



ENGINEERING
ARCHITECTURE
FIELD SERVICES

**HARDY COUNTY PUBLIC SERVICE DISTRICT
HARDY COUNTY, WEST VIRGINIA**

PROPOSED NEW OFFICE FACILITY

ADDENDUM #1

APRIL 5, 2022

THRASHER PROJECT #060-0958

TO WHOM IT MAY CONCERN:

A Pre-Bid Conference was held on Thursday, March 24, 2022 on the above-referenced project, a copy of the sign in sheet is included in this Addendum. The following are clarifications and responses to questions posed by contractors for the above reference project.

A. GENERAL

1. **THE BID FORM HAS BEEN REVISED. YOU MUST USE THE REVISED BID FORM WHEN PREPARING YOUR BID PACKAGE FOR THIS PROJECT.**

B. SPECIFICATIONS

Specification Section 051200 – Structural Steel Framing has been added.
Specification Section 052100 – Steel Joist Framing has been added.
Specification Section 053100 – Steel Decking has been added.
Specification Section 042900 – Engineered Unit Masonry has been added.
Specification Section 085413 – Fiberglass Windows has been added.
Specification Section 087100 – Door Hardware and Hardware Schedule has been added
Specification Section 133419 – Pre-Engineered Metal Buildings has been added.

C. DRAWINGS

Plan Sheet C-4.0 Proposed Gravity Plan has been revised.
Plan Sheet C-4.1 Erosion & Sediment Control Plan has been revised.
Plan Sheet C-6.1 Storm Plan and Profile has been revised.
Plan Sheet C-7.7 Details has been revised.

D. QUESTIONS AND RESPONSES

QUESTION

1. Are there any dividing walls in the Garage areas or are the bays all open?

RESPONSE

Only the partitions for the Shop Office and Restroom and the Work Alcove. All Bays are open. Refer to the Floor Plan and Enlarged Floor Plan 1/A4.01.

QUESTION

2. Can you please provide a wall detail for a 2-hour rated wall?

RESPONSE

See Details #2 & #6 on Drawing A5.02 for 2-hour separation of the Office and Garage Areas

QUESTION

3. Can exterior masonry be color stained instead of colored block?

RESPONSE

No. Exterior CMU is to be factory colored for full integral color.

QUESTION

4. What level of finish is required for drywall above ceiling elevation?

RESPONSE

All exposed drywall surfaces are to be finished, prime painted and 2 coat finish painted to minimum 6" above suspended ceilings. Gypsum Board above ceilings or in concealed spaces are to have joints taped and mudded and fasteners mudded with neat trowel finishes, but no sanding or painting is required.

QUESTION

5. How many flag poles are required for the project? The specification lists 1EA 30 and 2 EA 25's. The detail on plan says 40'. Location?

RESPONSE

Install 1 EA Flagpole as Located on Plan Sheet C-3.0. The Flagpole shall be 40' as noted on Plan Sheet C-7.3.

QUESTION

6. Can you provide detail for flagpole foundation?

RESPONSE

Please refer to Plan Sheet C-7.3. The base shall be a standard Flagpole Company Detail equal to or better than Specification Section 107516 – Instruction 3.2.B.

QUESTION

7. Is there a geotechnical report or soils boring for this project?

RESPONSE

No. Footings and foundations are designed to exceed a minimum 2,000 psf soil bearing capacity based on similar construction of neighboring buildings in the industrial park.

QUESTION

8. What is the height of the chain-link fence shown on drawing C3.0?

RESPONSE

Height of the chainlink fence should be 8'-0". Please see the revised detail of fencing shown on Plan Sheet C7.7.

QUESTION

9. Plan Sheet C-4.0 shows an earthwork summary. The quantities, however, do not line up with the descriptions. Can you please clarify?

RESPONSE

See Sheet update C-4.0.

QUESTION

10. Who is paying for the compaction testing and the concrete testing on this project?

RESPONSE

The General Contractor is responsible for the compaction and concrete testing, and shall coordinate an independent certified testing company.

QUESTION

11. There is a Note on Plan Sheet C-4.0 states "BUILDING UNDERCUT (ASSUME 3' DEEP)". Are we to figure 3' of undercut at the building as part of this bid and anything more than 3' of undercut will be handled by a change order later?

RESPONSE

There is no proposed undercut for this building. Note on Sheet C-4.0 has been revised for clarity.

QUESTION

12. Can you provide a door hardware specification?

RESPONSE

Specification Section 087100 – Door Hardware has been added. See Attachments.

QUESTION

13. Is there a specification for the Metal Building?

RESPONSE

Specification Section 133419 – Pre-Engineered Metal Buildings has been added. See Attachments.

QUESTION

14. Is there a specification for bar joists/decking/standing seam panel for the alternate?

RESPONSE

Specification Section 051200 – Structural Steel, Section 053100 – Steel Decking and Section 042900 – Engineered Unit Masonry have been added. See Attachments.

QUESTION

15. Is there a specification for the Metal Building insulation?

RESPONSE

Specification Section 133419 – Pre-Engineered Metal Buildings has been added. See Attachments.

QUESTION

16. Is there a specification for the Double Hung Windows?

RESPONSE

Specification Section 085413 – Fiberglass Windows has been added. See Attachments.

QUESTION

17. What is the Bid Hold time for this project?

RESPONSE

The Bid Hold time has been revised to 60 calendar days, which is the minimum Bid Hold for the funding agencies.

QUESTION

18. Is there an escalation clause in this project?

RESPONSE

No.

QUESTION

19. Are Davis Bacon wages required on this project?

RESPONSE

No. This Project is not subject to the Davis Bacon Act.

QUESTION

20. Is SC-6.03. M Contractor's Pollution Liability required?

RESPONSE

No.

QUESTION

21. Is SC-6.03. N Contractor's Professional Liability required?

RESPONSE

No.

QUESTION

22. Is SC-6.03. O Contractor's Railroad Protective Liability required?

RESPONSE

No.

QUESTION

23. Is SC-6.03. P Unmanned Aerial Vehicle Liability required?

RESPONSE

No. If the Contractor intends to use UAVs, the Contractor is responsible for securing any necessary approvals, permits or insurance.

QUESTION

24. Is SC-6.04 Builder's Risk required?

RESPONSE

Yes.

QUESTION

25. Is Flood Insurance required under the Builder's Risk?

RESPONSE

No.

QUESTION

26. Does Hardy County require any building permits?

RESPONSE

All permits for this project have been secured by the Owner.

QUESTION

27. Is there a hardware schedule?

RESPONSE

A Hardware Schedule has been included with Specification Section

QUESTION

28. Do B&O Tax or Industrial Park Fees apply to this Contract?

RESPONSE

No.

QUESTION

29. Will you consider increasing the Contract Time?

RESPONSE

The Contract Time has been increased to 360 days to Substantial Completion and 390 days to Final Completion.

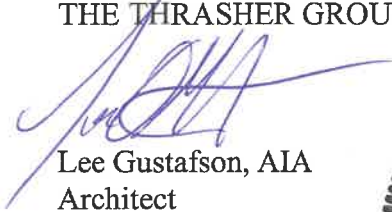
E. CLARIFICATIONS

1. **THE BID FORM (C-410) HAS BEEN REVISED AND IS INCLUDED WITH THIS ADDENDUM. YOU MUST USE THE REVISED BID FORM WHEN PREPARING YOUR BID PACKAGE FOR THIS PROJECT.**
2. Clarification for Sheet C-6.1 Storm Plan and Profile: Revised Sheet C-6.1 attached
 - Culverts modifications for pipe cover at the entrance driveways
 - Culvert 1 invert out is modified to be EL. 929.3 (was EL. 931.00)
 - Culvert 1 is 118 LF (was 118 LF = remains the same)
 - Slope from culvert 1 to culvert 2 is modified to be 7.3%. (was 9.2%)
 - Culvert 2 invert in is modified to be EL. 925.20 (was EL. 926.00)
3. The Owner has purchased the building property and the site can be used for storage at the Contractor's risk.
4. Contractor shall ignore the redundant "20220318 – HardyCountyPSD-Civil-ForBidSet" of drawings in the Zip File from QuestCDN. The Full Set of plans, "060-0958- Hardy County PSD CONSTRUCTION DOCUMENTS 2022-03-09" shall be used in conjunction with this Addendum to prepare the Bid.
5. The Contractor is **not** required to provide a job trailer for the Architect's use.
6. The Architect/Engineer understands the concerns with material availability and delivery delays and will work with the Contractor to make any necessary adjustments. The Contractor shall document the delays on a monthly basis.
7. Weather Days will be allowed for this Contract. Please see the Supplementary General Conditions for details.
8. All Bids for this project shall be due at 2:00 P.M. L.P.T at the Hardy County Public Library, located at 102 N Main Street in Moorefield, WV 26836 on Thursday, April 14, 2022. **ALL BIDS MUST BE RECEIVED BY 2:00 PM.**
9. The Method of Award for this Contract is on the Total Base Bid or Alternate Base Bid. The Application of Deductive Alternates will not affect the Low Bidder Qualification for awarding purposes.
10. American Iron and Steel requirements apply to this Contract.

If you have any questions or comments, please feel free to contact me at your earliest convenience. As a reminder, bids will be received until 2:00 p.m. on Thursday, April 14, 2022 at 102 N Main Street in Moorefield, WV 26836. Good luck to everyone and thank you for your interest in the project.

Sincerely,

THE THRASHER GROUP, INC.



Lee Gustafson, AIA
Architect



Attachments:



**HARDY COUNTY PUBLIC SERVICE DISTRICT
HARDY COUNTY, WEST VIRGINIA
PROPOSED NEW OFFICE FACILITY**

PRE-BID CONFERENCE

Thursday, March 24, 2022

Thrasher Project #060-0958

Name	Representing	Phone #	Email Address
Kylea Radcliff	Thrasher	304-624-4108	Kradcliff@thethrashergroup.com
Lee Gustafson	Thrasher	304-624-4108	lgustafson@thethrashergroup.com
Logan Moyers	Hardy Co. PSD	530-3048	lmoyers@hardynet.com
Keith Skelton	Breckenridge	304-472-3350	keith@breckenridgecorp.com

BID FORM FOR CONSTRUCTION CONTRACT

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 1—OWNER AND BIDDER

- 1.01 This Bid is submitted to:

*Hardy County Public Service District
P.O. Box 900
Moorefield, WV 26836*

- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2—ATTACHMENTS TO THIS BID

- 2.01 The following documents are submitted with and made a condition of this Bid:

A. Bid Opening Requirements

Note: Bid Opening Requirements (BOR-12) includes the American Iron and Steel Certification which needs to be filled out and signed by the Contractor. This certification also references two (2) Exhibits located in the Supplemental General Conditions (C-800) which were issued as part of RUS Bulletin 1780-35.

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

GENERAL

The Bidder shall take notice of and shall be responsible for any local or state taxes levied and applicable, and the cost for the same shall be included as part of the submitted Bid.

The total Bid cost stated includes a complete operating installation including furnishing and installation of any and all changes or additions in plans, piping, mechanical work, additional electrical work, accessories, controls, etc. necessary to accommodate alternative equipment systems or materials used in construction.

BID PROPOSAL

The Bidder agrees to perform all required Work described in the detailed Specifications and as shown on the Plans for the complete construction and placing in satisfactory operation the Proposed New Office Facility. The Project "Sequence of Construction" has been detailed in the Drawings and Specification

Division 1, Project Summary, Section 011000. The Bidder agrees to perform all the Work proposed for the total of the following Bid prices.

3.01 *Lump Sum Bids*

- A. Bidder will complete the Work in accordance with the Contract Documents for the lump sum (stipulated) price(s), together with any Unit Prices indicated in Paragraph 3.02 and shown in the bid schedule.
- B. Lump Sum Bids may be one of the following:
 - 1. Lump Sum Price (Single Lump Sum)
 - 2. Lump Sum Price (Base Bid and Alternates)
 - 3. Lump Sum Price (Sectional Lump Sum Bids)
- C. All specified cash allowance(s) are included in the price(s) set forth in the bid schedule, and have been computed in accordance with Paragraph 13.02 of the General Conditions.
- D. All specified contingency allowances are included in the price(s) set forth in the bid schedule, and have been computed in accordance with Paragraph 13.02 of the General Conditions.

3.02 *Total Bid Price (Lump Sum and Unit Prices)*

BID SCHEDULE

**PROPOSED
PROPOSED NEW OFFICE FACILITY
FOR THE

HARDY COUNTY PUBLIC SERVICE DISTRICT
HARDY COUNTY, WEST VIRGINIA**

NOTE: Bid PRICE amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Bids shall include sales tax and all other applicable taxes and fees.

Item #	Qty.	UNIT	DESCRIPTION	TOTAL PRICE WRITTEN IN WORDS	TOTAL PRICE
1	1	LS	To provide all labor equipment and services to furnish, construct & install a new Office Facility to include site development and a new building to provide administrative space and a garage facility for equipment. The single story, 6,000 SF structure will be comprised of concrete masonry units and pre-engineered metal building components with structural metal stud infill at the exterior of the office portion of the building. The roof will be ribbed metal panels per the metal building manufacturer. Exterior cladding of the office portion of the building will be split face CMU veneer and ribbed metal panels for the garage portion. The exterior doors will be galvanized hollow metal doors and frames and the interior doors will be primarily hollow metal frames with solid core wood doors. Interior partitions will be non-loadbearing metal studs and drywall. Finishes will include painted drywall, carpet tile, and LVT. Ceilings will be acoustic lay-in ceilings. The building will include electrical and data systems, lighting, plumbing and HVAC systems. There is also an alternate for using CMU bearing walls and steel joists in lieu of PEMB.		

Item #	Qty.	UNIT	DESCRIPTION	TOTAL PRICE WRITTEN IN WORDS	TOTAL PRICE
1A	1	LS	Delete Pre-Engineered Metal Building Structure and associated foundations and Construct a Conventional Steel Framed Roof on Reinforced CMU Split Faced Block Bearing Walls as indicated on Drawing S1.02.		

TOTAL BID: _____ (Words) _____ (\$ _____) (Figures)

TOTAL ALTERNATE BID: _____ (Words) _____ (\$ _____) (Figures)

(Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)

ORDER OF DEDUCTIVE ALTERNATIVES

NOTICE TO BIDDER: Unit prices used in Deductive Alternates must be the same unit prices used in the Bid.

DEDUCTIVE ALTERNATE #1

Item #	Qty.	UNIT	DESCRIPTION	TOTAL PRICE WRITTEN IN WORDS	TOTAL PRICE
1	1	LS	Delete Standing Seam Metal Roofing and Siding and install the Metal Building Manufacturer's Standard Ribbed Roof and Wall Panels with exposed fasteners. Finish, Insulation and General Performance Standards are to match the Standing Seam specifications.		

TOTAL DEDUCTIVE ALTERNATE #1: _____
(Words) _____
(\$ _____)
(Figures)

(Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)

DEDUCTIVE ALTERNATE #2

Item #	Qty.	UNIT	DESCRIPTION	TOTAL PRICE WRITTEN IN WORDS	TOTAL PRICE
2	1	LS	Delete Pella Fiberglass Single Hung Windows and install Metal Building Manufacturer's Standard Single Hung in size and performance to match Pella.		

TOTAL DEDUCTIVE ALTERNATE #2: _____
(Words) _____
(\$ _____)
(Figures)

(Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)

3.03 *Method of Award*

If at the time this Contract is to be awarded, the lowest total bid or alternate total bid submitted by a qualified, responsive, responsible bidder, as listed in contract does not exceed the amount of funds estimated by the Owner, as available to finance the contract, the construction contract will be awarded. If such bids exceeds such amount, the Owner may reject all bids. The Owner may award the contract on the total bid or alternate total bid submitted by a qualified, responsive, responsible bidder, less the amount(s) of the deductive alternate(s) subtracted in numerical order to produce the lowest bid within the funds available for financing. The application of deductive alternates will not change the low bidder for awarding purposes.

ARTICLE 4 ~~BASIS OF BID COST-PLUS FEE~~

4.01 ~~The Contract Price will be the Cost of the Work, determined as provided in Paragraph 13.01 of the General Conditions, together with the following fee, and subject to the Guaranteed Maximum Price.~~

4.02 *Contractor's Fee*

A. ~~Contractor's fee will be [number] percent of the Cost of the Work. No fee will be payable on the basis of costs itemized as excluded in Paragraph 13.01.C of the General Conditions.~~

1. ~~The maximum amount payable by Owner as a percentage fee (Guaranteed Maximum Fee) will not exceed \$[insert cap amount], subject to increases or decreases for changes in the Work.~~

B. ~~Contractor's fee will be determined by applying the following percentages to the various portions of the Cost of the Work as defined in Article 13 of the General Conditions. No fee will be payable on the basis of costs itemized as excluded in Paragraph 13.01.C of the General Conditions:~~

Costs	Percent
Payroll costs (See Paragraph 13.01.B.1, General Conditions)	
Materials and Installed Equipment cost (GC 13.01.B.2)	
Amounts to be paid to Subcontractors (GC 13.01.B.3)	
Amount to be paid to special consultants (GC 13.01.B.4)	
Other costs (GC 13.01.B.5)	

1. ~~The maximum amount payable by Owner as a percentage fee (Guaranteed Maximum Fee) will not exceed \$[insert cap amount], subject to increases or decreases for changes in the Work.~~

C. ~~Contractor's fee will be the fixed sum of \$[number].~~

4.03 *Guaranteed Maximum Price*

A. ~~The Guaranteed Maximum Price to Owner of the Cost of the Work including Contractor's Fee will not exceed \$[Bidder fill in GMP].~~

Deleted

ARTICLE 5 — PRICE-PLUS-TIME BID

5.01 *Price-Plus-Time Contract Award (Stipulated Price Contract)*

~~A. The Bidder to which an award of the Contract will be made will be determined in part on the basis of the Total Bid Price and the total number of calendar days to substantially complete the Work, in accordance with the following:~~

	Description		Amount
A	1. Total Bid Price		#{number}
	2. Total number of calendar days to substantially complete the Work	{number} days	
	3. Liquidated Damages Rate (from Agreement)	#{number}/day	
B	4. Adjustment Amount (2 x 3)		#{number}
A+B	5. Amount for Comparison of Bids		#{number}

~~B. The purpose of the process in the table above is only to calculate the lowest price plus time (A+B) bid amount for bid comparison purposes. The price for completion of the Work (the Contract Price) is the Total Bid Price.~~

~~C. Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.~~

5.02 *Price-Plus-Time Contract Award (Cost Plus Fee with Guaranteed Maximum Price Contract)*

~~A. The Bidder to which an award of Contract will be made will be determined in part on the basis of the Guaranteed Maximum Price and the total number of calendar days to substantially complete the Work, in accordance with the following:~~

	Description		Amount
A	1. Guaranteed Maximum Price		#{number}
	2. Total number of calendar days to substantially complete the Work	{number} days	
	3. Liquidated Damages Rate (from Agreement)	#{number}/day	
B	4. Adjustment Amount (2 x 3)		#{number}
A+B	5. Amount for Comparison of Bids		#{number}

~~B. The purpose of the process in the table above is only to calculate the lowest price plus time (A+B) bid amount for bid comparison purposes. The price for completion of the Work (the Contract Price) is based on the cost of the Work, plus a fee, subject to a guaranteed maximum price, as set forth in the Agreement.~~

~~C. Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.~~

Deleted

ARTICLE 6—TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

- 6.02 ~~Bidder agrees that the Work will be substantially complete on or before [Bidder inserts date], and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before [Bidder inserts date].~~

Deleted

- 6.03 ~~Bidder agrees that the Work will be substantially complete within [Bidder inserts number] calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within [Bidder inserts number] calendar days after the date when the Contract Times commence to run.~~

Deleted

- 6.04 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

7.01 *Bid Acceptance Period*

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

7.02 *Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

7.03 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda: **[Add rows as needed. Bidder is to complete table.]**

Addendum Number	Addendum Date

ARTICLE 8—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

8.01 *Bidder's Representations*

- A. In submitting this Bid, Bidder represents the following:
1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
 2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work, **including all American Iron and Steel requirements.**
 4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.
7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

8.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.

- c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.
- d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

Address for giving notices:

Bidder's Contact:

Name:

(typed or printed)

Title:

(typed or printed)

Phone:

Email:

Address:

Bidder's Contractor License No.: (if
applicable)

SECTION 042900 - ENGINEERED UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete block.
- B. Mortar and grout.
- C. Reinforcement and anchorage.
- D. Accessories.

1.2 REFERENCE STANDARDS

- A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.
- E. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016.
- F. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.
- G. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2016a.
- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.
- I. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.
- J. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- K. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.
- M. ASTM C476 - Standard Specification for Grout for Masonry; 2016.
- N. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2016a.
- O. ASTM C1019 - Standard Test Method for Sampling and Testing Grout; 2016.

- P. ASTM C1142 - Standard Specification for Extended Life Mortar for Unit Masonry; 1995 (Reapproved 2013).
- Q. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.
- R. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2005.

1.3 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, and mortar and grout.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.5 FIELD CONDITIONS

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.1 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M Type N.
- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.

2.2 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. Blok-Lok Limited: www.blok-lok.com.
 - 2. Hohmann & Barnard, Inc: www.h-b.com/sle.
 - 3. WIRE-BOND: www.wirebond.com/#sle.

4. Substitutions: See Section 016000 - Product Requirements.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) yield strength.
 1. Deformed billet-steel bars.
 2. Unfinished.
- C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- D. Single Wythe Joint Reinforcement: Truss type; 1 steel wire, hot dip galvanized after fabrication to 2, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

2.3 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
- C. Building Paper: ASTM D226/D226M, Type I ("No. 15") asphalt felt.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.4 MORTAR MIXES

- A. Ready Mixed Mortar: ASTM C1142, Type RM.
- B. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.

2.5 MORTAR MIXING

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.
- D. If water is lost by evaporation, re-temper only within two hours of mixing.

2.6 GROUT MIXES

- A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C94/C94M.
- B. Engineered Masonry: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C94/C94M.

2.7 GROUT MIXING

- A. Mix grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.
- C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- D. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Clean reinforcement of loose rust.
- C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

3.4 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar as work progresses.
- E. Interlock intersections and external corners, except for units laid in stack bond.

- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

3.5 REINFORCEMENT AND ANCHORAGE

- A. Reinforcement Bars: Secure at locations indicated and to avoid displacement during grouting. Minimum spacing between bars or to masonry surfaces shall be one bar diameter.
- B. Joint Reinforcement: Install horizontal joint reinforcement 8 inches on center.
 - 1. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
 - 2. Place continuous joint reinforcement in first and second joint below top of walls.
 - 3. Lap joint reinforcement ends minimum 6 inches.
- C. Anchors: Reinforce joint corners and intersections with strap anchors 16 inches on center.
- D. Wall Ties: Install wall ties at locations indicated, spaced at not more than 24 inches on center horizontally and 16 inches on center vertically, unless otherwise indicated on drawings.
- E. Reinforced Hollow Unit Masonry: Keep vertical cores to be grouted clear of mortar, including bed area of first course.
 - 1. Bond Beams: At bond beams or other locations for horizontally reinforced masonry, provide special masonry units or saw to accommodate reinforcement.

3.6 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up at least 1 inch, minimum, to form watertight pan at non-masonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.

3.7 GROUTING

- A. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of Contract Documents.
- B. Low-Lift Grouting:
 - 1. Limit height of pours to 64 inches.
 - 2. Limit height of masonry to 16 inches above each pour.
 - 3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.

4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

3.8 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.9 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

3.10 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.11 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.12 FIELD QUALITY CONTROL

- A. At the cost to the Contractor an independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

- B. Mortar Tests: Test each type of mortar in accordance with recommended procedures in ASTM C780, testing with same frequency as masonry samples.
- C. Test and evaluate grout in accordance with ASTM C1019 procedures.

3.13 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.

3.14 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

Hardy County Public Service District
Proposed New Office Facility

Added per Addendum #1
April 7, 2022
060-00958

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SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members.
- B. Base plates, struts.
- C. Grouting under base plates.

1.2 RELATED REQUIREMENTS

- A. Section 052100 - Steel Joist Framing.
- B. Section 053100 - Steel Decking: Support framing for small openings in deck.

1.3 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual; 2011.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- C. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- D. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- I. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- J. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.
- K. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- L. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

- M. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- N. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).
- O. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).
- P. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014a.
- Q. ASTM E94/E94M - Standard Guide for Radiographic Examination Using Industrial Radiographic Film; 2017.
- R. ASTM E94 - Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).
- S. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2013.
- T. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2012.
- U. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2015.
- V. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.
- W. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2016.
- X. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.
- Y. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (with March 2016 Errata).
- Z. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2014, with April 2015 Errata.
- AA. UL (FRD) - Fire Resistance Directory; current edition.

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Submit two (2) copies of producer/manufacturer's specifications and installation instructions for the following products. Include laboratory test reports/other data required to show compliance with test specifications. Indicate by transmittal form that a copy of each applicable instruction has been distributed to fabricators, installers and erectors:
 - a. Structural steel (each type) including certified copies of mill reports covering chemical 'physical properties.
 - b. High strength bolts (each type) including nuts and washers.
 - c. Direct tension Indicators, if used.

- d. Unfinished bolts and nuts.
 - e. Structural steel primer paint, if required.
 - f. Shrinkage-resistant grout.
- 2. Shop Drawings Submitted Without Complete Connection Design Calculations will not be reviewed.
 - 3. Submit drawings including complete details/schedules for fabrication, shop assembly, and field erection of members, including details, schedules, procedures, and diagrams showing sequence of erection.
 - 4. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size/length/type each weld. Provide setting drawings, templates, and other directions for installation of anchor bolts and other anchorages to be installed by others. Fabricator's erection drawings/shop details shall clearly show capacity of connections designed by fabricator. Fabricator's/Erector's shop drawings shall contain information and details developed in sufficient detail for field erection and assembly without the use of the Construction Documents.
 - 5. Other size shop drawings are not acceptable without written approval of the Structural Engineer. Reproducible copies of contract documents shall not be used as shop drawings. Shop drawings shall be reviewed by Contractor prior to submission. Drawings shall bear Contractor's approval stamp accepting responsibility for coordination of dimensions shown in the contract documents, quantities and coordination with other trades. Drawings not bearing
 - 6. Contractor's stamp may be rejected at the discretion of the Architect or Structural Engineer.
 - 7. Review and return of shop drawings shall be based on a MINIMUM of fifteen (15) working days in the Structural Engineer's office from receipt of submission to return to the next party for their action.
 - 8. Shop drawings should be submitted incrementally as appropriate packages are prepared to equalize the workload for review of the drawings.
 - 9. Submission of a large volume of shop drawings at one time may result in review times which will exceed those as noted above. Definition of a "large volume" of shop drawings is subject to interpretation.
 - 10. Contractor shall provide in his schedule for the above noted time and for appropriate additional time for delivery (shipping) of drawings.
 - 11. No claims may be made on the part of the Contractor for delay of the project due to shop drawing reviews which occur within the above stated time limits or for reviews which take greater time than noted above due to submission of a large volume of shop drawings at one time
 - 12. Shop drawings rejected due to non-compliance with the structural documents shall be resubmitted with the same time requirements for review as noted above. No claims may be made on the part of the Contractor for delay of the project due to shop drawings rejected due to non-compliance with the structural documents.
 - 13. Such delays, if they occur, shall be attributable entirely to the Contractor's Fabricator. Shop drawings submitted for more than two reviews due to fabricator's non-compliance shall result in time for additional engineering services being charged to the Contractor.
- C. Changes and Deviations: After submittal review, neither products nor construction requirements indicated on the shop drawings may be changed or deviated from.
- D. Structural Fasteners:

1. Submit complete manufacturer's specifications and test reports certifying that all structural fasteners (bolts) comply with requirements for ASTM A325 or A490 and for DOMESTIC FASTENERS ONLY.
2. American or Canadian fasteners are permitted providing that BOTH the steel used in fastener AND the fabrication of the fastener were produced/manufactured completely in either the United States or Canada.

E. Calculations:

1. Minimum service end reactions (ASD) for standard rolled shapes shall be as follows:
 - a. W8's----10 kips
 - b. W10's---12 kips
 - c. W12's----16 kips
 - d. W14's----18 kips
 - e. W16's----20 kips
 - f. W18's----22 kips
 - g. W21's----24 kips
 - h. W24's----26 kips
2. Submit complete calculations for each connection designed by Fabricator's CDE.
3. Calculations shall show details of the assembled joint with all bolts and welds indicated. All design calculations shall be sealed by the Fabricator's CDE.
4. Shop Drawings Submitted Without Complete Design Calculations will not be reviewed.
5. Calculations need not be performed for pre-designed connections taken from tables in AISC manuals and publications provided job conditions precisely match conditions presumed in the tables. Calculations shall be provided for all variations from conditions presumed in the tables. All information used from such tables shall be clearly identified with the table number and all such connections shall be indicated in the calculations submitted.

- F. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- G. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
- H. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Maintain one copy of each document on site.
- C. Comply with all applicable provisions of state and local building and safety codes and all other codes referenced therein, other federal (OSHA) safety requirements, and other codes and standards referenced in this specification, except where more stringent requirements are indicated or specified herein.
- D. AISC "Code of Standard Practice for Steel Buildings and Bridges". April 14, 2010 Edition except where superseded herein.
 1. AWS D1. 1 Latest Edition "Structural Welding Code".

2. Appropriate specifications of American Society for Testing and Materials.
 3. "Steel Structures Painting Manual", Volumes I and 2, Steel Structures Painting Council.
 4. ASTM A6-91b "General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use".
- E. If requested, furnish affidavit from manufacturer or fabricator certifying that materials or products delivered to job meet requirements specified. However, such certification shall not relieve Contractor from responsibility of complying with any added requirements specified herein.
- F. Any material or operation specified by reference to published specification of a manufacturer shall comply with requirements of standards listed herein. In case of a conflict between referenced specifications and project specifications, shall govern.
- G. Qualifications for Welding Work: Contractor shall retain testing laboratory to provide qualification of welding processes and welding operators in accordance with AWS "Standard Qualification Procedure". Provide certification that welders employed in work have as follows:
1. Satisfactorily passed AWS qualification tests based on most current AWS standards and procedures and have been continuously employed by the same Contractor since becoming certified.
 2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests within previous twelve (12) months.
 3. Where a partial penetration or complete penetration weld is found defective or, in the opinion of the ITL, requires other than superficial repairs, the welder responsible shall be suspended from such work until recertification for such work and positions is achieved. If after recertification the welder's work is again found other than superficially defective, the welder shall be dismissed from such work for the remainder of the project.
 4. Where recertification of welders is required, both cost and retesting will be Contractor's responsibility.
- H. Structural Steel Fabricator Qualifications: Structural steel fabricator must demonstrate a consistent record of at least ten (10) successful projects over the preceding five (5) years each of a magnitude equal or greater than the total structural steel scope of this project. The Contractor shall submit evidence within 48 hours of bid opening verifying the above required qualifications.
- I. Structural Steel Erector Qualifications: Structural Steel shall be erected by an erector who must demonstrate a consistent record of at least ten (10) successful projects over the preceding five (5) years each of equal or greater magnitude than the total erection scope of this project. The Contractor shall submit evidence to the Architect within 48 hours of bid opening verifying one of the above required qualifications.
- J. Bids From Contractors Including Fabricators Or Erectors Not Meeting The Above Requirements Will Be Disqualified And Rejected.
- K. Responsibility For Connection Design: Fabricator shall be responsible for design of connections not designed or shown on contract documents. In fulfillment of this responsibility, Fabricator shall retain a professional engineer (Connection Design Engineer - CDE), registered in the state where the project is located, who shall be in responsible charge of the design, detailing, and proper implementation and coordination of all such connections as part of fabricator's preparation of shop drawings.

- L. All shop drawings and connection design calculations submitted for review containing connections designed by fabricator shall be signed and sealed by fabricator's CDE. Connection design shall be submitted with the structural steel shop drawings.
- M. Fabricator's CDE shall include a statement with his seal indicating that his seal represents only the design detailing and proper implementation and coordination of the connections designed by him and shown on his drawings and that no responsibility nor liability is assumed by him with regard to the capacity or design of any members nor to the integrity or safety of the structure as a whole.
- N. Fabricator's CDE shall be responsible only for the connection design work assigned to him. Structural Engineer of Record (SER) retains responsibility for the adequacy of the entire structure. SER'S review of submittals from fabricator will begin ONLY AFTER fabricator's compliance with this requirement.
 - 1. Contractor shall submit evidence to the Architect within 48 hours of bid opening verifying Fabricator's compliance or ability to comply with above requirements.
 - 2. Failure to comply or failure of ability to comply shall disqualify fabricator's bid and shall require termination of fabricator's contract.
- O. Responsibility For Errors: The Contractor shall be responsible for all errors of detailing and fabrication, for the correct fitting of structural members, and for correction of work which does not conform to specified requirements including, but not limited to, strength of material, fit up, conformance to tolerance requirements, conformance, conformance to connection requirements, painting, and all other items indicated in the specifications or referenced standards.
- P. The Contractor shall correct and/or replace all non-conforming work in manner and with materials approved by the Structural Engineer. If steel is damaged or does not fit, the Contractor shall prepare and submit drawings showing his proposed corrective measures to the Architect. No modifications shall be made to the steel until such drawings have been approved by the Architect and Structural Engineer. Contractor shall be responsible for cost of such corrective measures including architectural and engineering services.
- Q. The Contractor shall promptly notify the Architect/Engineer where questions about the intent or clarity of the Contract Documents arise. Where sizes of any elements, dimensions, or assembly are not indicated or are conflicting with other information, the Contractor shall notify the Architect/Engineer in ample time to provide the information or issue a correction without delaying the work. Neither the Contractor nor the Fabricator shall 'make assumptions regarding the intent of the Contract Documents where such questions arise. No work shall proceed the respect to the affected portions of the structure until such questions are resolved.
- R. Contract Drawings: The Contractor shall verify that all dimensions shown on shop drawings are coordinated with the Contract Drawings. Contractor shall make all measurements in the field necessary to verify or supplement dimensions shown on the dimensions and requirements of the Contract Drawings.
- S. Quality Control: Contractor is responsible for quality control and compliance with requirements for materials, workmanship, fabrication, and erection of structural steel including that furnished by subcontractors and suppliers.
- T. Contractor shall meet all requirements indicated in the specifications and shown on the drawings.

- U. Inspections and tests performed by Owner as part of quality assurance program will not relieve Contractor of his responsibility to provide materials and workmanship in compliance with specified requirements.
- V. Materials and fabrication procedures are subject to inspections and tests in mill, shop, and field. Such inspections and tests will be performed by an independent testing laboratory (ITL) employed by Owner.

1.6 INSPECTION AND TESTLNG:

- A. Contractor shall employ, at his expense and with approval of the Architect, a qualified independent testing laboratory (ITL) to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports. Reports shall be furnished directly to the Architect and Structural Engineer with copies forwarded to the Contractor.
 - 1. ITL shall conduct and interpret tests and state in each report whether test specimens comply with requirements and specifically state any deviations there from.
 - 2. Contractor(s) shall provide access for ITL to places where structural steel work is being fabricated or produced so required inspection and testing can be accomplished.
 - 3. ITL may inspect structural steel at plant before shipment. However, Architect reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.
- B. Contractor/Fabricator shall correct deficiencies in structural steel work which inspections/laboratory test reports have indicated to be not in compliance with requirements. ITL shall perform additional tests to reconfirm any non-compliance of original work as may be necessary to show compliance. Such tests, including additional architectural/engineering services made necessary by such non-conformance, will be paid by Contractor.
- C. Structural Steel Testing: Where steel is not or cannot be identified by mill test reports, heat or melt numbers, ITL will secure samples of structural steel in ample quantities to perform structural tests on 5% by weight of all unidentified steel. Perform tensile, bend and elongation test per ASTM A-370.
- D. Shop Inspection Testing: Conduct shop inspections/tests as required during fabrication of structural steel with reports to include shop welder's certifications, type and location of all defects found during inspection, and measures required/performed to correct such defects, statements of final approval of all welding of shop connections and other fabrication data/information pertinent to safe/proper welding of shop connections. ITL shall obtain copies of all welder certifications of welders assigned to job.
- E. Inspect and test during fabrication of structural steel assemblies in accordance with AWS D1.1-90 as following:
 - 1. Perform visual inspections of all welds. Check for size, pinholes, undercut, and overlap. Any visual indication of cracks shall be checked further using magnetic particle testing methods.
 - 2. Perform non-destructive test of welds as follows:
 - a. Partial penetration welds - one (1) spot test per weld using magnetic testing techniques.
 - b. Full penetration welds - test entire length of all welds; use radio- graphic or ultrasonic testing techniques.

3. All welds that fail shall be re-welded and re-tested until they pass. When spot testing is designated each spot shall cover at least 4" of weld length. When spot testing reveals indication of flaws requiring repair, two additional spots in that joint shall be tested. If indications of flaws requiring repair are revealed in either of two spot tests, entire length of weld in that welded joint shall be tested.
- F. Field Inspection/Testing: Conduct field inspections/tests as required during erection and installation of structural steel assemblies in accordance with AWS D1.1-90 for welding and AISC Specification for Structural Joints for high-strength bolted connections and as indicated below. Reports to include bolt, nut, and washer verification bolt torque verification where slip-critical connections are required, field welder's certifications, type and location of all defects found during inspection, and measures required/performed to correct such defects, statements of final approval of all welding of field connections, stud shear connector welding, metal decking weld attachment, and other erection data/information pertinent to safe/proper bolting and welding of field connections. ITL shall obtain copies of all welder certifications of welders assigned to job.
1. Certify welders and conduct inspection and tests as required. Record types/location of all defects found in work. Record work required and performed to correct deficiencies. Re-certify welders where required.
 2. Perform visual inspection of all welds. Check for size, pinholes, undercut, and overlap. Any visual indication cracks shall be checked further using magnetic particle testing methods.
 3. Perform non-destructive tests of welds as follows:
 - a. Fillet welds - one (1) spot per member. Magnetic particle testing may be used.
 - b. Partial penetration welds - one (1) spot test per weld using magnetic particle testing techniques.
 - c. Full penetration welds - Test entire length of all field welds. Use radiographic or ultrasonic testing techniques.
 4. Correction for complete weld rejection shall be same as described under shop inspection and testing.
 5. Visually inspect all bolts for:
 - a. Number, diameter, length, and head mark.
 - b. Proper type of washers and nuts.
 - c. "Snug tight" condition in ALL JOINTS.
 - d. Flat hardened steel washers or common steel plate washers installed over all slotted hole conditions.
 6. Test a minimum of ten percent (10%) of the bolts, but at least two bolts, in all "Slip-Critical" bolted connections for proper bolt tension and check for proper assembly with hardened washers.
 7. Calibrate impact wrenches during erection operations using three (3) bolts of each type, size, and thread of bolt which will require testing. Measure bolt tension to the proof load required for ASTM A325 or A490 bolts as required. For each day of inspection, repeat calibration before beginning work and at the mid-point of the days operations.
 8. All bolted connections that fail shall be corrected and all bolts in that connection shall be re-tested. Cost of tests on connections that fail shall be borne by the Contractor.
 9. Bolts in bearing connections Shall NOT be tensioned without the approval of the Structural Engineer. Bolts in bearing connections tensioned without approval may require removal and replacement at Contractors expense.
 10. Check number, spacing, and length of studs. Evaluate weld quality by visual inspection of welds for full 360 degree flash and by striking each stud with six (6) pound hammer.

11. For a minimum of two studs per beam and for all studs where welds do not exhibit full 360 degree weld flash around stud:
 - a. Bend studs to approximately 15 degrees from vertical, opposite from the direction of the missing flash, by hammering, without fracturing welds. Threaded studs shall be torque tested not bend tested.
 - b. If failure occurs in either of the welds tested, then another two (2) studs shall likewise be tested, if failure occurs in either of the second pair then all studs on the beam shall be tested.
 - c. Studs failing test shall be replaced and re-tested, If the base metal is damaged or pulled out during stud removal, repairs shall be made in accordance with AWS D1 .1 and subject to approval by the ITL.
 - d. Studs passing test need not be hammered back to vertical.
12. At the start of each stud welding production period:
 - a. Examine first two (2) studs for full 360 degree weld flash.
 - b. Test first two (2) studs by bending to approximately 30 degrees from vertical, toward nearest end of beam, by hammering, without fracturing welds.
 - c. If either or both of the studs do not exhibit full 360 degree weld flash or if on testing failure occurs in the welds, then the welding procedure shall be corrected and another two (2) test studs shall be welded and likewise tested prior to beginning production. This operation shall be repeated until proper welding and successful testing is achieved.
 - d. None of these test studs are to be considered as part of the required shear connectors.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Rolled Steel Structural Shapes: ASTM A992/A992M.
- D. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- E. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.
- F. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class C.
- G. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.
- H. Anchor Bolts: ASTM A 307, Grade C.
- I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- J. Grout: Non-shrink, non-metallic aggregate type, complying with 1 and capable of developing a minimum compressive strength of 7,000 psi at 28 days.

- K. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- L. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Shop fabricate to greatest extent possible. Fabricate items of structural steel in accordance with the AISC Specifications, the AISC Code of Standard Practice, and as indicated on final shop drawings.
 - 1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials. Fabricator shall coordinate fit-up procedures with erector.
 - 2. Clearly mark grade of steel on each piece such it will be identifiable in the field from the viewpoint of the floor below or ground below for the purpose of field inspection and confirmation of steel grade.
 - 3. All corners, copes, or other re-entrant cuts shall be smooth and rounded to a minimum 1/2" radius. No notches or overcuts are permitted - such members may be rejected at the discretion of the Structural Engineer.
 - 4. Fitted stiffeners shall be fabricated to fit snugly between flanges. Ends of stiffeners shall be milled or ground to establish full bearing against abutting surfaces over their entire bearing length.
 - 5. Ends of columns and truss members at splices and at other bearing connections shall be finished to establish full bearing against abutting surfaces over their entire bearing length. Filler plates used at finished surfaces shall be finished together with the member.
 - 6. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
 - 7. Dimensional tolerances shall conform to those specified in the referenced AISC standards or as indicated in the specifications or on the drawings.
- B. Manual cutting shall only be done with a mechanically guided torch. An unguided torch may only be used where the cut is not within 1/8" of the finished edge and final finishing is done by chipping or grinding to produce a smooth surface free of notches or jagged edges.
- C. Milled surfaces of built-up elements shall be completely assembled or welded prior to milling.
- D. Refer to the architectural drawings for structural steel members designated as "Architecturally Exposed Structural Steel" (AESS). Contractor and Fabricator shall coordinate with Architect all exposed structural steel elements to determine if AESS classification is to apply and if test assemblies or components are required for architectural acceptance prior to start of shop drawings or fabrication.
- E. Lifting and Erection Devices: Fabricator shall be responsible for designing, detailing, and furnishing all lifting and erection devices as required. All such devices shall be removed after erection where interfere nor trades.
- F. Connections: Connections shall be designed to accommodate the following requirements, unless indicated otherwise on the drawings:

1. Shear connections, unless noted otherwise, shall be designed to support half the allowable load on beam, defined in the AISC "Allowable Loads on Beams" or reaction shown on drawings, or minimum 10 kips, whichever is greater. Reactions for composite members are shown on the drawings and connections for such members shall be designed for those reactions. Where connections are designed for loads taken from the AISC "Allowable Loads on Beams", any loads or beam reactions located within ten (10) percent of a members length from a support connection and any vertical force components of bracing members occurring at a connection shall be added to the reaction for that connection.
 2. Moment resisting connections not indicated and/or detailed on the drawings shall be designed for the moment capacity of the member based on the unbraced compression flange length of the member, unless design values for shear and moment have been indicated on plan.
 3. Connections not indicated, shown or detailed otherwise on the drawings shall be designed as simple shear connections. All typical beam simple shear connections shall be standard double angle or single angle framed beam connections using either bolts or welds for the shop connection and bolts for the field connection.
 4. Single plate "shear tab" connections may be used provided there is no axial force in the member. Such connections shall be designed in strict accordance with the AISC requirements for the grade of steel used. Short slotted holes shall be used in either the web of the beam or in the tab plate, not both, to accommodate beam end rotation. Bolts shall be snug tight and double nutted. Bolts shall be bearing type only. Slip-critical connections are not permitted in single plate "shear tab" connections. DO NOT tension bolts in shear tab connections.
 5. Seated beam or stiffened seated beam connections shall not be used unless indicated on the drawings or unless Structural Engineer approves capacity of supporting member to resist the eccentric loads applied by such connections. Fabricator is responsible for verifying that such connections will not interfere with architectural or mechanical requirements.
 6. Capacity of members affected by copes, blocks, holes or other reductions in the member section necessitated by details of connection shall be checked by the CDE. Where required, member capacity shall be restored or reinforced to accommodate required loads. Details required to restore or reinforce members shall be designed by the CDE.
 7. Weld or bolt shop connections, as indicated. Bolt field connections, except where welded connections or other connections are indicated. Provide a minimum of two high-strength threaded fasteners for all bolted connections.
 8. All groove butt welds are full penetration unless noted or detailed otherwise on the drawings. Provide necessary back-up extension, or over-run bars or plates as required.
 9. High strength bolts used in bearing type connections shall not be used in combination with welds for load transmission across the same faying surface in any connection.
- G. High-Strength Bolted Construction: Install and test high-strength threaded fasteners in accordance with these specifications and AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBSJ). All bolts shall be new and shall not be re-used.
1. All bolted construction shall be AISC bearing type connections, except as below or unless indicated otherwise on the drawings. Connections shall use standard hole sizes for the bolt diameter employed and threads shall be assumed included in the shear planes.
 2. Shear connections at simple span members shall accommodate unrestrained beam end rotations as indicated in the AISC Specification.
 3. Shear connections for welded moment connected elements and for all brace elements shall be AISC slip-critical connections.

4. Dimensions and washer requirements for oversize, short slotted, and long slotted holes shall be in accordance with the AISC Specification requirements.
- H. Tightening of bolts shall be in accordance with the following requirements and procedures:
1. Tighten high strength bolts in bearing connections to a snug tight condition. Snug tight condition is defined as that attained with an impact wrench providing 200 foot-pounds (± 20 ft-lbs) of torque for each bolt. Do not over-torque bearing bolts in snug tight connections or removal of bolts may be required.
 2. Tighten high strength bolts in slip-critical connections to required bolt tension in accordance with AISC Specifications.
 3. Washers shall be used with all bolted connections in accordance with the AISC Specification.
 4. All field tightening of high strength slip-critical bolts shall utilize load indicating washers or bolts in accordance with the manufacturer's requirements.
 5. Shop tightening of high strength slip-critical bolts shall utilize either load indicator washers or load indicator bolts.
- I. All bolts shall be well lubricated at the time of installation. Dry and/or rusty bolts are not permitted and shall be removed and replaced if used.
- J. Where bolted connections are transferring axial forces, the connections shall develop the full capacity of the member
- K. Where bolted connections are transferring flexural forces (moment connections), the bolted tensile or compressive strength of the member, unless indicated otherwise on the drawings.
- L. Connections shall develop the full flexural capacity of the member, unless indicated otherwise on the drawings.
- M. Welded Construction: All shop and field welding shall comply with AWS Code D1.1 for procedures, appearance, and quality of welds, and methods used in correcting welding work. For high-strength low-alloy steels, follow welding procedures recommended by steel producer for exposed/concealed connections.
1. Shop and field welders shall be certified according to AWS procedures for the welding process and position to be used.
 2. Welding shall be done in strict accordance with the methods and procedures specified in the AWS code, the approved shop drawings, and the structural drawings. Before any welding is performed, attention shall be paid to surface preparation, fit-up, cleanliness of materials, and back-up materials or welds.
 3. Minimum sizes and materials for welds shall be in accordance with AISC Specification Tables as noted below:
 - a. Fillet welds per Table J2.4.
 - b. Minimum effective throat thickness of partial-penetration and flare groove welds per Tables J2.1, J2.2, and J2.3.
 - c. Filler weld metal shall be as specified in AISC Specification Table J2.5.
 4. Welds not specified shall be continuous fillet welds, wherever possible. All welds shall be sound throughout. Welds shall exhibit no crack in any pass and shall be free from overlap. Craters shall be filled to the full cross section of the weld. Welds conforming to AWS requirements, as inspected by non-destructive testing, shall be considered sound.
 5. Follow welding procedures recommended by steel producer for high-strength low-alloy steels.

6. Fabricator shall coordinate with erector the welding responsibilities at all field welded joints.
7. Built-up sections assembled by welding and other weldments shall be assembled in accordance with the following:
 - a. Elements assembled by welding shall be free of warpage and all axes shall be in straight and true alignment. Assemble and weld built-up sections by methods which will produce required alignments without inducing warping.
 - b. Welding procedures shall be developed considering steel toughness and notch sensitivity in order to prevent premature or brittle fracture during fabrication and erection. Minimum preheat and interpass temperatures shall be in accordance with AWS requirements, except that no welding shall be performed when ambient temperatures are below 0 deg. F. Temperature shall be measured opposite from the face on which preheating is performed.
 - c. Heat, input, length of weld, and sequence of welding shall be controlled to prevent distortions. Surfaces to be welded and filler metals shall be subject to inspection prior to beginning welding.
 - d. Field moment connections where beams are groove welded directly to columns or girders shall not be welded until after all erection bolts are installed and the members are drawn together. However, all welds shall be made before any shear connection bolts are tightened.
 - e. All elements of weldments shall be welded together to develop the full strength for the elements using "V" or "T" groove welding, except where otherwise indicated on the structural drawings. Welds shall be continuous complete penetration, except where fillet welds can develop the full strength of the elements. Welds made without back-up bars shall have their roots chipped, ground, or gouged out to sound metal on the second face before welding is begun on that face. Stiffeners and Web Doublers: Provide fitted bearing stiffeners and/or web doubler plates under all concentrated bearing loads, in all members framing over columns, at all moment transferring beam/column joints (as required per AISC Specifications), and at all locations indicated on the drawings.
- N. Hanger and Kickers: Connections for all hangers and kickers not detailed on the drawings shall be designed for the full allowable tensile capacity of the member. Provide welded or bolted connections in accordance with the drawings where so indicated. Provide slotted holes in bolted components where necessary to accommodate field fit-up and erection tolerances. Where slotted holes are used, provide field welding after erection to prevent slip of components under supported loads.
- O. Steel Shelf Angles: Steel angles indicated on the drawings supporting masonry veneer shall be detailed in lengths not exceeding thirty feet, but in no case in lengths less than the maximum shelf angle support spacing indicated on the drawings. Angles shall have a minimum of two supports and shall have joints located at the mid-point between supports. Shelf angles shall be complete penetration welded to be continuous around corners and at other joints. Do not extend continuous shelf angles across masonry or concrete joints, (expansion, control, or construction)
- P. Embedded Plates: Plates shall be free of heavy rust, mill scale, dirt, grease, grime, and other foreign material which will interfere with welding of headed studs. Weld studs to plates using automatically timed stud welding equipment. Hot-dip galvanize plates and studs where exposed to exterior weather conditions.

- Q. Steel Wall Framing: Select members that are true and straight for fabrication of steel wall framing. Straighten as required to provide uniform, square, and true members in completed wall framing.
- R. Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug-weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws uniformly spaced not more than 10 inches n.e., unless indicated otherwise.
- S. Holes for Other Work: Provide holes securing other work to structural steel framing, and passage of other work through steel framing members, as shown on final shop drawings; provide threaded nuts welded to framing, and other specialty items as indicated to receive other work. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
- T. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

2.3 FINISH

- A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
 - 1. General: Surface preparation, paint, and painting procedures shall conform to the "Steel Structure Painting Manual", volumes I and 2, by the Steel Structures Painting Council (SSPC).
 - 2. After fabrication shop paint only all steel stairs, and all building cladding support steel not specified to be hot-dipped galvanized except as noted on the drawings or in the specifications.
 - 3. Do not paint surfaces to be fireproofed with spray-on materials or embedded in concrete, mortar, or grout (paint initial 2" of embedment). Do not paint top flanges of composite beams, nor other surfaces to receive welded studs, nor within 2" of surfaces which will be welded, nor surfaces where bolting with slip-critical bolts, or where otherwise noted on the drawings.
 - 4. Coordinate all shop painting of structural steel with Architect's painting requirements as indicated on the architectural drawings and in the specifications.
 - 5. Surface preparation: After fabrication and inspection, clean steelwork to be painted. Remove loose rust, mill scale and spatter, and slag or flux deposits. Clean steel in accordance with paint manufacturer's instructions using prescribed surface preparation and in accordance with Steel Structures Painting Council (SSPC) as follows:
 - a. SP-1 "Solvent Cleaning"
 - b. SP-2 "Hand Tool Cleaning"
 - c. SP-3 "Power Tool Cleaning"
 - d. SP-5 "White Metal Blast Cleaning"
 - e. SP-6 "Commercial Blast Cleaning"
 - f. SP-7 "Brush-off Blast Cleaning"
 - g. SP-8 "Pickling"
 - 6. Surface preparation: After fabrication and inspection, clean steelwork to be painted. Remove loose rust, mill scale and spatter, and slag or flux deposits. Clean steel in accordance with paint manufacturer's instructions using prescribed surface preparation and in accordance with Steel Structures Painting Council (SSPC) as follows:
 - 7. SP-1 "Solvent Cleaning"

- a. SP-2 "Hand Tool Cleaning"
 - b. SP-3 "Power Tool Cleaning"
 - c. SP-5 "White Metal Blast Cleaning"
 - d. SP-6 "Commercial Blast Cleaning"
 - e. SP-7 "Brush-off Blast Cleaning"
 - f. SP-8 "Pickling"
8. All structural steel that is not specified to be painted shall be cleaned of dirt and other foreign material by sweeping or brushing and shall be cleaned of oil, grease, and grime with solvent cleaners.
 9. Prime Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils, except that for steel exposed to crawl spaces provide a dry film thickness of not less than 2.5 mils. Provide full coverage of joints, corners, edges, and exposed surfaces. Apply two (2) coats of paint to surfaces which will be inaccessible after assembly or erection. Change color of second coat to distinguish from initial coat.

2.4 SOURCE QUALITY CONTROL

- A. Welded Connections: Visually inspect all shop-welded connections and test at least 50 percent of welds using one of the following:
 1. Radiographic testing performed in accordance with ASTM E94/E94M.
 2. Ultrasonic testing performed in accordance with ASTM E164.
 3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
 4. Magnetic particle inspection performed in accordance with ASTM E709.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Erector shall examine site and work areas and conditions where steelwork is to be erected and shall notify the Contractor and Architect/Engineer in writing of conditions detrimental to proper, safe, and completion of the work.
- B. Surveys: Contractor's Surveyor shall conduct Pre-Erection and Post-Erection surveys.
- C. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Structural Engineer. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Structural Engineer.
- D. Erection tolerances of anchor bolts, embedded items, and all structural steel shall conform to the AISC Code of Standard Practice except where more stringent tolerances are indicated in the specifications or on the drawings.

3.2 ERECTION

- A. Erect structural steel in compliance with AISC 303.

- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Temporary Shoring and Bracing: Provide temporary shoring/bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members/connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.
 - 1. Design and provide adequate shoring and bracing to safely withstand all loads which may occur during construction. Provide additional structural members and/or increased member sizes and connections as required to accommodate erection methods and equipment. Design of all temporary shoring and bracing is the responsibility of the General Contractor.
 - 2. Provide any temporary erection shoring, bracing, or supports required to secure structural steel in position until permanent bracing or other steel has been erected and concrete floor slabs have reached 75% of specified strength.
 - 3. Where conflicts with other trades, finishes, or building performance will not permit temporary shoring, bracing, supports, or other erection devices or connections to be permanently left in place, the erector shall remove these items or devices as part of his work.
- D. Field Assembly: Set structural frames accurately to lines/elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Work shall be assembled securely to resist all loads, erection stresses, and wind forces at all stages of construction process, following erection of steel columns. Provide planking/working platforms necessary to effectively complete work.
 - 1. Clean bearing surfaces/other surfaces in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level/plumb individual members of structure within specified AISC tolerances. Splice members only where indicated and accepted on shop drawings.
 - 2. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces. Comply with AISC for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
 - 3. Gas Cutting: Do not use gas cutting torches, reamers, or other devices in field for unauthorized correcting of fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Structural Engineer. Finish gas-cut sections equal to a sheared appearance when permitted.
 - 4. Errors in shop fabrication or shipping damage preventing proper erection or fit-up shall be reported to the Architect/Engineer and an approved correction shall be obtained prior to proceeding with affected work.
 - 5. Provide miscellaneous supplemental framing for metal decking support where normal deck bearing is interrupted by columns, other framing members, or other openings whether or not indicated on the drawings or where minimum deck bearing is inadequate for construction purposes.
- E. Touch-up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop painted materials. Apply paint to exposed areas using same material as used for shop painting. Apply by brush or spray to provide minimum dry film thickness of 1.5

mils. Apply "ZRC Cold Galvanizing Compound, or approved equal, to all field welded galvanized connections or to galvanized members or connections where visible damage to hot-dipped galvanizing has occurred.

- F. Field weld components and shear studs indicated on shop drawings.

3.3 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. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least 50 percent of bolts at each connection.
- B. Welded Connections: Visually inspect all field-welded connections and test at least 100 percent of welds using one of the following:
 - 1. Radiographic testing performed in accordance with ASTM E94/E94M.
 - 2. Ultrasonic testing performed in accordance with ASTM E164.
 - 3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
 - 4. Magnetic particle inspection performed in accordance with ASTM E709.

END OF SECTION

Hardy County Public Service District
Proposed New Office Facility

Added per Addendum #1
April 7, 2022
060-00958

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SECTION 052100 - STEEL JOIST FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Open web steel joists and shear stud connectors, with bridging, attached seats and anchors.
- B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.
- C. Supplementary framing for floor and roof openings greater than 18 inches.

1.2 RELATED REQUIREMENTS

- A. Section 051200 - Structural Steel Framing: Grouting base plates and bearing plates. Superstructure framing.
- B. Section 051200 - Structural Steel Framing: Superstructure framing.
- C. Section 053100 - Steel Decking: Bearing plates and angles.
- D. Section 053100 - Steel Decking: Support framing for openings less than 18 inches in decking.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- E. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- F. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).
- G. ASTM E94 - Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).
- H. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2013.
- I. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2012.
- J. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2015.

- K. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.
- L. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2016.
- M. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (with March 2016 Errata).
- O. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2014, with April 2015 Errata.
- P. SJI 100 - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.
- Q. SJI (SPEC) - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.
- R. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; 2008.
- S. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- T. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.
- C. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.5 QUALITY ASSURANCE

- A. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in West Virginia.
- B. Perform Work, including that for headers and other supplementary framing, in accordance with SJI (SPEC) Standard Specifications Load Tables and SJI Technical Digest No. 9.
- C. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum 8 years documented experience.
- D. Erector Qualifications: Company specializing in performing the work of this section with minimum 8 years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Steel Joists:
 - 1. Canam Group Inc: www.canam-steeljoists.ws
 - 2. Nucor-Vulcraft Group: www.vulcraft.com/#sle.
 - 3. New Millineum.
 - 4. Substitutions: See Section 016000 - Product Requirements.

2.2 MATERIALS

- A. Open Web Joists: SJI Type K Joists:
 - 1. Minimum End Bearing on Steel Supports: Comply with referenced SJI standard.
 - 2. Minimum End Bearing on Concrete or Masonry Supports: Comply with referenced SJI standard.
 - 3. Finish: Shop primed.
- B. Open Web Joists: SJI 100 Joist Girders:
 - 1. Minimum End Bearing on Steel Supports: Comply with referenced SJI standards.
- C. Open Web Joists: SJI (SPEC) Joist Girders:
 - 1. Provide top chord extensions as indicated.
 - 2. Minimum End Bearing on Steel Supports: Comply with referenced SJI standards.
- D. Anchor Bolts, Nuts and Washers: ASTM A307, hot-dip galvanized per ASTM A153/A153M, Class C.
- E. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.
- F. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.
- G. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36/A36M.
- H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.3 FINISH

- A. Shop prime joists as specified.
 - 1. Do not prime surfaces that will be fireproofed.
 - 2. Galvanize steel ledge angles.

- B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.2 ERECTION

- A. Erect joists with correct bearing on supports.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.
- D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- E. Install supplementary framing for floor and roof openings greater than 18 inches.
- F. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.
- G. Do not field cut or alter structural members without approval of joist manufacturer.
- H. After erection, prime welds, damaged shop primer, damaged galvanizing, and surfaces not shop primed, except surfaces specified not to be primed.

3.3 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
- B. Welded Connections: Visually inspect all field-welded connections and test at least 50 percent of welds using one of the following:
 - 1. Radiographic testing performed in accordance with ASTM E94.
 - 2. Ultrasonic testing performed in accordance with ASTM E164.
 - 3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
 - 4. Magnetic particle inspection performed in accordance with ASTM E709.

END OF SECTION

SECTION 053100 - STEEL DECKING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof deck.
- C. Supplementary framing for openings up to and including 18 inches.
- D. Bearing plates and angles.

1.2 RELATED REQUIREMENTS

- A. Section 042900 - Engineered Unit Masonry: Placement of anchors for bearing plates embedded in reinforced unit masonry.
- B. Section 051200 - Structural Steel Framing
- D. Section 052100 - Steel Joist Framing

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel; 2013.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- D. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2008.
- E. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; Factory Mutual System; 2006.
- F. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems; ICC Evaluation Service, Inc; 2010 (R2013).
- G. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements; ICC Evaluation Service, Inc; 2013.
- H. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.4 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittals procedures.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Steel Deck:
 - 1. Canam Steel Corporation: www.canam-steeljoists.ws.
 - 2. Cordeck, Inc: www.cordeck.com.
 - 3. Nucor-Vulcraft Group: www.vulcraft.com.

2.2 STEEL DECK

- A. Roof Deck: Non-composite type, fluted steel sheet:
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 - 2. Structural Properties:
 - a. Span Design: Double.
 - 3. Minimum Base Metal Thickness: 22 gage, 0.0299 inch.
 - 4. Nominal Height: 1-1/2 inch.
 - 5. Profile: Fluted; SDI NR.
 - 6. Formed Sheet Width: 24 inch.
 - 7. Side Joints: Lapped, mechanically fastened.
 - 8. End Joints: Lapped, mechanically fastened.

2.3 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.
- B. Fasteners: Galvanized hardened steel, self tapping.

- C. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
 - 1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
 - 2. Material: Steel; ASTM A510/A510M.
- D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- E. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

2.4 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On masonry surfaces provide minimum 4 inch bearing.
- C. On steel supports provide minimum 1-1/2 inch bearing.
- D. Clinch lock seam side laps.
- E. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.
- F. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
- G. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
- H. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.
- J. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- K. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION

Hardy County Public Service District
Proposed New Office Facility

Added per Addendum #1
April 7, 2022
060-00958

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SECTION 085413 - FIBERGLASS WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fiberglass-framed windows.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for fiberglass windows.

B. Shop Drawings: For fiberglass windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples: For each exposed product and for each color specified, 2 by 4 inches (50 by 100 mm) minimum in size.

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

1. Include Samples of hardware and accessories involving color selection.

E. Samples for Verification: For fiberglass windows and components required, prepared on Samples of size indicated below:

1. Exposed Finishes: 2 by 4 inches (50 by 100 mm) minimum.
2. Exposed Hardware: Full-size units.

F. Product Schedule: For fiberglass windows. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each type of fiberglass window, for tests performed by a qualified testing agency.

C. Field quality-control reports.

- D. Sample Warranties: For manufacturer's warranties.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating fiberglass windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
- B. Installer Qualifications: An installer acceptable to fiberglass window manufacturer for installation of units required for this Project.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockup of typical wall area as indicated on Drawings.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace fiberglass windows that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, and air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units, Non-Laminated: 20 years from date of Substantial Completion.
 - c. Glazing Units, Laminated: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain fiberglass windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: LC
 - 2. Minimum Performance Grade: 45
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of **0.30**.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of **0.30**.

2.3 FIBERGLASS WINDOWS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Pella Corporation; Pella Impervia or comparable product by one of the following:
 - 1. Accurate Dorwin.
 - 2. Alpen High Performance Products.
 - 3. Inline Fiberglass Ltd.
 - 4. Kolbe Windows & Doors.
 - 5. Milgard Manufacturing, Inc.
- B. Operating Types: Provide the following operating types in locations indicated on Drawings:
 - 1. Single Hung

Frames and Sashes: Pultruded fiberglass complying with AAMA/WDMA/CSA 101/I.S.2/A440 and with exposed exterior fiberglass surfaces finished with manufacturer's standard enamel coating.

 - 2. Exterior Color: White, Brown or Black, to be selected from Manufacturer full range color selection.
 - 3. Interior Finish: Matching exterior color.
- C. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.
 - 1. Kind: Fully tempered for all windows.
- D. Insulating-Glass Units: ASTM E2190.
 - 1. Glass: ASTM C1036, Type 1, Class 1, q3.
 - a. Tint: Clear.
 - b. Kind: Fully tempered where indicated on Drawings.

2. Lites: Two.
 3. Filling: Fill space between glass lites with argon.
 4. Low-E Coating: Sputtered on second or third surface.
- E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock fiberglass windows, and sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- G. Hung Window Hardware:
1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
 2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only
 3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
- H. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- I. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.
- 2.4 ACCESSORIES
- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
1. Type and Location: Full, inside for project-out sashes.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
 2. Finish for Interior Screens: Baked-on organic coating in color selected by Architect from manufacturer's full range.

- C. Glass-Fiber Mesh Fabric: 18-by-14 (1.1-by-1.4-mm) mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.

- 1. Mesh Color: Manufacturer's standard.

2.5 FABRICATION

- A. Fabricate fiberglass windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze fiberglass windows in the factory.
- C. Weatherstrip each operable sash to provide weathertight installation.
- D. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
 - B. Testing Services: Testing and inspecting of installed windows takes place as follows:
 1. Testing Methodology: Testing of windows for air infiltration and water resistance to be performed in accordance with AAMA 502.
 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
 - b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
 4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows to be tested after perimeter sealants have cured.
 5. Test Reports: Prepared in accordance with AAMA 502.
 - C. Windows will be considered defective if they do not pass tests and inspections.
 - D. Prepare test and inspection reports.
- 3.4 ADJUSTING, CLEANING, AND PROTECTION
- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
 - B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
 1. Keep protective films and coverings in place until final cleaning.
 - C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.
 - D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately in accordance with manufacturer's written instructions.

END OF SECTION 085413

SECTION 085413 - FIBERGLASS WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fiberglass-framed windows.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for fiberglass windows.

B. Shop Drawings: For fiberglass windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples: For each exposed product and for each color specified, 2 by 4 inches (50 by 100 mm) minimum in size.

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

1. Include Samples of hardware and accessories involving color selection.

E. Samples for Verification: For fiberglass windows and components required, prepared on Samples of size indicated below:

1. Exposed Finishes: 2 by 4 inches (50 by 100 mm) minimum.
2. Exposed Hardware: Full-size units.

F. Product Schedule: For fiberglass windows. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each type of fiberglass window, for tests performed by a qualified testing agency.

C. Field quality-control reports.

- D. Sample Warranties: For manufacturer's warranties.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating fiberglass windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
- B. Installer Qualifications: An installer acceptable to fiberglass window manufacturer for installation of units required for this Project.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockup of typical wall area as indicated on Drawings.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace fiberglass windows that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, and air infiltration.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of materials and finishes beyond normal weathering.
 - e. Failure of insulating glass.
 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units, Non-Laminated: 20 years from date of Substantial Completion.
 - c. Glazing Units, Laminated: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain fiberglass windows from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: **LC**
 - 2. Minimum Performance Grade: **45**
- C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of **0.30**.
- D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of **0.30**.

2.3 FIBERGLASS WINDOWS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Pella Corporation; Pella Impervia or comparable product by one of the following:
 - 1. Accurate Dorwin.
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 - 3. Inline Fiberglass Ltd.
 - 4. Kolbe Windows & Doors.
 - 5. Milgard Manufacturing, Inc.
- B. Operating Types: Provide the following operating types in locations indicated on Drawings:
 - 1. Single Hung

Frames and Sashes: Pultruded fiberglass complying with AAMA/WDMA/CSA 101/I.S.2/A440 and with exposed exterior fiberglass surfaces finished with manufacturer's standard enamel coating.

 - 2. Exterior Color: White, Brown or Black, to be selected from Manufacturer full range color selection.
 - 3. Interior Finish: Matching exterior color.
- C. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.
 - 1. Kind: Fully tempered for all windows.
- D. Insulating-Glass Units: ASTM E2190.
 - 1. Glass: ASTM C1036, Type 1, Class 1, q3.
 - a. Tint: Clear.
 - b. Kind: Fully tempered where indicated on Drawings.

2. Lites: Two.
 3. Filling: Fill space between glass lites with argon.
 4. Low-E Coating: Sputtered on second or third surface.
- E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock fiberglass windows, and sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- G. Hung Window Hardware:
1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
 2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only
 3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
- H. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- I. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.
- 2.4 ACCESSORIES
- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
1. Type and Location: Full, inside for project-out sashes.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
 2. Finish for Interior Screens: Baked-on organic coating in color selected by Architect from manufacturer's full range.

- C. Glass-Fiber Mesh Fabric: 18-by-14 (1.1-by-1.4-mm) mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.

- 1. Mesh Color: Manufacturer's standard.

2.5 FABRICATION

- A. Fabricate fiberglass windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze fiberglass windows in the factory.
- C. Weatherstrip each operable sash to provide weathertight installation.
- D. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
 - B. Testing Services: Testing and inspecting of installed windows takes place as follows:
 1. Testing Methodology: Testing of windows for air infiltration and water resistance to be performed in accordance with AAMA 502.
 2. Air-Infiltration Testing:
 - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
 - b. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
 3. Water-Resistance Testing:
 - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
 - b. Allowable Water Infiltration: No water penetration.
 4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows to be tested after perimeter sealants have cured.
 5. Test Reports: Prepared in accordance with AAMA 502.
 - C. Windows will be considered defective if they do not pass tests and inspections.
 - D. Prepare test and inspection reports.
- 3.4 ADJUSTING, CLEANING, AND PROTECTION
- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
 - B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
 1. Keep protective films and coverings in place until final cleaning.
 - C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.
 - D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately in accordance with manufacturer's written instructions.

END OF SECTION 085413

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:
 - a. Swinging doors.
2. Cylinders for door hardware specified in other Sections.

B. Products furnished, but not installed, under this Section include the products listed below. Coordinating and scheduling the purchase and delivery of these products remain requirements of this Section.

1. Hinges, thresholds, weather stripping and closers to be installed under Aluminum Entrance Sections.
2. Permanent lock cores to be installed by Owner.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Details of electrified door hardware.

C. Samples: For each exposed product and for each color and texture specified.

D. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - b. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.

- 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Door Hardware: Refer to hardware schedule on drawings.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
- B. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- C. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.
- D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: Comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design and ICC A117.1 for door hardware on doors in an accessible route.
 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 3. Bevel raised ADA compliant thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high for exterior doors and 1/4 inch high for interior doors.

4. Closers: Adjust door and gate closer sweep periods so that, from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum.
5. Spring Hinges: Adjust door and gate spring hinges so that, from an open position of 70 degrees, the time required to move the door to the closed position is 1.5 seconds minimum.

- F. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- B. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
 - a. Exit Devices: Three years from date of Substantial Completion.
 - b. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled on Drawings to comply with requirements in this Section.
 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.
 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
 2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 LOCK CYLINDERS FOR ALUMINUM ENTRANCE DOORS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
 - 1. Manufacturer: Same manufacturer as for locking devices.
- B. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- C. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.3 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
 - 1. Master Key System: Change keys and a master key operate cylinders.
- B. Keys: Nickel silver.
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."
 - 2. Quantity: In addition to one extra key blank for each lock, provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.

2.4 OPERATING TRIM (match existing)

- A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.

2.5 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Hager Companies.
 - b. National Guard Products, Inc.
 - c. Pemko Manufacturing Co.
 - d. Reese Enterprises, Inc.

2.6 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
 - 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
 - 5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.7 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
- C. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- E. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- F. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as directed by Owner.
 - 2. Furnish permanent cores to Owner for installation.
- G. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- H. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- I. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- L. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.2 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

3.3 DOOR HARDWARE SCHEDULE, (Set Numbers for Door Schedule on Drawings)

- A. Locksets, exit devices, and other hardware items are referenced in the following hardware sets for series, type and function. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

- B. Hardware Sets:

Set Number 1 (Exterior Panic Hardware)

3 BB1191 4 ½" x 4 ½" x NRP x 626 Hinges	Hager
1 9300B x YR08 x 630 Panic Device	Dormakaba
1 8616DS x 689 Closer	Dormakaba
1 S205A x 36" Threshold	Reese
1 967C x 36" Sweep	Reese
1 Set DS75A 3070 Weatherstrip	Reese

Set Number 2 (Interior Panic Hardware, 1 hour rated)

3 BB1279 4½x4½ X 626 Hinges	Hager
1 F9300B x YR08 x 630 Panic Device	Dormakaba
1 8616ARP x 689 Closer	Dormakaba
1 232W x 630 Wall Stop	Hager
1 190S 8"x34" X630 Kick Plate	Hager

Set Number 3 (Office w/ closer)

3 BB1279 4½x4½ x 626 Hinges	Hager
1 CL780 LRE x 626 Lockset	Dormakaba
1 8616ARP x 689 Closer	Dormakaba
1 232W x 630 Wall Stop	Hager

Set Number 4 (Privacy)

3 BB1279 4½x4½ x 626 Hinges	Hager
1 CL740 LRE x 626 Privacy Set	Dormakaba
1 236W x 630 Wall Stop	Hager
1 190S 4" x 34" x 630 MOP Plate	Hager

Set Number 5 (Office w/ no closer)

3 BB1279 4½x4½ x 626 Hinges	Hager
1 CL753LRE x 626 Lock Set	Dormakaba
1 236W x 630 Wall Stop	Hager

Set Number 6 (Aluminum Entrance Doors)

1 780-112HD Clear Continuous Hinge	Hager
1 9300B MLR x YR08 x 30 Panic Device	Dormakaba
Threshold and Weatherstripping	Door Manufacturer

Set Number 7 (1 hour rated, Mechanical & Utility Rms.)

3 BB1279 4½x4½ x 626 Hinges	Hager
1 CL77OLRE x 626 Lockset	Dormakaba
1 8616ARP x 689 Closer	Dormakaba
1 190S 8"x34" x 630 Kick Plate	Hager

END OF SECTION 087100

DIVISION 13

SECTION 133419 – PRE-ENGINEERED METAL BUILDING

Part 1 - General

1.01 Section Includes

A. The Building System for this project shall be a Butler Manufacturing Company Building System or pre-approved equal. The Building System includes the structural steel system (primary and secondary structurals), metal roof system, wall system, and all roof and wall insulation, trim and accessories as required by the drawings.

B. Technical specifications and information for Butler Manufacturing Company products and proprietary designs are included in the TECHNICAL SPECIFICATIONS portion of this document. Where several alternatives are described in the TECHNICAL SPECIFICATIONS, such as for finishes and trim options, the option proposed shall be as set forth in this section.

C. Other approved manufacturers are as follows so long as the general structure framing system, roofing, siding, finishes, and detailing meet or exceed these specifications:

- 1.) Nucor Building Systems
- 2.) Metallic Building Company
- 3.) American Building Company
- 4.) Star Building Systems
- 5.) Varco Pruden Building

1.02 Building Description

A. Building Dimensions: Building dimensions shall be as indicated on the project drawings. Horizontal dimensions shall be measured to the inside face of the wall sheets. Eave height shall be measured from the top of finished floor to intersection of insides of roof and sidewall sheets. The clear height between finished floor and bottom of roof steel shall be as indicated.

B. Primary Structurals: The primary framing system shall be Butler Manufacturing Company framing system per the structural steel specification in Section 2.01. Frames shall consist of welded up plate section columns and roof beams complete with necessary splice plates for bolted field assembly as described in the TECHNICAL SPECIFICATIONS. All bolts for field assembly of primary steel shall be high strength bolts as indicated on Building Manufacturer's erection drawings.

- Beam and post endwall frames shall consist of endwall corner posts, endwall roof beams, and endwall posts as required by design criteria.
- Exterior columns shall be welded-up "H" sections or cold-formed "C" sections; Interior columns will be "H" sections or tube columns.

- Connection of all primary structural members shall be made with ASTM A 325 bolts through factory punched or field drilled holes for exact alignment.
- All primary structurals shall be painted with manufacturer's standard primer, with the manufacturer's standard surface preparation per structural painting in framing system specification.

C. Secondary Structurals: The secondary framing system shall be Butler Manufacturing Company framing system per the structural steel specification in Section 2.01. Secondary structurals shall be purlins and girts with the manufacturer's standard finish.

D. Roof System: The roof system shall be Butler Manufacturing Company roof system per the roof system specification in Section 2.02.

E. Wall System: The wall system shall be Butler Manufacturing Company wall system per the wall system specification in Section 2.03.

F. Where metal panels are required to be painted, the coating system shall be a full strength 70% Kynar 500® or Hylar 5000® fluoropolymer (PVDF) coating. Manufacturer shall warrant that coating shall not peel, crack or chip for 25 years. For a period of 25 years chalking shall not exceed an ASTM D4214 #8 rating and shall not fade more than 5 Color Difference Units per ASTM D2244.

1.03 Quality Assurance

A. Letter of Certification

Certification: The manufacturer shall submit written certification prepared and signed by a Professional Engineer, registered to practice in the State of West Virginia verifying that the building system design and metal roof system design (including panels, clips, and support system components) meet indicated loading requirements and codes of authorities having jurisdiction. ***The certification must reference specific dead loads, live loads, snow loads, wind loads/speeds, tributary area load reductions (if applicable), concentrated loads, collateral loads, seismic loads, end use categories, governing code bodies, including year, and load applications.*** The letter of certification should use format as illustrated in ***Attachment "A"*** at the end of this section and must be on the manufacturer's letterhead. Refer to the Submittal Section of this Specification.

- Snow loads shall be 30 psf unless governing codes require additional loading

B. Material Testing

In addition to material certifications of structural steel, the manufacturer shall provide, upon request, evidence of compliance with specifications through testing independent of the manufacturer's suppliers. This quality assurance testing shall include testing of structural bolts, nuts, screw fasteners, mastics and metal coatings (primers, metallic coated products, and painted coil products).

C. Design Loads

1. Governing Design Code

Structural design for the building structural system shall be provided by the building manufacturer for the following design criteria.

Governing Building Code: International Building Code Year/Version:2003

Occupancy Category: Moderate Hazard Storage, IBC Class S-1

2. Roof Live Load – As per Code Requirements

3. Roof Snow Load – As per Code Requirements, with a minimum 30 psf ground snow load.

The roof snow load used for designing the structure may not be reduced and shall be the product

The design snow load shall include the effects of minimum flat roof load limits, rain on snow, drifting snow, and unbalanced snow load as defined in the governing building code specified above.

4. Wind Load – As per Code Requirements

Wind Pressure Coefficients and the design pressures shall be applied per the governing code.

5. Seismic Load

Seismic loads shall be applied per the governing code.

6. Dead Load

The dead load shall consist of the weight of building system construction, such as roof, framing, and covering members.

7. Collateral Load

Collateral load of pounds per square foot shall be applied to the entire structure to account for the weight of additional permanent materials other than the building system, such as sprinklers, mechanical systems, electrical systems, hung partitions, and ceilings. This allowance does not include the weight of hung equipment weighing 50 pounds or more. Equipment loads of 50 pounds or more shall be shown on the project drawings and the structure shall be strengthened as required. The specifier will provide the building manufacturer with the magnitude and approximate location of all concentrated loads greater than 50 pounds before design of the building commences.

8. Auxiliary Loads – Not Applicable

9. Crane Loads – Not Applicable

10. Load Combinations

Load combinations used to design primary and secondary structural members shall be according to the governing code.

E. Deflections

Calculations for deflections shall be done using only the bare frame method. Reductions based on engineering judgment using the assumed composite stiffness of the building envelope shall not be allowed. Drift shall follow AISC's "Serviceability Design Considerations for Low-Rise Buildings"; The use of composite stiffness for deflection calculations is permitted only when actual calculations for the stiffness are included with the design for the specific project. When maximum deflections are specified, calculations shall be included in the design data.

1.04 Warranties

The manufacturer shall provide a written weathertightness warranty for a maximum of twenty (25) years against leaks in roof panels arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions. Warranty shall be signed by both the metal roofing system manufacturer and the metal roofing system contractor. ***Maximum liability of warranty shall be no less than \$0.80 per square foot of roof area.*** (Generic Structural Standing Seam Roof Systems).

A. The manufacturer shall provide a written warranty for twenty (25) years against perforation of metal roof panels due to corrosion under normal weather and atmospheric conditions. Warranty shall be signed by metal roofing system manufacturer.

B. The manufacturer shall provide a paint film written warranty for twenty (25) years against cracking, peeling, chalking, and fading of the coating on painted wall panels, painted roof panels and soffit panels. Warranty shall be signed by building system or roof system manufacturer and state that the coating contains 70% Kynar 500® or Hylar 5000® resin. The manufacturer shall warrant that the coating shall not peel, crack or chip for 25 years. For a period of 25 years, chalking shall not exceed ASTM D4214 #8 rating and will not fade more than 5 color difference units per ASTM D2244.

C. Manufacturer's Certification: The manufacturer shall submit a signed written Certification one week prior to bid date stating that the metal roof system manufacturer or approved representative will provide warranties and Inspection and Report Service specified herein.

NOTE: Warranty terms shall be submitted with bid.

1.05 Submittals

A. Product Data: Submit manufacturer's product information, specifications, and installation instructions for building components and accessories.

B. Erection Drawings: Submit complete erection drawings showing roof framing, transverse cross-sections, covering and trim details, and accessory installation details to clearly indicate proper assembly of building components.

C. Certification: Submit written letter of certification prepared and signed by a Professional Engineer, registered to practice in the State of West Virginia verifying that the metal building system design and metal roof system design (including panels, clips, and support system components) meet indicated loading requirements and codes of authorities having jurisdiction. ***The certification must reference specific dead loads, live loads, snow loads, wind loads/speeds, tributary area load reductions (if applicable), concentrated loads, collateral loads, seismic loads, end use categories, governing code bodies, including year, and load applications Submit certification one week prior to bid date in format shown in Attachment "A" of Section 1.03 on the building manufacturer's letter head.***

D. Submit certification verifying that the metal roofing system has ***been tested and approved by Underwriter's Laboratory as Class 90.***

OR

Submit certification verifying that the metal roofing system has ***been tested and approved by Factory Mutual as Class 1-90.***

OR

Submit certification verifying that the metal roof system has ***been tested and approved using the ASTM E1592 test protocols.***

E. Dealer Certification: Submit certification ***one week prior to bid date*** that the building system supplier or metal roof system supplier is a manufacturer's authorized and franchised dealer of the system to be furnished. Certification shall state date on which authorization was granted.

Installer Certification: Submit certificate ***one week prior to bid date*** that the building system or roof system installer has been regularly engaged in the installation of building systems of the same or equal construction to the system specified.

Attachment "A"
Sample Letter of Certification
Building System

(Date)

Mr. John Doe Building Description
XYZ Corporation End Customer
Grand Rapids, MI 49508 Site Location
Mfgr. Order Nos.
Builder P.O. Nos.

Doddridge County Board of Education
103 Sistersville Pike
West Union, WV 26456

To Whom It May Concern:

Please accept this letter as our Certification that the manufacturer's components of the subject building **will be** designed in accordance with the purchase order (and documents accepted as a part thereof), the **2005** Edition of the AISC Specification for Structural Steel Buildings and the **2004** Edition of the AISI Specification for the Design of Cold-Formed Steel Structural Members.

The governing design code **will be** the 2009 *Edition of the International Building Code*. See next page for the Building Design Criteria applied in accordance with the governing code.

Collateral load **will be** included with gravity loads in determining critical stresses. Load combinations **will be** in accordance with the governing code.

These manufacturer's components, when properly erected on an adequate foundation, in accordance with the erection drawings as supplied, and using the components as furnished, will meet the above loading requirements. The design of this building for wind load assumes that components not supplied by the manufacturer will be designed to sustain the same design wind speed as the walls in which they are installed. This certification does not cover field modifications or design of material not furnished by the manufacturer. The design and fabrication of this building **will be** performed and produced in one or more of the manufacturer's facilities located in _____.

Cordially yours,
(name) , P.E.
(Engineer & Title)

(Date)
Attn: (Builder Contact)
(Buildership)

(Address)
(City, State & Zip)

End Customer:(End Customer)
Location: (Bldg. Location)
Description: (Bldg. Description)
Butler Order Number: (BMC Order No.)
Builder Order No.(Builder Order No.)

DESIGN CRITERIA PER 2006 EDITION OF THE INTERNATIONAL BUILDING CODE		
Occupancy Category (Table 1604.5)		General Usage
Section 1606 Dead Loads		
Weight of Roof Panel, Insulation, and Secondaries (psf)		2.7
Collateral Load on Frames (psf)	Lights, HVAC, and Sprinklers	5.0
Collateral Load on Secondaries (psf)	Lights, HVAC, and Sprinklers	5.0
Section 1603.1.2 Roof Live Load		
Roof Live Load (psf), Reducible per Section 1607.11.2		20
Section 1603.1.3 Roof Snow Load		
Ground Snow Load, Pg (psf)		30
Roof Snow Load, Pf (psf)		30
Snow Load Importance Factor, Is		1.0
Snow Exposure Factor, Ce		1.0
Snow Thermal Factor, Ct		1.0
Section 1603.1.4 Wind Design Data		
Basic Wind Speed, 3 sec gust, (mph)		90
Wind Importance Factor, Iw		1.00
Wind Exposure Category		B
Enclosure Classification		Enclosed
Internal Pressure Coefficients		±0.18
Section 1603.1.5 Earthquake Design Data		
Seismic Importance Factor, Ie		1.00
Spectral Response Acceleration at 0.2-sec Period, Ss		10% g
Spectral Response Acceleration at 1-sec Period, S1		6% g

Design Spectral Response Acceleration at Short Periods, Sds		0.107 g
Design Spectral Response Acceleration at 1-sec Period, Sd1		0.096 g
Site Class		D
Seismic Design Category		B
Basic Seismic Force Resisting System(s)		R
Bracing - Steel Sys. Not Specifically Detailed for Seismic		3.0
Main Frames - Steel Sys. Not Specifically Detailed for Seismic		3.0
Seismic Response Coefficients, Cs	Bracing	0.036
	Main Frames	0.036
Design Base Shear (kips), V = Cs W		See Reactions
Analysis Procedure: Equivalent Lateral Force Procedure		
Factory Mutual Wind Uplift Rating		1-90

Specific References Required in Letter of Certification

1. Building, including width, length, height, city, state, slope of building, Butler order number, and Builder purchase order number.
2. Builder who has sent the purchase order to the manufacturer.
3. The 2005 Edition of AISC for hot rolled steel and the 2004 Edition of AISI for cold rolled steel. The year of the edition must be indicated.
4. Edition (Year) of the governing building code (IBC, BOCA, SBC,UBC, State Code, etc.).
5. Roof snow load (ground snow load not acceptable without exposure coefficient shown).
6. Wind speed in miles per hour (never use pounds per square foot). The wind exposure should be indicated.
7. Seismic spectral acceleration factors.
8. Importance factor for the building's intended use
9. Collateral loads used in the building design such as sprinkler systems, mechanical units and auxiliary loads such as cranes or conveyors, and, the fact that they were analyzed with the full snow load.
10. Load combinations were applied in accordance with the governing code.

Specifications Table of Contents

2.01 STRUCTURAL STEEL: PRE-ENGINEERED BUILDING SYSTEM BY BUTLER MANUFACTURING COMPANY

1 GENERAL INFORMATION

1.1 The design of the structural system shall be a clear or multi-span rigid frame with tapered or straight columns and roof beams, with a gable or single slope roof.

1.2 Actual building length shall be structural line to structural line and shall be the same as nominal—i.e., the number of bays times length of bays. Structural line is defined as the inside face of the wall sheets.

1.3 Actual building width shall be structural line to structural line and shall be the nominal building width.

1.4 The roof shall have a minimum slope of 2”in 12”.

1.6 All components and parts of the structural system shall be as indicated on the drawings and/or specifications.

1.6.1 All components and parts shall be clearly marked and erection drawings shall be supplied for identification and assembly of the parts.

1.6.2 All drawings shall carry the stamp of a registered professional engineer.

1.8 Field modification of parts shall be in accordance with the best standard procedures, require the approval of the manufacturer, and be the responsibility of the building erector. No field modifications shall be made on the truss purlins unless specified on the erection drawings.

1.9 Foundations

1.9.1 Foundations including anchor bolt embedment length shall be adequately designed by a competent engineer, retained by other than the building manufacturer, in accordance with the best recommended practices for the specific soil conditions of the building site.

1.9.1.1 All reactions for the proper design of foundations shall be supplied Butler Manufacturing Company.

1.9.2 Anchor bolt diameter shall be as specified by Butler Manufacturing Company’s anchor bolt layout drawings.

1.9.2.1 Anchor bolts shall be supplied by the contractor, not the Building Manufacturer.

1.9.2.2 All anchor bolts on moment resisting column bases shall have nuts above and below the base plate.

1.9.2.3 Fixed column bases shall be grouted flush with floor line after structural steel erection is complete.

2. STRUCTURAL STEEL DESIGN

2.1 All structural mill sections or welded-up plate sections shall be designed in accordance with the 2005 edition of AISC "Specifications for Structural Steel Buildings", and all cold-formed steel structural members shall be designed in accordance with the 2004 edition of AISI "Specifications for the Design of Cold Formed Steel Structural Members".

2.2 The structural system shall be designed in accordance with the specified building code (Refer to Design Loads and Building Codes).

3. PRIMARY FRAMING

3.1 Rigid Frames

3.1.1 Frames shall consist of welded-up plate section columns and roof beams complete with necessary splice plates for bolted field assembly.

3.1.1.1 All base plates, cap plates, compression splice plates and stiffener plates shall be factory welded into place and have the connection holes factory fabricated.

3.1.1.2 Columns and roof beams shall be fabricated complete with holes in webs and flanges for the attachment of secondary structural members and bracing except for fieldwork as noted on manufacturer's erection drawings.

3.1.2 All bolts for field assembly of frame members shall be ASTM A325 high strength bolts as indicated on erection drawings.

3.2 Endwall Structurals

3.2.1 The endwall structurals shall be cold-formed channel members designed in accordance with the 2004 AISI Specification or welded-up plate sections designed in accordance with the 2005 AISC Specification.

3.2.2 Endwall frames shall consist of endwall corner posts, endwall roof beams and endwall posts as required by design criteria.

3.2.2.1 All splice plates and base clips shall be shop fabricated complete with bolt connection holes. All base plates, cap plates, compression splice plates and stiffener plates shall be factory welded into place and have the connection holes shop fabricated.

3.2.2.2 Beams and posts shall be factory fabricated complete with holes for the attachment of secondary structural members except for field work as noted on manufacturer's erection drawings.

3.2.3 Intermediate frames shall be substituted for end-wall roof beams when specified.

3.2.3.1 Necessary endwall posts and holes for connection to the intermediate frame used in the endwall shall be factory fabricated.

4 SECONDARY STRUCTURAL MEMBERS

4.1 Purlins

{Traditional roll-formed secondary structurals - 10' to 40' bays}

4.1.1 Purlins shall be "Z" shaped, precision roll formed acrylic coated galvanized steel in different gauges to meet the specified loading conditions. Purlins shall be 8", 9-1/2" or 12" deep "Z" sections

4.1.1 Truss purlins shall be cold-formed trusses that are factory assembled and welded. Truss purlins shall be either 20-1/2" or 29-1/2" deep.

4.1.2 Outer flange of purlins shall contain factory punched holes for panel connections.

4.1.2 Purlins shall be attached to the main frames and endwalls by 1/2" diameter bolts through the end seat of the truss purlin.

4.1.3 Purlins shall be braced on the top and bottom chords spaced at intervals shown on the erection drawings.

4.1.4 All concentrated loads shall be hung at purlin panel points.

4.2 Eave Members

4.2.1 Eave Struts shall be factory punched 8", 9-1/2", or 11" deep "C" sections precision roll formed acrylic coated galvanized steel in different gauges to meet the specified loading conditions.

4.2 Girts

4.2.1 Girts shall be "Z" or "C" shaped, precision roll formed acrylic coated galvanized steel in different gauges to meet the specified loading conditions.

4.2.2 Girts shall be 8", 9-1/2" or 12" deep "Z" or "C" sections.

4.2.3 Outer flange of all girts shall contain factory-punched holes for panel connections.

4.4 Bracing

4.4.1 Bracing shall be located as indicated on drawings.

4.4.3 Optional fixed base wind posts or pinned base portal frames shall be substituted for wall rod bracing on buildings as required.

4.4.4 Flange braces, purlin braces, etc., when required, shall be cold-formed and installed as indicated on drawings.

5. WELDING

5.1 Welding procedure, operator qualifications and welding quality standards shall be in accordance with the American Welding Society D1.1-2006 - Structural Welding Code – Steel and AWS D1.3-1998 - Structural Welding Code - Sheet Steel. Inspection other than visual inspection as defined by AWS D1.1 paragraph 6.9, shall be identified and negotiated prior to bidding.

5.2 Certification of welder qualification shall be supplied when requested.

6. STRUCTURAL PAINTING

6.1 General

6.1.1 All structural steel shall be prime painted as temporary protection against ordinary atmospheric conditions. Subsequent finish painting, if required, shall be performed in the field by others.

6.1.2 Prior to painting, all steel shall be cleaned of loose rust, loose mill scale, dirt and other foreign material. Unless otherwise specified the fabricator shall not be required to sand-blast, flame clean or pickle prior to painting.

6.2 Primary Frames

6.2.1 Clean all steel per SSPC-SP2.

6.2.2 Factory cover all steel with one coat of gray water reducible alkyd primer paint formulated to equal or exceed the performance requirements of Federal Specification TT-P-636D, TT-P-664C and SSPC Paint-25 to a minimum coating thickness of 1.0 mil.

6.3 Secondary Structurals - Roll-Formed

6.3.1 Clean all steel per SSPC-SP8 or SSPC-SP6.

6.3.1 Material shall have a hot dipped zinc coating per ASTM A653 G-30 specification followed by one coat of clear acrylic finish. The acrylic coated galvanized steel will equal or exceed the performance requirements of Federal Specification TT-P-66-4D and SSPC Paint-25.

6.4 Truss Purlins

6.4.1 Clean all steel per SSPC-SP2.

6.4.2 Factory cover all steel with one coat of gray primer by spray, dip, or electrodeposition method to a minimum coating thickness of 1.0 mil.

2.02 Roof System: MR-24® Standing Seam Roof System by Butler Manufacturing Company

1. GENERAL

1.1 The roof shall be covered with the MR-24® roof system as furnished by Butler Manufacturing Company and installed in accordance with the manufacturer's instructions.

2. COMPONENTS DESCRIPTION

2.1 Roof Panels and Matching Fascia Panels

2.1.1 Roof panels shall be factory roll-formed MR-24® Structural Standing Seam panels as manufactured by Butler Manufacturing Company 24" wide, with 2 major corrugations, 2" high (2-3/4" including seam) 24" on center. The flat of the panel shall contain cross flutes 6" on center perpendicular to the major corrugations the entire length of the panel to reduce wind noise.

2.1.2 Variable Width Panels: For roof lengths not evenly divisible by the 2'-0" MR-24 panel width, factory manufactured variable width (9", 12", 15", 18" and 21" wide) panels shall be used to insure a modular, weathertight roof installation. Variable width panels shall be at least 15' long and supplied in maximum possible panel lengths

2.2.3 Panel material as specified shall be: 24 gage galvanized (G-90 coating), per ASTM specification A 653 (G90), and painted with exterior colors of Butler-Cote™ finish system, a full strength, 70% Kynar 500® or Hylar 5000® fluoropolymer (PVDF) coating. Manufacturer shall warrant that coating shall not peel, crack or chip for 25 years. For a period of 25 years chalking shall not exceed ASTM D4214 #8 rating and will not fade more than 5 color difference units per ASTM D2244.

2.2.4 Panels of maximum possible lengths shall be used to minimize endlaps, eave panels shall extend beyond the structural line of the sidewall.

2.2.5 Panels shall be factory punched at panel end to match factory punched holes in the eave structural member. Panel end splices shall be factory punched and factory notched. The panel end laps shall be located directly over, but not fastened to, a supporting secondary roof structural member and be staggered, so as to avoid a four panel lap splice condition. End laps shall be floating which allows the roof panels to expand and contract with roof panel temperature changes. Self-drilling fasteners are not permitted to make the panel end splices.

2.2.6 Ridge assembly shall be designed to allow roof panels to move lengthwise with expansion/contraction as the roof panel temperature changes. Parts shall be factory punched for correct field assembly. Panel closures and interior reinforcing straps shall be installed to seal the panel ends at the ridge. The attachment fasteners shall not be exposed on the weather side. A lock seam plug shall be used to seal the lock seam portion of the panel. A hi-tensile steel ridge cover shall span from panel closure to panel closure and flex as the roof system expands and contracts.

3. SYSTEM DESIGN

3.1 All components of the MR-24® roof paneling system shall be designed in accordance with sound engineering methods and practices.

3.2 MR-24® roof panels shall be designed in accordance with 2004 edition of the AISI "North American Specification for the Design of Cold-Formed Steel Structural Members".

3.3 Paneling system shall be designed for a minimum roof slope of 1/4" in 12" and to support design live, snow and wind loads.

3.4 All endwall trim and roof transition flashings shall allow the roof panel to move relative to the wall panels and/or the parapets as the roof expands and contracts with temperature changes.

3.5 The MR-24® roof panel shall not be considered to be a safe work platform until completely secured to the structural system. Therefore, walk boards or other safety equipment as required by safety standards shall be provided by the erecting contractor to provide worker safety during panel installation.

4. SYSTEM INSTALLATION

4.1 All MR-24® panel clips shall be positioned by matching the hole in the clip with the factory punched holes in the secondary structural members.

4.2 All MR-24® panels shall be positioned and properly aligned by matching the factory punched holes in the panel end with the factory punched holes in the eave structural member and by aligning the panel with the panel clip.

4.3 MR-24® panel side laps shall be field-seamed by a self-propelled and portable electrical lock-seaming machine. The machine field forms the final 180 degrees of a 360-degree Pittsburgh double-lock standing seam; all side lap sealant shall be factory applied.

4.4 MR-24® panel end laps, when required, shall be at least 6", sealed with sealant (weather sealing compound) and fastened together by clamping plates. Sealants shall contain hard nylon beads, which prevent mastic from flowing out due to clamping actions. The panel laps shall be joined by means of a two-piece clamped connection consisting of a bottom reinforcing plate and a top panel strap. The panel end laps shall be located directly over, but not fastened to, a supporting secondary roof structural member and be staggered, so as to avoid a four panel lap splice condition.

4.5 A minimum blanket insulation thickness of two inches is required for all MR-24® applications.

5. FASTENERS

5.1 All connections of MR-24® panels to structural members, except at eave, shall be made with clips with movable stainless steel tabs that are seamed into the standing seam side lap.

5.2 Panel clips shall be fastened to structural members with Scrubolt™ fasteners as per manufacturer's erection drawings, using factory-punched holes in structural members. Fasteners shall have a metal backed rubber washer which serves as a torque indicator.

5.3 Exposed fasteners penetrating the metal roof membrane at the following locations do not exceed the frequency listed:

Basic Panel System 0 per square foot High Eave trim no parapet 2 / LF
Exterior Eave Gutter 2 per lineal foot Panel Splices 2 / LF
Gable Trim 0 per lineal foot High Eave with parapet 0 / LF
Ridge 0 per lineal foot Low eave structural 1.5 /LF

5.4 In lieu of factory punched secondaries and panels, pre-drilling of the structural members is mandatory in order to maintain proper alignment of the roof system.

6. ACCESSORIES

6.1 Accessories (i.e., ventilators, skylights, gutter, fascia) shall be as standard with Butler Manufacturing Company, unless otherwise noted and furnished as specified.

6.2 The metal paint finish on all gutters, downspouts, gable trim and eave trim to be Butler-Cote™ 500 FP finish system, a full strength, 70% Kynar 500® or Hylar 5000® fluoropolymer (PVDF) coating.

6.3 Location of standard accessories shall be as shown on erection drawings as furnished by Butler Manufacturing Company.

6.4 Material used in flashing and transition parts and furnished as standard by the Butler Manufacturing Company may or may not match the roof panel material. Parts shall be compatible and shall not cause a corrosive condition. Copper and lead materials shall not be used with Galvalume® panels.

7. PERFORMANCE TESTING

7.1 Underwriters Laboratories - U.L. Class 90 rating - The roof system shall carry a U.L. wind uplift classification Class 90 as determined according to UL 580 Tests for Uplift Resistance of Roof Assemblies to ensure structural integrity and possible reduction of insurance rates.

7.2 ASTM E 1592 – The roof system shall be tested according to ASTM E 1592 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air pressure Difference.

7.3 U.S. Army Corps of Engineers - The roof system has been tested in accordance with the Unified Facilities Guide Specification Section 07 61 13.

7.4 FM Global (Factory Mutual) –The roof system has been tested according to FMRC Standard 4471 and approved as a Class 1 Panel Roof. The Building manufacturer shall provide specific assemblies to meet the required Wind Rating per FM Global. Installation modifications or substitutions can invalidate the FM Global approval.

7.5 Dade County

8. PROVISION FOR EXPANSION/CONTRACTION

8.1 Provision for thermal expansion movement of the roof panels shall be accomplished by the use of clips with a movable tab. The stainless steel tabs shall be factory centered on the roof clip when installed to assure full movement in either direction. A force of no more than 8 pounds will be required to initiate tab movement. Each clip shall accommodate a minimum of 1.25" movement in either direction.

8.2 The roof shall provide for thermal expansion/contraction without detrimental effect on the roof panel when there is a $\pm 100^{\circ}\text{F}$. temperature difference between the interior structural framework of the building and the temperature of the roof panels.

9. ENERGY CONSERVATION

9.1 Purlins shall be insulated (optional) so as to eliminate "thermal short circuits" between purlins and roof panels. The heat loss (thermal short circuit) caused by compression of the blanket insulation between structural and panel is minimized by the use of a thermal block at each purlin location.

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Hylar 5000® is a trademark of Solvay Solexis.

2.03 WALL SYSTEM: BUTLERIB® II WALL SYSTEM BY BUTLER MANUFACTURING COMPANY

1. GENERAL

1.1 Exterior walls shall be covered with precision roll-formed Butlerib® II panels as furnished by Butler Manufacturing Company and installed in accordance with the manufacturer's instructions.

2. PANEL DESCRIPTION

2.1 Panels shall be 3' wide with four major corrugations, 1-1/2" high 12" on center with two minor corrugations between each of the major corrugations the entire length of the panel.

2.2 Panels shall be one piece from base to building eave.

2.3 The upper end of panels shall be fabricated with a mitered cut to match corrugations of the Butlerib® II roofs of 1/2" to 12" and square cut for all other roof panels and slopes

2.4 Wall panels shall be factory punched or field drilled at panel ends and shall match factory punched or field drilled holes in structurals for proper alignment.

3. PANEL DESIGN

3.1 Panel design shall be in accordance with the 2004 edition of the AISI "North American Specification for the Design of Cold Formed Steel Structural Members", and in accordance with sound engineering methods and practices.

4. PANEL MATERIAL AND FINISH

4.1 The panel material as specified shall be 26 or 24 gage galvanized steel (ASTM A 653) painted with exterior colors of Butler-Cote™ 500 FP finish system, a full strength, 70% Kynar 500® or Hylar 5000® fluoropolymer (PVDF) coating. Manufacturer shall warrant that coating shall not peel, crack or chip for 25 years. For a period of 25 years chalking shall not exceed ASTM D4214 #8 rating and will not fade more than 5 color difference units per ASTM D2244.

5. PANEL APPLICATION

5.1 Structural system shall be plumb before wall panels are attached.

5.2 Panels shall be aligned and attached in accordance with erection drawings furnished by the Building Manufacturer.

5.3 All side laps shall be at least one full corrugation.

5.4 Panels shall be sealed at the base with metal trim.

or

5.4 Panels shall be sealed at the base with metal trim and foam or rubber closures (Optional).

5.5 Trim material should be as follows:

5.5.1 All exterior trim shall be of the same finish as the exterior color of the wall panel except the following:

5.5.1.1 All gutters, downspouts, eave trim, gable trim, door side flashings and header flashings to be painted with exterior colors of Butler-Cote™ 500 FP finish system, a full strength, 70% Kynar 500® or Hylar 5000® fluoropolymer (PVDF) coating in the Manufacturer's standard color.

5.5.1.2 Windows shall be of aluminum extrusions (thermally broken) factory painted.

5.5.2 All flashings, trims, closures and similar items shall be as detailed on drawings as supplied by Butler Manufacturing Company.

6. FASTENERS

6.1 Wall panel-to-structural connections shall be made with Torx® head Scrubolt™ fasteners.

6.2 Wall panel-to-panel connections shall be made with Torx® head self-drilling screws.

6.3 Fastener locations shall be as shown on erection drawings as furnished by the Butler Manufacturing Company.

6.4 All exposed fasteners shall be factory painted to match wall color.

7. ACCESSORIES

7.1 Accessories (i.e., doors, windows, louvers) shall be as standard Butler Manufacturing Company unless otherwise noted, and furnished as specified.

7.2 Standard accessory locations shall be as shown on erection drawings as furnished by Butler Manufacturing Company.

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Fluoropon® is a registered trademark of The Valspar Corporation.
Kynar 500® is a registered trademark of Arkema.
Hylar 5000® is a trademark of Solvay Solexis.
Torx® is a trademark of the Camcar Division of Textron, Inc.

2.04 INSULATION

Butler MR 24 Roofing on Zee Purlins and Butler II Wall Panel Insulation shall be used as follows:

(Write description indicating where insulation is used.)

On all exterior wall and roof exposures for the main building and storage sheds.

The laminated fiberglass shall be Owens-Corning Fiberglas (NAIMA 202) (North American Insulation Manufacturer's Association) Certified R metal building insulation. The TIMA insignia and insulation thickness shall be ink jet printed on the fiberglass.

The back-fill insulation shall be Owens-Corning Fiberglas unfaced Pink Metal Building Insulation Plus.

The wall insulation used shall have a nominal thickness of 4" inches and shall have a certified "R" value of 9.1 .

The roof insulation used shall have a nominal thickness of 6" inches and shall have a certified "R" value of 20.0 .

Insulation Facing Materials

Roof/wall insulation facing shall be PSK Standard Duty (WMP-10). PSK Standard Duty is a .0015" thick UV stabilized white metalized polypropylene laminated to 14 # Kraft paper reinforced with glass fiber scrim. The facing is adhered to Owens-Corning Fiberglas Certified R (NAIMA 202) fiberglass insulation blanket. The assembly of blanket and facing has a flame spread rating of less than 25 and a U/L label can be furnished upon request. Perm rating is .02. Note that wall insulation stud facing sandwiched in with standard kraft faced wall insulation will have to be cut at approximately 32" o.c. to allow the wall to breath and not trap moisture.

2.05 METAL COATING SYSTEM: BUTLER-COTE™ 500 FP A FULL STRENGTH, 70% Kynar 500® or HYLAR® 5000 FLUOROPOLYMER (PVDF) COATING

1. SCOPE

1.1 This specification for the Kynar 500® or Hylar 5000® Fluoropolymer (PVDF) coating System covers the preparation, coating, physical characteristics and manufacturer's warranty on the factory applied exterior surface finish.

2. SUBSTRATE PREPARATION

2.1 G-90 hot dipped galvanized steel or AZ50 galvalume shall be given a controlled chemical conversion treatment.

3. COATING

3.1 The material shall be Fluoropon®, a full-strength 70% fluoropolymer Kynar 500® or Hylar 5000® finish.

3.2 After preparation of the steel, the exterior exposed surface shall be precision coated with primer and Fluoropon® color coat to a nominal total dry film thickness of 1.0 mil.

3.3 Interior exposed surfaces shall be coated with polyester color coat.

3.4 All coatings to be applied to entire material dimension of steel sheet prior to forming of panels.

4. PHYSICAL CHARACTERISTICS

4.1 The physical characteristics of the exterior coating shall provide resistance to failure through cracking, checking, peeling or loss of adhesion.

4.2 The physical characteristics of the exterior coating shall be measured by the following laboratory weather simulating tests to obtain test results justifying a manufacturer's 25-year warranty:

4.2.1 Humidity Resistance at 100° F. and 100% R.H. in accordance with ATSM D-2247.

4.2.2 Salt Spray Resistance at 5% Salt Fog per ATSM B-117.

4.2.3 Reverse Impact Resistance in accordance with ASTM D-2794.

4.2.4 Resistance to Accelerated Weathering - in an Atlas Model XW-R Dew Cycle Weather-OMeter in accordance with ASTM D-3361.

4.2.5 Resistance to Dry Heat.

4.2.6 Abrasion Resistance in accordance with ASTM D-968.

4.2.7 Chemical/Acid/Pollution Resistance with ASTM D-1308 and ASTM G-87.

4.3 Gloss of finish shall be maintained evenly over entire surface in accordance with ASTM D-523.

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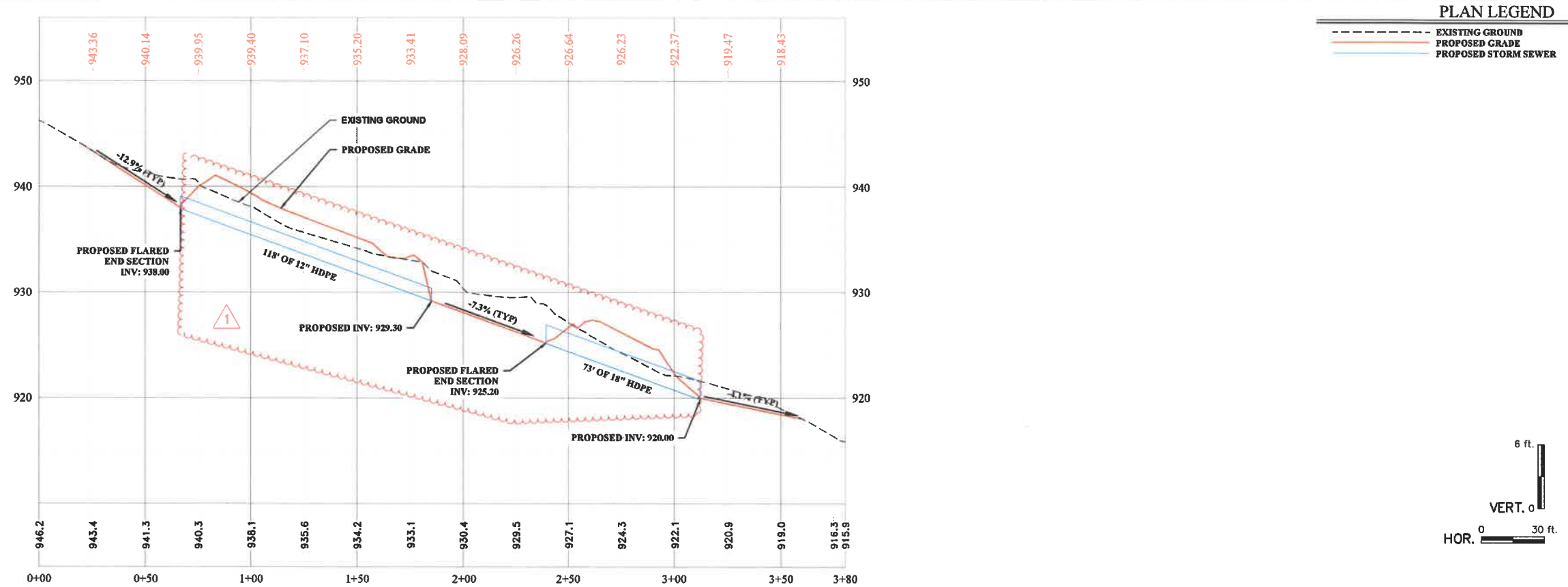
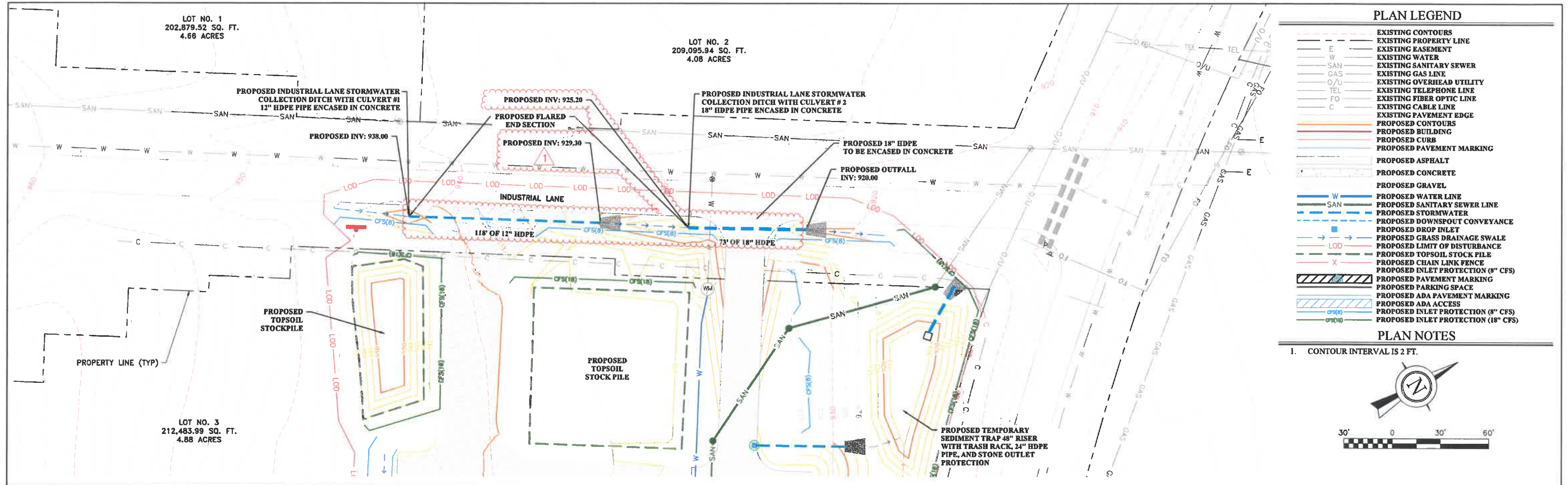
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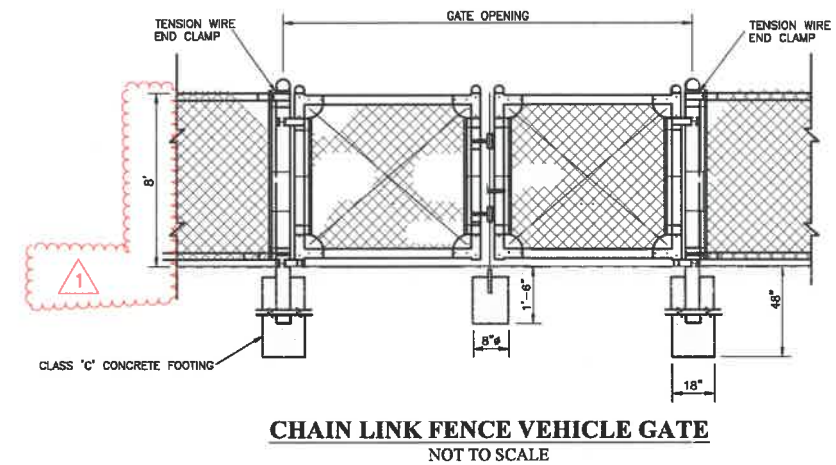
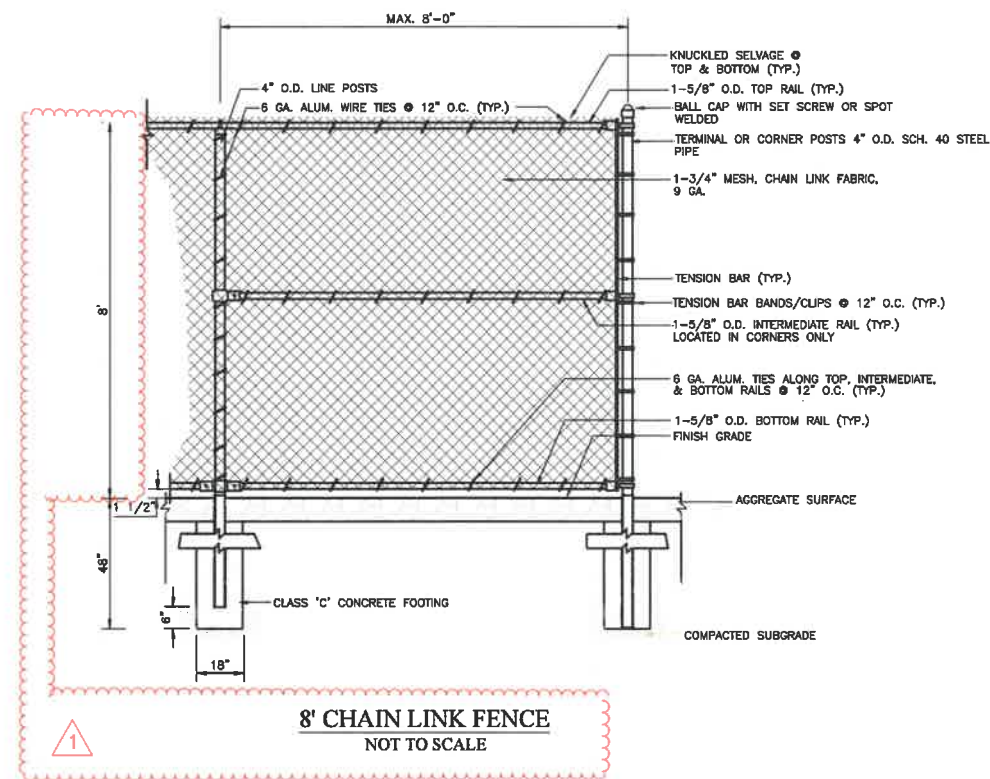
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LAYOUT TAB: STORM PROFILES-1
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NO.	BY	DATE	DESCRIPTION	1	PAE	04.08.2022	Addendum 1-Culvert 1 Inv Out EL, ditch slope, Culvert 2 Inv In EL						

LAYOUT Tab: D7
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NO.	BY	DATE	DESCRIPTION
1	PAE	04.08.2022	Addendum 1-Fence height

SCALE: AS SHOWN	
DRAWN: PAE	DATE: 04.08.2022
CHECKED: PAE	DATE: 04.08.2022
APPROVED: RRM	DATE: 04.08.2022
SURVEY DATE:	
SURVEY BY:	
FIELD BOOK No.:	

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PHASE No.	
CONTRACT No.	
PROJECT No.	
060-0958	

CONSTRUCTION PLANS FOR
HARDY COUNTY PSD BUILDING
HARDY COUNTY, WEST VIRGINIA
MARCH 2022
DETAILS

SHEET No.	
C-7.7	