



Board of County
Commissioners
Pete Gerken
President
Tina Skeldon Wozniak
Carol Contrada

Office of Support Services
Kelly Roberts
Director
Lynn DiPierro
Manager

Addendum #1 - Issued on October 12, 2012

Regarding Bids for **Engineer Road Maintenance Building Shell and Site Work (ITB 12-030P)** for Lucas County Engineer Road Maintenance, bid opening scheduled for October 26, 2012 at 2:00 P.M. (local time).

This document becomes a fully incorporated part of the specifications, and this letter constitutes legal notice of this requirement.

The entire original Bid Packet including this addendum must be submitted prior to the Bid Opening Date and Time.

Please see attached documentation:

- 12-030P - Addendum 01 - Question/Answer
- 12-030P - Addendum 01 - Revised Pricing Sheet
- 12-030P - Addendum 01 - Site Logistics Plan
- 12-030P - Addendum 01 - Arch Drawing Update
- 12-030P - Addendum 01 - Drawing and Spec Write-Up
- 12-030P - Addendum 01 - Specification Update
- 12-030P - Addendum 01 - Structural Drawing Update

ADDENDUM NO. 01

Lucas County Road Maintenance Building
Bid Package #12-030P – Shell & Site Work Packages
Dated 10/12/2012

Bidders on the above bid package shall note and respond to the following:

1. Questions:

- a) (SITE WORK & SHELL) Question: Please clarify the location of the mandatory Pre-Bid Meeting?

Answer: See Map shown below pointing to the meeting location.



- b) (SITE WORK) CLARIFICATION: Item 3.2.6 – Permanent Fence Change.

Answer: EXCLUDE the Permanent Fence from the Site Work scope of work (Reference Scope of Work Item 3.2.6). The Permanent Fence will now be issued in the General Trades package yet to be released.

- c) (SITE WORK) Question: Please Clarify the Temporary Stone requirements for this project and the Site Logistics Plan?

Answer: Reference the attached Site Logistic Drawing. The Site Logistics drawing shows all of the locations required to be temporary stone drives. The Site Logistics Drawing should be the basis for the Temporary Stone amounts required for this project. Reference scope item 3.2.7.

- d) (SITE WORK) Question: Does the Site Concrete Paving include the Fueling Station Non-Reinforced Concrete Pad?

Answer: No, the Site Work Package does not include the Non-Reinforced Concrete Pad at the Fueling Station. All other exterior Non-Reinforced Concrete Pads shown on the drawings are the responsibility of the Site Work Bidder. The Fueling Station Non-Reinforced Concrete Pad will be included in the Fueling Station Bid Package being release at a later date.

- e) (SITE WORK) Clarification: Estimated Quantities

Answer: The estimated quantities listed in the Site Work Package drawings are for information purposes only. It is each bidder's responsibility to verify quantities for all their work items from the drawings, specifications and bid documents.

- f) (SHELL) Question: On drawing S1.01 you show a bent PL 8" x 4" x 5/16" LLV w/ 5/8" Dia. x 6" Epoxy Anchors at each core approx. 12" c/c, please confirm who is responsible for this item?

Answer: The Edge angle shall be furnished and installed by the Shell Package bidder.

- g) (SHELL) Clarification: Who is responsible to fill the Metal Pan Stairs with concrete?

Answer: The Shell Package (Concrete Section) shall be responsible to furnish and install the concrete fill for the Metal Pan Stairs.

- h) (SHELL) Clarification: Specification 055113 (Metal Pan Stairs).

Answer: The Metal Pan Stairs Specification (055113) is part of the Shell Package (Misc. Metals Section).

- i) (SHELL) Clarification: On Drawing A1.01, Reference Railing Detail.

Answer: The Shell Package (Misc. Metals Section) shall be responsible to furnish and install the railings (guardrail, guard posts, fasteners, anchor bolts and other required items to provide a complete installation) as per the drawings and specifications.

- j) (SITE WORK & SHELL) Clarification: Below is the revised Estimated Budget for both packages.

<i>Revised Shell Package Estimate:</i>	<i>\$1,264,336</i>
<i>Revised Site Work Package Estimate:</i>	<i>\$827,114</i>

2. Due Date:

- a) No change to the Original Bid Package Due Date

3. Attachments Included in Addendum:

- a) "BP-01 – Addendum – 01 - Revised Pricing Sheet – 10-11-2012.pdf" – Revised Pricing Sheet must be filled out and submitted on the Bid Due Date.
- b) "BP-02 – Addendum – 01 – Site Logistics Plan.pdf"
- c) "BP-02 – Arch Drawing Update – Addendum 01.pdf"
- d) "BP-02 – Specification Update – Addendum 01.pdf"
- e) "BP-02 – Structural Drawing Update – Addendum 01.pdf"
- f) "BP-02 – Drawing and Spec Write-up – Addendum 01.pdf" – An Additional two questions are answered on the Drawing and Specification Write-up.

All other terms and conditions of to the original bid package remain in effect. Please sign and submit this addendum with the Pricing Sheet on the Bid Package Due Date.

ACCEPTED BY:

Name of Contractor:

By (Signature):

Date

PRICING SHEET

Lucas County Road Maintenance Building

Company Name _____

Street Address _____

City, State, Zip _____

Mailing Address _____
(If Different)

Contact Name _____

Phone No. _____

Fax No. _____

Email Address _____

DUE: October 26, 2012 @ 2:00 PM LOCAL TIME

TO: Lucas County Commissioners
One Government Center, Suite 480
Toledo OH 43604-2259

We, the undersigned, having carefully examined the Bid Documents agree to perform all work required by these documents heretofore submitted to bidder, as modified by any addenda listed herein.

1.0 **BASE BID**

Provide all necessary labor, material, supervision, taxes, insurance, cartage, storage, temporary protection, tools, equipment, layout, field engineering, and all things necessary or incidental to furnish, deliver and install complete in every detail the Work as defined by the drawings and specifications for the lump sum price of:

BID ITEM:

1.1 Lucas County Road Maintenance Building – Shell Package:

Base Bid Amount: _____

_____ Dollars \$: _____

1.2 Lucas County Road Maintenance Building – Site Work Package:

Base Bid Amount: _____
_____ Dollars \$: _____

1.3 **COMBINED BID** – Lucas County Road Maintenance Building – Site Work and Shell Packages:

Base Bid Amount: _____
_____ Dollars \$: _____

2.0 MANDATORY ALTERNATES

2.1 Shell Package – Formed Foundations - Furnish an Alternate Price to form the Foundations in lieu of earth-formed foundations as described in the base bid. The Drawings included in this Bid Package includes both the Base Bid Design of earth-formed foundations and the alternate design of formed foundations (Reference Title Blocks).

2.1 Alternate Bid Amount: _____
_____ Dollars \$: _____

3.0 CONTRACTOR'S FEE

After the signing of the contracts for the work included for this project, in the event it becomes necessary to authorize changes to the Scope of Work included in the Base Bid, the following "fees" shall apply.

- a. For additional work performed by your own forces, a fee of eight percent (8) of the approved cost of the work.
- b. For additional work performed by Subcontractors, a fee of five percent (5) of Subcontractor's approved cost of the work.

The "fee" stated above shall be the total amount to be added to the "approved cost" of the extra work and shall include "Profit and Overhead".

Cost shall be limited to the following: Cost of materials, including applicable tax and cost of delivery, cost of labor and applicable fringe benefits including Social Security, and Unemployment Insurance (labor cost may include a pro rata share of foreman's time; Workmen's Compensation and other applicable insurance); rental value of power tools and equipment.

Profit and Overhead shall include the following: travel, supervision, wages of timekeepers, watchmen and clerks, small tools, incidentals, general office expense and all other expenses not included in "Cost". The cost as used herein shall include all items of labor, materials, and equipment.

Fee shall include all profit and overhead and shall include the following: Travel other than required by Labor Agreement for trades directly involved in the work, supervision, wages of timekeepers, field

engineers and clerks, small tools, incidentals, general field and main office expense and all other expenses not included in "Cost".

4.0 ADDENDA

In the event that addenda have been received during the bidding period covering changes to the bid documents, the undersigned bidder subscribes to the following statement:

The work described in the following addenda is included in this proposal:

Addendum No. _____, Dated _____ Addendum No. _____, Dated _____

Addendum No. _____, Dated _____ Addendum No. _____, Dated _____

5.0 TIME OF COMPLETION

The undersigned bidder agrees to complete the work in accordance with the project schedule, as outlined in the Bid Documents.

6.0 REJECTION OF BIDS

The undersigned bidder acknowledges that the Owner reserves the right to reject any or all proposals and to award the work to other than the low bidder.

All bids will be opened publicly.

7.0 SITE INSPECTION

The undersigned bidder acknowledges that bidder has been afforded the opportunity to inspect the jobsite to arrive at a clear understanding of the conditions under which the work is to be done; to compare the site with the drawings and specifications; to satisfy bidder as to the condition of the premises; existing obstructions; condition, location, and size and configuration of buildings and areas allocated for construction purposes; location and availability of roads; location and availability of utilities, including the electrical characteristics of the available power; proximity and nature of Owner's existing operations; and any other conditions affecting the performance of the work.

No allowances or extra consideration on behalf of the undersigned bidder will be allowed by Owner by reason of additional costs, damages or other difficulties incurred by the undersigned bidder that could have been avoided had an adequate site inspection been undertaken by him.

8.0 EEO AND MBE

The undersigned bidder agrees to comply with all applicable local, state, and federal EEO and MBE goals and additional goals as set forth in the bid documents. See attached MBE Affidavit of Compliance and Bidder MBE Utilization Forms.

9.0 PRICE GUARANTEE

The undersigned bidder agrees that this proposal will remain firm for a period of not less than sixty (60) days and a maximum of _____ days.

10.0 LEGAL STATUS AND SIGNATURE OF BIDDER

Check one of the following:

- a. Bidder is an individual _____.
- b. Bidder is a corporation _____.
- c. Bidder is a partnership _____.

- 1) If Corporation -
State of Corporation _____

States in which qualified to do business -

- 2) If partnership, list names of all partners.

Name of Contractor

By (Signature)

Title

Address of Bidder

October 12, 2012

ADDENDUM NO. 001

To the Drawings and Specifications for:

Lucas County Road Maintenance Building Shell Package

106049

Lucas County Board of Commissioners

Prepared By:

THE COLLABORATIVE INC
Architects
Landscape Architects
Interior Designers
500 Madison Avenue
Toledo, Ohio 43604
Telephone: (419) 242-7405
Fax: (419) 242-7400

TO ALL BIDDERS:

This addendum supplements and amends the original drawings and specifications, and shall be taken into account in preparing proposals, and shall become a part of the contract documents. Receipt of this Addendum must be acknowledged in the Bid Form.

GENERAL

Questions:

- A. After reviewing the Technical Specifications for the Shell and Site Work Package manual I have a couple of questions. The Table of Contents lists Section 06 1600 Sheathing, but I did not see the section in the manual. Does the section apply to the project? Will it be provided in an upcoming addendum?

Answer: Section 06 1600 "Sheathing" covers wall sheathing used on the interior of the building wall surfaces. This material will be included with the Interiors bid package at a later date and **IS NOT** included in this bid package requirements.

- B. Also, I found Section 084113 - Aluminum-Framed Entrances and Storefronts, which is not listed on the Table of Contents. Does this section apply to the project?

Answer: Section 08 4113 "Aluminum-Framed Entrances and Storefronts" was inadvertently omitted from the Table of Contents; however, **it does apply** to this bid package scope of work including punched window openings.

Clarifications

1. **Base Bid Structural Foundations have been revised in their entirety. Refer to the revised drawings included with this addendum.**

Specifications

Table of Contents – (Section is re-issued)

- Item #1 Deleted Division 6 and reference to 06 1110 "Sheathing".
- Item #2 Added under Division 8 "Openings" Section 08 4113 "Aluminum-Framed Entrances and Storefronts". Section was included in bid package but missing from Table of Contents.
- Item #3 Added under Division 8 "Openings" Section 08 7100 "Door Hardware" which is first issued in this addendum.
- Item #4 Added under Division 8 "Openings" Section 08 7113 "Automatic Door Operators" which is first issued in this addendum.
- Item #5 Added under Division 8 "Openings" Section 08 8000 "Glazing" which is first issued in this addendum.

Section 05 5000 METAL FABRICATIONS

- Item #1 This section is re-issued as part of this addendum in its entirety. Refer to the attachment.

Section 05 5113 METAL PAN STAIRS

- Item #1 This section is issued as part of this addendum in its entirety. Refer to the attachment.

Section 08 7100 DOOR HARDWARE

- Item #1 This section is issued as part of this addendum in its entirety. Refer to the attachment.

Section 08 7113 AUTOMATIC DOOR OPERATORS

Item #1 This section is issued as part of this addendum in its entirety. Refer to the attachment.

Section 08 8000 GLAZING

Item #1 This section is issued as part of this addendum in its entirety. Refer to the attachment.

Drawings

Structural Drawings

Drawing F1.01 "Foundation Plan – Base Bid" – Re-Issued

Item #1 Foundation sizes revised based on structural design change to include hairpin ties.
Item #2 Revisions to Foundation Notes.

Drawing F1.01A "Foundation Plan – Alternate 001" – Re-Issued

Item #1 Revised foundation sizes along Column Lines '5' and '6'.
Item #2 Revisions to Foundation Notes as indicated.
Item #3 Revised thickness of floor slab in Repair Garage from 6-inches to 8-inches. Refer to shaded floor slab area on included drawing.

Drawing F1.02 "Foundation Schedules; Concrete Sections & Details – Base Bid" – Re-Issued

Item #1 Revised foundation schedule, sections and details as indicated.

Drawing F1.03 "Concrete Sections & Details – Base Bid" – Re-Issued

Item #1 Revised sections and details as indicated.

Drawing F1.04 "Salt Building Foundation and Details" – New Sheet

Item #1 First issue of this drawing as part of Shell Package.

Drawing S1.01 "Mezzanine Plan – Base Bid" – Re-Issued

Item #1 Extended mezzanine between Column Lines 'F' and 'E'.
Item #2 Added "Section 5" on sheet.

Architectural Drawings

Drawing A1.01 "First Floor Plan" – Re-Issued

Item #1 Added metal guard rails along interior north and south walls of the Garage.
Item #2 Revised exterior door number from "121E" to "121B".
Item #3 Added Railing Detail A5.
Item #4 Added section and elevation references to metal stairs.

Drawing A1.02 "Mezzanine Floor Plan" – Re-Issued

Item #4 Added section and elevation references to metal stairs.
Item #2 Added room name "Mech. Equipment 203".

Drawing A1.11 "Enlarged Plans & Interior Elevations" – Re-Issued

Item #1 Revised sheet name/title and deleted "Door Schedule".
Item #2 Revised door locations in concrete masonry walls as indicated to be 4-inches from adjacent wall surfaces.

Drawing A2.01 "Door Schedules" – Re-Issued

Item #1 Added hardware set numbers to all swing doors.

Drawing A4.01 "Building Sections" – Re-Issued

Item #1 Added interior metal guard rails in garage area.

Item #2 Added reference to mezzanine space "Mech. Equipment 203" to appropriate building sections.

Drawing A4.11 "Wall Sections" – Re-Issued

Item #1 Deleted references to "split faced" concrete masonry.

Item #2 Updated sections to show base bid foundations.

Item #3 Added vertical wall reinforcing notes to sections.

Item #4 Corrected dimension from finish floor to mezzanine level.

Item #5 Revised detail at edge of mezzanine in Section A2.

Drawing A4.12 "Wall Sections" – Re-Issued

Item #1 Updated sections to show base bid foundations.

Drawing A4.13 "Wall Sections" – Re-Issued

Item #1 Updated sections to show base bid foundations.

Item #2 Added vertical wall reinforcing notes to sections.

Drawing A4.14 "Wall Sections" – Re-Issued

Item #1 Updated sections to show base bid foundations.

Item #2 Added vertical wall reinforcing notes to sections.

Item #3 Added Plan Detail A1 to sheet.

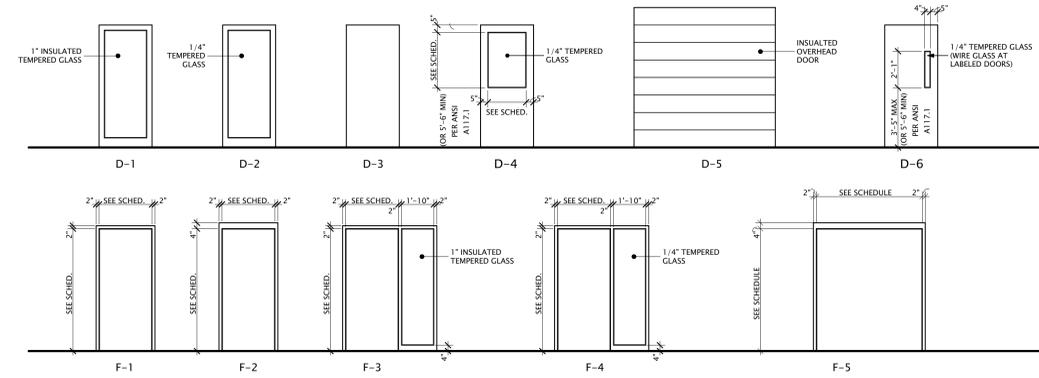
Item #4 Added Section B1 to sheet.

Drawing A5.01 "Stair Sections" – New Sheet

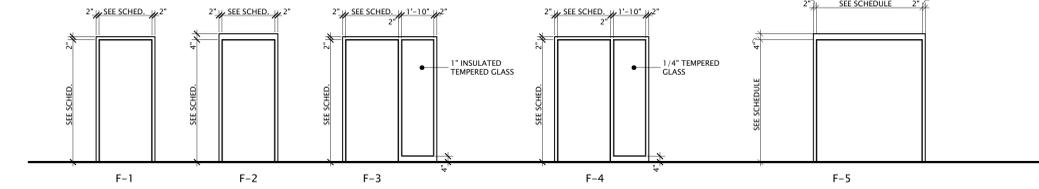
Item #1 Added sheet detailing metal stairs and associated railings.

6 | 5 | 4 | 3 | 2 | 1

E



DOOR TYPES & FRAMES
SCALE: 1/4" = 1'-0"



No.	SIZE		Door			FRAME				HOW SET	FIRE RATING	REMARKS
	W	HT	EL	MATL	FN	EL	H	J	MATL			
101	3'-0"	7'-0"	D-1	ALUM		F-2	J-4	ALUM			011	
101A	3'-0"	7'-0"	D-2	ALUM		F-4	J-4	ALUM			013	
102	3'-0"	7'-0"	D-6	HM	PT	F-2	J-1	HM	PT		004	
103	3'-0"	7'-0"	D-3	HM	PT	F-2	J-3	HM	PT		001	
104	3'-0"	7'-0"	D-3	HM	PT	F-2	J-3	HM	PT		001	
105	3'-0"	7'-0"	D-4	HM	PT	F-2	J-1	HM	PT		004	
106	3'-0"	7'-0"	D-6	HM	PT	F-2	J-1	HM	PT		004	
107	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		005	
108	3'-0"	7'-0"	D-3	HM	PT	F-2	J-3	HM	PT		012	
108A	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		005	
109	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		006	
110A	3'-0"	7'-0"	D-4	HM	PT	F-2	J-1	HM	PT		005	
110B	3'-0"	7'-0"	D-4	HM	PT	F-2	J-1	HM	PT		005	
111	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		008	
112	3'-0"	7'-0"	D-1	ALUM		F-2	J-4	ALUM			009	
112A	3'-0"	7'-0"	D-3	HM	PT	F-2	J-3	HM	PT		002	
113	3'-0"	7'-0"	D-3	HM	PT	F-2	J-3	HM	PT		003	
114A	3'-0"	7'-0"	D-3	HM	PT	F-2	J-3	HM	PT		002	
114B	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		002	
114C	6'-0"	7'-0"	D-3	HM	PT	F-5	J-1	HM	PT		007	
115	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
115A	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
115B	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
115C	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
115D	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		010	
115E	3'-0"	7'-0"	D-6	HM	PT	F-2	J-1	HM	PT		004	
121	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
121A	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		008	
121B	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		008	
121C	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
121D	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		008	
122	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
122A	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
122B	3'-0"	7'-0"	D-6	HM	PT	F-2	J-1	HM	PT		004	
122C	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		008	
123	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		008	
123A	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
123B	14'-0"	14'-0"	-	-	-	D-5	J-2	MTL	PT			INSULATED OVERHEAD DOOR
124	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		003	
125	6'-0"	7'-0"	D-3	HM	PT	F-5	J-1	HM	PT		007	
130	3'-0"	7'-0"	D-3	HM	PT	F-2	J-1	HM	PT		008	
201	3'-0"	7'-0"	D-3	HM	PT	F-2	J-3	HM	PT		002	
203A	3'-0"	7'-0"	D-3	HM	PT	F-2	J-3	HM	PT		002	
203B	3'-0"	7'-0"	D-3	HM	PT	F-2	J-3	HM	PT		002	

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tgc@thecollaborativeinc.com

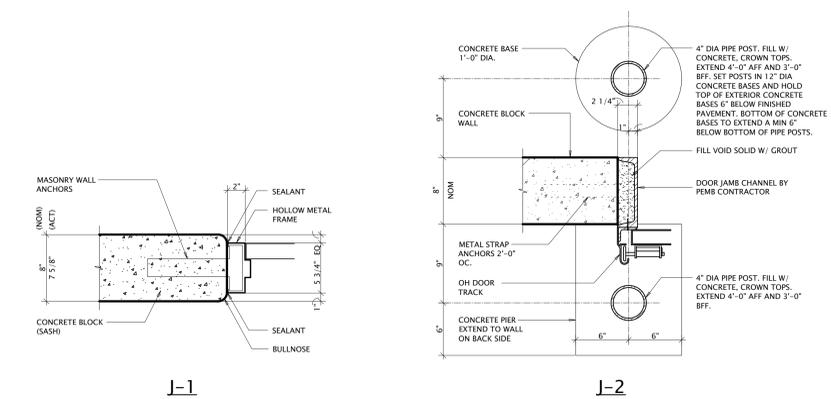
the COLLABORATIVE inc

ARCHITECTS
LANDSCAPE ARCHITECTS
INTERIOR DESIGNERS
PLANNERS

2-006 Received 10/12/2012

D

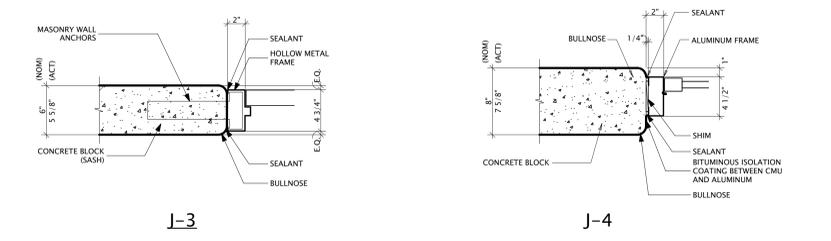
C



J-1

J-2

B



J-3

J-4

PROJECT TITLE
Lucas County Road Maintenance Building
1049 S. McCord Rd.
Holland, Ohio

Prepared for the
Lucas Co. Board of Commissioners

10.11.2012 ADD - 001
09.28.2012 BIDDING
BID PACKAGE:
SHELL PACKAGE

CHECKED ARB
APPROVED AB

TCI JOB NO. 106049

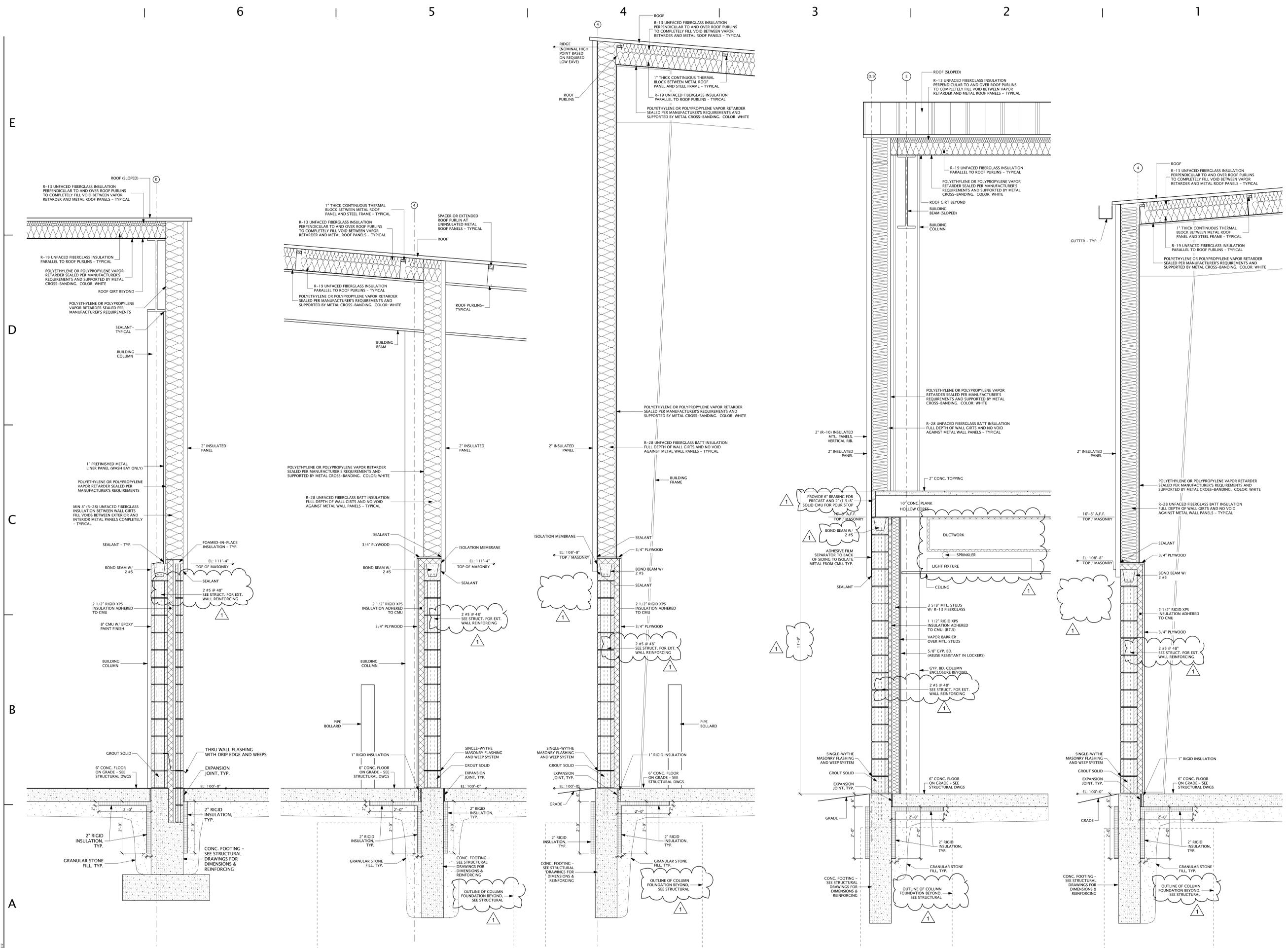
SHEET TITLE
Door Schedules

SHEET NO.
A2.01

A

A

6 | 5 | 4 | 3 | 2 | 1



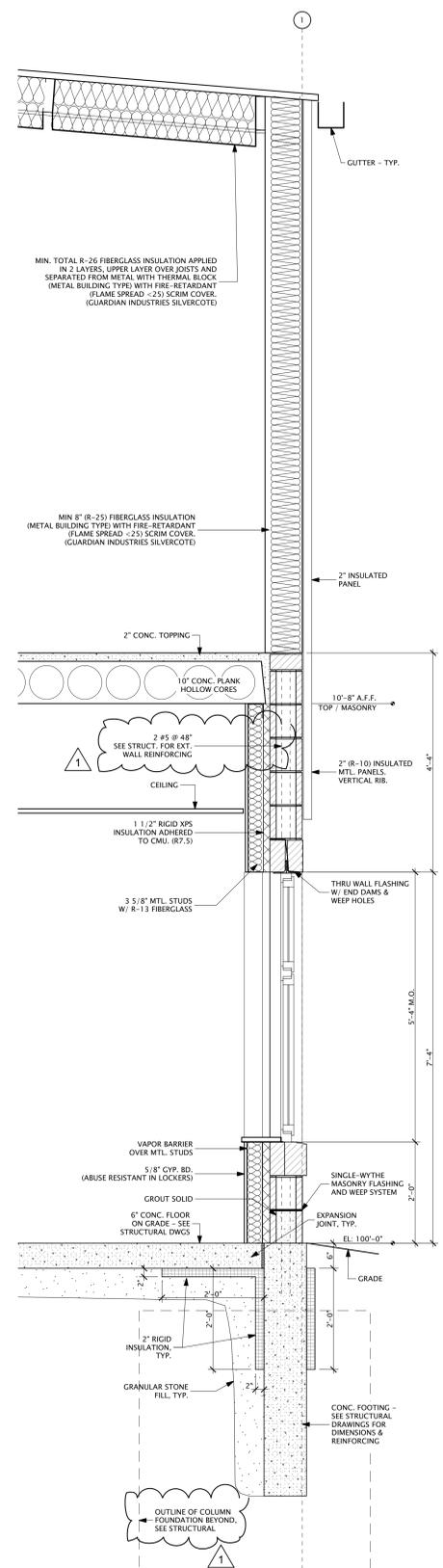
A4.11 WALL SECTION
 SCALE: 3/4" = 1'-0"

A5 WALL SECTION
 SCALE: 3/4" = 1'-0"

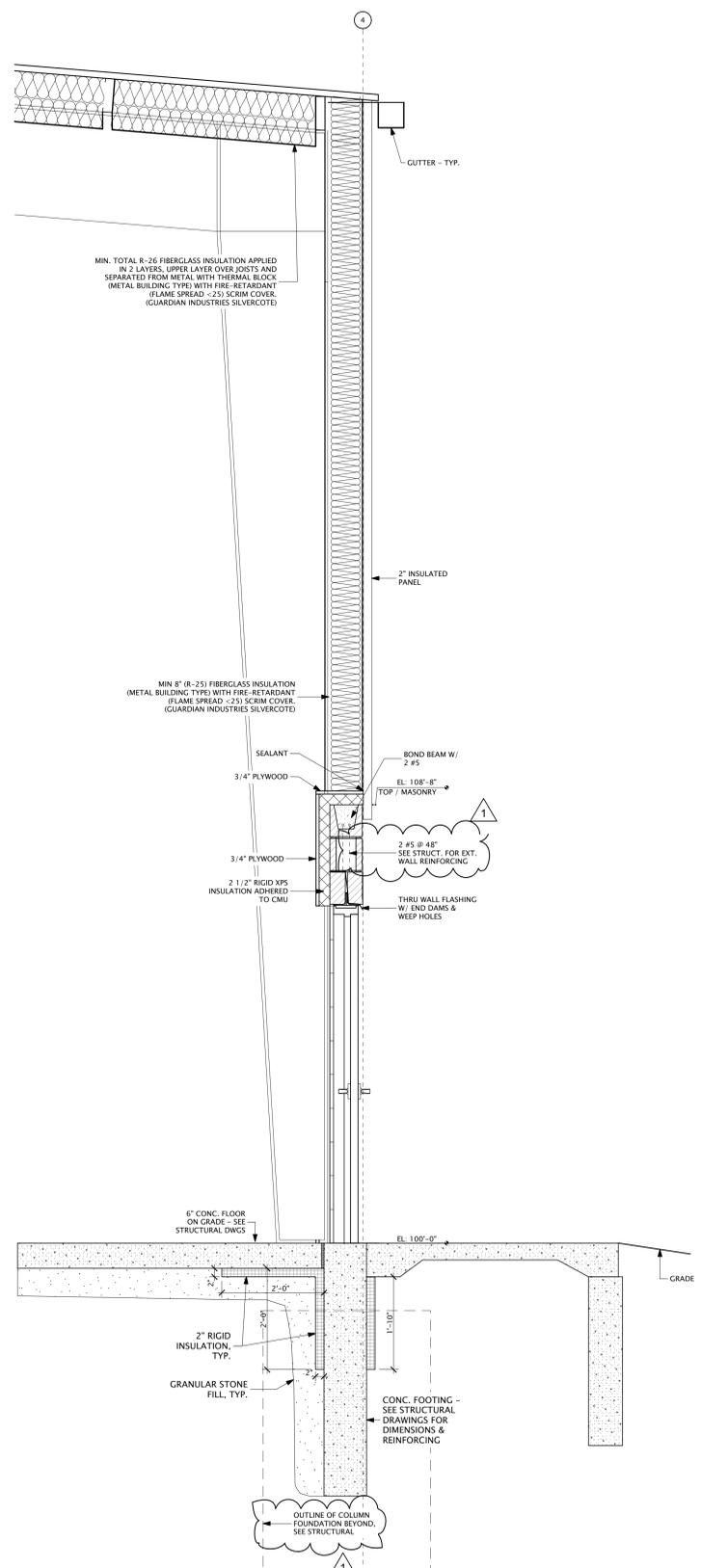
A3 WALL SECTION
 SCALE: 3/4" = 1'-0"

A2 WALL SECTION
 SCALE: 3/4" = 1'-0"

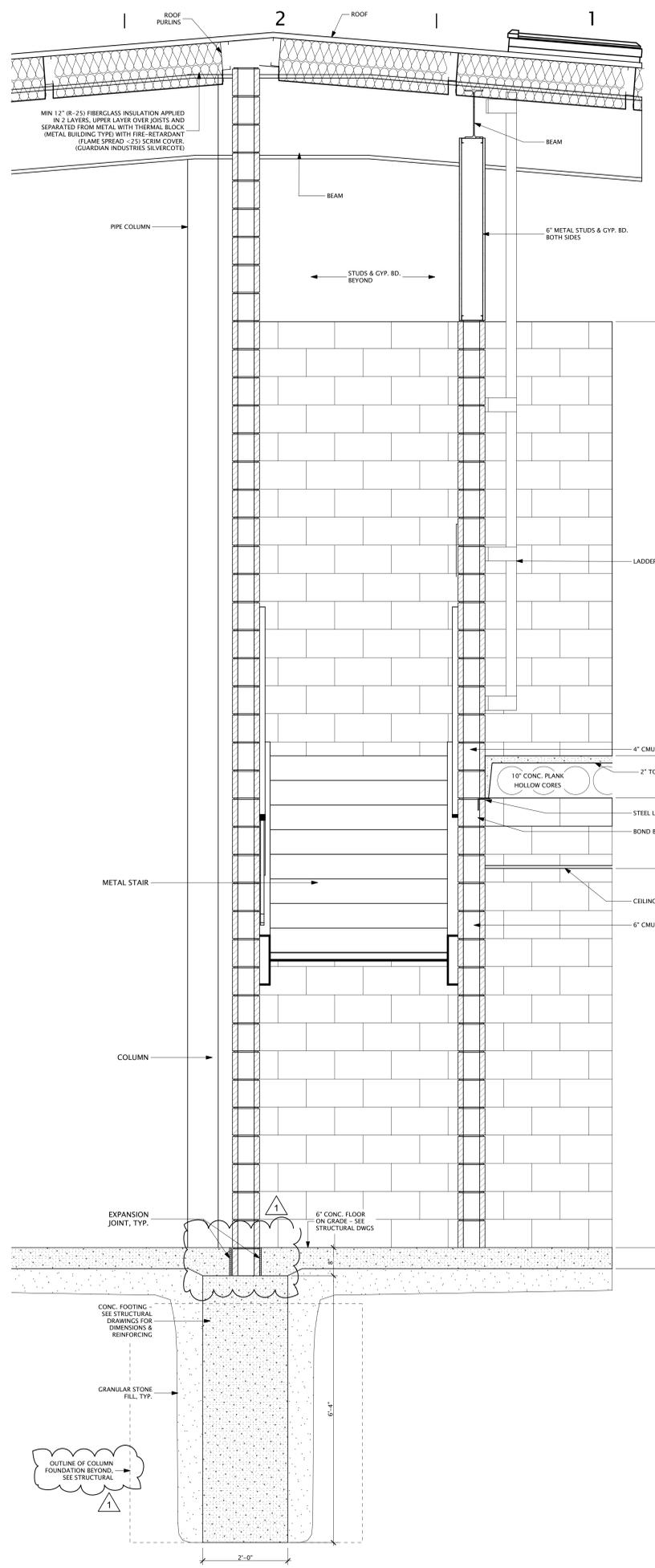
A1 WALL SECTION
 SCALE: 3/4" = 1'-0"



A5 WALL SECTION
 SCALE: 3/4" = 1'-0"



A3 WALL SECTION
 SCALE: 3/4" = 1'-0"



A1 WALL SECTION
 SCALE: 3/4" = 1'-0"

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 tci@thecollaborativeinc.com



ARCHITECTS
 LANDSCAPE ARCHITECTS
 INTERIOR DESIGNERS
 PLANNERS

2-006 Received 10/12/2012

PROJECT TITLE
Lucas County Road Maintenance Building
 1049 S. McCord Rd.
 Holland, Ohio
 Prepared for the
 Lucas Co. Board of Commissioners

10.11.2012	ADD - 001
09.28.2012	BIDDING
BID PACKAGE: SHELL PACKAGE	

CHECKED **ARB**
 APPROVED **AB**

TCI JOB NO. 106049

SHEET TITLE
Wall Sections

SHEET NO.
A4.13

10.11.2012	ADD - 001
09.28.2012	BIDDING
BID PACKAGE:	
SHELL PACKAGE	

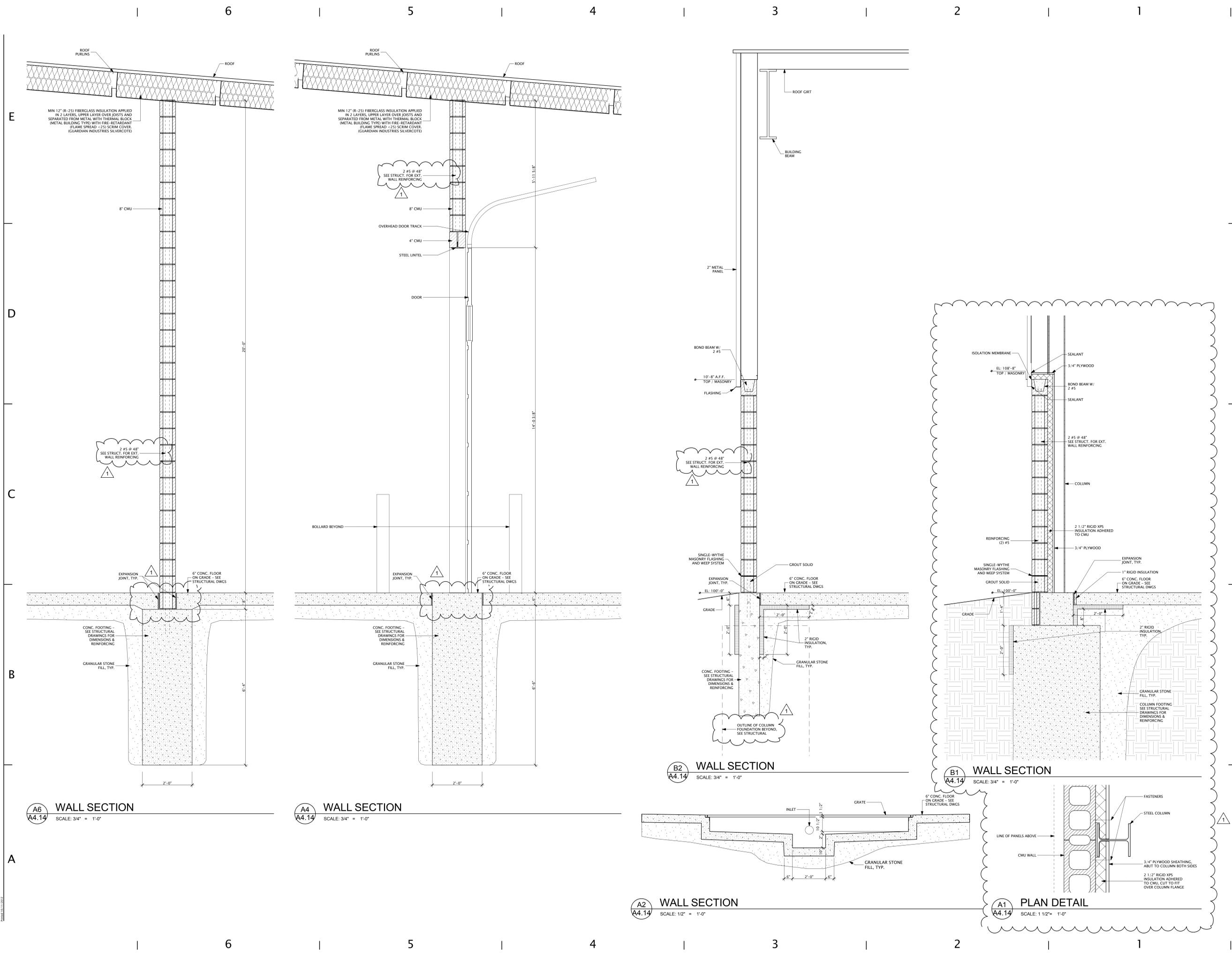
CHECKED ARB
APPROVED AB

TCI JOB NO. 106049

SHEET TITLE
Wall Sections

SHEET NO.

A4.14



A6 WALL SECTION
SCALE: 3/4" = 1'-0"

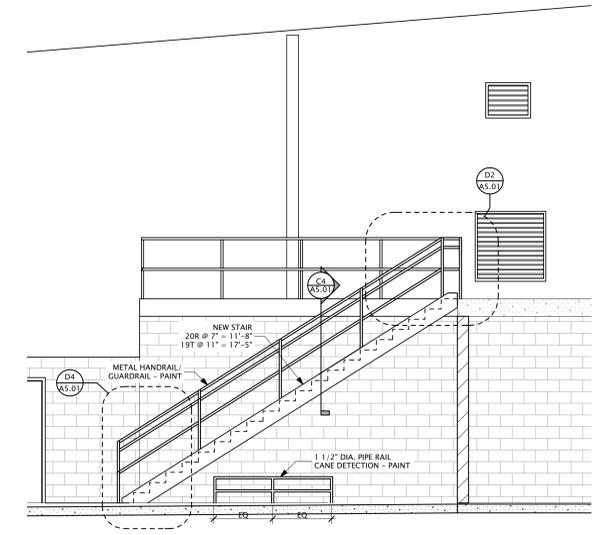
A4 WALL SECTION
SCALE: 3/4" = 1'-0"

A2 WALL SECTION
SCALE: 1/2" = 1'-0"

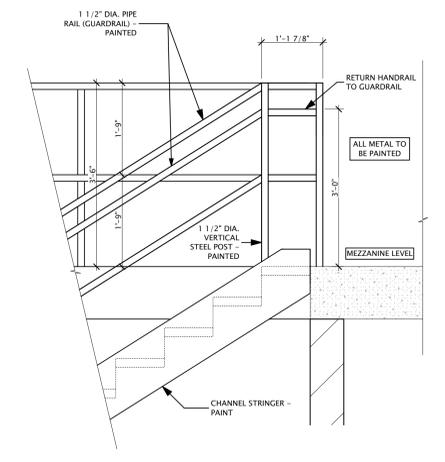
B2 WALL SECTION
SCALE: 3/4" = 1'-0"

B1 WALL SECTION
SCALE: 3/4" = 1'-0"

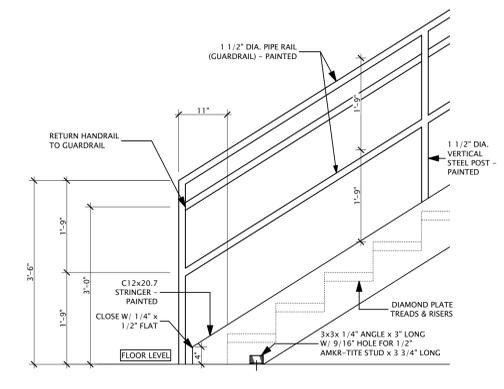
A1 PLAN DETAIL
SCALE: 1 1/2" = 1'-0"



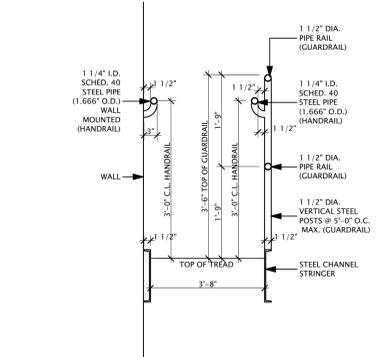
D1 ELEVATION STAIR 1
SCALE: 1/4" = 1'-0"



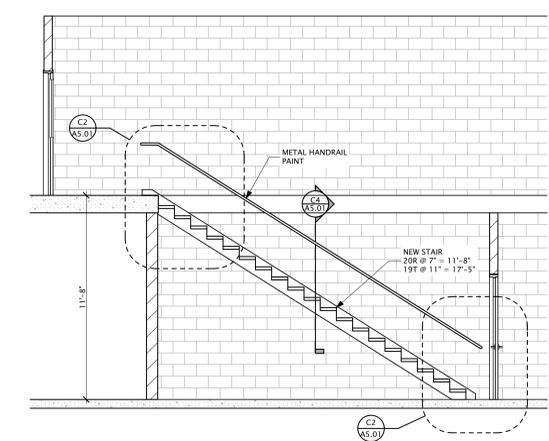
D2 UPPER RAIL DETAIL STAIR 1
SCALE: 3/4" = 1'-0"



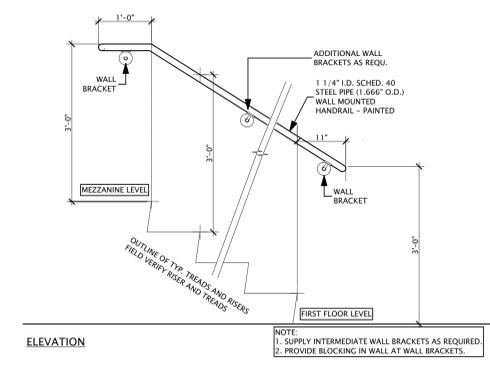
D4 LOWER RAIL DETAIL STAIR 1
SCALE: 3/4" = 1'-0"



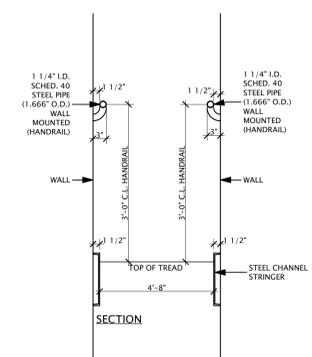
D5 DETAIL STAIR 1
SCALE: 3/4" = 1'-0"



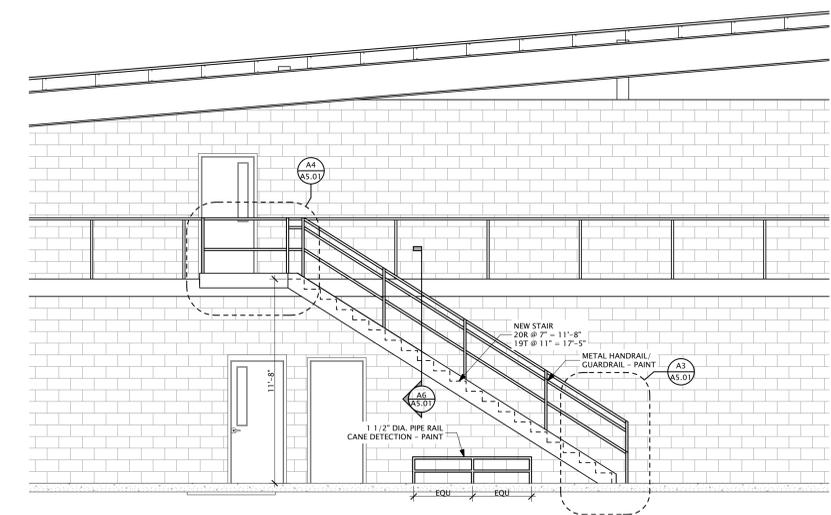
C1 SECTION STAIR 2
SCALE: 1/4" = 1'-0"



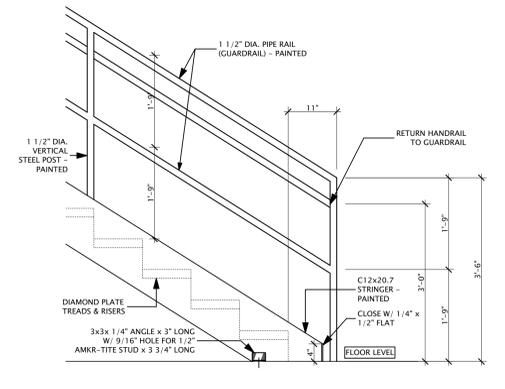
C2 RAIL SECTION DETAIL STAIR 2
SCALE: 3/4" = 1'-0"



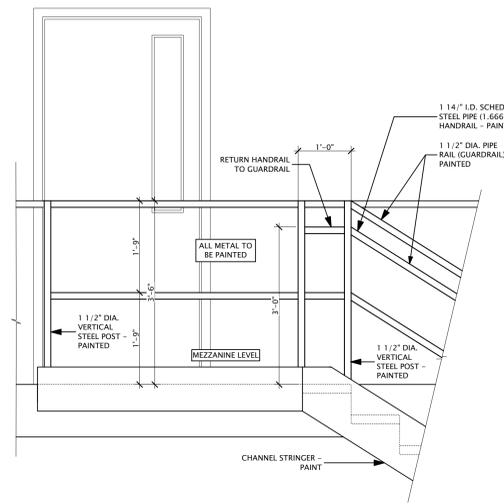
C4 DETAIL STAIR 2
SCALE: 3/4" = 1'-0"



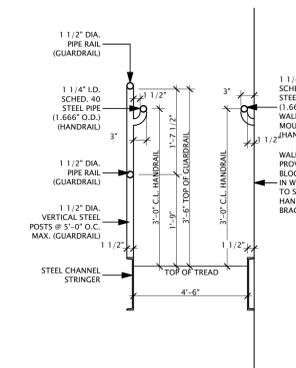
A1 ELEVATION STAIR 3
SCALE: 1/4" = 1'-0"



A3 LOWER RAIL DETAIL STAIR 3
SCALE: 3/4" = 1'-0"



A4 UPPER RAIL DETAIL STAIR 3
SCALE: 3/4" = 1'-0"



A6 DETAIL STAIR 3
SCALE: 3/4" = 1'-0"

E

D

C

B

A

A5.01

6

6

5

4

3

2

1

6

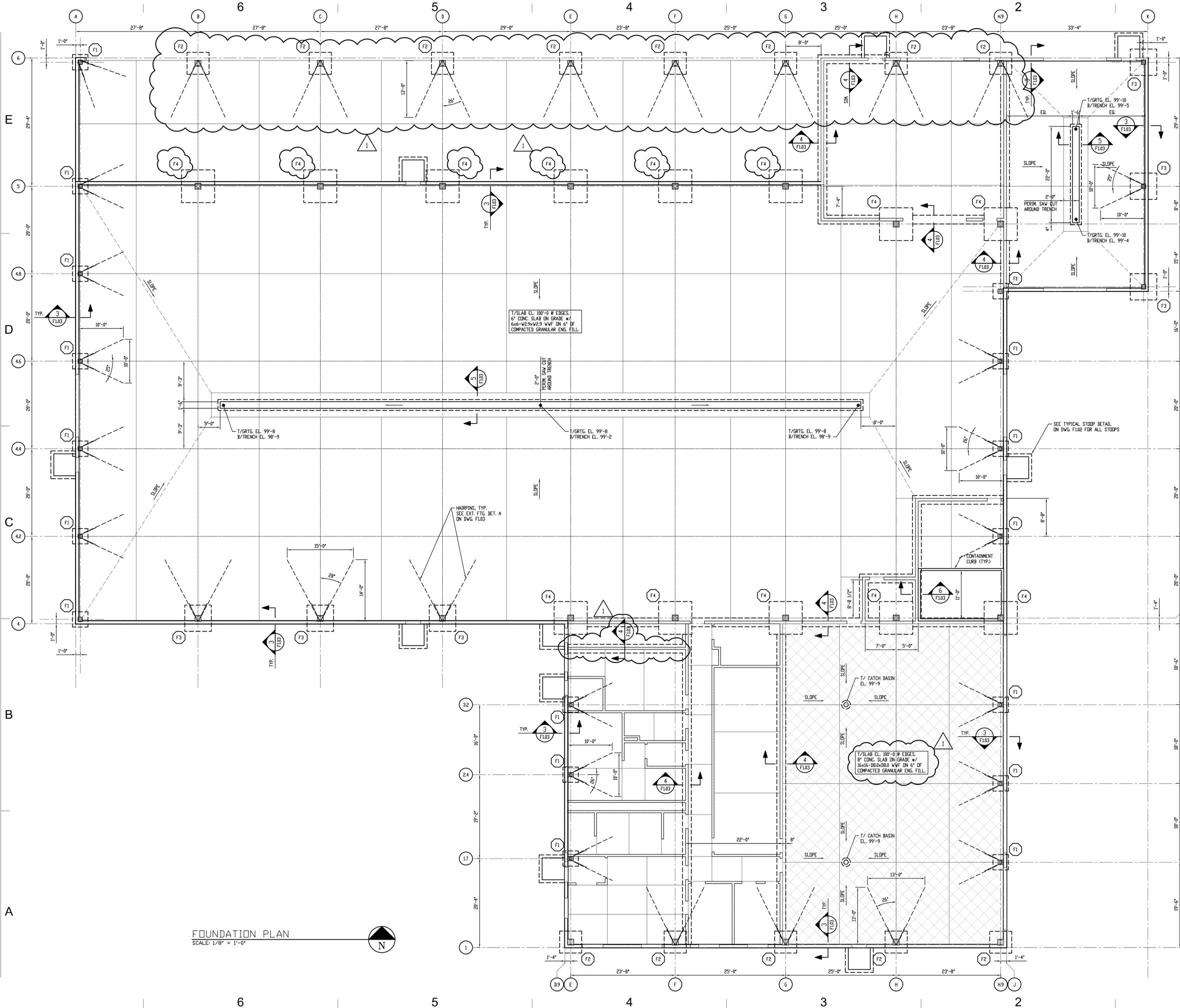
5

4

3

2

1



- FOUNDATION NOTES**
1. ALL ELEVATIONS ARE REFERENCED FROM TOP OF GROUND SLAB ELEVATION OF 100'-0" = 636.00
 2. BUILDING FOUNDATION BEARING SOILS SHALL BE PREPARED IN ACCORDANCE WITH THE RECOMMENDATIONS GIVEN BY "BOWSER MORNER"; SOILS REPORT NO. 159064-0812-3805.
 3. SPREAD FOOTING DESIGN IS BASED ON AN ALLOWABLE BEARING CAPACITY OF 2000 PSF. IF UNUSUAL CONDITIONS ARE ENCOUNTERED THE CONTRACTOR SHALL BRING THIS TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.
 4. SPREAD FOOTINGS AND PIERS ARE CENTERED ABOUT COLUMNS, UNLESS NOTED OTHERWISE. WALL STOP FOOTINGS ARE CENTERED ABOUT FOUNDATION WALLS, UNL.
- CONCRETE NOTES**
1. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSION STRENGTH OF 3,000 PSI AT 28 DAYS.
 2. THE DETAILING, BENDING AND PLACEMENT OF REINFORCING STEEL AND CONCRETE SHALL BE IN ACCORDANCE WITH THE LATEST ACI STANDARD CODE.
 3. ALL CONCRETE REINFORCING SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A615, GRADE 60.
 4. ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185, LAP MESH SHEETS ONE SQUARE MESH PLUS 2 INCHES, MINIMUM.
 5. CORNER BARS SHALL BE PROVIDED TO MATCH HORIZONTAL WALL AND FOOTING REINFORCEMENT AT ALL CORNERS. LAP 48 BAR DIAMETERS.
 6. ALL CONCRETE SLABS ON GRADE SHALL HAVE CONTROL JOINTS SPACED AT 25'-0" C/C EACH WAY, MAXIMUM. SPACING ASPECT RATIO SHALL NOT EXCEED 24. SEE PLAN FOR SPECIFIC CONTROL JOINT (C.J.) LOCATIONS.
 7. PRIOR TO PLACING CONCRETE COORDINATE WITH ALL OTHER TRADES, SUCH AS MECHANICAL, ELECTRICAL AND PLUMBING, THE INSTALLATION OF ALL ANCHOR BOLTS, PIPE SLEEVES, CONDUITS AND ETC.
 8. ALL CONCRETE WALLS SHALL BE SUPPORTED Laterally DURING BACKFILLING.
 9. PROVIDE A 3/4" CHAMFER ON ALL EXPOSED EDGES OF CONCRETE.
 10. ALL EXTERIOR CONCRETE SHALL BE AIR ENTRAINED WITH AN AIR CONTENT OF 5% ± OF THE VOLUME OF CONCRETE.
 11. IN COLD WEATHER (LESS THAN 40°F) THE CONCRETE TEMPERATURE SHALL BE MAINTAINED BETWEEN 50°F & 70°F DURING CURING.
 12. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, INTERFERENCE AND CONDITIONS PRIOR TO CONCRETE POUR AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
- MASONRY NOTES**
1. HOLLOW CONCRETE BLOCK MASONRY UNITS SHALL CONFORM WITH ASTM C-90 AND HAVE A MINIMUM UNIT STRENGTH OF 1900 PSI AND AN ASSEMBLY DESIGN STRENGTH (F_m) OF 1500 PSI.
 2. MORTAR SHALL BE TYPE "M" OR "S" AND CONFORM WITH ASTM C-270.
 3. SPECIAL INSPECTION FOR MASONRY CONSTRUCTION SHALL BE PROVIDED PER THE OHIO BUILDING CODE.
 4. GROUT SHALL HAVE A MINIMUM COMPRESSION STRENGTH OF 2000 PSI AND CONFORM WITH ASTM C-476.
 5. THE CONTRACTOR IS RESPONSIBLE FOR THE SHORING OF MASONRY WALLS DURING CONSTRUCTION.
 6. REFER TO ARCHITECTURAL DRAWINGS FOR MASONRY WALL LOCATIONS AND OPENING SIZES NOT GIVEN IN THESE DRAWINGS.
 7. ALL VERTICAL WALL REINFORCEMENT SHALL SPAN FROM FOOTING TO PARAPET IN SOLID GROUTED CELLS, WITH 48 BAR DIA. LAPS. BOWEL WALLS TO FOOTINGS WITH MATCHING REINFORCEMENT.
 8. ALL WALL CORNERS, ENDS AND OPENINGS LARGER THAN 2'-6" SHALL BE REINFORCED W/ #5 VERTICAL FOR HEIGHT OF FLOOR.
 9. REFER TO ARCHITECTURAL DRAWINGS FOR ANY ADDITIONAL VERTICAL OR HORIZONTAL REINFORCING NOT SHOWN IN THESE DRAWINGS.
 10. ALL MASONRY WALLS SHALL BE HORIZONTALLY REINFORCED WITH 9 GAGE JOINT REINFORCEMENT (CRUSS OR LADDER TYPE) AT 16" C/C. LAP REINFORCEMENT 16 INCHES.
 11. ALL MASONRY WALLS SHALL BE VERTICALLY REINFORCED WITH #5 @ 48" C/C.

FOUNDATION PLAN
SCALE: 1/8" = 1'-0"



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ARCHITECTS
LANDSCAPE ARCHITECTS
INTERIOR DESIGNERS
PLANNERS

C-006 Received 10/12/2011

KEY PLAN
N.T.S.



PROJECT TITLE
Lucas County Road Maintenance Building
1049 S. McCord Rd.
Holland, Ohio

Prepared for the
Lucas Co. Board of Commissioners

10.11.12 ADD - 001
09.28.12 ISSUED FOR BIDS
BID PACKAGE:
PRE-ENGINEERED METAL BUILDING SYSTEM

CHECKED DLW
APPROVED DLW

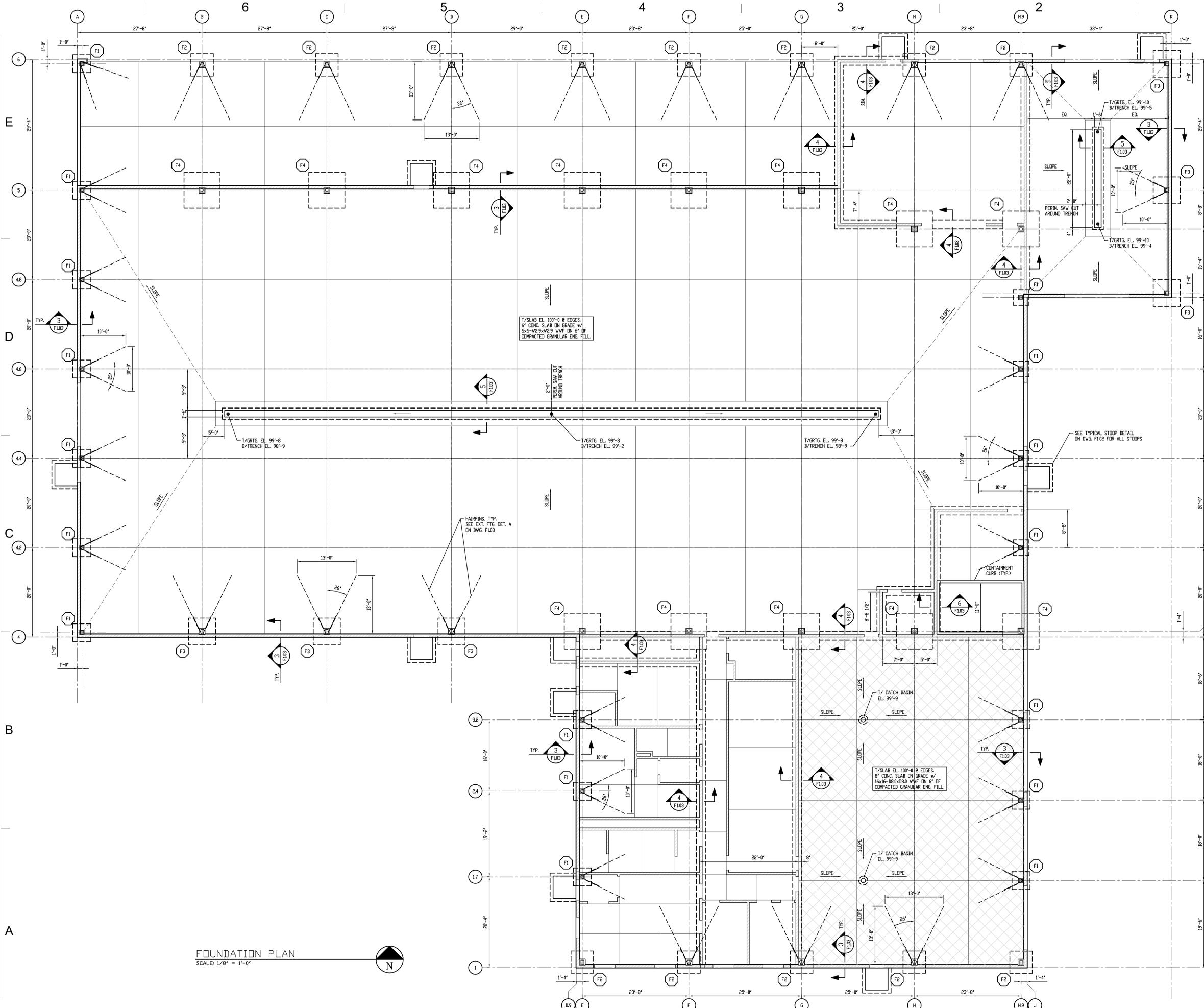
TCI JOB NO. 106049

SHEET TITLE
FOUNDATION PLAN

ALTERNATE 001

SHEET NO.

F1.01A



- FOUNDATION NOTES**
1. ALL ELEVATIONS ARE REFERENCED FROM TOP OF GROUND SLAB ELEVATION OF 100'-0" @ 636.80
 2. BUILDING FOUNDATION BEARING SOILS SHALL BE PREPARED IN ACCORDANCE WITH THE RECOMMENDATIONS GIVEN BY "BOWSER MORNER"; SOILS REPORT NO. 159064-0812-3805.
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THE COLLABORATIVE inc

ARCHITECTS
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INTERIOR DESIGNERS
PLANNERS

C-006 Received 10/12/2011

KEY PLAN
N.T.S.

Structural Design Systems, Inc.
12875 E. 1st St., Suite A
Paradee, OH 43081
Phone: (614) 852-7100
Fax: (614) 852-7104

PROJECT TITLE
Lucas County Road Maintenance Building

1049 S. McCord Rd. Holland, Ohio

Prepared for the Lucas Co. Board of Commissioners

0.1.1.12 ADD - 001
09.28.12 ISSUED FOR BIDS
BID PACKAGE SHELL PACKAGE

CHECKED DLW
APPROVED DLW

TCI JOB NO. 106049

SHEET TITLE
FOUNDATION PLAN

BASE BID

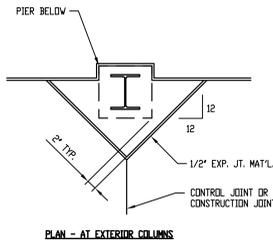
SHEET NO.
F1.01

ENTIRE DRAWING REISSUED

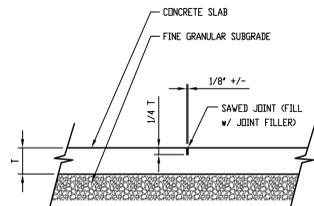
FOUNDATION PLAN
SCALE: 1/8" = 1'-0"



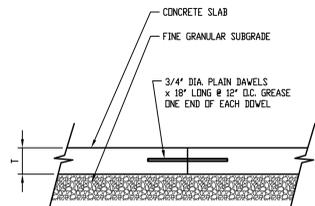
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PLAN - AT EXTERIOR COLUMNS

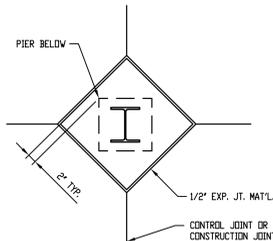


TYP. SLAB CONTROL JOINT (CJ)
SCALE: N.T.S.



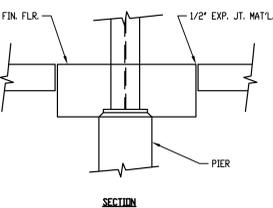
TYP. SLAB CONSTRUCTION JT. (CJ)
SCALE: N.T.S.

FOOTING AND PIER SCHEDULE					
MARK	F1	F2	F3	F4	
SIZE (WxLxD)	4'-0x4'-0x5'-8	5'-0x5'-0x5'-8	6'-0x6'-0x5'-8	8'-0x8'-0x5'-8	
B/FTG. EL.	93'-0	93'-0	93'-0	93'-0	
REINFORCING	4-#7 TOP & BOT. EA. WAY	5-#7 TOP & BOT. EA. WAY	6-#7 TOP & BOT. EA. WAY	8-#7 TOP & BOT. EA. WAY	
SIZE (A x B)	16'x16'	16'x16'	16'x16'	16'x16'	
T/PIER ELEV.	100'-0	100'-0	100'-0	100'-0	
REINFORCING	6-#5	6-#5	6-#5	6-#5	
TIES	#3 @ 3' c/c				
FTG. PERIM. TIES	#4 @ 12" c/c				
NOTES	SEE TYP. EXTERIOR FTG. SECTION				

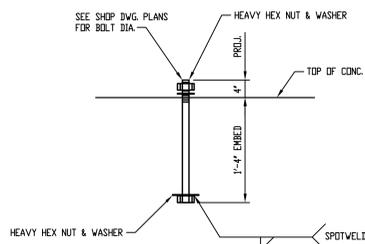


PLAN - AT INTERIOR COLUMNS

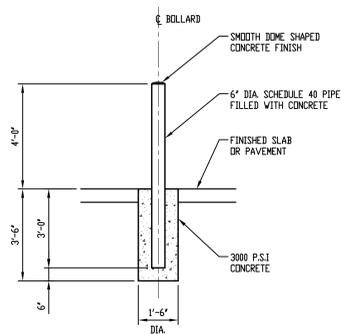
SEE ANCHOR BOLT LAYOUT FOR SIZE AND LOCATIONS



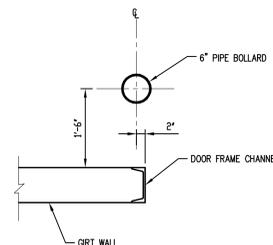
TYP. ISOLATION JOINT DETAIL
SCALE: N.T.S.



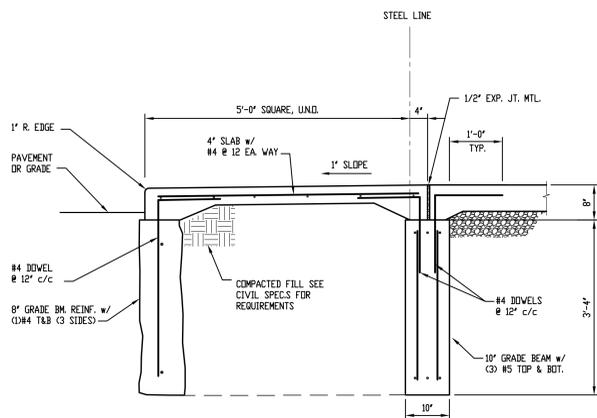
PRE-ENGR. BUILDING TYPICAL ANCHOR BOLT DETAIL
SCALE: N.T.S.



TYP. BOLLARD PLACEMENT
SCALE: 3/8"=1'-0"



TYP. BOLLARD PLACEMENT
SCALE: 3/4"=1'-0"



TYPICAL STOOP DETAIL
SCALE: 3/4"=1'-0"

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ARCHITECTS
LANDSCAPE ARCHITECTS
INTERIOR DESIGNERS
PLANNERS

C-006 Received 10/12/2011

KEY PLAN
N.T.S.



PROJECT TITLE
Lucas County Road Maintenance Building
1049 S. McCord Rd.
Holland, Ohio
Prepared for the
Lucas Co. Board of Commissioners

10.11.12
09.26.12
BID PACKAGE:
SHELL PACKAGE

CHECKED DLW
APPROVED DLW

TCJ JOB NO. 106049

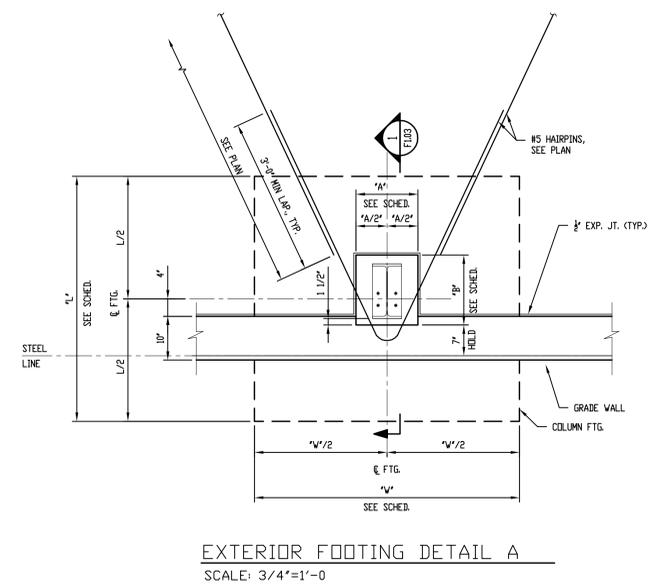
SHEET TITLE
**FOOTING SCHEDULE;
CONCRETE SECTIONS
& DETAILS**

A BASE BID

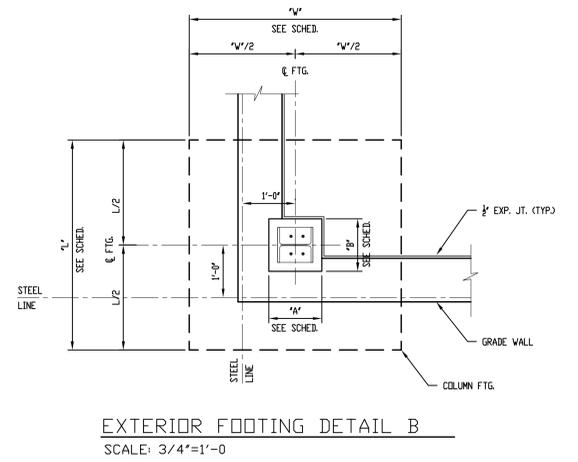
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F1.02

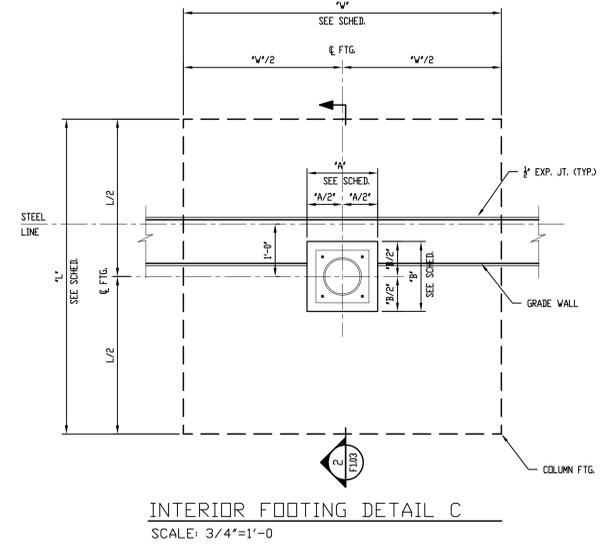
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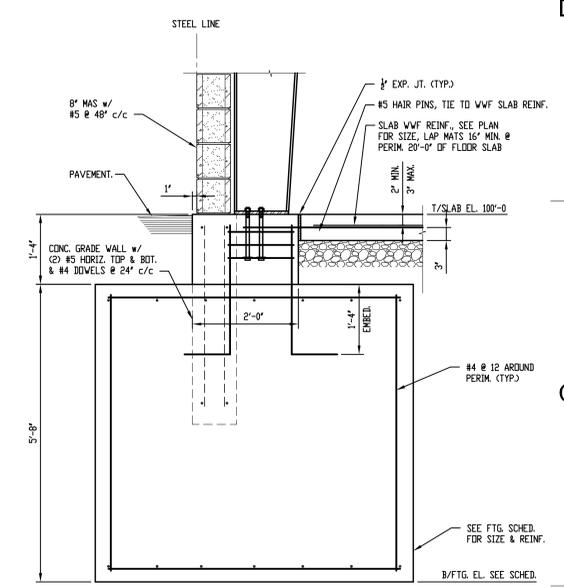
EXTERIOR FOOTING DETAIL A
 SCALE: 3/4"=1'-0"



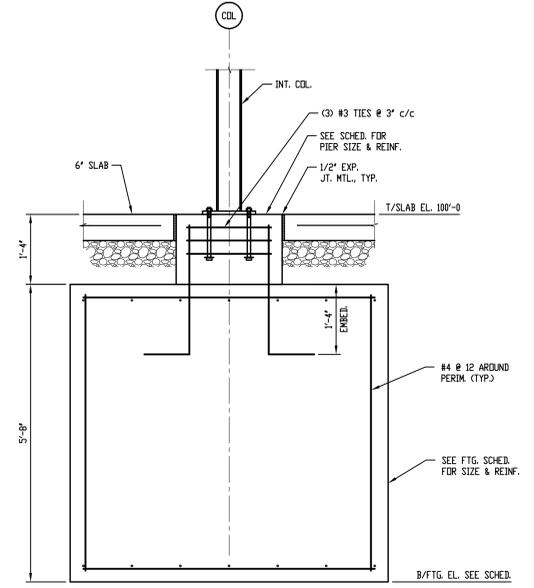
EXTERIOR FOOTING DETAIL B
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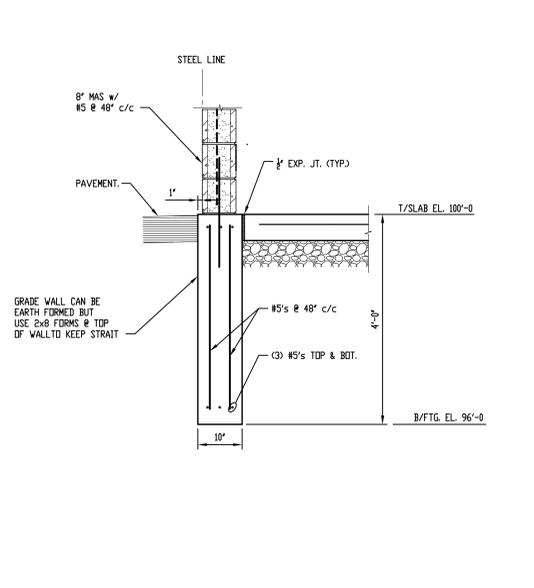
INTERIOR FOOTING DETAIL C
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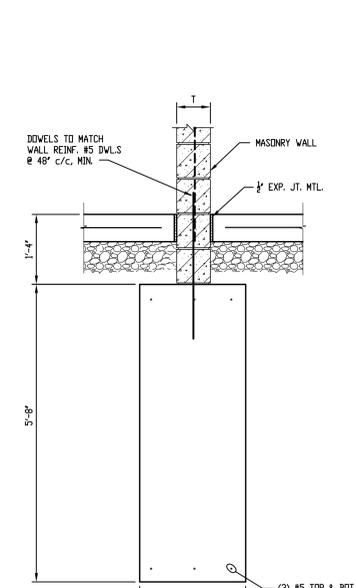
SECTION 1
 SCALE: 3/4"=1'-0"



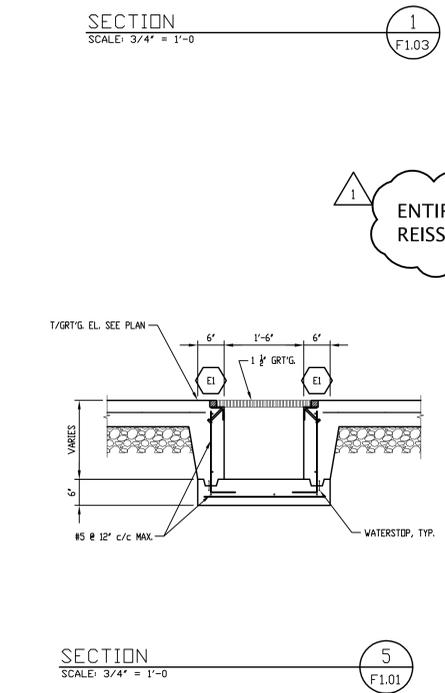
SECTION 2
 SCALE: 3/4"=1'-0"



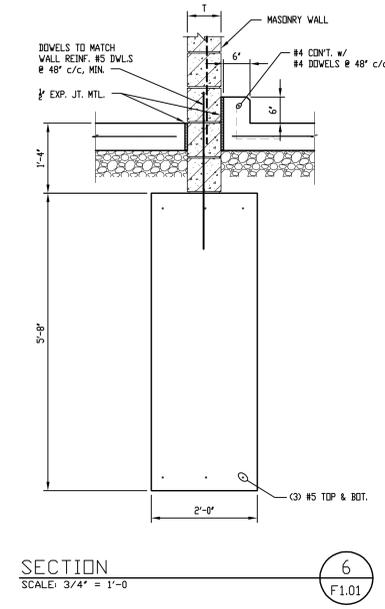
SECTION 3
 SCALE: 3/4"=1'-0"



SECTION 4
 SCALE: 3/4"=1'-0"

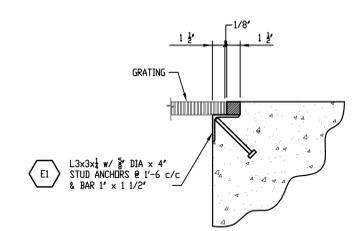


SECTION 5
 SCALE: 3/4"=1'-0"



SECTION 6
 SCALE: 3/4"=1'-0"

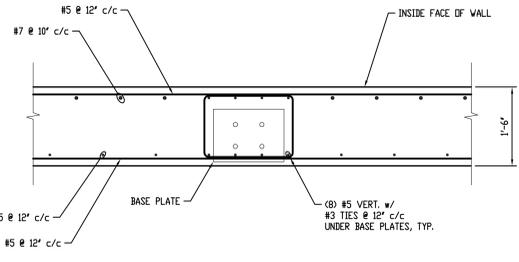
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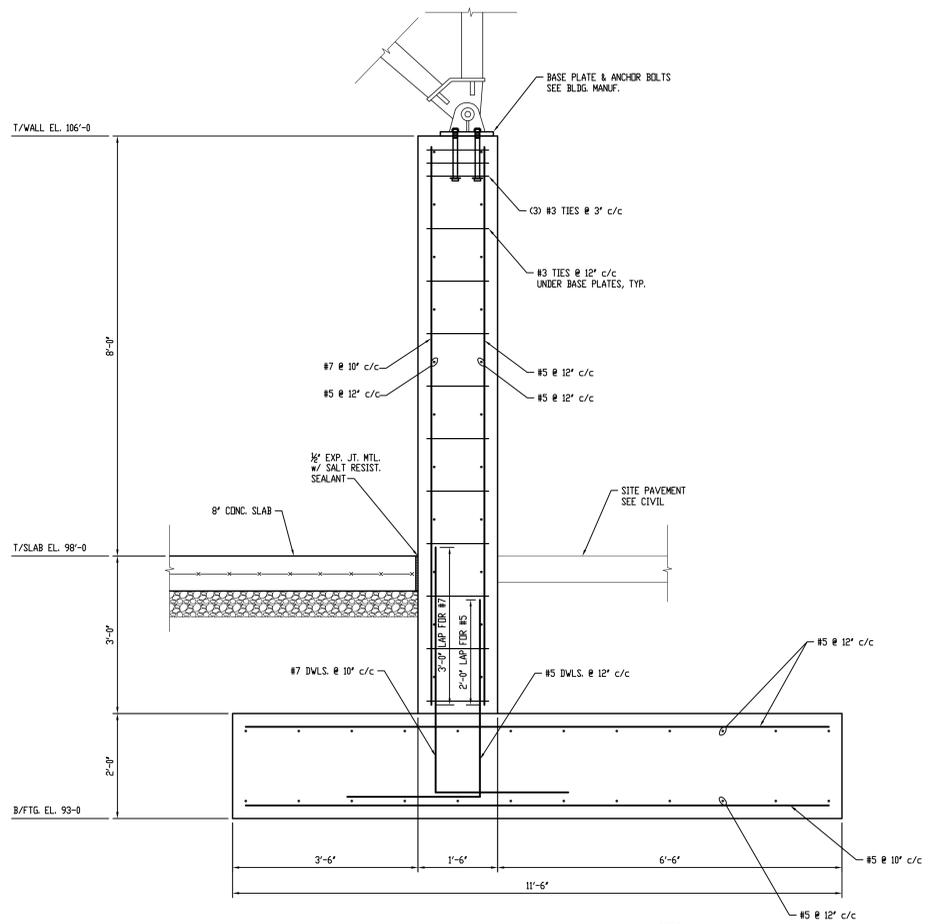
E1
 L3x3x1/4 w/ 5/8" DIA x 4" STUD ANCHORS @ 1'-6" c/c & BAR 1" x 1 1/2"

E
D
C
B
A

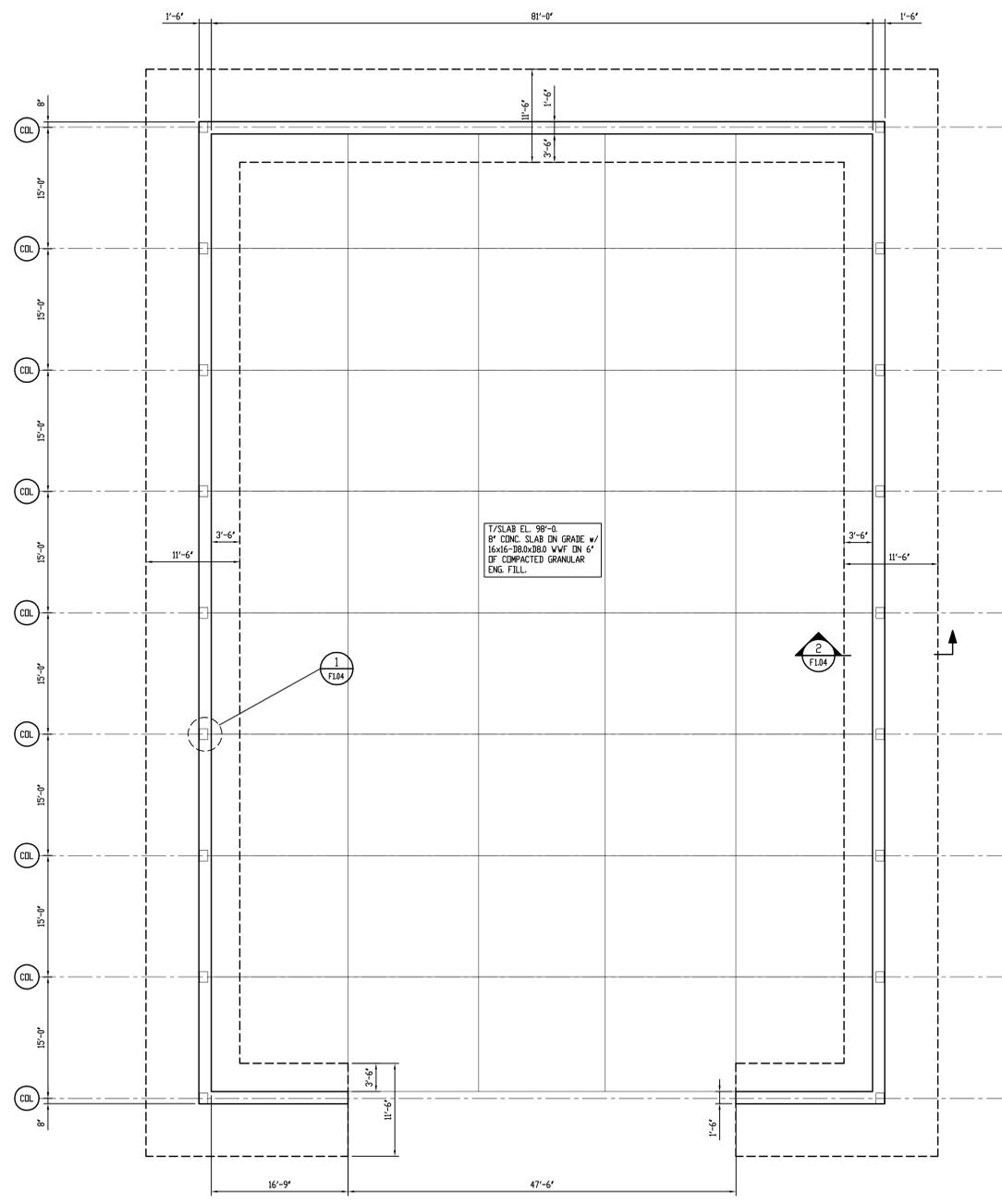
2/20/13 10:59:09



SECTION 1
SCALE: 3/4" = 1'-0" F1.04



SECTION 2
SCALE: 3/4" = 1'-0" F1.04



FOUNDATION PLAN
SCALE: 1/8" = 1'-0" N

- CONCRETE NOTES**
1. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSION STRENGTH OF 4,000 PSI AT 28 DAYS.
 2. THE DETAILING, BENDING AND PLACEMENT OF REINFORCING STEEL AND CONCRETE SHALL BE IN ACCORDANCE WITH THE LATEST ACI STANDARD CODE.
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 12. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, INTERFERENCE AND CONDITIONS PRIOR TO CONCRETE POUR AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
 13. SEAL CONCRETE AND CONTROL JOINTS WITH SALT RESISTANT CURING COMPOUND. SEE OWNER RECOMMENDATION FOR PRODUCT INFORMATION.

- FOUNDATION NOTES**
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 2. BUILDING FOUNDATION BEARING SOILS SHALL BE PREPARED IN ACCORDANCE WITH THE RECOMMENDATIONS GIVEN BY GEOSER WERNER'S SOILS REPORT No. 15964-9812-3805.
 3. RETAINING WALL FOOTING DESIGN IS BASED ON AN ALLOWABLE BEARING CAPACITY OF 2000 PSF. IF UNUSUAL CONDITIONS ARE ENCOUNTERED THE CONTRACTOR SHALL BRING THIS TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.

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ARCHITECTS
LANDSCAPE ARCHITECTS
INTERIOR DESIGNERS
PLANNERS

C-006 Received 10/12/2013

KEY PLAN
N.T.S.



PROJECT TITLE
Lucas County Road Maintenance Building
1049 S. McCord Rd.
Holland, Ohio

Prepared for the
Lucas Co. Board of Commissioners

10.11.12 AEO - 001
BID PACKAGE:
PRE-ENGINEERED METAL BUILDING SYSTEM

CHECKED DLW
APPROVED DLW

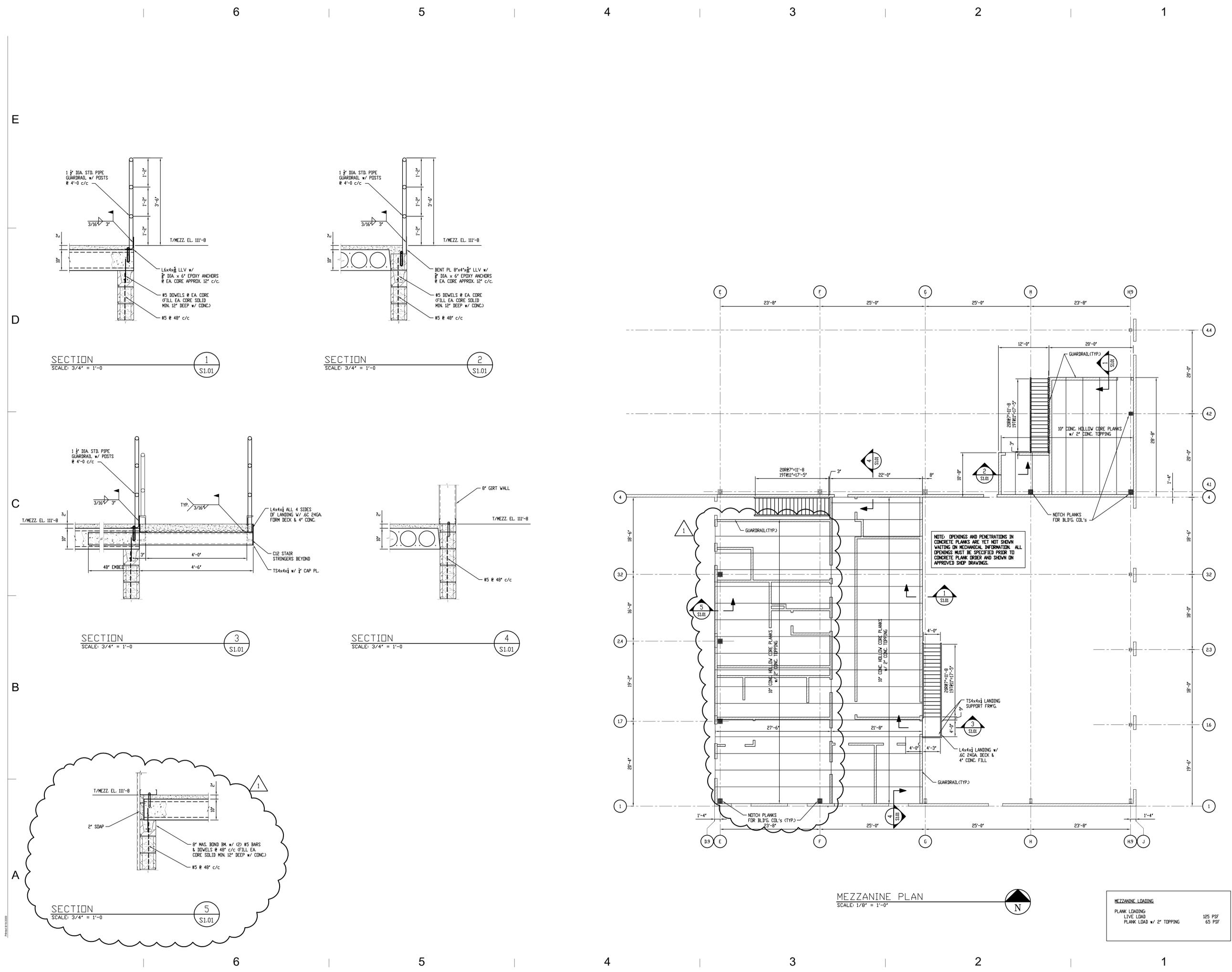
TCI JOB NO. 106049

SHEET TITLE
SALT BUILDING FOUNDATION PLAN & DETAILS

A BASE BID

SHEET NO.

F1.04



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B

A

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports for overhead doors.
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
4. Metal ladders.
5. Metal bollards.
6. Downspout guards.
7. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.

C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Section 051200 "Structural Steel Framing."

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
1. Steel framing and supports for overhead doors.
 2. Steel framing and supports for mechanical and electrical equipment.
 3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 4. Metal ladders.
 5. Metal bollards.
 6. Downspout guards.
 7. Loose steel lintels.
- B. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design ladders.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- F. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- G. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500.
- H. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening aluminum.
 - 2. Provide stainless-steel fasteners for fastening stainless steel.
 - 3. Provide stainless-steel fasteners for fastening nickel silver.
 - 4. Provide bronze fasteners for fastening bronze.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

- E. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
- F. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- G. Post-Installed Anchors: chemical anchors.
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).
- H. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- F. Nonsrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- G. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch (1 mm)** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, **1/8 by 1-1/2 inches (3.2 by 38 mm)**, with a minimum **6-inch (150-mm)** embedment and **2-inch (50-mm)** hook, not less than **8 inches (200 mm)** from ends and corners of units and **24 inches (600 mm)** o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
 - 1. All exterior miscellaneous framing and supports shall be galvanized.

2.7 METAL LADDERS

A. General:

1. Comply with ANSI A14.3.

B. Steel Ladders:

1. Space siderails **18 inches (457 mm)** apart unless otherwise indicated.
2. Siderails: Continuous, **3/8-by-2-1/2-inch (9.5-by-64-mm)** steel flat bars, with eased edges.
3. Rungs: **3/4-inch- (19-mm-)** diameter steel bars.
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
6. Support each ladder at top and bottom and not more than **60 inches (1500 mm)** o.c. with welded or bolted steel brackets.

2.8 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.

- B. Prime bollards with zinc-rich primer.

2.9 DOWNSPOUT GUARDS

- A. Fabricate downspout guards from **3/8-inch- (9.5-mm-)** thick by **12-inch- (300-mm-)** wide steel plate, bent to fit flat against the wall or column at both ends and to fit around pipe with **2-inch (50-mm)** clearance between pipe and pipe guard. Drill each end for two **3/4-inch (19-mm)** anchor bolts.

- B. Galvanize and prime downspout guards.

2.10 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

- B. Galvanize plates.

- C. Prime plates with zinc-rich primer.

2.11 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than **8 inches (200 mm)** unless otherwise indicated.

- C. Galvanize loose steel lintels located in exterior walls.

- D. Prime loose steel lintels located in exterior walls with zinc-rich primer.

2.12 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.13 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer unless indicated otherwise.
- D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
1. Cast Aluminum: Heavy coat of bituminous paint.
 2. Extruded Aluminum: Two coats of clear lacquer.
- 3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS
- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for overhead doors securely to, and rigidly brace from, building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
1. Grout base plates of columns supporting steel girders after girders are installed and leveled.
- 3.3 INSTALLING METAL BOLLARDS
- A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches (75 mm) above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.
1. Do not fill removable bollards with concrete.
- 3.4 INSTALLING DOWNSPOUT GUARDS

- A. Provide pipe guards at exposed vertical pipes in parking garage where not protected by curbs or other barriers. Install by bolting to wall or column with expansion anchors. Provide four **3/4-inch (19-mm)** bolts at each pipe guard. Mount pipe guards with top edge **26 inches (660 mm)** above driving surface.

3.5 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.6 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum **2.0-mil (0.05-mm)** dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

SECTION 055113 - METAL PAN STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Preassembled steel stairs with concrete-filled treads.
- 2. Steel tube railings attached to metal stairs.
- 3. Steel tube handrails attached to walls adjacent to metal stairs.

B. Related Requirements:

- 1. Section 033000 "Cast-in-Place Concrete" for concrete fill for stair treads and platforms.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Coordinate locations of hanger rods and struts with other work so that they do not encroach on required stair width and are within the fire-resistance-rated stair enclosure.

1.4 ACTION SUBMITTALS

A. Product Data: For metal pan stairs and the following:

- 1. Abrasive nosings.
- 2. Paint products.

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

C. Samples for Verification: For each type and finish of nosing.

D. Delegated-Design Submittal: For stairs and railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design stairs and railings.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Uniform Load: 100 lbf/sq. ft. (4.79 kN/sq. m).
 - 2. Concentrated Load: 300 lbf (1.33 kN) applied on an area of 4 sq. in. (2580 sq. mm).
 - 3. Uniform and concentrated loads need not be assumed to act concurrently.
 - 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 - 5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch (6.4 mm), whichever is less.
- C. Structural Performance of Railings: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
 - b. Infill load and other loads need not be assumed to act concurrently.
- D. Seismic Performance of Stairs: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Component Importance Factor: 1.5.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- E. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- F. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, structural steel, **Grade 25 (Grade 170)**, unless another grade is required by design loads; exposed.
- G. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, structural steel, **Grade 30 (Grade 205)**, unless another grade is required by design loads.
- H. Galvanized-Steel Sheet: ASTM A 653/A 653M, **G90 (Z275)** coating, structural steel, **Grade 33 (Grade 230)**, unless another grade is required by design loads.
- I. Aluminum Extrusions: **ASTM B 221 (ASTM B 221M)**, Alloy 6063-T6.
- J. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- K. Bronze Extrusions: ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).
- L. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).
- M. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.3 ABRASIVE NOSINGS

- A. Extruded Units: Aluminum units with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in lengths necessary to accurately fit openings or conditions.
 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. ACL Industries, Inc.
 - b. American Safety Tread Co., Inc.
 - c. Amstep Products.
 - d. Armstrong Products, Inc.
 - e. Balco, Inc.
 - f. Granite State Casting Co.

- g. Wooster Products Inc.
2. Provide ribbed units, with abrasive filler strips projecting **1/16 inch (1.5 mm)** above aluminum extrusion.
 3. Provide solid-abrasive-type units without ribs.
 4. Nosings: Square-back units, **1-7/8 inches (48 mm)** wide, without lip.
- B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- C. Apply bituminous paint to concealed surfaces of cast-metal units set into concrete.
- D. Apply clear lacquer to concealed surfaces of extruded units set into concrete.
- 2.4 FASTENERS
- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6)**; with hex nuts, **ASTM A 563 (ASTM A 563M)**; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, **ASTM A 563 (ASTM A 563M)**; and, where indicated, flat washers.
1. Provide mechanically deposited or hot-dip, zinc-coated anchor bolts for stairs indicated to be shop primed with zinc-rich primer.
- D. Post-Installed Anchors: chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, unless otherwise indicated.
 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group **1 (A1)** stainless-steel bolts, **ASTM F 593 (ASTM F 738M)**, and nuts, **ASTM F 594 (ASTM F 836M)**.

2.5 MISCELLANEOUS MATERIALS

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

- D. Concrete Materials and Properties: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa) unless otherwise indicated.
- E. Nonslip-Aggregate Concrete Finish: Factory-packaged abrasive aggregate made from fused, aluminum-oxide grits or crushed emery; rustproof and nonglazing; unaffected by freezing, moisture, or cleaning materials.
- F. Welded Wire Reinforcement: ASTM A 185/A 185M, 6 by 6 inches (152 by 152 mm), W1.4 by W1.4, unless otherwise indicated.

2.6 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
- B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work with accurate angles and surfaces and straight edges.
- F. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 3 welds: partially dressed weld with spatter removed.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

2.7 STEEL-FRAMED STAIRS

- A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," Commercial Class, unless more stringent requirements are indicated.

- B. Stair Framing:
1. Fabricate stringers of steel channels.
 - a. Provide closures for exposed ends of channel stringers.
 2. Construct platforms of steel channel headers and miscellaneous framing members as needed to comply with performance requirements indicated.
 3. Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.
 4. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.
- C. Metal Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements, but not less than **0.067 inch (1.7 mm)**.
1. Steel Sheet: Uncoated cold-rolled steel sheet unless otherwise indicated.
 2. Directly weld metal pans to stringers; locate welds on top of subtreads where they are concealed by concrete fill. Do not weld risers to stringers.
 3. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
 4. Shape metal pans to include nosing integral with riser.
 5. Attach abrasive nosings to risers.
 6. Provide subplatforms of configuration indicated or, if not indicated, the same as subtreads. Weld subplatforms to platform framing.

2.8 STAIR RAILINGS

- A. Steel Tube Railings: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.
1. Rails and Posts: **1-1/2-inch- (38-mm-)** square top and bottom rails and **1-1/2-inch- (38-mm-)** square posts.
 2. Intermediate Rails Infill: **1-1/2-inch- (38-mm-)** square intermediate rails spaced less than **21 inches (533 mm)** clear.
- B. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
1. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint as shown in NAAMM AMP 521.
- C. Form changes in direction of railings as follows:
1. As detailed.
 2. By bending.
 3. By flush bends.
- D. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

- E. Close exposed ends of railing members with prefabricated end fittings.
- F. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is **1/4 inch (6 mm)** or less.
- G. Connect posts to stair framing by direct welding unless otherwise indicated.
- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
 - 1. For nongalvanized railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.
 - 2. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides **1-1/2-inch (38-mm)** clearance from inside face of handrail to finished wall surface.
- I. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.9 FINISHES

- A. Finish metal stairs after assembly.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLING METAL PAN STAIRS

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- F. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.
- G. Place and finish concrete fill for treads and platforms to comply with Section 033000 "Cast-in-Place Concrete."
 - 1. Install abrasive nosings with anchors fully embedded in concrete. Center nosings on tread width.
- H. Install precast concrete treads with adhesive supplied by manufacturer.

3.2 INSTALLING RAILINGS

- A. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:
 - 1. Anchor posts to steel by welding to steel supporting members.
 - 2. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with postinstalled anchors and bolts.
- B. Attach handrails to wall with wall brackets. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as required to comply with performance requirements.

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

END OF SECTION 055113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:

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

- B. Related Sections:

- 1. Section 084113 "Aluminum-Framed Entrances and Storefronts" for installation of entrance door hardware, except cylinders.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Shop Drawings: Details of electrified door hardware, indicating the following:

- 1. Wiring Diagrams: For power, signal, and control wiring and including the following:
 - a. Details of interface of electrified door hardware and building safety and security systems.
 - b. Schematic diagram of systems that interface with electrified door hardware.
 - c. Point-to-point wiring.
 - d. Risers.
 - e. Elevations doors controlled by electrified door hardware.

- 2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

- C. 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. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware

schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

- b. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
- c. 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.
 - 5) Fastenings and other pertinent information.
 - 6) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for door hardware.
 - 8) List of related door devices specified in other Sections for each door and frame.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For electrified door hardware, from the manufacturer.
 - 1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
- B. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware schedule.

1.6 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.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Source Limitations: Obtain each type of door hardware from a single manufacturer.
 - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

- C. 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.
- D. 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. (3 cu. m per minute/sq. m)** at the tested pressure differential of **0.3-inch wg (75 Pa)** of water.
- E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- F. Means of Egress Doors: Latches do not require more than **15 lbf (67 N)** to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- G. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC/ANSI A117.1.
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 (22.2 N)**.
 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: **5 lbf (22.2 N)** applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than **1/2 inch (13 mm)** high.
 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point **3 inches (75 mm)** from the latch, measured to the leading edge of the door.
- H. Keying Conference: Conduct conference at Project site. In addition to Owner, Construction Manager, Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant and Owner's security consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 2. Preliminary key system schematic diagram.
 3. Requirements for key control system.
 4. Requirements for access control.
 5. Address for delivery of keys.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- D. Deliver keys to Owner by registered mail or overnight package service.

1.8 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.9 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. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.

1.10 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.
1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products or products equivalent in function and comparable in quality to named products and approved by Architect.
 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.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. McKinney Products Company; an ASSA ABLOY Group company.
 - c. Stanley Commercial Hardware; Div. of The Stanley Works.

2.3 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
1. Mortise Locks: Minimum **3/4-inch (19-mm)** latch bolt throw.
- C. Lock Backset: **2-3/4 inches (70 mm)**, unless otherwise indicated.
- D. Lock Trim:
1. Description: As indicated on Drawings.
 2. Levers: Forged or Cast.
 3. Escutcheons (Roses): Forged.
 4. Dummy Trim: Match lever lock trim and escutcheons.
 5. Operating Device: Lever with escutcheons (roses).
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latch bolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latch bolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
 4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.
- F. Mortise Locks: BHMA A156.13; Operational and Security Grade 1; stamped steel case with steel or brass parts; Series 1000.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 - d. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - e. Yale Security Inc.; an ASSA ABLOY Group company.

2.4 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
 - b. Folger Adam Electric Door Controls; an ASSA ABLOY Group company.
 - c. Von Duprin; an Ingersoll-Rand company.

2.5 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - c. Medeco; an Assa Abloy Company.

2.6 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
1. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
 2. Keyed Alike: Key all cylinders to same change key.

- B. Keys: Nickel silver.
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

2.7 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.5; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Key Boxes and Cabinets.
 - b. GE Security, Inc.
 - c. HPC, Inc.
 - d. Lund Equipment Co., Inc.
 - e. MMF Industries.
 - f. Tri Palm International.
 - 2. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
- B. Key Lock Boxes: Designed for storage of two keys.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Knox Company.

2.8 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; brass or bronze, unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Burns Manufacturing Incorporated.
 - b. Hager Companies.
 - c. IVES Hardware; an Ingersoll-Rand company.
 - d. Rockwood Manufacturing Company.

2.9 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DORMA Architectural Hardware; Member of The DORMA Group North America.
 - b. LCN Closers; an Ingersoll-Rand company.
 - c. Norton Door Controls; an ASSA ABLOY Group company.
 - d. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.10 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. Rockwood Manufacturing Company.

2.11 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Glynn-Johnson; an Ingersoll-Rand company.
 - b. Rockwood Manufacturing Company.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.12 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) 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, provide products by one of the following:
 - a. National Guard Products.
 - b. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - c. Zero International.

2.13 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. National Guard Products.
- b. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
- c. Zero International.

2.14 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. Rockwood Manufacturing Company.
 - c. Stanley Commercial Hardware; Div. of The Stanley Works.

2.15 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. 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.
- 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. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.16 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.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

3.3 INSTALLATION

- A. 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.
- B. 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. 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.
- C. 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 (750 mm)** of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every **30 inches (750 mm)** of door height greater than **90 inches (2286 mm)**.
- E. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings in equipment room. Verify location with Architect.
 1. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- H. 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.
- I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.

- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

3.7 DOOR HARDWARE SCHEDULE

The following items are basis-of-design hardware manufacturers for the references in the hardware sets listed below. The number of items listed are per door leaf.

Hinges:	Hagar
Lockset:	Schlage
Cylinder:	Medeco
Closer:	LCN
Door Operator:	LCN
Stops:	Ives
Seals:	National Guard Products (NGP)
Silencers:	Glynn Johnson
O.H. Stops:	Glynn Johnson
Flush Bolts:	Rockwood
Elec. Strikes:	Von Duprin
Power Supply:	Schlage
Kickplates:	Rockwood
Push/Pulls:	Rockwood
Threshold:	National Guard Products (NGP)

HARDWARE SET NO. 001

DOOR NUMBERS: 103, 104

3 ea	Butts BB1168 4 ½ x 4 ½ - 26D
1	Lockset L9050xLx03Lx626
1	Cylinder 10*0500x6-PINx626
1	Closer 1461xPA - Alum
1	Kickplate K1050 10 x 2" L.D.W. x B4E – 626
3	Silencers GJ64
1	Stop WS401CVX – US26D

HARDWARE SET NO. 002

DOOR NUMBERS: 114A, 114B, 112A, 201, 203A, 203B

3 ea	Butts BB1168 4 ½ x 4 ½ - 26D
1	Lockset L9080xLx03Lx626
1	Cylinder 10*0500x6-PINx626
1	Closer 1461xPA - Alum
1	Kickplate K1050 10 x 2" L.D.W. x B4E – 626
3	Silencers GJ64
1	Stop WS401CVX – US26D

HARDWARE SET NO. 003

DOOR NUMBERS: 113, 124

3 ea Butts BB1168 4 ½ x 4 ½ - 26D
 1 Lockset L9080xLx803Lx626
 1 Cylinder 10*0500x6-PINx626
 1 Closer 1461xPAxHCUSH - Alum
 1 Kickplate K1050 10 x 2" L.D.W. x B4E – 626
 3 Silencers GJ64

HARDWARE SET NO. 004

DOOR NUMBERS: 102, 105, 106, 115E, 122B

3 ea Butts BB1168 4 ½ x 4 ½ - 26D
 1 Lockset L9070xLx03Lx626
 1 Cylinder 10*0500x6-PINx626
 1 Closer 4041xPA - Alum
 1 Kickplate K1050 10 x 2" L.D.W. x B4E – 626
 1 O.H. Stop GJ90Sx626 (Doors 106 and 122B only)
 3 Silencers GJ64
 1 Stop WS401CVX – US26D (Except doors 106 and 122B)
 1 Seals 152SA, set for door head and jambs
 1 Sweep 200SA

HARDWARE SET NO. 005

DOOR NUMBERS: 107, 108A, 110A, 110B

3 ea Butts BB1168 4 ½ x 4 ½ - 26D
 1 Lockset L9010xLx03Lx626
 1 Closer 4041xPA - Alum
 1 Kickplate K1050 10 x 2" L.D.W. x B4E – 626
 3 Silencers GJ64
 1 Stop WS401CVX – US26D

HARDWARE SET NO. 006

DOOR NUMBERS: 109

3 ea Butts BB1168 4 ½ x 4 ½ - 26D
 1 Lockset L9040xLx03Lx626
 1 Cylinder 10*0500x6-PINx626
 1 Closer 1461xPA - Alum
 1 Kickplate K1050 10 x 2" L.D.W. x B4E – 626
 3 Silencers GJ64
 1 Stop WS401CVX – US26D (Except doors 106 and 122B)

HARDWARE SET NO. 007

DOOR NUMBERS: 114C, 125

3 ea Butts BB1168 4 ½ x 4 ½ - 26D
 1 Lockset L9080xLx03Lx626 (active leaf)
 1 Cylinder 10*0500x6-PINx626
 2 Flush Bolts 555-26Dx570 DP Strike
 1 Closer 4041xPA - Alum
 1 Kickplate K1050 10 x 2" L.D.W. x B4E – 626
 3 Silencers GJ64
 1 O.H. Stop GJ90Sx626 (inactive leaf)
 1 Stop WS401CVX – US26D (active leaf)
 1 Seals 152SA, set for door head and jambs

HARDWARE SET NO. 008

DOOR NUMBERS: 111, 121A, 121B, 121D, 122C, 123, 130

3 ea Butts BB1168 4 ½ x 4 ½xNRP - 26D
 1 Lockset L9050xLx03Lx626
 1 Cylinder 10*0500x6-PINx626
 1 Closer 4041xPAxHCUSH - Alum
 1 Kickplate K1050 10 x 2" L.D.W. x B4E – 626
 3 Silencers GJ64
 1 Seals 152SA, set for door head and jambs
 1 Sweep 200SA
 1 Threshold 8425

HARDWARE SET NO. 009

DOOR NUMBERS: 112

3 ea Butts BB1199 5 x 4 ½xNRP - 26D
 1 Lockset LV9050xLx03Lx626
 1 Cylinder 10*0500x6-PINx626
 1 Automatic Door Operator 9142 with Full Cover
 1 Elec. Strike 6211ALxFSExDSx24xUS32D
 1 Power Supply PS904
 1 Threshold 8425

Balance of door hardware and seals by door manufacturer. Coordinate automatic door operator, electric strike for release and proper operation when push pads are operated from interior and to delay release and operation until security access reader is activated from exterior side of door.

HARDWARE SET NO. 010

DOOR NUMBERS: 115D

4 ea Butts BB1199 5 x 4 ½xNRP - 26D
 1 Lockset LV9050xLx03Lx626
 1 Cylinder 10*0500x6-PINx626
 1 Closer 4041xPA - Alum
 1 Elec. Strike 6211ALxFSExDSx24xUS32D
 1 Power Supply PS904
 1 Kickplate K1050 10 x 2" L.D.W. x B4E – 626
 1 Seals 152SA, set for door head and jambs
 1 Sweep 200SA

1 Threshold 8425

HARDWARE SET NO. 011

DOOR NUMBERS: 101

4 ea Butts BB1199 5 x 4 ½xNRP - 26D
1 Lockset LV9050xLx03Lx626
1 Cylinder 10*0500x6-PINx626
1 Automatic Door Operator 9142 with Full Cover
1 Threshold 8425

Balance of door hardware and seals by door manufacturer.

HARDWARE SET NO. 012

DOOR NUMBERS: 108

3 ea Butts BB1168 4 ½ x 4 ½ - 26D
1 Push plate 73 8x16 - 626
1 Pull plate 111 x 73 4x16 - 626
1 Closer 4041xPA - Alum

HARDWARE SET NO. 013

DOOR NUMBERS: 101A

4 ea Butts BB1199 5 x 4 ½ - 26D
2 sets Push/Pull Bars 11247 - 32D x Type 12 Attachments
1 Closer 4041xPA - Alum

Balance of door hardware and seals by door manufacturer.

END OF SECTION 087100

SECTION 087113 - AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Low-energy door operators for swinging doors.

1.3 DEFINITIONS

- A. AAADM: American Association of Automatic Door Manufacturers.
- B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.
- C. Double-Egress (Doors): A pair of doors that simultaneously swing with the two doors moving in opposite directions with no mullion between them.
- D. Double-Swing (Doors): A pair of doors that swing with the two doors moving in opposite directions with a mullion between them; each door functioning as a single-swing door.
- E. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.
- F. For automatic door terminology, see BHMA A156.10 and BHMA A156.19 for definitions of terms.

1.4 COORDINATION

- A. Coordinate sizes and locations of recesses in concrete floors for recessed control mats that control automatic door operators. Concrete, reinforcement, and formwork requirements are specified elsewhere.
- B. Templates: Distribute for doors, frames, and other work specified to be factory prepared and reinforced for installing automatic door operators.
- C. Coordinate hardware for doors with operators to ensure proper size, thickness, hand, function, and finish.
- D. Electrical System Roughing-in: Coordinate layout and installation of automatic door operators with connections to power supplies and access-control system.

1.5 ACTION SUBMITTALS

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

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic door operators.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For automatic door operators.

1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
2. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Indicate locations of activation and safety devices.
4. Include diagrams for power, signal, and control wiring.
5. Include plans, elevations, sections, and attachment details for guide rails.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of automatic door operator.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For automatic door operators, safety devices, and control systems, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation and maintenance of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

- B. Certified Inspector Qualifications: Certified by AAADM.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Faulty or sporadic operation of automatic door operator, including controls.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide LCN Closers Series 9140 or comparable product by one of the following:
1. Besam Entrance Solutions; Subsidiary of ASSA ABLOY Entrance Systems.
 2. DORMA Automatics; Div. of DORMA Group North America.
 3. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
 4. Stanley Access Technologies, LLC; Div. of Stanley Security Solutions.
- B. Source Limitations: Obtain automatic door operators, including activation and safety devices, from single source from single manufacturer.

2.2 AUTOMATIC DOOR OPERATORS, GENERAL

- A. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated; and according to UL 325. Coordinate operator mechanisms with door operation, hinges, and activation and safety devices.
1. Wind Load: Provide door operators on exterior doors that will open and close doors and maintain them in fully closed position when subjected to wind load of 20 psf.
- B. Electromechanical Operating System: Self-contained unit powered by permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, connections for power and activation- and safety-device wiring, and manual operation including spring closing when power is off.
- C. Cover for Surface-Mounted Operators: Fabricated from **0.125-inch- (3.2-mm-)** thick, extruded or formed aluminum ; continuous over full width of operator-controlled door opening; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.
- D. Brackets and Reinforcements: Fabricated from aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 LOW-ENERGY DOOR OPERATORS

- A. Standard: BHMA A156.19.
- B. Performance Requirements:
1. Opening Force if Power Fails: Not more than **15 lbf (67 N)** required to release latch if provided, not more than **30 lbf (133 N)** required to manually set door in motion, and not more than **15 lbf (67 N)** required to fully open door.
 2. Entrapment-Prevention Force: Not more than **15 lbf (67 N)** required to prevent stopped door from closing or opening.
- C. Configuration: Operator to control single swinging door.
1. Traffic Pattern: Two way.
 2. Operator Mounting: Surface.

- D. Operation: Power opening and spring closing. Provide time delay for door to remain open before initiating closing cycle as required by BHMA A156.19. When not in automatic mode, door operator shall function as manual door closer, with or without electrical power.
- E. Operating System: Electromechanical.
- F. Microprocessor Control Unit: Solid-state controller.
- G. Features:
 - 1. Adjustable opening and closing speed.
 - 2. Adjustable opening and closing force.
 - 3. Adjustable backcheck.
 - 4. Adjustable hold-open time from zero to 30 seconds.
 - 5. Adjustable time delay.
 - 6. Adjustable acceleration.
 - 7. Obstruction recycle.
 - 8. On-off/hold-open switch to control electric power to operator.
- H. Activation Device: Push-plate switch on each side of door to activate door operator.
- I. Exposed Finish: Class I, clear anodic finish.

2.4 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extrusions: **ASTM B 221 (ASTM B 221M)**.
 - 2. Sheet: **ASTM B 209 (ASTM B 209M)**.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness, in manufacturer's standard thickness.
- C. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.5 CONTROLS

- A. General: Provide controls, including activation and safety devices, according to BHMA standards; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated. Coordinate activation and safety devices with door operation and door operator mechanisms.
- B. Push-Plate Switch: Momentary-contact door control switch with flat push-plate actuator with contrasting-colored, engraved message.
 - 1. Configuration: Rectangular push plate with **2-by-4-inch (50-by-100-mm)** junction box.
 - a. Mounting: Recess mounted, semiflush in wall.
 - 2. Push-Plate Material: Stainless steel as selected by Architect from manufacturer's full range.
 - 3. Message: International symbol of accessibility and "Push to Open."

- C. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.6 FABRICATION

- A. Factory fabricate automatic door operators to comply with indicated standards.
- B. Form aluminum shapes before finishing.
- C. Fabricate exterior components to drain condensation and water passing joints within operator enclosure to the exterior.
- D. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match operator.

2.7 ACCESSORIES

- A. Signage: As required by cited BHMA standard for type of door and its operation.
 - 1. Application Process: Operator manufacturer's standard process.
 - 2. Provide sign materials with instructions for field application when operators are installed.

2.8 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.
- B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame preparation and reinforcements, and other conditions affecting performance of automatic door operators.
- B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic door operator installation.

- C. Verify that full-height finger guards are installed at each door with pivot hinges where door has a clearance at hinge side greater than **1/4 inch (6 mm)** and less than **3/4 inch (19 mm)** with door in any position.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install automatic door operators according to manufacturer's written instructions and cited BHMA standard for type of door operation and direction of pedestrian travel, including signage, controls, wiring, remote power units if any, and connection to building's power supply.
 - 1. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion.
 - 2. Install operators true in alignment with established lines and door geometry without warp or rack. Anchor securely in place.
- B. Controls: Install activation and safety devices according to manufacturer's written instructions and cited BHMA standard for operator type and direction of pedestrian travel. Connect control wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Access-Control System: Connect operators to access-control system as required.
- D. Signage: Apply on both sides of each door as required by cited BHMA standard for type of door operator and direction of pedestrian travel.

3.3 ADJUSTING

- A. Adjust automatic door operators to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.
 - 1. Adjust operators on exterior doors for weathertight closure.
- B. After completing installation of automatic door operators, inspect exposed finishes on doors and operators. Repair damaged finish to match original finish.
- C. Readjust automatic door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).
- D. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.4 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of automatic door operator Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Engage a Certified Inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
2. Perform maintenance, including emergency callback service, during normal working hours.
3. Include 24-hour-per-day, 7-day-per-week, emergency callback service.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators.

END OF SECTION 087113

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
 - 1. Windows.
 - 2. Doors.
 - 3. Storefront framing.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. Interspace: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:
 - 1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
 - a. Basic Wind Speed: 90 mph (40 m/s).
 - b. Importance Factor: 1.5.
 - c. Exposure Category: C.
 - 2. Design Snow Loads: As indicated on Drawings.
 - 3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.

4. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
5. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.5 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass the following products; 12 inches (300 mm) square.

1. Tinted glass.
2. Insulating glass.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For glass and glazing products, from manufacturer.

B. Warranties: Sample of special warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

D. Source Limitations for Glass: Obtain ultraclear float glass, tinted float glass and insulating glass from single source from single manufacturer for each glass type.

E. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

F. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
 - G. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
 - H. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
 - B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.
- 1.9 PROJECT CONDITIONS
- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).
- 1.10 WARRANTY
- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 1. Warranty Period: 10 years from date of Substantial Completion.
 - B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
 2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as $\text{Btu/sq. ft.} \times \text{h} \times \text{deg F}$ ($\text{W/sq. m} \times \text{K}$).
 4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
 2. For uncoated glass, comply with requirements for Condition A.
 3. For coated vision glass, comply with requirements for Condition C (other coated glass).

2.3 INSULATING GLASS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Thompson IG, LLC.
 2. Cardinal Glass Industries
 3. Oldcastle
 4. Viracon
- B. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.

2. Spacer: Manufacturer's standard spacer material and construction.
3. Desiccant: Molecular sieve or silica gel, or blend of both.

C. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Insulating-Glass Types" Article.

2.4 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.
3. Silicone complying with ASTM C 1115.
4. Thermoplastic polyolefin rubber complying with ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene, silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

- G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.7 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

2.8 INSULATING-GLASS TYPES

- A. Glass Type : Low-e-coated, tinted insulating glass.
1. Overall Unit Thickness: 1 inch (25 mm).
 2. Thickness of Each Glass Lite: 6.0 mm.
 3. Outdoor Lite: Tinted float glass or fully tempered float glass as required by code.
 4. Interspace Content: Air.
 5. Indoor Lite: Clear float glass or fully tempered float glass as required by code.
 6. Low-E Coating: Pyrolytic on second surface.
 7. Visible Light Transmittance: 29 percent minimum.
 8. Winter Nighttime U-Factor: 0.35 maximum.
 9. Summer Daytime U-Factor: 0.35 maximum.
 10. Solar Heat Gain Coefficient: 0.33 maximum.
 11. Outdoor Lite Glass Basis-of-Design: "Pilkington Advantage Grey"
 12. Provide safety glazing labeling.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 2. Presence and functioning of weep systems.
 3. Minimum required face and edge clearances.
 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

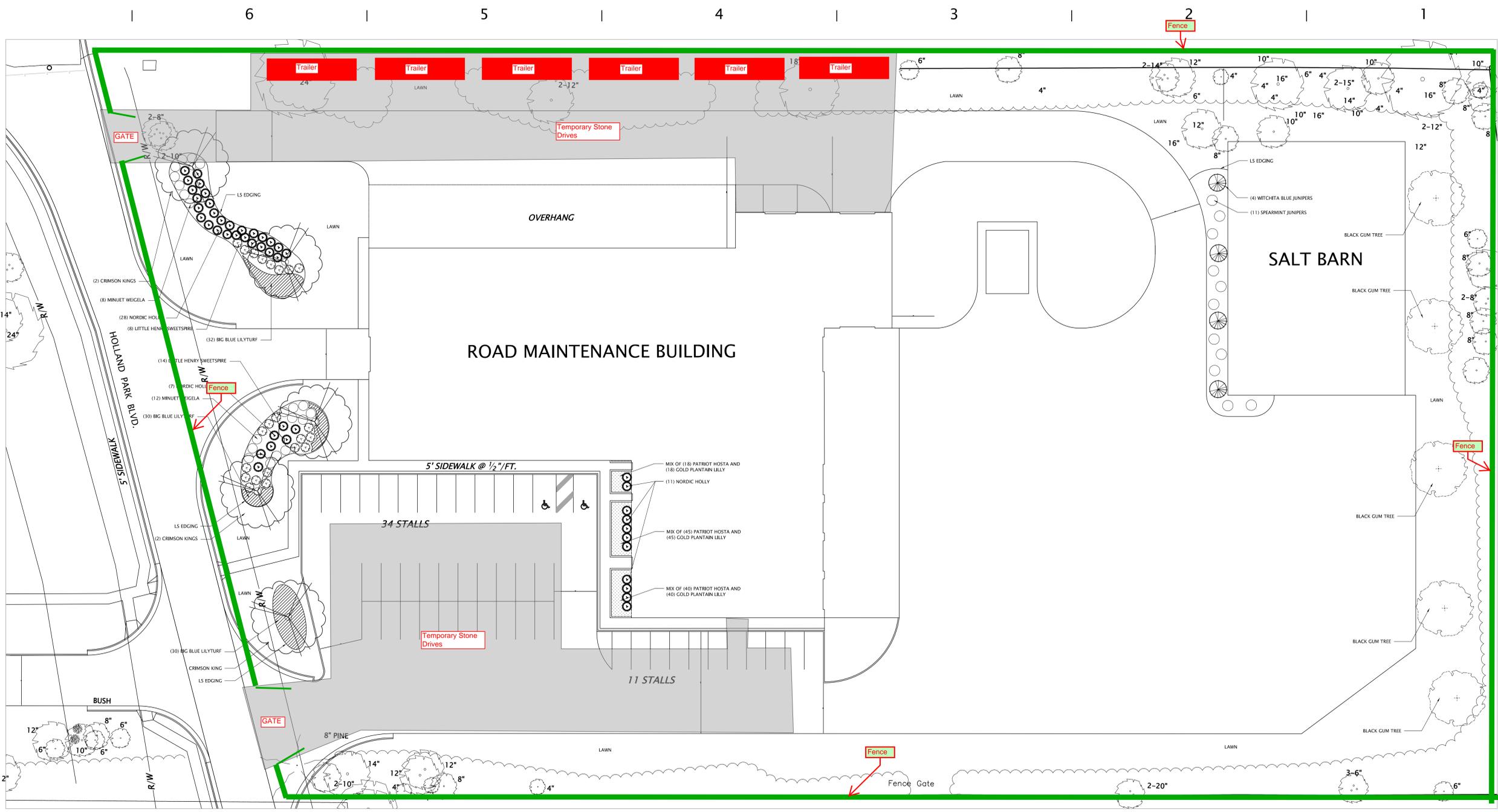
- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

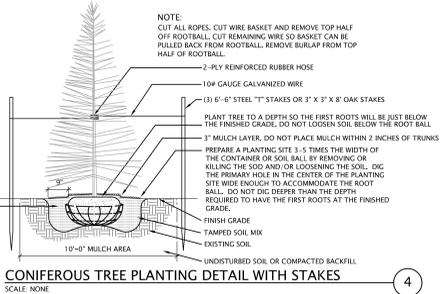
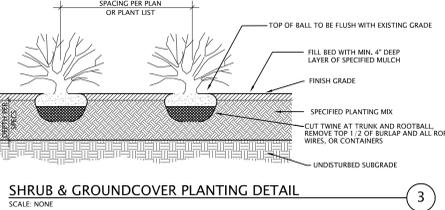
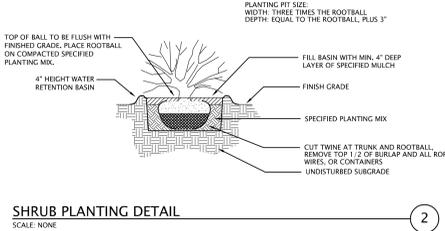
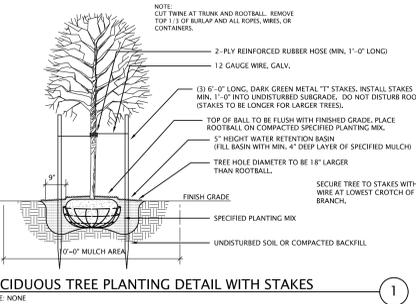
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000



GENERAL NOTES:

- 1 WRITTEN DIMENSIONS SHALL PREVAIL OVER SCALED DIMENSIONS.
- 2 ANY QUANTITIES ARE APPROXIMATE AND SHALL BE FIELD VERIFIED.
- 3 CONTRACTOR TO BE RESPONSIBLE FOR FIELD VERIFICATION OF ALL EXISTING CONDITIONS, DIMENSIONS, LOCATIONS AND MATERIALS.
- 4 THE CONTRACTOR SHALL REPAIR/REPLACE AT NO ADDITIONAL COST, ANY IMPROVEMENTS DAMAGED DURING WORK (INCLUDING BUT NOT LIMITED TO IRRIGATION, UTILITIES, WALKS, WALLS, LANDSCAPE, ETC.).
- 5 ALL LAYOUT POINTS ARE TO FACE OF CURB OR EDGE OF PAVEMENT, UNLESS NOTED OTHERWISE.
- 6 ALL AREAS DISTURBED BY CONSTRUCTION TO BE FINE GRADED TO THE PROPER ELEVATION AND SEEDED BY THE CONTRACTOR.
- 7 CONTRACTOR SHALL BE RESPONSIBLE TO KEEP ADJACENT STREETS FREE OF ALL DIRT AND CONSTRUCTION DEBRIS. CLEAN STREETS AS NECESSARY DURING CONSTRUCTION.
- 8 ALL TREES ARE TO BE FRESH DUG MATERIAL.
- 9 PROVIDE & INSTALL STEEL LANDSCAPE EDGING AT ALL LANDSCAPE BEDS.



PLANT SCHEDULE:

QUAN	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	SPACING
5	Acer Platanoides	Crimson King Maple	2" Cal.	B & B	Per Plans
20	Weigela Florida	Minuet Weigela	24" Ht.	B & B	Per Plans
46	Ilex Glabra 'Chamzin'	Nordic Holly	18" Ht.	B & B	Per Plans
92	Liriope Muscari	Big Blue Lilyturf	Clump	No 1 Cont.	2' O.C.
22	Itea Virginica 'Little Henry'	Little Henry Sweetspire	18" Ht.	No 2 Cont.	Per Plans
103	Hosta 'Patriot'	Patriot Hosta	Clump	No 1 Cont.	18" O.C.
103	Hosta 'Gold Plantain'	Gold Plantain Lily	Clump	No 1 Cont.	18" O.C.
5	Nyssa Sylvatica	Black Gum Tree	2" Cal.	B & B	Per Plans
11	Juniperus Chinensis 'Spearmit'	Spearmit Juniper	5' Ht.	B & B	Per Plans
4	Juniperus Scopulorum	Witchita Blue Juniper	6' Ht.	B & B	Per Plans

NOTE: CONTRACTOR TO VERIFY ALL PLANT QUANTITIES.