



ADDENDUM 1

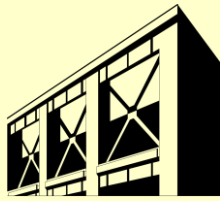
22 February 2021,

ITB AP 21-21

Construction of Satellite Concourse “C” at Destin-Fort Walton Beach Airport

Please find attached the Document and information below, for the above referenced Addendum No. 1. This Addendum is hereby made a part of the Contract Documents and Specifications of the above referenced project. All other requirements of the original Contract Documents and Specifications shall remain effective in their respective order. The purpose of Addendum No. 1 is to publish the pre-bid sign-in sheet, meeting notes and updates to the technical specifications and drawings, as referenced herein.

Note: The ITB Opening Date & Time remains unchanged.



Addendum No 1

Project: ITB AP 21-21 Construction of Satellite Concourse "C"

To: Okaloosa County, Florida
Board of County Commissioners

Okaloosa County Purchasing
Department
5479A Old Bethel Road
Crestview, FL 32536

From: MLM-Martin Architects, Inc.

668 N. Orlando Ave, Ste. 107
Maitland, FL 32751

ATTN: Jesica Darr

Miguel A. Martin

RE: Addendum No 1 [Δ 1]

Date: 3/19/2020
File: 19672-511-10

ATTACHED IS ADDENDUM NO 1 TO THE SUBJECT CONTRACT DOCUMENTS. THIS ADDENDUM SETS FORTH CHANGES AND/OR ADDITIONAL INFORMATION AS REFERENCED HEREIN AND IS HEREBY MADE PART OF AND SHOULD BE ATTACHED TO THE CONTRACT DOCUMENTS. **ACKNOWLEDGE RECEIPT** OF ALL ADDENDA IN THE SPACE PROVIDED IN THE **BID FORM**. FAILURE TO DO SO MAY SUBJECT THE BIDDERS TO DISQUALIFICATION.

A. Specifications:

- Item #1: Section 08 71 00, "Door Hardware and Schedule"
MODIFIED: paragraph 2.17-A.
Signage on doors to AOA: See wayfinding drawing for special ~~delayed egress~~ signage with international graphic symbols and other legal signage.
MODIFIED: Hardware Set No. 10
1-Mortise ~~DELAYED~~ Exit Device, Von Duprin-CX-HH-9875L-BE-F-E-7500-03-SS-FSE-630-CON.
MODIFIED: Hardware Set No. 12
1-~~DELAYED~~ Egress Device, Von Duprin-CX-HH-9857L-BE-F-E-7500-03-SS-FSE-630-CON.
- Item #2: Section 23 05 14, "VARIABLE FREQUENCY MOTOR CONTROLLERS"
MODIFIED: paragraph 3.7-A.
Refer to Commissioning Specifications, Section ~~018110~~ 230800, for related commissioning requirements.
MODIFIED: paragraph 3.7-B.
Contractor shall provide all necessary support to the commissioning team to implement commissioning plan as outlined in Section ~~018110~~ 230800.
- Item #3: Section 23 05 93, "Testing, Adjusting and Balancing for HVAC"
MODIFIED: paragraph 3.15-A.
Refer to Commissioning Specifications, Section ~~01 81 10~~ 23 08 00, for related commissioning requirements.
- Item #4: Section 23 08 00, "Commissioning of HVAC"
MODIFIED: paragraph 1.1-A.
Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification

~~Sections, apply to this Section, including 019113 General Commissioning Requirements. apply.~~

MODIFIED: paragraph 1.2-B-1.

Refer to Division 01 & ~~Section 019113 "General Commissioning Requirements"~~ the following sections for additional commissioning scope and requirements. All testing and commissioning requirements ~~of that for these~~ sections shall be met.

ADDED: sub-paragraph 1.2-B-1.a thru d for references.

Item #5: Section 23 09 00, "Instrumentation and Control for HVAC"

MODIFIED: paragraph 3.9-A.

Refer to Commissioning Specifications, Section ~~018110~~ 230800, for related commissioning requirements.

MODIFIED: paragraph 3.9-B.

Contractor shall provide all necessary support to the commissioning team to implement commissioning plan as outlined in Section ~~018110~~ 230800.

B. Drawings:

Item #1: Sheet G001

INDEX UPDATED FOR ADDENDUM #1

Item #2: Sheet G201

BLDG COMM. #2DETAIL E1 - ADDED - FOR NEW PAVEMENT MARKINGS REQUIRED AT "PUBLIC-WAY"

BLDG COMM. #2PLAN A1 - MODIFIED - TO DEMONSTRATE FBC REQUIRED PUBLIC WAY

Item #3: Sheet G212

(RFC 8-B) PLAN A1 - CLARIFIED - APPLICATION OF ALTERNATE, REMOVED INTERIOR WALL BLOCKING DOUBLE DOOR [W1231B].

(RFC 8-B) PLAN D1 - CLARIFIED - APPLICATION OF ALTERNATE, REMOVED INTERIOR WALL BLOCKING DOUBLE DOOR [W1231B].

Item #4: Sheet AL001

BLDG COMM. #1NOTE FOR DELAYED EGRESS HARDWARE DELETED.

BLDG COMM. #2MODIFIED - TO DEMONSTRATE FBC REQUIRED PUBLIC WAY

BLDG COMM. #3NOTE - ADDED - REF. TO THRESHOLD NOTES CONTAINED IN STRUCTURAL.

FIRE COMM. #1 ADDED - NOTE AND REF TO OCCUPANCY PLAN FOR CONVENIENCE.

FIRE COMM. #1 NOTE - MODIFIED - TO CLARIFY EMERGENCY LIGHTING OF PROJECT.

FIRE COMM. #2 LEGEND - CORRECTED - PRODUCTS LISTED.

Item #5: Sheet AL111

FIRE COMM. #1 NOTE ADDED FOR CLARITY.

D1 - CORRECTED - FUNCTIONAL USE OF OVERFLOW SEATING AREA.

SHEET TITLE CHANGE.

Item #6: Sheet AL211

BLDG COMM. #1LEGEND - MODIFIED - TO REMOVE "DELAYED EGRESS" FROM GATE DOORS

BLDG COMM. #1PLAN D1 - MODIFIED - TO REMOVE "DELAYED EGRESS" FROM GATE DOORS

BLDG COMM. #2PLAN A1 - MODIFIED - TO DEMONSTRATE FBC REQUIRED PUBLIC WAY

- Item #7: **FIRE COMM. #1** NOTE ADDED FOR CLARITY.
Sheet AL710
FIRE COMM. #1 NOTE ADDED FOR CLARITY.
FIRE COMM. #1 PLAN D1 - CLARIFIED - TO INCLUDE EGRESS INFORMATION SHOWN ON AL211.
FIRE COMM. #1 PLAN D1 - CLARIFIED - TO INCLUDE EMERGENCY LIGHTING - IN RED - SHOWN ON E3XX SERIES DRAWINGS.
FIRE COMM. #1 PLAN D1 - CLARIFIED - TO INCLUDE FAS DEVICES ALREADY SHOWN ON FA SERIES DRAWINGS. NO NEW DEVICES.
SHEET TITLE CHANGE.
- Item #8: Sheet A212
BLDG COMM. #5 PLAN B1 - CORRECTED - EXTENSIONS OF R-01 TO 12".
NOTE 10 - CORRECTED - SHEET REFERENCE FOR RAILING DETAILS.
- Item #9: Sheet A213
BLDG COMM. #5 PLAN B1 - CORRECTED - EXTENSIONS OF R-01 TO 12".
NOTE 10 - CORRECTED - SHEET REFERENCE FOR RAILING DETAILS.
- Item #10: Sheet A214
BLDG COMM. #5 PLAN B1 - CORRECTED - EXTENSIONS OF R-01 TO 12".
NOTE 10 - CORRECTED - SHEET REFERENCE FOR RAILING DETAILS.
- Item #11: Sheet A215
BLDG COMM. #5 PLAN B1 - CORRECTED - EXTENSIONS OF R-01 TO 12".
NOTE 10 - CORRECTED - SHEET REFERENCE FOR RAILING DETAILS.
- Item #12: Sheet A216
BLDG COMM #5 PLAN B1 - CORRECTED - EXTENSIONS OF R-01 TO 12".
(RFC 6-B) PLAN B1 - MODIFIED - TO INCLUDE DETAIL REF. FOR SOUTH ELEVATION - ELEMENTS OF ALT-5 EXTERIOR AREA.
NOTE 10 - CORRECTED - SHEET REFERENCE FOR RAILING DETAILS.
- Item #13: Sheet A452
BLDG COMM. #4 PLAN B1 - CORRECTED - LOCATION OF URINAL, RENDERED CLEARANCE ON PLAN.
BLDG COMM. #4 PLAN B1 - CORRECTED - LOCATION OF URINAL, RENDERED CLEARANCE ON PLAN.
BLDG COMM. #4 PLAN D1 - CORRECTED - LOCATION OF URINAL, RENDERED CLEARANCE ON PLAN.
PLAN A1 - ADDED - LOCATION OF MISSING ACCESSORIES.
PLAN B1 - ADDED - LOCATION OF MISSING ACCESSORIES.
PLAN B3 - ADDED - LOCATION OF MISSING ACCESSORIES.
PLAN D1 - ADDED - LOCATION OF MISSING ACCESSORIES.
PLAN D3 - ADDED - LOCATION OF MISSING ACCESSORIES.
- Item #14: Sheet A455
BLDG COMM. #4 DETAIL E2 - CORRECTED - LOCATION OF URINAL, RENDERED CLEARANCE ON PLAN.
DETAIL A4 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL A5 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL B4 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL C4 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL D5 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL E3 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL E4 - ADDED - LOCATION OF MISSING ACCESSORIES.

- Item #15: Sheet A456
BLDG COMM. #4DETAIL A1 - CORRECTED - LOCATION OF URINAL, RENDERED CLEARANCE ON PLAN.
DETAIL A2 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL C1 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL D1 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL D4 - ADDED - LOCATION OF MISSING ACCESSORIES.
DETAIL E5 - ADDED - LOCATION OF MISSING ACCESSORIES.
- Item #16: Sheet A457
LEGEND - DELETED - UNUSED ACCESSORIES
LEGEND - CORRECTED - PRODUCTS LISTED .
- Item #17: Sheet A501
BLDG COMM. #5ELEVATION A1 - CORRECTED - EXTENSIONS OF R-01 TO 12".
- Item #18: Sheet A502
- Item #19: **BLDG COMM. #5**ELEVATION A1 - CORRECTED - EXTENSIONS OF R-01 TO 12".
BLDG COMM. #5ELEVATION C1 - CORRECTED - EXTENSIONS OF R-01 TO 12".
- Item #20: Sheet A503
BLDG COMM. #5ELEVATION C1 - CORRECTED - EXTENSIONS OF R-01 TO 12".
(RFC 8-A) ELEVATION C3 - CORRECTED - TO MARK DOOR [W1251B] AND OTHER ALTERNATE 5 ELEMENTS.
- Item #21: Sheet A505
(RFC 6-B) ELEVATION A3 - CLARIFIED - WITH KEYNOTE ELEMENTS OF ALT-5 EXTERIOR AREA.
(RFC 6-B) ELEVATION B3 - ADDED - TO CLARIFY SOUTH ELEVATION OF ALT-5 EXTERIOR AREA.
(RFC 6-B) NOTE 01 23 05.G237 - ADDED - TO CLARIFY ELEMENTS OF ALT-5 EXTERIOR AREA.
(RFC 8-B) ELEVATION A3 - CLARIFIED - TO INCLUDE NOTE ABOUT SOUTH ELEVATION COORDINATING WITH ALTERNATES.
- Item #22: Sheet A711
BLDG COMM. #1NOTE 1 - MODIFIED - SCHEDULE COMMENT TO REMOVE DELAYED EGRESS FROM DOOR
(RFC 8-A) SCHEDULE W1251B - CORRECTED - ENTRYFOR PROPER DOOR TYPE AND BID ALTERNATE.
(RFC 8-B) SCHEDULE W1231B & W1251A - CORRECTED - TO INCLUDE DOORS IN BASE BID, AS THE SOUTH WALL MOVES WITH ACCEPTED BIDS.
- Item #23: Sheet A851
BLDG COMM. #5DETAIL A2 - CORRECTED - EXTENSIONS OF R-01 TO 12".
BLDG COMM. #5DETAIL C3 - CORRECTED - EXTENSIONS OF R-01 TO 12".
- Item #24: Sheet AG513
BLDG COMM. #1DETAIL D3 - MODIFIED - TO REMOVE "DELAYED EGRESS" FROM DOOR SIGN
- Item #25: Sheet E212
BLDG COMM. #6 PLAN - CLARIFIED - GFCI OUTLET FOR EWC-1
- Item #26: Sheet E215

BLDG COMM. #6 PLAN – CLARIFIED – GFCI OUTLET FOR EWC-1

C. Questions:

- Item #1: Will there be any passenger boarding bridges, PCA, GPU or other GSE equipment associated with this expansion? If so, will it be a part of this bid or a separate procurement?
A: There are no Passenger Boarding Bridges. This is a ground load facility. PCA, GPU / GSE Equipment is provisioned for with POWER ONLY installed under previous project. There is no anticipated GSE equipment with this project.
- Item #2: Can we see if the square footage or estimated value is listed?
A: Square Footage are Illustrated on the alternates – Sheet G211. Overall ultimate buildout SF 33,118 SF (AL001). Budget is not published.
- Item #3: Please indicate if the owner or the GC is the I responsible for providing the Commissioning agent for this project.
A: Per §230010-1.3-V. The contractor is to provide Commissioning services. Commissioning for HVAC as described in specification §230800 shall be included as a line-item cost for owner's evaluation, consideration, and acceptance. Value shall be prorated in relation to (%) percentage of value of Mechanical (Division 23) work for Base Bid, Alternates 1,2, & 3.
- Item #4: We would very much appreciate the opportunity to bid on the Hurricane Automatic Sliding door package for this project. As we are not currently listed as an approved manufacturer, we would greatly appreciate your assistance with the processing of the attached substitution request. It should contain all information needed to demonstrate our product as an approved equal. Please let me know if you think additional information will be necessary.
A: This Substitution approval (See other Attachment #4) is contingent on the following:
 1. Emergency brake away opening width meets or exceeds 153.5" as indicated on sheet AL211.
 2. Opening sensors able to operate without interference within vestibule depth indicated on sheet A211.
 3. Glazing can be tinted to match curtain wall glazing as specified §084929-2.4-C.-1.
- Item #5: Please see attached Substitution Request for Thermoplastic Roofing.
A: This Substitution is rejected (See other Attachment #5) basis on the following:
 1. Not able to confirm comparable Warranty Period to specified.
 2. Performance Criteria for PVC sheet does not meet requirements specified §075400-2.4-A.-5.
- Item #6: Part A) Sheet AL002 Product Approval Specification Sheet – Item 2.E. lists only Viracon Impact Glass. Specification Section 08 80 00 list only Viracon, Guardian, and Pilkington as being approved for this project. We request that Trulite and PPG be added to the approved vender list as long as they meet the requirements of the specifications.
A: if the products as suggested complying with Conditions for substitution §012500-2.1-A. then provide a substitution request for evaluation per §012500-1.4-A. any substitution must include verification that the proposed

will match not only the performance characteristics but the Color and quality of the Basis of Design.

Part B) Sheet A505 Elevation A3 – shows the south elevation of the building. Is there a drawing that shows the south elevation of the Outdoor Seating Area which is a part of Alternate #5?

A: See attached modified sheet **A505** with new elevation B3.

Item #7: Part A) Section 23-05-93 Paragraph 3.15.A. refers the Commissioning Specification 01 81 10 for related commissioning requirements. Please clarify and/or provide section 01 81 10.

A: Incorrect reference was provided see updated section 230593-3.15-A. pointing to 230800. In addition to paragraph identified, Sections 230514-3.7 and 230900-3.9 also revised.

Part B) Who provides the CxA (Commissioning Administrator) - the Owner or the Contractor?

A: Per §230010-1.3-V. The contractor is to provide Commissioning services. Commissioning for HVAC as described in specification §230800 shall be included as a line-item cost for owner's evaluation, consideration, and acceptance. Value shall be prorated in relation to (%) percentage of value of Mechanical (Division 23) work for Base Bid, Alternates 1,2, & 3.

Part C) Section 23 08 00 Paragraph 1.1.A & Paragraph 1.2.B.1. refers the Commissioning Specification 01 91 13 for "General Commissioning Requirements". Please clarify and/or provide section 01 91 13.

A: Incorrect reference was provided see updated section 230800 for further clarification.

Item #8: **Part A)** Sheet A216 – shows Door W1251B at the west wall of Alternate 5. Sheet A711 does not show that door on the Door Schedule. Please provide information for door W1251B.

A: Door was erroneously indicated outside of any base bid or alternate (see top of schedule). The entry has been corrected along with information missing from schedule. See Revised **A711**

Part B) Sheet A216 – Door W1251A – Will door W1251A go in the Base bid if no Alternates are taken? Or, will the South Wall of the Base bid become an exterior wall with no doors or windows? Please clarify what south building elevation will be if the alternates are not taken.

A: REF: G212 Indicating the Doors W1251A and W1231B will follow the south wall elevation depending on level of alternates taken. **G212** has been clarified for access to door W1231B, a note has been added to **A505** (south elevation) for clarity and schedule entries for doors on **A711** have been revised to indicate Base Bid.

Item #9: The speakers are to be mounted in the grid work above the tiles. They will project downwards into the solid tile and not be heard in the room below. I have asked that either the tiles be substituted with the appropriate acoustically transparent perforated tiles either in whole or wherever a specified speaker is located.

A: the assumption that speakers project to solid surface is incorrect. Refer to details **1 & 3/ TP811** indicating an opening in tile as well as speaker grille with finish.

Item #10: **Part A)** Sheet L100 Landscape Plan shows limits of Planting & Sod. Section 01 21 00 Paragraph 2.2.A. gives an allowances of \$40,000.00 for Landscaping for the Base Bid. Does this Allowance cover both Plantings and Sod or just Planting?

A: Intent is for allowance to cover Planting and Sod as shown **L100**.

PART B) Sheet S002 - 1000 General Notes - 15. States that the Floor Elevation is +86.25 See Civil Drawings for Actual Elevation. Structural Drawing shows this elevation from reference lines 1 to 6 and 1 foot lower from reference line 6 to 25 (see sheet A110 for the reference lines). Sheet A110 Shows the same as the Structural. Sheet C100 only shows a building elevation of FF = 85.25. Section C shows FF = 85.25:

1. Should Section C show FF= 86.5 ?
 - A) Section C should show FF 86.25
2. At what elevation is the building pad being graded to? At Reference Line 6, it shows 84.5 which is -1.42 blow the floor slab. And, at reference line 3 it is .92 feet below the floor slab. Please Clarify building pad Elevations.
 - A) Referenced "84.5" is an existing topographic curve. Building pads should accommodate structural slab thickness requirements and finish floor elevations of 86.25 from reference lines 1-6 and 85.25 from reference lines 6-25.
3. From reference Line 6 to 26 it appears the Building Pad Elevation is around +84.0 which will be .92 feet below the floor slab. Please clarify building pad elevations. And, who is responsible for the additional fill?
 - A) If additional fill is required, the County has fill material available meeting project requirements. Contractor will be responsible for up to 30 mile hauling.
4. Soils report states that an approved structural fill is to be used for the last 12" of fill below the floor slab. Can the excavated material from the footings and swales be used for the structural fill?
 - B) Spoils from excavation may be utilized if samplings from said spoils confirm to fill specifications of the project.

Item #11: In previous Bid last year it was difficult to find subcontractors for the following systems for the airport. They were in only one of the Electrical contractors quote. Who handle the service for the Airports -

1. Structured Cable System 27 10 00
 - A) Current and or Recent Airport Vendors
Glaze Communications Services, Inc. (805) 916-7455 or
Sunrise Network Solutions, Inc. (228) 875-7336
2. existing Multi-User Flight Information Display's (MUFIDS)
 - A) Current and or Recent Airport Vendors
Infax, Inc. (678) 533-4024

D. Other Items:

- Item #1: Pre-Bid Conference Sign in sheet.
Item #2: Pre-Bid Conference Presentation.
Item #3: Pre-Bid Conference Minutes

Item #4: 004-084229-Automatic Entrances
Item #5: 005-075400-Thermoplastic Roofing

End of Addendum No 1

SECTION 08 71 00 - DOOR HARDWARE AND SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Related Sections:

1. 08 10 00, "Steel Doors and Frames"
2. 08 31 13, "Access Doors and Frames"
3. 08 42 29, "Automatic Entrances"
4. DIVISIONS 26, 27 & 28.

1.2 SCOPE

- A. Work covered by this Section of Specifications consists of furnishing and delivering to the job site for fitting and installation of all finish hardware complete, in accordance with this Section and applicable drawings, and subject to terms and conditions of Contract.
- B. It is intended that the following list of hardware will cover all finish hardware to complete the project. Omissions and/or discrepancies shall be brought to the Architect's attention during the bidding period. If a hardware set for a door is not called out in the specifications, but the door is shown on the drawings, provide hardware set of similar to door set listed here in. Provide complete hardware set for all doors shown on plan.
- C. To the extent specified and shown on the drawings, provide and install all hardware for doors per schedule and/or notes on the drawings. Provide and install all hardware for doors shown on drawing plans.
- D. Field coordination with field conditions is required.
- E. Coordination with systems, electrical and wayfinding work is required.
- F. This Section references specification sections relating to commercial door hardware for the following:
 1. Swinging Doors.
 2. Other doors to the extent indicated in the specifications and contract documents. Provide hardware components required and as noted on the drawings.
- G. Commercial door hardware includes, but is not necessarily limited to, the following:
 1. Mechanical door hardware.
 2. Passive door hardware.
 3. Electro mechanical and access control door hardware.
 4. Electro mechanical and access control door hardware power supplies, back-ups and surge protection.
 5. UL listed transfer hinges.
 6. Automatic operators.

7. Permanent Removable key Cylinders
8. Cylinders specified for doors in other sections. IE Aluminum Frame Folding Doors, Automatic Entrances and Access doors.

H. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction. (The basis of governing code is the edition in effect at the time on which contract documents were received by AHJ for permit review)

1. ANSI A117.1 – Accessible and Usable Buildings and Facilities.
2. FBC – Florida Building Code 2017 and Amendments
3. FFPC- Florida Fire Protection Code 2017
4. NFPA 70 – National Electrical Code.
5. NFPA 80 – Fire Doors and Windows.
6. NFPA 101 – Life Safety Code. (As revised by Florida Fire Prevention Code 2017)
7. NFPA 105 – Installation of Smoke Door Assemblies.

I. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

J. Exterior doors will require document submittals for confirmation with NOA and/or Florida Product approval.

K. Provide and install permanent cores, coordinating with VPS locksmith.

1.3 SUPPLIER

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, Designer, VPS designated Locksmith and RPR 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. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:

1. For door hardware, an Architectural Hardware Consultant (AHC) who is also an Electrified Hardware Consultant (EHC) and Architectural Openings Consultant (AOC).
2. Include AHC, EHC and AOC certificates with submittal.

- C. 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.
- D. 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.
- 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 the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and Florida Building Code Accessibility 2017.
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 to comply with requirements in Section 01 31 13 "Project Coordination." In addition to Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant and VPS designated locksmith. 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.

I. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

1.4 DELIVERY

A. Items of finish hardware shall be delivered to the project site or as otherwise specified or required, and shall be checked in for completeness and familiarization with the contractor. All items of Finish Hardware shall be packaged, numbered, labeled to identify each opening for which it is intended and to correspond with item numbers on the approved Hardware Schedule.

1.5 TEMPLATES

A. All finish Hardware to be installed on or in metal doors and/or frames shall be manufactured to template. Template machine screws shall be furnished for all such materials. The supplier and Owner shall furnish Hardware Schedules as approved by the Architect and all necessary templates to metal door and frame fabricators for their coordination's use.

1.6 SUBMITTALS

A. Submit complete electronic copy of typewritten Hardware Schedules to the Architect for approval. After approval, provide required number of copies of approved Hardware Schedule for Distribution. No factory Order shall be placed for materials until approval has been given by the Architect.

B. Electronic current copy of a catalog cut shall be submitted with the Hardware Schedule for each item of hardware listed in the schedule. The item shall be highlighted with red box or cloud around item.

C. Submit complete typewritten Hardware Schedules to the Architect for review. After approval provide required number of copies of approved Hardware Schedule for distribution. No factory Order shall be placed for materials until review has been completed by the Architect .

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of

Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
 4. Content: Include the following information:
 - a. Type, style, function, size, label, hand and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Door and frame sizes and materials.
- D. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for lockets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders. Coordinate with VPS designated Locksmith.
- E. Summary or comments.
- F. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- G. Operating and Maintenance Manuals: Provide manufacturer's operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware after completion of the installation test to include "as built" modifications made during installation, checkout and acceptance.
- H. Warranties and Maintenance: Special warranties and maintenance agreements specified.
- I. Certificates showing compliance certifications for AHC, EHC and AOC for preparer of submittal.

1.7 RESPONSIBILITY

- A. It shall be the supplier's responsibility to furnish hardware in accordance with the intent of this specification, the functional use of door. Where, by virtue of Architectural design or by function,

a change is necessary, hardware of equal design and quality shall be furnished upon written approval of the Architect.

1.8 LOCATIONS

- A. Hardware locations dimension shall be as follows: Distance from finish floor to center line of:

Door Knob	38"
Door Pull	42"
Deadlock	60"
Exit Bolt Cross Bar	38"
Push Plate	50"
Butt Hinges	Bottom Hinges: Finish floor to bottom of Hinge 10".

Top Hinge: Head rabbet to top of Hinge 5".

Center Hinge: Equal distance between top and bottom hinges.

180 DEGREES OPENINGS

- B. Other than those doors that are restricted to less than 180 degrees opening by building or by overhead holders or stops, all butts and/or closer arms shall be of sufficient size to allow full 180 degrees opening of doors.

1.9 WARRANTY

- A. Provide in writing, guarantee that materials furnished under this Section are free from defect and warrant workmanship for a period of one (1) year from date of final payment. Exception: Supply closers with a ten- (10) year warranty from date of final payment.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the contract documents and final Door Hardware Schedule. Include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.11 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrical hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Division 08 Sections doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

PART 2 - PRODUCTS

2.1 BUTTS

Doors 1-3/4" thick:	Minimum 4-1/2" high
Doors 1-3/8" thick:	Minimum 3-1/2" high

- A. Each door shall not have less than three hinges. Doors 7'-10" and higher shall have four (4) hinges whether specified under items or not.
- B. All butts used with door closers shall be ball bearing. All exterior doors shall have ball bearing butts.
- C. Approved manufacturers are:

Hager	Five Knuckle, Ball Bearing, Heavy Duty, ANSI A 5111 Stainless Steel, BB1199, US32D, 630, Satin Stainless Steel
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2.2 FINISH:

Butts, Exterior	US32D, 630, Satin Stainless Steel
Butts, Interior	US32D, 630, Satin Stainless Steel
Locks	US32D, 630, Satin Stainless Steel
Push, Pull, Kick Plates	US32D, 630, Satin Stainless Steel
Closers	US32D, 630, Satin Stainless Steel
Panic Devices	US32D, 630, Satin Stainless Steel
Door Stops, Miscellaneous	US32D, 630, Satin Stainless Steel
Door Trim	US32D, 630, Satin Stainless Steel

2.3 LOCKSETS

- A. Manufacturer: BEST Mortise, 45H Series ANSI A156.13, Series 1000, Grade 1 operational, Grade 2 Security, Heavy Duty Mortise Locksets with Removable core with interchangeable cylinder. 630 Stainless Steel.

- B. Manufacturer: Best Mortise, 48 H Series Deadlocks with removable core with interchangeable cylinder. 630 Stainless Steel.
- C. Approved Substitution: NONE ALLOWED

2.4 CLOSERS

- A. Closers shall be of the following manufacturers and shall be furnished in the manufacturer's recommended printed size for the specified conditions unless otherwise noted in the hardware sets. Closers shall be full rack and pinion complete with back check. Springs shall be motor clock type. Furnish flush mount transom brackets where not transom bar exists. Furnish parallel arm where required.

MANUFACTURER	SERIES
LCN	#4040 XP Extra Heavy Duty, Metal Cover 72 MC 630 Cush-N-Stop
	#4041XP-3049 Extra Heavy Duty, Metal Cover 72 MC 630, At Gate doors, 180 degree hold open.

2.5 DOOR TRIM

- A. All push plates, pulls, pull plates, kick and/or armor plates shall be any one of the following manufacturer's products in catalog number as set forth herein:

MANUFACTURER	PUSH PLATE	PULL PLATE	KICK PLATE
Ives	8"x 16"	4" x 16"	8" High
Trimco	1001.11	1014.3	8" High
Rockwood	8" X 16"	4" X 16"	-----
Baldwin	8" X 16"	4" X 16"	-----

- B. FINISH: 630 Satin Stainless Finish

2.6 DOOR STOPS

- A. Stops shall be one of the following manufacturers:

MANUFACTURER	WALL	FLOOR
Ives	WS 404-CVX	-----
Glynn-Johnson	-----	-----
Hager	-----	-----
Finish: 630 (US32D) Satin Stainless Finish		

2.7 THRESHOLDS

- A. The following types of Manufacturer of Thresholds shall be used:

<u>TYPE</u>	<u>MANUFACTURER</u>
AS SCHEDULED	PEMKO

2.8 WEATHER/SOUND PERIMETER STRIPPINGS AND BOTTOM DROP SILLS

- A. The following types of manufactures:

<u>TYPE</u>	<u>MANUFACTURER</u>
AS SCHEDULED OR REQUIRED BY FUNCTION	PEMKO

2.9 LOCK CYLINDERS, CORE AND KEYING

- A. All locks, cores and keys on Airport Property shall be 'BEST' format, 7 pin small format interchangeable 'F' zero-bitted cores. No alternates will be accepted. Blank core & keys for each new lock are to be provided to the Airport's locksmith (vendor) to rekey prior to substantial completion. Grand Master keys, master keys and spare keys are not necessary.
- B. Provide and install all hardware including locking hardware and provide removable temporary cores keyed for construction for use by the contractor, A/E and airport. Provide keys as required to cover needs of the construction project.
- C. Provide Blank cores and keys for each new lock. Deliver to the Airport's Locksmith (vendor) to rekey prior to substantial completion. The Locksmith will perform all keying. Grand Master keys, master keys and spare keys are not necessary.
- D. At Substantial occupancy the G.C. will install all re keyed cores as directed by VPS or VPS Locksmith (vendor).
- E. Provide and install all "BEST" Removable Cylinders for all locksets and panic/fire devices. Coordinate with VPS Locksmith (vendor)

2.10 FASTENING

- A. All screws shall be of matching finish to their product being fastened or installed and shall be the manufacturer's standard for that item.

- B. Sex Bolts: Door closers, door holders, and exit devices installed on wood door shall be attached by means of thru-bolts and sex-nuts.

2.11 PANIC & FIRE DEVICES

- A. VonDuprin Series 98/99 -630
- B. VonDuprin Series 98/99 Chexit Electrified- 630
- C. VonDuprin Series 98/99F-630

2.12 ACCESS CARD SYSTEM READER

- A. Flush mounted, HID iClass RK40 with door number label.

2.13 SWITCH

- A. "Sentrol" 2700 Series High Security Concealed Magnetic Contact.

2.14 AUDIO VISUAL ALARM

- A. Interior flush mounted, Wheelock, MTWP-2475 W-NW, Multi-tone Strobe, Multi candela field selectable, white light with clear lense, white body.
- B. Exterior flush mounted: Wheelock series, MTWP with amber lens, for wet location.

2.15 ELECTRIC STRIKE

- A. HES 8500 Electric door strike, fail secure, provide optional face plate for "BEST o mortise locks

2.16 ELECTRIC POWER TRANSFER

- A. Manufacturers: Subject to compliance with requirements provide products by one of the following:
 - 1. Von Duprin EPT.
 - 2. Securitron CEPT
- B. Requirements:
 - 1. Provide power transfer with electrified options as scheduled in the hardware sets.
 - a. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.
 - 2. Power transfer hinges are not allowed.

2.17 SIGNAGE ON DOORS:

- A. Signage on doors to AOA: See wayfinding drawing for special ~~delayed egress~~ signage with international graphic symbols and other legal signage.
- B. Signage at the top of every door frame with door number. See wayfinding drawings.
- C. Signage at the lockset side of each door identifying room. See wayfinding drawings.

2.18 CONSTRUCTION AND PERMANENT CORES

- A. Provide temporary and final permanent cores for each lock.

2.19 POWER SUPPLIES

- A. Provide electrical accessories, such as power supply box for each electric hardware installation. See systems documents.

PART 3 - EXECUTION

3.1 DELIVERIES

- A. Stockpile items sufficiently in advance to ensure their availability, and make necessary deliveries in a timely manner to ensure orderly progress of work.

3.2 INSPECTION AND INSTALLATION

- A. Install finish hardware by hardware supplier.
- B. Certify installers are factory trained for products specified in this Section.
- C. Do not install surface-mounted items until finishes have been completed.
- D. Set thresholds for exterior doors in full bed of caulking as specified in Section "Joint Sealers".
- E. Upon completion of installation, and as a condition of its acceptance, visually inspect finish hardware furnished under this Section and place in optimum working condition. Turn over to VPS Locksmith, permanent cores, installation instructions, templates, adjusting tools and extra parts.
- F. Check upon completion of Project, check locks with VPS locksmith for proper location, operation, and keying.
- G. Final Adjustment:
 - 1. Wherever hardware installation is made more than one (1) month prior to final payment or occupancy of a space or area, return to work during week prior to acceptance or occupancy and make final check and adjustment of hardware items in such space or area.

2. Clean operating items as necessary to restore proper function and finish of hardware and doors.
 3. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- H. Instruct VPS's personnel in proper adjustment, maintenance of hardware and repair of hardware. Videotape this instruction meeting and provide one copy of DVD-format disk to VPS for future use.

PART 4 - SCHEDULE

HARDWARE SET NO.1,

Doors: W-1005, W-1007, W-1010, W1013 Each bypass sliding door to have:

2-BEST removable cores and cylinders (1 core for locking dead bolt, 1 core for control switch interior).

4-Door Position Switches (At each active break out panel).

Balance of hardware by door manufacturer. Dead bolts (DL), Storm rated (SR)

HARDWARE SET NO. 2,

NOT USED

HARDWARE SET NO. 3,

Doors: W-1003, W-1285, W1283, W1273, W1271 Each door to have:

1-Mortise Lockset-Privacy F-19 "BEST" 45H, STRIKE, LEVER 16, ROSE-S, 630, VIT-14 VISUAL INDICATOR.

1-Closer-LCN-4040 XP-72MC-62PA-630

1 ½ PAIR at Doors W1283 & W1271, HAGER-4 ½" x 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY WEIGHT-ANSI A-5111 (S.S.), US32.

2 PAIRS at Doors W-1003, W-1285, W1273 HAGAR-4 ½" X 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY WEIGHT-ANSI A-5111 (S.S.), US32.

1-WALL STOP-IVES-WS 404, CVK-626

2-Kick Plates, IVES 8400 x 8"-S.S.-630

1-Set of Weather Strip- PEMKO- 0-285, CPKL

1-Bottom Door Closer-PEMKO-430, CPKL

1-Sill- PEMKO-271A

HARDWARE SET NO. 4,

Doors: W-1064 Each door to have:

1-Mortise Lockset-Privacy F-19 "BEST" 45H, STRIKE, LEVER 16, ROSE-S, 630, VIT-14 VISUAL INDICATOR.

1-Closer-LCN-4040 XP-72MC-62PA-630 CUSH MOUNT

2 PAIR, HAGAR-4 ½" X 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY WEIGHT-ANSI A-5111 (S.S.), US32.

1-Floor Stop-IVES-WS 410-626

2-Kick Plates, IVES 8400 x 8"-S.S.-630

1-Set of Weather Stripping- PEMKO- 0-285, CPKL

1-Weather Strip@Closer-PEMKO-588BL

1-Bottom Door Closer-PEMKO-430, CPKL

1-Sill- PEMKO-271A

HARDWARE SET NO. 5,

Doors: W-1062, W-1276, W-1081 - Each door to have:

1-Mortise Lockset-Office, F-20 "BEST" 45H, STRIKE, LEVER 16, ROSE-S, 630.

1-Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format Interchangeable "F" zero Bitted Core.

1-Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format Interchangeable "F" zero Bitted Core, "BEST" cylinder.

1-Closer-LCN-4040 XP-72MC-62PA-630 CUSH MOUNT

1 ½ PAIR, at Door W-1276, HAGAR-4 ½" X 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY WEIGHT-ANSI A-5111 (S.S.), US32, N.R.P.

2-PAIRS, at Doors W-1062, W-1081, HAGAR-4 ½" X 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY WEIGHT-ANSI A-5111 (S.S.), US32, N.R.P.

1-WALL STOP-IVES-WS 404, CVK-626

2-Kick Plates, IVES 8400 x 8"-S.S.-630

1-Set of Weather Stripping- PEMKO- 0-285, CPKL

1-Weather Strip@Closer-PEMKO-588BL

1-Bottom Door Closer-PEMKO-430, CPKL

1-Sill- PEMKO-271A

HARDWARE SET NO. 6,

Doors: W-1006, W-1063, W-1018, W-1061, W-1282, W-1279, W-1270, W-1268 - Each door to have:

1-Mortise Lockset at Doors W-1063, W-1018, W-1282, W-1279, W-1270, W-1268 Storage Room, F-07 "BEST" 45H, STRIKE, LEVER 16, ROSE-S, 630.

1-Mortise Lockset at Doors W-1061, Intruder, F-33 "BEST" 45H, STRIKE, LEVER 16, ROSE-S, 630.

1-Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format Interchangeable "F" zero Bitted Core, "BEST" cylinder.

1-Closer-LCN-4040 XP-72MC-62PA-630 CUSH MOUNT

2-PAIRS, HAGAR-4 ½" X 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY WEIGHT-ANSI A-5111 (S.S.), US32, N.R.P.

1-WALL STOP-IVES-WS 404, CVK-626

2-Kick Plates, IVES 8400 x 8"-S.S.-630

1-Set of Weather Stripping- PEMKO- 0-285, CPKL

1-Weather Strip@Closer-PEMKO-588BL

1-Bottom Door Closer-PEMKO-430, CPKL

1-Sill- PEMKO-271A

HARDWARE SET NO. 7, Doors: W-1001-Each door to have:

1-Exit Device, Von Duprin- E9875L-HH-F-630

1-Closer-LCN-4040 XP-72MC-62PA-630 CUSH MOUNT

1-Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format, Interchangeable "F" zero Bitted Core.

1 ½ PAIR BUTTS - 4 ½" x 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY DUTY WEIGHT-ANSI A-5111 (S.S.), US32, N.R.P.

2-Kick Plates, IVES 8400 x 8"-S.S.-630

1-Overhead DRIP-PEMKO C346

1-Set of Weather Stripping- PEMKO- 0-285, CPKL

1-Weather Striping@Closer-PEMKO-588BL

1-Bottom Door Closer-PEMKO-430, CPKL

1-Sill- PEMKO-271A

1-Exterior Offset Security Bar-PEMKO 3572-PP7

HARDWARE SET NO. 8, Doors: W-1004, W-1278, W-1277, W-1267, W-1266-Each door to have:

1-Mortise Lockset Storage Room, F-07 "BEST" 45H, STRIKE, LEVER 16, ROSE-S, 630.

1-Closer-LCN-4040 XP-72MC-62PA-630 CUSH MOUNT

1-Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format, Interchangeable "F" zero Bitted Core.

1 ½ PAIR, BUTTS - 4 ½" X 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY DUTY WEIGHT-ANSI A-5111 (S.S.), US32, N.R.P.

2-Kick Plates, IVES 8400 x 8"-S.S.-630

1-Overhead DRIP-PEMKO C346

1-Set of Weather Stripping- PEMKO- 0-285, CPKL

1-Weather Striping@Closer-PEMKO-588BL

- 1-Bottom Door Closer-PEMKO-430, CPKL
- 1-Sill- PEMKO-271A
- 1-Exterior Offset Security Bar-PEMKO 3572-PP7

HARDWARE SET NO. 9, Doors: W-1051, W-1121, W-1151, W-1201, W-1232 - Each door to have:

- 1-Mortise Exit Device, Von Duprin- E9875EO-HH-QEL-ALK-SS-CON-630, RSS.
- 1-Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format Interchangeable "F" zero Bitted Core, "BEST" cylinder, For Alarm Reset.
- 1-Closer-LCN-4040 XP-72MC-62PA-630 CUSH MOUNT
- 1 ½ PAIR, HAGAR-4 ½" X 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY DUTY WEIGHT-ANSI A-5111 (S.S.), US32, N.R.P.
- 2-Kick Plates, IVES 8400 x 8"-S.S.-630
- 1-Exterior Offset SECURITY BAR-PEMKO 3572-PP7
- 1-Overhead DRIP-PEMKO C346
- 1-SWITCH Control- 2700 Series HIGH SECURITY CONCEALED MAGNETIC SWITCH.
- 1-Set of Weather Stripping- PEMKO- 0-285, CPKL
- 1-Set of Weather Stripping@Closer-PEMKO-588BL
- 1-Bottom Door Closer-PEMKO-430, CPKL
- 1-Sill- PEMKO-2715A HEAVY DUTY
- 1-Electric Power Transfer-Von-Duprin EPT
- 1-DIB

HARDWARE SET NO. 10, Doors: W-1072, W-1114, W-1141, W-1183, W-1231 - Each door to have:

- 1-Mortise ~~DELAYED~~ Exit Device, Von Duprin-CX-HH-9875L-BE-F-E-7500-03-SS-FSE-630-CON.

1-Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format Interchangeable "F" zero Bitted Core, "BEST" cylinder.

1-Closer-LCN-4041 XP-3049-MC-72 EXTRA HEAVY DUTY, 180 DEGREE, HOLD OPEN, 630.

1-HINGE CONTINUOUS: HAGER ROTON, 780-046HD, HEAVY DUTY, HALF SURFACE CONTINUOUS HINGE, ALUMINUM 6063-T6, Custom Cut, Modified to accept EPT

1-FLOOR STOP- IVES-FS-410-626

2-Kick Plates, IVES 8400 x 8"-S.S.-630

1-Set of Weather Stripping- PEMKO- 0-285, CPKL

1-Weather Strip@Closer-PEMKO-588BL

1-Bottom Door Closer-PEMKO-430, CPKL

1-Sill- PEMKO-2715A HEAVY DUTY

1-Overhead DRIP-PEMKO C346

2-Proximity Card Reader and Push Pad:
HID iClass RK40/Provide Lable

1-SWITCH Control- 2700 Series HIGH SECURITY CONCEALED MAGNETIC CONTACT

1-Electric Power Transfer-Von Duprin EPT

2-STROBES - "WHEELOCK"-Interior & Exterior MTWP-2475 W-NIV, Multi-Tone Strobe, Multi-Candela Selectable, with Amber Lense, White Body at exterior location. Use model for WET location.

1-DIB

1-DOOR DECAL- See Drawings

HARDWARE SET NO. 11, Doors: W-1251A-Each door to have:

1-Mortise, Classroom, F-06 "BEST" 45H, STRIKE, LEVER 16, ROSE-S, 630.

1-Closer-LCN-4040 XP-72MC-62PA-630 CUSH MOUNT

1-Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format, Interchangeable "F" zero Bitted Core.

2 PAIRS, BUTTS - 4 ½" X 4 ½" -BB-1199 FIVE KNUCKLE BALL BEARING, HEAVY DUTY WEIGHT-ANSI A-5111 (S.S.), US32, N.R.P.

2-Kick Plates, IVES 8400 x 8"-S.S.-630

1-Overhead DRIP-PEMKO C346

1-Set of Weather Stripping- PEMKO- 0-285, CPKL

1-Weather Striping@Closer-PEMKO-588BL

1-Bottom Door Closer-PEMKO-430, CPKL

1-Sill- PEMKO-2715A Heavy Duty

1-DIB

1-Floor Stop- IVES-FS 410-626

HARDWARE SET NO. 12, Doors: W-2331B-Each pair of doors to have:

1-~~DELAYED~~ Egress Device, Von Duprin-CX-HH-9857L-BE-F-E-7500-03-SS-FSE-630-CON, RSS-RG-27

7-Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format Interchangeable "F" zero Bitted Core, "BEST" cylinder.

1-Removable Key MULLION-Von Duprin, Key removable MULLION, Steel-SPECIAL Order.

2-Closers-LCN-4041 XP-3049-MC-72 EXTRA HEAVY DUTY, 180 DEGREE, HOLD OPEN.

4-HINGE CONTINUOUS: HAGER ROTON, 780-046HD, HEAVY DUTY, HALF SURFACE CONTINUOUS HINGE, ALUMINUM 6063-T6, Custom-Cut, Modified to accept EPT.

2-FLOOR STOP- IVES-FS-410-626

4-Kick Plates, IVES 8400 x 8"-S.S.-630

2-Set of Weather Stripping- PEMKO- 0-285, CPKL

2-Sets of Weather Stripping@Closer-PEMKO-588BL

2-Bottom Door Closer-PEMKO-430, CPKL

2-Sill- PEMKO-2715A HEAVY DUTY

1-Overhead DRIP-PEMKO C346

2-Proximity Card Reader and Push Pad (On active Door) HID iClass RK40/Provide Lable, (Secured and UnSecured Side)

2-SWITCHES-(for Each Leaf) Sentrol- 2700 Series HIGH SECURITY CONCEALED MAGNETIC CONTACT

2-Electric Power Transfer-Von Duprin EPT

2-STROBES - "WHEELLOCK"-Interior & Exterior MTWP-2475 W-NIV, Multi-Tone Strobe, Multi-Candela Selectable, with Amber Lense, White Body at exterior location. Use model for WET location.

1-DIB

HARDWARE SET NO. 13, ALL ACCESS Doors: Each door to have:

QUANTITY AS REQUIRED- Removable Key Core & Cylinder, "BEST" 7 Pin, Small Format Interchangeable "F" zero Bitted Core, "BEST" Cylinders.

END OF SECTION 08 71 00

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SECTION 23 05 14 - VARIABLE FREQUENCY MOTOR CONTROLLERS

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 DESCRIPTION

- A. This specification is to cover a complete Variable Frequency motor Drive (VFD) consisting of a pulse width modulated (PWM) inverter designed for use with a standard NEMA Design B induction motor.
- B. The drive manufacturer shall supply the drive and all necessary options, specified. The manufacturer shall have been engaged in the production of this type of equipment for a minimum of ten years. All VFDs installed on this project shall be from the same manufacturer.

1.3 SUMMARY

- A. Related Sections:
 - 1. Section 237300 – Custom Indoor Central-Station Air-Handling Units
 - 2. Section 233423 - HVAC Power Ventilators
 - 3. Section 232123 - Hydronic Pumps
 - 4. Section 230900 – Instrumentation and Control For HVAC
- B. Section includes separately enclosed, pre-assembled, combination VFCs, rated 600 V and less, for speed control of three-phase, squirrel-cage induction motors.

1.4 REFERENCES

- A. Institute of Electrical and Electronics Engineers
 - 1. IEEE C62.41 – Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
- B. National Electrical Manufacturers Association
 - 1. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA FU 1 – Low Voltage Cartridge Fuses.
 - 3. NEMA ICS 7 – Industrial Control and Systems: Adjustable Speed Drives.
 - 4. NEMA ICS 7.1 – Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable Speed Drive Systems.
- C. International Electrical Testing Association

1. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.5 SUBMITTALS

- A. Shop Drawings: Indicate front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends.
- B. Product Data: For each type and rating of VFC indicated. Include the following features:
 1. Performance
 2. Electrical Ratings
 3. Operating Characteristics
 4. Dimensioned outline drawing
 5. Schematic diagram
 6. Component list
 7. Power and control connection diagram(s).
 8. Bacnet Interface Controller
9. Compliance to IEEE 519 – harmonic analysis for particular jobsite including total harmonic voltage distortion and total harmonic current distortion (TDD).
 - a. The VFD manufacturer shall provide calculations; specific to this installation, showing total harmonic voltage distortion is less than 5%. Input filters shall be sized and provided as required by the VFD manufacturer to ensure compliance with IEEE standard 519. All VFD's shall include a minimum of 5% impedance reactors.
- C. Test Reports: Indicate field test and inspection procedures and test results.
- D. Manufacturer's Field Reports: Indicate start-up inspection findings.
- E. Harmonic Analysis Study and Report: Comply with IEEE 399 and NETA Acceptance Testing Specification; indentify the effects of nonlinear loads and their associated harmonic contributions on the voltages and currents throughout the electrical system. Analyze possible operating scenarios, including recommendations for VFC input filtering to limit TDD and THD (V) at each VFC to specified levels.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 - Execution and closeout requirements.
- B. Provide final equipment submittal information with all noted corrections incorporated.
- C. Field quality-control reports.

- D. Operation and Maintenance Data: Submit instructions complying with NEMA ICS 7.1. Include procedures for starting and operating controllers, and describe operating limits possibly resulting in hazardous or unsafe conditions. Include routine preventive maintenance schedule.
1. Manufacturer's written instructions for testing and adjusting thermal-magnetic circuit breaker and MCP trip setting.
 2. Manufacturer's written instructions for setting field-adjustable overload relays.
 3. Manufacturer's written instructions for testing, adjusting, and reprogramming microprocessor control modules.
 4. Manufacturer's written instructions for setting field-adjustable timers, controls, and status and alarm points.
- E. Load Current and List of Settings of Adjustable Overload Relays: Compile after motors have been installed and arrange to demonstrate that switch settings for motor-running overload protection suit actual motor to be protected.

1.7 QUALITY ASSURANCE

- A. Refer to calculation and additional testing requirements located within Division 26 and Part 3 of this Section.
- B. 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.
- C. QUALITY ASSURANCE
1. Referenced Standards:
 - a. Institute of Electrical and Electronic Engineers (IEEE)
 - 1) Standard 519-1992, IEEE Guide for Harmonic Content and Control.
 - b. Underwriters laboratories
 - 1) UL508C
 - c. National Electrical Manufacturer's Association (NEMA)
 - 1) ICS 7.0, AC Adjustable Speed Drives
 - d. IEC 16800 Parts 1 and 2
 - e. National Electric Code (NEC)
 - 1) NEC 430.120, Adjustable-Speed Drive Systems
 2. Qualifications:

- a. VFDs and options shall be UL listed as a complete assembly. VFD's that require the customer to supply external fuses for the VFD to be UL listed are not acceptable. VFDs with red label UL stickers, requiring additional branch circuit protection are not acceptable. The base VFD shall be UL listed for 100 KAIC without the need for input fuses.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Section 01 – Product Requirements: Product storage and handling requirements.
- B. Store in clean, dry space. Maintain factory wrapping and provide additional plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to components, enclosure, and finish.

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation, capable of driving full load without derating, under the following conditions:
 1. Ambient Temperature: Not less than 14 deg. F. and not exceeding 104 deg. F.
 2. Ambient Storage Temperature: Not less than minus 4 deg. F. and not exceeding 140 deg. F.
 3. Humidity: Less than 95 percent (noncondensing).
 4. Altitude: Not exceeding 1000 feet.
- B. Conform to NEMA ICS 7 service conditions during and after installation of variable frequency controllers.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace VFCs that fail in materials or workmanship within the specified warranty period.
- B. Furnish five year manufacturer warranty for variable frequency controller.

1.11 TRAINING

- A. Contractor shall provide 16 hours of training to university staff divided into 4 sessions.
- B. Training shall be video taped by a licensed videographer. One DVD copy shall be provided to the owner and one DVD copy shall be provided to the commissioning agent for issuance into the commissioning report.

1.12 MAINTENANCE SERVICE

- A. Section 01 – Execution and Closeout Requirements: Maintenance service.

- B. Furnish service and maintenance of variable frequency controller for one year from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 VARIABLE FREQUENCY CONTROLLER

- A. 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:
 - 1. ABB (ACH 550) Or approved equal.
 - 2. Or approved equal.

2.2 VARIABLE FREQUENCY CONTROLLER

- A. The VFD package as specified herein shall be enclosed in a UL Listed Type enclosure, exceeding NEMA enclosure design criteria (enclosures with only NEMA ratings are not acceptable), completely assembled and tested by the manufacturer in an ISO9001 facility. The VFD tolerated voltage window shall allow the VFD to operate from a line of +30% nominal, and -35% nominal voltage as a minimum.
 - 1. Environmental operating conditions: VFDs shall be capable of continuous operation at 0 to 500 C (32 to 1220 F) ambient temperature as per VFD manufacturers documented/submittal data or VFD must be oversized to meet these temperature requirements. Not acceptable are VFD's that can only operate at 40° C intermittently (average during a 24 hour period) and therefore must be oversized. Altitude 0 to 3300 feet above sea level, less than 95% humidity, non-condensing. All circuit boards shall have conformal coating.
- B. All VFDs shall have the following standard features:
 - 1. All VFDs shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating. The keypad shall be removable, capable of remote mounting and allow for uploading and downloading of parameter settings as an aid for start-up of multiple VFDs.
 - 2. The keypad shall include Hand-Off-Auto selections and manual speed control. The drive shall incorporate "bumpless transfer" of speed reference when switching between "Hand" and "Auto" modes. There shall be fault reset and "Help" buttons on the keypad. The Help button shall include "on-line" assistance for programming and troubleshooting.
 - 3. There shall be a built-in time clock in the VFD keypad. The clock shall have a battery backup with 10 years minimum life span. The clock shall be used to date and time stamp faults and record operating parameters at the time of fault. If the battery fails, the VFD shall automatically revert to hours of operation since initial power up. Capacitor back-up is not acceptable. The clock shall also be programmable to control start/stop functions, constant speeds, PID parameter

- sets and output Form-C relays. The VFD shall have a digital input that allows an override to the time clock (when in the off mode) for a programmable time frame. There shall be four (4) separate, independent timer functions that have both weekday and weekend settings.
4. The VFD's shall utilize pre-programmed application macro's specifically designed to facilitate start-up. The Application Macros shall provide one command to reprogram all parameters and customer interfaces for a particular application to reduce programming time. The VFD shall have two user macros to allow the end-user to create and save custom settings.
 5. The VFD shall have cooling fans that are designed for easy replacement. The fans shall be designed for replacement without requiring removing the VFD from the wall or removal of circuit boards. The VFD cooling fans shall operate only when required. To extend the fan and bearing operating life, the VFD shall cycle the cooling fans on and off as required.
 6. The VFD shall be capable of starting into a coasting load (forward or reverse) up to full speed and accelerate or decelerate to set point without tripping or component damage (flying start).
 7. The VFD shall have the ability to automatically restart after an over-current, over-voltage, under-voltage, or loss of input signal protective trip. The number of restart attempts, trial time, and time between attempts shall be programmable.
 8. The overload rating of the drive shall be 110% of its normal duty current rating for 1 minute every 10 minutes, 130% overload for 2 seconds. The minimum FLA rating shall meet or exceed the values in the NEC/UL table 430.250 for 4-pole motors.
 9. The VFD shall have internal 5% impedance reactors to reduce the harmonics to the power line and to add protection from AC line transients. The 5% impedance may be from dual (positive and negative DC bus) reactors, or 5% AC line reactors. VFD's with only one DC reactor shall add an AC line reactor.
 10. The input current rating of the VFD shall be no more than 3% greater than the output current rating. VFD's with higher input current ratings require the upstream wiring, protection devices, and source transformers to be oversized per NEC 430.120. Input and output current ratings must be shown on the VFD nameplate.
 11. The VFD shall include a coordinated AC transient surge protection system consisting of 4-120 joule rated MOV's (phase to phase and phase to ground), a capacitor clamp, and 5% impedance reactors.
 12. The VFD shall provide a programmable loss-of-load (broken belt / broken coupling) Form-C relay output. The drive shall be programmable to signal the loss-of-load condition via a keypad warning, Form-C relay output, and / or over the serial communications bus. The loss-of-load condition sensing algorithm shall include a programmable time delay that will allow for motor acceleration from zero speed without signaling a false loss-of-load condition.
 13. The VFD shall have user programmable underload and overload curve functions to allow user defined indications of broken belt or mechanical failure / jam condition causing motor overload
 14. The VFD shall include multiple "two zone" PID algorithms that allow the VFD to maintain PID control from two separate feedback signals (4-20mA, 0-10V, and / or serial communications). The two zone control PID algorithm will control motor

- speed based on a minimum, maximum, or average of the two feedback signals. All of the VFD PID controllers shall include the ability for "two zone" control.
15. If the input reference (4-20mA or 2-10V) is lost, the VFD shall give the user the option of either (1) stopping and displaying a fault, (2) running at a programmable preset speed, (3) hold the VFD speed based on the last good reference received, or (4) cause a warning to be issued, as selected by the user. The drive shall be programmable to signal this condition via a keypad warning, Form-C relay output and / or over the serial communication bus.
 16. The VFD shall have programmable "Sleep" and "Wake up" functions to allow the drive to be started and stopped from the level of a process feedback signal.

C. All VFDs to have the following adjustments:

1. Three (3) programmable critical frequency lockout ranges to prevent the VFD from operating the load continuously at an unstable speed. The lockout range must be fully adjustable, from 0 to full speed.
2. Two (2) PID Set point controllers shall be standard in the drive, allowing pressure or flow signals to be connected to the VFD, using the microprocessor in the VFD for the closed-loop control. The VFD shall have 250 ma of 24 VDC auxiliary power and be capable of loop powering a transmitter supplied by others. The PID set point shall be adjustable from the VFD keypad, analog inputs, or over the communications bus. There shall be two independent parameter sets for the PID controller and the capability to switch between the parameter sets via a digital input, serial communications or from the keypad. The independent parameter sets are typically used for night setback, switching between summer and winter set points, etc.
3. There shall be an independent, second PID loop that can utilize the second analog input and modulate one of the analog outputs to maintain the set point of an independent process (ie. valves, dampers, etc.). All set points, process variables, etc. to be accessible from the serial communication network.
4. Two (2) programmable analog inputs shall accept current or voltage signals.
5. Two (2) programmable analog outputs (0-20ma or 4-20 ma). The outputs may be programmed to output proportional to Frequency, Motor Speed, Output Voltage, Output Current, Motor Torque, Motor Power (kW), DC Bus voltage, Active Reference, Active Feedback, and other data.
6. Six (6) programmable digital inputs for maximum flexibility in interfacing with external devices. All digital inputs shall be programmable to initiate upon an application or removal of 24VDC or 24VAC.
7. Three (3) programmable, digital Form-C relay outputs. The relay outputs shall include programmable on and off delay times and adjustable hysteresis. The relays shall be rated for maximum switching current 8 amps at 24 VDC and 0.4 A at 250 VAC; Maximum voltage 300 VDC and 250 VAC; continuous current rating of 2 amps RMS. Outputs shall be true Form-C type contacts; open collector outputs are not acceptable.
8. Run permissive circuit - There shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad, input contact closure, time-clock control, or serial communications), the VFD shall provide a dry contact closure that will signal the damper to open (VFD motor does not operate). When the damper is fully open, a normally open dry contact (end-

- switch) shall close. The closed end-switch is wired to a VFD digital input and allows VFD motor operation. Two separate safety interlock inputs shall be provided. When either safety is opened, the motor shall be commanded to coast to stop and the damper shall be commanded to close. The keypad shall display "start enable 1 (or 2) missing". The safety input status shall also be transmitted over the serial communications bus.
9. The VFD control shall include a programmable time delay for VFD start and a keypad indication that this time delay is active. A Form C relay output provides a contact closure to signal the VAV boxes open. This will allow VAV boxes to be driven open before the motor operates. The time delay shall be field programmable from 0 – 120 seconds. Start delay shall be active regardless of the start command source (keypad command, input contact closure, time-clock control, or serial communications), and when switching from drive to bypass.
 10. Seven (7) programmable preset speeds.
 11. Two independently adjustable accel and decel ramps with 1 – 1800 seconds adjustable time ramps.
 12. The VFD shall include a motor flux optimization circuit that will automatically reduce applied motor voltage to the motor to optimize energy consumption and reduce audible motor noise. The VFD shall have selectable software for optimization of motor noise, energy consumption, and motor speed control.
 13. The VFD shall include a carrier frequency control circuit that reduces the carrier frequency based on actual VFD temperature that allows higher carrier frequency settings without derating the VFD.
 14. The VFD shall include password protection against parameter changes.
- D. The Keypad shall include a backlit LCD display. The display shall be in complete English words for programming and fault diagnostics (alpha-numeric codes are not acceptable). All VFD faults shall be displayed in English words. The keypad shall include a minimum of 14 assistants including:
1. Start-up assistant
 2. Parameter assistants
 - a. PID assistant
 - b. Reference assistant
 - c. I/O assistant
 - d. Serial communications assistant
 - e. Option module assistant
 - f. Panel display assistant
 - g. Low noise set-up assistant
 3. Maintenance assistant
 4. Troubleshooting assistant
 5. Drive optimizer assistants

- E. All applicable operating values shall be capable of being displayed in engineering (user) units. A minimum of three operating values from the list below shall be capable of being displayed at all times. The display shall be in complete English words (alpha-numeric codes are not acceptable):
1. Output Frequency
 2. Motor Speed (RPM, %, or Engineering units)
 3. Motor Current
 4. Motor Torque
 5. Motor Power (kW)
 6. DC Bus Voltage
 7. Output Voltage
- F. Serial Communications
1. The VFD shall have an EIA-485 port as standard. The standard protocols shall be ASHRAE 135 - BACnet. Each individual drive shall have the protocol in the base VFD. The use of third party gateways and multiplexers is not acceptable. All protocols shall be "certified" BTL Listed for BACnet. Use of non-certified protocols is not allowed.
 2. The BACnet connection shall be an EIA-485, MS/TP interface operating at 76.8 Kbps. The connection shall be tested by the BACnet Testing Labs (BTL) and be BTL Listed. The BACnet interface shall conform to the BACnet standard device type of an Applications Specific Controller (B-ASC). The interface shall support all BIBBs defined by the BACnet standard profile for a B-ASC including, but not limited to:
 - a. Data Sharing – Read Property – B.
 - b. Data Sharing – Write Property – B.
 - c. Device Management – Dynamic Device Binding (Who-Is; I-Am).
 - d. Device Management – Dynamic Object Binding (Who-Has; I-Have).
 - e. Device Management – Communication Control – B.
 3. If additional hardware is required to obtain the BACnet interface, the VFD manufacturer shall supply one BACnet gateway per drive. Multiple VFDs sharing one gateway shall not be acceptable.
 4. Serial communication capabilities shall include, but not be limited to; run-stop control, speed set adjustment, proportional/integral/derivative PID control adjustments, current limit, accel/decel time adjustments, and lock and unlock the keypad. The drive shall have the capability of allowing the DDC to monitor feedback such as process variable feedback, output speed / frequency, current (in amps), % torque, power (kW), kilowatt hours (resettable), operating hours (resettable), and drive temperature. The DDC shall also be capable of monitoring the VFD relay output status, digital input status, and all analog input and analog output values. All diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote VFD fault reset shall be possible.

5. Serial communication in bypass shall include, but not be limited to; bypass run-stop control, the ability to force the unit to bypass, and the ability to lock and unlock the keypad. The bypass shall have the capability of allowing the DDC to monitor feedback such as, current (in amps), kilowatt hours (resettable), operating hours (resettable), and bypass logic board temperature. The DDC shall also be capable of monitoring the bypass relay output status, and all digital input status. All bypass diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote bypass fault reset shall be possible.
 6. The VFD / bypass shall allow the DDC to control the drive and bypass digital and analog outputs via the serial interface. This control shall be independent of any VFD function. The analog outputs may be used for modulating chilled water valves or cooling tower bypass valves. The drive and bypass' digital (Form-C relay) outputs may be used to actuate a damper, open a valve or control any other device that requires a maintained contact for operation. In addition, all of the drive and bypass' digital inputs shall be capable of being monitored by the DDC system. This allows for remote monitoring of which (of up to 4) safeties are open.
 7. The VFD shall include an independent PID loop for customer use. The independent PID loop would be used for chilled water value control. Both the VFD PID control loop and the independent PID control loop shall continue functioning even if the serial communications connection is lost. As default, the VFD shall keep the last good set point command and last good DO & AO commands in memory in the event the serial communications connection is lost and continue controlling the process.
- G. EMI / RFI filters. All VFD's shall include EMI/RFI filters. The onboard filters shall allow the VFD assembly to be CE Marked and the VFD shall meet product standard EN 61800-3 for the First Environment restricted level with up to 100 feet of motor cable. No Exceptions. Certified test reports shall be provided with the submittals confirming compliance to EN 61800-3, First Environment.
- H. All VFD's through 25HP at 480 V shall be protected from input and output power mis-wiring. The VFD shall sense this condition and display an alarm on the keypad. The VFD shall not sustain damage from this power mis-wiring condition.
- I. ADDITIONAL FEATURES – Optional features to be furnished and mounted by the drive manufacturer. All optional features shall be UL Listed by the drive manufacturer as a complete assembly and carry a UL508 label.
1. Fieldbus adapters - BACnet IP, shall be provided by adding of an optional card.
- J. BYPASS CONTROLLER
1. A complete factory wired and tested bypass system consisting of a door interlocked, padlockable circuit breaker, output contactor, bypass contactor, and fast acting VFD input fuses are required. UL Listed motor overload protection shall be provided in both drive and bypass modes.

2. The bypass enclosure door and VFD enclosure must be mechanically interlocked such that the disconnecting device must be in the "Off" position before either enclosure may be accessed.
3. The VFD and bypass package shall have a UL listed short circuit current rating (SCCR) of 100,000 amps and this rating shall be indicated on the UL data label.
4. Drive Isolation Fuses - To ensure maximum possible bypass operation, fast acting fuses, exclusive to the VFD, shall be provided to allow the VFD to disconnect from the line prior to clearing upstream branch circuit protection. This maintains bypass operation capability in the event of a VFD failure. Bypass designs which have no such fuses, or that incorporate fuses common to both the VFD and the bypass, will not be accepted.
5. The system (VFD and Bypass) tolerated voltage window shall allow the system to operate from a line of +30%, -35% nominal voltage range. The system shall incorporate circuitry that will allow the drive or bypass contactor to remain "sealed in" over this voltage tolerance at a minimum.
6. The bypass shall maintain positive contactor control through the voltage tolerance window of nominal voltage +30%, -35%. This feature is designed to avoid contactor coil failure during brown out / low line conditions and allow for input single phase operation when in the VFD mode. Designs that will not allow input single phase operation in the VFD mode are not acceptable.
7. Motor protection from single phase power conditions - the bypass system must be able to detect a single phase input power condition while running in bypass, disengage the motor in a controlled fashion, and give a single phase input power indication. Bypass systems not incorporating single phase protection in bypass mode are not acceptable.
8. The bypass system shall NOT depend on the VFD for bypass operation. The bypass system shall be designed for standalone operation and shall be completely functional in both Hand and Automatic modes even if the VFD has been removed from the system for repair / replacement. Serial communications shall remain functional even with the VFD removed.
9. Serial communications – the bypass shall be capable of being monitored and controlled via serial communications. Communication shall be through BACnet IP.
10. Serial communication capabilities shall include, but not be limited to; bypass run-stop control; the ability to force the unit to bypass; and the ability to lock and unlock the keypad. The bypass shall have the capability of allowing the DDC to monitor feedback such as, current (in amps), kilowatt hours (resettable), operating hours (resettable), and bypass logic board temperature. The DDC shall also be capable of monitoring the bypass relay output status, and all digital input status. All bypass diagnostic warning and fault information shall be transmitted over the serial communications bus. Remote bypass fault reset shall be possible. The following additional status indications and settings shall be transmitted over the serial communications bus and / or via a Form-C relay output – keypad "Hand" or "Auto" selected, bypass selected, and broken belt indication. The DDC system shall also be able to monitor if the motor is running in the VFD mode or bypass mode over serial communications. A minimum of 50 field serial communications points shall be capable of being monitored in the bypass mode.

11. The bypass serial communications shall allow control of the bypass' digital outputs via the serial interface. This control shall be independent of any bypass function or operating state. The bypass' digital (relay) outputs may be used to actuate a damper, open a valve or control any other device that requires a maintained contact for operation. In addition, all of the bypass' digital inputs shall be capable of being monitored by the DDC system.
12. There shall be an adjustable motor current sensing circuit for the bypass and VFD modes to provide proof of flow (broken belt) indication. The condition shall be indicated on the keypad display, transmitted over the building automation protocol and / or via a Form-C relay output contact closure. The broken belt indication shall be programmable to be a system (drive and bypass) indication. The broken belt condition sensing algorithm shall be programmable to cause only a warning or a fault and / or system shutdown.
13. The digital inputs for the system shall accept 24VAC or 24VDC. The bypass shall incorporate an internally sourced power supply and not require an external control power source. The bypass power board shall supply 250 ma of 24 VDC for use by others to power external devices.
14. There shall be a run permissive circuit for damper or valve control. Regardless of the source of a run command (keypad command, time-clock control, digital input, or serial communications) the bypass shall provide a dry contact closure that will signal the damper to open (motor does not operate). When the damper is fully open, a normally open dry contact (end-switch) shall close. The closed end-switch is wired to a bypass system input and allows motor operation. Up to four separate safety interlock inputs shall be provided. When any safety is opened, the motor shall be commanded to coast to stop, and the damper shall be commanded to close. This feature will also operate in Fireman's override / smoke control mode.
15. The bypass control shall monitor the status of the VFD and bypass contactors and indicate when there is a welded contactor contact or open contactor coil. This failed contactor condition shall be indicated on the bypass LCD display, programmed to fire a Form-C relay output, and / or over the serial communications protocol.
16. The bypass control shall include a programmable time delay for bypass start and keypad indication that this time delay is in process. A Form C relay output provides a contact closure to signal the VAV boxes open. This will allow VAV boxes to be driven open before the motor operates at full speed in the bypass mode. The time delay shall be field programmable from 0 – 120 seconds.
17. There shall be a keypad adjustment to select manual or automatic transfer bypass. The user shall be able to select via keypad programming which drive faults will result in an automatic transfer to the bypass mode and which faults require a manual transfer to bypass. The user may select whether the system shall automatically transfer from drive to bypass mode on the following drive fault conditions:
 - a. Over current
 - b. Over voltage
 - c. Under voltage
 - d. Loss of analog input

18. The following operators shall be provided:
 - a. Bypass Hand-Off-Auto
 - b. Drive mode selector
 - c. Bypass mode selector
 - d. Bypass fault reset

19. The bypass shall include a two line, 20 character LCD display. The display shall allow the user to access and view:
 - a. Energy savings – in US dollars
 - b. Bypass motor amps
 - c. Bypass input voltage– average and individual phase voltage
 - d. Bypass power (kW)
 - e. Bypass faults and fault logs
 - f. Bypass warnings
 - g. Bypass operating time (resettable)
 - h. Bypass energy (kilowatt hours – resettable)
 - i. I/O status
 - j. Parameter settings / programming
 - k. Printed circuit board temperature

20. The following indicating lights (LED type) or keypad display indications shall be provided. A test mode or push to test feature shall be provided.
 - a. Power-on (Ready)
 - b. Run enable
 - c. Drive mode selected
 - d. Bypass mode selected
 - e. Drive running
 - f. Bypass running
 - g. Drive fault
 - h. Bypass fault
 - i. Bypass H-O-A mode
 - j. Automatic transfer to bypass selected
 - k. Safety open
 - l. Damper opening
 - m. Damper end-switch made

21. The Bypass controller shall have six programmable digital inputs, and five programmable Form-C relay outputs. This I/O allows for a total System (VFD and Bypass) I/O count of 24 points as standard. The bypass I/O shall be available to the BAS / DDC system even with the VFD removed.
 - a. The on-board Form-C relay outputs in the bypass shall be programmable for any of the following indications.
 - 1) System started
 - 2) System running

- 3) Bypass override enabled
 - 4) Drive fault
 - 5) Bypass fault
 - 6) Bypass H-O-A position
 - 7) Motor proof-of-flow (broken belt)
 - 8) Overload
 - 9) Bypass selected
 - 10) Bypass run
 - 11) System started (damper opening)
 - 12) Bypass alarm
 - 13) Over temperature
22. The bypass shall provide a separate terminal strip for connection of freeze, fire, smoke contacts, and external start command. All external safety interlocks shall remain fully functional whether the system is in VFD or Bypass mode. The remote start/stop contact shall operate in VFD and bypass modes. The terminal strip shall allow for independent connection of up to four (4) unique safety inputs.
23. Class 10, 20, or 30 (programmable) electronic motor overload protection shall be included.

K. Enclosures:

1. Provide the VFD and bypass panels with the appropriate NEMA rated enclosure for the following applications:
 - a. Indoors: NEMA 12.
 - b. Indoors (mechanical rooms): NEMA 12.
 - c. Outdoors (Protected by overhang): NEMA 12 in NEMA 3R enclosure.
 - d. Outdoors (exposed to windblown dust or water): NEMA 12 in NEMA 4
2. Provide appropriate ventilation of VFD cabinetry to maintain ambient temperature rating of the drive based upon application. On outdoor installations appropriate ventilation shall be powered ventilation fan(s) and external 12"x12"x1"paper filter arranged so as to not allow paper filter to be exposed to rain.

2.3 SOURCE QUALITY CONTROL

- A. Shop, inspect and perform standard productions tests for each controller.
- B. Make completed controllers available for inspection at manufacturer's factory prior to packaging for shipment. Notify the Owner at least seven days before inspection is allowed.
- C. Allow witnessing of factory inspections and tests at manufacturer's test facility. Notify the Owner at least seven days before inspections and tests are scheduled.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01300 – Administrative Requirements: Coordination and project conditions.
- B. Verify that building environment can be maintained within the service and ambient temperature and humidity ratings required by the VFD manufacturer

3.2 INSTALLATION

- A. Installation shall be the responsibility of the mechanical contractor. The contractor shall install the drive in accordance with the recommendations of the VFD manufacturer as outlined in the VFD installation manual.
- B. Power wiring shall be completed by the electrical contractor, to NEC code 430.122 wiring requirements based on the VFD input current. Caution: VFDs supplied without internal reactors have substantially higher input current ratings, which may require larger input power wiring and branch circuit protection. The contractor shall complete all wiring in accordance with the recommendations of the VFD manufacturer as outlined in the installation manual.
- C. Install in accordance with NEMA ICS 7.1.
- D. Verify that mounting surface for VFDs are ready to receive work. Mount VFDs on the wall or at supports in locations identified on the drawings.
- E. Tighten accessible connections and mechanical fasteners after placing controller.
- F. Install fuses in fusible switches.
- G. Select and install overload heater elements in motor controllers to match installed motor characteristics.
- H. Install engraved plastic nameplates in accordance with Section 23 05 53.
- I. Neatly type label inside controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating. Place label in clear plastic holder.
- J. Ground and bond controller in accordance with Section 26 05 26.
- K. Controls installer shall provide all wiring and conduit associated with the control signals into and out of the VFD to the DDC EMS and as required for any motor control interlocks.

3.3 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.

- B. Perform inspections and tests listed in NETA ATS, Section 7.16 and NEMA ICS 7.1.
- C. Perform power quality analysis per warranty requirements.

3.4 MANUFACTURER'S FIELD SERVICES

- A. VFD Start-up: Provide certified factory start-up for each drive by a factory authorized service center representative. A certified start-up form shall be filled out for each drive with a copy provided to the Owner, and a copy kept on file at the manufacturer. The following VFD start-up services are to be provided as a minimum:
 - 1. Service center technician shall be responsible for verifying correct installation, power and control wiring connections, starting-up the drive, and checking out for proper operation.
 - 2. Service center technician shall also provide all final adjustments to meet the specified performance requirements.

3.5 DEMONSTRATION AND TRAINING

- A. Provide 16 hours of instruction to be conducted at the project site with manufacturer's representative. The training shall be conducted at 4 hour maximums. Contractor to also provide two sets of VFD operation manuals for use at the training session and then provide to the Owner after completion of the session.

3.6 VARIABLE FREQUENCY DRIVE START-UP SERVICE

- A. Provide start-up commissioning of variable frequency drive and optional circuits by factory certified service technician experienced in start-up and repair services. Commissioning personnel shall be the same personnel that will provide factory service and warranty repairs at site. Sales personnel and other agents who are not factory certified technicians for drive field repair not acceptable.
- B. Include checking for verification of proper operation and installation and interface wiring to building automation system. Include as a minimum:
 - 1. Verify contractor wire terminations to VFD optional circuitry.
 - 2. Verify proper operation and reliability of VFD, motor being driven and building automation system.
 - 3. Provide up to one hour of Owner/operator training on operation and service diagnostics during commissioning.
 - 4. Measure to verify proper operation on:
 - a. Motor voltage and frequency. Verify proper motor operation.
 - b. Control input for proper building automation system interface and control calibration.
 - c. Calibration check for:
 - d. Minimum speed.
 - e. Maximum speed.
 - f. Acceleration and deceleration rates.

g. Adjust as necessary.

C. Configure VSD for automatic restart after a power failure or after an external fault is cleared.

3.7 COMMISSIONING

A. Refer to Commissioning Specifications, Section ~~018110~~[230800](#), for related commissioning requirements.

B. Contractor shall provide all necessary support to the commissioning team to implement commissioning plan as outlined in Section ~~018110~~[230800](#).

END OF SECTION 23 05 14

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

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. Balancing Air Systems:

- a. Constant-volume Dehumidification air systems.
 - b. Variable-air-volume systems.
 - c. General exhaust systems.
 - d. Chilled Beam Air systems.
 - e. Plate & Frame Heat Exchangers

- 2. Balancing Hydronic Piping Systems:

- a. Variable-flow hydronic systems.

- 1) Systems installed with pressure independent control valves shall not require hydronic system balancing. Flow shall be verified and adjusted for the pressure independent valve assembly for field conditions using the pressure independent control valve manufacturer's documented procedure for 25% of the total installed product. Exact locations of tested product to be coordinated with the commissioning agent.

1.3 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.

- E. TAB Specialist: An entity engaged to perform TAB Work.

1.4 SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. Certified TAB reports.
- E. Sample report forms.
- F. Instrument calibration reports, to include the following:
 - 1. Instrument type and make.
 - 2. Serial number.
 - 3. Application.
 - 4. Dates of use.
 - 5. Dates of calibration.

1.5 QUALITY ASSURANCE

- A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC, NEBB or TABB.
 - 1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC, NEBB or TABB.
 - 2. TAB Technician: Employee of the TAB contractor and who is certified by AABC, NEBB or TABB as a TAB technician.
- B. TAB Conference: Meet with Architect, Owner Representative, General Contractor, Engineer and Commissioning Authority on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.
 - 1. Agenda Items:
 - a. The Contract Documents examination report.

- b. The TAB plan.
 - c. Coordination and cooperation of trades and subcontractors.
 - d. Coordination of documentation and communication flow.
- C. Certify TAB field data reports and perform the following:
- 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 - 2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.
- D. TAB Report Forms: Use standard TAB contractor's forms approved by Commissioning Authority.
- E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

1.6 PROJECT CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 COORDINATION

- A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
- B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Division 23 Section "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- K. Examine strainers. Verify that startup screens are replaced by permanent screens with indicated perforations.
- L. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

- M. Examine system pumps to ensure absence of entrained air in the suction piping.
- N. Examine operating safety interlocks and controls on HVAC equipment.
- O. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks and prepare reports. Verify the following:
 - 1. Permanent electrical-power wiring is complete.
 - 2. Hydronic systems are filled, clean, and free of air.
 - 3. Automatic temperature-control systems are operational.
 - 4. Equipment and duct access doors are securely closed.
 - 5. Isolating and balancing valves are open and control valves are operational.
 - 6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - 7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111, NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", and SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
 - 1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Division 23 Section "Air Duct Accessories."
 - 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation."

- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.
- E. The project's DDC system shall be completed and confirmed in writing by the responsible contractor prior to final TAB activities taking place. The intent is to allow the TAB contractor to verify system operation in its final configuration and minimize inconsistencies introduced by changes to the DDC system.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."
 - 1. Prior to the ductwork being leak and pressure tested, the TAB contractor shall sign off that devices are installed that are needed to properly test and balance the system.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
1. Measure total airflow.
 - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
 2. Measure fan static pressures as follows to determine actual static pressure:
 - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
 3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Report the cleanliness status of filters and the time static pressures are measured.
 4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
 5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 6. Obtain approval from Engineer and Commissioning Authority for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
1. Measure airflow of submain and branch ducts.

- a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
 3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a minimum set-point airflow with the remainder at maximum-airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.
- B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
1. Set outdoor-air dampers at minimum, and set return- and exhaust-air dampers at a position that simulates full-cooling load.
 2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 3. Measure total system airflow. Adjust to within indicated airflow.
 4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the

air outlets downstream from terminal units the same as described for constant-volume air systems.

5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow the same as described for constant-volume air systems.
 - a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.
 6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.
 - a. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.
 7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
 8. Record final fan-performance data.
- C. Pressure-Dependent, Variable-Air-Volume Systems with Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
1. Set system at maximum indicated airflow by setting the required number of terminal units at minimum airflow. Select the reduced-airflow terminal units so they are distributed evenly among the branch ducts.
 2. Adjust supply fan to maximum indicated airflow with the variable-airflow controller set at maximum airflow.
 3. Set terminal units at full-airflow condition.
 4. Adjust terminal units starting at the supply-fan end of the system and continuing progressively to the end of the system. Adjust inlet dampers of each terminal unit to indicated airflow. When total airflow is correct, balance the air outlets downstream from terminal units the same as described for constant-volume air systems.
 5. Adjust terminal units for minimum airflow.
 6. Measure static pressure at the sensor.
 7. Measure the return airflow to the fan while operating at maximum return airflow and minimum outdoor airflow. Adjust the fan and balance the return-air ducts and inlets the same as described for constant-volume air systems.

3.7 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

- A. Prepare test reports with pertinent design data, and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against the approved pump flow rate. Correct variations that exceed plus or minus 5 percent.

- B. Prepare schematic diagrams of systems' "as-built" piping layouts.
- C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:
 - 1. Open all manual valves for maximum flow.
 - 2. Check flow-control valves for specified sequence of operation, and set at indicated flow.
 - 3. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.
 - 4. Set system controls so automatic valves are wide open to district loop.
 - 5. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
 - 6. Check air vents for a forceful liquid flow exiting from vents when manually operated.
- D. Before the piping is flushed and cleaned, the TAB contractor shall sign off that all devices (thermowells and threaded ports) needed are in place to correctly test and balance the system and calibrate all devices are installed in the piping for this flushing and cleaning activity.

3.8 PROCEDURE FOR HYDRONIC SYSTEMS

- A. Systems installed with pressure independent control valves shall not require hydronic system balancing. Flow shall be verified and adjusted for the pressure independent valve assembly for field conditions using the pressure independent control valve manufacturer's documented procedure for 25% of the total installed product. Exact locations of tested product to be coordinated with the commissioning agent.

3.9 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 - 1. Manufacturer's name, model number, and serial number.
 - 2. Motor horsepower rating.
 - 3. Motor rpm.
 - 4. Efficiency rating.
 - 5. Nameplate and measured voltage, each phase.
 - 6. Nameplate and measured amperage, each phase.
 - 7. Starter thermal-protection-element rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove

proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.10 TOLERANCES

- A. Set HVAC system's air flow rates and water flow rates within the following tolerances:
 - 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
 - 2. Air Outlets and Inlets: Plus or minus 10 percent.
 - 3. Cooling-Water Flow Rate: Plus or minus 10 percent.

3.11 REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Status Reports: Prepare monthly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.12 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 - 2. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 - 1. Pump curves.
 - 2. Fan curves.
 - 3. Manufacturers' test data.
 - 4. Field test reports prepared by system and equipment installers.
 - 5. Other information relative to equipment performance; do not include Shop Drawings and product data.

- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB contractor.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:
- a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:
- a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.

6. Balancing stations.
 7. Position of balancing devices.
- E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.
 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 3. Test Data (Indicated and Actual Values):
 - a. Total air flow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Filter static-pressure differential in inches wg.
 - f. Cooling-coil static-pressure differential in inches wg.
 - g. Heating-coil static-pressure differential in inches wg.
 - h. Outdoor airflow in cfm.
 - i. Return airflow in cfm.
 - j. Outdoor-air damper position.
 - k. Return-air damper position.
 - l. Vortex damper position.
- F. Apparatus-Coil Test Reports:
1. Coil Data:

- a. System identification.
 - b. Location.
 - c. Coil type.
 - d. Number of rows.
 - e. Fin spacing in fins per inch o.c.
 - f. Make and model number.
 - g. Face area in sq. ft.
 - h. Tube size in NPS.
 - i. Tube and fin materials.
 - j. Circuiting arrangement.
2. Test Data (Indicated and Actual Values):
- a. Air flow rate in cfm.
 - b. Average face velocity in fpm.
 - c. Air pressure drop in inches wg.
 - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
 - e. Return-air, wet- and dry-bulb temperatures in deg F.
 - f. Entering-air, wet- and dry-bulb temperatures in deg F.
 - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
 - h. Water flow rate in gpm.
 - i. Water pressure differential in feet of head or psig.
 - j. Entering-water temperature in deg F.
 - k. Leaving-water temperature in deg F.
- G. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:
1. Unit Data:
 - a. System identification.
 - b. Location.
 - c. Coil identification.
 - d. Capacity in Btu/h.
 - e. Number of stages.
 - f. Connected volts, phase, and hertz.
 - g. Rated amperage.
 - h. Air flow rate in cfm.
 - i. Face area in sq. ft.
 - j. Minimum face velocity in fpm.
 2. Test Data (Indicated and Actual Values):
 - a. Heat output in Btu/h.
 - b. Air flow rate in cfm.
 - c. Air velocity in fpm.
 - d. Entering-air temperature in deg F.
 - e. Leaving-air temperature in deg F.

- f. Voltage at each connection.
 - g. Amperage for each phase.
- H. Fan Test Reports: For supply, return, and exhaust fans, include the following:
- 1. Fan Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - g. Number, make, and size of belts.
 - 3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.
- I. Round and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
- 1. Report Data:
 - a. System and air-handling-unit number.
 - b. Location and zone.
 - c. Traverse air temperature in deg F.
 - d. Duct static pressure in inches wg.
 - e. Duct size in inches.
 - f. Duct area in sq. ft.

- g. Indicated air flow rate in cfm.
- h. Indicated velocity in fpm.
- i. Actual air flow rate in cfm.
- j. Actual average velocity in fpm.
- k. Barometric pressure in psig.

J. Air-Terminal-Device Reports:

1. Unit Data:

- a. System and air-handling unit identification.
- b. Location and zone.
- c. Apparatus used for test.
- d. Area served.
- e. Make.
- f. Number from system diagram.
- g. Type and model number.
- h. Size.
- i. Effective area in sq. ft.

2. Test Data (Indicated and Actual Values):

- a. Air flow rate in cfm.
- b. Air velocity in fpm.
- c. Preliminary air flow rate as needed in cfm.
- d. Preliminary velocity as needed in fpm.
- e. Final air flow rate in cfm.
- f. Final velocity in fpm.
- g. Space temperature in deg F.

K. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:

1. Unit Data:

- a. Unit identification.
- b. Location.
- c. Service.
- d. Make and size.
- e. Model number and serial number.
- f. Water flow rate in gpm.
- g. Water pressure differential in feet of head or psig.
- h. Required net positive suction head in feet of head or psig.
- i. Pump rpm.
- j. Impeller diameter in inches.
- k. Motor make and frame size.
- l. Motor horsepower and rpm.
- m. Voltage at each connection.

- n. Amperage for each phase.
 - o. Full-load amperage and service factor.
 - p. Seal type.
2. Test Data (Indicated and Actual Values):
- a. Static head in feet of head or psig.
 - b. Pump shutoff pressure in feet of head or psig.
 - c. Actual impeller size in inches.
 - d. Full-open flow rate in gpm.
 - e. Full-open pressure in feet of head or psig.
 - f. Final discharge pressure in feet of head or psig.
 - g. Final suction pressure in feet of head or psig.
 - h. Final total pressure in feet of head or psig.
 - i. Final water flow rate in gpm.
 - j. Voltage at each connection.
 - k. Amperage for each phase.
- L. Instrument Calibration Reports:
1. Report Data:
- a. Instrument type and make.
 - b. Serial number.
 - c. Application.
 - d. Dates of use.
 - e. Dates of calibration.
- 3.13 INSPECTIONS
- A. Initial Inspection:
- 1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
 - 2. Check the following for each system:
 - a. Measure airflow of at least 10 percent of air outlets.
 - b. Measure water flow of at least 5 percent of terminals.
 - c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
 - d. Verify that balancing devices are marked with final balance position.
 - e. Note deviations from the Contract Documents in the final report.
- B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Commissioning Authority.
 2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Commissioning Authority.
 3. Commissioning Authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
 4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
 5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:
1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.
- D. Prepare test and inspection reports.

3.14 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

3.15 COMMISSIONING

- A. Refer to Commissioning Specifications, Section ~~01-81-10~~23 08 00, for related commissioning requirements.
- B. Test and Balance contractor shall provide necessary support to complete necessary Pre-functional testing, Functional Testing, and any retesting required as required to complete the commissioning process.

DESTIN-FORT WALTON BEACH AIRPORT
ITB AP 21-21 CONSTRUCTION OF SATELLITE
CONCOURSE "C"

TESTING, ADJUSTING, AND
BALANCING FOR HVAC
SECTION 23 05 93

END OF SECTION 23 05 93

SECTION 23 08 00 - COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, ~~apply to this Section, including 019113 – General Commissioning Requirements.~~ apply.

1.2 SUMMARY

- A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.

- B. Related Sections:

1. Refer to Division 01 & ~~Section 019113 – “General Commissioning Requirements”~~ the following sections for additional commissioning scope and requirements. All testing and commissioning requirements ~~of that~~ for these sections shall be met.
- a. 23 00 10 – Basic Mechanical Requirements
 - b. 23 05 00 – Common Work Results for HVAC
 - c. 23 05 93 – Testing Adjusting and Balancing for HVAC
 - ~~a.~~d. 23 09 00 - Instrumentation and Control for HVAC

1.3 CONTRACTOR'S RESPONSIBILITIES

- A. Perform commissioning tests at the direction of the Commissioning Authority (CxA).
- B. Attend construction phase controls coordination meeting.
- C. Attend testing, adjusting, and balancing review and coordination meeting.
- D. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
- E. Provide information requested by the CxA for final commissioning documentation.
- F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

1.4 CxA RESPONSIBILITIES

- A. Provide project-specific construction checklists and commissioning process test procedures for actual HVAC&R systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.
- B. Direct commissioning testing.
- C. Verify testing, adjusting, and balancing of Work are complete.
- D. Provide test data, inspection reports, and issues log in Final Report.

1.5 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CxA for inclusion in the commissioning plan:
 - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
 - 2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
 - 3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
 - 4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
 - 5. Certificate of readiness certifying that HVAC&R systems, subsystems, equipment, and associated controls are ready for testing.
 - 6. Test and inspection reports and certificates.
 - 7. Corrective action documents.
 - 8. Verification of testing, adjusting, and balancing reports.

1.6 SUBMITTALS

- A. Certificates of readiness.
- B. Certificates of completion of installation, prestart, and startup activities.
- C. See other related specification sections for required submittals and manuals, including 019113 – General Commissioning Requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

- A. Certify that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Check safety cutouts, alarms, and interlocks during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.2 TESTING AND BALANCING VERIFICATION

- A. Prior to performance of testing and balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.
- B. Notify the CxA at least 10 days in advance of testing and balancing work, and provide access for the CxA to witness testing and balancing work.
- C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.
 - 1. The CxA will notify testing and balancing Contractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.
 - 2. The testing and balancing Contractor shall use the same instruments (by model and serial number) that were used when original data were collected.
 - 3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in

rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.

4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.3 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.
 1. Testing Strategies and Sampling: Refer to section 019113 for testing of equipment strategies and sampling requirement functional performance test requirements.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- D. The CxA along with the HVAC&R Contractor, testing and balancing Contractor, and HVAC&R Instrumentation and Control Contractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.
- E. Tests will be performed using design conditions whenever possible.
- F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- G. The CxA may direct that set points be altered when simulating conditions is not practical.
- H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

- J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.4 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. Boiler Testing and Acceptance Procedures: Testing requirements are specified in Division 23 boiler sections. Provide submittals, test data, inspector record, and boiler certification to the CxA.
- B. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.
- C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment requirements are specified in Division 23 piping Sections. HVAC&R Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:
 - 1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
 - 2. Description of equipment for flushing operations.
 - 3. Minimum flushing water velocity.
 - 4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.
- D. Energy Supply System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of hot-water systems and equipment at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
- E. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
- F. HVAC&R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

- G. Vibration and Sound Tests: Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

3.5 NONCONFORMANCE

- A. The CxA will record the results of the Functional Performance Tests. All deficiencies, nonconformance issues, or test failures will be noted and reported to the Contractors in a deficiency list or in a punch-list format.
- B. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form.
- C. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the Owners Representative.
- D. Retesting:
 - 1. If a Functional Performance Test fails, corrections shall be made to the deficient equipment or systems by the Contractors. The systems will be re-tested until they pass the Tests.
 - 2. The time/cost for the CxA to perform any retesting required because of improper set up of the systems by the contractors or failed functional or performance tests will be back-charged to the Contractor (who may choose to recover costs from the party responsible for executing faulty equipment startup/checkout and associated checklists). This includes instances where a specific item was overlooked in the equipment startup and checkout procedures, reported to have been successfully completed but determined during Functional Performance testing to be faulty.
 - 3. Any required retesting by any contractor, sub-contractor, or vendor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.

3.6 DEFICIENCIES AND RETESTING

- A. The CxA documents the results of each test. (Corrections of minor installation or sequence of operation deficiencies are made during tests at the discretion of CxA.)
- B. Deficiencies/nonconformance issues not corrected during testing are reported to the Contractors for corrective action. Upon completion, a request is made by the Contractors to CxA for retest.

DESTIN-FORT WALTON BEACH AIRPORT
ITB AP 21-21 CONSTRUCTION OF SATELLITE
CONCOURSE "C"

COMMISSIONING OF HVAC
SECTION 23 08 00

END OF SECTION 23 08 00

SECTION 23 09 00 - INSTRUMENTATION AND CONTROL FOR HVAC

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. This Section includes control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls, and Lab Controls.
- B. Related Sections include the following:
 - 1. Division 23 Section "Meters and Gages for HVAC Piping" for measuring equipment that relates to this Section.

1.3 DEFINITIONS

- A. BAS: Direct digital control.
- B. I/O: Input/output.
- C. MS/TP: Master slave/token passing.
- D. PC: Personal computer.
- E. PID: Proportional plus integral plus derivative.
- F. BAS: Building Automation System

1.4 SYSTEM PERFORMANCE

- A. Comply with the following performance requirements:
 - 1. Graphic Display: Display graphic with minimum 20 dynamic points with current data within 10 seconds.
 - 2. Graphic Refresh: Update graphic with minimum 20 dynamic points with current data within 8 seconds.

3. Object Command: Reaction time of less than two seconds between operator command of a binary object and device reaction.
4. Object Scan: Transmit change of state and change of analog values to control units or workstation within six seconds.
5. Alarm Response Time: Annunciate alarm at workstation within 45 seconds. Multiple workstations must receive alarms within five seconds of each other.
6. Program Execution Frequency: Run capability of applications as often as five seconds, but selected consistent with mechanical process under control.
7. Performance: Programmable controllers shall execute BAS PID control loops, and scan and update process values and outputs at least once per second.
8. Reporting Accuracy and Stability of Control: Report values and maintain measured variables within tolerances as follows:
 - a. Water Temperature: Plus or minus 1 deg F.
 - b. Water Flow: Plus or minus 2 percent of full scale.
 - c. Water Pressure: Plus or minus 5 percent of full scale.
 - d. Space Temperature: Plus or minus 1 deg F.
 - e. Ducted Air Temperature: Plus or minus 1 deg F.
 - f. Outside Air Temperature: Plus or minus 2 deg F.
 - g. Dew Point Temperature: Plus or minus 3 deg F.
 - h. Temperature Differential: Plus or minus 0.25 deg F.
 - i. Relative Humidity: Plus or minus 2 percent.
 - j. Airflow (Pressurized Spaces): Plus or minus 3 percent of full scale.
 - k. Airflow (Measuring Stations): Plus or minus 5 percent of full scale.
 - l. Airflow (Terminal): Plus or minus 10 percent of full scale.
 - m. Air Pressure (Space): Plus or minus 0.01-inch wg.
 - n. Air Pressure (Ducts): Plus or minus 0.1-inch wg.
 - o. Electrical: Plus or minus 5 percent of reading.

1.5 SEQUENCE OF OPERATION

- A. See Control Diagrams on Design Documents for Sequences of Operations.

1.6 SUBMITTALS

- A. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.
 1. BAS System Hardware: Bill of materials of equipment indicating quantity, manufacturer, and model number. Include technical data for operator workstation equipment, interface equipment, control units, transducers/transmitters, sensors, actuators, valves, relays/switches, control panels, and operator interface equipment.

2. Control System Software: Include technical data for operating system software, operator interface, color graphics, and other third-party applications.
 3. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data. Include written description of sequence of operation including schematic diagram.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
1. Bill of materials of equipment indicating quantity, manufacturer, and model number.
 2. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
 3. Wiring Diagrams: Power, signal, and control wiring.
 4. Details of control panel faces, including controls, instruments, and labeling.
 5. Written description of sequence of operation.
 6. Schedule of dampers including size, leakage, and flow characteristics.
 7. Schedule of valves including flow characteristics.
 8. BAS System Hardware:
 - a. Wiring diagrams for control units with termination numbers.
 - b. Schematic diagrams and floor plans for field sensors and control hardware.
 - c. Schematic diagrams for control, communication, and power wiring, showing trunk data conductors and wiring between operator workstation and control unit locations.
 9. Control System Software: List of color graphics indicating monitored systems, data (connected and calculated) point addresses, output schedule, and operator notations.
 10. Controlled Systems:
 - a. Schematic diagrams of each controlled system with control points labeled and control elements graphically shown, with wiring.
 - b. Scaled drawings showing mounting, routing, and wiring of elements including bases and special construction.
 - c. Written description of sequence of operation including schematic diagram.
 - d. Points list.
 11. All HVAC control system submittals, as-builts, graphics, alarms and programming shall use the same equipment and device naming convention used on the construction documents.
 12. PICS (Performance Interoperability Conformance Statements)

- a. Contractor shall provide for each type of equipment being supplied by all contracting trades.
- C. Data Communications Protocol Certificates: Certify that each proposed BAS system component complies with ASHRAE 135.
- D. Software and Firmware Operational Documentation: Include the following:
 1. Software operating and upgrade manuals.
 2. Program Software Backup: On a magnetic media or compact disc, complete with data files.
 3. Device address list.
 4. Printout of software application and graphic screens.
 5. Software license required by and installed for BAS workstations and control systems.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For HVAC instrumentation and control system to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 1. Maintenance instructions and lists of spare parts for each type of control device and compressed-air station.
 2. Interconnection wiring diagrams with identified and numbered system components and devices.
 3. Keyboard illustrations and step-by-step procedures indexed for each operator function.
 4. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
 5. Calibration records and list of set points.
 6. Refer to 230010 for additional requirements.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Automatic control system manufacturer's authorized representative who is trained and approved for installation of system components required for this Project.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with ASHRAE 135 for BAS system components.
- D. All HVAC control system components shall be BACnet BTL 135.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to equipment manufacturer.
- B. System Software: Update to latest version of software at Project completion.

1.9 COORDINATION

- A. Coordinate location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation.
- B. Coordinate equipment with Division 27 Section "Clock Systems" to achieve compatibility with equipment that interfaces with that system.
- C. Coordinate equipment with Division 26 Section "Network Lighting Controls" to achieve compatibility with equipment that interfaces with that system.
- D. Coordinate supply of conditioned electrical branch circuits for control units and operator workstation.
- E. Coordinate equipment with Division 26 Section "Electrical Power Monitoring and Control" to achieve compatibility of communication interfaces.
- F. Coordinate equipment with Division 26 Section "Panelboards" to achieve compatibility with starter coils and annunciation devices.
- G. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- H. Coordinate with Commissioning Agent for Commissioning of systems in accordance with Commissioning Specifications, Commissioning Plan, and Drawings and specifications.
- I. Coordinate with Test and Balance Company in accordance with Commissioning Specifications, Commissioning Plan, and Drawings and specifications.
 - 1. The project's DDC system shall be completed and confirmed in writing by the responsible contractor prior to final TAB activities taking place. The intent is to allow the TAB contractor to verify system operation in its final configuration and minimize inconsistencies introduced by changes to the DDC system.

2. The final TAB activities shall not proceed until the BAS system has been completed. Written confirmation and a copy of the current programming and graphics shall be provided to the College.

1.10 EXTRA MATERIALS

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

1. Replacement Materials: One replacement diaphragm or relay mechanism for each unique valve motor.
2. Refer to 230010 for additional spare parts requirements.
3. Spare materials shall be provided as a part of this project. In addition to any requirements in the drawings and/or specifications, the following items shall be provided:
 - a. 5 of each type of temperature sensor
 - b. 1 of each type of humidity sensor
 - c. 1 of each type of CO2 or VOC sensor
 - d. 1 of each type of dry differential pressure sensor and/or switch
 - e. 1 of each type of wet differential pressure sensor and/or switch
 - f. 1 of each type of air flow measuring station
 - g. 1 of each type of CT
 - h. 1 of each type of actuator
 - i. 1 of each type of BAS controller
 - j. 1 of ANY critical of long lead items
 - k. 2 of each type of BAS controller
 - l. 1 extra of any BAS interface

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

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

2.2 CONTROL SYSTEM

A. Manufacturers:

1. Siemens
 2. Trane
 3. Automated Logic
- B. BTL listed products, if available, must be provided.
- C. Selected Controls System provider shall implement latest published revision of controller, server, and workstation firmware and software. This includes all work for updates and/or changes that are necessary or required to vendor's existing control equipment.
- D. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, and accessories to control mechanical systems.
- E. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, accessories, and software connected to distributed controllers operating in multiuser, multitasking environment on token-passing network and programmed to control mechanical systems. An operator workstation permits interface with the network via dynamic color graphics with each mechanical system, building floor plan, and control device depicted by point-and-click graphics.
1. Controls and Graphics shall be in accordance with Valencia College Controls standards, including but not limited to Hardware, software, software, programming, trending, alarming, remote monitoring, energy reports, daily reports, monthly reports, annual reports...).
- F. The BAS shall be a web-enabled system with a secure interface. A static IP address and connectivity will be provided by Valencia College to utilize the web based interface with their campus system.
- G. Control system shall include the following:
1. Building lighting control system specified in Division 26 Section "Network Lighting Controls."
 - a. BMS contractor shall provide a digital signal to the network lighting controllers for operation of all lighting systems for the facility.
 - b. BMS contractor shall provide a 7 day/365 days a year schedule for programming the operation of the lighting system.
 2. Power Monitoring of Electric Water Heaters.
 3. Domestic and Reclaim Water Metering.
 4. Trending and Alarming required to implement any measurement and verification required by Part D of the IMPMV guidelines and measurement and verification plan.

5. Gateways and Integration as required for a complete system in accordance with drawings and specifications.

2.3 BAS EQUIPMENT

- A. Operator Workstation: One PC-based microcomputer(s) with minimum configuration as follows:
 1. Motherboard: With 8 integrated USB 2.0 ports, integrated Intel Pro 10/100 (Ethernet), integrated audio, bios, and hardware monitoring.
 2. Processor: Intel Xeon Dual Core 2.8 GHz (64 bit)
 3. Random-Access Memory: 32 GB, 1333 MHz, DDR3 SDRAM.
 4. Graphics: Video adapter, minimum 1800 x 1200 pixels, 512 MB video memory, dual-monitor capable.
 5. Monitor: 24 inches, LCD color, widescreen.
 6. Keyboard: QWERTY, 105 keys.
 7. Hard-Disk Drive: 1024 GB.
 8. Optical Drive: 16X DVD+/-RW.
 9. Media Drive: Internal 19-in-1 USB 2.0 Media Card reader
 10. Mouse: Three button, optical with wheel.
 11. Uninterruptible Power Supply: 2000 VA.
 12. Operating System: Microsoft Windows 7 Professional.
- B. Control Units: Modular, comprising processor board with programmable, nonvolatile, random-access memory; local operator access and display panel; integral interface equipment; and backup power source.
 1. Units monitor or control each I/O point; process information; execute commands from other control units, devices, and operator stations; and download from or upload to operator workstation or diagnostic terminal unit.
 2. Stand-alone mode control functions operate regardless of network status. Functions include the following:
 - a. Global communications.
 - b. Discrete/digital, analog, and pulse I/O.
 - c. Monitoring, controlling, or addressing data points.
 - d. Software applications, scheduling, and alarm processing.
 - e. Testing and developing control algorithms without disrupting field hardware and controlled environment.
 3. Standard Application Programs:
 - a. Electric Control Programs: Demand limiting, duty cycling, automatic time scheduling, start/stop time optimization, night setback/setup, on-off control with differential sequencing, staggered start, antishort cycling, PID control, BAS with fine tuning, and trend logging.

- b. HVAC Control Programs: Optimal run time, supply-air reset, and enthalpy switchover.
 - c. Programming Application Features: Include trend point; alarm processing and messaging; weekly, monthly, and annual scheduling; energy calculations; run-time totalization; and security access.
 - d. Remote communications.
 - e. Maintenance management.
 - f. Units of Measure: Inch-pound and SI (metric).
4. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
 5. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.
- C. Local Control Units: Modular, comprising processor board with electronically programmable, nonvolatile, read-only memory; and backup power source.
1. Units monitor or control each I/O point, process information, and download from or upload to operator workstation or diagnostic terminal unit.
 2. Stand-alone mode control functions operate regardless of network status. Functions include the following:
 - a. Global communications.
 - b. Discrete/digital, analog, and pulse I/O.
 - c. Monitoring, controlling, or addressing data points.
 3. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
 4. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.
- D. I/O Interface: Hardwired inputs and outputs may tie into system through controllers. Protect points so that shorting will cause no damage to controllers.
1. Binary Inputs: Allow monitoring of on-off signals without external power.
 2. Pulse Accumulation Inputs: Accept up to 10 pulses per second.
 3. Analog Inputs: Allow monitoring of low-voltage (0- to 10-V dc), current (4 to 20 mA), or resistance signals.
 4. Binary Outputs: Provide on-off or pulsed low-voltage signal, selectable for normally open or normally closed operation.
 5. Analog Outputs: Provide modulating signal, either low voltage (0- to 10-V dc) or current (4 to 20 mA).
 6. Tri-State Outputs: Provide two coordinated binary outputs for control of three-point, floating-type electronic actuators.
 7. Universal I/Os: Provide software selectable binary or analog outputs.

- E. Power Supplies: Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply shall match output current and voltage requirements and be full-wave rectifier type with the following:
1. Output ripple of 5.0 mV maximum peak to peak.
 2. Combined 1 percent line and load regulation with 100-mic.sec. response time for 50 percent load changes.
 3. Built-in overvoltage and overcurrent protection and be able to withstand 150 percent overload for at least 3 seconds without failure.
- F. Power Line Filtering: Internal or external transient voltage and surge suppression for workstations or controllers with the following:
1. Minimum dielectric strength of 1000 V.
 2. Maximum response time of 10 nanoseconds.
 3. Minimum transverse-mode noise attenuation of 65 dB.
 4. Minimum common-mode noise attenuation of 150 dB at 40 to 100 Hz.
- G. Third Party Devices: Third party devices shall be connected to building automation system through MS/TP communication bus at the fastest supported bps to the associated controller with the function in which they are being utilized.
1. The following devices shall be provided and connected to the Building Automation System with a BACnet Testing Laboratories BTL listed MS/TP communications card. If communication card is not available then an owner approved BTL Listed Proxy device or Non-BTL listed card may be used. Device object names must clearly indicate the object that is being represented or a proxy device may be required.
 - a. VFD's
 - b. Electrical Main Meter
 - c. Electrical Submeters
 - d. Lighting Control Panels
 - e. Chilled Water Energy Meters
 - f. Domestic Water Meter
 - g. Irrigation Water Meter
 - h. Chemical Treatment System
 - i. Chillers
 - j. Solar Hot Water Control System.
 - k. Solar Hot Water Energy Meters

2.4 ELECTRONIC SENSORS

- A. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.

- B. Thermistor Temperature Sensors and Transmitters:
1. Manufacturers:
 - a. Ebtron, Inc.
 - b. I.T.M. Instruments Inc.
 - c. RDF Corporation.
 2. Accuracy: Plus or minus 0.5 deg F at calibration point.
 3. Wire: Twisted, shielded-pair cable.
 4. Insertion Elements in Ducts: Single point, 8 inches long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft.
 5. Averaging Elements in Ducts: 18 inches long, rigid; use where prone to temperature stratification or where ducts are larger than 10 sq. ft.
 6. Insertion Elements for Liquids: Brass or stainless-steel socket with minimum insertion length of 2-1/2 inches.
 7. Room Sensor Cover Construction: Manufacturer's standard locking covers.
 - a. Set-Point Adjustment: Exposed.
 - b. Set-Point Indication: Concealed.
 - c. Thermometer: Concealed.
 - d. Color: White.
 - e. Orientation: Vertical.
 8. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
 9. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws.
- C. Humidity Sensors: Bulk polymer sensor element.
1. Manufacturers:
 - a. BEC Controls Corporation.
 - b. General Eastern Instruments.
 - c. MAMAC Systems, Inc.
 - d. ROTRONIC Instrument Corp.
 - e. TCS/Basys Controls.
 - f. Vaisala.
 2. Accuracy: 2 percent full range with linear output.
 3. Room Sensor Range: 20 to 80 percent relative humidity.
 4. Room Sensor Cover Construction: Manufacturer's standard locking covers.
 - a. Set-Point Adjustment: Concealed.
 - b. Set-Point Indication: Concealed.
 - c. Color: White.
 - d. Orientation: Vertical.

5. Duct Sensor: 20 to 80 percent relative humidity range with element guard and mounting plate.
6. Outside-Air Sensor: 20 to 80 percent relative humidity range with mounting enclosure, suitable for operation at outdoor temperatures of minus 22 to plus 185 deg F.
7. Duct and Sensors: With element guard and mounting plate, range of 0 to 100 percent relative humidity.

D. Pressure Transmitters/Transducers:

1. Manufacturers:
 - a. BEC Controls Corporation.
 - b. General Eastern Instruments.
 - c. MAMAC Systems, Inc.
 - d. ROTRONIC Instrument Corp.
 - e. TCS/Basys Controls.
 - f. Vaisala.
2. Static-Pressure Transmitter: Nondirectional sensor with suitable range for expected input, and temperature compensated.
 - a. Accuracy: 2 percent of full scale with repeatability of 0.5 percent.
 - b. Output: 4 to 20 mA.
 - c. Building Static-Pressure Range: 0- to 0.25-inch wg.
 - d. Duct Static-Pressure Range: 0- to 5-inch wg.
3. Water Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure; linear output 4 to 20 mA.
4. Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure and tested to 300-psig; linear output 4 to 20 mA.
5. Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential.
6. Pressure Transmitters: Direct acting for gas, liquid, or steam service; range suitable for system; linear output 4 to 20 mA.

2.5 STATUS SENSORS

- A. Status Inputs for Fans: Differential-pressure switch with pilot-duty rating and with adjustable range of 0- to 5-inch wg.
- B. Status Inputs for Pumps: Differential-pressure switch with pilot-duty rating and with adjustable pressure-differential range of 8 to 60 psig, piped across pump.

- C. Status Inputs for Electric Motors: Comply with ISA 50.00.01, current-sensing fixed- or split-core transformers with self-powered transmitter, adjustable and suitable for 175 percent of rated motor current.
- D. Current Switches: Self-powered, solid-state with adjustable trip current, selected to match current and system output requirements.

2.6 FLOW MEASURING STATIONS

- A. Air Flow Measuring Device: Provide where indicated multi-point thermal dispersion airflow traverse stations for continuous measurement of air volume. Each traverse station shall consist of a multiple array Dual "bead-in-glass" sensing locations. Air flow measurement station shall be sized to match actual duct size. Sensor density shall comply with manufactures recommendations (Density type) to insure specified accuracy in actual installation field conditions/location.
 - 1. Air flow measurement station shall be + 2% of reading, with 0.25% repeatability.
 - a. Provide Bacnet interface for BMS system interface. BMS shall monitor the following points at each AFM location:
 - 1) Instaneous Airflow
 - 2) Time weighted airflow average
 - 3) Temperature
 - b. Acceptable Manufacture/Model:
 - 1) Ebtron Gold Series - GTN116-PD
 - 2) Or approved equal
- B. Chilled Water Flow and Heating Hot Water Electromagnetic Flow BTU Meters: Provide chilled/hot water monitoring station consisting of a chilled/hot water flow meter, chilled/hot water supply and return water temperature sensors utilizing matching calibrated sensors.
 - 1. The BCS shall monitor chilled water usage in "ton-hours" or "kiloton-hours", with an accuracy of plus or minus 0.75% with a turn down range from 0.1fps to 33 fps.
 - 2. Provide Bacnet interface for BMS system interface. BMS shall monitor the following points at each AFM location:
 - a. Acceptable Manufacture/Model:
 - 1) Onicon F3500 with System 10 BTU Meter
 - 2) Or approved equal

- C. Chilled Water Flow and Heating Hot Water Electromagnetic Flow Meters: Provide chilled/hot water monitoring station consisting of a chilled/hot water flow meter.
1. The BCS shall monitor chilled water usage, with an accuracy of plus or minus 0.75% with a turn down range from 0.1fps to 33 fps.
 2. Provide Bacnet interface for BMS system interface. BMS shall monitor the following points at each AFM location:
 - a. Acceptable Manufacture/Model:
 - 1) Onicon F3500 Insertion
 - 2) Or approved equal
- D. Domestic Water Flow:
1. Pulse Width Modulating Type (Mass Displacement)
 2. Provide Bacnet interface for BMS system interface. BMS shall monitor the following points:
 - a. Total Flow
 3. Acceptable Manufacture:
 - a. Badger Meters, E-Series Meter with Bacnet Interface.
 - b. Or approved equal
- E. Reclaimed Water Flow:
1. Pulse Width Modulating Type (Mass Displacement)
 2. Provide Bacnet interface for BMS system interface. BMS shall monitor the following points:
 - a. Total Flow
 3. Acceptable Manufacture:
 - a. Badger Meters, Recodall
 - b. Or approved equal

2.7 THERMOSTATS

- A. Manufacturers:

1. Erie Controls.
2. Danfoss Inc.; Air-Conditioning and Refrigeration Div.
3. Heat-Timer Corporation.
4. Sauter Controls Corporation.
5. tekmar Control Systems, Inc.
6. Theben AG - Lumilite Control Technology, Inc.

B. Thermistor Temperature Sensor

1. Prerential rate control to minimize overshoot and deviation from setpoint.
2. Short-cycle protection.
3. Sensor operating temperature From 32°F to 122°F (0°C to 50°C)
4. Storage temperature From -40°F to 185°F (-40°C to 85°C)
5. Storage/operating humidity range 5% to 95% relative humidity (RH), noncondensing
6. Thermistor accuracy 0.36°F at calibration point, 1%
7. Setpoint functional range 45°F to 90°F (7.2°C to 32.2°C)
8. Setpoint thumbwheel markings
9. 50°F to 85°F (in 5°F increments) with */** icons on thumbwheel
10. 11°C to 29°C (in 3°C increments) with */** icons on thumbwheel
11. Housing material Polycarbonate/ABS (suitable for plenum mounting), UV protection, UL 94: 5 VA flammability rating.
12. Local Ethernet connection.

2.8 HUMIDISTATS

A. Manufacturers:

1. MAMAC Systems, Inc.
2. ROTRONIC Instrument Corp.

- B. Duct-Mounting Humidistats: Electric insertion, 2-position type with adjustable, 2 percent throttling range, 20 to 80 percent operating range, and single- or double-pole contacts.

2.9 CO2 SENSOR

A. Manufacturers:

1. Siemens Controls

- B. CO2 effectively control CO2 levels within a 0-2000 ppm range.

- C. Non-Dispersive InfraRed (NDIR) sensor.

- D. CO2 sensor shall be equipped with the following options:

1. Accuracy at 25°C ±30 ppm CO₂ +3% of reading (includes repeatability)
2. Pressure dependence of output +1.6% of reading per kPa
3. Annual zero drift ±10 ppm
4. Recommended calibration interval None (auto-calibrated)
5. Response time < 3 minutes
6. Operating temperature From 32°F to 122°F (0°C to 50°C)
7. Storage temperature From -40°F to 158°F (-40°C to 70°C)
8. Humidity range 0–85% relative humidity (RH)
9. Airflow range 0–33 ft/s (0–10 m/s)
10. Output signals • OUT1 (V): 0–10 VDC
11. Resolution of analog outputs 2ppm CO₂
12. Automatic self-diagnostics Diagnostic tools

2.10 ACTUATORS

- A. Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action or two-position action.
1. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
 2. Permanent Split-Capacitor or Shaded-Pole Type: Gear trains completely oil immersed and sealed. Equip spring-return motors with integral spiral-spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.
 3. Nonspring-Return Motors for Valves Larger Than NPS 2-1/2: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
 4. Spring-Return Motors for Valves Larger Than NPS 2-1/2: Size for running and breakaway torque of 150 in. x lbf.
 5. Nonspring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
 6. Spring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running and breakaway torque of 150 in. x lbf.
- B. Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque.
1. Manufacturers:
 - a. Belimo Aircontrols (USA), Inc.
 2. Valves: Size for torque required for valve close off at maximum pump differential pressure.
 3. Dampers: Size for running torque calculated as follows:

- a. Parallel-Blade Damper with Edge Seals: 7 inch-lb/sq. ft. of damper.
 - b. Opposed-Blade Damper with Edge Seals: 5 inch-lb/sq. ft. of damper.
 - c. Parallel-Blade Damper without Edge Seals: 4 inch-lb/sq. ft. of damper.
 - d. Opposed-Blade Damper without Edge Seals: 3 inch-lb/sq. ft. of damper.
 - e. Dampers with 2- to 3-Inch wg of Pressure Drop or Face Velocities of 1000 to 2500 fpm: Increase running torque by 1.5.
 - f. Dampers with 3- to 4-Inch wg of Pressure Drop or Face Velocities of 2500 to 3000 fpm: Increase running torque by 2.0.
4. Coupling: V-bolt and V-shaped, toothed cradle.
 5. Overload Protection: Electronic overload or digital rotation-sensing circuitry.
 6. Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on nonspring-return actuators.
 7. Power Requirements (Two-Position Spring Return): 24-V ac.
 8. Power Requirements (Modulating): Maximum 10 VA at 24-V ac or 8 W at 24-V dc.
 9. Proportional Signal: 2- to 10-V dc or 4 to 20 mA, and 2- to 10-V dc position feedback signal.
 10. Temperature Rating: Minus 22 to plus 122 deg F.
 11. Temperature Rating (Smoke Dampers): Minus 22 to plus 250 deg F.
 12. Run Time: 12 seconds open, 5 seconds closed.
 13. Motorized dampers shall not share a common actuator unless the dampers are controlling the same airstream.

2.11 PRESSURE INDEPENDENT CHARACTERIZED CONTROL VALVES

- A. Control Valves: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated.
 1. Pressure independent characterized ball control valves, Belimo or approved equal, shall be utilized for AHU's CHW coils and FCU coils.
- B. Manufacturer:
 1. Belimo (Belimo Energy Valve)
 2. Or approved equal.
- C. Control Valves: Factory fabricated of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated.
- D. The manufacturer shall warrant all components for a period of 5 years from the date of production, with the first two years unconditional (except as noted).
- E. Pressure Independent Control Valves 2" and smaller:

1. NPS 2 and Smaller: Forged brass body rated at no less than 360 PSI, stainless steel ball and stem, female NPT union or flanged ends, EPDM lubricated O-rings and TEFZEL characterizing disc.
2. Accuracy: The control valves shall accurately control the flow from 0 to 100% full rated flow with an operating pressure differential range of 5 to 50 PSID across the valve.
3. Flow Characteristics: Equal percentage/linear characteristics. (Ultrasonic flow meter with $\pm 5\%$ of the actual flow)
4. Close-Off Pressure Rating: 200 PSI.
5. Supply and return temperature sensors with thermowells and pipe fittings.
6. All actuators shall be electronically programmed by use of external computer software for the adjustment of flow. Programming using actuator mounted switches or multi-turn actuators are not acceptable. Actuators shall be provided with an auxiliary switch to prove valve position.
7. The actuator shall be the same manufacturer as the valve, integrally mounted to the valve at the factory with a single screw on a four-way DIN mounting-base.
8. The control valve shall require no maintenance and shall not include replaceable cartridges.
9. The manufacturer shall warrant all components for a period of 5 years from the date of production, with the first two years unconditional.
10. The use of pressure independent valves piped in parallel to achieve the rated coil flow shall be permitted. Actuators shall be electronically programmed to permit sequencing the flow with a single control output point. The use of external devices to permit sequencing is not acceptable.

F. Pressure Independent Control Valves 2-1/2" to 6":

1. NPS 2-1/2 to 6": Forged brass body rated at no less than 360 PSI, stainless steel ball and stem, flanged ends, EPDM lubricated O-rings and TEFZEL characterizing disc.
2. Accuracy: The control valves shall accurately control the flow from 0 to 100% full rated flow with an operating pressure differential range of 5 to 50 PSID across the valve.
3. Flow Characteristics: Equal percentage/linear characteristics. (Magnetic flow meter with $\pm 5\%$ of the actual flow)
4. Close-Off Pressure Rating: 200 PSI.
5. Supply and return temperature sensors with thermowells and pipe fittings.
6. All actuators shall be electronically programmed by use of external computer software for the adjustment of flow. Programming using actuator mounted switches or multi-turn actuators are not acceptable. Actuators shall be provided with an auxiliary switch to prove valve position.
7. The actuator shall be the same manufacturer as the valve, integrally mounted to the valve at the factory with a single screw on a four-way DIN mounting-base.
8. The control valve shall require no maintenance and shall not include replaceable cartridges.
9. The manufacturer shall warrant all components for a period of 5 years from the date of production, with the first two years unconditional.

10. The use of pressure independent valves piped in parallel to achieve the rated coil flow shall be permitted. Actuators shall be electronically programmed to permit sequencing the flow with a single control output point. The use of external devices to permit sequencing is not acceptable.

2.12 CONTROL VALVES

- A. Butterfly Valves: 200-psig, 150-psig maximum pressure differential, ASTM A 126 cast-iron or ASTM A 536 ductile-iron body and bonnet, extended neck, stainless-steel stem, field-replaceable EPDM or Buna N sleeve and stem seals.
 1. Body Style: Wafer.
 2. Disc Type: Aluminum bronze.
 3. Sizing: 1-psig maximum pressure drop at design flow rate.
 4. Manufacture : Belimo or approved equal.

2.13 DAMPERS

- A. Manufacturers:
 1. Air Balance Inc.
 2. TAMCO (T. A. Morrison & Co. Inc.).
 3. United Enertech Corp.
 4. Greenheck
 5. Ruskin
- B. Dampers: AMCA-rated, parallel-blade design; 0.108-inch- minimum thick, galvanized-steel or 0.125-inch- minimum thick, extruded-aluminum frames with holes for duct mounting; damper blades shall not be less than 0.064-inch- thick galvanized steel with maximum blade width of 8 inches and length of 48 inches.
 1. Secure blades to 1/2-inch- diameter, zinc-plated axles using zinc-plated hardware, with oil-impregnated sintered bronze blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.
 2. Operating Temperature Range: From minus 40 to plus 200 deg F.
 3. Edge Seals, Standard Pressure Applications: Closed-cell neoprene.
 4. Edge Seals, Low-Leakage Applications: Use inflatable blade edging or replaceable rubber blade seals and spring-loaded stainless-steel side seals, rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 4-inch wg when damper is held by torque of 50 in. x lbf; when tested according to AMCA 500D.
 5. Outside, return, relief and exhaust air dampers shall be of low leakage proportional type with spring return and fail closed.

2.14 CONTROL CABLE

- A. Electronic and fiber-optic cables for control wiring are specified in Division 27 Section "Communications Horizontal Cabling."
1. Electronic and fiber-optic cables for control wiring shall meet the following low voltage wiring requirements:
 - a. Input/Output = Green jacket, plenum rated with shield.
 - 1) 18 awg, shielded, plenum rated 2-conductor.
 - 2) Loop powered devices should be implemented using (2) two cables.
 - b. COMM = BACnet MS/TP Low Cap 100 ohm, 12.5pf/ft Blue jacket plenum rated with shield
 - 1) 24 awg, shielded, plenum rated 2-conductor
 - c. Power (<50VAC/VDC) = Orange jacket plenum rated with shield
 - 1) 18 awg, shielded, plenum rated 2-conductor

2.15 POWER MONITORING

- A. Power Monitor Meters: Provide power monitors sized for the respective load and/or panel being monitored.
1. The BCS shall monitor power usage in "KWH", peak demand "KW", instantaneous power "KW" demand, voltage per phase.
 2. Provide UL listed manufactures enclosure for assembly. NEMA 1 indoors, NEMA 3R outdoors.
 3. Provide Bacnet interface for BMS system interface. BMS shall monitor the following points at each power monitor location:
 - a. KW
 - b. KWH
 - c. Peak KW
 - d. Voltage per Phase
 - e. Current
 4. Acceptable Manufacture/Model:
 - a. Veris Power Meter system (Solid Core or split Core Style) with BACnet interface.
 - 1) Veris E50 for single circuits
 - 2) Veris E60 for MDP or distribution panel mains

- b. Or approved equal

2.16 LAB CONTROLS

- 1. Basis of Design: Antec (Model PACE) (By Price)

- a. Or as approved by Owner

- 2. Input/Output (I/O) Configuration:

- a. Digital Outputs:

- 1) 6 relay outputs SPDT (contact ratings: 5A @ 25OVAC)
- 2) Removable Screw terminals
- 3) Individual LED Indication of output status (color - "red")

- b. Universal Inputs:

- 1) 12 total
- 2) Input Signals Supported (jumper selectable):
 - a) Thermistor/Dry Contact.
 - b) 0-10 VDC (scalable in software for other ranges)
 - c) 0-20 mA (scalable in software for other ranges)
 - d) 1K Platinum RTD
- 3) Removable screw terminals
- 4) 12-Bit A/D
- 5) Selectable +5V or +24V voltage source (240 mA max)

- c. Universal Outputs:

- 1) 6 total
- 2) Analog Output Signals Supported:
 - a) 0-10 V DC on all 6 outputs (scalable in software for other ranges)
 - b) 0-10 VDC or 0-20 mA on 2 of the outputs
- 3) Digital Output Signals - Each of the 6 outputs can be individually configured as digital outputs. They have the signal capacity to drive an external voltage relay device.
- 4)

- 5) Removable screw terminals
 - 6) Individual LED Indication (red - vary in intensity based on output signal status)
3. Power Requirements:
- a. External Power Source - 24 VAC \pm 15 %, 50-60 Hz, 20 VA.
 - b. Removable screw terminal (2-position) for power connection
 - c. LED Indication: Power (green), Run (green), and Error (red) LEDs
4. Communication Ports:
- a. 4Ports
 - 1) Open Protocol Port #1 - EIA-232/485/ARC 156 (jumper selectable)
 - 2) Open Protocol Port #2 - Plug-in port for optional communications cards (LonWorks, Ethernet, Modem, etc.). Note: use of this plug-in port disables serial (232/485) communications at Port #1; however, ARC 156 communications may be active simultaneous to Port #2 usage.
 - 3) Rnet Port - for connection to keypad/displays and/or intelligent sensors. This port also acts as the local laptop access port.
 - 4) I/O Expansion Port (CAN-bus)
 - b. Removable Screw terminals
 - c. Transmit & Receive LEDs for each port
 - d. Rotary Address Switches
 - e. Protocol & Baud Rate selector DIP switch
 - f. Integrate to Fume hood autosash controller.
5. Size and Environmental Requirements:
- a. Board Size (including metal cover): 11-3/4" wide x 5" high x 2" deep
 - b. Expander Board Size: 10-5/8" wide x 3" high x 2" deep (note: the expander boards can be mounted on top of the ENV IV controller to conserve panel space or they can be remotely mounted up to 500 feet away from the controller.)
 - c. Protection: Brushed aluminum, gull-wing metal
 - d. Temperature Range: -40 to 150 deg. F, 10-95% RH non-condensing
 - e. Agency Listings: UL, cUL, CE. FCC
6. Lab Air Control Valves:
- a. Lab General Exhaust Valves:
 - 1) Basis of Design (ANTEC VV) or approved equal.
 - 2) Venturi Body and Cone

- 3) Body Material: Aluminum
 - 4) Cone Material: Aluminum
 - 5) Internal Hardware: 316L Stainless
 - 6) Electronic actuator
- b. Lab Hood Exhaust Valves:
- 1) Basis of Design (ANTEC VV) or approved equal.
 - 2) Venturi Body and Cone
 - 3) Body Material: Aluminum with PVDF Kynar Coating or equivalent
 - 4) Cone Material: Aluminum with PVDF Kynar Coating or equivalent
 - 5) Internal Hardware: 316L Stainless
 - 6) Electronic actuator
- c. Supply Air Valves:
- 1) Basis of Design: (ANTEC VFX with Hydronic Heat where scheduled) or approved equal.
 - 2) Blade style: Precision Damper
 - 3) Material: Aluminum
 - 4) Insulation: Metal Liner double wall construction with closed cell insulation
 - 5) AirFlow Measuring Station: Velocity Wing
 - 6) Damper Shaft: Solid one Piece Shaft
 - 7) Electronic actuator
 - 8) Hydronic Heater:
 - a) Casing: Minimum 22 ga. galvanized steel.
 - b) Factory installed.
 - c) Gasketed access door.
 - d) Aluminum fins mechanical bonded to seamless copper tubes.
 - e) AHRI 410 Certified.
- d. Refer to Design Drawings for Performance requirements.
7. See Fume hood specification for autosash controller being supplied with the Fume hoods. Fume hood controller shall be integrated with the Lab Controller to provide seamless operation between the two controller systems.
- a. Fume Hood Controllers shall provide the following operation:
- 1) Occupancy Sensor at each hood.
 - 2) Sash position at each hood.
 - 3) Auto Sash actuator at each hood.
 - 4) Sash obstruction sensor at each hood sash edge.

- 5) Hood airflow monitor, local digital indication, greenlight normal, redlight low flow, local low flow audible alarm, alarm silence (with adjustable silence time delay).
 - 6) Exit door Pushbutton at each exit door, programmed to reduce the lab exhaust airflows to allow for safe egress for 20 sec (adjustable), then return to exhaust airflow control.
8. Lab Control system shall provide Automatic Airflow tracking between lab exhaust and associated supply air, to perform the following:
- a. Maintain the associated lab minimum air change rates when in occupied or unoccupied modes. (4 AC when unoccupied, minimum 10 AC when occupied. Adjustable.)
 - b. Maintain the associated exhaust airflow tracking to maintain the lab negative cfm offset at all times. (To ensure lab is negative to adjacent occupied spaces at all times.
 - c. Modulate fume hood exhaust airflows, based upon associated sash position.
 - d. Automatically open and close hood sash's based upon occupancy sensors.
 - e. Provide local over-ride pushbutton of auto-sash control (with adjustable over-ride timer)
 - f. Modulate and reduce hood airflows when hood is closed, to code allowed minimums.
 - g. Modulate lab Air valves to scheduled values.
 - h. Modulate reheat to maintain space temperature set-points. Reheat shall be controlled to maintain a discharge air temperature set-point which is to be reset upon the space temperature set-point and associated space temperature reading.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that power supply is available to control units and operator workstation.

3.2 INSTALLATION

- A. Building Automation controllers can be organized into a hierarchy structure that allows for multiple IP addresses.
 1. The only devices allowed at the IP level shall be those that meet or exceed the minimum BIBB requirements of the latest BTL listed B-BC class PICS.
 2. All other devices must reside at a lower tier.

3. Any device that is dependent on another device for emergency operation, life safety, etc. must have a means of a direct I/O for the needed points.
 4. All installations shall utilize one controller for each piece of equipment or system. Two AHU's cannot share a common controller. However, two pumps for a chilled water system can utilize a common controller.
- B. The following framework shall be utilized for device addressing (DEVICE Instance) and network number:
1. Network number shall be comprised of 3 digit building number (551) followed by 2 digit network number. IP level devices shall be assigned a network number of 1.
 2. The device ID shall be comprised of the 3 digit building number (551) followed by 2 digit network number (IP devices use 00) followed by 2 digit device number.
 - a. EXAMPLE: BLDG (XXX)
 - 1) Devices on the IP level: xxx0001-xxx009
 - 2) MSTP assignable network numbers: Xxx01-xxx99

 - 3) MSTP assignable devices: xxx0101-xxx0199 for network xxx01
 - a) xxx0201-xxx0299 for network xxx02
 - b) xxx0301-xxx0399 for network xxx03continuing to
 - c) xxx9901-xxx9999 for network xxx99
 - 4) MS/TP physical address shall be set to match the last 2-digits of the device ID
 - 5) Building Numbers greater than 418 will be assigned an owner specified unique 3-digit number.
- C. Install software in control units and operator workstation(s). Implement all features of programs to specified requirements and as appropriate to sequence of operation.
- D. Connect and configure equipment and software to achieve sequence of operation specified.
- E. Verify location of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation. Install devices 48 inches above the floor.
1. Install averaging elements in ducts and plenums in crossing or zigzag pattern.
- F. Install automatic dampers according to Division 23 Section "Air Duct Accessories."

- G. Install damper motors on outside of duct in warm areas, not in locations exposed to outdoor temperatures.
- H. Install labels and nameplates to identify control components according to Division 23 Section "Identification for HVAC Piping and Equipment."
- I. Install hydronic instrument wells, valves, and other accessories according to Division 23 Section "Hydronic Piping."
- J. Install duct volume-control dampers according to Division 23 Sections specifying air ducts.
- K. Install electronic and fiber-optic cables according to Division 27 Section "Communications Horizontal Cabling."

3.3 ELECTRICAL WIRING AND CONNECTION INSTALLATION

- A. Install raceways, boxes, and cabinets according to Division 26 Section "Raceway and Boxes for Electrical Systems."
 - 1. Controls power shall be connected to emergency power system. A UPS shall be provided for the operator workstation and any file servers, with a minimum of 30 minute capacity.
 - a. Note: Terminal units with electric heat are not to be supplied with emergency power unless noted otherwise. (Therefore those controls will not be on emergency power, as the equipment is single point power connection.)
 - b. Note: FCU's units are not to be supplied with emergency power unless noted otherwise. (Therefore those controls will not be on emergency power, as the equipment is single point power connection.)
- B. Install building wire and cable according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."
- C. Install signal and communication cable according to Division 27 Section "Communications Horizontal Cabling."
 - 1. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
 - 2. Install exposed cable in raceway.
 - 3. Install concealed cable in raceway.
 - 4. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
 - 5. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
 - 6. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.

7. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.
- D. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.
- E. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
 2. Test and adjust controls and safeties.
 3. Test calibration of electronic controllers by disconnecting input sensors and stimulating operation with compatible signal generator.
 4. Test each point through its full operating range to verify that safety and operating control set points are as required.
 5. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
 6. Test each system for compliance with sequence of operation.
 7. Test software and hardware interlocks.
- C. BAS Verification:
 1. Verify that instruments are installed before calibration, testing, and loop or leak checks.
 2. Check instruments for proper location and accessibility.
 3. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.
 4. Check instrument tubing for proper fittings, slope, material, and support.
 5. Check installation of air supply for each instrument.
 6. Check flow instruments. Inspect tag number and line and bore size, and verify that inlet side is identified and that meters are installed correctly.
 7. Check pressure instruments, piping slope, installation of valve manifold, and self-contained pressure regulators.
 8. Check temperature instruments and material and length of sensing elements.
 9. Check control valves. Verify that they are in correct direction.
 10. Check BAS system as follows:

- a. Verify that BAS controller power supply is from emergency power supply, if applicable.
 - b. Verify that wires at control panels are tagged with their service designation and approved tagging system.
 - c. Verify that spare I/O capacity has been provided.
 - d. Verify that BAS controllers are protected from power supply surges.
- D. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.
- E. System verification: HVAC Controls: Refer to 230010-3.6 for additional requirements.

3.5 ADJUSTING

A. Calibrating and Adjusting:

1. Calibrate instruments.
2. Make three-point calibration test for both linearity and accuracy for each analog instrument.
3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.
4. Control System Inputs and Outputs:
 - a. Check analog inputs at 0, 50, and 100 percent of span.
 - b. Check analog outputs using milliampere meter at 0, 50, and 100 percent output.
 - c. Check digital inputs using jumper wire.
 - d. Check digital outputs using ohmmeter to test for contact making or breaking.
 - e. Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.
5. Flow:
 - a. Set differential pressure flow transmitters for 0 and 100 percent values with 3-point calibration accomplished at 50, 90, and 100 percent of span.
 - b. Manually operate flow switches to verify that they make or break contact.
6. Pressure:
 - a. Calibrate pressure transmitters at 0, 50, and 100 percent of span.
 - b. Calibrate pressure switches to make or break contacts, with adjustable differential set at minimum.
7. Temperature:

- a. Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
 - b. Calibrate temperature switches to make or break contacts.
8. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.
 9. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.
 10. Provide diagnostic and test instruments for calibration and adjustment of system.
 11. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.
 12. Refer to 230010-3.6 for additional calibration and adjustment requirements associated with prefunctional and functional testing.
- B. Adjust initial temperature and humidity set points.
- C. Occupancy Adjustments: 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.

3.6 PROCEDURE FOR HYDRONIC SYSTEMS

- A. Equipment installed with pressure independent control valves shall not require hydronic balancing. (Equipment hydronic performance criteria is still required to be measured and documented for all equipment). Flow shall be verified and adjusted for the pressure independent valve assembly for field conditions using the pressure independent control valve manufacturer's documented procedure for 25% of the total installed product. Exact locations of tested product to be coordinated with the commissioning agent.

3.7 MEASUREMENT & VERIFICATION

- A. The following building systems will be measured and trended through the building automation. The contractor shall provide all necessary measuring devices and programming to accomplish the monitoring and trending of these systems. The monitoring and trending shall be polled every 5 minutes at a minimum.
1. Common area lighting systems shall be monitored with check meters at each lighting power panel at each floor.
 2. Site lighting system is provided with check meters at the lighting power panel.
 3. HVAC systems are provided with check meters at the each power panel at each floor.

4. Major motor loads are also trended through the BAS DDC. The hours of operation are recorded and the total power used is calculated by multiplying the operating hours by the measured brake horsepower noted in the commissioning and testing/balancing reports.
5. VAV box heaters are provided with check meters at the power panel at each floor. VAV box heaters are also trended through the BAS DDC system for operation and discharge air temperature to compare to the anticipated operation model.
6. VFD operation is trended through the BAS DDC as a percentage of full operation. At each unit with a VFD, the motor brake HP is recorded in the commissioning and testing/balancing reports. The energy reduction is calculated by multiplying the percentage of operation trend by the full load power.
7. Building cooling load is monitored through the BAS DDC through the building's BTU meter that will be provided. BTU meter will monitor flow in, by-pass flow, supply water temperature and return water temperatures.
8. Building cooling load will be trended through the BAS DDC for airside and waterside. The outside air temperatures and AHU discharge temperatures are recorded to document cooling loads within the building. The BTU meter information is trended to document cooling loads, also.
9. Building outside air is trended through the BAS DDC for outside air conditioning reductions. The outside air temperature/humidity, leaving ERU outside air temperature/humidity, stale air temperature/humidity and leaving ERU stale air temperature/humidity are all trended. Outside air flow and stale airflow are also trended. The airside BTU meter information is trended to document cooling/heating loads, also.
10. Hot water heating requires trending through the BAS system.
11. Domestic Water use is recorded by the main building water meter and trended by the BAS DDC system.
12. Reclaimed Water use is recorded by the reclaimed water meter to the building's plumbing system by the BAS DDC system.

3.8 DEMONSTRATION AND TRAINING

- A. Provide 32 hours of instruction to be conducted at the project site with manufacturer's representative. The training shall be conducted at 4 sessions at 8 hour a piece. Contractor to also provide two sets of control operation manuals for use at the training session and then provide to the Owner after completion of the session.

3.9 COMMISSIONING

- A. Refer to Commissioning Specifications, Section ~~018410~~[230800](#), for related commissioning requirements.
- B. Contractor shall provide all necessary support to the commissioning team to implement commissioning plan as outlined in Section ~~018410~~[230800](#).

END OF SECTION 23 09 00

23 09 00 - 30



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

SEAL

Revisions		
No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: MLM-19672
Designed By: MLM, MAM
Drawn By: ST, CC, DM, CB
Checked By: MAM
Issue Date: 30-NOV-2020
Drawing Scale: 1" = 20'-0"
Drawing Title:

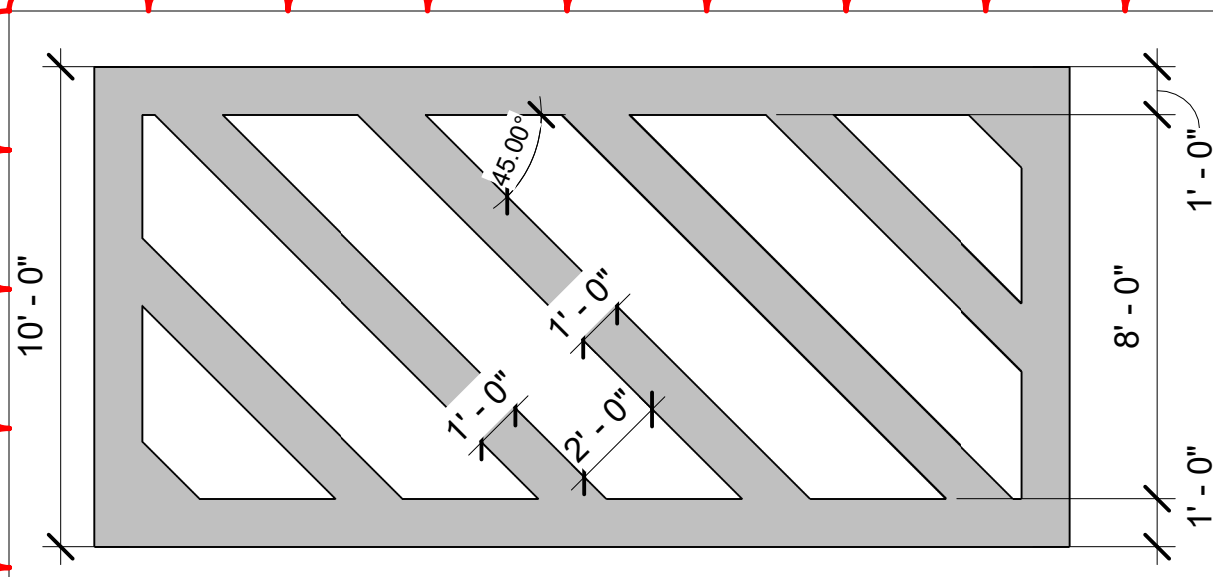
ARCHITECTURAL
SITE PLAN

BID DOCUMENTS

Drawing No.:

G201

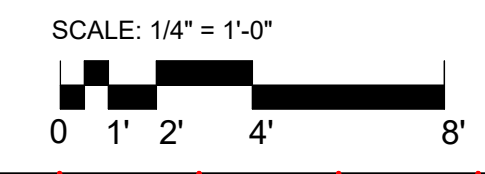
477369-CIS-2020 & FNW-2021



BASIS - FDOT SPEC P-620 PAVEMENT MARKINGS

E1 "PUBLIC WAY" MARKINGS

1/4" = 1'-0"



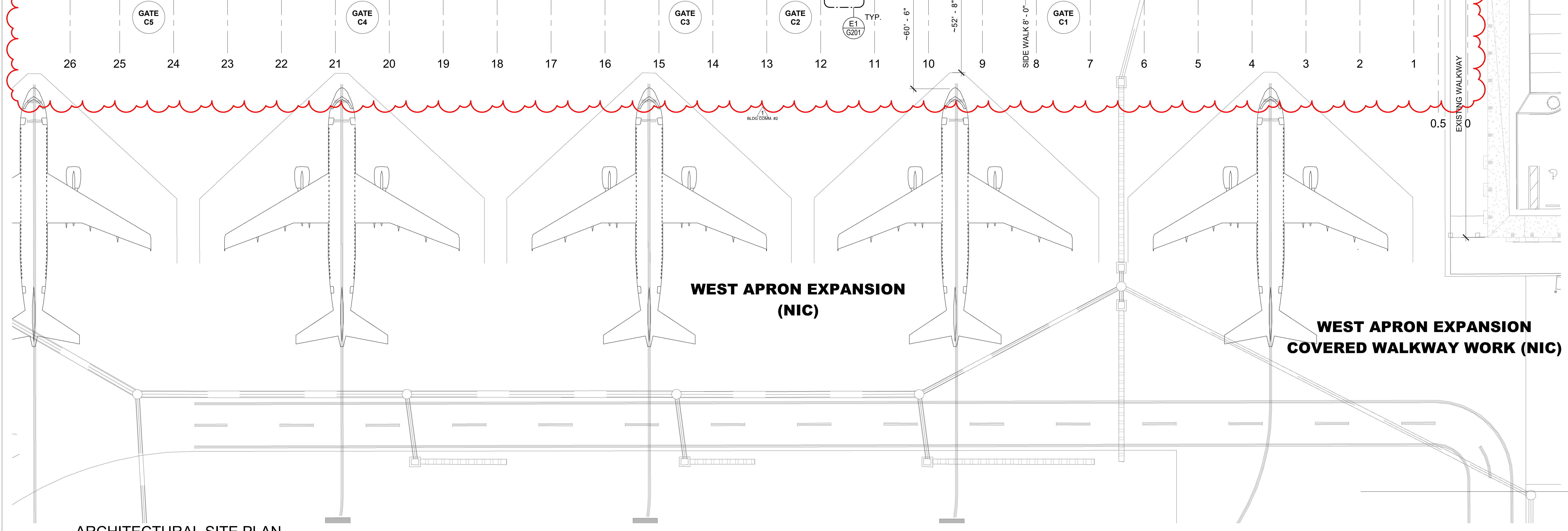
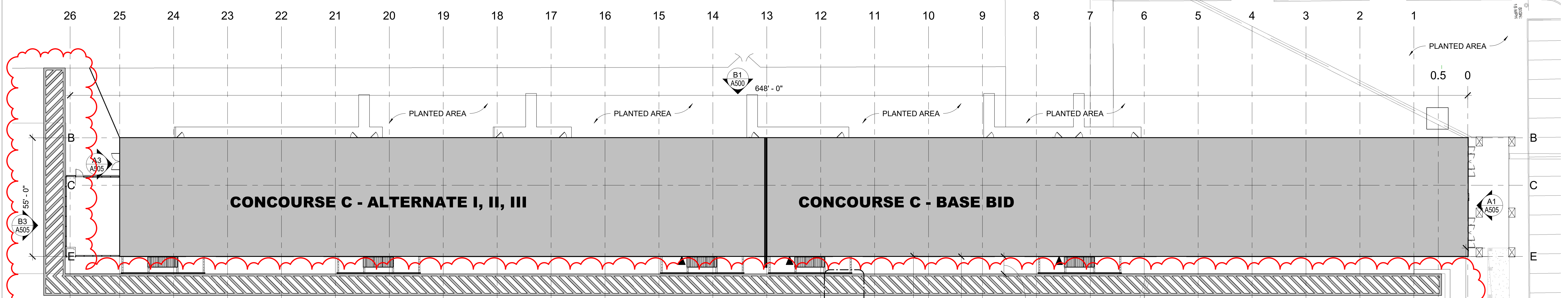
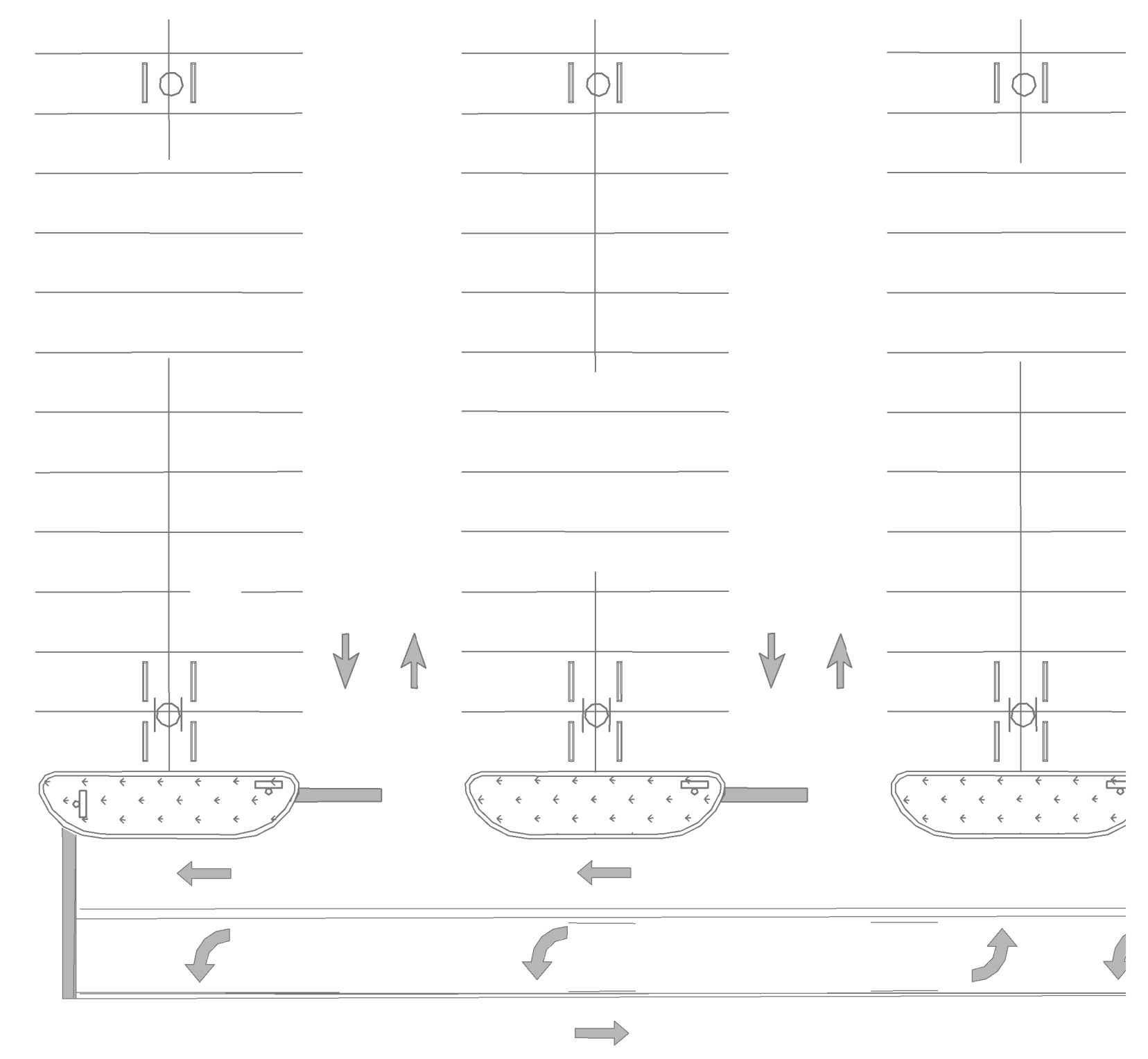
Paint				Glass Beads		
Type	Color	Mark	Fed Std. 595 Number	Application Rate Maximum	Type	Application Rate Minimum
III	YELLOW	Y	33538 or 33655	90 ft ² /gal	III	8 lb/gal

Paint. Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595. Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type III. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis. The acrylic resin used for Type III shall be 100% cross linking acrylic as evidenced by infrared peaks at wavelengths 1568, 1624, and 1672 cm-1 with intensities equal to those produced by an acrylic resin known to be 100% cross linking.

Reflective media. Glass beads for white paint shall meet the requirements for Federal Specification TT-B-1325D Type III. Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

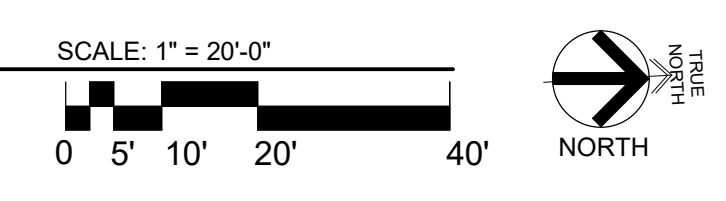
Materials acceptance. The Contractor shall furnish manufacturer's certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer's surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR

PARKING LOT B EXPANSION
(NIC)



A1 ARCHITECTURAL SITE PLAN

1" = 20'-0"



BIM 360/Design of Satellite Concourse/VPS-MLM_A.rvt

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C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

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Revisions		
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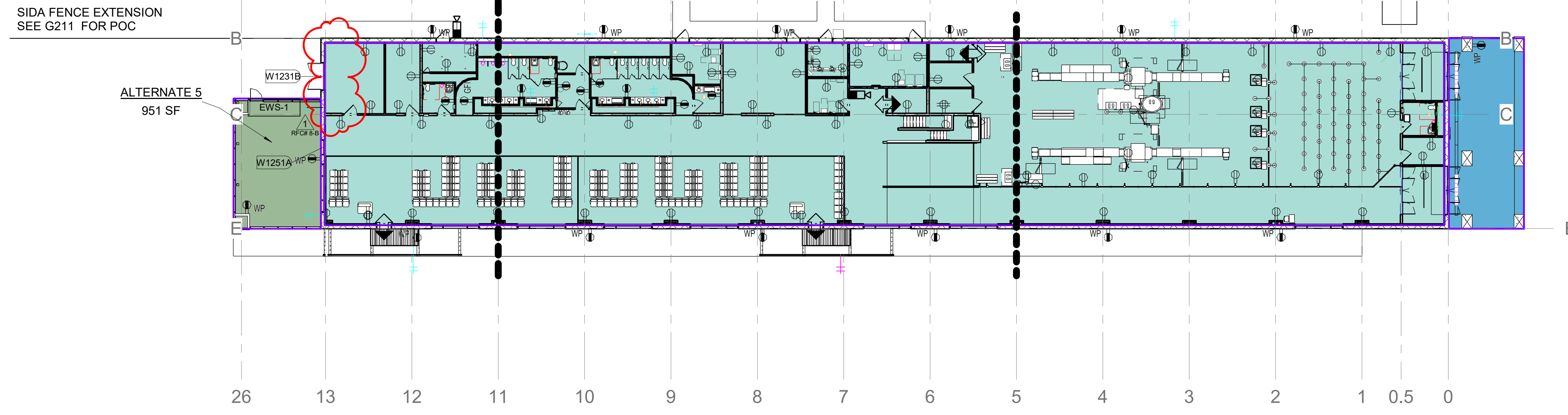
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 Designed By: **MLM, MAM**
 Drawn By: **ST, CC, DM, CB**
 Checked By: **MAM**
 Issue Date: **30-NOV-2020**
 Drawing Scale: **1" = 20'-0"**
 Drawing Title:

**ILLUSTRATED
ALTERNATE
EXECUTION**
 BID DOCUMENTS

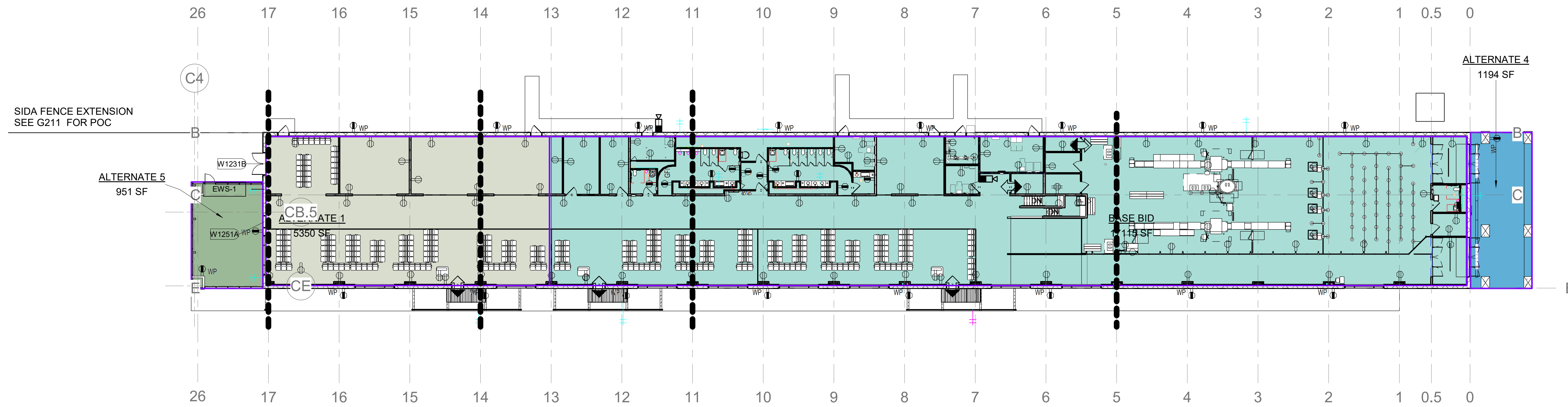
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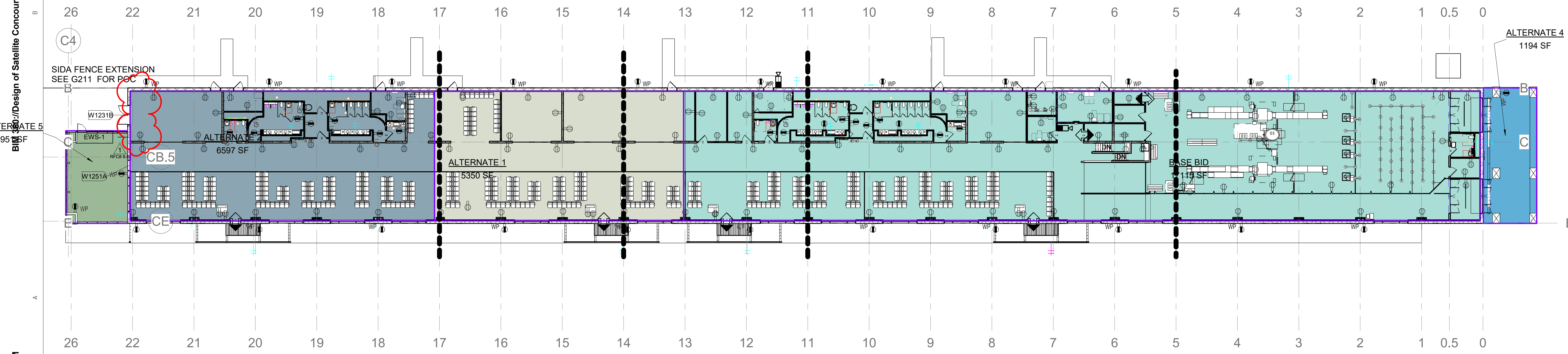
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INFORMATION ONLY**



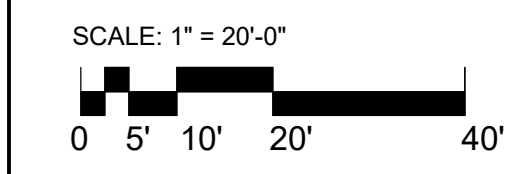
D1 ALTERNATE ILLUSTRATION BASE BID + ALTERNATES 4&5
 1" = 20'-0"



B1 ALTERNATE ILLUSTRATION BASE BID + ALTERNATES 1,4&5
 1" = 20'-0"



A1 ALTERNATE ILLUSTRATION BASE BID + ALTERNATES 1,2,4&5
 1" = 20'-0"



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C19-2811- AP
Construction
of Satellite
Concourse 'C'



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FL AR-98279

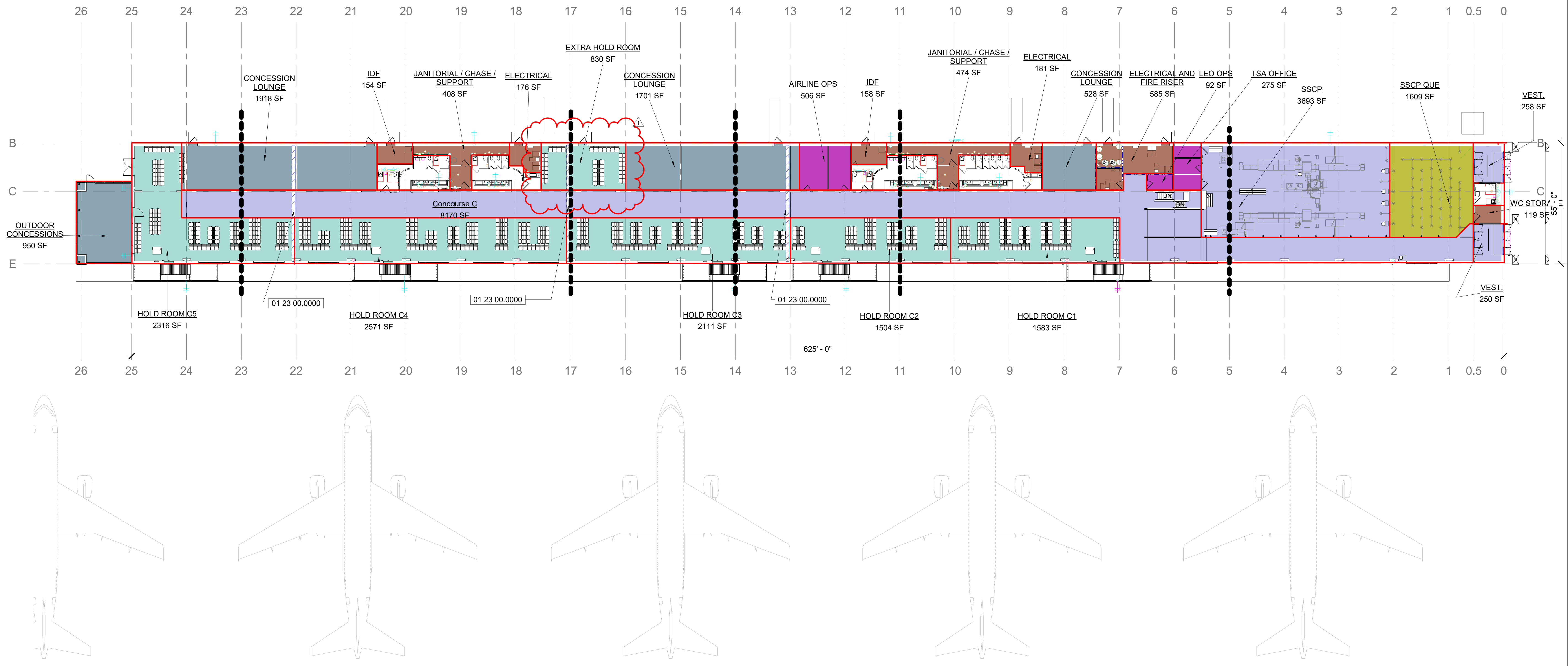
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No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

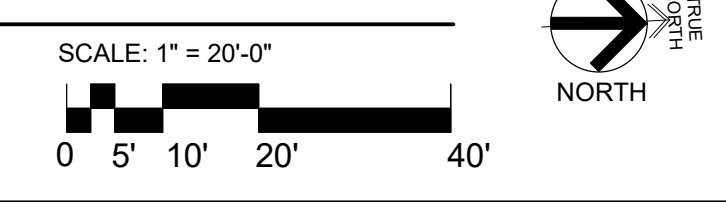
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Designed By: **MLM, MAM**
Drawn By: **ST, CC, DM, CB**
Checked By: **MAM**
Issue Date: **30-NOV-2020**

Drawing Title:
**FUNCTIONAL
USE &
OCCUPANT
LOAD PLAN
BID DOCUMENTS**

AL111



D1 OVERALL OCCUPANCY FUNCTION PLAN
1" = 20'-0"



FUNCTION LEGEND

- 300 SF Accessory storage areas, mechanical equipment room
- 100 SF Business Areas
- 100 SF Concourse
- 5 SF Standing Space Concentrated
- 15 SF Unconcentrated (tables and chairs)
- 15 SF Waiting areas

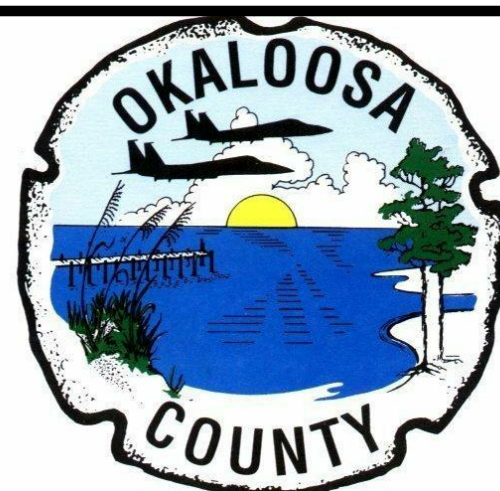
OCCUPANT LOAD (FBC TABLE 1004.1.2)

Name	Area	Occ Function	Occ Load Factor	Occupant Count
HOLD ROOM C5	2316 SF	Waiting areas	15 SF	155
HOLD ROOM C4	2571 SF	Waiting areas	15 SF	172
HOLD ROOM C3	2111 SF	Waiting areas	15 SF	141
HOLD ROOM C2	1504 SF	Waiting areas	15 SF	101
HOLD ROOM C1	1583 SF	Waiting areas	15 SF	106
AIRLINE OPS	506 SF	Business Areas	100 SF	6
LEO OPS	92 SF	Business Areas	100 SF	1
CONCESSION LOUNGE	1701 SF	Unconcentrated (tables and chairs)	15 SF	114
CONCESSION LOUNGE	528 SF	Unconcentrated (tables and chairs)	15 SF	36
Concourse C	8170 SF	Concourse	100 SF	82
SSCP QUE	1609 SF	Standing Space Concentrated	5 SF	322
IDF	154 SF	Accessory storage areas, mechanical equipment room	300 SF	1
IDF	158 SF	Accessory storage areas, mechanical equipment room	300 SF	1
SSCP	3693 SF	Concourse	100 SF	37
ELECTRICAL AND FIRE RISER	585 SF	Accessory storage areas, mechanical equipment room	300 SF	2
WC STORAGE	119 SF	Accessory storage areas, mechanical equipment room	300 SF	1
VEST.	258 SF	Concourse	100 SF	3
VEST.	250 SF	Concourse	100 SF	3
TSA OFFICE	275 SF	Business Areas	100 SF	3

Name	Area	Occ Function	Occ Load Factor	Occupant Count
ELECTRICAL	181 SF	Accessory storage areas, mechanical equipment room	300 SF	1
JANITORIAL / CHASE / SUPPORT	474 SF	Accessory storage areas, mechanical equipment room	300 SF	2
ELECTRICAL	176 SF	Accessory storage areas, mechanical equipment room	300 SF	1
JANITORIAL / CHASE / SUPPORT	408 SF	Accessory storage areas, mechanical equipment room	300 SF	2
CONCESSION LOUNGE	1918 SF	Unconcentrated (tables and chairs)	15 SF	128
OUTDOOR CONCESSIONS	950 SF	Unconcentrated (tables and chairs)	15 SF	64
EXTRA HOLD ROOM	830 SF	Waiting areas	15 SF	56
				1541

KEYNOTES

- NO. 01 23 00.0000 LIMITS OF ALTERNATE WORK, SEE SPECIFICATIONS FOR MORE INFORMATION.
- OTHER LIFE SAFETY PLANS**
- SEE AL710 - COMPREHENSIVE LIFE SAFETY PLAN
- SEE AL211 - FOR EGRESS PLAN W/ TRAVEL DISTANCES



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

SEAL

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

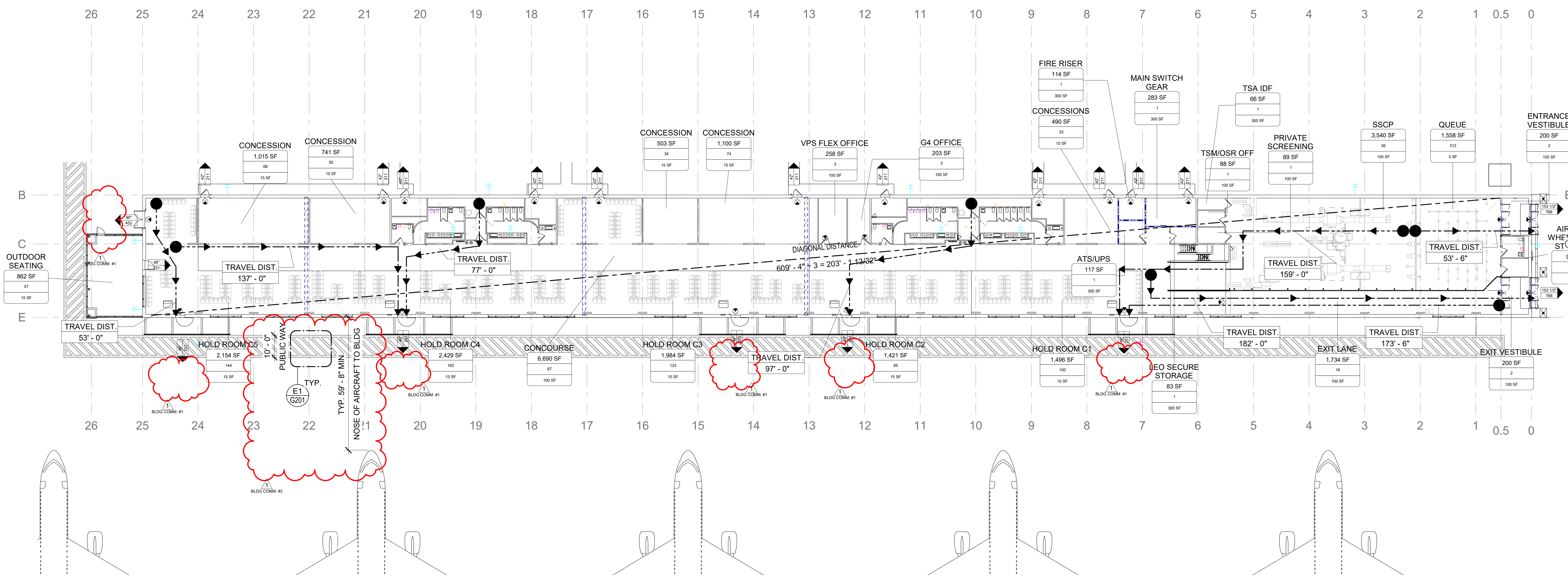
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Designed By: MLM, MAM
Drawn By: ST, CC, DM, CB
Checked By: MAM
Issue Date: 30-NOV-2020
Drawing Scale: 1" = 20'-0"
Drawing Title:

EGRESS PLAN

BID DOCUMENTS

Drawing No.:

AL211



D1 OVERALL EGRESS PLAN
1" = 20'-0"

EGRESS PLAN LEGEND

- CAPACITY OF EGRESS COMPONENT**
DIRECTION OF TRAVEL
CLEAR WIDTH
CAPACITY PER FBC§1005.3.2
- ROOM OCCUPANT LOAD FBC§1005.3**
AREA OF ROOM/SPACE
REQ'D OCCUPANT LOAD CAPACITY
OCCUPANT LOAD FACTOR FBC§ 1004.1.2 - SEE SHEET AL111
- EXIT TRAVEL DISTANCE FBC§1017.2**
TRAVEL DISTANCE
POINT OF BEGINNING
POINT OF DISCHARGE
PATH OF TRAVEL
- DOORWAY CONFIG. FBC§1007.1.1**
MEASURABLE DISTANCE
MINIMUM DISTANCE BETWEEN EXITS
FBC§1007.1.1-EXCEPTION 2
- EXIT SIGN FBC §1013**
ILLUMINATED FACE FBC §1013.3
DIRECTIONAL GRAPHICS

DISTANCE LIMITATIONS

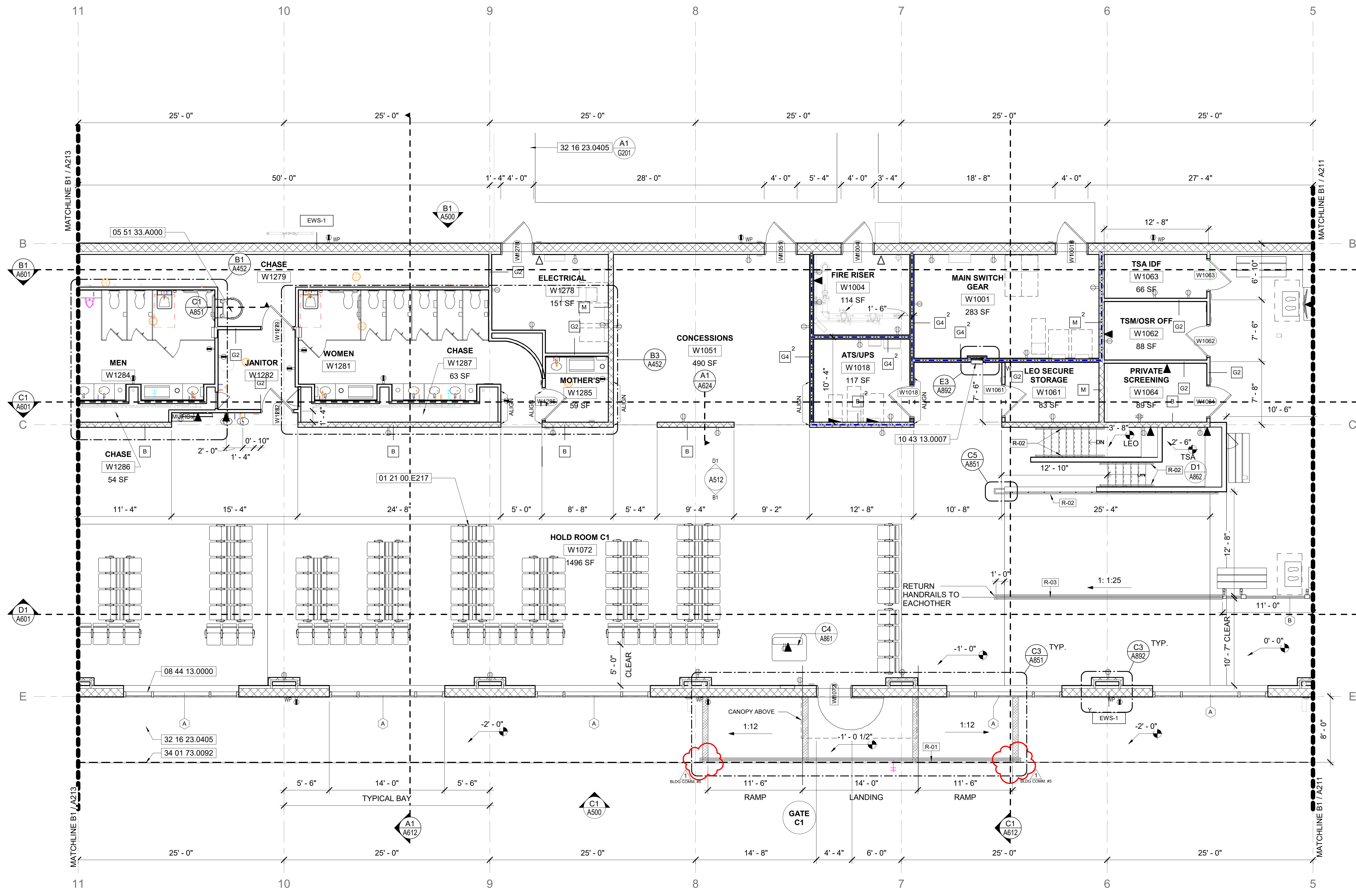
OCCUPANCY	MAXIMUM TRAVEL DISTANCE TO EXIT (FBC TABLE 1017.2)	MAXIMUM DEAD-END CORRIDOR LENGTH (FBC TABLE 1020.4)	MAXIMUM COMMON PATH OF TRAVEL (FBC TABLE 1006.2.1)
ASSEMBLY (A)	250'	20'	75'
BUSINESS (B)	300'	50' (1020.4(2))	100'
MERCANTILE (M)	250'	50' (1020.4(2))	75'

QUANTITY OF MEANS OF EGRESS

FBC 1006.3.1 MINIMUM NUMBER OF EXITS REQUIRED: 4
NUMBER OF EXITS PROVIDED: 8

OTHER LIFE SAFETY PLANS

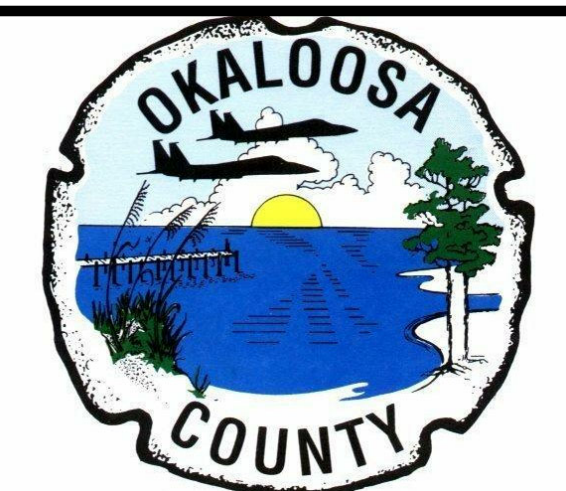
- SEE AL710 - COMPREHENSIVE LIFE SAFETY PLAN
- SEE AL111 - FOR OCCUPANCY AND USE FUNCTION PLAN



B1 CONCOURSE LEVEL AREA 2 PLAN
3/16" = 1'-0"

KEYNOTES

- NO. 01 21 00.E217 TYP. ALLOWANCE FOR FIXED MULTIPLE SEATING WORK.
- 05 51 33.A000 STEEL ROOF ACCESS LADDER
- 08 44 13.0000 TYP. GLAZED ALUMINUM CUTAIN WALL ASSEMBLY.
- 10 43 13.0007 TYP. WALL CABINET MOUNTED AUTOMATIC ELECTRONIC DEFIBRILLATOR (AED).
- 32 16 23.0405 TYP. 4" BROOM FINISHED CONCRETE SIDEWALK.
- 34 01 73.0092 TYP. PRESERVE EDGE OF AIRFIELD CONSTRUCTION. COORDINATE PROTECTION OF BUILT ELEMENTS WITH ADJACENT PROJECT.



C19-2811- AP Construction of Satellite Concourse 'C'



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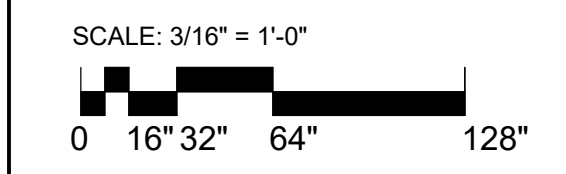
Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

NOTES

1. REFER TO A1.641 FOR PARTITION TYPES
2. ALL PARTITIONS ARE DIMENSIONED FROM FACE OF FINISH TO FACE OF FINISH U.O.N.
3. ALL WALL PARTITIONS TO BE FULL HEIGHT U.O.N.
4. REFER TO A1.6 SERIES SHEETS FOR WAYFINDING AND SIGNAGE.
5. MAINTAIN 1/16" SLOPE MINIMUM AND 1/4" SLOPE MAXIMUM TO AREA DRAINS
6. FOR FIRE EXTINGUISHER DETAILS REFER TO A1.710
7. FOR DOOR TYPES AND SCHEDULES REFER TO SHEET SERIES A711
8. HINGE DOORS SIDE OF DOORS TO BE LOCATED PER DETAILS FROM FACE OF ADJACENT PERPENDICULAR PARTITIONS U.O.N.
9. REFER TO ELECTRICAL, TELECOM, AV, AND SIGNAGE DRAWINGS FOR OUTLET INFORMATION.
10. FOR RAILING DETAILS REFER TO SHEET A851
11. REFER TO A1.6 SERIES SHEETS FOR FINISH INFORMATION.
12. SHOR-APPLIED GALVANIZATION FOR METAL TOUCH UP ALL DAMAGED GALVANIZATION WITHIN 24HRS OF ERECTION
13. CONTRACTOR TO PROVIDE SIGNED AND SEALED DRAWINGS AND LOAD CALCULATIONS IN COMPLIANCE WITH FLORIDA BUILDING CODE WITH SUPPLEMENTS FOR ALL FABRICATED STAIRS, LADDERS, GRAB BARS, GUARDS, HANDRAILS AND/OR PLATFORMS. MINIMUM 50 PLF AND 200 POUND CONCENTRATED DESIGN LOADS.
14. AREA DESIGNATED FOR FUTURE WORK (NIC), CONTRACTOR SHALL KEEP THIS AREA CLEAR OF ANY BUILT ELEMENTS ABOVE AND/OR BELOW GROUND UNLESS OTHERWISE NOTED WITHIN THE SCOPE OF THIS PROJECT.
15. CONCESSION AREAS SHALL BE FIT OUT AS SHELL SPACES WITH CODE MINIMUM SYSTEMS SUPPORT AS INDICATED.

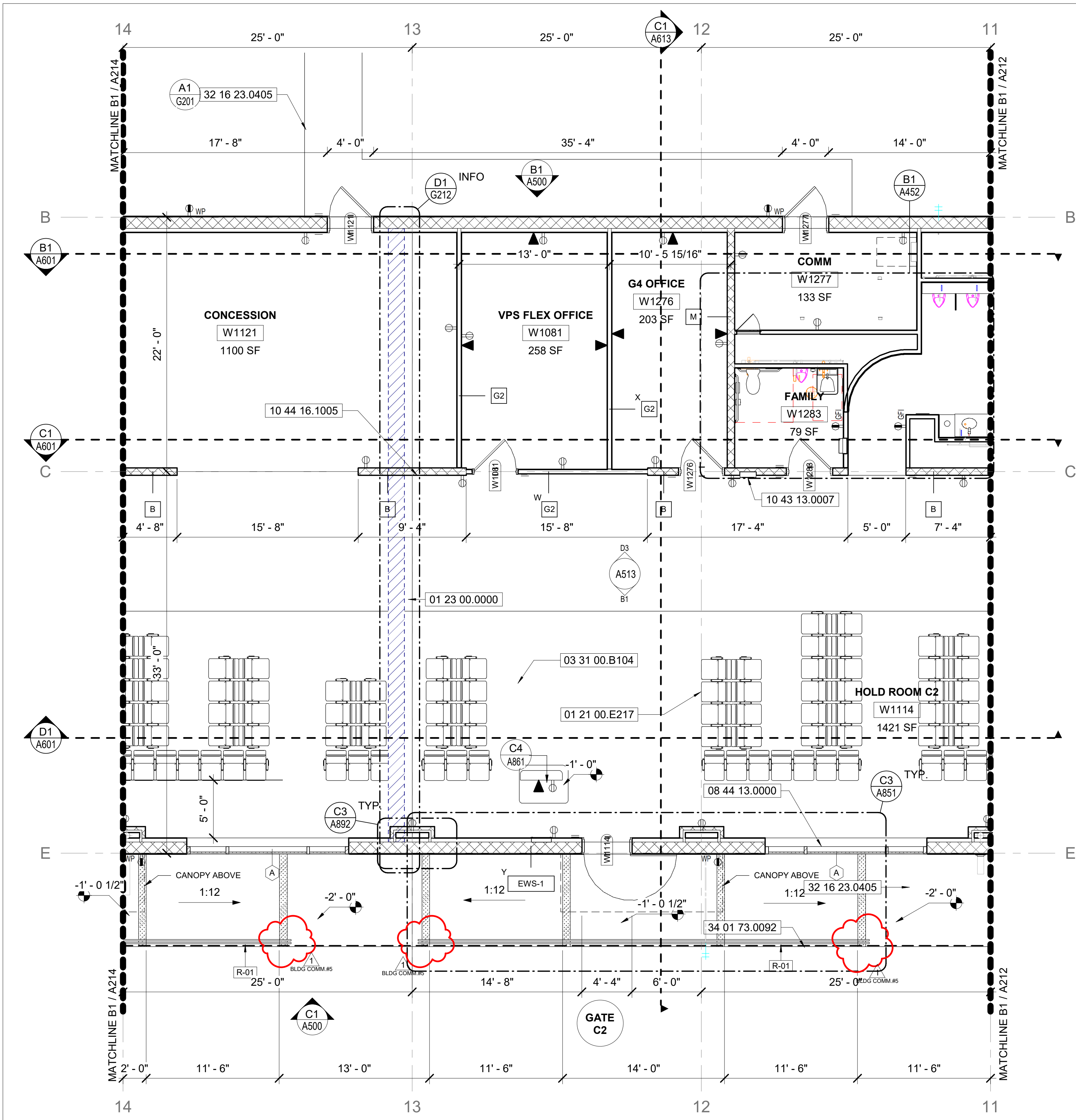
LIFE SAFETY LEGEND
RATED FIRE PARTITIONS
1 = 1 HOUR FIRE PARTITION
2 = 2 HOUR FIRE PARTITION



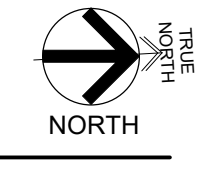
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Designed By: **MLM, MAM**
Drawn By: **ST, CC, DM, CB**
Checked By: **MAM**
Issue Date: **30-NOV-2020**
Drawing Scale: **As indicated**
Drawing Title:

ENLARGED FLOOR PLAN - AREA 2
BID DOCUMENTS

Drawing No.: **A212**
477369-CIS-2020 & FNW-2021



B1 CONCOURSE LEVEL AREA 3 PLAN
3/16" = 1'-0"



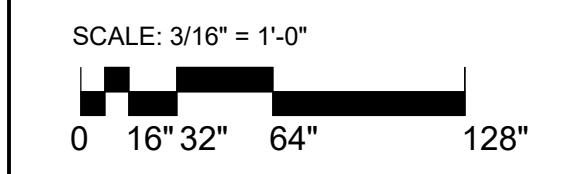
KEYNOTES

- NO. 01 21 00.E217 TYP. ALLOWANCE FOR FIXED MULTIPLE SEATING WORK.
- 01 23 00.0000 LIMITS OF ALTERNATE WORK, SEE SPECIFICATIONS FOR MORE INFORMATION.
- 03 31 00.B104 TYP. 4" STRUCTURAL SLAB-ON-GRADE, SEE STRUCTURAL.
- 08 44 13.0000 TYP. GLAZED ALUMINUM CUTAIN WALL ASSEMBLY.
- 10 43 13.0007 TYP. WALL CABINET MOUNTED AUTOMATIC ELECTRONIC DEFIBRILLATOR (AED).
- 10 44 16.1005 TYP. RECESSED WALL CABINET MOUNTED MULTI-PURPOSE (ABC CLASS) FIRE EXTINGUISHER.
- 32 16 23.0405 TYP. 4" BROOM FINISHED CONCRETE SIDEWALK.
- 34 01 73.0092 TYP. PRESERVE EDGE OF AIRFIELD CONSTRUCTION. COORDINATE PROTECTION OF BUILT ELEMENTS WITH ADJACENT PROJECT.

NOTES

1. REFER TO **AL841** FOR PARTITION TYPES
2. ALL PARTITIONS ARE DIMENSIONED FROM FACE OF FINISH TO FACE OF FINISH U.O.N.
3. ALL WALL PARTITIONS TO BE FULL HEIGHT U.O.N.
4. REFER TO **AG** SERIES SHEETS FOR WAYFINDING AND SIGNAGE.
5. MAINTAIN 1/16" SLOPE MINIMUM AND 1/4" SLOPE MAXIMUM TO AREA DRAINS
6. FOR FIRE EXTINGUISHER DETAILS REFER TO **AL710**
7. FOR DOOR TYPES AND SCHEDULES REFER TO SHEET SERIES **A711**
8. HINGE DOORS SIDE OF DOORS TO BE LOCATED PER DETAILS FROM FACE OF ADJACENT PERPENDICULAR PARTITIONS U.O.N.
9. REFER TO ELECTRICAL, TELECOM, AV, AND SIGNAGE DRAWINGS FOR OUTLET INFORMATION.
10. FOR RAILING DETAILS REFER TO SHEET **A851**
11. REFER TO **AF** SERIES SHEETS FOR FINISH INFORMATION.
12. SHOR-APPLIED GALVANIZATION FOR METAL TOUCH UP ALL DAMAGED GALVANIZATION WITHIN 24HRS OF ERECTION
13. CONTRACTOR TO PROVIDE SIGNED AND SEALED DRAWINGS AND LOAD CALCULATIONS IN COMPLIANCE WITH FLORIDA BUILDING CODE WITH SUPPLEMENTS FOR ALL FABRICATED STAIRS, LADDERS, GRAB BARS, GUARDS, HANDRAILS AND/OR PLATFORMS. MINIMUM 50 PLF AND 200 POUND CONCENTRATED DESIGN LOADS.
14. AREA DESIGNATED FOR FUTURE WORK (NIC), CONTRACTOR SHALL KEEP THIS AREA CLEAR OF ANY BUILT ELEMENTS ABOVE AND/OR BELOW GROUND UNLESS OTHERWISE NOTED WITHIN THE SCOPE OF THIS PROJECT.
15. CONCESSION AREAS SHALL BE FIT OUT AS SHELL SPACES WITH CODE MINIMUM SYSTEMS SUPPORT AS INDICATED.

LIFE SAFETY LEGEND
 RATED FIRE PARTITIONS
 1 = 1 HOUR FIRE PARTITION
 2 = 2 HOUR FIRE PARTITION



C19-2811- AP
Construction
of Satellite
Concourse 'C'



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FL AR-98279

SEAL

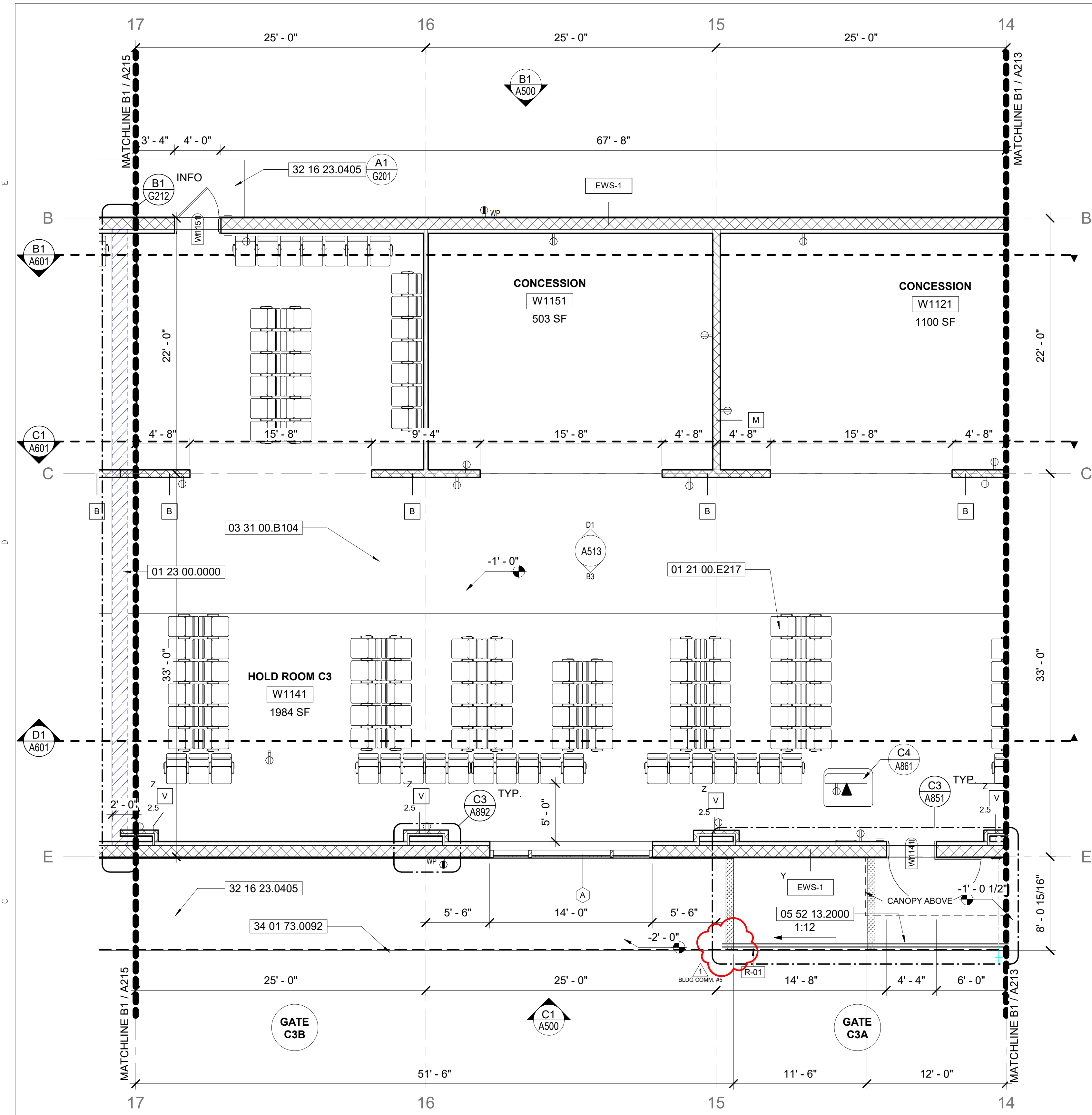
Revisions

No.	Date	Description
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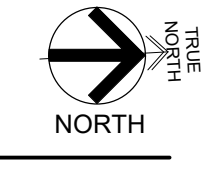
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 Issue Date: **30-NOV-2020**
 Drawing Scale: **3/16" = 1'-0"**
 Drawing Title:

ENLARGED FLOOR PLAN - AREA 3
 BID DOCUMENTS

Drawing No.: **A213**
 477369-CIS-2020 & FNW-2021



B1 CONCOURSE LEVEL AREA 4 PLAN
3/16" = 1'-0"



KEYNOTES

- NO. 01 21 00.E217 TYP. ALLOWANCE FOR FIXED MULTIPLE SEATING WORK.
- 01 23 00.0000 LIMITS OF ALTERNATE WORK, SEE SPECIFICATIONS FOR MORE INFORMATION.
- 03 31 00.B104 TYP. 4" STRUCTURAL SLAB-ON-GRADE, SEE STRUCTURAL.
- 05 52 13.2000 TYP. STAINLESS STEEL PIPE AND TUBE RAILING.
- 32 16 23.0405 TYP. 4" BROOM FINISHED CONCRETE SIDEWALK.
- 34 01 73.0092 TYP. PRESERVE EDGE OF AIRFIELD CONSTRUCTION. COORDINATE PROTECTION OF BUILT ELEMENTS WITH ADJACENT PROJECT.



C19-2811- AP Construction of Satellite Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

SEAL

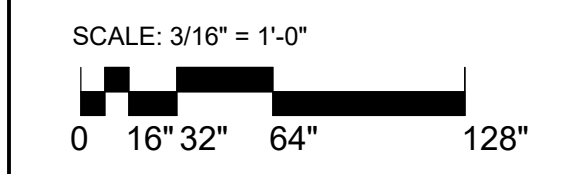
Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

NOTES

1. REFER TO A1641 FOR PARTITION TYPES
2. ALL PARTITIONS ARE DIMENSIONED FROM FACE OF FINISH TO FACE OF FINISH U.O.N.
3. ALL WALL PARTITIONS TO BE FULL HEIGHT U.O.N.
4. REFER TO AG SERIES SHEETS FOR WAYFINDING AND SIGNAGE.
5. MAINTAIN 1/16" SLOPE MINIMUM AND 1/4" SLOPE MAXIMUM TO AREA DRAINS
6. FOR FIRE EXTINGUISHER DETAILS REFER TO A1710
7. FOR DOOR TYPES AND SCHEDULES REFER TO SHEET SERIES A711
8. HINGE DOORS SIDE OF DOORS TO BE LOCATED PER DETAILS FROM FACE OF ADJACENT PERPENDICULAR PARTITIONS U.O.N.
9. REFER TO ELECTRICAL, TELECOM, AV, AND SIGNAGE DRAWINGS FOR OUTLET INFORMATION.
10. FOR RAILING DETAILS REFER TO SHEET A851 (1)
11. REFER TO AF SERIES SHEETS FOR FINISH INFORMATION.
12. SHOR-APPLIED GALVANIZATION FOR METAL TOUCH UP ALL DAMAGED GALVANIZATION WITHIN 24HRS OF ERECTION
13. CONTRACTOR TO PROVIDE SIGNED AND SEALED DRAWINGS AND LOAD CALCULATIONS IN COMPLIANCE WITH FLORIDA BUILDING CODE WITH SUPPLEMENTS FOR ALL FABRICATED STAIRS, LADDERS, GRAB BARS, GUARDS, HANDRAILS AND/OR PLATFORMS. MINIMUM 50 PLF AND 200 POUND CONCENTRATED DESIGN LOADS.
14. AREA DESIGNATED FOR FUTURE WORK (NIC), CONTRACTOR SHALL KEEP THIS AREA CLEAR OF ANY BUILT ELEMENTS ABOVE AND/OR BELOW GROUND UNLESS OTHERWISE NOTED WITHIN THE SCOPE OF THIS PROJECT.
15. CONCESSION AREAS SHALL BE FIT OUT AS SHELL SPACES WITH CODE MINIMUM SYSTEMS SUPPORT AS INDICATED.

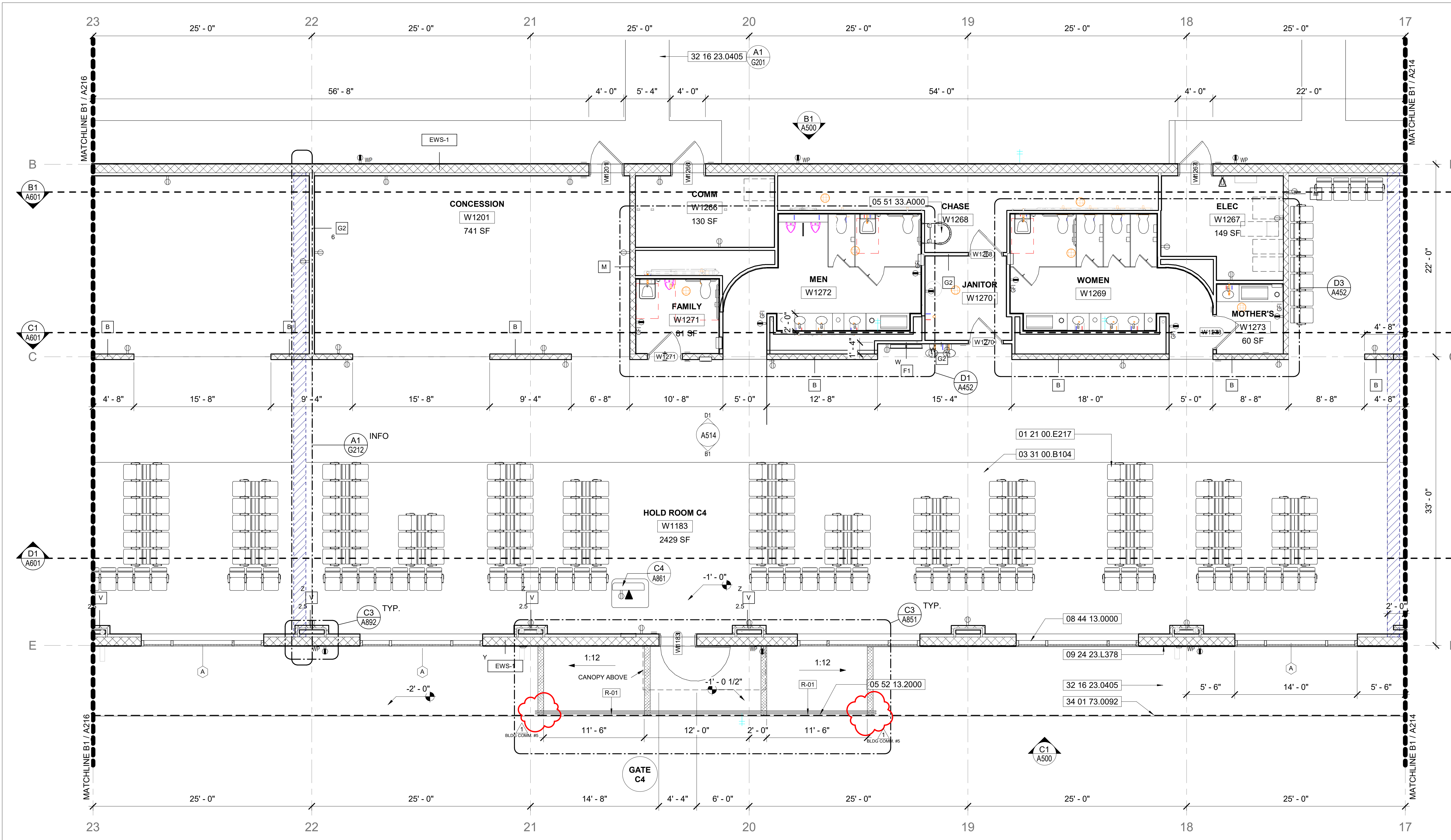
LIFE SAFETY LEGEND
RATED FIRE PARTITIONS
1 = 1 HOUR FIRE PARTITION
2 = 2 HOUR FIRE PARTITION



Project No.: **MLM-19672**
Designed By: **MLM, MAM**
Drawn By: **ST, CC, DM, CB**
Checked By: **MAM**
Issue Date: **30-NOV-2020**
Drawing Scale: **3/16" = 1'-0"**
Drawing Title:

ENLARGED FLOOR PLAN - AREA 4
BID DOCUMENTS

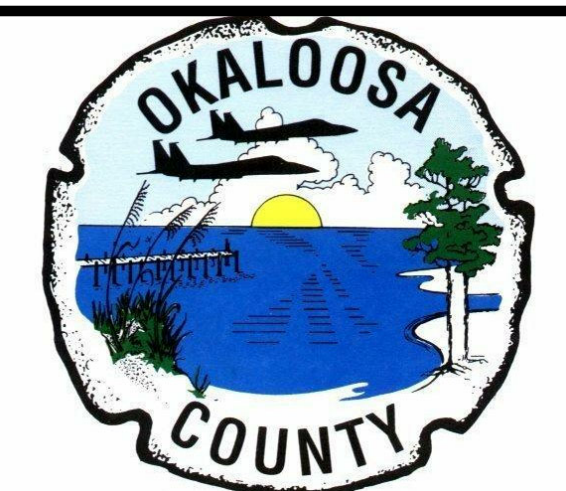
Drawing No.: **A214**
477369-CIS-2020 & FNW-2021



B1 CONCOURSE LEVEL AREA 5 PLAN
3/16" = 1'-0"

KEYNOTES

- | NO. | DESCRIPTION |
|---------------|---|
| 01 21 00.E217 | TYP. ALLOWANCE FOR FIXED MULTIPLE SEATING WORK. |
| 03 31 00.B104 | TYP. 4" STRUCTURAL SLAB-ON-GRADE, SEE STRUCTURAL. |
| 05 51 33.A000 | STEEL ROOF ACCESS LADDER |
| 05 52 13.2000 | TYP. STAINLESS STEEL PIPE AND TUBE RAILING. |
| 08 44 13.0000 | TYP. GLAZED ALUMINUM CUTAIN WALL ASSEMBLY. |
| 09 24 23.L378 | TYP. SMOOTH 7/8" STUCCO, 3 COAT SYSTEM |
| 32 16 23.0405 | TYP. 4" BROOM FINISHED CONCRETE SIDEWALK. |
| 34 01 73.0092 | TYP. PRESERVE EDGE OF AIRFIELD CONSTRUCTION, COORDINATE PROTECTION OF BUILT ELEMENTS WITH ADJACENT PROJECT. |



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

SEAL

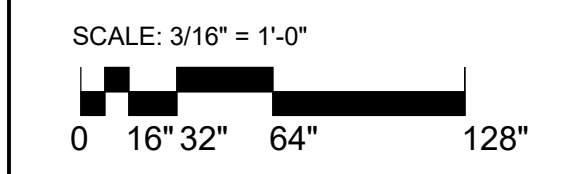
Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

NOTES

- REFER TO AL641 FOR PARTITION TYPES
- ALL PARTITIONS ARE DIMENSIONED FROM FACE OF FINISH TO FACE OF FINISH U.O.N.
- ALL WALL PARTITIONS TO BE FULL HEIGHT U.O.N.
- REFER TO AG SERIES SHEETS FOR WAYFINDING AND SIGNAGE.
- MAINTAIN 1/16" SLOPE MINIMUM AND 1/4" SLOPE MAXIMUM TO AREA DRAINS
- FOR FIRE EXTINGUISHER DETAILS REFER TO AL710
- FOR DOOR TYPES AND SCHEDULES REFER TO SHEET SERIES A711
- HINGE DOORS SIDE OF DOORS TO BE LOCATED PER DETAILS FROM FACE OF ADJACENT PERPENDICULAR PARTITIONS U.O.N.
- REFER TO ELECTRICAL, TELECOM, AV, AND SIGNAGE DRAWINGS FOR OUTLET INFORMATION.
- FOR RAILING DETAILS REFER TO SHEET A851
- REFER TO AF SERIES SHEETS FOR FINISH INFORMATION.
- SHORT-APPLIED GALVANIZATION FOR METAL TOUCH UP ALL DAMAGED GALVANIZATION WITHIN 24HRS OF ERECTION
- CONTRACTOR TO PROVIDE SIGNED AND SEALED DRAWINGS AND LOAD CALCULATIONS IN COMPLIANCE WITH FLORIDA BUILDING CODE WITH SUPPLEMENTS FOR ALL FABRICATED STAIRS, LADDERS, GRAB BARS, GUARDS, HANDRAILS AND/OR PLATFORMS. MINIMUM 50 PLF AND 200 POUND CONCENTRATED DESIGN LOADS.
- AREA DESIGNATED FOR FUTURE WORK (NIC), CONTRACTOR SHALL KEEP THIS AREA CLEAR OF ANY BUILT ELEMENTS ABOVE AND/OR BELOW GROUND UNLESS OTHERWISE NOTED WITHIN THE SCOPE OF THIS PROJECT.
- CONCESSION AREAS SHALL BE FIT OUT AS SHELL SPACES WITH CODE MINIMUM SYSTEMS SUPPORT AS INDICATED.

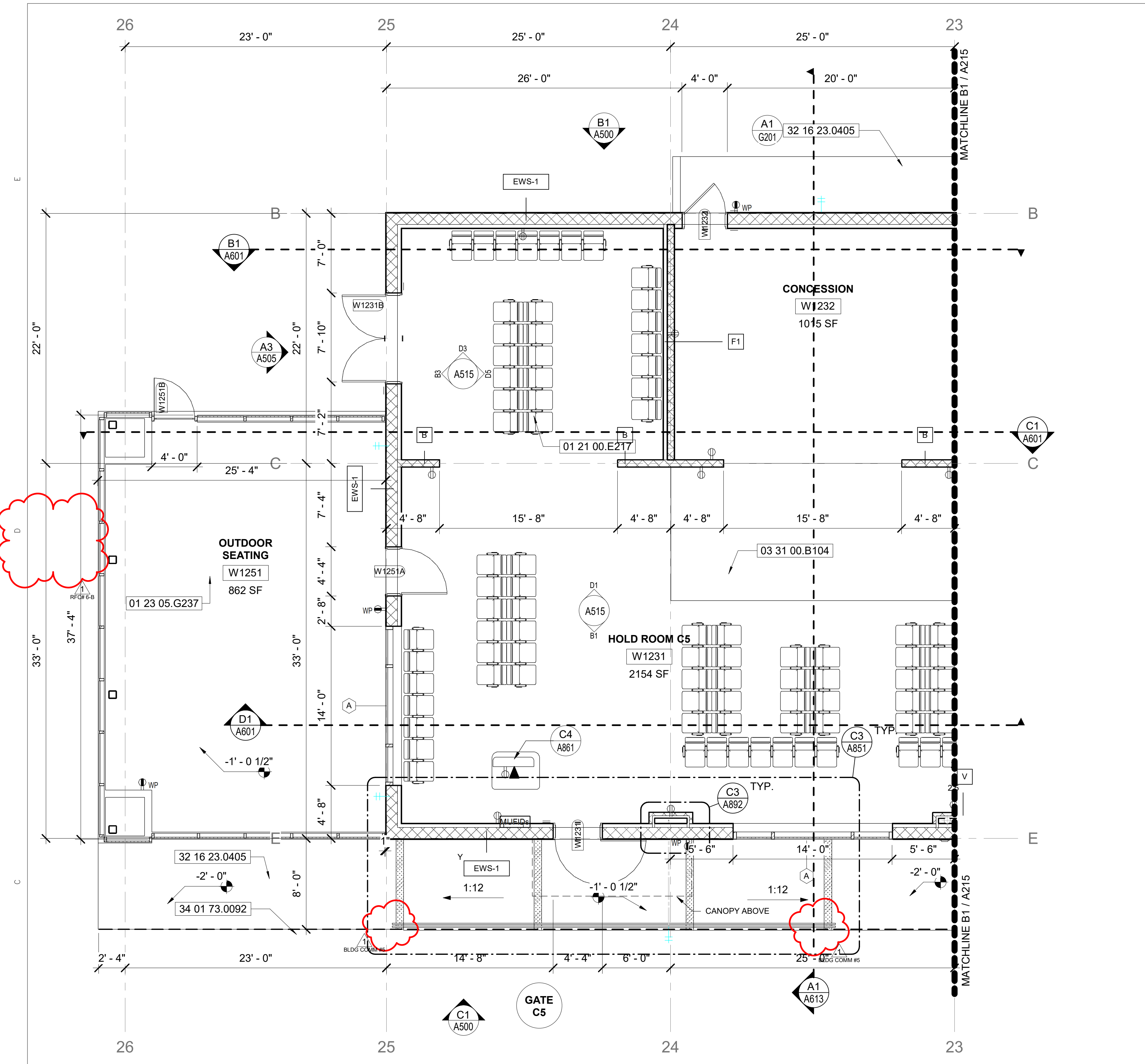
LIFE SAFETY LEGEND
RATED FIRE PARTITIONS
1 = 1 HOUR FIRE PARTITION
2 = 2 HOUR FIRE PARTITION



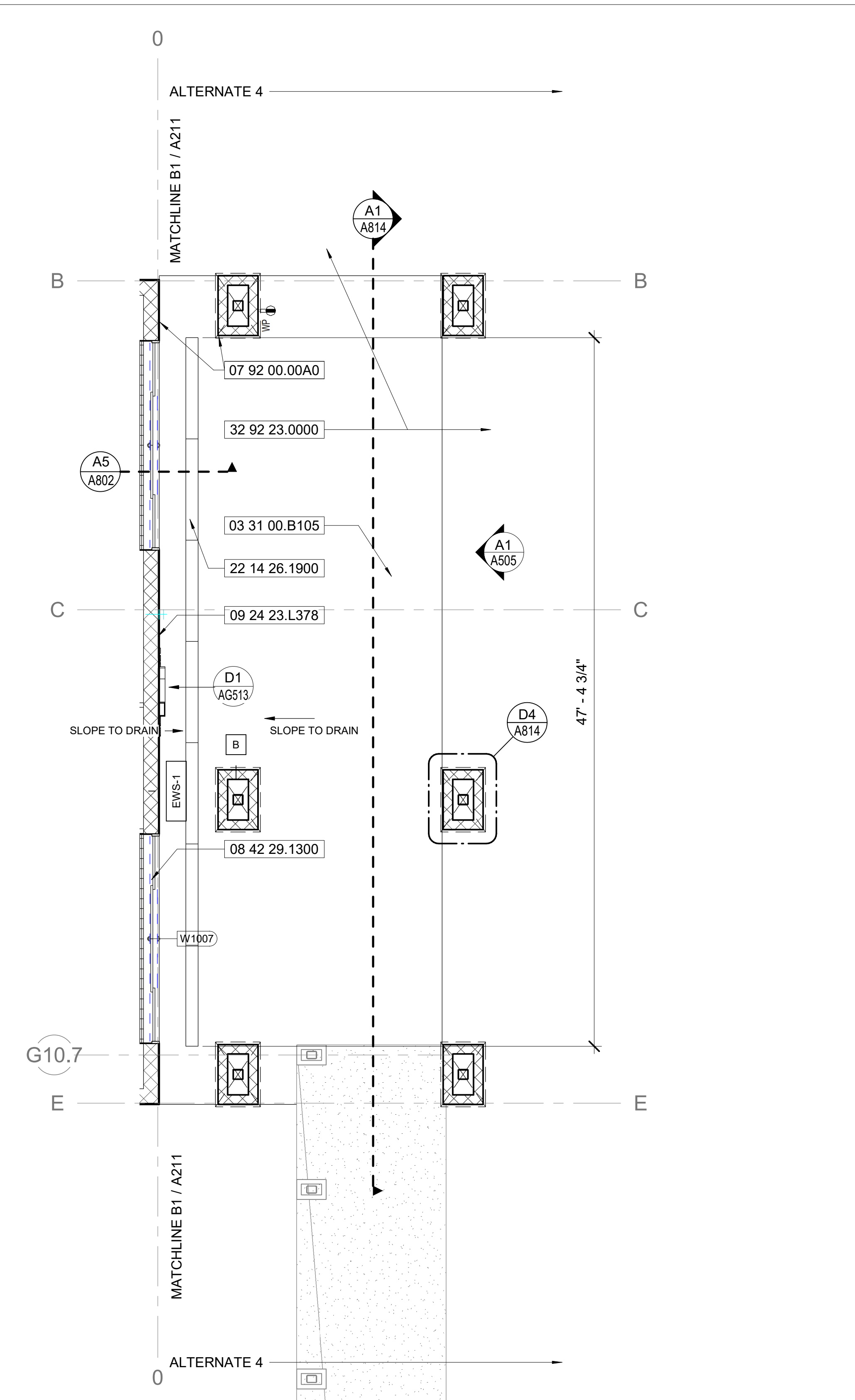
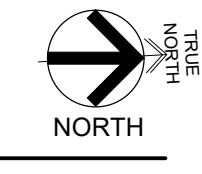
Project No.: **MLM-19672**
Designed By: **MLM, MAM**
Drawn By: **ST, CC, DM, CB**
Checked By: **MAM**
Issue Date: **30-NOV-2020**
Drawing Scale: **3/16" = 1'-0"**
Drawing Title:

ENLARGED FLOOR PLAN - AREA 5
BID DOCUMENTS

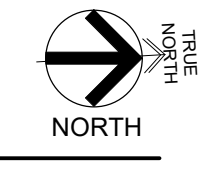
Drawing No.: **A215**
477369-CIS-2020 & FNW-2021



B1 CONCOURSE LEVEL AREA 6 PLAN
3/16" = 1'-0"



B4 ALTERNATE 4 PLAN
3/16" = 1'-0"



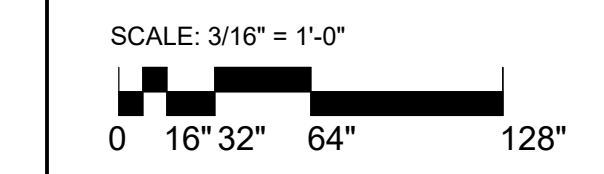
KEYNOTES

- NO. 01 21 00.E217 TYP. ALLOWANCE FOR FIXED MULTIPLE SEATING WORK.
- 01 23 05.G237 TYP. ALTERNATE 5 EXTERIOR CONCESSIONS PLAZA WORK.
- 03 31 00.B104 TYP. 4" STRUCTURAL SLAB-ON-GRADE, SEE STRUCTURAL.
- 03 31 00.B105 TYP. 5" CONCRETE FLOOR SLAB, SEE STRUCTURAL.
- 07 92 00.00A0 TYP. JOINT SEALANT, FULL PERIMETER.
- 08 42 29.1300 TYP. ALUMINUM FRAMED AUTOMATIC ENTRANCE DOOR.
- 09 24 23.L378 TYP. SMOOTH 7/8" STUCCO, 3 COAT SYSTEM
- 22 14 26.1900 TYP. FACILITY STORM TRENCH DRAIN, SEE PLUMBING.
- 32 16 23.0405 TYP. 4" BROOM FINISHED CONCRETE SIDEWALK.
- 32 92 23.0000 TYP. SODDING AND PLANTING SEE LANDSCAPE.
- 34 01 73.0092 TYP. PRESERVE EDGE OF AIRFIELD CONSTRUCTION. COORDINATE PROTECTION OF BUILT ELEMENTS WITH ADJACENT PROJECT.

NOTES

1. REFER TO **AL841** FOR PARTITION TYPES
2. ALL PARTITIONS ARE DIMENSIONED FROM FACE OF FINISH TO FACE OF FINISH U.O.N.
3. ALL WALL PARTITIONS TO BE FULL HEIGHT U.O.N.
4. REFER TO **AG** SERIES SHEETS FOR WAYFINDING AND SIGNAGE.
5. MAINTAIN 1/16" SLOPE MINIMUM AND 1/4" SLOPE MAXIMUM TO AREA DRAINS
6. FOR FIRE EXTINGUISHER DETAILS REFER TO **AL710**
7. FOR DOOR TYPES AND SCHEDULES REFER TO SHEET SERIES **A711**
8. HINGE DOORS SIDE OF DOORS TO BE LOCATED PER DETAILS FROM FACE OF ADJACENT PERPENDICULAR PARTITIONS U.O.N.
9. REFER TO ELECTRICAL, TELECOM, AV, AND SIGNAGE DRAWINGS FOR OUTLET INFORMATION.
10. FOR RAILING DETAILS REFER TO SHEET **AB81**
11. REFER TO **AF** SERIES SHEETS FOR FINISH INFORMATION.
12. SHOR-APPLIED GALVANIZATION FOR METAL. TOUCH UP ALL DAMAGED GALVANIZATION WITHIN 24HRS OF ERECTION
13. CONTRACTOR TO PROVIDE SIGNED AND SEALED DRAWINGS AND LOAD CALCULATIONS IN COMPLIANCE WITH FLORIDA BUILDING CODE WITH SUPPLEMENTS FOR ALL FABRICATED STAIRS, LADDERS, GRAB BARS, GUARDS, HANDRAILS AND/OR PLATFORMS. MINIMUM 50 PLF AND 200 POUND CONCENTRATED DESIGN LOADS.
14. AREA DESIGNATED FOR FUTURE WORK (NIC), CONTRACTOR SHALL KEEP THIS AREA CLEAR OF ANY BUILT ELEMENTS ABOVE AND/OR BELOW GROUND UNLESS OTHERWISE NOTED WITHIN THE SCOPE OF THIS PROJECT.
15. CONCESSION AREAS SHALL BE FIT OUT AS SHELL SPACES WITH CODE MINIMUM SYSTEMS SUPPORT AS INDICATED.

LIFE SAFETY LEGEND
RATED FIRE PARTITIONS
1 = 1 HOUR FIRE PARTITION
2 = 2 HOUR FIRE PARTITION



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

SEAL

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: **MLM-19672**
Designed By: **MLM, MAM**
Drawn By: **ST, CC, DM, CB**
Checked By: **MAM**
Issue Date: **30-NOV-2020**
Drawing Scale: **As indicated**
Drawing Title:

ENLARGED
FLOOR PLAN -
AREA 6
BID DOCUMENTS

Drawing No.:
A216



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

SEAL

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: **MLM-19672**
 Designed By: **MLM, MAM**
 Drawn By: **ST, CC, DM, CB**
 Checked By: **MAM**
 Issue Date: **30-NOV-2020**
 Drawing Scale: **1/4" = 1'-0"**
 Drawing Title:

**ENLARGED
RESTROOM
PLAN**
 BID DOCUMENTS

Drawing No.: **A452**

KEYNOTES

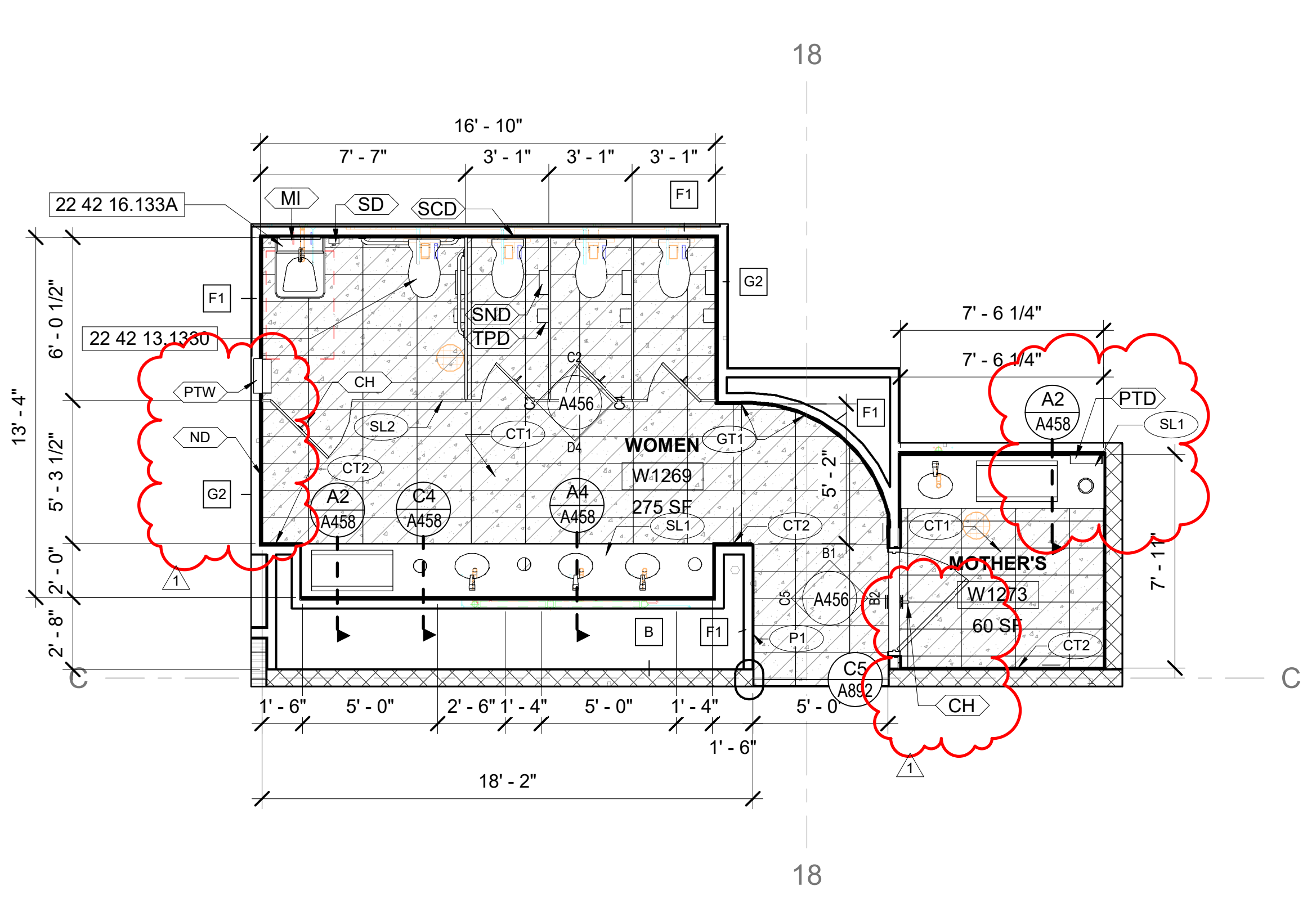
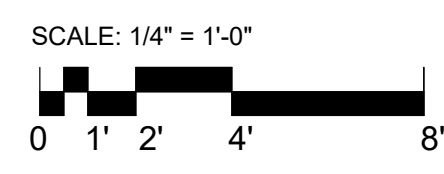
- NO. 10 21 13.1900 TYP. PLASTIC TOILET COMPARTMENT.
- 10 28 13.C000 TYPICAL GRAB BAR
- 10 43 13.0007 TYP. WALL CABINET MOUNTED AUTOMATIC ELECTRONIC DEFIBRILLATOR (AED).
- 22 42 13.1330 TYP. FLUSH VALVE WALL MOUNTED WATER CLOSET, SEE PLUMBING.
- 22 42 13.1630 TYP. FLUSH VALVE URINAL, SEE PLUMBING.
- 22 42 16.133A TYP. ADA WALL MOUNTED LAVATORY, SEE PLUMBING.

NOTES

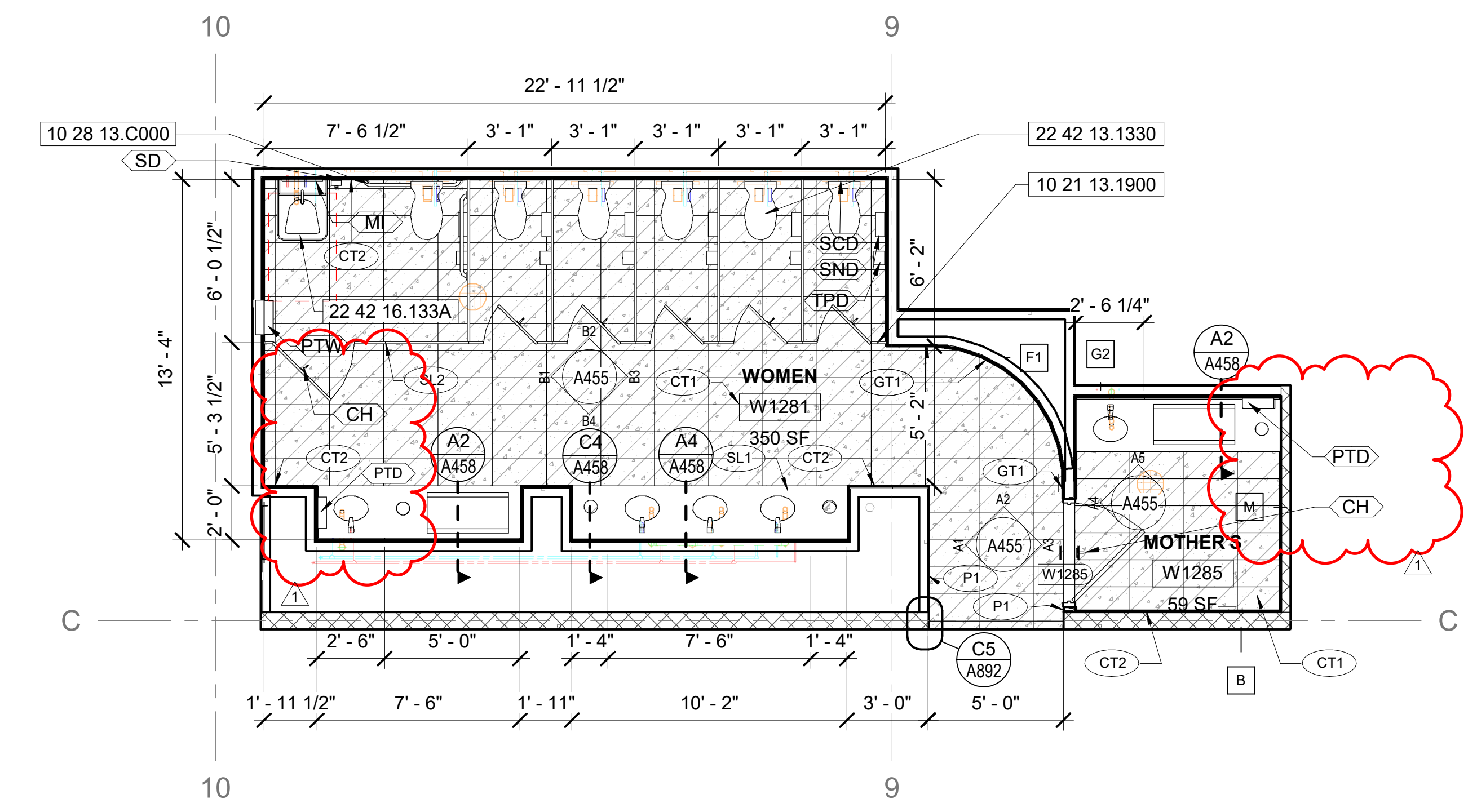
1. REFER TO A464 FOR PARTITION TYPES
2. ALL PARTITIONS ARE DIMENSIONED FROM FACE OF FINISH TO FACE OF FINISH U.O.N
3. FOR DOOR TYPES AND SCHEDULES REFER TO SHEET SERIES A711
4. REFER TO ELECTRICAL, TELECOM, AV, AND SIGNAGE DRAWINGS FOR OUTLET INFORMATION.
5. REFER TO A457 FOR ACCESSORIES INFORMATION. (X)
6. REFER TO A458 FOR COUNTERTOP AND OTHER RESTROOM DETAILS THAT APPLY TYPICALLY TO ALL LOCATIONS WITH IN RESTROOMS.

MATERIALS LEGEND

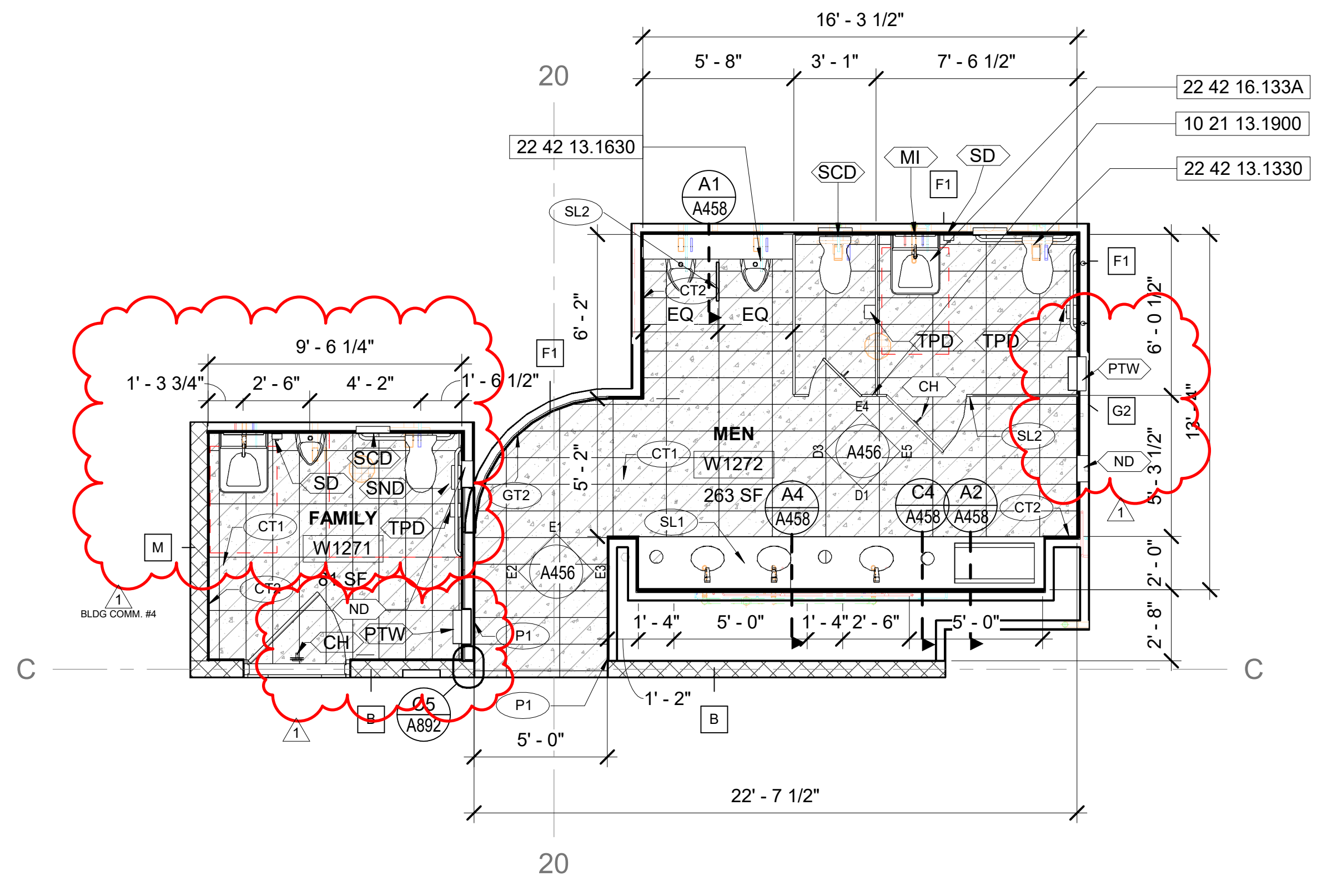
- CT1
- CT2
- P1
- GT1
ALTERNATE 7
REPLACE WITH CT2
- GT2
ALTERNATE 7
REPLACE WITH CT2



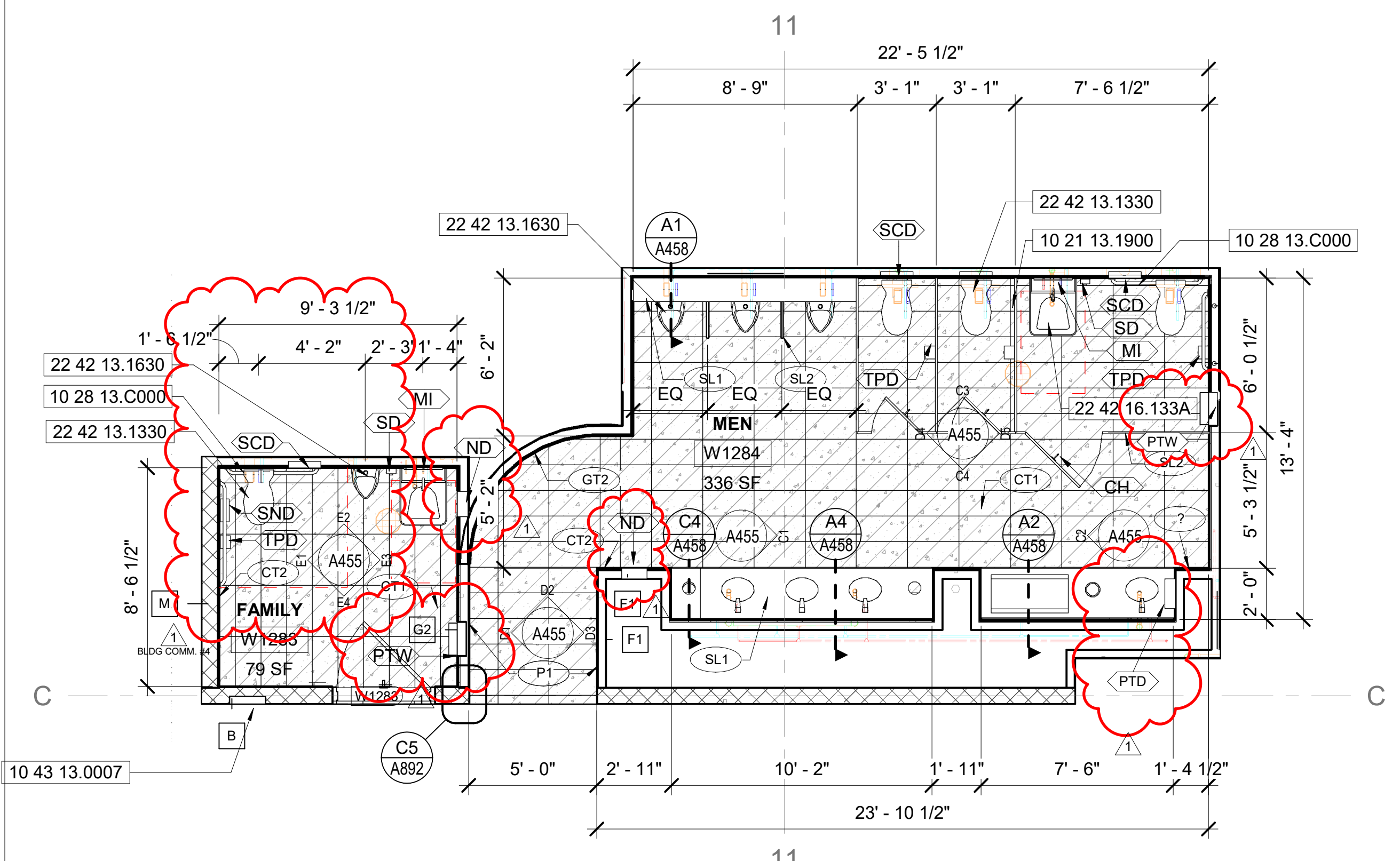
D3 ENLARGED RESTROOM WOMEN ALTERNATE 2 PLAN
1/4" = 1'-0"



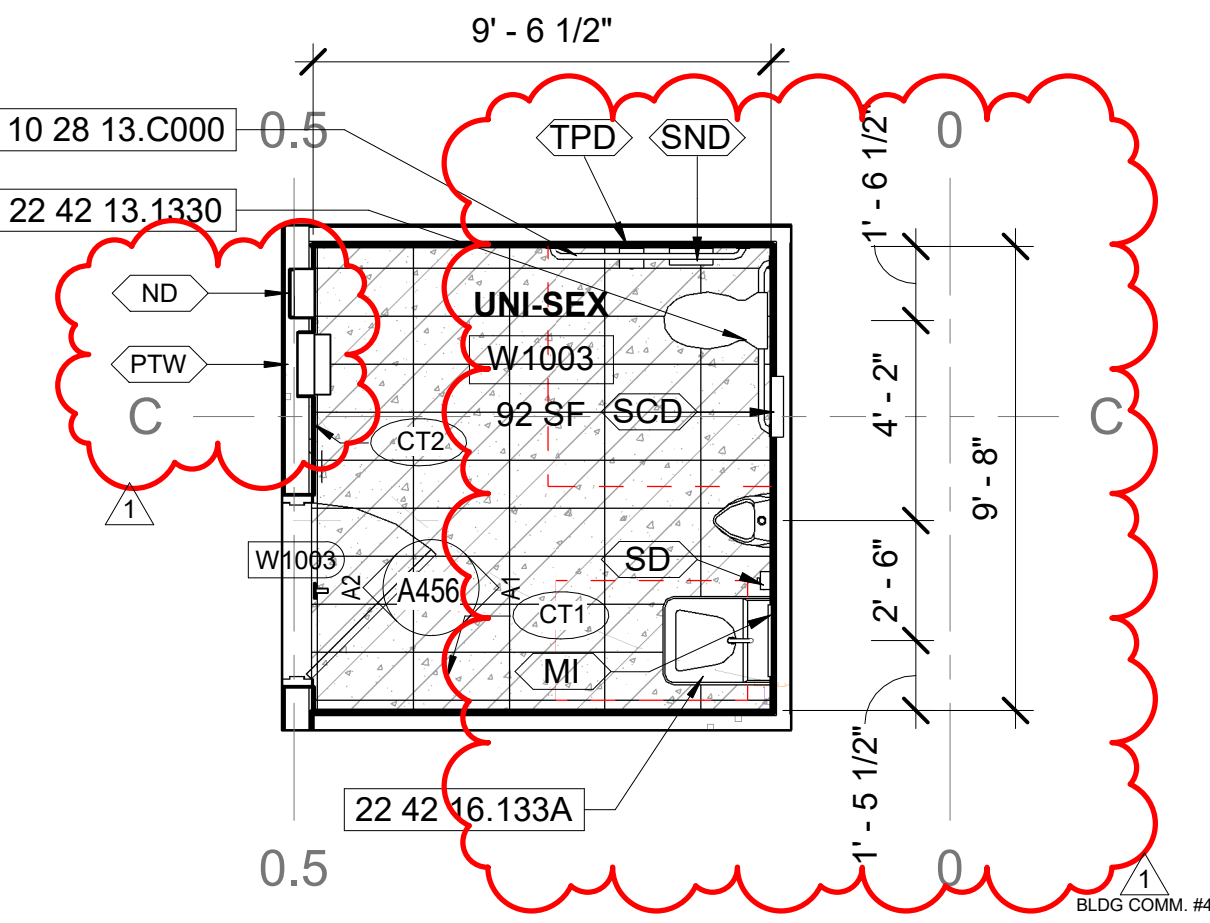
B3 ENLARGED WOMEN RESTROOM PLAN BASE BID
1/4" = 1'-0"



D1 ENLARGED RESTROOM MEN ALTERNATE 2 PLAN
1/4" = 1'-0"



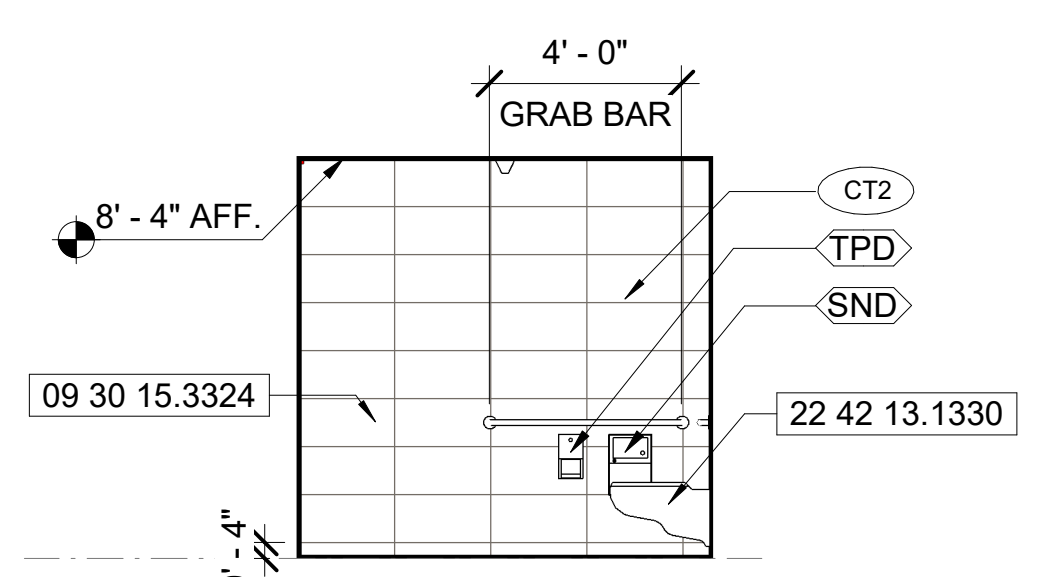
B1 ENLARGED MEN RESTROOM PLAN BASE BID
1/4" = 1'-0"



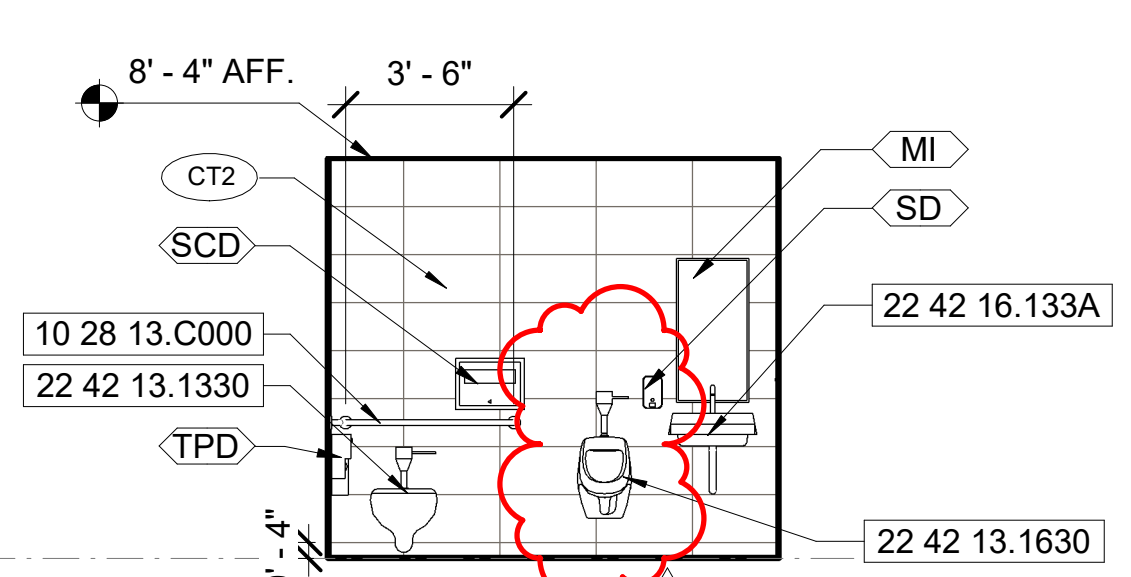
A1 ENLARGED RESTROOM PLAN (SSCP)
1/4" = 1'-0"

BIM 360/Design of Satellite Concourse/VPS-MLM_A.rvt

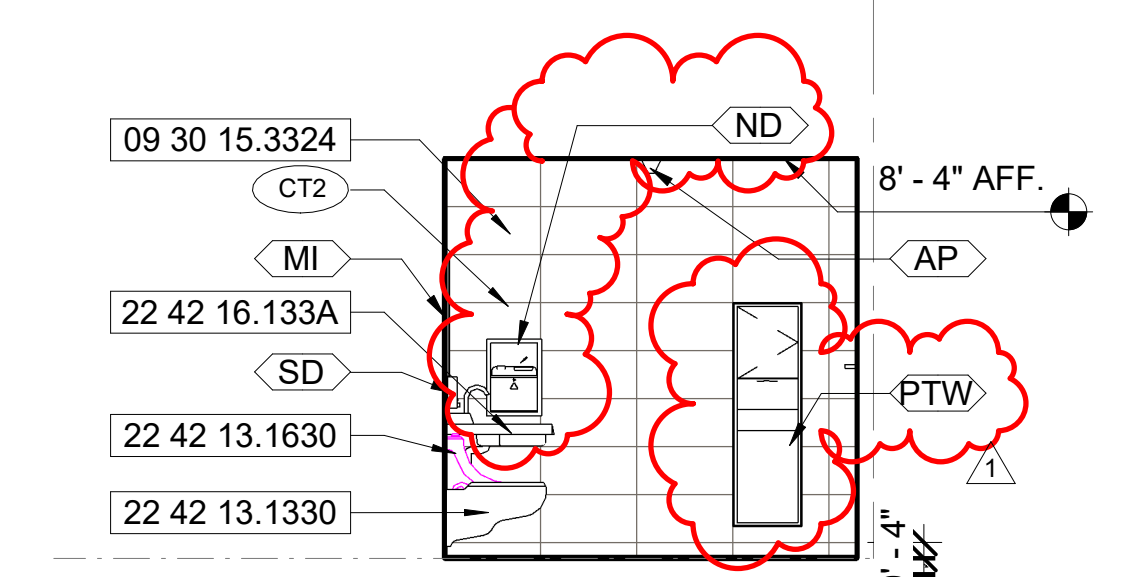
2/19/2021 5:35:24 PM



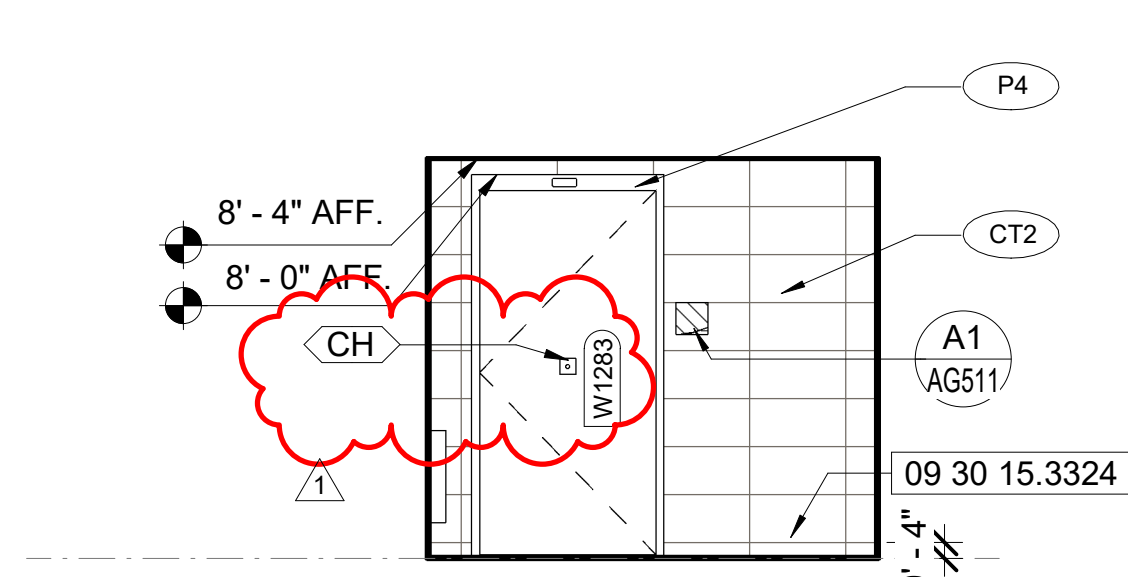
E1 FAMILY RR INT. ELEV.
1/4" = 1'-0"



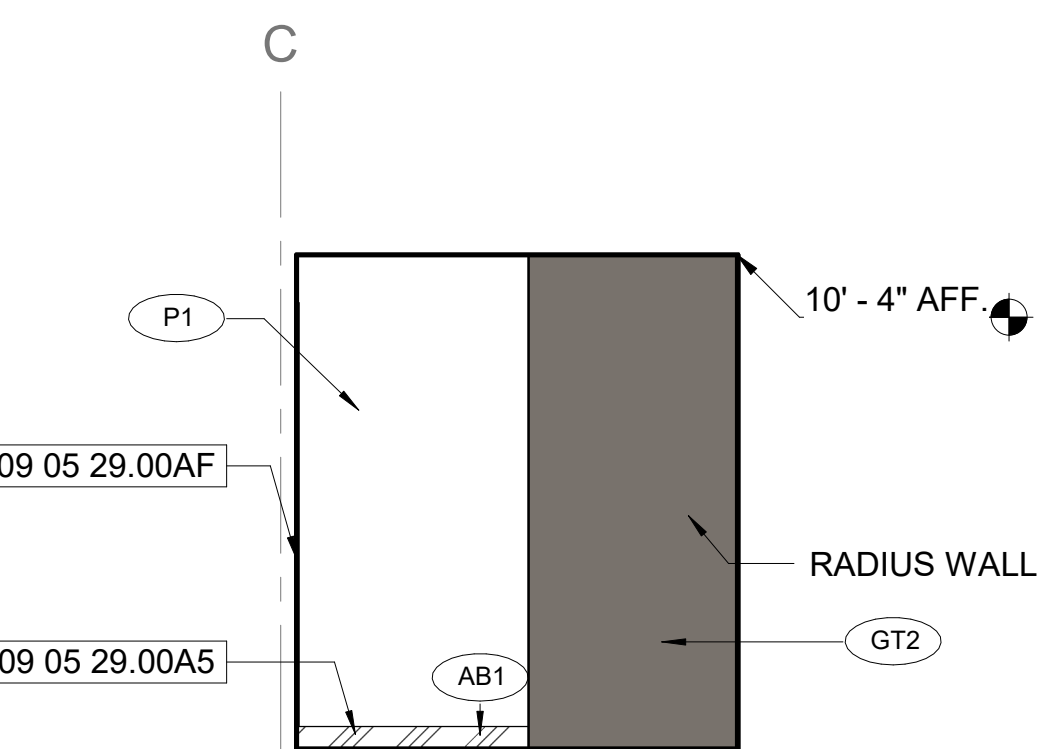
E2 FAMILY RR INT. ELEV.
1/4" = 1'-0"



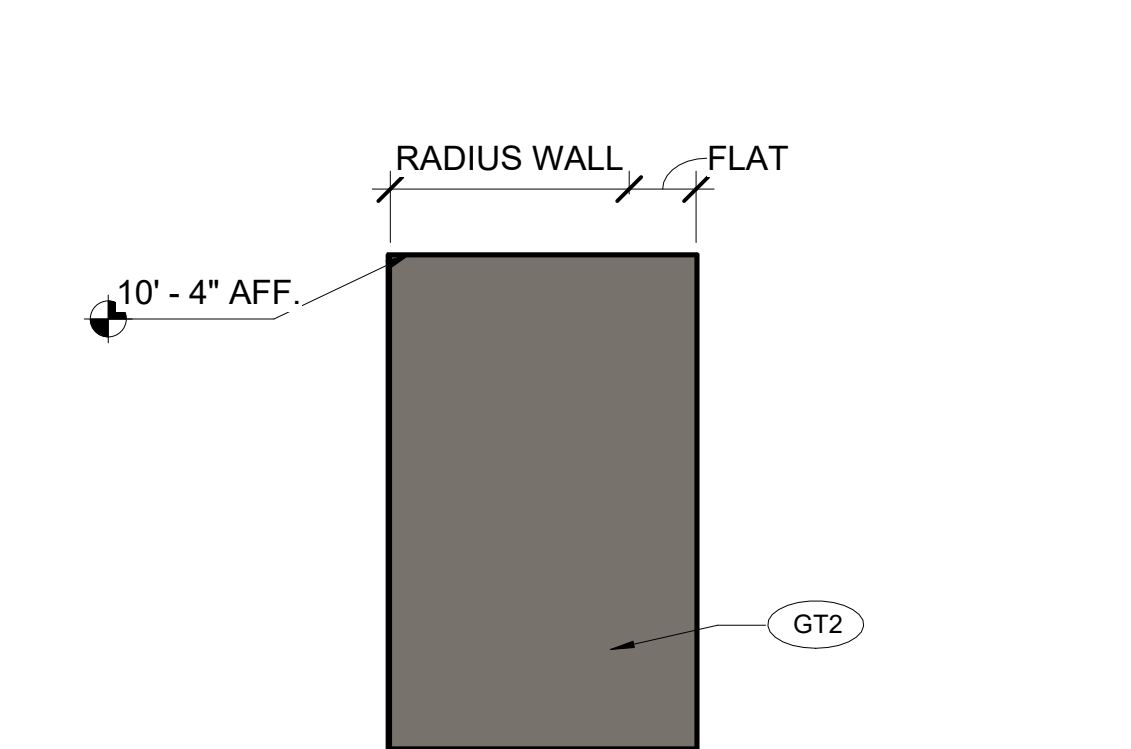
E3 FAMILY RR INT. ELEV.
1/4" = 1'-0"



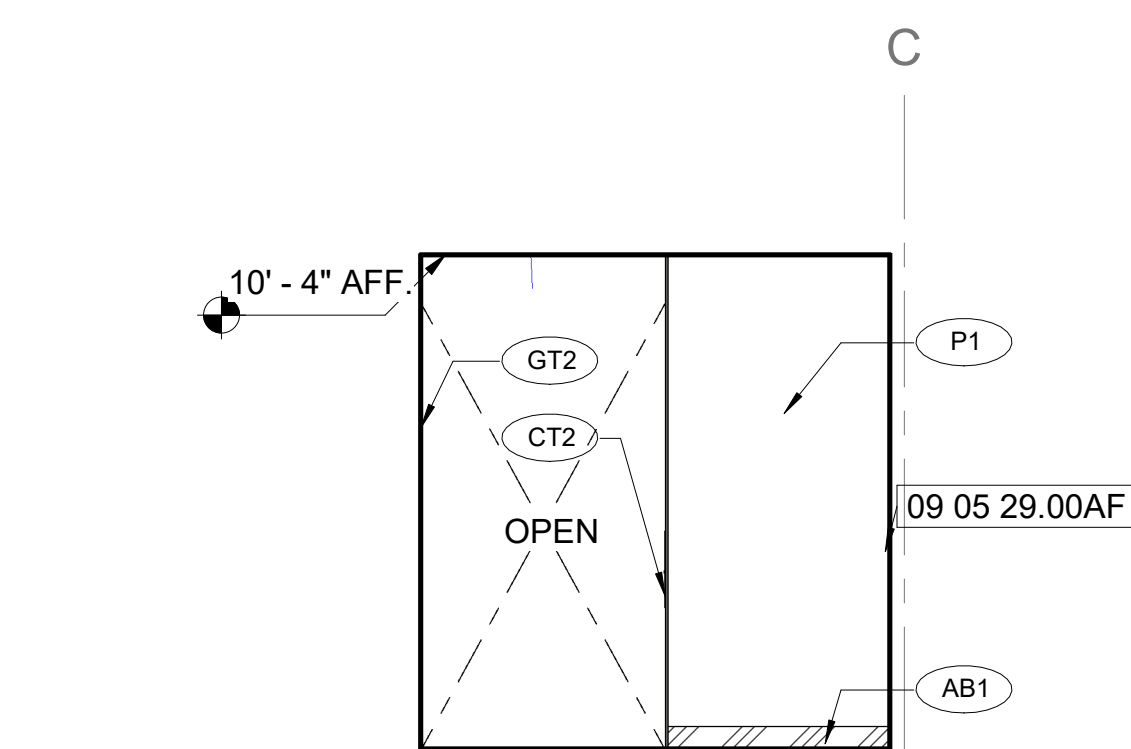
E4 FAMILY RR INT. ELEV.
1/4" = 1'-0"



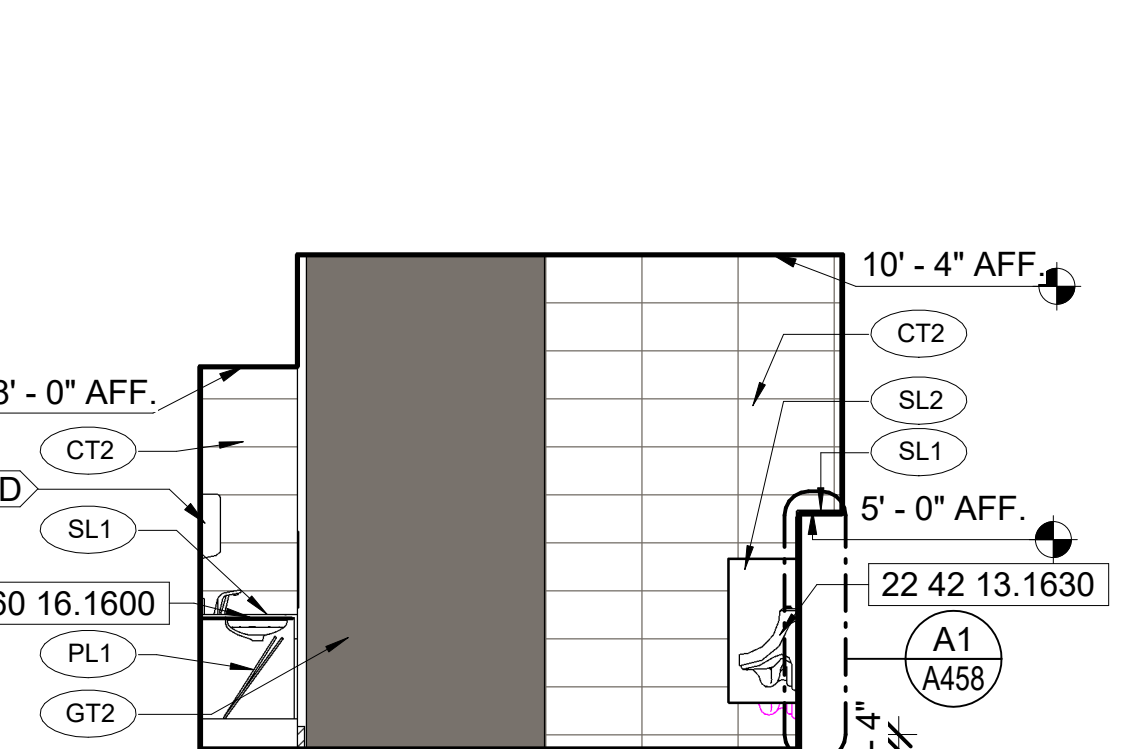
D1 MENS VEST INT. ELEV
1/4" = 1'-0"



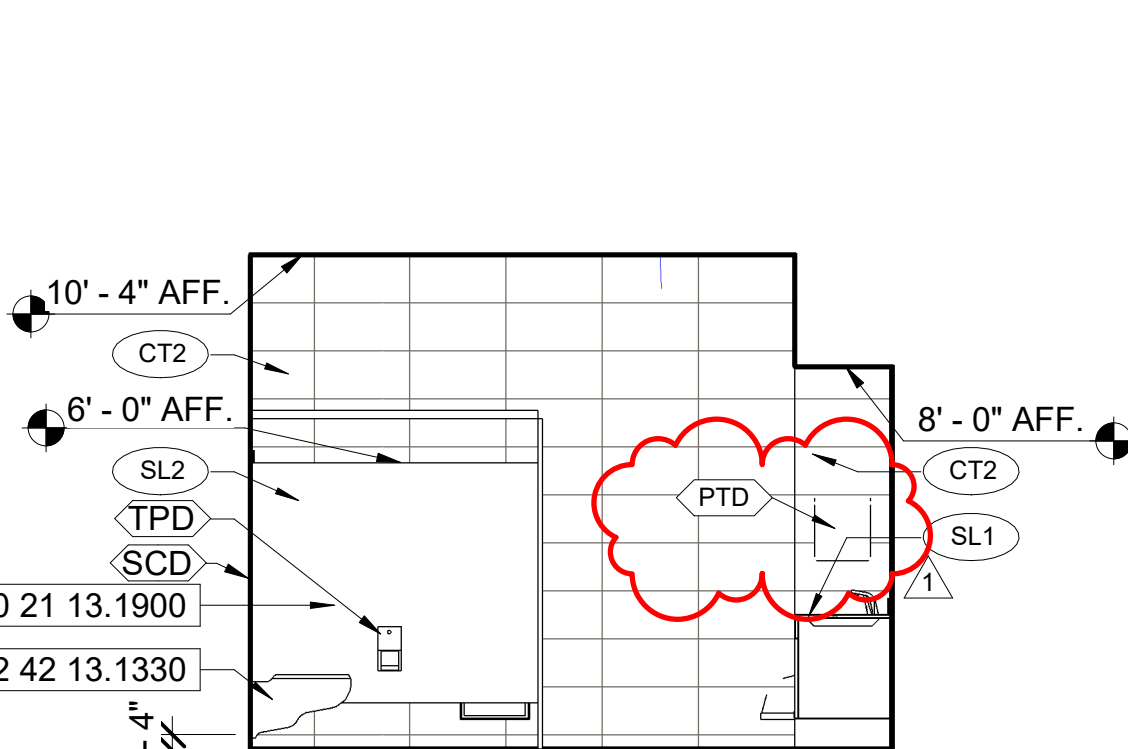
D2 MENS VEST INT. ELEV
1/4" = 1'-0"



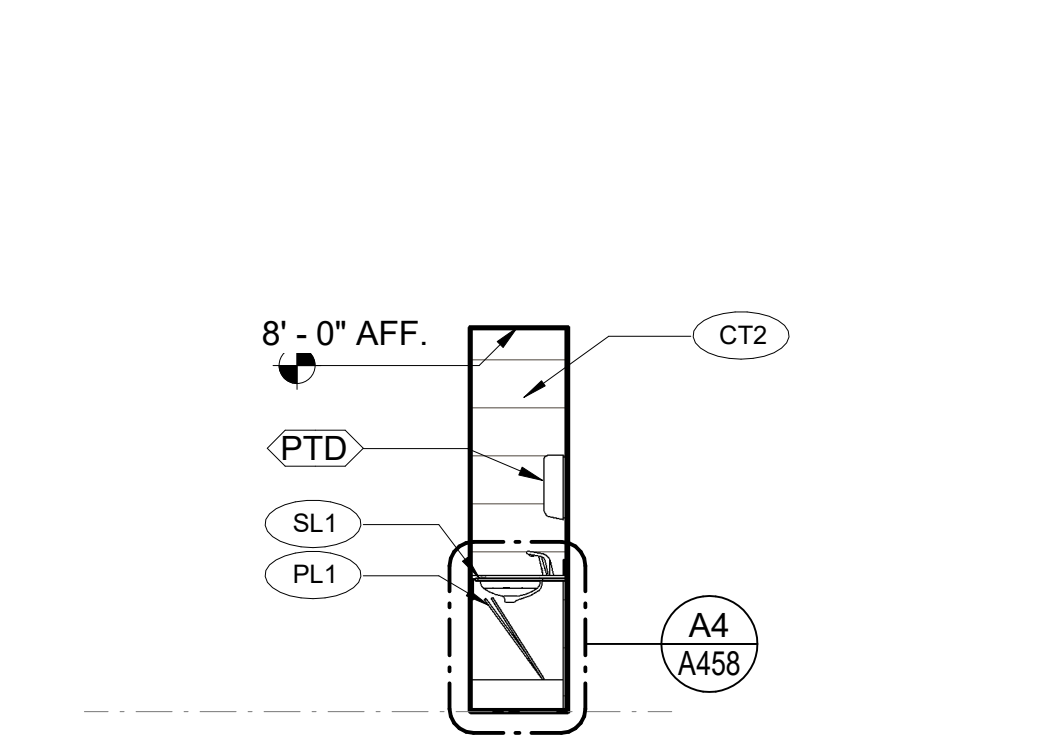
D3 MENS VEST INT. ELEV
1/4" = 1'-0"



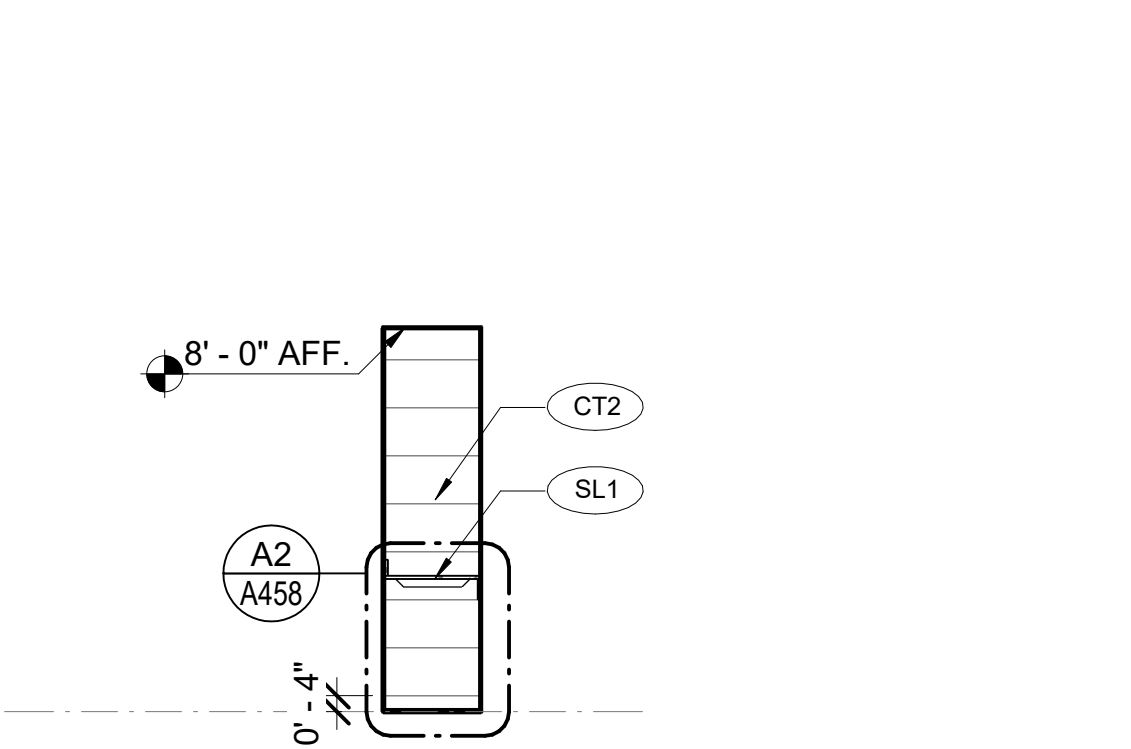
D4 MENS ROOM INT. ELEV
1/4" = 1'-0"



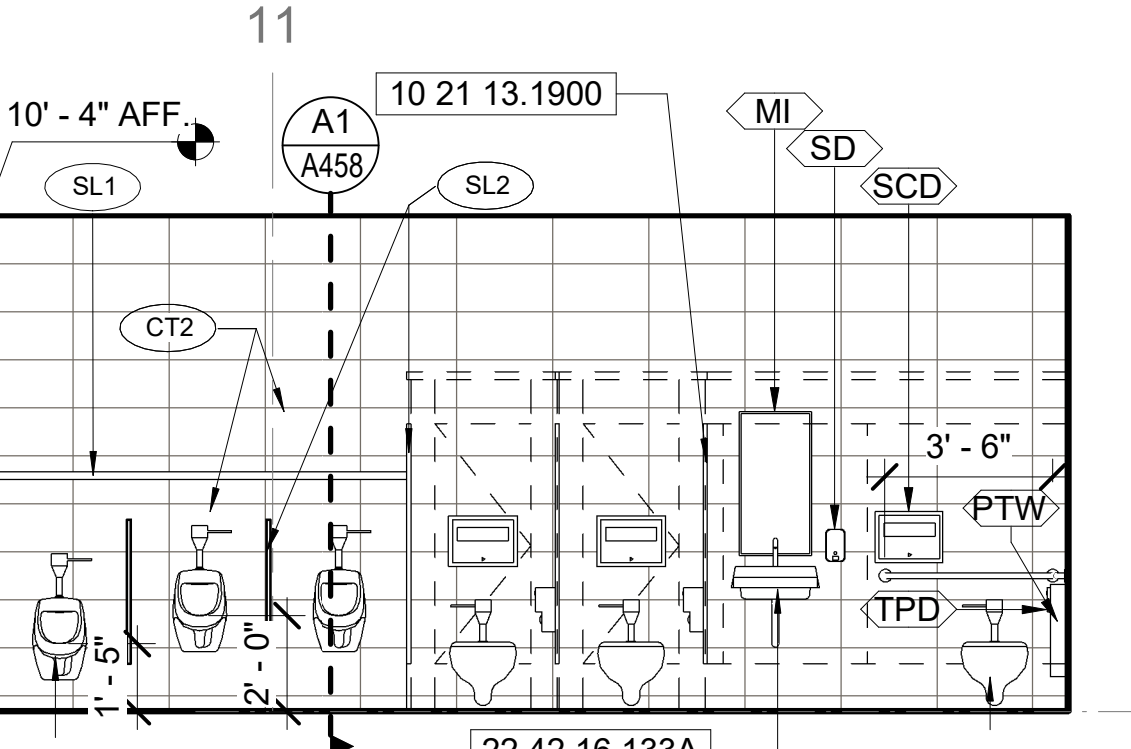
D5 MENS ROOM INT. ELEV
1/4" = 1'-0"



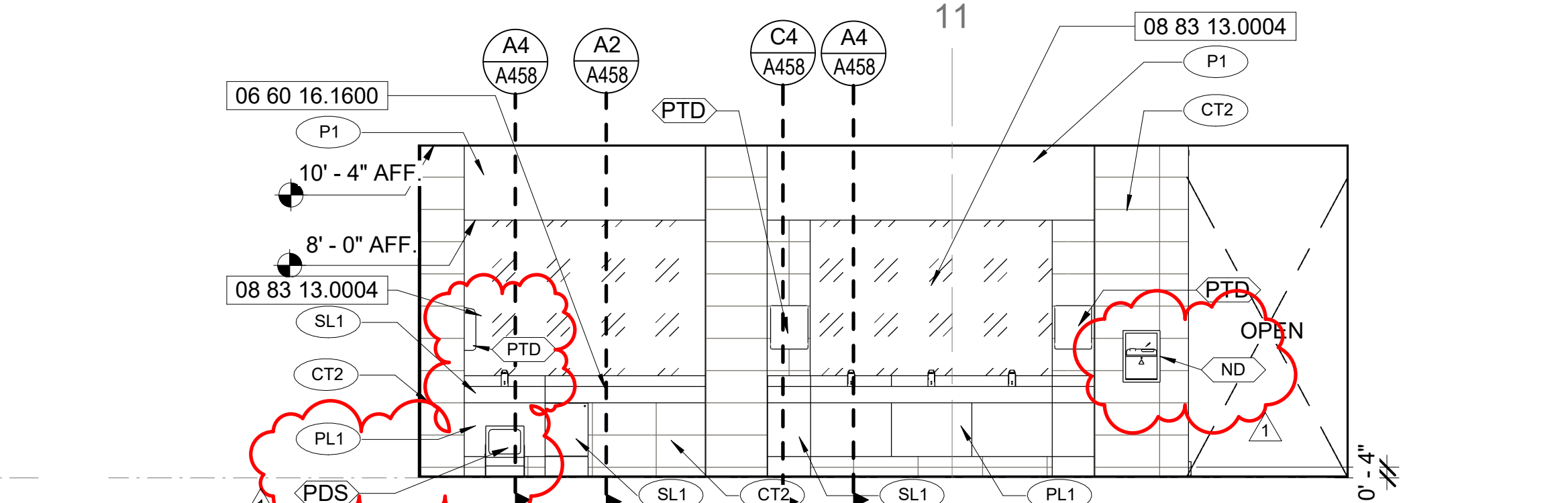
C1 VANITY RETURN
1/4" = 1'-0"



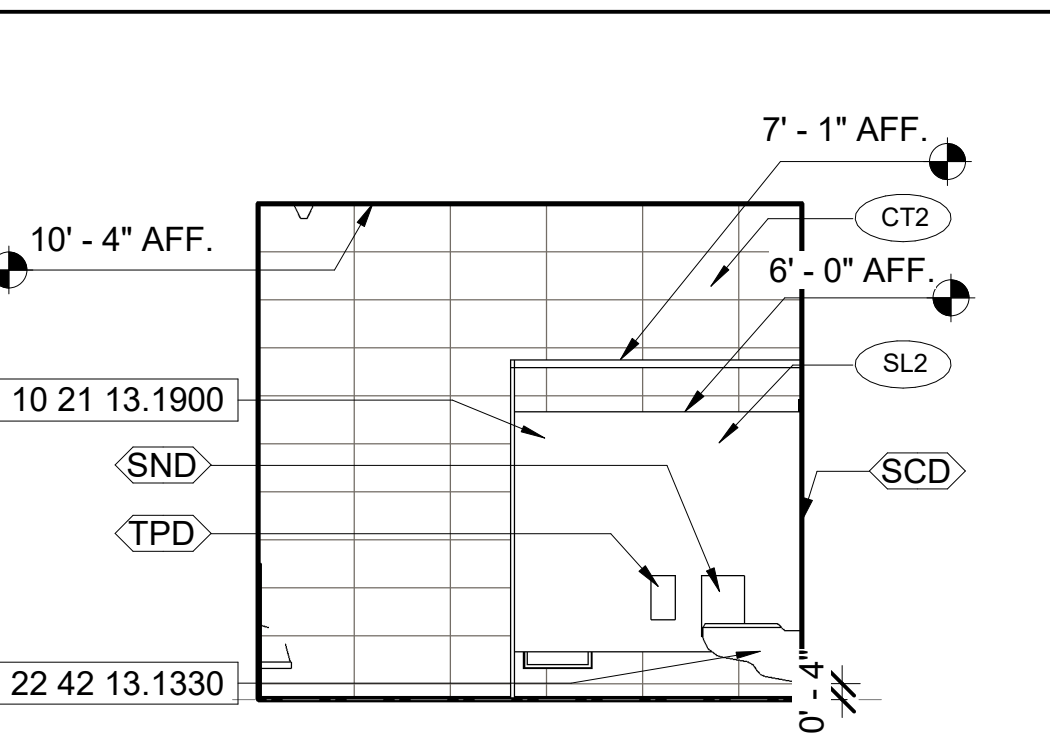
C2 VANITY RETURN
1/4" = 1'-0"



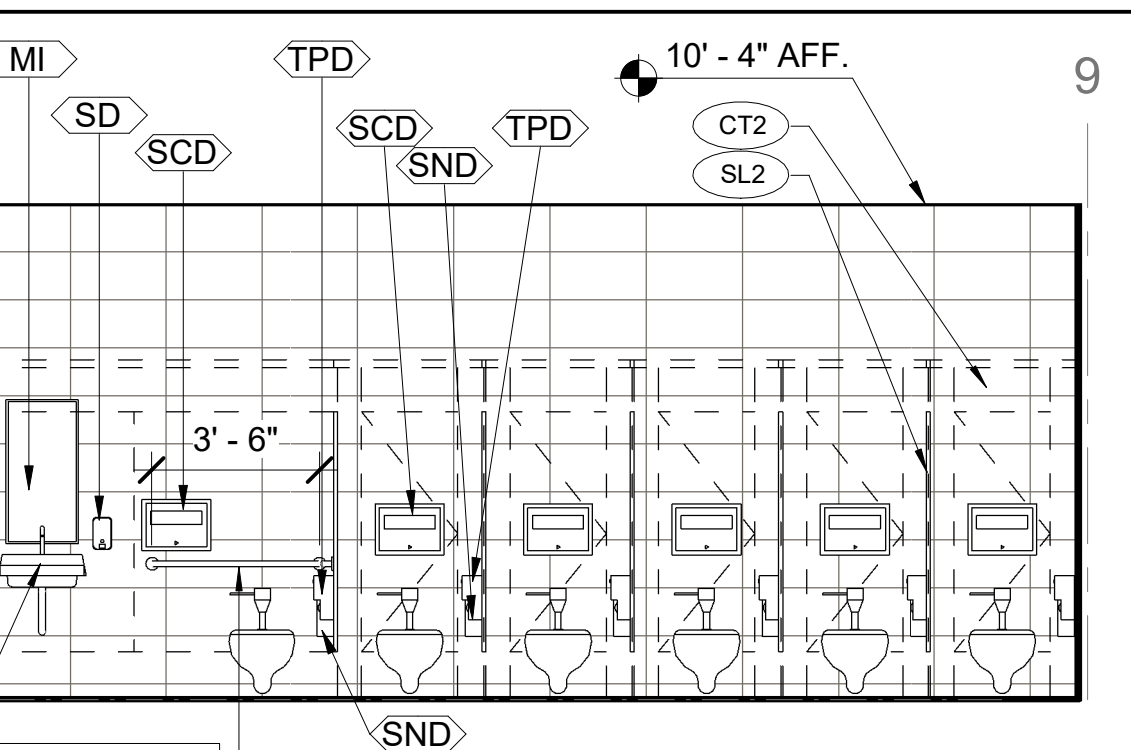
C3 MENS ROOM INT. ELEV
1/4" = 1'-0"



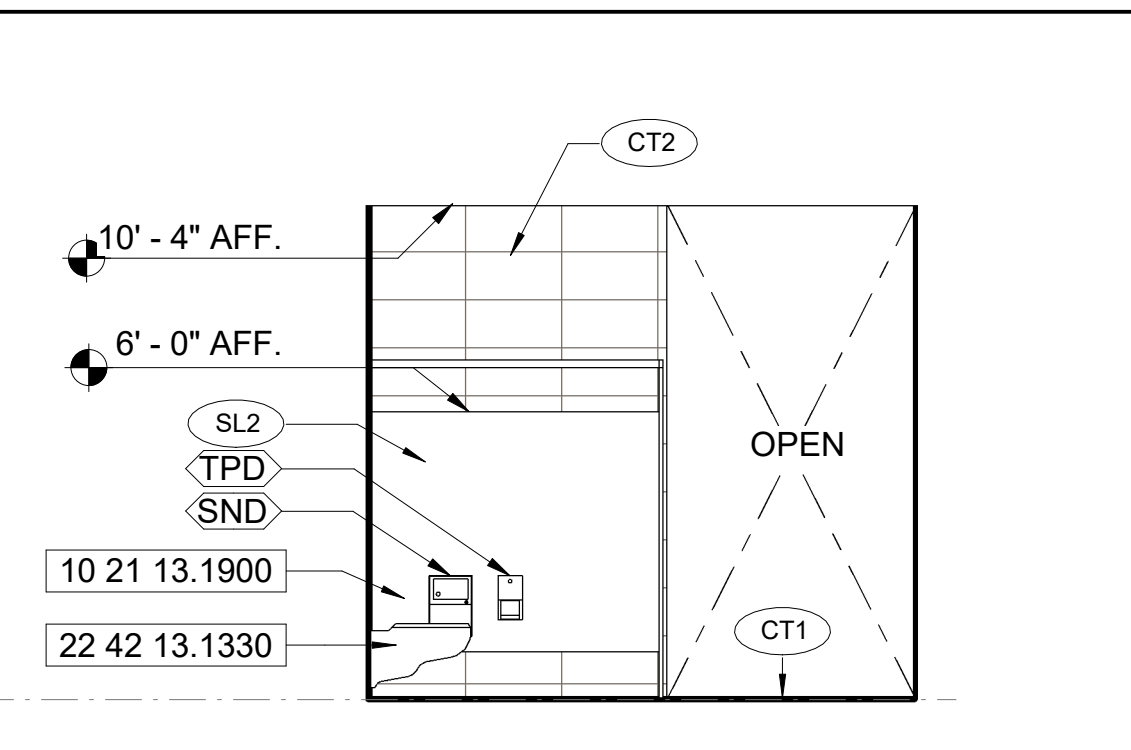
C4 MENS ROOM INT. ELEV
1/4" = 1'-0"



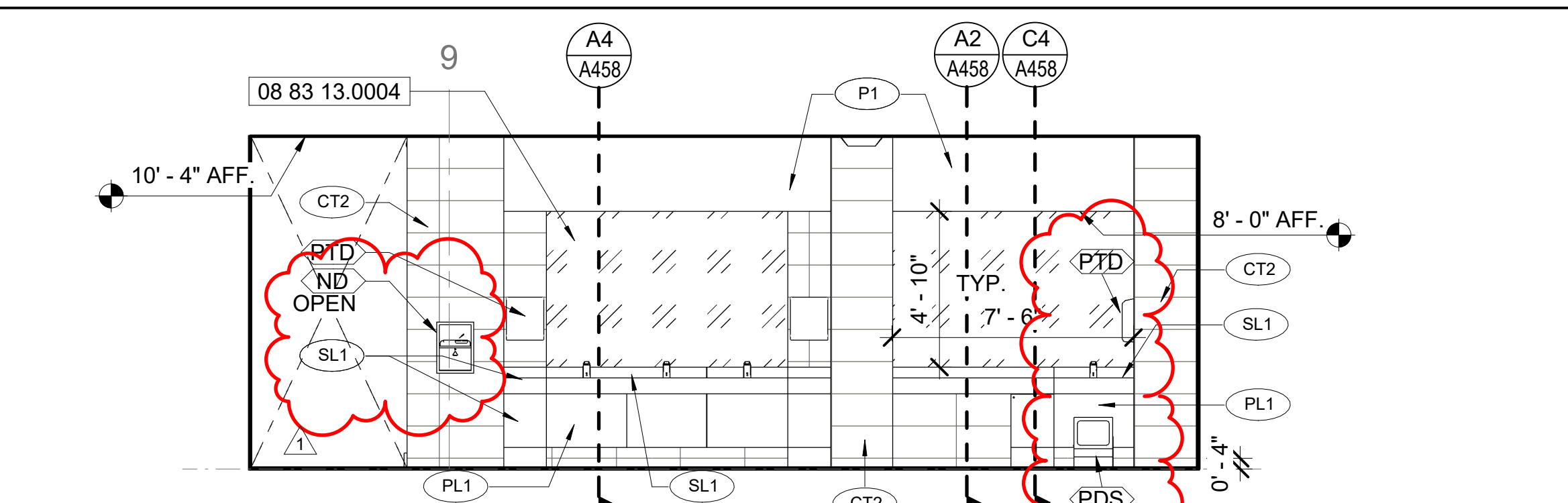
B1 WOMENS ROOM INT. ELEV
1/4" = 1'-0"



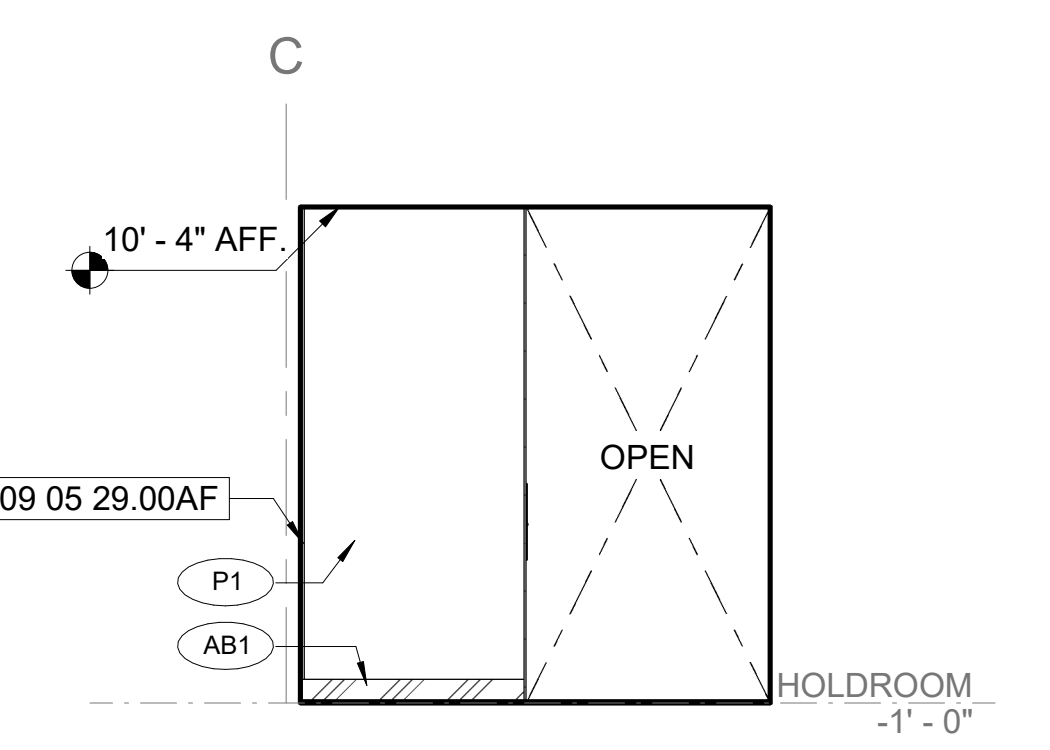
B2 WOMENS ROOM INT. ELEV
1/4" = 1'-0"



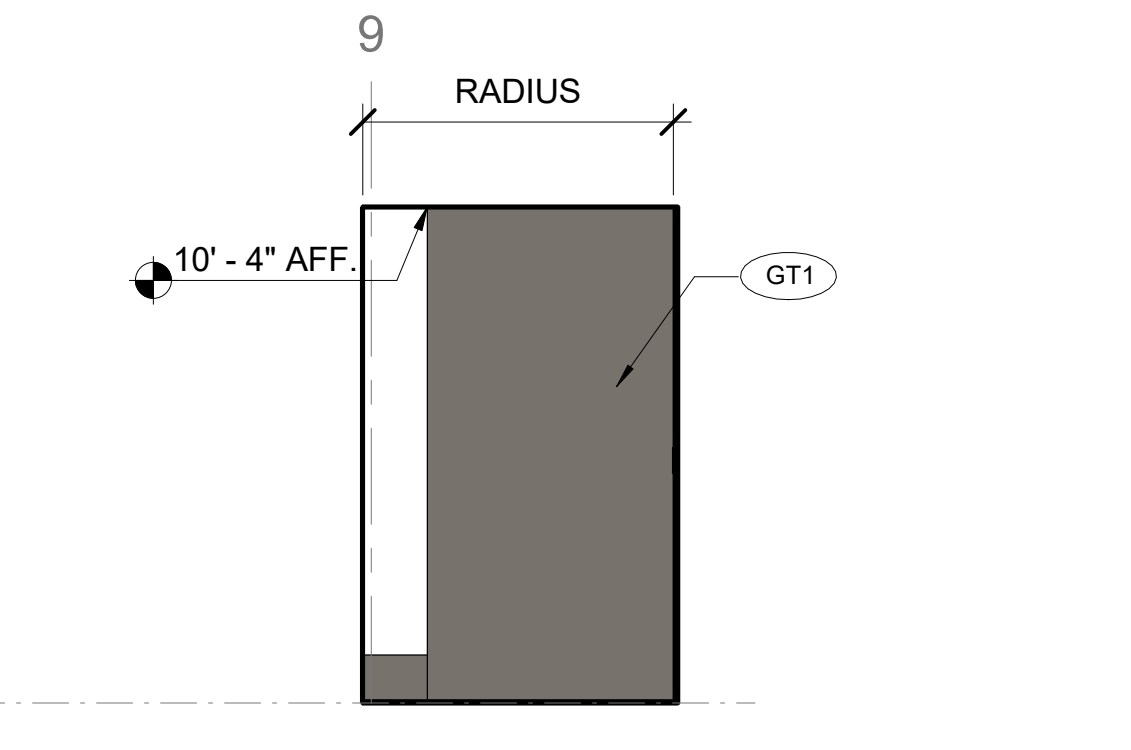
B3 WOMENS ROOM INT. ELEV
1/4" = 1'-0"



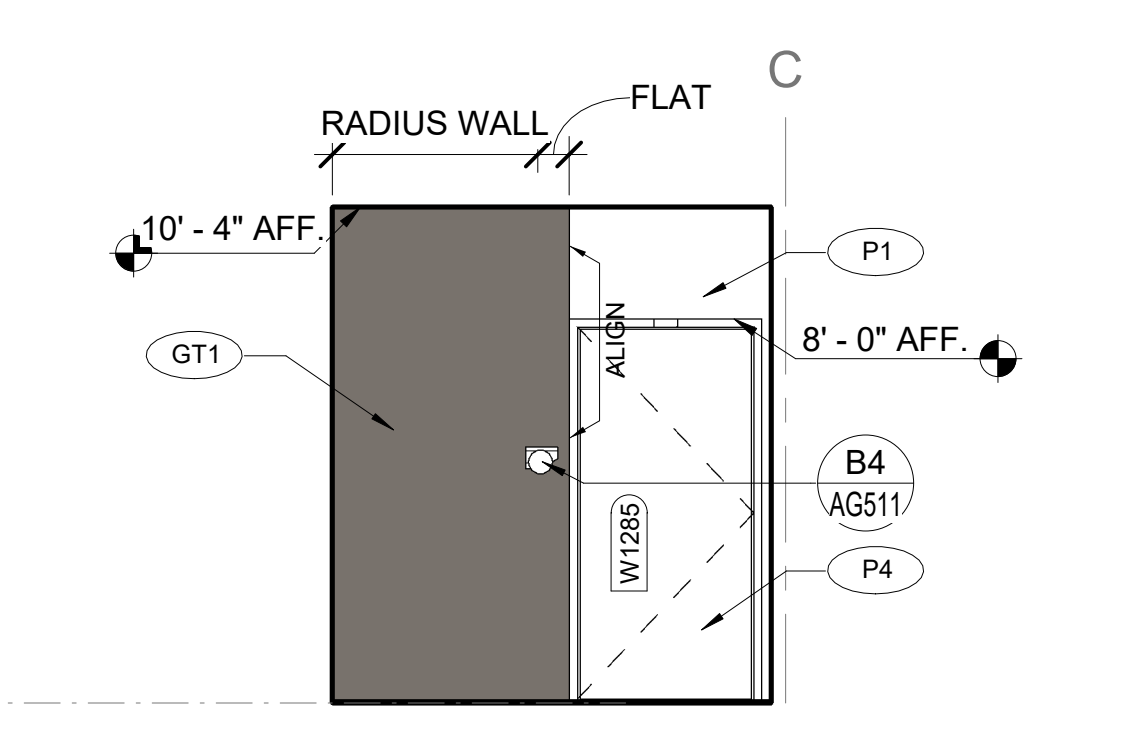
B4 WOMENS ROOM INT. ELEV
1/4" = 1'-0"



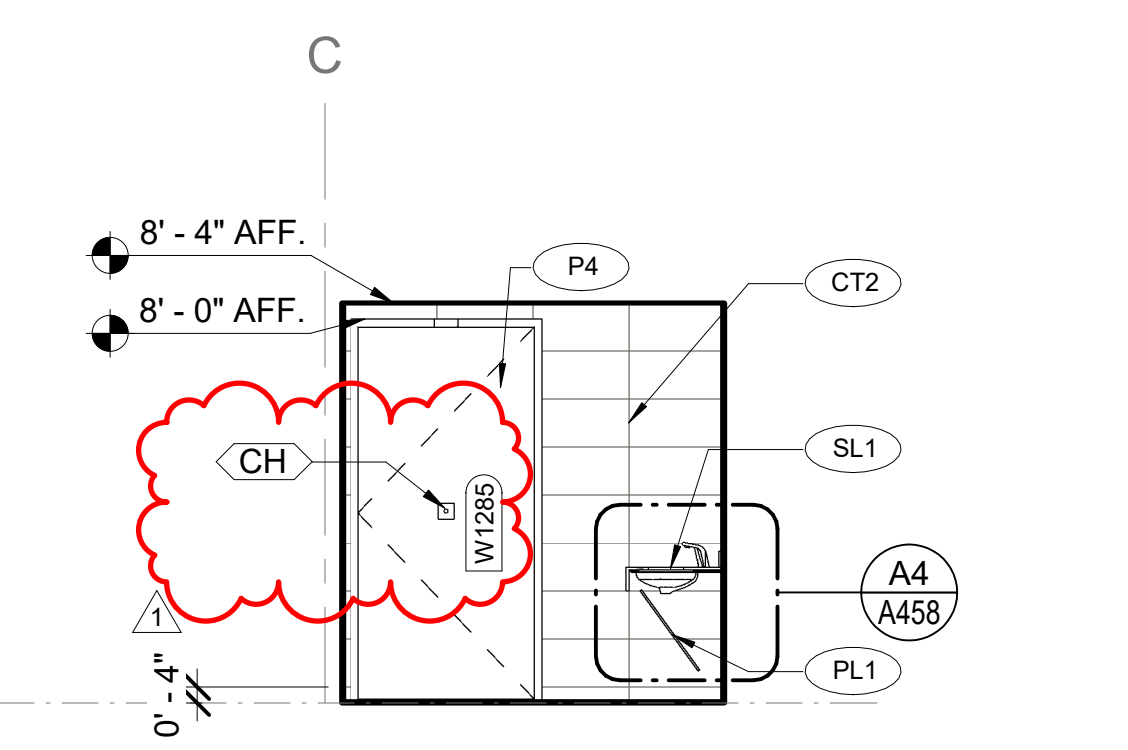
A1 WOMENS VEST INT. ELEV
1/4" = 1'-0"



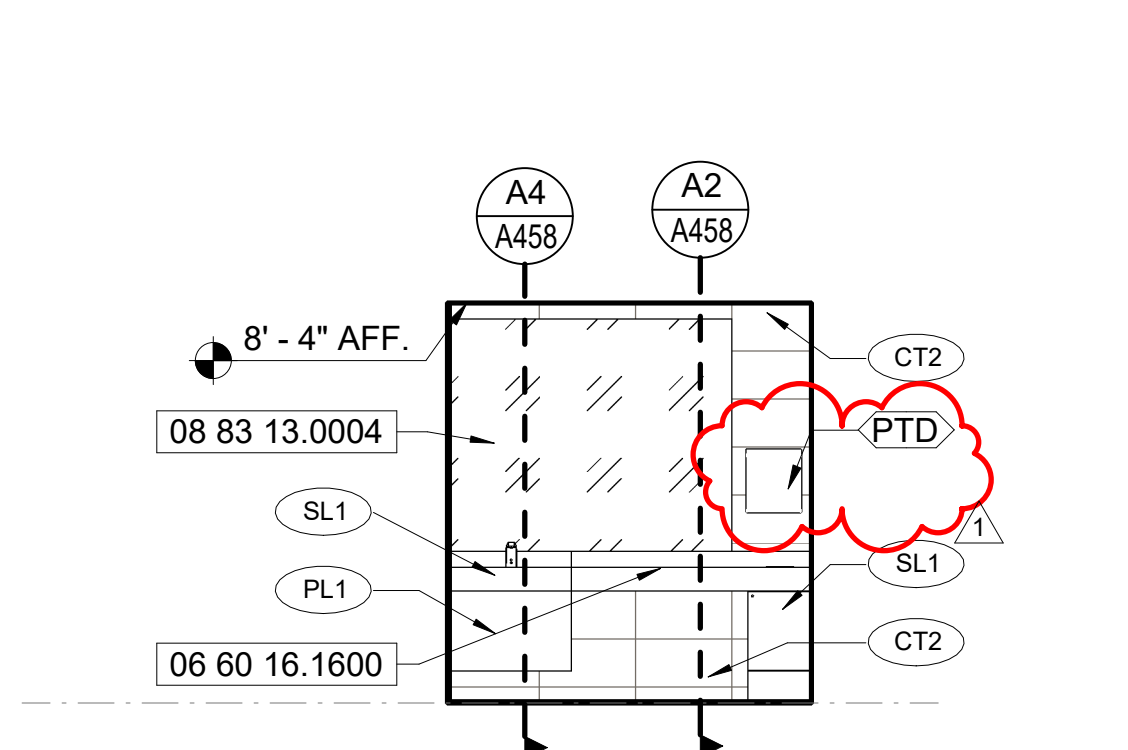
A2 WOMENS VEST INT. ELEV
1/4" = 1'-0"



A3 WOMENS VEST INT. ELEV
1/4" = 1'-0"



A4 MOTHERS ROOM INT. ELEV
1/4" = 1'-0"



A5 MOTHERS ROOM INT. ELEV
1/4" = 1'-0"

KEYNOTES

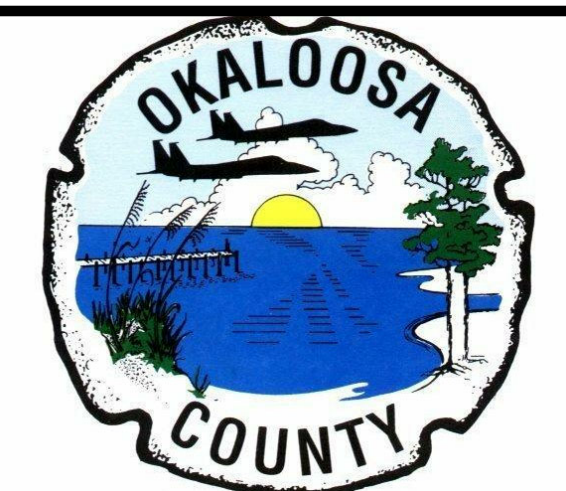
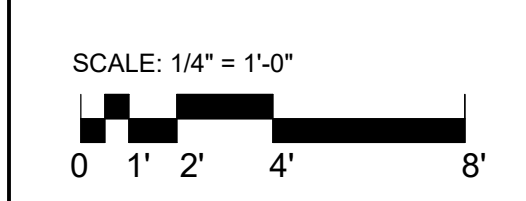
- NO. 06 60 16.1600 TYP. SOLID SURFACING COUNTERTOPS.
- 08 83 13.0004 TYP. 1/4" TEMPERED MIRROR GLAZING, WALL MOUNTED.
- 09 05 29.00A5 TYP. ALUMINUM GYPSUM BOARD REVEAL BASE ACCESSORY.
- 09 05 29.00AF TYP. ALUMINUM GYPSUM BOARD 'F' REVEAL ACCESSORY.
- 09 30 15.3324 TYP. 12" X 24" RECTIFIED, PROCELIAN STONE WALL TILING.
- 10 21 13.1900 TYP. PLASTIC TOILET COMPARTMENT.
- 10 28 13.C000 TYPICAL GRAB BAR
- 22 42 13.1330 TYP. FLUSH VALVE WALL MOUNTED WATER CLOSET, SEE PLUMBING.
- 22 42 13.1630 TYP. FLUSH VALVE URINAL, SEE PLUMBING.
- 22 42 16.133A TYP. ADA, WALL MOUNTED LAVATORY, SEE PLUMBING.

NOTES

1. REFER TO A454 FOR PARTITION TYPES
2. ALL PARTITIONS ARE DIMENSIONED FROM FACE OF FINISH TO FACE OF FINISH U.O.N.
3. FOR DOOR TYPES AND SCHEDULES REFER TO SHEET SERIES A711
4. REFER TO ELECTRICAL, TELECOM, AV, AND SIGNAGE DRAWINGS FOR OUTLET INFORMATION.
5. REFER TO A457 FOR ACCESSORIES INFORMATION. (X)
6. REFER TO A458 FOR COUNTERTOP AND OTHER RESTROOM DETAILS THAT APPLY TYPICALLY TO ALL LOCATIONS WITH IN RESTROOMS.

MATERIALS LEGEND

- (?) MATERIAL CODE SYMBOL: SEE A712 FOR DEFINITIONS
- CT1
- CT2
- P1
- GT1
ALTERNATE 7
REPLACE WITH CT2
- GT2
ALTERNATE 7
REPLACE WITH CT2



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

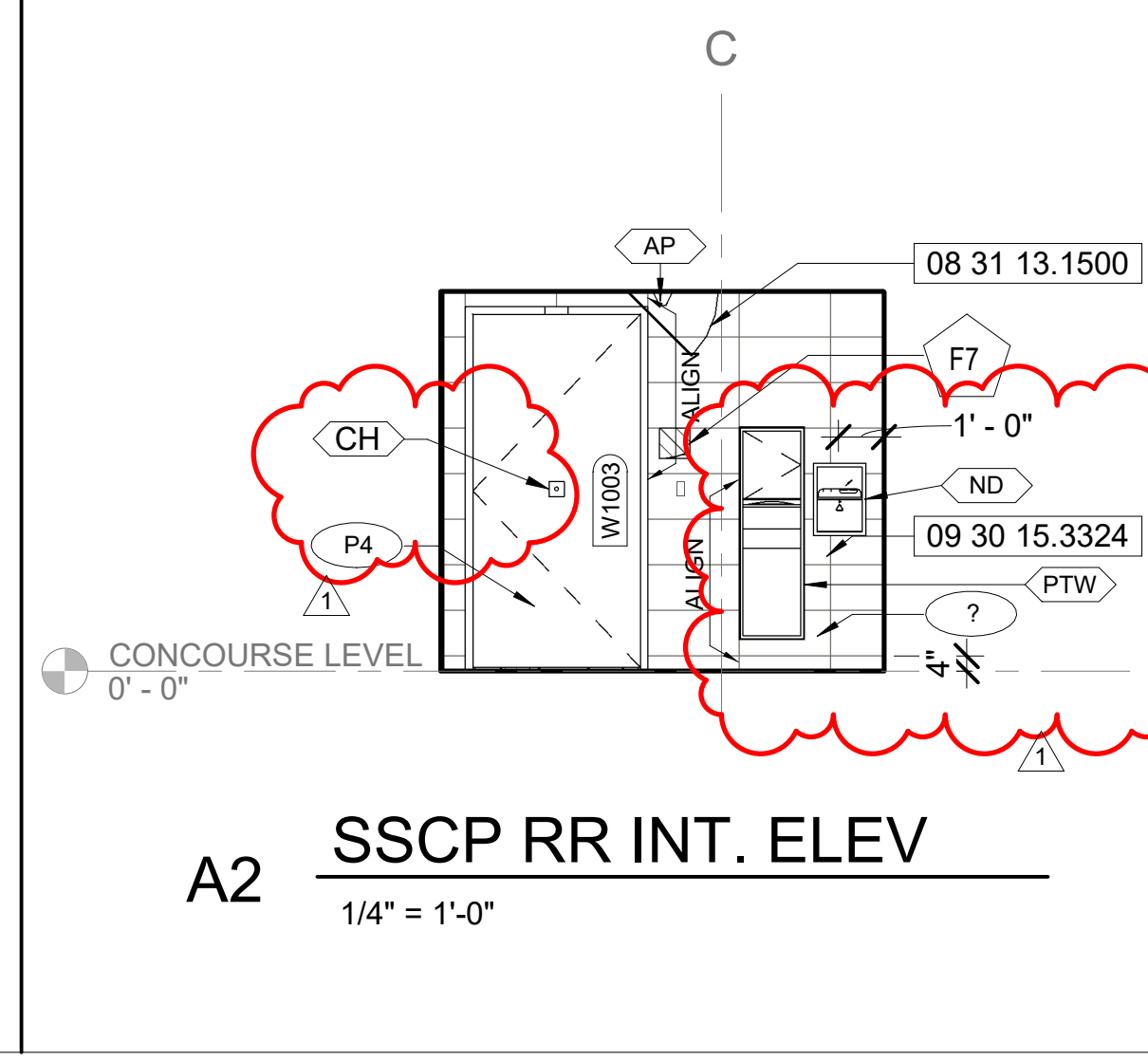
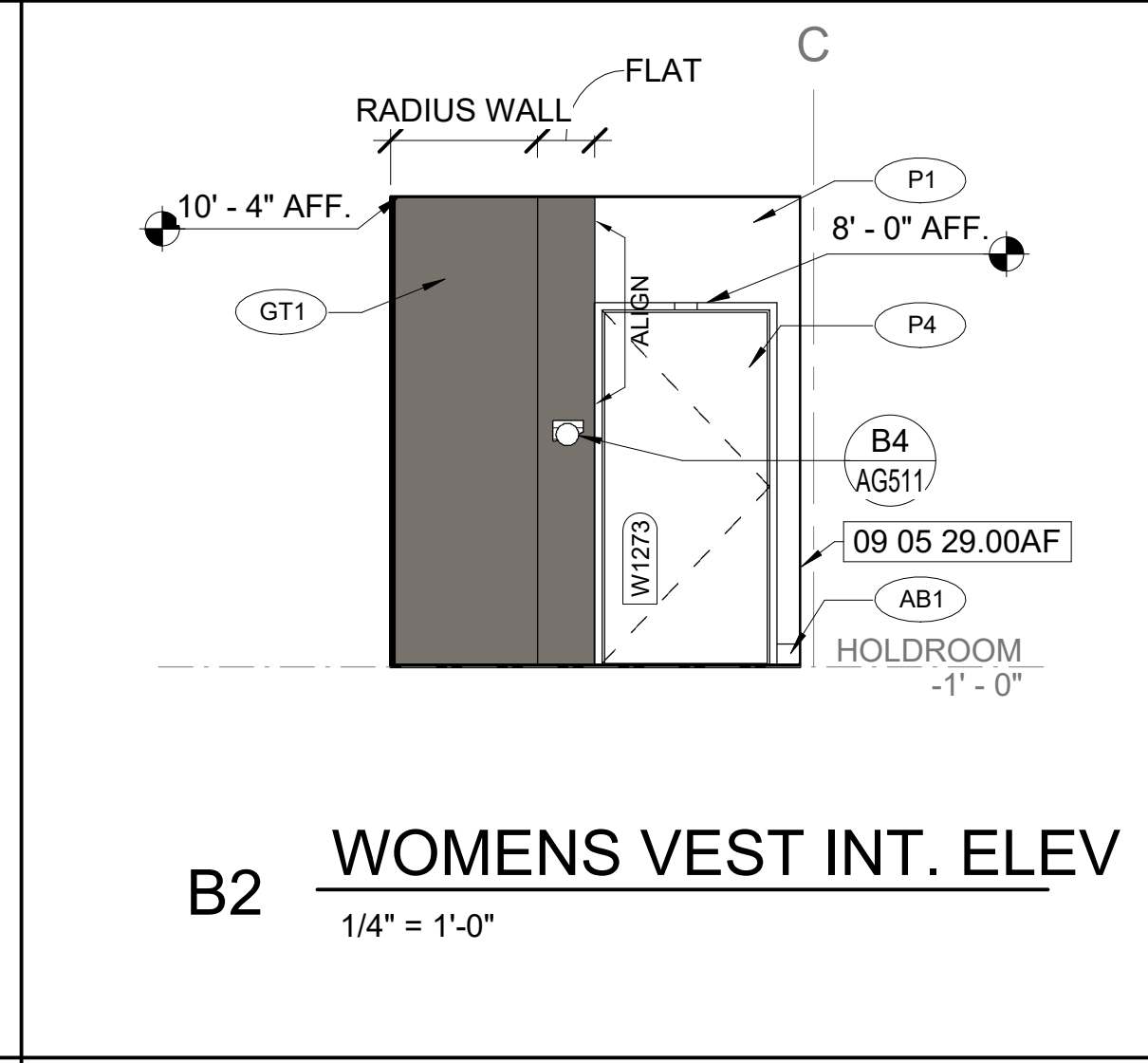
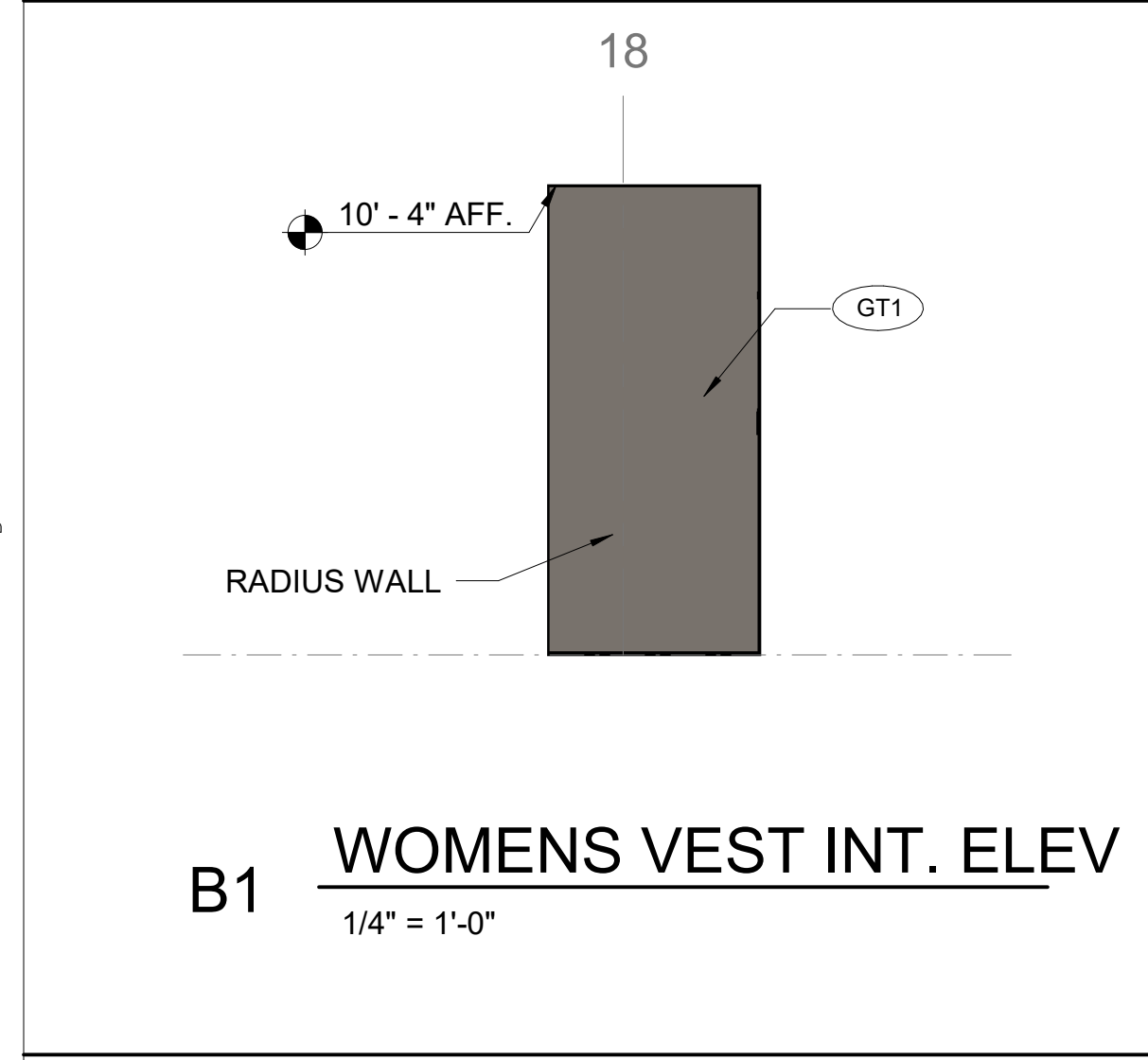
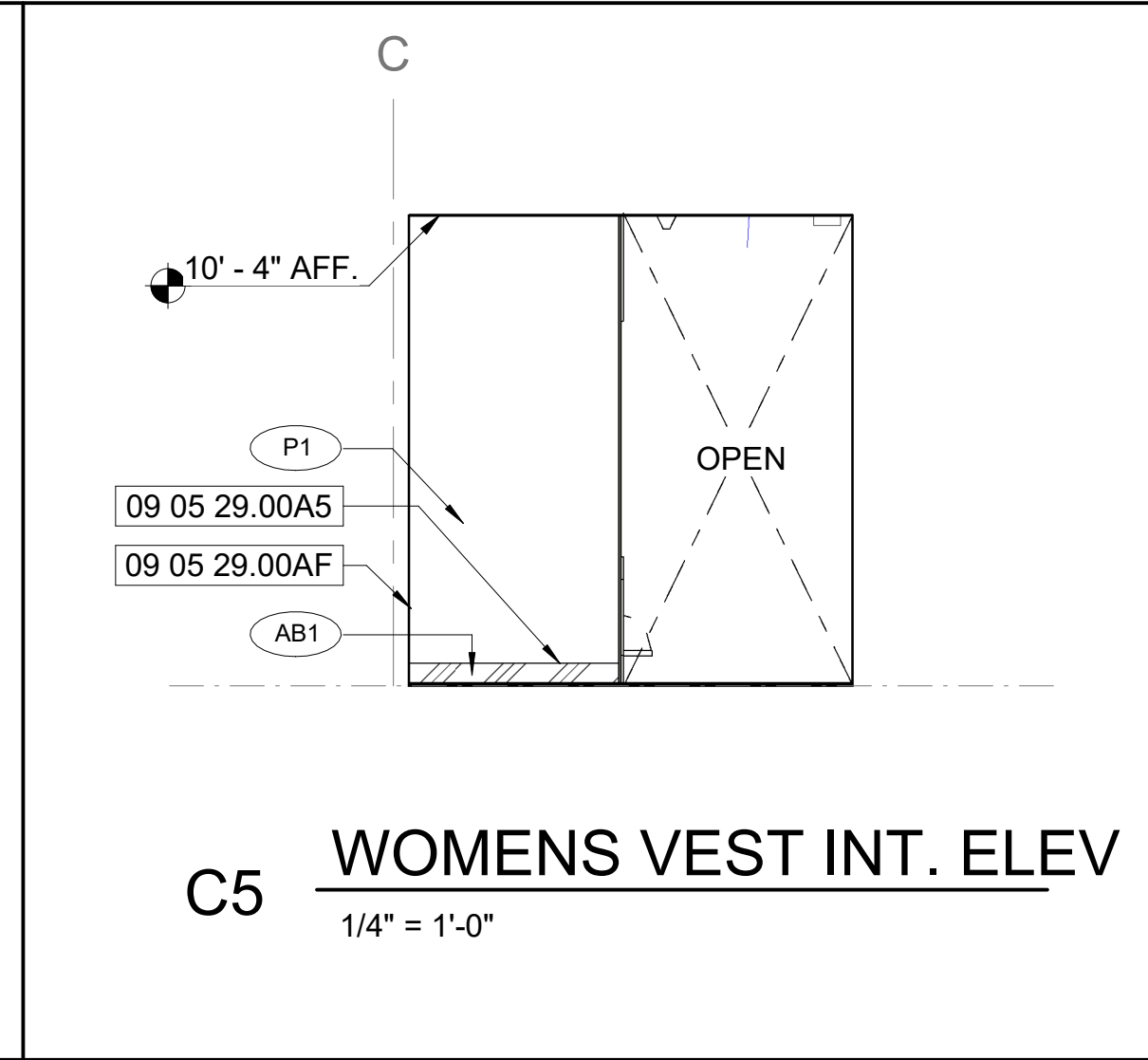
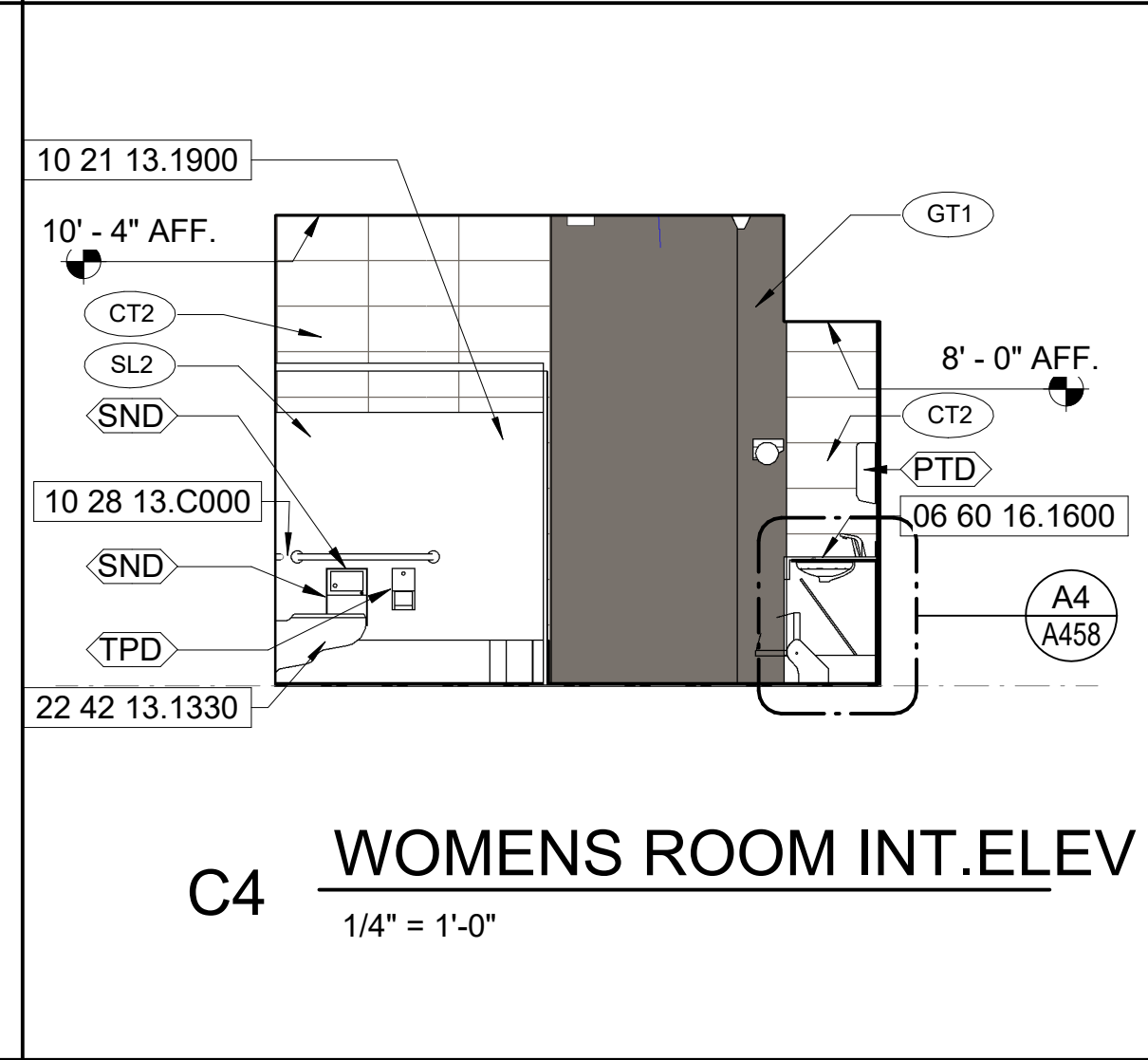
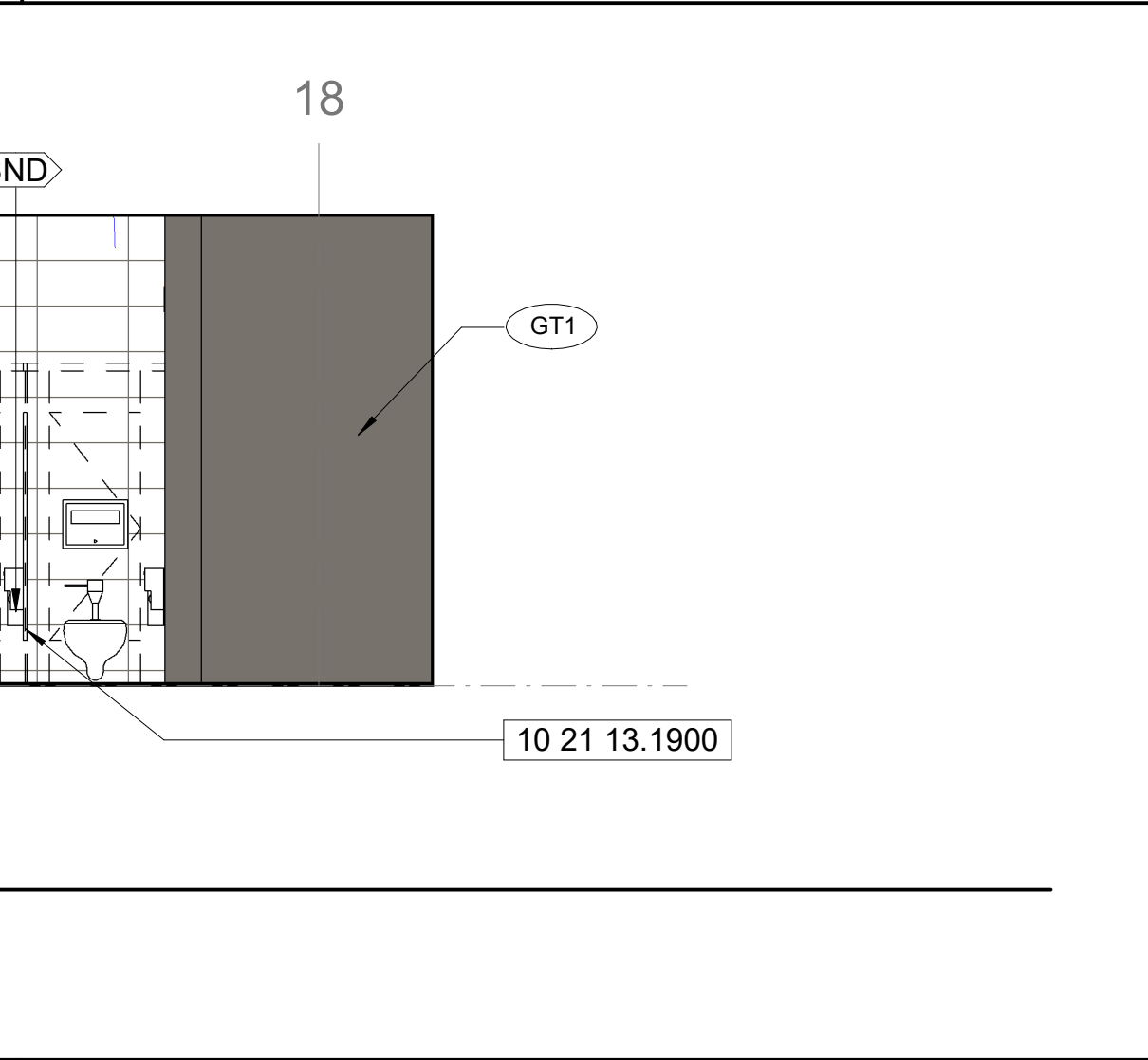
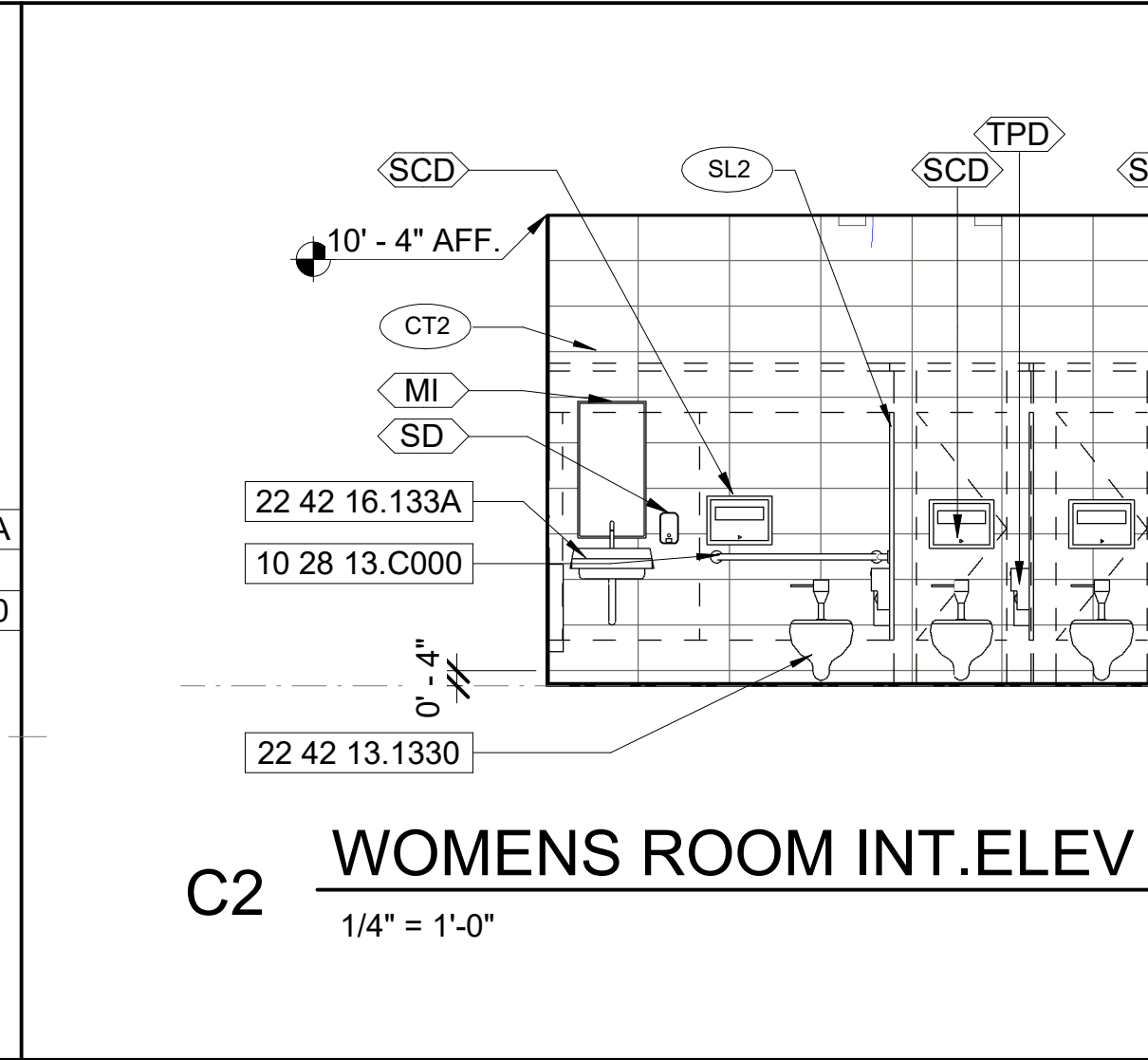
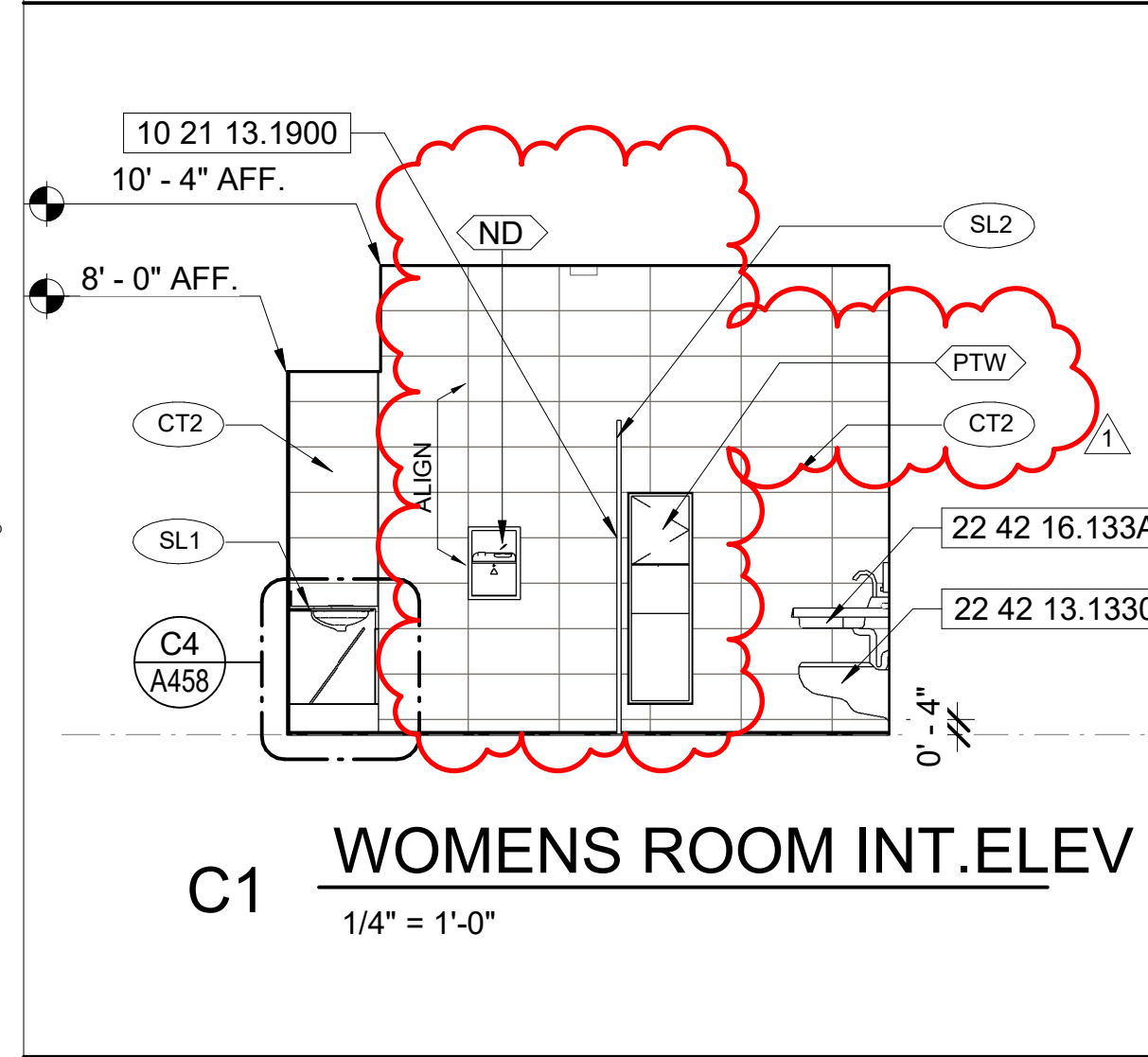
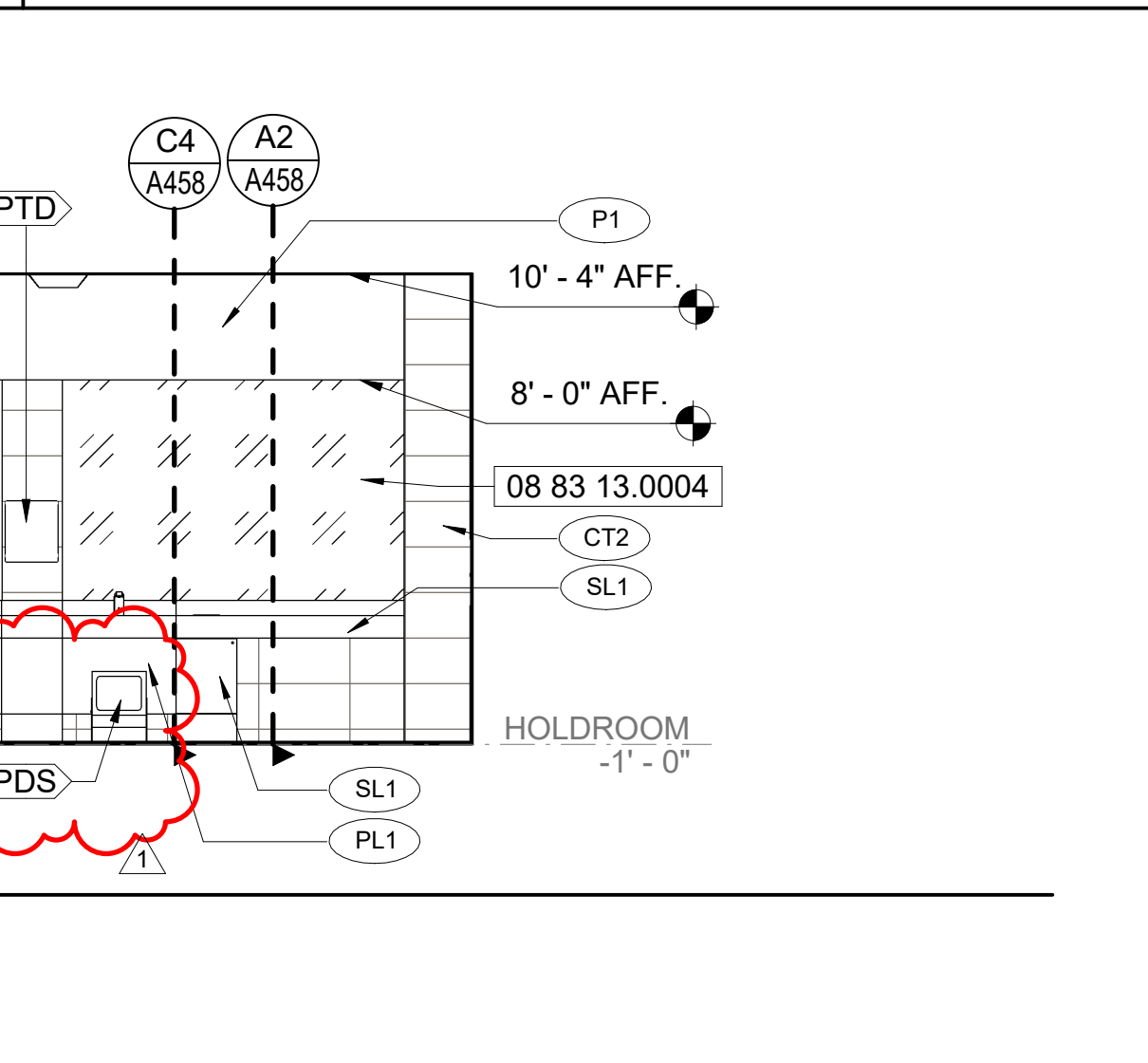
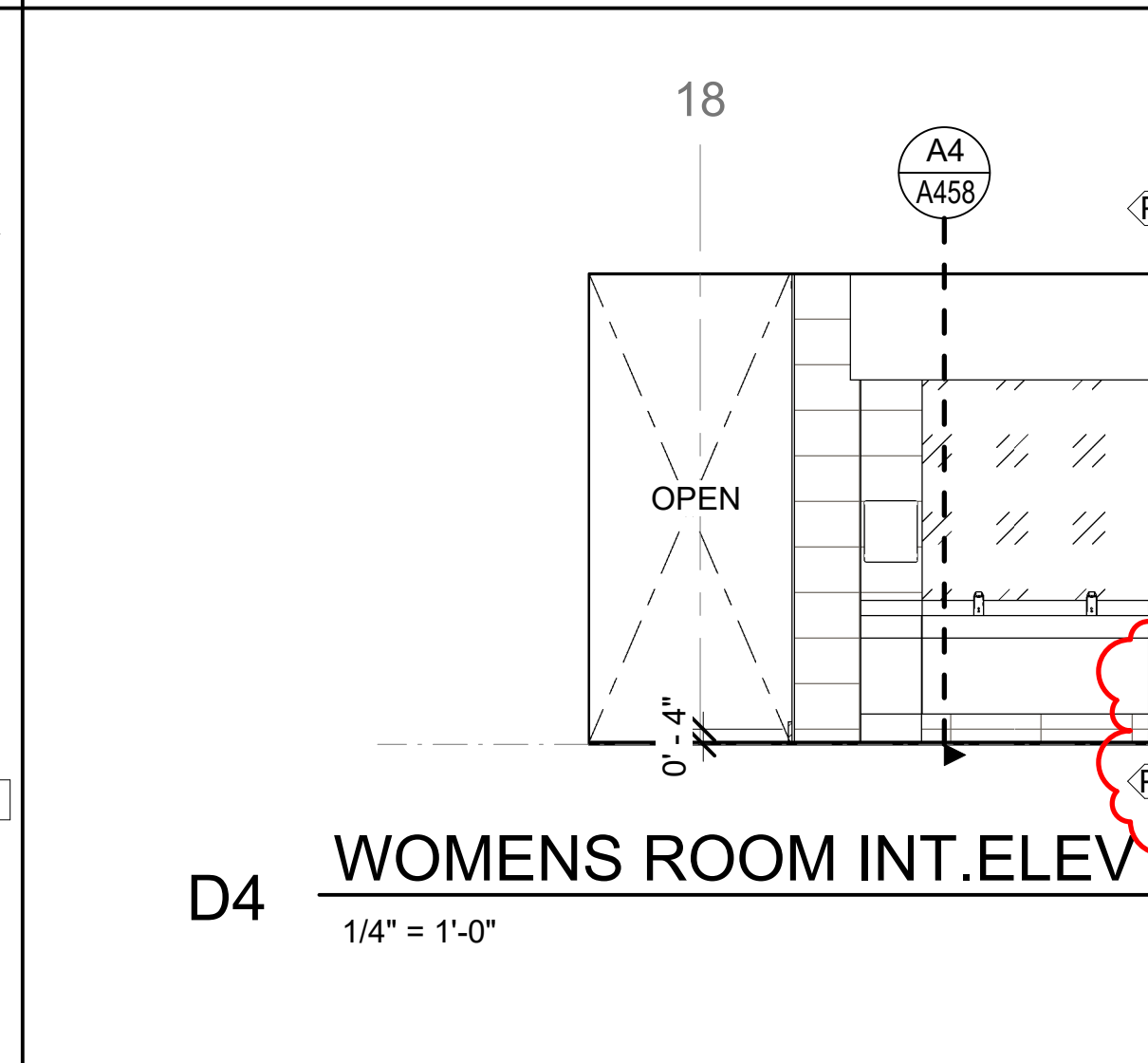
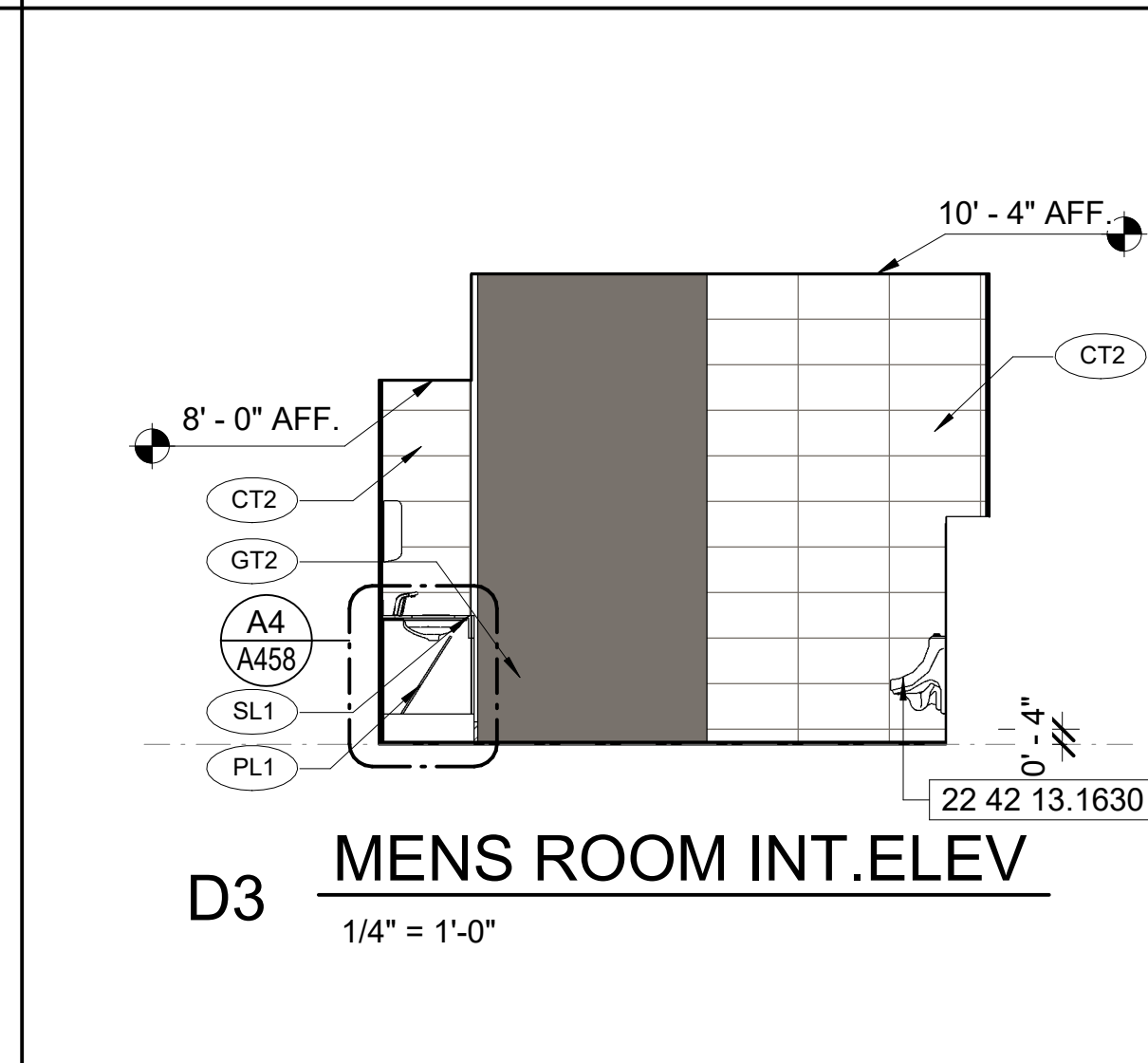
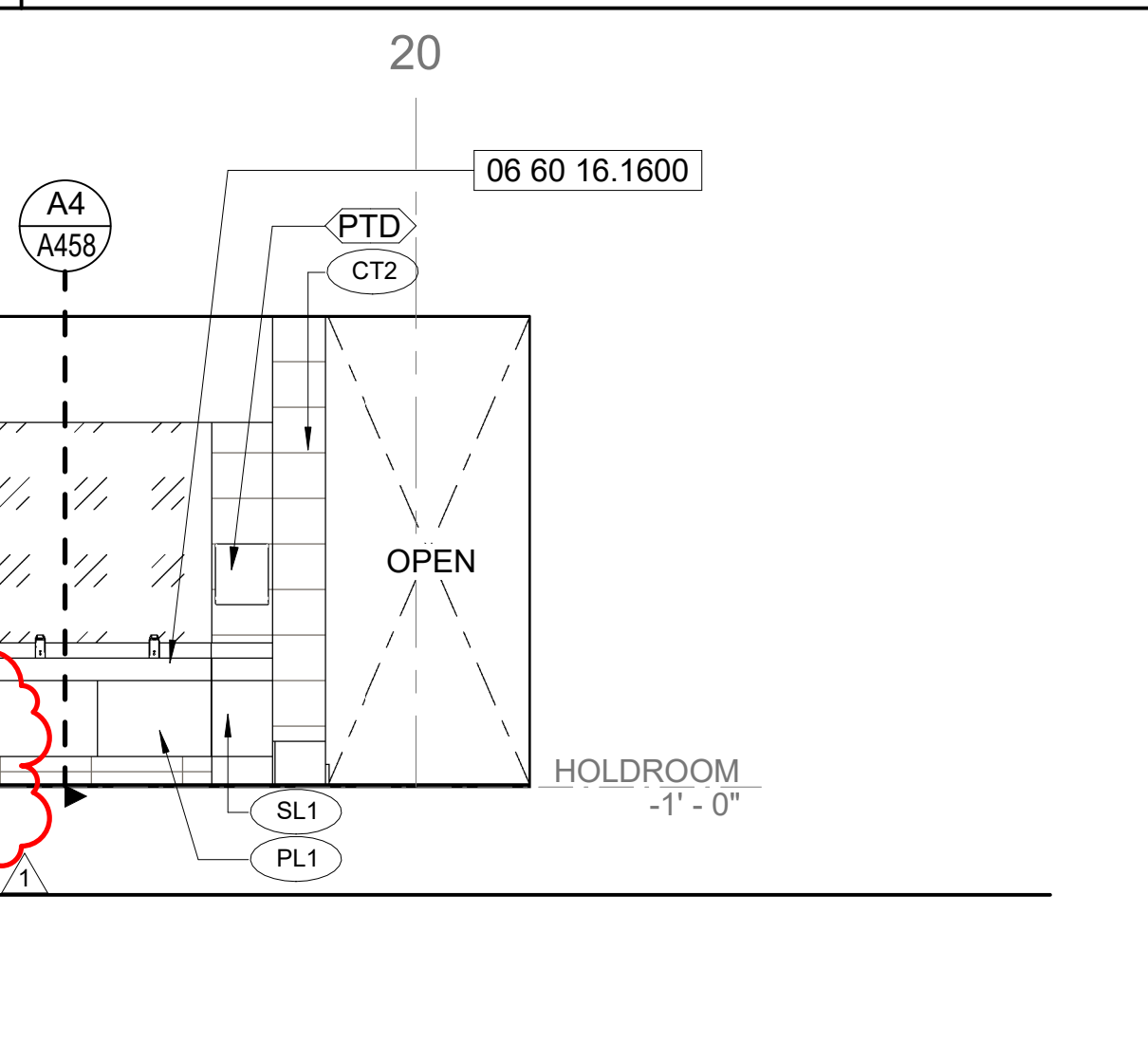
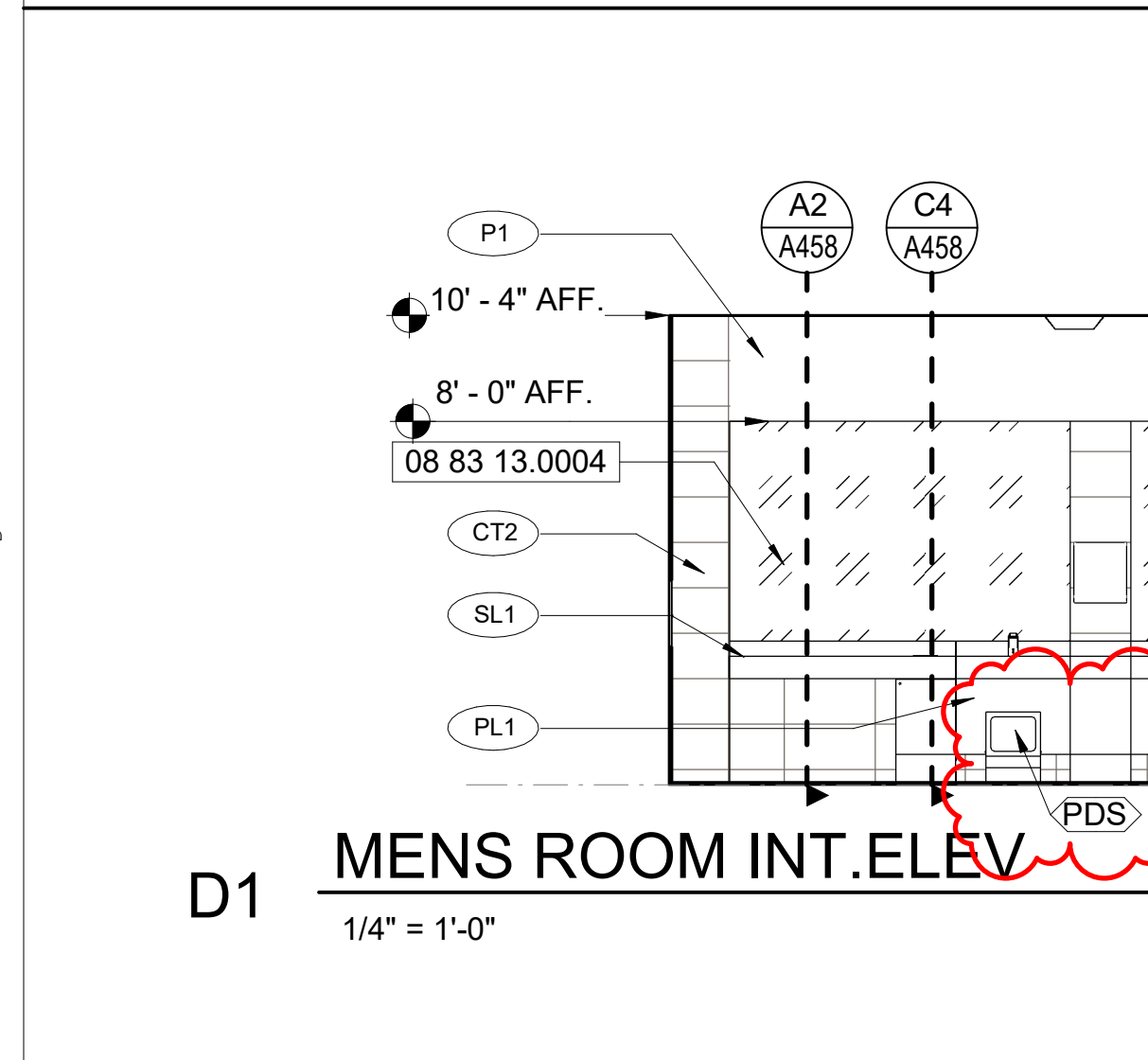
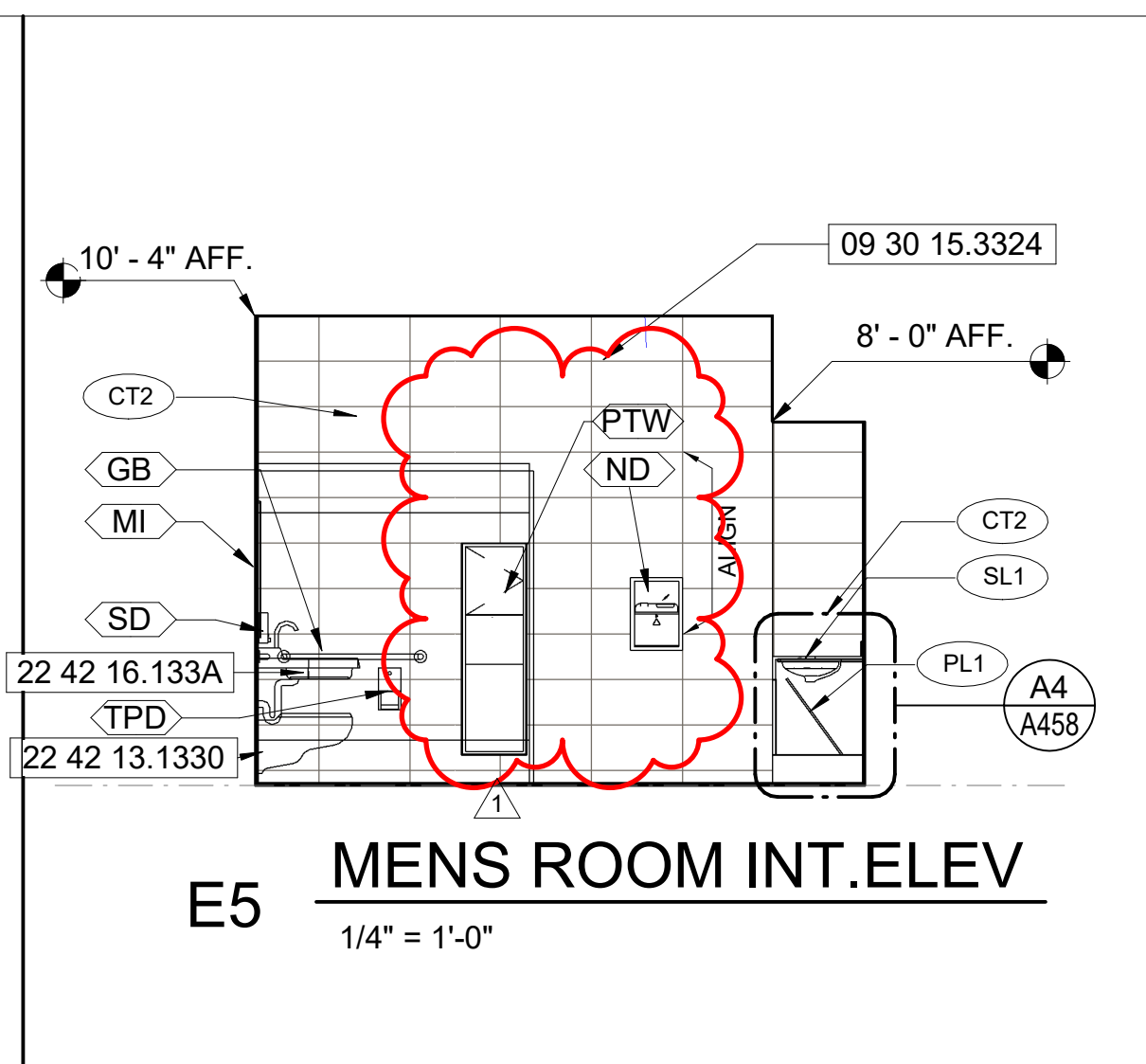
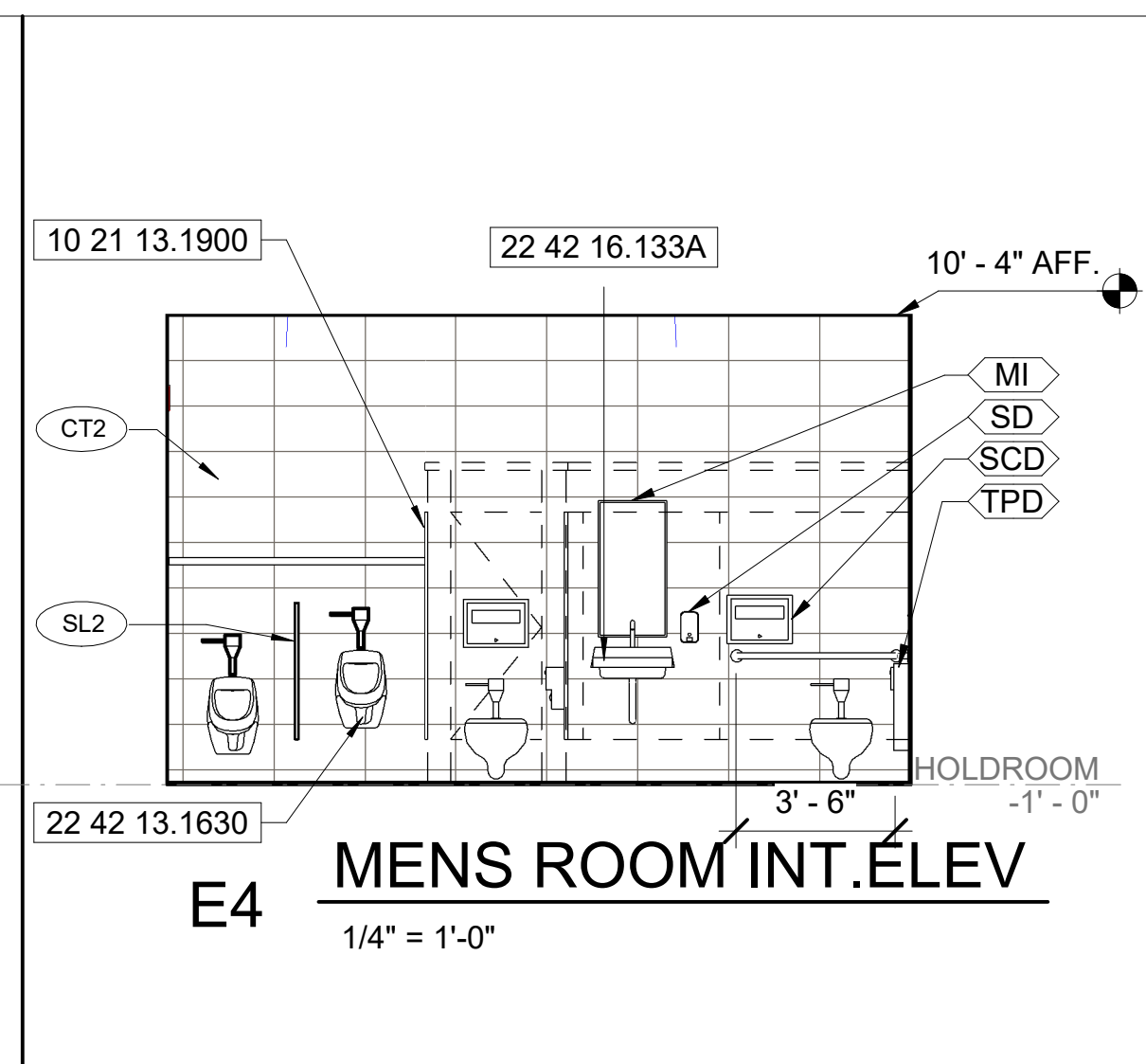
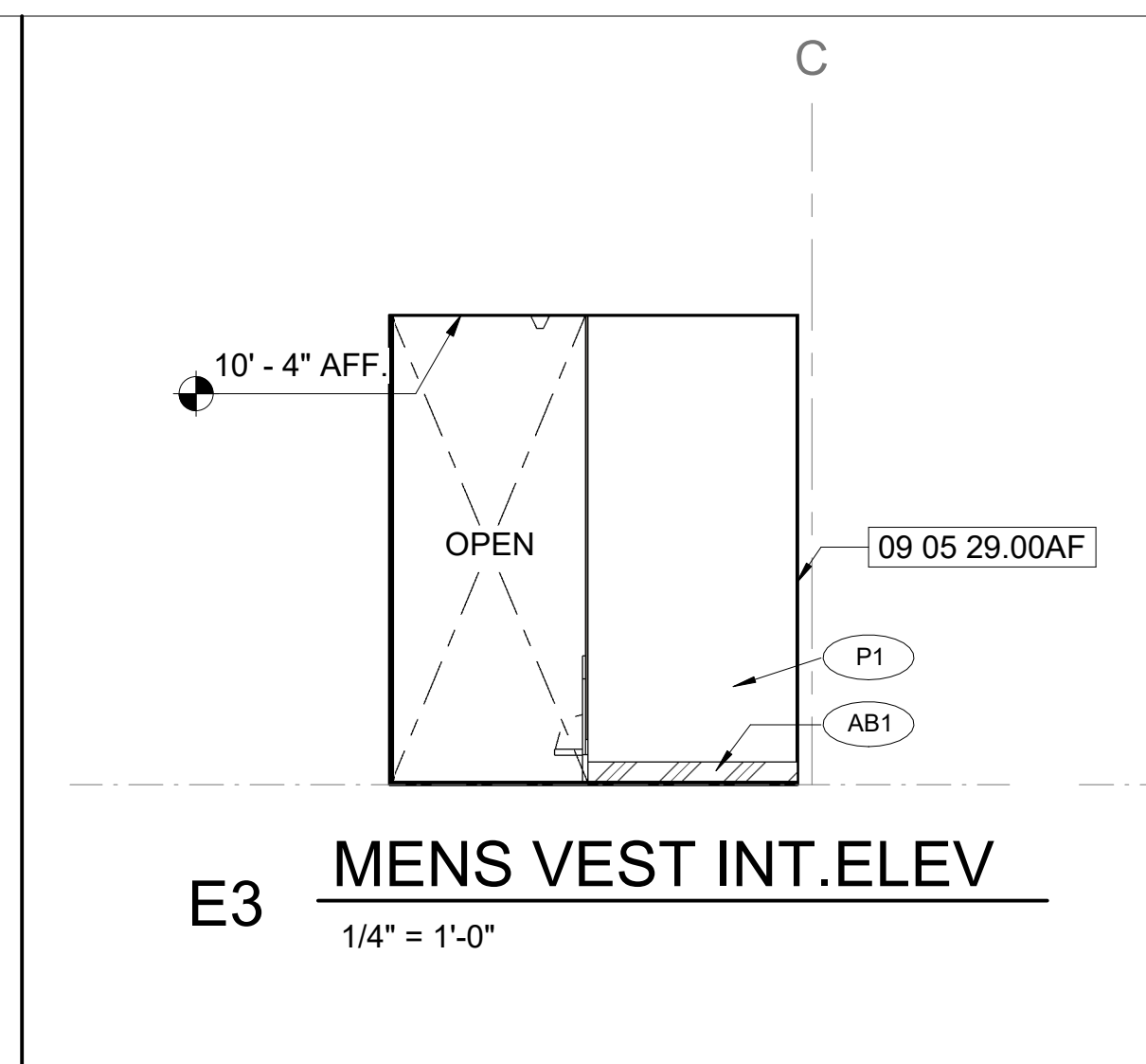
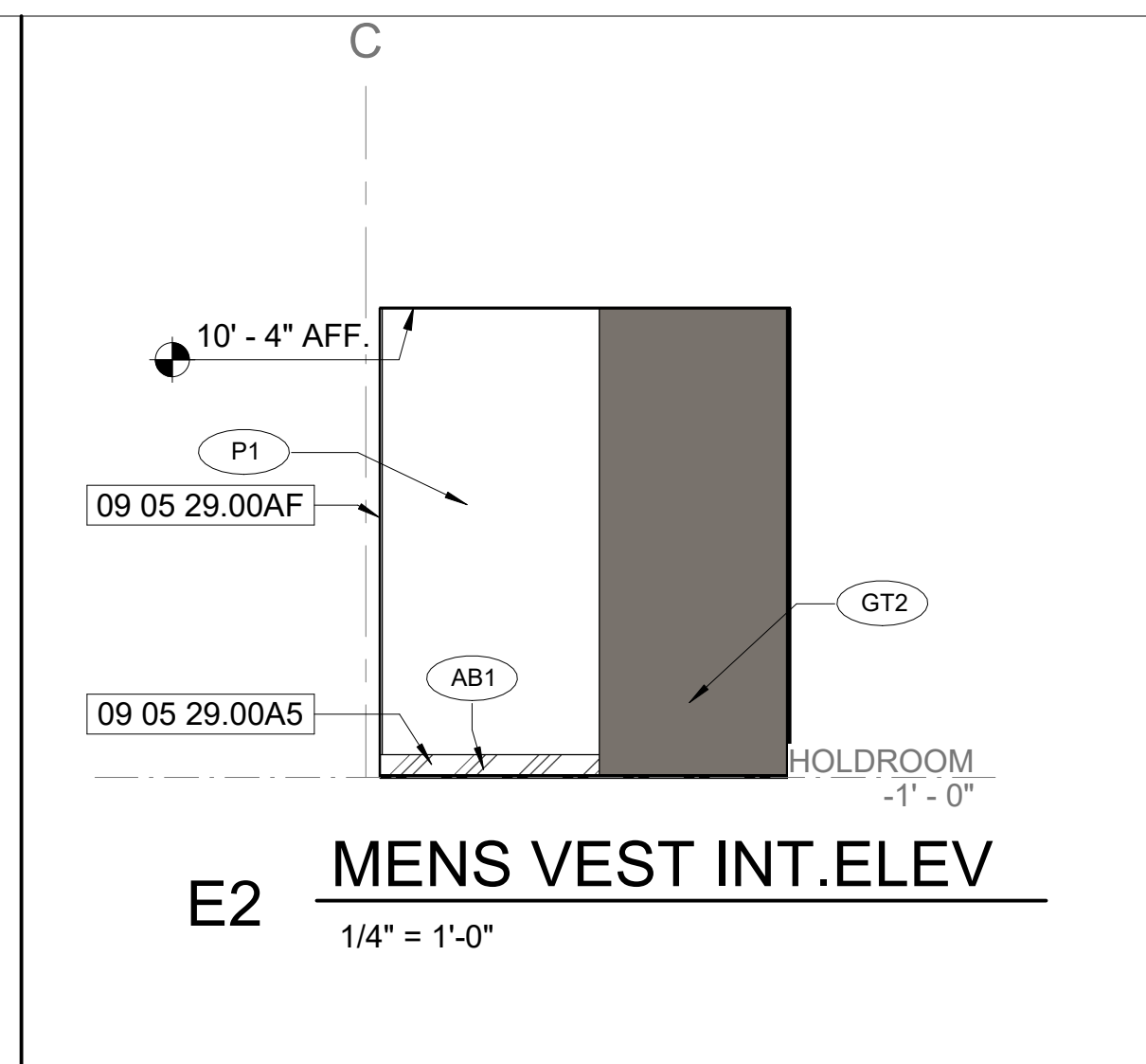
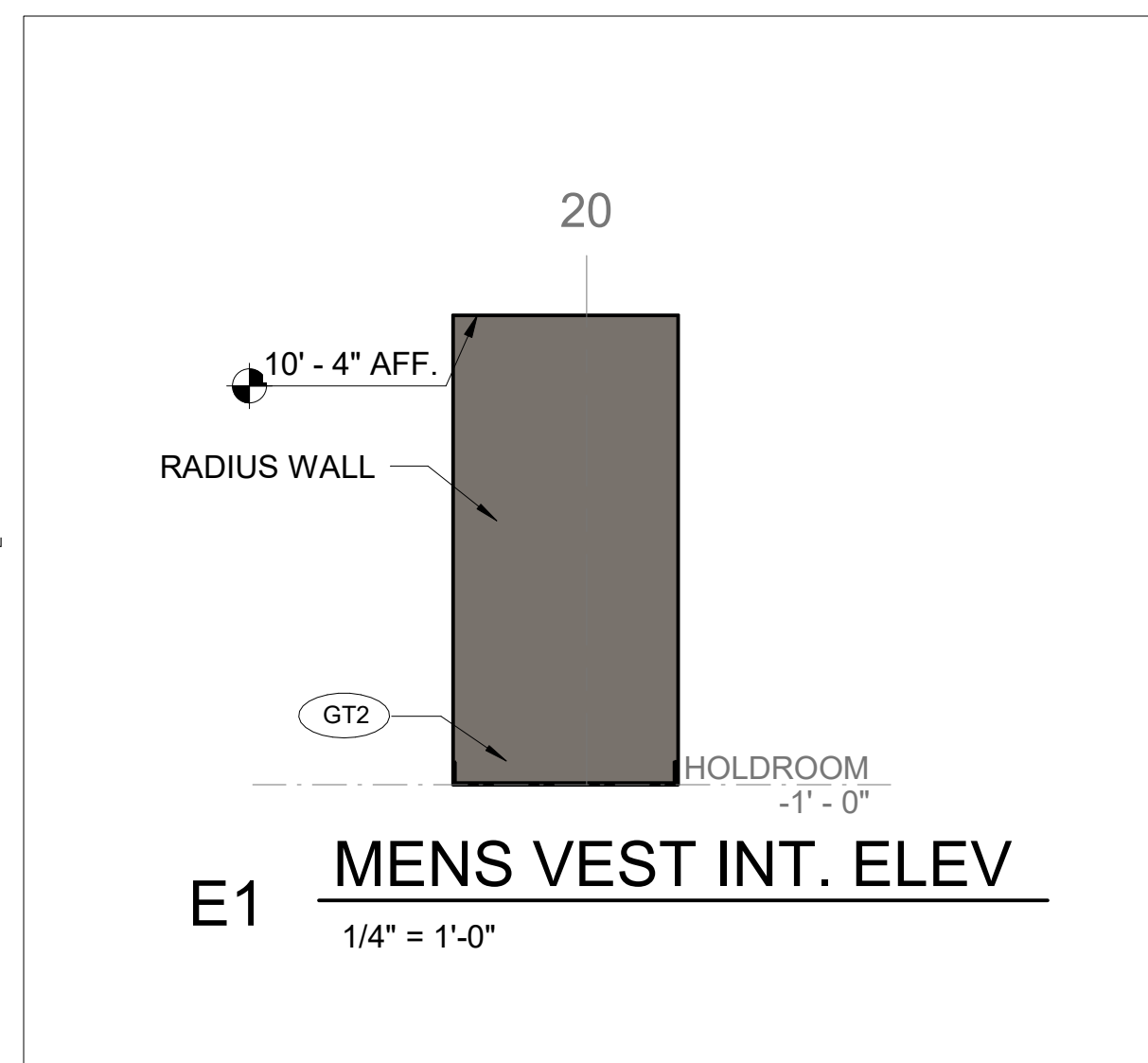
Project No.: **MLM-19672**
 Designed By: **MLM, MAM**
 Drawn By: **ST, CC, DM, CB**
 Checked By: **MAM**
 Issue Date: **30-NOV-2020**
 Drawing Scale: **1/4" = 1'-0"**
 Drawing Title:

RESTROOM
INTERIOR
ELEVATIONS
BID DOCUMENTS

Drawing No.:
A455

BMW 380/Design of Satellite Concourse/VPS-MLM_A.rvt

2/19/2021 5:35:53 PM



KEYNOTES

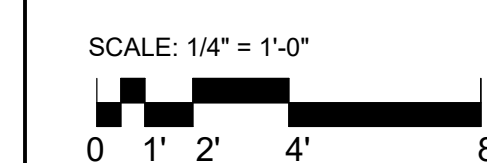
- NO. 06 60 16.1600 TYP. SOLID SURFACING COUNTERTOPS.
- 08 31 13.1500 TYPICAL GALV. MTL. CEILING ACCESS DOOR, PAINT TO MATCH SURROUNDING SURFACE.
- 08 83 13.0004 TYP. 1/4" TEMPERED MIRROR GLAZING, WALL MOUNTED.
- 09 05 29.00A5 TYP. ALUMINUM GYPSUM BOARD REVEAL BASE ACCESSORY.
- 09 05 29.00AF TYP. ALUMINUM GYPSUM BOARD 'F' REVEAL ACCESSORY.
- 09 30 15.3324 TYP. 12" X 24" RECTIFIED, PROCELIAN STONE WALL TILING.
- 10 21 13.1900 TYP. PLASTIC TOILET COMPARTMENT.
- 10 28 13.C000 TYPICAL GRAB BAR
- 22 07 19.1300 TYP. WRAP SINK P-TRAP AND EXPOSED SANITARY DRAIN LINES WITH PIPE INSULATION.
- 22 42 13.1330 TYP. FLUSH VALVE WALL MOUNTED WATER CLOSET, SEE PLUMBING.
- 22 42 13.1630 TYP. FLUSH VALVE URINAL, SEE PLUMBING.
- 22 42 16.133A TYP. ADA, WALL MOUNTED LAVATORY, SEE PLUMBING.

NOTES

1. REFER TO A454 FOR PARTITION TYPES
2. ALL PARTITIONS ARE DIMENSIONED FROM FACE OF FINISH TO FACE OF FINISH U.O.N.
3. FOR DOOR TYPES AND SCHEDULES REFER TO SHEET SERIES A711
4. REFER TO ELECTRICAL, TELECOM, AV, AND SIGNAGE DRAWINGS FOR OUTLET INFORMATION.
5. REFER TO A457 FOR ACCESSORIES INFORMATION. (X)
6. REFER TO A458 FOR COUNTERTOP AND OTHER RESTROOM DETAILS THAT APPLY TYPICALLY TO ALL LOCATIONS WITH IN RESTROOMS.

MATERIALS LEGEND

- ? MATERIAL CODE SYMBOL: SEE APT12 FOR DEFINITIONS
- ▨ CT1
- ▨ CT2
- ▨ P1
- ▨ GT1 ALTERNATE 7 REPLACE WITH CT2
- ▨ GT2 ALTERNATE 7 REPLACE WITH CT2



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

SEAL

Revisions

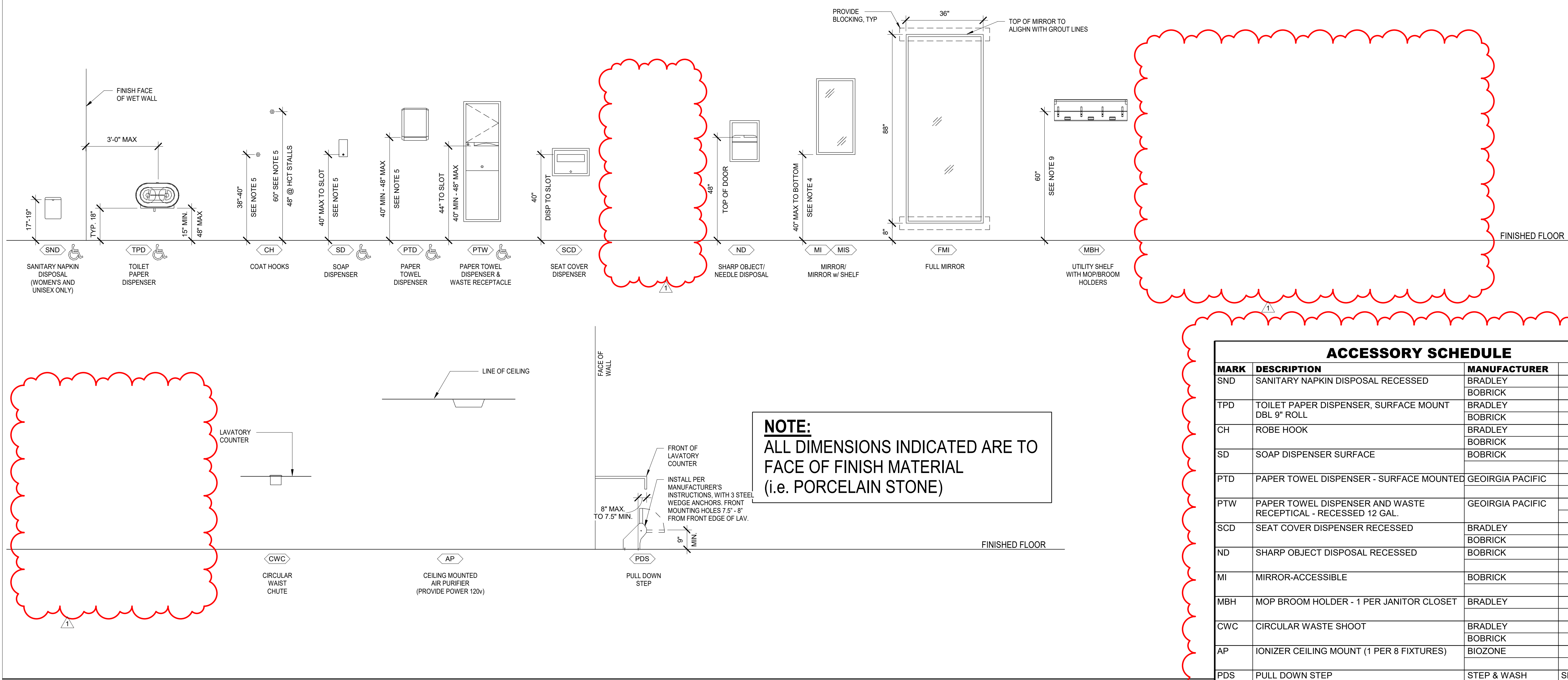
No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: **MLM-19672**
 Designed By: **MLM, MAM**
 Drawn By: **ST, CC, DM, CB**
 Checked By: **MAM**
 Issue Date: **30-NOV-2020**
 Drawing Scale: **1/4" = 1'-0"**
 Drawing Title:

**RESTROOM
INTERIOR
ELEVATIONS**
BID DOCUMENTS

Drawing No.:
A456

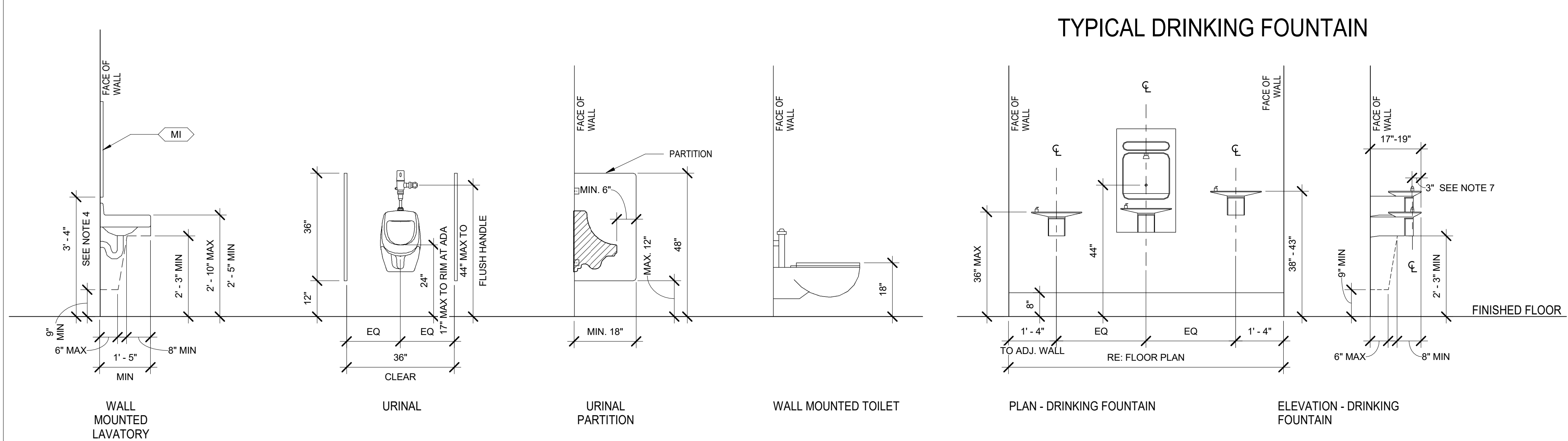
TOILET ACCESSORY MOUNTING DIAGRAM



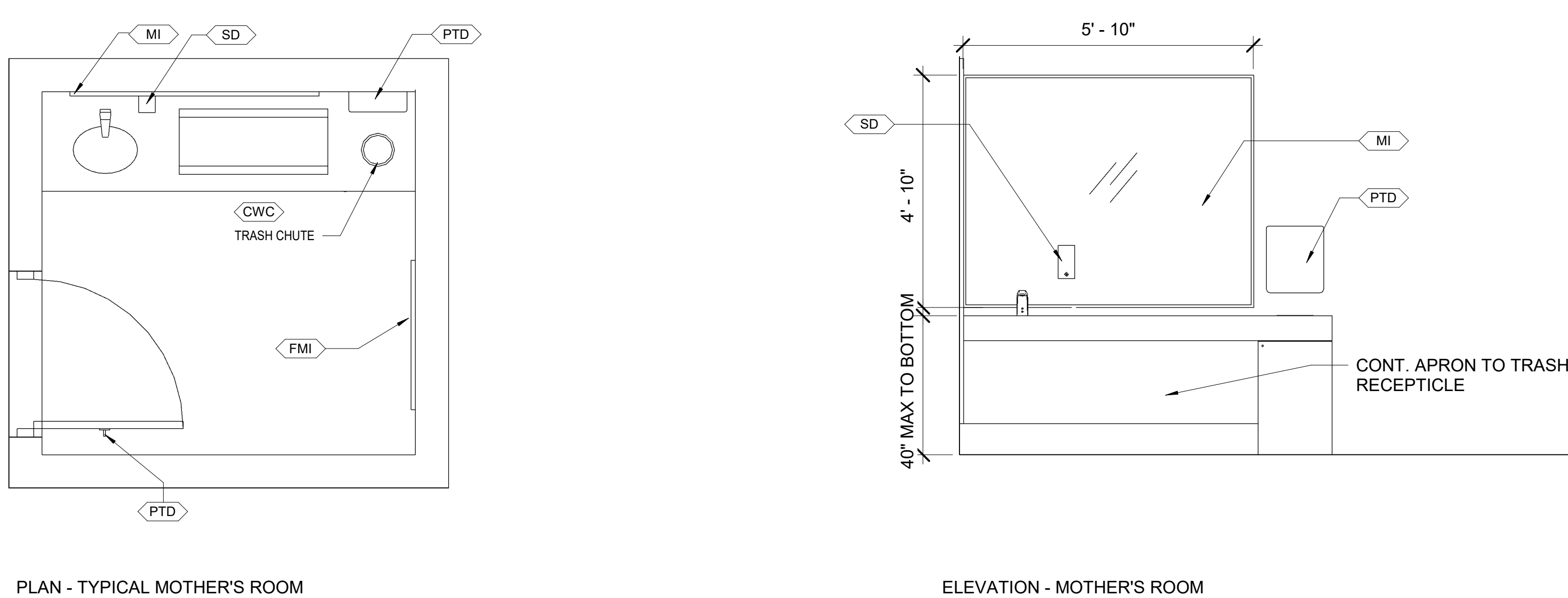
ACCESSORY SCHEDULE

MARK	DESCRIPTION	MANUFACTURER	PRODUCT
SND	SANITARY NAPKIN DISPOSAL RECESSED	BRADLEY	4732-1015
		BOBRICK	B-353
TPD	TOILET PAPER DISPENSER, SURFACE MOUNT DBL 9" ROLL	BRADLEY	5425
		BOBRICK	B-2892
CH	ROBE HOOK	BRADLEY	931
		BOBRICK	B-76717
SD	SOAP DISPENSER SURFACE	BOBRICK	B-2111
PTD	PAPER TOWEL DISPENSER - SURFACE MOUNTED	GEOIRGIA PACIFIC	59466
PTW	PAPER TOWEL DISPENSER AND WASTE RECEPTICAL - RECESSED 12 GAL.	GEOIRGIA PACIFIC	59491
			W/ 59466
SCD	SEAT COVER DISPENSER RECESSED	BRADLEY	584
		BOBRICK	B-301
ND	SHARP OBJECT DISPOSAL RECESSED	BOBRICK	B-35016
MI	MIRROR-ACCESSIBLE	BOBRICK	B-209
MBH	MOP BROOM HOLDER - 1 PER JANITOR CLOSET	BRADLEY	9954
CWC	CIRCULAR WASTE SHOOT	BRADLEY	P10-696
		BOBRICK	B-352
AP	IONIZER CEILING MOUNT (1 PER 8 FIXTURES)	BIOZONE	AC SERIES
PDS	PULL DOWN STEP	STEP & WASH	SNW-SS 975 B
GB	GRAB BAR - 42" 1 - 1/2" DIA STAINLESS STEEL	BRADLEY	812
		BOBRICK	B-6806
GB	GRAB BAR - 36" 1 - 1/2" DIA STAINLESS STEEL	BRADLEY	812
		BOBRICK	B-6806

FIXTURE AND PARTITION MOUNTING DIAGRAM



TYPICAL MOTHER'S ROOM CONFIGURATION



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

SEAL

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: **MLM-19672**
 Designed By: **MLM, MAM**
 Drawn By: **ST, CC, DM, CB**
 Checked By: **MAM**
 Issue Date: **30-NOV-2020**
 Drawing Scale: **NO SCALE**
 Drawing Title:

RESTROOM ACCESSORIES

BID DOCUMENTS

Bidding No.: **A457**



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
 FL AR-98279

SEAL

Revisions		
No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: **MLM-19672**
 Designed By: **MLM, MAM**
 Drawn By: **ST, CC, DM, CB**
 Checked By: **MAM**
 Issue Date: **30-NOV-2020**
 Drawing Scale: **3/16" = 1'-0"**
 Drawing Title:

BUILDING ELEVATIONS

BID DOCUMENTS

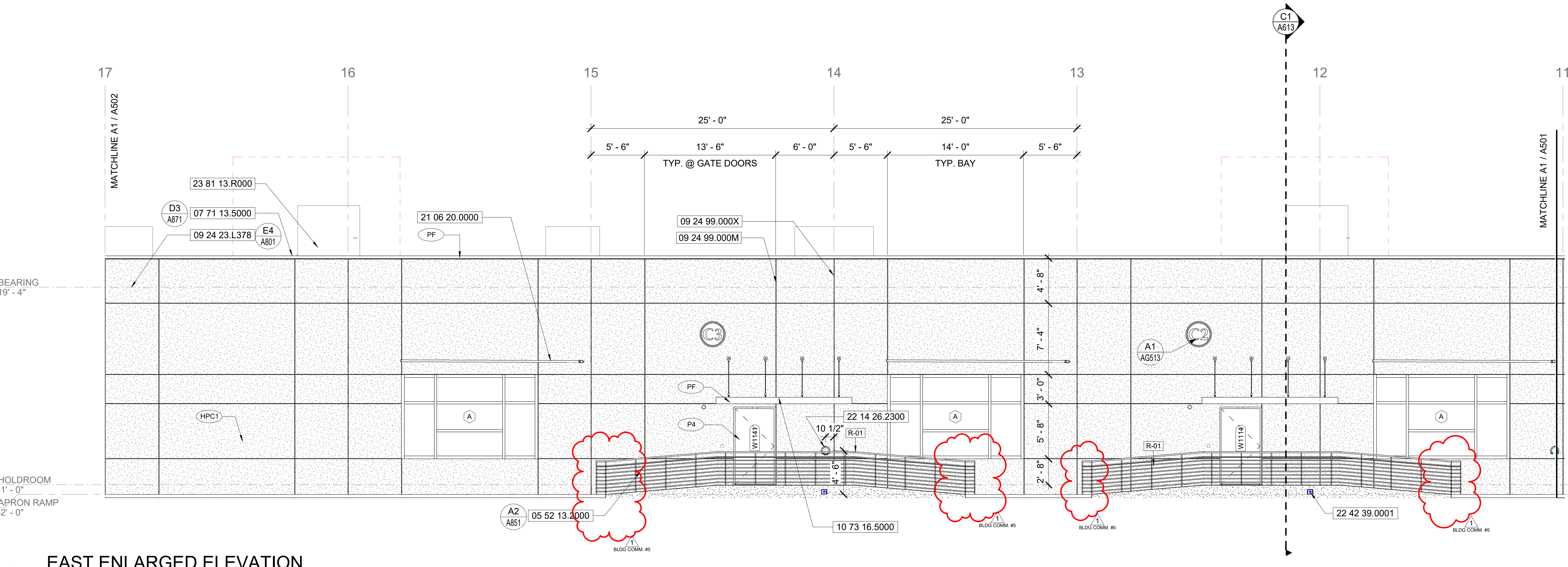
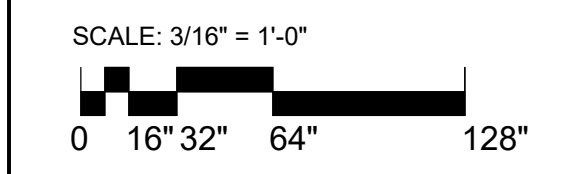
Drawing No.: **A502**

KEYNOTES

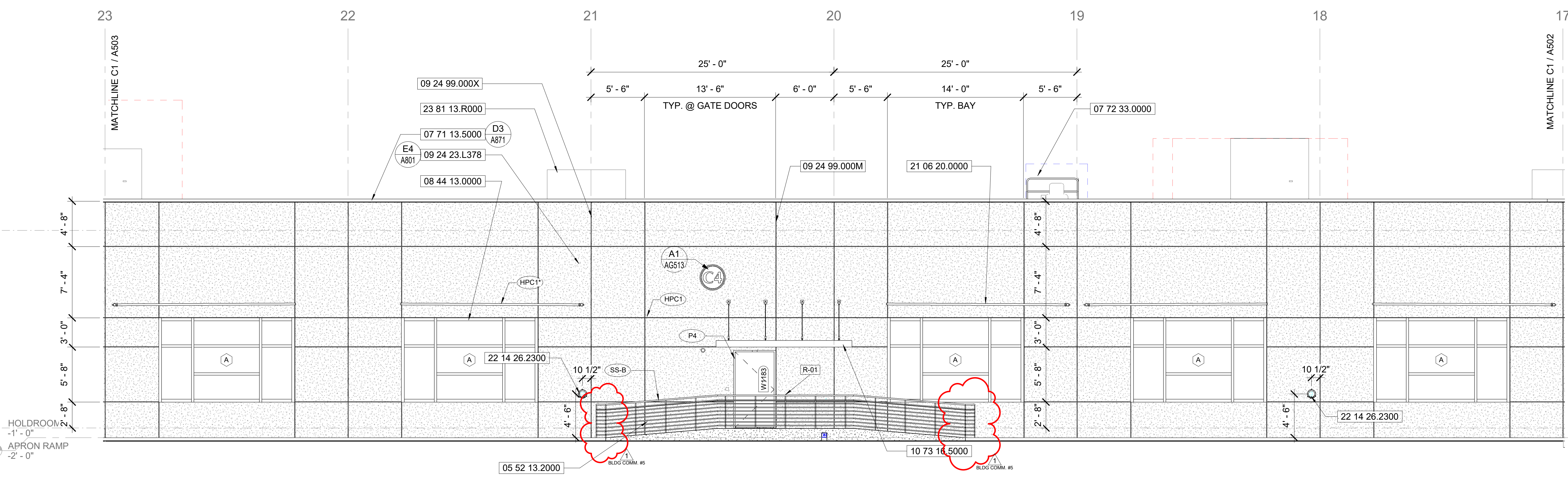
- NO. 05 52 13.2000 TYP. STAINLESS STEEL PIPE AND TUBE RAILING.
- 07 71 13.5000 TYP. ALUMINUM MANUFACTURED COPING SYSTEM, INSTALLED PER MNFR. INSTRUCTIONS.
- 07 72 33.0000 TYP. SINGLE-LEAF ROOF ACCESS HATCH W/ CURB AND SAFETY RAIL.
- 08 44 13.0000 TYP. GLAZED ALUMINUM CUTAIN WALL ASSEMBLY.
- 09 24 23.L378 TYP. SMOOTH 7/8" STUCCO, 3 COAT SYSTEM
- 09 24 99.000M TYP. CEMENT PLASTERING 'M' REVEAL SCREED ACCESSORY.
- 09 24 99.000X TYP. CEMENT PLASTERING EXPANSION CHANNEL W/ 1/2" REVEAL SCREED ACCESSORY.
- 10 73 16.5000 TYP. PREMANUFACTURED ALUMINUM CANOPY SYSTEM, PROVIDE SIGNED & SEALED CALCULATIONS/SHOPDRAWINGS COMPLYING W/ STRUCTURAL DESIGN LOADS.
- 21 06 20.0000 TYPICAL FIRE SUPPRESSION PIPING
- 22 14 26.2300 TYP. FACILITY STORM OVERFLOW OUTFALL FIXTURE, SEE PLUMBING. PROVIDE CONT. SEALANT AT WALL FLANGE.
- 22 42 39.0001 TYP. RECESSED EXTERIOR WALL HYDRANT, SEE PLUMBING.
- 23 81 13.R000 TYP. PACKAGED ROOFTOP UNIT, SEE MECH.

EXTERIOR FINISHES

- GROUND FACE "BURNISHED" MASONRY SEE PLAN FOR THICKNESS
- STUCCO FINISH SEE SHEET: A801



C1 EAST ENLARGED ELEVATION
 3/16" = 1'-0"

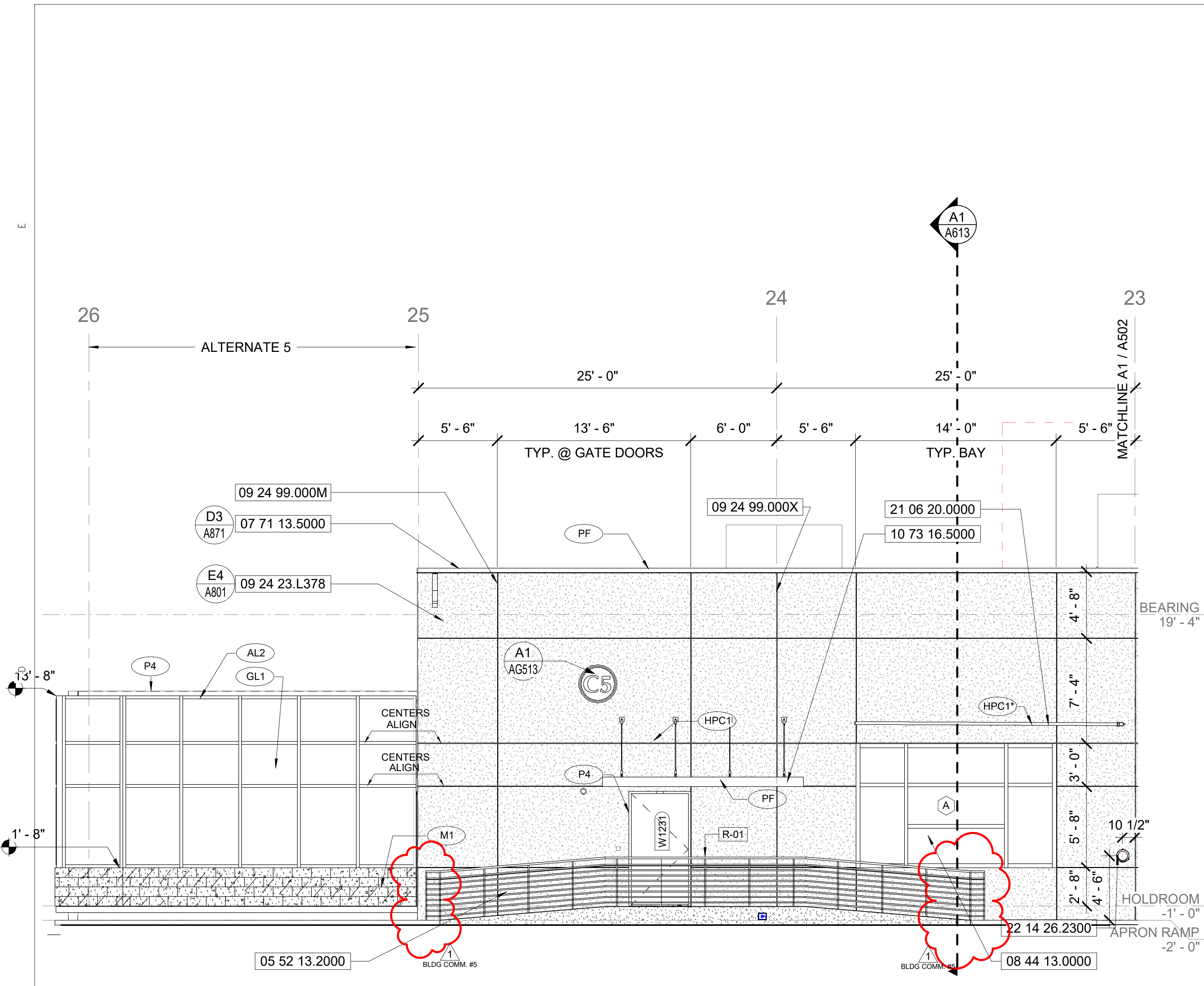


A1 EAST ENLARGED ELEVATION
 3/16" = 1'-0"

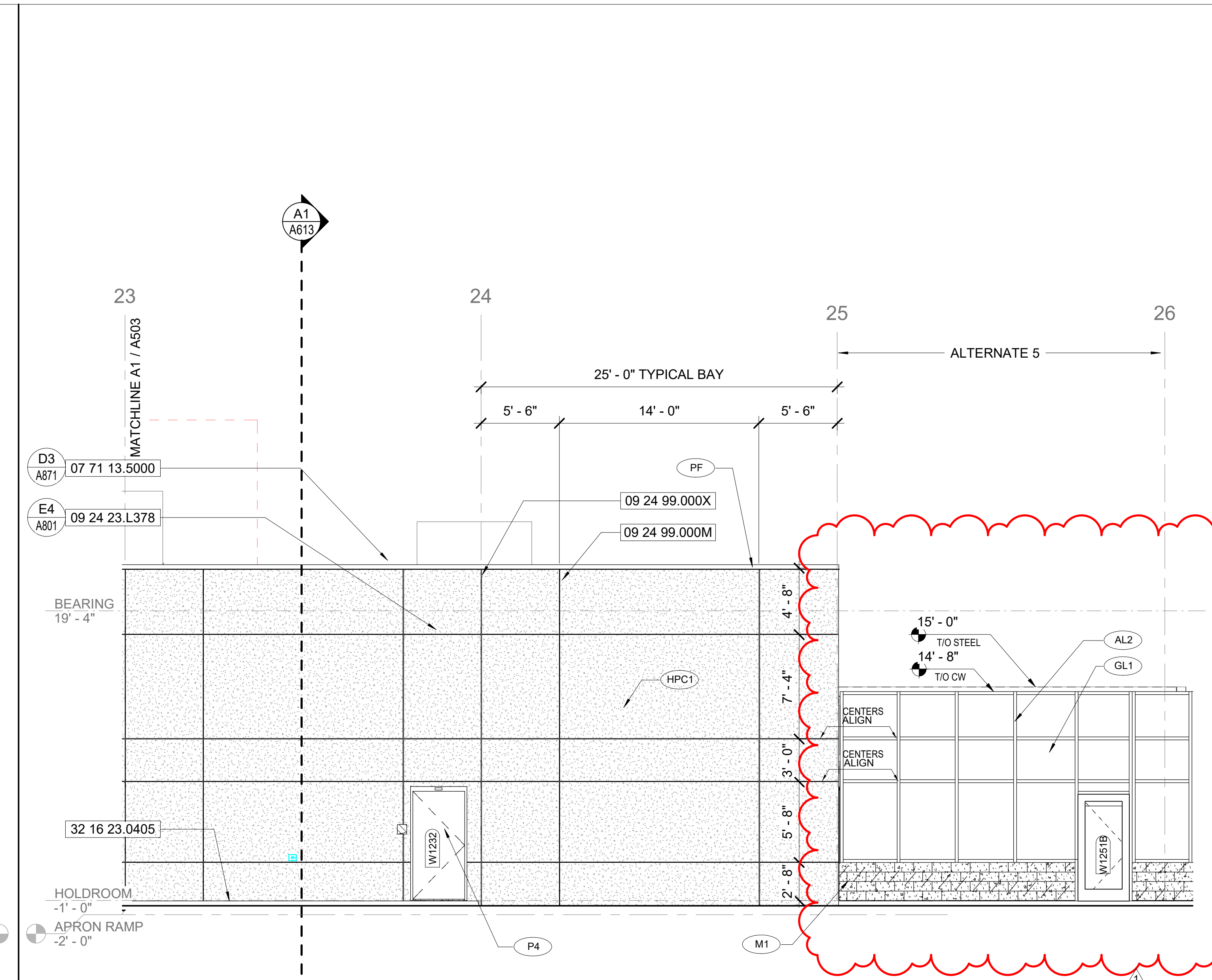
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BLM 380/Design of Satellite Concourse/VPS-MLM_A.rvt

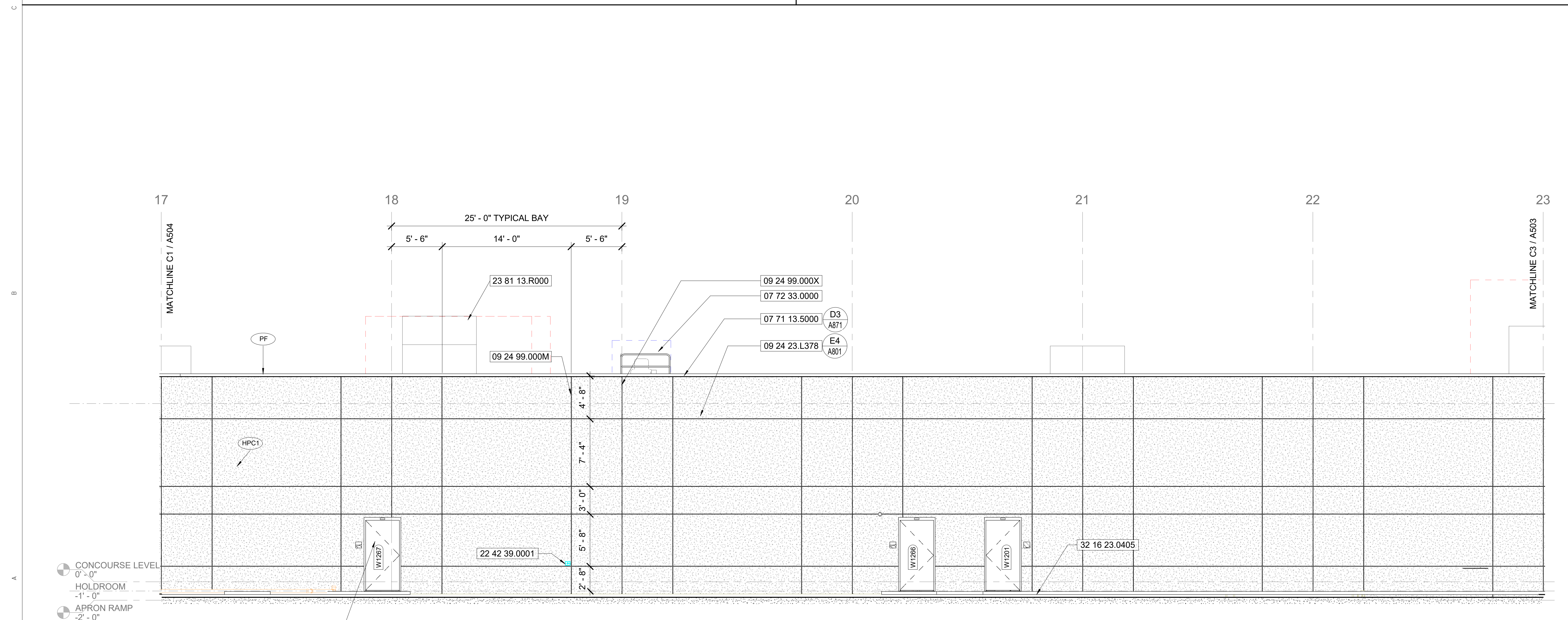
2/19/2021 5:36:46 PM



C1 EAST ENLARGED ELEVATION
3/16" = 1'-0"



C3 WEST ENLARGED ELEVATION
3/16" = 1'-0"



A1 WEST ENLARGED ELEVATION
3/16" = 1'-0"

- KEYNOTES**
- 05 52 13.2000 TYP. STAINLESS STEEL PIPE AND TUBE RAILING.
 - 07 71 13.5000 TYP. ALUMINUM MANUFACTURED COPING SYSTEM, INSTALLED PER MNFR. INSTRUCTIONS.
 - 07 72 33.0000 TYP. SINGLE-LEAF ROOF ACCESS HATCH W/ CURB AND SAFETY RAIL.
 - 08 44 13.0000 TYP. GLAZED ALUMINUM CUTAIN WALL ASSEMBLY.
 - 09 24 23.L378 TYP. SMOOTH 7/8" STUCCO, 3 COAT SYSTEM
 - 09 24 99.000M TYP. CEMENT PLASTERING 'M' REVEAL SCREED ACCESSORY.
 - 09 24 99.000X TYP. CEMENT PLASTERING EXPANSION CHANNEL W/ 1/2" REVEAL SCREED ACCESSORY.
 - 10 73 16.5000 TYP. PREMANUFACTURED ALUMINUM CANOPY SYSTEM. PROVIDE SIGNED & SEALED CALCULATIONS/SHOPDRAWINGS COMPLYING W/ STRUCTURAL DESIGN LOADS.
 - 21 06 20.0000 TYPICAL FIRE SUPPRESSION PIPING
 - 22 14 26.2300 TYP. FACILITY STORM OVERFLOW OUTFALL FIXTURE. SEE PLUMBING. PROVIDE CONT. SEALANT AT WALL FLANGE.
 - 22 42 39.0001 TYP. RECESSED EXTERIOR WALL HYDRANT. SEE PLUMBING.
 - 23 81 13.R000 TYP. PACKAGED ROOFTOP UNIT, SEE MECH.
 - 32 16 23.0405 TYP. 4" BROOM FINISHED CONCRETE SIDEWALK.

EXTERIOR FINISHES

- GROUND FACE "BURNISHED" MASONRY SEE PLAN FOR THICKNESS
- STUCCO FINISH SEE SHEET: A801

SCALE: 3/16" = 1'-0"

0 16" 32" 64" 128"



C19-2811- AP Construction of Satellite Concourse 'C'



MIGUEL ANTONIO MARTIN FL AR-98279

SEAL

Revisions

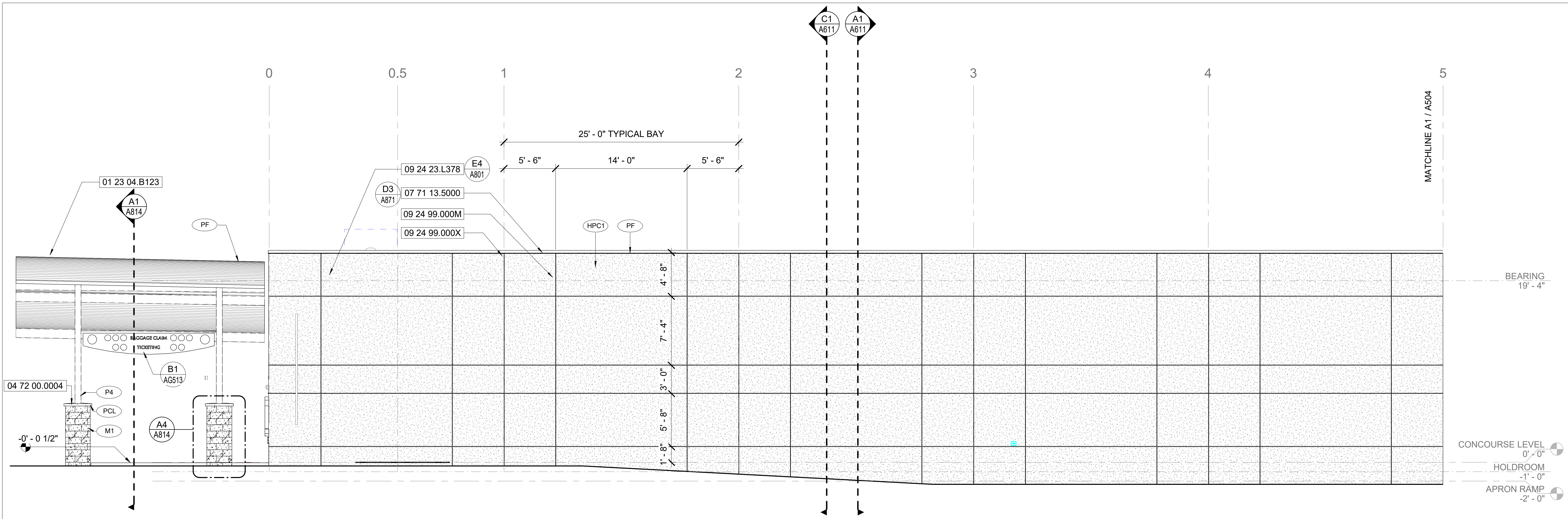
No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: **MLM-19672**
 Designed By: **MLM, MAM**
 Drawn By: **ST, CC, DM, CB**
 Checked By: **MAM**
 Issue Date: **30-NOV-2020**
 Drawing Scale: **3/16" = 1'-0"**
 Drawing Title:

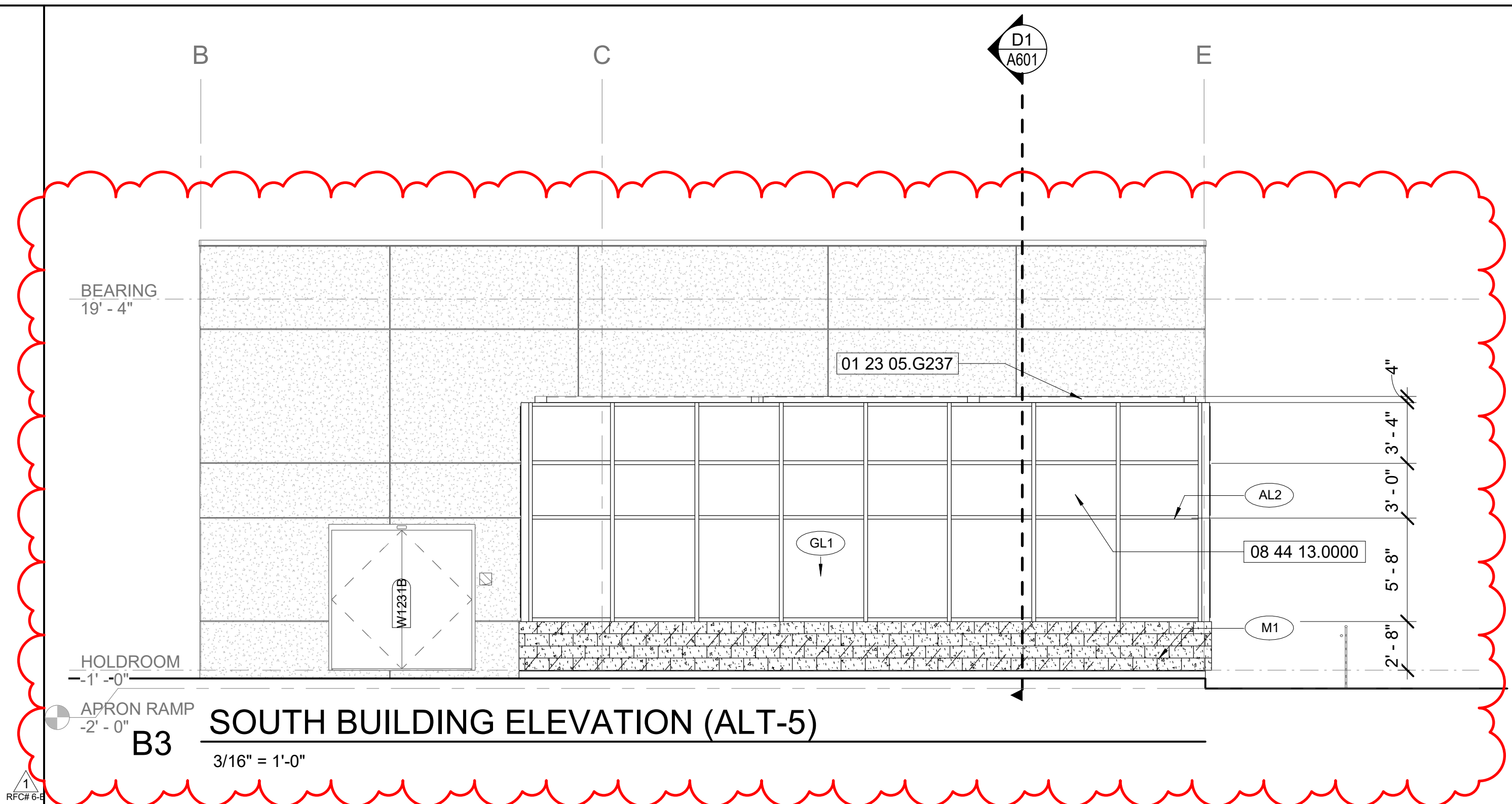
BUILDING ELEVATIONS

BID DOCUMENTS

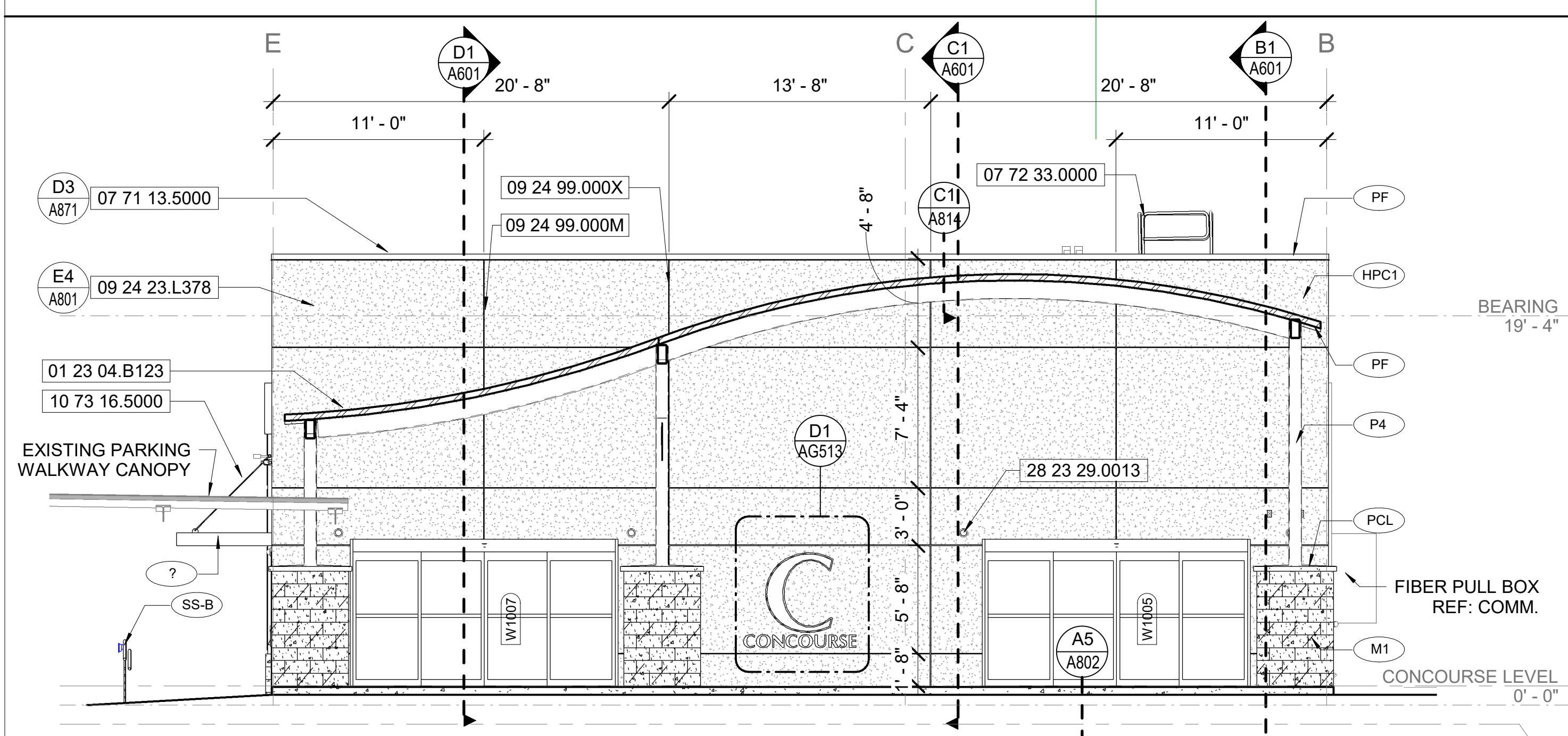
Bldg No.: **A503**



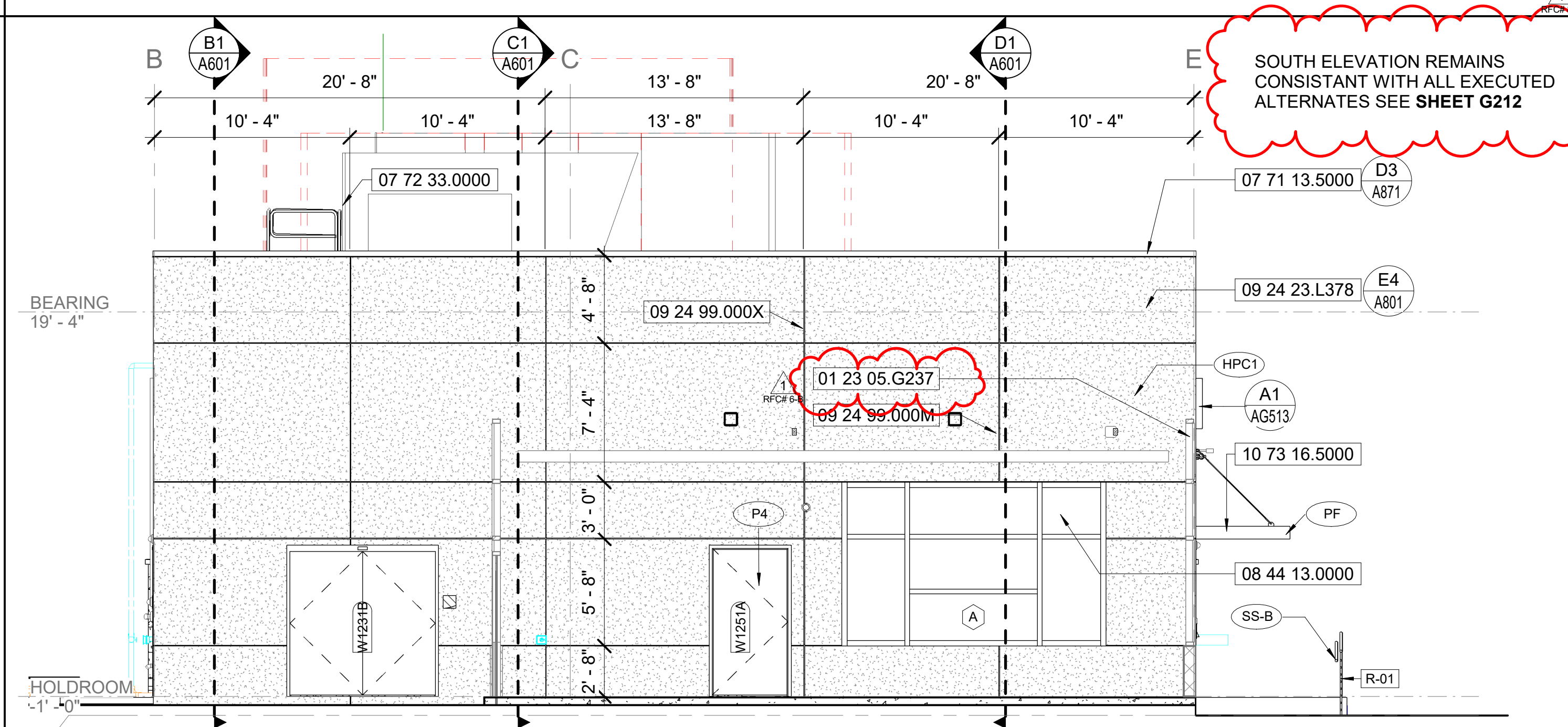
C1 WEST ENLARGED ELEVATION
3/16" = 1'-0"



B3 SOUTH BUILDING ELEVATION (ALT-5)
3/16" = 1'-0"



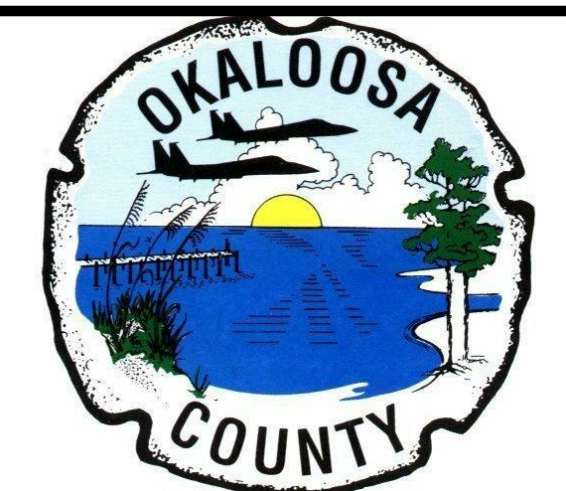
A1 NORTH BUILDING ELEVATION
3/16" = 1'-0"



A3 SOUTH BUILDING ELEVATION
3/16" = 1'-0"

KEYNOTES

- NO. 01 23 04.B123 TYP. ALTERNATE 4 CANOPY CONSTRUCTION WORK.
- 01 23 05.G237 TYP. ALTERNATE 5 EXTERIOR CONCESSIONS PLAZA WORK.
- 04 72 00.0004 TYP. CAST STONE CAP TO MATCH EXISTING, 4" TALL.
- 07 71 13.5000 TYP. ALUMINUM MANUFACTURED COPING SYSTEM, INSTALLED PER MNFR. INSTRUCTIONS.
- 07 72 33.0000 TYP. SINGLE-LEAF ROOF ACCESS HATCH W/ CURB AND SAFETY RAIL.
- 08 44 13.0000 TYP. GLAZED ALUMINUM CUTAIN WALL ASSEMBLY.
- 09 24 23.L378 TYP. SMOOTH 7/8" STUCCO, 3 COAT SYSTEM.
- 09 24 99.000M TYP. CEMENT PLASTERING 'M' REVEAL SCREED ACCESSORY.
- 09 24 99.000X TYP. CEMENT PLASTERING EXPANSION CHANNEL W/ 1/2" REVEAL SCREED ACCESSORY.
- 10 73 16.5000 TYP. PREMANUFACTURED ALUMINUM CANOPY SYSTEM. PROVIDE SIGNED & SEALED CALCULATIONS/SHOPDRAWINGS COMPLYING W/ STRUCTURAL DESIGN LOADS.
- 28 23 29.0013 TYP. VSS CAMERA, SEE SECURITY DRAWINGS.



C19-2811- AP Construction of Satellite Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

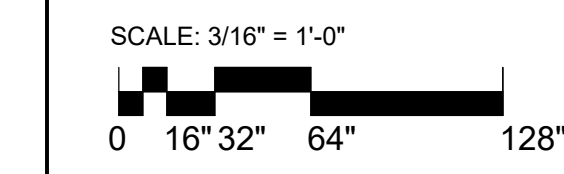
SEAL

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

EXTERIOR FINISHES

- GROUND FACE "BURNISHED" MASONRY SEE PLAN FOR THICKNESS
- STUCCO FINISH SEE SHEET: A801



Project No.: **MLM-19672**
 Designed By: **MLM, MAM**
 Drawn By: **ST, CC, DM, CB**
 Checked By: **MAM**
 Issue Date: **30-NOV-2020**
 Drawing Scale: **3/16" = 1'-0"**
 Drawing Title:
BUILDING ELEVATIONS
 BID DOCUMENTS
 Drawing No.:
A505

BMW 380/Design of Satellite Concourse/VPS-MLM_A.rvt

2/19/2021 5:37:15 PM

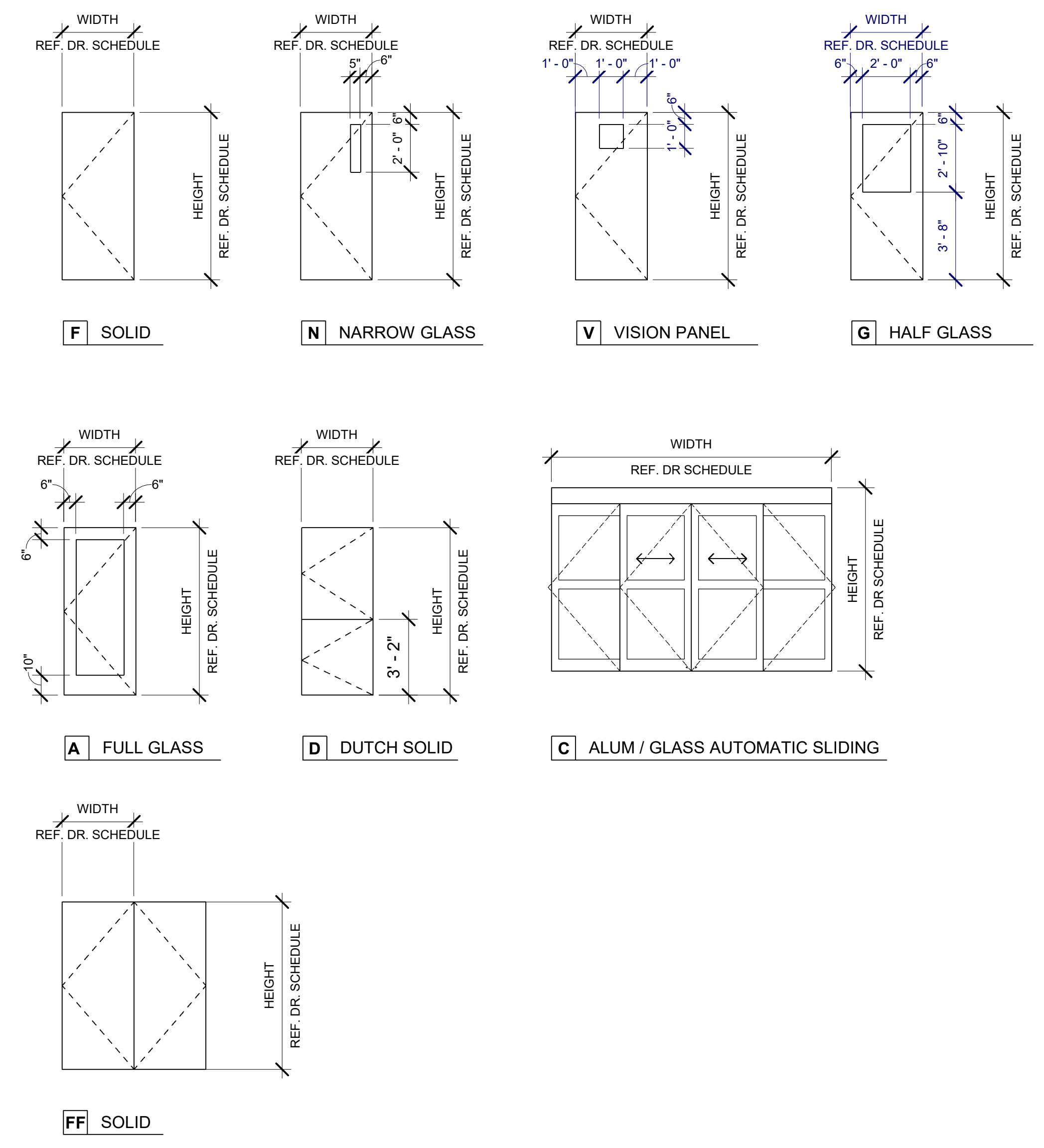
DOOR SCHEDULE

REV #	MARK	ROOM NO	TYPE	NUMBER OF LEAFS	DOOR SIZE			MATERIAL	FIRE RATING	ii	FRAME		THRESHOLD		COMMENTS	HARWARE SET
					WIDTH	HEIGHT	THICKNESS				TYPE	DETAIL	MATERIAL	DETAIL		
00_Base Bid																
No	W1001B	W1001	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		7
No	W1003	W1003	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5 SIM.	HM		ALUM		3
No	W1004	W1004	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		8
No	W1005	W1005	C	4	13'-8 1/2"	7'-0"	1 3/4"	ALUM	None	iii	B1/B2	ALUM		ALUM		1
No	W1006	W1006	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5 SIM.	HM		ALUM		6
No	W1007	W1007	C	4	13'-8 1/2"	7'-0"	1 3/4"	ALUM	None	iii	B1/B2	ALUM		ALUM		1
No	W1011	W1011	C	4	13'-8 1/2"	7'-0"	1 3/4"	ALUM	None	iii	C1/C2	ALUM		ALUM		1
No	W1013	W1013	C	4	13'-8 1/2"	7'-0"	1 3/4"	ALUM	None	iii	C1/C2	ALUM		ALUM		1
No	W1018	W1018	F	1	3'-8"	7'-10"	1 3/4"	HM	90 min	i	D4/D5 SIM.	HM		ALUM		6
No	W1051	W1051	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		9
No	W1061	W1061	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		6
No	W1062	W1062	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		5
No	W1063	W1063	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		6
No	W1064	W1064	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		4
No	W1072	W1072	F	1	4'-0"	7'-10"	1 3/4"	HM	45 min	i	B4/B5	HM		ALUM		10
No	W1081	W1081	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		5
No	W1114	W1114	F	1	4'-0"	7'-10"	1 3/4"	HM	45 min	i	B4/B5	HM		ALUM		10
Yes 1	W1231B	W1231	FF	2	3'-10"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM	1	12
Yes 1	W1251A	W1251	F	1	4'-0"	7'-10"	1 3/4"	HM	45 min	i	B4/B5	HM		ALUM	2	11
No	W1276	W1276	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	E4/E5	HM		ALUM		5
No	W1277	W1277	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		8
No	W1278	W1278	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		8
No	W1279	W1279	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		6
No	W1282	W1282	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		6
No	W1283	W1283	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	E4/E5	HM		ALUM		3
No	W1285	W1285	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		3
01_Alternate 1																
No	W1121	W1121	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		9
No	W1141	W1141	F	1	4'-0"	7'-10"	1 3/4"	HM	45 min	i	B4/B5	HM		ALUM		10
No	W1151	W1151	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		9
02_Alternate 2																
No	W1183	W1183	F	1	4'-0"	7'-10"	1 3/4"	HM	45 min	i	B4/B5	HM		ALUM		10
No	W1201	W1201	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		9
No	W1266	W1266	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		8
No	W1267	W1267	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		8
No	W1268	W1268	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		6
No	W1270	W1270	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		6
No	W1271	W1271	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	E4/E5	HM		ALUM		3
No	W1273	W1273	F	1	3'-8"	7'-10"	1 3/4"	HM	NONE	i	D4/D5	HM		ALUM		3
03_Alternate 3																
No	W1231	W1231	F	1	4'-0"	7'-10"	1 3/4"	HM	45 min	i	B4/B5	HM		ALUM		10
No	W1232	W1232	F	1	3'-8"	7'-8"	1 3/4"	HM	NONE	ii	B4/B5	HM		ALUM		9
05_Alternate 5																
Yes 1	W1251B	W1251	A	1	3'-7"	7'-10"	2 1/8"	ALUM	NONE	i		ALUM		ALUM		9

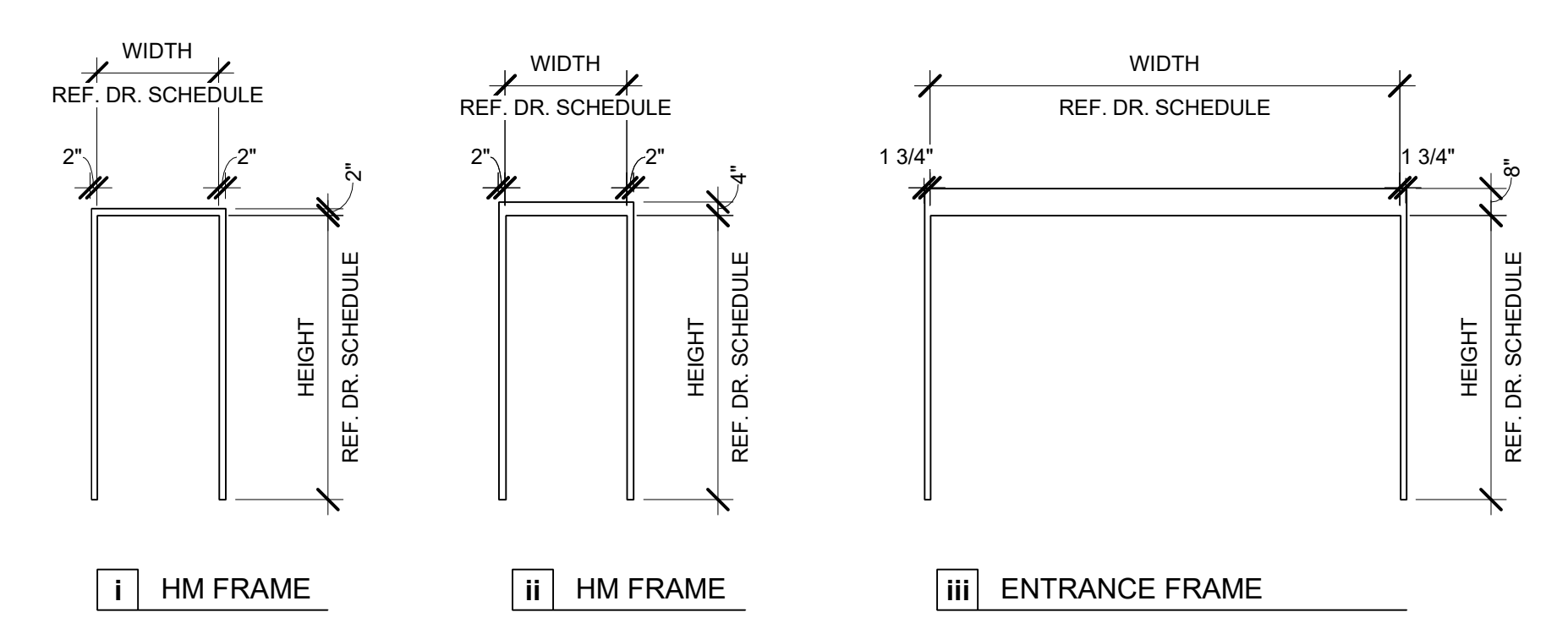
NOTICE:
SCHEDULE(S) REVISED
WHEN THIS AREA IS CLOUDED



DOOR TYPES



FRAME TYPES



GENERAL NOTES

- SEE SPECIFICATION SECTION 08 71 00 FOR HARDWARE GROUPS, SECTION 08 8000 FOR GLASS TYPE OF DOORS & WINDOWS.
- REFERENCE FINISH SCHEDULE FOR ADDITIONAL DOOR & FRAME FINISH INFORMATION.
- SEE PARTITION SCHEDULE FOR DEPTH OF ALL DOORS & WINDOWS IN GYP. BOARD WALLS.
- RIGHT HAND DOOR SHALL BE ACTIVE LEAF FOR DOUBLE DOORS.
- EXTERIOR DOORS - MAXIMUM EFFORT TO OPERATE DOORS SHALL NOT EXCEED 5 LBS.
- INTERIOR DOORS - MAXIMUM EFFORT TO OPERATE DOORS SHALL NOT EXCEED 5 LBS.
- MAXIMUM EFFORT TO OPERATE DOOR SHALL NOT EXCEED 15 LBS. FOR INTERIOR AND EXTERIOR FIRE DOORS.
- TYPICAL JAMB DIMENSIONS TO ADJACENT PARTITIONS ON HINGE SIDE OF DOOR OPENINGS: 8" AT CMU & 4" AT STUD PARTITIONS U.O.N.
- ALL WOOD DOORS ARE TO BE UNDERCUT AS REQUIRED FOR FLOOR FINISHES & SPECIFICATIONS.
- WIDTH / HEIGHT DIMENSIONS ARE LEAF OPENING SIZE
- FOR DOORS IN MASONRY CONDITIONS, PROVIDE DOOR FRAME WITH 4" HEAD WIDTH FOR TOP OF FRAME.
- FINISH AT MASONRY COURSING, WHERE OCCURS. CONTRACTOR TO VERIFY IN FIELD AND COORDINATE ALL LOCATIONS.
- ALL DETAILS MARKED IN SCHEDULE: SEE SHEET: A881

SCHEDULE COMMENTS

- ACS For Ramp Side Delivery
- ALWAYS UNLOCKED FROM 1281

BIDD COMM #1

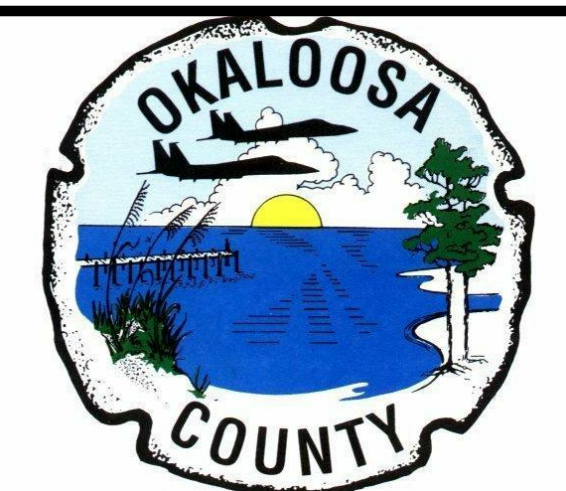
SUBMITTAL

EXTERIOR DOORS--(FOR EACH TYPE AND SIZE INSTALLED)--PROVIDE ONE OF THE FOLLOWING (TO INCLUDE COVER PAGE AND INSTALLATION DETAILS): FLORIDA PRODUCT APPROVAL, MIAMI DADE NOA, OR (ICC-ES) NER. DOCUMENTS ARE TO BE PROVIDED BY THE SAME ROUTING METHOD AS DRAWINGS WERE SUBMITTED TO GROWTH MANAGEMENT. THIS IS TO BE SUBMITTED BEFORE A FRAMING INSPECTION. BUILDER WILL NOT BE ABLE TO SCHEDULE A FRAMING INSPECTION UNTIL A RESPONSE IS APPROVED. 2017 FBC 104.9, 107.2.1; FLORIDA ADMINISTRATIVE CODE 9B-72.005

MATERIAL LEGEND

GLASS TYPES:
1 = 1/4" 20 MIN. RATED CLEAR TEMPERED GLASS
2 = 1/4" CLEAR TEMPERED GLASS
3 = 1 7/16" 90 MIN. RATED LAMINATED GLASS (NOTE: ALL GLASS IN DOORS, SIDELITES OR TRANSOMS TO BE SAFETY GLASS.)

MATERIALS:
ALUM = ALUMINUM
GL = GLASS
SS = STAINLESS STEEL
WD = WOOD
HM = HOLLOW METAL
WWM = WELDED WIRE MESH
DET = DETENTION DOOR



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: **MLM-19672**
Designed By: **MLM, MAM**
Drawn By: **ST, CC, DM, CB**
Checked By: **MAM**
Issue Date: **30-NOV-2020**
Drawing Scale: **NO SCALE**
Drawing Title:

DOOR SCHEDULE

BID DOCUMENTS

Drawing No.: **A711**



C19-2811- AP
Construction
of Satellite
Concourse 'C'



MIGUEL ANTONIO MARTIN
FL AR-98279

SEAL

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

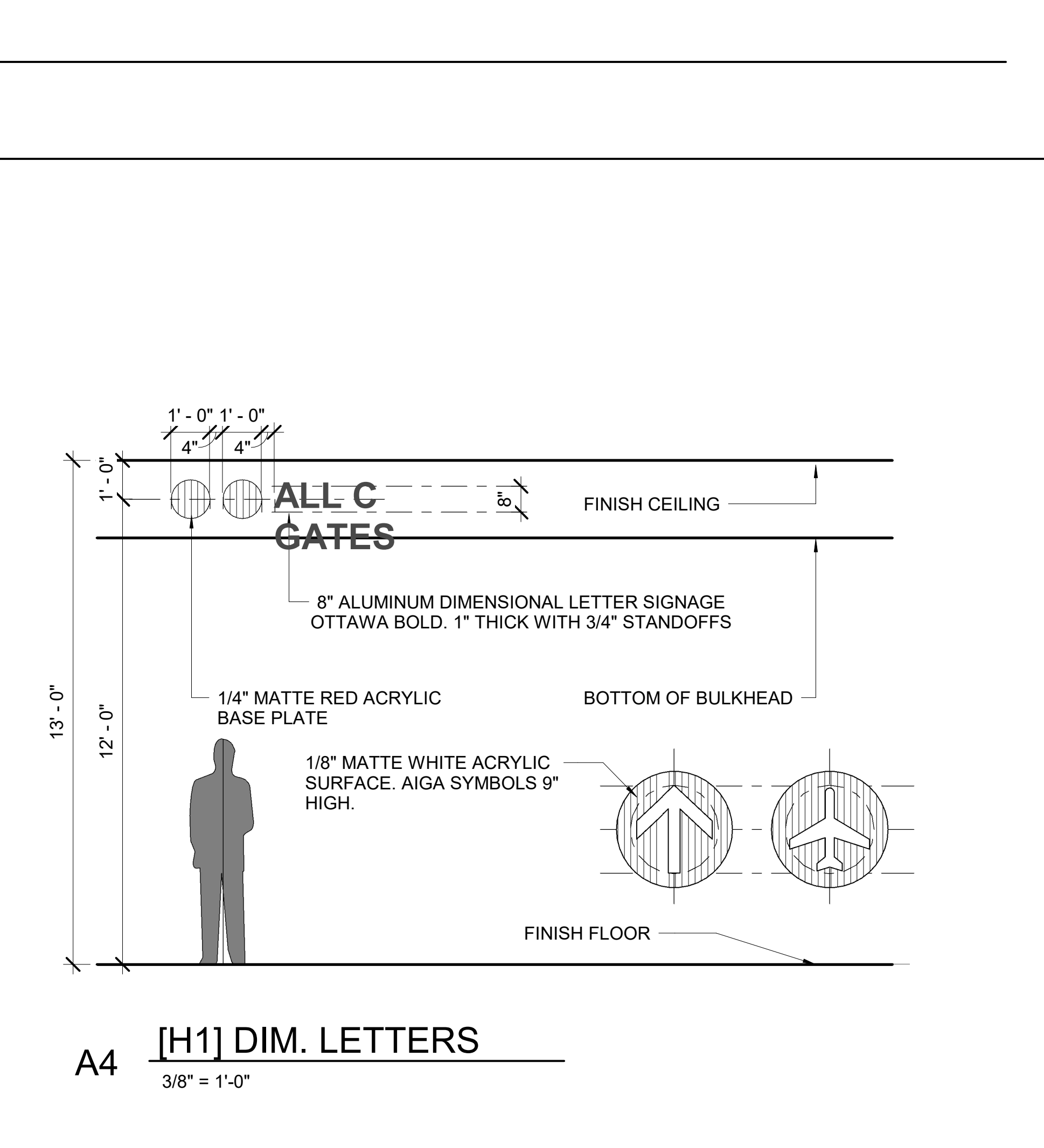
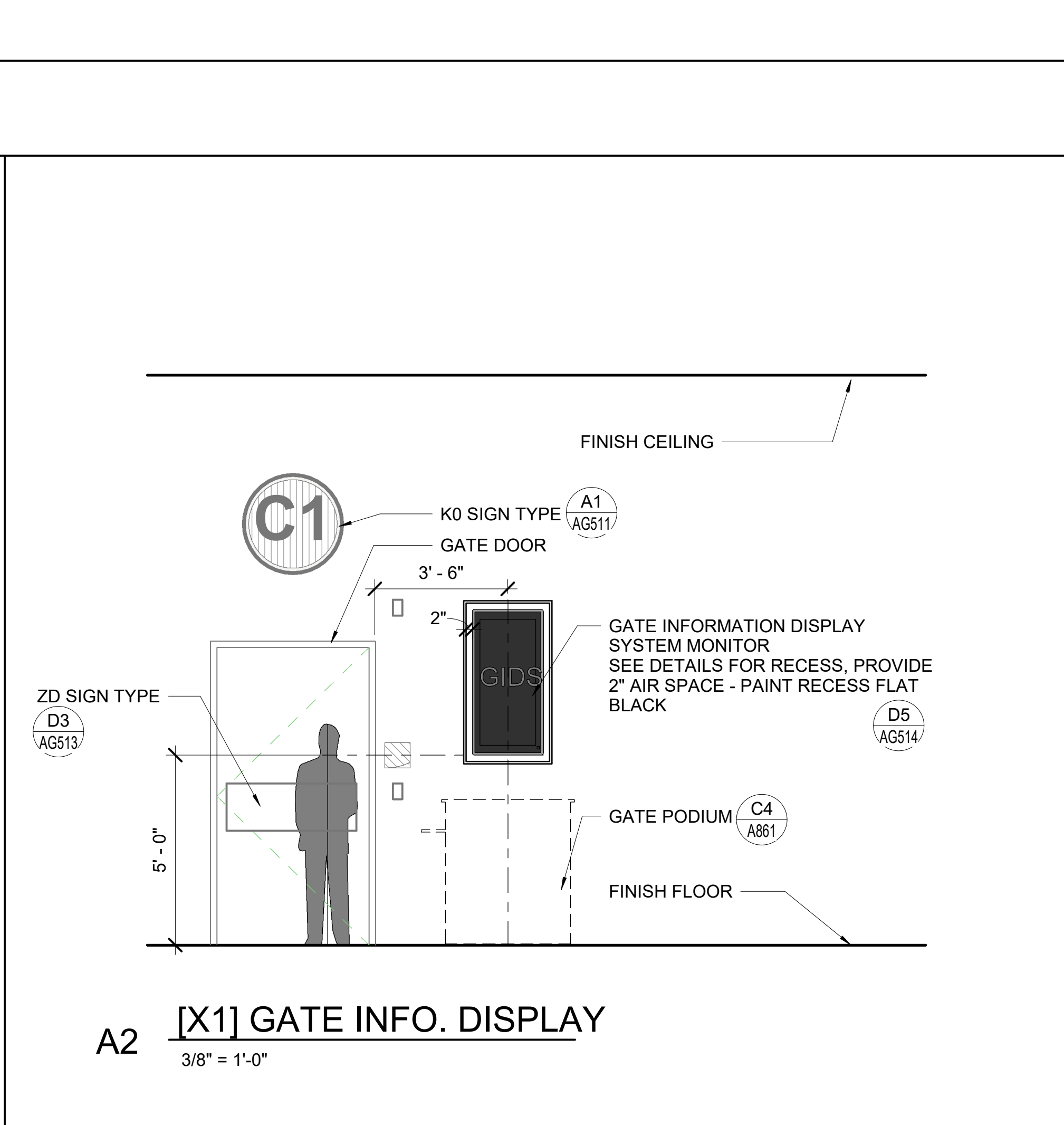
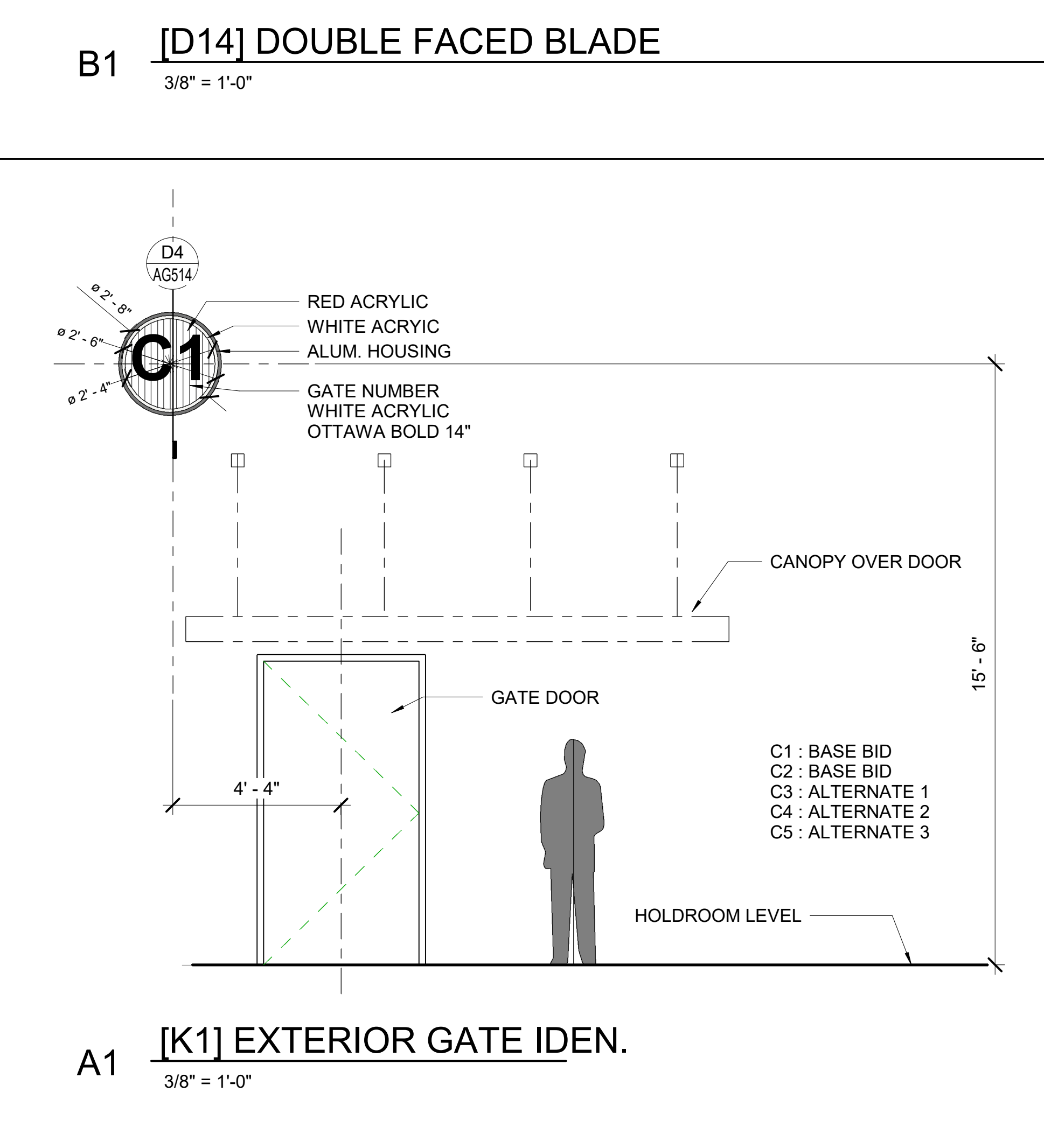
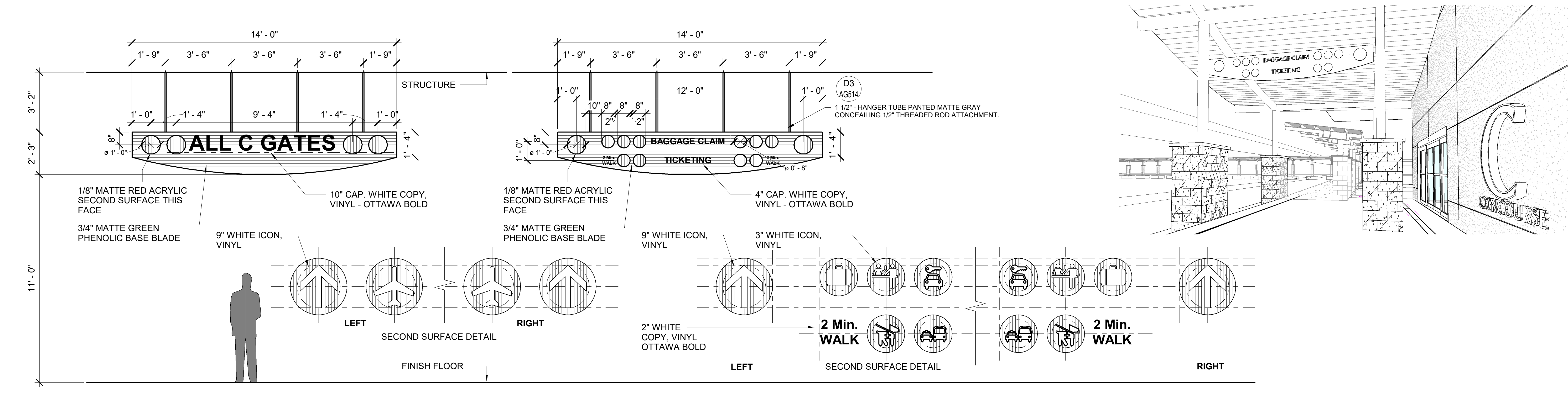
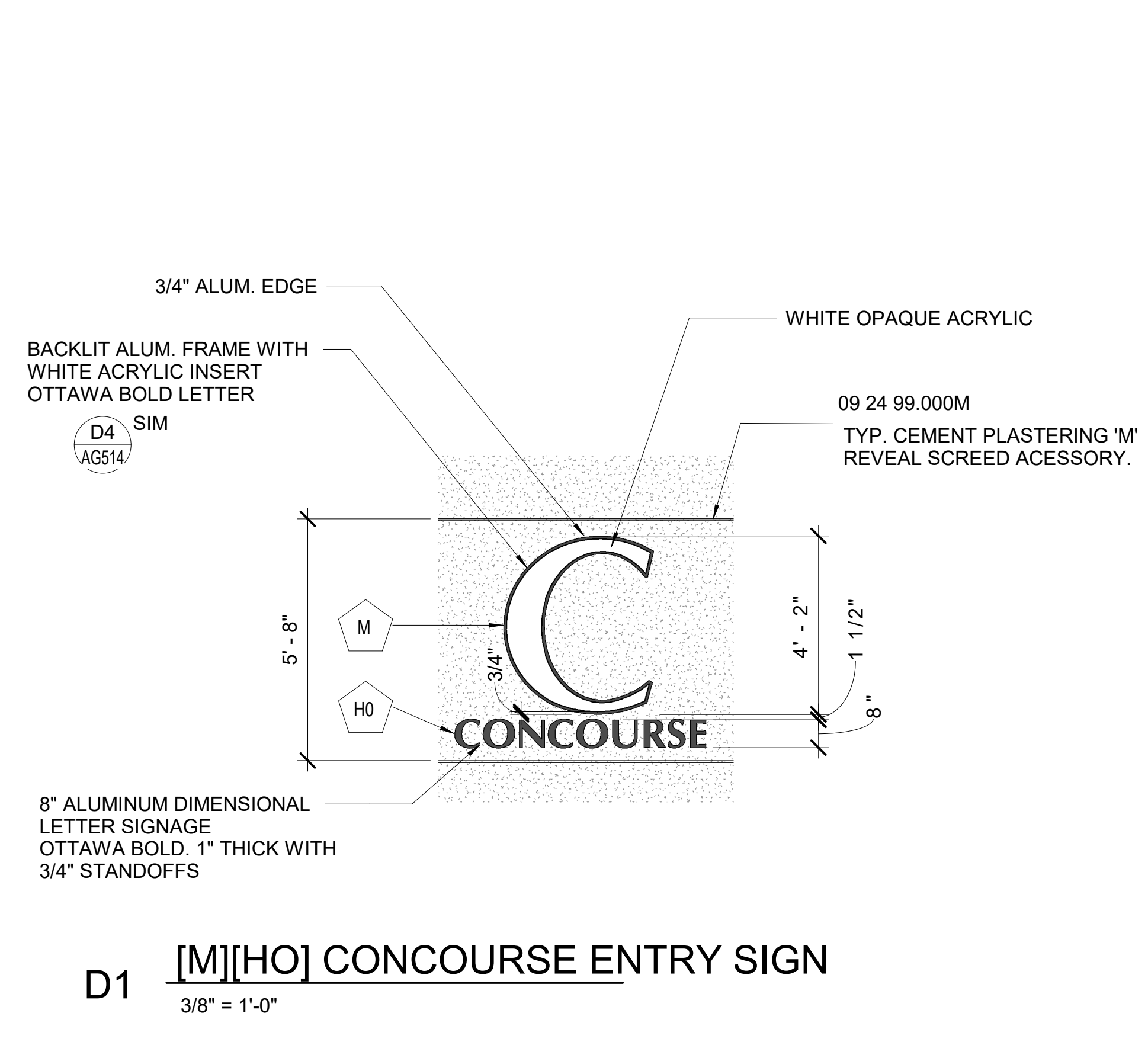
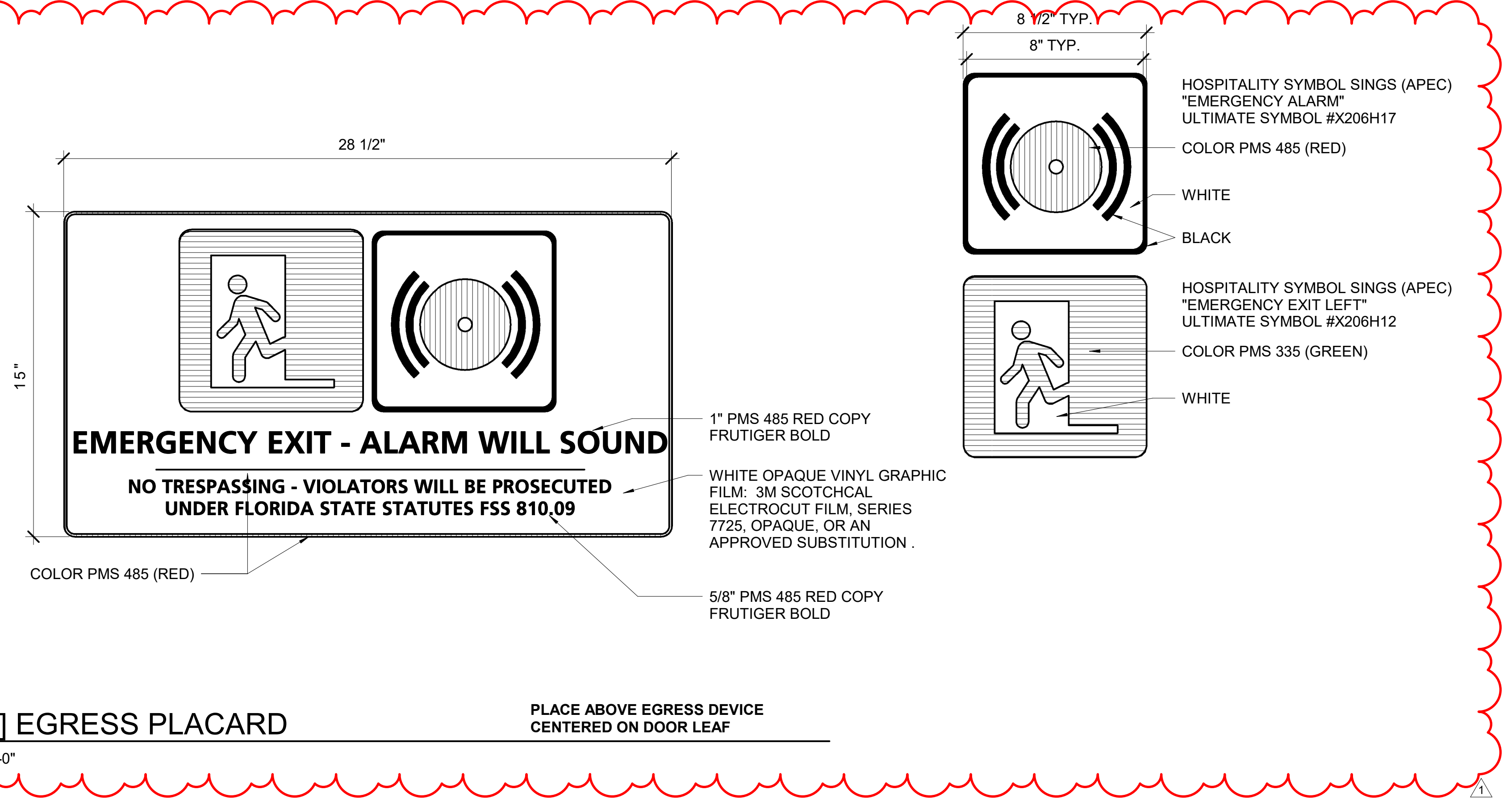
Project No.: **MLM-19672**
Designed By: **MLM, MAM**
Drawn By: **ST, CC, DM, CB**
Checked By: **MAM**
Issue Date: **30-NOV-2020**
Drawing Scale: **As indicated**
Drawing Title:

**SIGN TYPE
ELEVATIONS**

BID DOCUMENTS

Drawing No.:

AG513



NOTES

- REFER TO A441 FOR PARTITION TYPES
- FOR DOOR TYPES AND SCHEDULES REFER TO SHEET SERIES A711
- REFER TO ELECTRICAL, TELECOM AV, AND SIGNAGE DRAWINGS FOR OUTLET INFORMATION.
- REFER TO A SERIES SHEETS FOR DIMENSIONS
- AREA DESIGNATED FOR FUTURE WORK (NIC), CONTRACTOR SHALL KEEP THIS AREA CLEAR OF ANY BUILT ELEMENTS ABOVE AND/OR BELOW GROUND UNLESS OTHERWISE NOTED WITHIN THE SCOPE OF THIS PROJECT.
- ALL GRADE II BRAILLE IS PRESENTED FOR GRAPHIC REPRESENTATION. CONTRACTOR TO COORDINATE WITH FABRICATOR THAT ACTUAL BRAILLE PRODUCED TRANSLATES THE COPY PROVIDED.
- MESSAGES ILLUSTRATED IN DRAWINGS ARE NOT ACTUAL MESSAGES BUT FOR LAYOUT PURPOSES ONLY. SEE MESSAGE SCHEDULE FOR SPECIFIC MESSAGES. NOTE THAT BID ISSUE OF THE MESSAGE SCHEDULE IS DRAFT LEVEL AND IS TO BE UPDATED BY FABRICATOR THROUGHOUT PROJECT CONSTRUCTION SUBMITTAL PROCESS.
- SIGN LOCATION PLAN SYMBOLS INDICATE GENERAL SIGN LOCATIONS. THEY ARE NOT REPRESENTATIVE OF ACTUAL SIGN SIZES OR OR LOCATIONS. SEE MOUNTING DETAILS FOR MOUNTING LOCATION INFORMATION. CONDUCT PRE-CONSTRUCTION MEETING IN FIELD WITH AIRPORT AND ARCHITECT TO ESTABLISH PROTOTYPICAL LOCATIONS AND HEIGHTS FOR EACH SIGN TYPE.
- FABRICATOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND THEIR IMPACT ON FINAL SIGN DIMENSIONS PRIOR TO FABRICATION
- SUBSTITUTE TYPEFACES, ARROWS OR SYMBOLS WILL NOT BE ACCEPTED. ALL SYMBOLS TO BE STANDARD F.A.A., AIGA, DOT, ANSI, ADA SYMBOLS. IF NECESSARY, CONTACT ARCHITECT FOR INFORMATION ON AVAILABILITY. ALL FASTENERS TO BE CONCEALED AND VANDAL RESISTANT UNLESS OTHERWISE NOTED.
- FABRICATOR TO BE RESPONSIBLE FOR PULLING ALL PERMITS AND COORDINATING ALL INSPECTIONS REQUIRED IN CONNECTION WITH THE WORK.
- SIGN LOCATION SYMBOLS IN PLAN ASSIGNED SHOULD BE CROSS REFERENCED TO ELEVATION FOR INDICATION THAT SIGN IS DOUBLE FACED. PROJECTIONS SIGNS ARE ALSO DOUBLE FACED.
- FABRICATOR SHALL BE RESPONSIBLE FOR PREPARATION OF ITS SUBMITTALS AND PULLING OF ALL NECESSARY PERMITS AND VARIANCES. (IF APPLICABLE), INCLUDING SUBMITTALS FOR OTHER RELATED REVIEW COMMITTEES FOR THIS PROJECT'S JURISDICTION. TASKS ALSO INCLUDE COORDINATION OF ALL INSPECTIONS REQUIRED IN CONNECTION WITH THE WORK.
- FABRICATOR SHALL BE RESPONSIBLE FOR LAYOUT AND PRODUCTION OF FULL SIZE TEMPLATES FOR ALL DIMENSIONAL LETTERS AND OTHER SPECIALIZED FORMATS. THESE ALSO REQUIRE THE FIELD REVIEW BY OWNER, ARCHITECT AND OTHER DESIGN PROFESSIONALS.
- FOR SIGNS IN WHICH THE MOUNTING LOCATION IS REQUIRED TO BE ON GLASS, FABRICATOR SHALL PROVIDE VINYL SHEET PRECISION MEASURED TO SIZE OF SIGN AND APPLIED TO REVERSE SIDE OF GLASS. THE VINYL COLOR SHALL MATCH THE COLOR OF THE SIGN. THE SIGN AND ITS DOUBLE FACED TAPE ARE TO BE APPLIED TO THE VIEWING SIDE OF GLASS. THE "BACKER" VINYL SHALL BE OPTICALLY POSITIONED, SO NO "BACKER" VINYL IS SEEN.
- DETAILS SHOWN ARE DESIGN INTENT ONLY. CONTRACTOR TO PROVIDE SHOP DRAWINGS AND STRUCTURAL CALLUTIONS TO BE REVIEWED BY DESIGNER AND A41.

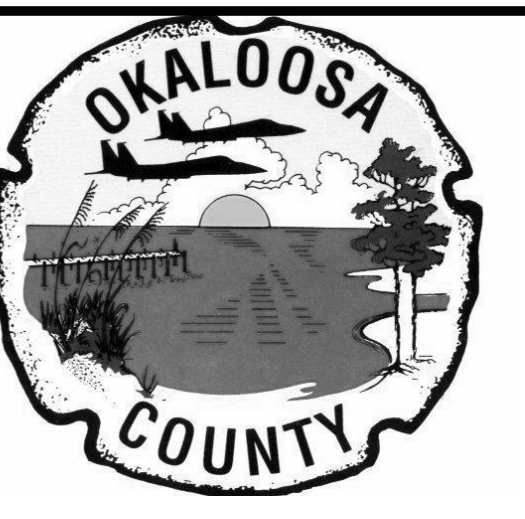
COLOR LEGEND

	ALUMINUM ANODIZED
	MATTHEWS "RED" - [7A-2A] PMS-179C
	BRISTOL "BLUE" - [75A-4A] PMS-5483C
	CASTLE KEEP "GREEN" - [62C-4D] PMS-7475C
	WHITE
	WHITE TEXT U.O.N.

ELEVATION INDEX

M H0	ZD
D14	
K1	X1 H1





C19-2811-AP
Design of
Satellite
Concourse 'C'

Burns

BURNS ENGINEERING, INC. | 215 928-5700
TWO CONGRESS SQUARE
201 MARKET ST, SUITE 400
PHILADELPHIA, PA 19106



668 N. ORLANDO AVE
SUITE 107
MAITLAND, FL 32751
407.897.6764 (VOICE)
407.894.1338 (FAX)
WWW.MLM-MARTIN.COM

SEAL

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: **Project Number**
Designed By: **BA**
Drawn By:
Checked By: **CMC**
Issue Date: **30-NOV-2020**
Drawing Scale: **As indicated**
Drawing Title:

**ENLARGED FLOOR
PLAN LEVEL 1 -
AREA 2**
BID DOCUMENT

Drawing No.:

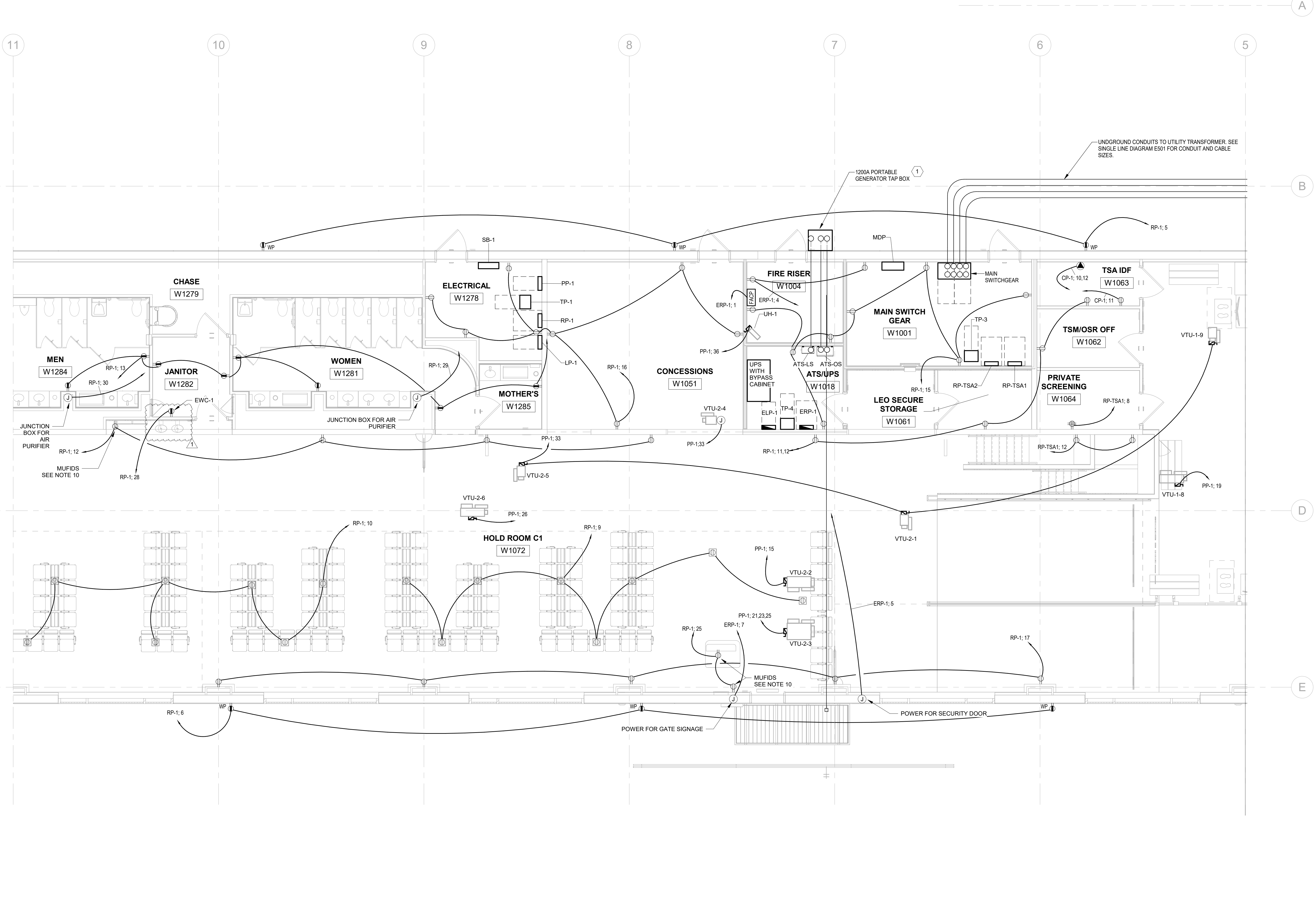
E212

- GENERAL ELECTRICAL NOTES:**
- SEE SHEET E000 FOR ELECTRICAL LEGEND, SYMBOLS, GENERAL NOTES & ABBREVIATIONS.
 - SEE SHEETS E601-E603 FOR SWITCHBOARD AND PANEL SCHEDULES.
 - SEE SHEET E604 FOR LIGHTING FIXTURE SCHEDULE.
 - SEE SHEET E801 FOR ELECTRICAL DETAILS.
 - REFER TO MECHANICAL DRAWINGS FOR MORE DETAILS ON HVAC EQUIPMENT.
 - FOR THE ACTUAL SERVICE ENTRANCE RUNS AND LOCATION OF PROPOSED GULF POWER UTILITY TRANSFORMER PAD, REFER TO THE CIVIL DRAWINGS PACKAGE.
 - ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL 480V CABLES FROM THE SECONDARY SIDE OF THE SERVICE TRANSFORMERS TO THE MAIN SWITCHGEAR IN THE MAIN ELECTRICAL ROOM.
 - ALL OUTDOOR ELECTRICAL EQUIPMENT SHALL BE NEMA 3R.
 - VAV TERMINAL UNIT INTEGRAL FUSED DISCONNECT SWITCH PROVIDED BY UNIT MANUFACTURER.
 - COORDINATE MUFIDS RECEPTACLE MOUNTING HEIGHT WITH ARCHITECTURAL DRAWINGS.

- ELECTRICAL - ADD ALTERNATE NOTES:**
- ELECTRICAL CONTRACTOR SHALL PRICE WORK FOR ADD ALTERNATES IN AREAS AS CALLED OUT ON ARCHITECTURAL DRAWINGS AND AS DEFINED ON SHEET G211. INCLUDE MATERIALS AND LABOR COST FOR ADD ALTERNATES AS REQUIRED.
 - INCLUDE MATERIALS AND LABOR COST FOR PANEL PP-2 (LOCATED IN ADD ALTERNATE #2) IN ADD ALTERNATE #1 BID PRICE. IF ADD ALTERNATE #1 IS SELECTED, BUT ADD ALTERNATE #2 IS NOT, ALL CIRCUITING FOR DEVICES WITHIN ADD ALTERNATE #1 SHALL BE CIRCUITED TO SPARE CIRCUIT BREAKERS IN PANELS IN ELECTRIC ROOM W1278.
 - ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ARCHITECT FOR DELINEATION AND DOCUMENTATION TO INCLUDE ADD ALTERNATES.

KEYED NOTES

- 1 PROVIDE TAP BOX WITH NEMA 3R RATING. MOUNT ON PAD. PROVIDE ADDITIONAL LUGS FOR CONNECTION ON INTERIOR TO (2) MANUAL TRANSFER SWITCHES AS SHOWN ON SINGLE LINE DIAGRAM ON E501. PROVIDE PHASE ROTATION MONITOR KIT. PROVIDE POWERTRON 1200A UNIT OR APPROVED EQUAL. PROVIDE KIRK KEY INTERLOCK FEATURE WITH CONNECTION TO KIRK KEY AT SWITCHBOARD MAIN CIRCUIT BREAKER SO THAT ONLY ONE SOURCE CAN PROVIDE POWER TO THE BUILDING AT A TIME.



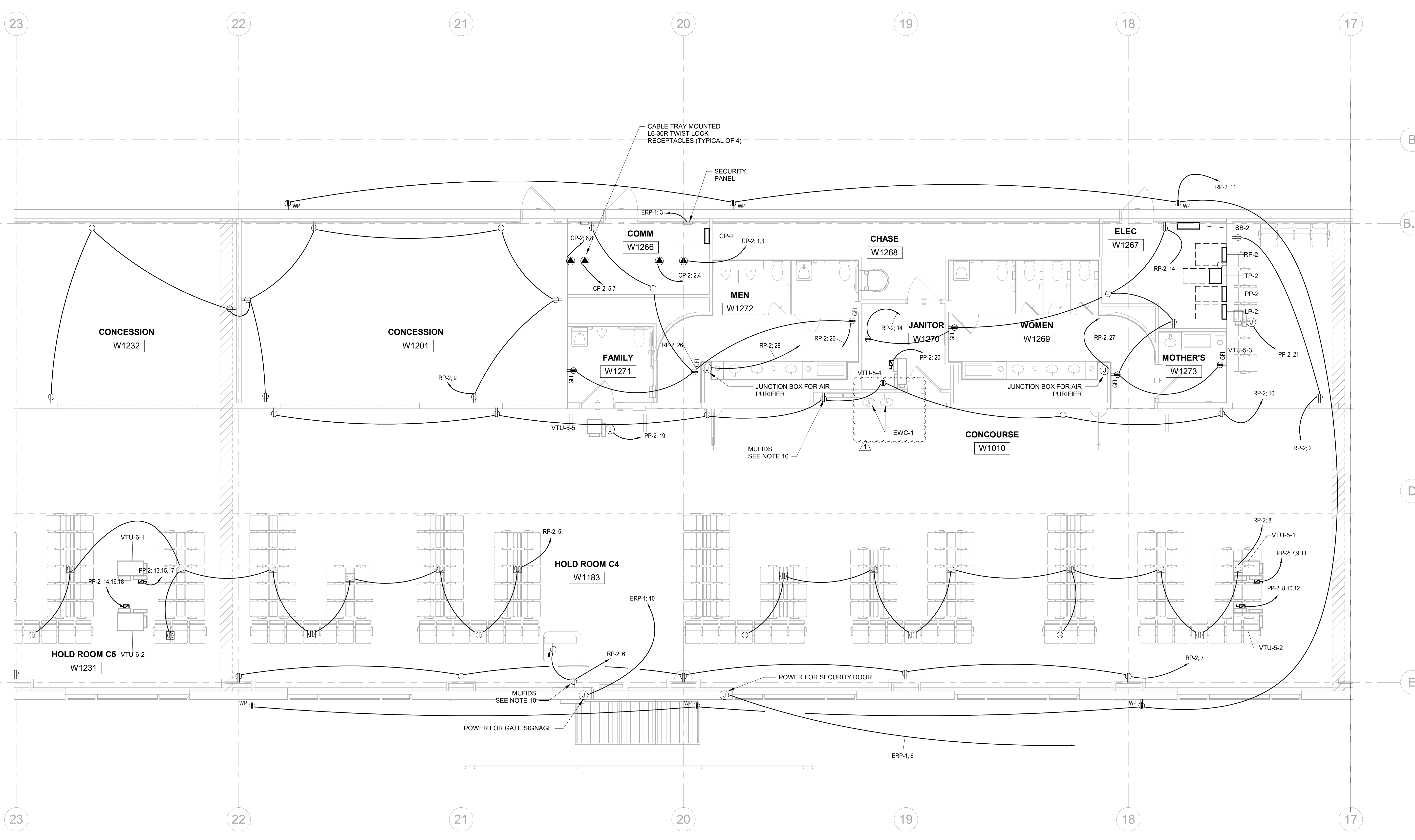
1 LEVEL 1 - POWER - AREA 2
3/16" = 1'-0"

B:\360\Design of Satellite Concourse\NPS_ET\STCFA.rvt

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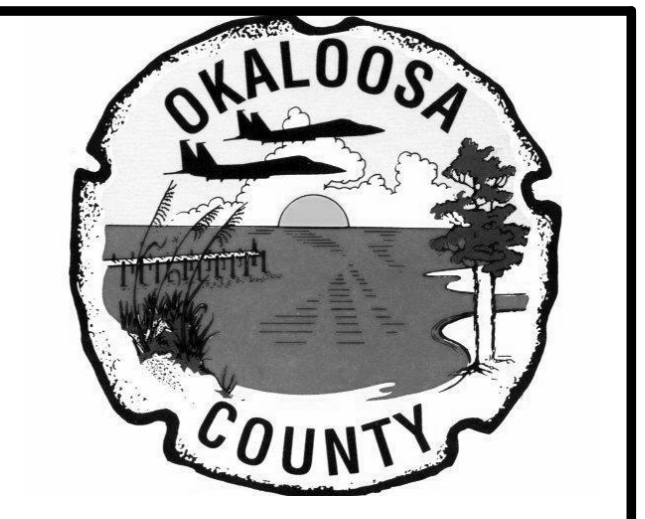
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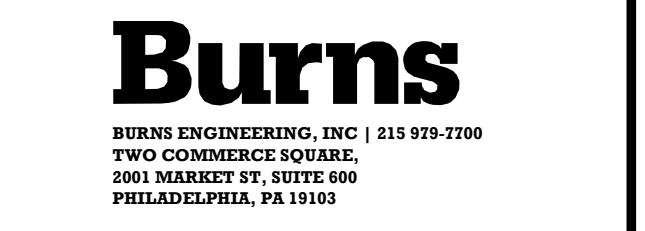
1 LEVEL 1 - POWER - AREA 5
3/16" = 1'-0"

- GENERAL ELECTRICAL NOTES:**
- SEE SHEET E000 FOR ELECTRICAL LEGEND, SYMBOLS, GENERAL NOTES & ABBREVIATIONS.
 - SEE SHEETS E601-E603 FOR SWITCHBOARD AND PANEL SCHEDULES.
 - SEE SHEET E604 FOR LIGHTING FIXTURE SCHEDULE.
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 - ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ARCHITECT FOR DELINEATION AND DOCUMENTATION TO INCLUDE ADD ALTERNATES.



C19-2811-AP
Design of
Satellite
Concourse 'C'



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SUITE 107
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WWW.MLM-MARTIN.COM
ALC020208
02/15/2021 FOR PROPERTY ARCHITECTS, INC.

SEAL

Revisions

No.	Date	Description
1	15-FEB-2021	ADDENDUM 001

Project No.: **Project Number**
Designed By: **BA**
Drawn By:
Checked By: **CMC**
Issue Date: **30-NOV-2020**
Drawing Scale:
Drawing Title:

**ENLARGED FLOOR
PLAN LEVEL 1 -
AREA 5**
BID DOCUMENT

Drawing No.:
E215

PRE-BID MEETING SIGN-IN SHEET

Wednesday 17 February, 2021, 11:00 a.m. (CST)

Satellite Concourse C
Destin-Fort Walton Beach Airport

NAME	REPRESENTING	TELEPHONE	E-MAIL ADDRESS
Tracy Stage	Okaloosa County Airports	850-651-7160	tstage@myokaloosa.com
Chad Rogers	Okaloosa County Airports	850-651-7160	rrogers@myokaloosa.com
Allyson Oury	Okaloosa County Airports	850-651-7160	aoury@myokaloosa.com
Mike Stenson	Okaloosa County Airports	850-651-7160	mstenson@myokaloosa.com
Raymond Beasley	Okaloosa County Airports	850-651-7160	rbeasley@myokaloosa.com
Stephen Saxer	Okaloosa County Airports	850-651-7160	ssaxer@myokaloosa.com
Carrol Arrieta	Okaloosa County Airports	850-651-7160	carrieta@myokaloosa.com
Miguel Martin	MLM-Martin Architects, Inc,	407-897-6764	MAMartin@mlm-martin.com
Lance Olsen	Digital Building Services, LLC	305-202-1208	lolsen@dbuilds.com

PRE-BID MEETING SIGN-IN SHEET

Wednesday 17 February, 2021, 11:00 a.m. (CST)

Satellite Concourse C
Destin-Fort Walton Beach Airport

NAME	REPRESENTING	TELEPHONE	E-MAIL ADDRESS
Jamie Gartman	Drace Construction	228-244-0100	estimating@dracecorp.com
Richard Ausdron	Vintage Signs & Lights	850-389-8585 (c) 404-335-8130	richard@vintagesignandlight.com
Rob Brethauer	AERO Bridge Works, Inc.	404-307-8635	rob.brethauer@aerobridgeworks.net
Dale Whitaker	Lord & Son Construction	850-863-5158	dale@lordandson.com
Juanmiguel Gorut	Wharton-Smith	813-288-0068	jgorut@whartonsmith.com
Joe Fulton	Modern Sound & Communication, Inc	251-380-9080	joe_fulton@modernsound.net
Billy Whitesell	Whitesell-Green	850-434-5311	bwhitesell@whitesell-green.com
Jack Dillon	Whitesell-Green	239-253-5596	jdillon@whitesell-green.com
James Carey	Arconas Airport Seating	905-272-0727	jcarey@arconas.com

PRE-BID MEETING SIGN-IN SHEET

Wednesday 17 February, 2021, 11:00 a.m. (CST)

Satellite Concourse C
Destin-Fort Walton Beach Airport

NAME	REPRESENTING	TELEPHONE	E-MAIL ADDRESS
Becca Waterloo	Silhouette Design Architecture	708-769-0676	rwaterloo@silhouetteinc.com
Connie Johnson	EMR, Inc.	850-897-0210	cjohnson@emr-inc.com
Jeff Hyde	Okaloosa County Purchasing	850-689-5960	jhyde@myokaloosa.com
Jesica Darr	Okaloosa County Purchasing	850-689-5960	jdarr@myokaloosa.com
Wally Janokowics	Faber Int'l	201-401-8388	wjanokowicz@faber-intl.com
Tom Larossi	Wharton-Smith, Inc.	813-288-0068	tlarossi@wharton-smith.com



ITB AP 21-21

Construction of Satellite Concourse 'C' at Destin-Fort Walton Beach Airport



Meeting Agenda



Introduction of Participants



Purpose



Scope of Work



Administration and Legal Requirements



Discussion / Questions

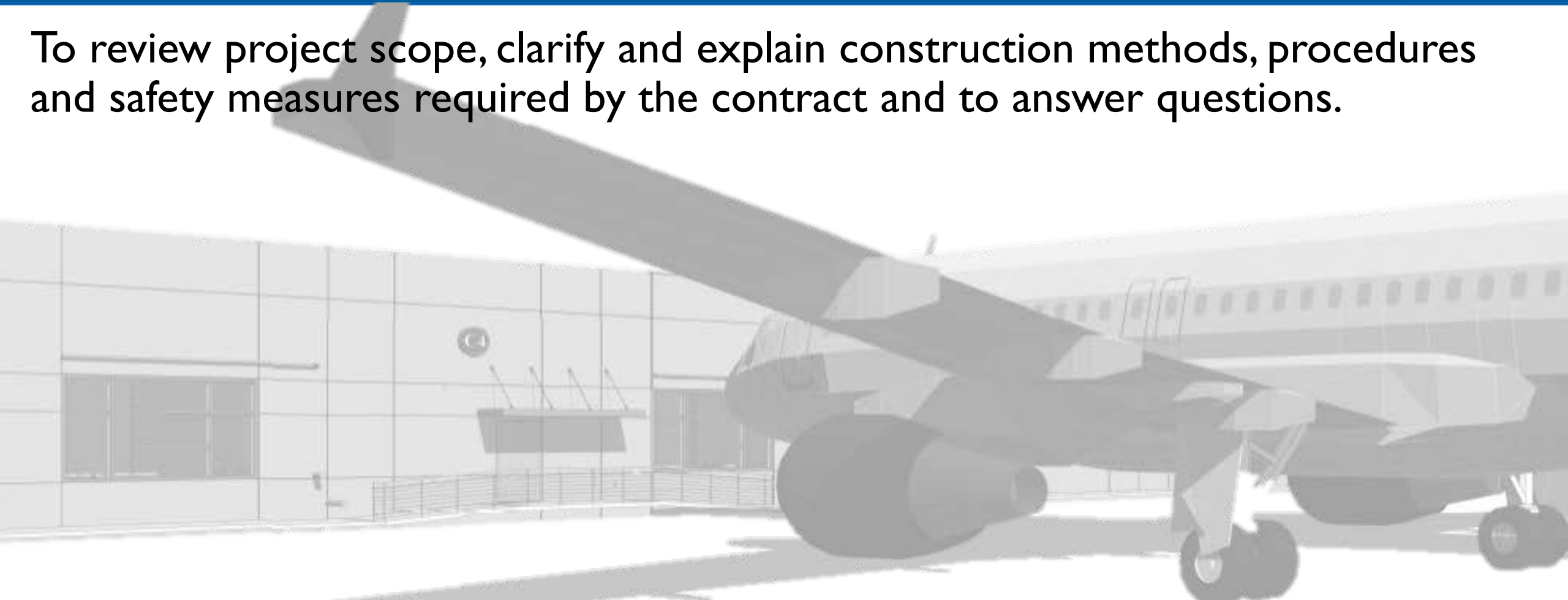


Wanted: Team Member



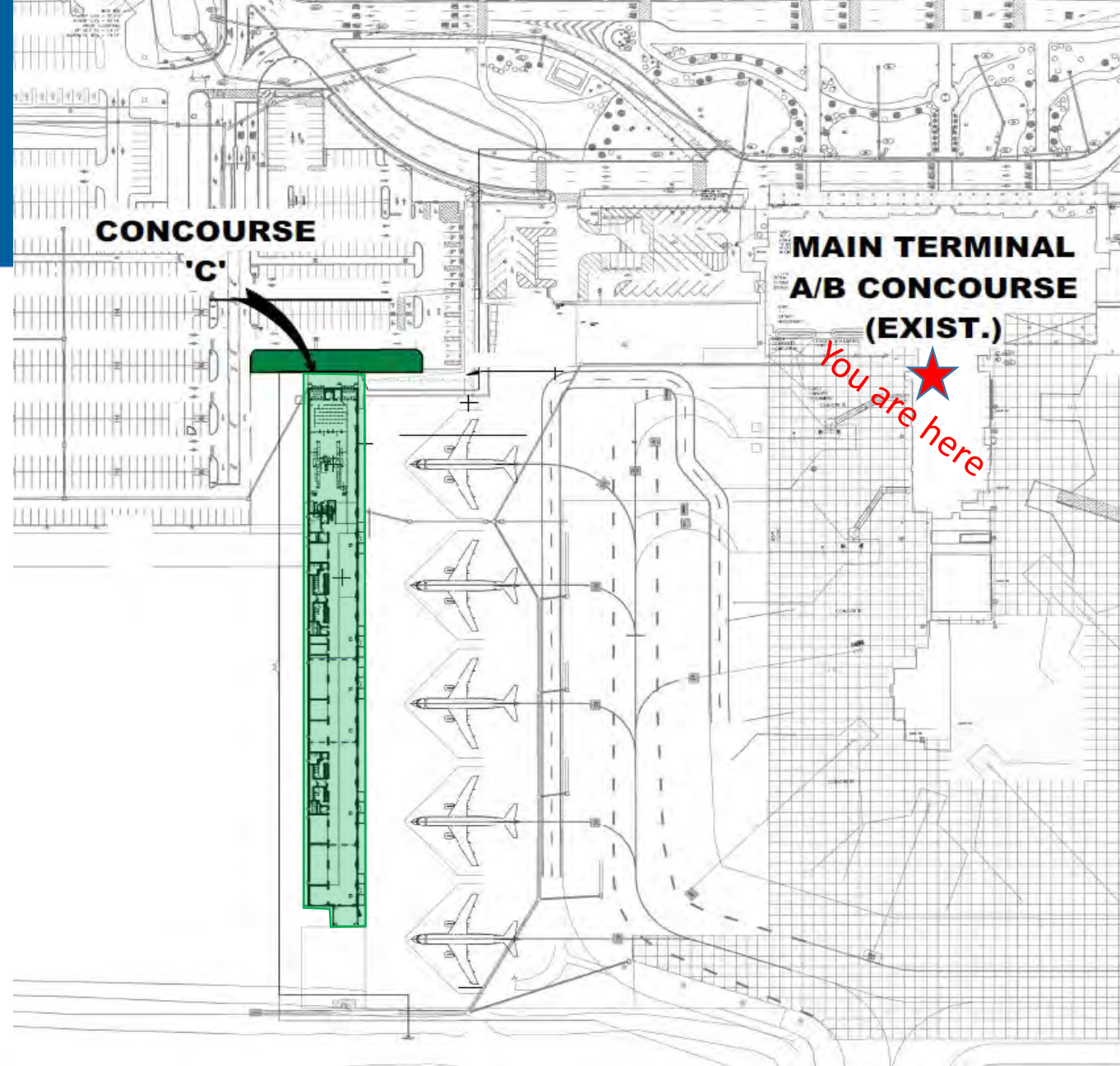
We are here today:

To review project scope, clarify and explain construction methods, procedures and safety measures required by the contract and to answer questions.



Project Overview

- Construct a new single story stand-alone concourse building with up to (5) five ground loading aircraft gates; inclusive of a security screening checkpoint, concessions shell space, restrooms and support spaces
- Construction consists of masonry bearing walls, open web steel joist and insulated single ply membrane roofing



Design Overview



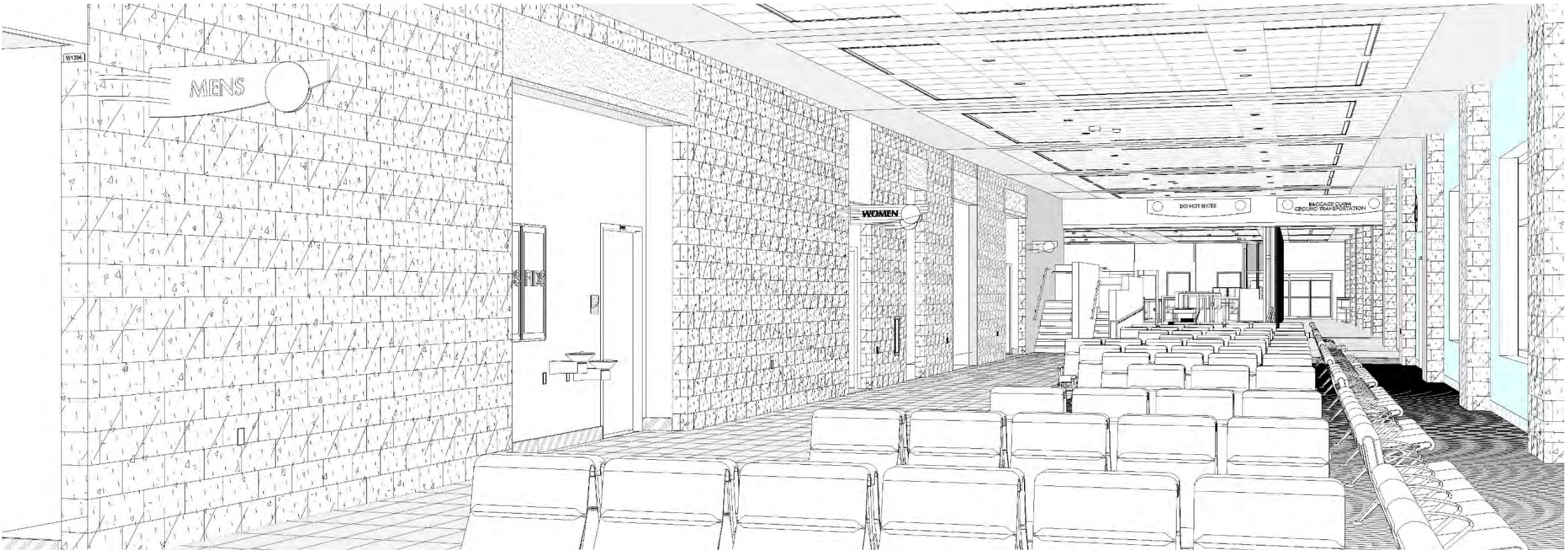
Air-side Access (no boarding bridges)



Air-side Exterior



Interior Space View



Concourse Entrance / Exit View



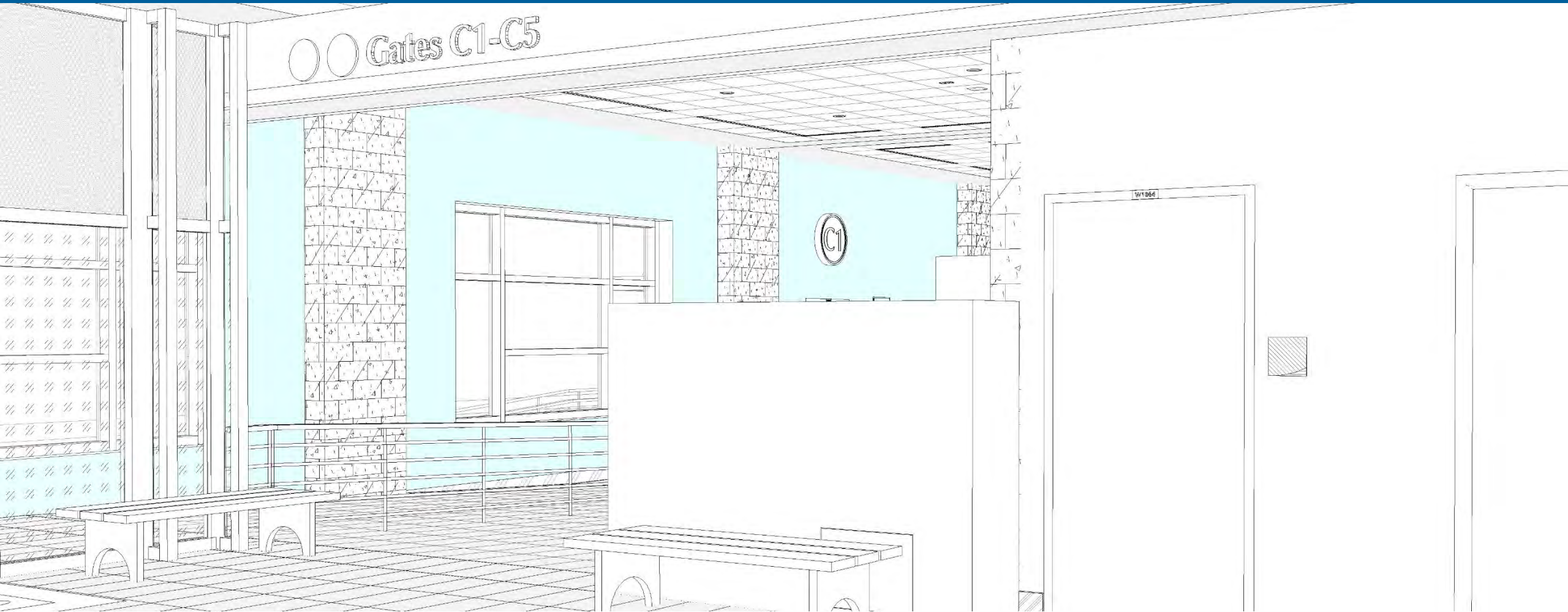
Building Entrance (Alt 4)



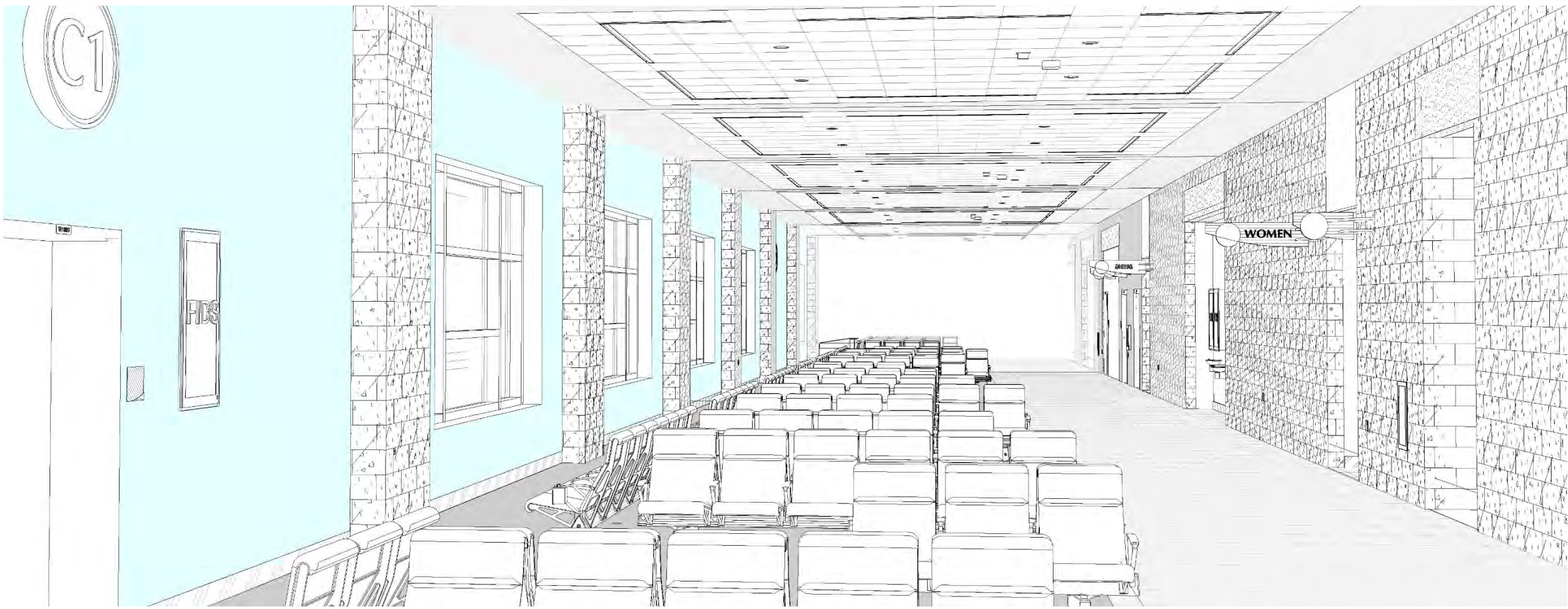
Entrance to Concourse (TSA Equip View)



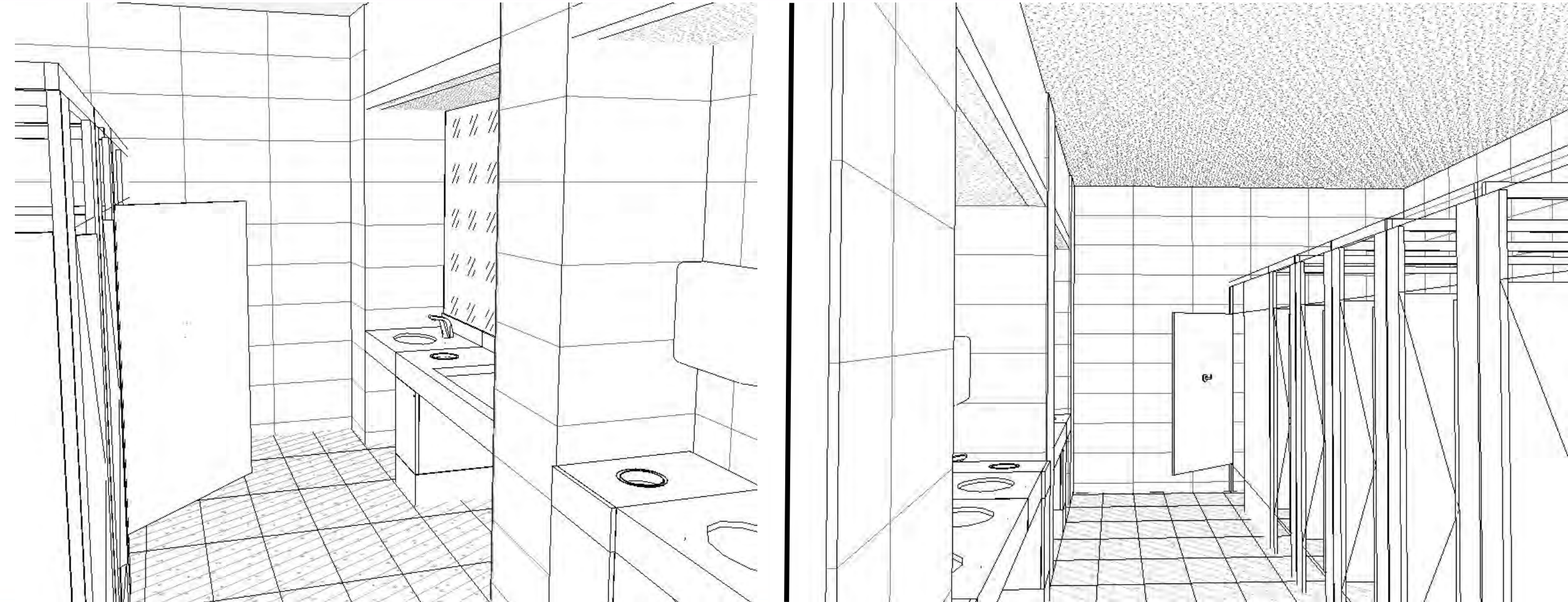
Exit of TSA Area (Admin Space)



South Facing Interior View



Restroom Layout



Bid Schedule

- Look at Alternate Information Sheets provided in the Set

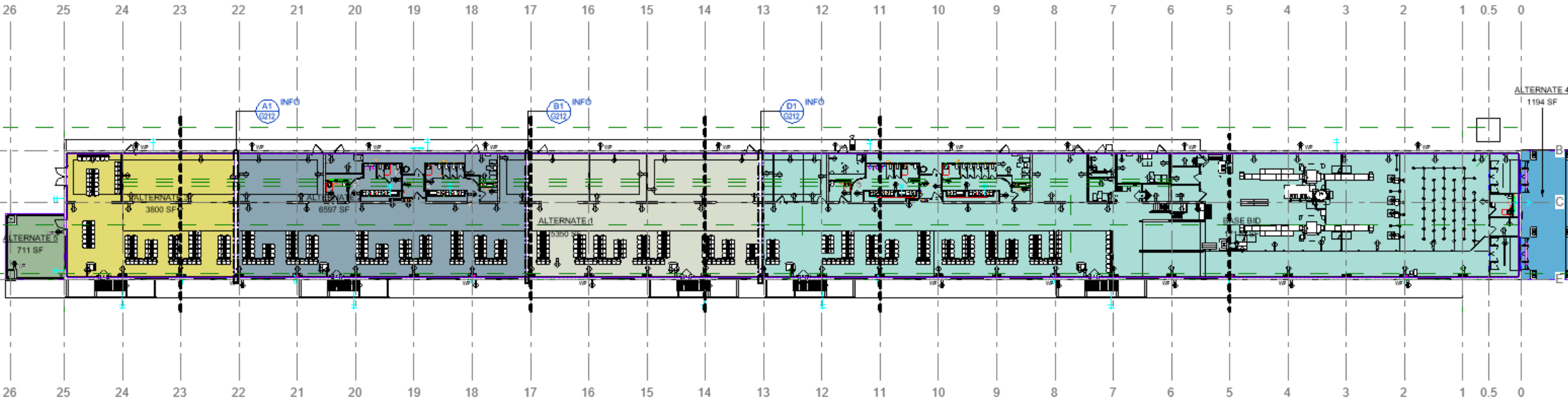
G211 & G212

- Base bid and all alternates are lump sum each
- County may award the base only or any combination of base and alternates

Item Description	Quantity	Unit	Amount
BASE BID: Entry, TSA Support, (SSCP) Security Screening Check Point, Restroom Core 1, Holdroom C1 & C2, Reference Line 0-13	1	ea	
ADD ALTERNATE NO 1: Concessions, Holdroom C3, Reference Line 13-17	1	ea	
ADD ALTERNATE NO 2: Concessions, Restroom Core 2, Holdroom C4, Reference Line 17-22	1	ea	
ADD ALTERNATE NO 3: Holdroom C5, Reference Line 22-25	1	ea	
ADD ALTERNATE NO 4: Covered Entry Canopy and Structure Only; SLAB IS IN BASE BID	1	ea	
ADD ALTERNATE NO 5: Outdoor Seating Area (Concessions)	1	ea	
ADD ALTERNATE NO 6: Substitute "CALLA" HIGH CAC 50 24" X 24" x 1 3/4" Ceiling Tile for ACT1, See AF712	1	ea	
ADD ALTERNATE NO 7: Substitute CT2 for GT1 and GT2, See A45X SERIES & AF712	1	ea	



Construction Bid Plan



- 17,115SF** BASE BID
Entry, TSA Support, SSCP,
Restroom Core 1, Holdroom C1 & C2;
REF LINES 00-13
- 3,800SF** ALTERNATE 3
Holdroom C5; REF LINES 22-25
- ALTERNATE 6
SUBSTITUTE "CALLA" HIGH CAC 50
24" X 24" X 1-3/4" CEILING TILE FOR ACT1
SEE AF712
- 5,350SF** ALTERNATE 1
Concessions, Holdrooms C3 :
REF LINES 13-17
- 1,194SF** ALTERNATE 4
Covered Entry Canopy and Structure
Only; Slab In Base Bid
- ALTERNATE 7
SUBSTITUTE CT2 FOR GT1 AND GT2
SEE A45X SERIES & AF712
- 6,597SF** ALTERNATE 2
Concessions, Restroom Core 2,
Holdroom C4; REF LINES 17-22
- 711SF** ALTERNATE 5
Outdoor Seating Area (Concessions)



Surrounding Projects

- On-going
- Complete Nov 2021



- On-going
- Complete April 2021



Out of secure area



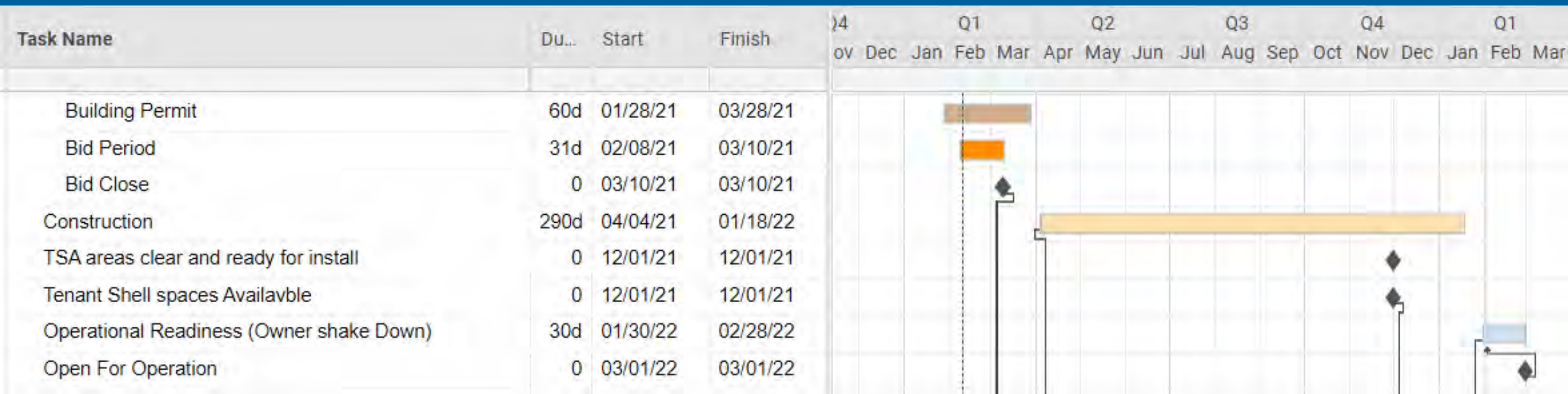
- Haul Route
- Stub Utilities
- Drainage



Project Site is Shovel Ready



Project Bid & Construction Schedule



- Look to sign/approve contract immediately & issue NTP
 - Start Construction early April 2021
- Liquidated Damages (\$3,902/day)
 - Overall project substantial (290 days) / final completion (320 days)
 - December 1st 2021 for building envelope shell ready for concessions build-out (BF-2)

5. **Contract Time:** Contractor agrees that Work will be substantially complete **290** calendar days after the date when the (NTP) Contract Time commences to run, and will be completed and ready for final inspection and final payment within **320** calendar days after the date when the (NTP) Contract Time commences to run. Further the contractor agrees that the concession shell spaces will be substantially complete by December 1, 2021, as a phase 1 completion of work requirement.



Substitutions

Instructions to Respondents (ITC) § 9

- The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or “or-equal” item of material or equipment may be furnished or used by Contractor if acceptable to the County, acceptance of the substitution “or equal” to material or equipment, will typically be considered by the County after the contract is awarded. However, any proposed substitution that represents a deviation from the design intent, must be approved prior to submission of the bid responses. A determination as to whether a design deviation or particular item that changes the design intent of the plans or specification is acceptable as a substitute or “equal” will be made by the County and Architect/Engineer. Design deviations approved prior to bid submittals will be made known to other contractors through an addendum.



Instruction To Bidders

Be sure to read and Fill out all forms included in section **BF**

Use **blue ink** to fill out originals

Be sure to check the purchasing website, demandstar and/or bidnetdirect for published addenda



Addenda / Bid Opening

- All questions about the meaning or intent of these Project Documents are to be directed to Issuing Office. Interpretations or clarifications considered necessary by Issuing Office in response to such questions will be issued by Addenda on the Purchasing website and bid net as mentioned above. Questions received after the question deadline may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- Addenda may also be issued to modify these Project Documents as deemed advisable by Owner or Architect/Engineer.

- Last Day for Questions
 - **February 24th 2021**
- Last Day for posted Addenda
 - **March 3rd 2021**
- Bids Due/Opening
 - **March 10th 2021 (3pm)**

Send Questions to:

Okaloosa County Purchasing Department
5479A Old Bethel Road
Crestview, FL 32536

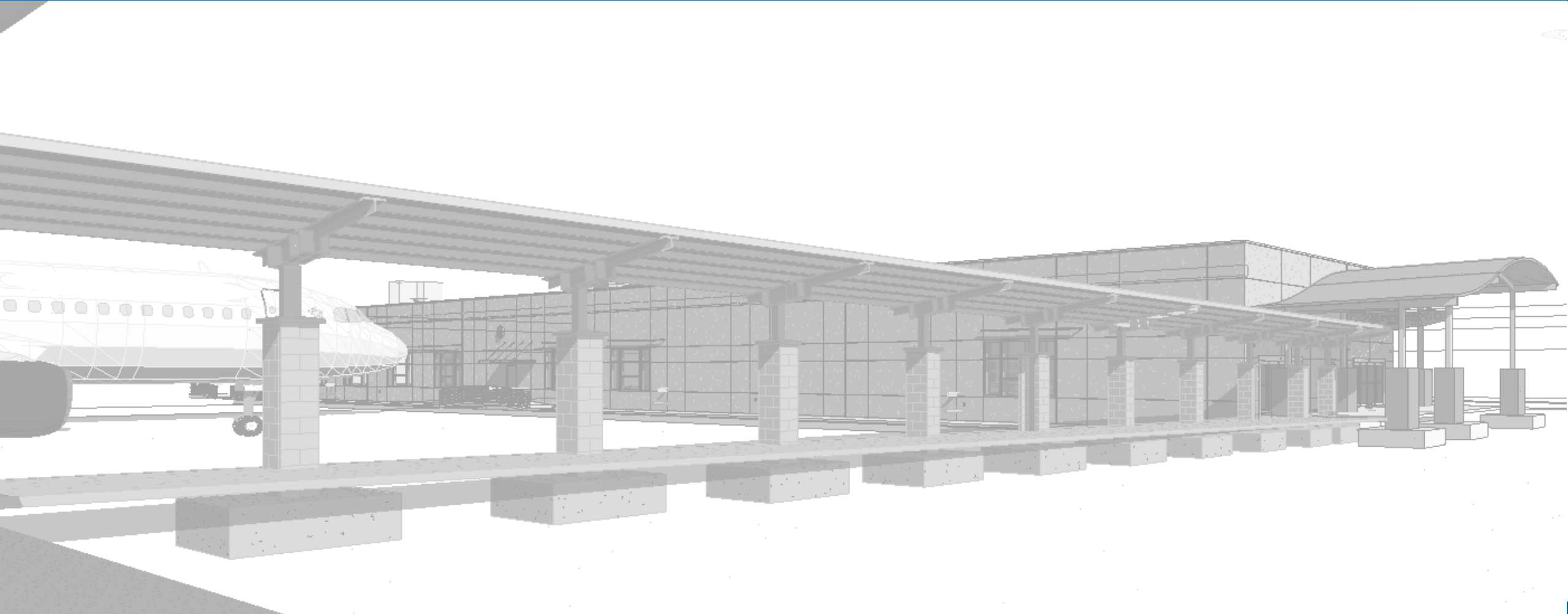
Email: jdarr@myokaloosa.com

(850) 689-5960



FLY VPS DESTIN
FORT WALTON BEACH
AIRPORT

Questions





VPS Concourse C: Pre-Bid Meeting Minutes

Location:	VPS Conference Room 1
Meeting Date:	2/17/2021
Meeting Time:	11:00 AM
Project:	ITB AP 21-21
File:	19672-506-50

RE: Construction of Satellite Concourse "C" at VPS

I. INTRODUCTION OF PARTICIPANTS

- A. Owner – Destin-Fort Walton Beach Airport, Okaloosa County
- B. Architect – MLM-Martin Architects, Inc.

II. PURPOSE

To review project scope, clarify and explain construction methods, procedures and safety measures required by the contract and to answer questions.

III. SCOPE OF WORK

- A. Description of Project
- B. Bid Schedule-**See Section IV B.2. and C. below as well as slides**
- C. Phasing / Staging Requirements
- D. Project Schedule and Time-**Target start is the First or Second week of April w/ 290 days Substantial/320 days Final.**
 - a. Concessions shell timing & GC within project boundary-**1 Dec 2021 for Concessions. (Phase I)**
 - b. Permitting-**Building Permit has already been submitted to Okaloosa County and TSA to begin assembling the Checkpoint**
- E. Safety and Security Requirements and Procedures-**Airport will coordinate with TSA; All work is planned to be outside of the Secure Area.**

IV. ADMINISTRATION

- A. Addenda
- B. Questions
 - 1. Send all correspondence through Purchasing
Okaloosa County Purchasing Department
5479A Old Bethel Road
Crestview, FL 32536
Email: jdarr@myokaloosa.com
(850) 689-5960

2. Last day for questions to make addenda is **February 24, 2021**
 3. Last day for posted Addenda is **3 March, 2021**
- C. Substitutions
- D. Bids Due **March 10, 2021 at 3pm CST—Okaloosa County Purchasing Department (5479A Old Bethel Road, Crestview, FL)**

V. LEGAL REQUIREMENTS

- A. Instructions to Bidders
- B. DBE & LDB Requirements
- C. Insurance Requirements

VI. QUESTIONS

Questions Submitted to Purchasing Department prior to Pre-Bid Conference are answered on the Addendum #1

1. Is there a local participation requirement? **No**
2. What is the Bid Bond requirement? **5% of total project bid**
3. The Armstrong ceiling treatments are not acoustically transparent. It was discussed in the previous bid to have the tiles replaced at each speaker location with the approved perforated ceiling tiles that are acoustically transparent. (Joe Fulton; Modern Sound & Communication, Inc) **See Addendum 1 question 9.**
4. Is there an estimated budget available for the project? (Connie Johnson; EMR, Inc.) **No**
5. Permit fees will be paid by the GC? **Yes**
6. Previous bid was postponed due to Budget or COVID? **Uncertainty of COVID.**
7. Is there an owner direct purchase for tax savings or deferment? **No**
8. Is this project tax exempt? (James Carey; Arconas Airport Seating). **No**
9. Are there specific DBE Goals? **The bid manual states that there is no DBE goal but with the potential for FAA funding streams to be applied a DBE goal will be applied. The project specific goal of 6.67% will be applied based on the Airport's Disadvantaged and Small Business Enterprise Program.**

VII. SITE VISIT

- A. **Mr. Jamie Gartmon (Drace Construction) visited the site after the Pre-Bid Meeting**



SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: Construction of Satellite Concourse C Destin-Fort Walton Beach Airport
To: MLM-Martin Inc
Re: Miguel Martin

Substitution Request Number: _____
From: record-usa
Date: 2/11/2021
A/E Project Number: _____
Contract For: _____

Specification Title: Automatic Entrances Description: Stanley
Section: 084229 Page: _____ Article/Paragraph: _____

Proposed Substitution: 5400 Series Hurricane-Stormcord High Impact Door
Manufacturer: record-usa Address: 4324 Phil Hargett Court Monroe, NC 28110 Phone: 704-289-9212
Trade Name: record-usa Model No.: 5400 Series Hurricane-Stormcord High Impact Door

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: Pamela Czahoroski
Signed by: _____
Firm: record-usa
Address: 4324 Phil Hargett Court Monroe, NC 28110
Telephone: 704-289-9212

This approval is contingent on the following:

- 1. Emergency brake away opening width meets or exceeds 153.5" as indicated on sheet AL211.**
- 2. Opening sensors able to operate without interference within vestibule depth indicated on sheet A211.**
- 3. Glazing can be tinted to match curtain wall glazing as specified 5084929-2.4-C-1.**

MLM-MARTIN
ARCHITECTS, INC.

A/E's REVIEW AND ACTION

7:24 pm, Feb 19, 2021

- Substitution approved - Make submittals in accordance with Specification Section 01330.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by:

01 33 23

Date:

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

5400/5500 Series

Automatic door technology as you've never seen it before!

STORM FRONT



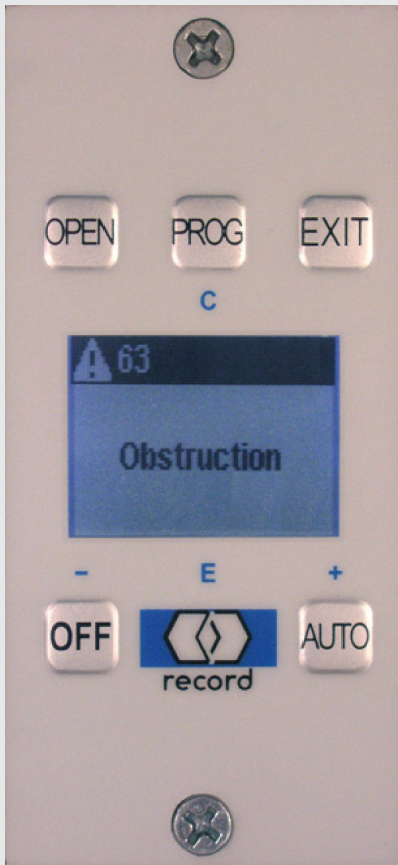
hurricane resistant doors

www.recorddoors.com



record

your global partner for entrance solutions



S.M.A.R.T. Panel

- Provides user with the phone number of the authorized service agent
- Reminds you of your commitment in performing a daily safety check
- Provides information regarding objects in track that may negatively impact the operation of the door
- Displays current door setting in regard to traffic selection and egress
- Indicates when a door has been accidentally broken out
- Identifies if a safety beam has failed or been damaged
- Notifies user of which part needs replacement due to failure or abuse

5400/5500 Series Hurricane Resistant Sliding Doors

record-usa is proud to introduce our Stormcord series of hurricane resistant sliding door systems. The 5400 Large Missile Impact Series and the 5500 Wind load series have both been tested to rigorous Florida State and Dade County criteria and offer the same fluid, quiet and reliable operation that the 5100 Series is known for:

Features

- Two (2) Year Warranty
- Exclusive S.M.A.R.T. Panel (Self Monitoring Accurate Reporting Technology)
- Narrow Stile Design

Benefits

- Only Standard 2 Year in the Industry
- Virtually Eliminates Unnecessary Service Calls and Reduces Callbacks when Service is Needed
- Offers Clean Aesthetic Site Lines and Provides Maximum Natural Light
- Meets Dade County Large and Small Missile Impact
- Designed to Withstand Category 5 Force Winds
- Single Motion Release for Emergency Egress
- No Lock Required on SO Panels (Standard on both impact and non-impact models)

Options

- Exit Devices Offer Highly Efficient Emergency Egress
- Programmable Fail Safe or Fail Secure Electric Lock
- Battery Back Up Power Supply Good for One Cycle

Testing

- The 5400 Series has been Tested to Design Loads of +65 PSF/-70 PSF (NOA 15-0316-04)
- The 5500 Series has been Tested to Design Loads of +55 PSF/-60 PSF (NOA 15-0316-05)

→ record USA

4324 Phil Hargett Court – Post Office Box 3099 – Monroe, NC 28110
tel. +1 704 289-9212 – e-mail: info@recorddoors.com – www.recorddoors.com

→ Headquarters

agta record ltd – Allmendstrasse 24 – 8320 Fehraltorf – Switzerland
tel.: +41 44 954 91 91 – e-mail: info@agta-record.com – www.agta-record.com

www.recorddoors.com



record

your global partner for entrance solutions



DEPARTMENT OF REGULATORY AND ECONOMIC RESOURCES (RER)
 BOARD AND CODE ADMINISTRATION DIVISION
NOTICE OF ACCEPTANCE (NOA)

Record-USA, Inc.
4324 Phil Hargett Court
Monroe, NC 28110

SCOPE:

This NOA is being issued under the applicable rules and regulations governing the use of construction materials. The documentation submitted has been reviewed and accepted by Miami-Dade County RER -Product Control Section to be used in Miami Dade County and other areas where allowed by the Authority Having Jurisdiction (AHJ).

This NOA shall not be valid after the expiration date stated below. The Miami-Dade County Product Control Section (In Miami Dade County) and/or the AHJ (in areas other than Miami Dade County) reserve the right to have this product or material tested for quality assurance purposes. If this product or material fails to perform in the accepted manner, the manufacturer will incur the expense of such testing and the AHJ may immediately revoke, modify, or suspend the use of such product or material within their jurisdiction. RER reserves the right to revoke this acceptance, if it is determined by Miami-Dade County Product Control Section that this product or material fails to meet the requirements of the applicable building code.

This product is approved as described herein and has been designed to comply with the Florida Building Code, including the High Velocity Hurricane Zone.

DESCRIPTION: Series "5400" Aluminum Automatic Sliding Glass Door w/ Breakout-LMI

APPROVAL DOCUMENT: Drawing No. **14-2168** (former **09-REU-0001**), titled "Series 5400 Automatic Sliding Glass Door", sheets 1 through 23 of 23 prepared by Engineering Express, dated 02/28/18, signed and sealed by Frank L. Bernardo, P.E., bearing the Miami-Dade County Product Control Renewal stamp with the Notice of Acceptance number and expiration date by the Miami-Dade County Product Control section.

MISSILE IMPACT RATING: Large and Small Missile Impact

LIMITATIONS:

1. See Head and Sill anchor Layout in sheet **4**. The Jamb anchors OC spacing not to exceed **12"**.
2. Not approved where water infiltration is required.
3. Electrical/ Electronic functions are not part of this approval and to be reviewed by appropriate Bldg. official
4. Full length steel channel reinforcements at stiles are required per sheet **10**. See glazing details in sheet **10**.

LABELING: Each unit shall bear a permanent label with the manufacturer's name or logo, city, state and series and following statement: "Miami-Dade County Product Control Approved", unless otherwise noted herein.

RENEWAL of this NOA shall be considered after a renewal application has been filed and there has been no change in the applicable building code negatively affecting the performance of this product.

TERMINATION of this NOA will occur after the expiration date or if there has been a revision or change in the materials, use, and/or manufacture of the product or process. Misuse of this NOA as an endorsement of any product, for sales, advertising or any other purposes shall automatically terminate this NOA. Failure to comply with any section of this NOA shall be cause for termination and removal of NOA.

ADVERTISEMENT: The NOA number preceded by the words Miami-Dade County, Florida, and followed by the expiration date may be displayed in advertising literature. If any portion of the NOA is displayed, then it shall be done in its entirety.

INSPECTION: A copy of this entire NOA shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.

This NOA **renews** NOA # **17-1227.16** and consists of this page 1 and evidence pages E-1 & E-2, as well as approval document mentioned above.

The submitted documentation was reviewed by **Ishaq I. Chanda, P.E.**



2/18/20

NOTICE OF ACCEPTANCE: EVIDENCE SUBMITTED

1. Evidence submitted under previous files

A. DRAWINGS

1. Manufacturer's die drawings and sections (submitted under files, see below)
2. Drawing No. **14-2168** (former **09-REU-0001**), titled "Series 5400 Automatic Sliding Glass Door", sheets 1 through 23 of 23 prepared by Engineering Express, dated 02/12/15, signed and sealed by Frank L. Bernardo, P.E.

B. TESTS (submitted under files # **12-0403.06/#09-0712.12**)

1. Test reports on 1) Air Infiltration Test, per FBC, TAS 202-94 (**0.29** cfm/ft²@1.57PSF)
 - 2) Uniform Static Air Pressure Test, per FBC, TAS 202-94
 - 3) Water Resistance Test, per FBC, TAS 202-94 (Not Performed)
 - 4) Large Missile Impact Test per FBC, TAS 201-94
 - 5) Cyclic Wind Pressure Loading per FBC, TAS 203-94
 - 6) Forced Entry Test, per FBC 2411 3.2.1 and TAS 202-94

along with installation diagram of aluminum automatic entrance door, prepared by American Testing Lab, Inc. Test Report No. **ATLNC 0428.01-08**, dated 04/29/09, signed and sealed by David Johnson, P.E.

Note: This test report has been revised by an addendum letter dated 01/20/10, issued by American Testing Lab, signed and sealed by David Johnson, P.E.

C. CALCULATIONS

1. Anchor Verification Calculations, complying w/ FBC-2014, dated 02/09/15, prepared by Engineering Express, signed and sealed by Frank L. Bennardo, P.E.
2. Glazing complies w/ ASTM E-1300-02, -04 & -09.

D. QUALITY ASSURANCE

1. Miami Dade Department of Regulatory and Economic Resources (RER).

E. MATERIAL CERTIFICATIONS

1. Notice of Acceptance No. #**14-0423.11** issued to Oldcastle Building Envelope, Inc. (NJ) for "**Storm Glass: Saflex CP-(VS-XX) interlayer w/ PET core**", expiring on 12/11/18.

F. STATEMENTS

1. Statement letter of conformance to FBC 2014 and letter of no financial interest, prepared by Engineering Express, both dated 02/10/15, signed and sealed by Frank L. Bennardo, P.E.
2. Lab compliance as part of the above referenced test report.

G. OTHER

1. This NOA **revises & renews** NOA # **12-0403.06**, expiring on 03/17/20.
2. Test proposal #**08-0238**, approved by BCCO.

Ishaq I. Chanda

Ishaq I. Chanda, P.E.
Product Control Unit Supervisor
NOA No. 20-0129.03
Expiration Date: March 17, 2025
Approval Date: February 13, 2020

NOTICE OF ACCEPTANCE: EVIDENCE SUBMITTED

2. Evidence submitted under previous NOA

A. DRAWINGS

1. Drawing No. **14-2168** (former **09-REU-0001**), titled "Series 5400 Automatic Sliding Glass Door", sheets 1 through 23 of 23 prepared by Engineering Express, dated 02/28/18, signed and sealed by Frank L. Bennardo, P.E.

B. Test

1. None.

C. CALCULATIONS

1. Anchor verification calculations and structural analysis, complying with FBC2017(6th Edition), prepared by Engineering Express, dated 12/22/17, signed and sealed by Frank L. Bennardo, P.E.

D. QUALITY ASSURANCE

1. Miami Dade Department of Regulatory and Economic Resources (RER).

E. MATERIAL CERTIFICATIONS

1. None.

F. STATEMENTS

1. Statement letter of conformance to FBC 2017 (6th Edition), dated 09/29/17, prepared by Engineering Express, dated 12/22/17, signed and sealed by Frank L. Bennardo, P.E.

G. OTHER

1. This NOA revises # **15-0316.04**, expiring 07/17/20.

3. New Evidence submitted

A. DRAWINGS

1. Drawing No. **14-2168** (former **09-REU-0001**), titled "Series 5400 Automatic Sliding Glass Door", sheets 1 through 23 of 23 prepared by Engineering Express, dated 02/28/18, signed and sealed by Frank L. Bennardo, P.E.

B. Test

1. None.

C. CALCULATIONS (submitted under NOA # 17-1227.16)

1. None.

D. QUALITY ASSURANCE

1. Miami Dade Department of Regulatory and Economic Resources (RER).

E. MATERIAL CERTIFICATIONS

1. Notice of Acceptance No. #**18-0611.01** issued to Oldcastle Building Envelope, Inc. (NJ) for "Storm Glass: Saflex CP-(VS-XX) interlayer w/ PET core", expiring on 12/11/23.

F. STATEMENTS

1. Statement letter of conformance to FBC 2017 (6th Edition), dated 09/29/17, prepared by Engineering Express, dated 12/22/17, signed and sealed by Frank L. Bennardo, P.E. (submitted under NOA # 17-1227.16)

G. OTHER

1. This NOA renews NOA # **17-1227.16**, expiring 03/17/20.



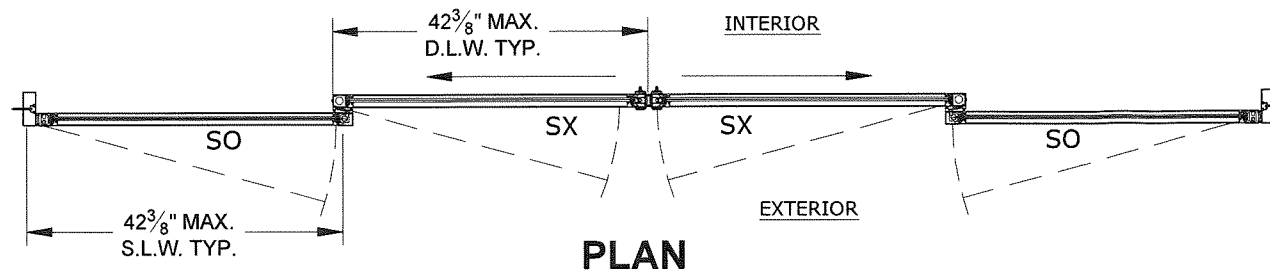
Ishaq I. Chanda, P.E.
Product Control Unit Supervisor
NOA No. 20-0129.03
Expiration Date: March 17, 2025
Approval Date: February 13, 2020

SERIES 5400 AUTOMATIC SLIDING GLASS DOOR

LARGE MISSILE IMPACT RESISTANT

FRANK L. BENNARDO, P.E.
#PE0046549
02/28/2018
STATE OF FLORIDA
PROFESSIONAL ENGINEER

ENGINEERING EXPRESS
CORPORATE OFFICE:
160 SW 12th AVE, SUITE 106
DEERFIELD BEACH, FL 33442
P: (954) 354-0660 F: (954) 354-0443
E: HELLO@ENGINEERINGEXPRESS.COM
ENGINEERINGEXPRESS.COM
CERT OF AUTH #9885

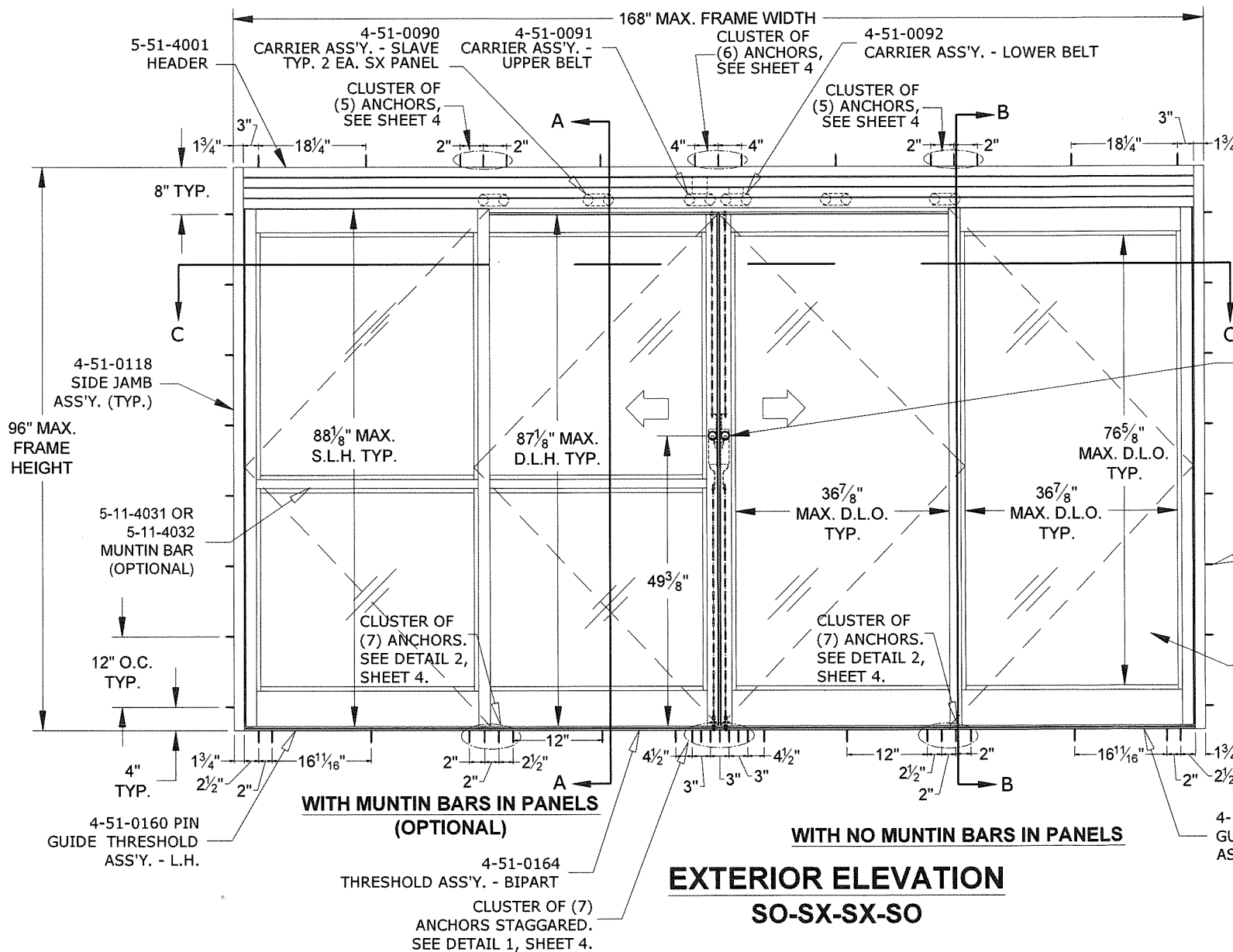


DESIGN PRESSURE RATING		IMPACT RATING
POSITIVE	+65 PSF	LARGE AND SMALL MISSILE IMPACT
NEGATIVE	-70 PSF	

NOTE: THIS SYSTEM WAS NOT TESTED FOR WATER INFILTRATION AND IS TO BE INSTALLED ONLY WHERE THE WATER REQUIREMENT IS NOT NEEDED.

GENERAL NOTES

1. THE SYSTEM DESCRIBED HEREIN HAS BEEN DESIGNED AND TESTED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE SIXTH EDITION (2017), FOR USE WITHIN AND OUTSIDE THE HIGH VELOCITY HURRICANE ZONE, PER TAS 201, 202, AND 203 STANDARDS.
2. NO 33-1/3% INCREASE IN ALLOWABLE STRESS HAS BEEN USED IN THE DESIGN OF THIS SYSTEM. WIND LOAD DURATION FACTOR Cd=1.6 HAS BEEN USED FOR WOOD ANCHOR DESIGN.
3. POSITIVE AND NEGATIVE DESIGN PRESSURES CALCULATED FOR USE WITH THIS SYSTEM SHALL BE DETERMINED BY OTHERS ON A JOB-SPECIFIC BASIS IN ACCORDANCE WITH THE GOVERNING CODE.
4. THE SYSTEM DETAILED HEREIN IS GENERIC AND DOES NOT PROVIDE INFORMATION FOR A SPECIFIC SITE. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN WITHIN THE HVHZ, A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE SHALL BE APPLIED FOR AND SECURED FROM THE MIAMI-DADE BUILDING CODE COMPLIANCE OFFICE PRODUCT CONTROL DIVISION. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN OUTSIDE THE HVHZ, THE BUILDING OFFICIAL MAY REQUIRE A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE BE OBTAINED, OR THAT SITE SPECIFIC DOCUMENTS BE PREPARED, SIGNED, DATED AND SEALED BY A LICENSED ENGINEER OR REGISTERED ARCHITECT, WHICH DETAIL AND JUSTIFY THE DEVIATION.
5. PERMIT HOLDER SHALL VERIFY THE ADEQUACY OF THE EXISTING STRUCTURE TO WITHSTAND SUPERIMPOSED LOADS. WOOD BUCKS (BY OTHERS) SHALL BE ANCHORED PROPERLY TO TRANSFER LOADS TO THE EXISTING STRUCTURE.
6. ALL EXTRUSIONS SHALL BE 6063-T5 ALUMINUM ALLOY, UNLESS NOTED OTHERWISE.
7. EXTERIOR SEAM OF FRAME CORNERS SHALL BE SEALED WITH SILICONE.
8. ALL BOLTS & WASHERS SHALL BE ZINC COATED STEEL, GALVANIZED STEEL, OR STAINLESS STEEL WITH A MINIMUM TENSILE YIELD STRENGTH OF 60 KSI. ALL 3/16"Ø OR 1/4"Ø POP RIVETS SHALL BE 5056-H32 ALUMINUM ALLOY OR STRONGER UNLESS OTHERWISE NOTED.
9. ALL STEEL IN CONTACT WITH ALUMINUM SHALL BE PAINTED OR PLATED AS PRESCRIBED IN THE ABOVE-NOTED BUILDING CODE.



ADAMS RITE 1871-2 CYLINDER OPERATED FLUSH BOLT (EXTENDING A 1/2" STAINLESS STEEL HEX BOLT DOWNWARD INTO THRESHOLD ASSEMBLY), WITH INTERNATIONAL DOOR CLOSER INC. HB-4015-N HEADER BOLT SET (EXTENDING A 3/8" STEEL HEX BOLT UPWARD INTO DOOR CATCH ASSEMBLY), CZ-1001 MORTISE KEY CYLINDER (EXTERIOR) AND TZ-3001 THUMBTURN (INTERIOR) - TYP. EACH SX PANEL

OLDCASTLE GLASS INC. STORM GLASS™ 7/16" LAMINATED IMPACT-RESISTANT GLASS (TYP. ALL PANELS) PER CURRENT N.O.A. (SEE TYPICAL GLAZING DETAIL)

4-51-0161 PIN GUIDE THRESHOLD ASS'Y. - R.H.

NOTE: SEE SHEET 4 FOR ANCHOR LAYOUT DETAILS AND ANCHOR TYPES.

RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212

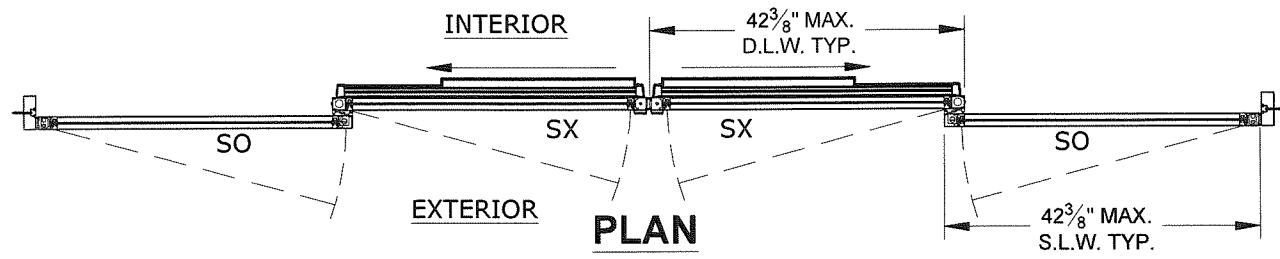
REMARKS	DATE	DRWN	CHKD
INIT ISSUE	06/26/09	KL	KL
REV PER BCCO COMMENT	12/01/09	KL	FLB
REV PER BCCO COMMENT	03/19/12	KL	FLB
REV PER BCCO COMMENT	02/09/15	RWN	CSL
REV PER BCCO COMMENT	12/20/17	RWN	FLB

14-2168
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PAGE DESCRIPTION:

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02/28/2018 - 2:15pm rickn

V:\Projects\14-2168 NOA - Update 12-0403.07 (09-REL-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c Series 5400 Automatic SGD (NOA).dwg

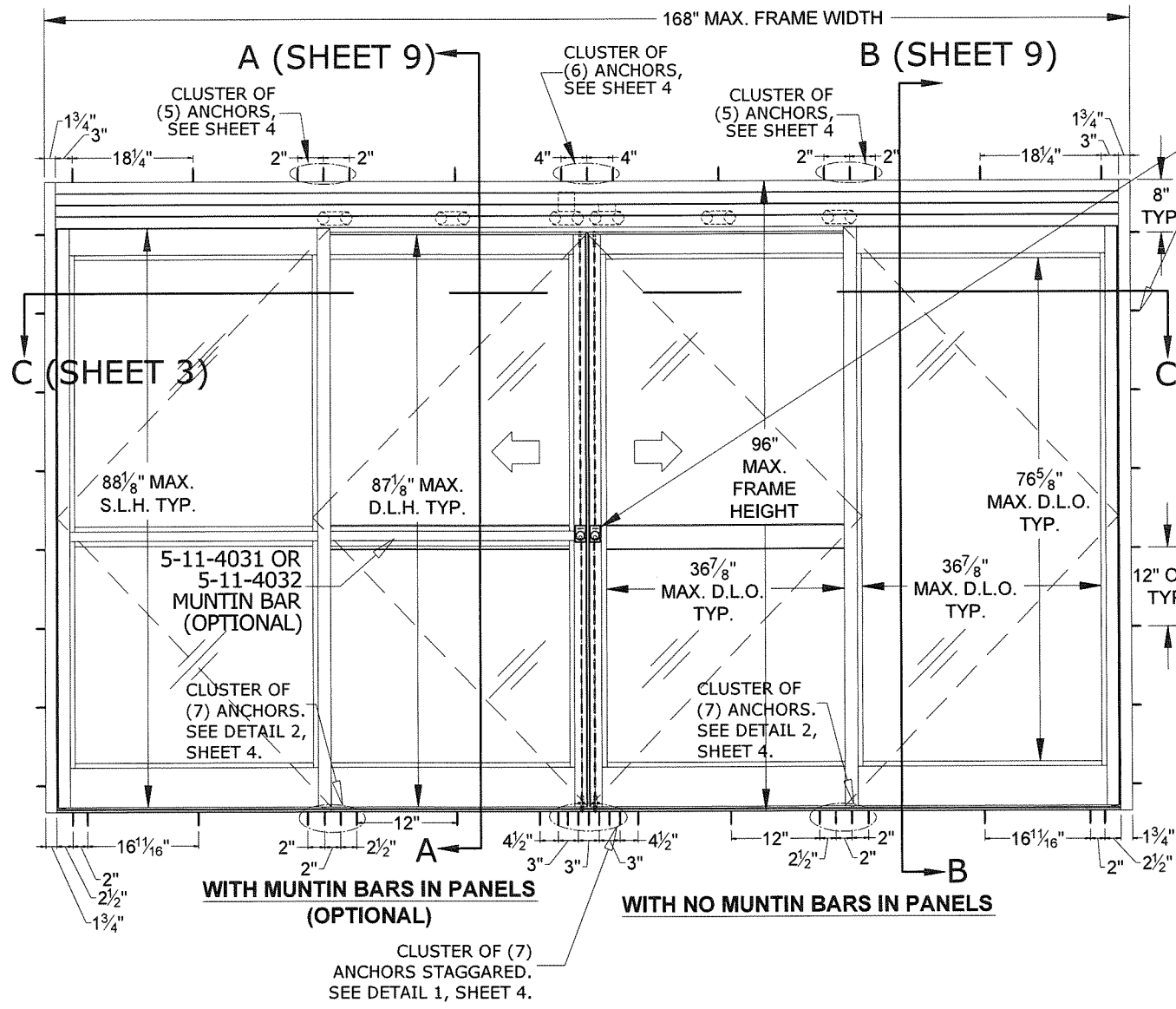
02/28/2018 - 2:15pm rickn



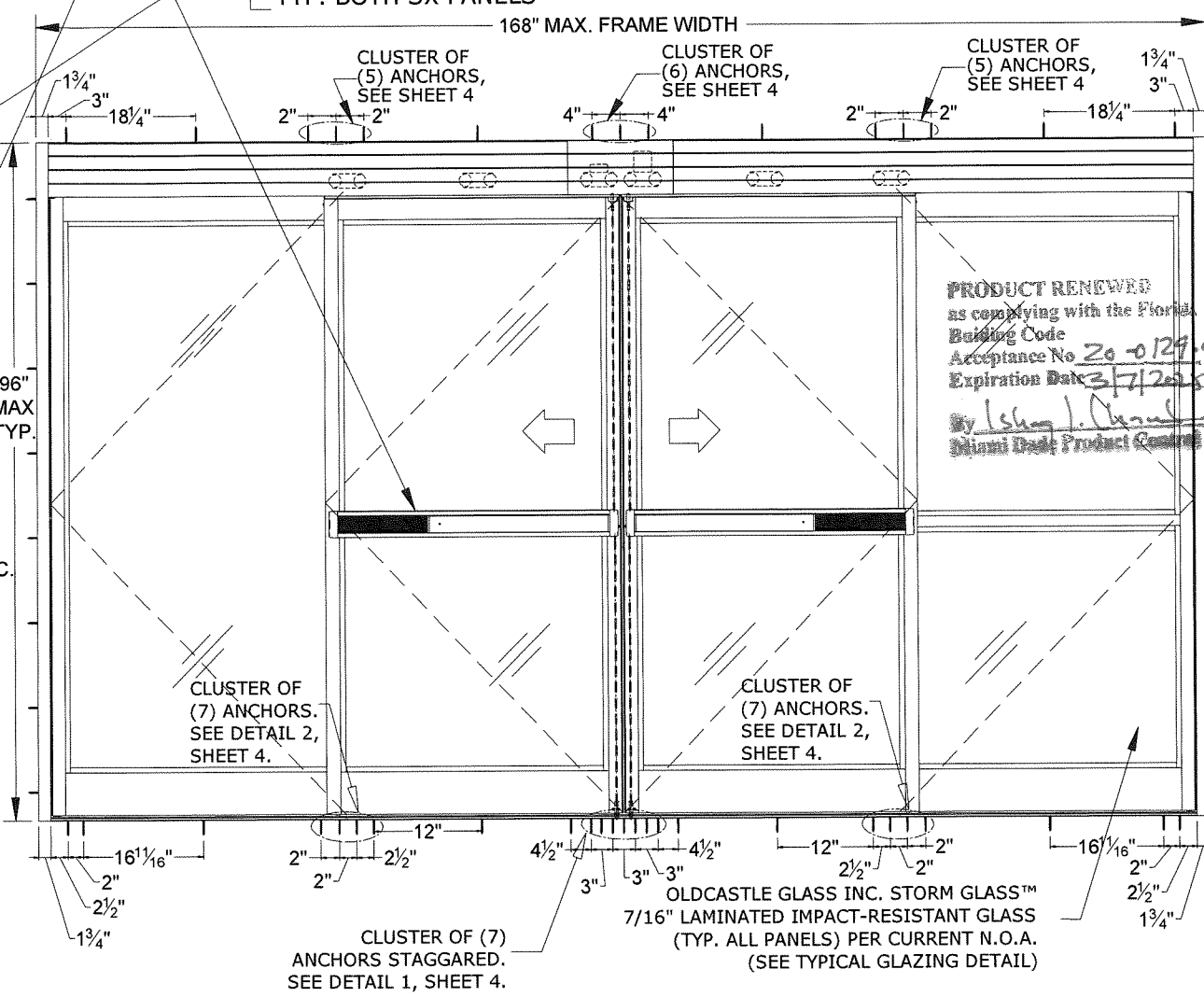
ANCHORS PER ANCHOR SCHEDULE.

INTERIOR:
ADAMS RITE G86 CONCEALED VERTICAL ROD EXIT DEVICE EXTENDING A 3/8\"/>

EXTERIOR:
ADAMS RITE 8651 ESCUTCHEON WITH INTERNATIONAL DOOR CLOSER, INC. CZ-1001 MORTISE KEY CYLINDER TYP. BOTH SX PANELS



EXTERIOR ELEVATION
SO-SX-SX-SO

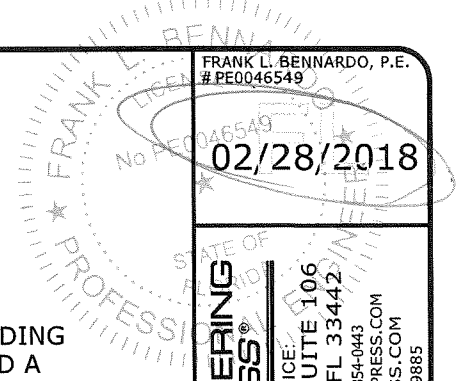


INTERIOR ELEVATION
SO-SX-SX-SO

DESIGN PRESSURE RATING		IMPACT RATING
POSITIVE	+65 PSF	LARGE AND SMALL MISSILE IMPACT
NEGATIVE	-70 PSF	
NOTE: THIS SYSTEM WAS NOT TESTED FOR WATER INFILTRATION AND IS TO BE INSTALLED ONLY WHERE THE WATER REQUIREMENT IS NOT NEEDED.		

NOTE: SEE SHEET 4 FOR ANCHOR LAYOUT DETAILS AND ANCHOR TYPES.

PRODUCT REVISED
as complying with the Florida Building Code
Acceptance No 17-1227-16
Expiration Date 3/17/20



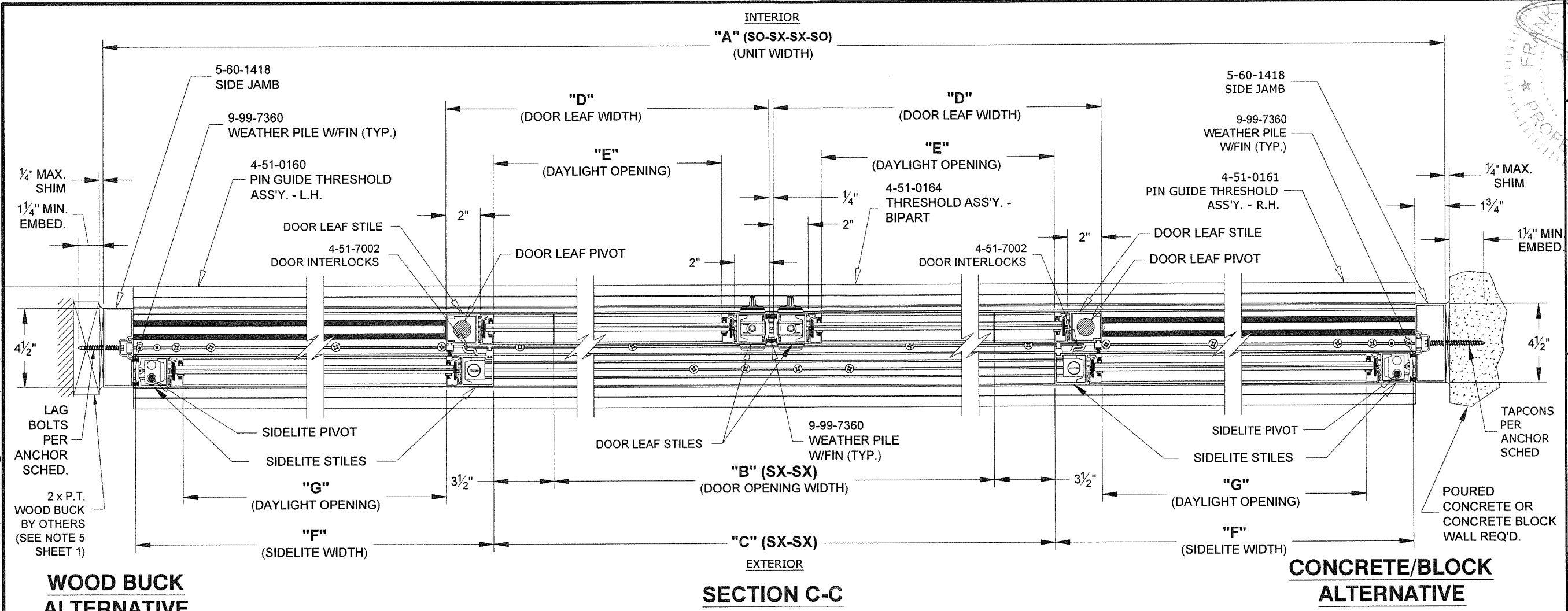
FRANK L. BENNARDO, P.E.
#PE0046549
02/28/2018
ENGINEERING EXPRESS
CORPORATE OFFICE:
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DEERFIELD BEACH, FL 33442
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ENGINEERINGEXPRESS.COM
CERT OF AUTH #9885

RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212
SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

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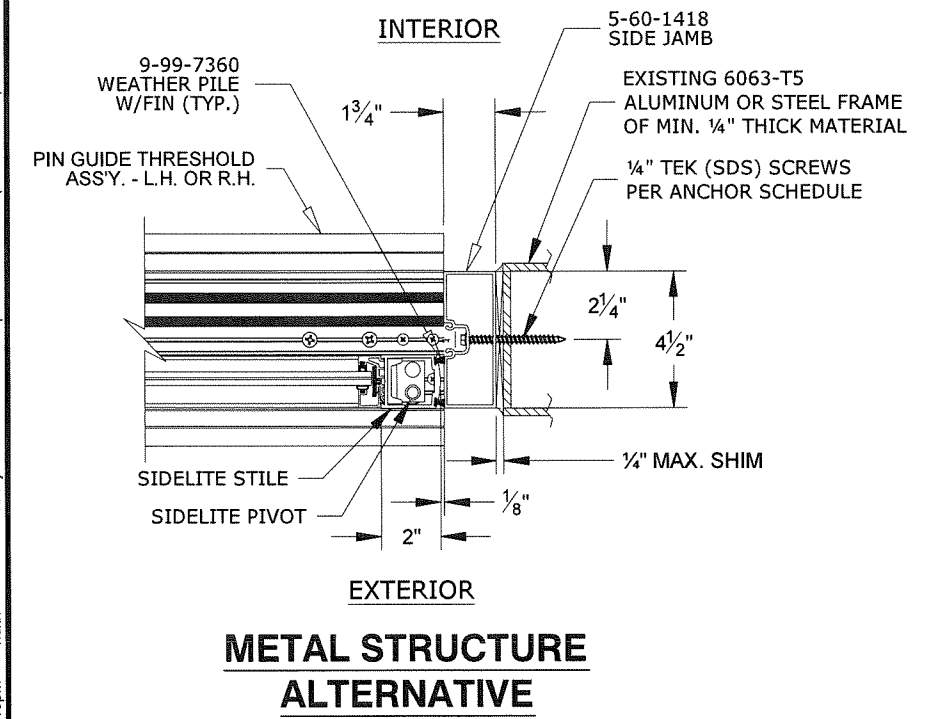
02/28/2018 - 2:15pm rickn V:\Projects\14-2168 NOA - Update 12-04-03-07 (09-REL-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c-Series 5400 Automatic SGD (NOA).dwg



WOOD BUCK ALTERNATIVE

SECTION C-C

CONCRETE/BLOCK ALTERNATIVE



METAL STRUCTURE ALTERNATIVE

UNIT WIDTH "A" (SO-SX-SX-SO)	DOOR OPENING WIDTH "B" (SX-SX)	DIMENSION "C" (SX-SX)	DOOR LEAF SIZE		DAYLIGHT OPENING (DOOR LEAF)		SIDELITE SIZE		DAYLIGHT OPENING (SIDELITE)		UNIT HEIGHT (MAX.)	ROUGH OPENING WIDTH (INCL. 1/4" SHIM SPACE BOTH SIDES) (SO-SX-SX-SO)
			WIDTH "D"	HEIGHT	WIDTH "E"	HEIGHT	WIDTH "F"	HEIGHT	WIDTH "G"	HEIGHT		
9' 0"	42 1/2"	49 1/2"	27 3/8"	87 1/8"	21 7/8"	76 5/8"	27 3/8"	88 1/8"	21 7/8"	76 5/8"	8' 0"	9' 1/2"
10' 0"	48 1/2"	55 1/2"	30 3/8"	87 1/8"	24 7/8"	76 5/8"	30 3/8"	88 1/8"	24 7/8"	76 5/8"	8' 0"	10' 1/2"
12' 0"	60 1/2"	67 1/2"	36 3/8"	87 1/8"	30 7/8"	76 5/8"	36 3/8"	88 1/8"	30 7/8"	76 5/8"	8' 0"	12' 1/2"
14' 0"	72 1/2"	79 1/2"	42 3/8"	87 1/8"	36 7/8"	76 5/8"	42 3/8"	88 1/8"	36 7/8"	76 5/8"	8' 0"	14' 1/2"

NOTE: DOOR WIDTH AND HEIGHT SHALL COMPLY WITH THE MINIMUM REQUIREMENTS OF THE FLORIDA BUILDING CODE.

PRODUCT RENEWED
 as complying with the Florida
 Building Code
 Acceptance No. 20-0129.03
 Expiration Date 3/17/2021
 By [Signature]
 Miami Dade Product Control

PRODUCT REVISED
 as complying with the Florida
 Building Code
 Acceptance No. 17-1222.16
 Expiration Date 3/17/20
 By [Signature]
 Miami Dade Product Control

FRANK L. BENNARDO, P.E.
 # PE0046549
 02/28/2018
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RECORD-USA
 4324 HARGETT COURT
 MONROE, NC 28110
 (704) 289 - 9212
 SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AVL	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

14-2168
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FRANK L. BENNARDO, P.E.
PE0046549

02/28/2018

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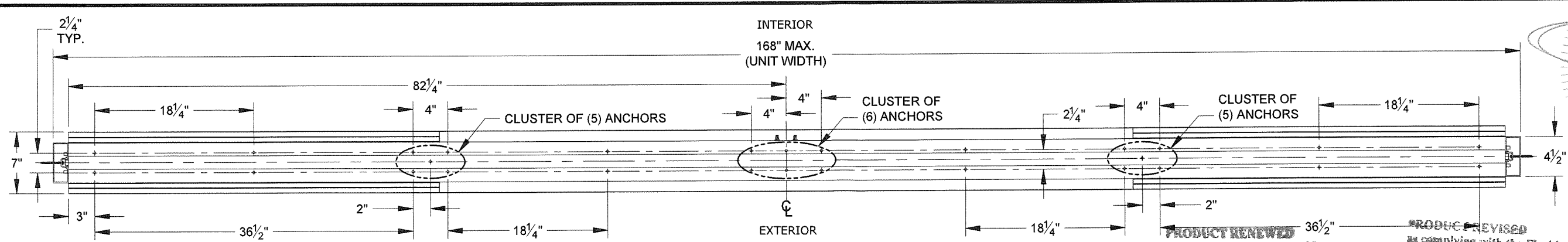
RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212

DRWN	CHKD	DATE
AML	KL	06/26/09
FLB	KL	12/01/09
FLB	KL	03/19/12
RWN	CSL	02/09/15
RWN	FLB	12/20/17

14-2168

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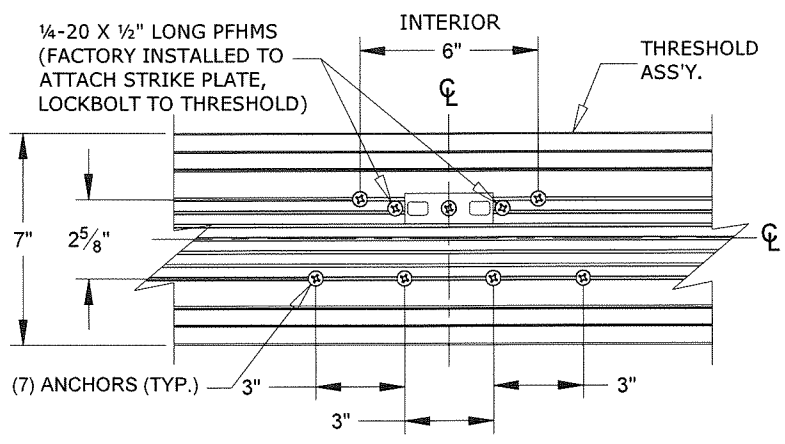
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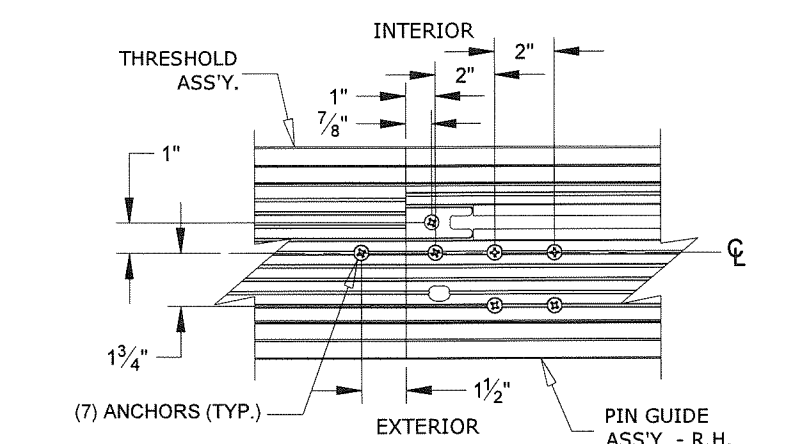
**ANCHOR LAYOUT AT HEADER
(SO-SX-SX-SO)**

PRODUCT RENEWED
as complying with the Florida Building Code
Acceptance No 20-0129-03
Expiration Date 3/17/2025
By *[Signature]*
Miami Trade Product Control

PRODUCT REVISED
as complying with the Florida Building Code
Acceptance No 17-1227-16
Expiration Date 3/17/2020
By *[Signature]*
Miami Trade Product Control



DETAIL 1



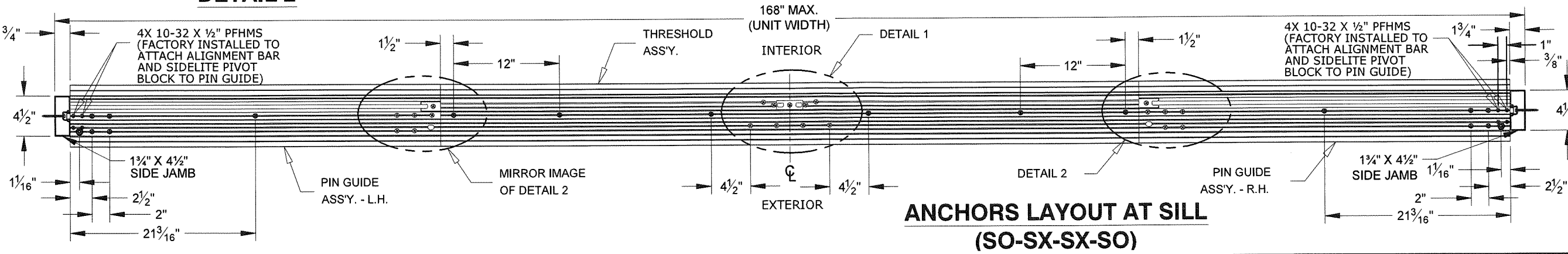
DETAIL 2

ANCHOR SCHEDULE		
LOCATION	SUBSTRATE	ANCHOR TYPE
HEAD	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	#14 WOOD SCREWS W/ 1-1/2" MIN. THREAD PENETRATION AND 1" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE
JAMBS	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	#14 WOOD SCREWS W/ 1-1/2" MIN. THREAD PENETRATION AND 1" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE
SILL	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/2" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	1/4" S.S. ITW TAPCONS W/ 1-1/2" MIN. THREAD PENETRATION AND 3/4" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE

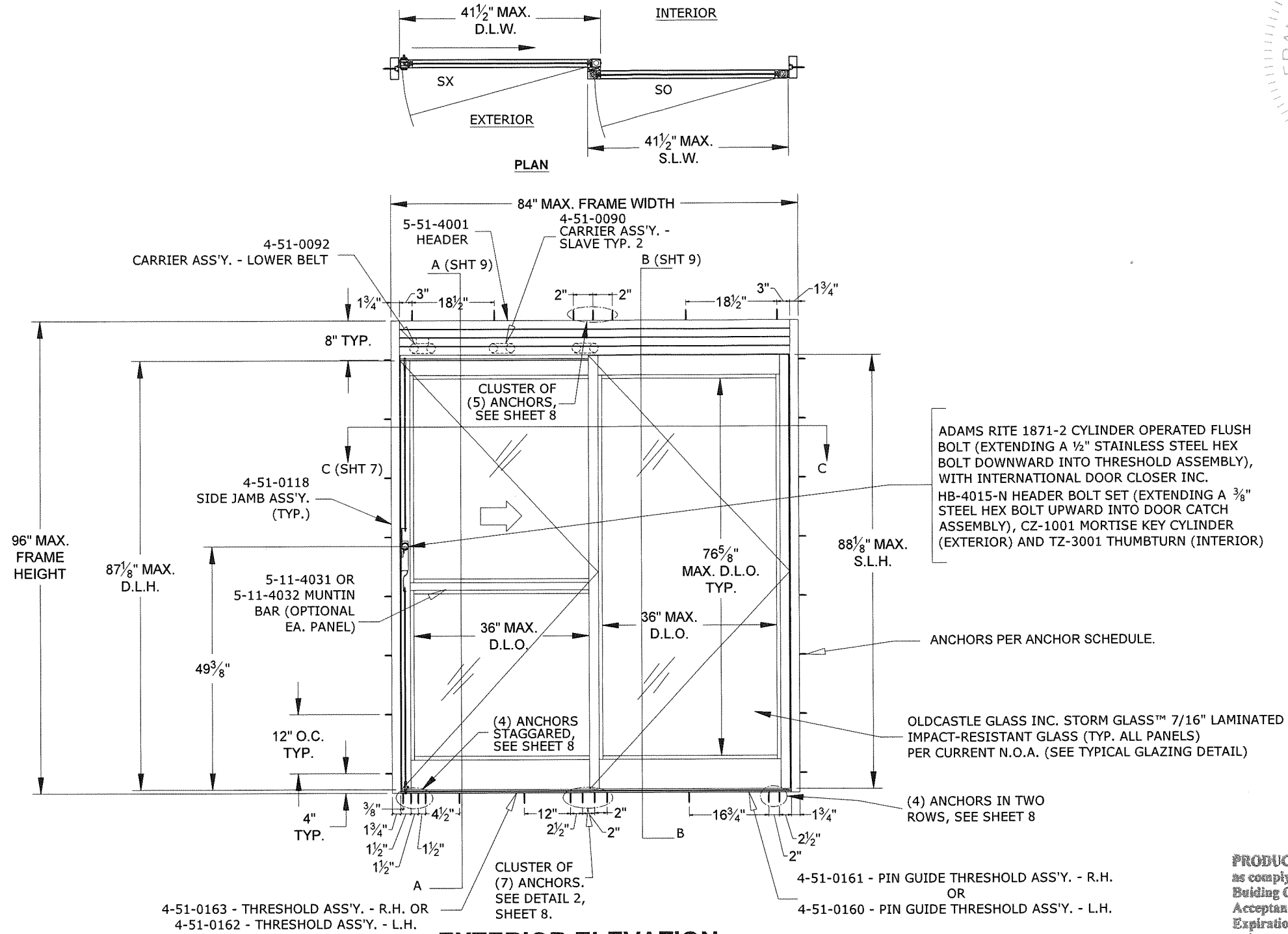
NOTE: FOR SO-SX OR SX-SO ANCHOR LAYOUTS, SEE SHEET 8.

ANCHOR NOTES:

- SEE EXTERIOR ELEVATIONS AND ANCHOR LAYOUT DETAILS FOR ANCHOR LOCATIONS AND/OR SPACING.
- ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS. ALL CONCRETE ANCHORS SHALL BE INSTALLED TO NON-CRACKED CONCRETE ONLY.
- ENSURE MINIMUM 2-1/2" EDGE DISTANCE FOR ALL ANCHORS TO CONCRETE & TO CONCRETE BLOCK. EDGE DISTANCE OF 1/2" IS ACCEPTABLE FOR ANCHORS TO STEEL OR ALUMINUM.
- WHERE ANCHORS FASTEN TO NARROW FACE OF STUD FRAMING, ANCHOR SHALL BE LOCATED IN CENTER OF NOMINAL 2x (MIN) WOOD STUD, U.N.O..
- WOOD HOST STRUCTURE SHALL BE "SOUTHERN PINE" G=0.55 OR GREATER DENSITY.
- ANCHOR REQUIREMENTS AS SHOWN HEREIN, INCLUDING MINIMUM EMBEDMENT AND EDGE DISTANCE, EXCLUDES STUCCO, FOAM, BRICK, AND OTHER WALL FINISHES. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN WITHIN THE HVHZ, A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE SHALL BE APPLIED FOR AND SECURED FROM THE MIAMI-DADE BUILDING CODE COMPLIANCE OFFICE PRODUCT CONTROL DIVISION. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN OUTSIDE THE HVHZ, THE BUILDING OFFICIAL MAY REQUIRE A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE BE OBTAINED, OR THAT SITE SPECIFIC DOCUMENTS BE PREPARED, SIGNED, DATED AND SEALED BY A LICENSED ENGINEER OR REGISTERED ARCHITECT, WHICH DETAIL AND JUSTIFY THE DEVIATION.
- WHERE EXISTING STRUCTURE IS WOOD FRAMING, EXISTING CONDITIONS MAY VARY. FIELD VERIFY THAT FASTENERS ARE INTO ADEQUATE WOOD FRAMING MEMBERS, NOT INTO PLYWOOD.
- WOOD BUCKS (BY OTHERS) SHALL BE ANCHORED PROPERLY TO TRANSFER LOADS TO THE EXISTING STRUCTURE.
- SELF DRILLING SCREWS SHALL BE SAE GRADE 5 INSTALLED WITH FULL ENGAGEMENT OF THREADS INTO METAL HOST STRUCTURE AND MAY HAVE EITHER A FLAT HEAD, PAN HEAD, TRUSS HEAD, OR OTHER HEAD STYLES. PROVIDE (5) PITCHES MIN. PAST THE THREAD PLANE.



**ANCHORS LAYOUT AT SILL
(SO-SX-SX-SO)**



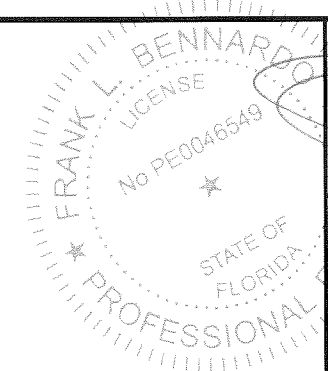
EXTERIOR ELEVATION
5405 SX-SO R.H. SHOWN
5404 SO-SX L.H. OPPOSITE

DESIGN PRESSURE RATING		IMPACT RATING
POSITIVE	+65 PSF	LARGE AND SMALL MISSILE IMPACT
NEGATIVE	-70 PSF	
NOTE: THIS SYSTEM WAS NOT TESTED FOR WATER INFILTRATION AND IS TO BE INSTALLED ONLY WHERE THE WATER REQUIREMENT IS NOT NEEDED.		

NOTE: SEE SHEET 8 FOR ANCHOR LAYOUT DETAILS AND ANCHOR TYPES.

PRODUCT RENEWED
 as complying with the Florida Building Code
 Acceptance No 20-0129.03
 Expiration Date 3/17/2025
 By [Signature]
 Miami Dade Product Control

PRODUCT REVISED
 as complying with the Florida Building Code
 Acceptance No 17-127.16
 Expiration Date 3/17/20
 By [Signature]
 Miami Dade Product Control



FRANK L. BENNARDO, P.E.
 #PE0046549

02/28/2018

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 E: HELLO@ENGINEERINGEXPRESS.COM
 CERT OF AUTH #9885

RECORD-USA
 4324 HARGETT COURT
 MONROE, NC 28110
 (704) 289 - 9212

SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV PER BCC COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

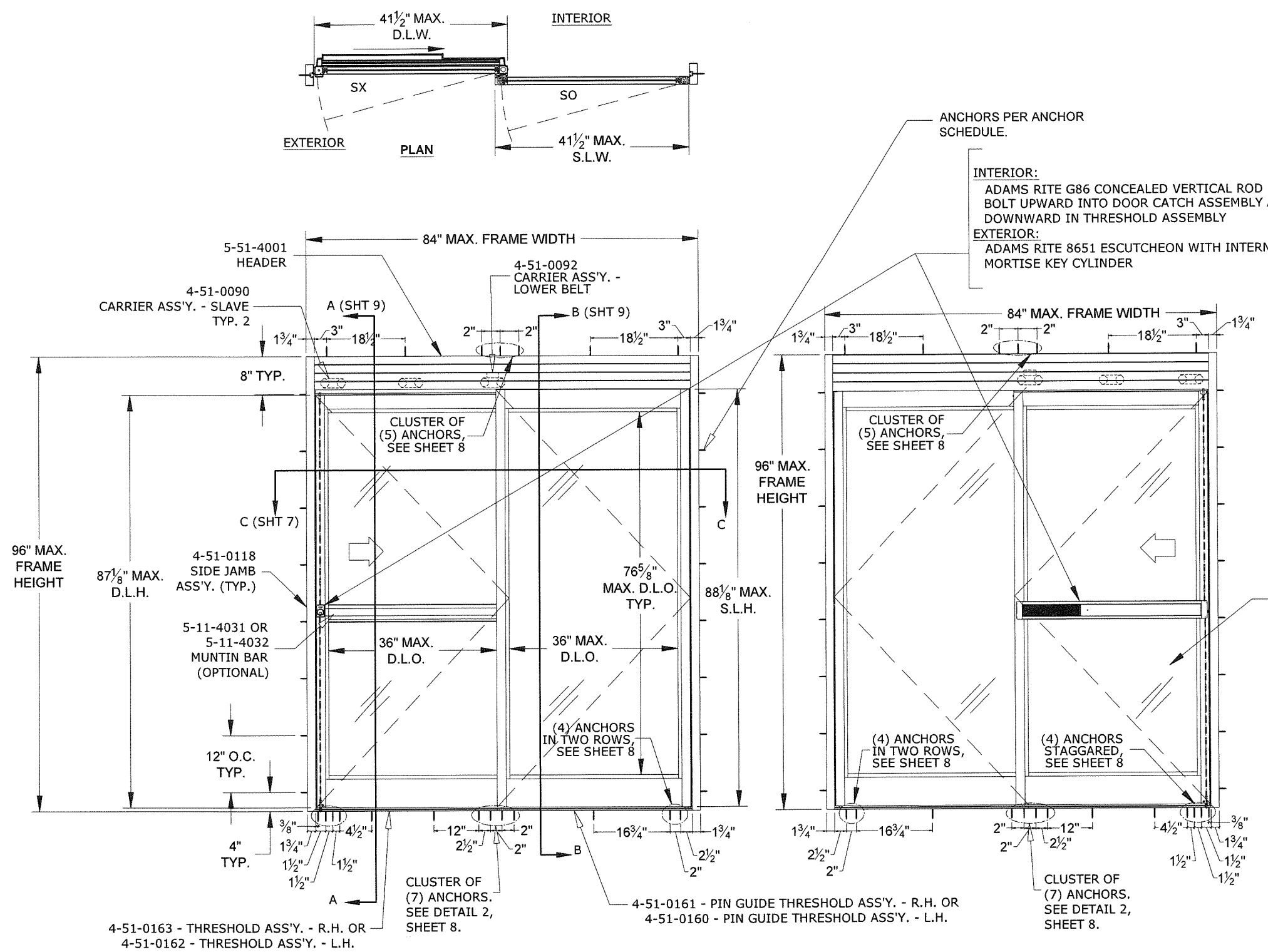
14-2168

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PAGE DESCRIPTION:

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02/28/2018 - 2:15pm rickn



ANCHORS PER ANCHOR SCHEDULE.

INTERIOR:
ADAMS RITE G86 CONCEALED VERTICAL ROD EXIT DEVICE EXTENDING A 3/8" STEEL HEX BOLT UPWARD INTO DOOR CATCH ASSEMBLY AND A 1/2" STAINLESS STEEL HEX BOLT DOWNWARD IN THRESHOLD ASSEMBLY

EXTERIOR:
ADAMS RITE 8651 ESCUTCHEON WITH INTERNATIONAL DOOR CLOSER, INC. CZ-1001 MORTISE KEY CYLINDER

OLDCASTLE GLASS INC. STORM GLASS™ 7/16" LAMINATED IMPACT-RESISTANT GLASS (TYP. ALL PANELS) PER CURRENT N.O.A. (SEE TYPICAL GLAZING DETAIL)

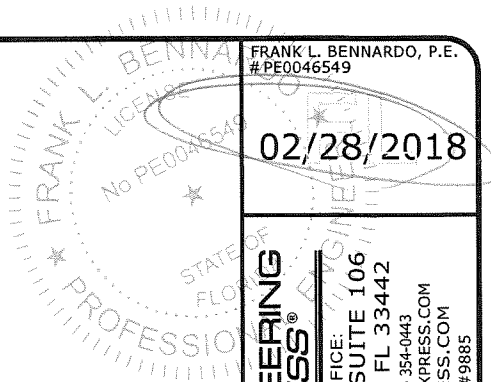
PRODUCT RENEWED
as complying with the Florida Building Code
Acceptance No 20-0129-03
Expiration Date 3/17/2025
By Isahay I. Chandra
Miami Code Product Control

PRODUCT REVISED
as complying with the Florida Building Code
Acceptance No 17-1227-16
Expiration Date 3/17/20
By Isahay I. Chandra
Miami Code Product Control

EXTERIOR ELEVATION
5405 SX-SO R.H. SHOWN
5404 SO-SX L.H. OPPOSITE

DESIGN PRESSURE RATING		IMPACT RATING
POSITIVE	+65 PSF	LARGE AND SMALL MISSILE IMPACT
NEGATIVE	-70 PSF	
NOTE: THIS SYSTEM WAS NOT TESTED FOR WATER INFILTRATION AND IS TO BE INSTALLED ONLY WHERE THE WATER REQUIREMENT IS NOT NEEDED.		

NOTE: SEE SHEET 8 FOR ANCHOR LAYOUT DETAILS AND ANCHOR TYPES.



FRANK L. BENNARDO, P.E.
#PE0046549
02/28/2018

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CERT OF AUTH #9885

RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212

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LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/07/09
2010 FBC (09-REU-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

14-2168
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02/28/2018

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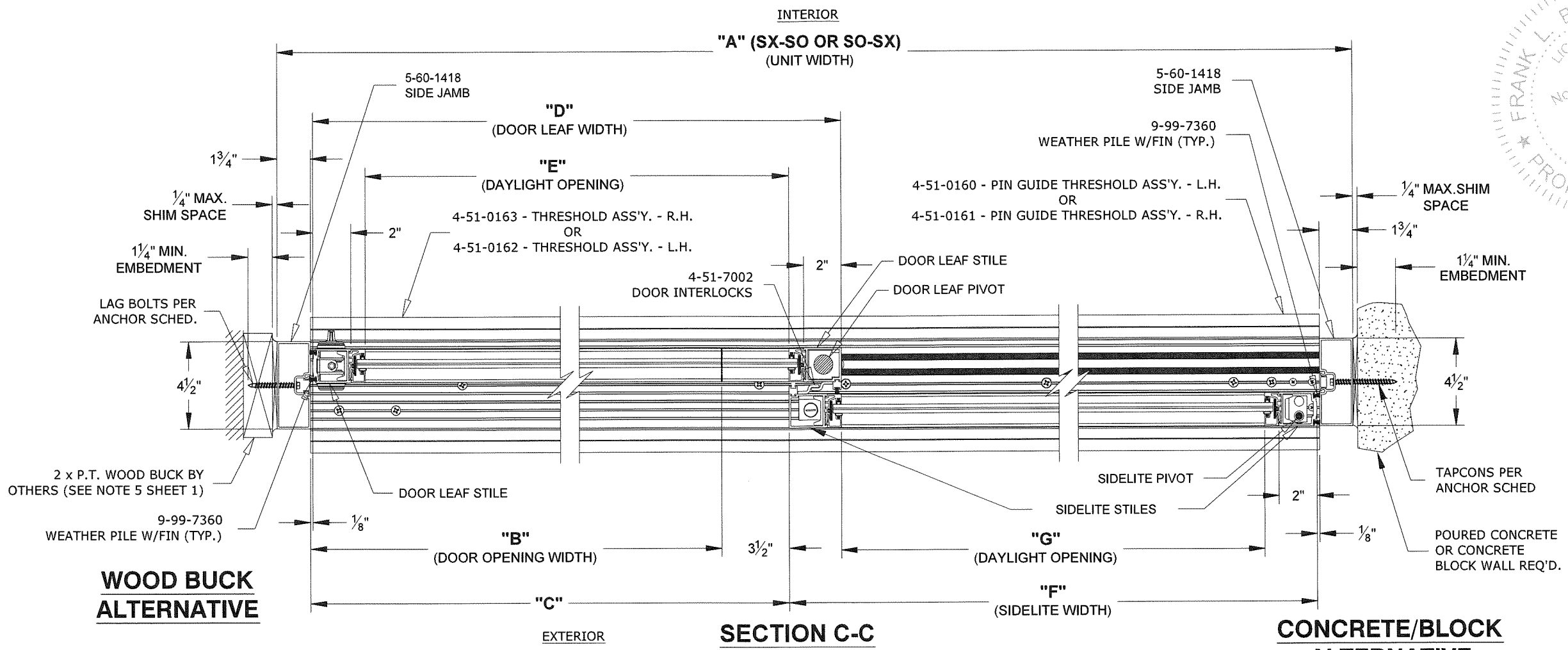
RECORD-USA
4324 HARGETT COURT
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(704) 289 - 9212

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LARGE MISSILE IMPACT RESISTANT
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REMARKS	DRWN	CHKD	DATE
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REV FBC 2014	RWN	CSL	02/09/15
REV/2017 FBC	RWN	FLB	12/20/17

14-2168
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PAGE DESCRIPTION:

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7

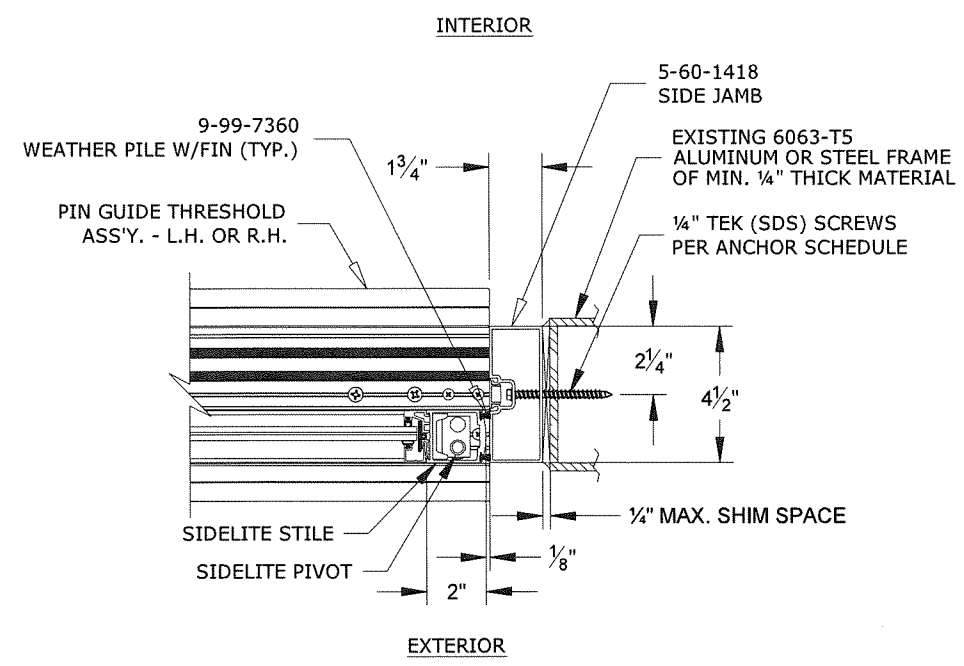


WOOD BUCK ALTERNATIVE

CONCRETE/BLOCK ALTERNATIVE

SECTION C-C
5405 SX-SO R.H. SHOWN
5404 SO-SX L.H. OPPOSITE

NOTE: SEE ELEVATIONS ON SHEET 6 AND ANCHOR DETAILS ON SHEET 8.



METAL STRUCTURE ALTERNATIVE

UNIT WIDTH "A" (SX-SO OR SO-SX)	DOOR OPENING WIDTH "B"	DIMENSION "C"	DOOR LEAF SIZE		DAYLIGHT OPENING (DOOR LEAF)		SIDELITE SIZE		DAYLIGHT OPENING (SIDELITE)		UNIT HEIGHT (MAX.)	ROUGH OPENING WIDTH (INCL. 1/4" SHIM SPACE BOTH SIDES)
			WIDTH "D"	HEIGHT	WIDTH "E"	HEIGHT	WIDTH "F"	HEIGHT	WIDTH "G"	HEIGHT		
6' 6"	32 3/8"	36"	38 1/2"	87 1/8"	33"	76 5/8"	38 1/2"	88 1/8"	33"	76 5/8"	8' 0"	6' 6 1/2"
7' 0"	35 3/8"	39"	41 1/2"	87 1/8"	36"	76 5/8"	41 1/2"	88 1/8"	36"	76 5/8"	8' 0"	7' 1/2"

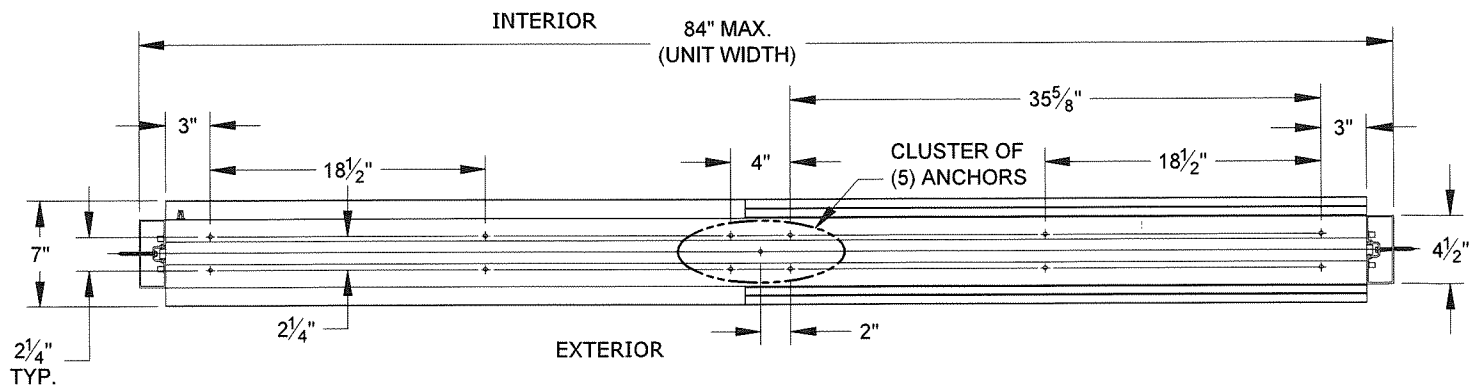
NOTE: DOOR WIDTH AND HEIGHT SHALL COMPLY WITH THE MINIMUM REQUIREMENTS OF THE FLORIDA BUILDING CODE.

PRODUCT RENEWED
as complying with the Florida Building Code
Acceptance No 20-0129.03
Expiration Date 3/17/2025
By *[Signature]*
Miami Dade Product Control

PRODUCT REVISED
as complying with the Florida Building Code
Acceptance No 17-1227-16
Expiration Date 3/17/20
By *[Signature]*
Miami Dade Product Control

V:\Projects\14-2168 NOA - Update 12-0403.07 (09-REU-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c-Series 5400 Automatic SGD (NOA).dwg

02/28/2018 - 2:15pm rickn

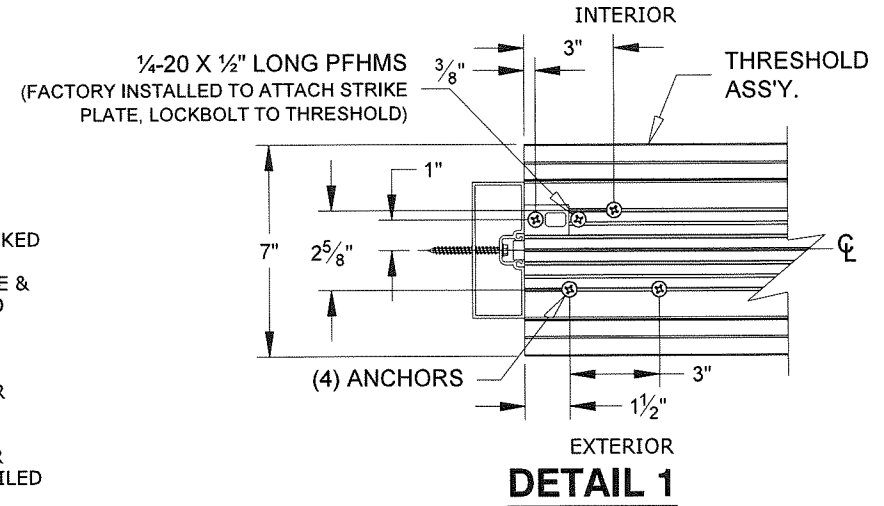


**ANCHOR LAYOUT AT HEADER
(TYP. FOR SO-SX OR SX-SO)**

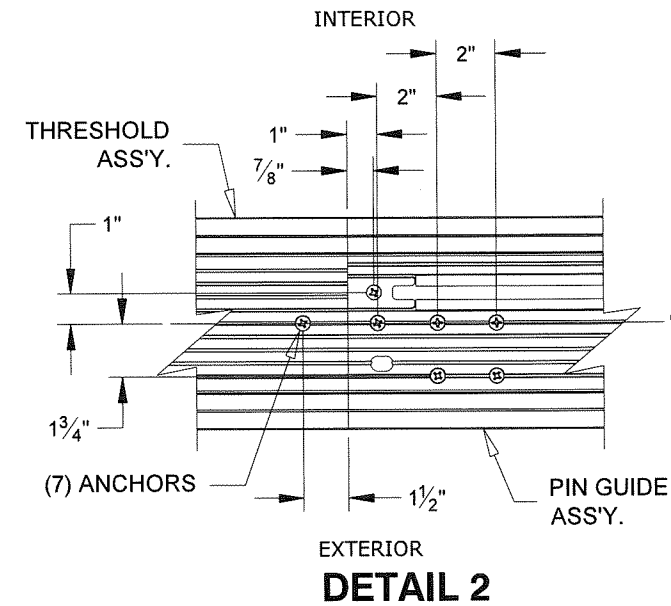
ANCHOR SCHEDULE		
LOCATION	SUBSTRATE	ANCHOR TYPE
HEAD	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	#14 WOOD SCREWS W/ 1-1/2" MIN. THREAD PENETRATION AND 1" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE
JAMBS	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	#14 WOOD SCREWS W/ 1-1/2" MIN. THREAD PENETRATION AND 1" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE
SILL	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	1/4" ITW S.S. TAPCONS W/ 1-1/2" MIN. THREAD PENETRATION AND 3/4" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE

ANCHOR NOTES:

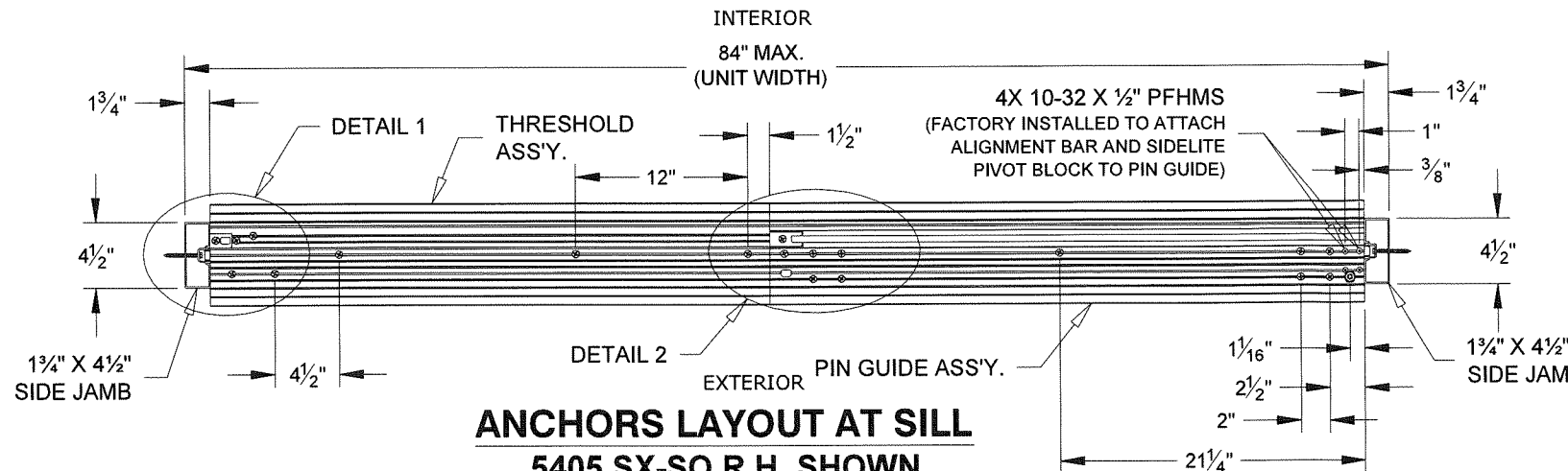
- SEE EXTERIOR ELEVATIONS AND ANCHOR LAYOUT DETAILS FOR ANCHOR LOCATIONS AND/OR SPACING.
- ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS. ALL CONCRETE ANCHORS SHALL BE INSTALLED TO NON-CRACKED CONCRETE ONLY.
- ENSURE MINIMUM 2-1/2" EDGE DISTANCE FOR ALL ANCHORS TO CONCRETE & TO CONCRETE BLOCK. EDGE DISTANCE OF 1/2" IS ACCEPTABLE FOR ANCHORS TO STEEL OR ALUMINUM.
- WHERE ANCHORS FASTEN TO NARROW FACE OF STUD FRAMING, ANCHOR SHALL BE LOCATED IN CENTER OF NOMINAL 2x (MIN) WOOD STUD, U.N.O..
- WOOD HOST STRUCTURE SHALL BE "SOUTHERN PINE" G=0.55 OR GREATER DENSITY.
- ANCHOR REQUIREMENTS AS SHOWN HEREIN, INCLUDING MINIMUM EMBEDMENT AND EDGE DISTANCE, EXCLUDES STUCCO, FOAM, BRICK, AND OTHER WALL FINISHES. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN WITHIN THE HVHZ, A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE SHALL BE APPLIED FOR AND SECURED FROM THE MIAMI-DADE BUILDING CODE COMPLIANCE OFFICE PRODUCT CONTROL DIVISION. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN OUTSIDE THE HVHZ, THE BUILDING OFFICIAL MAY REQUIRE A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE BE OBTAINED, OR THAT SITE SPECIFIC DOCUMENTS BE PREPARED, SIGNED, DATED AND SEALED BY A LICENSED ENGINEER OR REGISTERED ARCHITECT, WHICH DETAIL AND JUSTIFY THE DEVIATION.
- WHERE EXISTING STRUCTURE IS WOOD FRAMING, EXISTING CONDITIONS MAY VARY. FIELD VERIFY THAT FASTENERS ARE INTO ADEQUATE WOOD FRAMING MEMBERS, NOT INTO PLYWOOD.
- WOOD BUCKS (BY OTHERS) SHALL BE ANCHORED PROPERLY TO TRANSFER LOADS TO THE EXISTING STRUCTURE.
- SELF DRILLING SCREWS SHALL BE SAE GRADE 5 INSTALLED WITH FULL ENGAGEMENT OF THREADS INTO METAL HOST STRUCTURE AND MAY HAVE EITHER A FLAT HEAD, PAN HEAD, TRUSS HEAD, OR OTHER HEAD STYLES. PROVIDE (5) PITCHES MIN. PAST THE THREAD PLANE.



DETAIL 1



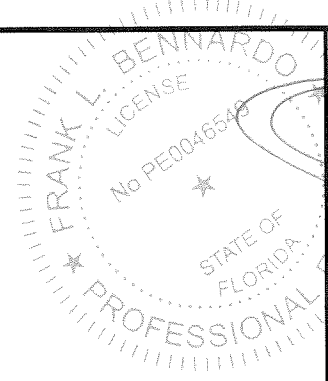
DETAIL 2



**ANCHORS LAYOUT AT SILL
5405 SX-SO R.H. SHOWN
5404 SO-SX L.H. OPPOSITE**

PRODUCT RENEWED
as complying with the Florida Building Code
Acceptance No. 2a-0129.03
Expiration Date 3/17/2025
By Isang L. Lim
Miami Dade Product Control

PRODUCT REVISED
as complying with the Florida Building Code
Acceptance No. 17-1227.16
Expiration Date 3/17/20
By Isang L. Lim
Miami Dade Product Control



FRANK L. BENARDO, P.E.
PE0046549

02/28/2018

ENGINEERING EXPRESS
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E: HELLO@ENGINEERINGEXPRESS.COM
ENGINEERINGEXPRESS.COM
CERT OF AUTH #9885

RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212

SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

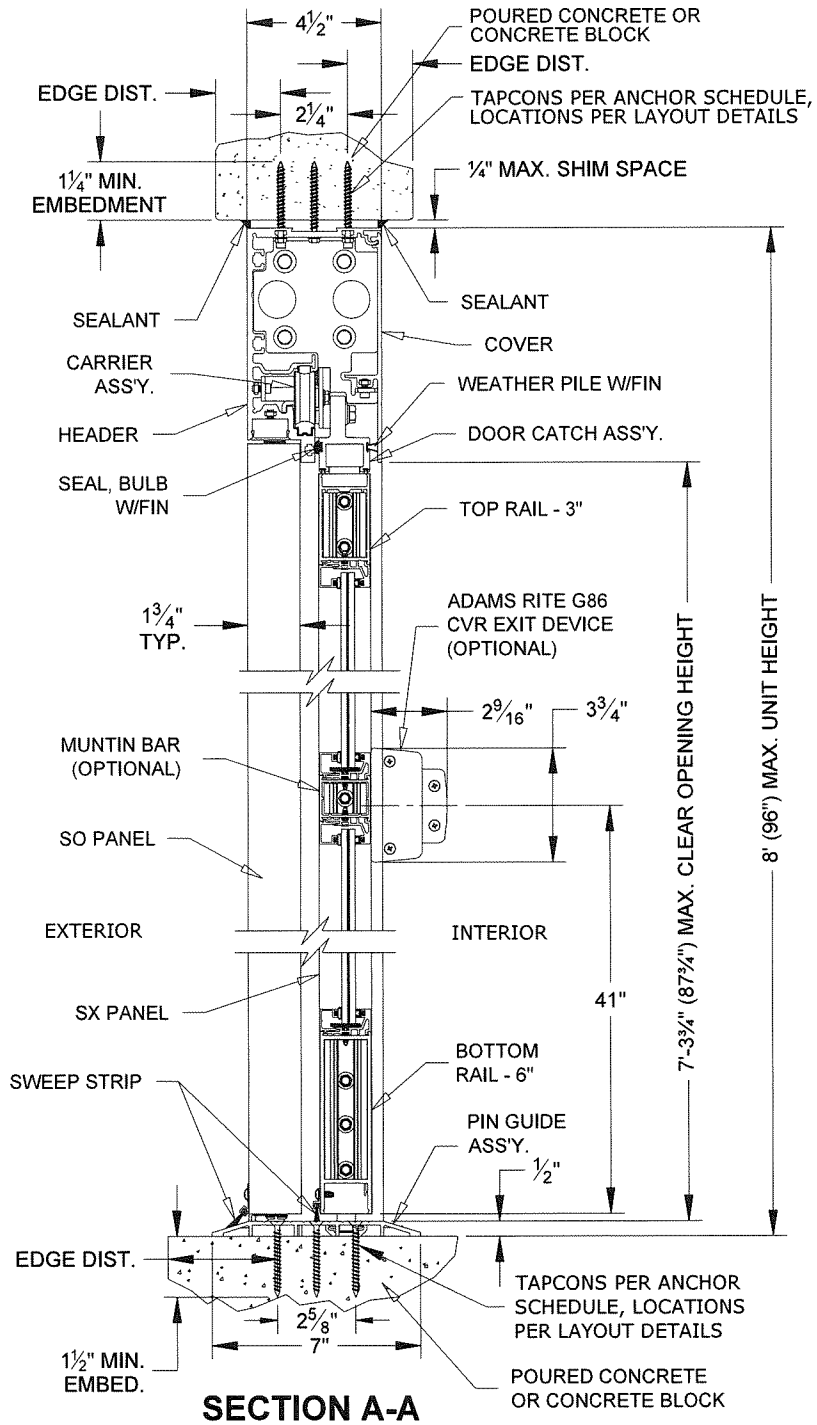
14-2168

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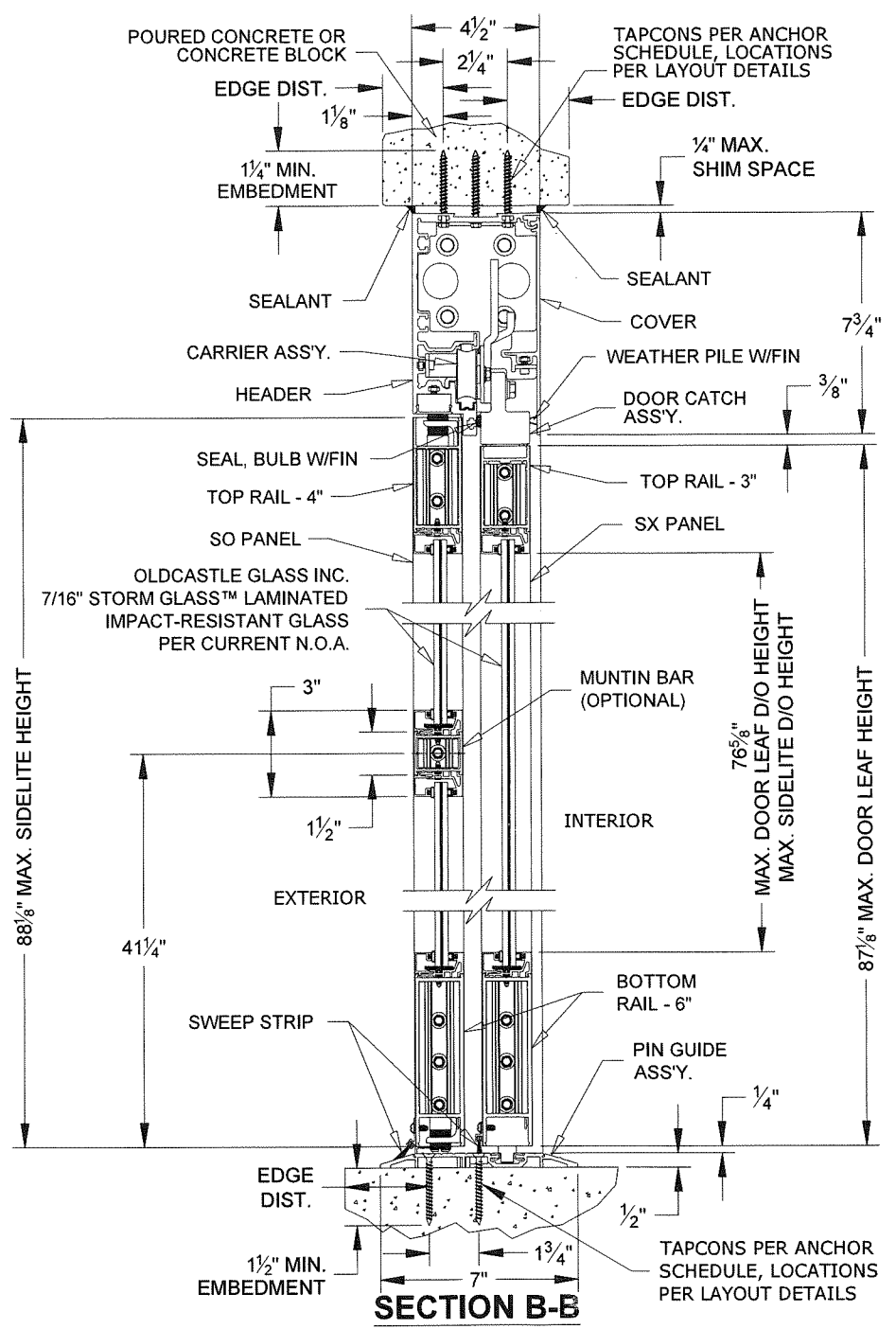
V:\Projects\14-2168 NOA - Update 12-04-03-07 (09-REL-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c Series 5400 Automatic SGD (NOA).dwg

02/28/2018 - 2:15pm rickn



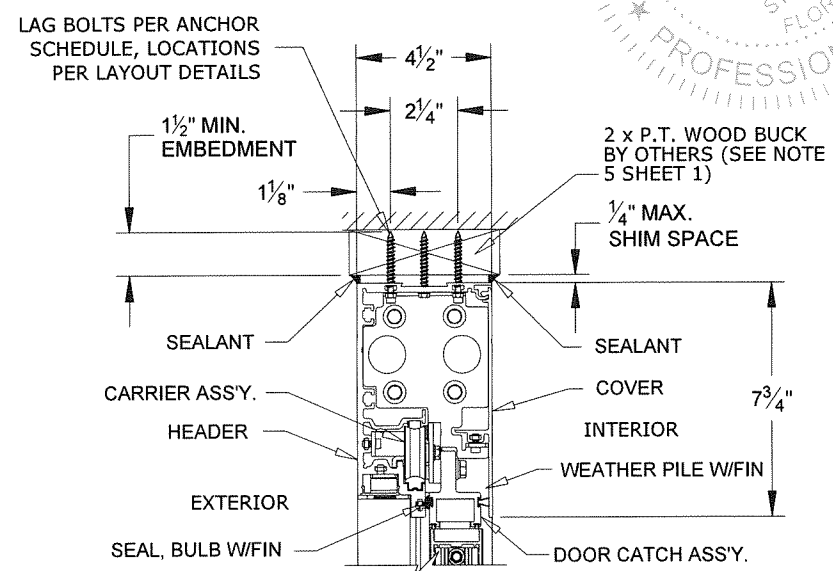
SECTION A-A

(SEE SECTION C-C FOR ADDITIONAL FASTENER DETAIL IN THRESHOLD)

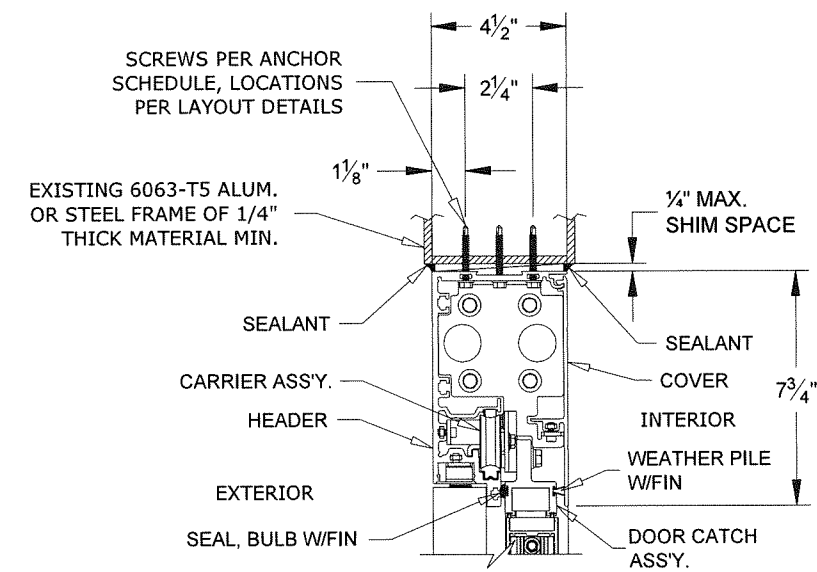


SECTION B-B

(SEE SECTION C-C FOR ADDITIONAL FASTENER DETAIL IN THRESHOLD)



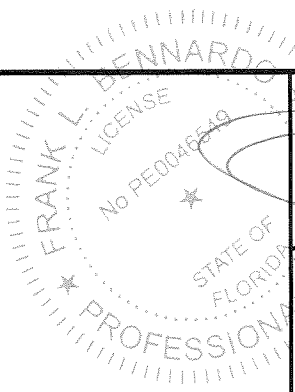
WOOD ALTERNATIVE



METAL STRUCTURE ALTERNATIVE

PRODUCT RENEWED
 as complying with the Florida
 Building Code 20-0129.03
 Acceptance No.
 Expiration Date 3/17/2025
 By: Ishag I. Chank
 Michael Deak Product Control

PRODUCT REVISED
 as complying with the Florida
 Building Code
 Acceptance No. 17-1227.16
 Expiration Date 3/17/20
 By: Ishag I. Chank
 Michael Deak Product Control



FRANK L. BENNARDO, P.E.
 # PE0046549
 02/28/2018

ENGINEERING EXPRESS
 CORPORATE OFFICE:
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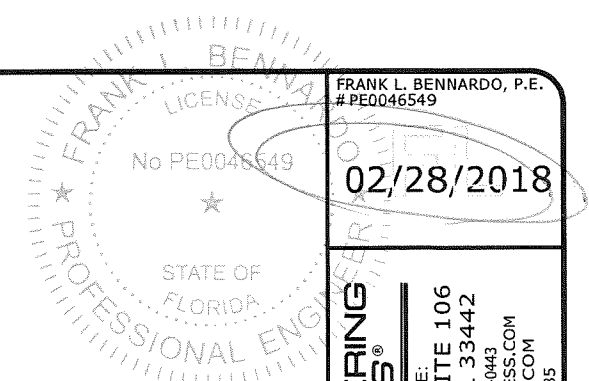
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 (704) 289 - 9212
 SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AVL	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	RWN	CSL	03/19/12
REV FBC 2014	RWN	FLB	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

14-2168
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02/28/2018 - 2:16pm rickn



FRANK L. BENNARDO, P.E.
#PE0046549

02/28/2018

ENGINEERING EXPRESS®
CORPORATE OFFICE:
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DEERFIELD BEACH, FL 33442
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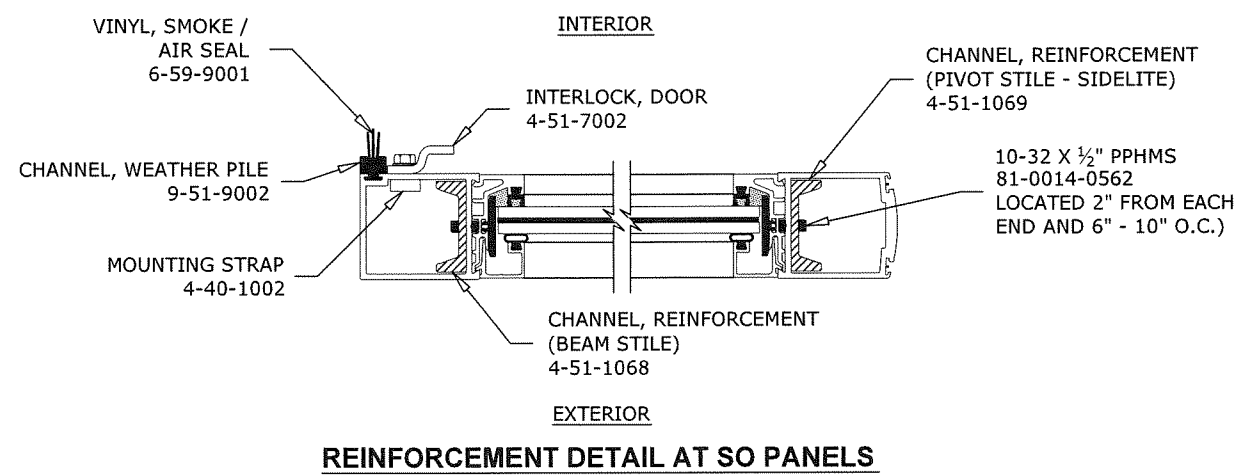
SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

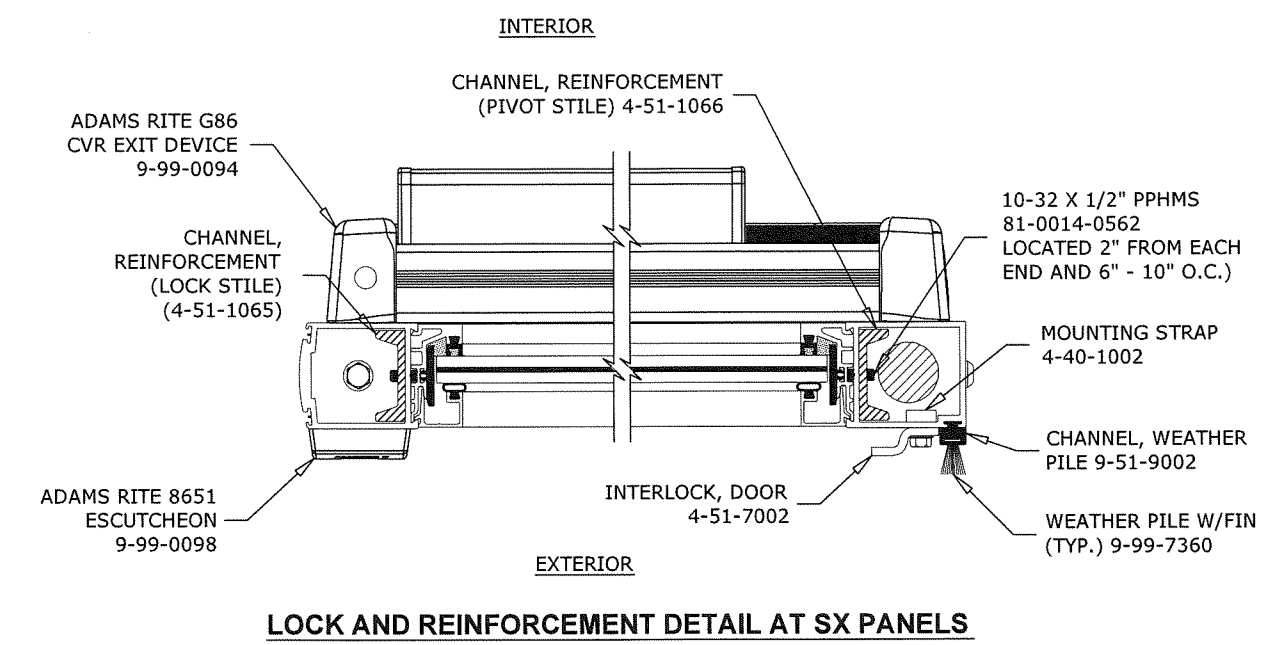
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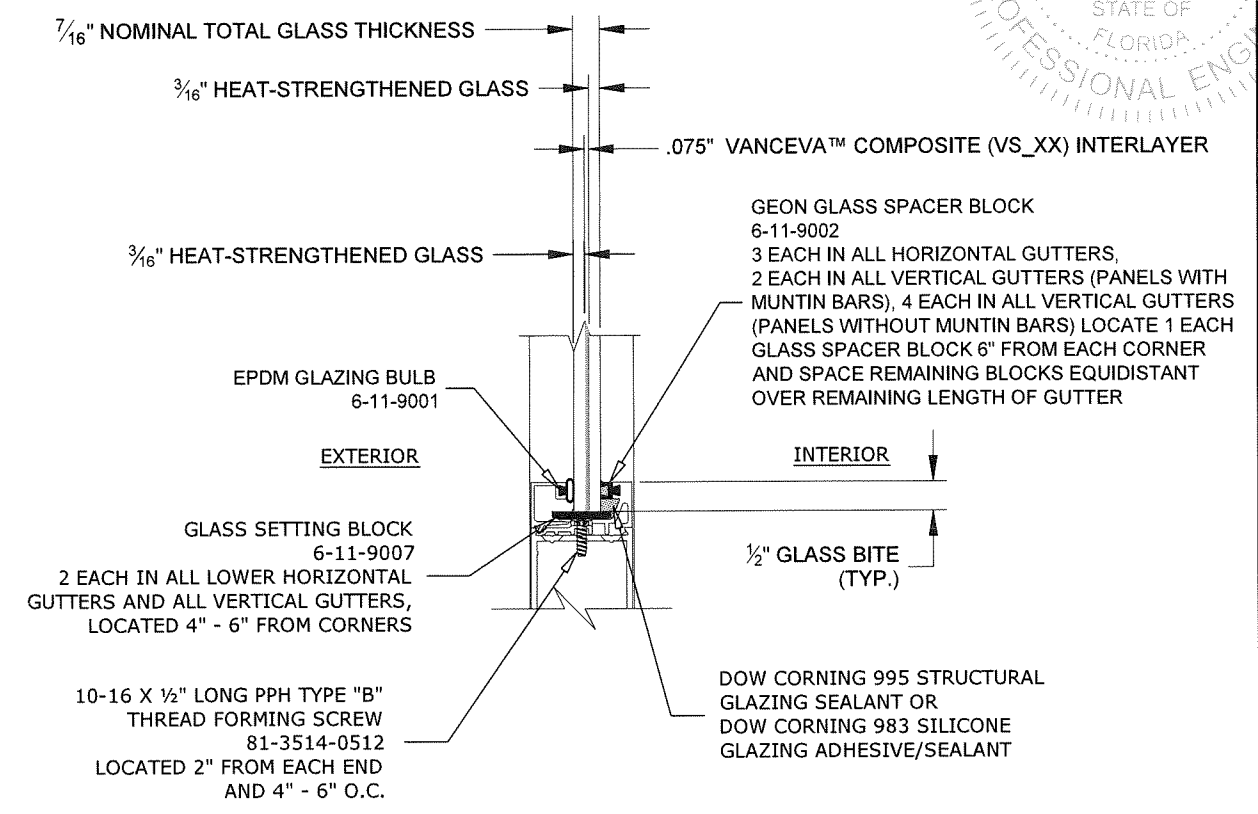
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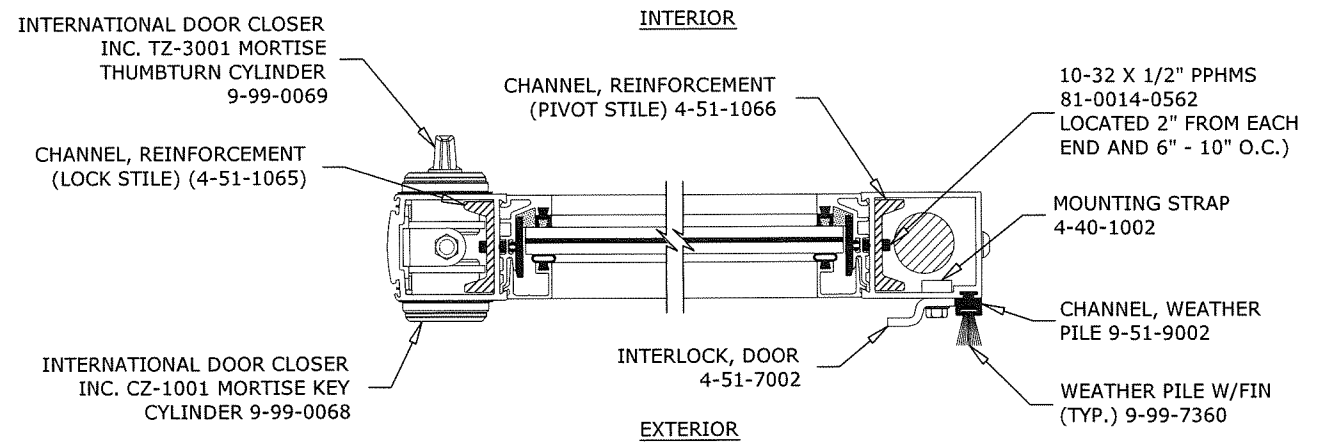
REINFORCEMENT DETAIL AT SO PANELS



LOCK AND REINFORCEMENT DETAIL AT SX PANELS



TYPICAL GLAZING DETAIL (ALL LITES)

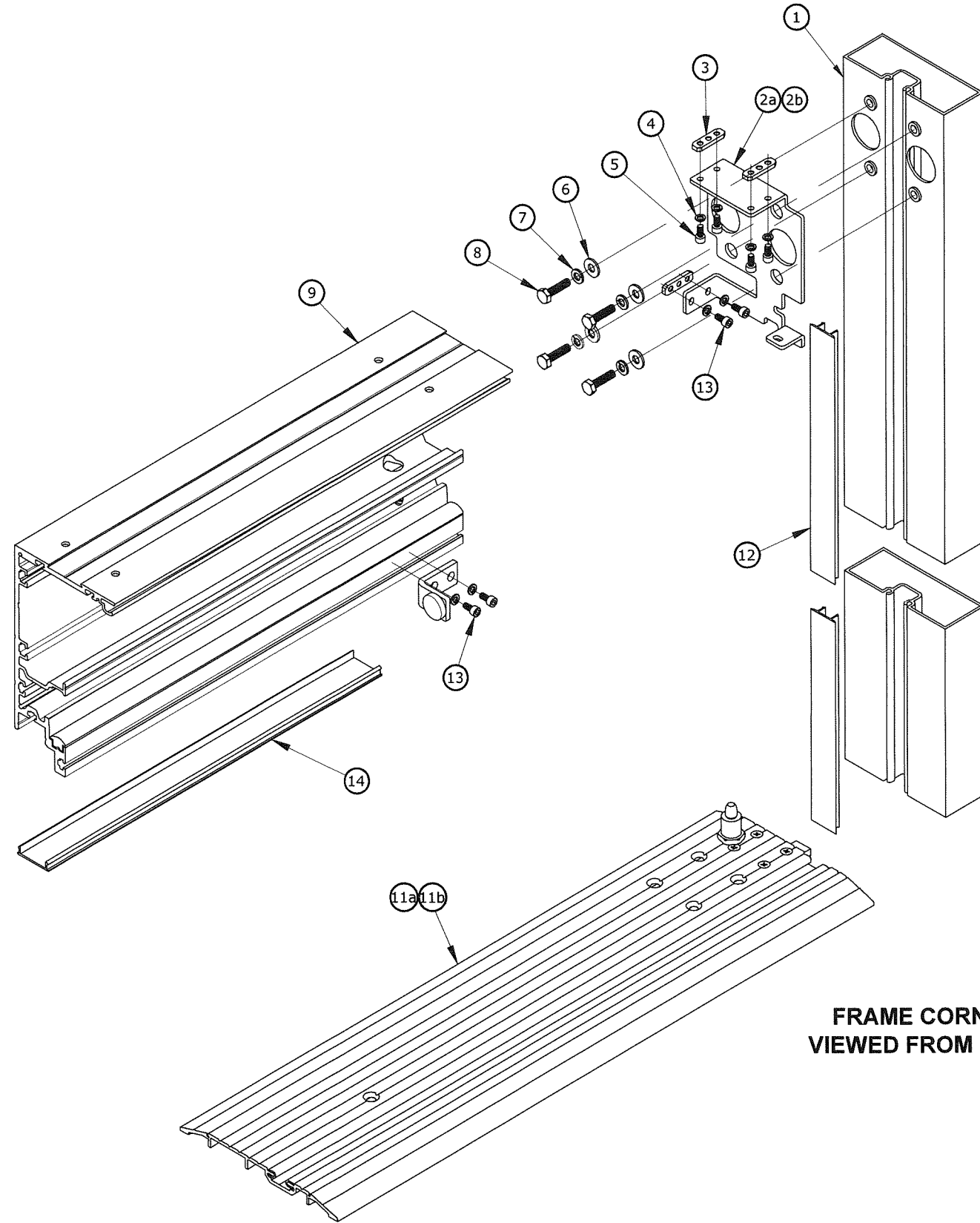


LOCK AND REINFORCEMENT DETAIL AT SX PANELS

PRODUCT REVIEWED
as complying with the Florida
Building Code
Acceptance No. 20-0129.03
Expiration Date 3/17/2025
By Frank L. Bennardo
Miami Dade Product Control

PRODUCT REVIEWED
as complying with the Florida
Building Code
Acceptance No. 17-1227.11
Expiration Date 3/17/20
By Frank L. Bennardo
Miami Dade Product Control

02/28/2018 - 2:19pm rickn V:\Projects\14-2168 NOA - Update 12-0403.07 (09-REU-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c Series 5400 Automatic SGD (NOA).dwg

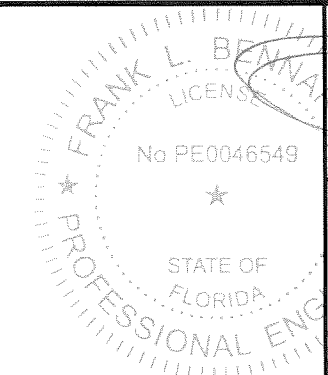


**FRAME CORNER DETAILS
VIEWED FROM INTERIOR SIDE**

HEADER / SIDE JAMB CORNER ATTACHMENT DETAIL			
ITEM NO.	PART NO.	DESCRIPTION	QUANTITY
1	5-60-1418	SIDE JAMB	2
2a	4-51-1055	BRACKET, HEADER MOUNTING - R.H.	1
2b	4-51-1056	BRACKET, HEADER MOUNTING - L.H.	1
3	4-51-1037	PLATE, NUT	8
4	9-99-7249	LOCK WASHER, SPLIT, #10	16
5	81-0016-2258	SCREW, 10-32 X 3/8" SHCS	8
6	9-99-7346	WASHER, 1/4" FLAT	8
7	9-99-7161	WASHER, 1/4" LOCK SPLIT	8
8	81-0088-3670	SCREW, 1/4-20 X 1" HHMS - GR. 8	8
9	5-51-4001	HEADER	1
10	4-51-0020	DOOR STOP ASS'Y.	2
11a	4-51-0150	PIN GUIDE THRESHOLD ASS'Y. - L.H.	1
11b	4-51-0151	PIN GUIDE THRESHOLD ASS'Y. - R.H.	1
12	5-60-1532	JAMB FILLER	2
13	81-0016-2562	SCREW, 10-32 X 1/2" SHCS	8
14	5-51-4003	FILLER, HEADER SOFFIT	3

PRODUCT RENEWED
as complying with the Florida
Building Code 20-0129.03
Acceptance No
Expiration Date 3/17/2025
By [Signature]
Miami Dade Product Control

***PRODUCT REVISED**
as complying with the Florida
Building Code
Acceptance No 17-1227.16
Expiration Date 3/17/20
By [Signature]
Miami Dade Product Control



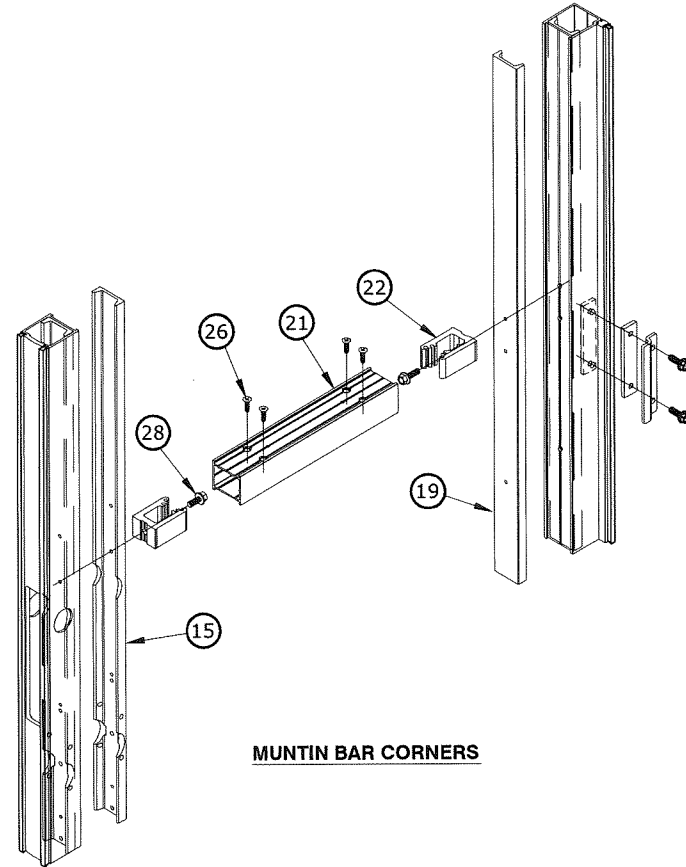
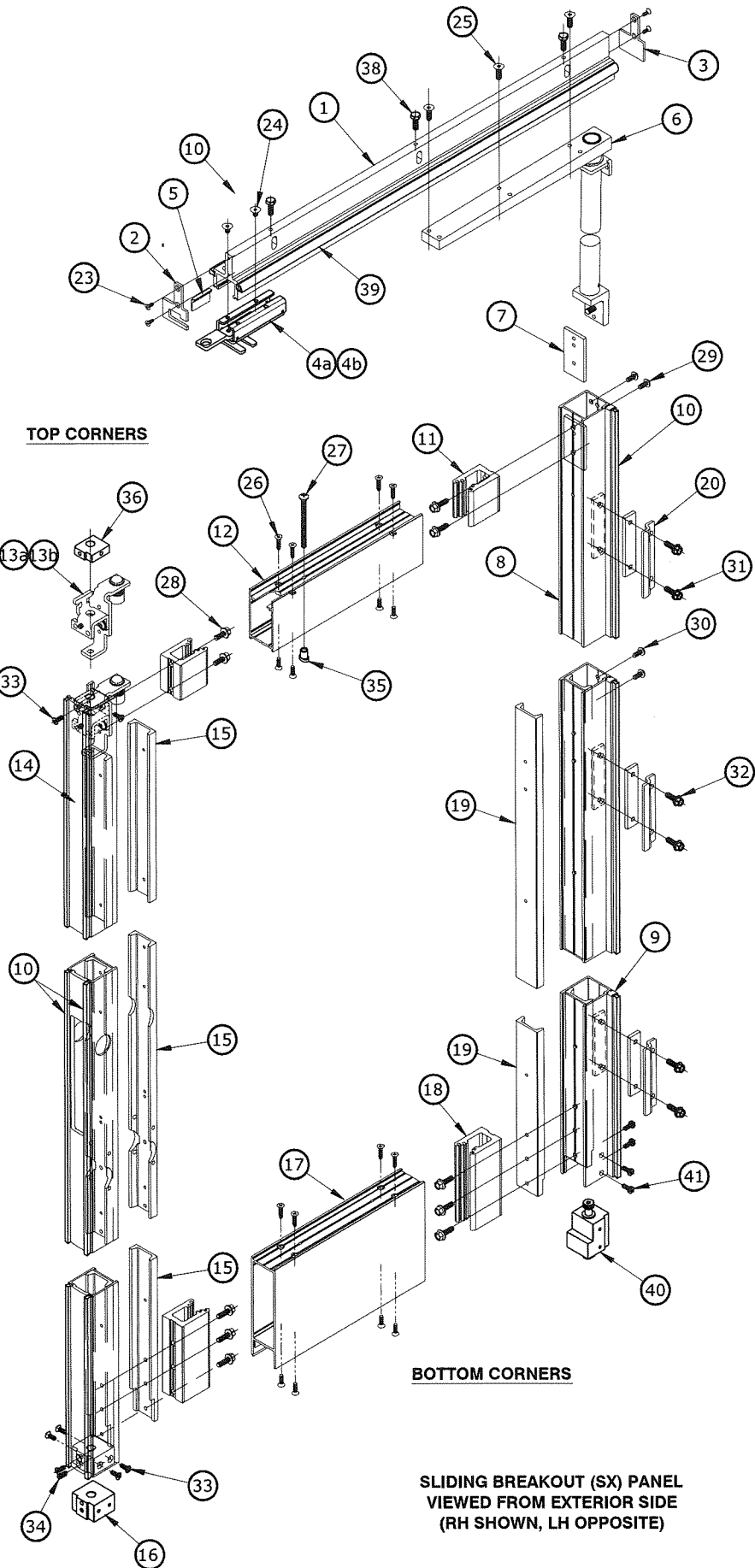
FRANK L. BENNARDO, P.E.
PE0046549
02/28/2018

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RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212
SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	INITIALS	DATE
DRWN	KL	06/26/09
CHKD	FLB	12/01/09
AML	FLB	03/19/12
REV. PER BCCO COMMENT	RWN	02/09/15
2010 FBC (09-REU-0001)	RWN	12/20/17
REV FBC 2014		
REV 2017 FBC		

14-2168
SCALE: -
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MUNTIN BAR CORNERS

PRODUCT REVIEWED
 as complying with the Florida
 Building Code
 Acceptance No 17-1227-16
 Expiration Date 3/17/20
[Signature]
 Minor Code Product Control

PRODUCT RENEWED
 as complying with the Florida
 Building Code
 Acceptance No 20-1129-03
 Expiration Date 3/17/2025
[Signature]
 Minor Code Product Control

FRANK L. BENNARDO, P.E.
 #PE0046549
 No PE0046549
 02/28/2018
 STATE OF FLORIDA
 PROFESSIONAL ENGINEER

SLIDING BREAKOUT (SX) PANEL						
ITEM NO.	PART NO.	DESCRIPTION	QUANTITY			
			W/O MUNTIN BAR		W/MUNTIN BAR	
			L.H.	R.H.	L.H.	R.H.
1	51-4006	DOOR CATCH	1	1	1	1
2	4-59-1020	END CAP, DOOR CATCH (POSITIVE LATCH)	1	1	1	1
3	4-51-1049	END CAP, DOOR CATCH	1	1	1	1
4a	4-51-0027	DOOR CATCH ASS'Y. - L.H.	1	-	1	-
4b	4-51-0014	DOOR CATCH ASS'Y. - R.H.	-	1	-	1
5	4-51-9004	COVER, DOOR CATCH	1	1	1	1
6	4-51-0011	TORQUE BAR ASS'Y.	1	1	1	1
7	4-11-1082	PLATE, BACKER	1	1	1	1
8	5-11-4022	STILE, FIXED (NARROW)	1	1	1	1
9	6-51-9002	CHANNEL, WEATHER PILE	1	1	1	1
10	9-99-7360	WEATHER PILE W/FIN	A/R	A/R	A/R	A/R
11	4-11-4097	BLOCK, SHEAR	2	2	2	2
12	5-51-4009	RAIL - 3"	1	1	1	1
13a	4-51-0015	INTERLOCK ASS'Y. - L.H.	1	-	1	-
13b	4-51-0016	INTERLOCK ASS'Y. - R.H.	-	1	-	1
14	5-11-4021	STILE, TANDEM (NARROW)	1	1	1	1
15	4-51-1065	CHANNEL, REINFORCEMENT (LOCK STILE)	1	1	1	1
16	4-51-9007	BLOCK, FLUSHBOLT SUPPORT	1	1	1	1
17	5-11-4036	RAIL - 6"	1	1	1	1
18	4-51-4151	BLOCK, SHEAR	2	2	2	2
19	4-51-1066	CHANNEL, REINFORCEMENT (PIVOT STILE)	1	1	1	1
20	4-51-7002	INTERLOCK, DOOR	-	-	1	1
21	5-11-4031	MUNTIN BAR	-	-	2	2
22	4-11-4096	BLOCK, SHEAR	-	-	2	2
23	81-3511-0412-DB	SCREW, 8-18 X 1/2" PFHMS, TYPE B	4	4	4	4
24	81-0011-2658	SCREW, 1/4-20 X 3/8" SFCHCS	2	2	2	2
25	81-0011-2670	SCREW, 1/4-20 X 1" SFCHCS	3	3	3	3
26	81-4411-0516	SCREW, 10-24 X 3/4" PFHMS, TYPE 23	16	16	20	20
27	81-0014-0688	SCREW, 1/4-20 X 3" PPHMS	1	1	1	1
28	81-0017-3666	SCREW, 1/4-20 X 3/4" HWHMS, GR. 8	10	10	12	12
29	81-0016-2658	SCREW, 1/4-20 X 3/8" BSHCS - S.S.	2	2	2	2
30	81-0014-2670	SCREW, 1/4-20 X 1" BSHCS - S.S.	2	2	2	2
31	81-0017-3662	SCREW, 1/4-20 X 1/2" HWHMS, GR. 8	2	2	2	2
32	81-0017-3664	SCREW, 1/4-20 X 5/8" HWHMS, GR. 8	8	8	8	8
33	81-0011-0562	SCREW, 10-32 X 1/2" PFHMS	7	7	7	7
34	9-99-0113	PLUNGER, SPRING LOADED	1	1	1	1
35	9-99-2596	BLOCK, GLASS JACKING	1	1	1	1
36	4-51-4265	BLOCK, HEX BOLT GUIDE	1	1	1	1
37	4-40-1002	MOUNTING STRAP	5	5	5	5
38	81-0718-3666	SCREW, 1/4-20 X 3/4" HHMS, GR. 5 W/NYLOC STRIP	3	3	3	3
39	6-11-9009	SEAL, BULB W/FIN	A/R	A/R	A/R	A/R
40	4-51-0093	BOTTOM GUIDE ASS'Y.	1	1	1	1
41	81-0074-0562	SCREW, 10-32 X 1/2" PPHMS - STAINLESS STEEL	4	4	4	4

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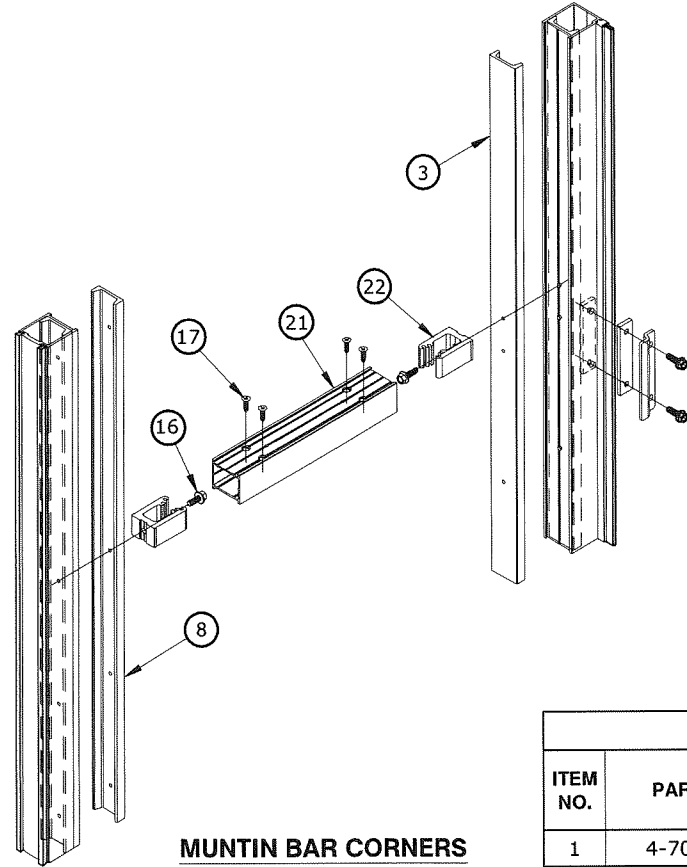
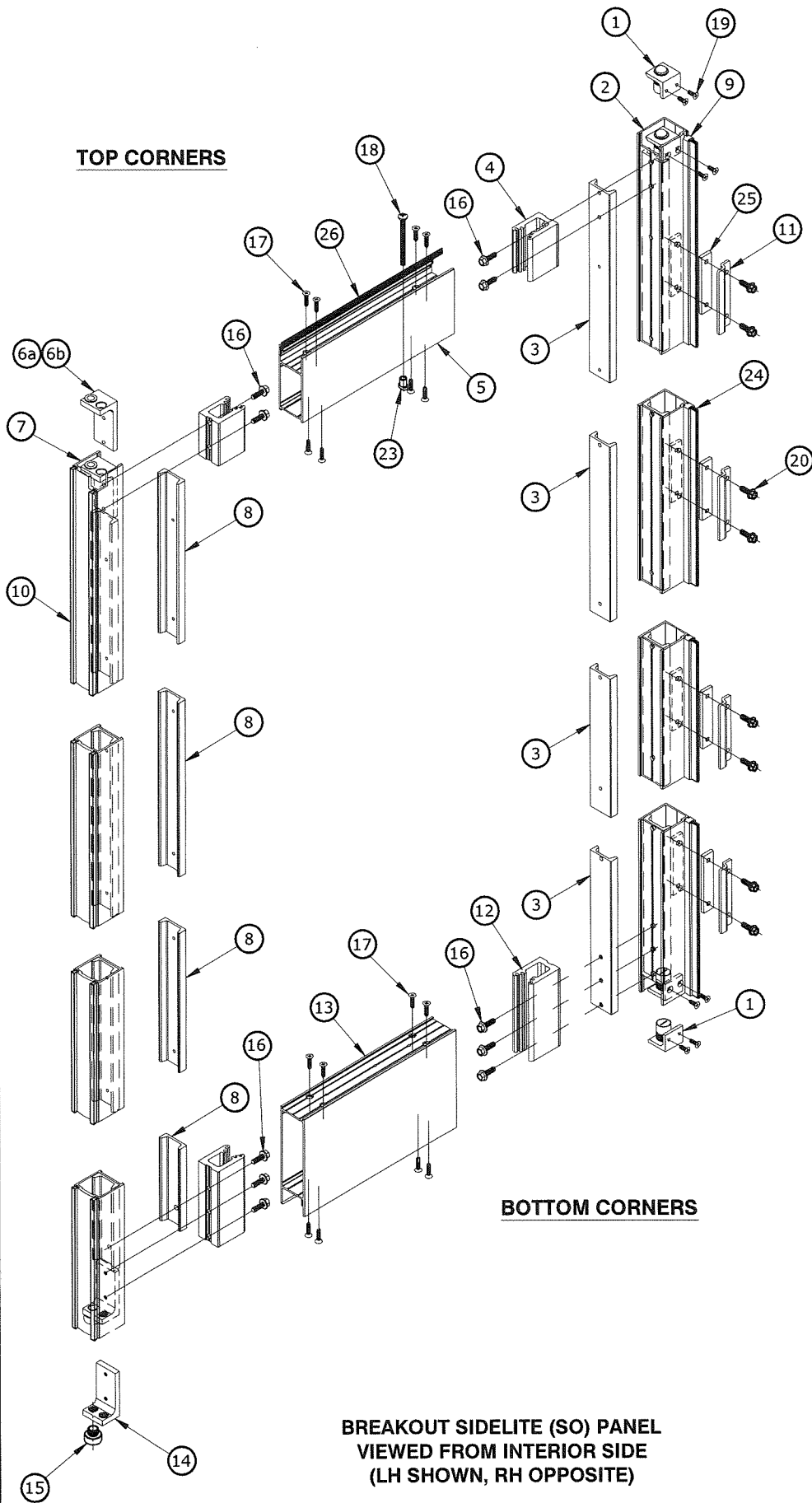
RECORD-USA
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 MONROE, NC 28110
 (704) 289 - 9212
 SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REU-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

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V:\Projects\14-2168 NOA - Update 12-0403-07 (09-REU-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c Series 5400 Automatic SGD (NOA).dwg

02/28/2018 - 2:16pm rickn

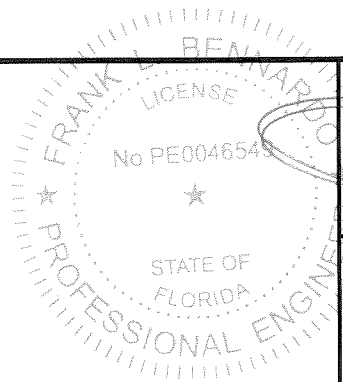


MUNTIN BAR CORNERS

PRODUCT REVISED
 as complying with the Florida
 Building Code
 Acceptance No 17-1227-16
 Expiration Date 3/17/20
 By Frank L. Bennardo
 Miami Dade Product Control

PRODUCT RENEWED
 as complying with the Florida
 Building Code
 Acceptance No 20-0129-03
 Expiration Date 3/17/2025
 By Shag L. Bennardo
 Miami Dade Product Control

BREAKAWAY SIDELITE (SO) PANEL							
ITEM NO.	PART NO.	DESCRIPTION	QUANTITY				
			W/O MUNTIN BAR		W/MUNTIN BAR		
			L.H.	R.H.	L.H.	R.H.	
1	4-70-0672	ROLLER CATCH ASS'Y.	2	2	2	2	
2	5-11-4022	STILE, FIXED (NARROW)	1	1	1	1	
3	4-51-1068	CHANNEL, REINFORCEMENT (BEAM STILE)	1	1	1	1	
4	4-11-4098	BLOCK, SHEAR	2	2	2	2	
5	5-11-4034	RAIL - 4"	1	1	1	1	
6a	4-11-0432	ANGLE ASS'Y., SIDELITE PIVOT (TOP) - L.H.	1	-	1	-	
6b	4-11-0433	ANGLE ASS'Y., SIDELITE PIVOT (TOP) - R.H.	-	1	-	1	
7	5-11-4021	STILE, TANDEM (NARROW)	1	1	1	1	
8	4-51-1069	CHANNEL, REINFORCEMENT (PIVOT STILE)	1	1	1	1	
9	6-51-9002	CHANNEL, WEATHER PILE	1	1	1	1	
10	9-99-7360	WEATHER PILE W/FIN	A/R	A/R	A/R	A/R	
11	4-51-7002	INTERLOCK, DOOR	5	5	5	5	
12	4-51-4151	BLOCK, SHEAR	1	1	1	1	
13	5-11-4036	RAIL - 6"	1	1	1	1	
14	4-51-1067	ANGLE, SIDELITE PIVOT (BOTTOM)	1	1	1	1	
15	4-51-7003	BUSHING, SIDELITE PIVOT (BOTTOM)	1	1	1	1	
16	81-0017-3666	SCREW, 1/4-20 X 3/4" HWHMS, GR. 8	10	10	12	12	
17	81-4411-0516	SCREW, 10-24 X 3/4" PFHMS, TYPE 23	16	16	20	20	
18	81-0014-0690	SCREW, 1/4-20 X 3 1/2" PPMS	1	1	1	1	
19	81-0012-0562	SCREW, 10-32 X 5/16" PFHMS	4	4	4	4	
20	81-0017-3664	SCREW, 1/4-20 X 5/8" HWHMS, GR. 8	10	10	10	10	
21	5-11-4031	MUNTIN BAR	-	-	1	1	
22	4-11-4096	BLOCK, SHEAR	-	-	2	2	
23	9-99-2596	BLOCK, GLASS JACKING	1	1	1	1	
24	6-59-9001	VINYL, SMOKE / AIR SEAL	A/R	A/R	A/R	A/R	
25	4-40-1002	MOUNTING STRAP	5	5	5	5	
26	9-99-7361	SEAL, SIDELITE (TOP)	1	1	1	1	



FRANK L. BENNARDO, P.E.
 # PE0046549
 02/28/2018

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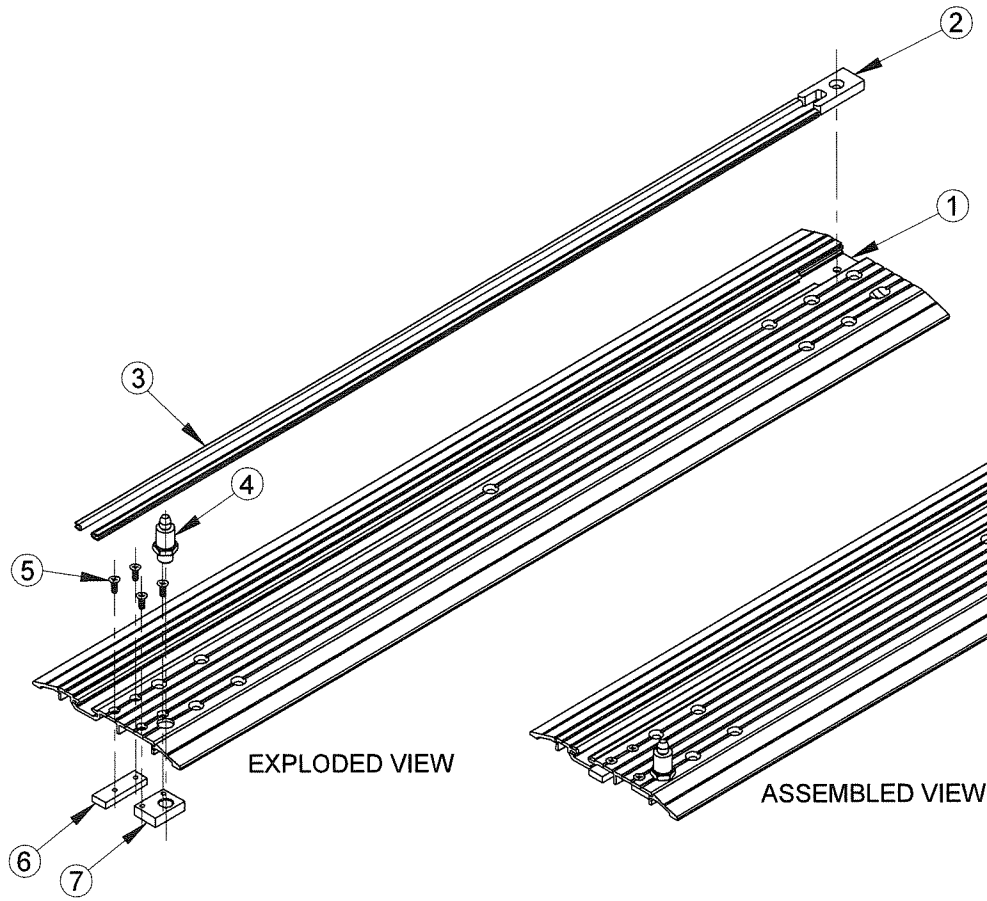
RECORD-USA
 4324 HARGETT COURT
 MONROE, NC 28110
 (704) 289 - 9212
 SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REU-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

14-2168
 SCALE: -
 PAGE DESCRIPTION:
 13

V:\Projects\14-2168 NOA - Update 12-0403.07 (09-RELU-0002) for 2014 FBC-Renewal\VP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c Series 5400 Automatic SGD (NOA).dwg

02/28/2018 - 2:16pm rickn



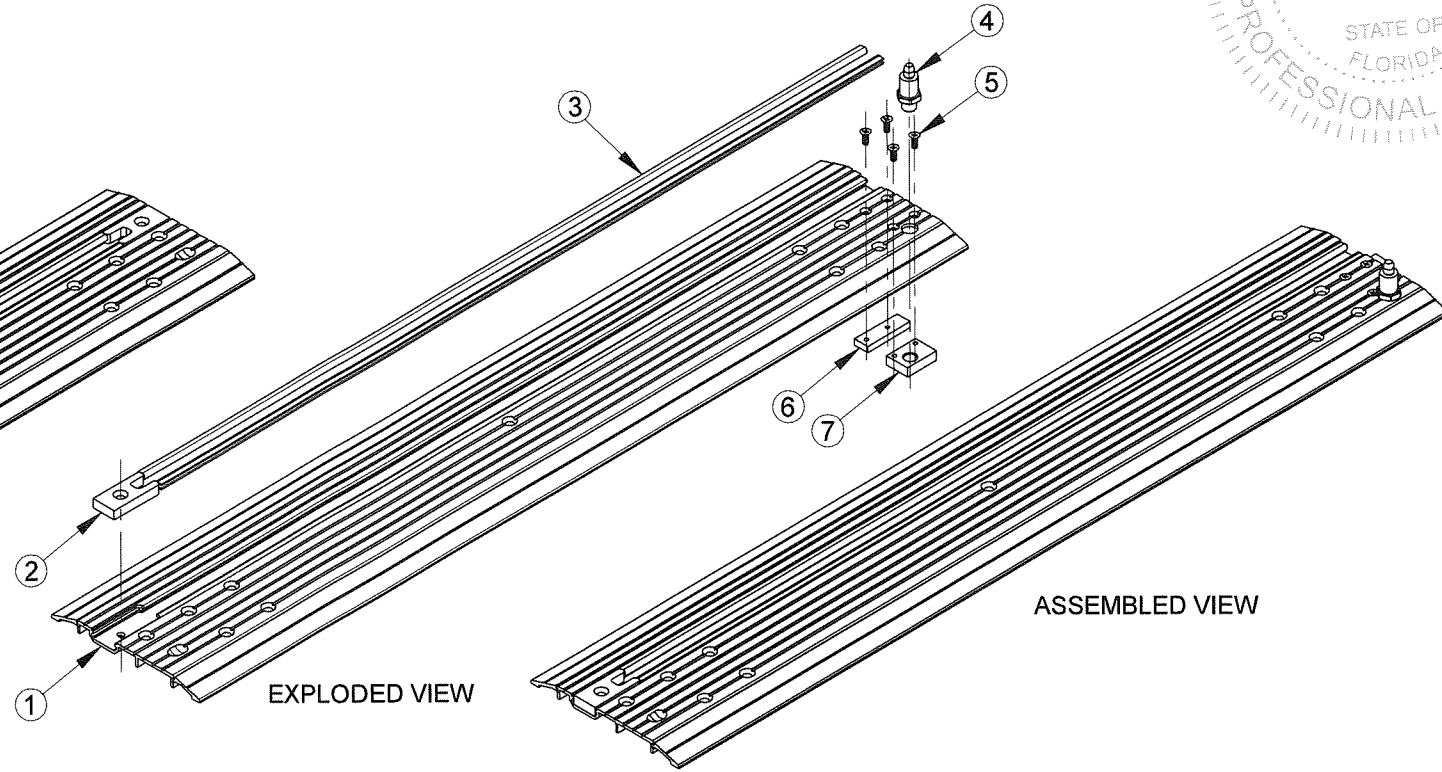
EXPLODED VIEW

ASSEMBLED VIEW

PIN GUIDE THRESHOLD ASS'Y. - L.H.

PART NO.: 4-51-0160
SCALE: 1" = 6"

BILL OF MATERIALS			
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	4-51-4260	PIN GUIDE THRESHOLD MACHINING - L.H.	1
2	4-51-7005	PLATE, PIN GUIDE SUPPORT	1
3	9-70-0077	BUMPER, PIN GUIDE	2
4	4-11-1031	PIN, SIDELITE PIVOT (BOTTOM)	1
5	81-0011-0562	SCREW, 10-32 X 1/2" FFHMS	4
6	4-51-4009	BAR, ALIGNMENT (PIN GUIDE THRESHOLD)	1
7	4-51-4265	BLOCK, SIDELITE PIVOT (BOTTOM)	1



EXPLODED VIEW

ASSEMBLED VIEW

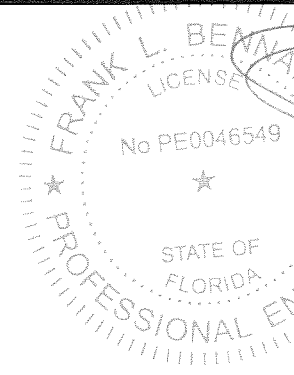
PIN GUIDE THRESHOLD ASS'Y. - R.H.

PART NO.: 4-51-0161
SCALE: 1" = 6"

BILL OF MATERIALS			
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	4-51-4261	PIN GUIDE THRESHOLD MACHINING - R.H.	1
2	4-51-7005	PLATE, PIN GUIDE SUPPORT	1
3	9-70-0077	BUMPER, PIN GUIDE	2
4	4-11-1031	PIN, SIDELITE PIVOT (BOTTOM)	1
5	81-0011-0562	SCREW, 10-32 X 1/2" FFHMS	4
6	4-51-4009	BAR, ALIGNMENT (PIN GUIDE THRESHOLD)	1
7	4-51-4265	BLOCK, SIDELITE PIVOT (BOTTOM)	1

PRODUCT RENEWED
as complying with the Florida
Building Code
Acceptance No. 20-0129.03
Expiration Date 3/17/2025
By Frank L. Bennardo
Miami Dade Product Control

PRODUCT REVISED
as complying with the Florida
Building Code
Acceptance No. 17-1227.16
Expiration Date 3/17/20
By Frank L. Bennardo
Miami Dade Product Control



FRANK L. BENNARDO, P.E.
PE0046549

02/28/2018

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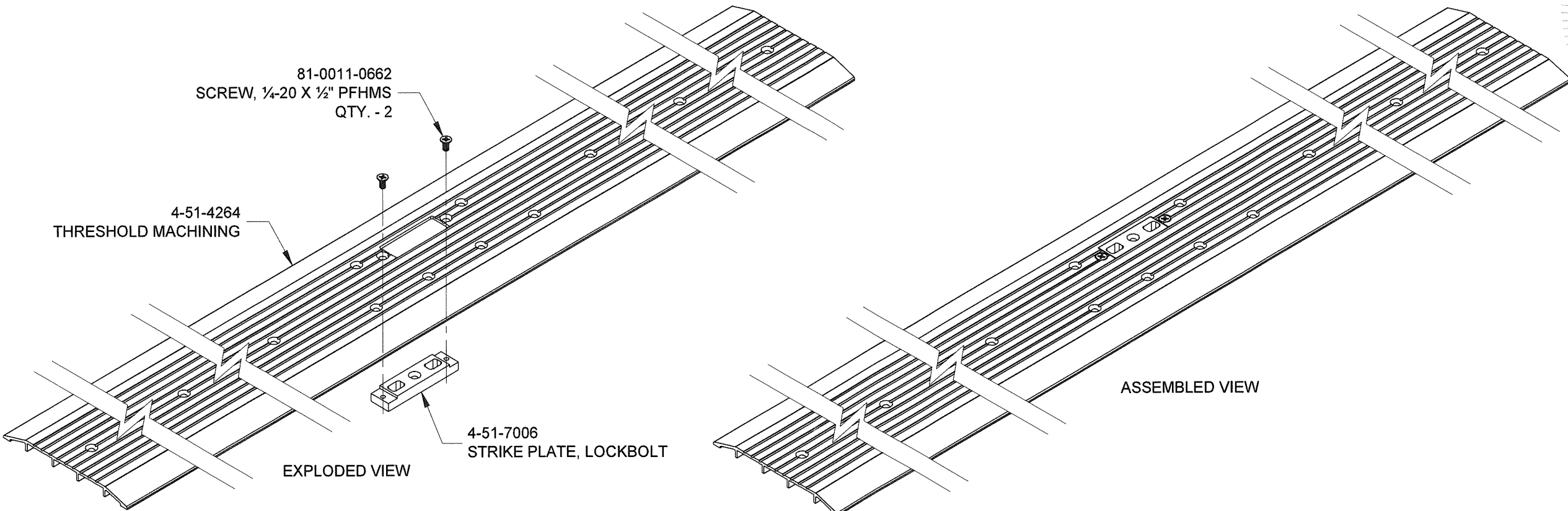
14-2168

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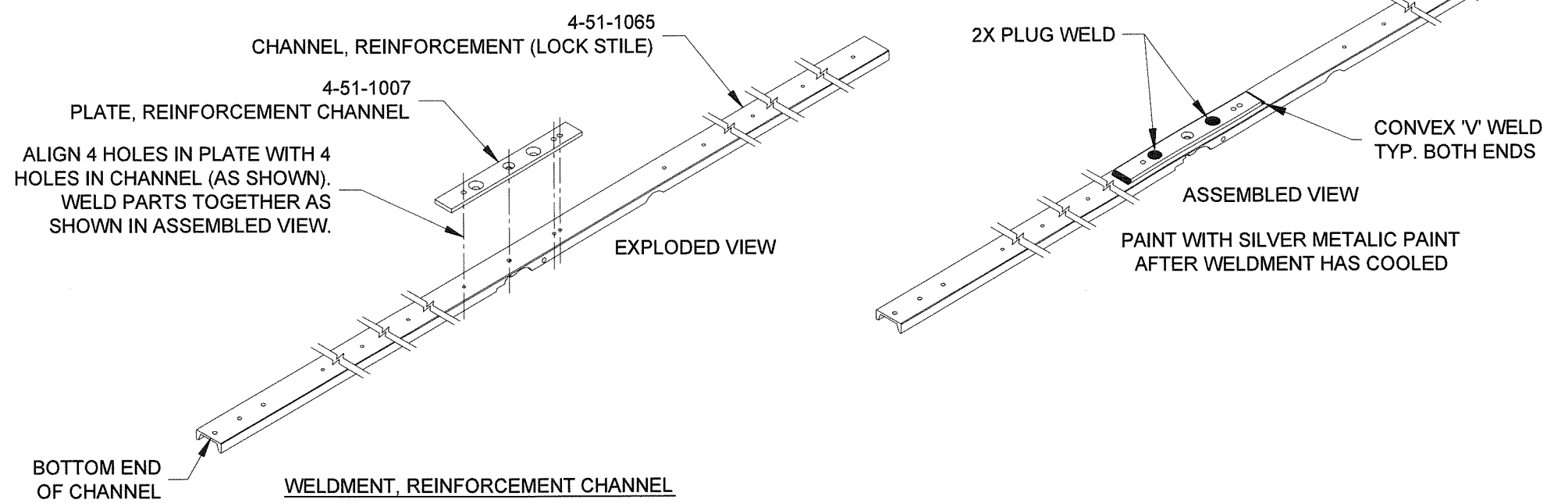
14

23

02/28/2018 - 2:16pm rickn V:\Projects\14-2168 NOA - Update 12-0403.07 (09-REL-0002) for 2014 FBC-Renewal\WPV2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c Series 5400 Automatic SGD (NOA).dwg



THRESHOLD ASS'Y. - BIPART
 PART NO.: 4-51-0164
 SCALE: 1/4" = 1"



WELDMENT, REINFORCEMENT CHANNEL
 PART NO.: 4-51-0029
 SCALE: 1" = 6"

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 By Ishag I. Chaudhry
 Miami Dade Product Control

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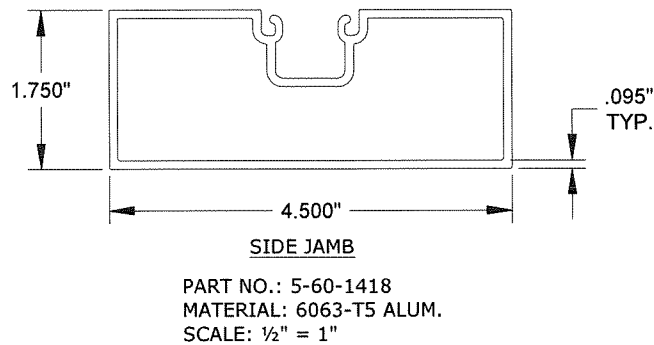
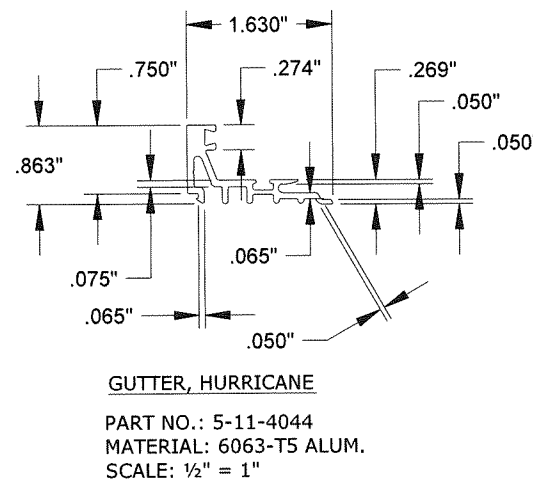
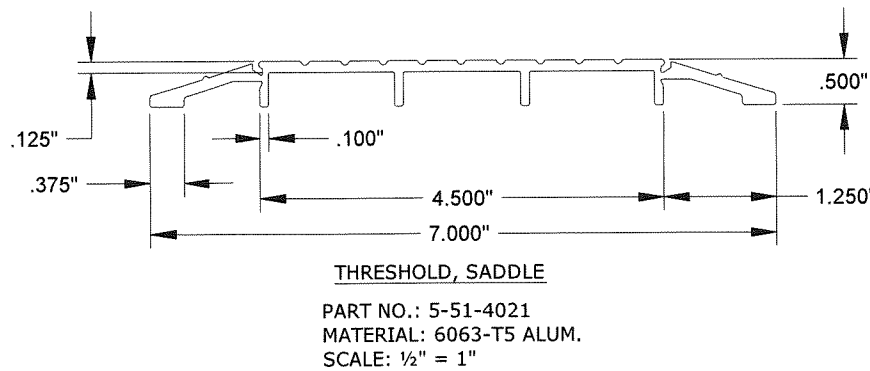
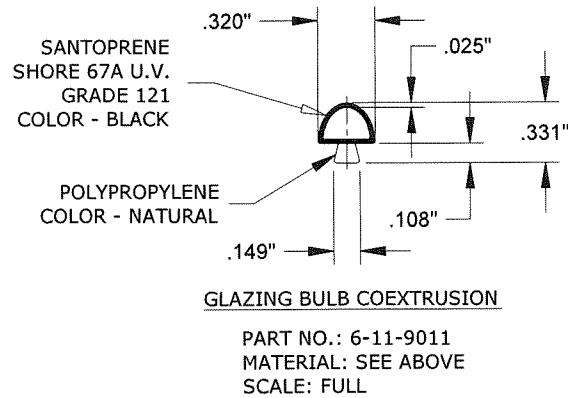
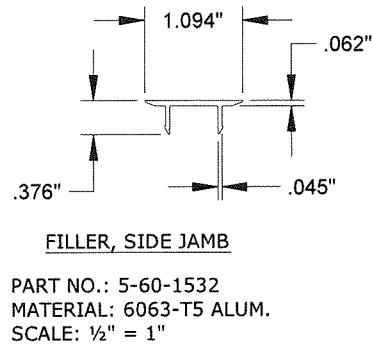
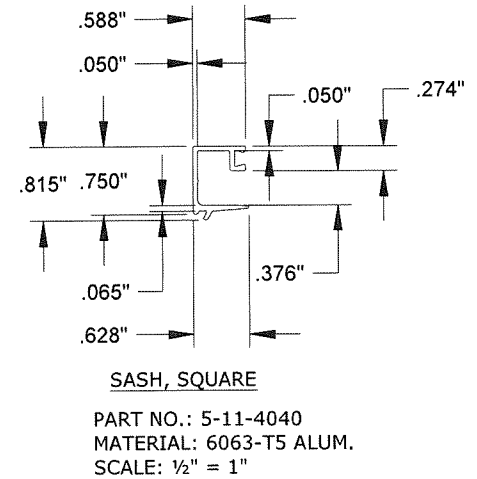
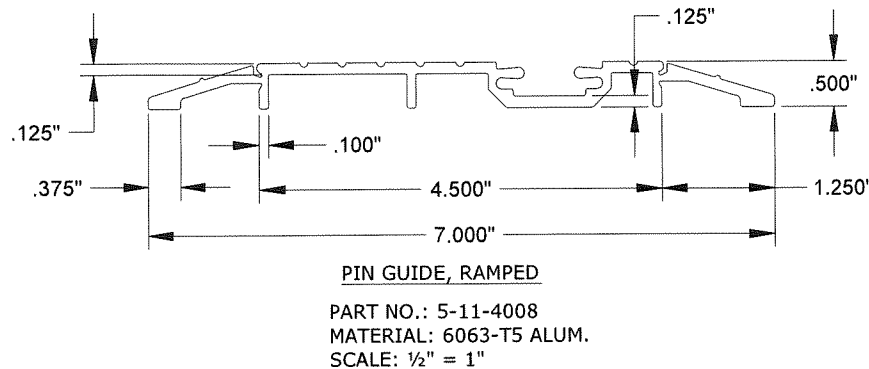
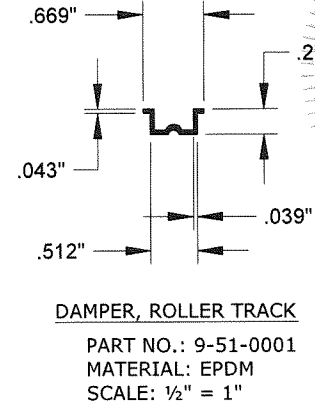
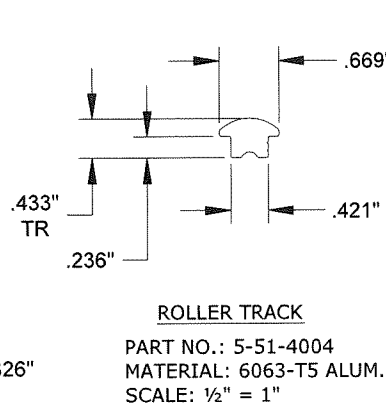
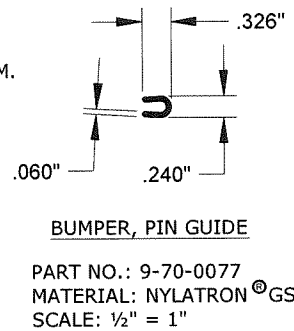
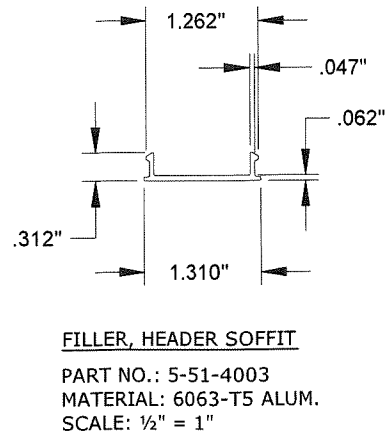
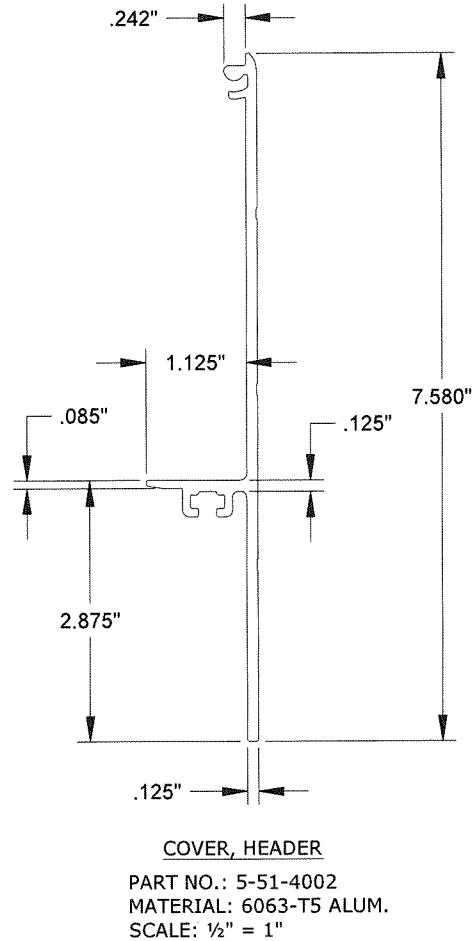
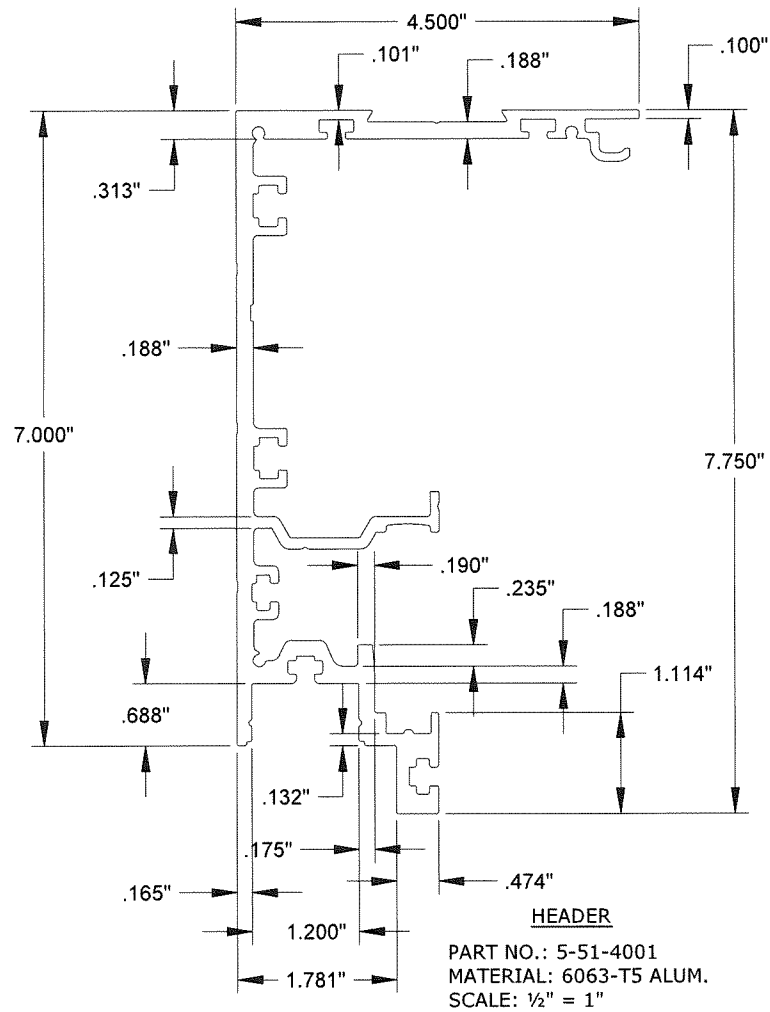
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REV 2017 FBC	RWN	FLB	12/20/17

14-2168
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 rickn



NOTE: ALL ALUMINUM EXTRUSIONS SHALL HAVE A MINIMUM Fu=31 ksi & Fy=26200 psi.

PRODUCT REVISED
 as complying with the Florida Building Code
 Acceptance No. 17-1227-16
 Expiration Date 3/17/20
 By: [Signature]
 Miami Dade Product Control

PRODUCT RENEWED
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 Acceptance No. 20-0129-03
 Expiration Date 3/17/2022
 By: [Signature]
 Miami Dade Product Control

FRANK L. BENNARDO, P.E.
 #PE0046549

02/28/2018

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REV 2017 FBC	RWN	FLB	12/20/17

14-2168

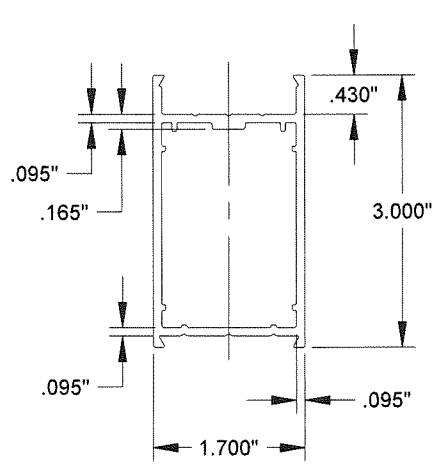
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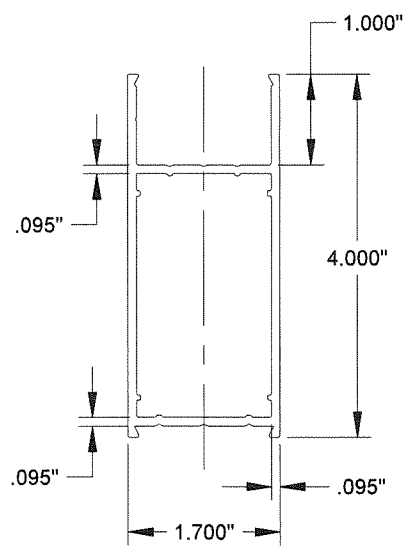
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02/28/2018 - 2:16pm rickn



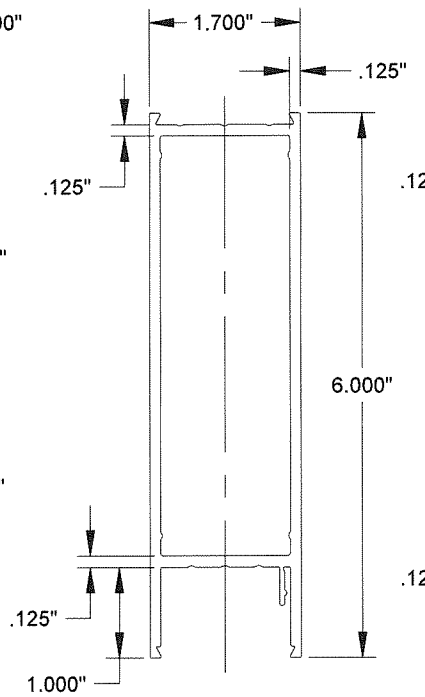
RAIL, TOP (SX PANEL)

PART NO.: 5-51-4009
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



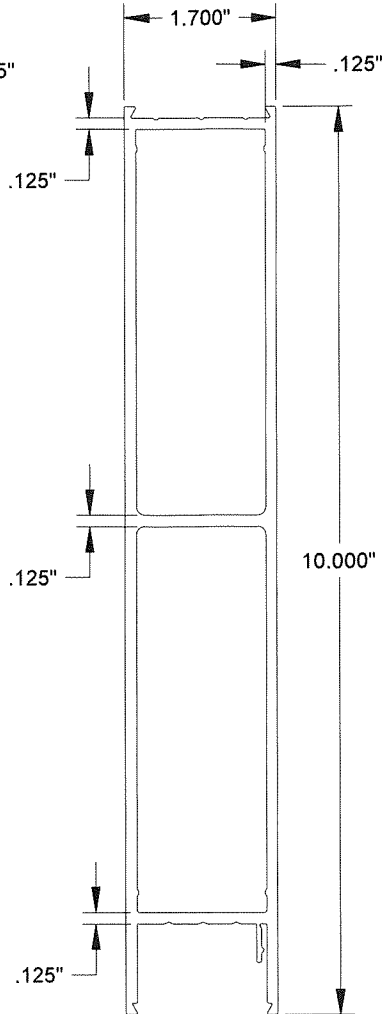
RAIL, TOP (SO PANEL)

PART NO.: 5-11-4034
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



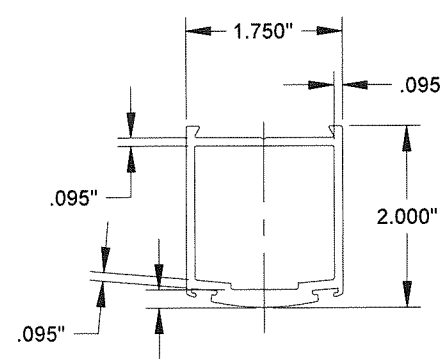
RAIL, BOTTOM - 6"

PART NO.: 5-11-4036
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



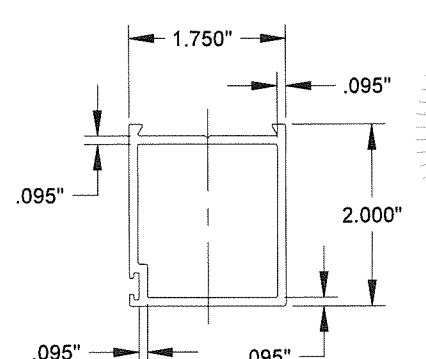
RAIL, BOTTOM - 10" (OPTIONAL)

PART NO.: 5-51-4011
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



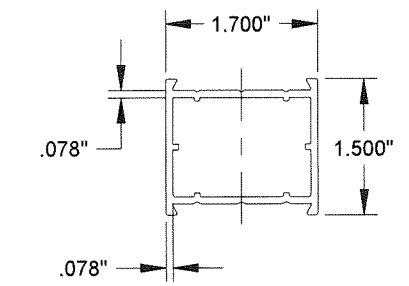
STILE, TANDEM

PART NO.: 5-11-4021
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



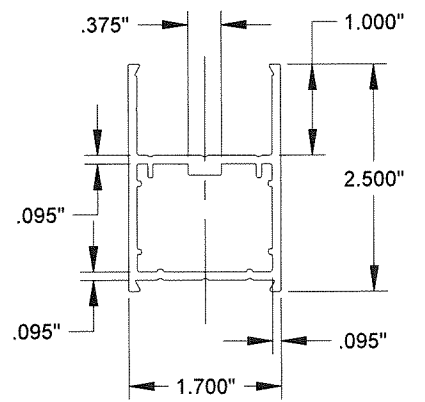
STILE, FIXED

PART NO.: 5-11-4022
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



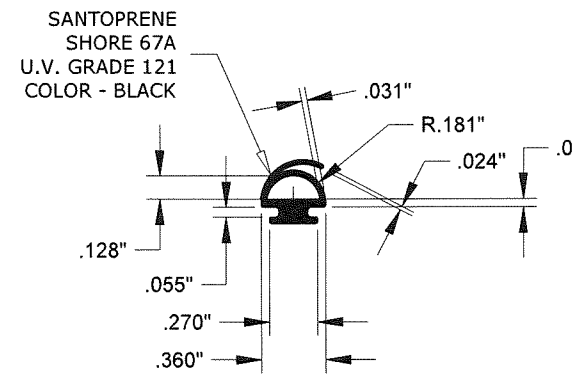
MUNTIN BAR

PART NO.: 5-11-4031
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



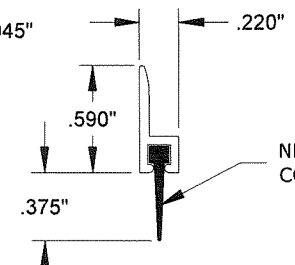
MUNTIN BAR (OPTIONAL)

PART NO.: 5-11-4032
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



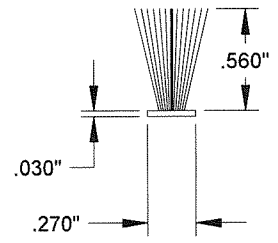
SEAL, BULB W/FIN

PART NO.: 6-11-9009
MATERIAL: ZERO INT'L. #870N
SCALE: FULL



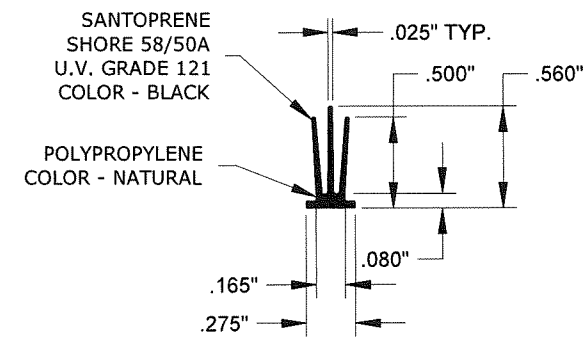
SEAL, SIDELITE (TOP)

PART NO.: 9-99-7361
MATERIAL: ZERO INT'L. 8194AA
SCALE: FULL



WEATHER PILE W/FIN

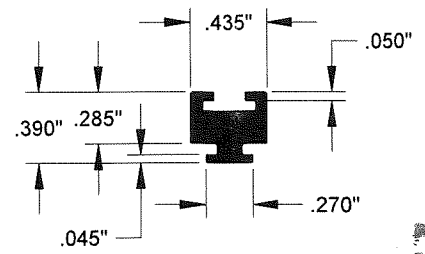
PART NO.: 9-99-7360
MATERIAL: ULTRAFAB SOFT TOUCH FIN
SCALE: FULL



VINYL, SMOKE / AIR SEAL

PART NO.: 6-59-9001
MATERIAL: SEE ABOVE
SCALE: FULL

NOTE: ALL ALUMINUM EXTRUSIONS SHALL HAVE A MINIMUM Fu=31 ksi & Fy=26200 psi.

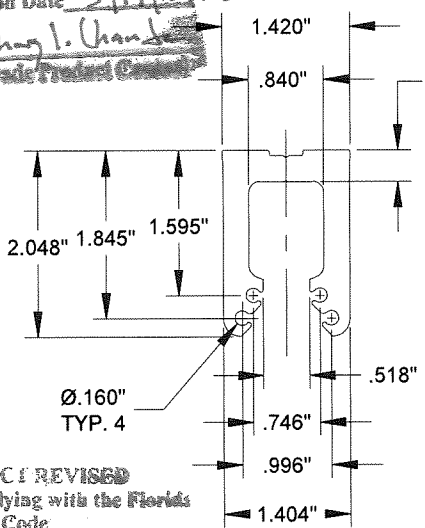


CHANNEL, WEATHER PILE

PART NO.: 6-51-9002
MATERIAL: GEON 8700 PVC
SCALE: FULL

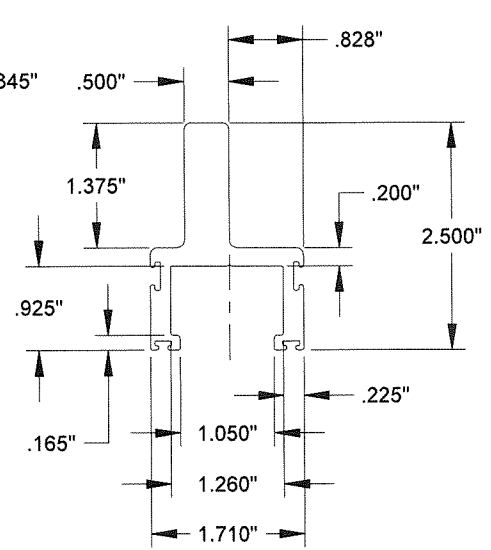
PRODUCT RENEWED
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Building Code
Acceptance No 20-0129.03
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By Ishay L. Chank
Miami Dade Product Council

PRODUCT REVISED
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Acceptance No 17-1227.16
Expiration Date 3/17/2020
By Ishay L. Chank
Miami Dade Product Council



BLOCK, SHEAR

PART NO.: 5-11-4027
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



DOOR CATCH

PART NO.: 5-51-4006
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"

FRANK L. BENNARDO, P.E.
#PE0046549

02/28/2018

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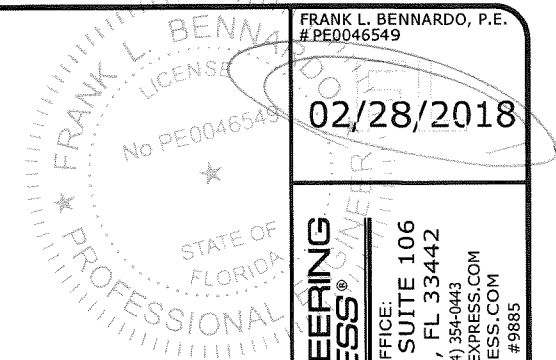
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CONSOLIDATED BILL OF MATERIALS

DESCRIPTION	record-usa PART NO.	MATERIAL	MANUFACTURER / REMARKS
TORQUE BAR ASSY.	4-51-0011		
WELDMENT, TORQUE BAR	4-51-0001		
PIVOT, TORQUE BAR BOTTOM	4-70-4104	2" X 2" X 3/8" ALUMINUM ANGLE	
PIVOT PIN, TORQUE BAR	4-70-1034	Ø3/8" X 1 3/8" STEEL CLEVIS PIN	
PIN, SPRING (TORQUE BAR)	9-99-3922	Ø3/16" X 1" STEEL SLOTTED SPRING PIN	
RETAINING RING, TORQUE BAR ASS'Y.	9-99-4625		ROTOR CLIP #SHR-98
BRACKET, TORQUE BAR SUPPORT	4-51-1003	3/16" C.R.S., ZINC PLATE	
PLATE, TORQUE BAR	4-51-1013	3/4" X 1 1/4" AISI 1018 COLD FINISHED FLAT BAR	
BAR, TORQUE	4-51-1014	Ø1.00" AISI 1018 ROUND STEEL BAR	
DOOR CATCH ASS'Y. - L.H.	4-51-0013		
DOOR CATCH ASS'Y. - R.H.	4-51-0027		
HOUSING, DOOR CATCH ASS'Y. - L.H.	4-51-1038	11 GA. (.1196) C.R.S., ZINC PLATE	
HOUSING, DOOR CATCH ASS'Y. - R.H.	4-51-1036	MAKE FROM 4-51-1038	
INTERLOCK, DOOR CATCH - L.H.	4-51-1039	10 GA. (.1345) C.R.S., ZINC PLATE	
INTERLOCK, DOOR CATCH - R.H.	4-51-1040	10 GA. (.1345) C.R.S., ZINC PLATE	
PLATE, DOOR INTERLOCK	4-51-1064	3/16" H.R.P.O., ZINC PLATE	
BALL PLUNGER ASS'Y.	4-70-0582		
PLUG, BALL PLUNGER	4-11-4090	Ø1 1/16" 6061-T6511 ALUMINUM ROUND BAR	
SPRING, BALL PLUNGER	9-99-5689	Ø.080 STEEL MUSIC WIRE, ZINC PLATE	
BALL, SPRING PLUNGER	9-99-0104	BALL, CHROME ALLOY STEEL, Ø5/8"	
HOUSING, BALL PLUNGER	4-11-2001	Ø3/4" FREE CUTTING BRASS ROUND ROD	
DOOR STOP ASS'Y.	4-51-0020		
BUMPER, DOOR STOP	9-99-2598	MEDIUM-HARD SRB RUBBER, SHORE 55A, BLACK	McMASTER CARR P/N 9310K124
BRACKET, DOOR STOP	4-51-1006	3/16" C.R.S., BLACK OXIDE	
DOOR INTERLOCK ASS'Y. - L.H.	4-51-0015		
DOOR INTERLOCK ASS'Y. - R.H.	4-51-0016		
PLATE, DOOR INTERLOCK ASS'Y.	4-51-1042	7 GA. (.1793) C.R.S., ZINC PLATE	
BRACKET, INTERLOCK ASS'Y.	4-51-1041	3/16" (.1875) C.R.S., ZINC PLATE	
PLUNGER, SPRING LOADED	9-99-0113		VLIER P/N NM-55N
CARRIER ROLLER ASS'Y.	4-51-0005		
BODY, CARRIER ROLLER	9-51-0002	PA6 - POLYAMIDE (NYLON) 6	

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MONROE, NC 28110
(704) 289 - 9212
SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
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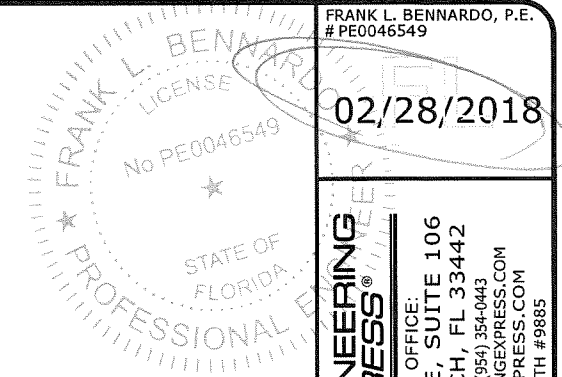
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18 23

CONSOLIDATED BILL OF MATERIALS

DESCRIPTION	record-usa PART NO.	MATERIAL	MANUFACTURER / REMARKS
BALL BEARING, CARRIER ROLLER	9-07-0049	6201-Z BALL BEARING	JESA W2
RETAINING RING, CARRIER ROLLER	9-99-4624		ROTOR CLIP #DHO-32
ROLLER ASS'Y., ANTI-RISE	9-99-3922		
ROLLER, ANTI-RISE	9-51-9006	DELTRIN, WHITE	
AXLE, ANTI-RISE ROLLER	4-51-7001	Ø½" TYPE 303 STAINLESS STEEL ROUND BAR	
RETAINING RING, ANTI-RISE ROLLER	9-99-4629		ROTOR CLIP #PO-50ST PA
PLATE ASS'Y. - CARRIER ROLLER	4-51-0002		
PLATE, CARRIER ROLLER	4-51-1020	10 GA. (.1345) C.R.S., ZINC PLATE	
NUT, PEM	9-99-6193		PEM #S0518-3, ZINC PLATE
PLATE SUB-ASS'Y., CARRIER ROLLER	4-51-0017		
SPACER, CARRIER ROLLER	4-51-1017	Ø⅝" O.D. X 13 GA. (.095) WALL MECHANICAL STEEL TUBING (D.O.M.)	
AXLE, CARRIER ROLLER	4-51-1021	Ø⅝" TYPE 303 STAINLESS STEEL ROUND BAR	
BRACKET, BELT BASE	4-51-1001	14 GA. (.0747) C.R.S., ZINC PLATE	
BRACKET, BELT CLASP	4-51-1002	14 GA. (.0747) C.R.S., ZINC PLATE	
CARRIER ASS'Y., SLAVE	4-51-0090		
CARRIER ASS'Y., UPPER BELT	4-51-0091		
CARRIER ASS'Y., LOWER BELT	4-51-0092		
SCREW, M6 X 10 HFHCS	9-99-1812		
SCREW, M6 X 12 HFHCS	9-99-1820		
WASHER, LOCK - ⅝"	9-99-7235		
WASHER, FLAT - ⅝"	9-99-7311		
SCREW, ⅝"-18 X 1½" HHCS, GR. 8	81-0018-3726		
BRACKET, ANTI-DERAIL	4-51-1063	10 GA. (.1345) C.R.S., ZINC PLATE	
PLATE, CARRIER ASS'Y. - SLAVE	4-51-1001	¼" C.R.S., ZINC PLATE	
PLATE, BELT RETAINER (LOWER)	4-51-1019	¼" C.R.S., ZINC PLATE	
PLATE, BELT RETAINER (UPPER)	4-51-1018	¼" C.R.S., ZINC PLATE	
BRACKET, SIDELITE STRIKE	4-51-1010	11 GA. (.1196) TYPE 304 STAINLESS STEEL	
BLOCK, UPPER SIDELITE PIVOT	4-51-4152	⅝" X 1¼" 6061-T6511 EXTRUDED ALUMINUM RECTANGULAR BAR	
PLATE, NUT	4-51-1037	10 GA. (.1345) C.R.S., ZINC PLATE	
BRACKET, HEADER MOUNTING - L.H.	4-51-1055	11 GA. (.1196) C.R.S., ZINC PLATE	
BRACKET, HEADER MOUNTING - R.H.	4-51-1056	11 GA. (.1196) C.R.S., ZINC PLATE	

PRODUCT RENEWED
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 By: *Ismael L. Grande*
 Miami Dade Product Control

PRODUCT REVISED
 as complying with the Florida
 Building Code
 Acceptance No 17-1227.16
 Expiration Date 3/17/20
 By: *Ismael L. Grande*
 Miami Dade Product Control



FRANK L. BENNARDO, P.E.
 # PE0046549

02/28/2018

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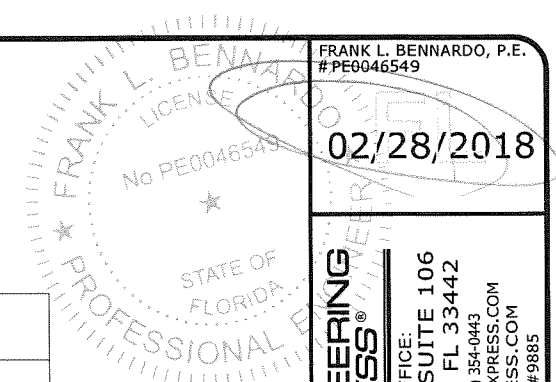
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CONSOLIDATED BILL OF MATERIALS

DESCRIPTION	record-usa PART NO.	MATERIAL	MANUFACTURER / REMARKS
END CAP, DOOR CATCH	4-51-1049	11 GA. (.1196) C.R.S., BLACK POWDER COAT	
END CAP, DOOR CATCH (POSITIVE LATCH)	4-59-1020	MAKE FROM 4-51-1019	
BRACKET, BALL PLUNGER	4-70-4342	1 1/4" X 1 1/4" X 3/16" 6063-T52 ALUMINUM ANGLE	
BLOCK, GLASS SETTING	6-11-9007	GEON 8700 PVC, DUROMETER 97 SHORE A, BLACK	
BLOCK, GLASS SPACER	6-11-9002	GEON 8700 PVC, DUROMETER 97 SHORE A, BLACK	
BOTTOM GUIDE ASS'Y.	4-51-0093		
BLOCK, BOTTOM GUIDE ASS'Y.	4-51-4267	1 1/4" 6061-T6 EXTRUDED ALUMINUM SQUARE BAR	
PIN, BOTTOM GUIDE	4-51-7007	Ø5/8" TYPE 304 STAINLESS STEEL ROUND BAR	
SPRING, COMPRESSION (BOTTOM GUIDE)	9-99-5693	Ø.045 TYPE 302 STAINLESS STEEL WIRE	McMASTER CARR P/N 9435K126
SCREW, SHOULDER (BOTTOM GUIDE)	9-99-1820	TYPE 18-8 STAINLESS STEEL	McMASTER CARR P/N 91327A165
BUSHING, FLANGED (BRONZE)	9-99-0233	ALLOY 932 (SAE 660) BRONZE	McMASTER CARR P/N 7815K18
BLOCK, FLUSHBOLT SUPPORT	4-51-4265	1 1/4" 6061-T6 EXTRUDED ALUMINUM SQUARE BAR	
BLOCK, HEX BOLT GUIDE	4-51-4266	1/2" X 1 1/4" 6061-T6511 EXTRUDED ALUMINUM RECTANGULAR BAR	
SPRING, COMPRESSION (EXIT DEVICE TOP BOLT)	9-99-5692	Ø.042 STEEL MUSIC WIRE, ZINC PLATE	McMASTER CARR P/N 9434K8
LOCK BOLT, EXIT DEVICE	4-11-1059	3/8" AISI 12L14 STEEL HEX BAR STOCK, ZINC PLATE	
HEX BOLT, THRESHOLD	4-51-7008	Ø1/2" TYPE 304 STAINLESS STEEL HEX BAR STOCK	
BLOCK, SHEAR (MACHINED)	4-11-4098	MAKE FROM 5-11-4027	
BLOCK, SHEAR (MACHINED)	4-51-4151	MAKE FROM 5-11-4027	
BLOCK, SHEAR (MACHINED)	4-11-4096	MAKE FROM 5-11-4027	
PLATE, BACKER	4-11-1082	7 GA. (.1793) C.R.S., ZINC PLATE	
BRACKET, ANTI-DERAIL	4-51-1063	10 GA. (.1345) C.R.S., ZINC PLATE	
ANGLE, SIDELITE PIVOT (TOP)	4-11-1086	3" X 2" X 5/16" STEEL ANGLE, SILVER METALLIC PAINT	
BUSHING, SIDELITE PIVOT (TOP)	9-99-0203	SAE 841 SINTERED BRONZE	
ANGLE, SIDELITE PIVOT (BOTTOM)	4-51-1067	3" X 2" X 5/16" STEEL ANGLE, SAFETY YELLOW PAINT	
BUSHING, SIDELITE PIVOT (BOTTOM)	4-51-7003	Ø7/8" TYPE 304 STAINLESS STEEL ROUND BAR	
DOOR INTERLOCK	4-51-7002	10 GA. (.1345) TYPE 304 STAINLESS STEEL	
MOUNTING STRAP	4-40-1002	3/16" H.R.P.O., ZINC PLATE	
WELDMENT, REINFORCEMENT CHANNEL	4-51-0029		SILVER METALLIC PAINT
CHANNEL, REINFORCEMENT (LOCK STILE)	4-51-1065	1 1/2" X 1/2" X 1/8" BAR CHANNEL, M 1020 - MERCHANT QUALITY	
PLATE, REINFORCEMENT CHANNEL	4-51-1007	3/8" X 1" AISI 1018 C.R.S. FLAT BAR	
CHANNEL, REINFORCEMENT (PIVOT STILE)	4-51-1066	1 1/2" X 1/2" X 1/8" BAR CHANNEL, M 1020 - MERCHANT QUALITY	SILVER METALLIC PAINT

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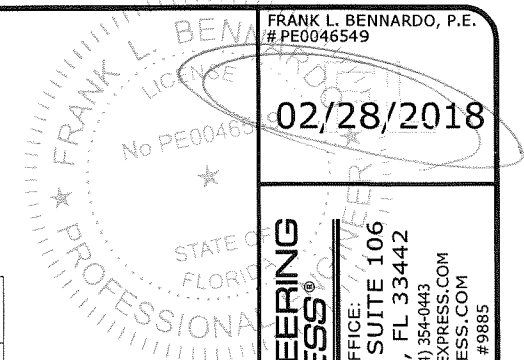
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CONSOLIDATED BILL OF MATERIALS

DESCRIPTION	record-usa PART NO.	MATERIAL	MANUFACTURER / REMARKS
CHANNEL, REINFORCEMENT (BEAM STILE)	4-51-1068	1½" X ½" X ⅛" BAR CHANNEL, M 1020 - MERCHANT QUALITY	SILVER METALLIC PAINT
CHANNEL, REINFORCEMENT (PIVOT STILE - SIDELITE)	4-51-1069	1½" X ½" X ⅛" BAR CHANNEL, M 1020 - MERCHANT QUALITY	SILVER METALLIC PAINT
PIN GUIDE THRESHOLD ASS'Y. - L.H.	4-51-0160		
PIN GUIDE THRESHOLD ASS'Y. - R.H.	4-51-0161		
PIN GUIDE THRESHOLD MACHINING - L.H.	4-51-4260	MAKE FROM 5-11-4008	
PIN GUIDE THRESHOLD MACHINING - R.H.	4-51-4261	MAKE FROM 5-11-4008	
PLATE, PIN GUIDE SUPPORT	4-51-7005	⅜" X 1" TYPE 303 STAINLESS STEEL RECTANGULAR BAR	
BUMPER, PIN GUIDE	9-70-0077	NYLATRON [®] GS	
PIN, SIDELITE PIVOT (BOTTOM)	4-11-1031	¾" AISI 12L14 STEEL HEX BAR STOCK, ZINC PLATE	
BAR, ALIGNMENT (PIN GUIDE THRESHOLD)	4-51-4009	¼" X ⅝" 6061-T5 ALUMINUM RECTANGULAR BAR	
BLOCK, SIDELITE PIVOT (BOTTOM)	4-51-4265	⅜" X 1" 6061-T5 ALUMINUM RECTANGULAR BAR	
THRESHOLD ASS'Y., BIPART	4-51-0164		
THRESHOLD MACHINING	4-51-4264	MAKE FROM 5-51-4021	
STRIKE PLATE, LOCKBOLT	4-51-7006	½" X 1" TYPE 303 STAINLESS STEEL RECTANGULAR BAR	POLYMER CORP. PROFILE 40-101
HEADER	5-51-4001	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
COVER, HEADER	5-51-4002	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
FILLER, HEADER SOFFIT	5-51-4003	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
ROLLER TRACK	5-51-4004	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
SIDE JAMB	5-60-1418	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
FILLER, SIDE JAMB	5-60-1532	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
PIN GUIDE, RAMPED	5-11-4008	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
THRESHOLD, SADDLE	5-51-4021	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
RAIL, TOP (SX PANEL)	5-51-4009	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
RAIL, TOP (SO PANEL)	5-11-4034	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
RAIL, BOTTOM - 6"	5-11-4036	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
RAIL, BOTTOM - 10" (OPTIONAL)	5-51-4011	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
STILE, TANDEM	5-11-4021	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
STILE, FIXED	5-11-4022	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
MUNTIN BAR	5-11-4031	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
MUNTIN BAR (OPTIONAL)	5-11-4032	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
DOOR CATCH	5-51-4006	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.

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FRANK L. BENNARDO, P.E.
 #PE0046549
 02/28/2018
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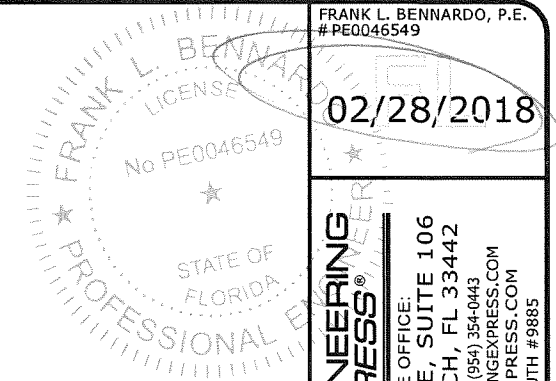
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 21

CONSOLIDATED BILL OF MATERIALS

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BLOCK, SHEAR	5-11-4027	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
GUTTER, HURRICANE	5-11-4044	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
SASH, SQUARE	5-11-4040	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
GLAZING BULB	6-11-9011	SANTOPRENE / POLYPROPYLENE COEXTRUSION	CENTRAL PLASTICS, INC.
CHANNEL, WEATHER PILE	6-51-9002	GEON 8700 PVC	UNITED PLASTICS CORP.
WEATHER PILE W/FIN	9-99-7360	ULTRAFAB SOFT TOUCH FIN	ULTRAFAB, INC. P/N W31565NK0000
VINYL, SMOKE / AIR SEAL	6-59-9001	SANTOPRENE / POLYPROPYLENE COEXTRUSION	CENTRAL PLASTICS, INC.
SEAL, BULB W/FIN	6-11-9009	SANTOPRENE SHORE 67A, U.V. GRADE 121	ZERO INTERNATIONAL #870N
SEAL, SIDELITE (TOP)	9-99-7361	NEOPRENE FIN WITH ALUMINUM HOUSING	ZERO INTERNATIONAL #8194AA
DAMPER, ROLLER TRACK	9-51-0001	EPDM SHORE 85±5A, BLACK	CENTRAL PLASTICS, INC.
FLUSHBOLT, CYLINDER OPERATED	9-99-0067	ADAMS RITE 1871-2	ADAMS RITE MANUFACTURING CO.
HEADER BOLT SET	9-99-0075	INTERNATIONAL DOOR CLOSER INC. HB-4015-N	INTERNATIONAL DOOR CLOSER INC.
MORTISE KEY CYLINDER	9-99-0068	INTERNATIONAL DOOR CLOSER INC. CZ-1001	INTERNATIONAL DOOR CLOSER INC.
MORTISE THUMBTURN	9-99-0069	INTERNATIONAL DOOR CLOSER INC. TZ-3001	INTERNATIONAL DOOR CLOSER INC.
EXIT DEVICE, G86 C.V.R.	9-99-0094	ADAMS RITE G86 C.V.R. EXIT DEVICE	ADAMS RITE MANUFACTURING CO.
ESCUTCHEON, MORTISE KEY CYLINDER	9-99-0098	ADAMS RITE 8651 ESCUTCHEON	ADAMS RITE MANUFACTURING CO.
SCREW, 5/16-18 X 1" FSHCS	81-0011-2720		
SCREW, 10-32 X 3/8" PFHMS	81-0011-0558		
SCREW, 10-32 X 1/4" PFHMS	81-0011-0554		
SCREW, 10-32 X 1/2" PFHMS	81-0011-0562		
SCREW, 1/4-20 X 3/8" BFHCS	81-0017-2658		
SCREW, M6 X 16 HFHCS	9-99-1813		
SCREW, 1/4-20 X 1/2" PFHMS	81-0011-0662		
LOCK WASHER, SPLIT, #10	9-99-7249		
SCREW, 10-32 X 3/8" SHCS	81-0016-2258		
WASHER, 1/4" FLAT	9-99-7346		
WASHER, 1/4" LOCK SPLIT	9-99-7161		
SCREW, 1/4-20 X 1" HHMS - GR. 8	81-0088-3670		
SCREW, 10-32 X 1/2" SHCS	81-0016-2562		
SCREW, 8-18 X 1/2" PFHMS, TYPE B	81-3511-0412-DB		
SCREW, 1/4-20 X 3/8" SFHCS	81-0011-2658		

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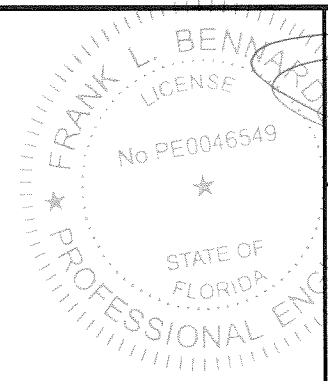
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 22

CONSOLIDATED BILL OF MATERIALS

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SCREW, 1/4-20 X 1" SFCHCS	81-0011-2670		
SCREW, 10-24 X 3/4" PFHMS, TYPE 23	81-4411-0516		
SCREW, 1/4-20 X 3" PPHMS	81-0014-0688		
SCREW, 1/4-20 X 3/4" HWHMS, GR. 8	81-0017-3666		
SCREW, 1/4-20 X 3/8" BSHCS - S.S.	81-0016-2658		
SCREW, 1/4-20 X 1" BSHCS - S.S.	81-0014-2670		
SCREW, 1/4-20 X 1/2" HWHMS, GR. 8	81-0017-3662		
SCREW, 1/4-20 X 5/8" HWHMS, GR. 8	81-0017-3664		
SCREW, 10-32 X 1/2" PFHMS	81-0011-0562		
SCREW, 1/4-20 X 3/4" HHMS, GR. 5 W/NYLOC STRIP	81-0718-3666		



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23



09 March 2010

To Whom It May Concern:

This document provides notice of certification that the following products, manufactured by record-USA, have been designed and manufactured to comply with the specific ANSI/BHMA standard listed, when installed and adjusted per the manufacturer's instructions.

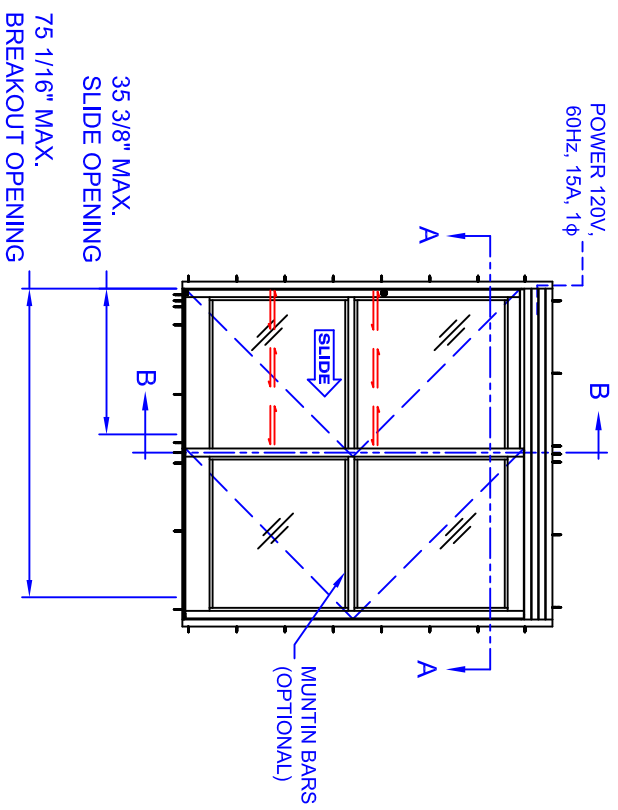
Series 4500 Folding Door Systems	ANSI/BHMA A156.10*
Series 5100 Sliding Door Systems	ANSI/BHMA A156.10
Series 5400/5500 Sliding Door Systems	ANSI/BHMA A156.10
Series 6100/6200 Swinging Door Operators	ANSI/BHMA A156.19*
Series 8100/8200 Swinging Door Operators	ANSI/BHMA A156.19
Series 8600 Swinging Door and Operator Systems	ANSI/BHMA A156.10

A handwritten signature in blue ink, appearing to read 'David Hewitt', written over a horizontal line.

David Hewitt
Vice-president

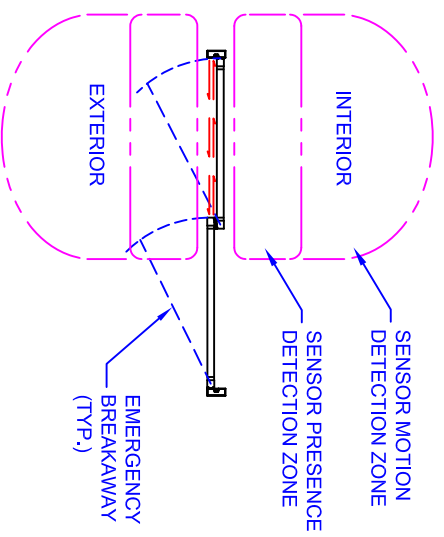
*A 156.10 – American National Standard for Power Operated Pedestrian Doors

*A 156.19 – American National Standard for Power Assist and Low Energy Power Operated Doors



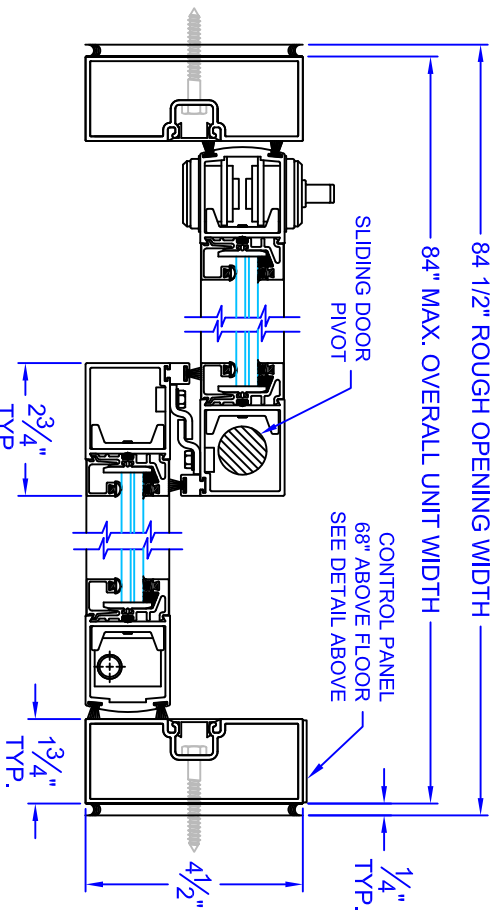
ELEVATION VIEW

SCALE: 1/2" = 1'



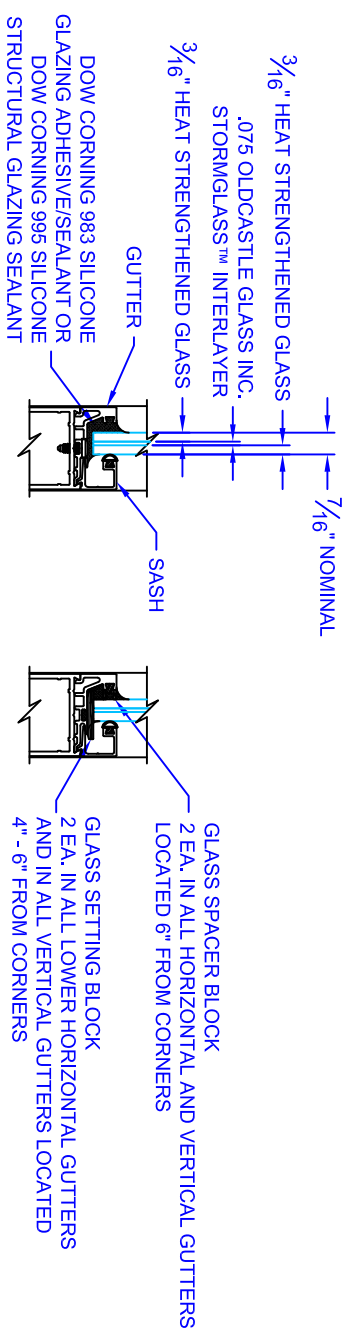
PLAN VIEW

SCALE: 1/2" = 1'



SECTION A-A

SCALE: 1/2 SIZE

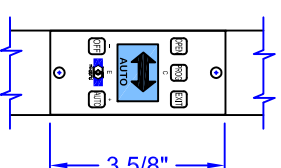


TYPICAL GLAZING DETAIL
(ALL LITES)

- NOTES:**
1. FINISH AS SPECIFIED.
 2. THRESHOLD PHOTOELECTRIC SAFETY BEAMS AT 24" AND 48" ABOVE FLOOR.
 3. DISPLAY CONTROL PANEL (ONE PER UNIT).
 4. GLASS (OLDCASTLE 7/16" LAMINATED IMPACT-RESISTANT STORMGLASS™) AND GLAZING BY RECORD-USA INSTALLING DEALER.
 5. CAULKING AND SEALING BY RECORD-USA INSTALLING DEALER.
 6. THE FOLLOWING ITEMS TO BE PROVIDED BY OTHERS:
A. FINISHED OPENING PLUMB, SQUARE, AND OF ADEQUATE CONSTRUCTION TO RECEIVE DOOR OPERATING EQUIPMENT.
B. 120VAC, 15A, 60HZ, 1ϕ DEDICATED ELECTRICAL SERVICE TO EACH UNIT.

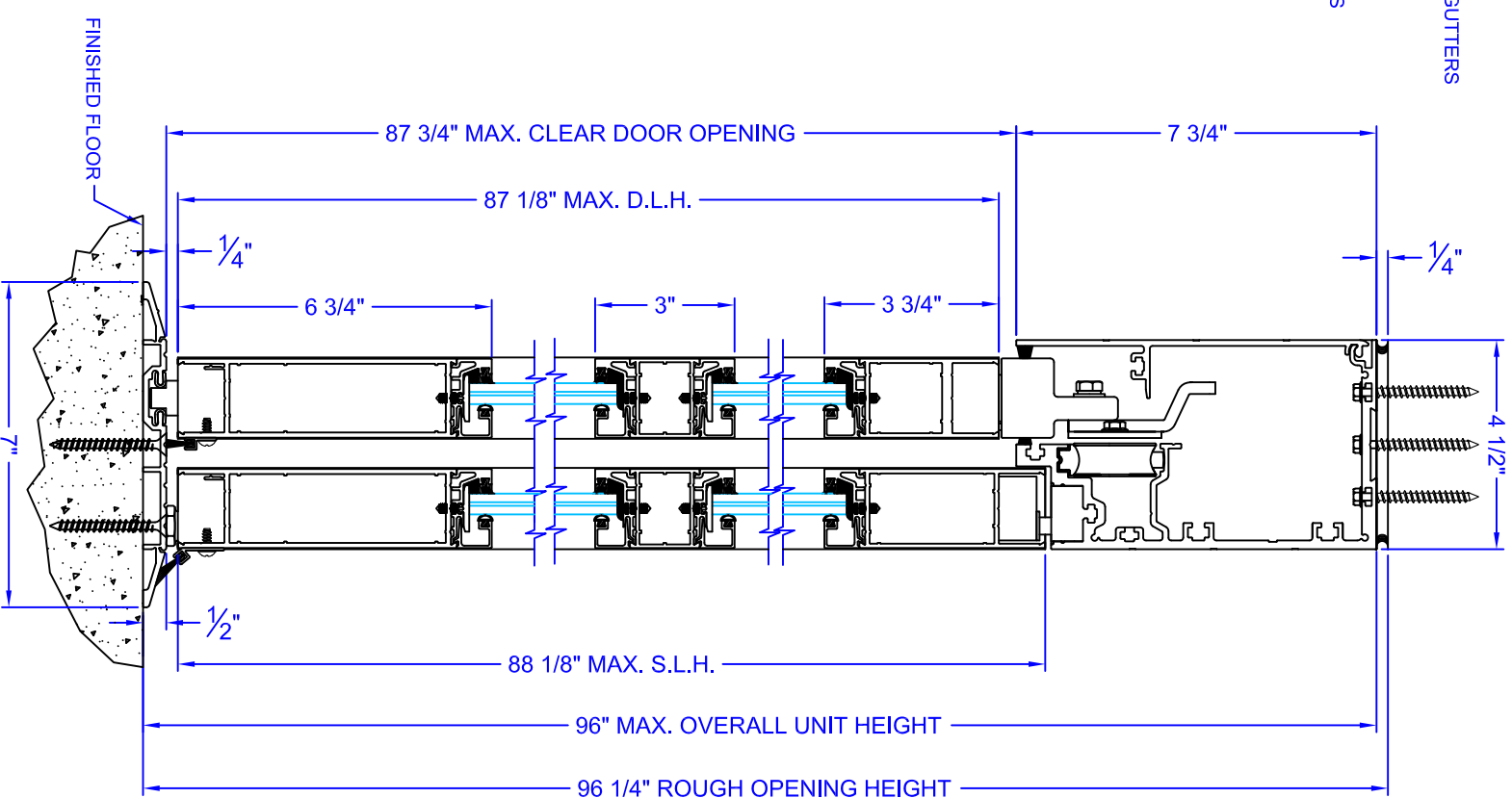
ANCHOR SCHEDULE		SUBSTRATE			
LOCATION	QUANTITY	ANCHOR TYPE	CONCRETE	WOOD	STEEL
HEADER	13	TAPCON LAG BOLT (GALVANIZED)	1/4 X 2" HEX WASHER HEAD	1/4 X 2" HEX WASHER HEAD	1/4 X 2" HEX WASHER HEAD
SILL (PIN GUIDE & THRESHOLD)	16	TEK (SDS) SCREW TAPCON	1/4 X 2 1/2" PHILLIPS FLAT HEAD	1/4 X 2 1/2" PHILLIPS FLAT HEAD	1/4 X 2" HEX WASHER HEAD
SIDE JAMBS	8 EA.	TAPCON LAG BOLT (GALVANIZED) TEK (SDS) SCREW	1/4 X 3/2" HEX WASHER HEAD	1/4 X 2 1/2" HEX WASHER HEAD	1/2-14 X 2" HEX WASHER HEAD

DISPLAY CONTROL PANEL PROVIDING THE FOLLOWING FUNCTIONS:
OFF / LOCKED MODE:
FULL/PARTIAL CYCLE IN 2-WAY & 1-WAY MODE:
STATUS & DIAGNOSTICS



CONTROL PANEL

SCALE: 1/2 SIZE

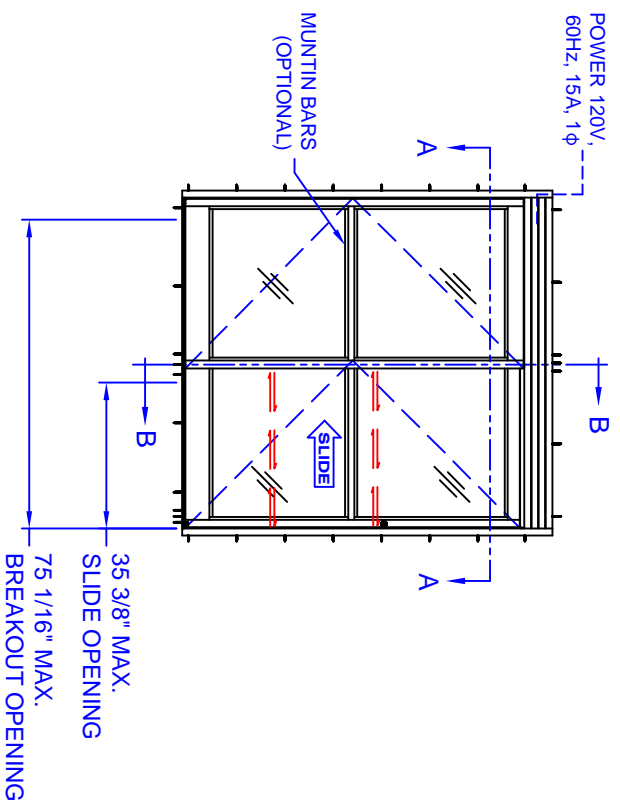


SECTION B-B

SCALE: 1/2 SIZE

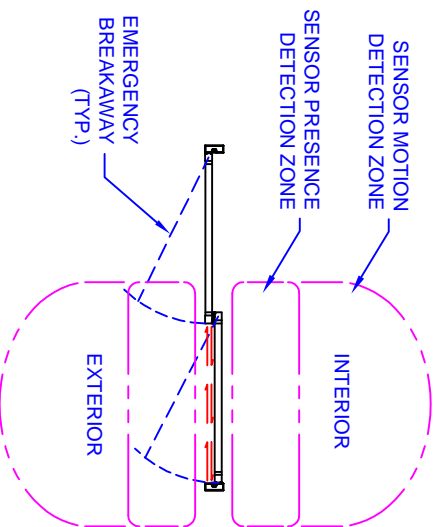
SERIES: 5400	FINISH: AS	TYPE: 5405
SIZE: AS NOTED DWN.	REVISIONS:	DATE:

DEALER:	JOB:
LOCATION:	ARCHITECT:
CONTRACTOR:	DATE:



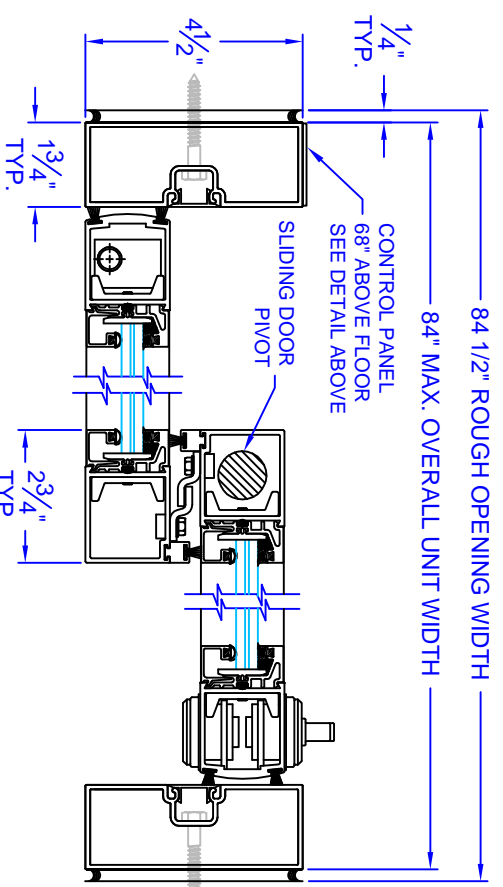
ELEVATION VIEW

SCALE: 1/2" = 1'



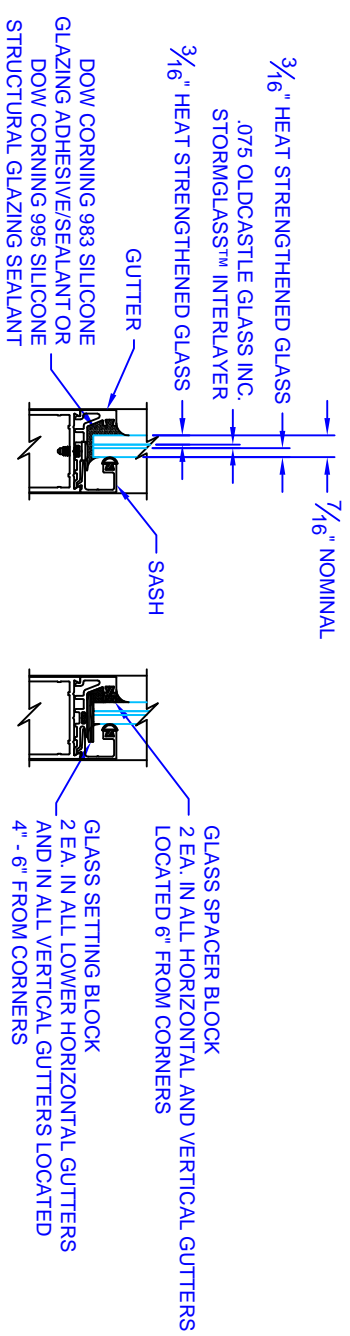
PLAN VIEW

SCALE: 1/2" = 1'



SECTION A-A

SCALE: 1/2 SIZE



TYPICAL GLAZING DETAIL

(ALL LITES)

SECTION AT GUTTER
SECTION AT GLASS

SCREW LOCATION

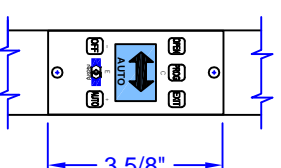
SETTING BLOCK LOCATION

- NOTES:**
1. FINISH AS SPECIFIED.
 2. THRESHOLD PHOTOELECTRIC SAFETY BEAMS AT 24" AND 48" ABOVE FLOOR.
 3. DISPLAY CONTROL PANEL (ONE PER UNIT).
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 - B. 120VAC, 15A, 60HZ, 1ϕ DEDICATED ELECTRICAL SERVICE TO EACH UNIT.

LOCATION		QUANTITY	ANCHOR TYPE	SUBSTRATE		
HEADER	13	LAG BOLT (GALVANIZED)	TEK (SDS) SCREW	CONCRETE	WOOD	STEEL
				1/4" X 2" HEX WASHER HEAD	1/4" X 2" HEX WASHER HEAD	1/4" X 2" HEX WASHER HEAD
SILL (PIN GUIDE & THRESHOLD)	16	TAPCON	TEK (SDS) SCREW	CONCRETE	WOOD	STEEL
				1/4" X 2 1/4" PHILLIPS FLAT HEAD	1/4" X 2 1/4" PHILLIPS FLAT HEAD	1/4" X 2" HEX WASHER HEAD
SIDE JAMBS	8 EA.	LAG BOLT (GALVANIZED)	TEK (SDS) SCREW	CONCRETE	WOOD	STEEL
				1/4" X 3/4" HEX WASHER HEAD	1/4" X 2 1/2" HEX WASHER HEAD	1/4" X 14 X 1 1/2" PHILLIPS FLAT HEAD

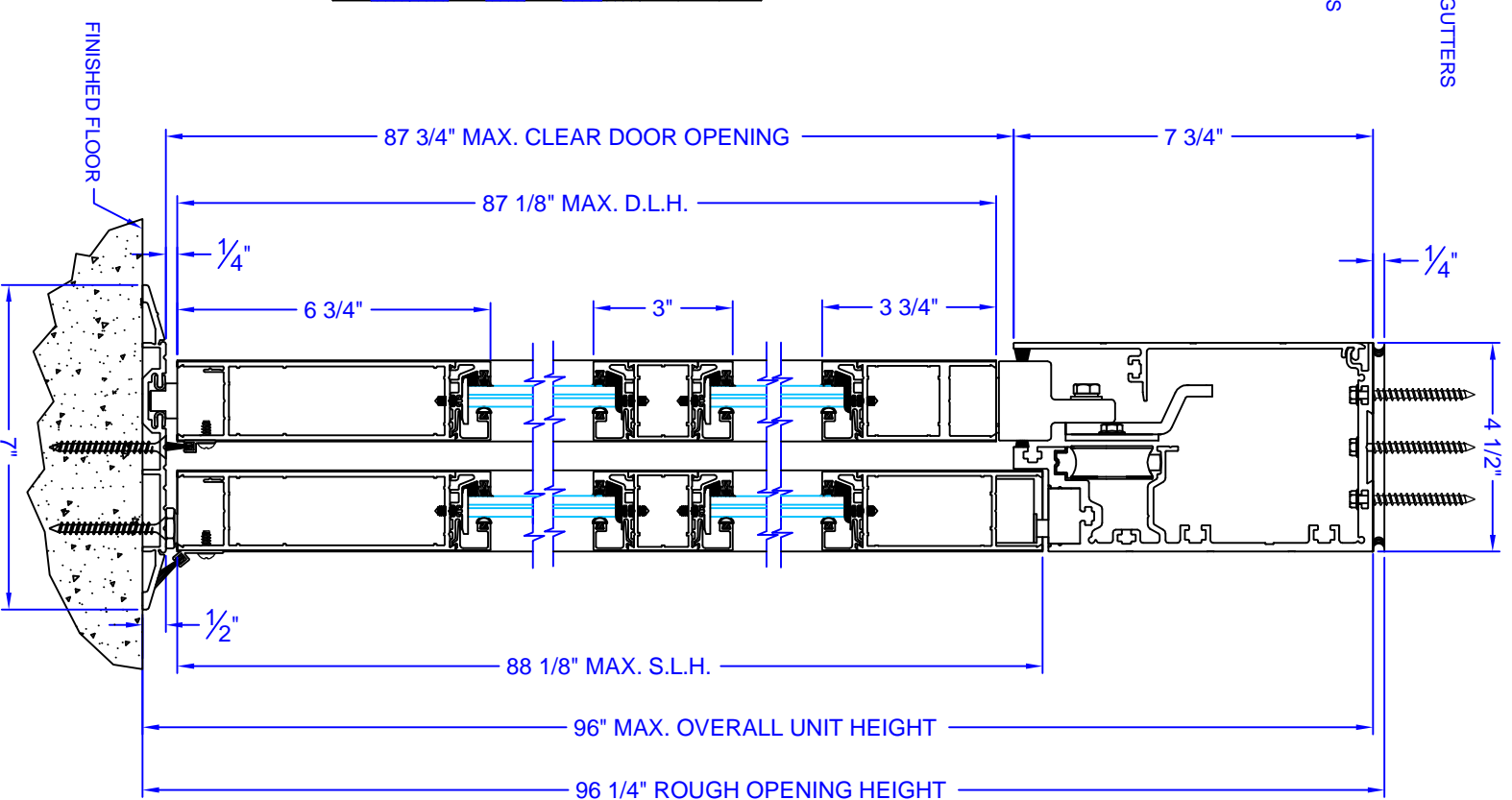
ANCHOR SCHEDULE

DISPLAY CONTROL PANEL PROVIDING THE FOLLOWING FUNCTIONS:
OFF / LOCKED MODE;
FULL/PARTIAL CYCLE IN 2-WAY & 1-WAY MODE;
STATUS & DIAGNOSTICS



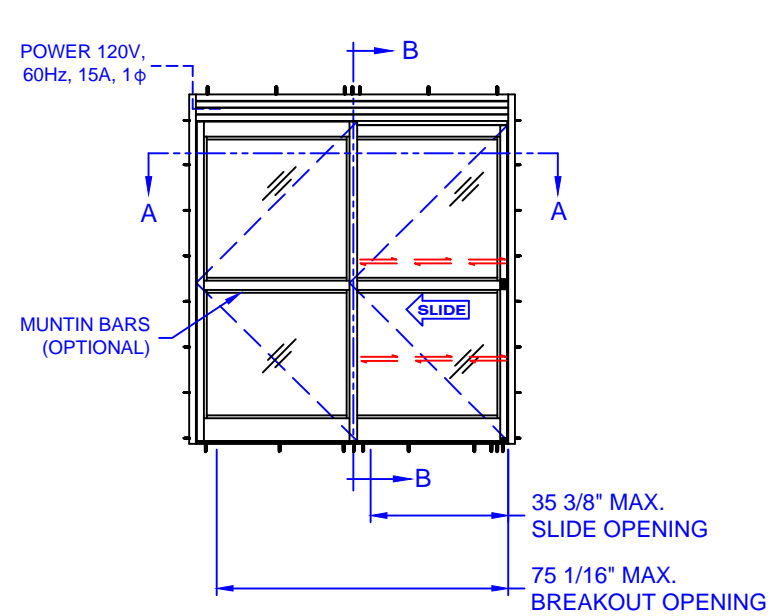
CONTROL PANEL

SCALE: 1/2 SIZE



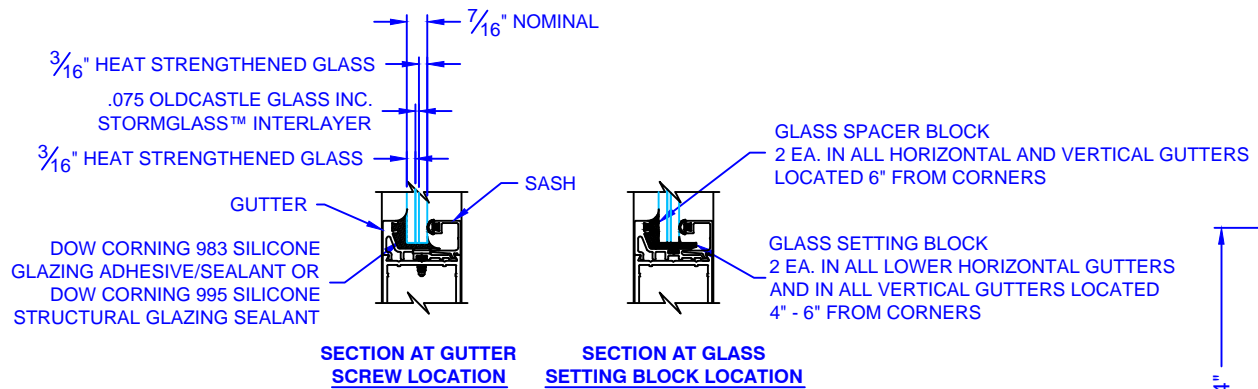
SECTION B-B

SCALE: 1/2 SIZE



ELEVATION VIEW

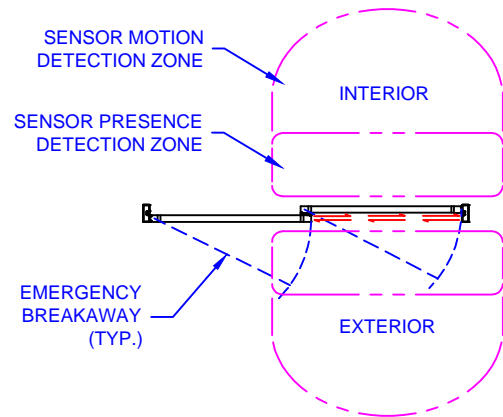
SCALE: 1/2" = 1'



TYPICAL GLAZING DETAIL
(ALL LITES)

NOTES:

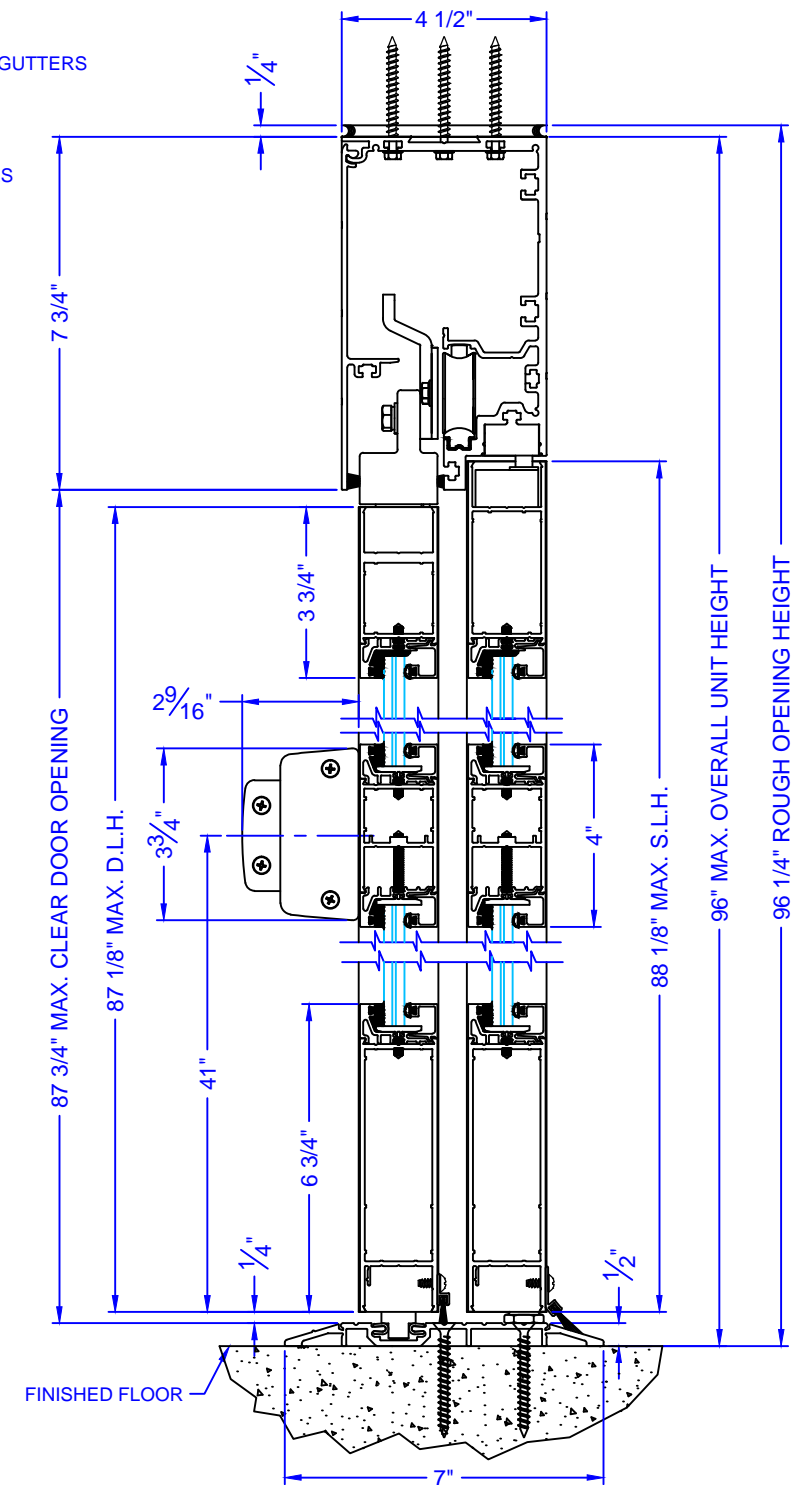
1. FINISH AS SPECIFIED.
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 - B. 120VAC, 15A, 60HZ, 1φ DEDICATED ELECTRICAL SERVICE TO EACH UNIT.



PLAN VIEW

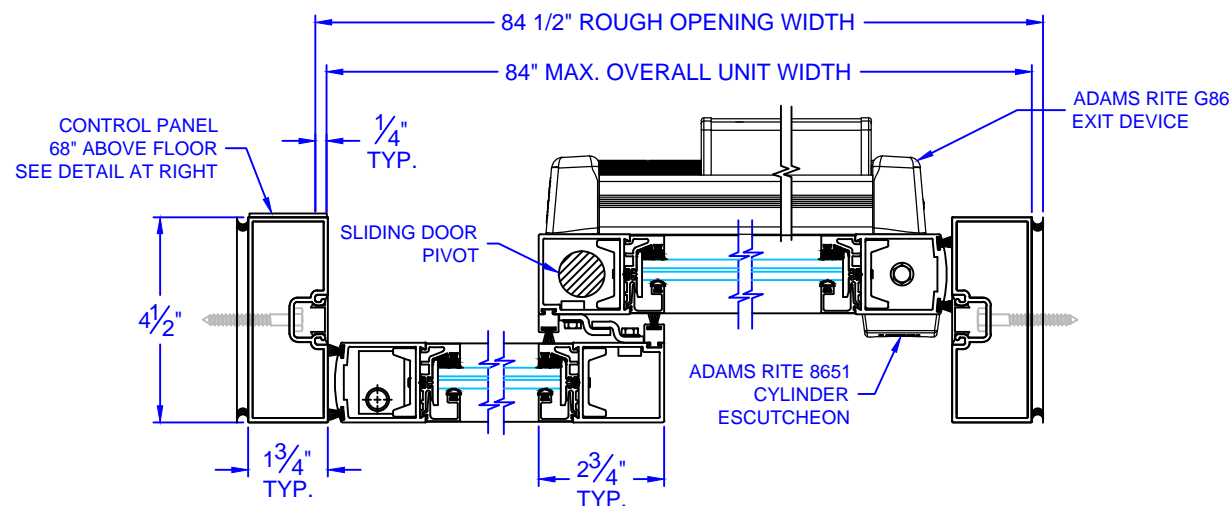
SCALE: 1/2" = 1'

ANCHOR SCHEDULE					
LOCATION	QUANTITY	ANCHOR TYPE	SUBSTRATE		
			CONCRETE	WOOD	STEEL
HEADER	13	TAPCON	1/4 X 2" HEX WASHER HEAD	1/4 X 2" HEX WASHER HEAD	1/4 X 2" HEX WASHER HEAD
		LAG BOLT (GALVANIZED)		1/4 X 2" HEX WASHER HEAD	
		TEK (SDS) SCREW			1/4 X 2" HEX WASHER HEAD
SILL (PIN GUIDE & THRESHOLD)	16	TAPCON	1/4 X 2 1/4" PHILLIPS FLAT HEAD	1/4 X 2 1/4" PHILLIPS FLAT HEAD	1/4-14 X 1 1/2" PHILLIPS FLAT HEAD
		TEK (SDS) SCREW			1/4-14 X 1 1/2" PHILLIPS FLAT HEAD
SIDE JAMBS	8 EA.	TAPCON	1/4 X 3 1/2" HEX WASHER HEAD	1/4 X 2 1/2" HEX WASHER HEAD	1/4-14 X 2" HEX WASHER HEAD
		LAG BOLT (GALVANIZED)		1/4 X 2 1/2" HEX WASHER HEAD	
		TEK (SDS) SCREW			1/4-14 X 2" HEX WASHER HEAD



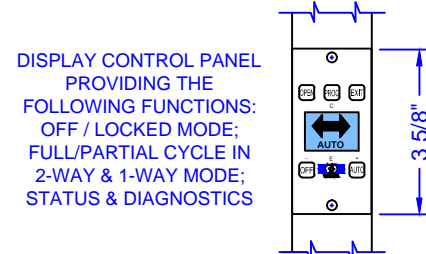
SECTION B-B

SCALE: 1/2 SIZE



SECTION A-A

SCALE: 1/2 SIZE



CONTROL PANEL

SCALE: 1/2 SIZE

SERIES: 5400	FINISH: AS NOTED	TYPE: 5404 SO-SX	DEALER:
SIZE: AS NOTED	DWN.:		JOB:
NO.	REVISIONS	DATE	LOCATION:
			ARCHITECT:
			CONTRACTOR:

record-usa
4324 PHIL HARGETT COURT
MONROE, NC 28110

record

DATE: _____ SD# _____ SHEET _____ OF _____

	Record 5400	Stanley 3000 Dura-Storm
Standard Warranty (complete unit)	2 years	1 year
Roller Track Warranty	Lifetime	1 year
Roller Warranty	3 years	1 year
Rollers per panel*	4	2
Operating Temperature Range	negative 40 to 140 Fahrenheit	negative 30 to 130 Fahrenheit
Maximum Door Panel Weight	300 lbs	220 lbs
Header Size*	4-1/2" x 7"	6" x 8"
PSF	65 PSF	50 PSF
NOA	Yes	Yes
Power Consumption	100 Watts	650 Watts
Motor Size****	1/8 HP	1/4 HP
Bi-Part Package Size	14' x 8'	14' X 7' 8"
Door Panel Construction*	Mortise Block	Through-Bolts
Diagnostics	Exposed via LCD SMART Panel	Stanley Personnel Only
Life cycle counter	Exposed via LCD SMART Panel	Stanley Personnel Only
Safety Adjustments	Software limits to ANSI 156.10	Relies on Service Tech to comply
Weather Stripping	Extruded Channel in Door Panels	Adhesive "stick on" weather stripping
Standard Safety Detection	2 infrared curtains, 2 beams	1 infrared curtain, 2 beams
Uni-Directional Motion Detection	Standard	Standard
Bottom Guide Design*	Round Pin=Anti-Friction, Smooth, Quiet	Fork Guide=Friction & Wear

Power Consumption



record-usa 5100 series 100W



record

your global partner for entrance solutions



Besam Unislide 250 W



Horton 2000/2003 300W



Stanley Dura-Slide 600W



Series 5100 Sliding Door System Electrical Cost Study

Door Moving (1,000,000 cycles per year)

- Average open and close cycle is 8 seconds
- Annual cycle time is 2,222 hours
- Usage of 1000 W* .00011W = .011W
- Annual cost is approximately \$24.44/yr (2,222* .011W)

Door at rest

- Series 5100 uses 25 W @ rest/25*
- .00011 = 0.00275 per hr
- 1 year = 365 days * 24 hours or 8,760 hrs
- Annual @ rest cost = 8,760 hours* .00275 = \$24.09 per year

The average cost of electricity = 0.11 kWh or 0.00011 Wh*



record

your global partner for entrance solutions



STANDARD FEATURES AND OPTIONS
***record-usa* SERIES 5400 LMI & SERIES 5500 NI**
***STORM FRONT* HURRICANE-RATED AUTOMATIC SLIDING DOORS**

Series Nomenclature:

- 5400 LMI (Large Missile Impact)
- Series 5500 NI (Non-Impact)

Applicable State of Florida and Miami-Dade County building code test protocols:

- TAS 201-94 – Large Missile Impact Test Procedures (Series 5400 LMI units only)
- TAS 202-94 – Air Infiltration Test, Uniform Static Air Pressure Structural Test, and Forced Entry Test (All units)
- TAS 203-94 – Cyclic Wind Pressure Loading Test (Series 5400 LMI units only)

Configurations:

- Narrow stile single slide (5X04 SO-SX, 5X05 SX-SO) full breakout units
- Narrow stile bipart (5X06 SO-SX-SX-SO) full breakout units

Maximum Unit Sizes:

- Single slide units – 7' (84") OFW x 8' (96") OFH
- Bipart units – 14' (168") OFW x 8' (96") OFH

Design Loads and Glazing:

- Series 5400 LMI units
 - Design Loads (PSF): +65 / -70
 - Glazing: Oldcastle 7/16" (3/16" HS / .075 Interlayer / 3/16" HS) laminated StormGlass™, wet glazed with either Dow Corning 983 Silicone Glazing Adhesive/Sealant or Dow Corning 995 Structural Glazing Sealant
- Series 5500 NI units
 - Design Loads (PSF): +55 / -60
 - Glazing: Any standard tempered glass can be used, from ¼" single pane to 1" IG, wet glazed with commercially available clear silicone sealant.

Bottom Guide Systems:

- Surface ramped pin guide with ½" saddle threshold or ½" carpet/saddle threshold
- Recess pin guide with ½" recessed threshold in door opening area

Standard Features:

- 6" bottom rails
- Keyed 2-point flushbolt locking (all SX panels) with inside thumbturn
- Surface-applied sweep strips (all panels)
- Steel channel reinforcing in all vertical stiles
- Display control panel



STANDARD FEATURES AND OPTIONS
***record-usa* SERIES 5400 LMI & SERIES 5500 NI**
***STORM FRONT* HURRICANE-RATED AUTOMATIC SLIDING DOORS**

Optional Features Available:

- 10" bottom rails
- 3" horizontal muntin bars (limit of 1 per panel)
- Inside cylinder in lieu of inside thumbturn
- Adams Rite G86 exit device locking with outside cylinder/escutcheon (in lieu of flushbolts all SX panels) to meet Means of Egress Life Safety codes
- Electric locking (Fail-Safe or Fail-Secure)
- Display panel with enclosure, dual rocker switch panel, rocker switch / key switch panel

Configurations, Features and Options NOT Available:

- Fixed panel (O-SX, SX-O, O-SX-SX-O) or surface applied (P-SX, SX-P, P-SX-SX-P) units, including Reverse Breakout (RBO) units
- 3-panel or 6-panel telescope units
- Bottom rails shorter than 6"
- Units with transom
- 1" side jambs
- Mullion material side jambs
- 'No Threshold' or '1/4" Threshold' options
- Door closers in SX or SO panels
- Limit arms in SO panels
- Toe rollers in SX panels
- Multiple horizontal muntin bars in panels
- Vertical muntin bars in panels
- 'No Doors' or 'Doors By Others' options



DEPARTMENT OF REGULATORY AND ECONOMIC RESOURCES (RER)
 BOARD AND CODE ADMINISTRATION DIVISION
NOTICE OF ACCEPTANCE (NOA)

Record-USA, Inc.
4324 Phil Hargett Court
Monroe, NC 28110

SCOPE:

This NOA is being issued under the applicable rules and regulations governing the use of construction materials. The documentation submitted has been reviewed and accepted by Miami-Dade County RER -Product Control Section to be used in Miami Dade County and other areas where allowed by the Authority Having Jurisdiction (AHJ).

This NOA shall not be valid after the expiration date stated below. The Miami-Dade County Product Control Section (In Miami Dade County) and/or the AHJ (in areas other than Miami Dade County) reserve the right to have this product or material tested for quality assurance purposes. If this product or material fails to perform in the accepted manner, the manufacturer will incur the expense of such testing and the AHJ may immediately revoke, modify, or suspend the use of such product or material within their jurisdiction. RER reserves the right to revoke this acceptance, if it is determined by Miami-Dade County Product Control Section that this product or material fails to meet the requirements of the applicable building code.

This product is approved as described herein and has been designed to comply with the Florida Building Code, including the High Velocity Hurricane Zone.

DESCRIPTION: Series "5400" Aluminum Automatic Sliding Glass Door w/ Breakout-LMI

APPROVAL DOCUMENT: Drawing No. **14-2168** (former **09-REU-0001**), titled "Series 5400 Automatic Sliding Glass Door", sheets 1 through 23 of 23 prepared by Engineering Express, dated 02/28/18, signed and sealed by Frank L. Bernardo, P.E., bearing the Miami-Dade County Product Control Renewal stamp with the Notice of Acceptance number and expiration date by the Miami-Dade County Product Control section.

MISSILE IMPACT RATING: Large and Small Missile Impact

LIMITATIONS:

1. See Head and Sill anchor Layout in sheet **4**. The Jamb anchors OC spacing not to exceed **12"**.
2. Not approved where water infiltration is required.
3. Electrical/ Electronic functions are not part of this approval and to be reviewed by appropriate Bldg. official
4. Full length steel channel reinforcements at stiles are required per sheet **10**. See glazing details in sheet **10**.

LABELING: Each unit shall bear a permanent label with the manufacturer's name or logo, city, state and series and following statement: "Miami-Dade County Product Control Approved", unless otherwise noted herein.

RENEWAL of this NOA shall be considered after a renewal application has been filed and there has been no change in the applicable building code negatively affecting the performance of this product.

TERMINATION of this NOA will occur after the expiration date or if there has been a revision or change in the materials, use, and/or manufacture of the product or process. Misuse of this NOA as an endorsement of any product, for sales, advertising or any other purposes shall automatically terminate this NOA. Failure to comply with any section of this NOA shall be cause for termination and removal of NOA.

ADVERTISEMENT: The NOA number preceded by the words Miami-Dade County, Florida, and followed by the expiration date may be displayed in advertising literature. If any portion of the NOA is displayed, then it shall be done in its entirety.

INSPECTION: A copy of this entire NOA shall be provided to the user by the manufacturer or its distributors and shall be available for inspection at the job site at the request of the Building Official.

This NOA **renews** NOA # **17-1227.16** and consists of this page 1 and evidence pages E-1 & E-2, as well as approval document mentioned above.

The submitted documentation was reviewed by **Ishaq I. Chanda, P.E.**



2/18/20

NOTICE OF ACCEPTANCE: EVIDENCE SUBMITTED

1. Evidence submitted under previous files

A. DRAWINGS

1. Manufacturer's die drawings and sections (submitted under files, see below)
2. Drawing No. **14-2168** (former **09-REU-0001**), titled "Series 5400 Automatic Sliding Glass Door", sheets 1 through 23 of 23 prepared by Engineering Express, dated 02/12/15, signed and sealed by Frank L. Bernardo, P.E.

B. TESTS (submitted under files # **12-0403.06/#09-0712.12**)

1. Test reports on 1) Air Infiltration Test, per FBC, TAS 202-94 (**0.29** cfm/ft²@1.57PSF)
 - 2) Uniform Static Air Pressure Test, per FBC, TAS 202-94
 - 3) Water Resistance Test, per FBC, TAS 202-94 (Not Performed)
 - 4) Large Missile Impact Test per FBC, TAS 201-94
 - 5) Cyclic Wind Pressure Loading per FBC, TAS 203-94
 - 6) Forced Entry Test, per FBC 2411 3.2.1 and TAS 202-94

along with installation diagram of aluminum automatic entrance door, prepared by American Testing Lab, Inc. Test Report No. **ATLNC 0428.01-08**, dated 04/29/09, signed and sealed by David Johnson, P.E.

Note: This test report has been revised by an addendum letter dated 01/20/10, issued by American Testing Lab, signed and sealed by David Johnson, P.E.

C. CALCULATIONS

1. Anchor Verification Calculations, complying w/ FBC-2014, dated 02/09/15, prepared by Engineering Express, signed and sealed by Frank L. Bennardo, P.E.
2. Glazing complies w/ ASTM E-1300-02, -04 & -09.

D. QUALITY ASSURANCE

1. Miami Dade Department of Regulatory and Economic Resources (RER).

E. MATERIAL CERTIFICATIONS

1. Notice of Acceptance No. #**14-0423.11** issued to Oldcastle Building Envelope, Inc. (NJ) for "**Storm Glass: Saflex CP-(VS-XX) interlayer w/ PET core**", expiring on 12/11/18.

F. STATEMENTS

1. Statement letter of conformance to FBC 2014 and letter of no financial interest, prepared by Engineering Express, both dated 02/10/15, signed and sealed by Frank L. Bennardo, P.E.
2. Lab compliance as part of the above referenced test report.

G. OTHER

1. This NOA **revises & renews** NOA # **12-0403.06**, expiring on 03/17/20.
2. Test proposal #**08-0238**, approved by BCCO.

Ishaq I. Chanda

Ishaq I. Chanda, P.E.
Product Control Unit Supervisor
NOA No. 20-0129.03
Expiration Date: March 17, 2025
Approval Date: February 13, 2020

NOTICE OF ACCEPTANCE: EVIDENCE SUBMITTED

2. Evidence submitted under previous NOA

A. DRAWINGS

1. Drawing No. **14-2168** (former **09-REU-0001**), titled "Series 5400 Automatic Sliding Glass Door", sheets 1 through 23 of 23 prepared by Engineering Express, dated 02/28/18, signed and sealed by Frank L. Bennardo, P.E.

B. Test

1. None.

C. CALCULATIONS

1. Anchor verification calculations and structural analysis, complying with FBC2017(6th Edition), prepared by Engineering Express, dated 12/22/17, signed and sealed by Frank L. Bennardo, P.E.

D. QUALITY ASSURANCE

1. Miami Dade Department of Regulatory and Economic Resources (RER).

E. MATERIAL CERTIFICATIONS

1. None.

F. STATEMENTS

1. Statement letter of conformance to FBC 2017 (6th Edition), dated 09/29/17, prepared by Engineering Express, dated 12/22/17, signed and sealed by Frank L. Bennardo, P.E.

G. OTHER

1. This NOA revises # **15-0316.04**, expiring 07/17/20.

3. New Evidence submitted

A. DRAWINGS

1. Drawing No. **14-2168** (former **09-REU-0001**), titled "Series 5400 Automatic Sliding Glass Door", sheets 1 through 23 of 23 prepared by Engineering Express, dated 02/28/18, signed and sealed by Frank L. Bennardo, P.E.

B. Test

1. None.

C. CALCULATIONS (submitted under NOA # 17-1227.16)

1. None.

D. QUALITY ASSURANCE

1. Miami Dade Department of Regulatory and Economic Resources (RER).

E. MATERIAL CERTIFICATIONS

1. Notice of Acceptance No. #**18-0611.01** issued to Oldcastle Building Envelope, Inc. (NJ) for "Storm Glass: Saflex CP-(VS-XX) interlayer w/ PET core", expiring on 12/11/23.

F. STATEMENTS

1. Statement letter of conformance to FBC 2017 (6th Edition), dated 09/29/17, prepared by Engineering Express, dated 12/22/17, signed and sealed by Frank L. Bennardo, P.E. (submitted under NOA # 17-1227.16)

G. OTHER

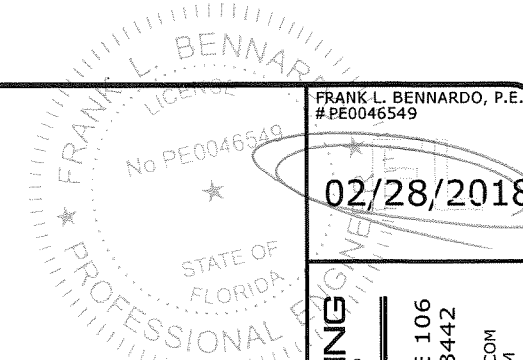
1. This NOA renews NOA # **17-1227.16**, expiring 03/17/20.



Ishaq I. Chanda, P.E.
Product Control Unit Supervisor
NOA No. 20-0129.03
Expiration Date: March 17, 2025
Approval Date: February 13, 2020

SERIES 5400 AUTOMATIC SLIDING GLASS DOOR

LARGE MISSILE IMPACT RESISTANT

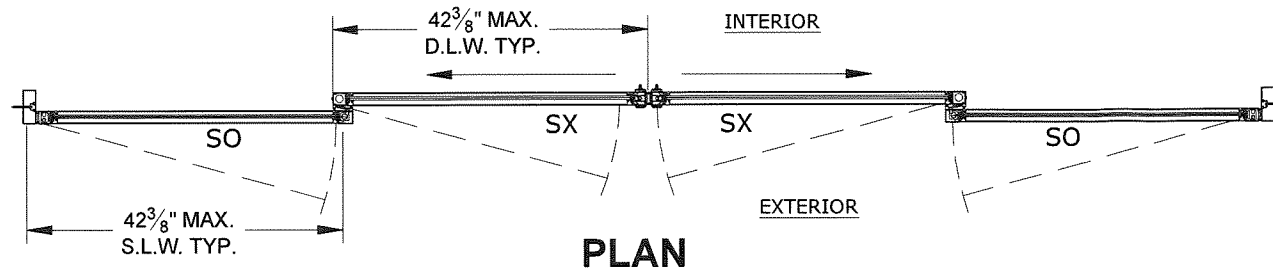


02/28/2018

ENGINEERING EXPRESS
 CORPORATE OFFICE:
 160 SW 12th AVE, SUITE 106
 DEERFIELD BEACH, FL 33442
 P: (954) 354-0660 F: (954) 354-0443
 E: HELLO@ENGINEERINGEXPRESS.COM
 ENGINEERINGEXPRESS.COM
 CERT OF AUTH #9885

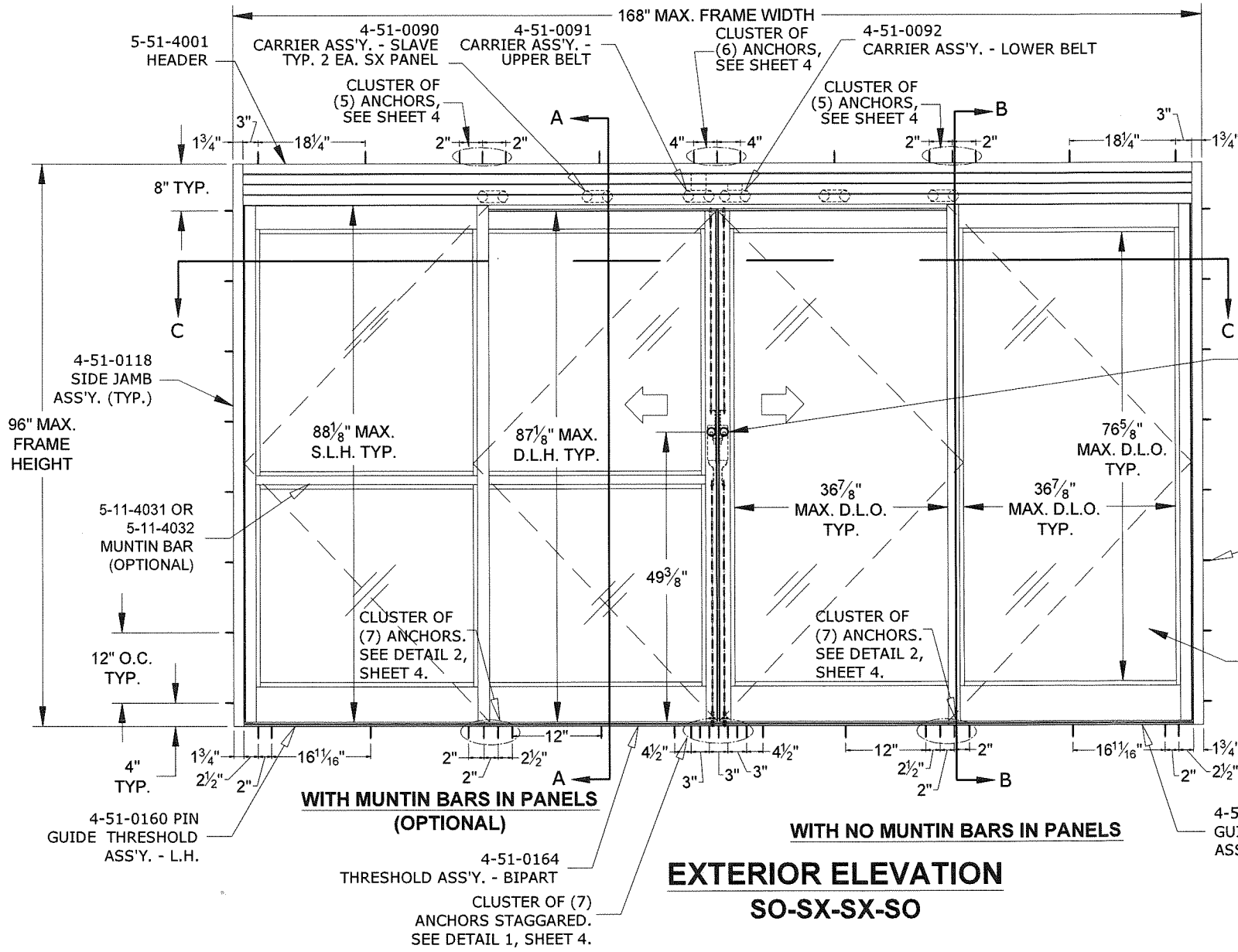
DESIGN PRESSURE RATING		IMPACT RATING
POSITIVE	+65 PSF	LARGE AND SMALL MISSILE IMPACT
NEGATIVE	-70 PSF	

NOTE: THIS SYSTEM WAS NOT TESTED FOR WATER INFILTRATION AND IS TO BE INSTALLED ONLY WHERE THE WATER REQUIREMENT IS NOT NEEDED.



GENERAL NOTES

1. THE SYSTEM DESCRIBED HEREIN HAS BEEN DESIGNED AND TESTED IN ACCORDANCE WITH THE FLORIDA BUILDING CODE SIXTH EDITION (2017), FOR USE WITHIN AND OUTSIDE THE HIGH VELOCITY HURRICANE ZONE, PER TAS 201, 202, AND 203 STANDARDS.
2. NO 33-1/3% INCREASE IN ALLOWABLE STRESS HAS BEEN USED IN THE DESIGN OF THIS SYSTEM. WIND LOAD DURATION FACTOR Cd=1.6 HAS BEEN USED FOR WOOD ANCHOR DESIGN.
3. POSITIVE AND NEGATIVE DESIGN PRESSURES CALCULATED FOR USE WITH THIS SYSTEM SHALL BE DETERMINED BY OTHERS ON A JOB-SPECIFIC BASIS IN ACCORDANCE WITH THE GOVERNING CODE.
4. THE SYSTEM DETAILED HEREIN IS GENERIC AND DOES NOT PROVIDE INFORMATION FOR A SPECIFIC SITE. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN WITHIN THE HVHZ, A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE SHALL BE APPLIED FOR AND SECURED FROM THE MIAMI-DADE BUILDING CODE COMPLIANCE OFFICE PRODUCT CONTROL DIVISION. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN OUTSIDE THE HVHZ, THE BUILDING OFFICIAL MAY REQUIRE A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE BE OBTAINED, OR THAT SITE SPECIFIC DOCUMENTS BE PREPARED, SIGNED, DATED AND SEALED BY A LICENSED ENGINEER OR REGISTERED ARCHITECT, WHICH DETAIL AND JUSTIFY THE DEVIATION.
5. PERMIT HOLDER SHALL VERIFY THE ADEQUACY OF THE EXISTING STRUCTURE TO WITHSTAND SUPERIMPOSED LOADS. WOOD BUCKS (BY OTHERS) SHALL BE ANCHORED PROPERLY TO TRANSFER LOADS TO THE EXISTING STRUCTURE.
6. ALL EXTRUSIONS SHALL BE 6063-T5 ALUMINUM ALLOY, UNLESS NOTED OTHERWISE.
7. EXTERIOR SEAM OF FRAME CORNERS SHALL BE SEALED WITH SILICONE.
8. ALL BOLTS & WASHERS SHALL BE ZINC COATED STEEL, GALVANIZED STEEL, OR STAINLESS STEEL WITH A MINIMUM TENSILE YIELD STRENGTH OF 60 KSI. ALL 3/16"Ø OR 1/4"Ø POP RIVETS SHALL BE 5056-H32 ALUMINUM ALLOY OR STRONGER UNLESS OTHERWISE NOTED.
9. ALL STEEL IN CONTACT WITH ALUMINUM SHALL BE PAINTED OR PLATED AS PRESCRIBED IN THE ABOVE-NOTED BUILDING CODE.



ADAMS RITE 1871-2 CYLINDER OPERATED FLUSH BOLT (EXTENDING A 1/2" STAINLESS STEEL HEX BOLT DOWNWARD INTO THRESHOLD ASSEMBLY), WITH INTERNATIONAL DOOR CLOSER INC. HB-4015-N HEADER BOLT SET (EXTENDING A 3/8" STEEL HEX BOLT UPWARD INTO DOOR CATCH ASSEMBLY), CZ-1001 MORTISE KEY CYLINDER (EXTERIOR) AND TZ-3001 THUMBTURN (INTERIOR) - TYP. EACH SX PANEL

OLDCASTLE GLASS INC. STORM GLASS™ 7/16" LAMINATED IMPACT-RESISTANT GLASS (TYP. ALL PANELS) PER CURRENT N.O.A. (SEE TYPICAL GLAZING DETAIL)

4-51-0161 PIN GUIDE THRESHOLD ASS'Y. - R.H.

NOTE: SEE SHEET 4 FOR ANCHOR LAYOUT DETAILS AND ANCHOR TYPES.

RECORD-USA
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 MONROE, NC 28110
 (704) 289 - 9212

SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REVISIONS	DATE	BY	CHKD
INIT ISSUE	06/26/09	KL	KL
REV PER BCCO COMMENT	12/01/09	KL	FLB
2010 FBC (09-REL-0001)	03/19/12	KL	FLB
REV FBC 2014	02/09/15	RWN	CSL
REV 2017 FBC	12/20/17	RWN	FLB

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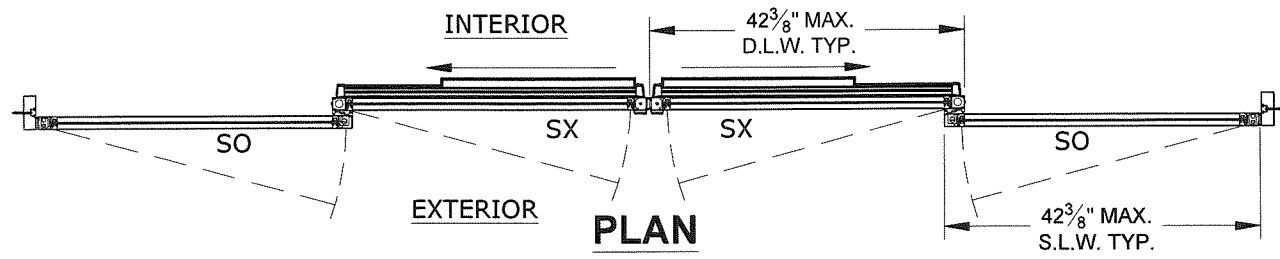
PRODUCT REVISED
 as complying with the Florida Building Code
 Acceptance No 20-0129-03
 Expiration Date 3/17/2020

PRODUCT REVISED
 as complying with the Florida Building Code
 Acceptance No 17-1227-16
 Expiration Date MAR 17, 2020

By: *[Signature]*
 Project: *[Signature]*

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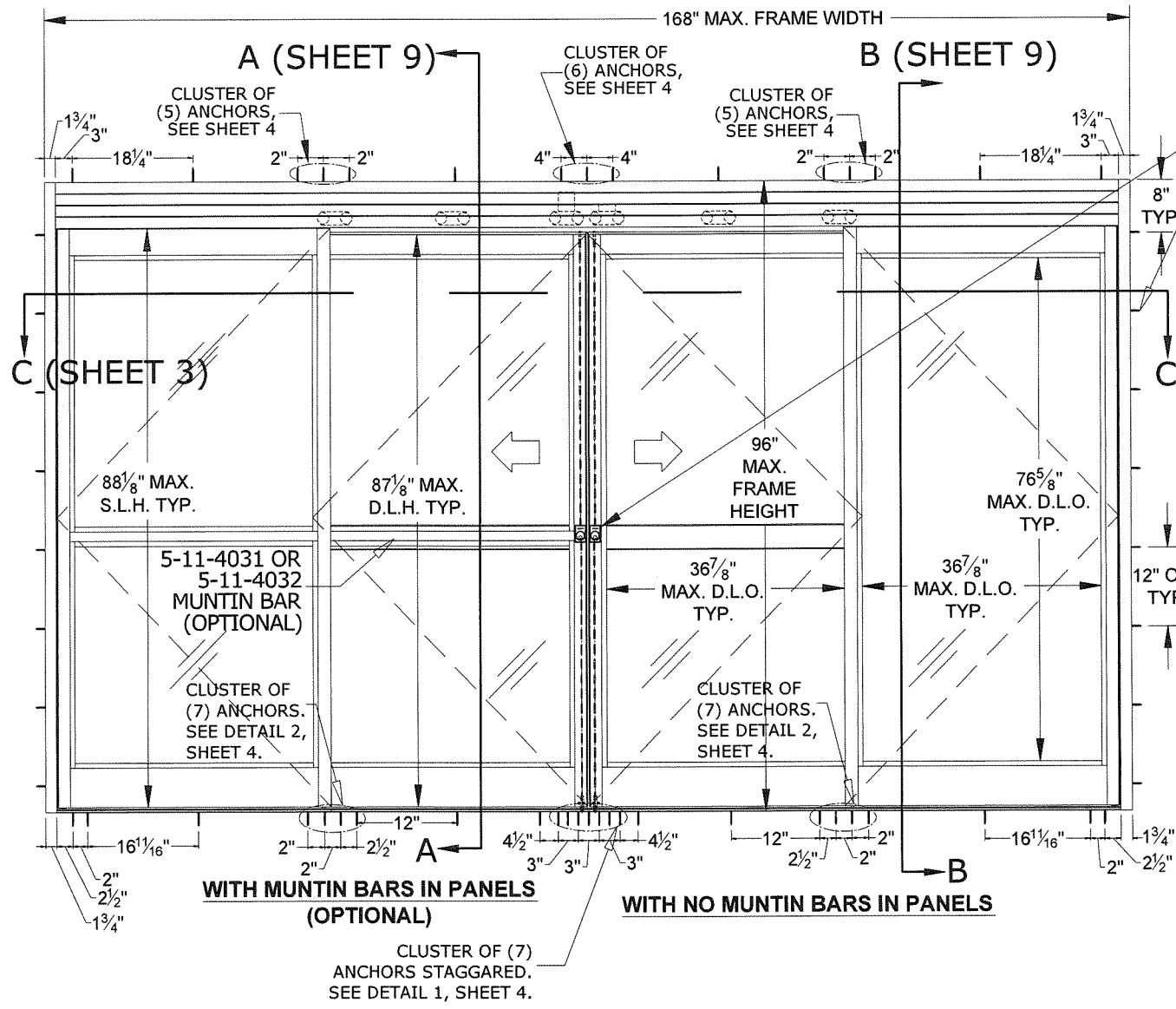
02/28/2018 - 2:15pm rickn



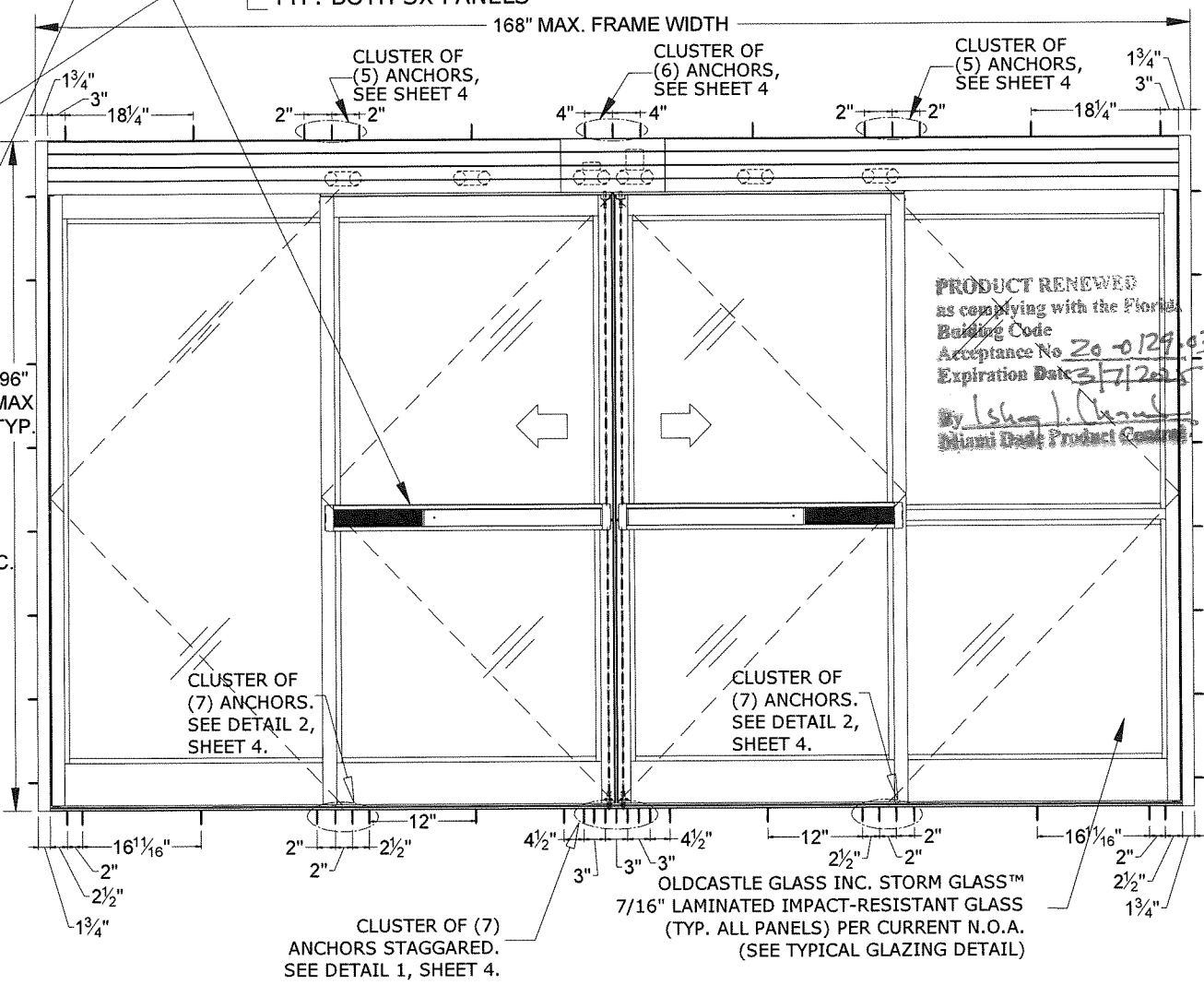
ANCHORS PER ANCHOR SCHEDULE.

INTERIOR:
ADAMS RITE G86 CONCEALED VERTICAL ROD EXIT DEVICE EXTENDING A 3/8\"/>

EXTERIOR:
ADAMS RITE 8651 ESCUTCHEON WITH INTERNATIONAL DOOR CLOSER, INC. CZ-1001 MORTISE KEY CYLINDER TYP. BOTH SX PANELS



EXTERIOR ELEVATION
SO-SX-SX-SO

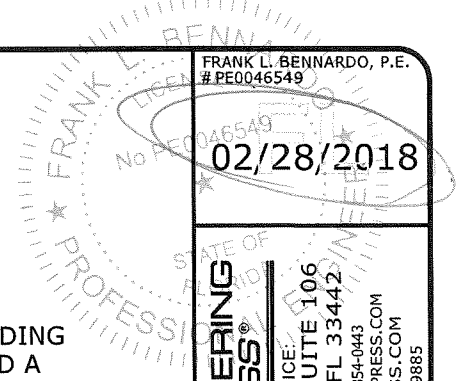


INTERIOR ELEVATION
SO-SX-SX-SO

DESIGN PRESSURE RATING		IMPACT RATING
POSITIVE	+65 PSF	LARGE AND SMALL MISSILE IMPACT
NEGATIVE	-70 PSF	
NOTE: THIS SYSTEM WAS NOT TESTED FOR WATER INFILTRATION AND IS TO BE INSTALLED ONLY WHERE THE WATER REQUIREMENT IS NOT NEEDED.		

NOTE: SEE SHEET 4 FOR ANCHOR LAYOUT DETAILS AND ANCHOR TYPES.

PRODUCT REVISED
as complying with the Florida Building Code
Acceptance No 17-1227-16
Expiration Date 3/17/20



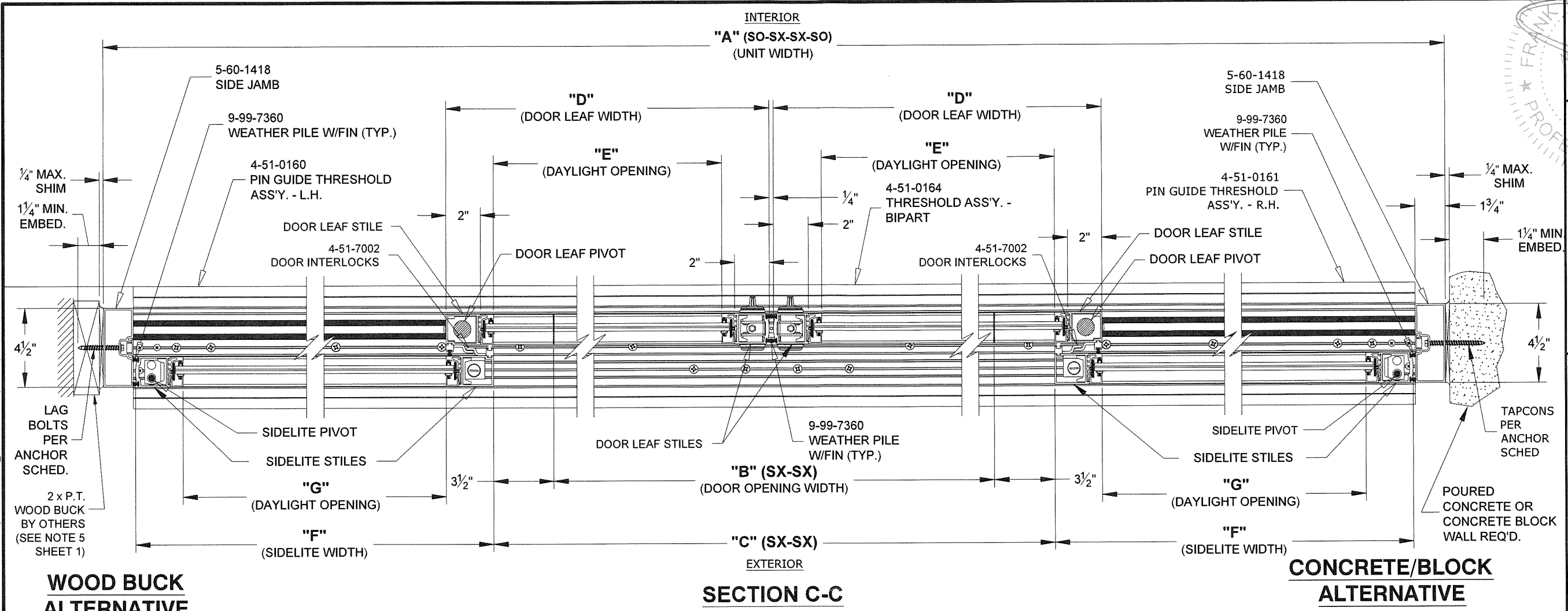
FRANK L. BENNARDO, P.E.
#PE0046549
02/28/2018
ENGINEERING EXPRESS
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CERT OF AUTH #9885

RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212
SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

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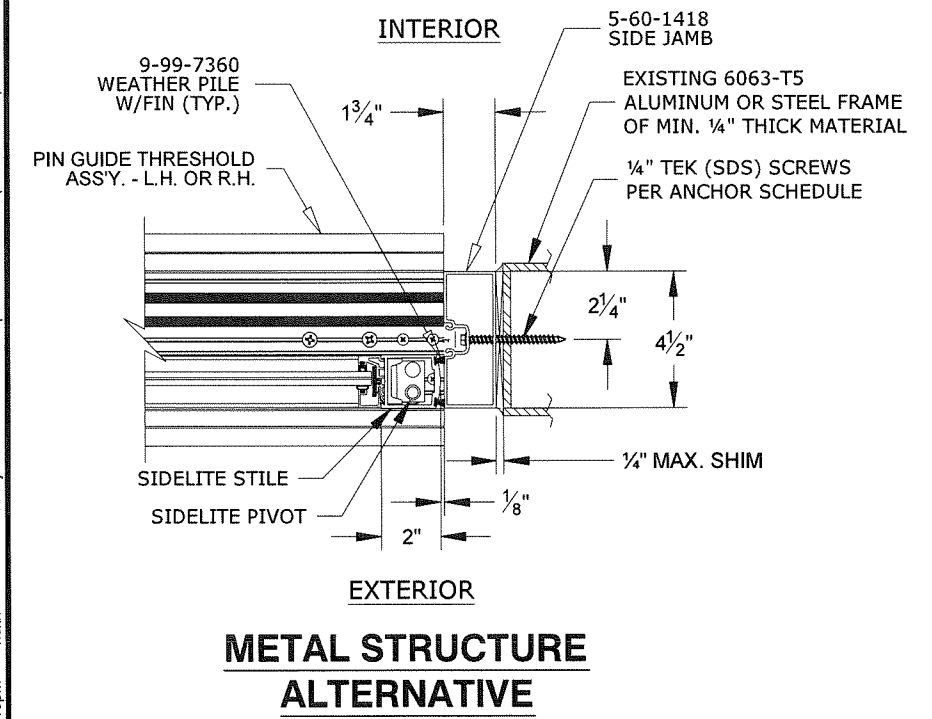
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WOOD BUCK ALTERNATIVE

SECTION C-C

CONCRETE/BLOCK ALTERNATIVE



METAL STRUCTURE ALTERNATIVE

UNIT WIDTH "A" (SO-SX-SX-SO)	DOOR OPENING WIDTH "B" (SX-SX)	DIMENSION "C" (SX-SX)	DOOR LEAF SIZE		DAYLIGHT OPENING (DOOR LEAF)		SIDELITE SIZE		DAYLIGHT OPENING (SIDELITE)		UNIT HEIGHT (MAX.)	ROUGH OPENING WIDTH (INCL. 1/4" SHIM SPACE BOTH SIDES) (SO-SX-SX-SO)
			WIDTH "D"	HEIGHT	WIDTH "E"	HEIGHT	WIDTH "F"	HEIGHT	WIDTH "G"	HEIGHT		
9' 0"	42 1/2"	49 1/2"	27 3/8"	87 1/8"	21 7/8"	76 5/8"	27 3/8"	88 1/8"	21 7/8"	76 5/8"	8' 0"	9' 1/2"
10' 0"	48 1/2"	55 1/2"	30 3/8"	87 1/8"	24 7/8"	76 5/8"	30 3/8"	88 1/8"	24 7/8"	76 5/8"	8' 0"	10' 1/2"
12' 0"	60 1/2"	67 1/2"	36 3/8"	87 1/8"	30 7/8"	76 5/8"	36 3/8"	88 1/8"	30 7/8"	76 5/8"	8' 0"	12' 1/2"
14' 0"	72 1/2"	79 1/2"	42 3/8"	87 1/8"	36 7/8"	76 5/8"	42 3/8"	88 1/8"	36 7/8"	76 5/8"	8' 0"	14' 1/2"

NOTE: DOOR WIDTH AND HEIGHT SHALL COMPLY WITH THE MINIMUM REQUIREMENTS OF THE FLORIDA BUILDING CODE.

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 as complying with the Florida Building Code
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 By [Signature]
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 Acceptance No. 17-1222.16
 Expiration Date 3/17/20
 By [Signature]
 Miami Dade Product Control

FRANK L. BENNARDO, P.E.
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 02/28/2018
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 (704) 289 - 9212
 SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AVL	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
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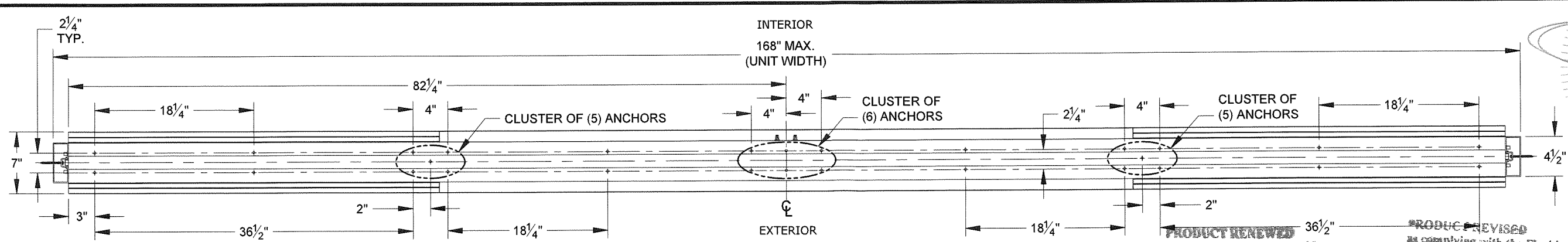
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PE0046549

02/28/2018

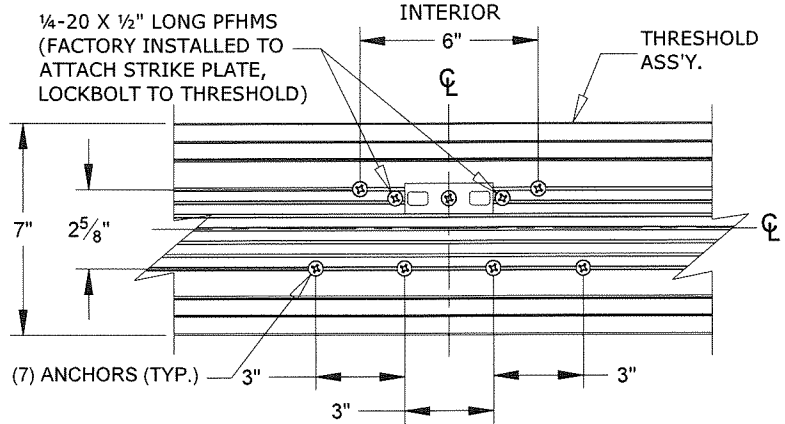
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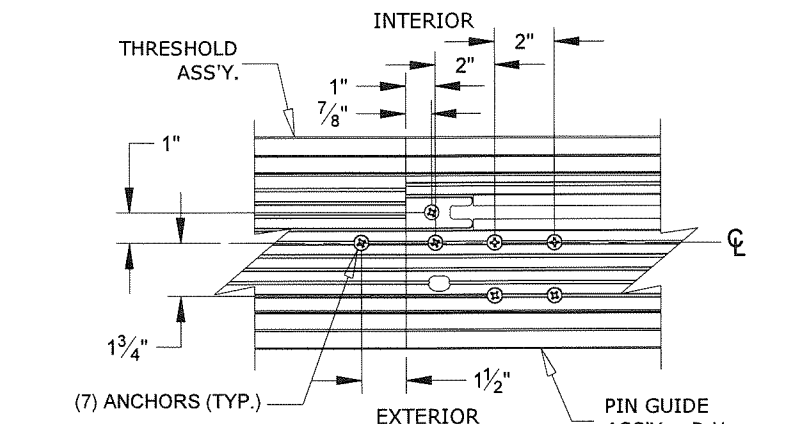
**ANCHOR LAYOUT AT HEADER
(SO-SX-SX-SO)**

PRODUCT RENEWED
as complying with the Florida Building Code
Acceptance No 20-0129-03
Expiration Date 3/17/2025
By *[Signature]*
Miami Trade Product Control

PRODUCT REVISED
as complying with the Florida Building Code
Acceptance No 17-1227-16
Expiration Date 3/17/2020
By *[Signature]*
Miami Trade Product Control



DETAIL 1



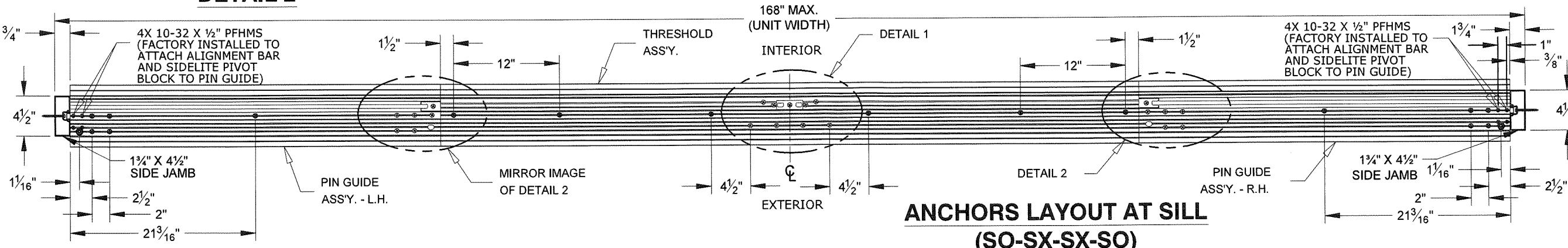
DETAIL 2

ANCHOR SCHEDULE		
LOCATION	SUBSTRATE	ANCHOR TYPE
HEAD	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	#14 WOOD SCREWS W/ 1-1/2" MIN. THREAD PENETRATION AND 1" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE
JAMBS	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	#14 WOOD SCREWS W/ 1-1/2" MIN. THREAD PENETRATION AND 1" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE
SILL	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/2" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	1/4" S.S. ITW TAPCONS W/ 1-1/2" MIN. THREAD PENETRATION AND 3/4" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE

ANCHOR NOTES:

- SEE EXTERIOR ELEVATIONS AND ANCHOR LAYOUT DETAILS FOR ANCHOR LOCATIONS AND/OR SPACING.
- ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS. ALL CONCRETE ANCHORS SHALL BE INSTALLED TO NON-CRACKED CONCRETE ONLY.
- ENSURE MINIMUM 2-1/2" EDGE DISTANCE FOR ALL ANCHORS TO CONCRETE & TO CONCRETE BLOCK. EDGE DISTANCE OF 1/2" IS ACCEPTABLE FOR ANCHORS TO STEEL OR ALUMINUM.
- WHERE ANCHORS FASTEN TO NARROW FACE OF STUD FRAMING, ANCHOR SHALL BE LOCATED IN CENTER OF NOMINAL 2x (MIN) WOOD STUD, U.N.O..
- WOOD HOST STRUCTURE SHALL BE "SOUTHERN PINE" G=0.55 OR GREATER DENSITY.
- ANCHOR REQUIREMENTS AS SHOWN HEREIN, INCLUDING MINIMUM EMBEDMENT AND EDGE DISTANCE, EXCLUDES STUCCO, FOAM, BRICK, AND OTHER WALL FINISHES. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN WITHIN THE HVHZ, A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE SHALL BE APPLIED FOR AND SECURED FROM THE MIAMI-DADE BUILDING CODE COMPLIANCE OFFICE PRODUCT CONTROL DIVISION. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN OUTSIDE THE HVHZ, THE BUILDING OFFICIAL MAY REQUIRE A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE BE OBTAINED, OR THAT SITE SPECIFIC DOCUMENTS BE PREPARED, SIGNED, DATED AND SEALED BY A LICENSED ENGINEER OR REGISTERED ARCHITECT, WHICH DETAIL AND JUSTIFY THE DEVIATION.
- WHERE EXISTING STRUCTURE IS WOOD FRAMING, EXISTING CONDITIONS MAY VARY. FIELD VERIFY THAT FASTENERS ARE INTO ADEQUATE WOOD FRAMING MEMBERS, NOT INTO PLYWOOD.
- WOOD BUCKS (BY OTHERS) SHALL BE ANCHORED PROPERLY TO TRANSFER LOADS TO THE EXISTING STRUCTURE.
- SELF DRILLING SCREWS SHALL BE SAE GRADE 5 INSTALLED WITH FULL ENGAGEMENT OF THREADS INTO METAL HOST STRUCTURE AND MAY HAVE EITHER A FLAT HEAD, PAN HEAD, TRUSS HEAD, OR OTHER HEAD STYLES. PROVIDE (5) PITCHES MIN. PAST THE THREAD PLANE.

NOTE: FOR SO-SX OR SX-SO ANCHOR LAYOUTS, SEE SHEET 8.



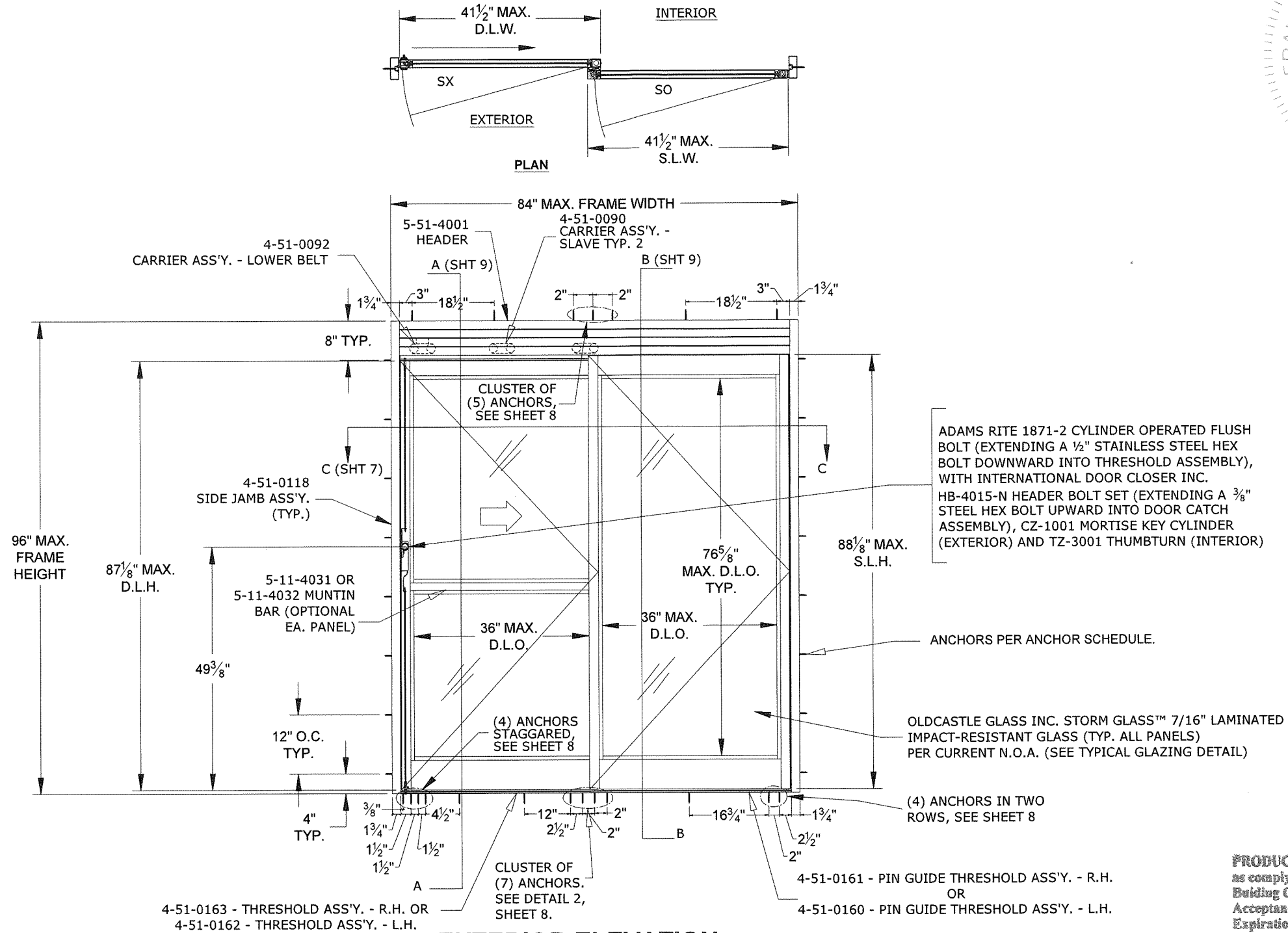
**ANCHORS LAYOUT AT SILL
(SO-SX-SX-SO)**

RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212

DRWN	CHKD	DATE
AML	KL	06/26/09
FLB	KL	12/01/09
FLB	KL	03/19/12
RWN	CSL	02/09/15
RWN	FLB	12/20/17

14-2168

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PAGE DESCRIPTION: -



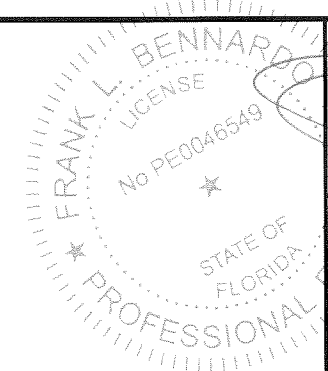
EXTERIOR ELEVATION
5405 SX-SO R.H. SHOWN
5404 SO-SX L.H. OPPOSITE

DESIGN PRESSURE RATING		IMPACT RATING
POSITIVE	+65 PSF	LARGE AND SMALL MISSILE IMPACT
NEGATIVE	-70 PSF	
NOTE: THIS SYSTEM WAS NOT TESTED FOR WATER INFILTRATION AND IS TO BE INSTALLED ONLY WHERE THE WATER REQUIREMENT IS NOT NEEDED.		

NOTE: SEE SHEET 8 FOR ANCHOR LAYOUT DETAILS AND ANCHOR TYPES.

PRODUCT RENEWED
 as complying with the Florida Building Code
 Acceptance No 20-0129.03
 Expiration Date 3/17/2025
 By [Signature]
 Miami Dade Product Control

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 as complying with the Florida Building Code
 Acceptance No 17-127.16
 Expiration Date 3/17/20
 By [Signature]
 Miami Dade Product Control



FRANK L. BENNARDO, P.E.
 #PE0046549

02/28/2018

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 CERT OF AUTH #9885

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 MONROE, NC 28110
 (704) 289 - 9212

SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV PER BCC COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

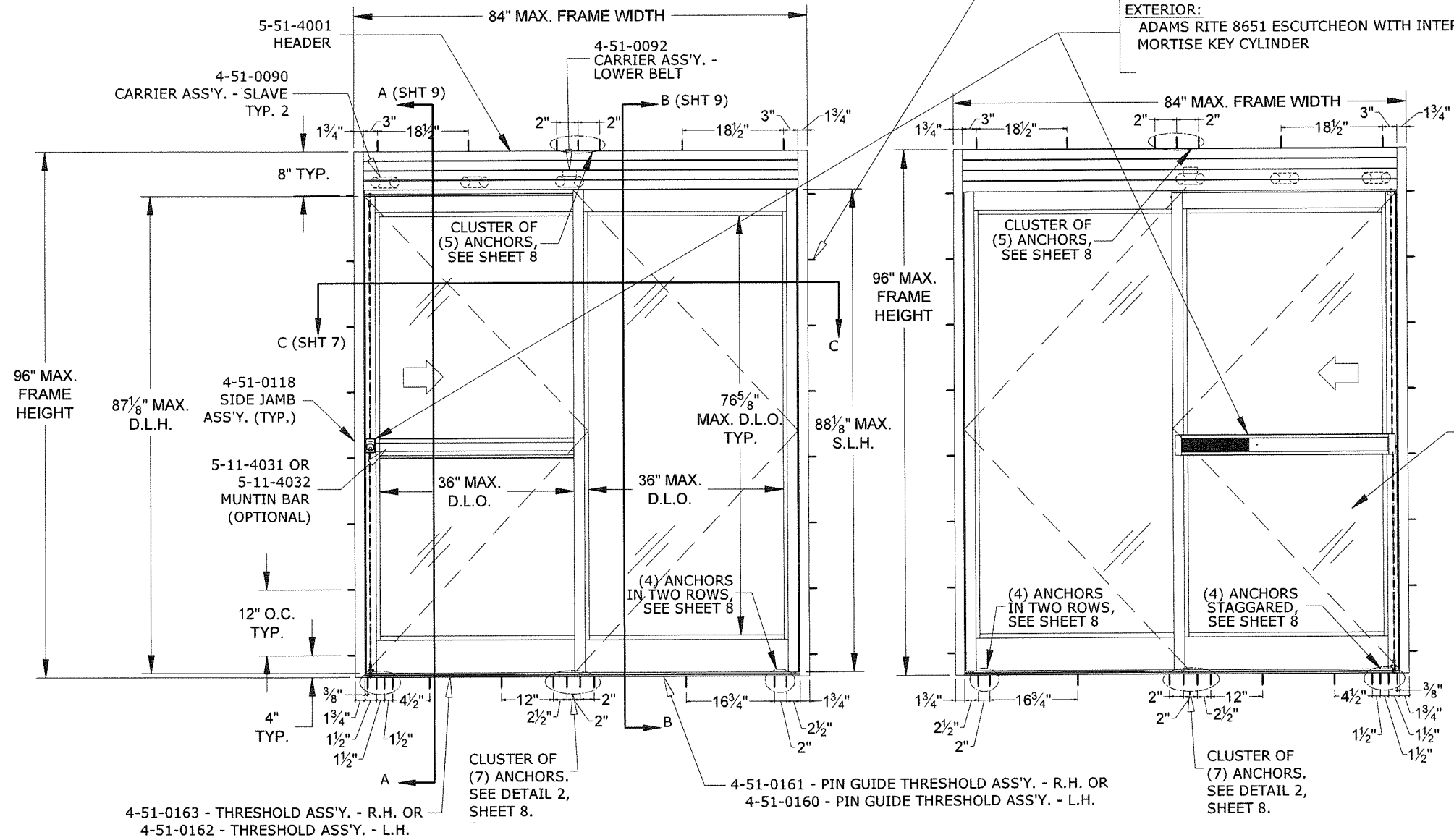
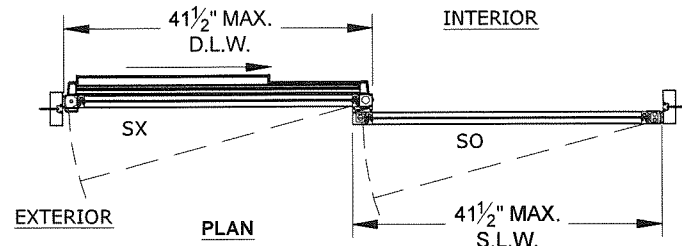
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02/28/2018 - 2:15pm rickn



ANCHORS PER ANCHOR SCHEDULE.

INTERIOR:
ADAMS RITE G86 CONCEALED VERTICAL ROD EXIT DEVICE EXTENDING A 3/8" STEEL HEX BOLT UPWARD INTO DOOR CATCH ASSEMBLY AND A 1/2" STAINLESS STEEL HEX BOLT DOWNWARD IN THRESHOLD ASSEMBLY

EXTERIOR:
ADAMS RITE 8651 ESCUTCHEON WITH INTERNATIONAL DOOR CLOSER, INC. CZ-1001 MORTISE KEY CYLINDER

OLDCASTLE GLASS INC. STORM GLASS™ 7/16" LAMINATED IMPACT-RESISTANT GLASS (TYP. ALL PANELS) PER CURRENT N.O.A. (SEE TYPICAL GLAZING DETAIL)

PRODUCT RENEWED
as complying with the Florida Building Code
Acceptance No 20-0129-03
Expiration Date 3/17/2025
By Ismael B. Hernandez
Miami Code Product Control

PRODUCT REVISED
as complying with the Florida Building Code
Acceptance No 17-1227-16
Expiration Date 3/17/20
By Ismael B. Hernandez
Miami Code Product Control

EXTERIOR ELEVATION
5405 SX-SO R.H. SHOWN
5404 SO-SX L.H. OPPOSITE

DESIGN PRESSURE RATING		IMPACT RATING
POSITIVE	+65 PSF	
NEGATIVE	-70 PSF	
NOTE: THIS SYSTEM WAS NOT TESTED FOR WATER INFILTRATION AND IS TO BE INSTALLED ONLY WHERE THE WATER REQUIREMENT IS NOT NEEDED.		LARGE AND SMALL MISSILE IMPACT

NOTE: SEE SHEET 8 FOR ANCHOR LAYOUT DETAILS AND ANCHOR TYPES.

FRANK L. BENNARDO, P.E.
#PE0046549

02/28/2018

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RECORD-USA

4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212

SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/07/09
2010 FBC (09-REU-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

14-2168

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 rickn
 02/28/2018 - 2:15pm

FRANK L. BENNARDO, P.E.
 #PE0046549

02/28/2018

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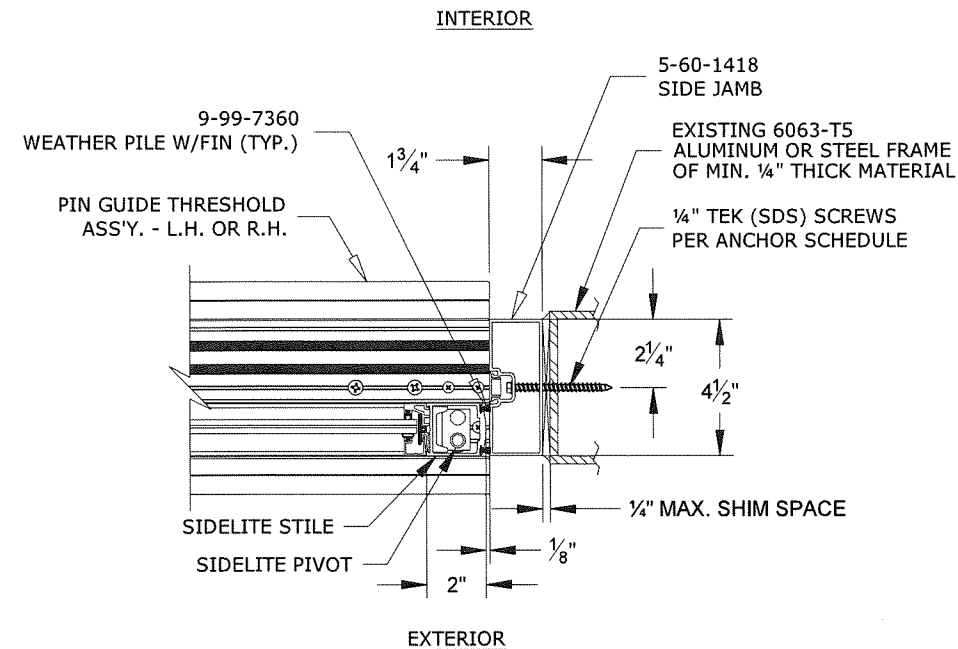
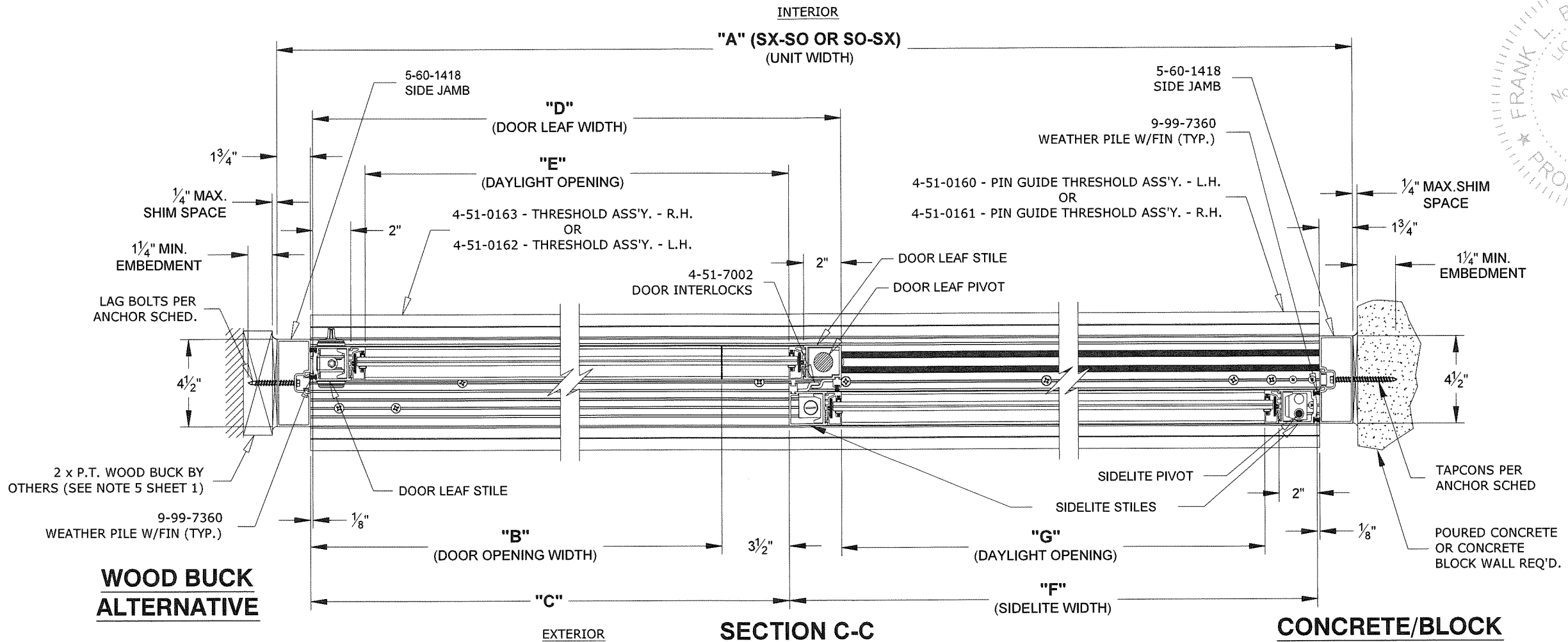
SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
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REV FBC 2014	RWN	CSL	02/09/15
REV/2017 FBC	RWN	FLB	12/20/17

14-2168

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 PAGE DESCRIPTION:

7



METAL STRUCTURE ALTERNATIVE

UNIT WIDTH "A" (SX-SO OR SO-SX)	DOOR OPENING WIDTH "B"	DIMENSION "C"	DOOR LEAF SIZE		DAYLIGHT OPENING (DOOR LEAF)		SIDELITE SIZE		DAYLIGHT OPENING (SIDELITE)		UNIT HEIGHT (MAX.)	ROUGH OPENING WIDTH (INCL. 1/4" SHIM SPACE BOTH SIDES)
			WIDTH "D"	HEIGHT	WIDTH "E"	HEIGHT	WIDTH "F"	HEIGHT	WIDTH "G"	HEIGHT		
6' 6"	32 3/8"	36"	38 1/2"	87 1/8"	33"	76 5/8"	38 1/2"	88 1/8"	33"	76 5/8"	8' 0"	6' 6 1/2"
7' 0"	35 3/8"	39"	41 1/2"	87 1/8"	36"	76 5/8"	41 1/2"	88 1/8"	36"	76 5/8"	8' 0"	7' 1/2"

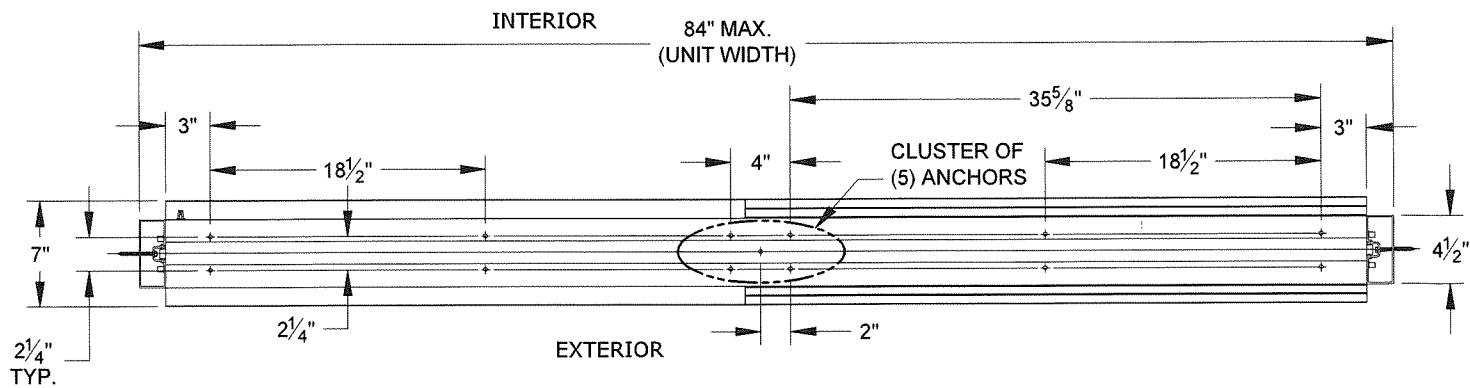
NOTE: DOOR WIDTH AND HEIGHT SHALL COMPLY WITH THE MINIMUM REQUIREMENTS OF THE FLORIDA BUILDING CODE.

PRODUCT RENEWED
 as complying with the Florida
 Building Code
 Acceptance No 20-0129.03
 Expiration Date 3/17/2025
 By *[Signature]*
 Miami Dade Product Control

PRODUCT REVISED
 as complying with the Florida
 Building Code
 Acceptance No 17-1227-16
 Expiration Date 3/17/20
 By *[Signature]*
 Miami Dade Product Control

V:\Projects\14-2168 NOA - Update 12-0403.07 (09-RELU-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c-Series 5400 Automatic SGD (NOA).dwg

02/28/2018 - 2:15pm rickn

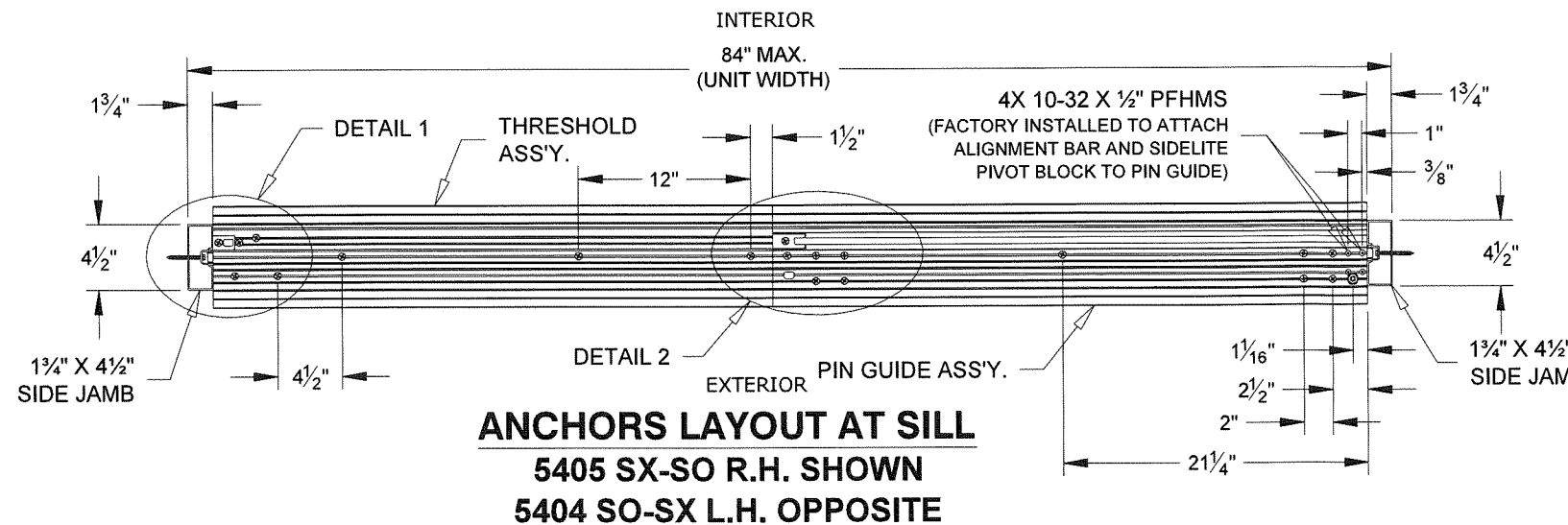


**ANCHOR LAYOUT AT HEADER
(TYP. FOR SO-SX OR SX-SO)**

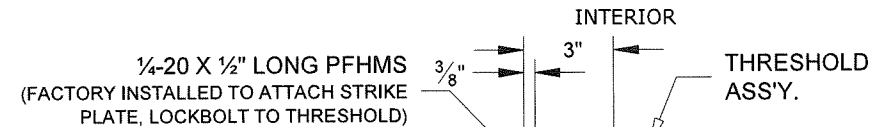
ANCHOR SCHEDULE		
LOCATION	SUBSTRATE	ANCHOR TYPE
HEAD	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	#14 WOOD SCREWS W/ 1-1/2" MIN. THREAD PENETRATION AND 1" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE
JAMBS	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	#14 WOOD SCREWS W/ 1-1/2" MIN. THREAD PENETRATION AND 1" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE
SILL	CONCRETE (3192 PSI MIN) OR CONCRETE BLOCK	1/4" ITW S.S. TAPCONS W/ 1-1/4" MIN. EMBEDMENT AND 2-1/2" MIN. EDGE DISTANCE
	WOOD (G=0.55 MIN)	1/4" ITW S.S. TAPCONS W/ 1-1/2" MIN. THREAD PENETRATION AND 3/4" MIN. EDGE DISTANCE
	1/4" MINIMUM 6063-T5 ALUMINUM OR STEEL	1/4" 316 STAINLESS STEEL SELF DRILLING SCREWS W/ 1/2" MIN. EDGE DISTANCE

ANCHOR NOTES:

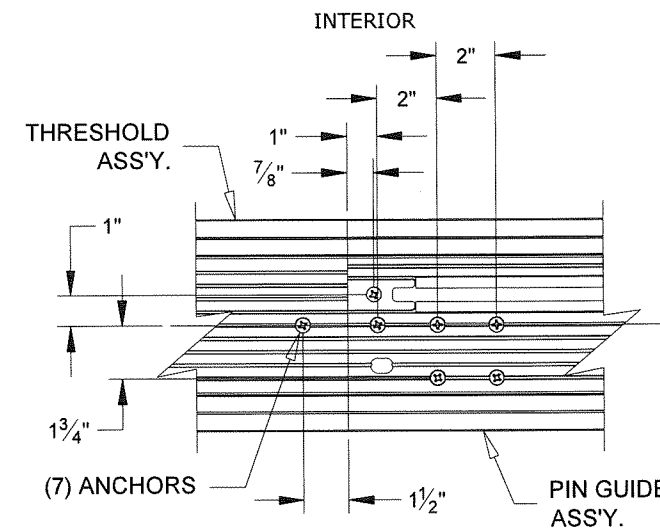
- SEE EXTERIOR ELEVATIONS AND ANCHOR LAYOUT DETAILS FOR ANCHOR LOCATIONS AND/OR SPACING.
- ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS. ALL CONCRETE ANCHORS SHALL BE INSTALLED TO NON-CRACKED CONCRETE ONLY.
- ENSURE MINIMUM 2-1/2" EDGE DISTANCE FOR ALL ANCHORS TO CONCRETE & TO CONCRETE BLOCK. EDGE DISTANCE OF 1/2" IS ACCEPTABLE FOR ANCHORS TO STEEL OR ALUMINUM.
- WHERE ANCHORS FASTEN TO NARROW FACE OF STUD FRAMING, ANCHOR SHALL BE LOCATED IN CENTER OF NOMINAL 2x (MIN) WOOD STUD, U.N.O..
- WOOD HOST STRUCTURE SHALL BE "SOUTHERN PINE" G=0.55 OR GREATER DENSITY.
- ANCHOR REQUIREMENTS AS SHOWN HEREIN, INCLUDING MINIMUM EMBEDMENT AND EDGE DISTANCE, EXCLUDES STUCCO, FOAM, BRICK, AND OTHER WALL FINISHES. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN WITHIN THE HVHZ, A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE SHALL BE APPLIED FOR AND SECURED FROM THE MIAMI-DADE BUILDING CODE COMPLIANCE OFFICE PRODUCT CONTROL DIVISION. FOR SITE CONDITIONS DIFFERENT FROM THE CONDITIONS DETAILED HEREIN OUTSIDE THE HVHZ, THE BUILDING OFFICIAL MAY REQUIRE A ONE-TIME SITE-SPECIFIC NOTICE OF ACCEPTANCE BE OBTAINED, OR THAT SITE SPECIFIC DOCUMENTS BE PREPARED, SIGNED, DATED AND SEALED BY A LICENSED ENGINEER OR REGISTERED ARCHITECT, WHICH DETAIL AND JUSTIFY THE DEVIATION.
- WHERE EXISTING STRUCTURE IS WOOD FRAMING, EXISTING CONDITIONS MAY VARY. FIELD VERIFY THAT FASTENERS ARE INTO ADEQUATE WOOD FRAMING MEMBERS, NOT INTO PLYWOOD.
- WOOD BUCKS (BY OTHERS) SHALL BE ANCHORED PROPERLY TO TRANSFER LOADS TO THE EXISTING STRUCTURE.
- SELF DRILLING SCREWS SHALL BE SAE GRADE 5 INSTALLED WITH FULL ENGAGEMENT OF THREADS INTO METAL HOST STRUCTURE AND MAY HAVE EITHER A FLAT HEAD, PAN HEAD, TRUSS HEAD, OR OTHER HEAD STYLES. PROVIDE (5) PITCHES MIN. PAST THE THREAD PLANE.



**ANCHORS LAYOUT AT SILL
5405 SX-SO R.H. SHOWN
5404 SO-SX L.H. OPPOSITE**



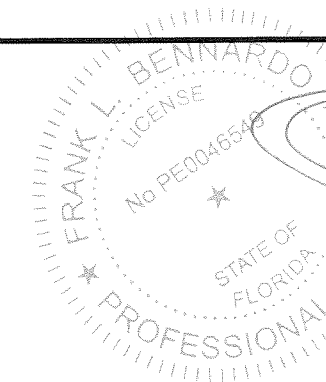
DETAIL 1



DETAIL 2

PRODUCT RENEWED
as complying with the Florida Building Code
Acceptance No. 20-0129.03
Expiration Date 3/17/2025
By Isang L. Lim
Miami Dade Product Control

PRODUCT REVISED
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Acceptance No. 17-1227.16
Expiration Date 3/17/20
By Isang L. Lim
Miami Dade Product Control



FRANK L. BENARDO, P.E.
PE0046549

02/28/2018

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CERT OF AUTH #9885

RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212

SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

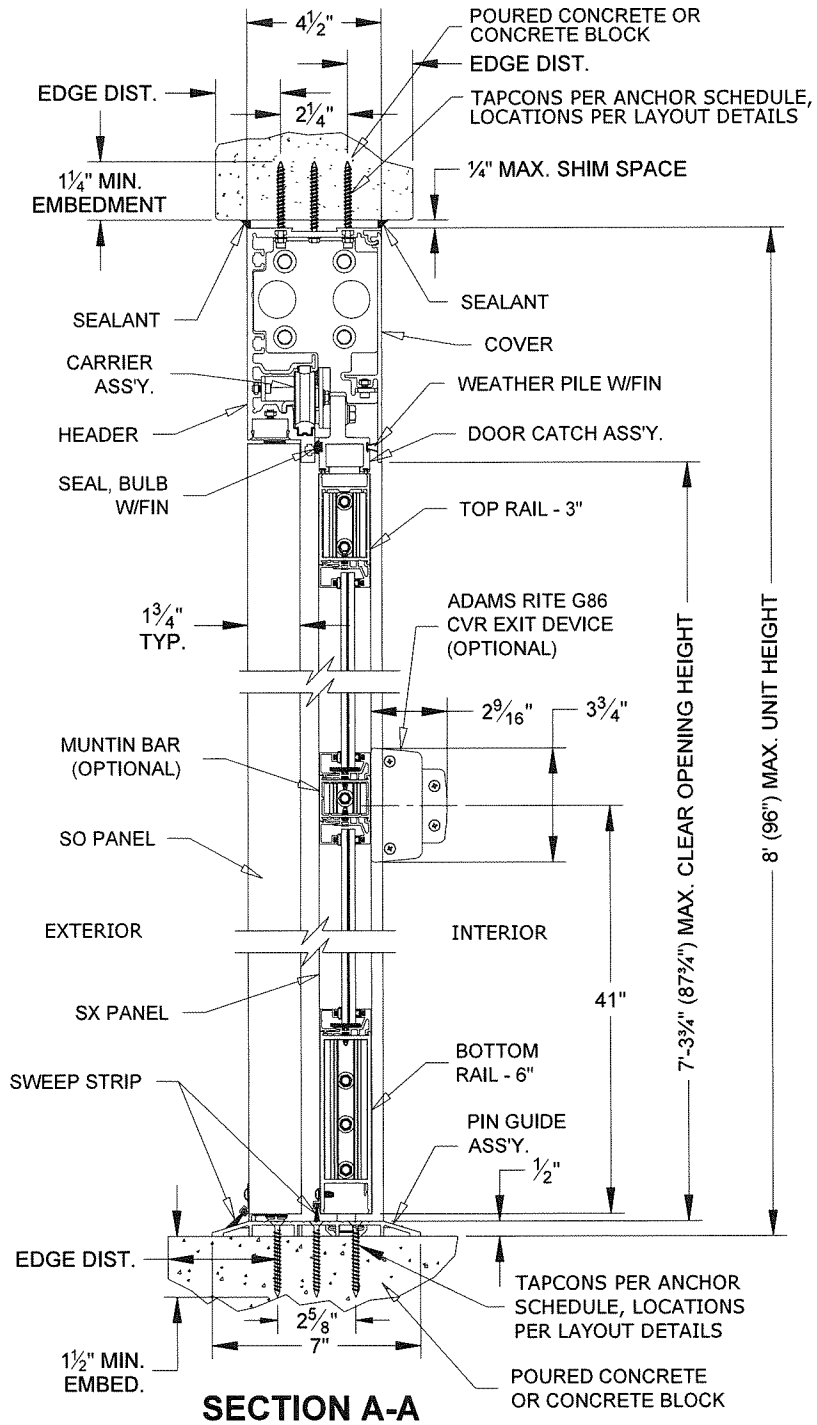
14-2168

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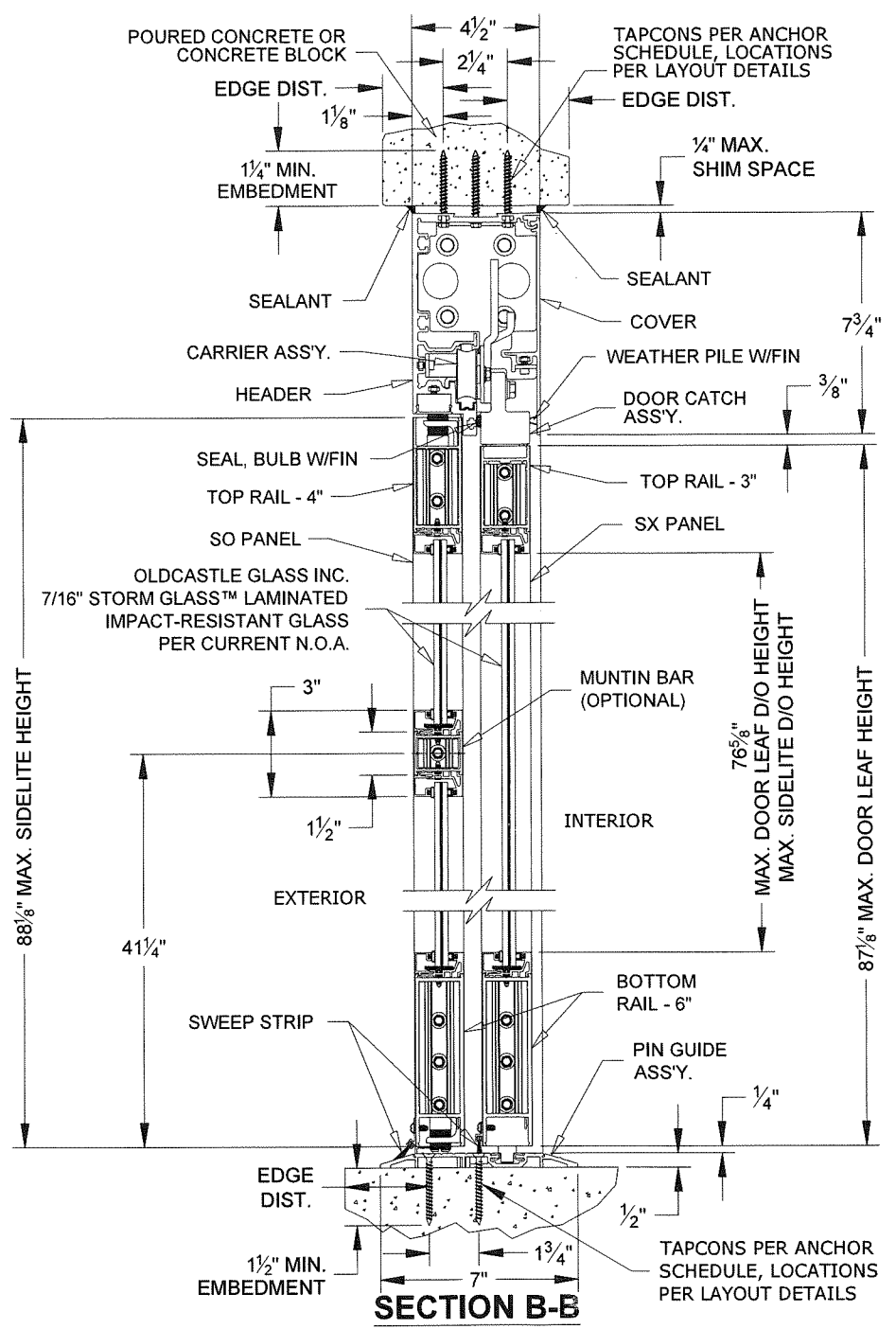
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02/28/2018 - 2:15pm rickn



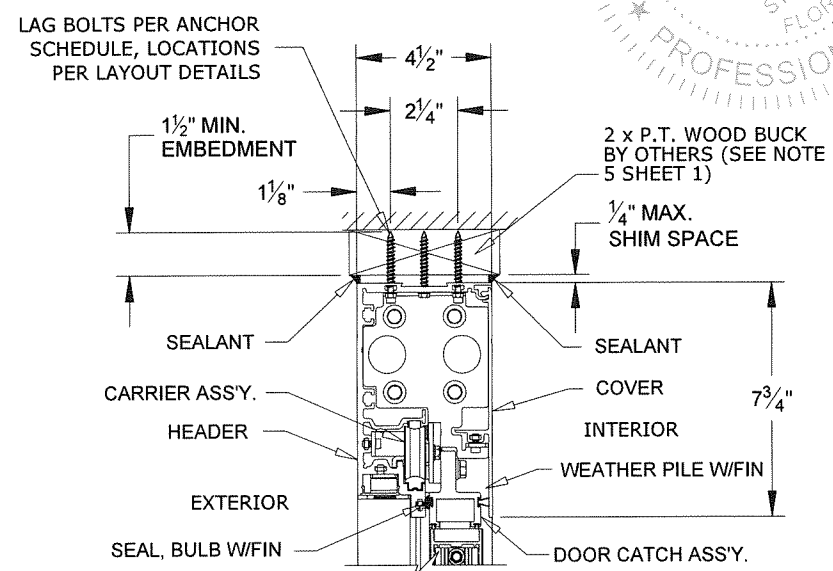
SECTION A-A

(SEE SECTION C-C FOR ADDITIONAL FASTENER DETAIL IN THRESHOLD)

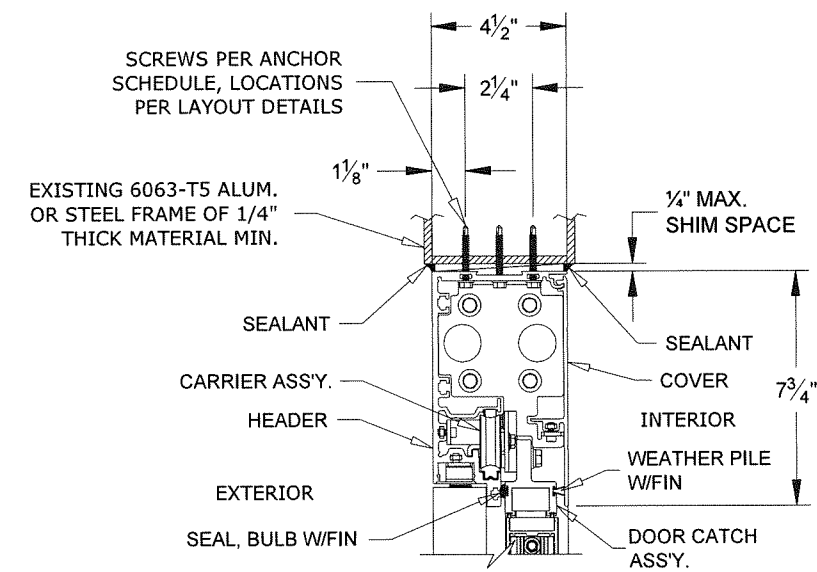


SECTION B-B

(SEE SECTION C-C FOR ADDITIONAL FASTENER DETAIL IN THRESHOLD)



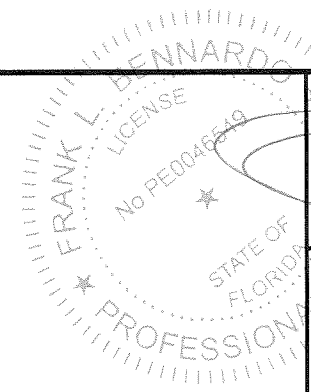
WOOD ALTERNATIVE



METAL STRUCTURE ALTERNATIVE

PRODUCT RENEWED
 as complying with the Florida
 Building Code 20-0129.03
 Acceptance No.
 Expiration Date 3/17/2025
 By: Ishag I. Chank
 Michael Deak Product Control

PRODUCT REVISED
 as complying with the Florida
 Building Code
 Acceptance No. 17-1227.16
 Expiration Date 3/17/20
 By: Ishag I. Chank
 Michael Deak Product Control



FRANK L. BENNARDO, P.E.
 # PE0046549
 02/28/2018

ENGINEERING EXPRESS
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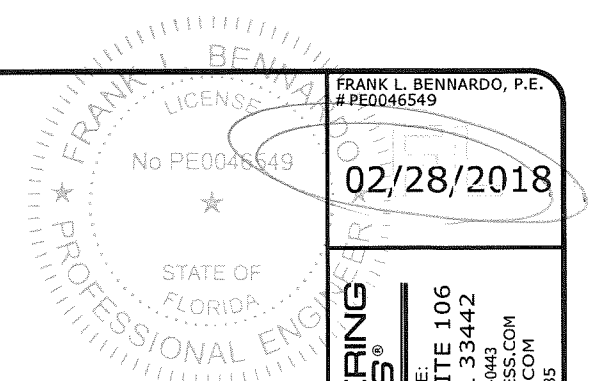
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 (704) 289 - 9212
 SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AVL	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	RWN	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

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02/28/2018 - 2:16pm rickn



FRANK L. BENNARDO, P.E.
#PE0046549

02/28/2018

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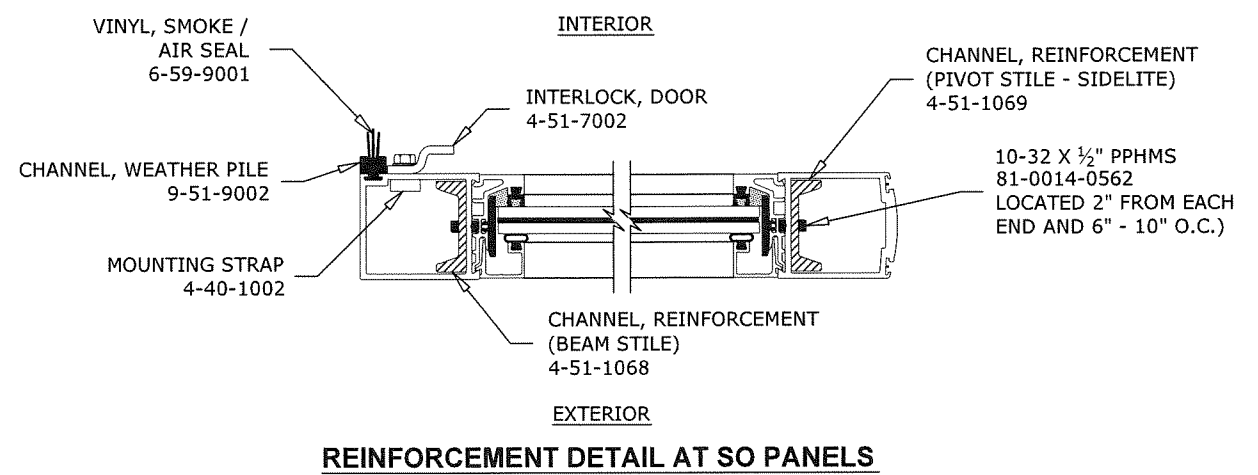
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REMARKS	DRWN	CHKD	DATE
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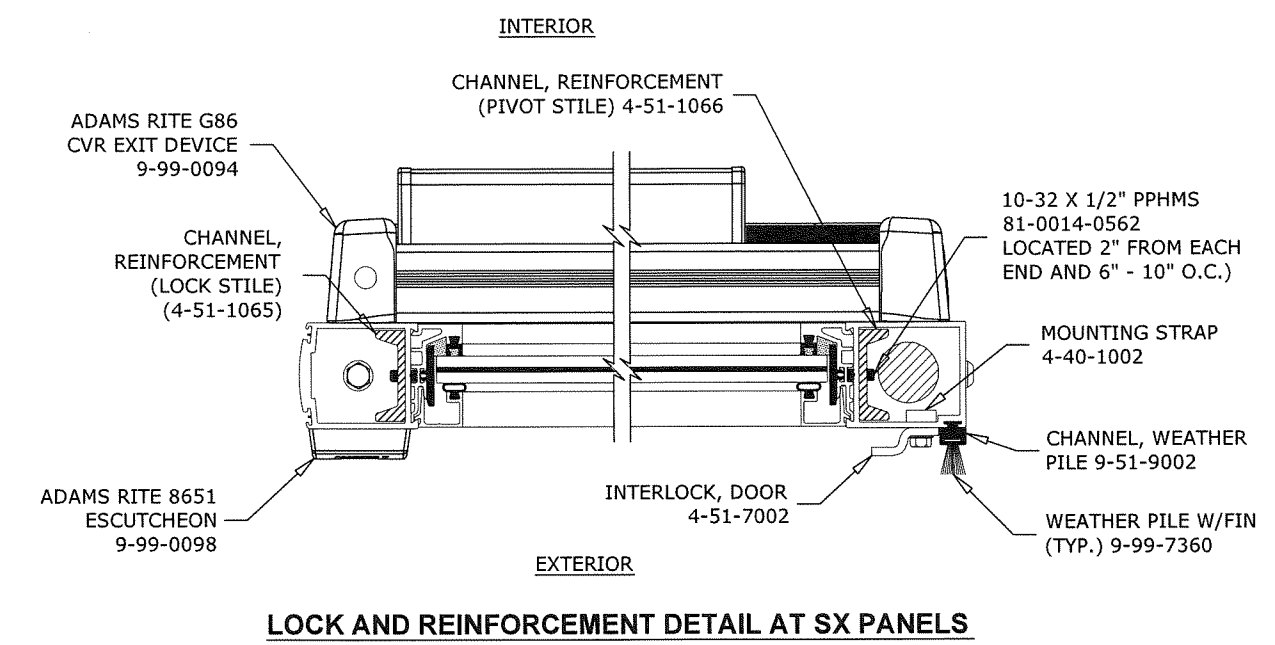
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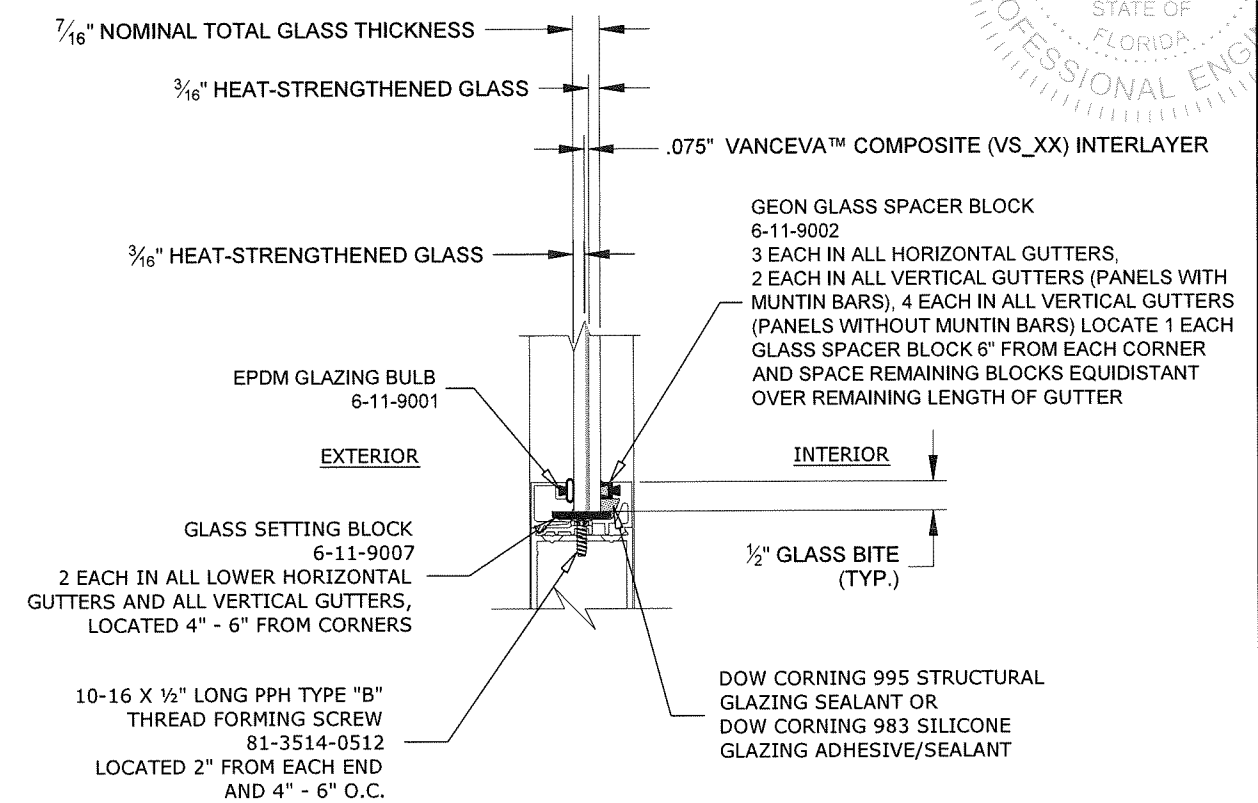
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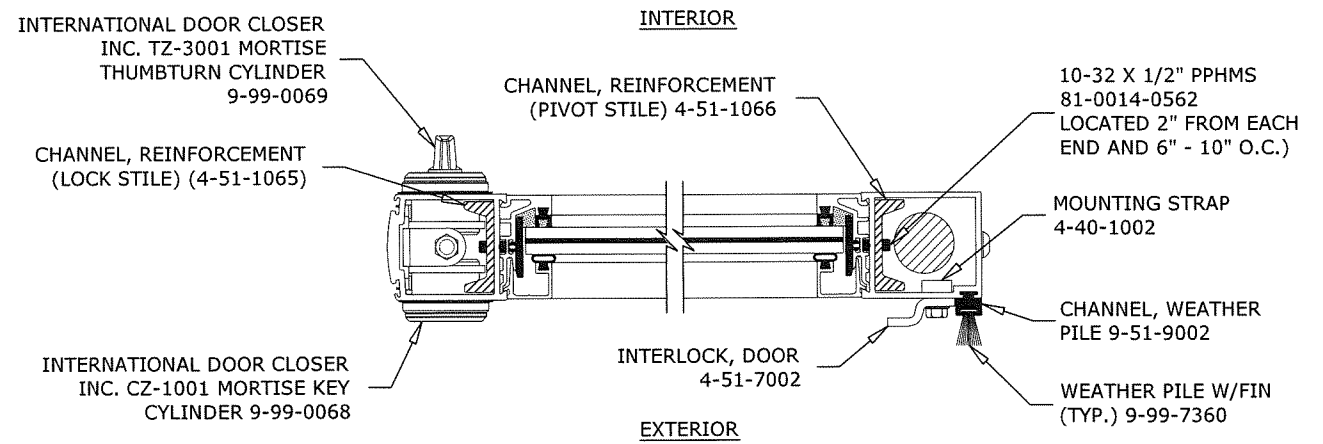
REINFORCEMENT DETAIL AT SO PANELS



LOCK AND REINFORCEMENT DETAIL AT SX PANELS



TYPICAL GLAZING DETAIL (ALL LITES)

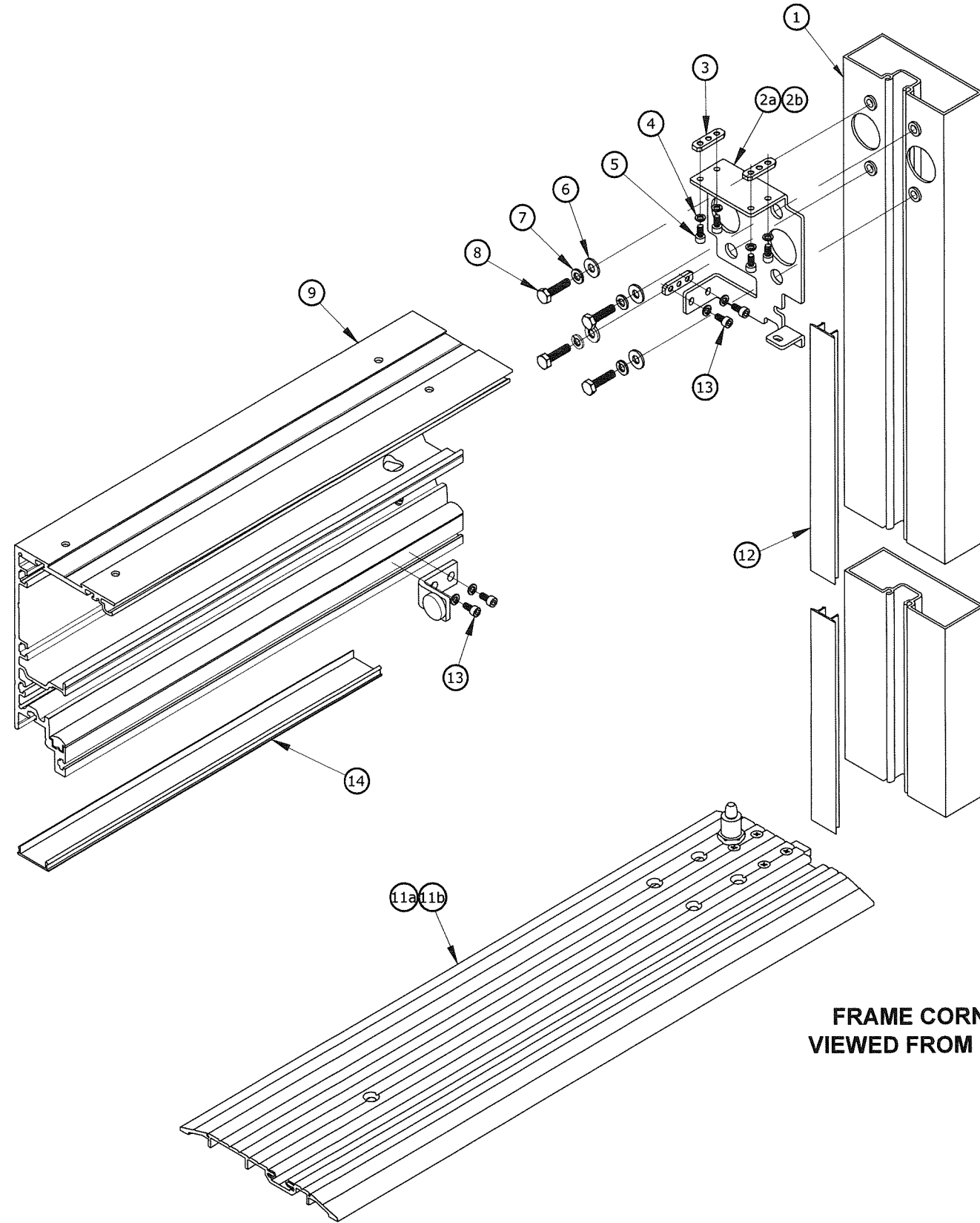


LOCK AND REINFORCEMENT DETAIL AT SX PANELS

PRODUCT REVIEWED
as complying with the Florida
Building Code
Acceptance No. 20-0129.03
Expiration Date 3/17/2025
By Frank L. Bennardo
Miami Dade Product Control

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as complying with the Florida
Building Code
Acceptance No. 17-1227.11
Expiration Date 3/17/20
By Frank L. Bennardo
Miami Dade Product Control

02/28/2018 - 2:19pm rickn V:\Projects\14-2168 NOA - Update 12-0403.07 (09-REU-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-28-18)\14-2168c Series 5400 Automatic SGD (NOA).dwg

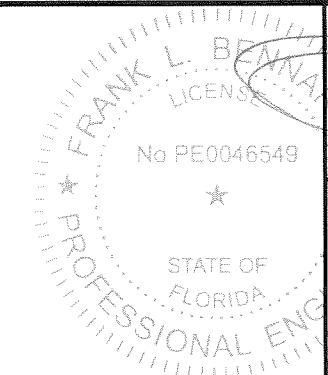


**FRAME CORNER DETAILS
VIEWED FROM INTERIOR SIDE**

HEADER / SIDE JAMB CORNER ATTACHMENT DETAIL			
ITEM NO.	PART NO.	DESCRIPTION	QUANTITY
1	5-60-1418	SIDE JAMB	2
2a	4-51-1055	BRACKET, HEADER MOUNTING - R.H.	1
2b	4-51-1056	BRACKET, HEADER MOUNTING - L.H.	1
3	4-51-1037	PLATE, NUT	8
4	9-99-7249	LOCK WASHER, SPLIT, #10	16
5	81-0016-2258	SCREW, 10-32 X 3/8" SHCS	8
6	9-99-7346	WASHER, 1/4" FLAT	8
7	9-99-7161	WASHER, 1/4" LOCK SPLIT	8
8	81-0088-3670	SCREW, 1/4-20 X 1" HHMS - GR. 8	8
9	5-51-4001	HEADER	1
10	4-51-0020	DOOR STOP ASS'Y.	2
11a	4-51-0150	PIN GUIDE THRESHOLD ASS'Y. - L.H.	1
11b	4-51-0151	PIN GUIDE THRESHOLD ASS'Y. - R.H.	1
12	5-60-1532	JAMB FILLER	2
13	81-0016-2562	SCREW, 10-32 X 1/2" SHCS	8
14	5-51-4003	FILLER, HEADER SOFFIT	3

PRODUCT RENEWED
as complying with the Florida
Building Code 20-0129.03
Acceptance No
Expiration Date 3/17/2025
By [Signature]
Miami Dade Product Control

***PRODUCT REVISED**
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Building Code
Acceptance No 17-1227.16
Expiration Date 3/17/20
By [Signature]
Miami Dade Product Control



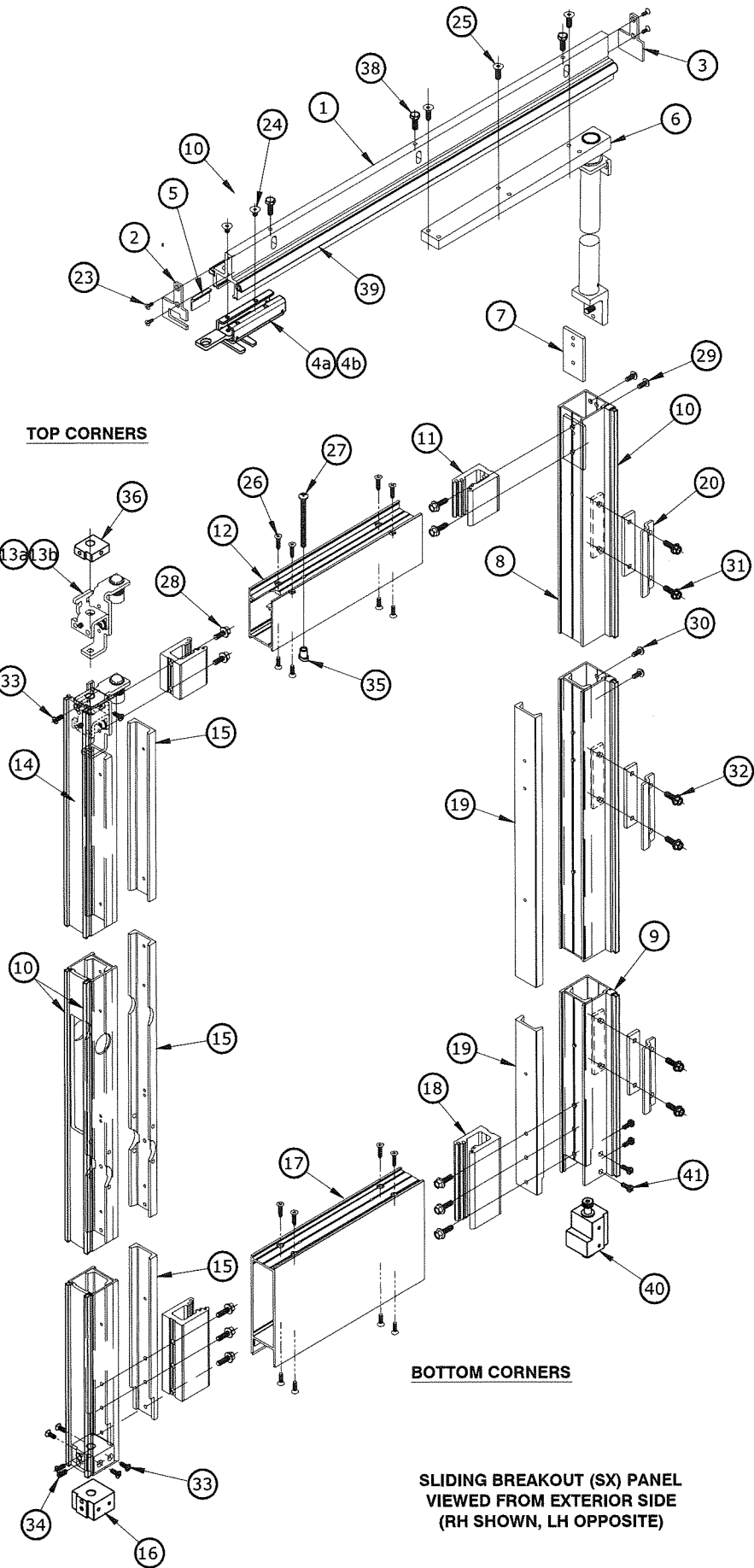
FRANK L. BENNARDO, P.E.
PE0046549
02/28/2018

ENGINEERING EXPRESS
CORPORATE OFFICE:
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MONROE, NC 28110
(704) 289 - 9212
SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REU-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

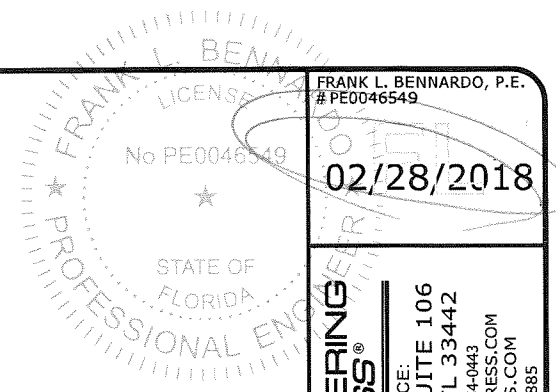
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11



SLIDING BREAKOUT (SX) PANEL
VIEWED FROM EXTERIOR SIDE
(RH SHOWN, LH OPPOSITE)

PRODUCT REVISED
as complying with the Florida
Building Code
Acceptance No 17-1227-16
Expiration Date 3/17/20
[Signature]
Minor Code Product Control

PRODUCT RENEWED
as complying with the Florida
Building Code
Acceptance No 20-1129-03
Expiration Date 3/17/2025
[Signature]
Minor Code Product Control



FRANK L. BENNARDO, P.E.
#PE0046549

02/28/2018

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SLIDING BREAKOUT (SX) PANEL						
ITEM NO.	PART NO.	DESCRIPTION	QUANTITY			
			W/O MUNTIN BAR		W/MUNTIN BAR	
			L.H.	R.H.	L.H.	R.H.
1	51-4006	DOOR CATCH	1	1	1	1
2	4-59-1020	END CAP, DOOR CATCH (POSITIVE LATCH)	1	1	1	1
3	4-51-1049	END CAP, DOOR CATCH	1	1	1	1
4a	4-51-0027	DOOR CATCH ASS'Y. - L.H.	1	-	1	-
4b	4-51-0014	DOOR CATCH ASS'Y. - R.H.	-	1	-	1
5	4-51-9004	COVER, DOOR CATCH	1	1	1	1
6	4-51-0011	TORQUE BAR ASS'Y.	1	1	1	1
7	4-11-1082	PLATE, BACKER	1	1	1	1
8	5-11-4022	STILE, FIXED (NARROW)	1	1	1	1
9	6-51-9002	CHANNEL, WEATHER PILE	1	1	1	1
10	9-99-7360	WEATHER PILE W/FIN	A/R	A/R	A/R	A/R
11	4-11-4097	BLOCK, SHEAR	2	2	2	2
12	5-51-4009	RAIL - 3"	1	1	1	1
13a	4-51-0015	INTERLOCK ASS'Y. - L.H.	1	-	1	-
13b	4-51-0016	INTERLOCK ASS'Y. - R.H.	-	1	-	1
14	5-11-4021	STILE, TANDEM (NARROW)	1	1	1	1
15	4-51-1065	CHANNEL, REINFORCEMENT (LOCK STILE)	1	1	1	1
16	4-51-9007	BLOCK, FLUSHBOLT SUPPORT	1	1	1	1
17	5-11-4036	RAIL - 6"	1	1	1	1
18	4-51-4151	BLOCK, SHEAR	2	2	2	2
19	4-51-1066	CHANNEL, REINFORCEMENT (PIVOT STILE)	1	1	1	1
20	4-51-7002	INTERLOCK, DOOR	-	-	1	1
21	5-11-4031	MUNTIN BAR	-	-	1	1
22	4-11-4096	BLOCK, SHEAR	-	-	2	2
23	81-3511-0412-DB	SCREW, 8-18 X 1/2" PFHMS, TYPE B	4	4	4	4
24	81-0011-2658	SCREW, 1/4-20 X 3/8" SFCHCS	2	2	2	2
25	81-0011-2670	SCREW, 1/4-20 X 1" SFCHCS	3	3	3	3
26	81-4411-0516	SCREW, 10-24 X 3/4" PFHMS, TYPE 23	16	16	20	20
27	81-0014-0688	SCREW, 1/4-20 X 3" PPHMS	1	1	1	1
28	81-0017-3666	SCREW, 1/4-20 X 3/4" HWHMS, GR. 8	10	10	12	12
29	81-0016-2658	SCREW, 1/4-20 X 3/8" BSHCS - S.S.	2	2	2	2
30	81-0014-2670	SCREW, 1/4-20 X 1" BSHCS - S.S.	2	2	2	2
31	81-0017-3662	SCREW, 1/4-20 X 1" HWHMS, GR. 8	2	2	2	2
32	81-0017-3664	SCREW, 1/4-20 X 5/8" HWHMS, GR. 8	8	8	8	8
33	81-0011-0562	SCREW, 10-32 X 1/2" PFHMS	7	7	7	7
34	9-99-0113	PLUNGER, SPRING LOADED	1	1	1	1
35	9-99-2596	BLOCK, GLASS JACKING	1	1	1	1
36	4-51-4265	BLOCK, HEX BOLT GUIDE	1	1	1	1
37	4-40-1002	MOUNTING STRAP	5	5	5	5
38	81-0718-3666	SCREW, 1/4-20 X 3/4" HHMS, GR. 5 W/NYLOC STRIP	3	3	3	3
39	6-11-9009	SEAL, BULB W/FIN	A/R	A/R	A/R	A/R
40	4-51-0093	BOTTOM GUIDE ASS'Y.	1	1	1	1
41	81-0074-0562	SCREW, 10-32 X 1/2" PPHMS - STAINLESS STEEL	4	4	4	4

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REV 2017 FBC	RWN	FLB	12/20/17

14-2168

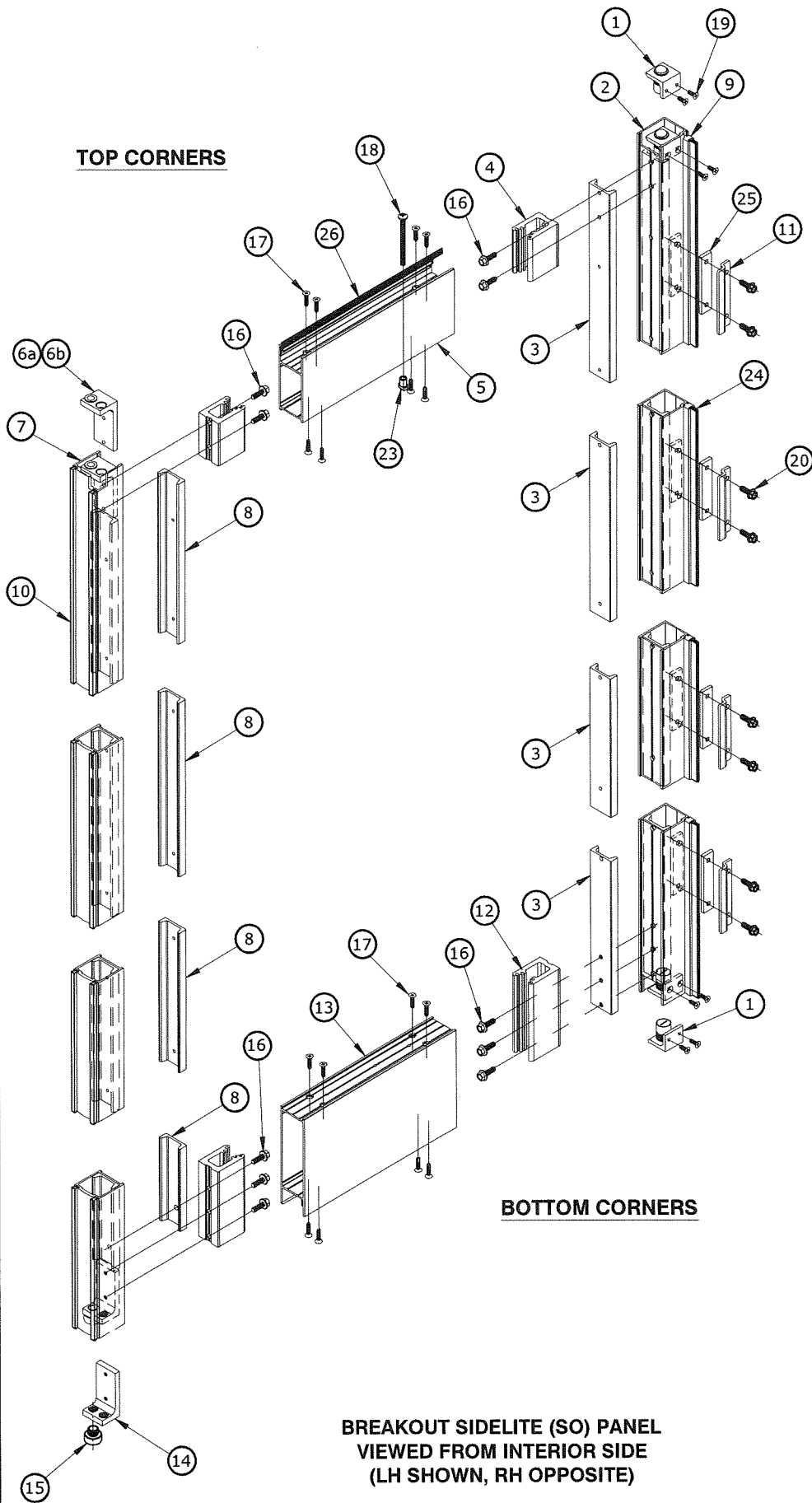
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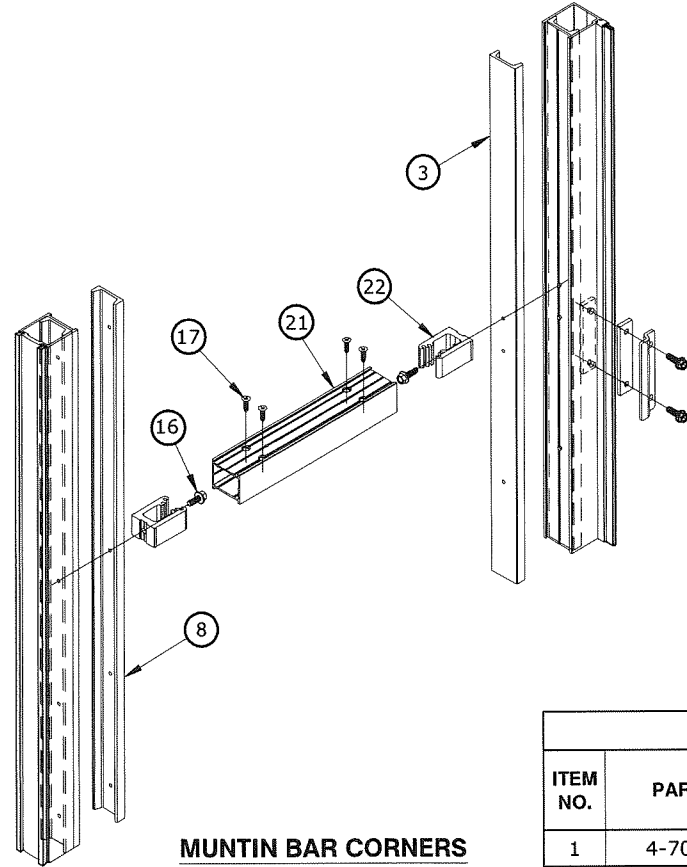
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LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

V:\Projects\14-2168 NOA - Update 12-0403-07 (09-REU-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c Series 5400 Automatic SGD (NOA).dwg

02/28/2018 - 2:16pm rickn



**BREAKOUT SIDELITE (SO) PANEL
VIEWED FROM INTERIOR SIDE
(LH SHOWN, RH OPPOSITE)**

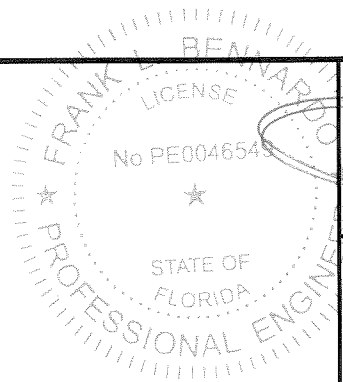


MUNTIN BAR CORNERS

PRODUCT REVISED
as complying with the Florida
Building Code
Acceptance No 17-1227-16
Expiration Date 3/17/20
By Frank L. Bennardo
Miami-Dade Product Control

PRODUCT RENEWED
as complying with the Florida
Building Code
Acceptance No 20-0129-03
Expiration Date 3/17/2025
By Shag L. Bennardo
Miami-Dade Product Control

BREAKAWAY SIDELITE (SO) PANEL							
ITEM NO.	PART NO.	DESCRIPTION	QUANTITY				
			W/O MUNTIN BAR		W/MUNTIN BAR		
			L.H.	R.H.	L.H.	R.H.	
1	4-70-0672	ROLLER CATCH ASS'Y.	2	2	2	2	
2	5-11-4022	STILE, FIXED (NARROW)	1	1	1	1	
3	4-51-1068	CHANNEL, REINFORCEMENT (BEAM STILE)	1	1	1	1	
4	4-11-4098	BLOCK, SHEAR	2	2	2	2	
5	5-11-4034	RAIL - 4"	1	1	1	1	
6a	4-11-0432	ANGLE ASS'Y., SIDELITE PIVOT (TOP) - L.H.	1	-	1	-	
6b	4-11-0433	ANGLE ASS'Y., SIDELITE PIVOT (TOP) - R.H.	-	1	-	1	
7	5-11-4021	STILE, TANDEM (NARROW)	1	1	1	1	
8	4-51-1069	CHANNEL, REINFORCEMENT (PIVOT STILE)	1	1	1	1	
9	6-51-9002	CHANNEL, WEATHER PILE	1	1	1	1	
10	9-99-7360	WEATHER PILE W/FIN	A/R	A/R	A/R	A/R	
11	4-51-7002	INTERLOCK, DOOR	5	5	5	5	
12	4-51-4151	BLOCK, SHEAR	1	1	1	1	
13	5-11-4036	RAIL - 6"	1	1	1	1	
14	4-51-1067	ANGLE, SIDELITE PIVOT (BOTTOM)	1	1	1	1	
15	4-51-7003	BUSHING, SIDELITE PIVOT (BOTTOM)	1	1	1	1	
16	81-0017-3666	SCREW, 1/4-20 X 3/4" HWHMS, GR. 8	10	10	12	12	
17	81-4411-0516	SCREW, 10-24 X 3/4" PFHMS, TYPE 23	16	16	20	20	
18	81-0014-0690	SCREW, 1/4-20 X 3 1/2" PPMS	1	1	1	1	
19	81-0012-0562	SCREW, 10-32 X 5/16" PFHMS	4	4	4	4	
20	81-0017-3664	SCREW, 1/4-20 X 5/8" HWHMS, GR. 8	10	10	10	10	
21	5-11-4031	MUNTIN BAR	-	-	1	1	
22	4-11-4096	BLOCK, SHEAR	-	-	2	2	
23	9-99-2596	BLOCK, GLASS JACKING	1	1	1	1	
24	6-59-9001	VINYL, SMOKE / AIR SEAL	A/R	A/R	A/R	A/R	
25	4-40-1002	MOUNTING STRAP	5	5	5	5	
26	9-99-7361	SEAL, SIDELITE (TOP)	1	1	1	1	



FRANK L. BENNARDO, P.E.
PE0046549
02/28/2018

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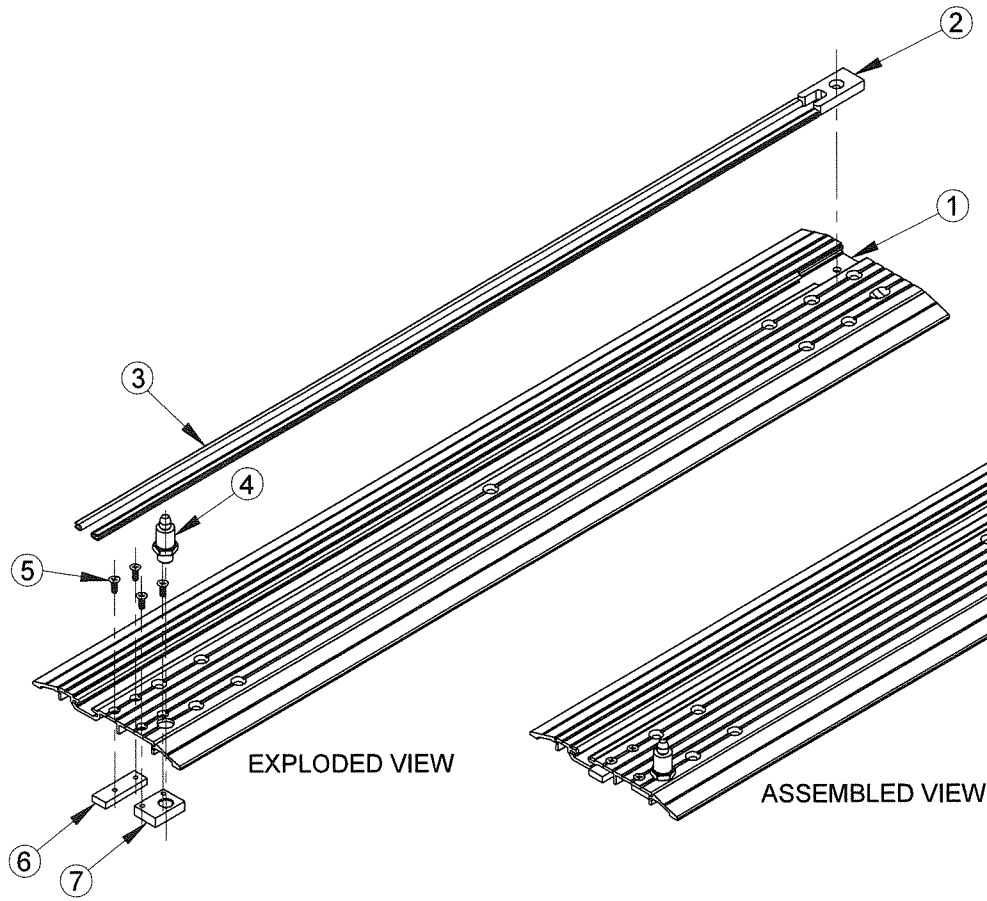
RECORD-USA
4324 HARGETT COURT
MONROE, NC 28110
(704) 289 - 9212
SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV. PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REU-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

14-2168
SCALE: -
PAGE DESCRIPTION:
13

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02/28/2018 - 2:16pm rickn



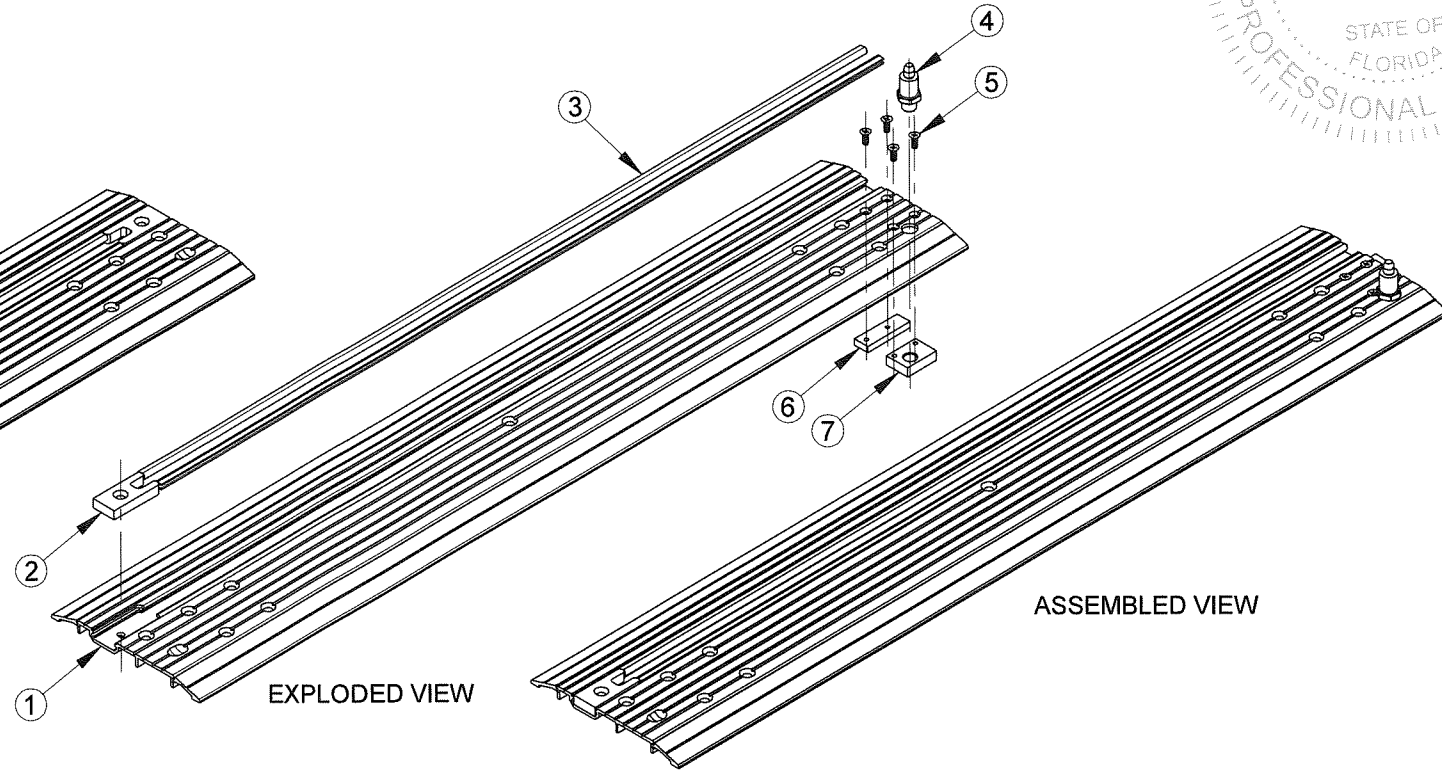
EXPLODED VIEW

ASSEMBLED VIEW

PIN GUIDE THRESHOLD ASS'Y. - L.H.

PART NO.: 4-51-0160
SCALE: 1" = 6"

BILL OF MATERIALS			
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	4-51-4260	PIN GUIDE THRESHOLD MACHINING - L.H.	1
2	4-51-7005	PLATE, PIN GUIDE SUPPORT	1
3	9-70-0077	BUMPER, PIN GUIDE	2
4	4-11-1031	PIN, SIDELITE PIVOT (BOTTOM)	1
5	81-0011-0562	SCREW, 10-32 X 1/2" FFHMS	4
6	4-51-4009	BAR, ALIGNMENT (PIN GUIDE THRESHOLD)	1
7	4-51-4265	BLOCK, SIDELITE PIVOT (BOTTOM)	1



EXPLODED VIEW

ASSEMBLED VIEW

PIN GUIDE THRESHOLD ASS'Y. - R.H.

PART NO.: 4-51-0161
SCALE: 1" = 6"

BILL OF MATERIALS			
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	4-51-4261	PIN GUIDE THRESHOLD MACHINING - R.H.	1
2	4-51-7005	PLATE, PIN GUIDE SUPPORT	1
3	9-70-0077	BUMPER, PIN GUIDE	2
4	4-11-1031	PIN, SIDELITE PIVOT (BOTTOM)	1
5	81-0011-0562	SCREW, 10-32 X 1/2" FFHMS	4
6	4-51-4009	BAR, ALIGNMENT (PIN GUIDE THRESHOLD)	1
7	4-51-4265	BLOCK, SIDELITE PIVOT (BOTTOM)	1

PRODUCT RENEWED
as complying with the Florida
Building Code
Acceptance No. 20-0129.03
Expiration Date 3/17/2025
By: Frank L. Bennardo
Miami Dade Product Control

PRODUCT REVISED
as complying with the Florida
Building Code
Acceptance No. 17-1227.16
Expiration Date 3/17/2020
By: Frank L. Bennardo
Miami Dade Product Control

FRANK L. BENNARDO, P.E.
#PE0046549
02/28/2018
STATE OF FLORIDA
PROFESSIONAL ENGINEER
No PE0046549

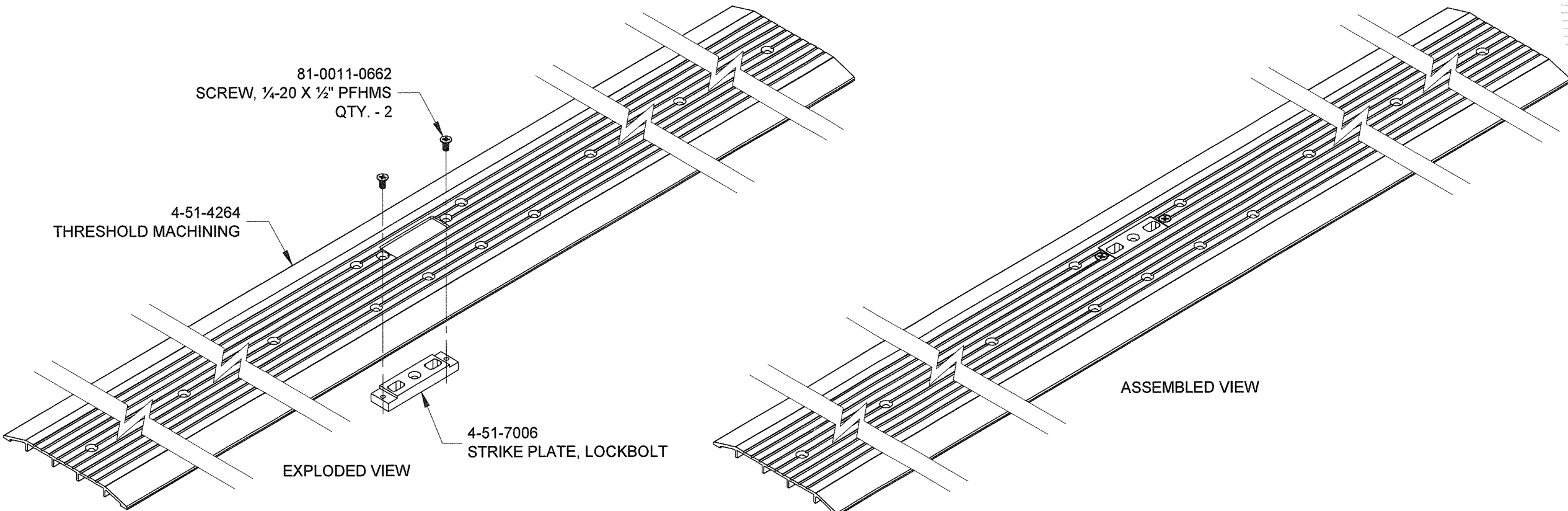
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14

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81-0011-0662
SCREW, 1/4-20 X 1/2" PFHMS
QTY. - 2

4-51-4264
THRESHOLD MACHINING

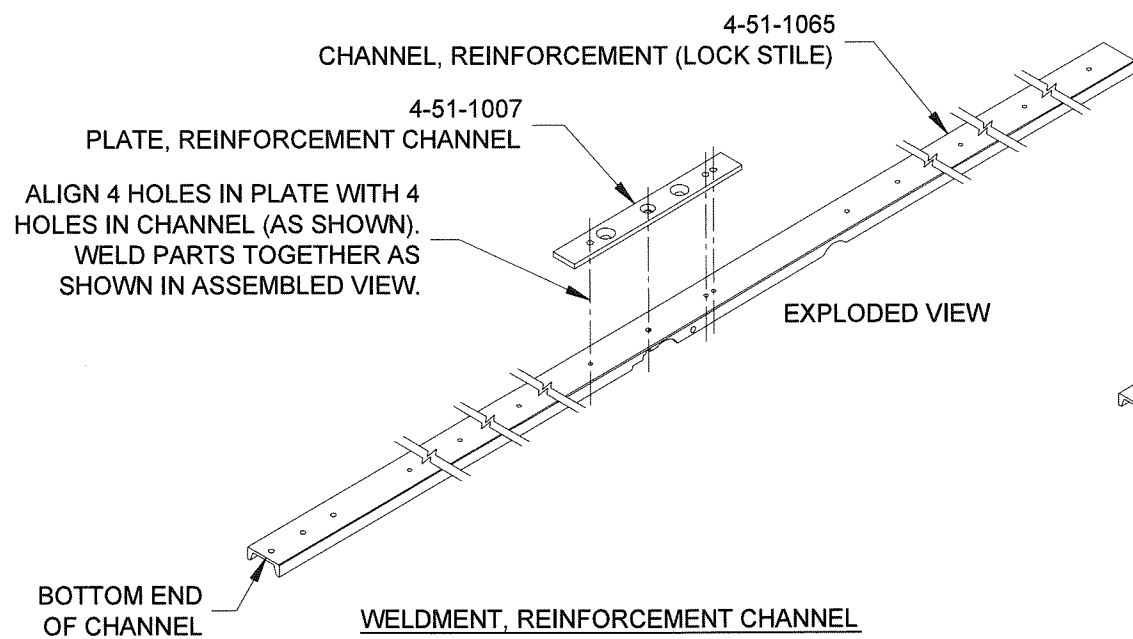
EXPLODED VIEW

4-51-7006
STRIKE PLATE, LOCKBOLT

ASSEMBLED VIEW

THRESHOLD ASS'Y. - BIPART

PART NO.: 4-51-0164
SCALE: 1/4" = 1"



4-51-1065
CHANNEL, REINFORCEMENT (LOCK STILE)

4-51-1007
PLATE, REINFORCEMENT CHANNEL

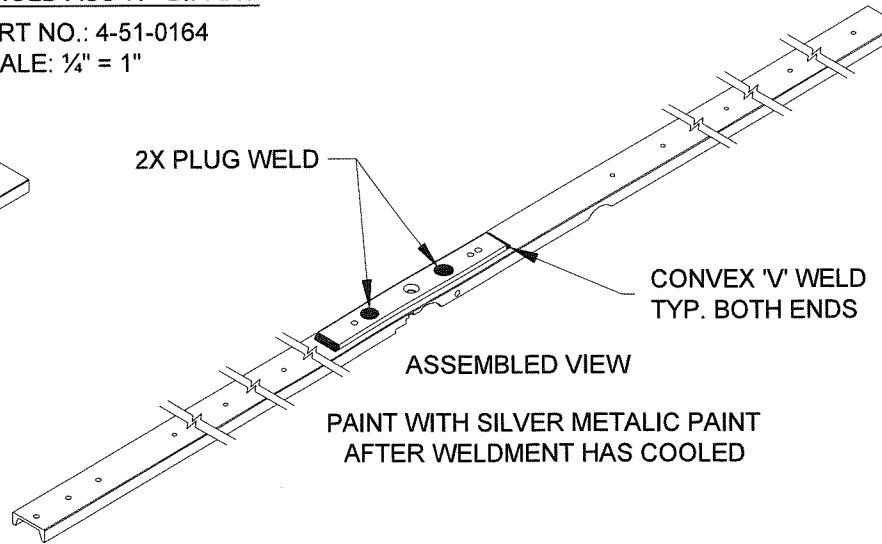
ALIGN 4 HOLES IN PLATE WITH 4 HOLES IN CHANNEL (AS SHOWN).
WELD PARTS TOGETHER AS SHOWN IN ASSEMBLED VIEW.

EXPLODED VIEW

BOTTOM END OF CHANNEL

WELDMENT, REINFORCEMENT CHANNEL

PART NO.: 4-51-0029
SCALE: 1" = 6"



2X PLUG WELD

ASSEMBLED VIEW

CONVEX 'V' WELD
TYP. BOTH ENDS

PAINT WITH SILVER METALIC PAINT
AFTER WELDMENT HAS COOLED

PRODUCT RENEWED
as complying with the Florida
Building Code
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Expiration Date 3/17/2025
By: [Signature]
Miami Dade Product Control

PRODUCT REVISED
as complying with the Florida
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Expiration Date 3/17/20
By: [Signature]
Miami Dade Product Control

FRANK L. BENNARDO, P.E.
#PE0046549

02/28/2018

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(704) 289 - 9212

SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
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REV 2017 FBC	RWN	FLB	12/20/17

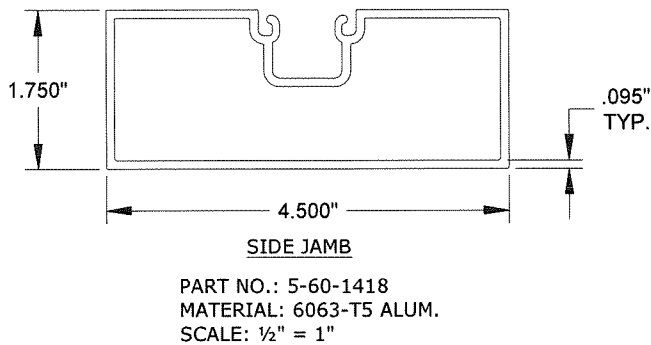
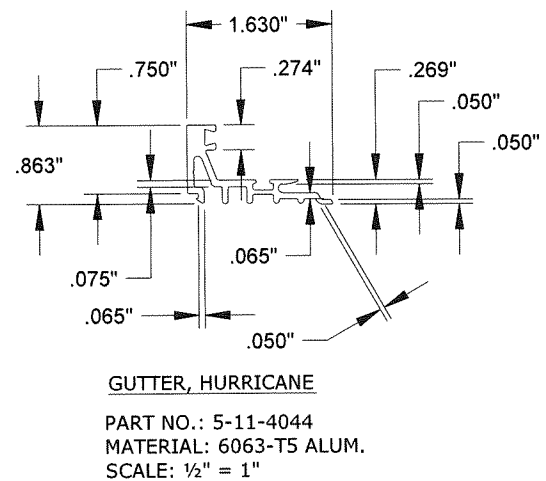
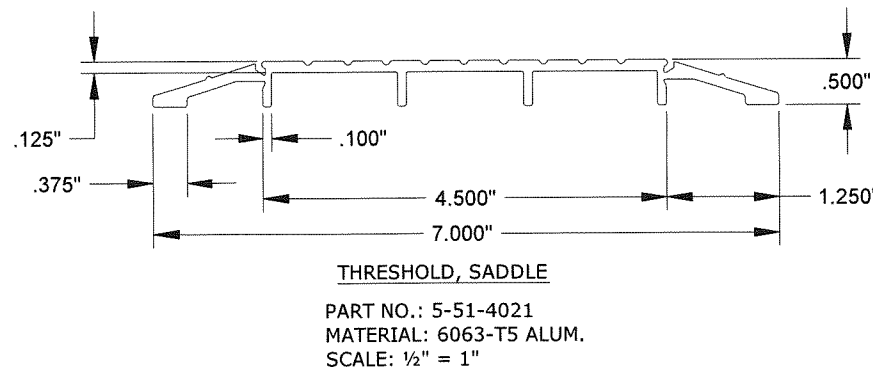
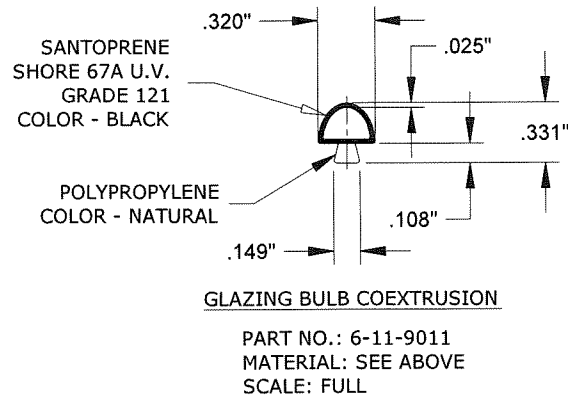
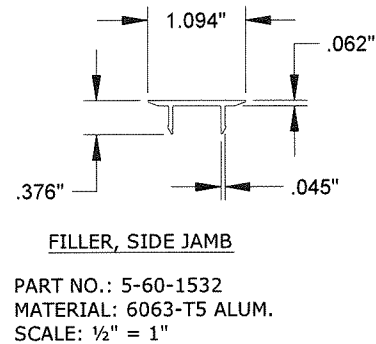
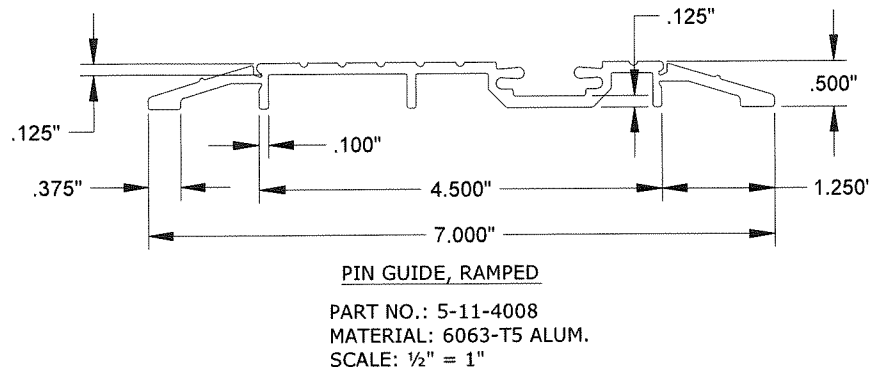
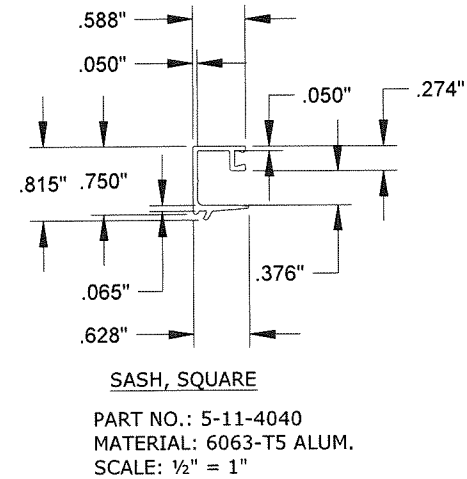
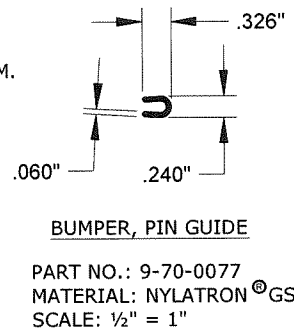
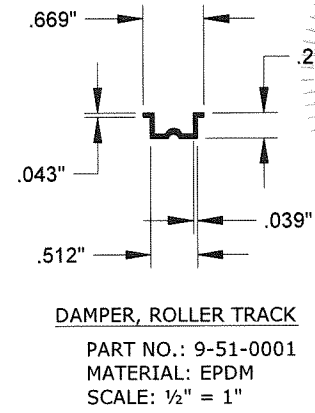
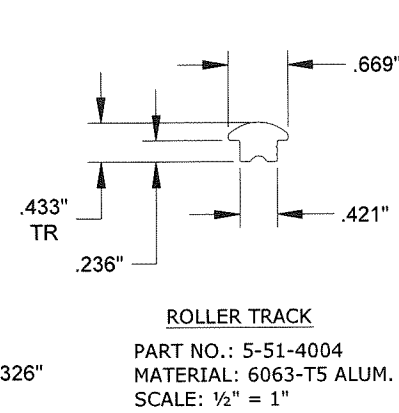
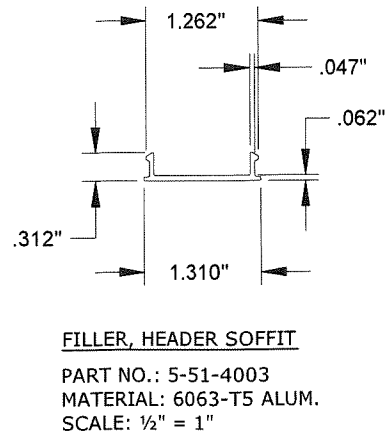
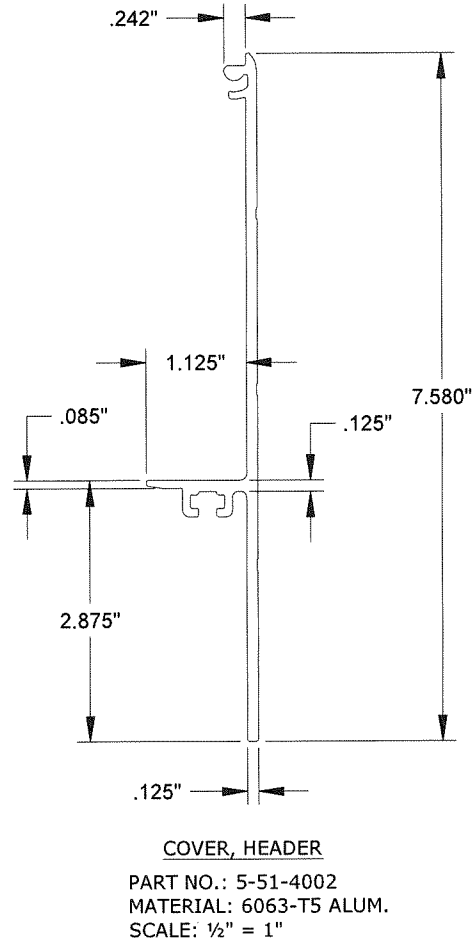
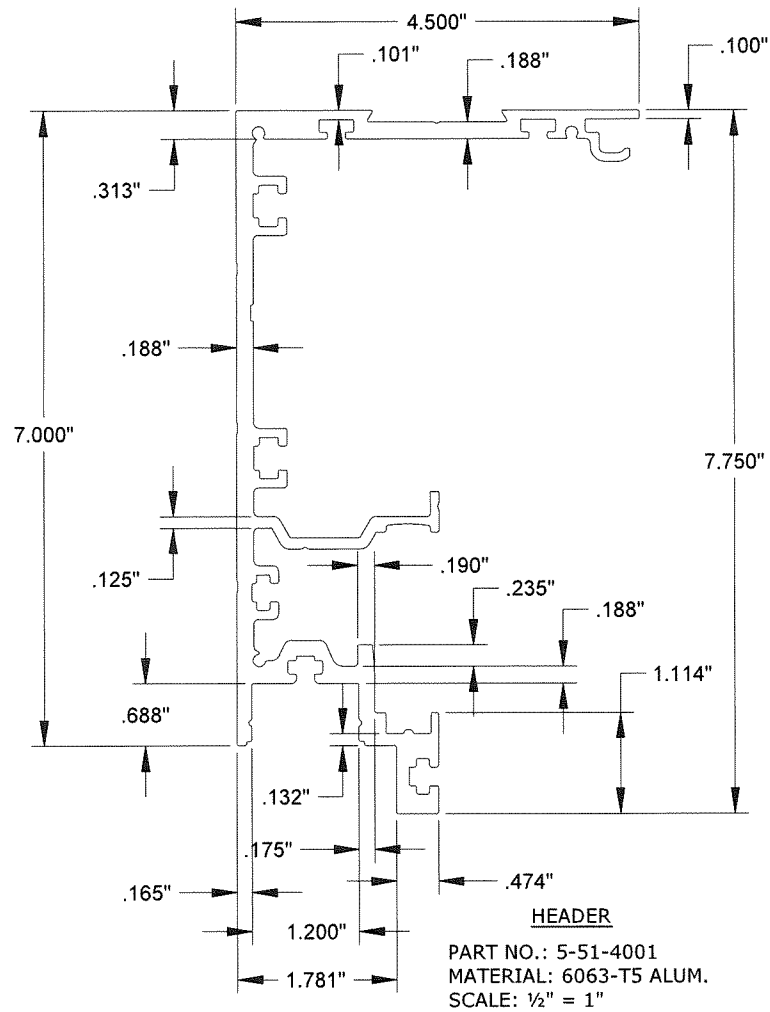
14-2168

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23

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 rickn



NOTE: ALL ALUMINUM EXTRUSIONS SHALL HAVE A MINIMUM Fu=31 ksi & Fy=26200 psi.

PRODUCT REVISED
 as complying with the Florida Building Code
 Acceptance No. 17-1227-16
 Expiration Date 3/17/20
 By: [Signature]
 Miami Dade Product Control

PRODUCT RENEWED
 as complying with the Florida Building Code
 Acceptance No. 20-0129-03
 Expiration Date 3/17/2022
 By: [Signature]
 Miami Dade Product Control

FRANK L. BENNARDO, P.E.
 #PE0046549

02/28/2018

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 (704) 289 - 9212
 SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
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REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

14-2168

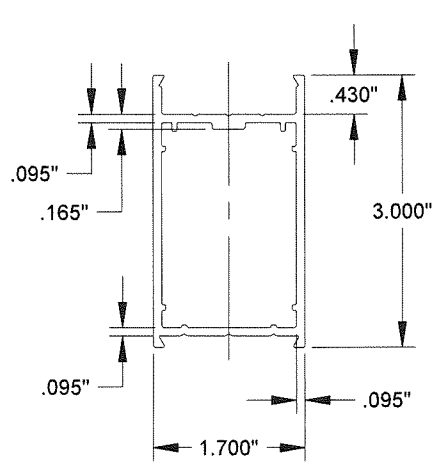
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16

23

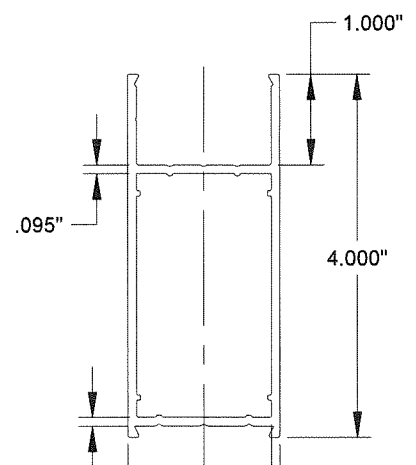
V:\Projects\14-2168 NOA - Update 12-0403.07 (09-REU-0002) for 2014 FBC-Renewal\WP\2017 FBC Update\Submittal_MD Comments (2-26-18)\14-2168c Series 5400 Automatic SGD (NOA).dwg

02/28/2018 - 2:16pm rickn



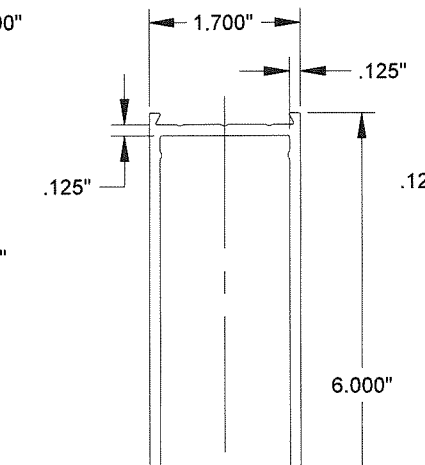
RAIL, TOP (SX PANEL)

PART NO.: 5-51-4009
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



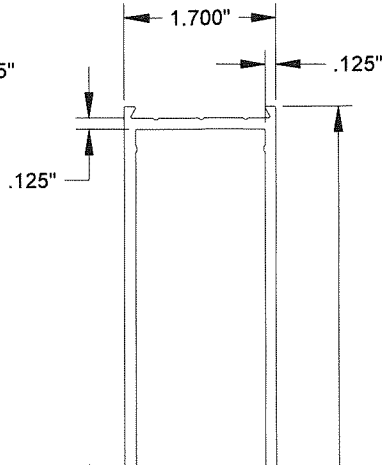
RAIL, TOP (SO PANEL)

PART NO.: 5-11-4034
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



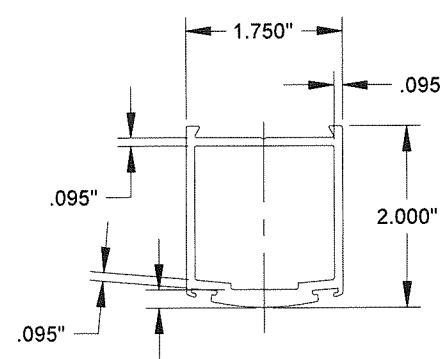
RAIL, BOTTOM - 6"

PART NO.: 5-11-4036
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



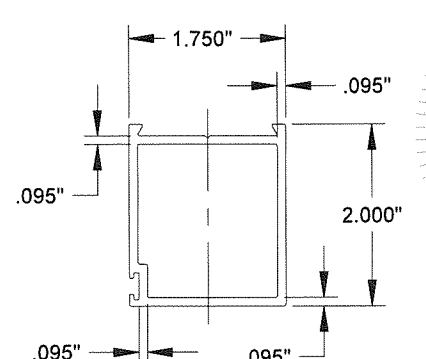
RAIL, BOTTOM - 10" (OPTIONAL)

PART NO.: 5-51-4011
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



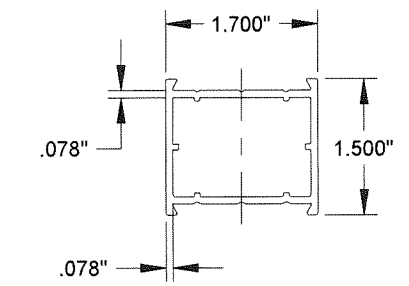
STILE, TANDEM

PART NO.: 5-11-4021
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



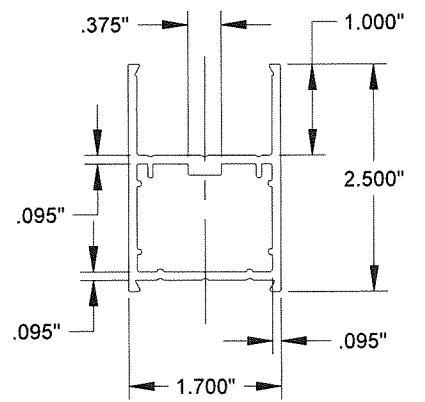
STILE, FIXED

PART NO.: 5-11-4022
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



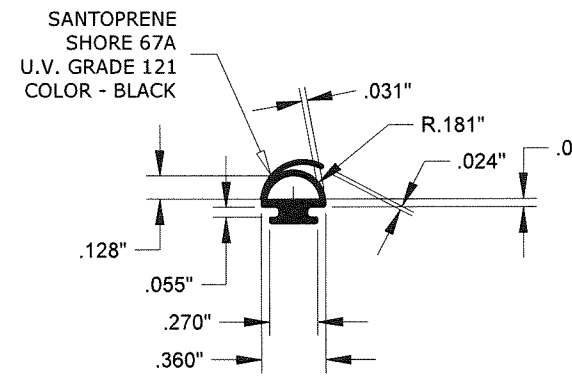
MUNTIN BAR

PART NO.: 5-11-4031
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



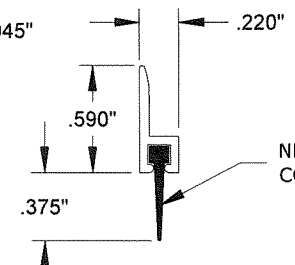
MUNTIN BAR (OPTIONAL)

PART NO.: 5-11-4032
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



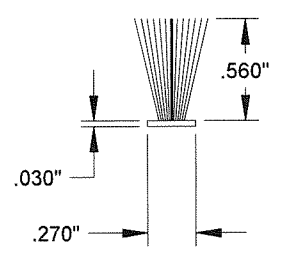
SEAL, BULB W/FIN

PART NO.: 6-11-9009
MATERIAL: ZERO INT'L. #870N
SCALE: FULL



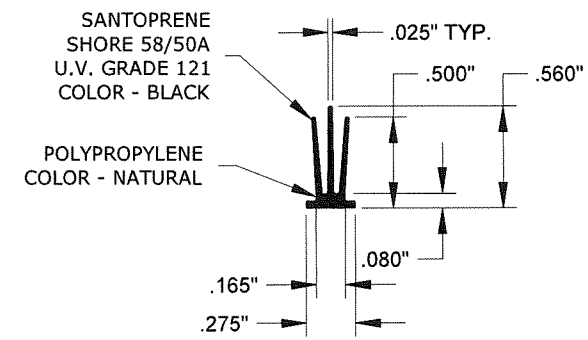
SEAL, SIDELITE (TOP)

PART NO.: 9-99-7361
MATERIAL: ZERO INT'L. 8194AA
SCALE: FULL



WEATHER PILE W/FIN

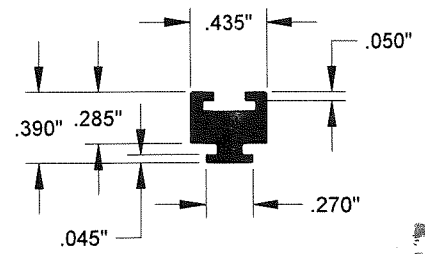
PART NO.: 9-99-7360
MATERIAL: ULTRAFAB SOFT TOUCH FIN
SCALE: FULL



VINYL, SMOKE / AIR SEAL

PART NO.: 6-59-9001
MATERIAL: SEE ABOVE
SCALE: FULL

NOTE: ALL ALUMINUM EXTRUSIONS SHALL HAVE A MINIMUM Fu=31 ksi & Fy=26200 psi.

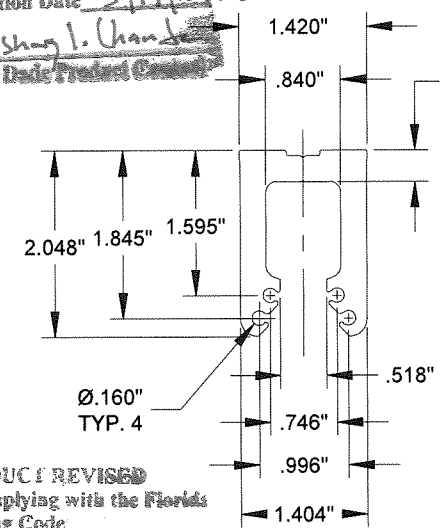


CHANNEL, WEATHER PILE

PART NO.: 6-51-9002
MATERIAL: GEON 8700 PVC
SCALE: FULL

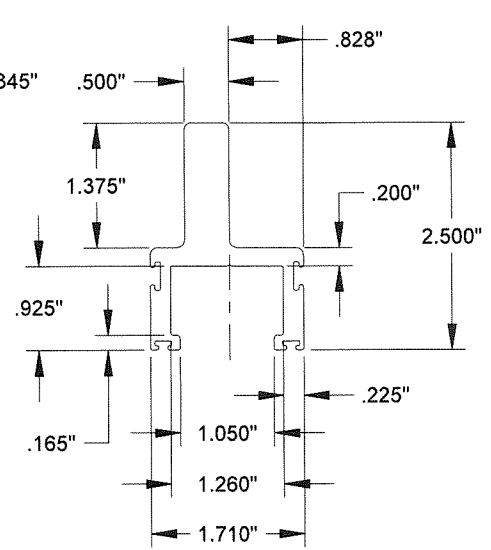
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as complying with the Florida
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By Ishay L. Chank
Miami Dade Product Council

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Acceptance No 17-1227.16
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By Ishay L. Chank
Miami Dade Product Council



BLOCK, SHEAR

PART NO.: 5-11-4027
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"



DOOR CATCH

PART NO.: 5-51-4006
MATERIAL: 6063-T5 ALUM.
SCALE: 1/2" = 1"

FRANK L. BENNARDO, P.E.
#PE0046549

02/28/2018

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REV 2017 FBC	RWN	FLB	12/20/17

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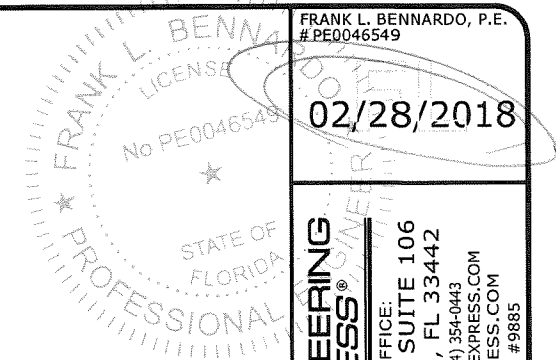
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CONSOLIDATED BILL OF MATERIALS

DESCRIPTION	record-usa PART NO.	MATERIAL	MANUFACTURER / REMARKS
TORQUE BAR ASSY.	4-51-0011		
WELDMENT, TORQUE BAR	4-51-0001		
PIVOT, TORQUE BAR BOTTOM	4-70-4104	2" X 2" X 3/8" ALUMINUM ANGLE	
PIVOT PIN, TORQUE BAR	4-70-1034	Ø3/8" X 1 3/8" STEEL CLEVIS PIN	
PIN, SPRING (TORQUE BAR)	9-99-3922	Ø3/16" X 1" STEEL SLOTTED SPRING PIN	
RETAINING RING, TORQUE BAR ASS'Y.	9-99-4625		ROTOR CLIP #SHR-98
BRACKET, TORQUE BAR SUPPORT	4-51-1003	3/16" C.R.S., ZINC PLATE	
PLATE, TORQUE BAR	4-51-1013	3/4" X 1 1/4" AISI 1018 COLD FINISHED FLAT BAR	
BAR, TORQUE	4-51-1014	Ø1.00" AISI 1018 ROUND STEEL BAR	
DOOR CATCH ASS'Y. - L.H.	4-51-0013		
DOOR CATCH ASS'Y. - R.H.	4-51-0027		
HOUSING, DOOR CATCH ASS'Y. - L.H.	4-51-1038	11 GA. (.1196) C.R.S., ZINC PLATE	
HOUSING, DOOR CATCH ASS'Y. - R.H.	4-51-1036	MAKE FROM 4-51-1038	
INTERLOCK, DOOR CATCH - L.H.	4-51-1039	10 GA. (.1345) C.R.S., ZINC PLATE	
INTERLOCK, DOOR CATCH - R.H.	4-51-1040	10 GA. (.1345) C.R.S., ZINC PLATE	
PLATE, DOOR INTERLOCK	4-51-1064	3/16" H.R.P.O., ZINC PLATE	
BALL PLUNGER ASS'Y.	4-70-0582		
PLUG, BALL PLUNGER	4-11-4090	Ø1 1/16" 6061-T6511 ALUMINUM ROUND BAR	
SPRING, BALL PLUNGER	9-99-5689	Ø.080 STEEL MUSIC WIRE, ZINC PLATE	
BALL, SPRING PLUNGER	9-99-0104	BALL, CHROME ALLOY STEEL, Ø5/8"	
HOUSING, BALL PLUNGER	4-11-2001	Ø3/4" FREE CUTTING BRASS ROUND ROD	
DOOR STOP ASS'Y.	4-51-0020		
BUMPER, DOOR STOP	9-99-2598	MEDIUM-HARD SRB RUBBER, SHORE 55A, BLACK	McMASTER CARR P/N 9310K124
BRACKET, DOOR STOP	4-51-1006	3/16" C.R.S., BLACK OXIDE	
DOOR INTERLOCK ASS'Y. - L.H.	4-51-0015		
DOOR INTERLOCK ASS'Y. - R.H.	4-51-0016		
PLATE, DOOR INTERLOCK ASS'Y.	4-51-1042	7 GA. (.1793) C.R.S., ZINC PLATE	
BRACKET, INTERLOCK ASS'Y.	4-51-1041	3/16" (.1875) C.R.S., ZINC PLATE	
PLUNGER, SPRING LOADED	9-99-0113		VLIER P/N NM-55N
CARRIER ROLLER ASS'Y.	4-51-0005		
BODY, CARRIER ROLLER	9-51-0002	PA6 - POLYAMIDE (NYLON) 6	

PRODUCT RENEWED
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By Ismael L. Hernandez
Miami Dade Product Control

PRODUCT REVISED
as complying with the Florida
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Acceptance No 17-1227.16
Expiration Date 3/17/2020
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Miami Dade Product Control



FRANK L. BENNARDO, P.E.
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02/28/2018

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(704) 289 - 9212
SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
LARGE MISSILE IMPACT RESISTANT
MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
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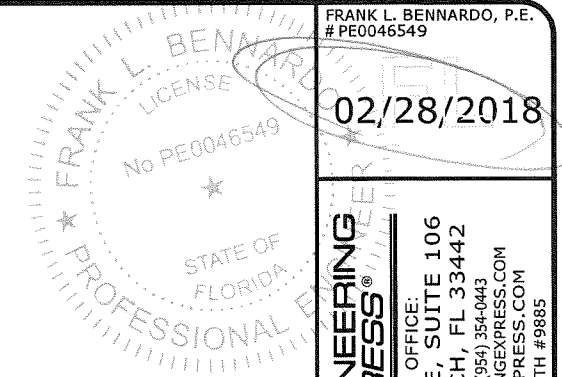
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CONSOLIDATED BILL OF MATERIALS

DESCRIPTION	record-usa PART NO.	MATERIAL	MANUFACTURER / REMARKS
BALL BEARING, CARRIER ROLLER	9-07-0049	6201-Z BALL BEARING	JESA W2
RETAINING RING, CARRIER ROLLER	9-99-4624		ROTOR CLIP #DHO-32
ROLLER ASS'Y., ANTI-RISE	9-99-3922		
ROLLER, ANTI-RISE	9-51-9006	DELTRIN, WHITE	
AXLE, ANTI-RISE ROLLER	4-51-7001	Ø½" TYPE 303 STAINLESS STEEL ROUND BAR	
RETAINING RING, ANTI-RISE ROLLER	9-99-4629		ROTOR CLIP #PO-50ST PA
PLATE ASS'Y. - CARRIER ROLLER	4-51-0002		
PLATE, CARRIER ROLLER	4-51-1020	10 GA. (.1345) C.R.S., ZINC PLATE	
NUT, PEM	9-99-6193		PEM #S0518-3, ZINC PLATE
PLATE SUB-ASS'Y., CARRIER ROLLER	4-51-0017		
SPACER, CARRIER ROLLER	4-51-1017	Ø⅝" O.D. X 13 GA. (.095) WALL MECHANICAL STEEL TUBING (D.O.M.)	
AXLE, CARRIER ROLLER	4-51-1021	Ø⅝" TYPE 303 STAINLESS STEEL ROUND BAR	
BRACKET, BELT BASE	4-51-1001	14 GA. (.0747) C.R.S., ZINC PLATE	
BRACKET, BELT CLASP	4-51-1002	14 GA. (.0747) C.R.S., ZINC PLATE	
CARRIER ASS'Y., SLAVE	4-51-0090		
CARRIER ASS'Y., UPPER BELT	4-51-0091		
CARRIER ASS'Y., LOWER BELT	4-51-0092		
SCREW, M6 X 10 HFHCS	9-99-1812		
SCREW, M6 X 12 HFHCS	9-99-1820		
WASHER, LOCK - ⅝"	9-99-7235		
WASHER, FLAT - ⅝"	9-99-7311		
SCREW, ⅝"-18 X 1½" HHCS, GR. 8	81-0018-3726		
BRACKET, ANTI-DERAIL	4-51-1063	10 GA. (.1345) C.R.S., ZINC PLATE	
PLATE, CARRIER ASS'Y. - SLAVE	4-51-1001	¼" C.R.S., ZINC PLATE	
PLATE, BELT RETAINER (LOWER)	4-51-1019	¼" C.R.S., ZINC PLATE	
PLATE, BELT RETAINER (UPPER)	4-51-1018	¼" C.R.S., ZINC PLATE	
BRACKET, SIDELITE STRIKE	4-51-1010	11 GA. (.1196) TYPE 304 STAINLESS STEEL	
BLOCK, UPPER SIDELITE PIVOT	4-51-4152	⅝" X 1¼" 6061-T6511 EXTRUDED ALUMINUM RECTANGULAR BAR	
PLATE, NUT	4-51-1037	10 GA. (.1345) C.R.S., ZINC PLATE	
BRACKET, HEADER MOUNTING - L.H.	4-51-1055	11 GA. (.1196) C.R.S., ZINC PLATE	
BRACKET, HEADER MOUNTING - R.H.	4-51-1056	11 GA. (.1196) C.R.S., ZINC PLATE	

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 Miami Dade Product Control

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FRANK L. BENNARDO, P.E.
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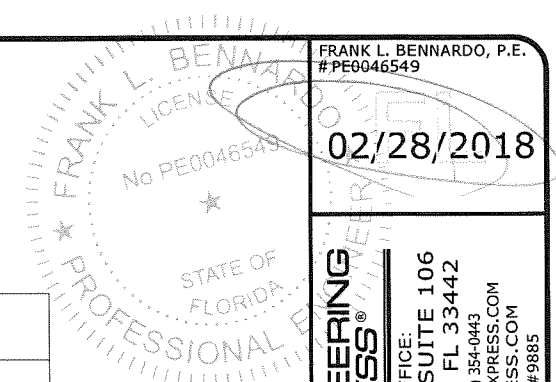
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 02/28/2018 - 2:16pm rickn

CONSOLIDATED BILL OF MATERIALS

DESCRIPTION	record-usa PART NO.	MATERIAL	MANUFACTURER / REMARKS
END CAP, DOOR CATCH	4-51-1049	11 GA. (.1196) C.R.S., BLACK POWDER COAT	
END CAP, DOOR CATCH (POSITIVE LATCH)	4-59-1020	MAKE FROM 4-51-1019	
BRACKET, BALL PLUNGER	4-70-4342	1 1/4" X 1 1/4" X 3/16" 6063-T52 ALUMINUM ANGLE	
BLOCK, GLASS SETTING	6-11-9007	GEON 8700 PVC, DUROMETER 97 SHORE A, BLACK	
BLOCK, GLASS SPACER	6-11-9002	GEON 8700 PVC, DUROMETER 97 SHORE A, BLACK	
BOTTOM GUIDE ASS'Y.	4-51-0093		
BLOCK, BOTTOM GUIDE ASS'Y.	4-51-4267	1 1/4" 6061-T6 EXTRUDED ALUMINUM SQUARE BAR	
PIN, BOTTOM GUIDE	4-51-7007	Ø5/8" TYPE 304 STAINLESS STEEL ROUND BAR	
SPRING, COMPRESSION (BOTTOM GUIDE)	9-99-5693	Ø.045 TYPE 302 STAINLESS STEEL WIRE	McMASTER CARR P/N 9435K126
SCREW, SHOULDER (BOTTOM GUIDE)	9-99-1820	TYPE 18-8 STAINLESS STEEL	McMASTER CARR P/N 91327A165
BUSHING, FLANGED (BRONZE)	9-99-0233	ALLOY 932 (SAE 660) BRONZE	McMASTER CARR P/N 7815K18
BLOCK, FLUSHBOLT SUPPORT	4-51-4265	1 1/4" 6061-T6 EXTRUDED ALUMINUM SQUARE BAR	
BLOCK, HEX BOLT GUIDE	4-51-4266	1/2" X 1 1/4" 6061-T6511 EXTRUDED ALUMINUM RECTANGULAR BAR	
SPRING, COMPRESSION (EXIT DEVICE TOP BOLT)	9-99-5692	Ø.042 STEEL MUSIC WIRE, ZINC PLATE	McMASTER CARR P/N 9434K8
LOCK BOLT, EXIT DEVICE	4-11-1059	3/8" AISI 12L14 STEEL HEX BAR STOCK, ZINC PLATE	
HEX BOLT, THRESHOLD	4-51-7008	Ø1/2" TYPE 304 STAINLESS STEEL HEX BAR STOCK	
BLOCK, SHEAR (MACHINED)	4-11-4098	MAKE FROM 5-11-4027	
BLOCK, SHEAR (MACHINED)	4-51-4151	MAKE FROM 5-11-4027	
BLOCK, SHEAR (MACHINED)	4-11-4096	MAKE FROM 5-11-4027	
PLATE, BACKER	4-11-1082	7 GA. (.1793) C.R.S., ZINC PLATE	
BRACKET, ANTI-DERAIL	4-51-1063	10 GA. (.1345) C.R.S., ZINC PLATE	
ANGLE, SIDELITE PIVOT (TOP)	4-11-1086	3" X 2" X 5/16" STEEL ANGLE, SILVER METALLIC PAINT	
BUSHING, SIDELITE PIVOT (TOP)	9-99-0203	SAE 841 SINTERED BRONZE	
ANGLE, SIDELITE PIVOT (BOTTOM)	4-51-1067	3" X 2" X 5/16" STEEL ANGLE, SAFETY YELLOW PAINT	
BUSHING, SIDELITE PIVOT (BOTTOM)	4-51-7003	Ø7/8" TYPE 304 STAINLESS STEEL ROUND BAR	
DOOR INTERLOCK	4-51-7002	10 GA. (.1345) TYPE 304 STAINLESS STEEL	
MOUNTING STRAP	4-40-1002	3/16" H.R.P.O., ZINC PLATE	
WELDMENT, REINFORCEMENT CHANNEL	4-51-0029		SILVER METALLIC PAINT
CHANNEL, REINFORCEMENT (LOCK STILE)	4-51-1065	1 1/2" X 1/2" X 1/8" BAR CHANNEL, M 1020 - MERCHANT QUALITY	
PLATE, REINFORCEMENT CHANNEL	4-51-1007	3/8" X 1" AISI 1018 C.R.S. FLAT BAR	
CHANNEL, REINFORCEMENT (PIVOT STILE)	4-51-1066	1 1/2" X 1/2" X 1/8" BAR CHANNEL, M 1020 - MERCHANT QUALITY	SILVER METALLIC PAINT

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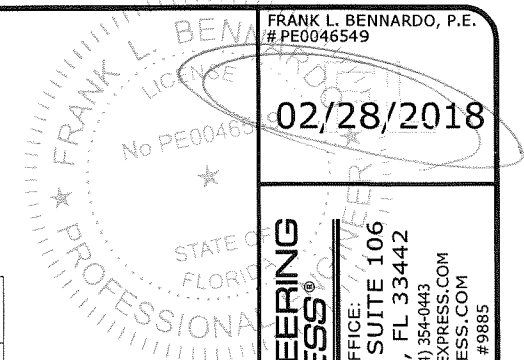
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CONSOLIDATED BILL OF MATERIALS

DESCRIPTION	record-usa PART NO.	MATERIAL	MANUFACTURER / REMARKS
CHANNEL, REINFORCEMENT (BEAM STILE)	4-51-1068	1½" X ½" X ⅛" BAR CHANNEL, M 1020 - MERCHANT QUALITY	SILVER METALLIC PAINT
CHANNEL, REINFORCEMENT (PIVOT STILE - SIDELITE)	4-51-1069	1½" X ½" X ⅛" BAR CHANNEL, M 1020 - MERCHANT QUALITY	SILVER METALLIC PAINT
PIN GUIDE THRESHOLD ASS'Y. - L.H.	4-51-0160		
PIN GUIDE THRESHOLD ASS'Y. - R.H.	4-51-0161		
PIN GUIDE THRESHOLD MACHINING - L.H.	4-51-4260	MAKE FROM 5-11-4008	
PIN GUIDE THRESHOLD MACHINING - R.H.	4-51-4261	MAKE FROM 5-11-4008	
PLATE, PIN GUIDE SUPPORT	4-51-7005	⅜" X 1" TYPE 303 STAINLESS STEEL RECTANGULAR BAR	
BUMPER, PIN GUIDE	9-70-0077	NYLATRON [®] GS	
PIN, SIDELITE PIVOT (BOTTOM)	4-11-1031	¾" AISI 12L14 STEEL HEX BAR STOCK, ZINC PLATE	
BAR, ALIGNMENT (PIN GUIDE THRESHOLD)	4-51-4009	¼" X ⅝" 6061-T5 ALUMINUM RECTANGULAR BAR	
BLOCK, SIDELITE PIVOT (BOTTOM)	4-51-4265	⅜" X 1" 6061-T5 ALUMINUM RECTANGULAR BAR	
THRESHOLD ASS'Y., BIPART	4-51-0164		
THRESHOLD MACHINING	4-51-4264	MAKE FROM 5-51-4021	
STRIKE PLATE, LOCKBOLT	4-51-7006	½" X 1" TYPE 303 STAINLESS STEEL RECTANGULAR BAR	POLYMER CORP. PROFILE 40-101
HEADER	5-51-4001	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
COVER, HEADER	5-51-4002	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
FILLER, HEADER SOFFIT	5-51-4003	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
ROLLER TRACK	5-51-4004	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
SIDE JAMB	5-60-1418	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
FILLER, SIDE JAMB	5-60-1532	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
PIN GUIDE, RAMPED	5-11-4008	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
THRESHOLD, SADDLE	5-51-4021	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
RAIL, TOP (SX PANEL)	5-51-4009	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
RAIL, TOP (SO PANEL)	5-11-4034	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
RAIL, BOTTOM - 6"	5-11-4036	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
RAIL, BOTTOM - 10" (OPTIONAL)	5-51-4011	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
STILE, TANDEM	5-11-4021	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
STILE, FIXED	5-11-4022	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
MUNTIN BAR	5-11-4031	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
MUNTIN BAR (OPTIONAL)	5-11-4032	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
DOOR CATCH	5-51-4006	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.

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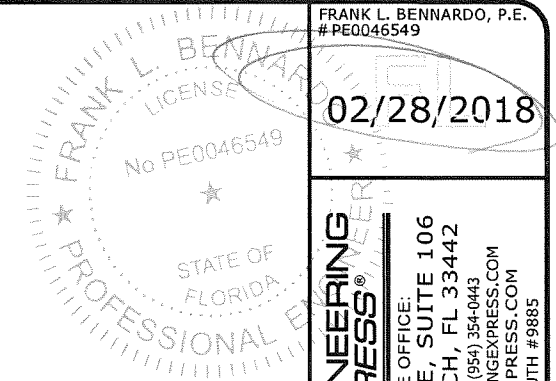
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BLOCK, SHEAR	5-11-4027	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
GUTTER, HURRICANE	5-11-4044	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
SASH, SQUARE	5-11-4040	6063-T5 ALUMINUM	BONNELL ALUMINUM, INC.
GLAZING BULB	6-11-9011	SANTOPRENE / POLYPROPYLENE COEXTRUSION	CENTRAL PLASTICS, INC.
CHANNEL, WEATHER PILE	6-51-9002	GEON 8700 PVC	UNITED PLASTICS CORP.
WEATHER PILE W/FIN	9-99-7360	ULTRAFAB SOFT TOUCH FIN	ULTRAFAB, INC. P/N W31565NK0000
VINYL, SMOKE / AIR SEAL	6-59-9001	SANTOPRENE / POLYPROPYLENE COEXTRUSION	CENTRAL PLASTICS, INC.
SEAL, BULB W/FIN	6-11-9009	SANTOPRENE SHORE 67A, U.V. GRADE 121	ZERO INTERNATIONAL #870N
SEAL, SIDELITE (TOP)	9-99-7361	NEOPRENE FIN WITH ALUMINUM HOUSING	ZERO INTERNATIONAL #8194AA
DAMPER, ROLLER TRACK	9-51-0001	EPDM SHORE 85±5A, BLACK	CENTRAL PLASTICS, INC.
FLUSHBOLT, CYLINDER OPERATED	9-99-0067	ADAMS RITE 1871-2	ADAMS RITE MANUFACTURING CO.
HEADER BOLT SET	9-99-0075	INTERNATIONAL DOOR CLOSER INC. HB-4015-N	INTERNATIONAL DOOR CLOSER INC.
MORTISE KEY CYLINDER	9-99-0068	INTERNATIONAL DOOR CLOSER INC. CZ-1001	INTERNATIONAL DOOR CLOSER INC.
MORTISE THUMBTURN	9-99-0069	INTERNATIONAL DOOR CLOSER INC. TZ-3001	INTERNATIONAL DOOR CLOSER INC.
EXIT DEVICE, G86 C.V.R.	9-99-0094	ADAMS RITE G86 C.V.R. EXIT DEVICE	ADAMS RITE MANUFACTURING CO.
ESCUTCHEON, MORTISE KEY CYLINDER	9-99-0098	ADAMS RITE 8651 ESCUTCHEON	ADAMS RITE MANUFACTURING CO.
SCREW, 5/16-18 X 1" FSHCS	81-0011-2720		
SCREW, 10-32 X 3/8" PFHMS	81-0011-0558		
SCREW, 10-32 X 1/4" PFHMS	81-0011-0554		
SCREW, 10-32 X 1/2" PFHMS	81-0011-0562		
SCREW, 1/4-20 X 3/8" BFHCS	81-0017-2658		
SCREW, M6 X 16 HFHCS	9-99-1813		
SCREW, 1/4-20 X 1/2" PFHMS	81-0011-0662		
LOCK WASHER, SPLIT, #10	9-99-7249		
SCREW, 10-32 X 3/8" SHCS	81-0016-2258		
WASHER, 1/4" FLAT	9-99-7346		
WASHER, 1/4" LOCK SPLIT	9-99-7161		
SCREW, 1/4-20 X 1" HHMS - GR. 8	81-0088-3670		
SCREW, 10-32 X 1/2" SHCS	81-0016-2562		
SCREW, 8-18 X 1/2" PFHMS, TYPE B	81-3511-0412-DB		
SCREW, 1/4-20 X 3/8" SFHCS	81-0011-2658		

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 as complying with the Florida
 Building Code
 Acceptance No 20-0129.03
 Expiration Date 3/17/2025
 By Ishay L. Khankh
 Miami Dade Product Control

PRODUCT RENEWED
 as complying with the Florida
 Building Code
 Acceptance No 17-1227.11
 Expiration Date 3/17/20
 By Ishay L. Khankh
 Miami Dade Product Control



FRANK L. BENNARDO, P.E.
 #PE0046549
 02/28/2018

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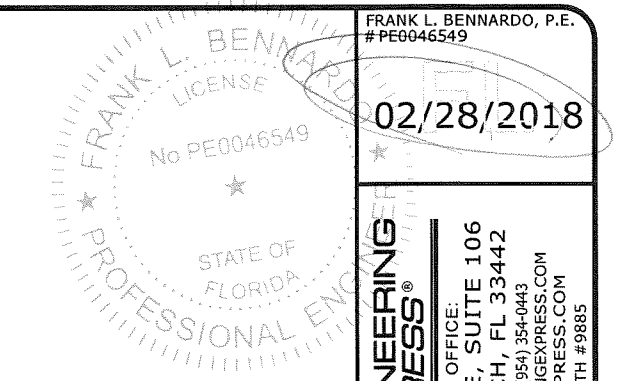
RECORD-USA
 4324 HARGETT COURT
 MONROE, NC 28110
 (704) 289 - 9212
 SERIES 5400 ALUMINUM AUTOMATIC SLIDING GLASS DOORS
 LARGE MISSILE IMPACT RESISTANT
 MIAMI-DADE NOTICE OF ACCEPTANCE

REMARKS	DRWN	CHKD	DATE
INIT ISSUE	AML	KL	06/26/09
REV PER BCCO COMMENT	KL	FLB	12/01/09
2010 FBC (09-REL-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

14-2168
 SCALE: -
 PAGE DESCRIPTION:
 22

CONSOLIDATED BILL OF MATERIALS

DESCRIPTION	record-usa PART NO.	MATERIAL	MANUFACTURER / REMARKS
SCREW, 1/4-20 X 1" SFCHCS	81-0011-2670		
SCREW, 10-24 X 3/4" PFHMS, TYPE 23	81-4411-0516		
SCREW, 1/4-20 X 3" PPHMS	81-0014-0688		
SCREW, 1/4-20 X 3/4" HWHMS, GR. 8	81-0017-3666		
SCREW, 1/4-20 X 3/8" BSHCS - S.S.	81-0016-2658		
SCREW, 1/4-20 X 1" BSHCS - S.S.	81-0014-2670		
SCREW, 1/4-20 X 1/2" HWHMS, GR. 8	81-0017-3662		
SCREW, 1/4-20 X 5/8" HWHMS, GR. 8	81-0017-3664		
SCREW, 10-32 X 1/2" PFHMS	81-0011-0562		
SCREW, 1/4-20 X 3/4" HHMS, GR. 5 W/NYLOC STRIP	81-0718-3666		



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By Frank L. Bennardo
Miami Dade Product Control

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INIT ISSUE	AML	KL	06/26/09
REV PER BCCO COMMENT	KL	FLB	12/07/09
2010 FBC (08-RELU-0001)	KL	FLB	03/19/12
REV FBC 2014	RWN	CSL	02/09/15
REV 2017 FBC	RWN	FLB	12/20/17

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SECTION 08460 - AUTOMATIC SLIDING DOORS

PART 1 - GENERAL

1.01 SUMMARY

- A. WORK INCLUDED: Furnish and install automatic aluminum door system(s), factory fabricated. Door packages shall be complete and without damage or defect.
- B. RELATED WORK:
 - 1. Section 07920 – Joint Sealers
 - 2. Section 08410 – Aluminum Entrances and Storefronts
 - 3. Section 08700 – Finish Hardware
 - 4. Section 08800 – Glazing
 - 5. Section 16000 – Electrical

1.02 RELATED WORK

- A. The following exclusions are covered in other Sections:
 - 1. Preparation of the plumb and square masonry opening
 - 2. Floor preparation
 - 3. Electrical supply and connection (dedicated 120 VAC, 15 amp circuit to each operator/header)

1.03 SUBMITTALS

- A. PRODUCT DATA: Provide complete product and installation documentation as provided by the manufacturer.
- B. SHOP DRAWINGS: Provide details of door construction including profiles, dimensioned layout, and assembly including finish, glazing, electrical, and anchoring requirements.
- C. Contract Closeout: Provide manufacturer's Warranty documentation and Owners Manual.

1.04 QUALITY ASSURANCE

- A. Manufacturer must have a minimum of five (5) years experience in the fabrication of aluminum-and-glass door assembly similar to those specified. Door packages shall be warranted against defect in material and workmanship for a period of two years from the date of installation.
- B. Installation shall be approved by an AAADM certified inspector.

1.05 WARRANTY

- A. Door packages shall be warranted against defect in material and workmanship for a period of two years from the date of installation, and a lifetime warranty on the roller track.

PART 2 - PRODUCT

- 2.01 MANUFACTURER
record-usa
Monroe, North Carolina, USA
(704) 289-9212

2.02 DESIGN

- A. Series 5400 Bi-Part Slider-Full Breakout Sliding Doors as tested in conformance with Dade County Requirements by ATL.

Tests Conducted: **FBC, HVHZ TAS201-94, TAS202-94, TAS 203-94 Qualifying: ASTM E 283, E 330**

- B. DESIGN PRESSURES: + 65.0 psf, - 70.0 psf
- C. SLIDING DOOR PACKAGE: Sliding door packages shall be complete including operator, sliding doors, sidelites, headers, jambs, thresholds, bottom door guides, and activation and safety sensors.
- D. DOORS AND FRAMES: All structural aluminum sections shall be 6063-T5 alloy with exposed surfaces anodized to matching architectural finish. Extruded aluminum header and cover shall conceal replaceable roller track, and integrated anti-derail extrusion. Door carrier assemblies shall incorporate four 1 $\frac{3}{4}$ " diameter roller assemblies with sealed ball bearings and Grade 8 alloy steel hanger bolts. Concealed bottom door guides shall provide stable movement of sliding panels. Narrow stile door and sidelite construction shall utilize 1 $\frac{3}{4}$ " deep x 2" wide vertical profiles and 6" or 10" bottom rails. Mohair weather pile shall run full height at front of sliding doors, back of side lites, and between the doors and side lites.
1. Side jambs and transom framing shall be 1 $\frac{3}{4}$ " x 4 $\frac{1}{2}$ ".
- E. OPERATOR: Door movement shall be driven by a sealed DC gear motor and nylon reinforced drive belt. The multifunction microprocessor control shall provide fully adjustable open, close, and check speeds. An adjustable hold open time delay (1-30 seconds) shall be provided. The microprocessor shall provide a safety-first recycle/stop feature if closing/opening is obstructed. The control shall provide a self-monitor system that compensates each cycle for changes in temperature, wind load, pressure and mechanical drag and checks for proper internal operation. The control shall automatically adjust motor speeds, checking action, and other operating characteristics. A backlit jamb mounted LCD display panel shall be provided as standard and shall have the following modes: Automatic, Off, Exit Only, Full Open, and Partial Open, and shall allow authorized service personnel to make door performance adjustments to the control. The reduced opening distance shall be field adjustable and can be constant or a function of traffic frequency. Selectable ratchet mode shall keep the door in the open position until a second activation signal. The operator shall allow the door to be opened manually in power off conditions. Optional battery pack shall automatically either open or close the door(s) after power is lost.
- F. EMERGENCY EGRESS: Sliding doors and swing-out side lites shall be capable of being swung out to 90° from any position of slide movement (except for SR units) and require no more than 50 lbf. (222 N) of force applied at the lock stile to open. Units with this emergency egress feature comply with Chapter 5, Means of Egress, of Code for Safety from Fire in Buildings & Structures, NFPA 101.
- G. SECURITY: The sliding doors shall be fitted with a International Door Closer Inc. DH-1820-H hook bolt deadlock with HB-4015-N Header Bolt Set. Biparting units shall include a two-point lock Adams Rite MS1880 Flush Bolt. Units with swing-out side lites shall incorporate mechanical interlocks between the sliding doors and side lites to guard against forced entry when the unit is locked.
- H. Optional Security: Adams Rite G86exit device locking with outside cylinder/escutcheon (in lieu of flush bolts all SX panels) to meet Means of Egress Life Safety Codes.
- I. Optional Electric locking: May be Fail-Safe or Fail Secure
- J. FINISH: All exposed surfaces shall be 204-R1 clear anodized for Class 2 architectural finish or dark bronze or black anodized for Class 1 architectural finish. Painted packages to match storefront are optional.

- K. SAFETY AND ACTIVATING DEVICES: Unit shall have two infrared safety beams installed at 24" and 48" from the finished floor. On bi-parting units, beams will be installed in the vertical stiles of the side lites. The beams will not be active when the doors are fully closed. Motion/presence sensors shall be installed on both sides of the unit to detect traffic approaching the door from either direction. For units intended for one-way traffic only, the detection sensor on the side not intended for use shall not be active when the doors are fully closed.

2.03 REQUIREMENTS FOR WORK SPECIFIED IN OTHER SECTIONS

- A. ELECTRICAL: The General Contractor or Electrical Contractor shall furnish and install all wiring to the operator. Provide 120VAC, 60 Hz, 1 phase, 15 amp service to each operator header on a separate, dedicated circuit routed into the header.
- B. GLASS AND GLAZING: Glazing bead and setting blocks shall be in compliance with ANSI Z97.1.
 - 1. Note: Laminator's Bug (Permanent Identification) verified prior to testing
 - 2. Glazing Material: 0.449" laminated Storm glass. 3/16" HS glass / 0.075" Venceva Composite (VS-XX) interlayer / 3/16" HS glass, laminated by Old Castle Glass, Inc.
 - 3. Glazing Method: The doors are glazed from the outside. The glass is supported on the interior side by an extruded aluminum gutter (part # 5-11-4044) that is attached to the stiles and rails with # 10-16 x 1/2" PPH thread forming screws, staggered 2" from each end and sealant 4" – 6" on center. Glass is wet glazed on the interior side with a Geon 8700 insert (glass spacer block) (part # 6-11-9002) (0.318 x 0.274), (2) in all horizontal and vertical gutters located at 6" from corners, and Dow Corning 983 silicone sealant (specimens A, A1 and C1) or Dow Corning 995 silicone sealant (specimen D), Glass bite 31/64". The glass is supported on the exterior side by an extruded aluminum sash, 1/4" square (part # 5-11-4040)(0.628" x 0.815" x 0.050" typical wall thickness) and glazed with a EPDM Glazing bulb (part # 6-11-9001)(0.331" x 0.320"). (2) glass setting blocks (part # 6-11-9007)(material 93 Duro, 082BA) in all lower horizontal gutters and in all vertical gutters, each, located 4" – 6" from corners.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Inspect frame opening for correct size, plumb and square, and level floor for safe and reliable performance. Provide written notification to the appropriate personnel of conditions not acceptable to the installer and/or manufacturer. Proceed with installation only after necessary corrections are made by the general contractor to insure a suitable opening.

3.02 INSTALLATION

- A. Install sliding door unit plumb, square, and level in properly prepared and supported opening, using specified fasteners, as required by installation instructions, Test report and as detailed on the shop drawings.

3.03 INSTRUCTION

- A. Following the installation and final adjustments, the installer shall fully instruct the facility manager as to correct operating procedure and safety requirements of the sliding door package.

3.04 FINAL CLEANUP

- A. After installation and adjustment for smooth, reliable operation, clean the door package and remove all surplus material, equipment, and debris incidental to this work.

END OF SECTION

automatic door solutions

Automatic door technology as you've never seen it before!



automatic doors

www.recorddoors.com



record

your global partner for entrance solutions

record automatic sliding doors



Complete Satisfaction and Quality

Our top priority is your complete satisfaction with the quality of our products and services.

By this we mean:

- Individual professional advice in choosing building access solutions for people and goods;
- A wide range of high-tech products to meet the requirements of modern building automation;
- Elegant designs with numerous options, compatible with any architectural style or building plan.

There are 22 record subsidiaries in Europe and the USA, and we have over 50 years' experience in mechanics, sensor technology, electronics and software for automatic door systems and related products.

Talk to us about your needs!

Thank you for your confidence in our company; we look forward to hearing from you.

Our corporate headquarters in Monroe, NC. This state of the art facility allows us to manufacture quality entrances, on time and when you need them. With over 60,000 sq. feet, our facility provides the latest manufacturing techniques and machinery to provide nothing less than your total and complete satisfaction.



www.recorddoors.com



5100 Series Sliding Doors

All record-usa Series 5100 automatic sliding entrances allow the sliding doors to break away and swing in the direction of egress when force is applied (similar to a swing door). The doors can be pushed to swing at any point in the door opening or closing cycle (except for Reverse Breakout units), and the force required to break the doors away is mechanically adjustable. On units with exterior swing-out sidelights, breaking the doors away will also cause the sidelights to swing in the same direction as the sliding doors. These units also incorporate mechanical interlocks that lock the sliding doors and sidelights together when the doors are full closed. record-usa utilizes 1 3/4" x 4 1/2" framing for the side jambs and transom members on all sliding entrances. Where applications require, optional 1" x 4 1/2" or 4 1/2" x 4 1/2" framing may be substituted. On telescope, full pocket, and surface mount units, 1 3/4 x 6 1/2" framing is standard with optional 1' x 6 1/2" framing also available. On surface mounted units, 1 3/4" x 2 3/4" (narrow stile) or 1 3/4" x 4 1/4" (medium stile) filler tubes are mounted against the wall or storefront in place of sidelights to provide a weather seal and members to mount the safely beams.

Options

- Electric Locking: Concealed electric locks are available in both fail safe (unlock on loss of power) and fail secure (lock on loss of power) operation. The electric locks are mounted in the header and operate as a carriage lock that automatically locks the door against slide after each open-close cycle, or can be unlocked for daytime use and locked at night.
- Battery Pack: A constant charge battery pack is available for use with building alarm and security systems to ensure that entrances are secured in an emergency. The battery pack can be provided to open or close the door upon loss of incoming electrical power or when signaled from the security system. An UPS (uninterruptible power supply) that provides 300 door opening cycles is also available.
- Exit Devices: Recessed vertical rod exit devices are available on inside slides as well as outside slides. These devices extend across the full width of the door panel. Exit devices are mounted at the same height as the muntin bar (41-5/8" from the floor or threshold to the centerline of the exit device/muntin bar.)
- Partial Open Feature: A selectable partial opening feature is available for applications that require a full width opening during pleasant weather conditions but a partial opening during harsh weather. The microprocessor-based operator control offers an infinite number of partial opening settings. The partial opening can be constant or automatic depending on traffic volume. In the automatic mode during high traffic conditions, the control will override the reduced opening setting and open the door to the full opening available. Once traffic decreases, the control will return to the reduced opening.



S.M.A.R.T. Panel:

- The 5100 introduces a new control panel with an intuitive interface and visual feedback of door status. Selecting the operational mode of the door is a single button press, and the built-in display will provide confirmation.
- The control panel can be manually locked, preventing unauthorized alteration by those who do not have permission to adjust the door.
- Two control panels can be installed on the same door; one at the unit and one remote.
- The control panel will automatically provide an alert message if an abnormal condition occurs.
- Provides user with the phone number of the authorized service agent.
- Reminds you of your commitment in performing a daily safety check.
- Provides information regarding objects in track that may negatively impact the operation of the door.
- Displays current door setting in regard to traffic selection and egress.
- Indicates when a door has been accidentally broken out.
- Identifies if a safety beam has failed or been damaged.
- Notifies user of which part needs replacement due to failure or abuse.



Available in Telescoping & Surface Applied Packages



record sliding door series comply with ANSI 156.10; IBC2003; UL325; CUL and NFPA101.

5100 Series The Greener Door

record-usa's new 5100 series sliding door offers the very latest in automatic door technology to assure the quietest, smoothest performance in a sleek and elegant design. Offering a variable breadth of configurations and functions, the 5100 series assures the architect and building owner a wide array of capabilities in ensuring the most safe, secure and attractive entranceway available by choosing from the following options:

record-usa recognizes the importance of the Green initiative.

Disposing of items that can be recycled diminishes energy, water and natural resources that could be saved by recycling. Creating an environment of cultural responsibility has been a focus of ours over the past several years and will remain as such for the foreseeable future.

Energy Consumption of record-usa 5100 Series sliding door systems:

The Standby load has been tested at 25 watts. This is when the door is closed at rest and set on automatic mode, with other peripherals connected such as sensors, locking, etc.

The maximum loading (continuously in full operation) has been tested at 100 watts. Most leading competitor's average from 250 W to 600 W. This is when the door is under permanent and maximum operation combined with the maximum door leaf weight of 225 pounds per panel. With the motor voltage at 35VDC, the operator is classified as Class II.

Exclusive Traffic Sensitive "Smart" opening logic reduces air infiltration.

When low traffic is sensed the door operates to a selectable reduced opening. When two-way and/or higher volume is sensed, the door operates at full opening width. This is achieved automatically without the requirement of having to go to the door and adjust the operating mode.

By automatically changing the opening and closing width based on pedestrian traffic flow record reduces air loss out of the building.

Construction Waste Management

Product manufactured by record-usa ships in recycled cardboard that is suited for further recycling or for possible reuse when required. We never use hard to dispose of styrofoam like other manufacturers. This eliminates or greatly reduces extensive re-usable garbage/material being delivered to and or buried in public disposal areas.

- Electronics allow for both low wattage consumption and energy efficiency
- Traffic Sensitive Sensor provides controlled and timed opening and closing cycles
- 1" glazing offers protection from the elements and reduces hot/cold transfer from interior and or exterior
- Rubber seals between panels and extended bottom door sweeps reduce and eliminate air and smoke infiltration
- Door closers assure panel coming closed after breakout reducing loss of building heat or cold
- Extended door sweeps add extra resistance to the elements keeping cold air and snow out and heat in thereby saving on heating and air conditioning costs as well

5200 series All Glass

- Clear line of sight unhindered by vertical stiles
- Single slide or bipart packages available
- For use with 1/2" tempered glass

5300 series Heavy Duty

- Virtually silent operation incorporating dual motor operation
- Available for door panels glazed with 1/4" glass up to 10 feet tall; 1/2" and 1" up to 9 feet
- Each door panel may weigh up to 375 pounds

5400 series Impact Rated Hurricane

- Steel reinforced doors and panels
- No lock required on SO panels
- Complies with Dade County NOA 15-0316.04
- Incorporates 7/16" Old Castle Glazing
- LMI series (Large Missile Impact)

5500 Series Non Impact Rated Hurricane

- Steel reinforced doors and panels
- No lock required on SO panels
- Complies with Dade County NOA 15-0316.05
- Incorporates Glazing from 1/4" to 1" (in 1/4" increments)
- Wind load Series

5600 Series

- Choose the 5600 series when desiring to automate wood, hollow metal or other door types and still get the reliability, durability and silence of the 5100 series.

Other Options:

Bullet Resistant Doors:

- Utilizes 1" thick glass laminate UL 753 Level II rated
- Utilizes 7/16" Amortex Composite UL 752 Level III rated (concealed in aluminum extrusions)

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5900 Series Manual ICU Doors

Health care environments are challenging in that the need for a door way to rapidly provide break out capability in the event of emergency patient care is always evident.

ICU doors are used to provide separation between patient rooms and other areas of the hospital.

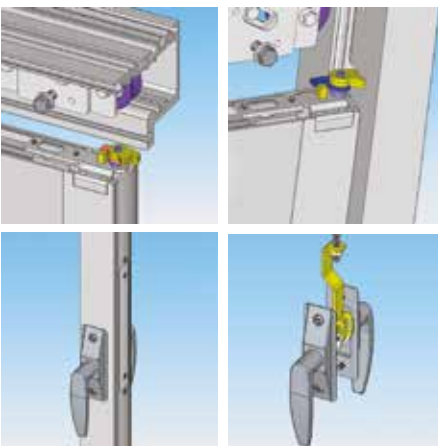
ICU doors are specified to eliminate critical life safety situations arising when possible delays may result due to hospital personnel hesitating momentarily when transporting patients due to slow moving doorways.

record-usa's manual sliding ICU door packages are available in multiple configurations that allow the architect total freedom in the design of a patient facility. One may select from two, three or four panel options, both with or without floor tracks. Other possibilities include either three or six panel telescopic designs, again both with and without floor tracks. To satisfy all of the requirements of the healthcare facility, the doors may be specified to breakaway either into the patient room, or out into the hallway—whichever option best allows for quick and unimpeded transportation of patients either in wheelchairs or on gurneys.

Note: With trackless units, breakaway capability may only be achieved for the sidelite assembly and the active sliding door leaf when the doors reach the fully open position. With standard pin guide track units sidelite and sliding door assemblies breakout from any position during the slide travel of the door.

- PrivacyVue™ Glass
- Integral Blinds
- Self Closing
- Automatic

MEETS UL 1784



5900 Series Manual ICU Doors Positive Latching

(exclusive design allows for latching at the top on Bi-Parts)

record-usa's unique positive latching system on their manual ICU doors is different from that of the competition in that it latches inside the header and not on exposed vertical members which is quite common.



5800 Series IC Matic Low Energy Power Operated Sliding Doors

Healthcare environments are constantly changing to meet the rigorous demands and expectations of an aging population concerned with the possibility of disease spreading through human contact.

As such, the automatic door market has adapted and recently introduced products to meet these requirements.

The record IC-Matic is a low energy power operation sliding door system ideal for intensive care wards. A sleek design and reduced header height proves attractive while the ability to open automatically through jamb or wall mounted touchless wall plates eliminates the need to physically touch an activation device, thereby reducing greatly the spread of germs.

Unique Positive Latching

Utilizing a fail secure lock with an emergency manual override, the IC Matic positive latching mechanism ensures that the door is securely shut every time the door closes after both the sliding and breakout motions. This allows one to freely exit the room in case of power loss and fire. The IC Matic positive latching mechanism fully complies with UL 1784, NFPA 101 and NFPA 105.

For normal door operation, when it is closed the lock will always be engaged. In order to release this lock under normal operation, simply activate the door using your chosen touchless knowing act activation accessory. The entire locking mechanism is firmly enclosed inside the header; there are no protrusions from the door or jamb tube into the door opening area. The lock throws a rod directly into the factory prepared cutout on the door catch, securely locking the sliding motion of the door.

4900 Series All-in-One Bi-Fold/Bi-Swing Manual Doors



Introducing the new record-usa ALL-IN-ONE door package. Ideally used to eliminate the possible impedance in a hallway of hospital personnel with patients caused by open door leaves, the dual folding-swinging ALL-IN-ONE door system assures that narrow hallways remain clear of possible obstructions that other door — systems may cause.

In the event of an emergency, standard ICU packages may cause concern by breaking into the hallway to allow quick egress from the patient room. Doors of this type also may rely on a floor track system that slows a patient's travel while on a gurney or may lead to discomfort as they proceed over the track. ICU doors are also usually manufactured with hard to grasp handles that are very difficult to open when the nurse may have his/her hands full. Nurses now may easily back into the swing side of the door system and enter the doorway even when handling food trays, patient charts, etc.

When large doorways are desired to allow the simple transportation of carts, wheelchairs or other equipment, standard ICU doors are provided with a breakout feature to allow the door panels to fold in one direction and stack. This design feature provides a larger than normal clear doorway opening than swinging doors may allow. But when choosing record usa's ALL-IN-ONE door package the requirement of a breakout feature is eliminated simply by opening the bi-fold and biswing door quickly and easily. This ingenious three panel door system offers the combination of both a folding door and a double acting swing door system. Inherent to the creativity of the design is the ability to select which side of the unit the folding door panels are on and which side the swinging door unit is on— whichever allows the quickest egress should an emergency situation arise.

4500 Series Automatic Slide/Fold Doors



Elegant-silent-reliable

Where space is at a premium, record's Slide/Fold door allows quick and easy access. Ideally suited to buildings with narrow entrances, it is the perfect solution for restaurants, hotels, business premises, hospitals and homes for the elderly, as well as offices and private buildings. The Slide/Fold doors use record's proven system drive and control units, and have all the features and functions of record's 5100 series standard operator. The Slide/Fold can be either surface applied or mounted between jambs.

Reasons why the record Slide/Fold is vastly superior to standard folding door systems:

- ➔ Provides a much larger door opening in even the most restricted doorways (for example a 78" opening provides a 64.625" clear opening as opposed to a 51" clear opening).
- ➔ Eliminates the requirement of finger guard at the jamb — a component that consistently fails



- ➔ A folding pivot is subject to torsional loads and fatigue failure caused by —
 - a.) location of the pivot point with respect to the alignment of the panels;
 - b.) flexing (twisting) of the door panels during normal operation;
 - c.) jerky operation of the drive mechanism.
 By aligning the pivot with the door panels, the record design will reduce torsional problems associated with the projected pivot used on the current folding door.
- ➔ Moving the pivot closer to the jamb provides additional support of the pivot and increases the clear opening of the door. The record bottom pivot is a sealed, precision bearing mounted into a hardened steel ring, which provides protection for the bearing. Being positioned adjacent to the jamb also increases net door opening and abuse protection.



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6100 Series (for squared header assemblies please specify 6200 series)

record-usa's 6100 series is the ideal choice for interior door ways that demand reliability, durability and silence. The 6100 was designed to meet all requirements of both ANSI A156.19 for power assist and low energy power operated doors as well as applications that must comply within the parameters as defined by the ADA Civil Rights Law.

8100 Series (for squared header assemblies please specify 8200 series)

The 8100 series as manufactured by record-usa provides the end user with the best solution for interior or exterior entrances. Since the 8100 has complete control of the door throughout its entire opening AND closing cycle and may be programmed for either ANSI A 156.19 or ANSI A 156.10 (power operated pedestrian doors) applications, the 8100 promises to be your choice for heavily used doorways that require a long lasting unit. The 8100 retains the completely silent performance of the 6100 series as well.

8600 Series

The record 8600 overhead concealed package incorporates the 8100 series operator but is supplied complete with a medium stile, center pivoted aluminum door panel, standard 1 3/4" X 4 1/2" jamba, cylinder and lock; push bar; offset-pull handle; finger guards and threshold (wide stiles also available.)

8700 Series

When the requirement of an overhead concealed unit that can be used on offset or butt hinge applications is evident, the record-usa 8700 series provides attractive aesthetics as well as durable performance. The 8700 series is supplied with a continuous hinge gear only.



	6100 Series	8100 Series
Doors	Interior	Interior/Exterior
Weights	up to 175 lbs.	up to 350 lbs.*
ANSI	156.19	156.19/156.10
Arm	Standard	Standard/Track/Offset
Door Size	36" or 72"	up to 51" Single & 108" Pairs
Warranty	1 Year	2 Year
Non Handed	✓	✓
Overhead Concealed	✓	✓
Inswing Doors	✓	✓
Outswing Doors	✓	✓
Double Egress	✓	✓
On/Off/Hold Open Switch	✓	✓
Microprocessor Control	✓	✓
Surface Applied	✓	✓
Center Hung	✓	✓
Center Pivoted doors Butt/Offset Hung Doors	✓	✓
Deep Reveal Applications	✓	✓
ADA Compliance	✓	✓
Fire Rated Openings	✓	✓
Standard Anodized	✓	✓
Paint	✓	✓
Clad	✓	✓
Electromechanical	✓	✓
Push to Start	✓	✓
Power Boost (Latch Assist)	✓	✓
No Relay Required for Electric Strikes	✓	✓
No Lockout Relay Required for Sensors	✓	✓
Built-in Power Supply for Sensors	✓	✓
Built in Power Supply for Sensors	✓	✓
Optional Remote Digital Control Panel	✓	✓

Features/Options:

- Available with either squared headers or rounded headers
- Brake option available to maintain door position at the full open and/or full closed position(s) on the 8100 Series
- Reveals up to 24" in depth
- Extended arm adaptors to provide clearance in multiple framing conditions
- UL listed for both UL325 and UL228
- Non-handing operator assembly
- Easily configurable with the record-usa S.M.A.R.T panel
- One header for simultaneous, independent and double egress pairs
- Can be prepped for automation on one door leaf and used with manual closers by LCN, Jackson, Ryobi, etc. on the other
- Two year warranty is standard on the 8100 Series
- Overhead design (see the 8600 Series on the next page) provides completely concealed application
- Non handed to maximize all field condition applications
- The 8100 is adjustable from low energy to high speed operation to meet application needs and ANSI code requirements
- Unit is capable of either push or pull operation with either standard or track arm configuration
- The 8100 is able to confidently and safely operate door
- leaves up to 350 pounds* and 48". The 6100 series may be selected for doors up to 48" and weighing up to 175 pounds.
- Built in interface for electric locking eliminates the need for additional costly peripherals
- Push to start operation saves on the installation and expense of additional activation devices
- Latch assist closing ensures closing to overcome stack and wind conditions (saves heating and/or air conditioning expense) or to overcome applied door hardware such as electric strikes that may otherwise bind, causing a breach of security
- Obstruction shut down halts the door when an object is detected to provide additional safety throughout the door operation
- Recycle on obstruction reopens the door upon making contact with an object or individual to provide additional safety throughout the door operation
- Built in lock out relay provides simplified coordination with safety devices

*Consult Factory



In the Floor
Sliders



In the Floor
Swingers



High Speed
Roll-Up Doors



Thermally
Broken Doors



Exit Lane
Breach Control



Security
Portals

→ record USA

4324 Phil Hargett Court – Post Office Box 3099 – Monroe, NC 2811
tel. +1 704 289-9212 – e-mail: info@recorddoors.com – www.recorddoors.com

→ Headquarters

agta record ltd – Allmendstrasse 24 – 8320 Fehrltorf – Switzerland
tel.: +41 44 954 91 91 – e-mail: info@agta-record.com – www.agta-record.com

www.recorddoors.com



record

your global partner for entrance solutions



SUBSTITUTION REQUEST

(During the Bidding/Negotiating Stage)

Project: Destin-Fort Walton Beach Airport Satellite Substitution Request Number: _____
 From: Ellen Walkama
 To: Martin Miguel Date: 02/12/2021
 A/E Project Number: _____
 Re: _____ Contract For: _____

Specification Title: PVC Description: Adhered 60 mil
 Section: 0754 23 Article/Paragraph: _____

Proposed Substitution: G410 60 mil adhered PVC
 Manufacturer: Sika Samafil Address: 100 Dan Road, Canton, MA 02021 Phone: 800-451-2502
 Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- ~~Proposed substitution will have no effect on building design, including, but not limited to, load capacity, fire rating, and other building code requirements.~~

Submitted by: _____
 Signed by: Bill Ben
 Firm: _____
 Address: _____
 Telephone: _____

Not able to confirm comparable Warranty Period to specified. Performance Criteria for PVC sheet does not meet requirements specified S075400-2.4-A.-5.

MILM-MARTIN
ARCHITECTS, INC.

A/E's REVIEW AND ACTION

7:45 pm, Feb 19, 2021

- Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
 Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
 Substitution rejected - Use specified materials.
 Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

PRODUCT DATA SHEET

SARNAFIL® G 410 ENERGYSMART
ROOF® MEMBRANE 48 60 72 80 FELTBACK

Sarnafil G 410 EnergySmart Roof Membrane is a PVC thermoplastic membrane produced with an integral fiberglass mat reinforcement for excellent dimensional stability, is highly reflective, guaranteed for thickness, with heat-weldable seams, and a unique lacquer coating applied to the top of the membrane to reduce dirt pick up.

PRODUCT INFORMATION**USES**

Sarnafil G 410 EnergySmart Roof Membrane is used in adhered applications with various adhesives over various substrates.

AREAS OF APPLICATION

- New Roofs
- Reroofs
- Flashings

FEATURES / BENEFITS

- Excellent dimensional stability
- Factory applied lacquer coated to reduce dirt pick up
- Hot-air welded seams for long-term performance
- Proven membrane performance
- Guaranteed thickness
- Highly reflective
- Superior fire resistance

TESTS**CODES / APPROVALS**

- FM Global
- Underwriters Laboratories
- Underwriters Laboratories of Canada
- ICC Code Compliance – ESR 1157
- Miami-Dade County
- Florida Building Code
- NSF/ANSI 347: Platinum Certified
- ENERGY STAR®
- California Title 24
- LEED / Green Globes

PRODUCT DATA

FORM

COMPOSITION

High-quality, PVC membrane containing ultraviolet light stabilizers, flame retardant and polyester scrim reinforcement with a unique lacquer coating on the top surface.

COLOR

- Top: White, Reflective Gray, Tan, and Patina Green
- Bottom: Gray

PACKAGING (White, Reflective Gray, and Tan)

- **48 mil (1.2 mm) Membrane***
 - Bareback: 10 ft x 150 ft (3 m x 45 m) roll, 464 lbs (211 kg) per roll, 8 rolls per pallet
 - 5 ft x 150 ft (1.5 m x 45 m) roll, 232 lbs (105 kg) per roll, 12 rolls per pallet
 - Feltback: 10 ft x 100 ft (3 m x 30 m) roll, 363 lbs (165 kg) per roll, 9 rolls per pallet
- * Made to order, minimum volume required, extended production lead times. Consult with Sika – Roofing representative for further information.

- **60 mil (1.5 mm) Membrane**
 - Bareback: 10 ft x 100 ft (3 m x 30 m) roll, 389 lbs (177 kg) per roll, 8 rolls per pallet
 - 5 ft x 100 ft (1.5 m x 30 m) roll, 195 lbs (89 kg) per roll, 12 rolls per pallet
 - Coverstrip: 8 in x 100 ft (20 cm x 30 m) roll, 25 lbs (12 kg) per roll, 25 rolls per pallet
 - Feltback: 10 ft x 80 ft (3 m x 24 m) roll, 354 lbs (161 kg) per roll, 9 rolls per pallet
- **72 mil (1.8 mm) Membrane**
 - Bareback: 10 ft x 100 ft (3 m x 30 m) roll, 471 lbs (214 kg) per roll, 4 rolls per pallet
 - 5 ft x 100 ft (1.5 m x 30 m) roll, 236 lbs (107 kg) per roll, 9 rolls per pallet
 - Feltback: 10 ft x 80 ft (3 m x 24 m) roll, 419 lbs (190 kg) per roll, 8 rolls per pallet
- **80 mil (2.0 mm) Membrane**
 - Bareback: 10 ft x 100 ft (3 m x 30 m) roll, 520 lbs (236 kg) per roll, 4 rolls per pallet
 - 5 ft x 100 ft (1.5 m x 30 m) roll, 260 lbs (118 kg) per roll, 9 rolls per pallet
 - Feltback: 10 ft x 80 ft (3 m x 24 m) roll, 459 lbs (208 kg) per roll, 8 rolls per pallet

PACKAGING (Patina Green)

- **48 mil (1.2 mm) Membrane***
 - Bareback: 6.56 ft x 65.6 ft (2 m x 20 m) roll, 133 lbs (60 kg) per roll, 19 rolls per pallet
 - 3.25 ft x 65.6 ft (1 m x 20 m) roll, 63 lbs (29 kg) per roll, 20 rolls per pallet
 - Feltback: 6.56 ft x 65.6 ft (2 m x 20 m) roll, 157 lbs (71 kg) per roll, 15 rolls per pallet.
- **60 mil (1.5 mm) Membrane**
 - Bareback: 6.56 ft x 65.6 ft (2 m x 20 m) roll, 168 lbs (76 kg) per roll, 19 rolls per pallet

-
- Coverstrip: 8 in x 100 ft (20 cm x 30 m) roll, 25 lbs (12 kg) per roll,
25 rolls per pallet
- Feltback: 6.56 ft x 65.6 ft (2 m x 20 m) roll, 190 lbs (86 kg) per roll,
10 rolls per pallet
- **72 mil (1.8 mm) Membrane**
Bareback: 6.56 ft x 49.2 ft (2 m x 15 m) roll, 159 lbs (72 kg) per roll,
19 rolls per pallet
Feltback: 6.56 ft x 49.2 ft (2 m x 15 m) roll, 177 lbs (80 kg) per roll,
10 rolls per pallet
 - **80 mil (2.0 mm) Membrane**
Bareback: 6.56 ft x 49.2 ft (2 m x 15 m) roll, 175 lbs (79 kg) per roll,
19 rolls per pallet
Feltback: 6.56 ft x 49.2 ft (2 m x 15 m) roll, 193 lbs (88 kg) per roll,
10 rolls per pallet
-

STORAGE

STORAGE CONDITIONS

Store rolls on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

TECHNICAL DATA

TYPICAL PHYSICAL PROPERTIES*

Properties	ASTM Test Method	ASTM Type II D4434 Spec. Requirement	Typical Results			
Overall Thickness, mil	D751	45	48	60	72	80
Thickness Over Scrim, mil	--	16	22	27	35	40
Reinforcing Material	--	--	Fiberglass			
Felt Weight, oz/sq yd (feltback membrane only)	--	--	9	9	9	9
Breaking Strength, lbf/in (N)	D751	55 (245)	60 (267)	80 (356)	100 (445)	110 (489)
Elongation at Break, % M. D. ¹ & C.M.D. ¹	D751	250 & 220	250 & 220	250 & 220	250 & 220	250 & 220
Seam Strength, % of original ²	D751	75	Pass	Pass	Pass	Pass
Retention of Properties After Heat Aging	D3045	--	--	--	--	--
Tensile Strength, % of original	D751	90	Pass	Pass	Pass	Pass
Elongation, % of original	D751	90	Pass	Pass	Pass	Pass
Tearing Resistance, lbf (N)	D1004	10 (45)	15 (67)	17.5 (78)	20.5 (91)	22 (98)
Low Temperature Bend, -40°F (-40°C)	D2136	Pass	Pass	Pass	Pass	Pass
Accelerated Weathering Test, Hours (Florescent Light UV exposure)	G154	5,000	10,000	10,000	10,000	10,000
Cracking (7x magnification)	--	None	None	None	None	None
Discoloration (by observation)	--	Negligible	Negligible			
Crazing (7x magnification)	--	None	None	None	None	None
Linear Dimensional Change, %	D1204	0.1	-0.02	-0.02	-0.01	-0.01
Weight Change After Immersion in Water, %	D570	± 3.0	2.4	1.9	1.8	1.7
Static Puncture Resistance, lbf (kg)	D5602	33 (15)	Pass	Pass	Pass	Pass
Dynamic Puncture Resistance, ft-lbf (J)	D5635	7.3 (10)	Pass	Pass	Pass	Pass
Recycled Content	--	--	9% Pre-consumer, 1% Post-consumer			

*Results may differ based upon statistical variations depending upon mixing methods and equipment, temperature, application methods, test methods, actual site conditions, and curing conditions.

¹M.D. = Machine Direction, C.M.D. = Cross Machine Direction.

²Failure occurs through membrane rupture not seam failure.



EnergySmart Colors	INITIAL SOLAR REFLECTANCE ¹	3-YEAR SOLAR REFLECTANCE ¹	INITIAL THERMAL EMITTANCE ²	3-YEAR THERMAL EMITTANCE ²	INITIAL SOLAR REFLECTANCE INDEX	3-YEAR SOLAR REFLECTANCE INDEX
EnergySmart White ³	0.85	0.74	0.86	0.84	107	90
EnergySmart Tan ³	0.73	0.65	0.85	0.86	89	78
EnergySmart Reflective Gray ⁴	0.73	0.65	0.89	0.88	90	78
EnergySmart Patina Green ⁵	0.55	0.46	0.86	0.85	64	51

¹Solar Reflectance testing according to ASTM C1549.

²Thermal Emittance testing according to ASTM C1371, Slide Method.

³EnergySmart White and EnergySmart Tan membranes meet ENERGY STAR®, LEED, Green Globes, and California's Title 24 criteria for Low and Steep Slope applications.

⁴EnergySmart Reflective Gray membrane meets LEED, Green Globes, and California's Title 24 criteria for Low and Steep Slope applications.

SYSTEM INFORMATION

APPLICATION INSTRUCTIONS

APPLICATION

Sarnafil G 410 EnergySmart is installed after proper preparation of the approved substrate. The membrane is unrolled into Sarnacol adhesive in accordance with Sika's technical requirements and then pressed into place with a minimum 100 lb (45 kg) steel roller. Sarnafil G 410 EnergySmart seams are heat-welded together by trained operators using hot-air welding equipment. Different Sarnacol adhesives require different application methods. Please consult Sika's Specifications or Applicator Handbook for detailed installation procedures.

AVAILABILITY

From Sika Corporation – Roofing Authorized Applications for use within Sarnafil systems.

MAINTENANCE

Standard maintenance of Sarnafil systems should include regular inspection of flashings, drains, and termination sealants at least twice a year and after each storm.

WARRANTY

Upon successful completion of the installed roof by the Sika Authorized Applicator, Sika Corporation will provide a warranty to the Building Owner via the Sika Authorized Applicator.

LEGAL NOTES

All information provided by Sika Corporation ("Sika") concerning Sika products, including but not limited to, any recommendations and advice relating to the application and use of Sika products, is given in good faith based on Sika's current experience and knowledge of its products when properly stored, handled and applied under normal conditions in accordance with Sika's instructions. In practice, the differences in materials, substrates, storage and handling conditions, actual site conditions and other factors outside of Sika's control are such that Sika assumes no liability for the provision of such information, advice, recommendations or instructions related to its products, nor shall any legal relationship be created by or arise from the provision of such information, advice, recommendations or instructions related to its products. The user of the Sika product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with the full application of the product(s). Sika reserves the right to change the properties of its products without notice. All sales of Sika product(s) are subject to its current terms and conditions of sale which are available at usa.sarnafil.sika.com or by calling 800-451-2504.

Prior to each use of any Sika product, the user must always read and follow the warnings and instructions on the product's most current Product Data Sheet, product label and Safety Data Sheet which are available online at usa.sarnafil.sika.com or by calling Sika's Technical Service Department at 800-451-2504. Nothing contained in any Sika materials relieves the user of the obligation to read and follow the warnings and instruction for each Sika product as set forth in the current Product Data Sheet, product label and Safety Data Sheet prior to product use.

Sika warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Product Data Sheet if used as directed within shelf life. User determines suitability of product for intended use and assumes all risks. Buyer's sole remedy shall be limited to the purchase price or replacement of product exclusive of labor or cost of labor.

NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS

SIKA CORPORATION – ROOFING

UNITED STATES

SIKA CANADA INC

Product Data Sheet
Sarnafil G 410 EnergySmart
4-17-18, VERSION #14

North America
Membrane



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Canton, MA 02021
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can.sika.com
marketing.construction@ca.sika.com



PVC & KEE

Sarnafil

BUILDING TRUST



PHYSICAL PROPERTY TESTING

- Tested 14 products:
 - PVC: 7 (including S327)
 - KEE: 3
 - TPO: 4

PHYSICAL PROPERTY TESTING

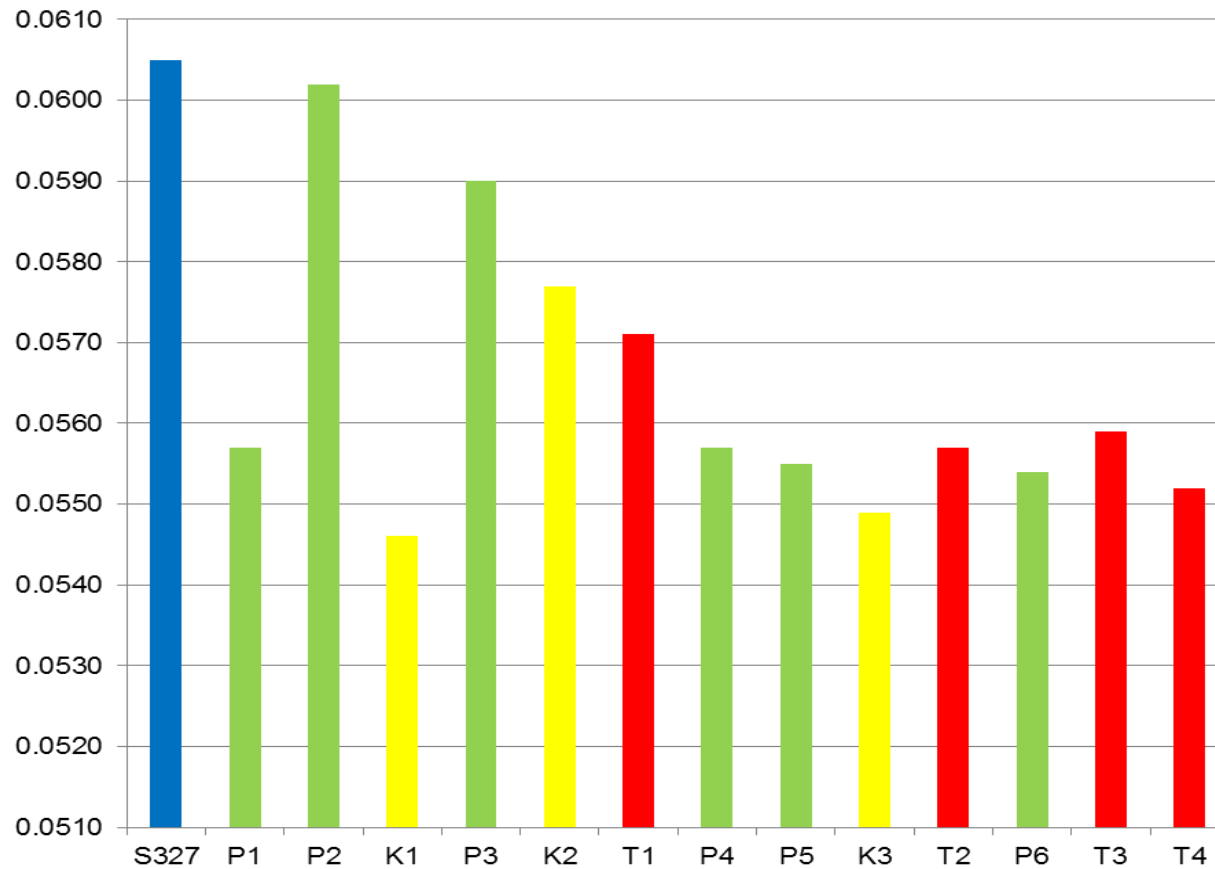
- For consistency all test procedures based on ASTM D4434: Standard Specification for Poly (Vinyl Chloride) Sheet Roofing
- All membranes labeled 60 mils thick

KEY DIFFERENCES BETWEEN D4434 AND D6754

	D4434 (PVC)	D 6754 (KEE)
Low T Bend (D2136)	-40°C	-35°C
Water Absorption	D570 168 Hr @ 70°C Full immersion Max 3%	D471 166 Hr @ 70°C Top Surface Max 6%

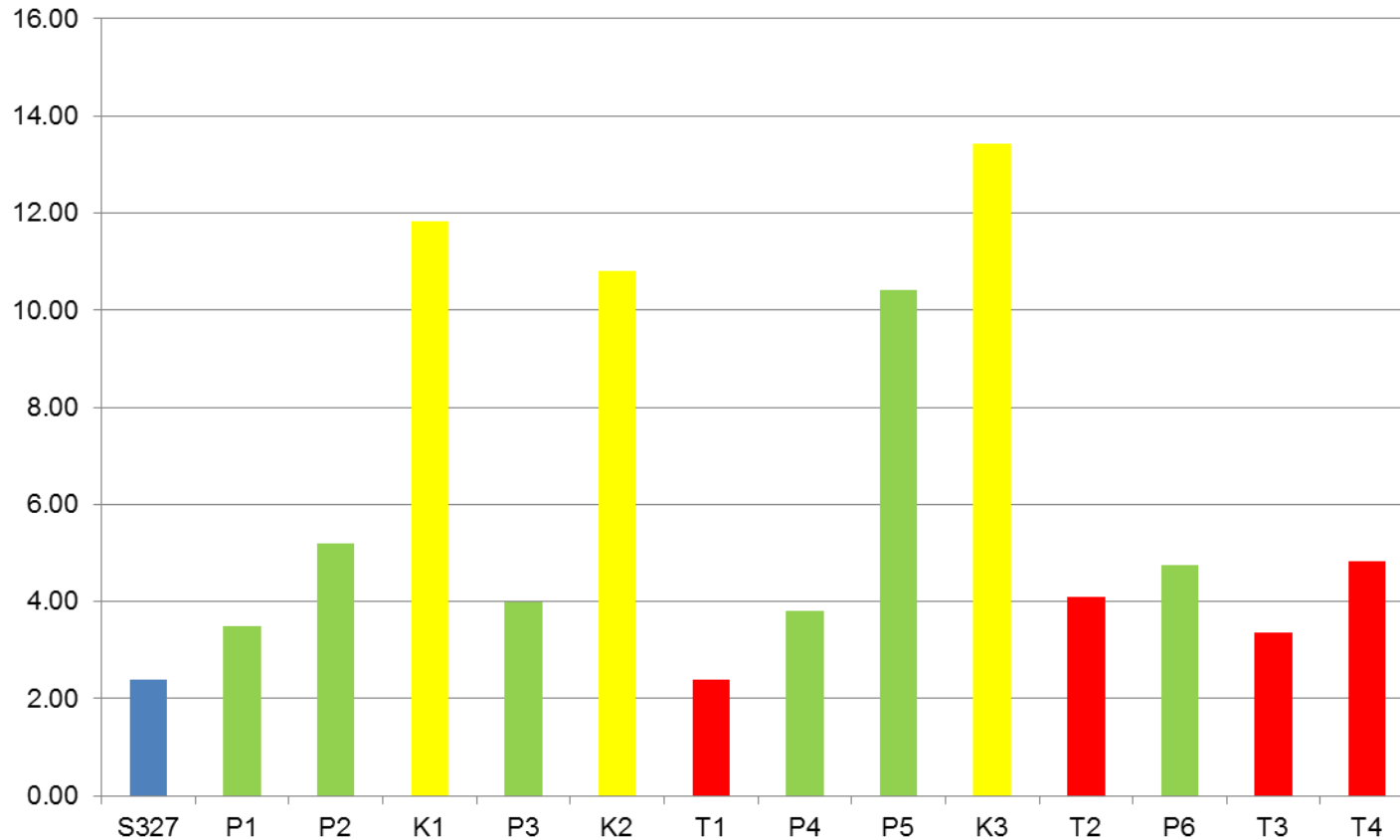
MEMBRANE THICKNESS

Average Thickness D751 +/- 10% from nominal

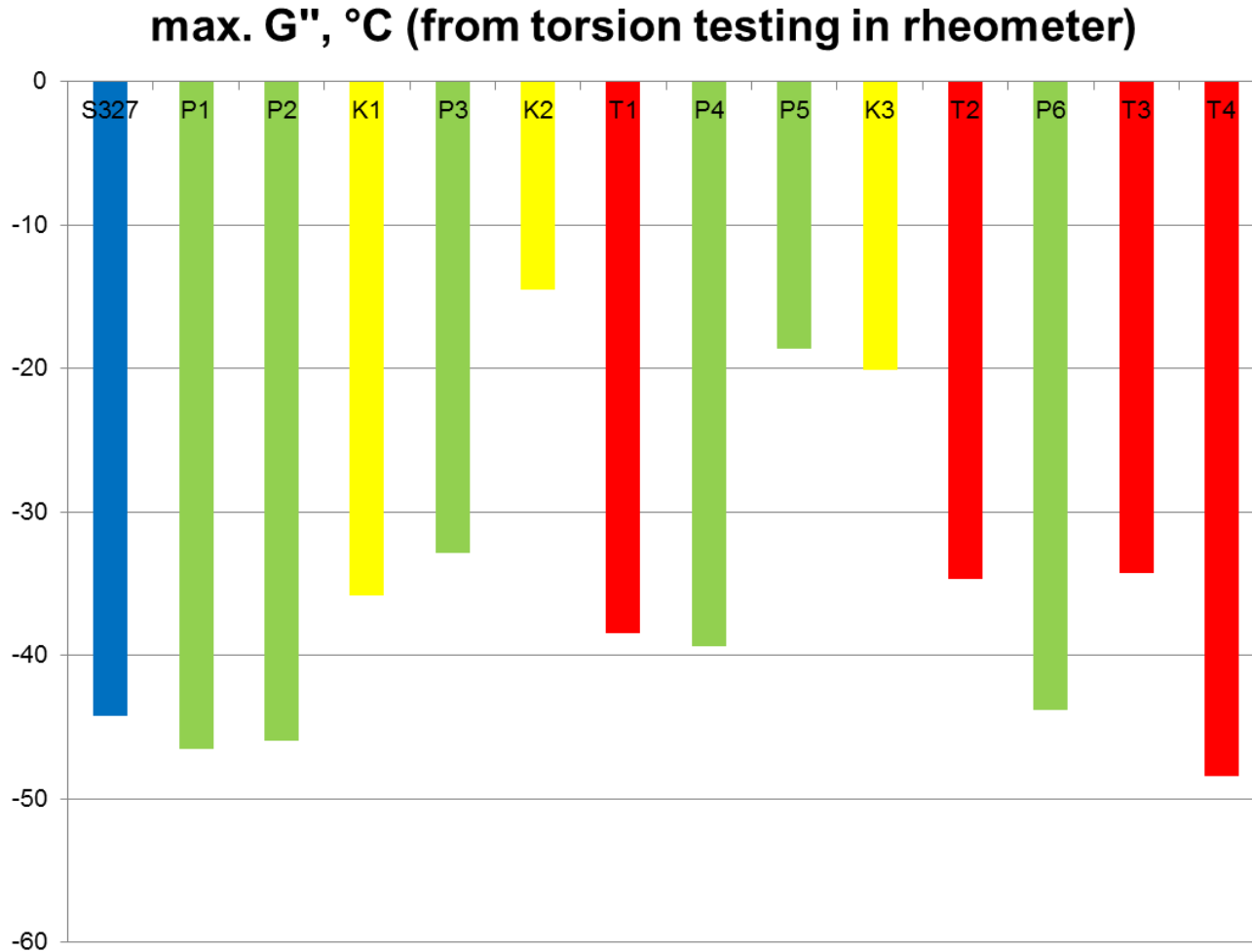


WATER ABSORPTION: FULL IMMERSION, EDGES NOT SEALED

Change in Weight After Immersion in Water, max,
% D570 modified 3.0%

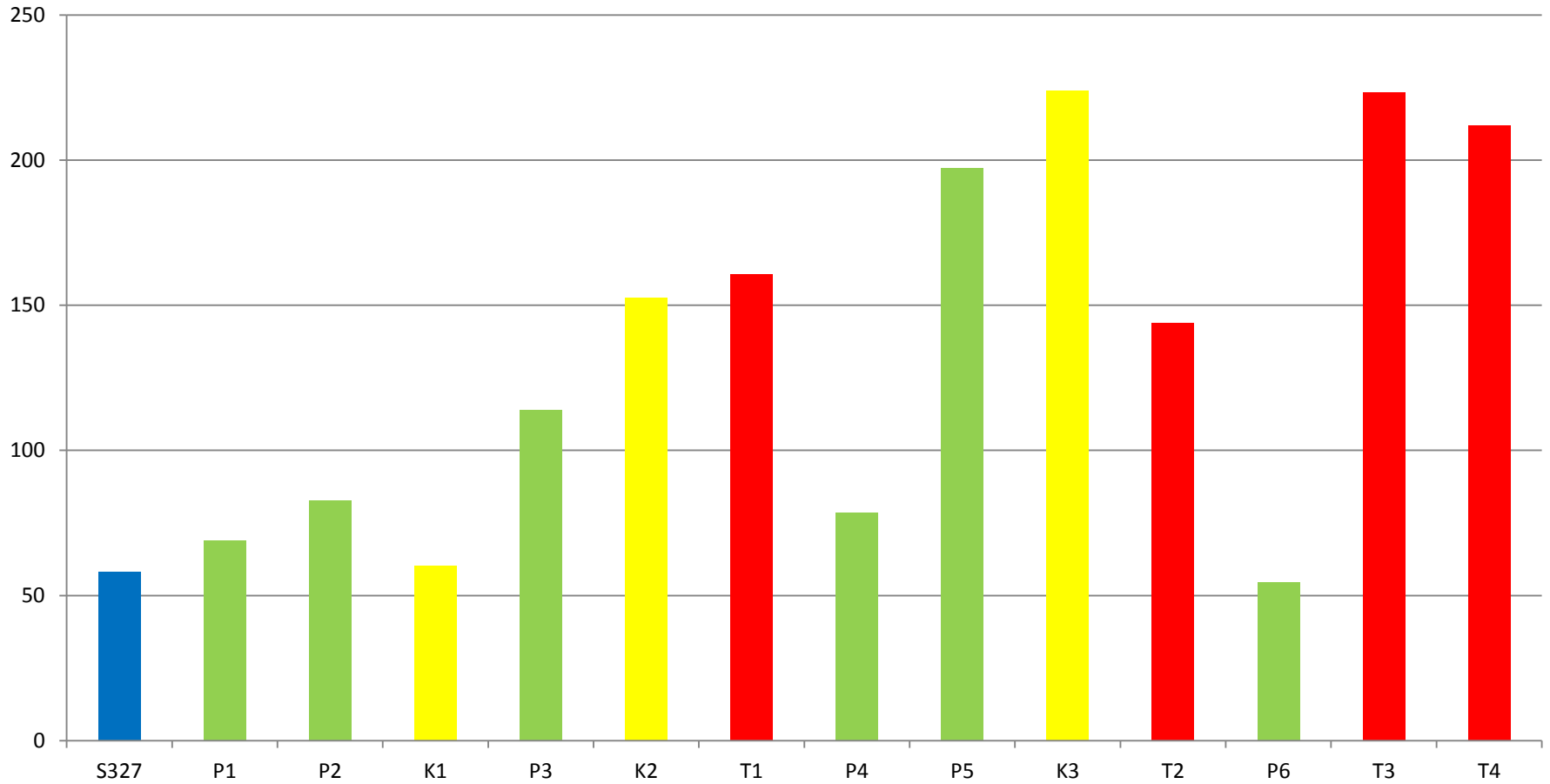


GLASS TRANSITION TEMPERATURE



STIFFNESS AT 0° C

G' @ 0°C Mpa



WELDING OF THERMOPLASTIC ROOFING MEMBRANES SUBJECTED TO DIFFERENT CONDITIONING PROCEDURES

SIXTH SYMPOSIUM ON ROOFING RESEARCH & STANDARDS DEVELOPMENT
DECEMBER 3, 2007

S.P. GRAVELINE
VICE PRESIDENT TECHNICAL SERVICES
SIKA SARNAFIL INC.

WELDING STUDY

- Acquired samples of 5 different thermoplastics
 - Two PVC (both 60 mils)
 - One KEE based PVC (34 mils)
 - Two TPO (both 60 mils)
- Welded each
 - At various combinations of welding speeds and temperatures
 - As received, after wetting and after soiling

DATA ANALYSIS?

- 5 Materials
- 3 Conditions
- 4 Temperatures
- 3 Speeds

- 180 Sets of Data!

PREVIOUS STUDY

- **Effects of Welding Parameters on Seam Strength of Thermoplastic Polyolefin (TPO) Roofing Membranes**
 - North American Conference on Roofing Technology, 1999
 - T. Simmons, TRS Consulting
 - D. Runyan, Dryspace, Inc.
 - K. Liu, R. Paroli, A. Delgado, J. Irwin, National Research Council of Canada

SIMMONS ET AL. OBSERVATION

- Adhesive mode of failure (within weld) typical when peel strength ≤ 26 lbf/in.
- Cohesive mode of failure (within sheet) when peel strength > 26 lbf/in.

WELD SAFETY FACTOR AS BASIS FOR ANALYSIS

- With 26 lbs/in. as a basis for a cohesive weld
- Can determine a weld safety factor

- $SF = \frac{T \text{ Peel} - 26}{26}$

MAX. SF

	TPO1	TPO2	PVC1	PVCE	PVC2
Rec'd	1.7	0.6	2.0	0.6	1.9
H₂O	1.1	0.7	1.3	0.1	1.6
Soil	1.1	0.5	2.0	0.2	1.9

PERSONICO SWITZERLAND, INSTALLED 1968



SAMPLE REMOVAL 2014





PVC & KEE

Sarnafil

BUILDING TRUST



PVC and KEE

Thermoplastic polyvinyl chloride (PVC) membranes were introduced in Europe in the 1960s. Sarnafil membranes were commercialized in Switzerland in 1962 and introduced in North America in 1978.

The thermoplastic PVC segment of the roofing industry has experienced, and continues to exhibit, continual steady growth. The success of PVC roof membranes has been due in part to the superior performance attributes of hot air welded seams, and the growing awareness of the energy savings, and urban heat island mitigation benefits, of light colored membranes amongst other things. Additionally, in Sika Sarnafil's case a track record of proven performance second to none has also been a driving force in the product's success in the market place. The overall growth of PVC membranes and the perceived higher profitability in this segment compared to other, typically commodity, single ply technologies has attracted a number of new players to the field over the past few years. Most of these companies do not manufacture their sheets, but purchase them from toll producers and re-sell them under their private labels. In order to try to differentiate their products, and to try to position them as a new generation of PVC materials, many companies introduced PVC membranes incorporating Ketone Ethylene Ester (KEE) in their formulations.

The first ASTM Standard Specification for single ply roof membranes, D4434 Standard Specification for Poly (Vinyl Chloride) Sheet Roofing was released in 1985. KEE modified PVC membranes struggled to meet many of the requirements of D4434. Some segments of the industry lobbied for a separate standard for these materials, which lead to the drafting of ASTM D6754 Standard Specification for Ketone Ethylene Ester Based Sheet Roofing which was first published in 2002.

A comparison of the differences between these standards is a good starting point for evaluating the differences in the products they cover.

	D4434 Type III (PVC)	D6754 (KEE)
Composition	PVC resin > 50% of the total polymer content	KEE polymer > 50% of the total polymer content
Min. thickness over scrim mm/ in.	0.40 / 0.016	0.18/ 0.007
Low temperature bend D2136	-40°C (-40°F)	-35°C (-30°F)
Water Absorption	D570 168 Hr @ 70°C (158°F) Immersion Max. 3%	D471 166 Hr @ 70°C (158°F) One side/ face exposed Max. 6%

Composition

KEE is marketed by DuPont™ under the trade name Elvaloy®. It is promoted as a “solid phase flexibilizer”. PVC in its natural state is a relatively rigid material (e.g. vinyl siding). Plasticizers/“flexibilizers” are blended with the base polymer to make it flexible and to allow it to accommodate the various structural and thermal stresses roof membranes are subjected to. Traditional plasticizers are liquids. KEE proponents argue that solid phase “flexibilizers” do not migrate from the sheet, while liquid plasticizers do, and therefore they claim, KEE materials *should* last longer. It is not quite so simple, as we will demonstrate throughout this paper.

Suppliers of KEE containing PVC membranes imply, and in some cases outright claim, that their sheets do not contain any liquid plasticizers. This is a fallacy. All PVC membranes, “traditional” and “KEE containing” have liquid plasticizers. Although the amount may vary, with more in the “traditional” membranes and less in the “KEE containing” products, every single PVC membrane currently available on the market contains liquid plasticizers. Membranes constructed solely of PVC resin and KEE would be too stiff to be used as a roofing membrane and would weld very poorly, thereby compromising the waterproofing integrity of the roof system.

As noted above to meet the requirements of ASTM D6754, a membrane must be comprised of at least 50% KEE. At this time only one manufacturer claims to produce membranes meeting this requirement. KEE is extremely difficult to quantify analytically, and therefore it is extremely difficult, if not impossible to test for compliance with this requirement of the standard. ASTM has sponsored a project to develop an analytical technique to measure the amount of KEE in a sheet. It is anticipated the methodology will be introduced in 2014 at the earliest.

It is interesting to note that all of the recently introduced KEE containing PVC membrane vendors market their products as being manufactured to the requirements of ASTM D4434. Presumably they do not contain enough KEE to meet the composition requirement of D6754. Some appear simply to be confused, as one vendor notes on their data sheet¹ “...exceeds the requirements of ASTM D4434 standard specification for Elvaloy KEE sheet roofing”

Thickness

The minimum thickness of polymer over scrim allowed in D6754 (6 mils) is less than 40% of that required in D4434 (16 mils) and other ASTM single ply standards. To

1

http://www.gaf.com/Roofing/Commercial/Products/Single_Ply_Roofing/EverGuard_PVC_Single_Ply_Membranes/EverGuard_PVC_XK_60_Membrane_05/29/13

appreciate how thin six mils is, consider that this is the generally accepted minimum thickness of polyethylene to be used as vapor retarders in roof assemblies, or roughly equivalent to the total thickness of two sheets of paper.

Increased membrane thickness can improve abrasion resistance, service life, and improve welding regardless of the membrane's polymer or blend.

- With few exceptions single ply membrane manufacturers require thicker membranes for longer term warranties
- A series of welding tests were carried out on two different TPO membranes, two "traditional" PVC membranes and one KEE PVC membrane². Materials were welded and tested as received, after water conditioning and after soiling (and cleaning). The KEE sheet typically exhibited the lowest weld strengths under all conditions. The thickness of the sheet appears to affect weld strength in general, even on new material. After soiling, the textured surface of the sheet which is a result of the thin polymer coverage, appears to hinder cleaning. Whereas most of the other materials could be cleaned sufficiently to allow the material to achieve weld strengths similar to new material, the KEE seams of the cleaned materials were noticeably weaker than for the new materials. Similarly water conditioning resulted in a significant reduction in weld strength/ quality (see "Water Absorption" below). The paper expanded on the concept of weld safety factor developed previously by others³. The KEE sheet was generally found to provide the lowest weld safety factors of the five thermoplastic membranes tested for the three conditions tested, while the "PVC 2" (Sarnafil) results were consistently amongst the highest.

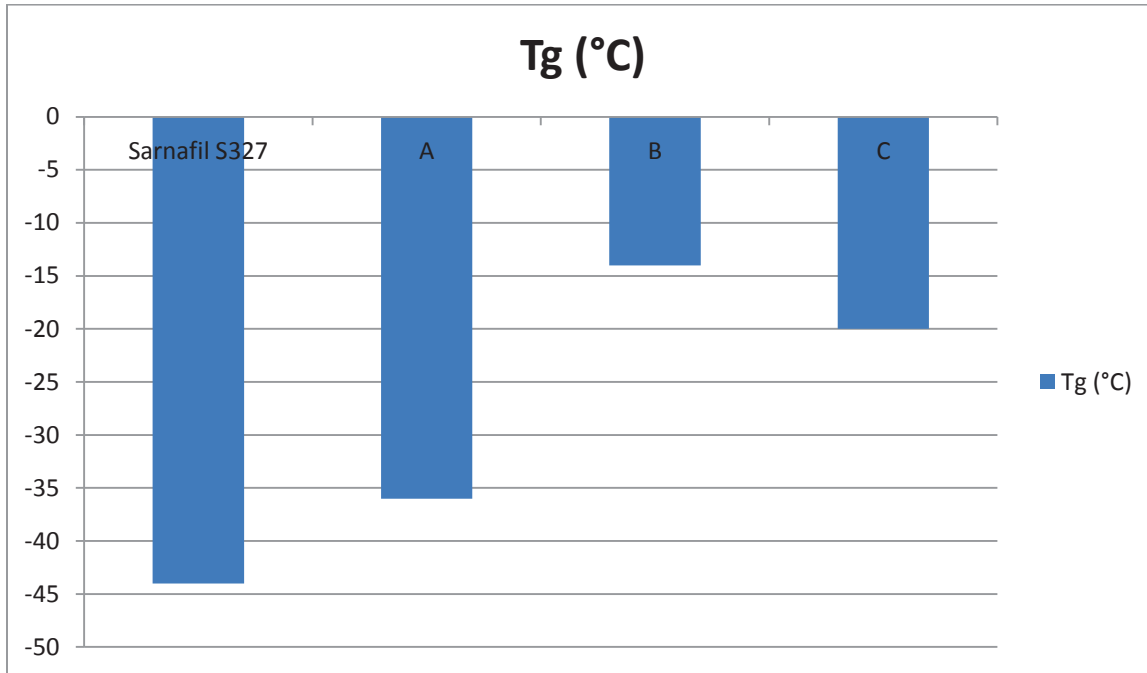
Low Temperature Bend

The low temperature properties of Elvaloy based sheets are also known to be inferior to those of traditional PVC sheets. Whereas both standards previously referenced call for the same low temperature bend test (procedure D 2136), the PVC requirement is to pass at – 40 °C (-40 °F), the KEE requirement is – 35 °C (-31 °F).

² Graveline, S., Welding of Thermoplastic Roofing Membranes Subjected to Different Conditioning Procedures, *Journal of ASTM International*, Vol. 4, No. 8, Paper ID JAI101018

³ Simmons, T.R., Runyan, D., Liu, K.K.Y., Paroli, R.M., Delgado, A.H., Irwin, J.D., 1999, Effects of Welding Parameters on Seam Strength of Thermoplastic Polyolefin (TPO) Roofing Membranes, Proceedings of the North American Conference on Roofing Technology, pp 56-65

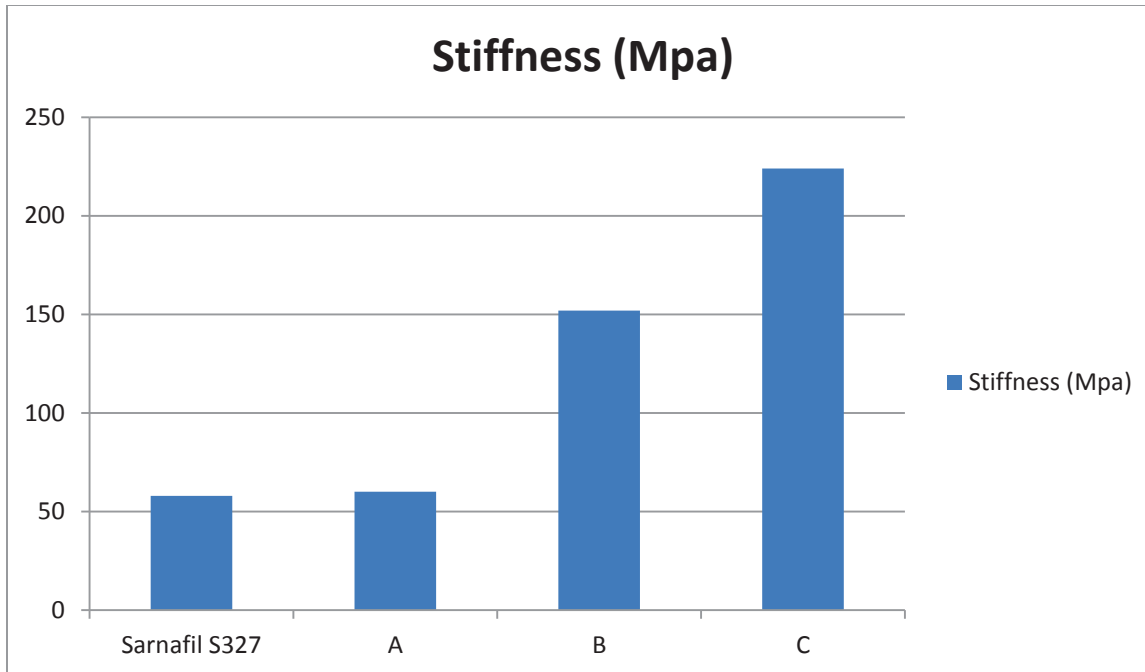
Although this test is a good indicator of a membrane's behavior at low temperature, glass transition temperature (T_g) may be a better metric for assessing this property. As a polymer system such as flexible PVC is cooled, it loses some flexibility, and becomes increasingly stiffer with decreasing temperature. The temperature at which it transitions from a flexible material into a brittle solid is referred to as the glass transition temperature. Sarnafil S327's T_g ⁴ is compared to those of KEE containing membranes.



Product A is promoted as being in compliance with ASTM D6754, while products B and C are marketed as KEE containing materials meeting ASTM D4434. It is also interesting to look at a related physical property, stiffness. The stiffness measured in MPa at 0°C⁵ for the same membranes is shown in the following chart.

⁴ Max. G'' , °C, measured from torsion testing in a rheometer

⁵ G' at °C, measured from torsion testing in a rheometer



As can be seen the KEE containing membranes are almost three to four times stiffer than Sarnafil S327 at 0°C. Primarily a factor during installation at lower temperatures, stiffer membranes may subject greater loads to fastening elements and other components through a roof's service life.

Water Absorption

KEE based PVC roofing membranes are known to absorb water at a much higher rate than traditional PVC type membranes. In comparative testing of thirteen thermoplastic membranes, C.G. Cash⁶ found the lowest level of water absorption in material #1/PVC (Sarnafil G410) and #2/PVC (Sarnafil S327), with values of 3.62% and 3.38% respectively. The worst material for this property in this study was material #10 PVC/Elvaloy, with 16.14% water absorption. All products were tested according to ASTM D570 (see below).

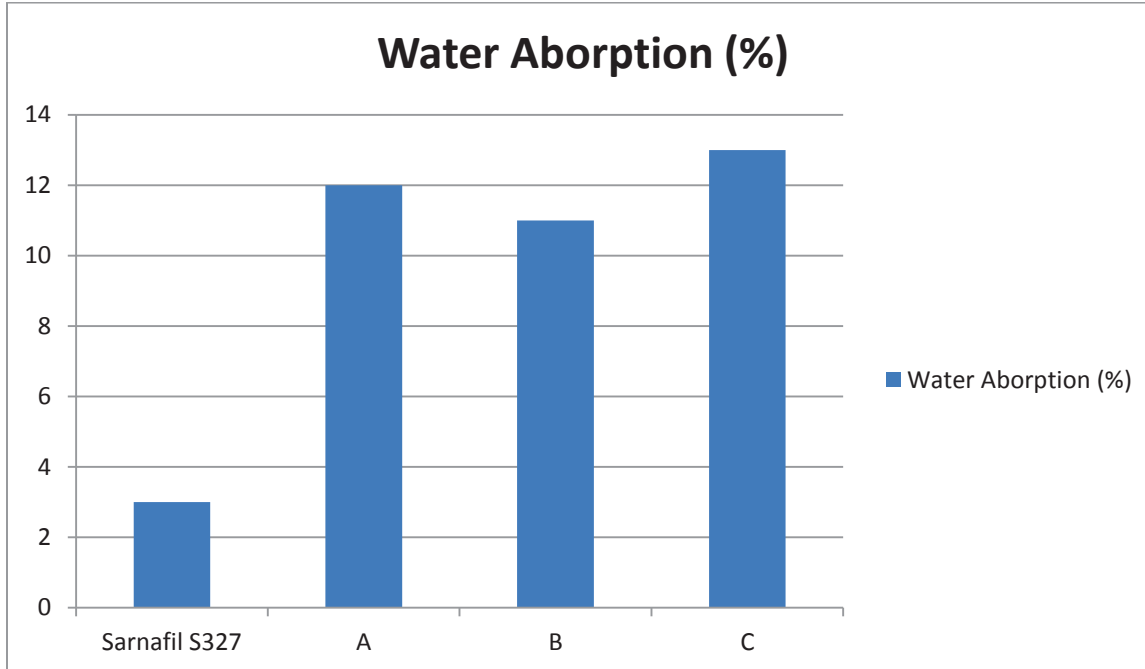
The suppliers of KEE membranes recognized the tendency of their materials to be highly absorbent and made great allowances for it in drafting the KEE ASTM standard⁷. The specified water absorption test (D471) provides for "exposure to *one side only* in

⁶ Comparative Testing and Rating of Thirteen Thermoplastic Single Ply Roofing Membranes, Cash, C.G., Proceedings of the Durability of Building Materials & Components Symposium, Vancouver, Canada, 1999

⁷ ASTM D 6754-02, Standard Specification for Ketone Ethylene Ester Based Sheet Roofing

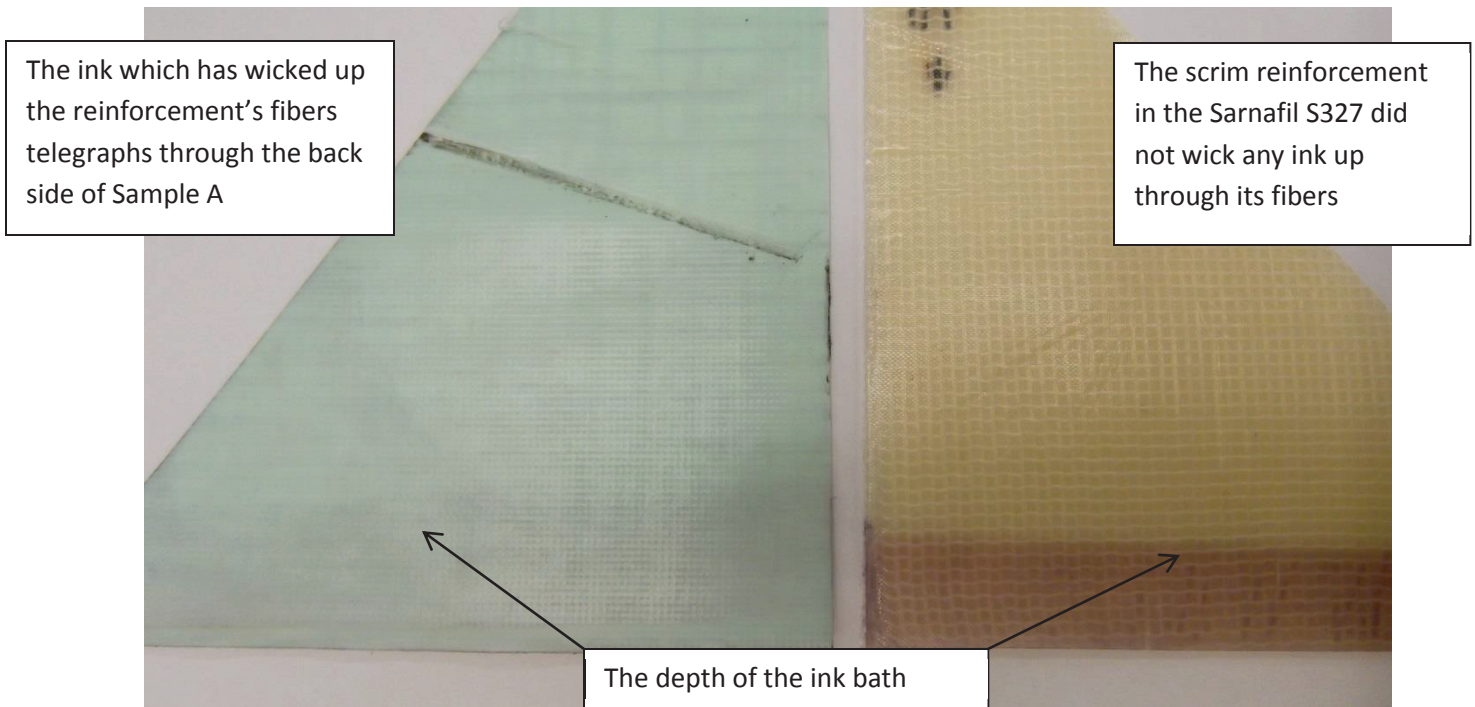
water at $70 \pm 2^\circ\text{C}$ for 166 h”. The procedure (D 570) in the PVC standard⁸ on the other hand calls for “*immersion* in water at $70 \pm 1^\circ\text{C}$ for 168 ± 1 h” of the entire sample. Despite the drastic difference in exposure conditions, the KEE standard allows for up to 6% change in weight, while the PVC standard allows for a maximum of 3%.

The same materials noted above were subjected to water absorption testing according to the ASTM D471 (the test method called for in ASTM D4434) in our laboratories.



Water absorption can be a function of the polymer formulation, the scrim and the manufacturing process used to produce a sheet. Sarnafil S327 and sample A were subjected to a wicking test. The test involves standing samples in a 20 mm deep ink bath, for 24 hours. After 24 hours the height that has wicked up the height of the sample is measured. Due to the translucent nature of Sarnafil S327, a samples was prepared without any pigments, making it translucent. The sample was otherwise identical (formulation, scrim) to “regular” Sarnafil S327. As can be seen in the following photo, the ink did not wick up beyond the depth of the bath in the S327, while for sample A, the ink wicked the full 220 mm height of the sample.

⁸ ASTM D 4434-06 Standard Specification for Poly (Vinyl Chloride) Sheet Roofing



A group of researchers from the National Research Council Canada, the U.S. Army Corps of Engineers and Simpson, Gumpertz and Heger, Inc. have analyzed and compared twelve different roof membranes⁹ comprised of products from all the major generic roofing materials (PVC, EPDM, TPO, BUR, Modified Bitumen). They subjected the materials to a series of analytical procedures as received, after various conditioning procedures and after exposure for four years in three different climates. The authors noted that of all the physical properties they analyzed, “water absorption test seems to be the most useful in tracking the weathering path of organic membrane samples”.

As noted previously, water absorption can also negatively impact a membrane’s welding properties and more specifically its repairability.

Field Performance

Although various physical properties are important, and many are potential indicators of performance, proven performance in the field is by far the most important metric. In field

⁹ Predictive Service Life Tests for Roofing Membranes, Cash, C.G., Bailey, D.M., Davies, A.G., Delgado, A.H., Niles, D.L., Paroli, R.M., Proceedings of the International Conference on Durability of Building Materials and Components, Lyons, France, 2005

studies^{10, 11}, including work done in conjunction with the National Research Council of Canada, Sarnafil membranes have demonstrated they can achieve service life well in excess of 30 years. In fact, the British Board of Agreement (BBA) notes in their Certificate¹² for Sarnafil S327 that: “Accelerated ageing tests and performance in use confirm that satisfactory retention of physical properties is achieved. All available evidence indicates that a Sarnafil S roofing system, used in the context of this Certificate, should have a life in excess of 35 years”, the highest rating they have ever awarded a single ply membrane roof system. A similar certificate is also available for Sarnafil G410.

Beyond our experience in exposed applications, Sika Sarnafil has been involved with vegetated roofs for about as long as we have been with exposed roofs. To the best of our knowledge no other thermoplastic membrane has a track record of longevity in the field, number of projects, square footage installed, variety of systems options and constructions, etc. as Sika Sarnafil. Sarnafil’s BBA Certificate for protected roofs, including vegetated (Certificate 08/4530) also notes Sarnafil’s PVC membrane’s life expectancy as being “in excess of 35 years”. Although the National Roofing Contractors Association (NRCA) recommends the use of PVC membranes in vegetative roof assemblies, KEE is amongst the materials that NRCA does not support for use in such assemblies¹³.

As noted previously, at this time most of the KEE containing, allegedly ASTM D4434 compliant sheets, are produced by third party manufacturers and re-sold under the private labels of various membrane companies. Most of these materials have but a few years of field experience, certainly nowhere near the track record required to support many of the performance claims being made.

Post Consumer Recycling

Sika Sarnafil has been recycling our membranes and those of our competitors since the early 1990s in Europe and since 2005 here in the U.S.. Once these membranes achieve the end of their service life, we have been recycling them back into new membrane materials to once more provide decades of weather protection. Sika Sarnafil

¹⁰ Whelan, B., Graveline, S., Delgado, A., Paroli, R., “Field Investigation and Laboratory Testing of Exposed Poly(Vinyl Chloride) Roof Systems”, Proceedings of the *CIB World Building Congress, “Building for the Future”*, Toronto, Canada, 2004

¹¹ S.P. Graveline, H.R. Beer, R.M. Paroli, A.H. Delgado, “Field Investigation and Laboratory Testing of Exposed Poly(Vinyl Chloride) Roof Systems”, Proceedings of the *RCI 20th International Convention and Trade Show*, Miami, FL, 2005

¹² British Board of Agreement, Certificate No. 08/4532, Sarnafil Mechanically Fastened Roof Waterproofing Systems.

¹³ The NRCA Vegetative Roof System Manual, Second Edition, 2009

goes so far as to commit in writing to major owners like Wal-Mart that we will take back and recycle their Sika Sarnafil membranes at the end of their useful life.

KEE based membrane suppliers do not have any known post \-consumer recycling program. This may be due to the thin polymer coverage of the fabric for some products making the return on investment in a recycling program uneconomical and impractical.