Building Addendum #2

University of North Carolina at Charlotte
Facilities Operations and Parking Services Complex
Building Phase

Date: 09/15/17

The following items are hereby incorporated into the above referenced Project:

BIDDERS MANUAL

1. **Part 4 – Bidder Package Descriptions:**
    a. BP 10A – Specialties
        i. Add Item 20 – Furnish and Install bicycle racks per contract documents. See C300 & C404.
        ii. Item 4. Add “Including corner guards.”
        iii. Add Item 21 – Furnish and Install FRW (Wall Panel with Top Cap) per contract documents. See A-720 in LS3P Addendum #5.
    b. BP 10C – Lockers & Benches
        i. Item 11 – Delete.
        ii. Item 14 – change to, “Furnish and install locker base as required by Contract Documents.”
    c. BP 15B – Plumbing
        i. Item 7 – Delete.
    d. BP 15D – Test & Balance
        i. Item 1 – Change to “Bidder has reviewed and understands all requirements of specification section 23 05 93.
    e. BP 16A – Electrical
        i. Add Item 9 – Contractor to provide Blue Phone Stanchion concrete base and wiring per contract documents. See C300 and C401 from LS3P Addendum #5.
        ii. Add Item 10 – provide emergency gas shut off push button and interlock with gas solenoid valve. See P-201A in LS3P Addendum 5.
2. Part 12 – BIM Requirements
    a. Add the attached UNCC Integrated Life Management (ILM) VDC/BIM Requirements Implementation Plan to the end of the BIM Requirements section.

QUESTIONS AND ANSWERS

ITEM	QUESTION	ANSWER
1	Who is providing the steel (i.e. 4x4 steel tube post and 2x4 steel tube support structure for the Welding Exhaust Filtration System?	Steel supports for WEFS are to be furnished and installed by the 15C contractor

2	Are time clocks Owner Furnished? Who installs?	Time Clocks are Owner Furnished Contractor Installed as indicated on the drawings. Installed by BP 16A.
3	Is the electrical package to include furnishing and install communication cabling? We understood that UNCC was performing all the communication wiring and devices. Please clarify.	Owner will provide all cabling, face plates, and terminations.
4	Is the perimeter fencing layout affected by Alternate 2A and/or 2B?	Refer to note at Wash Rack on Sheet C300A.
5	We noticed some of the alternates (numerical) are missing from the specification. Do any of these alternates affect the Building Package trades?	Reference LS3P Addendum No. 4, Item - 3. Numbers not used are Alternates related to the Early Site/Structural Package.
6	Are the wood doors to be factory or field finished?	Refer to Specification Section 081416 Article 2.6.
7	Where are the Cart Storage foundations located?	Refer to "Electric Cart/Mules Parking" on C300 and Electric Cart Charging Canopy Foundation Plan on 3/S-201.
8	Is the PEMB exposed steel to be painted?	Refer to Specification Section 133419 Article 2.4.H.
9	Does the Masonry Screen Wall specified in Alternate 3 and/or 9 require any painting?	No.
10	For the OFCI items, please provide cutsheets (i.e. key box, time clock, AED).	See attached cut sheets for reference only.
11	Which bid packages are to include the unit price allowance #1 for trench rock?	Bid Packages 15B, 15C, & 16A
12	Locker spec 105113 para 1.2 A. 1. calls for “Welded Corridor Lockers”, however para 2.3 clearly calls out “Knocked Down Corridor Lockers”. Can I assume that the corridor lockers are to be knocked down as described?	Refer to LS3P Addendum No. 5, Item - 6
13	Para 2.5 B. 2. Calls for locker benches to be HDPE. Penco does not offer HDPE benches. Since Penco is the “basis of design” are standard Penco wood benches acceptable?	Refer to LS3P Addendum No. 5, Item - 6
14	The locker detail E5/A252 shows Changing Room lockers as 75” high. The standard height from Penco is 72” high. Is Penco 72” high locker acceptable?	Referenced dimension not provided on elevation E5/A-252. Provide lockers per drawings and specifications.
15	BP 10C locker scope item 11. Says subcontractor responsible for all locks. Locks are not specified. Please clarify whether or not locks are required and what type.	Locks are not required.
16	BP 10C item 14. Says to install “integral metal base”, Exclusions says CMU Locker Base. Spec section 105113 2.6 F. calls for “Continuous Zee Base”. Please clarify what type of base is required for lockers.	Install lockers per documents. Refer to specifications for integral metal base requirements. CMU base is to be provided by BP 4A.
17	Spec section para 2.3 A.5. and 2.4 A.6. calls for sound dampening panels and vented panels. Doors can be furnished with one or the other, please clarify which.	Refer to Addendum No. 5, Item - 6

18	Please clarify if there is a Lip-Brick on this project. Detail D6/A512 shows a soldier lip brick where detail D1/A511 shows regular stretcher brick.	Refer to Addendum No. 5, Item - 18 and Item - 19
19	Dwg E201A – there are 2 fixtures at the entrance near CL H.8/.9 that are not identified.	Refer to Addendum No. 5, Item - 26. There are three fixtures in this area; fixture type DL1. Two of these fixtures are to have a generator transfer device.
20	Dwg E201A - there are 2 fixtures at the entrance near CL C/.9 that are not identified.	Refer to Addendum No. 5, Item - 26. There are three fixtures in this area; fixture type DL1. Two of these fixtures are to have a generator transfer device.
21	BP 15B Plumbing- Scope of Work item number 5.a.iv refers to the installation of the fire water at the service yard. FP-011 drawing detail 2 ,says that the fire water services shall be brought into the building by the Site Contractor. Please confirm that all fire water service piping will be brought to the inside of the building by the Site Contractor.	Plumbing contractor will make connection to site watermain, 5' outside building, and route to internal backflow and meter. Fire protection mains will be installed into the mechanical room, 1' above FFE by the Early Site Utility contractor.
22	Spec. Section 220503- Plumbing Pipe, Tube, Fittings list sanitary piping below grade to be extra heavy cast iron bell and spigot. P-001 drawing under Plumbing Materials and Notes- lists for sanitary pipe below grade as service weight cast iron or no hub pipe with heavy duty bands. Which type of the listed materials will be required for the below grade sanitary pipe?	Refer to Addendum No. 5, Item - 21 and "Plumbing General Note" #7 on P-001.
23	P-201A drawing lists that the Electrical Contractor is to furnish the Emergency Gas Shutoff pushbuttons, and furnish the gas solenoid valve and wiring. Please confirm that all Emergency Gas Shutoff equipment and wiring will be furnished by the Electrical Contractor and only the installation of the gas solenoid valve will be required by the Plumbing Contractor.	Refer to Addendum No. 5, Item - 23 and 3/E-002.
24	The door schedule on drawing A601 lists all overhead coiling doors, tagged with type OH, with the note that they are to have insulated slats. This would include interior doors OH156CA, OH156B, and OH154AA. Specification section 083323 lists requirements for both insulated service doors and non-insulated service doors (see subsections 1.2A 1 and 2, 2.2, 2.3). Please clarify if we are to follow the door schedule and provide all interior and exterior doors with insulation, or if we are to provide all interior doors without insulation (leaving only exterior doors with insulation) or another mixture of insulated/non-insulated doors with corresponding door tags describing which are to be insulated vs. non-insulated	Refer to Door Schedules on A-601 and Addendum No. 5, Item - 4
25	Specification section 083323 subsection 2.2 D-2 specifies that we are to provided gasket seals between slats. This is not an available option from any standard overhead coiling door manufacturer. Please confirm if this requirement can be deleted considering bidders will not be able to comply.	Refer to Specification Section 083323 Article 2.2.D.2

26	Specification section 083323 subsection 2.9 C lists 5 different motor mounting configurations - please confirm which of the 5 configurations we are to use for pricing: Top of hood mounting, front of hood mounting, wall mounted, bench mounted, or through wall mounting. Each represents a different price point, especially with the wall mounted or through mounted options adding additional labor to complete.	Refer to Addendum No. 5, Item - 4
27	Scope of work item #1-a for bid package 8B requires the we provide any additional steel required to mount the overhead coiling doors. The structural drawings do not specifically show the overhead coiling door attachment locations, however drawing A-501 detail C2 and C1 both show a clear jamb attachment. In the case of the office/shops building for doors OH132, OH131C, and OH131B, the attachment is to a structural steel tube. Please confirm if Bid Package 8B is responsible for providing these tubes, or if the misc steel subcontractor will provide them for us. All doors in the warehouse building seem to utilize the detail C-1 from A-501 for a pre-engineered building. The jamb detail shows the coiling door attaching to some sort of steel jamb that appears to be included in the pre-engineered building structure. Please confirm that the structural steel attachment at this location is going to be provided with the pre-engineered building or is supplemental steel bid package 8B is responsible for.	BP 05A will provide the HSS Steel members identified on 13/S-802 for the Office/Shops Building. Any additional steel identified in C2/A-501 is to be provided by by the 08B contractor. "Jamb - Re: PEMB" in C1/A-501 is to be provided by the 13A contractor. BP 08B is responsible for any additional miscellaneous steel not shown that should be necessary for mounting/supporting.
28	BP 8B scope of work item #3 states that one of the items that we are to provide is “tubes”, which would be the same tubes shown on A-501. If the structural steel subcontractor is providing the steel tubes, please confirm if we can delete the requirement for “tubes” from item #3.	See response to Q&A Item above.
29	BP 8B Scope of work item #4 states that we are to “coordinate” with the controls and electrical divisions. Please confirm that the electrical subcontractor will provide both high voltage and low voltage connections for the coiling doors, or if one or both items are to be covered by bid package 8B.	Electrical contractor will provide the power supply to an area near the overhead door. Low voltage wiring and connections are by BP 8B.
30	Confirming that parking for 2 vehicles per trade will be available on site.	See Bidders Manual - Part 4 Bid Package Descriptions - Rules of the Site - Item 1.
31	Confirming that lay down area will be provided for a conex on site.	Laydown area is available onsite but must be coordinated with CM.
32	Is BP 15B responsible for temporary water and waste to New Atlantics trailer. And should it be carried in the bid?	See BP 15B description in Bidders Manual. Item 3.a. for work to be included in the bid. No waste for trailer is required.
33	083323 1.2A1 service doors are noted here but the door schedule calls all doors to be insulated. Please clarify.	Refer to Door Schedules on A-601 and Addendum No. 5, Item - 4
34	083323 1.8A2 Warranty. The manufacture offers a 3 year warranty on door and operator combination. Is that acceptable?	Refer to Specification Section 083323 Article 1.8
35	083323 2.7A1 UL gasketing. Not sure what you are looking for here. Please clarify.	Refer to Addendum No. 5, Item - 4
36	111319 1.9A4 Unlimited warranty. For this warranty manufacture requires the following information, number of trucks per pay, number of loads per day, maximum weight of loads.	Refer to Addendum No. 5, Item - 7

37	111319 2.2 E5 auto ramp return. This option is only available on hydraulic levelers not mechanical. Please clarify.	Refer to Addendum No. 5, Item - 7
38	111319 2.2 E6 interlock. Option available on electrically operated units only. Please clarify.	Refer to Addendum No. 5, Item - 7
39	111319 2.2 K Accessories. Which are required?	Refer to Addendum No. 5, Item - 7
40	What is the weight capacity of the dock board?	Refer to Addendum No. 5, Item - 7
41	A102B calls for the dock bumpers to be 9" projection but the specs call for 7 1/2" bumpers. Please clarify.	Refer to Addendum Item No. 5 - Item No. 15
42	What size leveler is needed?	Refer to A1/A-102B.
43	ON P-001 MOCK UP REQUIREMENTS – PC TO PROVIDE FAN COIL MOCK UP – PLEASE ADVISE	Refer to Addendum No. 5, Item - 21
44	ON P-102B 4"FS-1 FOUND NEAR P-8 (x2)—THERE IS NO SPEC FOR FS-1. – PLEASE ADVISE	Refer to Addendum No. 5, Item - 22
45	Mic. lintel schedule ON S-802 calls for LGMF manufacturer to provide steel lintels. Is BP 9A to provide steel lintels?	The loose angle lintels are to be furnished by BP 5A.
46	What bid package is responsible for R-13 vinyl face insulation shown A-003 W4?	BP 9A.
47	Rigid board insulation on exterior sheathing is not part of BP 9A scope of work correct?	Exterior sheathing is part of the 9A scope. The rigid insulation is part of the 4A scope.
48	Who is responsible for the water piping from the PATS/FO to the warehouse? To the wash rack?	All domestic and fire water from 5' outside of buildings is in the site work contractors scope.
49	Who is responsible for the DDC controls for the water meters?	Refer to BP 15B description Item 4.b. Actual DDC controls are provided by BP 15C.
50	Does the warehouse and the PATS / FO need to be priced separately or both part of base bid?	All work in the contract documents not specified as alternates per section 012300 - ALTERNATES is to be Base Bid.
51	S-203 shows the roof framing plan for the PATS FO, storage shed and wash station. Where is the roof framing plan for the warehouse?	Warehouse is Pre-Engineered Metal Building; refer to 1/S-202, A4/A-302 and B4/A-302.
52	With no roof drawing is there any structural roof support in between the 25' span between the purlins. We need something to hang our piping from.	Warehouse is Pre-Engineered Metal Building; refer to 1/S-202, A4/A-302 and B4/A-302.
53	Is BP 9A responsible for blocking shown on A-551-D4 & D5?	BP 7B is responsible for all roof blocking.
54	Test and Balance - In New Atlantic Bidders Manual item #1 spec section 230553 is referenced. Please clarify	Change to specification 230593
55	Drawing A-720 list transition strips under Division 10. Please advise if transitions scope is in respective Division 9 packages.	All transitions are by respective division 9 packages (9C & 9D)
56	Polished Concrete - Traffic control- All trades will need to be off of the area during installation in that particular area. No pedestian or vehicular traffic will be allowed during that time due to contamination of cleaned areas to receive densifiers, stain, or sealers. How is this to be handled?	Work activities will be scheduled accordingly.

57	Plumbing - who is responsible for commissioning?	See commissioning specifications for systems to be commissioned. The third party commissioning agent is provided by the owner, but each trade contractor must be involved as specified.
58	Signage - please clarify directional / wayfinding signage during construction.	See bid package 10B item 8.
59	Is BP 10B to carry temporary signage for all other trade packages?	See bid package 10B item 8.
60	Please clarify if BP 10A is responsible for all items in the Toilet Accessories Legend (A-410) listed as "G.C."	Yes. These Items are to be furnished and installed by BP 10A unless noted as "Owner."
61	BP 16A - #3.a states, “Disregard any reference to work performed by Early Site Package.” Does this mean we are to include or exclude items described for the early site package (like the temporary electrical service)?	The scope of electrical work performed by the Early Site package is the temporary power for the CMAR jobsite trailer only. All other electrical scope including temporary electrical service is by BP 16A.
62	BP 16A - #8.d states, “Furnish and install all clocks.” Please clarify or provide specification if EC is to furnish this item.	See Q&A Item 2.
63	Electrical contractor is to furnish and install the lightning protection system. Can Alternate #13 be deleted from bid package 13A description?	Evaluate Alternate 13 regarding any impact to the PEMB roofing system caused by the Lightning Protection System (i.e. flashing). If there is no effect on cost, write "0"

SPECIFICATIONS & DRAWINGS:

See attached **LS3P ADDENDUM NUMBER FIVE** dated September 11, 2017**.**

GENERAL INFORMATION:

- List of Attachments in Building Addendum #2 – dated 09.15.17
  - LS3P ADDENDUM V – dated 09.11.17
  - UNCC Integrated Life Management (ILM) VDC/BIM Requirements Implementation Plan
  - AED Owners Manual (for reference only)
  - Key Box Cut Sheet (for reference only)
  - Time Clock Manual (for reference only)
  - Time Clock Quick Start Guid (for reference only)

END OF ADDENDUM

ADDENDUM V

Date of Addendum: 11 September 2017

Project Name: Facilities Operations / Parking Services Complex

Building Package

SCO ID# 16-15656-02B

PROJECT INFORMATION

A. Owner: University of North Carolina at Charlotte.

B. SCO ID Number: 16-15656-02B.

C. Architect: LS3P.

D. Architect Project Number: 9202-164730.

NOTICE TO BIDDERS

A. This Addendum is issued **to all Pre-Qualified Subcontractors** pursuant to the **Instructions to Bidders and Conditions of the Contract**. This Addendum serves to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.

B. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.

C. The date for receipt of bids is **Wednesday, September 27, 2017 at 2:00pm.**

D. **ADDENDUM I, II, AND III HAVE BEEN ISSUED IN THE EARLY SITE/STRUCTURAL PACKAGE.**

ATTACHMENTS

A. This Addendum includes the following attached Documents and Specification Sections:
1. Section 000010 – Table of Contents, dated September 11, 2017, (reissued).
2. Substitution Request Form, dated September 11, 2017, (new).
3. Section 012900 – Payment Procedures, dated September 11, 2017, (new).
4. Section 083323 – Overhead Coiling Doors, dated September 11, 2017, (reissued).
5. Section 105113 – Metal Lockers, dated September 11, 2017, (reissued).
6. Section 111319 – Stationary Loading Dock Equipment, dated September 11, 2017, (reissued).

B. This Addendum includes the following attached Sheets:
1. Civil Sheet C300 – Layout Plan – Base Bid, dated 09/11/2017, (reissued).
2. Civil Sheet C401 – Site Details, dated 09/11/2017, (new).
3. Architectural Sheet A-004 – Partition Types, dated 09/11/17, (reissued).
4. Architectural Sheet A-101A – Office/Shops Partial Floor Plan – PATS, dated 09/11/17, (reissued).
5. Architectural Sheet A-101B – Office/Shops Partial Floor Plan – FO, dated 09/11/17, (reissued).

6. Architectural Sheet A-101C – Office/Shops Partial Floor Plan – FO Shops, dated 09/11/17, (reissued).
7. Architectural Sheet A-102B – Warehouse Partial Floor Plan - East, dated 09/11/2017, (reissued).
8. Architectural Sheet A-252 – Interior Elevations, dated 09/11/2017, (reissued).
9. Architectural Sheet A-410 – Toilet Room Plans and Schedule, dated 09/11/2017, (reissued).
10. Architectural Sheet A-511 – Section Details (Exterior), dated 09/11/2017, (reissued).
11. Architectural Sheet A-512 – Section Details (Exterior), dated 09/11/2017, (reissued).
12. Architectural Sheet A-720 – Room Finish Legend and Finish Schedules, dated 09/11/2017, (reissued).
13. Plumbing Sheet P-001 – Plumbing Schedules and Notes, dated 09/11/17, (reissued).
14. Plumbing Sheet P-002 – Plumbing Schedules, dated 09/11/17, (reissued).
15. Plumbing Sheet P-201A – Floor Plan - PATs/FO - Water and Gas, dated 09/11/17, (reissued).
16. Mechanical Sheet M-001 – Mechanical Legend, Notes and Schedules, dated 09/11/17, (reissued).
17. Electrical Sheet E-010 – Electrical Site Plan – Electrical, dated 09/11/17, (reissued).
18. Electrical Sheet E-201A – Reflected Ceiling Plan - PATs/FO - Lighting, dated 09/11/17, (reissued).
19. Electrical Sheet E-501 – Power Riser, dated 09/11/17, (reissued).

REVISIONS TO DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

Item V-1. Replace DOCUMENT 000010 – TABLE OF CONTENTS with revised Document, included in the Attachments.

REVISIONS TO DIVISION 01 GENERAL REQUIREMENTS

Item V-2. SECTION 012500 – SUBSTITUTION PROCEDURES, (not reissued).

1. Add SUBSTITUTION REQUEST FORM following section, included in the Attachments.

Item V-3. Add SECTION 012900 – PAYMENT PROCEDURES, included in the Attachments.

REVISIONS TO DIVISIONS 02 - 49 SPECIFICATION SECTIONS

Item V-4. Replace SECTION 083323 – OVERHEAD COILING DOORS, with revised Document, included in the Attachments.

Item V-5. SECTION 095113 – ACOUSTICAL PANEL CEILINGS, Article: Make the following revisions:

A. Article 2.3.A.1.a : Revise “Product: Cortega #770 Square Lay-In.” to read “Product: Cortega #769A Square Lay-In.”

Item V-6. Replace SECTION 105113 – METAL LOCKERS with revised Document, included in the Attachments.

Item V-7. SECTION 111319 – STATIONARY LOADING DOCK EQUIPMENT with revised Document, included in the Attachments

Item V-8. SECTION 133419 – METAL BUILDING SYSTEMS, Article: Make the following revisions:

A. Article 2.4.I.3: Revise "Primer: SSPC-Paint 15, Type I, red oxide." to read "Primer: SSPC-Paint 15, Type I, gray."

REVISIONS TO DRAWING SHEETS

Item V-9. Replace SHEET C300 – LAYOUT PLAN – BASE BID with revised Sheet C300, included in the Attachments.

Item V-10. Add SHEET C401 – SITE DETAILS, included in the Attachments.

Item V-11. Replace SHEET A-004 – PARTITION TYPES with revised Sheet A-004, included in the Attachments.

Item V-12. Replace SHEET A-101A - OFFICE/SHOPS PARTIAL FLOOR PLAN - PATS, with revised Sheet A-101A, included in the Attachments.

Item V-13. Replace SHEET A-101B - OFFICE/SHOPS PARTIAL FLOOR PLAN - FO, with revised Sheet A-101B, included in the Attachments.

Item V-14. Replace SHEET A-101C – OFFICE/SHOPS PARTIAL FLOOR PLAN - FO SHOPS with revised Sheet A-101C, included in the Attachments.

Item V-15. Replace SHEET A-102B – WAREHOUSE PARTIAL FLOOR PLAN – EAST with revised Sheet A-102B, included in the Attachments.

Item V-16. Replace SHEET A-252 – INTERIOR ELEVATIONS with revised Sheet A-252, included in the Attachments.

Item V-17. Replace SHEET A-410 – TOILET ROOM PLANS AND SCHEDULE with revised Sheet A-410, included in the Attachments.

Item V-18. Replace SHEET A-511 – SECTION DETAILS (EXTERIOR) with revised Sheet A-511, included in the Attachments.

Item V-19. Replace SHEET A-512 – SECTION DETAILS (EXTERIOR) with revised Sheet A-512, included in the Attachments.

Item V-20. Replace SHEET A-720 – ROOM FINISH LEGEND AND FINISH SCHEDULES with revised Sheet A-720, included in the Attachments.

Item V-21. Replace SHEET P-001 – PLUMBING SCHEDULES AND NOTES with revised Sheet P-001, included in the Attachments.

Item V-22. Replace SHEET P-002 – PLUMBING SCHEDULES with revised Sheet P-002, included in the Attachments.

Item V-23. Replace SHEET P-201A – FLOOR PLAN - PATS/FO - WATER AND GAS with revised Sheet P-201A, included in the Attachments.

Item V-24. Replace SHEET M-001 – MECHANICAL LEGEND, NOTES AND SCHEDULES with revised Sheet M-001, included in the Attachments.

Item V-25. Replace SHEET E-010 – ELECTRICAL SITE PLAN - ELECTRICAL with revised Sheet E-010, included in the Attachments.

Item V-26. Replace SHEET E-201A – REFLECTED CEILING PLAN - PATS/FO - LIGHTING with revised Sheet E-201A, included in the Attachments.

Item V-27. Replace SHEET E-501 – POWER RISER with revised Sheet E-501, included in the Attachments.

END OF ADDENDUM V

TABLE OF CONTENTS
FOR

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

UNC CHARLOTTE

CHARLOTTE, NORTH CAROLINA

(*Sections listed in *ITALICS* are included for Reference Only)

VOLUME ONE

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

DIVISION 08 - OPENINGS

DIVISION 09 - FINISHES

DIVISION 10 - SPECIALTIES

VOLUME TWO

END OF TABLE OF CONTENTS

Date:_____

Substitution Request Form

UNCC Facilities Operations / Parking Services Complex
Charlotte, NC

LS3P Project #: 9202-164730

Owner: _____

To: _____

From: _____

Architect: _____

Contractor: _____

CONTRACTOR'S REQUEST, WITH SUPPORTING DATA:

1. Section of the Specifications to which this request applies:

   _____ Product data for proposed substitution is attached (description of product, reference standards, performance and test data).

   _____ Sample is attached

   _____ Sample will be sent if requested by Architect

2. Itemized comparison of proposed substitution with product specified.

	Original Product	Substitution
Name, Brand:	_____	_____
Catalog Number:	_____	_____
Manufacturer:	_____	_____

Significant Variations: _____

_____

_____

3. Unit costs of original product and proposed substitution

   Original Product: $ _____ per _____

   Substitution: $ _____ per _____

   a) State whether cost is for: _____Material Only or _____ Material Installed

4. Proposed change in Contract Sum:

   Credit to Owner: $ _____

   Additional Cost to Owner: $ _____

5. Proposed Change in Contract Time:

   Reduce/Increase Contract Time by _____days.

6. Effect of the proposed substitution on other parts of the Work, or on other contracts:

   _____

   _____

   _____

7. Reason for requesting substitution:

   _____

   _____

   _____

CONTRACTOR'S STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENTS:

We have investigated the proposed substitution and:

1. Believe that it is equal or superior in all respects to the originally specified product, except as stated in #2 above.
2. Shall provide the same warranty as required in General Conditions.
3. Shall provide the same special warranty or guaranty as specified.
4. Have included all cost data and cost implications of the proposed substitutions.
5. Shall pay review, redesign and special inspection costs caused by the use of this product.
6. Shall pay additional costs to other contractors caused by the substitution.
7. Shall coordinate the incorporation of the proposed substitution in the Work.
8. Shall modify other parts of the Work as may be needed to make all parts of the Work complete and functioning.
9. Waive future claims for added cost to Contractor caused by the proposed substitution.

Contractor (Signature): _____ Date: _____

ARCHITECT'S REVIEW AND ACTION:

_____ Rejected

_____ Provide more information in the following categories. Resubmit.

_____ Sign contractor's Statement of Conformance. Resubmit.

_____ The Proposed substitution is approved, with the following conditions:

_____

_____

_____

The following changes will be made by Change Order number: _____

Addition/Deduction from the Contract Sum: $ _____

Addition/Deduction from the Contract Time: _____ Days

_____ _____

LS3P Date

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Documents:

1. Division 01 Section "Unit Prices" for administrative requirements governing the use of unit prices.
2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Construction Manager's construction schedule.
4. Division 01 Section "Submittal Procedures" for administrative requirements governing the preparation and submittal of the submittal schedule.
5. Division 01 Section “Project Closeout” for requirements precedent to final applications for payment.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Construction Manager's construction schedule.

1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:

   a. Application for Payment forms with continuation sheets.
   b. Submittal schedule.
   c. Items required to be indicated as separate activities in Construction Manager's construction schedule.

2. Submit the schedule of values to Architect through Construction Manager at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Separate Elements of Work: Where the Construction Manager's construction schedule defines separate elements of the Work, provide subschedules showing values correlated with each element.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:
   a. Project name and location.

b. Name of Architect.
c. Architect's project number.
d. Contractor's name and address.
e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
      1) Labor.
      2) Materials.
      3) Equipment.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of Contract Sum.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Construction Manager's option.
10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Final Acceptance, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Construction Manager. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702/CMa and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Construction Manager. Construction Manager will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Construction Manager's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders issued before last day of construction period covered by application.
4. Provide Sales and Use Tax Report with each Application for Payment.

E. Transmittal: Submit five signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Construction Manager's construction schedule (preliminary if not final).
4. Combined Construction Manager's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).

6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Construction Manager's staff assignments.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.
13. Certificates of insurance and insurance policies.

H. Subsequent Applications for Payment: After issuing the Initial Application for Payment, administrative actions and submittals that must precede or coincide with submittal of remaining Applications for Payment include the following:

1. Reports and other documents indicated in Division 01 Section "Construction Progress Documentation".

I. Application for Payment at Final Acceptance: After issuing the Certificate of Final Acceptance, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Final Acceptance issued previously for Owner occupancy of designated portions of the Work.

J. Submittals that must precede or coincide with submittal of Application for Payment at Final Acceptance include the following:

1. Operation and Maintenance Data final submittal.

K. Final Payment Application: After completing Project closeout requirements, submit Final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements, including submittal of record Documents.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. NC SCO Document “Contractor’s Affidavit of Payment of Debts and Claims.”
5. NC SCO Document “Contractor’s Affidavit of Release of Liens.”
6. NC SCO Document “Consent of Surety to Final Payment.”
7. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 083323 - OVERHEAD COILING DOORS

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. Service doors.~~
2. Insulated service doors.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design overhead coiling doors, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

1. Design Wind Load: As indicated on Drawings.
2. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.

C. Operation Cycles: Provide overhead coiling door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

1.4 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

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

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
5. Show locations of controls, locking devices, and other accessories.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum of ten (10) years experience in producing rolling doors of the type specified.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1. Installer shall provide evidence of at least five (5) years experience with a minimum of three (3) projects of equivalent size and scope within the last two (2) years, and have the manufacturer’s approval.
2. Manufacturers’ or installers’ logos, decals, or signs shall not be allowed to be applied to automatic door operators.

C. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

D. Regulatory Requirements: Comply with applicable provisions in ICC/ANSI A117.1.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of coiling doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Faulty operation of hardware.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use, rust through.
      d. Delamination of exterior or interior facing materials.
   2. Warranty Period: Five years from date of Final Acceptance.

B. Special Finish Warranty: Manufacturer's standard from in which manufacturer agrees to repair or replace components that show evidence of deterioration of factory applied finishes within specified warranty period.
   1. Warranty Period: 10 years from date of Final Acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. General: Manufacturers' or installers' logos, decals, or signs shall not be allowed to be applied to automatic door operators.

B. Manufacturers: Subject to compliance with requirements, provide products approved by Architect by one of the following:
   1. Cornell Iron Works, Inc.
   2. Cookson Company (The).
   3. McKeon Door Company.
   4. Overhead Door Corporation.

2.2 DOOR ASSEMBLY

A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
   1. Include tamperproof cycle counter.

C. Door Curtain Material: Galvanized steel; 22 ga thick.

D. Door Curtain Slats: Flat profile slats of ~~1 1/2 inch~~ **1-7/8- to 3-1/4- inch** center-to-center height.

1. Insulated-Slat Interior Facing: Metal.
2. Gasket Seal: Manufacturer's standard continuous gaskets between slats.

E. Bottom Bar: Two angles, each not less than 2 inch by 2 inch by 1/8 inch; fabricated from hot-dip galvanized and finished to match door.

F. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats. Provide removable post(s) and jamb guides where shown on Drawings.

G. Hood: Match curtain material and finish.

1. Shape: As shown on Drawings.
2. Mounting: As shown on Drawings.

H. Locking Devices: Equip door with slide bolt for padlock.

I. Electric Door Operator:

1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
2. Operator Location: As indicated on Drawings.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Exterior, wet, and humid.
5. Motor Electrical Characteristics: As recommended by manufacturer.

    a. Voltage: 120-V ac, single phase, 60 Hz.

6. Emergency Manual Operation: Push-up type.

7. Control Station(s): Where indicated on Drawings.
8. Other Equipment: Audible and visual signals.

J. Door Finish:

1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.

    a. Galvanized steel curtain slats to be phosphate treated and finished with a baked-on prime coat of paint. Galvanized steel hood and all other exposed ferrous surfaces shall be primed

~~2.3 DOOR ASSEMBLY~~

~~A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.~~

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

1. Include tamperproof cycle counter.

C. Door Curtain Material: Galvanized steel.

D. Door Curtain Slats: Flat profile slats of 1-7/8 inch to 3-1/4 inch center-to-center height.

E. Bottom Bar: Two angles, each not less than 2 inch by 2 inch by 1/8 inch; fabricated from hot-dip galvanized steel and finished to match door.

F. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats. Provide removable post(s) and jamb guides where shown on Drawings.

G. Hood: Match curtain material and finish.

1. Shape: As shown on Drawings.
2. Mounting: As shown on Drawings.

H. Locking Devices: Equip door with slide bolt for padlock.

I. Electric Door Operator:

1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
2. Operator Location: As indicated on Drawings.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Exterior, wet, and humid.
5. Motor Electrical Characteristics: As recommended by manufacturer.

a. Voltage: 120 V ac, single phase, 60 Hz.

6. Emergency Manual Operation: Push-up type.

7. Control Station(s): Where indicated on Drawings.
8. Other Equipment: Audible and visual signals.

J. Door Finish:

1. Baked Enamel or Powder Coated Finish: Color as selected by Architect from manufacturer's full range.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel sheet; complying with ASTM A 653/A 653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
2. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84 or UL 723. Enclose insulation completely within slat faces.
3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch and minimum aluminum thickness of 0.032 inch.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.5 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Galvanized Steel: Nominal 24 gauge thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 653/A 653M.
2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

B. Intermediate supports shall be provided as required to prevent excessive sag. The hood shall be equipped with a thermally controlled, internal, galvanized steel flame baffle, when required.

2.6 LOCKING DEVICES

A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

2.7 CURTAIN ACCESSORIES

A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.

1. Provide perimeter gasketing on guides and bottom bars and field installed at the head of the opening. ~~UL listed gasketing shall bear the label of an approved certified testing agency~~. It shall be installed to effectively close the perimeter gaps, but not so tight as to affect the automatic closing of the door under alarm or test conditions.

2. At door head, use 1/8-inch- thick, replaceable, continuous-sheet baffle secured to inside of hood or field- installed on the header.
3. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene.
4. Astragals: For exterior doors, equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper and weathersealing.

B. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

2.8 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel:. Counterbalance shaft assembly shall consist of steel pipe capable of supporting curtain load with maximum deflection of 0.03" per foot of width and helical torsion spring assembly designed for proper balance of door to insure that effort to operate door will not exceed 15 pounds. Provide wheel for applying spring torque and for future adjustment located outside end bracket.

C. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door Operator Location(s): Operator location indicated for each door.

~~1. Top-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on top of the door hood assembly and connected to the door drive shaft with drive chain and sprockets. Headroom is required for this type of mounting.~~

2. Front-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on coil side of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Front clearance is required for this type of mounting.

~~3. Wall Mounted: Operator is mounted to the inside front wall on the left or right side of door and connected to door drive shaft with drive chain and sprockets. Side room is required for this type of mounting. Wall-mounted operator can also be mounted above or below shaft; if above shaft, headroom is required.~~

~~4. Bench Mounted: Operator is mounted to the right or left door head plate and connected to the door drive shaft with drive chain and sprockets. Side room is required for this type of mounting.~~

~~5. Through Wall Mounted: Operator is mounted on other side of wall from coil side of door.~~

D. Motors: Reversible-type motor for motor exposure indicated for each door assembly.

1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

E. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."

1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
2. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

F. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

G. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.

2.10 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 STEEL AND GALVANIZED-STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.
   1. Galvanized steel curtain slats to be phosphate treated and finished with a baked-on prime coat of paint. Galvanized steel hood and all other exposed ferrous surfaces shall be primed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

D. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

   1. Perform installation and startup checks according to manufacturer's written instructions.

2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
3. Test door closing when activated by detector or alarm-connected fire-release system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

1. Adjust exterior doors and components to be weather-resistant.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 105113 - METAL LOCKERS

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. ~~Welded corridor lockers.~~
2. Welded athletic lockers.
3. Locker benches.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of metal locker.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker and bench.

B. Shop Drawings: For metal lockers.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Show locker trim and accessories.
3. Include locker identification system and numbering sequence.

C. Samples for Verification: For the following products, in manufacturer's standard size:

1. Lockers and equipment.
2. Locker benches.

D. Product Schedule: For lockers. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

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

1. Full-size units of the following metal locker hardware items equal to 10 units for each type and finish installed.

a. Locks.
b. Identification plates.
c. Hooks.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

B. Deliver combination control charts to Owner by registered mail or overnight package service.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate sizes and locations of wood bases for metal lockers.

B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures.
b. Faulty operation of latches and other door hardware.

2. Damage from deliberate destruction and vandalism is excluded.
3. Warranty Period for Knocked-Down Metal Lockers: Two years from date of Final Acceptance.
4. Warranty Period for Welded Metal Lockers: 10 years from date of Final Acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain metal lockers and accessories from single source from single locker manufacturer.

1. Obtain locks from single lock manufacturer.

B. Basis-of-Design: Subject to compliance with requirements, provide lockers by Penco Products, Inc. or a comparable product by one of the following:

1. List Industries, Inc.
2. Lyon, LLC.
3. Penco Products, Inc. (Basis-of-Design).
4. Republic Storage Systems, LLC.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Requirements: For lockers indicated to be accessible, comply with applicable provisions in the U.S. Department of Justice 2010 ADA Standards for Accessible Design and ICC A117.1.

~~2.3 KNOCKED-DOWN CORRIDOR LOCKERS~~

~~A. Doors: One-piece; fabricated from 0.060-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.~~

~~1. Doors less than 12 inches wide may be fabricated from 0.048-inch nominal-thickness steel sheet.~~
~~2. Doors for box lockers less than 15 inches wide may be fabricated from 0.048-inch nominal-thickness steel sheet.~~
~~3. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.~~
~~4. Stiffeners: Manufacturer's standard full-height stiffener fabricated from 0.048-inch nominal-thickness steel sheet; welded to inner face of doors.~~
~~5. Sound-Dampening Panels: Manufacturer's standard, designed to stiffen doors and reduce sound levels when doors are closed, of die-formed metal with full-perimeter flange and sound-dampening material; welded to inner face of doors.~~
~~6. Door Style: Vented panel as follows:~~

a. Perforated Vents: Manufacturer's standard shape and configuration.

B. Body: Assembled by riveting or bolting body components together. Fabricate from unperforated steel sheet with thicknesses as follows:

1. Tops, Bottoms, and Intermediate Dividers: 0.024 inch nominal thickness, with single bend at sides.
2. Backs and Sides: 0.024 inch nominal thickness, with full height, double flanged connections.
3. Shelves: 0.024 inchnominal thickness, with double bend at front and single bend at sides and back.

C. Frames: Channel formed; fabricated from 0.060 inch nominal thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.

1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
2. Frame Vents: Fabricate face frames with vents.

D. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.

1. Hinges: Manufacturer's standard, steel.

E. Door Handle and Latch for Lockers: Stainless-steel strike plate with integral pull; with steel padlock loop that projects through metal locker door.

F. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.

G. Hooks: Manufacturer's standard ball-pointed type hooks, aluminum or steel; zinc plated.

H. Continuous Sloping Tops: Fabricated from 0.036 inch nominal thickness steel sheet.

1. Closures: Vertical end type.

I. Filler Panels: Fabricated from 0.048 inch nominal thickness steel sheet.

J. Materials:

1. Cold Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
2. Metallic Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with A60 zinc iron, alloy (galvannealed) coating designation.

K. Finish: Baked enamel or powder coat.

1. Color: As indicated on Room Finish Legend on Drawings.

2.4 WELDED ATHLETIC LOCKERS

A. Doors: One piece; fabricated from 0.060-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.

1. Doors less than 12 inches wide may be fabricated from 0.048-inch nominal-thickness steel sheet.
2. Doors for box lockers less than 15 inches wide may be fabricated from 0.048-inch nominal-thickness steel sheet.
3. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.
4. Stiffeners: Manufacturer's standard full-height stiffener fabricated from 0.048-inch nominal-thickness steel sheet; welded to inner face of doors.
5. ~~Sound-Dampening Panels: Manufacturer's standard, designed to stiffen doors and reduce sound levels when doors are closed, of die-formed metal with full-perimeter flange and sound-dampening material; welded to inner face of doors.~~
6. Door Style: Vented panel as follows:

a. Perforated Vents: Manufacturer's standard shape and configuration.

B. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:

1. Tops and Bottoms: 0.060-inch nominal thickness, with single bend at edges.
2. Backs: 0.048-inch nominal thickness.
3. Shelves: 0.060-inch nominal thickness, with double bend at front and single bend at sides and back.

C. Perforated Sides: Fabricated from 0.060-inch nominal-thickness steel sheet with manufacturer's standard diamond perforations.

D. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet or 0.097-inch nominal-thickness steel angles; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.

1. Cross Frames for Double-Tier Lockers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.

E. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.

1. Hinges: Manufacturer's standard, steel.

F. Door Handle and Latch for Box Lockers: Stainless-steel strike plate with integral pull; with steel padlock loop that projects through metal locker door.

G. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.

H. Label Holders: Clear plastic, designed to accommodate changeable card name holders; minimum 1 inch high by 4 inches wide.

I. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.

J. Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.

K. Materials:

1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.

L. Finish: Baked enamel or powder coat.

1. Color: As indicated on Interior Finish Legend on Drawings.

2.5 PEDESTAL BENCHES

A. Provide bench units with overall assembly height of 17-1/2 inches nominal.

B. Bench Tops: Manufacturer’s standard one-piece units, with rounded corners and edges.

1. Size: Minimum 9-1/2 inches wide by 1-1/2 inches thick in lengths indicated on Drawings, but not exceeding 96 inches, **except provide 20- inch-wide tops where accessible benches are indicated.**
2. Material: ~~High impact, high density polyethylene (HDPE).~~ **Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.**

~~a. Color: As selected by Architect from manufacturer’s full range.~~

C. Fixed Pedestals: Manufacturer’s standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors, and as follows:

1. Tubular Steel: 1-1/2-inch- diameter steel tubing secured to bench tops with stainless steel, tamper resistant torx head screws and secured to the floor using lead expansion shields with 2-inch stainless steel Phillip’s head machine bolts.

a. Color: As selected by Architect from manufacturer’s full range.

2.6 FABRICATION

A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.

1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments. Factory weld frame members of each metal locker together to form a rigid, one-piece assembly.

1. Configuration: As indicated on Drawings.

C. Equipment: Provide each locker with an identification plate and the following equipment:

1. Single-Tier Units: Two shelves, one double-prong ceiling hook, and one single-prong wall hooks.
2. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.

~~D. Knocked Down Construction: Fabricate metal lockers using nuts, bolts, screws, or rivets for nominal assembly at Project site.~~

E. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds flush.

F. Continuous Zee Base: Fabricated in lengths as long as practical to enclose base and base ends; finished to match lockers.

G. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.

1. Sloping-top corner fillers, mitered.

H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.

2.7 ACCESSORIES

A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.

B. Anchors: Material, type, and size required for secure anchorage to each substrate.

1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install lockers level, plumb, and true; shim as required, using concealed shims.

~~B. Knocked-Down Lockers: Assemble with standard fasteners, with no exposed fasteners on door faces or face frames.~~

C. Welded Lockers: Connect groups together with standard fasteners, with no exposed fasteners on face frames.

D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.

1. Attach recess trim to recessed metal lockers with concealed clips.
2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
3. Attach sloping-top units to metal lockers, with closures at exposed ends.
4. Attach boxed end panels using concealed fasteners to conceal exposed ends of nonrecessed metal lockers.
5. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.

E. Fixed Benches: Provide no fewer than two pedestals for each bench, uniformly spaced not more than 72 inches apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.

3.3 ADJUSTING

A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

3.4 PROTECTION

A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.

B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

SECTION 111319 - STATIONARY LOADING DOCK EQUIPMENT

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. Recessed dock levelers.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for curb angles at edges of recessed pits and loading dock platform edge channels.
2. Section 111313 "Loading Dock Bumpers" for loading dock bumpers.

1.3 DEFINITIONS

A. Operating Range: Maximum amount of travel above and below the loading dock level.

B. Working Range: Recommended amount of travel above and below the loading dock level for which loading and unloading operations can take place.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for stationary loading dock equipment.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For stationary loading dock equipment.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of anchors and field connection.
3. Include diagrams for power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Welding certificates.

C. Product Test Reports: For each dock leveler, for tests performed by manufacturer and witnessed by a qualified testing agency.

1. Indicate compliance of dock levelers with requirements in MH 30.1 for determining rated capacity, which is based on comprehensive testing within last two years of current products.
2. Submittal Form: According to MH 30.1.

D. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For stationary loading dock equipment to include in operation and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

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

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of construction contiguous with stationary loading dock equipment, including recessed pit dimensions slopes of driveways and heights of loading docks, by field measurements before fabrication.

1.9 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace dock levelers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including cracked or broken structural support members, load-bearing welds, and front and rear hinges.
b. Faulty operation of operators, control system, or hardware.
c. Deck plate failures including cracked plate or permanent deformation in excess of 1/4 inch between deck supports.
d. Hydraulic system failures including failure of hydraulic seals and cylinders.

2. Warranty Period for Structural Assembly: 10 years from date of Final Acceptance.
~~3. Warranty Period for Hydraulic System: Five years from date of Final Acceptance.~~
4. Warranty shall be for unlimited usage of leveler for the specified rated capacity over the term of the warranty.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 RECESSED DOCK LEVELERS

A. General: Recessed, hinged-lip-type dock levelers designed for permanent installation in concrete pits preformed in the edge of loading platform; of type, function, operation, capacity, size, and construction indicated; and complete with controls, safety devices, and accessories required.

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

a. Advance Lifts.
b. Beacon Industries, Inc.
c. Kelley Entrematic.
d. Pentalift Equipment Corporation (Basis-of-Design)
1) Product: Series MU Series Ultima Mechanical Dock Leveler.
e. Rite-Hite Corporation.
f. W.B. McGuire.

B. Standard: Comply with MH 30.1, except for structural testing to establish rated capacity.

C. Rated Capacity: Capable of supporting total gross load of 45,000 lbs. without permanent deflection or distortion.

D. Platform: Not less than 1/4-inch- thick, nonskid steel plate.

1. Platform Size: As indicated on Drawings.
2. Frame: Manufacturer's standard.
3. Toe Guards: Equip open sides of dock leveler over range indicated with metal toe guards.

a. Toe-Guard Range: Entire upper operating range.

E. Hinged Lip: Not less than 1-inch- thick, nonskid steel plate.

1. Hinge: Full-width, piano-type hinge with heavy-wall hinge tube and grease fittings, with gussets on lip and ramp for support.
2. Safety Barrier Lip: Designed to protect material-handling equipment from an accidental fall from loading platform edge of the dock leveler when the leveler is not in use.

F. Function: Dock levelers shall compensate for differences in height between truck bed and loading platform.

1. Vertical Travel: Operating range above platform level of sufficient height to enable lip to extend and clear truck bed before contact with the following minimum working range:

a. Above Adjoining Platform: ~~As indicated on Drawings~~ **12 inches**.
b. Below Adjoining Platform: ~~As indicated on Drawings~~ **12 inches.**

2. Automatic Vertical Compensation: Floating travel of ramp with lip extended and resting on truck bed shall compensate automatically for upward or downward movement of truck bed during loading and unloading.
3. Automatic Lateral Compensation: Tilting of ramp with lip extended and resting on truck bed shall compensate automatically for canted truck beds of up to 4 inches over width of ramp.
4. Lip Operation: Manufacturer's standard mechanism, which automatically extends and supports hinged lip on ramp edge with lip resting on truck bed over dock leveler's working range, allows lip to yield under impact of incoming truck and automatically retracts lip when truck departs.

a. Length of Lip Extension: ~~As indicated on Drawings~~ **20 inches.**

~~5. Automatic Ramp Return: Automatic return of unloaded ramp, from raised or lowered positions to stored position, level with platform, as truck departs.~~
~~6. Interlock: Leveler does not operate while leveler night lock is engaged.~~

G. Mechanical Operating System: Manual control; counterbalance and spring operation. Spring-operated raising and walk-down lowering of unloaded ramp. Equip leveler with an upward-biased-spring counterbalancing mechanism controlled by a hold-down device. Ramp raises to top limit of operating range by operating recessed control handle in ramp to disengage hold-down device. Ramp lowers below platform level with lip retracted by operating auxiliary, recessed control handle to release support legs.

1. Free-Fall Protection: Manufacturer's standard protection system to limit free fall of loaded ramps with front edge supported by truck bed.

H. Construction: Fabricate dock-leveler frame, platform supports, and lip supports from structural- or formed-steel shapes. Weld platform and hinged lip to supports. Fabricate entire assembly to withstand deformation during both operating and stored phases of service. Chamfer lip edge to minimize obstructing wheels of material-handling vehicles.

1. Cross-Traffic Support: Manufacturer's standard method of supporting ramp at platform level in stored position with lip retracted. Provide a means to release supports to allow ramp to descend below platform level.
2. Maintenance Strut: Integral strut to positively support ramp in up position during maintenance of dock leveler.

I. Dock Bumpers: As indicated in Section 111313 "Loading Dock Bumpers."

J. Materials:

1. Steel Plates, Shapes, and Bars: ASTM 36/A 36M.
2. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from steel plate complying with ASTM A 572/A 572M, Grade 55.
3. Steel Tubing: ASTM A 500/A 500M, cold formed.
4. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

K. Dock-Leveler Finish: Manufacturer's standard finish.

1. Toe Guards: Paint toe guards to comply with ANSI Z535.1.

L. Accessories:

1. Curb Angles: 3-by-3-by-1/4-inch galvanized-steel curb angles for edge of recessed leveler pit, with 1/2-inch-diameter by 6-inch-long concrete anchors welded to angle at 6 inches o.c.
2. Self-Forming Pan: Manufacturer's standard prefabricated, self-forming steel form system for poured-in-place construction of concrete pit.
3. ~~Night Locks: Manufacturer's standard means to prevent extending lip and lowering ramp when overhead doors are locked.~~
4. ~~Side and rear weatherseals.~~
5. ~~Foam insulation under dock leveler platform.~~
6. Abrasive skid-resistant surface.

2.3 FINISH REQUIREMENTS

A. Finish loading dock equipment after assembly and testing.

B. Galvanizing: Hot-dip galvanize components to comply with the following:

1. ASTM A 123/A 123M for iron and steel loading dock equipment.
2. ASTM A 153/A 153M or ASTM F 2329 for iron and steel hardware for loading dock equipment.

C. Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat in manufacturer's standard color.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical systems for loading dock equipment to verify actual locations of connections before equipment installation.

C. Examine walls and floors of pits for suitable conditions where recessed loading dock equipment is to be installed. Pits shall be plumb and square and properly sloped for drainage from back to front of loading dock.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate size and location of loading dock equipment indicated to be attached to or recessed into concrete or masonry, and furnish anchoring devices with templates, diagrams, and instructions for their installation.

B. Set curb angles in concrete edges of dock-leveler recessed pits with tops flush with loading platform. Fit exposed connections together to form hairline joints.

C. Set curb angles in concrete edges of truck-leveler recessed pits with tops flush with driveway. Fit exposed connections together to form hairline joints.

D. Place self-forming pan system for recessed dock levelers in proper relation to loading platform before pouring concrete.

E. Clean recessed pits of debris.

3.3 INSTALLATION

A. General: Install loading dock equipment as required for a complete installation.

1. Rough-in electrical connections.

B. Recessed Dock Levelers: Attach dock levelers securely to loading dock platform, flush with adjacent loading dock surfaces and square to recessed pit.

3.4 ADJUSTING

A. Adjust loading dock equipment to function smoothly and safely, and lubricate as recommended by manufacturer.

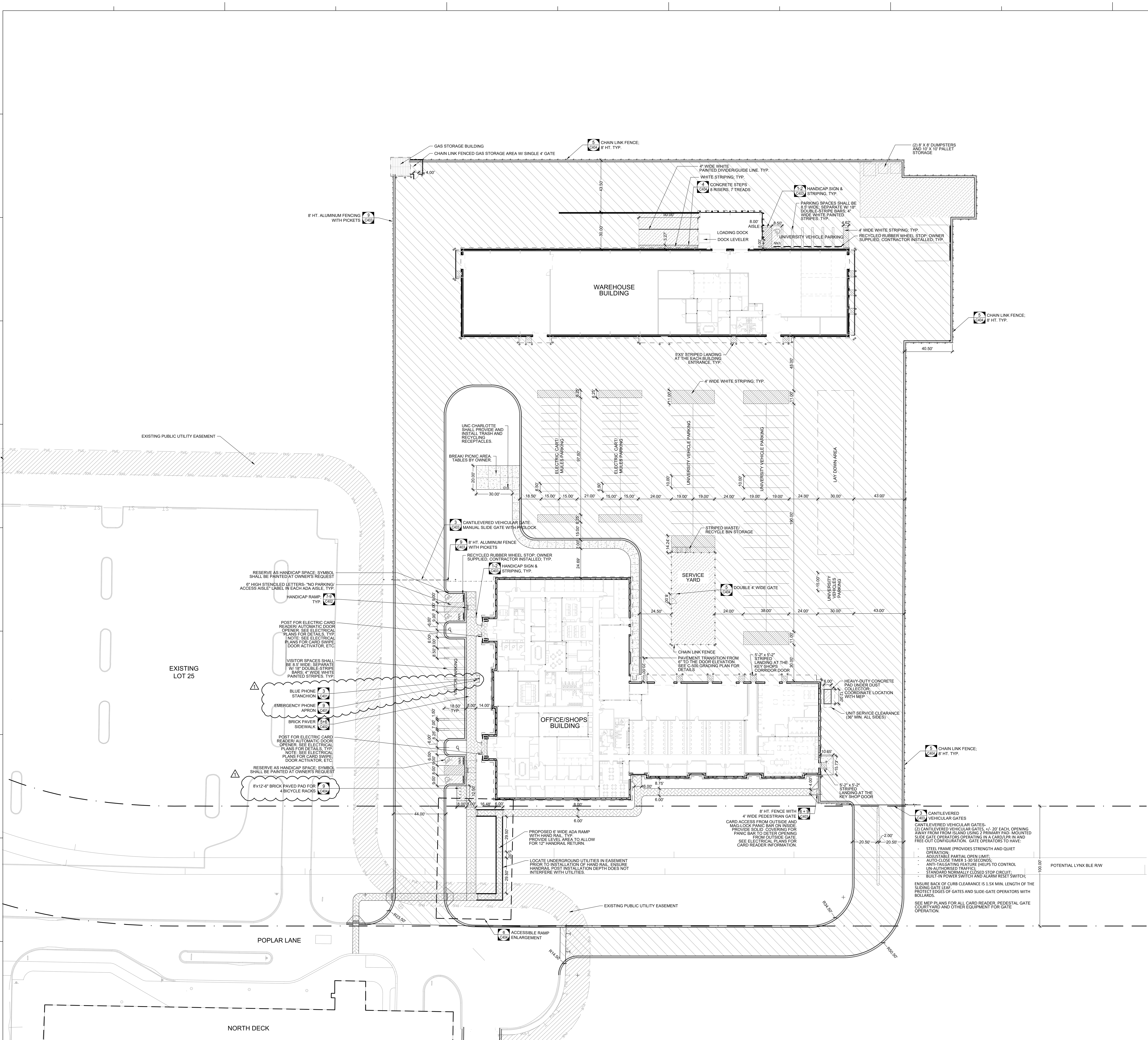
B. Test dock levelers for vertical travel within operating range indicated.

C. After completing installation of exposed, factory-finished loading dock equipment, inspect exposed finishes and repair damaged finishes.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain loading dock equipment.

END OF SECTION 111319



GAS STORAGE BUILDING
CHAIN LINK FENCED GAS STORAGE AREA W/ SINGLE 4' GATE
CHAIN LINK FENCE; 8' HT. TYP.
(2) 8' X 8' DUMPSTERS AND 10' X 10' PALLET STORAGE
8' HT. ALUMINUM FENCING WITH PICKETS
4' WIDE WHITE PAINTED DIVIDER/GUIDE LINE. TYP.
WHITE STRIPING, TYP.
CONCRETE STEPS 8 RISERS, 7 TREADS
HANDICAP SIGN & STRIPING, TYP.
LOADING DOCK
DOCK LEVELER
UNIVERSITY VEHICLE PARKING
4' WIDE WHITE STRIPING, TYP.
RECYCLED RUBBER WHEEL STOP: OWNER SUPPLIED, CONTRACTOR INSTALLED, TYP.
WAREHOUSE BUILDING
5'X5' STRIPED LANDING AT THE EACH BUILDING ENTRANCE, TYP.
4' WIDE WHITE STRIPING, TYP.
UNC CHARLOTTE SHALL PROVIDE AND INSTALL TRASH AND RECYCLING RECEPTACLES.
BREAK/ PICNIC AREA. TABLES BY OWNER.
ELECTRIC CART/ MULES PARKING
UNIVERSITY VEHICLE PARKING
LAY DOWN AREA
EXISTING PUBLIC UTILITY EASEMENT
CANTILEVERED VEHICULAR GATE: MANUAL SLIDE GATE WITH PADLOCK
8' HT. ALUMINUM FENCE WITH PICKETS
RECYCLED RUBBER WHEEL STOP: OWNER SUPPLIED, CONTRACTOR INSTALLED, TYP.
HANDICAP SIGN & STRIPING, TYP.
STRIPED WASTE/ RECYCLE BIN STORAGE
SERVICE YARD
DOUBLE 4' WIDE GATE
UNIVERSITY VEHICLES PARKING
RESERVE AS HANDICAP SPACE; SYMBOL SHALL BE PAINTED AT OWNER'S REQUEST
6" HIGH STENCILED LETTERS: "NO PARKING/ ACCESS AISLE" LABEL IN EACH ADA AISLE, TYP.
HANDICAP RAMP, TYP.
POST FOR ELECTRIC CARD READER/ AUTOMATIC DOOR OPENER. SEE ELECTRICAL PLANS FOR DETAILS, TYP. NOTE: SEE ELECTRICAL PLANS FOR CARD SWIPE, DOOR ACTIVATOR, ETC.
VISITOR SPACES SHALL BE 8.5' WIDE, SEPARATE W/ 18" DOUBLE-STRIPE BARS, 4" WIDE WHITE PAINTED STRIPES, TYP.
EXISTING LOT 25
BLUE PHONE STANCHION
EMERGENCY PHONE APRON
BRICK PAVER SIDEWALK
8'x12'-6" BRICK PAVED PAD FOR 4 BICYCLE RACKS
CHAIN LINK FENCE
PAVEMENT TRANSITION FROM 6" TO THE DOOR ELEVATION SEE C-500 GRADING PLAN FOR DETAILS
5'-2" x 5'-2" STRIPED LANDING AT THE KEY SHOPS CORRIDOR DOOR
OFFICE/SHOPS BUILDING
HEAVY-DUTY CONCRETE PAD UNDER DUST COLLECTOR; COORDINATE LOCATION WITH MEP
UNIT SERVICE CLEARANCE (36" MIN. ALL SIDES)
CHAIN LINK FENCE; 8' HT. TYP.
5'-2" x 5'-2" STRIPED LANDING AT THE KEY SHOP DOOR
8' HT. FENCE WITH 4' WIDE PEDESTRIAN GATE
CARD ACCESS FROM OUTSIDE AND MAG-LOCK PANIC BAR ON INSIDE. PROVIDE SOLID COVERING FOR PANIC BAR TO DETER OPENING FROM OUTSIDE GATE. SEE ELECTRICAL PLANS FOR CARD READER INFORMATION.
CANTILEVERED VEHICULAR GATES
PROPOSED 6' WIDE ADA RAMP WITH HAND RAIL, TYP. PROVIDE LEVEL AREA TO ALLOW FOR 12" HANDRAIL RETURN.
LOCATE UNDERGROUND UTILITIES IN EASEMENT PRIOR TO INSTALLATION OF HAND RAIL. ENSURE HANDRAIL POST INSTALLATION DEPTH DOES NOT INTERFERE WITH UTILITIES.
POTENTIAL LYNX BLE R/W
EXISTING PUBLIC UTILITY EASEMENT
ACCESSIBLE RAMP ENLARGEMENT
POPLAR LANE
NORTH DECK
BEFORE YOU DIG! CALL 1-800-632-4949 N.C. ONE-CALL CENTER IT'S THE LAW!
PROJECT NORTH
TRUE NORTH

CANTILEVERED VEHICULAR GATES- (2) CANTILEVERED VEHICULAR GATES, +/- 20' EACH, OPENING AWAY FROM ISLAND USING 2 PRIMARY PAD- MOUNTED SLIDE GATE OPERATORS OPERATING IN A CARD/LPR IN AND FREE-OUT CONFIGURATION. GATE OPERATORS TO HAVE:

- STEEL FRAME (PROVIDES STRENGTH AND QUIET OPERATION;
- ADJUSTABLE PARTIAL OPEN LIMIT;
- AUTO-CLOSE TIMER 1-30 SECONDS;
- ANTI-TAILGATING FEATURE (HELPS TO CONTROL UN-AUTHORIZED TRAFFIC);
- STANDARD NORMALLY CLOSED STOP CIRCUIT;
- BUILT-IN POWER SWITCH AND ALARM RESET SWITCH;

ENSURE BACK OF CURB CLEARANCE IS 1.5X MIN. LENGTH OF THE SLIDING GATE LEAF.
PROTECT EDGES OF GATES AND SLIDE-GATE OPERATORS WITH BOLLARDS.

SEE MEP PLANS FOR ALL CARD READER, PEDESTAL GATE COURTYARD AND OTHER EQUIPMENT FOR GATE OPERATION.

LAYOUT NOTES:

1. NO WATERCOURSE OR 100 YEAR FLOODPLAIN AS MAPPED BY F.E.M.A. OR AS DEFINED BY ANY FEDERAL, STATE OR LOCAL AUTHORITY IS LOCATED ON THIS PROPERTY.
2. AT TIME OF STAKING, CONTRACTOR TO CONTACT LANDSCAPE ARCHITECT FOR DIGITAL SITE PLAN FILE FOR COORDINATION.
3. SHOULD ANY DISCREPANCIES OR ERRORS BETWEEN COORDINATE POINTS AND DIMENSIONS OR OMISSIONS OF CRITICAL STAKING INFORMATION BE DISCOVERED, CONTACT THE LANDSCAPE ARCHITECT IMMEDIATELY FOR A COORDINATED SOLUTION.
4. ALL DIMENSIONS AND RADII ARE TO THE **BACK OF CURB** UNLESS OTHERWISE NOTED.
5. LAND DEVELOPMENT ENGINEER TO BE GIVEN 24 HOURS NOTICE PRIOR TO START OF CONSTRUCTION.
6. ALL SITE FURNISHINGS TO BE UNC CHARLOTTE STANDARDS. INCLUDE BENCHES, TRASH RECEPTACLES, BIKE RACKS, BOLLARDS, TABLES AND CHAIRS, ETC.

LEGEND

CONCRETE
HEAVY DUTY ASPHALT
HEAVY DUTY CONCRETE
GRAVEL
UNCC STANDARD BRICK PAVER
8' HT CHAIN LINK FENCE
MASONRY SCREEN WALL
8' HT DECORATIVE ALUMINUM FENCE

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

LandDesign.

223 NORTH GRAHAM STREET
CHARLOTTE NC, 28202
(t) 704.333.0325

LANDDESIGN, INC. CORPORATE SEAL C-0653 NORTH CAROLINA

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT #0797 ALLISON W. MERRIMAN
09/11/17

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

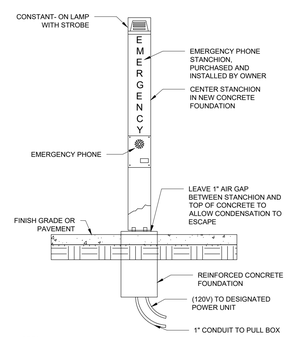
No.	Description	Date
1	ADDENDUM #5	9.11.17

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: AEE
CHECKED BY: AWM

LAYOUT PLAN - BASE BID

C300

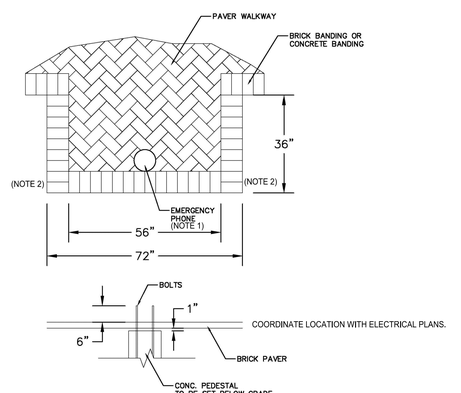
BUILDING BID DOCUMENTS



NOTES
1. STANCHION MOUNT BLUE PHONES WILL BE PURCHASED AND INSTALLED BY UNC CHARLOTTE. BASES WILL BE PROVIDED BY THE E.C. POWER WIRING AND TELECOM WIRING SHALL BE COILED IN THE PULL BOX. FINAL CONNECTIONS TO BE MADE BY UNC CHARLOTTE. GROUNDING BY E.C.

IMPORTANT NOTE
CONTRACTOR MUST FOLLOW FACTORY SPECIFIC INSTALLATION INSTRUCTIONS FOR LOCATING ANCHOR BOLTS BEFORE POURING CONCRETE BASE IN ORDER FOR THE INSTALLED EMERGENCY PHONE TO BE FACING THE PROPER DIRECTION. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THIS DIRECTION WITH THE OWNER AND FOR CORRECT ORIENTATION OF THE EMERGENCY PHONE

3 / C401 BLUE PHONE STANCHION
SECTION — NOT TO SCALE



9 / C401 EMERGENCY PHONE APRON
PLAN AND SECTION — NOT TO SCALE

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
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WWW.LS3P.COM

LandDesign

223 NORTH GRAHAM STREET
CHARLOTTE NC, 28202
(t) 704.333.0325

LANDDESIGN, INC. CORPORATE SEAL C-0653 NORTH CAROLINA

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 0797 NICHOLAS W. ALLISON

09/11/17

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

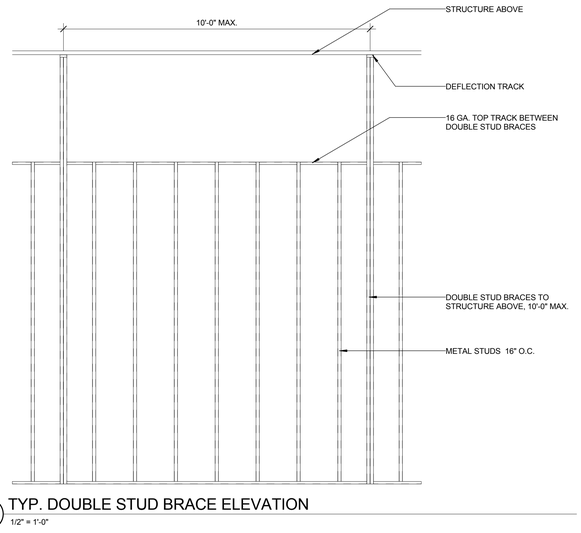
No.	Description	Date
1	ADDENDUM #5	9.11.17

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: AEE
CHECKED BY: AWM

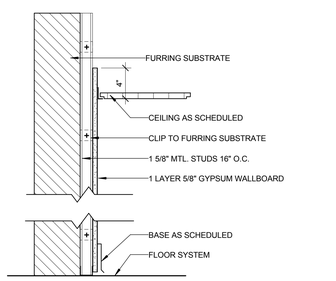
SITE DETAILS

C401

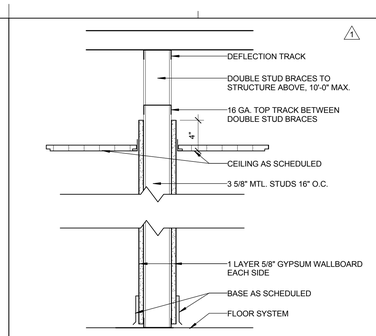
BUILDING BID DOCUMENTS



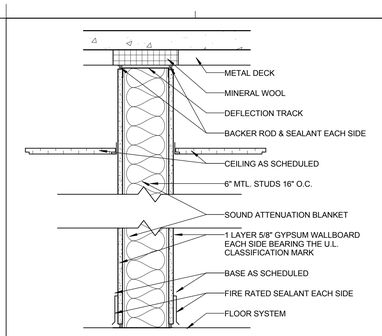
D1 TYP. DOUBLE STUD BRACE ELEVATION
1/2" = 1'-0"



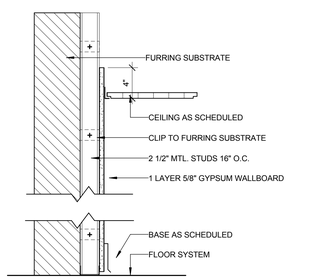
G21	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A



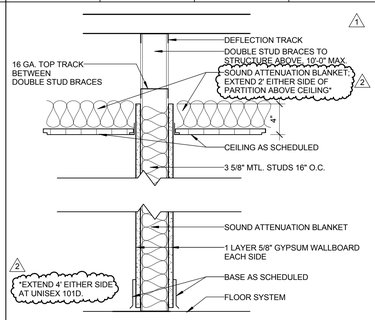
G31	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A



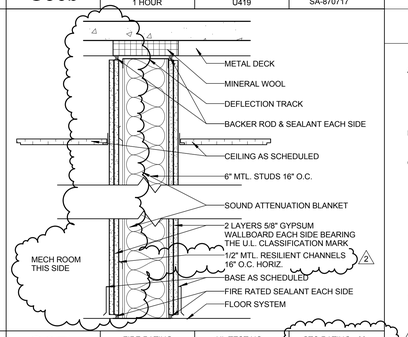
G36b	FIRE RATING	UL TEST NO.	STC RATING - 49
	1 HOUR	U419	SA-870717



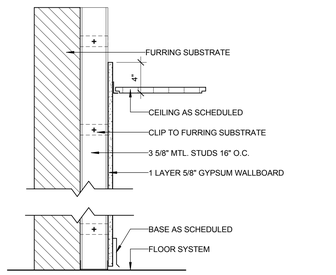
G22	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A



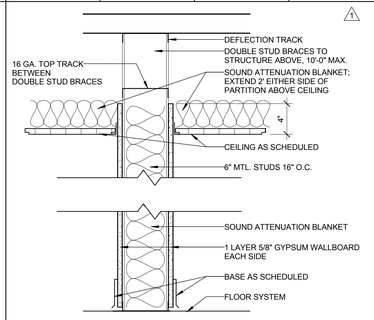
G32	FIRE RATING	UL TEST NO.	STC RATING - 49
	N/A	N/A	SA-870717



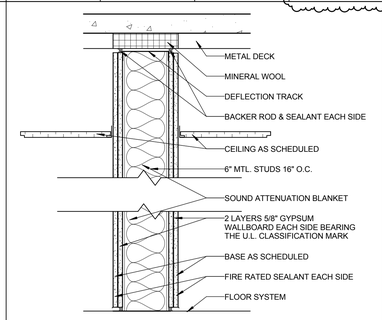
G37b	FIRE RATING	UL TEST NO.	STC RATING - 60+
	1 HOUR	U419	TL13-193



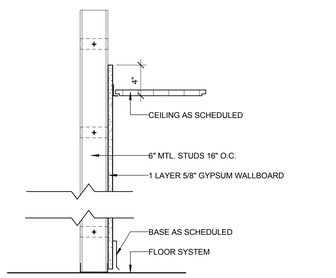
G23	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A



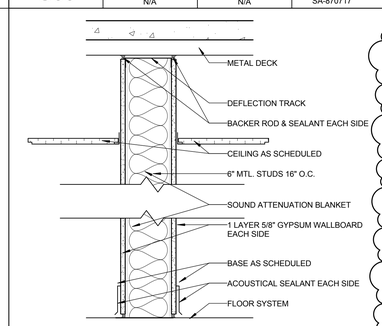
G33	FIRE RATING	UL TEST NO.	STC RATING - 49
	N/A	N/A	SA-870717



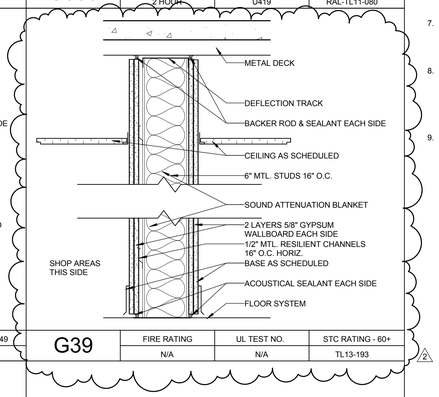
G38d	FIRE RATING	UL TEST NO.	STC RATING - 52
	2 HOUR	U419	RAL-TL11-080



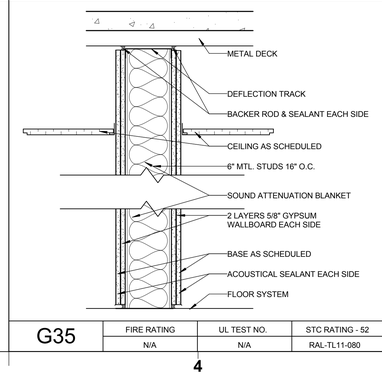
G24	FIRE RATING	UL TEST NO.	STC RATING - N/A
	N/A	N/A	N/A



G34	FIRE RATING	UL TEST NO.	STC RATING - 49
	N/A	N/A	SA-870717

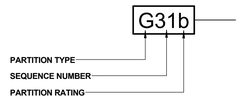


G39	FIRE RATING	UL TEST NO.	STC RATING - 60+
	N/A	N/A	TL13-193



G35	FIRE RATING	UL TEST NO.	STC RATING - 52
	N/A	N/A	RAL-TL11-080

PARTITION DESIGNATION KEY



PARTITION TYPE

C - CONCRETE	F - FURRING
E - EXTERIOR	G - GYPSUM
S - SHAFT	D - DEMOUNTABLE

PARTITION RATING

a - SMOKE RATED
b - 1 HOUR FIRE RATED
c - 1 HOUR FIRE AND SMOKE RATED
d - 2 HOUR FIRE RATED

GENERAL NOTES

A. THE CONSTRUCTION SUBSYSTEMS AND PARTITION TYPES SHOWN, INDICATE THE GENERAL CONSTRUCTION FEATURES OF THE MAJORITY OF THE CONSTRUCTION SYSTEMS TO BE PROVIDED. THEY ARE NOT INTENDED TO REPRESENT A COMPLETE LISTING OF SYSTEMS REQUIRED AND DO NOT NECESSARILY INDICATE ALL OF THE CONSTRUCTION REQUIREMENTS TO BE PROVIDED BY THE CONTRACT DOCUMENTS.

B. SEE REFLECTED CEILING PLANS FOR ADDITIONAL REQUIREMENTS FOR PARTITION TYPES.

C. REFERENCE FOR FIRE RESISTANCE & SOUND RATINGS:

CCMA: CAROLINAS CONCRETE MASONRY ASSOCIATION, CONCRETE MASONRY HANDBOOK, SOUND CONTROL

GA: GYPSUM ASSOCIATION, FIRE RESISTANCE DESIGN MANUAL, ELEVENTH EDITION

NCMA: NATIONAL CONCRETE MASONRY ASSOCIATION, TEK NOTES

SA: SHINER AND ASSOCIATES

SBCC: STANDARD BUILDING CODE CONGRESS, LATEST EDITION

UL: UNDERWRITERS LABORATORY, INC., FIRE RESISTANCE DIRECTORY

D. WHERE FURRED/SINGLE FACED SYSTEMS OCCUR ON CONCRETE MASONRY UNIT WALL OR PARTITION SURFACE, PROVIDE GYPSUM BOARD TO 4" ABOVE CEILING, OR IF NO CEILING OCCURS, PROVIDE GYPSUM BOARD TO UNDERSIDE OF DECK.

NOTES

1. CONCRETE MASONRY UNIT WALLS AND PARTITIONS: PROVIDE HORIZONTAL JOINT REINFORCEMENT, VERTICAL REINFORCEMENT, BOND BEAMS, GROUTING, AND ADDITIONAL REQUIREMENTS AS INDICATED BY STRUCTURAL DRAWINGS AND SPECIFICATIONS.
2. COLOR, TEXTURE AND FACE PATTERN MAY VARY. SEE MISCELLANEOUS AND EXTERIOR COLOR SCHEDULE , SPECIFICATIONS AND DRAWINGS FOR CLARIFICATION.
3. KEEP CAVITY CLEAR OF ALL MORTAR.
4. SEE FINISH SCHEDULE FOR LOCATION OF APPLIED FINISHES (SUCH AS CERAMIC TILE, WALL COVERING, ETC) THAT MAY AFFECT THE PARTITION SURFACE AND CONSTRUCTION REQUIREMENTS.
5. WHERE CERAMIC TILE AND CEMENTITIOUS BACKER UNIT ARE NOT SCHEDULED TO BE FULL HEIGHT OF PARTITION, PROVIDE GYPSUM BOARD (TYPE X @ RATED PARTITIONS) @ THOSE PORTIONS OF THE PARTITION NOT SCHEDULED TO RECEIVE CERAMIC TILE. CEMENTITIOUS BACKER UNIT TO BE SAME THICKNESS AS GYPSUM BOARD.
6. PROVIDE FIRE RATED CMU (OR EQUIVALENT) WHERE PARTITION INDICATED TO BE FIRE RATED ON REFLECTED CEILING PLANS. RATED PARTITION TO MEET CONSTRUCTION REQUIREMENTS OF FIRE RATING REFERENCE LISTED.
7. PROVIDE MANUFACTURER'S PROPRIETARY TYPE 'X' GYPSUM BOARD (MEETING THE DESIGNATED FIRE REFERENCE LISTED) WHERE PARTITION IS INDICATED TO BE FIRE RATED ON REFLECTED CEILING PLANS. RATED PARTITION TO MEET CONSTRUCTION REQUIREMENTS OF FIRE RATING REFERENCE LISTED.
8. PROVIDE ACOUSTICAL SEALANT AT PERIMETER OF ALL SOUND RATED PARTITIONS AND AT ALL PARTITION PENETRATIONS. IF PARTITION IS FIRE RATED, PROVIDE UL LABELED FIRESTOPPING IN PLACE OF ACOUSTICAL SEALANT. AT PARTITIONS THAT ARE SOUND AND FIRE RATED, PROVIDE ACOUSTICAL SEALANT AT PARTITION PENETRATIONS THAT DO NOT REQUIRE FIRESTOPPING (EXAMPLE: DUCT PENETRATIONS WITH FIRE DAMPERS).
9. PROVIDE MOISTURE RESISTANT GYPSUM BOARD IN ALL TOILET ROOMS, ALL SHOWER ROOMS AND ALL CASEWORK WALLS IN BREAKROOM AREAS. 1

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WILLIAM SCOTT HARRIS REGISTERED ARCHITECT 8326 NORTH CAROLINA CHARLOTTE, N.C. 9/11/2017

LS3P ASSOCIATES, LTD. REGISTERED ARCHITECTURAL COMPANY CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum No. 4	08/28/207
2	Addendum No. 5	09/11/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: KF
CHECKED BY: SH

PARTITION TYPES

A-004

BUILDING BID DOCUMENTS

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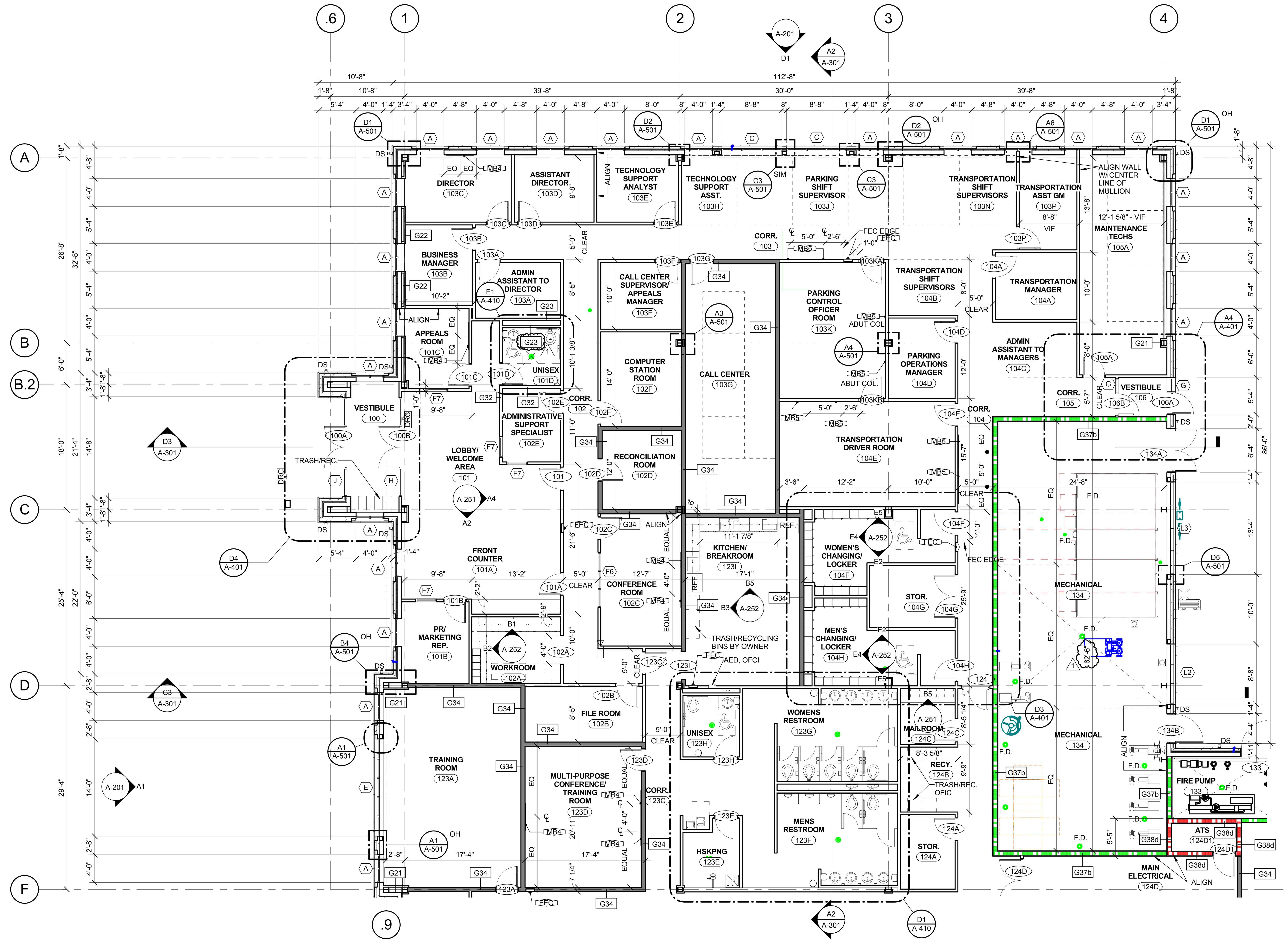

A1 OFFICE/SHOPS PARTIAL FLOOR PLAN - PATS

1/8" = 1'-0"

PROJECT NORTH TRUE NORTH

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FLOOR PLAN SHEET NOTES

1. EXTERIOR DIMENSIONS AT MASONRY VENEER ARE TO FACE OF MASONRY.
2. INTERIOR DIMENSIONS INDICATED ARE TO FACE OF FINISH WALLS AND CENTERLINES OF COLUMNS, UNO.
3. LOCATE DOOR OPENINGS 4" FROM NEAREST PERPENDICULAR WALL, UNO.
4. FIRE AND SOUND RATED WALLS/PARTITIONS TO BE CONSTRUCTED TIGHT TO STRUCTURE, PIPING, DUCTWORK AND OTHER PENETRATIONS. ALL WORK IS TO BE BRACED TO STRUCTURE ABOVE.
5. WHERE PARTITIONS OF DIFFERENT FIRE RATINGS INTERSECT, THE HIGHEST RATED PARTITION SHALL CONTINUE THROUGH. MAINTAIN PARTITION FIRE RATING BEHIND RECESSED FIRE EXTINGUISHER CABINETS.
6. INSTALL BLOCKING IN PARTITIONS FOR CASEWORK, WALL MOUNTED EQUIPMENT, TRIM AND RELATED CONSTRUCTION AS INDICATED IN THE SPECIFICATIONS.
7. SEE LIFE SAFETY PLANS FOR REQUIRED FIRE SEPARATION WALLS.
8. SEE SHEET A-601 & A-603 FOR DOOR WINDOW & GLAZING TYPES
9. SEE SHEET A-603 FOR LOUVER TYPES
10. SEE SHEET A-003 FOR CONSTRUCTION SUBSYSTEMS.
11. SEE SHEET A-251, A-252, A-410, A-411 AND A-761 FOR CASEWORK ELEVATIONS & DETAILS.
12. SEE SHEETS A-251 AND A-252 FOR INTERIOR ELEVATIONS, ACCESSORY DESCRIPTIONS & MOUNTING HEIGHTS.
13. SEE SHEETS A-721 THROUGH A-722 FOR FINISH FLOORING, TRANSITIONS, PATTERNS AND WALL PROTECTION.
14. SEE SHEET A-720 FOR FINISH SCHEDULE.
15. SEE SHEETS A-401 FOR ENLARGED PLANS INDICATING ADDITIONAL DIMENSIONS AND PARTITION TYPES.
16. SEE SHEET A-765 FOR SIGN SCHEDULE & ELEVATIONS AND DETAILS.
17. SEE STRUCTURAL DRAWINGS FOR SLAB DEPRESSIONS AND CUTOUTS.
18. SEE BUILDING ELEVATION DRAWINGS FOR LOCATION OF EXTERIOR MASONRY CONTROL JOINTS.
19. EXTERIOR DIMENSIONS TAKEN FROM MASONRY FACE, NOT METAL PANEL
20. ACCESSIBLE AND COMMON FEATURES, E.G., AUTOMATIC DOOR ACTIVATOR, CARD SWIPE, SHALL BE PLACED 34"-36" AFF. DO NOT PLACE ACCESSIBLE OR COMMON USE BUILDING FEATURES WITHIN 24" OF AN INTERIOR CORNER.

PARTITION NOTES

1. ALL NON-DESIGNATED PARTITIONS SHALL BE TYPE G32.
2. ALL PIPE AND CONDUIT PENETRATIONS THRU 1 HR RATED OR MORE PARTITIONS, FLOORS, ROOF, ETC. SHALL BE SEALED WITH A RESPECTIVELY RATED FIRE BARRIER PENETRATION SEALING SYSTEM BY 3M OR U.L. APPROVED EQUAL
3. TILE BACKER BOARD SHALL BE USED IN ALL LOCATIONS TO RECEIVE TILE FINISHES. REFER TO FINISH SCHEDULE AND INTERIOR ELEVATIONS FOR LOCATIONS..
4. CONTRACTOR SHALL COORDINATE WITH MECHANICAL DUCTWORK PRIOR TO FABRICATION OF PARTITION WALLS.
5. SHOULD CONDITIONS OCCUR WHERE A WALL IS UNABLE TO GO STRAIGHT UP TO STRUCTURE DUE TO PIPING, DUCTWORK, ETC., THE PARTITION (GYPSUM BOARD AND FRAMING) MAY JOG HORIZONTALLY ABOVE THE CEILING TO AVOID THE PROBLEM. RATED WALL INTEGRITY SHALL BE MAINTAINED.
6. WHERE STUDS EXTEND TO STRUCTURE AND GYPSUM WALLBOARD AND SOUND ATTENUATION BLANKETS EXTEND JUST ABOVE THE FINISH CEILING, CAP OFF PARTITION FINISHES WITH A RUNNER CHANNEL WHEN CEILING PLENUM IS USED AS A RETURN AIR PLENUM.
7. DIMENSIONAL CONFLICTS BETWEEN PARTITION TYPES AND THE ARCHITECTURAL FLOOR PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
8. SEE LIFE SAFETY PLANS FOR THE LOCATIONS OF SMOKE BARRIERS, SMOKE PARTITIONS AND FIRE-RATED PARTITIONS.
9. REFER TO UNDERWRITERS LABORATORIES, INC. FIRE RESISTANCE VOLUMES - CURRENT EDITION FOR SPECIFIC CONSTRUCTION REQUIREMENTS OF U.L. LISTED ASSEMBLIES.
10. REFER TO MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR TYPICAL U.L. LISTED PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING APPROPRIATE PROJECT-SPECIFIC U.L. LISTED ASSEMBLIES FOR PENETRATIONS.
11. AT ALL EXISTING AND CONSTRUCTED PARTITIONS THE CONTRACTOR IS TO MAINTAIN THE FIRE-RESISTIVE INTEGRITY
12. PROVIDE ACOUSTICAL SEALANT AT PERIMETER OF ALL SOUND RATED PARTITIONS AND AT ALL PARTITION PENETRATIONS. IF PARTITION IS FIRE RATED, PROVIDE UL LABELED FIRESTOPPING IN PLACE ACOUSTICAL SEALANT AT PARTITIONS THAT ARE SOUND AND FIRE RATED, PROVIDE ACOUSTICAL SEALANT AT PARTITION PENETRATIONS THAT DO NOT REQUIRE FIRESTOPPING (EXAMPLE: DUCT PENETRATIONS WITH FIRE DAMPERS).

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE TYPE W1 U.N.O. SEE A-003 FOR CONSTRUCTION OF SUBSYSTEMS
2. SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES
3. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

NON-RATED WALL. EXTEND GYP. BD. AND FRAMING TO STRUCTURE ABOVE.

NON-RATED WALL. EXTEND GYP. BD. TO MIN. 4" ABOVE FINISHED CEILING AND FRAMING TO STRUCTURE ABOVE.

1 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

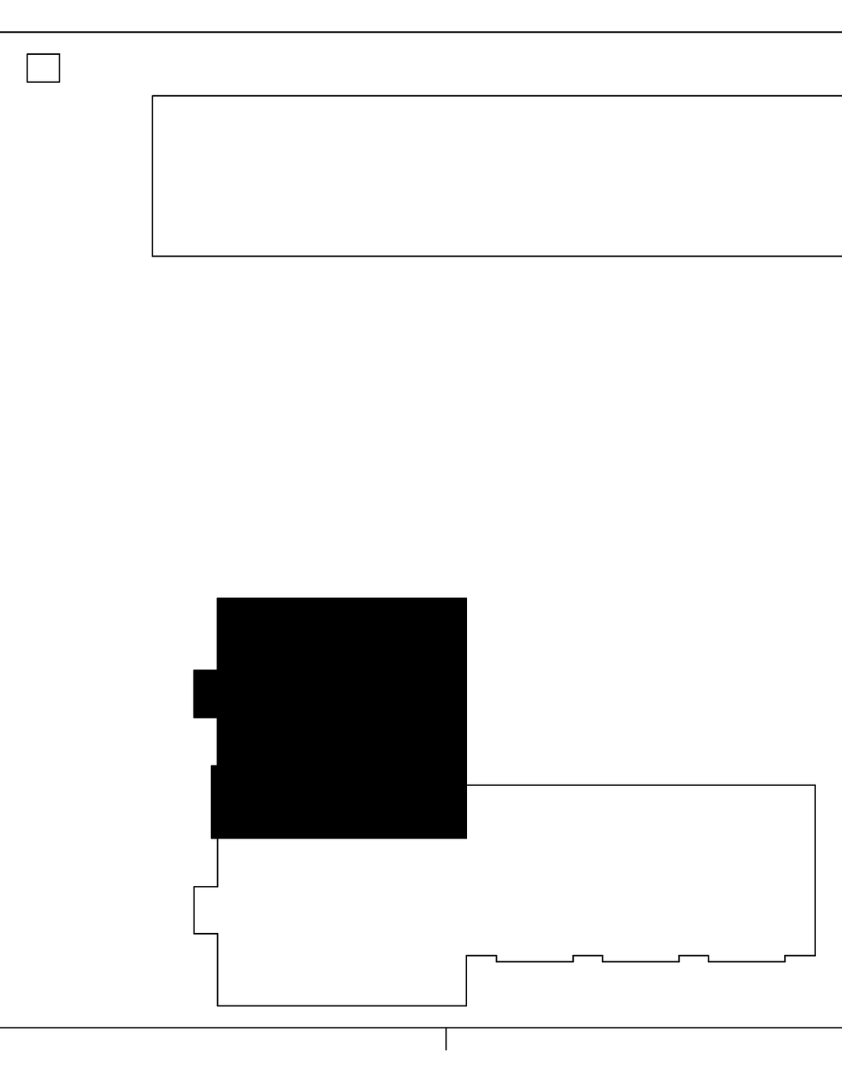
2 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

FEC FIRE EXTINGUISHER CABINET

FEB FIRE EXTINGUISHER BRACKET

CG CORNER GUARD

KEYPLAN



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MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum No. 5	09/11/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: KF
CHECKED BY: SH

OFFICE/SHOPS PARTIAL FLOOR PLAN - PATS

A-101A

BUILDING BID DOCUMENTS

A1 OFFICE SHOPS PARTIAL FLOOR PLAN - FO

1/8" = 1'-0"

PROJECT NORTH TRUE NORTH

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FLOOR PLAN SHEET NOTES

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6. INSTALL BLOCKING IN PARTITIONS FOR CASEWORK, WALL MOUNTED EQUIPMENT, TRIM AND RELATED CONSTRUCTION AS INDICATED IN THE SPECIFICATIONS.
7. SEE LIFE SAFETY PLANS FOR REQUIRED FIRE SEPARATION WALLS.
8. SEE SHEET A-601 & A-603 FOR DOOR WINDOW & GLAZING TYPES
9. SEE SHEET A-603 FOR LOUVER TYPES
10. SEE SHEET A-003 FOR CONSTRUCTION SUBSYSTEMS.
11. SEE SHEET A-251, A-252, A-410, A-411 AND A-761 FOR CASEWORK ELEVATIONS & DETAILS.
12. SEE SHEETS A-251 AND A-252 FOR INTERIOR ELEVATIONS, ACCESSORY DESCRIPTIONS & MOUNTING HEIGHTS.
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15. SEE SHEETS A-401 FOR ENLARGED PLANS INDICATING ADDITIONAL DIMENSIONS AND PARTITION TYPES.
16. SEE SHEET A-765 FOR SIGN SCHEDULE & ELEVATIONS AND DETAILS.
17. SEE STRUCTURAL DRAWINGS FOR SLAB DEPRESSIONS AND CUTOUTS.
18. SEE BUILDING ELEVATION DRAWINGS FOR LOCATION OF EXTERIOR MASONRY CONTROL JOINTS.
19. EXTERIOR DIMENSIONS TAKEN FROM MASONRY FACE, NOT METAL PANEL
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PARTITION LEGEND

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2. SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES
3. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

NON-RATED WALL. EXTEND GYP. BD. AND FRAMING TO STRUCTURE ABOVE.

NON-RATED WALL. EXTEND GYP. BD. TO MIN. 4" ABOVE FINISHED CEILING AND FRAMING TO STRUCTURE ABOVE.

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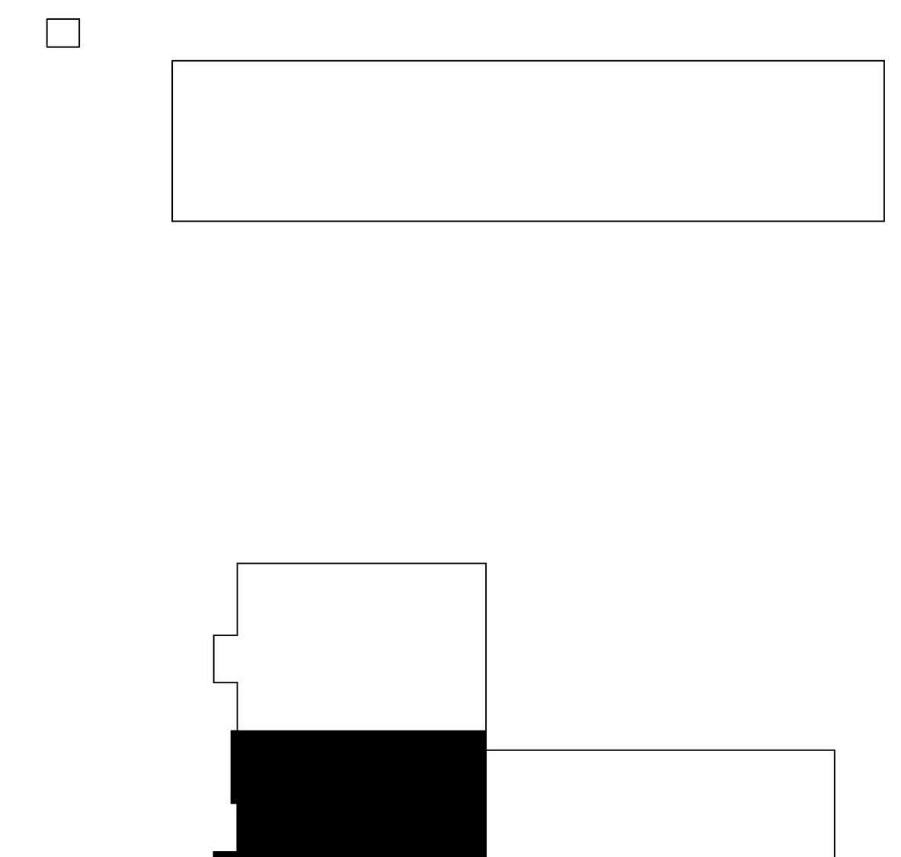
FEC — FIRE EXTINGUISHER CABINET
FEB — FIRE EXTINGUISHER BRACKET
CG — CORNER GUARD

KEYPLAN



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TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

WILLIAM SCOTT BAKER — REGISTERED ARCHITECT — 8326 — NORTH CAROLINA — CHARLOTTE, N.C. — 9/11/2017

LS3P ASSOCIATES LTD. — REGISTERED ARCHITECTURAL COMPANY — CERT. NO. 50417 — NORTH CAROLINA — CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

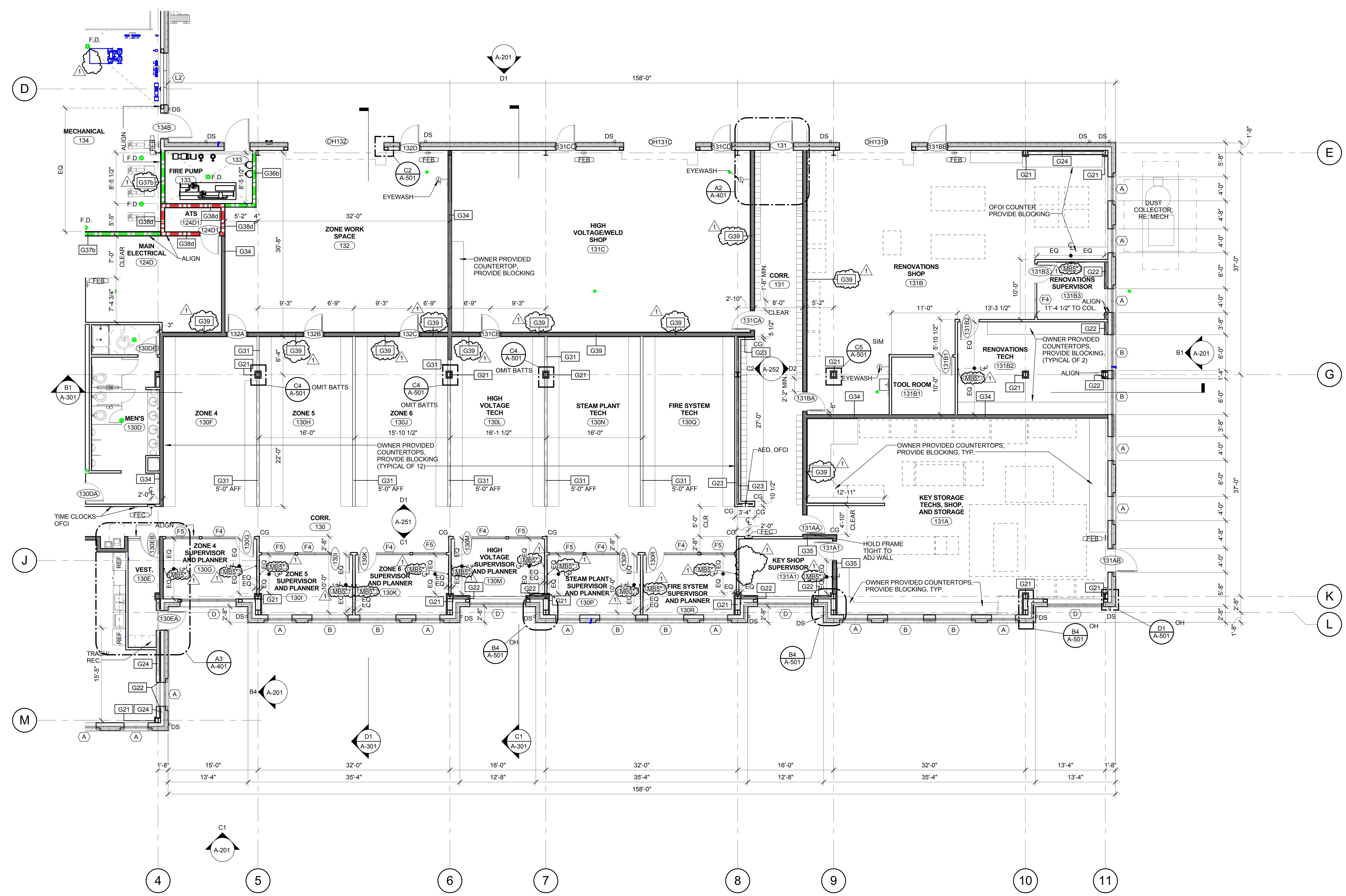
No.	Description	Date
1	Addendum No. 5	09/11/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: KF
CHECKED BY: SH

OFFICE/SHOPS PARTIAL FLOOR PLAN - FO

A-101B

BUILDING BID DOCUMENTS



A1 OFFICE/SHOPS PARTIAL FLOOR PLAN - FO SHOPS

1/8" = 1'-0"

PROJECT NORTH TRUE NORTH

FLOOR PLAN SHEET NOTES

1. EXTERIOR DIMENSIONS AT MASONRY VENEER ARE TO FACE OF MASONRY.
2. INTERIOR DIMENSIONS INDICATED ARE TO FACE OF FINISH WALLS AND CENTERLINES OF COLUMNS, UNO.
3. LOCATE DOOR OPENINGS 4" FROM NEAREST PERPENDICULAR WALL, UNO.
4. FIRE AND SOUND RATED WALLS/PARTITIONS TO BE CONSTRUCTED TIGHT TO STRUCTURE, PIPING, DUCTWORK AND OTHER PENETRATIONS. ALL WORK IS TO BE BRACED TO STRUCTURE ABOVE.
5. WHERE PARTITIONS OF DIFFERENT FIRE RATINGS INTERSECT, THE HIGHEST RATED PARTITION SHALL CONTINUE THROUGH. MAINTAIN PARTITION FIRE RATING BEHIND RECESSED FIRE EXTINGUISHER CABINETS.
6. INSTALL BLOCKING IN PARTITIONS FOR CASEWORK, WALL MOUNTED EQUIPMENT, TRIM AND RELATED CONSTRUCTION AS INDICATED IN THE SPECIFICATIONS.
7. SEE LIFE SAFETY PLANS FOR REQUIRED FIRE SEPARATION WALLS.
8. SEE SHEET A-601 & A-603 FOR DOOR WINDOW & GLAZING TYPES
9. SEE SHEET A-603 FOR LOUVER TYPES
10. SEE SHEET A-003 FOR CONSTRUCTION SUBSYSTEMS.
11. SEE SHEET A-251, A-252, A-410, A-411 AND A-761 FOR CASEWORK ELEVATIONS & DETAILS.
12. SEE SHEETS A-251 AND A-252 FOR INTERIOR ELEVATIONS, ACCESSORY DESCRIPTIONS & MOUNTING HEIGHTS.
13. SEE SHEETS A-721 THROUGH A-722 FOR FINISH FLOORING, TRANSITIONS, PATTERNS AND WALL PROTECTION.
14. SEE SHEET A-720 FOR FINISH SCHEDULE.
15. SEE SHEETS A-401 FOR ENLARGED PLANS INDICATING ADDITIONAL DIMENSIONS AND PARTITION TYPES.
16. SEE SHEET A-765 FOR SIGN SCHEDULE & ELEVATIONS AND DETAILS.
17. SEE STRUCTURAL DRAWINGS FOR SLAB DEPRESSIONS AND CUTOUTS.
18. SEE BUILDING ELEVATION DRAWINGS FOR LOCATION OF EXTERIOR MASONRY CONTROL JOINTS.
19. EXTERIOR DIMENSIONS TAKEN FROM MASONRY FACE, NOT METAL PANEL
20. ACCESSIBLE AND COMMON FEATURES, E.G., AUTOMATIC DOOR ACTIVATOR, CARD SWIPE, SHALL BE PLACED 34"-36" AFF. DO NOT PLACE ACCESSIBLE OR COMMON USE BUILDING FEATURES WITHIN 24" OF AN INTERIOR CORNER.

PARTITION NOTES

1. ALL NON-DESIGNATED PARTITIONS SHALL BE TYPE G32.
2. ALL PIPE AND CONDUIT PENETRATIONS THRU 1 HR RATED OR MORE PARTITIONS, FLOORS, ROOF, ETC. SHALL BE SEALED WITH A RESPECTIVELY RATED FIRE BARRIER PENETRATION SEALING SYSTEM BY 3M OR U.L. APPROVED EQUAL
3. TILE BACKER BOARD SHALL BE USED IN ALL LOCATIONS TO RECEIVE TILE FINISHES. REFER TO FINISH SCHEDULE AND INTERIOR ELEVATIONS FOR LOCATIONS..
4. CONTRACTOR SHALL COORDINATE WITH MECHANICAL DUCTWORK PRIOR TO FABRICATION OF PARTITION WALLS.
5. SHOULD CONDITIONS OCCUR WHERE A WALL IS UNABLE TO GO STRAIGHT UP TO STRUCTURE DUE TO PIPING, DUCTWORK, ETC., THE PARTITION (GYPSUM BOARD AND FRAMING) MAY JOG HORIZONTALLY ABOVE THE CEILING TO AVOID THE PROBLEM. RATED WALL INTEGRITY SHALL BE MAINTAINED.
6. WHERE STUDS EXTEND TO STRUCTURE AND GYPSUM WALLBOARD AND SOUND ATTENUATION BLANKETS EXTEND JUST ABOVE THE FINISH CEILING, CAP OFF PARTITION FINISHES WITH A RUNNER CHANNEL WHEN CEILING PLENUM IS USED AS A RETURN AIR PLENUM.
7. DIMENSIONAL CONFLICTS BETWEEN PARTITION TYPES AND THE ARCHITECTURAL FLOOR PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
8. SEE LIFE SAFETY PLANS FOR THE LOCATIONS OF SMOKE BARRIERS, SMOKE PARTITIONS AND FIRE-RATED PARTITIONS.
9. REFER TO UNDERWRITERS LABORATORIES, INC. FIRE RESISTANCE VOLUMES - CURRENT EDITION FOR SPECIFIC CONSTRUCTION REQUIREMENTS OF U.L. LISTED ASSEMBLIES.
10. REFER TO MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR TYPICAL U.L. LISTED PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING APPROPRIATE PROJECT-SPECIFIC U.L. LISTED ASSEMBLIES FOR PENETRATIONS.
11. AT ALL EXISTING AND CONSTRUCTED PARTITIONS THE CONTRACTOR IS TO MAINTAIN THE FIRE-RESISTIVE INTEGRITY
12. PROVIDE ACOUSTICAL SEALANT AT PERIMETER OF ALL SOUND RATED PARTITIONS AND AT ALL PARTITION PENETRATIONS. IF PARTITION IS FIRE RATED, PROVIDE UL LABELED FIRESTOPPING IN PLACE ACOUSTICAL SEALANT AT PARTITIONS THAT ARE SOUND AND FIRE RATED, PROVIDE ACOUSTICAL SEALANT AT PARTITION PENETRATIONS THAT DO NOT REQUIRE FIRESTOPPING (EXAMPLE: DUCT PENETRATIONS WITH FIRE DAMPERS).

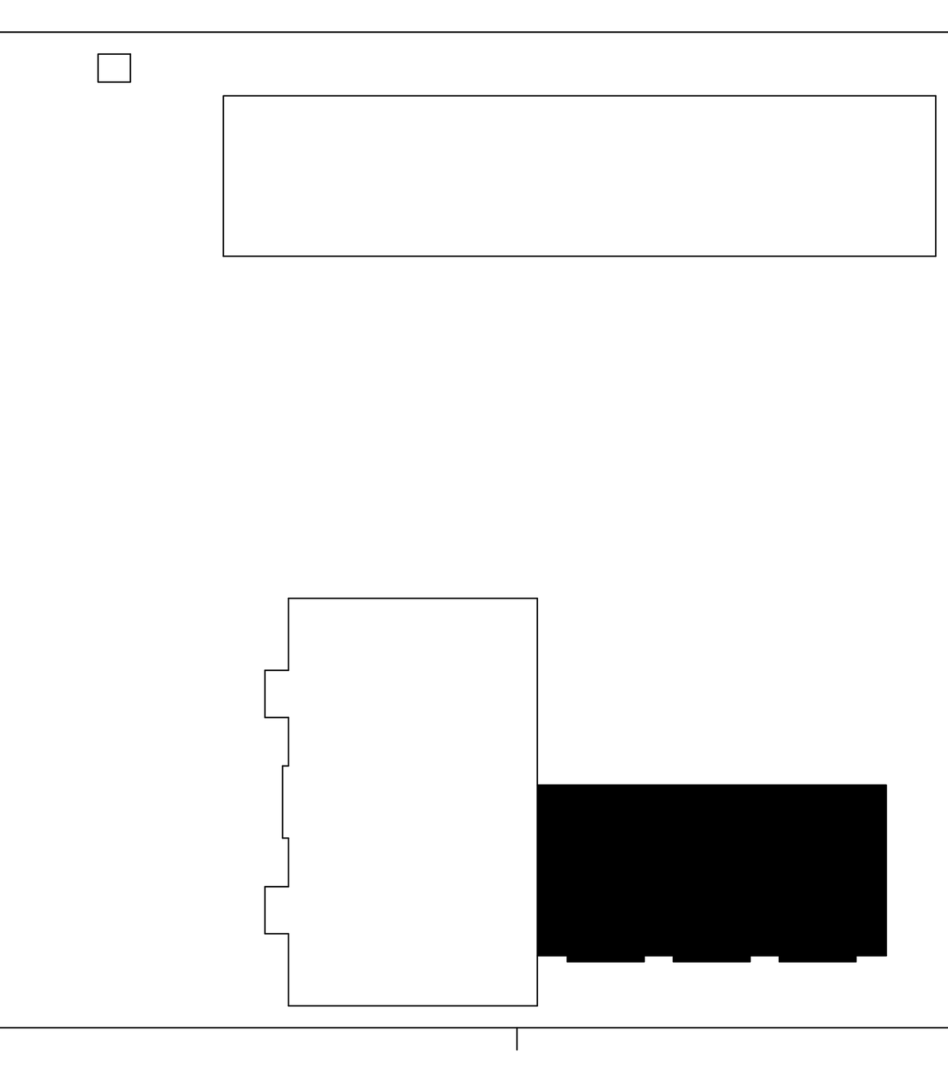
PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE TYPE W1 U.N.O. SEE A-003 FOR CONSTRUCTION OF SUBSYSTEMS
2. SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES
3. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

- NON-RATED WALL. EXTEND GYP. BD. AND FRAMING TO STRUCTURE ABOVE.
- NON-RATED WALL. EXTEND GYP. BD. TO MIN. 4" ABOVE FINISHED CEILING AND FRAMING TO STRUCTURE ABOVE.
- 1 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.
- 2 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

- FEC FIRE EXTINGUISHER CABINET
- FEB FIRE EXTINGUISHER BRACKET
- CG CORNER GUARD

KEYPLAN



UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
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WILLIAM SCOTT BAKER 8326 CHARLOTTE, N.C. 9/11/2017

LS3P ASSOCIATES LTD CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

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PROJECT: 9202-164730
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DATE: AUGUST 21, 2017
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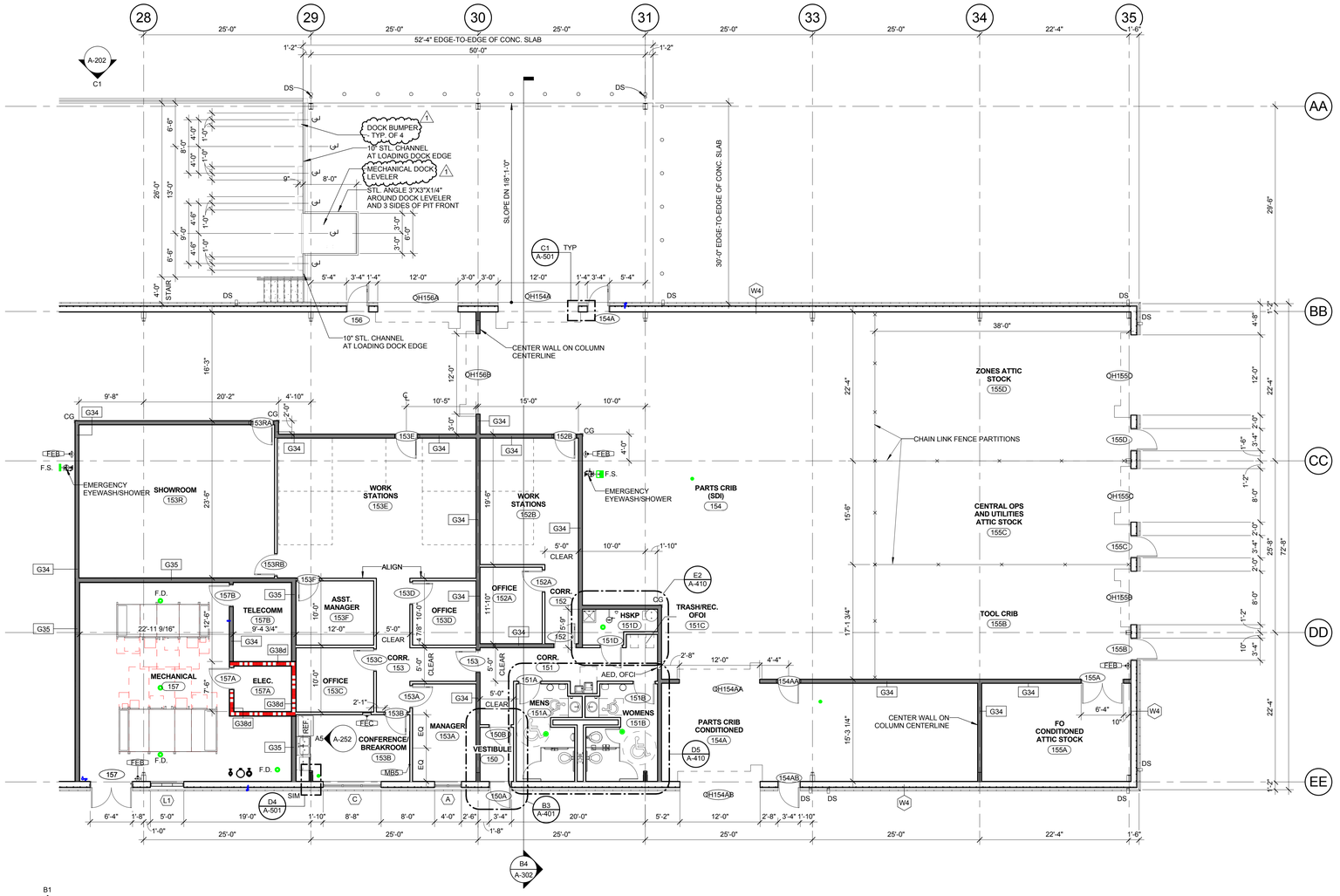
OFFICE/SHOPS PARTIAL FLOOR PLAN - FO SHOPS

A-101C

BUILDING BID DOCUMENTS

C:\Users\sharonhuot\Documents\Arch_UNCC Facilities Operations Complex_2016_sharonhuot.rvt
9/11/2017 11:06:15 AM



A1 WAREHOUSE PARTIAL FLOOR PLAN - EAST

1/8" = 1'-0"

FLOOR PLAN SHEET NOTES

1. EXTERIOR DIMENSIONS AT MASONRY VENEER ARE TO FACE OF MASONRY.
2. INTERIOR DIMENSIONS INDICATED ARE TO FACE OF FINISH WALLS AND CENTERLINES OF COLUMNS, UNO.
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PARTITION LEGEND

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2. SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES
3. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

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NON-RATED WALL. EXTEND GYP. BD. TO MIN. 4" ABOVE FINISHED CEILING AND FRAMING TO STRUCTURE ABOVE.

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2 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

FEC FIRE EXTINGUISHER CABINET

FEB FIRE EXTINGUISHER BRACKET

CG CORNER GUARD

KEYPLAN

PROJECT NORTH TRUE NORTH

UNC CHARLOTTE

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LS3P

227 WEST TRADE STREET SUITE 700
CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
WWW.LS3P.COM

WILLIAM SCOTT BOWLES REGISTERED ARCHITECT 8326 NORTH CAROLINA CHARLOTTE, NC 9/11/2017

LS3P ASSOCIATES LTD. REGISTERED ARCHITECTURAL FIRM CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum No. 5	09/11/2017

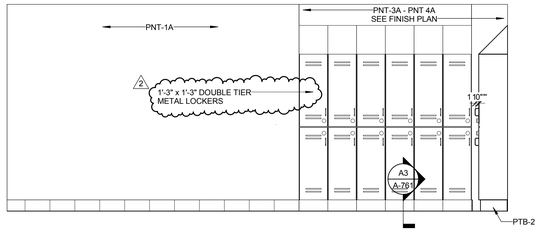
PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: KF
CHECKED BY: SH

WAREHOUSE PARTIAL FLOOR PLAN - EAST

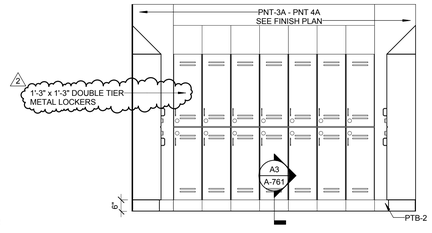
A-102B

BUILDING BID DOCUMENTS

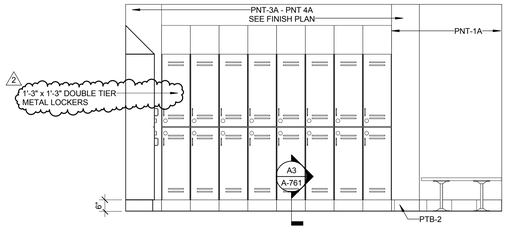
C:\Users\sharonhuot\Documents\Arch_UNCC Facilities Operations Complex_2016_sharonhuot.rvt
9/11/2017 11:06:29 AM



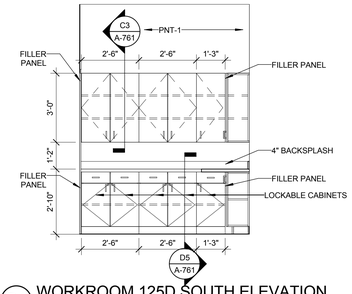
E2 CHANGING LOCKERS 136/140 TYP. WALL
3/8" = 1'-0"



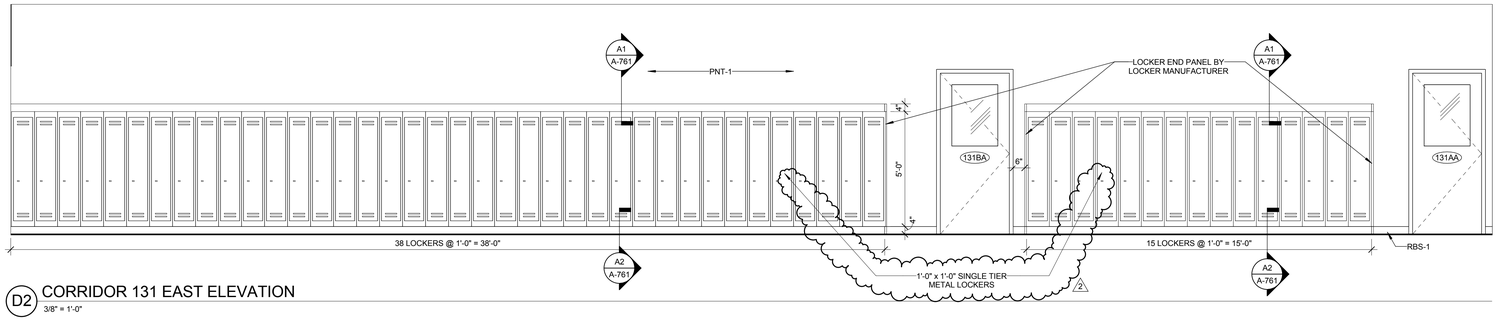
E4 CHANGING LOCKERS 136/140 TYP. WEST WALL
3/8" = 1'-0"



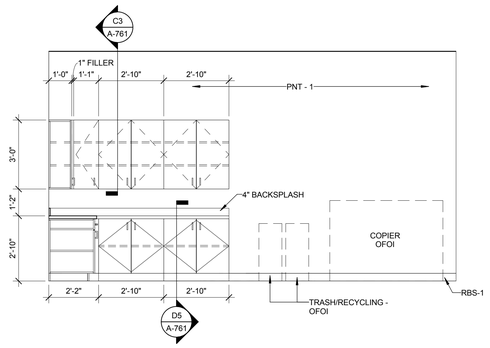
E5 CHANGING LOCKERS 136/140 TYP. BENCH WALL
3/8" = 1'-0"



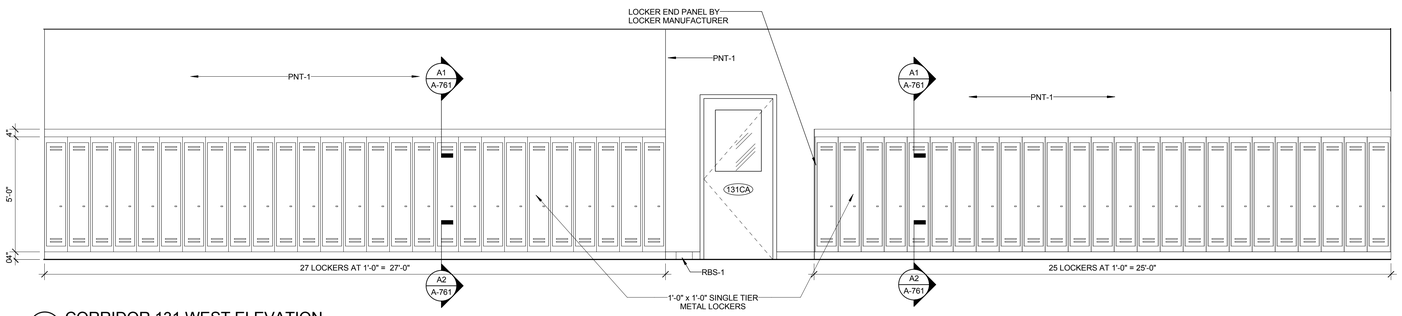
D1 WORKROOM 125D SOUTH ELEVATION
3/8" = 1'-0"



D2 CORRIDOR 131 EAST ELEVATION
3/8" = 1'-0"

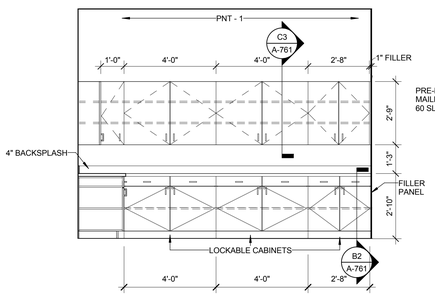


C1 WORKROOM 125D WEST ELEVATION
3/8" = 1'-0"

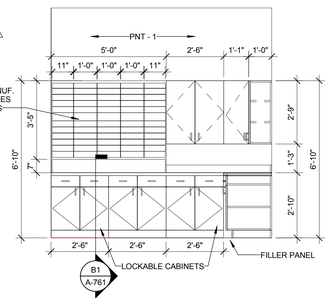


C2 CORRIDOR 131 WEST ELEVATION
3/8" = 1'-0"

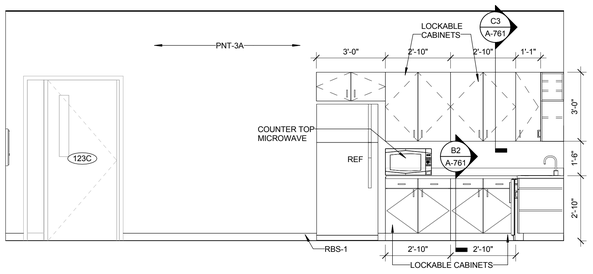
SIM



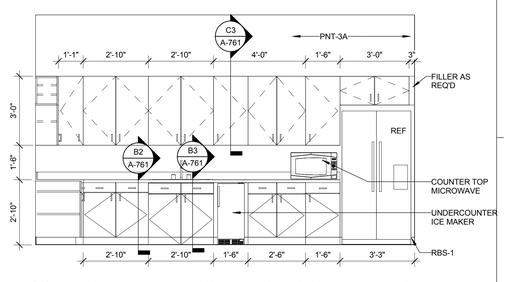
B1 WORKROOM 102A NORTH ELEVATION
3/8" = 1'-0"



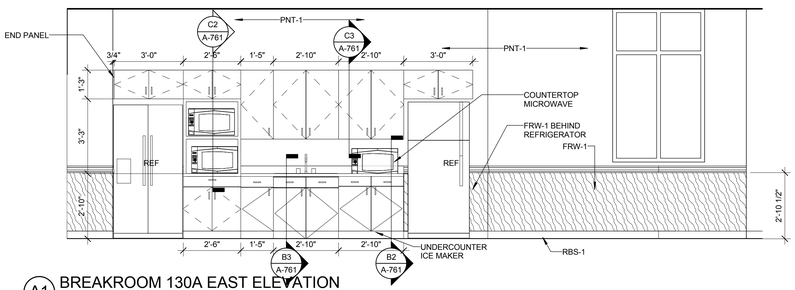
B2 WORKROOM 102A WEST ELEVATION
3/8" = 1'-0"



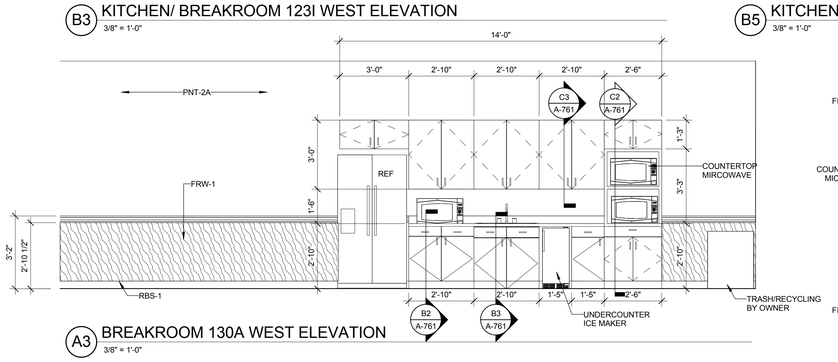
B3 KITCHEN/ BREAKROOM 123I WEST ELEVATION
3/8" = 1'-0"



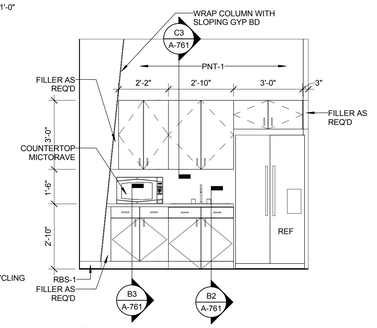
B5 KITCHEN/ BREAKROOM 123I NORTH ELEVATION
3/8" = 1'-0"



A1 BREAKROOM 130A EAST ELEVATION
3/8" = 1'-0"



A3 BREAKROOM 130A WEST ELEVATION
3/8" = 1'-0"



A5 CONFERENCE/BREAKROOM 153B
3/8" = 1'-0"

UNC CHARLOTTE

FACILITIES
OPERATIONS /
PARKING SERVICES
COMPLEX

LS3P

227 WEST TRADE STREET SUITE 700
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WILLIAM SCOTT HOWARD
REGISTERED ARCHITECT
8326
NORTH CAROLINA
CHARLOTTE, N.C.
9/11/2017

LS3P ASSOCIATES, LTD.
REGISTERED ARCHITECTURAL FIRM
CERT. NO.
50417
NORTH CAROLINA
CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum No. 4	08/28/207
2	Addendum No. 5	09/11/2017

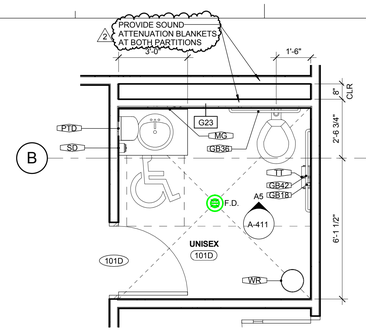
PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: AR
CHECKED BY: SH

INTERIOR
ELEVATIONS

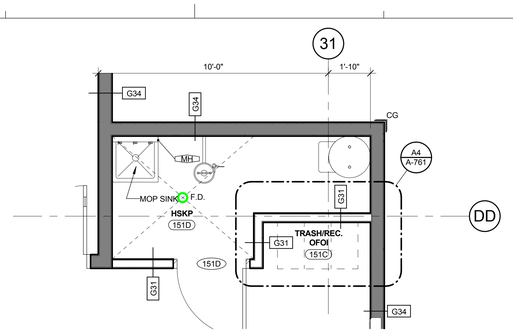
A-252

BUILDING BID DOCUMENTS

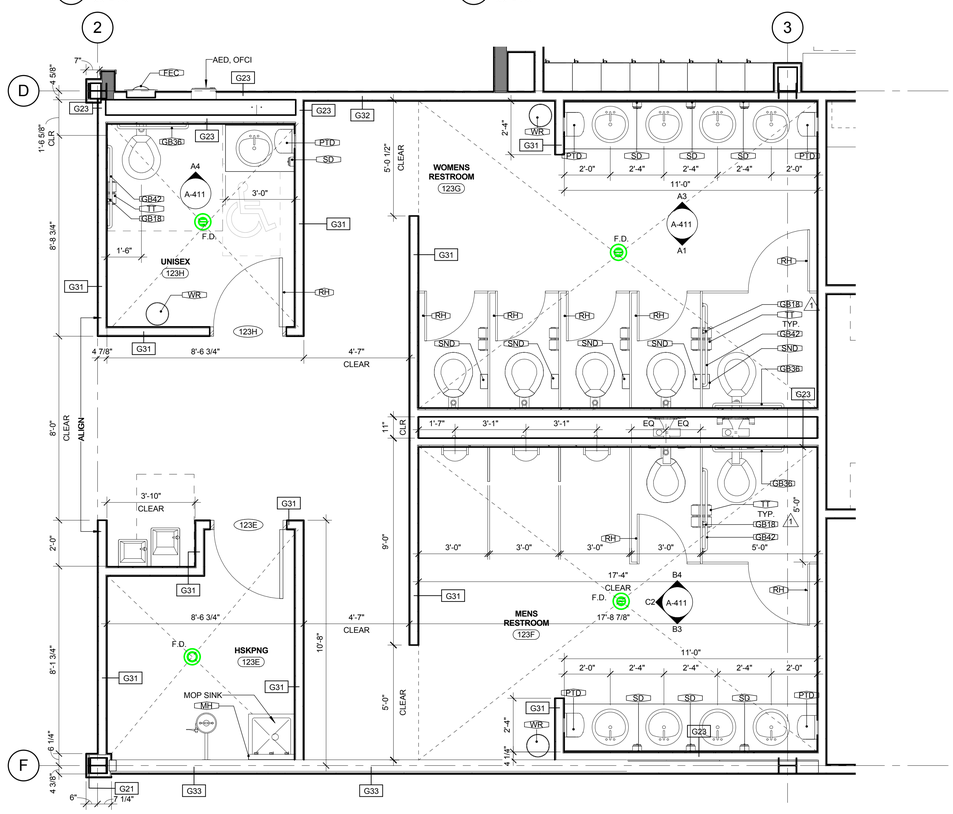
C:\Users\sharonhuot\Documents\Arch_UNCC Facilities Operations Complex_2016_sharonhuot.rvt
9/11/2017 11:07:19 AM



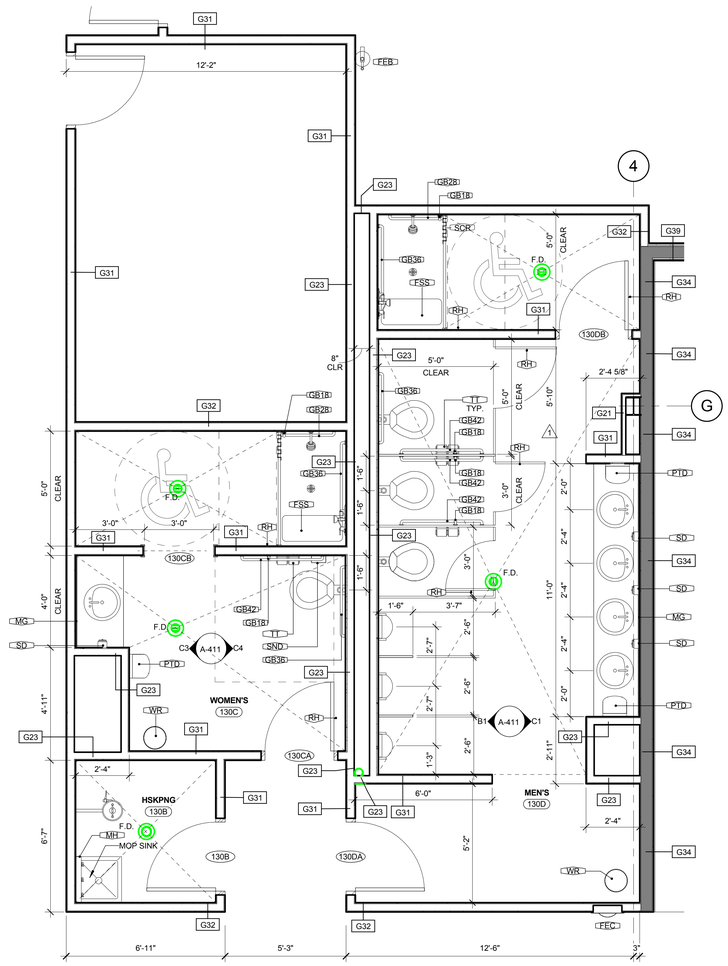
E1 ENLARGED PLAN - UNISEX RESTROOM
3/8" = 1'-0"



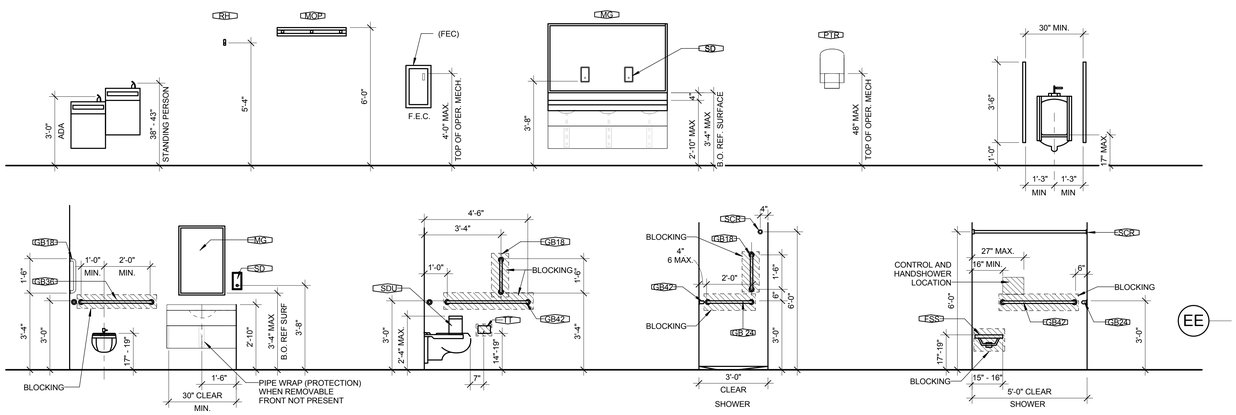
E2 ENLARGED PLAN - WAREHOUSE HSKP AND RECY
3/8" = 1'-0"



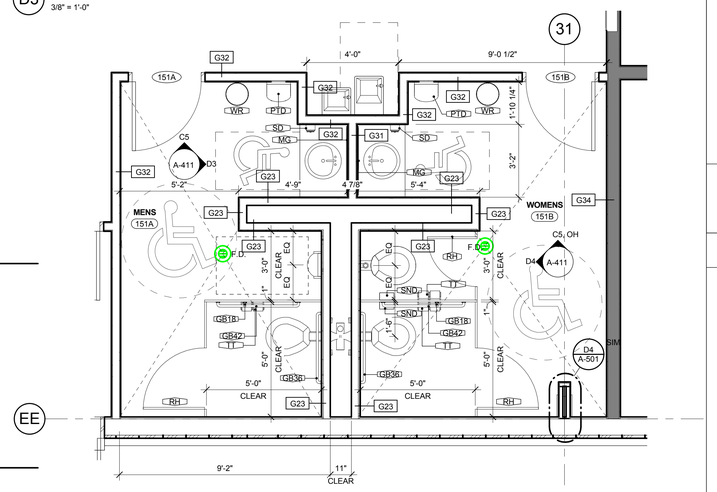
D1 ENLARGED PLAN - OFFICE RESTROOMS
3/8" = 1'-0"



D3 ENLARGED PLAN - FO SHOP RESTROOMS
3/8" = 1'-0"



A1 TYPICAL MOUNTING HEIGHTS
3/8" = 1'-0"



D5 ENLARGED PLAN - WAREHOUSE RESTROOMS
3/8" = 1'-0"

EE

PROJECT NORTH TRUE NORTH

FLOOR PLAN SHEET NOTES

1. EXTERIOR DIMENSIONS AT MASONRY VENEER ARE TO FACE OF MASONRY.
2. INTERIOR DIMENSIONS INDICATED ARE TO FACE OF FINISH WALLS AND CENTERLINES OF COLUMNS, UNO.
3. LOCATE DOOR OPENINGS 4" FROM NEAREST PERPENDICULAR WALL, UNO.
4. FIRE AND SOUND RATED WALLS/PARTITIONS TO BE CONSTRUCTED TIGHT TO STRUCTURE. PIPING, DUCTWORK AND OTHER PENETRATIONS. ALL WORK IS TO BE BRACED TO STRUCTURE ABOVE.
5. WHERE PARTITIONS OF DIFFERENT FIRE RATINGS INTERSECT, THE HIGHEST RATED PARTITION SHALL CONTINUE THROUGH. MAINTAIN PARTITION FIRE RATING BEHIND RECESSED FIRE EXTINGUISHER CABINETS.
6. INSTALL BLOCKING IN PARTITIONS FOR CASEWORK, WALL MOUNTED EQUIPMENT, TRIM AND RELATED CONSTRUCTION AS INDICATED IN THE SPECIFICATIONS.
7. SEE LIFE SAFETY PLANS FOR REQUIRED FIRE SEPARATION WALLS.
8. SEE SHEET A-601 & A-603 FOR DOOR WINDOW & GLAZING TYPES
9. SEE SHEET A-603 FOR LOUVER TYPES
10. SEE SHEET A-003 FOR CONSTRUCTION SUBSYSTEMS.
11. SEE SHEET A-251, A-252, A-410, A-411 AND A-761 FOR CASEWORK ELEVATIONS & DETAILS.
12. SEE SHEETS A-251 AND A-252 FOR INTERIOR ELEVATIONS, ACCESSORY DESCRIPTIONS & MOUNTING HEIGHTS.
13. SEE SHEETS A-721 THROUGH A-722 FOR FINISH FLOORING, TRANSITIONS, PATTERNS AND WALL PROTECTION.
14. SEE SHEET A-720 FOR FINISH SCHEDULE.
15. SEE SHEETS A-401 FOR ENLARGED PLANS INDICATING ADDITIONAL DIMENSIONS AND PARTITION TYPES.
16. SEE SHEET A-765 FOR SIGN SCHEDULE & ELEVATIONS AND DETAILS.
17. SEE STRUCTURAL DRAWINGS FOR SLAB DEPRESSIONS AND CUTOUTS.
18. SEE BUILDING ELEVATION DRAWINGS FOR LOCATION OF EXTERIOR MASONRY CONTROL JOINTS.
19. EXTERIOR DIMENSIONS TAKEN FROM MASONRY FACE, NOT METAL PANEL
20. ACCESSIBLE AND COMMON FEATURES, E.G., AUTOMATIC DOOR ACTIVATOR, CARD SWIPE, SHALL BE PLACED 34"-36" AFF. DO NOT PLACE ACCESSIBLE OR COMMON USE BUILDING FEATURES WITHIN 24" OF AN INTERIOR CORNER.

PARTITION NOTES

1. ALL NON-DESIGNATED PARTITIONS SHALL BE TYPE G32.
2. ALL PIPE AND CONDUIT PENETRATIONS THRU 1 HR RATED OR MORE PARTITIONS, FLOORS, ROOF, ETC. SHALL BE SEALED WITH A RESPECTIVELY RATED FIRE BARRIER PENETRATION SEALING SYSTEM BY 3M OR U.L. APPROVED EQUAL.
3. TILE BACKER BOARD SHALL BE USED IN ALL LOCATIONS TO RECEIVE TILE FINISHES. REFER TO FINISH SCHEDULE AND INTERIOR ELEVATIONS FOR LOCATIONS.
4. CONTRACTOR SHALL COORDINATE WITH MECHANICAL DUCTWORK PRIOR TO FABRICATION OF PARTITION WALLS.
5. SHOULD CONDITIONS OCCUR WHERE A WALL IS UNABLE TO GO STRAIGHT UP TO STRUCTURE DUE TO PIPING, DUCTWORK, ETC., THE PARTITION (GYPSUM BOARD AND FRAMING) MAY JOG HORIZONTALLY ABOVE THE CEILING TO AVOID THE PROBLEM. RATED WALL INTEGRITY SHALL BE MAINTAINED.
6. WHERE STUDS EXTEND TO STRUCTURE AND GYPSUM WALLBOARD AND SOUND ATTENUATION BLANKETS EXTEND JUST ABOVE THE FINISH CEILING, CAP OFF PARTITION FINISHES WITH A RUNNER CHANNEL WHEN CEILING PLENUM IS USED AS A RETURN AIR PLENUM.
7. DIMENSIONAL CONFLICTS BETWEEN PARTITION TYPES AND THE ARCHITECTURAL FLOOR PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
8. SEE LIFE SAFETY PLANS FOR THE LOCATIONS OF SMOKE BARRIERS, SMOKE PARTITIONS AND FIRE-RATED PARTITIONS.
9. REFER TO UNDERWRITERS LABORATORIES, INC. FIRE RESISTANCE VOLUMES - CURRENT EDITION FOR SPECIFIC CONSTRUCTION REQUIREMENTS OF U.L. LISTED ASSEMBLIES.
10. REFER TO MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR TYPICAL U.L. LISTED PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING APPROPRIATE PROJECT-SPECIFIC U.L. LISTED ASSEMBLIES FOR PENETRATIONS.
11. AT ALL EXISTING AND CONSTRUCTED PARTITIONS THE CONTRACTOR IS TO MAINTAIN THE FIRE-RESISTIVE INTEGRITY.
12. PROVIDE ACOUSTICAL SEALANT AT PERIMETER OF ALL SOUND RATED PARTITIONS AND AT ALL PARTITION PENETRATIONS. IF PARTITION IS FIRE RATED, PROVIDE UL LABELED FIRESTOPPING IN PLACE ACOUSTICAL SEALANT AT PARTITIONS THAT ARE SOUND AND FIRE RATED. PROVIDE ACOUSTICAL SEALANT AT PARTITION PENETRATIONS THAT DO NOT REQUIRE FIRESTOPPING (EXAMPLE: DUCT PENETRATIONS WITH FIRE DAMPERS).

TOILET ACCESSORIES LEGEND

	DESCRIPTION	SUPPLIED BY	INSTALLED BY
TT	TOILET TISSUE DISPENSER	OWNER	G.C.
PTR	PAPER TOWEL DISPENSER, ROLL	OWNER	G.C.
WR	WASTE RECEPTACLE	OWNER	OWNER
SD	LIQUID SOAP DISPENSER	OWNER	G.C.
GB18	18" GRAB BAR	G.C.	G.C.
GB28	28" GRAB BAR	G.C.	G.C.
GB36	36" GRAB BAR	G.C.	G.C.
GB42	42" GRAB BAR	G.C.	G.C.
SDU	SANITARY PRODUCT DISPOSAL UNIT	G.C.	G.C.
MG	GLASS MIRROR UNIT	G.C.	G.C.
SCR	SHOWER CURTAIN ROD	G.C.	G.C.
SC	SHOWER CURTAIN	G.C.	G.C.
FSS	FOLDING SHOWER SEAT	G.C.	G.C.
SH	SOAP HOLDER	G.C.	G.C.
RH	ROBE HOOK	G.C.	G.C.
TB	TOWEL BAR	G.C.	G.C.
MH	MOP HOOKS	G.C.	G.C.

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE TYPE W1 U.N.O. SEE A-003 FOR CONSTRUCTION OF SUBSYSTEMS
2. SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES
3. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.

NON-RATED WALL, EXTEND GYP. BD. AND FRAMING TO STRUCTURE ABOVE.

NON-RATED WALL, EXTEND GYP. BD. TO MIN. 4" ABOVE FINISHED CEILING AND FRAMING TO STRUCTURE ABOVE.

1 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

2 HR-RATED BARRIER; EXTEND TO THE UNDERSIDE OF THE DECK ABOVE.

FEC FIRE EXTINGUISHER CABINET

FEB FIRE EXTINGUISHER BRACKET

CG CORNER GUARD

UNC CHARLOTTE

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CHARLOTTE, NORTH CAROLINA 28202
TEL. 704.333.6686 FAX 704.333.2926
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WILLIAM SCOTT BOYLE REGISTERED ARCHITECT 8326 NORTH CAROLINA CHARLOTTE, N.C. 9/11/2017

LS3P ASSOCIATES, LTD. REGISTERED ARCHITECTURAL COMPANY CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

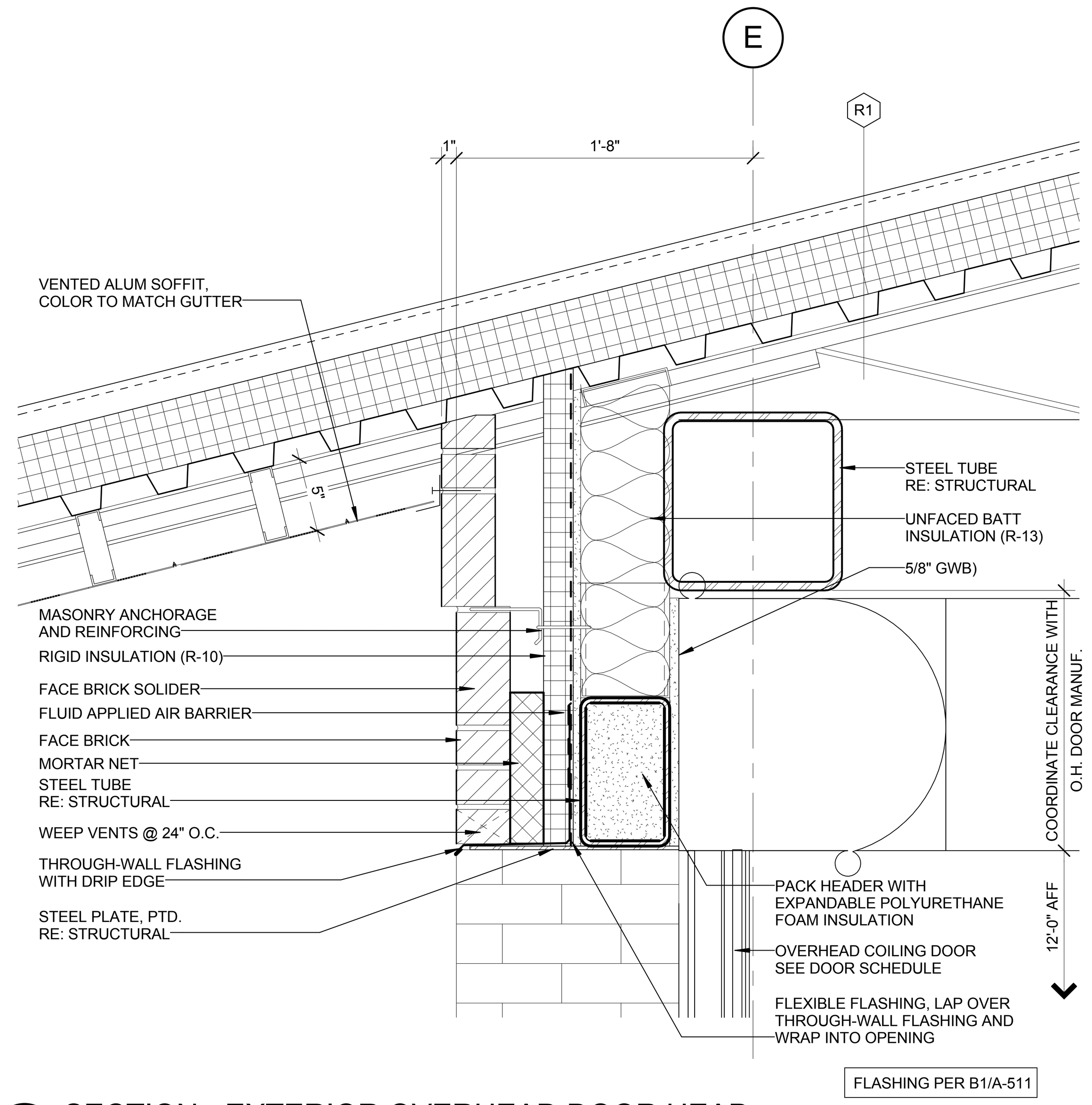
No.	Description	Date
1	Addendum No. 4	08/28/207
2	Addendum No. 5	09/11/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: ZS
CHECKED BY: SH

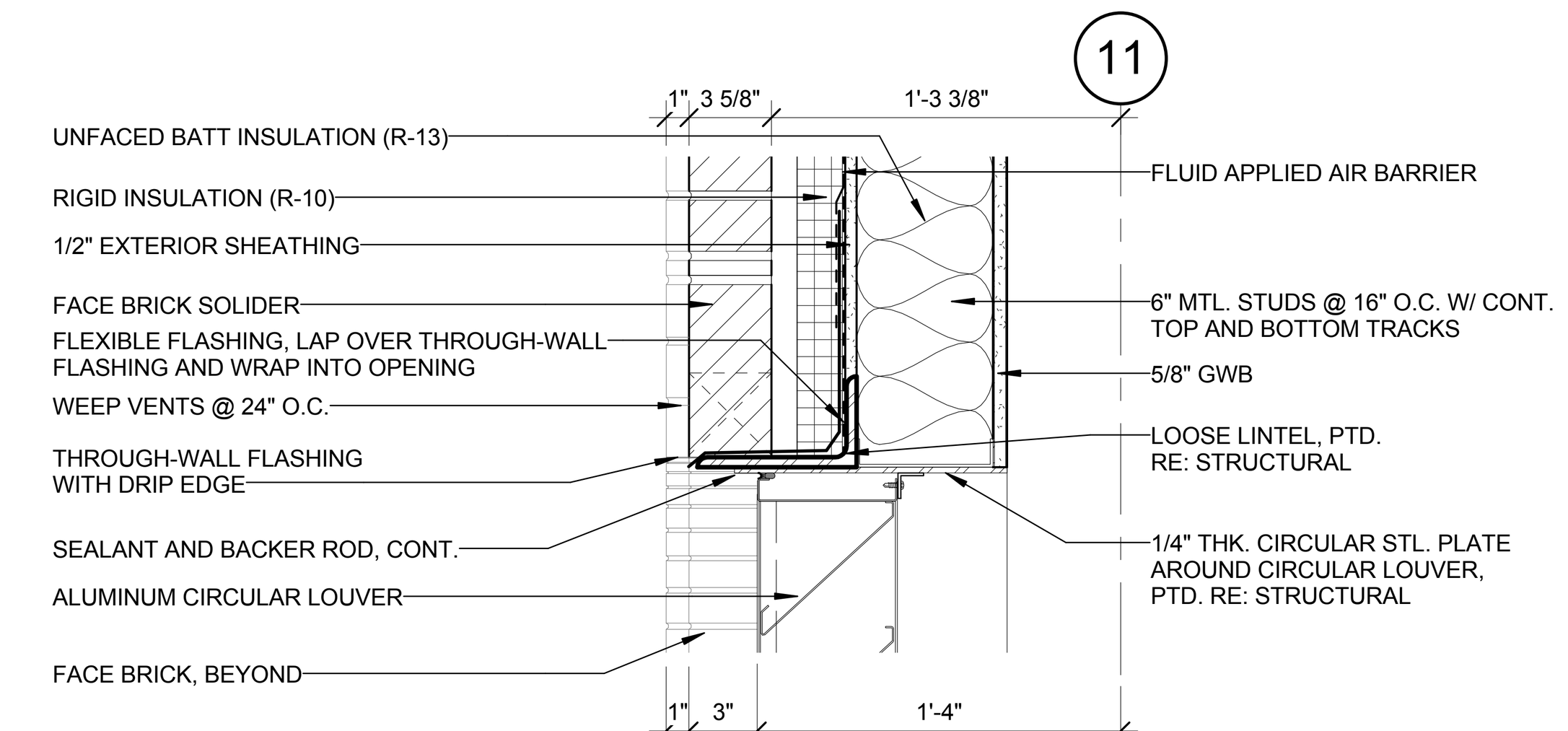
TOILET ROOM PLANS AND SCHEDULE

A-410

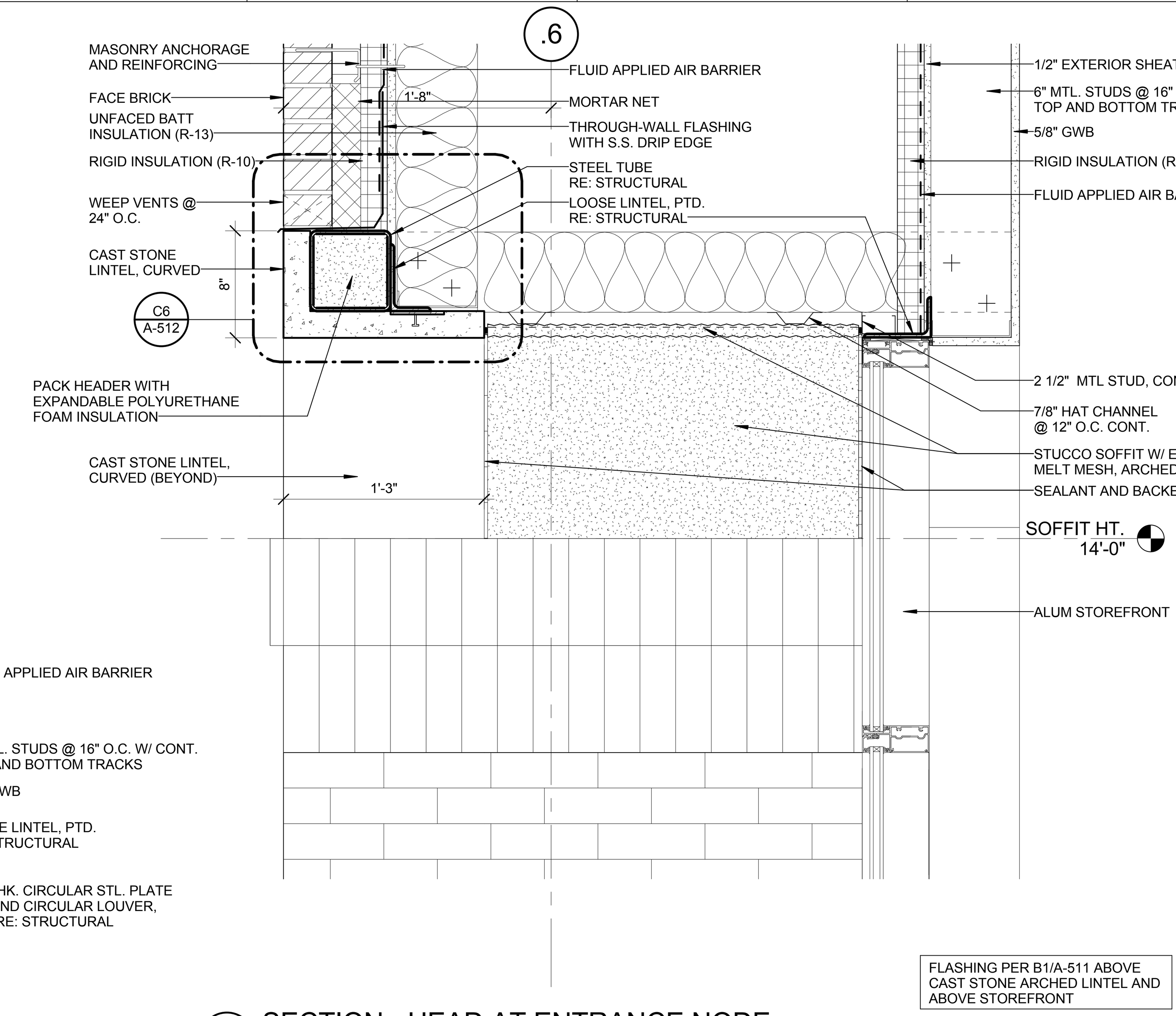
BUILDING BID DOCUMENTS



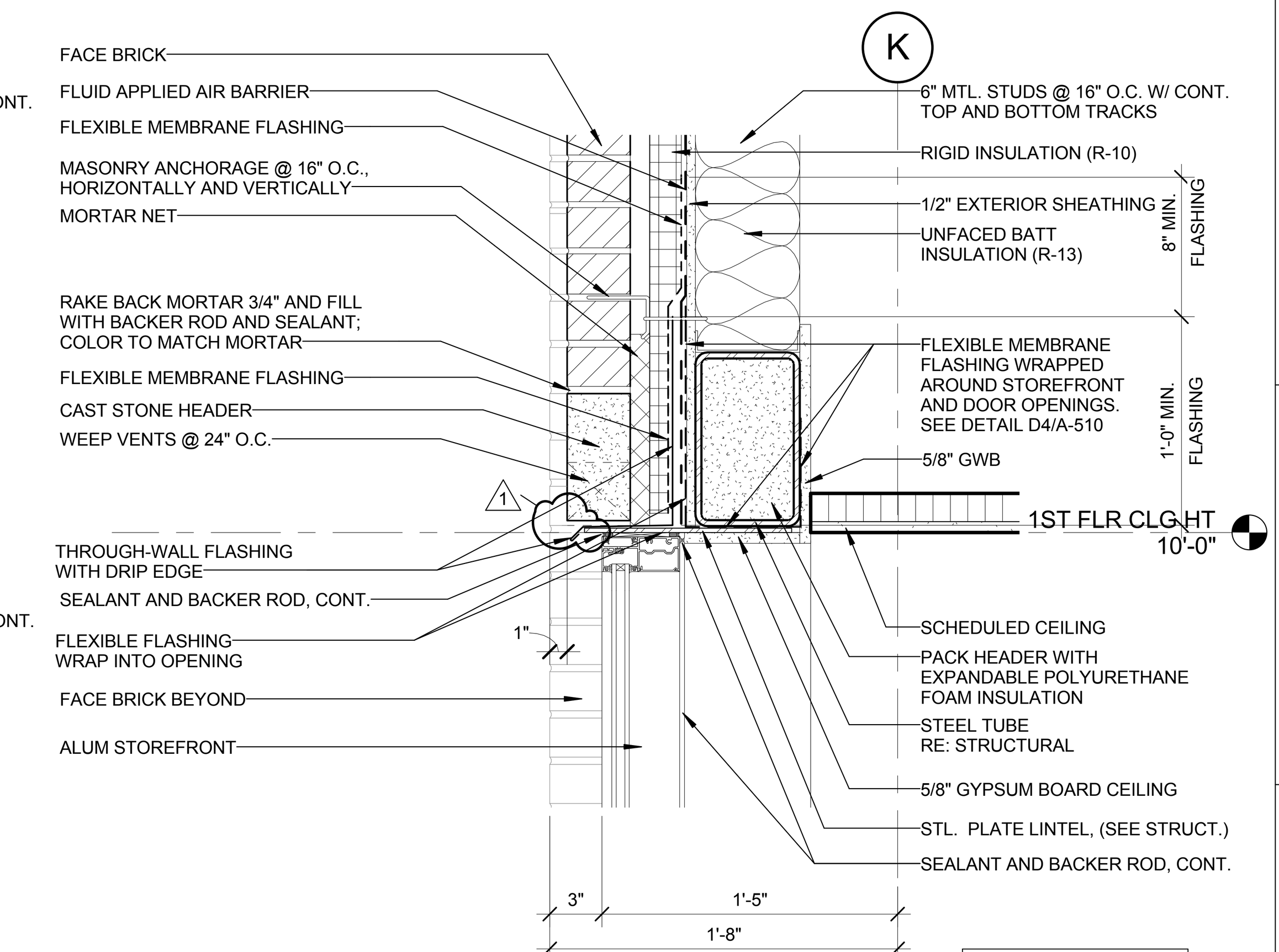
D1 SECTION - EXTERIOR OVERHEAD DOOR HEAD
1 1/2" = 1'-0"



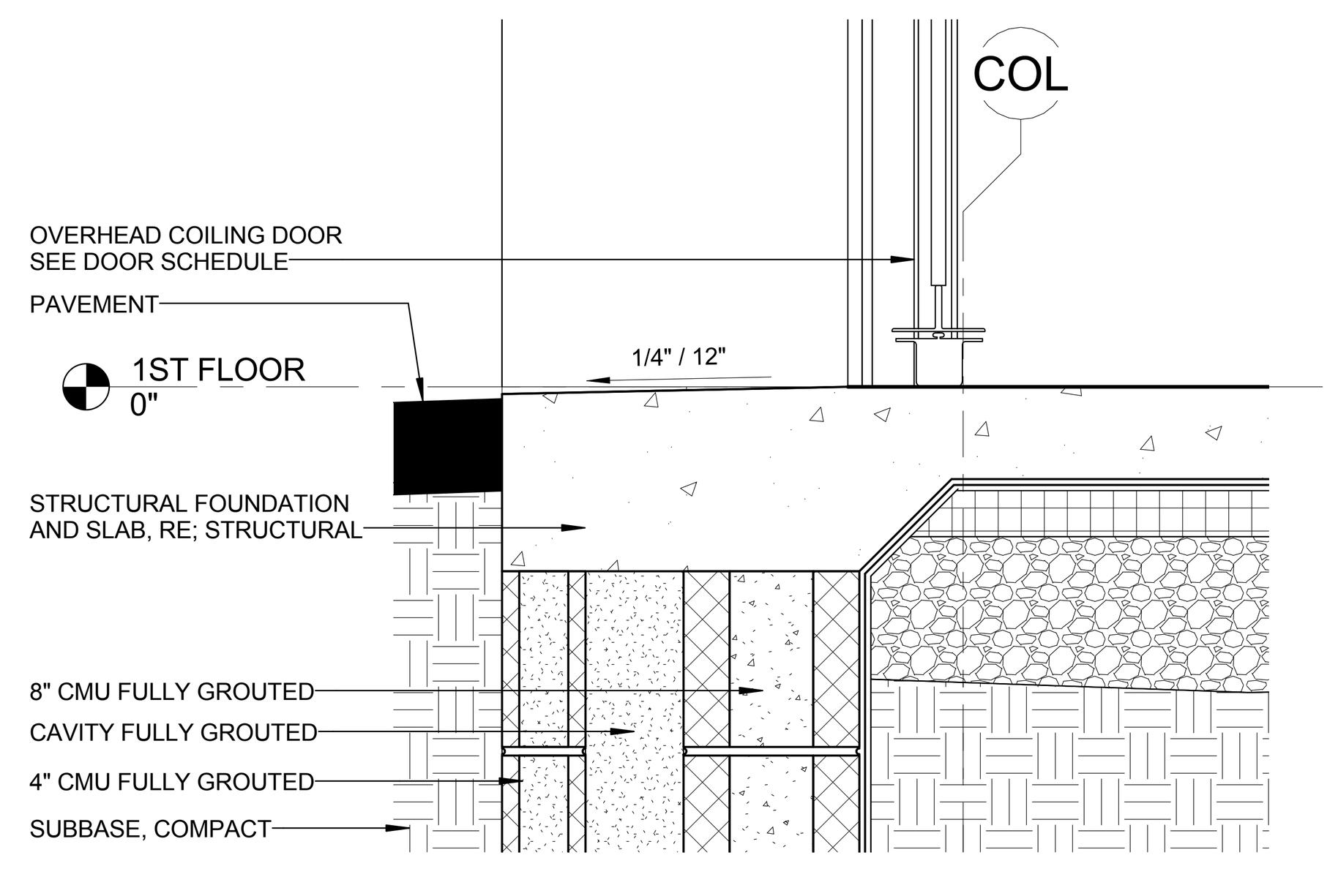
D2 SECTION - CIRCULAR LOUVER, HEAD
1 1/2" = 1'-0"



D4 SECTION - HEAD AT ENTRANCE NODE
1 1/2" = 1'-0"

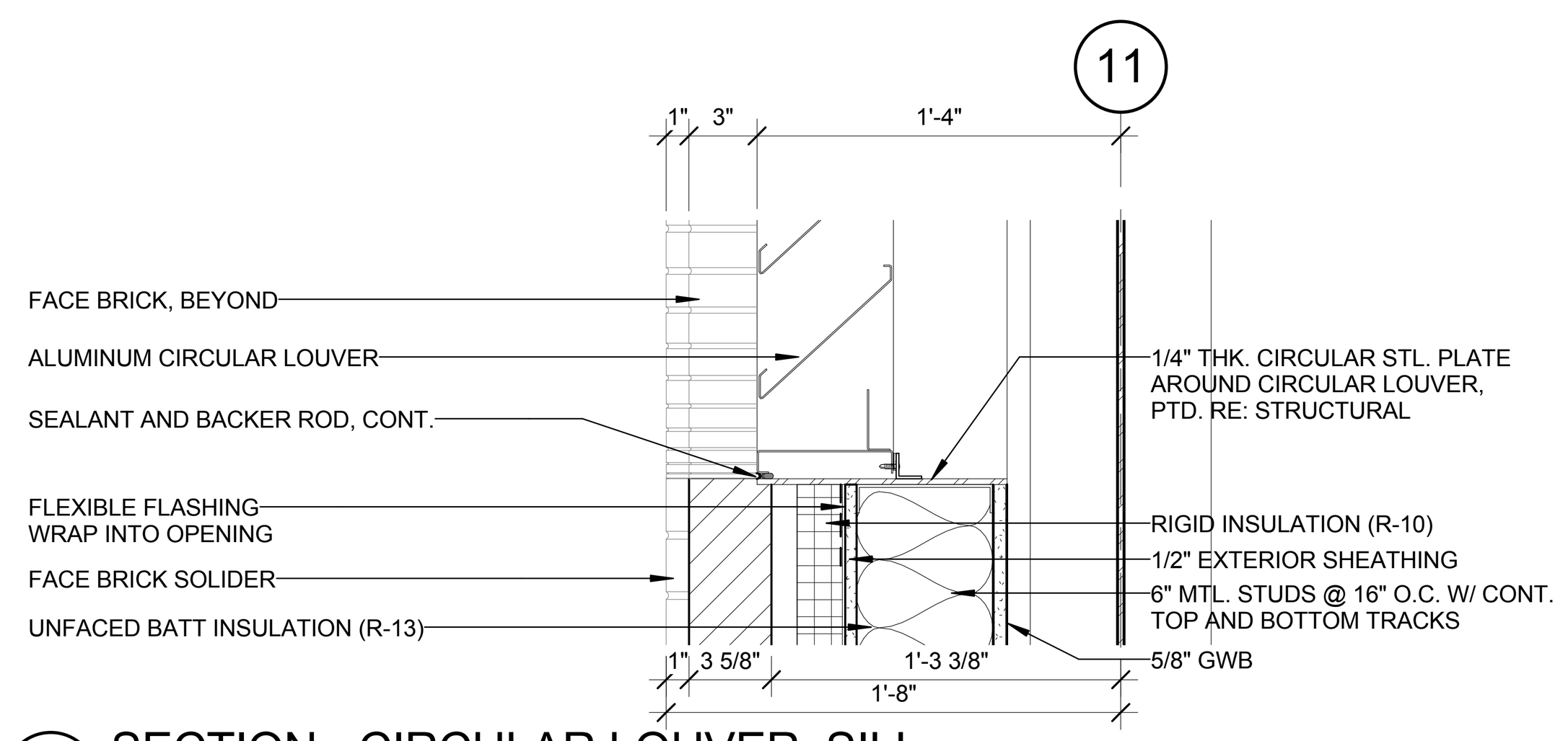


D5 SECTION - WINDOW HEAD, PLATE LINTEL
1 1/2" = 1'-0"

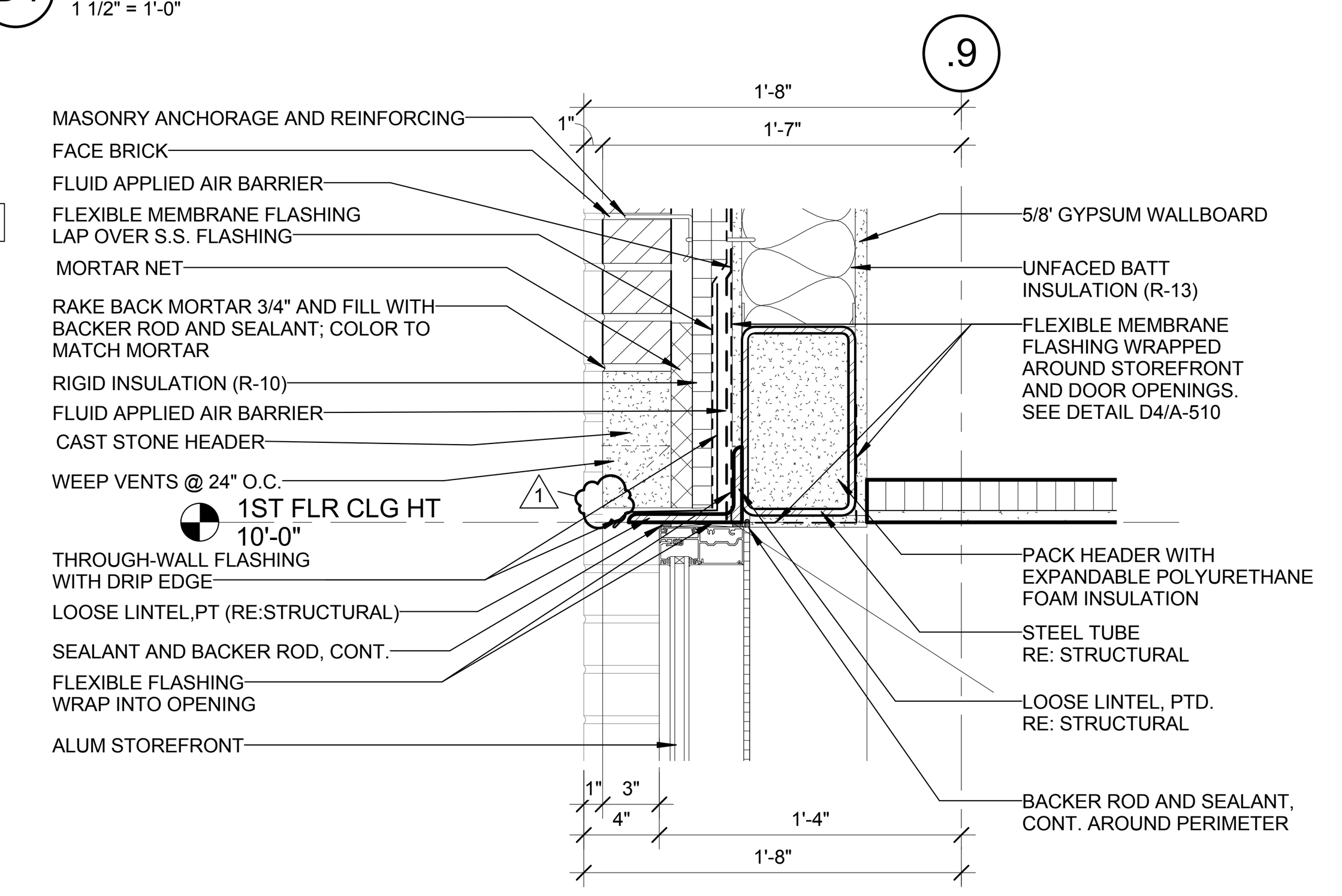


C1 SECTION - EXTERIOR OVERHEAD DOOR SILL
1 1/2" = 1'-0"

FLASHING PER B1/A-511

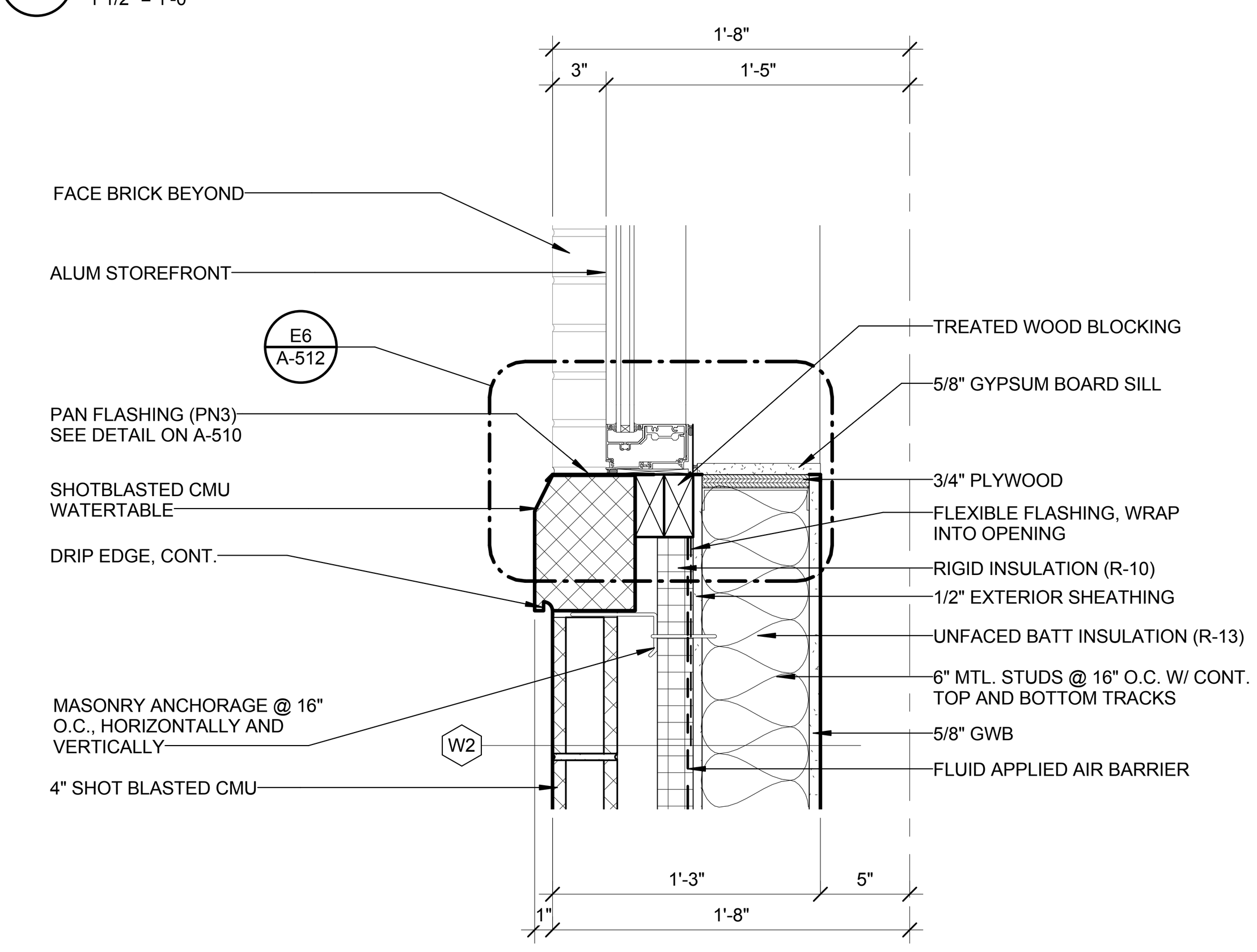


C2 SECTION - CIRCULAR LOUVER, SILL
1 1/2" = 1'-0"

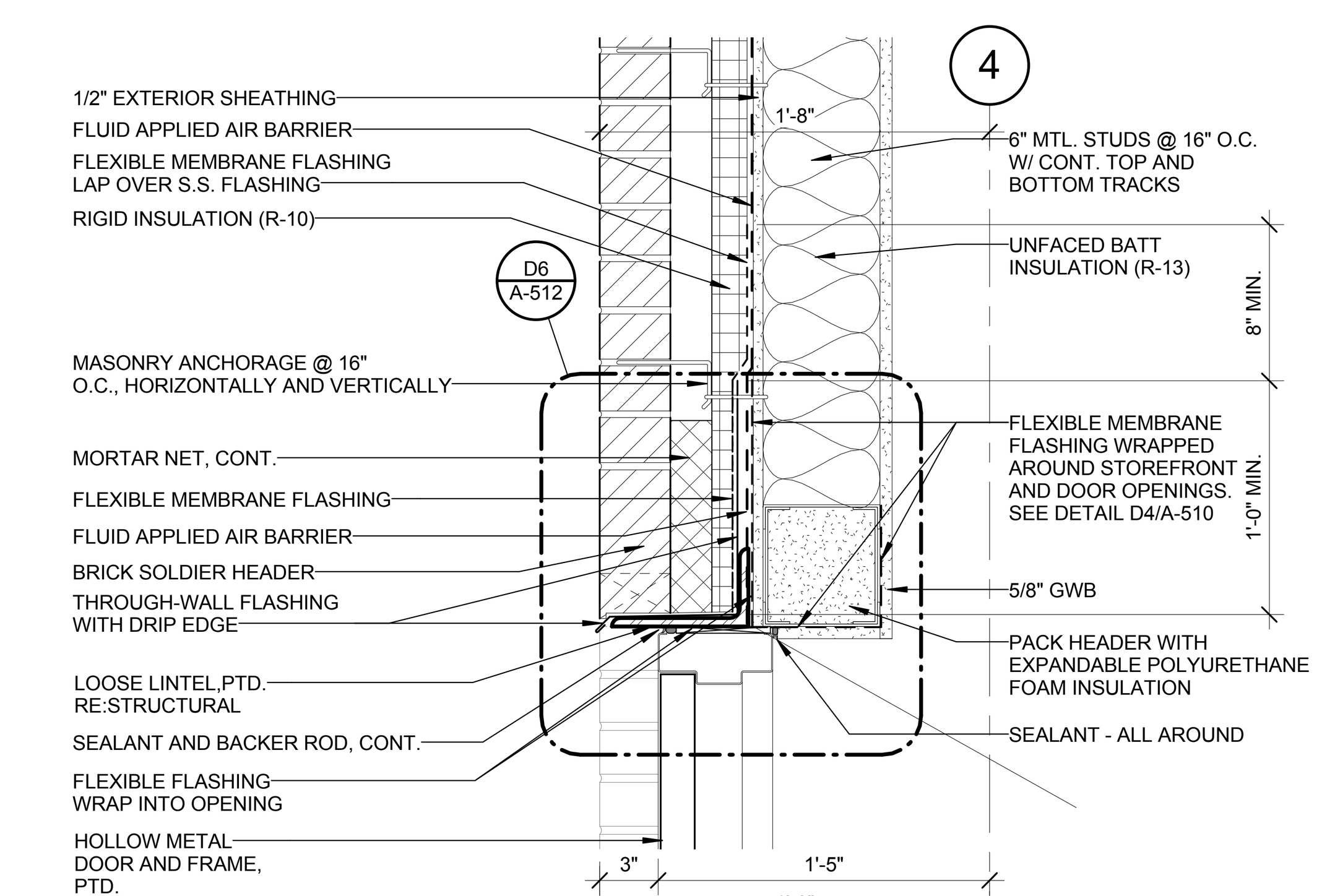


C4 SECTION - WINDOW HEAD, ANGLE LINTEL
1 1/2" = 1'-0"

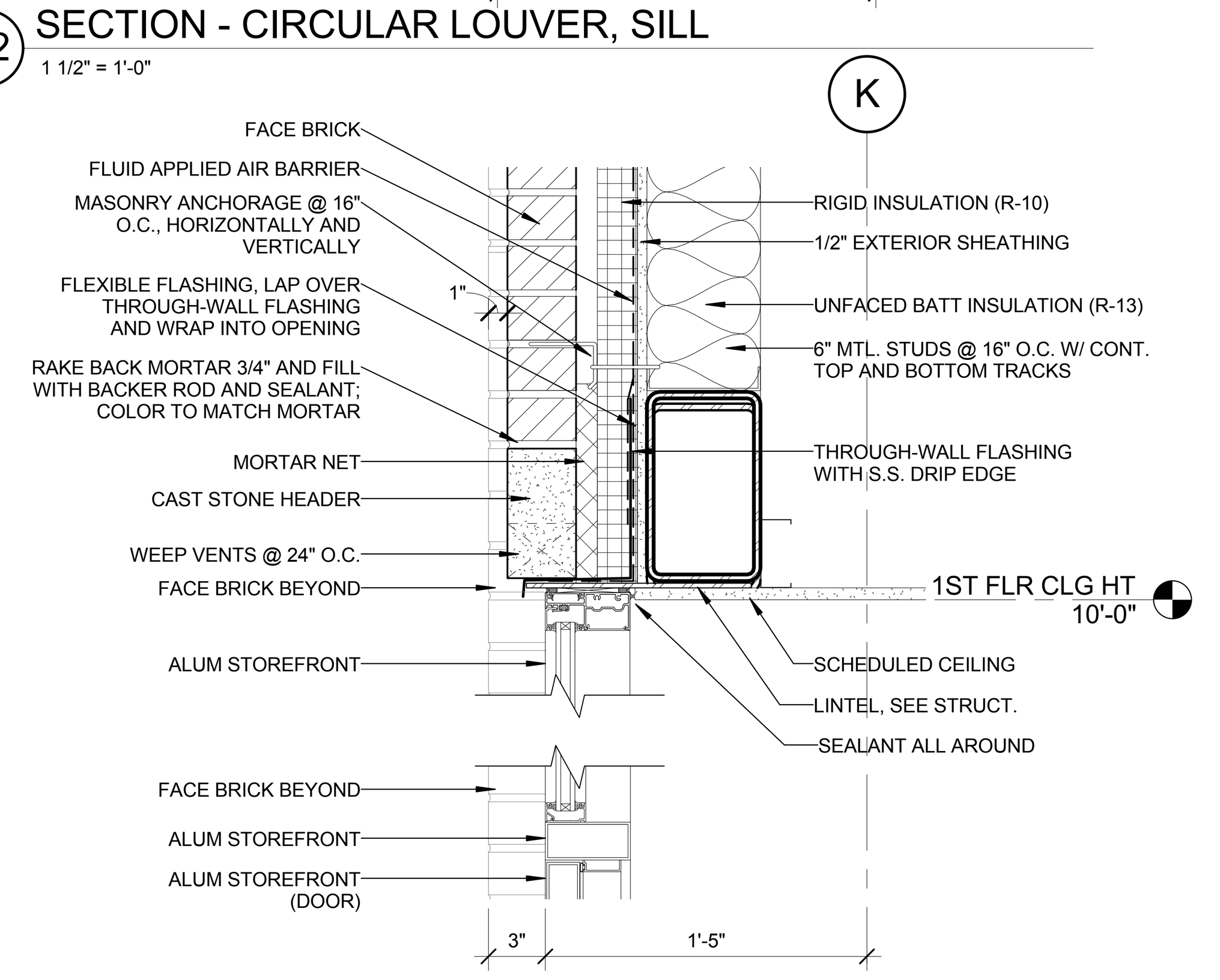
FLASHING PER B1/A-511



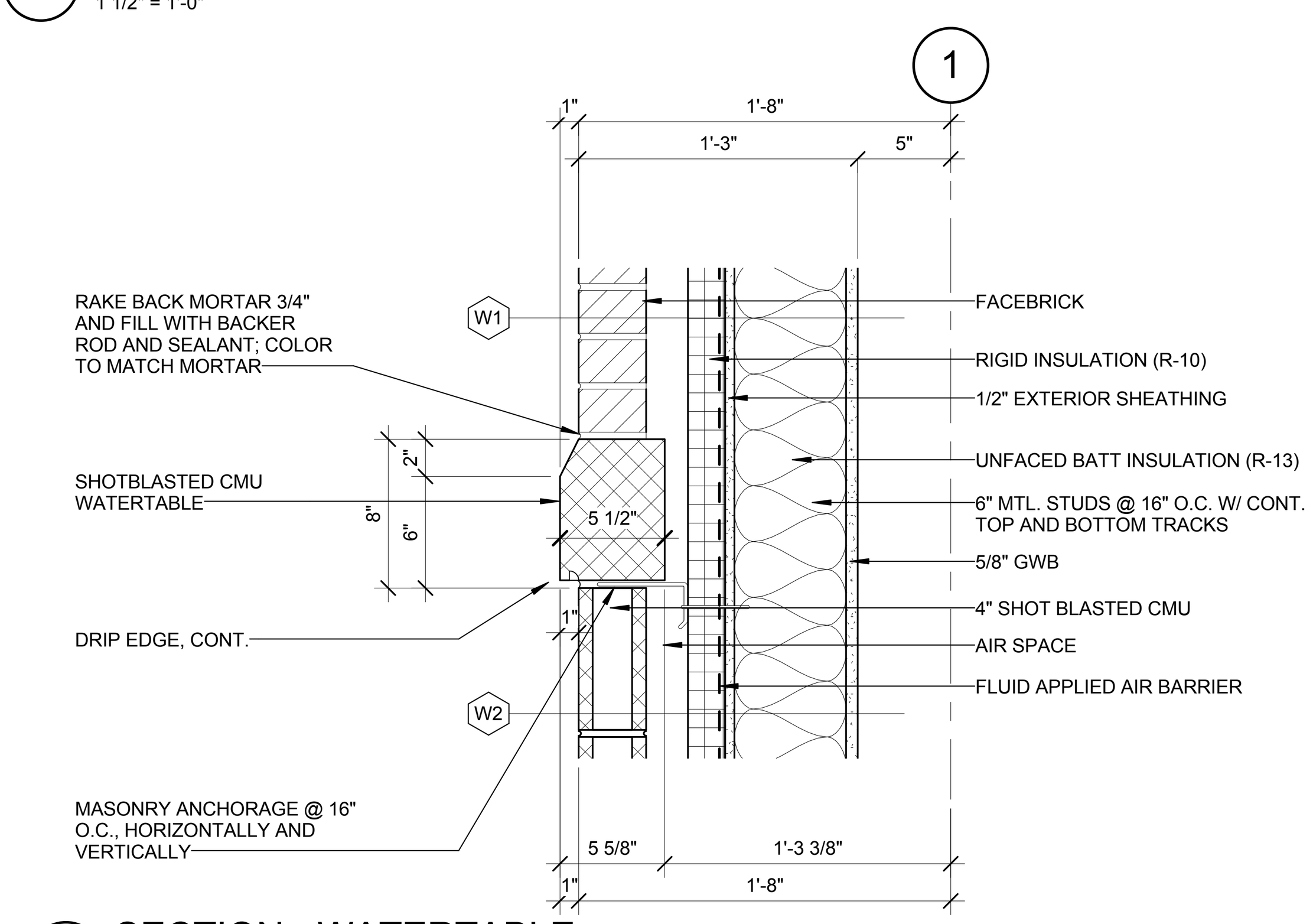
C5 SECTION - WINDOW SILL
1 1/2" = 1'-0"



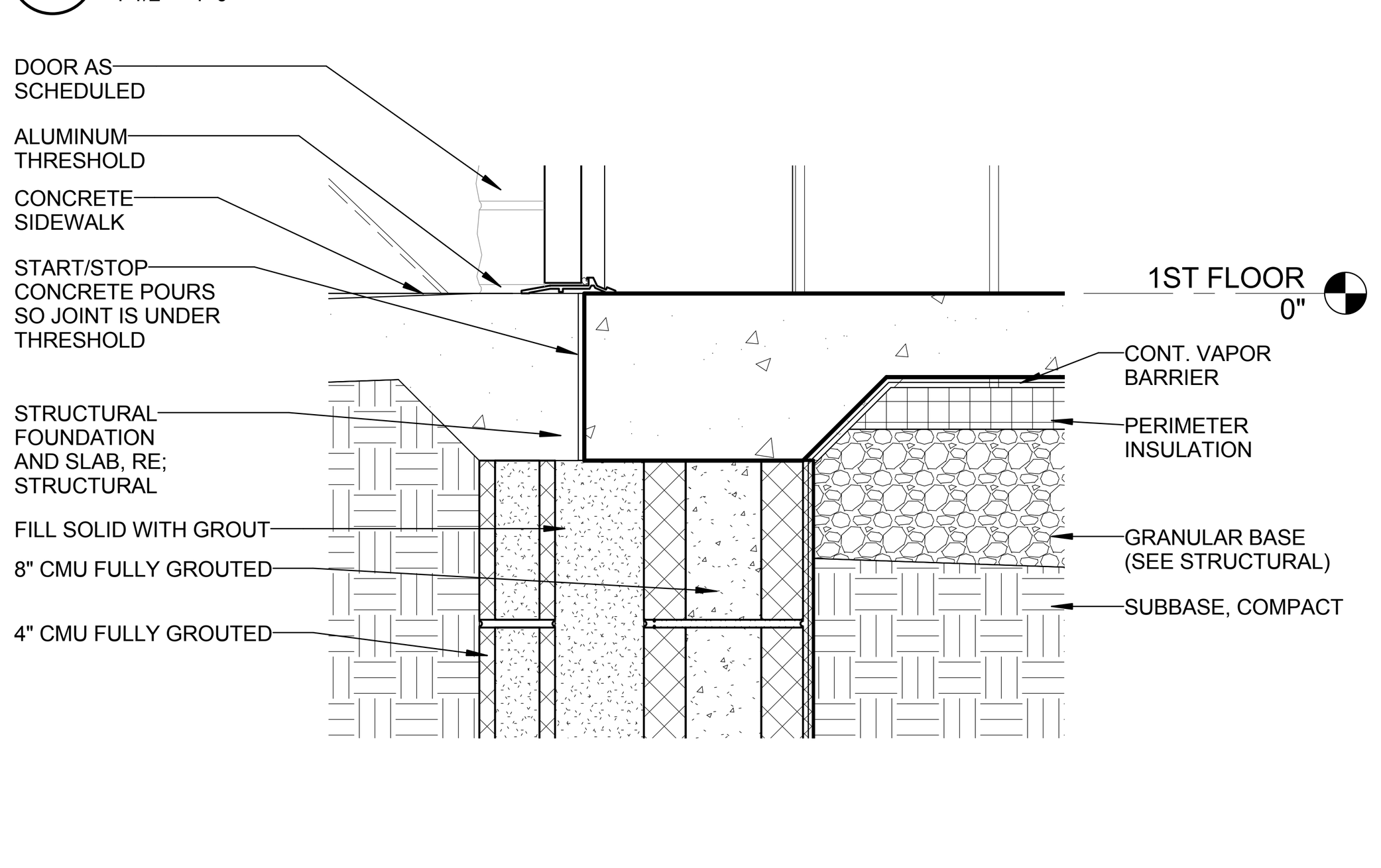
B1 SECTION - EXTERIOR HM DOOR HEAD
1 1/2" = 1'-0"



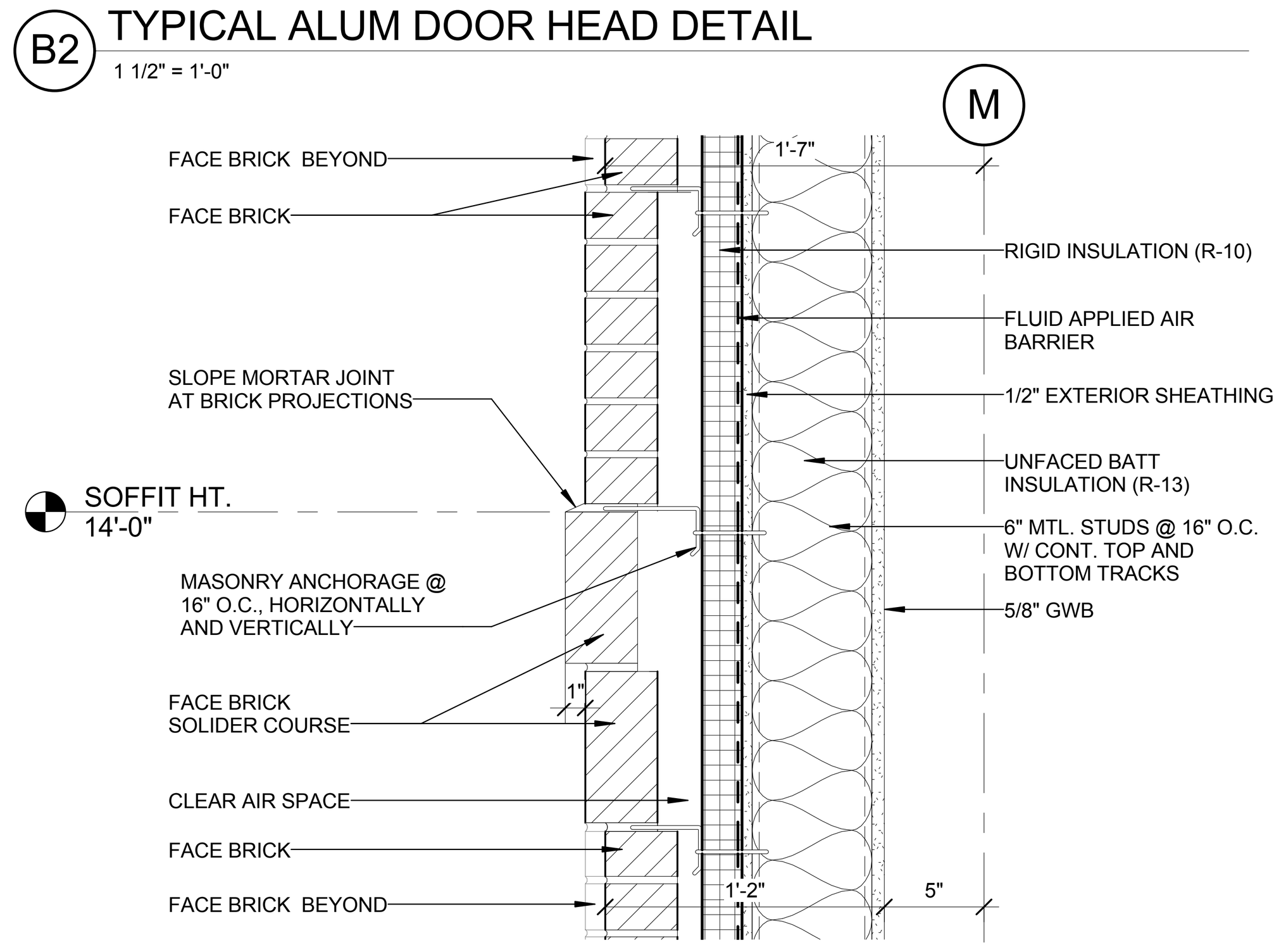
B2 TYPICAL ALUM DOOR HEAD DETAIL
1 1/2" = 1'-0"



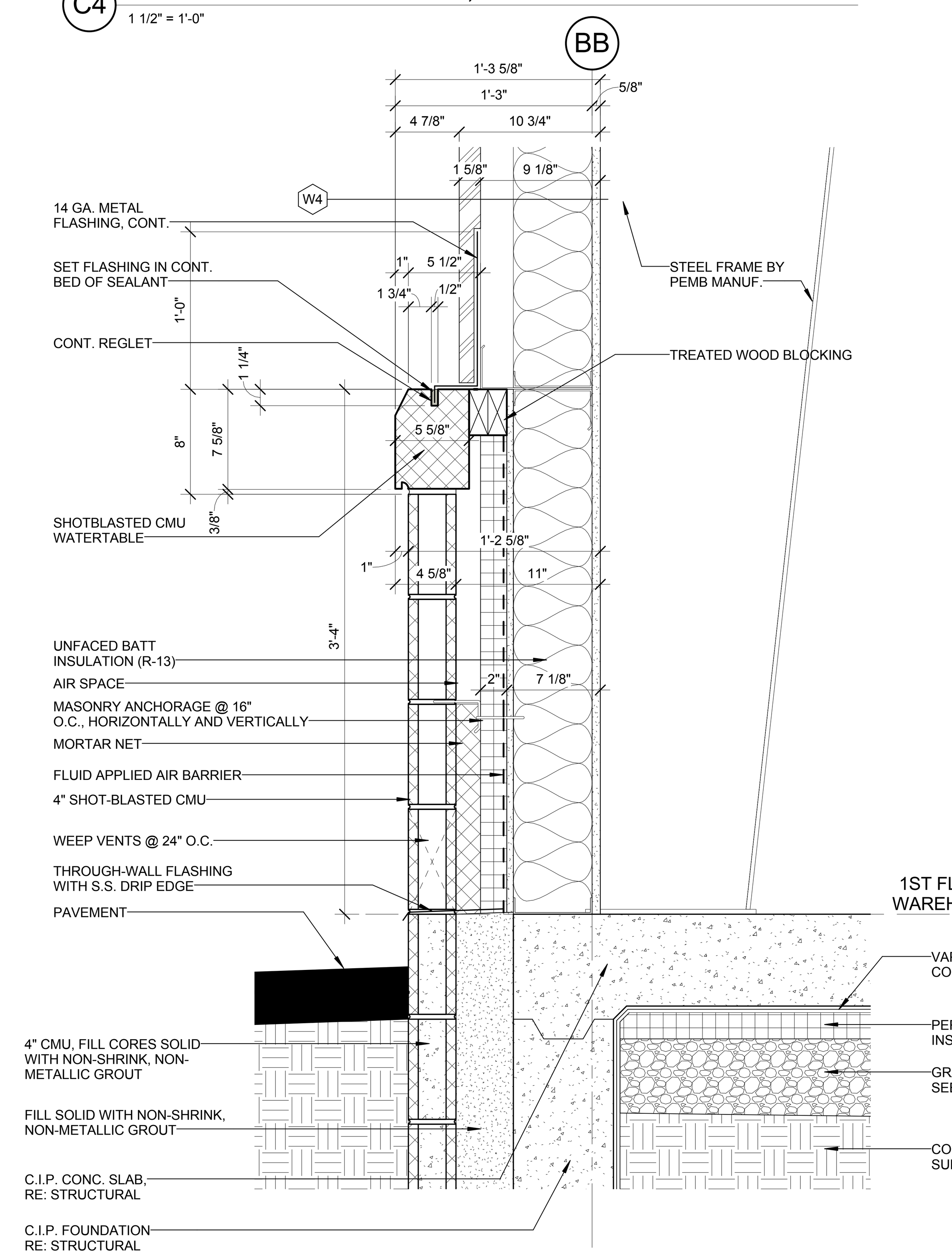
B5 SECTION - WATERTABLE
1 1/2" = 1'-0"



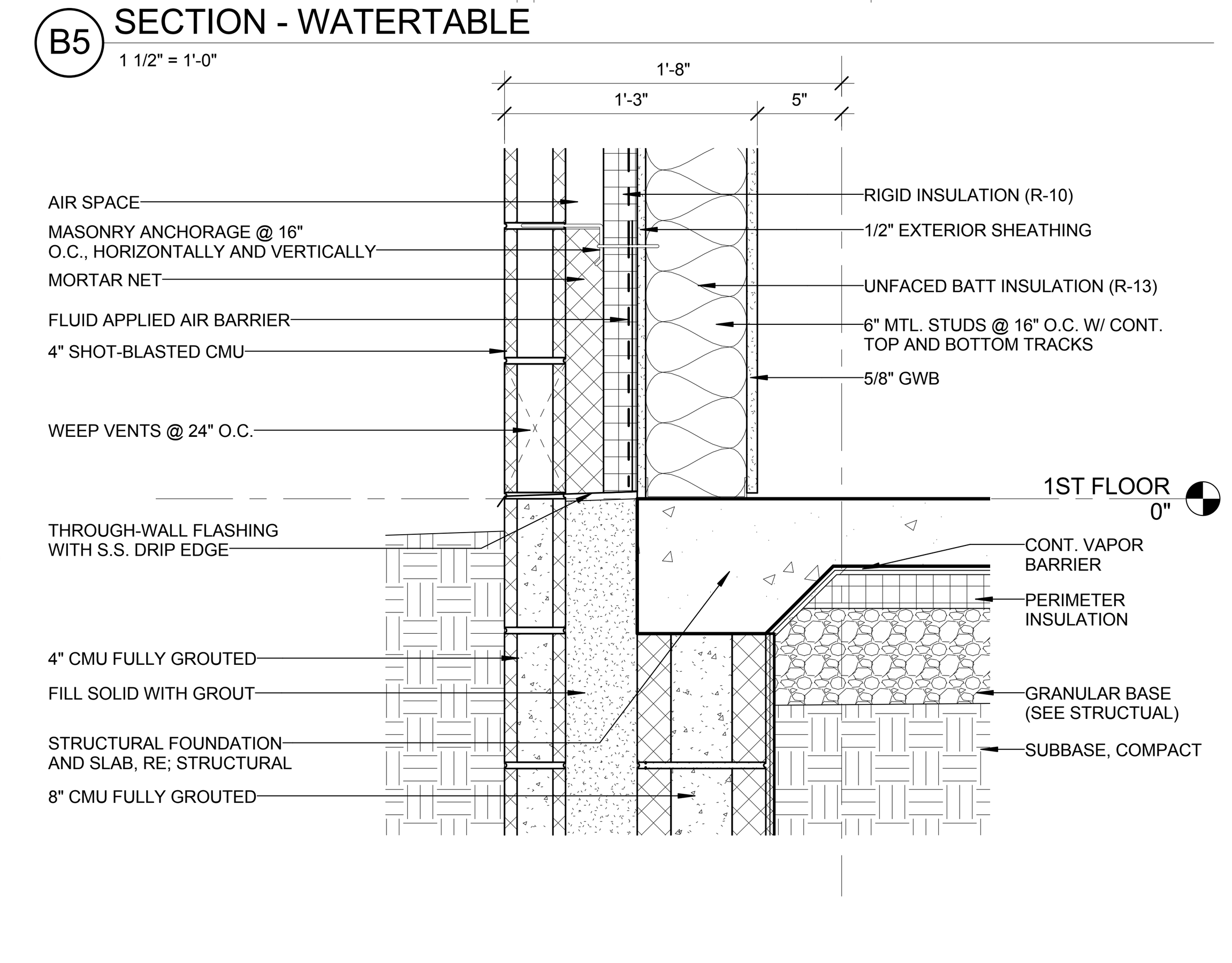
A1 SECTION - EXTERIOR DOOR SILL
1 1/2" = 1'-0"



A2 SECTION - DOUBLE SOLDIER COURSE FACE BRICK
1 1/2" = 1'-0"



A4 SECTION - BASE OF WAREHOUSE WALL
1 1/2" = 1'-0"



A5 SECTION - BASE OF TYPICAL OFFICE / SHOP WALL
1 1/2" = 1'-0"

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WILLIAM SCOTT BAKER 8326 NORTH CAROLINA CHARLOTTE, N.C. 9/11/2017

LS3P ASSOCIATES LTD REGISTERED ARCHITECTURAL COMPANY CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

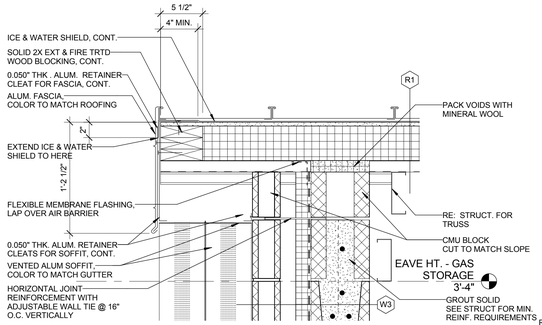
No.	Description	Date
1	Addendum No. 5	09/11/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: RD
CHECKED BY: SH

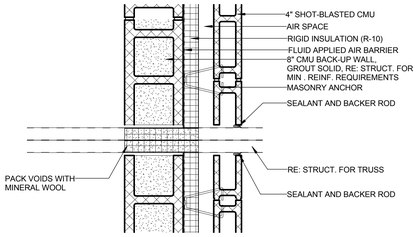
SECTION DETAILS (EXTERIOR)

A-511

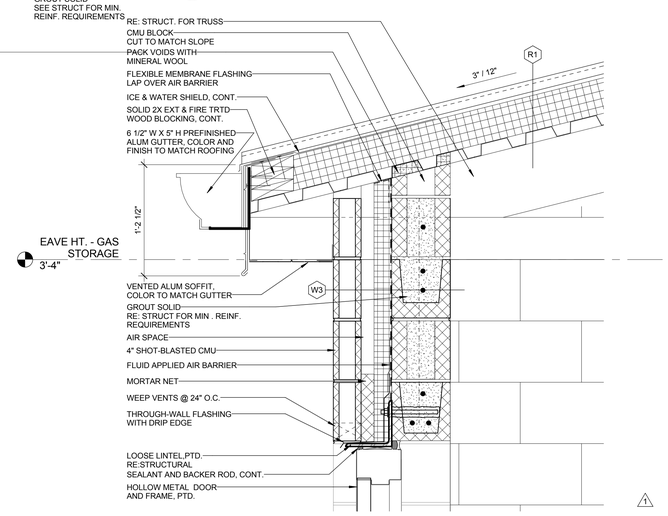
BUILDING BID DOCUMENTS



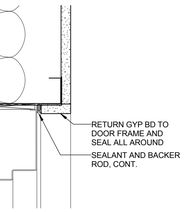
E2 SECTION DETAIL - GAS STORAGE AT GABLE END
1 1/2" = 1'-0"



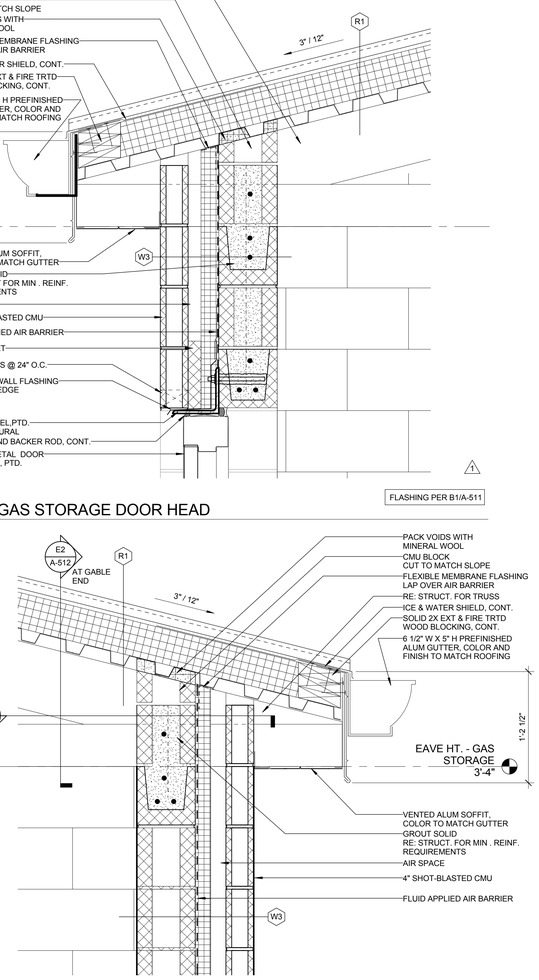
D2 PLAN DETAIL - GAS STORAGE
1 1/2" = 1'-0"



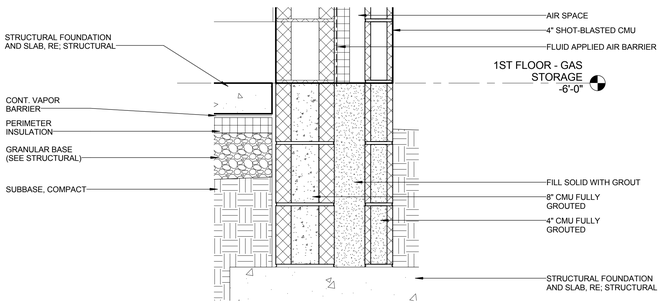
C3 SECTION-GAS STORAGE DOOR HEAD
1 1/2" = 1'-0"



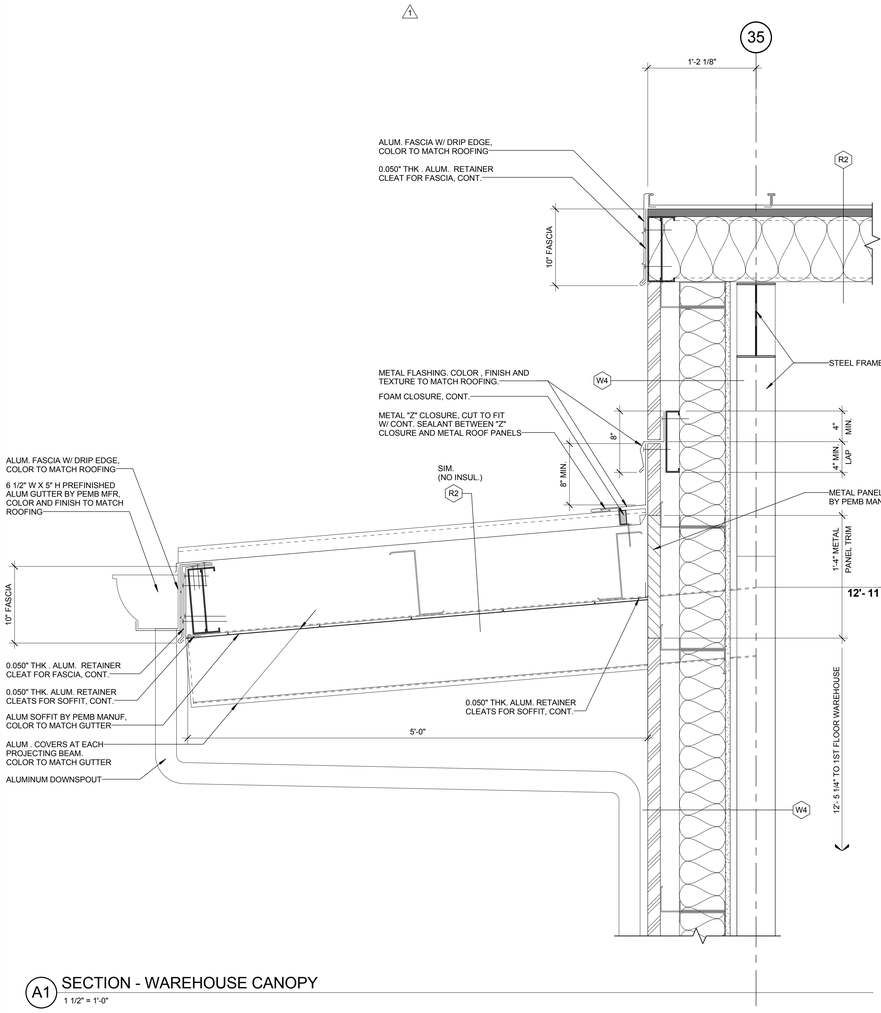
E3 TYPICAL DOOR HEAD @ PEMB
3" = 1'-0"



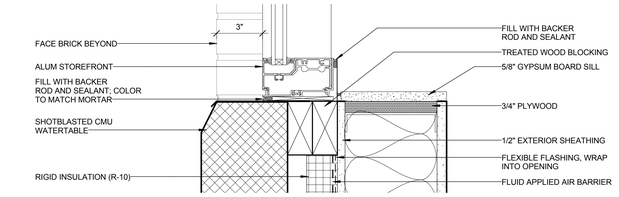
B3 SECTION- GAS STORAGE
1 1/2" = 1'-0"



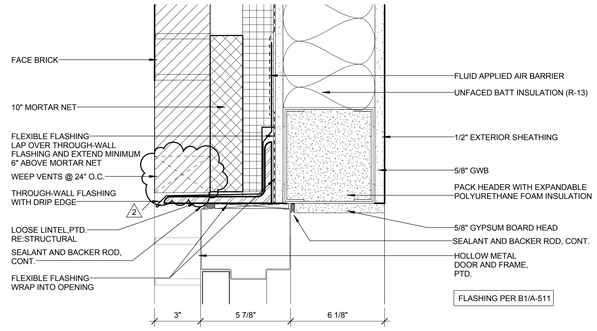
A3 SECTION-GAS STORAGE WALL
1 1/2" = 1'-0"



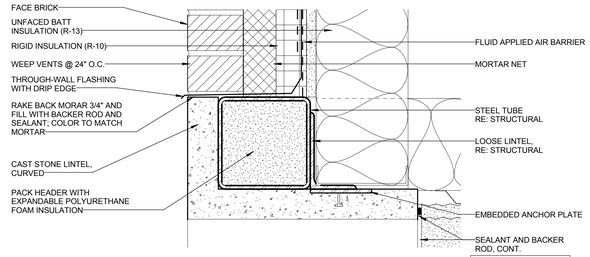
A1 SECTION - WAREHOUSE CANOPY
1 1/2" = 1'-0"



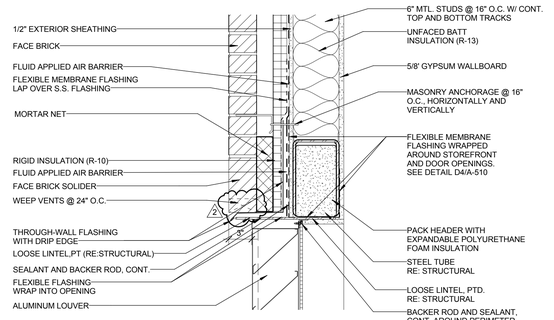
E6 TYPICAL WINDOW SILL
3" = 1'-0"



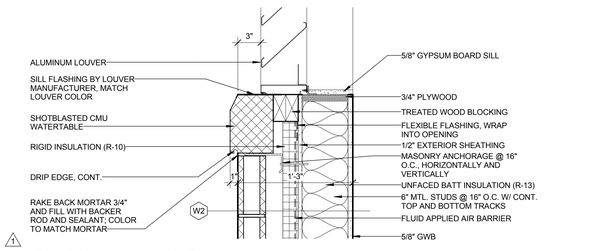
D6 TYPICAL DOOR HEAD
3" = 1'-0"



C6 CAST STONE HEAD DETAIL
3" = 1'-0"



B5 SECTION - LOUVER HEAD
1 1/2" = 1'-0"



A5 SECTION - LOUVER SILL
1 1/2" = 1'-0"

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WILLIAM SCOTT BOWLING REGISTERED ARCHITECT 8326 NORTH CAROLINA CHARLOTTE, N.C. 9/11/2017

LS3P ASSOCIATES LTD REGISTERED ARCHITECTURAL FIRM CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

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REVISIONS:

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2	Addendum No. 5	09/11/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: RD
CHECKED BY: SH

SECTION DETAILS (EXTERIOR)

A-512

BUILDING BID DOCUMENTS

C:\Users\sharonhuot\Documents\Arch_UNCC Facilities Operations Complex_2016_sharonhuot.rvt
9/11/2017 11:08:43 AM

ROOM FINISH SCHEDULE - OFFICE/SHOPS BUILDING

ROOM NUMBER	ROOM NAME	WALL FINISH	BASE	FLOORING	CEILING FINISH	REMARKS
100	VESTIBULE	PNT-1	PTB-1	PTF-1/2	PNT-5	
101	LOBBY/ WELCOME AREA	PNT-1/PNT-2	PTB-1	PTF-1/2	ACT-1/PNT-5	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
101A	FRONT COUNTER	PNT-1	RBS-1	CPT-1	ACT-1	
101B	PR/ MARKETING REP.	PNT-1	RBS-1	CPT-1	ACT-1	
101C	APPEALS ROOM	PNT-1	RBS-1	CPT-3	ACT-1	
101D	UNISEX	PNT-3/PTW-1/2/3	PTB-1	PTF-1/2	PNT-5	PTW-1 @ PTD SEE C2/A-411
102	CORR.	PNT-1	RBS-1	CPT-2	ACT-1	
102A	WORKROOM	PNT-1	RBS-1	LVT-1	ACT-1	
102B	FILE ROOM	PNT-1	RBS-1	CPT-1	ACT-1	
102C	CONFERENCE ROOM	PNT-1	RBS-1	CPT-3	ACT-1	
102D	RECONCILIATION ROOM	PNT-1	RBS-1	CPT-1	ACT-1	PAINT ACCENT PNT-4 SEE FINISH SCHEDULE FOR LOCATION
102E	ADMINISTRATIVE SUPPORT SPECIALIST	PNT-1	RBS-1	CPT-1	ACT-1	
102F	COMPUTER STATION ROOM	PNT-1	RBS-1	CPT-1	ACT-1	
103	CORR.	PNT-1/PNT-2	RBS-1	CPT-2	ACT-1	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
103A	ADMIN ASSISTANT TO DIRECTOR	PNT-1	RBS-1	CPT-1	ACT-1	
103B	BUSINESS MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
103C	DIRECTOR	PNT-1	RBS-1	CPT-1	ACT-1	
103D	ASSISTANT DIRECTOR	PNT-1	RBS-1	CPT-1	ACT-1	
103E	TECHNOLOGY SUPPORT ANALYST	PNT-1	RBS-1	CPT-1	ACT-1	
103F	CALL CENTER SUPERVISOR/ APPEALS MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
103G	CALL CENTER	PNT-1	RBS-1	CPT-1	ACT-1	
103H	TECHNOLOGY SUPPORT ASST.	PNT-1	RBS-1	CPT-3	ACT-1	
103J	PARKING SHIFT SUPERVISOR	PNT-1	RBS-1	CPT-3	ACT-1	
103K	PARKING CONTROL OFFICER ROOM	PNT-1	RBS-1	CPT-3	ACT-1	
103N	TRANSPORTATION SHIFT SUPERVISORS	PNT-1	RBS-1	CPT-3	ACT-1	
103P	TRANSPORTATION ASST GM	PNT-1	RBS-1	CPT-1	ACT-1	
104	CORR.	PNT-1	RBS-1	CPT-2	ACT-1	
104A	TRANSPORTATION MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
104B	TRANSPORTATION SHIFT SUPERVISORS	PNT-1	RBS-1	CPT-2	ACT-1	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
104C	ADMIN ASSISTANT TO MANAGERS	PNT-1	RBS-1	CPT-2	ACT-1	
104D	PARKING OPERATIONS MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
104E	TRANSPORTATION DRIVER ROOM	PNT-1	RBS-1	CPT-3	ACT-1	PAINT ACCENT PNT-4 SEE FINISH SCHEDULE FOR LOCATION
104F	WOMEN'S CHANGING/ LOCKER	PNT-1/3A	PTB-2	PTF-3	ACT-1/PNT-5	
104G	STOR.	PNT-1	RBS-1	CSL-1	ACT-1	
104H	MEN'S CHANGING/ LOCKER	PNT-1A/4A	PTB-2	PTF-3	ACT-1/PNT-5	
105	CORR.	PNT-1	RBS-1	CPT-2	ACT-1	
105A	MAINTENANCE TECHS	PNT-1	RBS-1	CPT-5	ACT-1	
106	VESTIBULE	PNT-1	PTB-1	PTF-1	PNT-5	
120	VESTIBULE	PNT-1	PTB-1	PTF-1/2	PNT-5	
121	LOBBY/ WELCOME AREA	PNT-1/PNT-2	PTB-1	PTF-1/2	ACT-1/PNT-5	
121A	RECEPTION	PNT-1/PNT-2	PTB-1	PTF-1/2	ACT-1/PNT-5	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
121B	KEY STOR.	PNT-1	PTB-1	PTF-1/2	ACT-1	
122	CORR.	PNT-1	RBS-1	CPT-2	ACT-1	
122A	CRITICAL SYSTEMS MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
122B	PD&E COORDINATOR	PNT-1	RBS-1	CPT-1	ACT-1	
122C	PROGRAM DEVELOPMENT & EDUCATION TRAINING ROOM	PNT-1	RBS-1	CPT-3	ACT-1	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
123	CORR.	PNT-1	RBS-1	CPT-2	ACT-1	
123A	TRAINING ROOM	PNT-1	RBS-1	CPT-3	ACT-1	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
123B	PA/ CALL CENTER	PNT-1	RBS-1	CPT-1	ACT-1	
123B1	STORAGE	PNT-1	RBS-1	CSL-1	ACT-1	
123C	CORR.	PNT-1	RBS-1	CPT-2	ACT-1	
123D	MULTI-PURPOSE CONFERENCE/ TRAINING ROOM	PNT-1	RBS-1	CPT-3	ACT-1	
123E	HSKPNG	PNT-1	RBS-1	CSL-1	PNT-5	PROVIDE 48"X48" FRP PANELS ON ALL WALLS ADJACENT TO SINK
123F	MENS RESTROOM	PNT-1A/3A/PTW-1/2/3	PTB-2	PTF-3	PNT-5	PTW 1/2/3 @ PLUMBING WALLS ONLY, SEE A-411; PTW-1 @ PTD SEE C2/A-411. PAINT ACCENT PNT-2A AND PNT-3A SEE FINISH SCHEDULE FOR LOCATION
123G	WOMENS RESTROOM	PNT-1A/3A/PTW-1/2/3	PTB-2	PTF-3	PNT-5	PTW 1/2/3 @ PLUMBING WALLS ONLY, SEE A-411; PTW-1 @ PTD SEE C2/A-411. PAINT ACCENT PNT-2A AND PNT-3A SEE FINISH SCHEDULE FOR LOCATION
123H	UNISEX	PNT-1A/4A/PTW-1/2/3	PTB-2	PTF-3	PNT-5	PTW-1 @ PTD SEE C2/A-411
123I	KITCHEN/ BREAKROOM	PNT-1/3A	RBS-1	LVT-1	ACT-1	PAINT ACCENT PNT-3A SEE FINISH SCHEDULE FOR LOCATION
124	CORR.	PNT-1	RBS-1	CPT-2	ACT-1	PAINT ACCENT PNT-2 AND PNT-3A SEE FINISH SCHEDULE FOR LOCATION
124A	STOR.	PNT-1	RBS-1	CSL-1	ACT-1	
124B	RECY.	PNT-1	RBS-1	CPT-2	ACT-1	PAINT ACCENT PNT-4 SEE FINISH SCHEDULE FOR LOCATION
124C	MAILROOM	PNT-1	RBS-1	LVT-1	ACT-1	
124D	MAIN ELECTRICAL	PNT-1	RBS-1	CSL-1	EXPOSED	
124D1	ATS	PNT-1	RBS-1	CSL-1	EXPOSED	
124E	MAIN TELECOMM	PNT-1	RBS-1	CSL-1	ACT-1	
124F	VENDING	PNT-1	RBS-1	CPT-2	PNT-5	PAINT ACCENT PNT-4 SEE FINISH SCHEDULE FOR LOCATION
124G	BAS-COMMISSIONING	PNT-1	RBS-1	CPT-3	ACT-1	
125	CORR.	PNT-1/PNT-2	RBS-1	CPT-2	ACT-1	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
125A	DIRECTOR	PNT-1	RBS-1	CPT-1	ACT-1	
125B	CENTRAL OPERATIONS MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
125C	UTILITIES MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
125D	WORKROOM	PNT-1	RBS-1	LVT-1	ACT-1	
125D1	STORAGE	PNT-1	RBS-1	CSL-1	ACT-1	
125E	OPS CENTER	PNT-1	RBS-1	CPT-1	ACT-1	
125F	FCAP AND PM TECHS	PNT-1	RBS-1	CPT-3	ACT-1	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
125G	STUDENT WORKERS	PNT-1	RBS-1	CPT-1	ACT-1	
125H	FCAP	PNT-1	RBS-1	CPT-1	ACT-1	
125I	PM SUPERVISOR	PNT-1	RBS-1	CPT-1	ACT-1	
125J	CONTROLS ENGINEER	PNT-1	RBS-1	CPT-1	ACT-1	
125K	ZONE MAINTENANCE MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
126	CORR.	PNT-1	RBS-1	CPT-2	ACT-1	
126A	OFFICE MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
126B	CONFERENCE ROOM	PNT-1	RBS-1	CPT-3	ACT-1	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
126C	BUSINESS ANALYST	PNT-1	RBS-1	CPT-1	ACT-1	
130	CORR.	PNT-1/PNT-2	RBS-1	CPL-1	ACT-1	PAINT ACCENT PNT-2/2A SEE FINISH SCHEDULE FOR LOCATION
130A	BREAK ROOM	PNT-1/PNT-2A	RBS-1	CPL-1	ACT-1	PAINT ACCENT PNT-2A SEE FINISH SCHEDULE FOR LOCATION
130B	HSKPNG	PNT-1	RBS-1	CSL-1	EXPOSED	PROVIDE 48"X48" FRP PANELS ON ALL WALLS ADJACENT TO SINK
130C	WOMEN'S	PNT-1A/3A/PTW-1/2/3	PTB-2	PTF-3	PNT-5	PAINT ACCENT PNT-3A SEE FINISH SCHEDULE FOR LOCATION
130D	MEN'S	PNT-1A/4A/PTW-1/2/3	PTB-2	PTF-3	PNT-5	PAINT ACCENT PNT-4A SEE FINISH SCHEDULE FOR LOCATION; PTW-1 @ PTD SEE C2/A-411
130E	VEST.	PNT-1	PTB-1	CPL-1	PNT-5	
130F	ZONE 4	PNT-1	RBS-1	CPT-4	ACT-1	
130G	ZONE 4 SUPERVISOR AND PLANNER	PNT-1	RBS-1	CPT-1	ACT-1	
130H	ZONE 5	PNT-1	RBS-1	CPT-4	ACT-1	
130I	ZONE 5 SUPERVISOR AND PLANNER	PNT-1	RBS-1	CPT-1	ACT-1	
130J	ZONE 6	PNT-1	RBS-1	CPT-4	ACT-1	
130K	ZONE 6 SUPERVISOR AND PLANNER	PNT-1	RBS-1	CPT-1	ACT-1	
130L	HIGH VOLTAGE TECH	PNT-1	RBS-1	CPT-4	ACT-1	
130M	HIGH VOLTAGE SUPERVISOR AND PLANNER	PNT-1	RBS-1	CPT-1	ACT-1	
130N	STEAM PLANT TECH	PNT-1	RBS-1	CPT-4	ACT-1	
130P	STEAM PLANT SUPERVISOR AND PLANNER	PNT-1	RBS-1	CPT-1	ACT-1	
130Q	FIRE SYSTEM TECH	PNT-1	RBS-1	CPT-4	ACT-1	
130R	FIRE SYSTEM SUPERVISOR AND PLANNER	PNT-1	RBS-1	CPT-1	ACT-1	
131	CORR.	PNT-1	RBS-1	CPL-1	ACT-1	
131A	KEY STORAGE TECHS, SHOP, AND STORAGE	PNT-1	RBS-1	CPL-1	ACT-1	
131A1	KEY SHOP SUPERVISOR	PNT-1	RBS-1	CPT-1	ACT-1	
131B	RENOVATIONS SHOP	PNT-1	RBS-1	CPL-1	EXPOSED	

ROOM FINISH SCHEDULE - OFFICE/SHOPS BUILDING

ROOM NUMBER	ROOM NAME	WALL FINISH	BASE	FLOORING	CEILING FINISH	REMARKS
131B1	TOOL ROOM	PNT-1	RBS-1	CPL-1	PNT-5	
131B2	RENOVATIONS TECH	PNT-1	RBS-1	CPL-1	ACT-1	
131B3	RENOVATIONS SUPERVISOR	PNT-1	RBS-1	CPL-1	ACT-1	
131C	HIGH VOLTAGE/WELD SHOP	PNT-1	RBS-1	CPL-1	EXPOSED	
132	ZONE WORK SPACE	PNT-1	RBS-1	CPL-1	EXPOSED	
133	FIRE PUMP	PNT-1	RBS-1	CSL-1	EXPOSED	
134	MECHANICAL	PNT-1	RBS-1	CSL-1	EXPOSED	
150	VESTIBULE	PNT-1	PTB-1	PTF-1/2	PNT-5	
151	CORR.	PNT-1	RBS-1	LVT-1	ACT-1	
151A	MENS	PNT-1A/4A/PTW-1/2/3	PTB-2	PTF-3	PNT-5	PAINT ACCENT PNT-4A SEE FINISH SCHEDULE FOR LOCATION
151B	WOMENS	PNT-1A/3A/PTW-1/2/3	PTB-2	PTF-3	PNT-5	PAINT ACCENT PNT-3A SEE FINISH SCHEDULE FOR LOCATION
151C	TRASH/REC. OFOI	PNT-1	RBS-1	LVT-1	ACT-1	
151D	HSKP	PNT-1	RBS-1	CSL-1	PNT-5	PROVIDE 48"X48" FRP PANELS ON ALL WALLS ADJACENT TO SINK
152	CORR.	PNT-1	RBS-1	CPT-1	ACT-1	
152A	OFFICE	PNT-1	RBS-1	CPT-1	ACT-1	
152B	WORK STATIONS	PNT-1	RBS-1	CPT-1	ACT-1	
153	CORR.	PNT-1	RBS-1	CPT-3	ACT-1	PAINT ACCENT PNT-2 SEE FINISH SCHEDULE FOR LOCATION
153A	MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
153B	CONFERENCE/ BREAKROOM	PNT-1	RBS-1	LVT-1	ACT-1	PAINT ACCENT PNT-2A SEE FINISH SCHEDULE FOR LOCATION
153C	OFFICE	PNT-1	RBS-1	CPT-1	ACT-1	
153D	OFFICE	PNT-1	RBS-1	CPT-1	ACT-1	
153E	WORK STATIONS	PNT-1	RBS-1	CPT-3	ACT-1	
153F	ASST. MANAGER	PNT-1	RBS-1	CPT-1	ACT-1	
153R	SHOWROOM	PNT-1	RBS-1	CSL-1	ACT-1	
154	PARTS CRIB (SDI)	PNT-1	RBS-1	CSL-1	EXPOSED	
154A	PARTS CRIB CONDITIONED	PNT-1	RBS-1	CSL-1	EXPOSED	
155A	FO CONDITIONED ATTIC STOCK	PNT-1	RBS-1	CSL-1	EXPOSED	
155B	TOOL CRIB	PNT-1	RBS-1	CSL-1	EXPOSED	
155C	CENTRAL OPS. AND UTILITIES ATTIC STOCK	PNT-1	RBS-1	CSL-1	EXPOSED	
155D	ZONES ATTIC STOCK	PNT-1	RBS-1	CSL-1	EXPOSED	
156A	LOADING DOCK	-	-	-	EXPOSED	
156B	R & S CONDITIONED STORAGE	PNT-1	RBS-1	CSL-1	EXPOSED	
156C	R&S STORAGE	PNT-1	RBS-1	CSL-1	EXPOSED	
157	MECHANICAL	PNT-1	RBS-1	CSL-1	EXPOSED	
157A	ELEC.	PNT-1	RBS-1	CSL-1	EXPOSED	
157B	TELECOMM	PNT-1	RBS-1	CSL-1	ACT-1	
180	GAS STOR.	-	-	-	EXPOSED	

MATERIAL CODE LEGEND

Code	Material	Code	Material
AWP	ACOUSTICAL WRAPPED PANEL	PTB	PORCELAIN TILE BASE
CCS	COLORED CONCRETE SURFACE	PTF	PORCELAIN TILE FLOORING
CHD	CONCRETE LIQUID HARDENER	PTW	PORCELAIN TILE WALL
CKT	CORK TILE	PWB	PAINTED WALL BASE
CON	CONCRETE	RBS	RUBBER BASE
CPT	CARPET	RBT	RUBBER TILE
CRT	ACOUSTICAL CURTAIN	RTF	RESILIENT TILE FLOORING
CSL	CONCRETE SEALER	SCN	SEALED CONCRETE
CTB	CERAMIC TILE BASE	SDT	STATIC DISSIPATIVE TILE
CTW	CERAMIC TILE WALL	SHV	SHEET VINYL
EPX	EPOXY FLOORING	SPF	SPORTS FLOORING
ETR	EXISTING TO REMAIN	STC	STAMPED CONCRETE
FWC	FABRIC WALLCOVERING	STF	PERFORMANCE STAGE FLOORING
GTF	GROUT, FLOORING	STN	STONE COUNTER
GTW	GLASS TILE WALL	TBD	TO BE DETERMINED
LIN	LINOLEUM	TZB	TERRAZZO BASE
MCC	MULTI-COLORED COATING	TZZ	TERRAZZO FLOORING
MEL	MELAMINE	VCT	VINYL COMPOSITION TILE
MPW	METAL PANEL WALL	VPF	VINYL PLANK FLOORING
PLM	PLASTIC LAMINATE	VWC	VINYL WALLCOVERING
PNC	PAINTED CONCRETE	WDB	WOOD BASE
PNT	PAINT	WDF	WOOD FLOORING

BASIS OF DESIGN ROOM FINISH LEGEND

Key Name	DESCRIPTION	MANUFACTURER	PRODUCT NAME AND NUMBER	FINISH	COLOR	SIZE	NOTES
DIVISION 6 WOOD AND PLASTICS							
CHW-1	CABINET HARDWARE	AMEROCK	CTC PULL BP40517 PN	POLISHED NICKEL		5-1/16 in	
DWS-1	DOOR WOOD STAIN	MARSHFIELD DOOR SYSTEMS	MARSHFIELD	TOAST 28-95	WHITE OAK		
FRP-1	GLASS-FIBER-REINFORCED PLASTIC PANELING	TBD	TBD	SMOOTH	WHITE	48"x48"	
GRM-1	WIRE GROMMETS	TBD					
PLM-1	PLASTIC LAMINATE, VERTICAL SURFACE	WILSONART	4830K-18		SATIN STAINLESS		RESTROOM APRONS
PLM-2	PLASTIC LAMINATE, VERTICAL SURFACE	FORMICA	927-58	MATTE FINISH	FOLKSTONE		CASEWORK BREAK ROOMS & CORRIDORS
SSM-1	SOLID SURFACE	CORIAN	SEAFOAM			1/2 IN THICKNESS	RESTROOMS COUNTERTOPS
SSM-2	SOLID SURFACIE	CORAIN	SILT			1/2 IN THICKNESS	COUNTERS CASEWORK BREAK ROOMS & CORRIDORS
DIVISION 8 DOORS AND WINDOWS							
DHW-1	DOOR HARDWARE FINISH	TBD					
OCD-1	OVERHEAD COILING DOOR	TBD					
DIVISION 9 FINISHES - CEILINGS							
ACT-1	ACOUSTICAL CEILING TILE, STANDARD	ARMSTRONG	769A		WHITE	5/8 in x 24 in x 24 in	
SCT-1	SUSPENDED CEILING PERIMETER TRIM	ARMSTRONG	AXION TRANSITIONS				
DIVISION 9 FINISHES - FLOORS							
CPL-1	POLISHED CONCRETE	ARDEX	CLASS B - FINE AGGREGATE (SALT & PEPPER)	LEVEL 2 - SATIN (HONED)	GREY		
CPT-1	CARPET, TILE	MANNINGTON	MESH		DISTRICT (13219)	18 in x 36 in	HORIZONTAL BRICK ASHLAR INSTALLATION
CPT-2	CARPET, TILE	MANNINGTON	MESH		METRO (14215)	18 in x 36 in	HORIZONTAL BRICK ASHLAR INSTALLATION
CPT-3	CARPET, TILE	MANNINGTON	SPAN		METRO (14215)	18 in x 36 in	HORIZONTAL BRICK ASHLAR INSTALLATION
CPT-4	WALK-OFF CARPET TILE	SHAW CONTRACT	ALL ACCESS 5T034	LAVA	34549	24 in x 24 in	
CPT-5	ANTI-STATIC CARPET	STATICWORX				19.69 in x 19.69 in	ROOM 137
CSL-1	CONCRETE SEALER	SHERWIN WILLIAMS			AFINITY - AF 710		
LVT-1	LUXURY VINYL TILE	MANNINGTON	DIVEVERGENT STRAND	QUANTUM GUARD HP	CUMULUS	18 in x 36 in	BREAKROOM AND CORRIDOR
PTF-1	PORCELAIN TILE FLOORING	TRINITY SURFACES	DALLIANCE - NUVOLA	MATE		24 in x 24 in	LOBBIES, VESTIBULES
PTF-2	PORCELAIN TILE FLOORING	TRINITY SURFACES	DALLIANCE - NUVOLA	MATE		12 in x 24 in	LOBBIES, VESTIBULES
PTF-3	PORCELAIN TILE FLOORING	DALTILE	VERANDA SOLIDS		FOG P542	20 in x 13 in	RESTROOMS
DIVISION 9 FINISHES - WALL BASE							
PTB-1	PORCELAIN TILE, BASE	TRINITY SURFACES	DALLIANCE - NUVOLA	MATE			LOBBIES, VESTIBULES
PTB-2	PORCELAIN TILE, BASE	DALTILE	VERANDA SOLIDS S-44K9M		SAPHIRE P551	4 in x 20 in	BATH ROOMS
RBS-1	RUBBER BASE	JOHNSONNITE	COVE BASE		460 COTTON	4 in cove base	
DIVISION 9 FINISHES - WALLS							
PNT-1	PAINT	SHERWIN WILLIAMS	FLEUR DE SEL	G3	SW 7666		FIELD COLOR
PNT-1A	PAINT	SHERWIN WILLIAMS	FLEUR DE SEL	EPOXY	SW 7666		FIELD COLOR
PNT-1B	PAINT	SHERWIN WILLIAMS	FLEUR DE SEL	G5	SW 7666		FIELD COLOR
PNT-2	PAINT	SHERWIN WILLIAMS	TINSMITH	G3	SW 7657		ACCENT WALLS
PNT-2A	PAINT	SHERWIN WILLIAMS	TINSMITH	EPOXY	SW 7657		BATH ROOMS
PNT-3	PAINT	SHERWIN WILLIAMS	TANSY GREEN	G3	SW6424		ACCENT WALLS
PNT-3A	PAINT	SHERWIN WILLIAMS	TANSY GREEN	EPOXY	SW6424		BATH ROOMS
PNT-4	PAINT	SHERWIN WILLIAMS	REFUGE	G3	SW 6228		ACCENT WALLS
PNT-4A	PAINT	SHERWIN WILLIAMS	REFUGE	EPOXY	SW 6228		BATH ROOMS
PNT-5	PAINT	SHERWIN WILLIAMS	ALABASTER	G1 FLAT	SW 7008		CEILINGS
PTW-1	PORCELAIN TILE, WALL	DALTILE	VERANDA SOLIDS		FOG P542	6 1/2 in x 13 in	
PTW-2	PORCELAIN TILE, WALL	DALTILE	VERANDA SOLIDS		TITANIUM P523	6 1/2 in x 13 in	
PTW-3	PORCELAIN TILE, WALL	DALTILE	VERANDA SOLIDS		SAPHIRE P551	6 1/2 in x 13 in	
DIVISION 10 SPECIALTIES							
CG	CORNER GUARD	CS ACROVYN	CO-8		STAINLESS STEEL		AS INDICATED AND REQUIRED
EDP-1	EDGE WALL TILE PROTECTION	SCHULTER SYSTEMS	TBD	ALUMINUM			
FRW-1	WALL PANEL WITH TOP CAP	INPRO	IPC RIGID SHEET		TBD SOLID COLOR	4'x8' 0.40" THICK	
LKM-1	METAL LOCKERS	PENCO	0-21 GREY ASH				
MB4	MARKERBOARD	TBD				48" W x 48" H	MOUNT BOTTOM OF BOARD AT 2'-8"
MB5	MARKERBOARD	TBD				60" W x 48" H	MOUNT BOTTOM OF BOARD AT 2'-8"
MB5*	MARKERBOARD						OWNER PROVIDED MARKERBOARD, PROVIDE BLOCKING
TPT-1	TOILET PARTITION	HINY HIDERS		HAMMERED TEXTURE	STAINLESS		
TRS-1	TRANSITION STRIP	SCHULTER SYSTEMS	SCHLUTER RENO-U	ALUMINUM			TRANSITION CONCRETE TO TILE
TRS-2	TRANSITION STRIP REDUCER	JOHNSONITE					TRANSITION CONCRETE TO LVT
TRS-3	TRANSITION STRIP	SCHULTER SYSTEMS	SCHLUTER RENO-U	ALUMINUM			TRANSITION TILE TO LVT
TRS-4	TRANSITION STRIP	JOHNSONITE					TRANSITION CARPET TO LVT
TRS-5	TRANSITION STRIP	SCHULTER SYSTEMS	SCHLUTER SCHIENE	ALUMINUM			TRANSITION TILE TO CARPET
TRS-6	TRANSITION STRIP	SCHULTER SYSTEMS	SCHLUTER RENO-U	ALUMINUM			TRANSITION TILE TO VCT
TRS-7	TRANSITION STRIP	JOHNSONITE					TRANSITION LVT TO VCT

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

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LS3P ASSOCIATES LTD. REGISTERED ARCHITECTURAL CORPORATION CERT. NO. 50417 CHARLOTTE, NORTH CAROLINA

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum No. 5	09/11/2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: AR
CHECKED BY: SH

ROOM FINISH LEGEND AND FINISH SCHEDULES

A-720

BUILDING BID DOCUMENTS

2012 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - PLUMBING SUMMARY

501.1 METHOD OF COMPLIANCE

- ■ 2012 NCECC CHAPTER 5
- ☐ ASHRAE 90.1-2010 PRESCRIPTIVE
- ☐ ASHRAE 90.1-2010 PERFORMANCE
- ☐ COMCHECK PROVIDED (2012 NCECC)
- ☐ COMCHECK PROVIDED (90.1-2010)
- ☐ ENERGY MODELING DATA PROVIDED

501.2 APPLICATION COMPLIANCE

- ☐ 506.2.1 EFFICIENT MECH EQUIPMENT
- ■ 506.2.2 REDUCED LTG DENSITY
- ☐ 506.2.3 ENERGY RECOVERY SYSTEMS
- ☐ 506.2.4 HI EFFICIENCY DOMESTIC HW
- ☐ 506.2.5 ONSITE RENEWABLE ENERGY
- ☐ 506.2.6 DAYLIGHTING CONTROLS

504.2 SERVICE WATER-HEATING EQUIPMENT PERFORMANCE EFFICIENCY

SYSTEM DESCRIPTION - WH1: GAS WATER HEATER, 100 GALLON TANK TYPE, 150 CFH

STORAGE WATER HEATERS, GAS:

SIZE CATEGORY (> 75 MBH ≤ 155 MBH):	150,000 BTU/H
STORAGE TOTAL:	100 GALLONS
SUBCATEGORY (< 4,000 BTU/H/GAL):	1,500 BTU/H/GAL
MINIMUM THERMAL EFF. REQUIRED:	80 %
THERMAL EFF. OF SPECIFIED HEATER(S):	96 %
MAXIMUM STANDBY LOSS:	[(150,000/800) + (110 X √100)]
	= 1,287.5 BTU/H
STANDBY LOSS OF REQUIRED HEATER(S):	967 BTU/H

504.2 SERVICE WATER-HEATING EQUIPMENT PERFORMANCE EFFICIENCY

SYSTEM DESCRIPTION - WH4 : ELECTRIC WATER HEATER, 119 GALLON TANK TYPE, 54.0 KW

STORAGE WATER HEATERS, ELECTRIC:

SIZE CATEGORY (> 12 KW):	54.0 KW
STORAGE TOTAL:	119 GALLONS
MINIMUM STANDBY LOSS REQUIRED:	(1.73 X 119) + 155 = 361 BTU/H
STANDBY LOSS OF SPECIFIED HEATER(S):	340 BTU/H

PLUMBING GENERAL NOTES

GENERAL REQUIREMENTS:

1. PLUMBING WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE NORTH CAROLINA STATE PLUMBING CODE AND WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION.
2. GENERAL AND SPECIAL CONDITIONS ARE HEREBY MADE AN INTEGRAL PART OF THE PLUMBING SPECIFICATIONS INSOFAR AS THE GENERAL AND SPECIAL CONDITIONS ARE APPLICABLE TO THE PLUMBING WORK, UNLESS OTHERWISE SPECIFIED.
3. SCOPE: PROVIDE ALL LABOR, MATERIAL AND EQUIPMENT REQUIRED FOR THE COMPLETION AND OPERATION OF ALL PLUMBING SYSTEMS IN ACCORDANCE WITH ALL APPLICABLE CODES.
4. WARRANTY: PROVIDE A ONE YEAR WARRANTY, FROM THE DATE OF ACCEPTANCE OF WORK BY THE OWNER, FOR ALL PLUMBING MATERIALS AND EQUIPMENT.
5. COORDINATE ALL PLUMBING PIPING LOCATIONS, ROUGH-IN LOCATIONS AND EQUIPMENT LOCATIONS WITH OTHER TRADES TO AVOID CONFLICTS AND INTERFERENCES. FINAL PIPING AND EQUIPMENT LOCATIONS SHALL BE A CODE COMPLIANT INSTALLATION FOR ALL TRADES.
6. FIELD VERIFY PROPER OPERATION OF EXISTING SYSTEMS BEFORE STARTING CONSTRUCTION. NOTIFY THE ARCHITECT / ENGINEER OF RECORD OF ANY PROBLEMS OR DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND EXISTING CONDITIONS AND/OR ANY POTENTIAL PROBLEMS OBSERVED BEFORE CONTINUING WORK IN THE EFFECTED AREAS.
7. WHERE DISCREPANCIES ARE FOUND IN THE DRAWINGS AND SPECIFICATIONS THE MORE STRINGENT SHALL APPLY.
8. ALL PIPING SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA.
9. ALL VALVES, BACKFLOW PREVENTERS, BOOSTER PUMPS, ETC. SERVING THE DOMESTIC WATER SYSTEM SHALL MEET LEAD FREE STANDARDS PER ANSI / NSF 372 AND NSF 61, ANNEX G.
10. CUT WALLS, FLOORS AND CEILINGS AS REQUIRED FOR INSTALLATION OF PLUMBING WORK. ALL CUTTING SHALL BE HELD TO A MINIMUM. PATCH AND FINISH SURFACES TO MATCH ADJOINING SURFACES.
11. PLUMBING PLANS SHALL NOT BE SCALED. REFERENCE THE ARCHITECTURAL PLANS FOR ALL LOCATIONS OF PLUMBING FIXTURES, WALLS, DOORS, WINDOWS, ETC.
12. PLUMBING PIPING SHALL BE LOCATED CONCEALED IN WALLS, PARTITIONS OR ABOVE CEILINGS UNLESS NOTED OTHERWISE. PLUMBING PIPING IN EXPOSED AREAS SHALL BE RUN TIGHT TO UNDERSIDE OF STRUCTURE.
13. PLUMBING PIPING, VENTS, ETC. EXTENDING THROUGH EXTERIOR WALLS AND/OR THE ROOF SHALL BE FLASHED AND COUNTER FLASHED IN A WATERPROOF MANNER. COORDINATE FLASHING WITH THE GENERAL CONTRACTOR.
14. DO NOT INSTALL PLUMBING PIPING IN AREAS SUBJECT TO FREEZING TEMPERATURES. INSTALL PLUMBING PIPING SHOWN IN EXTERIOR WALLS ON THE CONDITIONED SIDE OF THE WALL INSULATION.
15. PROVIDE NON-CONDUCTING DIELECTRIC UNIONS WHENEVER CONNECTING DISSIMILAR METALS.
16. ATTACH HANGERS TO STRUCTURE, HANGERS SHALL NOT ATTACH TO THE DECK.
17. PROVIDE ACCESS DOORS FOR VALVES, WATER HAMMER ARRESTORS, TRAP PRIMERS, ETC. CONCEALED IN MASONRY WALLS, GYPBOARD WALLS AND/OR CEILINGS THAT WILL REQUIRE MAINTENANCE ACCESS.
18. PLUMBING SYSTEMS INCLUDE, BUT ARE NOT LIMITED TO: PLUMBING FIXTURES AND EQUIPMENT, FIRE STOPPING, PIPE IDENTIFICATION, DOMESTIC WATER SYSTEM, SANITARY WASTE AND VENT SYSTEM, NATURAL GAS SYSTEM

PLUMBING FIXTURES AND EQUIPMENT:

1. PROVIDE COMPLETE PLUMBING FIXTURES AND EQUIPMENT. INCLUDE SUPPLIES, STOPS, VALVES, FAUCETS, DRAINS, TRAPS, TAIL PIECES, ESCUTCHEONS, ETC.
2. PLUMBING FIXTURES AND EQUIPMENT SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS AND INSTALLATION INSTRUCTIONS.
3. THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH SUBSTITUTIONS TO SPECIFIED PLUMBING FIXTURES AND EQUIPMENT INCLUDING BUT NOT LIMITED TO; PROVIDING MAINTENANCE ACCESS CLEARANCE, PIPING, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC. AND ANY MODIFICATIONS TO ASSOCIATED MECHANICAL, ELECTRICAL OR PLUMBING SYSTEMS REQUIRED BY THE EQUIPMENTS INSTALLATION INSTRUCTIONS. ALL COSTS ASSOCIATED WITH SUBSTITUTIONS SHALL BE INCLUDED IN THE ORIGINAL BASE BID.

FIRE STOPPING:

1. FIRE STOP ALL PENETRATIONS, BY PIPING OR CONDUITS, OF FIRE RATED WALLS, FLOORS AND PARTITIONS. PROVIDE A DEVICE(S) OR SYSTEM(S) WHICH HAS BEEN TESTED AND LISTED AS COMPLYING WITH ASTM E-814 AND INSTALL IN ACCORDANCE WITH THE CONDITIONS OF THEIR LISTING. PROVIDE A DEVICE(S) OR SYSTEM(S) WITH AN 'F' RATING EQUAL TO THE RATING OF THE ASSEMBLY BEING PENETRATED. REFER TO ARCHITECTURAL PLANS FOR WALL AND FLOOR TYPES.

PIPE IDENTIFICATION:

1. PIPE IDENTIFICATION SHALL MATCH THE FACILITY'S EXISTING STANDARD. IF NO STANDARD EXISTS, THEN THE PIPE IDENTIFICATION SHALL BE IN ACCORDANCE WITH ANSI A13.1.
2. PROVIDE PIPING LABELS FOR ALL PLUMBING PIPING. PIPING LABELS SHALL BE ACRYLIC FACED, WRAP-AROUND TYPE. EACH LABEL SHALL INDICATE THE PIPING CONTENTS, DIRECTION OF FLOW AND SHALL BEAR THE MANUFACTURER'S STANDARD COLOR FOR THE SERVICE INDICATED.

COMMISSIONING NOTE:

1. PLUMBING CONTRACTOR SHALL COORDINATE WITH OWNER'S COMMISSIONING AGENT AND PROVIDE ALL NECESSARY TIME, MATERIALS, AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT.

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PLUMBING MATERIALS AND NOTES

DOMESTIC WATER PIPING:

1. DOMESTIC WATER PIPING AND JOINTS BELOW GRADE : PROVIDE TYPE 'K' SOFT ANNEALED SEAMLESS COPPER TUBING (ASTM B 88) WITH NO JOINTS FOR PIPING 2-1/2" AND SMALLER. PROVIDE DUCTILE IRON PIPE AND FITTINGS (AWWA C151, AWWA C110) WITH RUBBER GASKET JOINTS AND RODS (AWWA C111) PIPING 3" AND LARGER.
2. DOMESTIC WATER PIPING AND JOINTS ABOVE GRADE: PROVIDE TYPE 'L' HARD DRAWN SEAMLESS COPPER TUBING (ASTM B 88) AND CAST COPPER ALLOY FITTINGS (ASME B16.18). JOINTS 1" AND SMALLER SHALL BE LEAD FREE 95-5 TIN/SILVER SOLDER JOINTS (ASTM B 32), JOINTS 1-1/4" AND LARGER SHALL BE BCUP SILVER/PHOSPHORUS/COPPER BRAZED JOINTS (AWS A5.8).
3. STERILIZE THE DOMESTIC WATER SYSTEM IN ACCORDANCE WITH THE AMERICAN WATER WORKS ASSOCIATION'S AWWA C651.
4. INSULATE DOMESTIC WATER PIPING ABOVE GRADE (EXCEPT EXPOSED CONNECTIONS TO PLUMBING FIXTURES) WITH GLASS FIBER INSULATION HAVING A VAPOR BARRIER AND JACKET. PIPE INSULATION SHALL HAVE A CONDUCTIVITY NOT EXCEEDING 0.27 BTUH x SQ. FT. FOLLOW SCHEDULE BELOW:

SERVICE TYPE	PIPE SIZES	INSULATION THICKNESS
DOMESTIC HOT WATER & CIRCULATION	1/2" - 1-1/4"	1"
DOMESTIC HOT WATER & CIRCULATION	1-1/2" - 4"	1-1/2"
DOMESTIC COLD WATER	1/2" - 1-1/4"	1/2"
DOMESTIC COLD WATER	1-1/2" - 4"	1"

5. DOMESTIC WATER PIPING INSULATION, JACKETS, COVERINGS, SEALERS, MASTICS AND ADHESIVES ARE REQUIRED TO MEET A FLAME-SPREAD RATING OF 25 OR LESS AND A SMOKE-DEVELOPED RATING OF 50 OR LESS, AS TESTED BY ASTM E84 (NFPA 255) METHOD AND SHALL BE PLENUM RATED. PROVIDE PVC JACKET FOR EXPOSED PIPING IN MECHANICAL ROOMS. PEX PIPING SHALL BE INSULATED.
6. PROVIDE TWO-PIECE, BRONZE OR BRASS BODY, FULL PORT, 600 PSI WOG, BALL TYPE SHUT-OFF VALVES WITH BLOW-OUT PROOF STEMS AND ADJUSTABLE PACKING GLANDS. VALVES SHALL BE LEAD FREE PER NSF 61, ANNEX G REQUIREMENTS. INSTALL VALVES IN A LOCATION THAT PERMITS ACCESS FOR SERVICE WITHOUT DAMAGE TO THE BUILDING OR FINISHED MATERIALS.
7. PROTECT COPPER PIPING AGAINST CONTACT WITH DISSIMILAR METALS. ALL HANGERS, SUPPORTS, ANCHORS AND CLIPS SHALL BE COPPER OR COPPER PLATED. WHERE COPPER PIPING IS CARRIED ON TRAPEZE HANGERS WITH OTHER PIPING, PROVIDE A PERMANENT ELECTROLYTIC ISOLATION MATERIAL TO PREVENT CONTACT WITH DISSIMILAR OTHER METALS.
8. PROTECT COPPER PIPING AGAINST CONTACT WITH ALL MASONRY. WHERE COPPER IS SLEEVED THROUGH MASONRY, PROVIDE COPPER OR RED BRASS SLEEVES. WHERE COPPER MUST BE CONCEALED IN OR AGAINST MASONRY PARTITIONS, PROVIDE A HEAVY COATING OF ASPHALTIC ENAMEL ON THE COPPER PIPING AND 15# ASPHALT SATURATED FELT BETWEEN THE PIPING AND THE MASONRY PARTITION.
9. DOMESTIC WATER PIPING SHALL BE SLOPED FOR DRAINAGE WITH DRAIN VALVES INSTALLED AT LOW POINTS.
10. BALANCE THE DOMESTIC HOT WATER CIRCULATION SYSTEM TO THE PERFORMANCE SPECIFICATIONS INDICATED ON THE PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR.

SANITARY WASTE / VENT PIPING:

1. SANITARY WASTE PIPING BELOW GRADE: PROVIDE EXTRA HEAVY WEIGHT CAST IRON BELL AND SPIGOT PIPE (ASTM A 74) WITH COMPRESSION JOINTS (CISPI HSN) AND NEOPRENE GASKETS (ASTM C 564).
2. SANITARY WASTE/VENT PIPING ABOVE GRADE: PROVIDE SERVICE WEIGHT CAST IRON NO-HUB PIPE AND FITTINGS (CISPI 301) WITH NEOPRENE GASKET AND STAINLESS STEEL CLAMP JOINTS (HEAVY DUTY). /1
3. SLOPE SANITARY WASTE PIPING AT 1/4" PER FOOT MINIMUM FOR PIPING 2-1/2" AND SMALLER AND 1/8" PER FOOT MINIMUM FOR PIPING 3" AND LARGER UNLESS NOTED OTHERWISE.
4. PROVIDE CLEAN-OUTS AT THE BASE OF SANITARY WASTE STACKS AND AT EVERY TURN IN PIPING IN EXCESS OF 45° AND NO FURTHER THAN 100'-0" APART IN A LOCATION THAT PERMITS ACCESS FOR SERVICE WITHOUT DAMAGE TO THE BUILDING OR FINISHED MATERIALS.
5. PROVIDE FLOOR CLEANOUTS WITH TOPS DESIGNED TO MATCH SPECIFIC FLOOR FINISHES SUCH AS CARPET, TILE, ETC. YARD CLEANOUTS SHALL BE PROVIDED IN AN 18"x18"x6" CONCRETE PAD.
6. WHERE WASTE PIPING IS EXPOSED IN REST ROOM AREAS, PROVIDE CHROME PLATED BRASS PIPING, REMOVABLE P-TRAPS, MATCHING STOPS AND ESCUTCHEONS FOR ALL LAVATORIES.
7. INSULATE MECHANICAL ROOM FLOOR DRAIN BODIES, P-TRAP AND HORIZONTAL DRAIN PIPING ABOVE GRADE WITH 1" THICK GLASS FIBER INSULATION WITH VAPOR BARRIER AND JACKET.
8. PIPING INSULATION, JACKETS, COVERINGS, SEALERS, MASTICS AND ADHESIVES ARE REQUIRED TO MEET A FLAME-SPREAD RATING OF 25 OR LESS AND A SMOKE-DEVELOPED RATING OF 50 OR LESS, AS TESTED BY ASTM E84 (NFPA 255) METHOD.

NATURAL GAS PIPING:

1. NATURAL GAS PIPING AND FITTINGS ABOVE GRADE: SCHEDULE 40 BLACK STEEL PIPING, TYPE S, SEAMLESS, GRADE B (ASTM A 53) AND 150 PSI MALLEABLE BLACK IRON FITTINGS, GRADE 32510, (ASTM B 16.3) OR FORGED STEEL WELDING TYPE FITTINGS (ASTM A234). PROVIDE THREADED JOINTS FOR PIPE 2" AND SMALLER. PROVIDE WELDED JOINTS (ASME B31.9) FOR PIPE 2-1/2" AND LARGER.
2. NATURAL GAS PIPING AND FITTINGS OUTSIDE BELOW GRADE : SCHEDULE 40 BLACK STEEL, TYPE S, SEAMLESS, GRADE B (ASTM A 53) AND FORGED STEEL WELDING TYPE FITTINGS (ASTM A234) WITH (AWWA C105) POLYETHYLENE JACKET OR DOUBLE LAYER, HALF LAPPED 10 MIL POLYETHYLENE TAPE. PROVIDE WELDED JOINTS (ASME B31.9) FOR ALL UNDERGROUND PIPE. SDR11 POLYETHYLENE PIPING, ASTM D2513 WITH HEAT FUSION AND MECHANICAL JOINTS. MAY BE USED WHERE APPROVED BY GAS SERVICE PROVIDER. THE CONTRACTOR SHALL SUBMIT A LETTER FROM THE GAS SERVICE PROVIDER CONFIRMING THEIR APPROVAL OF THIS MATERIAL.
3. SPACE GAS PIPING HANGER RODS 7'-0" ON CENTER MAXIMUM AND SPACE TRANSVERSE BRACING 20'-0" ON CENTER MAXIMUM. TRANSVERSE BRACING FOR ONE SECTION MAY ACT AS LONGITUDINAL BRACING FOR THE PIPE SECTION CONNECTED TO IT IF THE BRACING IS INSTALLED WITHIN 24" OF THE ELBOW OR TEE. COORDINATE HANGER LOCATIONS WITH STRUCTURAL DRAWING DETAILS.
4. PROVIDE A.G.A. CERTIFIED SHUT-OFF VALVES MINIMUM, 125 PSI RATED, NON- LUBRICATED PLUG TYPE WITH BRONZE BODY AND BRONZE PLUG, STRAINERS AND REGULATORS (AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER) FOR ALL EQUIPMENT CONNECTED TO THE NATURAL GAS SYSTEM.
5. GAS PRESSURE REGULATORS SHALL COMPLY WITH ANSI Z21.80. REGULATORS SHALL BE CAST IRON OR DIE-CAST ALUMINUM CONSTRUCTION WITH INTERCHANGEABLE ZINC-PLATED STEEL SPRINGS, ZINC-PLATED STEEL DIAPHRAGM PLATE, NITRILE RUBBER SEAT DISC, INTERCHANGEABLE ALUMINUM ORIFICE, AND ULTRAVIOLET-STABILIZED MINERAL FILLED NYLON SEAL PLUG. REGULATOR SHALL BE SINGLE-PORT SELF-CONTAINED WITH ORIFICE NO LARGER THAN REQUIRED AT MAXIMUM PRESSURE INLET AND NO PRESSURE SENSING PIPING EXTERNAL TO THE REGULATOR. PRESSURE REGULATOR SHALL MAINTAIN DISCHARGE PRESSURE SETTING DOWNSTREAM AND NOT EXCEED 150 PERCENT OF DESIGN DISCHARGE PRESSURE AT SHUTOFF. OVERPRESSURE PROTECTION DEVICE SHALL BE FACTORY MOUNTED ON REGULATOR. WHEN USING VENTLESS REGULATORS, MOUNT REGULATOR IN A HORIZONTAL UPRIGHT POSITION. IF VENTED TYPE REGULATORS ARE USED, INSTALL VENT PIPING (FULL SIZE OPENING) FROM GAS PRESSURE REGULATORS TO OUTDOORS AND TERMINATE IN WEATHERPROOF HOOD.
6. PAINT ALL GAS PIPING WITH 2 COATS OF YELLOW ENAMEL PAINT APPLIED WITH A BRUSH (2 MIL THICKNESS MINIMUM). STENCIL "GAS" ON PIPE AT 12'-0" CENTERS FOR ALL LOW PRESSURE PIPING (0.5 PSI). STENCIL "2-PSI GAS" ON PIPE AT 6'-0" CENTERS FOR 2 PSI GAS PIPING.
7. GAS PIPING SHALL BE BONDED IN ACCORDANCE WITH THE 2012 NCFGC, SECTION 310 ELECTRICAL BONDING.
8. PROVIDE A TRACER WIRE FOR UNDERGROUND GAS PIPING IN ACCORDANCE WITH THE 2012 NCFGC, SECTION 404.15.3 TRACER.
9. PROVIDE EMERGENCY GAS SHUT-OFF SYSTEM AT NATURAL GAS SERVICE ENTRANCE IN BOILER / ERU 164. PROVIDE GAS SOLENOID RACK ASSEMBLY EQUAL TO ISIMET MODEL S-5XX3-1-1 1/2"-R-U (1-1/2" GAS), 120 VAC (CONTROL BY OTHERS), RESETS INCLUDED. PROVIDE REMOTE PANIC ASSEMBLY EQUAL TO ISIMET MODEL IPO-K-C, PANIC BUTTON ASSEMBLY WITH KEY RESET MAINTAINED OPERATOR, AND CLEAR FLIP-UP PROTECTIVE COVER WHERE INDICATED ON THE DRAWINGS.

COORDINATION DRAWINGS

PER WRITTEN SPECIFICATION SECTIONS 01 00 00 AND 01 31 00, THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF COORDINATION DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA, AND GENERAL CONTRACTOR). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA, AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS AND COORDINATION DRAWINGS:

1. ALL COORDINATION DRAWINGS WILL BE PRODUCED AT 1/4" = 1'-0" SCALE.
2. COORDINATION DRAWINGS WILL BE DISTRIBUTED ON REPRODUCIBLE MATERIAL 48"x36".
3. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
4. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

THE USE OF BUILDING INFORMATION MODELING (BIM) THROUGHOUT THE CONSTRUCTION PROCESS IS A REQUIREMENT FOR THIS PROJECT TO HELP REDUCE OR ELIMINATE FIELD DETECTED CONFLICTS, IMPROVE CONSTRUCTION QUALITY AND MAINTAIN AN AGGRESSIVE SCHEDULE. THE CONTRACTOR WILL BE RESPONSIBLE FOR CREATING THE MODEL AND MANAGING THE COORDINATION AND COLLISION DETECTION PROCESS. THE MODEL MUST CONTAIN COMPLETE ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION SYSTEMS CONSISTENT WITH THE DESIGN AND FABRICATION DRAWINGS.

PLUMBING LEGEND

NEW PIPING	ABBR	DESCRIPTION
	CW	COLD WATER PIPING
	HW	HOT WATER PIPING
	HWR	HOT WATER RETURN PIPING
	W	SANITARY WASTE PIPING
	V	SANITARY VENT PIPING
G	G	NATURAL GAS PIPING
D	D	DRAIN
	-	ELBOW DOWN
	-	ELBOW UP
	-	PIPE CONTINUES
	-	PIPE CAP
	-	BALL VALVE
	CV	CHECK VALVE
	BV	BALANCING VALVE / CIRCUIT SETTER
	-	GAS COCK
	PRV	PRESSURE REDUCING/REGULATING VALVE
	-	SOLENOID VALVE
	RPZ	REDUCED PRESSURE ZONE BACKFLOW PREVENTER
	-	IN-LINE PUMP
	-	DIRECTION OF FLOW
	-	PIPE REDUCER
	FCO	FLOOR CLEAN OUT
	WCO	WALL CLEAN OUT
	CO	END OF LINE CLEAN OUT
	YCO	YARD CLEAN OUT
	FD	FLOOR DRAIN
	HB	HOSE BIBB/WALL HYDRANT
SA-F	SA	SHOCK ARRESTOR - SUFFIX INDICATES PDI SIZE
	-	THERMOMETER
	-	PRESSURE GAUGE
	TP	TRAP PRIMER
	CTE	CONNECT TO EXISTING

ADDITIONAL ABBREVIATIONS

ABV	ABOVE	KW	KILOWATT
AFF	ABOVE FINISHED FLOOR	LAV	LAVATORY
BAS	BUILDING AUTOMATION SYSTEM	MH	MOUNTING HEIGHT
BEL	BELOW	PH	PHASE
BF	BARRIER FREE	PSI	POUNDS PER SQUARE INCH
BFF	BELOW FINISHED FLOOR	SF	SQUARE FEET
BTUH	BRITISH THERMAL UNIT / HOUR	T&P	TEMPERATURE AND PRESSURE
CFH	CUBIC FEET PER HOUR	TYP	TYPICAL
CLG	CEILING	UR	URINAL
DFU	DRAINAGE FIXTURE UNIT (WASTE)	VB	VACUUM BREAKER
DN	DOWN	VLV	VALVE
EX	EXISTING	VTR	VENT THRU ROOF
FFE	FINISHED FLOOR ELEVATION	WC	WATER COLUMN
FLR.	FLOOR	EC	ELECTRICAL CONTRACTOR
FU	FIXTURE UNITS	GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE	MC	MECHANICAL CONTRACTOR
HP	HORSE POWER	PC	PLUMBING CONTRACTOR
INV	INVERT ELEVATION		
IW	INDIRECT WASTE		

DRAWING LIST - PLUMBING

SHEET #	SHEET NAME
P-001	PLUMBING SCHEDULES AND NOTES
P-002	PLUMBING SCHEDULES
P-003	PLUMBING DETAILS
P-004	PLUMBING DETAILS
P-101A	FLOOR PLAN - PATS/FO - WASTE AND VENT
P-101C	FLOOR PLAN - FO SHOPS - WASTE AND VENT
P-102A	FLOOR PLAN - WAREHOUSE - WASTE AND VENT - WEST
P-102B	FLOOR PLAN - WAREHOUSE - WASTE AND VENT - EAST
P-201A	FLOOR PLAN - PATS/FO - WATER AND GAS
P-201C	FLOOR PLAN - FO SHOPS - WATER AND GAS
P-202A	FLOOR PLAN - WAREHOUSE - WATER & GAS - WEST
P-202B	FLOOR PLAN - WAREHOUSE - WATER & GAS - EAST

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9/11/17

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REVISIONS:

No.	Description	Date
1	Addendum #5	9.11.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: RPD
CHECKED BY: DAR

PLUMBING SCHEDULES AND NOTES

P-001

OPTIMA #: 16-0265 1 OF 12

BUILDING BID DOCUMENTS

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GAS-FIRED WATER HEATER SCHEDULE

SYM.	DESCRIPTION	STORAGE (GALLONS)	GAS BURNER DATA			FLUE SIZE	SELECTION BASED ON		REMARKS
			INLET PRESS. (IN. W.C.)	BTU/HR INPUT	GPH RECOVERY @ 80°F RISE		MANUFACTURER	MODEL	
WH1	GAS FIRED WATER HEATER	100	8	150,000	223	4"	A.O. SMITH	BTH-150	1-6

REMARKS:
1. EQUIVALENT MANUFACTURERS: BRADFORD WHITE, LOCHINVAR.
2. ELECTRICAL REQUIREMENTS: 120V, 15 AMP BREAKER.
3. WATER HEATER SHALL MEET OR EXCEED THE REQUIREMENTS OF ASHRAE 90.1.
4. PROVIDE HEATER WITH ACID NEUTRALIZATION KIT FOR CONDENSATE.
5. INSTALL DIRECT VENT PIPING PER MANUFACTURER'S DIRECTIONS. CPVC PIPING OR STAINLESS STEEL SHALL BE USED FOR VENT PIPING MATERIAL. PVC PIPING IS NOT ACCEPTABLE.
6. PROVIDE CARBON MONOXIDE DETECTOR ADJACENT TO WATER HEATERS. INTERLOCK CARBON MONOXIDE DETECTOR WITH BAS.

ELECTRIC WATER HEATER SCHEDULE

SYM.	DESCRIPTION	STORAGE (GALLONS)	GPH RECOVERY	ELECTRICAL DATA				SELECTION BASED ON		REMARKS
				KW	VOLTS	PHASE	HERTZ	MANUFACTURER	MODEL	
WH2	TANKLESS WATER HEATER	-	61°F RISE @ 1.0 GPM	9.0	277	1	60	EEMAX	EX90T	4
WH3	TANKLESS WATER HEATER	-	56°F RISE @ 0.5 GPM	4.1	277	1	60	EEMAX	EX4277T EE	4
WH4	ELECTRIC WATER HEATER	120	221 GPH @ 100°F RISE	54.0	480	3	60	A.O. SMITH	DRE-120-54.0	1,2,3

REMARKS:
1. EQUIVALENT MANUFACTURERS: BRADFORD WHITE, LOCHINVAR.
2. WATER HEATER SHALL MEET OR EXCEED THE REQUIREMENTS OF ASHRAE 90.1
3. BASIS-OF-DESIGN WATER HEATER CONTAINS (9) 6.0 KW ELEMENTS, WITH SIMULATNEOUS OPERATION.
4. EQUIVALENT MANUFACTURERS: BOSCH, BRADFORD WHITE, CHRONOMITE.

EXPANSION TANK SCHEDULE

SYM.	DESCRIPTION	VOLUME (GALLONS)	DIAMETER (INCHES)	HEIGHT (INCHES)	SELECTION BASED ON		REMARKS
					MANUFACTURER	MODEL	
ET1	BLADDER TYPE EXPANSION TANK	6.4	12	15.375	AMTROL	ST-12	1, 2
ET4	BLADDER TYPE EXPANSION TANK	6.4	12	15.375	AMTROL	ST-12	1, 2

REMARKS:
1. EQUIVALENT MANUFACTURERS: BELL & GOSSETT, WESSELS COMPANY.
2. EXPANSION TANK SHALL BE CHARGE TO MEET FINAL OPERATING PRESSURE FOR DOMESTIC WATER SYSTEM.

PUMP SCHEDULE

SYM	DESCRIPTION	TYPE	CAPACITY		ELECTRICAL DATA				SELECTION BASED ON		REMARKS
			GPM	HEAD (FT)	HP	VOLTS	PH	HZ	MANUFACTURER	MODEL	
RCP1	HW RECIRC PUMP	IN-LINE	4	6	1/12	120	1	60	BELL & GOSSETT	NBF-9F/LW	1,2,3
RCP4	HW RECIRC PUMP	IN-LINE	4	6	1/12	120	1	60	BELL & GOSSETT	NBF-9F/LW	1,2,3
BP1	DUPLEX VARIABLE SPEED WATER BOOSTER PACKAGE	END SUCTION	60 EACH	104	5 EACH	480	3	60	HY-FAB	MVP-850-460	1,4,5

REMARKS:
1. EQUIVALENT MANUFACTURERS: GRUNDFOS, TACO, PACE
2. PUMP SHALL BE ALL BRONZE CONSTRUCTION.
3. PROVIDE AUTOMATIC TIMER KIT AND AQUASTAT EQUAL TO BELL & GOSSETT MODEL TC-1 AND AQS-3/4
4. PROVIDE BOOSTER PUMP PACKAGE WITH FX-60V HYDRO-PNUEMATIC TANK
5. PROVIDE WITH BACNET MS/TP COMMUNICATION MODULE FOR OUTPUT TO BAS. COORDINATE CONNECTION TO BAS SYSTEM WITH CONTROLS CONTRACTOR.

MIXING VALVE SCHEDULE

SYM.	DESCRIPTION	MAXIMUM GPM	MINIMUM GPM	PRESSURE LOSS (PSI)	LEAVING WATER TEMP. (°F)	SELECTION BASED ON		REMARKS
						MANUFACTURER	MODEL	
MV1	THERMOSTATIC MIXING VALVE CONTROL STATION	115	1	5	115	LEONARD	4NB-LF	1,2
MV2	THERMOSTATIC MIXING VALVE	4.5	0.5	5	110	SYMMONS	7-225-CK SERIES	1

REMARKS:
1. EQUIVALENT MANUFACTURERS: LAWLER, POWERS
2. HIGH-LOW MANIFOLD.

INTERCEPTOR SCHEDULE

SYM.	DESCRIPTION	INLET/ OUTLET SIZE	FLOW RATE (GPM)	CAPACITY		SELECTION BASED ON		REMARKS
				WATER (GALLONS)	OIL (GALLONS)	MANUFACTURER	MODEL	
OIL1	OIL INTERCEPTOR	4	100	300	156	PROCEPTOR	OMC 300	1,2,3

REMARKS:
1. EQUIVALENT MANUFACTURERS: SCHEIB, XERXES, HIGHLAND TANK, ZURN
2. INSTALL BELOW GRADE FOR HEAVY VEHICULAR TRAFFIC
3. PROVIDE MULTI-LEVEL OIL MOINTOR

BACKFLOW PREVENTER SCHEDULE

SYM.	DESCRIPTION	SYSTEM	DESCRIPTION	MANUF.	MODEL	COMMENTS
BFP1	REDUCED PRESSURE PRINCIPLE ASSEMBLE	DOMESTIC WATER	REDUCED PRESSURE PRINCIPLE ASSEMBLY 2"	ZURN WILKINS	375V-OSY	
BFP2	REDUCED PRESSURE PRINCIPLE ASSEMBLE	MAKE-UP WATER	REDUCED PRESSURE PRINCIPLE ASSEMBLY 1"	ZURN WILKINS	975XL	

PLUMBING FIXTURE AND EQUIPMENT SCHEDULE

SYM.	DESCRIPTION	CONNECTIONS (IN.)				SPECIFICATION	REMARKS
		W	V	CW	HW		
P1	WATER CLOSET, HET, ELONGATED BOWL, WALL HUNG, FLUSH VALVE, SENSOR, HARD-WIRED, 1.28 GPF	4"	2"	1-1/2"	-	FIXTURE: ZURN Z5615-BWL SEAT: CHURCH 9500CT FLUSH VALVE: ZURN ZEMS6000PL-HET MATERIAL: VITREOUS CHINA COLOR: WHITE CARRIER: ZURN Z-1203 SERIES	SEAT HEIGHT 15" AFF SEE NOTE 4 BELOW
P1A	WATER CLOSET, HET, ADA COMPLIANT, ELONGATED BOWL, WALL HUNG, FLUSH VALVE, SENSOR, HARD-WIRED, 1.28 GPF	4"	2"	1-1/2"	-	FIXTURE: ZURN Z5615-BWL SEAT: CHURCH 9500CT FLUSH VALVE: ZURN ZEMS6000PL-HET MATERIAL: VITREOUS CHINA COLOR: WHITE CARRIER: ZURN Z-1203 SERIES	PROVIDE LEVER ON WIDE SIDE OF STALL SEAT HEIGHT 17"-19" AFF SEE NOTE 4 BELOW
P2	URINAL, HEU, ADA COMPLIANT, WALL MOUNTED, FLUSH VALVE, SENSOR, HARD-WIRED, 0.125 GPF	2"	1-1/2"	3/4"	-	FIXTURE: ZURN Z5758 FLUSH VALVE: ZURN ZEMS6003PL-ULF COLOR: WHITE MATERIAL: VITREOUS CHINA CARRIER: ZURN FLOOR MOUNTED URINAL CARRIER	FIXTURE LIP HEIGHT 24"AFF SEE NOTE 4 BELOW
P2A	URINAL, HEU, ADA COMPLIANT, WALL MOUNTED, FLUSH VALVE, SENSOR, HARD-WIRED, 0.125 GPF	2"	1-1/2"	3/4"	-	FIXTURE: ZURN Z5758 FLUSH VALVE: ZURN ZEMS6003PL-ULF COLOR: WHITE MATERIAL: VITREOUS CHINA CARRIER: ZURN FLOOR MOUNTED URINAL CARRIER	FIXTURE LIP HEIGHT 17"AFF SEE NOTE 4 BELOW
P3A	LAVATORY, ADA COMPLIANT, SINK UNDER-MOUNTED OVAL BOWL, GRID DRAIN, SENSOR FAUCET, HARD-WIRED, 0.25 GPC	2"	1-1/2"	1/2"	1/2"	FIXTURE: ZURN Z5220 DRAIN: ZURN Z8743 GRID STRAINER FAUCET: ZURN Z6950-XL-IM-S-CWB, 0.25 GPC P-TRAP: ZURN Z-8701 (1-1/4" x 1-1/2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR-LK MATERIAL: VITREOUS CHINA	SEE NOTES 1 & 4 BELOW
P4A	ELECTRIC WATER COOLER, ADA WALL MOUNTED, SINGLE COOLER, STAINLESS STEEL FINISH, BOTTLE FILLER, FLEXIBLE BUBBLER	2"	1-1/2"	1/2"	-	FIXTURE: ELKAY LZWS-LBP8M28K P-TRAP: ZURN Z-8701 (1-1/4" X 1-1/2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR-LK CARRIER: FLOOR MOUNTED CHAIR CARRIER	BUBBLER HEIGHT 34" AFF
P5A	2-COMP, STAINLESS STEEL SINK, ADA COMPLIANT, 42" x 18" x 5.5" (19" x 16" BOWLS), FOUR HOLE PUNCH, KITCHEN FAUCET, 1.5 GPM OUTLET, BASKET STRAINERS	2"	1-1/2"	1/2"	1/2"	FIXTURE: ELKAY ELUHAD4218 DRAIN: ELKAY LK3SL, BASKET STRAINER FAUCET: ZURN Z82300-XL-CP8-HS (1.5 GPM) P-TRAP: ZURN 8703 (1-1/2"X2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR-LK	PROVIDE MINIMUM CLEARANCES BELOW SINK TO MEET ADA REQUIREMENTS. SEE NOTE 1 BELOW
P5B	2-COMP. STAINLESS STEEL SINK, ADA COMPLIANT, 42" x 18" x 5.5" (19" x 16" BOWLS), FOUR HOLE PUNCH, KITCHEN FAUCET, 1.5 GPM OUTLET, BASKET STRAINERS	2"	1-1/2"	1/2"	1/2"	FIXTURE: ELKAY ELUHAD4218 DRAIN: ELKAY LK3SL, BASKET STRAINER FAUCET: ZURN Z82300-XL-CP8-HS (1.5 GPM) P-TRAP: ZURN 8703 (1-1/2"X2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR-LK	PROVIDE MINIMUM CLEARANCES BELOW SINK TO MEET ADA REQUIREMENTS. SEE NOTES 1 & 5 BELOW
P5C	LAUNDRY TUB, MOLDED COMPOSITE 21-1/2"L x 23"W x 13-7/16"D FLOOR MOUNTED PROVIDE (1.5 GPM) AERATOR	2"	1-1/2"	1/2"	1/2"	FIXTURE: FIAT FL-1 FAUCET: ZURN Z812G6-XL (1.5 GPM) DRAIN: 1-1/2" PLUG DRAIN P-TRAP: ZURN 8703 (1-1/2"x2", 17 GA.) SUPPLIES/STOPS: ZURN 8806-LR	PROVIDE ACCESSORY KIT WITH (4) LEGS
P6A	SHOWER, ROLL-IN ADA COMPLIANT, TRENCH DRAIN, PRESSURE BALANCED SHOWER VALVE, 1.5 GPM WALL SHOWERHEAD AND HAND HELD SHOWER WITH HOSE AND SLIDE BAR.	2"	1-1/2"	1/2"	1/2"	FIXTURE: COMFORT DESIGN XST 6232 TR.75 SHOWER TRIM: LEONARD 4500S-D2L-H14-515P(G)30 DRAIN: ZURN ZS880, STAINLESS STEEL, GRATE TO BE SELECTED BY ARCH. P-TRAP: 2" TRAP	REFER TO ARCHITECTURAL DETAIL FOR ADDITIONAL SURROUND INFORMATION AND SHOWER TRIM HEIGHTS AND LOCATIONS. GROUT BASE SOLID
P7	MOP SINK TERRAZZO 28" x 28" x 12" BUMPER GUARDS	3"	1-1/2"	1/2"	1/2"	BASIN: FIAT TSBCR-1100 DRAIN: FIAT 1453-BB FAUCET: FIAT 830-AA ACCESSORIES: MSG2828 SS WALL GUARDS ACCESSORIES: 832-AA HOSE & BRACKET ACCESSORIES: 889-CC MOP HANGER ACCESSORIES: E-88-AA BUMPERGUARDS	
P8	EMERGENCY EYEWASH / SHOWER POLISHED CHROME FINISH STAINLESS STEEL SHOWERHEAD AND RECEPTOR, WITH MIXING VALVE ADA COMPLIANT	4"	2"	1-1/4"	1"	FIXTURE: GUARDIAN G8F1909SSH-BC-TMV MOUNT PULL ROD AT ADA COMPLIANT HEIGHT TMV: GUARDIAN G3800LF	PROVIDE TEST KIT WITH BUCKET. PROVIDE 2" P-TRAP FOR EYEWASH DRAIN AT BASE OF UNIT.
P9	EMERGENCY EYE WASH WALL MOUNTED, STAINLESS STEEL, STAY-OPEN BALL VALVE, TWO SPRAY HEADS, WITH MIXING VALVE	2"	1-1/2"	1/2"	1/2"	FIXTURE: GUARDIAN G1814BC-TMV MIXING VALVE: GUARDIAN G3600LF P-TRAP: ZURN 8703 (1-1/2" X 2", 17 GA.)	INSTALL PER ANSI Z358.1
P10	EMERGENCY EYE WASH WALL MOUNTED, STAINLESS STEEL, STAY-OPEN BALL VALVE, TWO SPRAY HEADS	2"	1-1/2"	1/2"	1/2"	FIXTURE: GUARDIAN G1814BC P-TRAP: ZURN 8703 (1-1/2" X 2", 17 GA.)	INSTALL PER ANSI Z358.1
SA	SHOCK ARRESTOR	-	-	-	-	EQUIPMENT: SIOUX CHIEF 650 SERIES SIZE PER P.D.I. REQUIREMENTS	SEE SIZING TABLE THIS SHEET.
HB1	WALL HYDRANT AUTOMATIC DRAINING, FREEZELESS, ANTI-SIPHON VACUUM BREAKER	-	-	3/4"	-	EQUIPMENT: WOODFORD 65EP	MOUNT 18" AFF.
HB2	HOSE BIBB AUTOMATIC DRAINING, ANTI-SIPHON VACUUM BREAKER	-	-	3/4"	-	EQUIPMENT: WOODFORD 24	MOUNT 24" AFF.
HB3	YARD HYDRANT NON-FREEZE, AUTOMATIC DRAINING, VACUUM BREAKER	-	-	3/4"	-	EQUIPMENT: WOODFORD Y95 FINISH: BRASS BOX	
FCO	FLOOR CLEANOUT ADJUSTABLE, CAST IRON BODY, COATED CAST IRON TOP	SEE DWG	-	-	-	CLEANOUT: ZURN ZN-1400	GAS / WATER TIGHT ABS PLUG
WCO	WALL CLEANOUT CAST IRON BODY, STAINLESS STEEL WALL PLATE	SEE DWG	-	-	-	CLEANOUT: ZURN ZS-1468	GAS / WATER TIGHT ABS PLUG
YCO	YARD CLEANOUT ADJUSTABLE, CAST IRON BODY, COATED CAST IRON TOP	SEE DWG	-	-	-	CLEANOUT: ZURN ZN-1474 IN AN 18"L x 18"W x 6"D CONCRETE PAD.	GAS / WATER TIGHT ABS PLUG
CO	END OF LINE PLUG CLEANOUT CAST BRONZE	-	-	-	-	CLEANOUT: ZURN Z-1470	
FD1	FLOOR DRAIN CAST IRON BODY	SEE DWG	-	-	-	DRAIN: ZURN ZN-415-VP STRAINER: ZURN 6"Ø TYPE B FINISH: POLISHED NICKEL BRONZE	PROVIDE TRAP PRIMER WITH 1/2" COPPER SUPPLY TO TRAP.
FD2	FLOOR DRAIN, MECHANICAL ROOM CAST IRON BODY SEDIMENT BUCKET	SEE DWG	-	-	-	DRAIN: ZURN Z-556-Y STRAINER: ZURN 8"Ø FINISH: COATED CAST IRON	SEE NOTE 2 BELOW. PROVIDE TRAP PRIMER CONNECTION AS REQUIRED
TD1	TRENCH DRAIN, 6'-8" LONG, INTEGRAL FRAMES, DUCTILE IRON SLOTTED GRATE	4"	2"	-	-	DRAIN: ZURN Z886-HD-DGC, 1 SECTION WITH 2 CLOSED END CAPS AND A 4" BOTTOM OUTLET & TRAP, 4" DEEP SEAL	
FS1	FLOOR SINK 12" x 12" x 6" STAINLESS STEEL BODY AND GRATE	SEE DWG	-	-	-	DRAIN: ZURN Z-1750-XC-2 STRAINER: 12"x12" STAINLESS STEEL (TYPE 304) P-TRAP: DEEP SEAL (MATCH DRAIN SIZE)	
TP1	TRAP PRIMER PROVIDE DISTRIBUTION UNIT WHEN SERVING MORE THAN ONE DRAIN	-	-	-	1/2"	PRIMER: PPP "OREGON #1"	PROVIDE TRAP PRIMER WITH 1/2" COPPER SUPPLY TO TRAP.
IMB1	ICE MAKER BOX	-	-	1/2"	-	EQUIPMENT: GUY GRAY BIM-875 MATERIAL: 16 GAUGE STEEL WITH EPOXY FINISH	
IWB	INDIRECT WASTE BOX RECESSED WHITE ABS BOX & FRAME, WITH INTEGRAL SHOCK ARRESTOR	2"	1-1/2"	-	-	FIXTURE: SIOUX CHIEF 696-3 "OX BOX" FUNNEL: SIOUX CHIEF 696-CF, 1-1/2" AIR GAP	
CS1	BALANCING VALVE	-	-	3/4"	-	EQUIPMENT: CIRCUIT SOLVER CS-3/4"-120	PROVIDE 3/4"-120 UNLESS OTHERWISE NOTED ON PLAN.

NOTES:
1. PROVIDE PRE-MANUFACTURED INSULATION KIT FOR EXPOSED TRIM UNDER SINK. COORDINATE WITH ARCHITECT PRIOR TO ORDERING.
2. PROVIDE SURESEAL INLINE FLOOR DRAIN TRAP SEALER IN FLOOR DRAIN FOR WATERLESS TRAP PRIMER.
3. CONTRACTOR SHALL VERIFY IF GFI TYPE ELECTRICAL OUTLET IS REQUIRED WITH ELECTRICAL CONTRACTOR. PROVIDE GFI TYPE OUTLET IF REQUIRED.
4. PROVIDE "-HW6" HARD-WIRED CONVERTER AND "-MJ" MINI JUNCTION BOX IN EACH ROOM AT FIXTURE LOCATION TO POWER UP TO 8 SENSOR FIXTURES. COORDINATE WITH E.C. AND ARCHITECT PRIOR TO PERFORMING ANY WORK.
5. PROVIDE VALVED CW SUPPLY TO ADJACENT ICEMAKER. PROVIDE BACKFLOW PREVENTER EQUAL TO WATTS 5D3 PRIOR TO CONNECTION TO ICEMAKER. DRAIN BACKFLOW PREVENTER AND ICEMAKER TO FLOOR DRAIN WITH AIR GAP. PROVIDE TRAP PRIMER WITH 1/2" CW SUPPLY FOR ICEMAKER FLOOR DRAIN.

APPROVED EQUALS:	SPECIFIED PRODUCT:	ACCEPTED EQUAL:
THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE MODEL WHICH MOST CLOSELY MATCHES THE SPECIFIED PRODUCT. PROVIDE PRODUCTS MADE BY THE MANUFACTURER'S LISTED.	ZURN (VITREOUS CHINA FIXTURES) ZURN (SENSOR FLUSH VALVES) ZURN (SENSOR FAUCETS) ZURN (MANUAL FAUCETS) ELKAY (S.S. SINKS) ELKAY (WATER COOLERS) ZURN (SUPPLY STOPS) ZURN (DRAINS, CARRIERS) FIAT (UTILITY) LEONARD (SHOWER VALVES)	AMERICAN STANDARD, KOHLER, TOTO KOHLER, SLOAN, TOTO CHICAGO, KOHLER, SLOAN, TOTO CHICAGO, KOHLER ACCORN, JUST HAWS, OASIS BRASSCRAFT, E.B.C., MCGUIRE J.R. SMITH, WADE FLORESTONE, STERN WILLIAMS DELTA, MOEN COMMERCIAL, LAWLER, SYMMONS

SHOCK ARRESTOR SIZING TABLE

DRAWING SYMBOL	FIXTURE UNITS	PDI WH201 STANDARD DESIGNATION	ARRESTOR SIZE	APPROVED MANUFACTURERS
SA-A	1-11	A	1/2"	- SIOUX CHIEF - WATTS - PPP INC.
SA-B	12-32	B	3/4"	
SA-C	33-60	C	1"	
SA-D	61-113	D	1-1/4"	REMARKS
SA-E	114-154	E	1-1/2"	INSTALL SHOCK ARRESTORS PER PDI WH201 GUIDELINES
SA-F	155-330	F	2"	

PLUMBING LOAD SUMMARY

LOAD	FIXTURE UNITS	FLOW
OFFICE: SANITARY WASTE	125 DFU	-
OFFICE: DOMESTIC WATER	263 FU	103 GPM
WAREHOUSE: SANITARY WASTE	30 DFU	-
WAREHOUSE: DOMESTIC WATER	66 FU	56 GPM

GAS LOAD SUMMARY (BASE BID)

LOAD	CONSUMPTION (CFH)
DOMESTIC WATER HEATER: WH1	150
MECHANICAL BOILER: HWB-1	1,250
MECHANICAL BOILER: HWB-2	1,250
RADIANT HEATER: GRH-1	40
RADIANT HEATER: GRH-2	40
RADIANT HEATER: GRH-3	40
RADIANT HEATER: GRH-4	50
TOTAL	2,820

NOTES:
FARTHEST POINT OF DELIVERY FROM GAS METER (TO 2 PSI GAS PRESSURE REGULATOR AT WATER HEATERS IN MECHANICAL ROOM) = ±300 FT.

FUEL GAS CODE TABLE FOR ABOVE GRADE 2 PSI PIPING: 2012 NCFGC - TABLE 402.4(3)
SCHEDULE 40 METALLIC PIPE, 2 PSI INLET PRESSURE, 1 PSI PRESSURE DROP.

FUEL GAS CODE TABLE FOR ABOVE GRADE LOW PRESSURE PIPING: 2012 NCFGC - TABLE 402.4(2)
SCHEDULE 40 METALLIC PIPE, 0.5 PSI INLET PRESSURE, 0.5" W.C. PRESSURE DROP.

*-AVAILABLE AT PRESSURE REGULATOR

GAS LOAD SUMMARY (ALTERNATE #10)

LOAD	CONSUMPTION (CFH)
DOMESTIC WATER HEATER: WH1	150
MECHANICAL BOILER: HWB-1	1,250
MECHANICAL BOILER: HWB-2	1,250
TOTAL	2,650

NOTES:
FARTHEST POINT OF DELIVERY FROM GAS METER (TO 2 PSI GAS PRESSURE REGULATOR AT WATER HEATERS IN MECHANICAL ROOM) = ±100 FT.

FUEL GAS CODE TABLE FOR ABOVE GRADE 2 PSI PIPING: 2012 NCFGC - TABLE 402.4(3)
SCHEDULE 40 METALLIC PIPE, 2 PSI INLET PRESSURE, 1 PSI PRESSURE DROP.

FUEL GAS CODE TABLE FOR ABOVE GRADE LOW PRESSURE PIPING: NCFGC 2012 - TABLE 402.4(2)
SCHEDULE 40 METALLIC PIPE, 0.5 PSI INLET PRESSURE, 0.5" W.C. PRESSURE DROP.

*-AVAILABLE AT PRESSURE REGULATOR

ALTERNATE NOTE AS IT RELATES TO GAS PIPING:
THIS ALTERNATE REFLECTS THE UPDATED GAS LOAD SUMMARY RESULTING FROM THE REMOVED GAS-FIRED RADIANT HEATERS GRH-1 (3 EACH) AND GRH-2 (2 EACH).

UNC CHARLOTTE

FACILITIES OPERATIONS / PARKING SERVICES COMPLEX

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9/11/17

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017
2	Addendum #5	9.11.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: RPD
CHECKED BY: DAR

PLUMBING SCHEDULES

P-002

OPTIMA #: 16-0265 2 OF 12

BUILDING BID DOCUMENTS

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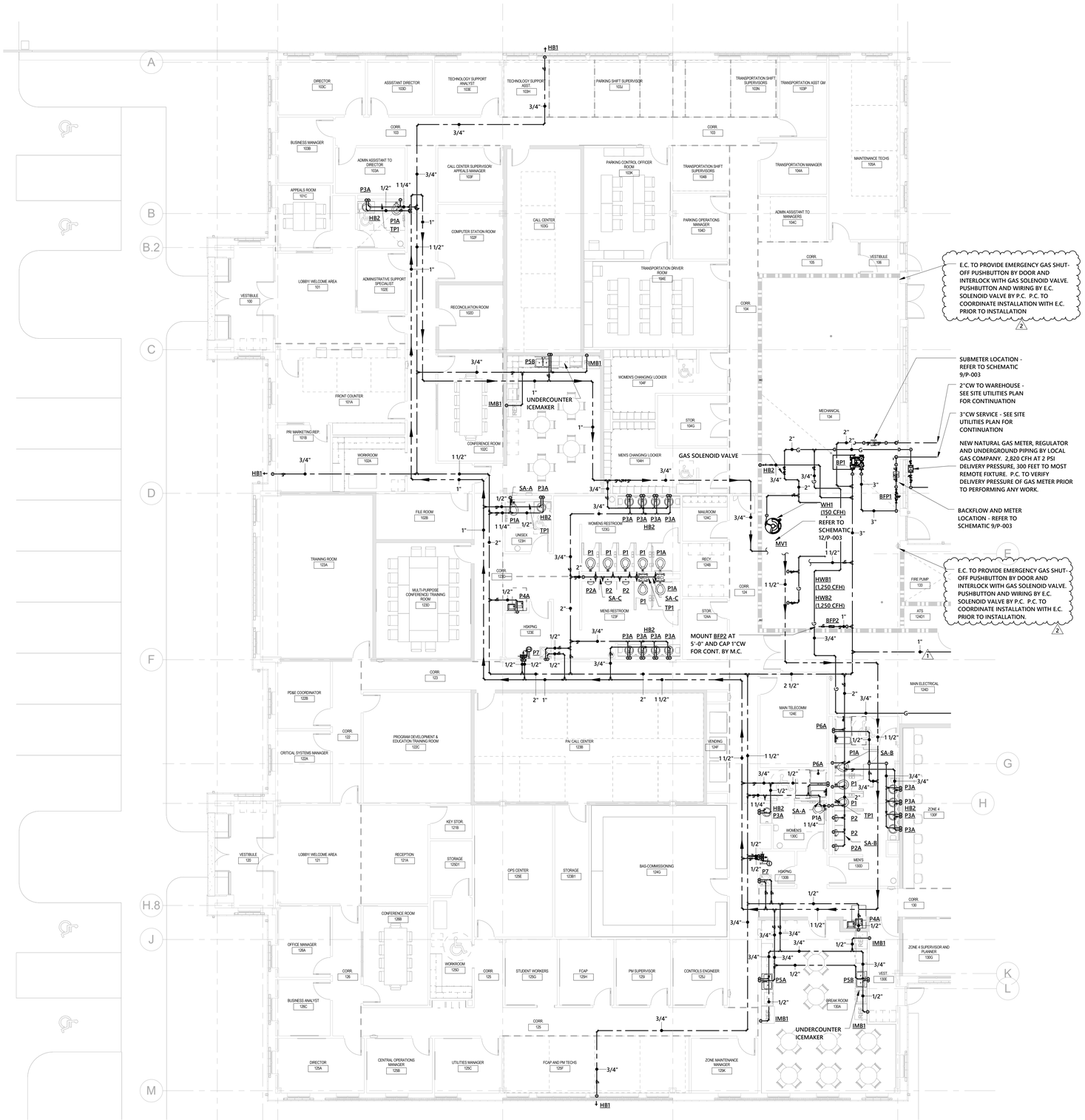


1 FLOOR PLAN - PATS/FO - WATER & GAS

1/8" = 1'-0" 8 6 4 2 0 8 16

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

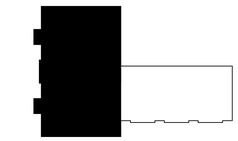
PROJECT NORTH TRUE NORTH

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE W1 U.N.O.
2. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.
   - NON-RATED PARTITION TO CEILING
   - NON-RATED PARTITION TO DECK
   - 1 HR. RATED PARTITION TO DECK
   - 2 HR. RATED PARTITION TO DECK

NOTE: SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES.

KEYPLAN



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No.	Description	Date
1	Addendum #4	8.28.2017
2	Addendum #5	9.11.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 **CODE:** 41526
DATE: AUGUST 21, 2017
DRAWN BY: RPD
CHECKED BY: DAR

FLOOR PLAN - PATS/FO - WATER AND GAS

P-201A

OPTIMA #: 16-0265 9 OF 12

BUILDING BID DOCUMENTS

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VAV BOX SCHEDULE (HOT WATER HEAT)

SYMBOL	CFM MAXIMUM	CFM MINIMUM	HOT WATER COIL BTUH	HOT WATER COIL GPM	HOT WATER COIL RUNOUT	ENVIRO-TEC SDR	RUNOUT SIZE	REMARKS
1.1	250	100	4000	0.3	1/2	5	8	
1.2	310	130	6000	0.4	1/2	6	8	
1.3	150	60	3000	0.2	1/2	4	8	
1.4	295	120	5000	0.4	1/2	5	8	
1.5	320	130	6000	0.4	1/2	6	8	
1.6	600	240	10000	0.7	1/2	8	10	SOUND ATTENUATOR
1.7	700	280	12000	0.8	1/2	8	10	
1.8	840	340	14000	1.0	1/2	9	12	
1.9	370	150	6000	0.4	1/2	6	8	
1.10	120	50	2000	0.2	1/2	4	8	
1.11	220	90	4000	0.3	1/2	5	8	
1.12	500	200	8000	0.6	1/2	7	10	
1.13	430	180	8000	0.6	1/2	7	10	
1.14	400	160	7000	0.5	1/2	7	8	
1.15	800	320	13000	0.9	1/2	9	12	
1.16	300	120	5000	0.4	1/2	6	8	
1.17	375	150	6000	0.4	1/2	6	8	
1.18	450	180	8000	0.6	1/2	7	10	
1.19	540	220	9000	0.6	1/2	7	10	
1.20	400	400	16000	1.1	1/2	7	8	
1.21	1100	440	18000	1.2	1/2	10	12	
1.22	500	200	8000	0.6	1/2	7	10	
1.23	450	450	18000	1.2	1/2	7	10	
1.24	535	220	9000	0.6	1/2	7	10	
1.25	650	260	11000	0.8	1/2	8	10	
1.26	1125	450	18000	1.2	1/2	10	12	SOUND ATTENUATOR
1.27	450	180	8000	0.6	1/2	7	10	
1.28	650	260	11000	0.8	1/2	8	10	
1.29	450	180	8000	0.6	1/2	6	8	
1.30	775	310	13000	0.9	1/2	8	12	
1.31	425	170	7000	0.5	1/2	7	10	
1.32	375	150	6000	0.4	1/2	6	8	
1.33	230	100	4000	0.3	1/2	5	8	
1.34	530	220	9000	0.6	1/2	7	10	
1.35	310	130	6000	0.4	1/2	6	8	
1.36	750	300	12000	0.8	1/2	8	10	
1.37	580	240	10000	0.7	1/2	7	10	
1.38	300	120	5000	0.4	1/2	6	8	
1.39	350	350	14000	1.0	1/2	6	8	
1.40	750	300	12000	0.8	1/2	8	10	
1.41	500	200	8000	0.6	1/2	7	10	
1.42	850	340	14000	1.0	1/2	9	12	
1.43	500	200	8000	0.6	1/2	7	10	
1.44	500	200	8000	0.6	1/2	7	10	
1.45	600	240	10000	0.7	1/2	8	10	
1.46	450	180	8000	0.6	1/2	7	10	
1.47	850	340	14000	1.0	1/2	9	12	
1.48	450	180	8000	0.6	1/2	7	10	
1.49	450	180	8000	0.6	1/2	7	10	
1.50	300	120	5000	0.4	1/2	6	8	
1.51	400	160	7000	0.5	1/2	7	8	
1.52	650	650	26000	1.8	1/2	8	10	
2.1	650	260	11000	0.8	1/2	8	10	
2.2	780	320	13000	0.9	1/2	8	12	
2.3	380	160	7000	0.5	1/2	6	8	
2.4	550	220	9000	0.6	1/2	7	10	
2.5	325	130	6000	0.4	1/2	6	8	
2.6	200	200	8000	0.6	1/2	5	8	
2.7	350	140	6000	0.4	1/2	6	8	
2.8	230	100	4000	0.3	1/2	5	8	

NOTES:
1. MINIMUM INLET PRESSURE TO TERMINAL UNITS SHALL BE 0.75" W.G.
2. MAXIMUM PRESSURE DROP THROUGH TERMINAL UNITS SHALL BE 0.25" S.P.
3. FURNISH TERMINAL UNITS WITH: FACTORY MOUNTED DDC CONTROLS, ACOUSTICAL LINING, THERMOSTAT, CONTROL VOLTAGE TRANSFORMER.
4. MECHANCIAL CONTRACTOR SHALL EXTEND CONTROL POWER WIRING (120 V) FROM J-BOX TO VAV BOX. 120 V J-BOX BY ELECTRICAL CONTRACTOR, WIRING FROM J-BOX AND FINAL CONNECTION TO UNIT BY MECHANICAL CONTRACTOR. COORDINATE LOCATION OF 120 V J-BOXES WITH ELECTRICAL CONTRACTOR.
5. DDC CONTROLS SHALL BE FURNISHED TO THE BOX MANUFACTURER BY THE CONTROLS VENDOR. BOX MANUFACTURER SHALL FACTORY MOUNT AND WIRE CONTROLS. INSTALLATION OF CONTROLS SHALL INCLUDE CONTROLS TRANSFORMER, CONTROL COVER, AND ALL WIRING AND LABOR FOR A COMPLETE AND OPERATIONAL SYSTEM.
6. THE ABOVE NOTED HEATING VALUES ARE BASED ON E.A.T. OF 60°F AND A L.A.T. OF 95°F
7. PROVIDE MINIMUM 2 ROW HEATING COILS

MEASUREMENT & VERIFICATION NOTE

THIS IS A NORTH CAROLINA STATE CONSTRUCTION PROJECT WITH MANDATED MEASUREMENT AND VERIFICATION OF POST-OCCUPANCY WATER, AND ELECTRIC CONSUMPTION. DESIGN ANALYSIS AND PROJECTED CONSUMPTION WILL BE COMPARED TO ACTUAL USAGE AT BOTH 10 MONTH AND 12 MONTH POST-OCCUPANCY INTERVALS.

THE COMMISSIONING AGENT AND OWNER WILL PROVIDE WATER AND ELECTRIC CONSUMPTION AND TRENDING DATA FROM THE MEASUREMENT AND VERIFICATION SYSTEM AT THE 10 MONTH AND 12 MONTH INTERVALS. THIS INFORMATION WILL BE PROVIDED TO THE ENGINEER FOR EVALUATION AND COMPARISON TO THE DESIGN ANALYSIS, ENERGY MODEL SIMULATION AND CONSUMPTION GOALS OF THE PROJECT.

RESULTS DEVIATING BY GREATER THAN 15% FROM PROJECTIONS WILL BE FURTHER ANALYZED AND A SYSTEM ADJUSTMENT REPORT PROVIDED FROM THE ENGINEER TO THE OWNER FOR SUGGESTED OPERATIONAL MODIFICATIONS.

COMMISSIONING NOTE

MECHANICAL CONTRACTOR SHALL COORDINATE WITH OWNER'S COMMISSIONING AGENT AND PROVIDE ALL NECESSARY TIME, MATERIALS, AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT.

EQUIVALENT MANUFACTURERS LISTING

LISTING OF MANUFACTURER'S NAME DOES NOT GUARANTEE APPROVAL. ALL EQUIPMENT MUST MEET OR EXCEED QUALITY AND CAPACITIES OF SPECIFIED EQUIPMENT. FINAL APPROVAL WILL BE BASED ON EQUIPMENT SUBMITTALS. ANY MANUFACTURER NOT LISTED BUT WISHING TO BID THIS PROJECT SHALL SUBMIT A WRITTEN REQUEST A MINIMUM OF 14 DAYS PRIOR TO BID DATE OR AS INDICATED IN THE SPECIFICATIONS, PRIOR APPROVAL IS REQUIRED FOR ALL MANUFACTURERS NOT LISTED. SEE SPECIFICATIONS FOR ADDITIONAL REQUIRMENTS.

FANS : COOK, GREENHECK, PENN, TWIN CITY, BIGASS, MACRO-AIR
AIR DISTRIBUTION : CARNES, METAL*AIRE, NAILOR, PRICE, TITUS, ACUTHERM
FIRE DAMPERS : NAILOR, RUSKIN, POTTORFF, PREFCO, SAFE-AIRE
DUCTLESS SPLIT SYSTEMS : DAIKIN, MITSUBISHI, PANASONIC (1)
DDC CONTROLS : ALC, SCHNEIDER, ALERTON, HOFFMAN BUILDING TECH, JCI, ECS, PLATINUM BLDG SOL..
PUMPS & HYDRONIC EQUIPMENT : ARMSTRONG, BELL & GOSSETT, GRUNDFOS, SPIROTHERM
FAN COIL UNITS : CARRIER, INTERNATIONAL, TRANE, DAIKIN
FACTORY ASSEMBLED MODULAR AIR HANDLERS : DAIKIN-MCQUAY, TRANE, CARRIER, JCI (1)
UNIT HEATERS : MCQUAY, TRANE, CARRIER, PRICE
VARIABLE FREQUENCY DRIVES : ABB, CUTLER HAMMER, DANFOSS, SQUARE D
TERMINAL UNITS : PRICE, NAILOR, METAL*AIRE, TITUS, JCI
AIR COOLED CHILLERS : TRANE, CARRIER, DAIKIN, JCI (1)
CONDENSING BOILERS : AERCO, FULTON, LAARS, LOCHINVAR
DUST COLLECTOR: DONALDSON TORIT, CAMFILL FARR, STERNVENT, FILTER ONE
WELDING EXHAUST FILTRATION SYSTEM: LINCOLN, AIR FLOW SYSTEMS, CAMFIL FARR

NOTE:
ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

GRILLE AND DIFFUSER SCHEDULE

SYMBOL	SERVICE	CFM RANGE	FACE SIZE	NECK SIZE	TYPE	OBD	PRICE
A	SUPPLY	51-125	24x24	6"	SQ. PLAQUE	YES	SPD
		126-225	24x24	8"	SQ. PLAQUE	YES	SPD
		226-350	24x24	10"	SQ. PLAQUE	YES	SPD
		351-425	24x24	12"	SQ. PLAQUE	YES	SPD
B	SUPPLY	0 - 125	12x12	6"	SQ. PLAQUE	YES	SPD
C	EXHAUST	0 - 125	12x12	6"/6x6	PERF	NO	PDDR
D*	RETURN	51-125	24x24	8"	PERF	NO	PDDR
		126-225	24x24	10"	PERF	NO	PDDR
		226-350	24x24	12"	PERF	NO	PDDR
		351-425	24x24	14"	PERF	NO	PDDR
E	EXHAUST	126-225	24x24	8"	PERF	YES	PDDR
		226-350	24x24	10"	PERF	YES	PDDR
		351-425	24x24	12"	PERF	YES	PDDR
F	RETURN	0 - 125	12x12	6"/6x6	PERF	NO	PDDR
G	SUPPLY	0-100	(1) .5" SLOT 36"L (6" INLET)		LINEAR SLOT	YES	SDA-50
		101 - 185	(2) .75" SLOT 48"L (8" INLET)		LINEAR SLOT	YES	SDA-75
		186-265	(3) .75" SLOT 48"L (10" INLET)		LINEAR SLOT	YES	SDA-75
		266-385	(4) .75" SLOT 48"L (10" INLET)		LINEAR SLOT	YES	SDA-75

NOTES:
1. ALL DEVICES SHALL BE FURNISHED WITH AN ENAMEL OFF-WHITE FINISH, PROVIDE COLOR SAMPLE SELECTIONS TO ARCH FOR REVIEW.
2. ALL DEVICES SHALL BE FURNISHED WITH FRAMES SUITABLE FOR TYPE OF INSTALLATION REQUIRED.
3. PROVIDE MINIMUM FACE SIZE WITH SPECIFIED NECK SIZE FOR ALL AIR DISTRIBUTION EXPOSED OR LOCATED IN HARD CEILINGS. PROVIDE SHEET-METAL RUN-OUTS (NO FLEX) FOR ALL EXPOSED AIR DISTRIBUTION.

** PROVIDE OBD FOR ALL AIR DISTRIBUTION WHERE RUNOUT DUCTS ARE LOCATED ABOVE HARD CEILINGS. OBD ADJUSTMENT SCREW SHALL BE CONCEALED BEHIND THE BLADES OF THE GRILLE.

* RETURN AIR GRILLE AIRFLOW IS BASED OF SUPPLY AIRFLOW PROVIDED TO ROOM

RETURN AIR PLENUM

THIS PROJECT WILL UTILIZE THE ABOVE CEILING SPACE FOR A RETURN AIR PLENUM, ALL ABOVE CEILING UTILITIES PROVIDED UNDER THIS PROJECT SHALL BE PLENUM RATED AND HAVE A FLAME SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50

2012 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - MECHANICAL SUMMARY

501.1 METHOD OF COMPLIANCE
☐ NC SPECIFIC COMCHECK PROVIDED
■ 2012 NCECC CHAPTER 5
■ 24% IMPROVEMENT OVER ASHRAE 90.1-2007 (ENERGY MODEL - EQUAL TO ASHRAE 90.1-2010)

501.2 APPLICATION COMPLIANCE
☐ 506.2.1 EFFICIENT MECH EQUIPMENT
☐ 506.2.4 HI EFFICIENCY DOMESTIC HW
■ 506.2.2 REDUCED LTG DENSITY
☐ 506.2.5 ONSITE RENEWABLE ENERGY
☐ 506.2.3 ENERGY RECOVERY SYSTEMS
☐ 506.2.6 DAYLIGHTING CONTROLS

301.1 CLIMATE ZONE 3A - MECKLENBURG COUNTY, NORTH CAROLINA

DESIGN CONDITIONS

EXTERIOR (ASHRAE 90.1-2010 TABLE D-1)
- WINTER DRY BULB 21.6° F.
- SUMMER DRY BULB 94.2° F.
- SUMMER WET BULB 74.7° F.

INTERIOR (2012 NCECC SECTION 302.1)		WAREHOUSE (CONDITIONED)
WINTER DRY BULB	72° F.	70° F.
SUMMER DRY BULB	75° F.	78° F.

*PROVIDE 5°F DEADBAND PER 503.2.4.2

503.2 HEATING & COOLING LOADS AND EQUIPMENT & SYSTEM SIZING
- BUILDING HEATING LOAD 1800 MBH
- BUILDING COOLING LOAD 135 TONS
- INSTALLED HEATING CAPACITY REFER TO SCHEDULES
- INSTALLED COOLING CAPACITY REFER TO SCHEDULES

503.2.3 & 506.2.1 - REQUIRED & INCREASED HVAC EQUIPMENT PERFORMANCE

SYSTEM DESCRIPTION - 4 PIPE AIR HANDLERS, FAN COIL UNITS, DUCTED SPLIT SYSTEMS, PACKAGED UNITS

■ MINIMUM HVAC EQUIPMENT EFFICIENCY COMPLIANCE - TABLE 503.2.3
☐ INCREASED HVAC EQUIPMENT EFFICIENCY COMPLIANCE - TABLE 506.2.1

EQUIP TYPE	SIZE CATEGORY (BTUH)	SUBCATEGORY	503.2.3 MINIMUM EFFICIENCY (b)	506.2.1 INCREASED EFFICIENCY	DESIGN EFFIC.
TABLE 5.3.2.3(1) - UNITARY AIR CONDITIONERS AND CONDENSING UNITS					
AIR COND, AIR COOLED	< 65,000 (<= 5 TONS)	SPLIT SYSTEM & SINGLE PACKAGE	13.0 SEER	15.0 SEER 12.5 EER	SEE SCHEDULE
AIR COND, AIR COOLED	>= 65,000 & < 135,000	SPLIT SYSTEM & SINGLE PACKAGE	11.2 EER (c)	12.0 EER 12.4 IPLV	SEE SCHEDULE
AIR COND, AIR COOLED	>= 135,000 & < 240,000	SPLIT SYSTEM & SINGLE PACKAGE	11.0 EER (c)	12.0 EER 12.4 IPLV	SEE SCHEDULE

b. IPLVS ARE ONLY APPLICABLE TO EQUIPMENT WITH CAPACITY MODULATION.
c. DEDUCT 0.2 FROM THE REQUIRED EERS AND IPLVS FOR UNITS WITH A HEATING SECTION OTHER THAN ELECTRIC RESISTANCE HEAT.

503.2.4 THRU 503.2.9
■ HVAC SYSTEMS ARE FULLY COMPLIANT WITH THE REQUIREMENTS FOR HVAC SYSTEM CONTROL, VENTILATION, ENERGY RECOVERY, DUCT AND PLENUM INSULATION AND SEALING, PIPING INSULATION, AND SYSTEM COMPLETION.

503.2.10 - AIR SYSTEM DESIGN AND CONTROL
☐ ALL FANS INSTALLED ON THE PROJECT ARE BELOW 5 HP AND ARE EXEMPT FROM THESE REQUIREMENTS.
■ FANS ABOVE 5 HP MEET THE CFM LIMITATIONS SHOWN BELOW:

OPTION 1 - FAN SYSTEM MOTOR NAMEPLATE HP - TABLE 503.2.10.1(1)

SYSTEM/UNIT	ALLOWABLE MOTOR BRAKE HP	DESIGN MOTOR BRAKE HP	DESIGN CFM
AHU-1 SUPPLY	37.5HP	35HP	SEE SCHEDULE
AHU-1 RETURN	9.5HP	7.5HP	SEE SCHEDULE
AHU-2 SUPPLY	9.2HP	8HP	SEE SCHEDULE
AHU-2 RETURN	N/A	N/A	SEE SCHEDULE
AHU-3 SUPPLY	7.2HP	6.5HP	SEE SCHEDULE
AHU-3 RETURN	N/A	N/A	SEE SCHEDULE

503.3 - SIMPLE HVAC SYSTEMS AND EQUIPMENT (PRESCRIPTIVE)
☐ PROJECT CONSISTS OF ONLY DX SINGLE ZONE SYSTEMS FULLY COMPLIANT WITH THE SIMPLE PRESCRIPTIVE REQUIREMENTS OF 503.3.

503.4 - COMPLEX HVAC SYSTEMS AND EQUIPMENT (PRESCRIPTIVE)
■ PROJECT CONSISTS OF HVAC SYSTEMS FULLY COMPLIANT WITH THE COMPLEX PRESCRIPTIVE REQUIREMENTS OF 503.4.

ELECTRICAL/MECHANICAL DEMARCATION

REFER TO DETAIL 13/M-5.02 FOR MECHANICAL CONTRACTOR'S RESPONSIBILITIES RELATED TO ELECTRICAL DISCONNECTS, STARTERS AND WIRING OF MECHANICAL EQUIPMENT. ALL DISCONNECTS, STARTERS AND WIRING (LOAD SIDE OF DISCONNECTS) SHALL BE FURNISHED AND INSTALLED BY M.C. UNLESS OTHERWISE NOTED IN DETAIL 13/M-5.02. COORDINATE ALL ELECTRICAL REQUIREMENTS WITH E.C. PRIOR TO ASSEMBLING SHOP DRAWING SUBMITTALS OR ORDERING EQUIPMENT.

COORDINATION DRAWINGS

PER SPECIFICATION SECTION 01 31 00 PROJECT MANAGEMENT AND COORDINATION, THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF COORDINATION DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA, AND GENERAL CONTRACTOR). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA, AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS AND COORDINATION DRAWINGS:

1. ALL COORDINATION DRAWINGS WILL BE PRODUCED AT 1/4"= 1'-0" SCALE
2. COORDINATION DRAWINGS WILL BE DISTRIBUTED ON REPRODUCIBLE MATERIAL 48"x36"
4. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
5. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

MECHANICAL GENERAL NOTES

1. DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS AND REFLECTED CEILING PLANS FOR EXACT LOCATION OF DOORS, WINDOWS, CEILING DIFFUSERS, ETC.
2. ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR. THIS INCLUDES ANY MODIFICATIONS TO ANY ASSOCIATED MECHANICAL, PLUMBING, OR ELECTRICAL SYSTEMS REQUIRED BY THIS SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. ALL DUCTWORK SHALL BE GALVANIZED SHEET METAL CONSTRUCTED IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS. ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK SHALL BE WRAPPED WITH 2" THICK DUCT WRAP WITH VAPOR BARRIER. INSULATION (INCLUDING FLEXIBLE DUCT INSULATION) SHALL HAVE A MINIMUM INSTALLED R-VALUE OF 5.0. TRANSFER DUCTS SHALL BE LINED WITH 1" THICK CLOSED CELLULAR FOAM LINER FOR ACOUSTICAL PURPOSES. DUCT DIMENSIONS ON PLANS ARE FREE AREA SIZE. PROVIDE RIGID INSULATION BLOCK AT ALL SUPPORT LOCATIONS, REFER TO SPECS, AND DETAIL-6/M-502 FOR DOUBLE WALL DUCT REQUIREMENTS
4. ALL DUCTWORK SHALL BE SEALED PER THE REQUIREMENTS OF THE INTERNATIONAL MECHANICAL CODE. SEAL LOW PRESSURE SUPPLY, RETURN, OUTSIDE AIR, AND EXHAUST DUCTWORK FOR SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 12, REFER TO SPECIFICATION SECTION 233113 FOR PRESSURE CLASSIFICATION SYSTEM REQUIREMENTS.
5. ALL MEDIUM PRESSURE DUCTWORK MAINS WILL BE SUBJECT TO PRESSURE TESTING PER SMACNA GUIDELINES (REGARDLESS OF DUCT PRESSURE CLASSIFICATION).
6. ALL PIPING, DUCTS, VENTS, ETC., EXTENDING THROUGH WALLS AND ROOF SHALL BE FLASHED AND COUNTERFLASHED IN A WATERPROOF MANNER.
7. ALL PIPING AND DUCTWORK LOCATIONS SHALL BE COORDINATED WITH THE WORK UNDER OTHER DIVISIONS OF THE SPECIFICATIONS, TO AVOID INTERFERENCE.
8. TEST AND BALANCE CONTRACTOR WILL BE PROVIDED BY THE CONSTRUCTION MANAGER. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF ALL EQUIPMENT, VALVES, DAMPERS AND ACCESSORIES REQUIRED TO BALANCE THE SYSTEM WATER AND AIR FLOWS AS SPECIFIED. THE MECHANICAL CONTRACTOR AND SHALL ASSIST THE TEST AND BALANCE CONTRACTOR CONTRACTED BY THE CONSTRUCTION MANAGER DURING TESTING AND BALANCING. ALL MECHANICAL SYSTEMS SHALL BE BALANCED TO THE PERFORMANCE SPECIFICATIONS INDICATED ON PLANS, ANY EQUPMENT OR SYSTEM FOUND TO BE DEFICIENT WILL BE CORRECTED AND RETESTED AT NO COST TO THE OWNER. TEST AND BALANCE CONTRACTOR WILL BE AABC OR NEBB CERTIFIED.
9. UPON PROJECT COMPLETION, THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE OWNER INSTALLATION INFORMATION IN ACCORDANCE WITH DIVISION 01 OF THE SPECIFICATIONS INCLUDING BUT NOT BE LIMITED TO: RECORD SUBMITTALS (WITH ANY SUBMITTAL REVIEW COMMENTS ADDRESSED), O&M MANUALS FOR EACH PIECE OF EQUIPMENT INCLUDING ALL SELECTED OPTIONS, THE NAME AND ADDRESS OF AT LEAST ONE SERVICE AGENCY, FULL CONTROL SYSTEM O&M AND CALIBRATION INFORMATION INCLUDING WIRING DIAGRAMS, SCHEMATICS, FULL SEQUENCE OF OPERATION, AND PROGRAMMED SETPOINTS.
10. PROVIDE A ONE YEAR WARRANTY FOR ALL WORK PERFORMED BEGINNING ON THE DATE OF FINAL SCO INSPECTION/ACCEPTANCE
11. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND ALL EQUIPMENT FOR MAINTENANCE AND FILTER REMOVAL.
12. CONDENSATE DRAIN PIPING SHALL BE BE SCHEDULE TYPE "L" HARD DRAWN COPPER AND SHALL BE INSULATED PER THE SPECIFICATIONS. DRAINS FROM ALL COOLING COILS SHALL BE TRAPPED. DRAIN SIZE SHALL BE EQUIPMENT DRAIN CONNECTION SIZE (3/4" MINIMUM) WITH A MINIMUM DEPTH OF 4" OR 1.5 TIMES THE UNIT FAN TSP, WHICHEVER IS GREATER.
13. ALL REFRIGERANT PIPE SHALL BE NITROGENIZED ACR COPPER TUBE. SIZE, INSULATE, AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS.
14. ANY DEVICE REQUIRING A THERMOSTAT FOR CONTROL SHALL BE FURNISHED WITH A THERMOSTAT WHETHER INDICATED ON THE DRAWINGS OR NOT.
15. INSTALL THE TOP OF ALL THERMOSTATS, SENSORS, AND SWITCHES AT 4'-0" (MAXIMUM) ABOVE FINISH FLOOR. COORDINATE EXACT THERMOSTAT LOCATION WITH OWNER PRIOR TO INSTALLATION. ANY DEVICE ON A PERIMETER WALL SHALL BE MOUNTED ON A FOAM-FILLED ELECTRICAL BOX, WITH ALL GAPS BETWEEN BOX AND WALL SEALED TO PREVENT INFILTRATION.
16. MECHANICAL CONTRACTOR SHALL LOCATE EXHAUST FANS, OUTLETS, AND GAS FLUES A MINIMUM OF 20'-0" FROM ANY OUTSIDE AIR INTAKE.
17. CHILLED WATER PIPING AND FITTINGS BELOW GRADE SHALL BE FACTORY PREINSULATED AS MANUFACTURED BY THERMACOR(OR EQUAL). CARRIER PIPE SHALL BE SCHEDULE 40 ASTM A53 GRADE B BEVELED FOR WELDING. INSULATION SHALL BE FOAMED IN-PLACE CLOSED CELL POLYURETHANE FOAM COMPLETELY FILLING THE ANNULUS BETWEEN THE CARRIER PIPE AND HPDE JACKETING. OUTER JACKETING SHALL BE HDPE.
18. ALL CHILLED WATER, AND HOT WATER PIPING SHALL MEET THE REQUIREMENTS OF SECTION 232113. ALL PIPING SHALL BE INSULATED PER SPECIFICATION SECTION 230700. ALL PIPING JACKETING, LABELING AND IDENTIFICATION SHALL MEET THE REQUIREMENTS OF SECTION 230553 (COLOR-CODED PVC JACKETING REQUIRED IN MECHANICAL ROOMS). MINIMUM PIPE SIZE SHALL BE 3/4".
19. ALL BRANCH CHILLED WATER AND HOT WATER PIPING SHALL PITCH UP IN DIRECTION OF FLOW WITH MANUAL AIR VENTS AT ALL HIGH POINTS AND 1/2" DRAIN VALVES AT ALL LOW POINTS.
20. PROVIDE UNIONS, FLANGES OR COUPLINGS AT CONNECTION TO ALL VALVES AND EQUIPMENT. DO NOT USE DIRECT WELDED OR THREADED CONNECTIONS TO VALVES, EQUIPMENT OR OTHER APPARATUS.
21. PROVIDE NON-CONDUCTING DIELECTRIC UNIONS WHENEVER CONNECTING DISSIMILAR METALS.
22. EQUIPMENT OPERATED DURING CONSTRUCTION SHALL USE FILTERED MEDIA TO PREVENT CONSTRUCTION DEBRIS FROM ENTERING COILS, DUCTWORK SYSTEMS, AIR TERMINALS ETC. AT COMPLETION OF CONSTRUCTION, MECHANICAL CONTRACTOR SHALL CLEAN ALL SYSTEMS WITH ALL CONTROL DEVICES WIDE OPEN AND REMOVE ANY REMAINING DEBRIS PRIOR TO TEST AND BALANCING. MECHANICAL CONTRACTOR SHALL REPLACE ALL FILTRATION WITH NEW FILTERS AT COMPLETION OF CONSTRUCTION. ANY DUCTWORK, AIR TERMINALS, AND/OR OTHER EQUIPMENT UPSTREAM OF FILTRATION SHALL BE CLEANED THOROUGHLY OF CONSTRUCTION DEBRIS BEFORE HANDING OVER TO OWNER. COORDINATE WITH OWNER/CM FOR ANY FILTER MAINTENANCE PROGRAM REQUIREMENTS.
23. ALL EQUIPMENT CONCRETE PAD SIZES FOR MECHANICAL EQUIPMENT SHALL BE CONFIRMED WITH APPROVED SHOP DRAWING SUBMITTALS AND ASSOCIATED UNIT MANUFACTURER ANCHOR LOCATIONS PRIOR TO FABRICATION/INSTALLATION. THE MECHANICAL AND PLUMBING CONTRACTORS SHALL COORDINATE THE EXACT LOCATION OF MECHANICAL EQUIPMENT HOUSEKEEPING PADS WITH THE FLOOR DRAIN LOCATIONS PRIOR TO INSTALLATION OF DRAINS.
24. ALL PIPING AND DUCTWORK SHALL BE SUPPORTED IN ACCORDANCE WITH THE SPECIFICATIONS, AND FURTHER SUPPORTS OR HANGERS SHALL BE PROVIDED AS REQUIRED TO PREVENT THE WEIGHT OF PIPING BEING PLACED ON EQUIPMENT.
25. DUCTWORK AND PIPING PASSING THROUGH/ABOVE ELECTRICAL ROOMS SHALL BE CLOSELY COORDINATED WITH THE ELECTRICAL CONTRACTOR. DUCTWORK OR PIPING SHALL NOT BE LOCATED ABOVE ELECTRICAL PANELS.
26. EXTEND ALL DRAIN LINES TO NEAREST FLOOR DRAIN OR AS INDICATED SO ROUTED AS TO AVOID INTERFERENCE WITH PASSAGEWAYS AND MAINTENANCE.
27. ALL VALVES AND SPECIALTIES SHALL BE LINE SIZE UNLESS NOTED OTHERWISE, USING ECCENTRIC REDUCERS (FLAT ON BOTTOM) WHENEVER PIPING TRANSITIONS ARE REQUIRED. AT INLINE PUMP SUCTION THE ECCENTRIC REDUCER SHALL BE FLAT ON TOP OF PIPE.
28. THIS PROJECT WILL BE COMMISSIONED IN ACCORDANCE WITH THE MANDATORY NORTH CAROLINA STATE CONSTRUCTION THIRD-PARTY COMMISSIONING REQUIREMENTS. MECHANICAL CONTRACTOR SHALL COORDINATE WITH THE OWNER'S COMMISSIONING AGENT AND PROVIDE ALL NECESSARY TIME, MATERIALS, AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT. SEE COMMISSIONING SPECIFICATION SECTION 019100 IN PROJECT MANUAL FOR FURTHER INFORMATION.
29. PRIOR TO TURNING ALL HYDRONIC SYSTEMS OVER TO THE OWNER SYSTEMS, A SYSTEM FLUSHING AND CHEMICAL TREATMENT REPORT SHALL BE PROVIDED AND VERIFIED BY THE OWNERS COMMISSIONING AGENT.
30. CONTROLS VALVES, DAMPERS, AND BAS CONTROLLERS SHALL BE INSTALLED A MAXIMUM OF 2 FEET ABOVE THE CEILING AND WHERE INSTALLED ABOVE AN INACCESSIBLE CEILING A MINIMUM OF 2'x2' ACCESS DOOR SHALL BE PROVIDED. COORDINATE WITH ARCHITECTURAL PLANS FOR LOCATIONS AND CEILING TYPES.
31. VALVES MOUNTED 12' OR GREATER A.F.F SHALL BE PROVIDED WITH CHAIN OPERATORS.
32. ALL MOTORS PROVIDED FOR EQUIPMENT IN MECHANICAL ROOM SHALL BE PROVIDED WITH A T.E.F.C. ARRANGEMENT.
33. ALL CLOSED LOOP PIPING SYSTEMS SHALL BE FLUSHED USING PRODUCT AND SERVICES BY EXPERIENCED WATER SOLUTIONS INC. BY-PASS VALVES SHALL BE PROVIDED FOR ALL EQUIP. INCLUDING TERMINAL UNITS.
34. REFER TO SPECIFICATIONS FOR GAS PIPING REQUIREMENTS
35. ALL ISOLATION VALVES, TERMINAL UNITS, CONTROLS, ETC. REQUIRING ACCESS SHALL BE INSTALLED WITHIN 18" OF THE CEILING FOR SERVICE ACCESSIBILITY. LOCATIONS SHALL BE INDICATED ON THE CEILING GRID PER THE SPECIFICATIONS.
36. ALL CONTROL WIRING SHALL BE IN CONDUIT

MECHANICAL DRAWING INDEX

DRAWING LIST - MECHANICAL

MECHANICAL LEGEND

SYMBOL	DESCRIPTION	ABBR.
CHS	CHILLED WATER SUPPLY	CHS
CHR	CHILLED WATER RETURN	CHR
HWS	HOT WATER SUPPLY	HWS
HWR	HOT WATER RETURN	HWR
G	NATURAL GAS	G
D	CONDENSATE DRAIN	D
PC	PUMPED CONDENSATE	PC
CW	COLD WATER MAKE-UP	CW
R	REFRIGERANT PIPING	R
	BUTTERFLY VALVE	
	3-PIECE BALL VALVE	
	CHECK VALVE	
	STRAINER WITH BLOWDOWN VALVE WITH HOSE CONN.	
	BALANCING VALVE	
	B&G CIRCUIT SETTER	
	UNION	
	THERMOMETER	
P	PRESSURE GAGE & COCK	
	GAGE COCK	
	FLOW SWITCH	
	ECCENTRIC REDUCER	
	CONCENTRIC REDUCER	
	CONTROL VALVE	
DP	DIFFERENTIAL PRESSURE SENSOR	
T	TEMPERATURE GAUGE	
FM	FLOW METER	
	GAS COCK	
	PRESSURE REDUCING/REGULATING VALVE	
S	SOLENOID VALVE	
3WV	3-WAY VALVE	
T / T CO2	THERMOSTAT / COMBO TSTAT/CO2 SENSOR (4'-0" AFF TO TOP)	
H	HUMIDISTAT (4'-0" AFF TO TOP)	
S	SWITCH (4'-0" AFF TO TOP)	
P	WALL MOUNTED BUILDING PRESSURE SENSOR	
PS	MANUAL PULL STATION	
	SUPPLY AIR DIFFUSER (4-WAY)	
	SUPPLY AIR DIFFUSER (3-WAY)	
	RETURN AIR GRILLE	
	RETURN AIR GRILLE WITH SOUND ATTENUATION (SEE DETAIL)	
	EXHAUST AIR GRILLE	
	DOUBLE LINE DUCTWORK	
	SINGLE LINE DUCTWORK	
FD	FIRE DAMPER W/ ACCESS DOOR (SEE DETAIL)	
20/14	20"x14" FLAT OVAL DUCT	
20x14	20"x14" RECTANGULAR DUCT	
20x14L	20"x14" RECTANGULAR DUCT LINED	
8" ⌀	8" DIAMETER ROUND DUCT	
DD	DUCT MOUNTED SMOKE DETECTOR W/ ACCESS DOOR	
SP	STATIC-PRESSURE SENSOR	
M	MOTORIZED DAMPER	
BD	BACKDRAFT DAMPER	
C	CARBON MONOXIDE SENSOR	
CO2	CARBON DIOXIDE SENSOR	
U	UNDERCUT DOOR	
⊗	LOW PRESSURE STEAM TRAP	
⊠	HIGH PRESSURE STEAM TRAP	
M.C.	MECHANICAL CONTRACTOR	
E.C.	ELECTRICAL CONTRACTOR	
P.C.	PLUMBING CONTRACTOR	
N.I.C.	NOT IN CONTRACT	
AFF	ABOVE FINISHED FLOOR	
DN	DOWN	
UP	UP	

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NORTH CAROLINA PROFESSIONAL SEAL 17228 ENGINEER RONALD V. ALMOND
9/11/17

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum #5	9.11.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: CAH
CHECKED BY: RVA

MECHANICAL LENDEND, NOTES AND SCHEDULES

M-001

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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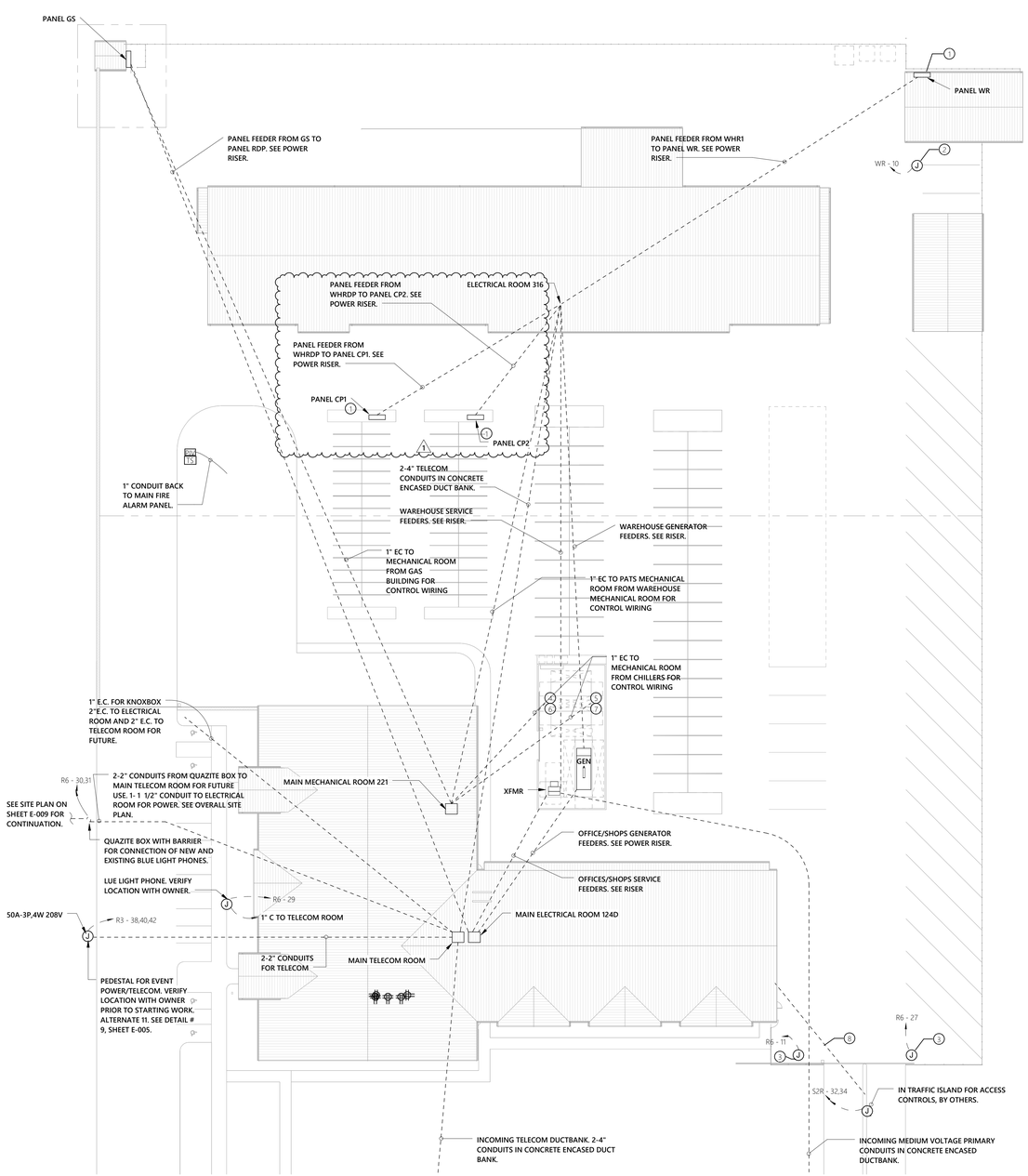

1 ELECTRICAL SITE PLAN - POWER
1" = 30'-0"

KEYED NOTES: (X)

1. PROVIDE UNI-STRUT STRUCTURE TO MOUNT PANEL. COORDINATE LOCATION WITH OWNER
2. J-BOX FOR CONNECTION TO HOT BOX.
3. PROVIDE AND INSTALL 30A/F20-1P-3R DISCONNECT.
4. PROVIDE 400/F250-3P-3R DISCONNECT FOR CHILLER #1. CIRCUITED TO MDP-7.
5. PROVIDE 400/F250-3P-3R DISCONNECT FOR CHILLER #2. CIRCUITED TO MDP-8.
6. PROVIDE J-BOX FOR 20A, 120V CIRCUIT FOR CHILLER#1 CONTROLS. CIRCUIT TO RM-14.
7. PROVIDE J-BOX FOR 20A, 120V CIRCUIT FOR CHILLER#2 CONTROLS. CIRCUIT TO RM-26.
8. PROVIDE 2"EC FROM TRAFFIC ISLAND TO KEY SHOP WALL MOUNTED TELECOM RACK LOCATION.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028297 REGISTERED BRANDON L. MILLER
9/11/17

REVISIONS:

No.	Description	Date
1	Addendum #5	9.11.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

ELECTRICAL SITE PLAN - ELECTRICAL

E-010

OPTIMA #: 16-0265

PROJECT NORTH TRUE NORTH

BUILDING BID DOCUMENTS

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1 OFFICE/SHOPS - REFLECTED CEILING PLAN - PATS/FO - LIGHTING

1/8" = 1'-0"

8 6 4 2 0 8 16

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

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GENERAL NOTES:

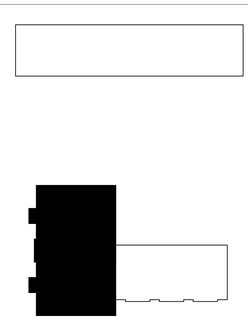
1. SET TIME OUT ON ALL OCCUPANCY SENSORS TO 'MAX'.
2. CONNECT ALL EXIT SIGNS AND EMERGENCY POWER FOR GENERATOR TRANSFER DEVICES BETWEEN COLUMN LINES A THROUGH C TO CIRCUIT LS-16.
3. CONNECT ALL EXIT SIGNS AND EMERGENCY POWER FOR GENERATOR TRANSFER DEVICES BETWEEN COLUMN LINES C THROUGH F TO CIRCUIT LS-18.
4. CONNECT ALL EXIT SIGNS AND EMERGENCY POWER FOR GENERATOR TRANSFER DEVICES BETWEEN COLUMN LINES F THROUGH M TO CIRCUIT LS-20.
5. CONNECT ALL "OWL1" AND "OWL2" FIXTURES AS SHOWN. ROUTE THROUGH CIRCUIT LIGHTING CONTACTOR LC-1. REFER TO DETAIL #10/E006.
6. ALL LIGHTS NOTED AS 'NL' SHALL SERVE AS NIGHT LIGHTS CONNECT TO CIRCUITS SHOWN OR NOTED.
7. CONNECT EMERGENCY CIRCUIT TO GENERATOR TRANSFER DEVICES IN ADDITION TO NORMAL CIRCUIT SHOWN ROUTED TO FIXTURE.
8. LOCATE POWERPACKS, SHOWN IN AREAS WITH HARD CEILINGS, ABOVE NEAREST ACCESSIBLE CEILING.

PARTITION LEGEND

1. ALL EXTERIOR WALLS TO BE W1 U.N.O.
2. ALL INTERIOR METAL STUD PARTITIONS TO BE TYPE G32 U.N.O.
   - NON-RATED PARTITION TO CEILING
   - NON-RATED PARTITION TO DECK
   - 1 HR. RATED PARTITION TO DECK
   - 2 HR. RATED PARTITION TO DECK

NOTE: SEE SHEET A-004 FOR CONSTRUCTION OF PARTITION TYPES.

KEYPLAN



PROJECT NORTH TRUE NORTH

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NORTH CAROLINA REGISTERED Brandon T. Miller 028297 PROFESSIONAL ENGINEER SEAL

9/11/17

MEMBERS OF THE AMERICAN INSTITUTE OF ARCHITECTS

REVISIONS:

No.	Description	Date
1	Addendum #5	9.11.2017

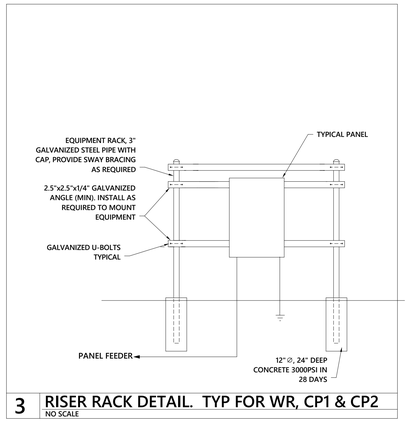
PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

REFLECTED CEILING PLAN - PATS/FO - LIGHTING

E-201A

OPTIMA #: 16-0265 [redacted]

BUILDING BID DOCUMENTS

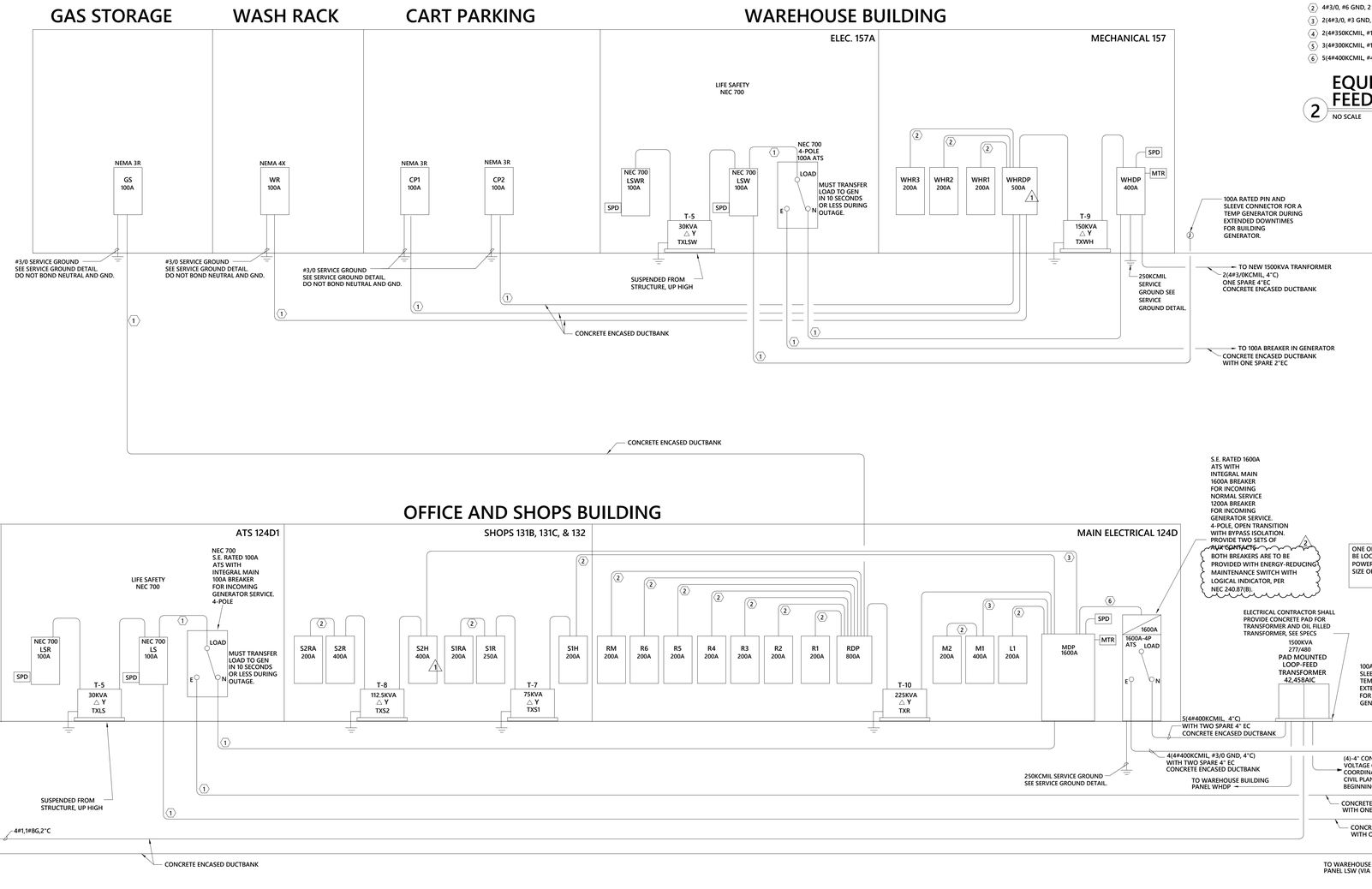


3 RISER RACK DETAIL. TYP FOR WR, CP1 & CP2
NO SCALE

DRY-TYPE TRANSFORMER SCHEDULE

TRANSF. TYPE	PRIMARY VOLTAGE	SECONDARY VOLTAGE	KVA	SQUARE "D"	PRIMARY	SECONDARY	GROUNDING ELECTRODE CONDUCTOR	SIZE
T-5	480	208/120 Y	30		(3)-#8, #10 Gnd. -3/4 "C. 50 AMP	(4)-#3, #8 Gnd. -1 1/2" C. 100 A	#8	25/14
T-6	480	208/120 Y	45		(3)-#4, #8 Gnd. -1 1/4" C. 70 AMP	(4)-#1/0, #6 Gnd. -2" C. 150 A	#6	30/20
T-7	480	208/120 Y	75		(3)-#1, #6 Gnd. -1 1/2" C. 125 AMP	(4)-#4/0, #2 Gnd. -2 1/2" C. 225 A	#2	30/20
T-8	480	208/120 Y	112.5		(3)-#2/0, #6 Gnd. -1 1/2" C. 175 AMP	(2) SETS(4)-#3/0, #1/0 Gnd. - 2"C. 400 A	#1/0	35/29
T-9	480	208/120 Y	150		(3)-#4/0, #4 Gnd. -2 1/2" C. 225 AMP	(2)-SETS (4)-#250, #1/0 Gnd., -3"C 500A	#1/0	41/32
T-10	480	208/120 Y	225		(3) #500kcmil, #3 Gnd. 3" C. 350 AMP	(3)-SETS (4)-#300kcmil, #2/0 Gnd. -3" C. EA. / 800 AMP	#2/0	48/30

NOTE: NOT ALL SIZES OR TYPES MAY BE USED.



1 4#3, #8 GND, 2"C
2 4#3/0, #6 GND, 2 1/2"C
3 2(4#3/0, #3 GND, 2 1/2"C)
4 2(4#350KCMIL, #1 GND, 3"C)
5 3(4#300KCMIL, #1/0 GND, 3"C)
6 5(4#400KCMIL, #4/0 GND, 4"C)

EQUIPMENT AND FEEDER LEGEND
2 NO SCALE

1. TYPE OF METER ON "MDP" IS VERIFIED WITH OWNER PRIOR TO ORDERING. BASIS OF DESIGN IS "CUTLER HAMMER" IQ-250 OR EQUAL. METERS ARE SHOWN AS "MTR". COORDINATE COMMUNICATION PROTOCOL WITH M.C. PRIOR TO ORDERING.
2. FEEDERS THAT ARE REQUIRED TO BE CONCRETE ENCASED ARE TO BE CONCRETE ENCASED UNTIL TERMINATION POINT, INCLUDING UNDER BUILDING SLABS. EXCAVATION WILL BE REQUIRED IN EXISTING MAIN ELECTRICAL ROOM.
3. PROVIDE CONCRETE PAD FOR INDOOR TRANSFORMER. PAD SPECS ARE TO BE COORDINATED WITH TRANSFORMER MANUFACTURER.
4. MOTOR(S), CONTROLLER(S), AND ASSOCIATED ACCESSORIES FOR THE FIRE PUMP SYSTEM SHALL BE LISTED FOR FIRE PROTECTION SERVICE. COORDINATE EXACT SIZING REQUIREMENTS WITH MANUFACTURER. ADJUST BREAKER/FUSE/WIRING SIZING AS REQUIRED BASE ON THE MANUFACTURER'S REQUIREMENTS.
5. FIRE/JOCKEY PUMPS CONTROLLER DISCONNECTS SHALL BE LISTED FOR USE AS SERVICE ENTRANCE EQUIPMENT, LOCKABLE IN THE "ON" POSITION, LABELED PER NEC 695-4(b)(3) AND SUPERVISED IN THE CLOSED POSITION BY THE FIRE ALARM CONTROL PANEL. LOCATE DISCONNECTS ADJACENT TO FIRE/JOCKEY PUMPS CONTROLLER.

POWER RISER DIAGRAM
1 1/8" = 1'-0"

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NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL 028297 BRANDON L. MILLER
9/11/17

REVISIONS:

No.	Description	Date
1	Addendum #4	8.28.2017
2	Addendum #5	9.11.2017

PROJECT: 9202-164730
SCO ID: 16-15656-02B
ITEM: 315 CODE: 41526
DATE: AUGUST 21, 2017
DRAWN BY: J. Holcolmb
CHECKED BY: M. Mazzone

POWER RISER

E-501

OPTIMA #: 16-0265

BUILDING BID DOCUMENTS

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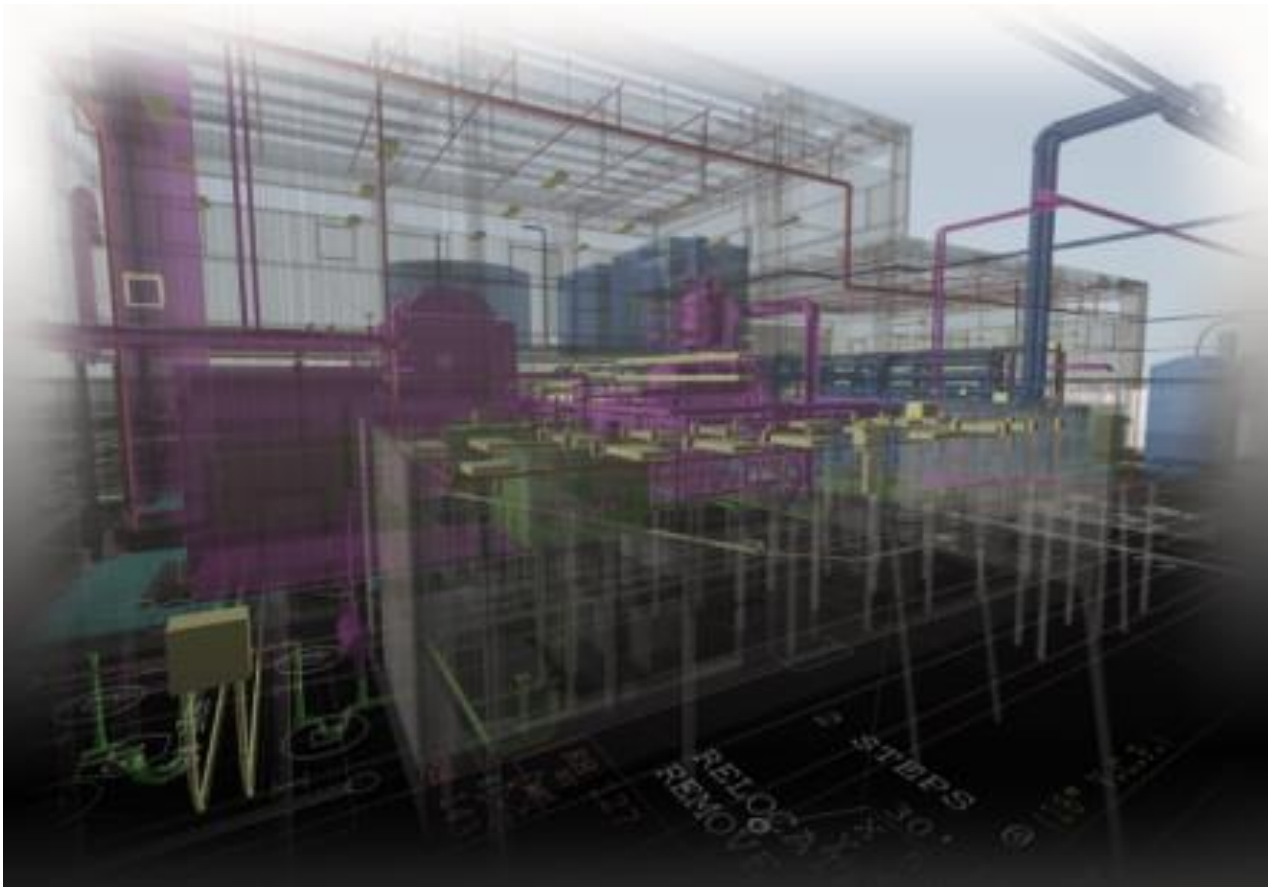
UNC CHARLOTTE



INTEGRATED LIFECYCLE MANAGEMENT

VDC/BIM REQUIREMENTS

IMPLEMENTATION PLAN

Manual for VDC, BIM and Lifecycle Data for design and construction projects at UNC Charlotte.

V2.0 - April 2017

4/2017

ILM helps Owners manage project and post-project related information easier with these four goals: ***Communication***, ***Centralization***, ***Documentation, Standardization*** and ***Automation***.

This document has been provided to assist in the development of Lifecycle Management through BIM, the VDC process and Data Management resources.

To achieve this vision, The University of North Carolina Charlotte (UNC Charlotte) has issued these instructions which will be required as part of the contract for all campus design and construction projects. The Implementation Plan is sponsored by UNC Charlotte in partnership with JLL (Jones Lang LaSalle).

Throughout the defined process of these requirements, various UNC Charlotte departments will review the BIM, Project Metadata and associated documentation for verification, accuracy and delivery. These departments and their involvement are as follows:

- **UNC Charlotte Capital Project Manager**
  - Coordinate development of BIM and Metadata within various departments.
  - Receives, reviews and is the final signs-off on BXP-D and BXP-C.
  - Provide Design Team with Site Code and Building ID for Revit project information
  - Responsible for providing Design and Construction Teams with UNC Charlotte Revit Template and DMG Structure.
  - Insures that BXP-D and BXP-C is adhered to for the duration of the project.
  - Provide access to Project Collaboration Cloud

- **UNC Charlotte Capital Projects**

- **UNC Charlotte Facilities Operations**
  - FO defines FM metadata, documentation, clearances to mechanical equipment and equipment naming standards. They will also verify that the systems and zones are defined correctly.

- **UNC Charlotte Information Technology Services**
  - Defines IT model and metadata requirements.

- **UNC Charlotte 3rd Party Consultants**
  - Any 3rd party viewer in conjunction with the above listed UNC Charlotte departments to validate models, documentation, deliverables and overall VDC/BIM requirements.

If you have any questions about the VDC/BIM Requirements Implementation Plan please contact the Associate Director for Capital Planning at UNC Charlotte.

Update Schedule

Release	Date	Brief Update Description
1	10/2013	Initial public release
2	3/2017	Full plan revision #1, v2.0

Table of Contents

Glossary

AEC
Architectural/Engineering/Construction

ARCHIBUS
IWMS used for Space Planning and Facilities Maintenance

As-Built Documents
As-built documents are the collection of 2D hard copy documents and/or electronic drawing files from the Contractor/CM that contain mark-ups, annotations, and comments about changes that have been made to the Contract Documents during the construction phase.

As-Built Model
This is a collection of models that have been collected and updated throughout the construction process by the Construction Manager/Contractor. These changes and updates have been communicated from the Contractor and Sub-Contractors through comments, annotations, mark-ups and design changes; model showing how a building is actually assembled and delivered. (Also see Section 7.6.3)

Building Information Modeling (BIM)
An integrated process aimed at providing coordinated, reliable information about a building project throughout different project phases—from design through construction and into operations. BIM gives architects, engineers, builders, and owners a clear overall vision of the project—to help them make better decisions faster, improve quality, and increase profitability of the project.

BIM Execution Plan (BXP)
The BXP helps to define the BIM roles and responsibilities for the Design and Construction Team during the project.

Cx
Commissioning Agent

Clash Detection
The process of checking for clashes and interferences in one or more BIM models. May also be referred to as model coordination.

Construction Documents
The Construction Documents are a set of Drawings, that along with the Specifications, Addenda, Construction Change Directives, Change Orders or other written amendment or orders make up the set of documents that includes all pertinent information required for the contractor to price and build the project.

Construction Model
The model used during construction to simulate and analyze the construction of a building for constructability, pricing, etc. within an authoring software. (Also see Section 7.6.1)

Coordination Model
A federated model created from two or more models, used to show the relationship of multiple building disciplines such as architectural, civil, structural, and MEP (mechanical, electrical, and plumbing) for constructability and coordination. (Also see Section 7.6.2)

Core Collaboration Team
The group of people—which should include someone from each party working on the project, such as the owner, architect, contractor, consultants and trade contractors—responsible for completing a BIM and BES, creating the document management file folder structure and permission levels in the collaborative project management system, and enforcing the action plan set out in that document throughout design and construction of the project.

Design Team
The Design Team is considered to be the Architect and all of the consultants that provide design services for a project. These design services can be rendered at any time during the project.

Design Model
The model used to communicate the design intent of a building as is the single source for construction document development.

.DWF
.DWF is a file type that was developed by Autodesk to be locked file for drawing sheets and model data. It can be used as a file transfer for estimating data, markups, and other third party software. It can be a combination of 3D and 2D information within the same file.

FM
Facility management is a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology.

Integrated Lifecycle Management (ILM)
A management process that improves collaboration and optimizes efficiency between the AEC team and Owner through standardization and refinement of business structures and facility practices into a process that collaboratively optimizes efficiency through all phases of design, fabrication, construction and lifecycle management.

Integrated Workplace Management System (IWMS)
A workplace management system characterized by an enterprise-class software platform that integrates five key components of functionality, operated from a single technology platform and database repository: real estate management, project management, facilities and space management, maintenance management, and environmental sustainability.

LEED
The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a suite of standards for environmentally sustainable construction. Based on a point system, a building can achieve different ratings based on the performance of the design, construction, and operation of the building.

MEP
Mechanical, Electrical and Plumbing. MEP/FP is Mechanical, Electrical, Plumbing and Fire Protection

Metadata
The term refers to "data about data". For this document it refers to individual instances of application data, the data content, or “content about content". This content can be authored in a field, stored and managed in one database and transfer to yet another database.

Model Manager
The project team member(s) responsible for managing the collaboration and sharing of electronic files during the project. Model managers are also responsible for maintaining the integrity of BIM models, which can include gathering, linking, and uploading updated models.

Navisworks
Navisworks is software that allows for the viewing of multiple model formats. This ability to "view" these files also allows for Navisworks to simulate the interaction between model files. That includes collision reporting, time lining, and coordination.

NWC
This file is a Cache File that is used by Navisworks to quickly read many other file types.
These files can only be read in Navisworks and Navisworks cannot export out or be saved as a NWC. NWC is the format that is typically created (exported) from products like Revit and AutoCAD, and also is created automatically when Navisworks opens up a DWG directly.

NWD
This is the equivalent of a DWF or PDF. Typically the project file NWF is published to NWD which removes all links and keeps everything in the NWD. This allows the ability to share a project with someone externally without having to send all of the linked/appended files. A NWD can be opened with any Navisworks program, specifically Freedom Viewer.

NWF
This is the project file. The NWF contains all of the Navisworks data and pointers to the files that are loaded. The content that is saved in an NWF are things like redlines, saved viewpoints, materials, etc. Project/working file used daily to update info and reload updates from the linked/appended files.

O&M
Operations and Maintenance

Operations and Maintenance Support Information (OMSI)
Comprehensive data to properly operate, maintain and repair the facility and its systems. OMSI, also referred to as "Technical Operating Manuals," provides a process and a product that captures and organizes key information produced during the design, construction and final acceptance of new facility acquisition or major rehabilitation. The OMSI Scope of Work helps ensure that virtually all as-built architectural and technical product and system information will be available in a standardized, user-friendly format for use over the life cycle of the facility.

Parametric
The relationships among and between all elements of a model that enable coordination and change management. These relationships are created either automatically by the software or manually by users as they work.

Record Drawings
The capturing of As-Built Document's annotation, comments, and mark-ups into an updated drawing set. This is a collection of 2D hard copy documents and/or electronic drawing files from team members assigned to producing and providing the documentation to the Owner.

Record Model
Model containing all Contractual and As-Built conditions used to depict an accurate representation of the physical conditions, environment, and assets of a facility within an authoring software. (Also see Section 7.6.3)

.RVT
An .RVT file is a Revit native file type. It is also the deliverable file format for all projects. This includes all of the Design Team's models.

Single Line Diagrams
A 2D simplified diagram illustrating the inter-relationship of pieces of a system or other elements. These are not to scale.

Schematics
Similar to a Single Line Diagram, a Schematic Diagram illustrates the inter-relationship of components, but incorporates more of a spatial context of the elements, i.e. locations. Generally these are not to scale.

Virtual Design and Construction (VDC)
The management of integrated multi-disciplinary performance models and metadata of design-construction projects, including the product (i.e., facilities), work processes and organization of the design-construction-operation team in order to support explicit and public business objectives

End of Glossary

1.1 Objectives

Integrated Lifecycle Management (ILM) is a management process by the Owner to improve collaboration and optimize efficiency between the AEC team and Owner through standardization and refinement of business structures and facility practices into a process that collaboratively optimizes efficiency through all phases of design, fabrication, construction and lifecycle management.

This VDC/BIM Requirement and its corresponding guidelines are intended to act as the standard for the AEC Team to follow and develop their Project Specific Execution Plans. Project Plans written to execute these guidelines should allow the facility to be compliant with the UNC Charlotte's BIM and Lifecycle Data requirements. All drawings, schedules, simulations, and services required for assessment, review, and construction shall be extractions from the model and support electronic data and metadata. Moving this collected design and construction data into an IWMS is critical to UNC Charlotte meeting their intended Lifecycle requirement.

UNC Charlotte's VDC/BIM Requirement is a living document and will continually be reviewed for applicability with current methods and technology. Also review section 01 78 23 in the Project Manual for additional information associated with these requirements. UNC Charlotte welcomes feedback from the AEC Teams and internal staff regarding the performance of these processes as critical to keeping it relevant.

1.2 BIM Vision

UNC Charlotte understands that VDC/BIM represent both an enhanced technology and process change for the architecture-engineering-construction-facilities management industry. UNC Charlotte is committed to moving both the organization and its service providers to BIM as effectively and efficiently as possible, and to integrate VDC/BIM process methodologies into its delivery requirements. The information model shall include geometry, physical characteristics and metadata needed to describe the project, its construction and provide UNC Charlotte with needed Facilities Management Data.

All drawings, schedules, simulations and services required for assessment, review, bidding and construction shall be extractions from this model. The Design and Construction Teams shall follow the guidelines and requirements detailed in this document for VDC/BIM related services and deliverable requirements.

UNC Charlotte will describe in this VDC/BIM Requirement how the modeling requirements need to be developed and how they can be used by their internal teams during and after construction. These requirements are split into categories for model use during design, construction requirements for modeling and metadata and data use after project completion. Modeled elements shall be of a Level of Development described within to support an integrated design process that coordinates critical systems for proper building function, performance and IWMS integration.

1.3 Lifecycle Vision

UNC Charlotte's goal is to maximize lifecycle building performance with detailed facility information and metadata, electronic building data improves the design and management across the lifecycle. This should occur from concept design through construction and beyond into operations and eventually to renovations and/or salvage and demolition.

To achieve this, UNC Charlotte has looked internally to its own workflows and processes to strategically align them with a VDC/BIM workflow moving forward. Changes have been made to assets and other electronic information within their IWMS system to better match VDC/BIM processes from the AEC industry. Therefore UNC Charlotte is asking all AEC providers to use compliant VDC/BIM authoring tools for all major construction and renovation projects over $500,000. This requirement shall apply to design and construction by the architects, engineers, other

consultants, and other contractors hired for UNC Charlotte projects. For projects under $500,000 UNC Charlotte will actively support and encourage the use of VDC/BIM where practical, taking into account the size, type of project, and the availability of the VDC/BIM skill sets that are needed to accomplish the project.

1.4 General Responsibilities

VDC/BIM authoring tools, data integration, and collaborative team workflow environments shall be used to develop and produce project information and documentation as required for completion of construction. Both geometry and data information from BIM is to be used to maximize project reviews, decision support, design analysis, and quality assurance during all phases of the project.

It is the responsibility of all AEC Team members to have or obtain, at their cost, the trained personnel, hardware, and software needed to successfully use VDC/BIM and Data Management processes for the project. All technical disciplines shall be responsible for their data integration and data reliability of their work and coordinated models.

1.5 Reuse

It is important for UNC Charlotte to own, reuse, and properly manage building data throughout the facility lifecycle. Consequently, UNC Charlotte will place significant importance on the accurate creation, management, and stewardship of building information during project creation and expects that data created during planning, design and construction to be reused throughout construction and into facility management. Record Model(s) in the authoring software shall be provided at the end of construction to further the lifecycle and development efforts.

--- END OF SECTION ---

BIM Execution Planning

UNC Charlotte requires a BIM Execution Plan (BXP) developed to provide a master information/data management plan and assignment of roles and responsibilities for model creation and data integration at project initiation. The BXP shall align the project needs and requirements from this VDC/BIM Requirement with the Design and Construction team skills, capabilities, and technology maturity. Through this process, the team members and UNC Charlotte project management team shall jointly agree on how, when, why, to what level, and for which projects BIM will be used and to what extent.

For Design-Bid-Build or GMP projects, a separate BXP for Design and Construction shall be developed and submitted to UNC Charlotte with specific attention to model and data handover from the design team to the construction team to Facilities. If a Construction Team is involved during Design and information is available during the design phase, a single BXP can address both Design and Construction activities.

2.1 Design BXP (BXP-D)

The Design Team shall submit to UNC Charlotte their BXP-D before the start of schematic design or within thirty [30] days of contract award. Within fifteen (15) days of submission the BXP-D will be reviewed for approval by UNC Charlotte. BXP-D should identify the entire Design Team including all consulting engineers and specialty consultants, roles and responsibilities of the team(s), even if that party has not yet been identified, should be included in the BXP-D. The BXP-D will be a part of the final contract documents. A retainage shall be held from the designers for not submitting a BXP-D per the requirements.
At a minimum the BXP-D should contain:

- How BIM during the design phase will support the project delivery method
- Strategy for hosting, transfer, and access of metadata and file exchange between technical disciplines
- Proposed BIM software version to be used by each technical discipline team member
- Energy modeling strategies
- Project schedule aligned to BIM development
- Strategy for updating and coordinating changes during construction into the final model deliverables
- Means for incorporating RFIs, Change Orders and Clash Changes into the As-Built and/or Record Model(s)
- BIM Leads for all major disciplines (Architect, Civil, MEP, Structural, etc.)
- Use of UNC Charlotte's Revit Templates
- Inclusion of UNC Charlotte's 01 78 23 Division 01 Spec Section into the project manual
- Documentation of any proposed deviation from UNC Charlotte's BXP

2.2 Construction BXP (BXP-C)

The Construction Team shall submit to UNC Charlotte their BXP-C within thirty [30] days of contract award outlining the strategy and schedule for utilizing VDC/BIM Technology to execute construction related activities and project coordination. Within fifteen (15) days of submission the BXP-C will be reviewed for approval by UNC Charlotte. BXP-C should identify the entire Construction Team, subcontractors and specialty trades. Roles and responsibilities of the team(s), even if that party has not yet been identified, should be included in the BXP-C. The BXP-C will be a part of the final contract documents and to make this a collaborative process the Construction Team needs to involve the Design Team in their VDC workflow when creating their BEP-C. A retainage shall be held from the Contractor/CM for not submitting a BXP-C per the requirements.

At a minimum the BXP-C should contain:

- How the Construction BIM will support the project delivery activity
- Strategy for the Design BIM reuse
- Process for Co-Modeling or using a Construction Model if Contractor/CM uses a BIM authoring software
- Utilization of Third Party Vendors if constructability modeling is not performed by the Contractor/CM or

sub-trades

- Constructability and clash analysis with VDC/BIM
- Strategy for software compatibility, file formats, hosting, transfer, and access of data between trades
- Proposed trade coordination strategy and schedule (clash detection)
- Proposed use of digital fabrication and sub-trades using it
- Strategy for updating and coordinating changes during construction into the final model deliverables
- Utilization of 4D scheduling and construction sequencing technology
- Proposed BIM Software to be used by fabrication modelers
- Strategy to assure all trade information is modeled and coordinated
- Integration of construction changes and commissioning data into VDC/BIM
- Field BIM integration and data transfer strategy
- Means for incorporating RFI, Change Order and Clash Changes into the As-Built or Record Model(s)
- Documentation of any proposed deviation from UNC Charlotte's BXP

2.3 Information Exchange

UNC Charlotte's Capital Project and Facility Management Exchange is working to eliminate hard-copy drawings, DWG electronic files, boxes of specs and basic electronic documents turned over to the Owner at Close-Out. It is evolving into an ongoing information delivery exchange process integral with the entire Team. UNC Charlotte seeks to advance the quality, timeliness and cost- effectiveness of the collection, input and maintenance of that facility information. Further aiding this process is a deliverable standard that produces all design & construction documentation in a consistent format the Owner understands and receives on all projects. This electronic workspace is established for the purpose of efficient and timely exchange of documents, models and database files.

The UNC Charlotte will provide the Contractor/CM with a template file structure to populate all Record Documentation for the Owner during construction. This folder structure has a direct relationship to the Digital Management Exchange Guidelines outlined in the appendix. UNC Charlotte will utilize a cloud based document management process for collecting the required deliverables listed in the appendix.

--- END OF SECTION ---

Process Responsibilities

3.1 General Responsibilities

The AEC Team should involve the owner's key personnel as directed by the Capital Project Manager, such as the facility managers (FM), head of maintenance, and head of information technology (IT) and telecommunications systems to provide information during design and construction as needed. Their involvement should continue all the way through commissioning & closeout. Feedback from them will be helpful in understanding if the documents and data being developed meet the O&M needs and are compliant.

Documentation reviews at the end of all Design Phases will be performed paperless via a Bluebeam Studio Session set up by the UNC Charlotte Project Manager or the Architect or Record. This session does not require each participant to own a copy of the software and allows them to use a free viewer version to access and mark-up the file setup. All comments, markups, and suggestions for documentation and design changes should be made with this session as part of the contract. All markups need to be reviewed by each parties' respective lead prior to changes being made to the documents.

Tracking markups and/or comments during design or construction documents review:

Mark Color	Description
Black	Original Document
Red	Corrections to documents. Edits in this color provide direction for revisions, additions, or deletions to the documents that are to be included in the updated documents.
Blue	Notation from document editor. Edits in this color provide direction that are NOT to be specifically added or deleted from the documents.
Green	Questions from design team members picking up markups or comments back to the originator. This is to seek clarification or direction. (Note: utilize this work method only when comment originator is not available for immediate clarification)
Orange	Reviewers Acceptance to marks and comments in the document. This is for the Markups list color only
Yellow	Corrections to documents have been incorporated and design team has back checked their work. This can be highlighted in the document, but should also be added as a reply to the markup in the markups list.

During construction updated Documentation sheets and information should be made in accordance to the BXP-C and unincorporated markups and revised sheets will be transferred to the latest sheet. Only full sheets with bubbled changes should be issued during construction. This will provide a single collaborative and accurate way for the AEC Team and Owner to review and resolve changes and milestones. The BXP-C shall address whether the Design or Construction team maintains the Record Set in a Bluebeam Studio Session during construction.

3.2 VDC/BIM Leads

As part of the execution of the BXP-D and BXP-C, the Design and Construction Team shall assign an individual to the role of Design Team and Construction Team VDC/BIM Manager. The individual shall have sufficient BIM experience for the size and complexity of the project and shall have relevant proficiency in the proposed BIM authoring and coordination software. The individual shall serve as the main point of contact for UNC Charlotte and the Design/Construction Team for BIM related issues.

3.3 Consultant/Sub-trade Leads

All major design consultant/disciplines shall assign an individual to the role of Lead BIM Technician to coordinate their work with the entire Design/Construction Team. These individuals shall have the relevant BIM experience

required by the complexity of the project and should have, as a minimum, the following responsibilities for their discipline:

- Coordinate technical discipline BIM development, standards, data requirements as required in the BXPs
- Lead the technical discipline BIM team in its documentation and analysis efforts
- Validates the level of development and controls as defined for the project and trade
- Coordinate the inclusion Lifecycle Operations and Maintenance data for the BIM deliverables
- Coordinate clash detection and resolution activities

3.4 Pre-Design

Design Teams may use any method to begin the Planning and Pre-design process, but should consider moving to BIM authoring model(s) as soon as possible. Provide initial design based on conceptual parameters established by the UNC Charlotte; ensure that code and zoning requirements meet project objectives. A model may or may not take shape during the Pre-Design phase. If a model is created, its role will be to depict the visual concept and general layout of the project.

3.5 Schematic Design

UNC Charlotte encourages the Team to take advantage of data exchanges and/or validations with BIM early in Schematic Design, especially when it comes to Program and Space validation. Start providing spatial design based on input from the Pre- Design phase; provide initial design for building systems and attributes including architectural, structural, and MEP; identify initial coordination issues among building systems.
All information needed to describe the schematic design should be graphically or alphanumerically included in and derived from BIM by the end of Schematic Design. The Architectural model should show the general design and layout of the building structure and act as the baseline for all other subsystem designs, such as MEP and Structural models. The subsystem designs can be used to show the layout of building components with the combined model showing the spatial relationship of the Architectural model and subsystem design models. UNC Charlotte will require the design teams to upload their Schematic Design models to specified location for QA/QC checks. A retainage shall be held from the designers if requirements are not met and approval to proceed to the Design Development phase will be held up.

3.6 Design Development

Continued development of the BIM should commence with an increased LOD based on the Model Development Specification (MDS) and building systems. The model should now also include parametric links to enable automatic generation of all plans, sections, elevations, custom details and schedules as well as 3D views. During Design Development, in not before, the UNC Charlotte expects the Design Team to use analysis tools to analyze schedule, cost, constructability and start resolving coordination issues. The Architectural model should continue to act as the baseline for all other subsystem designs. The subsystem designs will be modified accordingly to represent the enhanced design. The combined Design model will continue to show the spatial relationship of the Architectural model and subsystem models. During Design Development and for the remainder of the Design Phase the Design Team is to use BIM for conflict checking and the coordination of individual and specialized Design models. The conflicts report should be developed and show any outstanding coordination issues between the Design Team members as resolved.

UNC Charlotte will require the design teams to upload their Design Development models to specified location for QA/QC checks. Items being checked will be use of the UNC Charlotte Revit Template, UNC Standards around Room and Equipment Naming, Finish and Equipment Scheduling, LOD and general model health checks. A retainage shall be held from the designers if requirements are not met and approval to proceed to the Construction Documents phase will be held up.

3.7 Construction Documents

During the Construction Document phase the design should be finalized for the building and all building systems

while preparing documentation for code review. All information needed to describe the "Contract Documents" shall be graphically or alphanumerically included in and derived from these models only, except for maybe the Specifications. Any inclusion of electronic specification integration into the model is welcomed, but not required, by UNC Charlotte. At this point no documentation of the models should happen outside of the BIM Authoring software. As described later in this VDC/BIM Requirement all model elements mentioned should be modeled and to their required LOD outlined in the MDS.

It is the Design Team's responsibility to conduct and manage an adequate and thorough Clash Detection process so that all major interferences between building components will have been detected and resolved at the completion of Construction Documents. A final report confirming this action should be issued to UNC Charlotte at the end of Construction Document phase. The goal here is to reduce the number of changes during construction due to major building interferences. After the final design clash report is issued UNC Charlotte will require the design teams to upload their Construction Document models to a specified location for the final QA/QC checks. A retainage shall be held from the designers if these requirements are not met leading into Agency Review and Preconstruction.

3.8 Agency Review

The Architect's BIM Manager will communicate agency comments back to the design team. The Consultants' BIM Managers will revise their design models accordingly and submit them back to the Architect. The Design models will all be revised based on agency feedback and finalized to reflect that feedback.

3.9 Preconstruction

If BIM can or is used during bidding, the use of BIM Standards should be announced and reviewed with potential bidders. The Contractor/CM shall have access to the Design BIMs during bidding as needed. The solicitation for bids will define the legal status of the BIM to the bidders by determining the Contract Record Document (the model(s) or the extracted 2D document set). Regardless of whether or not the Design model(s) are the Contract Record Documents, after a contract is awarded for construction the coordinated Design BIM and all native BIM files shall be provided to the appropriate Contractor/CM entities as needed.

3.10 Construction

The Design Team shall continue development of their BIM throughout construction in conjunction with the Contractor/CM based on submittals, RFIs, or owner-directed changes. Maintaining the model based on construction activities and coordinating all updates for the individual and specialized models and databases will insure completeness and accuracy of the overall project model. All information needed to describe the ongoing "detailed design" shall be graphically or alphanumerically included in and derived from these models only. Documentation of the models shall not happen outside of the BIM Authoring software.

By direction from the Design Team Lead the Consulting Engineers' models shall also be revised throughout construction based on submittals, RFIs, or owner-directed changes. The models shall always reflect the revised contract documents. At an agreed upon interval, and outlined in the BXP-C, during construction the updated design models shall be published in the approved collaboration format and posted for the Contractor/CM's coordination. If native authoring model files are needed by the Contractor/CM, separate copies of each technical disciplines model in the original format shall be provided.

Contractor/CM will have the Design Model(s) available at the start of construction to update and house data as established by the bid documents and specifications as necessary to support construction and UNC Charlotte's facility management objectives. Regardless of the Legal status of the model (Binding, Informational, Reference, Reuse), these electronic files are provided to the Contractor/CM solely for the uses related to this project. In the event of a conflict between the Contract Documents and the Electronic Model Files, the Contract Documents shall control, take precedence over, and govern the Electronic Files unless stated otherwise.

It is the Contractor/CM's responsibility to assure that all major trades are modeled and used for clash detection,

construction phasing, and installation coordination. Fabrication models shall be coordinated with the design model and any conflicts need to be made prior to fabrication and construction. Those conflicts shall be reported to the Design Team in the form of a Request for Information (RFI). Clash reports should be issued to UNC Charlotte and the Design Team by the Contractor/CM as background information for RFI's and constructability issues. Minor changes that have not been officially executed in the design models and that are considered As-Built changes will be documented by the Contractor/CM during construction. As listed in the BXP-C, those Mark-Ups shall be shared and coordinated with the Design Team so the changes can be incorporated into the Design model(s). All changes in the authoring software shall be published to the Contractor/CMs collaboration model to keep them stay up to date and accurate.

Methods for recording As-Built information are left to the discretion of the contractor. Potential options include traditional methods, and/or periodic laser scanning of completed or partially completed primary systems coordinated with the sequence of construction, 3D DWF markups that can be opened in the authoring BIM software or traditional electronic 2D redlines.

If the Contractor/CM uses Concurrent Construction Modeling in authoring software they should submit an action plan to UNC Charlotte and the Design Team for review prior to the start of construction that outlines the process for concurrent As-Built documentation and outline this process in the BXP-C. Per Section 01 78 23 of the project manual retainages will occur for not meeting the requirements listed for construction.

3.11 Commissioning

Commissioning data including but not limited to design intent, performance criteria and operations data shall be recorded in Electronic form within the described Field Management or UNC Charlotte approved application. Unlike traditional paper-based systems, an electronic application for mobile Commissioning can capture systems and equipment information electronically, right in the field, which saves time, reduces errors and develops Real-Time Data Capture. This should reduce the time required for commissioning, improve speed of re-commissioning and validate requirement or deliverables related to equipment issues or documentation. Dynamic reporting can show the statuses of all systems and equipment, enabling commissioning agents and other responsible parties to better manage project status and workflows. Commissioning requirements shall be coordinated with the LEED requirements of the project. It shall be the Contractor/CM and Commissioning Agents responsibility to coordinate the information sources and integrate this information through the electronic application into a format for transfer at the completion of the project, or before.

If Commissioning is to reside in the Contractor/CM's electronic platform the agents shall provide the Contractor/CM with their traditional documentation that would be used for Commissioning Construction Checklists, Pre-Commissioning, Functional Testing and any other documentation typically used by the agent. The Construction Manager/Contractor or UNC Charlotte will in turn create that documentation in an electronic version inside their system for Commissioning and Sub-trade coordination.

During the building commissioning processes, Facilities Operations (FO) staff shall be involved and coordinate through the Capital Projects PM to see how all building systems are designed to function and that they are being installed, balanced and verified to perform as designed. There should be an orientation and training program for FO staff to review the contents of the O&M manuals for major systems and equipment, including building mechanical, automation controls, plumbing, electrical, fire detection and protection, security, elevators, systems, etc. Any specialized training in building automation software should not be 'generic training' but should be performed using the actual project building graphics, controls sequences and data. All OMSI required documentation that are filed per the Digital Management Exchange Guidelines (DMEG) in the appendix should be reviewed for compliance by the Commissioning Agents.

--- END OF SECTION ---

Coordination & Collaboration

The success of a ILM enabled project is highly dependent upon the level at which the entire Design/Construction Team can communicate and work collaboratively for the duration of the project and with the UNC Charlotte. This section documents collaboration procedures for effectively managing this process.

4.1 Kickoff Orientation

Upon award of the project to the Contractor/CM, they shall facilitate a Project Kickoff Orientation Meeting, which will review all UNC Charlotte BIM and data requirements and answer questions from the Project Team. Both BXP's should be reviewed and coordinated while also reviewing the Primary Systems in BIM.

Primary Architectural Systems include, but may not be limited to:
Partition systems with structure, flooring systems, partition systems with bulkheads, partition systems with expansion control, vertical transportation systems with primary engineering systems, millwork and casework systems with power and data outlets, horizontal ceiling systems with window openings, bulkheads, partitions, lighting, fire protection and HVAC outlet locations, exterior skin systems with window openings, structure, roof edge conditions, parapets, roof penetrations, and equipment locations.

Primary Engineering Systems include, but may not be limited to:
Structural framing, primary HVAC duct runs, primary fire protection main runs, primary electrical conduits (2"+), ceiling grids layouts, primary data, audio visual, security and communication distribution systems (cable trays, etc.).

4.2 Consultants/Sub-trades

Prior to installation, the Contractor shall hold trade coordination meetings with subcontractors. The coordinated model will be used to review and optimize scheduling and field installation. Sub-trades should be expected to have individuals attend who can actively engage in the subcontractor coordination process and make schedule commitments.

This collaborative process is to ensure that the deep knowledge and associated efficiencies of the fabricator are embedded into the Construction Model(s). The following construction trades (at a minimum) should provide 3D fabrication models:

- Structural Steel
- Mechanical System Duct MEP subcontractors (incorporate vendor models if available)
- Curtain Wall
- Building Envelope Systems (rain screens, pre-cast panels, glazing systems)
- Casework and furniture systems
- Additional fabrication models generated by subcontractor

4.3 Clash Issues

Design Teams are required to perform internal coordination between disciplines to assure quality project document delivery. Contractor/CM is required to coordinate models between design team disciplines, subcontractors and specialty trades to perform clash detection in order to assure constructability and help reduce RFI and Change Order submissions before construction begins. Contractor/CM shall require subcontractors, fabricators, suppliers, and manufactures to submit all models to the contractor as outlined in the BXP-C. These model(s) should be updated after each project coordination meeting or as changes occur in the field during construction.

- On a multistory project, the models may need to be split on a level-by-level basis for MEP/F coordination. If a floor is particularly large, it may also need to be split by zones to reduce file size. Typically, 3D clash

detection/coordination continues on a single floor until building systems are fully coordinated, and then continues on the next floor up.

- The team shall review the model and the Clash Reports in coordination meetings outlined in the BXP-C
- Internal Clash Resolution – Design Consultants and Subcontractors who are responsible for multiple scopes of work are expected to coordinate the clashes between those scopes prior to providing those models to the BIM Manager for overall spatial and system coordination.
- Spatial Coordination Verification: Verification and tracking of resolved conflicts of all trade coordination issues which could result in change orders or field conflicts shall be provided to UNC Charlotte during project milestone dates, and should be fully resolved before build out.

Collision Reports

Collision reports can be published in a standard XML, HTML, or Text format. These reports shall include the following information at a minimum:

- Description of Collision Report
- Date of Collision Report Run
- List of all Collisions detected their status, and their proposed solution

Contractor/CM shall submit a Collision Report schedule to UNC Charlotte and Design Team as outlined in the BXP-C. Static Coordination Model files should be created at all critical coordination milestones; this model should be archived with the date of the Clash Report at each instance, providing a record document at this point and time during construction.

4.4 Field Management

Field Management applications and their connected web-based workflow for in field point-of-construction data solutions, Issues Tracking and Punchlist are to be utilized by the Contractor/CM in conjunction with the Design Team, Sub-trades and UNC Charlotte for project coordination and data entry. Linked documents, photographs and model data between BIM and the Field Management application can be utilized to collaborate during construction and in preparation for data exchange to UNC Charlotte. Commissioning tests and checks, as-installed data, O&M manuals and start-up procedures are some the items the Field Management application can be used to track, test and validate during construction. UNC Charlotte highly recommends utilizing BIM 360 Filed for the Equipment Asset Registry and minimum by the Contractor/CM.

--- END OF SECTION ---

5.1 Authoring Software

All architects, engineers, and specialty consultants are required to use the following design authoring software. Projects will remain on the same software release throughout the life of the project unless approved by the entire team and University. This should be outlined and coordinated in the BXP-D and BXP-C for the University to review.

- Autodesk Revit
- AutoCAD MEP* (on the trade side only if necessary due to fabrication, equipment naming and tagging must be carried over from the original model)

Architectural Models – These Autodesk Revit (.rvt) Model(s) are Central Revit Files with Worksets enabled. The Architecture Model file (.rvt) contains all architectural features for a building and all state and local codes and laws must be followed. If there will be more than one Architectural and/or Interior models please outline and describe in the BXP-D.

Structural Model – These Autodesk Revit (.rvt) Model(s) are Central Revit Files with Worksets enabled.. The Structure (.rvt) model contains all structural features for a building and all state and local codes and laws must be followed.

Mechanical, Electrical, and Plumbing Model – These Autodesk Revit (.rvt) Model(s) are Central Revit Files with Worksets enabled. The MEP file or files (.rvt) contain all MEP features for a building and all state and local codes and laws must be followed.

Life Safety and Fire Protection – These Autodesk Revit (.rvt) Model(s) are Central Revit Files with Worksets enabled. The Life Safety and Fire Protection (.rvt) model file contains all special system features for a building and all state and local codes and laws must be followed.

*AutoCAD MEP and propriety software add-ons are welcomed to develop, coordinate and fabricate the project. Where modeling for coordination and constructability is done outside of Revit or recreated as an entirely new model, all the Equipment, System and Zone Naming conventions developed in the Design model must be ported over to these models for data integrity and reliability. Changes made in these platforms; be it placement, geometry or metadata, must make its way back into the original authoring software model and Record Model.

5.2 Coordination Software

Coordination software shall be used for assembling the various design models to electronically identify, collectively coordinate resolutions, and track and publish interference reports between all disciplines. The technical disciplines shall be responsible for updating their models to reflect the coordinated resolution. All internal and external model coordination and conflict detection are required to use the following software in its native file format in its current version. Confirm version with UNC Charlotte in the BXP-C for the project.

- Autodesk Navisworks Manage
- Autodesk BIM 360 Glue (optional)

5.3 Field Asset Management

A Secure, cloud-based, web and mobile Field Asset Management application that delivers a complete field management solution shall be used. This system will electronically enable workflows for quality, commissioning and document management processes in the field and in the office; proven to reduce rework, delays and eliminate paper. Modules required by the UNC Charlotte on their projects are Issues, Punch-List, Commissioning and Equipment Tracking. BIM 360 Field is an example of a Field Management software that UNC Charlotte currently

integrates with their IWMS and would suggest Contractors/CMs use.

- Autodesk BIM 360 Field

5.4 Additional BIM Tools

The Design and Construction Teams are encouraged to explore options to use the BIM and other electronic tools to enhance the project quality and delivery times, including quantity take-offs, cost estimating, overall project scheduling, subcontractor coordination and manpower loading, off-site fabrication, and other widely discussed BIM benefits. UNC Charlotte is interested in fostering and supporting innovation, and encourages bold steps toward trying new ways to improve business process efficiency, design, and project outcomes.

Following are some of the discretionary areas that UNC Charlotte may support for further development and the use of BIM; other ideas may also be proposed by the AEC Teams:

- 5D – Material take-offs & cost estimating
- Integrating information, e.g., electronic specifications that are tied to the BIM
- Achieving automated code checking
- Repeatable pre-fabrication components to speed construction erection time
- Off-site fabrication

Virtual Mockups

The contractor may want to utilize this process in which software is used to design and analyze the construction of a complex building system (e.g. curtain wall, form work, design element, tie-backs, etc.) in order to increase awareness and planning. Any physical mock-ups that need Owner approval can first be developed virtually, but without written approved authorization the Virtual Mockups cannot be supplemented for the Physical Mockups per the specifications.

Energy Requirements

The Design Team shall work with UNC Charlotte to establish project specific energy goals and energy use targets. The Design Team may also establish an energy modeling method including local weather data within the BXP-D that will details how energy modeling will be accomplished for the project.

Potential software to perform the energy modeling for the project may be:

- Insight 360
- Sefaira
- eQuest

--- END OF SECTION ---

Model Format & Data Collection

The models shall consist of objects and elements that represent the actual dimensions of the building elements and the building equipment that will be installed on the project. Before modeling begins, the BIM Manager will work with the Design Team to develop the model and model view extraction structure for all the construction document files to assure coordination between disciplines. This structure shall be provided to UNC Charlotte so that the models can be reconstructed at a later date. BIM coordination requires the following model structure and features:

- The BIM Manager shall establish the floor elevation protocol so that the Technical Discipline/Trade BIMs will be modeled at the correct elevation.
- Clearance Reservations: All models shall include required clearances for all mechanical equipment for repair, maintenance, and replacement, light fixture access, overhead cable tray access, etc.
- All 3D model files submitted for clash detection shall be "clean;" all extraneous 2D references and/or 3d elements must be stripped from the model files.
- Revit deliverables should not have imported or linked 2D AutoCAD files associated with them.

6.1 General Requirement

6.1.1 Origin Point

All models must be in the correct location in 3D Space (x, y, and z coordinates). Models should be inserted by Auto-Origin to Origin. All models should contain their own grids and levels as a QC method to assure correct location. The correct insertion point is critical and ensures that each model will align properly without modification when linking and coordinating.

6.1.2 Tolerances

Model(s) must be within construction tolerances of the element in question – use 1/16" if unsure. Tolerances for specific items and systems will be determined as necessary. Set precision to 1/256". Globally set the precision to 1/256" and look for odd dimensions, the intent is to model at the highest accuracy as not to start out with errors built in.

6.2 Model Structure

All elements of the building must be coordinated into one file and should be modeled by their specific trade.

Examples:

- Architectural models should not include any of the structural elements contained in the structural model.
- Lights should be modeled by the electrical engineer, and not be the architect
- Plumbing Fixtures should be modeled by the plumbing engineer, and not the architect
- Architectural ceilings should contain information for openings for lights, registers, etc. as required by design
- All models should include 3D representations of required clearances and/or access requirements for equipment

Models will be separated by the following disciplines for design and construction coordination by all project participants throughout the construction process.

- Architectural -Deliverable-
- Mechanical -Deliverable- (This may coordinated into a single MEP model)
- Electrical -Deliverable- (This may coordinated into a single MEP model)
- Plumbing -Deliverable- (This may coordinated into a single MEP model)
- Structural -Deliverable-

- Construction Based on Contractor/CM authoring capabilities
- Coordination Required during Construction, only Clash Reports are a required deliverable.
- As-Built -Deliverable-
- Record -Deliverable-

6.3 File Naming

Model deliverables should have a file name that consists of three [3] distinct sections delineated by the following format: Facility ID _Discipline _Published Date.xxx

Uploaded Copy after each Design Phase:

Architectural Design Model(s)	Facility ID_ARCH_YYYYMMDD.rvt
Interiors/Furniture Design Model(s)	Facility ID_FURN or INTR_YYYYMMDD.rvt
MEP Design Model(s)	Facility ID _MEP or [DISCIPLINE]_YYYYMMDD.rvt
Structural Design Model(s)	Facility ID_STRL_YYYYMMDD.rvt
Life Safety and Fire Protection	Facility ID_LSFP_YYYYMMDD.rvt

Final As-Built Model:

As-Built	Facility ID _AsBuilt_YYYYMMDD.nwd

Final Record Model:

Architectural Model(s)	Facility ID_ARCH_YYYYMMDD.rvt
Interiors/Furniture Model(s)	Facility ID_FURN or INTR_YYYYMMDD.rvt
MEP Model(s)	Facility ID _MEP or [DISCIPLINE]_YYYYMMDD.rvt
Structural Model(s)	Facility ID_STRL_YYYYMMDD.rvt
Life Safety and Fire Protection	Facility ID_LSFP_YYYYMMDD.rvt

6.4 Data Modeling Requirements

6.4.1 Room Name & Numbers

Use the Room Numbering convention provided by the UNC Charlotte for all new construction projects, coordinate existing Room Numbers with UNC Charlotte for renovation projects. This system provides a consistent method for identifying and managing building space and shall be adhered to unless approval is documented in writing by the UNC Charlotte. Workstations in Open Office areas need to have a Room Number associated with them, do not tag the Workstation with a Furniture Tag. Use the Room Separation Line Rectangle tool to create the Rooms based on the inside faces of the Workstation. Coordinate the Areas in the Schedule to confirm all Workstations of the same size have the same Area. This Room Numbering structure will be reviewed and approved at the end of Design Development and cannot be changed without written approval from both Capital Projects and FO at UNC Charlotte.

The Room Numbers shall be assigned to the Room Number Parameter in Revit for each individual Room or Space. This process gives the space a Unique Identifier understood by the UNC Charlotte while also allowing the developed space to be connected to complex space standards and regulations inside the UNC Charlotte's IWMS once connected. This serves as the Primary Connecter for Room Data between Revit and the IWMS. Every building is unique so if questions arise about Room Numbers, i.e. when Corridors should change name, review these areas with the Facilities Team to coordinate their current process for the IWMS.

6.4.2 Room Finishes

Using the UNC Charlotte Revit Template a base Room Finish Schedule has been prepared so finishes can be tracked at the individual Room. This will provide detailed metadata to UNC Charlotte's Facilities Maintenance software on the type of finishes used in each Room. The means in which the design team populates this schedule is up to them, but the finish data required per the template must end up residing at the Room level as

well as an schedule produced in the documentation process.

Built in Revit Finishes should be used for the Room Finish Material for Floor, Base, Wall and Ceiling. Additionally the Finish Code, Color and Manufacturer need to be filled in for each Room as well as the Ceiling Height.

6.4.3 Room Category

All Rooms are assigned a Room Category per the University, you can find these listed in *Exhibit 1-Room Assets*. An additional Shared Parameter of Room Category will be assigned to Rooms and will be available once transferring the Project Standards from the *UNCC ARCHIBUS Shared Parameters File Template*. Populate this field when placing a Room with the Category assigned to that Room Type per the Exhibit provided in this document.

6.4.4 Occupancy

UNC Charlotte has two fields relating to Occupancy they would like populated. The first one being the Standard Room field of "Occupancy" which is the maximum number allowed per code. Second is the additional "Fixed Occupancy" field for those spaces that have fixed seating or built in work stations within the space.

6.4.5 Area Calculation

UNC Charlotte has a fundamental method of measuring Room Square Footage that synchronizes in a practical way with their IWMS. The Area bound by the inside faces of surrounding walls, minus the area bound by the outside faces of contained full height columns will be the net area of a space. Revit should automatically delineate this based on the footprint of surrounding walls.

6.4.5 Equipment Category

All UNC Charlotte defined Equipment Assets should be assigned one of seven available Equipment Categories in the MEP Design Model, you can find these listed in *Exhibit 4-Equipment Assets*. A Shared Parameter field for Equipment Category will be assigned to MEP Equipment and will be available once transferring the Project Standards from the *UNC_C VDC-BIM Lifecycle Revit Template*. Populate this field when placing a piece of Equipment in the Design Model with the Standards provided in the attached Exhibit.

6.4.6 Equipment Type

All UNC Charlotte defined Equipment Assets should be assigned an Equipment Type at the Family Level in the MEP Design Model, you can find these listed in *Exhibit 4-Equipment Assets*.

6.4.7 **Equipment ID** (Unique Project ID)

Developing Asset Management during Design aids during Construction and UNC Charlotte in more efficient maintenance and operation procedures of a facility. By having data in the model early, it allows the FM team to start planning for building start up and tracking of building operations instead of spending time doing data entry or trying to find O&M documentation.

Each individual piece of building equipment shall include the following attributes and be maintained throughout Design and Construction. The Mark field in Revit serves as the Projects Unique Identifier and is a derivative of UNC Charlotte's Portfolio based Equipment Code. Those associated equipment tags shown on the documents lend a relationship to metadata collected elsewhere in the VDC process. The Equipment Code will serve as the Primary Connecter for Equipment Data between Revit and UNC Charlotte's IWMS and is to be authored in the model during Design when the equipment is placed. Those Equipment Codes can be found in *Exhibit 4-Equipment Assets*.

6.4.8 **Equipment Code** (Unique Portfolio ID)

All UNC Charlotte defined Equipment Assets are to be assigned an Equipment Code in the MEP Design Model,

you can find these listed in *Exhibit 4-Equipment Assets*. A Shared Parameter field for Equipment Code will be assigned to MEP Equipment and will be available once transferring the Project Standards from the *UNC_C VDC-BIM Lifecycle Revit Template*. Populate this field when placing a piece of Equipment in the Design Model with the Standards provided in the attached Exhibit.

Using the UNC Charlotte Revit Template a base Equipment Schedule has been prepared so all Equipment can be tracked in a single schedule for QA/QC purposes. This provides metadata to UNC Charlotte's Facilities Maintenance software using its required data structures. Data developed from items 6.4.5-6.4.7 are tracked in that boiler plate schedule.

6.4.9 Equipment Standard

After or during the equipment submittal process all UNC Charlotte defined Equipment Assets are to be assigned an Equipment Standard during construction in the Field Equipment Registry software, you can find the data structure description in *Exhibit 4-Equipment Assets*. The Equipment Standard is driven from the portfolio level, these are multiple quantities of like Equipment Components. The Equipment Standard is associated at the Category, Manufacturer and Model Number level allowing for bulk look-up or updates to equipment data.

6.4.10 CSI MasterFormat Number

All Equipment in the MEP Design Model is to be assigned its equivalent MasterFormat Level 3, and when available Lever 4, CSI Number. An additional Shared Parameter for CSI Number will be assigned to MEP Equipment and will be available once transferring the Project Standards from the *UNC_C VDC-BIM Lifecycle Revit Template*. Populate these fields when placing a piece of Equipment in the Design Model with the appropriate number.

6.4.10 Doors

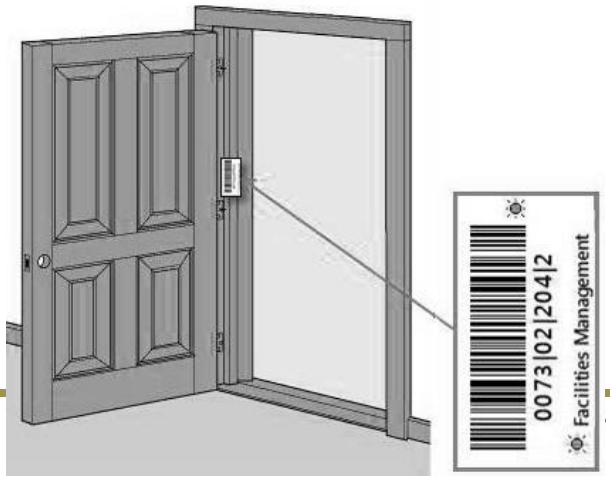
Door types are to be created to accurately reflect each kind of door in regards to type, size and information. The door symbol is a result of the view that is created from the model. Because of this, 3-D doors shall be used throughout the construction documents process and be built into the door schedule and parameters. Each door is also to receive a barcode over the second (middle) hinge of each door frame.

Door Details Tracked in Model During Design

- Door Number (Mark)
- Door Width
- Door Height
- Door Thickness
- Door Hand (Shared Parameter)
- Door Material
- Frame Material
- Frame Type
- Fire Rating
- Side Light or Transom
- Emergency Egress
- Hardware Code (Shared Parameter)

Door Details Tracked During Construction

- Interior or Exterior
- Lock Brand
- Lock Design
- Lock Finish



- Lock Back Set
- Cylinder Brand
- Cylinder Part Number
- Cylinder Material
- Cylinder Finish

Barcode information:

- Example barcode ID: 0055|02|232|A
- ID Breakdown: Building ID|Floor ID|Room ID|Door ID
- Barcodes are to face the door they are associated with.
- Doors are associated with Rooms by the following rules:
    - The lock faces opposite of the room that the door is associated with. Example: When you unlock a room 120 from hallway 100, the door is associated to room 120.
    - If panic hardware is installed on a door then the direction the panic hardware is facing is the room the door is associated to.
    - In the instance of a corridor where both doors swing in either direction, it's the discretion of the installer to decide which room the doors are associated with.

6.4.11 Wall Partitions

A different Partition type is to be created for each type of wall used in the project per UNC Charlotte approval and constructed in 3-dimensional form. These will based on University standards opposed to project standards. The Fire Rating, Fire Rating UL# and STC Rating # all need to be Parameters associated with each Partition type.

Partition Type Mark/Tag Example: G5a

G=Partition Type
5=Sequence Number
a=Fire/Smoke Rating

Partition Types:
C = Concrete
E = Exterior
S = Shaft
F = Furring
G = Gypsum
D = Demountable

Fire Ratings:
G5 = No Rating
G5a = Smoke Rated
G5b = 1 Hour Fire Rating
G5c = 1 Hour Fire and Smoke Rated
G5d = 2 Hour Fire Rated
*Continue progression as needed above 2 hours+.

6.5 Types of Model Elements

Model elements should be derived from inherent Parameters and specific Shared Parameters for Room and Equipment. The Spared Parameters will be issued by the UNC Charlotte via a Revit Template file so those Instance Parameters can be transferred to the Design and Construction models. Facilities Data will need to be entered into these fields during Design and Construction and eventually be passed to the Record Model. These Shared Parameters will exist at the Instance Level, not the Family Level. So if data requested by the UNC Charlotte exist at the Family Level for the Manufacture's Elements or Custom Elements, that metadata will have to be duplicated at the Instance Level as well. Please refer to the attached Exhibits for the Shared Parameter fields being added.

- Manufacturer's Model Elements - elements created by and acquired from manufacturers often have more information than is prudent to keep in the model; the *appropriate* level of detail should be retained for the design element. However, embedded performance data shall remain for analysis and specification purposes.
- Custom Created Model Elements - custom model elements that are created must utilize appropriate BIM Authoring tool templates to create custom elements. Custom models components need to be assigned as a part and part of a family or group.

6.6 Model Systems and Components

- BIM shall be used for all building systems design, development, and analysis, including but not limited to architectural, structural, mechanical, electrical, plumbing, and fire suppression, etc.
- During Concepts, SD and DD Phases, BIM technology shall be used to develop and establish building performance and the basis of design in accordance with UNC Charlotte standards.
- Elements, objects and equipment shall be tagged with unique identifiers (GUIDs).

6.6.1 Architectural Systems

Model the following architectural elements to a level that defines the design intent and accurately represents the design solution.

- Architectural Site plan
- Exterior wall systems
- Interior wall systems
- Fire rated walls
- Architectural floor slabs
- Roofing systems
- Equipment including owner provided equipment
- Reflected ceiling plans
- Vertical circulation – including elevators, stairs, escalators, and railings
- Doors and door frames
- Glazing – windows, interior glazing, curtain wall, and storefront
- Millwork and casework
- Finishes – Including all room paint codes, flooring codes, and other finish items
- Toilets and accessories
- Toilet Partitions
- Specialties
- Must meet BOMA Standards
- Furnishings, fixtures, and equipment if not provided by others and integrated into the architectural model for coordination and document generation.
- Specialty equipment (food service, etc)
- Clearance zones for access, door swings, service space requirements, gauge reading, and other operational clearance must be modeled and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

6.6.2 Structural Systems

Model the following structural elements.

- Foundations, including foundation walls
- Columns, beams, and joists
- Column grid
- Load bearing structural walls
- Brace frames and shear walls
- Structural slab

- Specialties
- Misc. structural components.
- Miscellaneous Steel
  - Angles for openings, deck bearing, etc.
  - Channels for mechanical units coordinating between mechanical
  - Lintels (unless considered a major member)
- These items may be modeled at the Design Team's option:
  - Steel reinforcing in concrete
  - Embeds in concrete

6.6.3 HVAC Systems

Model the following HVAC elements at a minimum. Model all HVAC components into Supply Air, Return Air and Exhaust Air Systems. Create Zones and assign all Rooms served to its corresponding Zone.

Systems should be named as followed: Category-System-Component, i.e. HVAC-SupplyAir-AHU1
Zones should be named as followed: Equipment Type-Rooms in Zone, i.e. VAV1-100,102,103

- Equipment
  - Fans, VAV's, compressors, chillers, cooling towers, air handlers etc.
- Distribution
  - Supply, return, exhaust, relief and outside air ductwork modeled to outside face dimension or duct insulation (whichever is greater)
  - Duct Joints
  - Diffusers, grilles, louvers, hoods, radiant panels, perimeter units, wall units
- Pipes sized at and over 2" diameter, include any insulation in model
- Clearance zones for access, door swings, service space requirements, gauge reading, and other operational clearance must be modeled as part of the HVAC equipment and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

6.6.4 Electrical systems

Model the following electrical elements at a minimum. Model all Electrical components into Lighting, Power, Telecommunications and Fire Alarm Systems.

- Power and Telecommunications
  - Interior and exterior transformers, emergency generators, and other equipment
  - Main and distribution panels and switchgear including access clearances
  - Main IDF's
  - Feeders and conduit at and over 2"diameter, and all large conduit bundles
  - Outlets, Switches, Junction Boxes
- Light Fixtures
- Lighting Controls
- Fire Alarm and Security Systems
  - Input devices
  - Notification devices
  - Associated equipment and access clearances
  - Permanently mounted fixtures
- Building Controls
- Clearance zones for access, door swings, service space requirements, gauge reading, valve clearances and other operational clearance must be modeled as part of the electrical

equipment for collision checking. These clearance zones should be modeled as invisible solids within the object.

6.6.5 Plumbing and Fire Protection Systems

Model all Plumbing components into Domestic Hot Water, Domestic Cold Water, Sanitary and Sprinkler Systems. Sprinkler Systems are divided into multiple styles of suppression, these suppression systems must be identified.

- Model the following plumbing and fire protection elements at a minimum.
- Waste and Vent Piping sized at and over 2" diameter, includes any insulation in model
- Roof and floor drains, leaders, sumps, grease interceptors, tanks, water treatments and other major items.
- Supply Piping sized at and over 1½"diameter, includes any insulation in model.
- Domestic Booster Pumps
- Fixtures (sinks, toilet fixtures, water tanks, floor sinks, etc.)
- Fire protection Sprinkler lines at and over 1"diameter
- Sprinkler heads, Fire Protection Pumps
- Stand pipes, wall hydrants, fire department connections, risers, including valve clearances
- Clearance zones for access, service space requirements, gauge reading, valve clearances and other operational clearance must be modeled as part of the plumbing and fire protections system and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

6.6.6 Specialty Consultants

- Specified or provided equipment by consultants should be outlined in the BXP-C.
- If questionable, pose to UNC Charlotte for further direction.

6.6.7 Civil & Site

- Grading, contours (proposed and existing), site structures to nominal dimensions, all new utilities will be modeled.
- Existing utilities and points of connection, only as applicable and available from existing owner as-built information. Include all structures and utilities to be demolished.
- Pads and other accommodations for buildings will be modeled. Floor slabs, decks and other structural surfaces will be modeled by the architecture team.
- Landscape items, benches, etc. will be modeled by the architecture team to the extent that they are required for overall project coordination.

6.7 Construction Modeling

6.7.1 Construction Model

Objective: Construction Models are the models being developed during construction in an authoring software package by the Contractor/CM and/or Sub-trades. Depending on the Contractor/CM and the BXP-C, model authoring by the Contractor/CM may not occur, but is required by the Sub-trades for coordination. Any Construction Modeling should reflect the exact geometric properties of the materials and/or systems being submitted. In addition to the items mentioned in Section 7 these models could include fabrication, shop drawing and other models for coordination. Once federated with all the Design, Construction, Sub-trade, etc. models this is to be referred to as the Coordination Model.

Responsibilities: The Contractor/CM's BIM Manager will work with the Design Team and Sub-trades to

answer the RFIs and submittals and adjust the Construction Models accordingly while also using it for constructability analysis. If so determined in the BXP-C the Contractor/CM's Construction Model may replace the Architect's Design model during construction and within the Coordination Model. Sub-trade models are to be analyzed based on the Design and be incorporated into the Coordination Model.

6.7.2 Coordination (Federated) Model

Objectives: Update Coordination based on submittals, RFIs, or owner-directed changes; maintaining the model during construction based on construction activities and developed to reflect the actual fabrication of the building. These models are to include fabrication, shop drawing and other models developed during coordination and constructability reviews. The model is to always reflect the revised contract documents and can be used for scheduling analysis, construction sequencing if so desired.

Trade Constructability/Coordination Colors:

HVAC Pipe: Lime Green	Electrical: Cyan
Lights: Yellow	HVAC Duct: Blue
Fire Sprinklers: Red	Plumbing: Magenta
Ceilings: Orange	Framing: Purple
Steel: Maroon	Concrete: Gray

Responsibilities: The Architect's BIM Manager will work with the Architect's Consultants to answer the RFIs and submittals and adjust the Design model accordingly. The Contractor's BIM Manager will update this model throughout construction with supplier and sub-trade models.

6.7.3 As-Built (Federated) Model

Objectives: The As-Built model serves as the final model based on updated Coordination models including all field changes and data requirements and represents the actual assembly of the building. These models will be issued per floor of the building at the close of construction as both a Naviworks NWD file and PDF file.

Responsibilities: The Contractor/CM's BIM Manager will work with all Consultants and Sub-trades to finalize this Coordination Model into an As-Built model. The success of an As-Built BIM is highly dependent upon the level at which the entire Design/Construction Team communicate, share and work collaboratively for the duration of construction.

6.7.4 Record Model

Objective: Model in the original authoring software format containing all Contractual and As-Built conditions used to depict an accurate representation of the physical conditions, environment, and assets of a facility. The Record Model contains information relating to the main architectural, structural, and MEP elements, coordinated to match that of the As-Built model conditions as well as the Sub-trade models. It is the culmination of the BIM process for the project including As-Built conditions back into the Authoring Software Platform for use by the Owner and Facility Management Team.

Responsibilities: The Contractor/CM is responsible for providing UNC Charlotte this Record Model deliverable. These Revit RVT file model is to be delivered to the University within 90 days of Substantial Completion.

6.8 Level of Development

UNC Charlotte intends to make final deliverable building information models available for integration into a Lifecycle Management solution. In order to meet that objective, it is important that the UNC Charlotte's model

delivered in the LOD specified in the MDS.

UNC Charlotte' welcomes the use of the Level of Development for BIM deliverables as defined by the 2016 Level of Development Specification by BIM Forum. As UNC Charlotte specific information will be added to the Design and Construction Models, the Record Model will consist of many LOD 350 components. This number refers to a LOD 300 for those items defined in the MDS and delivered at the Construction Document Phase. The 50 represents the more specific supplemental equipment and facilities metadata and As-Built construction changes that may have been or need to be included in the Record Model. Supplemental metadata during construction may have to be authored directly into the model or via the Field Asset Management application defined in this scope. The Contractor/CM shale coordinate this process with UNC Charlotte in the BXP-C.

During Construction and Coordination modeling the Contractor/CM and Sub-trades should use LOD 400 on elements requiring a high level of spatial coordination or constructability review.

6.9 Model Quality

Discussions regarding processes and best practices to ensure Quality should be reviewed at the Kickoff Orientation as a project team. At project milestones mentioned earlier in the these requirements the model and metadata will be reviewed to confirm that each model and its corresponding metadata/documents are being developed in accordance with the UNC Charlotte's intended use. The goal is to support each team member and verify that the processes are being followed throughout the timeline of the project, that there are no unresolved issues during construction and that there are no issues that may result in a significant loss of metadata upon exchange of information.

The Team shall establish and use in-house modeling quality control guidelines and exchange protocols. Good BIM practices may include but are not limited to:

- Use of element and component objects that embed the best practices of the firm.
- Maintenance of parametric linkages within the model at all times.
- Dynamic Search Sets as opposed to Static Selection Sets
- Use of UNC Charlotte defined nomenclature from the Equipment Standards Matrix.
- Use appropriate and interoperable viewing, checking, and output file formats.
- Review of a random 15% of model components, metadata and documentation for compliance.

UNC Charlotte will provide Issue Reports back to the Design and Construction Teams when variations or incorrect modeling and/or data collection procedures are not followed per these requirements.

--- END OF SECTION ---

7.1 Integrated Workplace Management System (IWMS)

The CAFM portion of the application helps UNC Charlotte improve space efficiency and evaluate the true costs associated with space usage. The reports resulting from a space management analysis will reveal how each square foot of space is being allocated which can enable a highly granular chargeback process. This can, in turn, improve reimbursement rates from third parties who require accurate and defensible space allocation and occupancy reports. With Space Management, organizations can easily satisfy these needs and better plan for current and future space needs across the organization.

The CMMS portion of the application allows them to cost-effectively manage on demand or preventive maintenance (PM), improve internal and outsourced service provider performance, and simplifies forecasting and budgeting. Building Operations Management puts all of those capabilities—and more—easily within reach so the organization may gain more control over their workload instead of allowing it to manage them.

UNC Charlotte intends to integrate the final deliverable Record Model into a Lifecycle Management solution. In order to meet that objective, it is important that the data guidelines presented in this document be followed so they can be validated by the Owners IWMS. The integration of the Record BIM data into an IWMS is critical to UNC Charlotte's O&M procedures. Electronic data already in the model allows the FM team to start planning for building start up and tracking building operations; instead of spending time "catching-up" with data entry after taking control of the building. Any additional BIM advice or data collection opportunities that the AEC Team might be aware of or can be provided during the process are welcomed.

7.2 IWMS Construction Data Collection

Field Asset Management applications enable users to leverage Equipment and their attributes (i.e. name, type and manufacturer) as well as UNC Charlotte driven attributes. Using a mobile device in the field as well as web-based applications that are dynamically updated as work and operations progress all the entire team to review the project at any time. End users do not even need to see the BIM while entering data as part of this workflow.

Equipment related metadata should be uploaded to the Field Asset Application as made available during construction so the information can be reviewed by the AEC Team, Cx Team Members and the Owner's Facilities Maintenance team. The purpose is to create a more collaborative team approach and to collect equipment data and documentation throughout construction, not just at the end of the project. Metadata within the Field Asset Application is to be utilized to manage equipment during construction in preparation for Lifecycle Management. These documents and metadata inside the Field Asset Application can then be mapped to UNC Charlotte's IWMS for Lifecycle Management and Operations and Maintenance creating a Real-Time Data Collection Process.

Tracking of the materials and equipment are identified within the attached Exhibit, these assets have components and metadata to be tracked across all stages of the construction process. The Contractor/CM will be responsible for coordinating with the Owner and any other Consultants to ensure all custom metadata fields needed for Facilities O&M metadata are produced per these requirements. The QA/QC of models and metadata as well as the metadata mapping integrations is the responsibility UNC Charlotte.

Tracking electronic information by barcoding is part of UNC Charlotte's business and usual process and they are now extending that to the Construction and VDC process as well. Using Owner supplied barcodes the AEC Team is required to track materials and assets with the Field Asset Management Application throughout installation and into building handover. By attaching barcodes to the Equipment Assets, the team will track and update the progress and metadata of these components and can directly access information about the asset. This process further prepares the database for Lifecycle Management tracking for UNC Charlotte.

Barcoding Requirements

The proper scheduling and association during the construction project is key to a successful process of allowing the barcode to be utilized in all phases of construction as well as O&M. Two areas of importance to focus on throughout the process is the individual placement of the tag and when the association with the tag begins. This process can start as early as with the manufacture at fabrication and shipping, but we are looking at that level with our projects. So from a timing and speed standpoint using a generic barcode installed during the asset's installation has rewarded the best ROI. A member of that same Trade Partners team or someone from the CM/GC team can then come though and quickly associate the barcode to the asset record, and/or model and collect additional information required. A good validation review during this process is for the Commissioning Agent to review when checking and commissioning the equipment.

A team meeting to review a label location standard for equipment is recommended because multiple people from the Trade Partner or CM/GC may be applying these labels. Without such standards each individual will determine what they think is best, leaving the owner to figure out that logic and search for labels each time they approach a piece of equipment. One universal standard set by UNC Charlotte is to not install the barcode label on a cover plate or any other type of removable cover. During construction and O&M, removable plates get lost, relocated and switched out, leaving an asset with no label or a label from another similar piece of equipment.

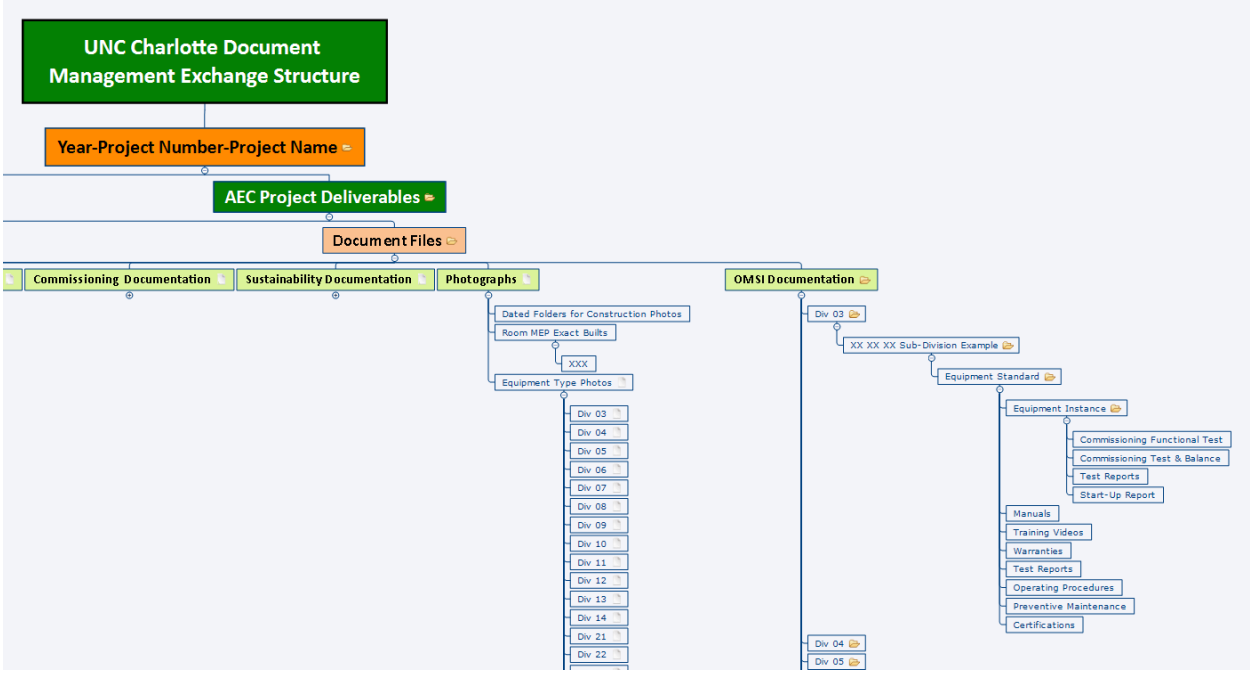
On a monthly basis, at minimum, the Contractor/CM shall include UNC Charlotte and all BIM Managers in a coordination established for the purpose of assessing and/or executing FM data reviews and/or transfers from the construction process. Data transfers shall be coordinated with the Owner representative and the BIM Managers (when feasible) and be based on the FM objectives as defined. The Contractor/CM will be responsible for coordinating with the UNC Charlotte to ensure all custom metadata fields needed for Facilities O&M data are produced in the Field Asset Management Application. It will be UNC Charlotte's responsibility to integrate systems so that metadata is transferred to UNC Charlotte's IWMS and the attached asset documentation to the DMEG.

--- END OF SECTION ---

Digital Management Exchange Guidelines

A Digital Management Exchange shall be established for the purpose of efficient and timely transfer of model, metadata and document files in an electronic process. Also reference the 01 78 23 Spec Section in the Project Manual for additional information. UNC Charlotte's Capital Projects deliverables have advanced beyond hard copy deliverables. UNC Charlotte seeks to advance the quality, timeliness and cost- effectiveness of the collection, input and maintenance of the facility information and be as paperless as possible in doing so. Further aiding this process is a deliverable standard that produces all design & construction documentation in a consistent format the Owner understands and receives on all projects. This electronic workspace is established for the purpose of efficient and timely transfer of information and standard structure for deliverables to reside. The Contractor/CM is to obtain, file and store this data from the entire AEC Team based on UNC Charlotte's giving structure. For this process UNC Charlotte will leverage a Cloud based platform for the design and construction team to file electronic documents per the DMEG. The contractor will have full administrative access to this cloud based project for their team and UNC Charlotte will only have read-only capabilities until building handover. If the contractor would like to leverage their own Cloud based document management tool they will need to request this exception in their BXP-C. If so granted UNC Charlotte will provide the Contractor/CM with a template folder structure for the document exchange process. This folder structure has a direct relationship to the DMEG and should be exchanged with UNC Charlotte at the close of the project based on the process agreed on by the Contractor/CM and Owner outlined in the BXP-C.

2D documentation for the purposes of assembling a design or construction set shall be derived from the models. All BIM information shall be fully parametric so that all applicable information regarding fixtures and/or elements can be generated for the schedules. Also refer to *Exhibit 7-Digital Management Exchange Guidelines*.



(Exert from the DMEG Folder Structure)

--- END OF SECTION ---

Waivers

Situations could arise where adherence to this standard may be problematic. If such a situation arises, the party creating the data must request a waiver. UNC Charlotte will entertain such requests, but the request must identify the specific standard for which the waiver is requested, the reason for the waiver, the resulting impacts on the use of the data for the purposes UNC Charlotte intends, and any alternative approaches that should be considered.

Models and facility data developed for the project are the property of UNC Charlotte. UNC Charlotte may make use of this data as allowed under the [Owner/Architect Agreement, AIA-B141] and [Owner/Contractor Agreement, AIA-A101] and [General Conditions of the Contract for Construction, AIA-201].

- The A/E or Consultant, as applicable, may retain copies, including reproducible copies of such Drawings, Specifications and other documents for information and reference.
- Drawings, Specifications, or other documents, including the Electronic Files used to create them, may be used by UNC Charlotte or others employed by UNC Charlotte for reference in any remodeling, renovation, alteration, modification of, or addition to, the Project, without prior approval of, or compensation to, the A/E or its Consultants.
- Drawings, Specifications or other documents, including the Electronic Files used to create them, shall not be used by UNC Charlotte, or be given or sold by UNC Charlotte to be used by others, on other projects, except by prior written agreement with, including mutually acceptable compensation to, the A/E or Consultant, as applicable.

--- END OF SECTION ---

Appendix

Exhibit 1 - Space Mapping and Responsibility Matrix
Exhibit 2 - Space Assets
Exhibit 3 - Equipment Mapping and Responsibility Matrix
Exhibit 4 - Equipment Assets
Exhibit 5 - Equipment Asset Details
Exhibit 6 – Equipment Specific Asset Details
Exhibit 7 - Digital Management Exchange
Exhibit 8 - Revit Shared Parameters File

Exhibit 1- Space Mapping and Responsibility Matrix

The following Parameter should be tracked for each Space/Room Asset and will be mapped to the Rooms Table in the IWMS. The associated mapping along with the Author and Authoring Software is listed. See ***Exhibit 7-UNC Charlotte VDC/BIM Lifecycle Revit Template*** on how to use the Revit .rte file to transfer Project Standards from the Template File to the Design Model.

Information Category	Space Details	IWMS	Model	Who Enters Data	Data Authoring Software	ARCHIBUS Field	Revit Field
Building	Site Code	X		Owner	ARCHIBUS	site_id	N/A
Building	Building Code	X		Owner	ARCHIBUS	bl_id	N/A
Spatial Location	Floor Code	X		Owner	ARCHIBUS	fl_id	Level†
Spatial Location	Floor Name	X		Owner	ARCHIBUS	name	N/A
Room Program	Room Name	X	X	Designer	Revit	rm_name	Room Name†
Room Program	Room Code	X	X	Designer	Revit	rm_id	Room Number†
Room Program	Room Category	X	X	Designer	Revit	rm_cat	Room Category*
Physical Properties	Area	X	X	Auto	Revit	area	Auto Fill
Physical Properties	Perimeter	X	X	Auto	Revit	length	Auto Fill
Physical Properties	Condition	X	X	Designer	Revit	rm_condition	Ceiling Height
Physical Properties	Ceiling Height	X	X	Owner	ARCHIBUS	rm_condition	Room Condition
Program Compliance	Division	X	X	Owner	ARCHIBUS	dp_id	Division*
Program Compliance	Department	X	X	Owner	ARCHIBUS	dp_id	Department*
Program Compliance	Occupancy	X	X	Designer	Revit	occ_num	Occupancy†
Program Compliance	Stations	X	X	Designer	Revit	stations	Fixed Occupancy†
Room Finishes	Base Finish	X	X	Designer	Revit		Base Finish
Room Finishes	Base Finish Code	X	X	Designer	Revit		Base Finish Code
Room Finishes	Base Finish Color	X	X	Designer	Revit		Base Finish Color
Room Finishes	Base Finish Manufacturer	X	X	Designer	Revit		Base Finish Manufacturer
Room Finishes	Floor Finish	X	X	Designer	Revit		Floor Finish
Room Finishes	Floor Finish Code	X	X	Designer	Revit		Floor Finish Code
Room Finishes	Floor Finish Color	X	X	Designer	Revit		Floor Finish Color
Room Finishes	Floor Finish Manufacturer	X	X	Designer	Revit		Floor Finish Manufacturer

Information Category	Space Details	IWMS	Model	Who Enters Data	Data Authoring Software	ARCHIBUS Field	Revit Field
Room Finishes	Wall Finish	X	X	Designer	Revit		Wall Finish
Room Finishes	Wall Finish Code	X	X	Designer	Revit		Wall Finish Code
Room Finishes	Wall Finish Color	X	X	Designer	Revit		Wall Finish Color
Room Finishes	Wall Finish Manufacturer	X	X	Designer	Revit		Wall Finish Manufacturer
Room Finishes	Ceiling Finish	X	X	Designer	Revit		Ceiling Finish
Room Finishes	Ceiling Finish Code	X	X	Designer	Revit		Ceiling Finish Code
Room Finishes	Ceiling Finish Color	X	X	Designer	Revit		Ceiling Finish Color
Room Finishes	Ceiling Finish Manufacturer	X	X	Designer	Revit		Ceiling Finish Manufacturer

†Existing Revit Field
*Parameter Created by ARCHIBUS
ᶻShared Parameter File

Exhibit 2-Room Asset Codes

The following Parameter of Room Category is to be tracked for each Room in the Architectural Design Model. A Revit a Template will be provided to assign this Shared Parameter to Rooms. See ***UNC Charlotte VDC/BIM Lifecycle Revit Template*** on how to use the Revit .rte file to transfer Project Standards from the Template File to the Design Model.

Room Description	**Room Category** for Revit
Toilet or Bath	**919**
Media Prod. Srvc	**535**
Trash Room	**X04**
Lobby	**W05**
Athletic/Phys. Ed.	**520**
Toilet or Bath Mobility Impaired	**919X**
Mechanical Area	**YYY**
Animal Quarters	**570**
Building Service Area	**XXX**
Athletic/Phys. Ed. Srvc	**525**
FACILITY SERVICES	**X05**
Assembly Srvc	**615**
Research/Non-Class Lab Srvc	**255**
Open-Stack Study Rm	**430**
Lounge Srvc	**655**
Merchandising Srvc	**665**
Recreation	**670**
Recreation Srvc	**675**
Meeting Room Srvc	**685**
Shop Srvc	**725**
Central Storage Srvc	**735**
Central Service Supp.	**755**
Hazardous Material	**760**
Hazardous Material Srvc	**765**
Patient Bath	**820**
Nurse Station	**830**
Nurse Station Srvc	**835**
Treatment/Exam Srvc	**855**
Diag. Srvc Lab.	**860**
Central Supplies	**870**
Public Waiting	**880**
Sleep/Study No Bath - Designed for Mobility Impaired	**910X**
Sleep/Study with Toilet or Bath	**920**
Sleep/Study Service	**935**

Apartment	**950**
Apartment - Designed for Mobility Impaired	**950X**
Apartment Service	**955**
Circulation Area	**WWW**
Bridge/Tunnel	**W01**
Escalator	**W03**
Loading Dock	**W04**
Janitor Room	**X02**
Electrical Room	**Y24?**
Stairway	**W07**
Shaft	**Y03**
Custodial Supply Closet	**X01**
FACILITY SERVICES	**Y24**
Mechanical Room	**Y14**
Telecomm Room	**Y34**
ELEC/TELECOMM	**Y44**
MECH/ELEC/TELECOMM	**Y54**
MECH/ELEC	**Y65**
ELEC/HSKPG	**Y74**
Public Corridor	**W06**
COMMON SPACE	**W08**
Office Service	**315**
Men's Restroom ADA	**011**
Women's Restroom ADA	**012**
Unisex Restroom Equipped for Mobility Impaired	**013**
Classroom	**110**
Class Labs	**210**
Office	**310**
Assembly	**610**
Central Storage	**730**
Sleep/Study No Bath	**910**
Elevator - Passenger	**010**
Utility/Mechanical Space	**Y04**
Vertical Penetration	**ZZZ**
Treatment/Exam	**850**
Central Service	**750**
Shop	**720**
Exhibition	**620**
Vehicle Storage	**740**
Conf. Room	**350**
Central Computer/TC Srvc	**715**
Study Room	**410**

Central Computer/Telecom	**710**
Lounge	**650**
Meeting Room	**680**
Classroom Service	**115**
Research/Non-Class Lab	**250**
Merchandising	**660**
Stack	**420**
House	**970**
Class Lab Srvc	**215**
Media Production	**530**
Inactive Area (available but unassigned)	**050**
Public Restroom	**X03**
Open Lab	**220**
Food Facility	**630**
Alteration or Conversion Area	**060**
Unfinished Area	**070**
Open Lab Srvc	**225**
Conf. Room Srvc	**355**
Processing Room	**440**
Study Service	**455**
Animal Quarters Srvc	**575**
Greenhouse	**580**
Greenhouse Srvc	**585**
Exhibition Service	**625**
Food Facility Srvc	**635**
Support Facilities General	**700**
Building Roof	**ROOF**
Athletic Facilities Spectator Seating	**523**
Vehicle Storage Srvc	**745**

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Exhibit 3- Equipment Mapping and Responsibility Matrix

The following Parameter should be developed during design if so designated and further tracked for all Equipment Assets during construction and will be mapped to the Equipment Table in the IWMS. The associated mapping along with the Author and Authoring Software is listed below. See ***UNC Charlotte VDC/BIM Lifecycle Revit Template*** on how to use the Revit .rte file to transfer Project Standards from the Template File to the Design Model.

Information Category	Equipment Details	IWMS	Model	Who Enters Data	Data Authoring Software	ARCHIBUS Field	Revit Field
Spatial Location	Room Code	X	X	Designer or Contractor	Revit or 360 Field	rm_id	Space Number†
Asset Properties	Mark (Revit/Project Unique Identifier)*	X	X	Designer	Revit	mep_code	Mark†
Asset Properties	Equipment Code (FM/Portfolio Unique Identifier)	X	X	Designer	Revit	eq_id	Equipment Code²
Asset Properties	CSI ID (CSI Masterformat Number)	X	X	Designer	Revit	csi_id	CSI Number²
Asset Properties	Asset ID (Asset Barcode Tag)	X	X	Contractor	360 Field	asset_id	Barcode²
Asset Properties	Equipment Category	X	X	Designer	Revit	N/A	N/A
Asset Properties	Equipment Type	X	X	Designer	Revit	eq_type	Equipment Type²
Manufacture Information	Manufacturer	X	X	Contractor	360 Field	model_name	Manufacturer²
Manufacture Information	Model Number	X	X	Contractor	360 Field	model_num	Model Number²
Manufacture Information	Serial Number	X	X	Contractor	360 Field	num_serial	Serial Number²
Cost Requirements	Purchase Cost	X		Contractor	360 Field	cost_purchase	N/A
Cost Requirements	Cost of Replacement	X		Contractor	360 Field	cost_replace	N/A
Facility Management	Date Purchased	X		Contractor	360 Field	date_purchased	N/A
Facility Management	Install Date	X	X	Contractor	360 Field	date_installed	Install Date²
Facility Management	Date In Service	X	X	Contractor	360 Field	date_in_service	In Service Date²
Facility Management	Life Expectancy	X	X	Contractor	360 Field	eq_life_expct	Life Expectancy²
Facility Management	Warranty Start Date (Manufacturer)	X		Contractor	360 Field	warranty_start_ date	N/A
Facility Management	Warranty Length (Manufacturer)	X		Contractor	360 Field	warranty_length	N/A
Facility Management	Parent Code (Child to Parent)	X	X	Contractor	360 Field	parent_id	Parent ID²
Facility Management	Condition²	X	X	Owner	ARCHIBUS	condition	Condition²

†Existing Revit Field
*Parameter Created by ARCHIBUS
²Shared Parameter File

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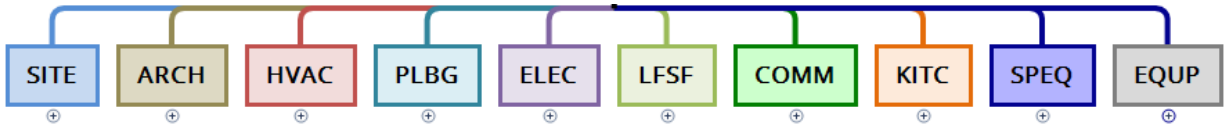
Exhibit 4-Equipment Asset Naming

Parameter fields and documentation listed in ***Exhibit 5-Equipment Asset Details*** are to be collected on all Equipment Assets listed in ***Exhibit 4***. Metadata fields listed in ***Exhibit 5*** will be tracked and authored in either Revit by the Design Team or the Field Management Application by the Contractor/CM and/or Sub-trades. Refer to the ***Exhibit 3*** for authoring party and software.

This is a comprehensive list of Equipment Assets for UNC Charlotte, it items mentioned below are not part of the project and will not be modeled in the Revit outline those in the BXP-D for approval. If there are additional pieces of Equipment specific to your project not listed here outline those in the BXP-C for review by UNC Charlotte.

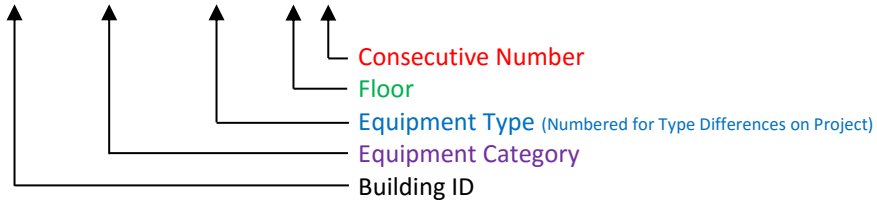
Equipment Categories:



Equipment Code Format:

Building ID-Equipment Category-Equipment Type-Floor and Consecutive Number
Populate in Revit when Equipment is placed in the model.
Example:

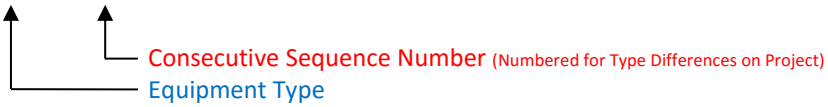
0080-HVAC-VAV01-0101



Equipment Name – Revit Tag/Mark Format: (Would also serve as the UNCC MEP-Code)

Equipment Type-Floor and Consecutive Number
Populate in Revit when Equipment is placed in the model.
Example:

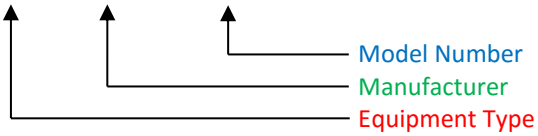
VAV01-0101



Equipment Standard Format:

Equipment Type-Manufacture-Model
Populate in Field Asset Management Application during construction.
Example:

AHU-TRANE-059943



Equipment Category - Architectural: ARCH		
Equipment	**Type**	**CSI Number**
Access Floor	ACFL	09690000
Automatic Door	AUDR	08330000
Bleachers	BLER	13341653
Building Exterior	BEXT	01911943
Building Interior	BINT	09912300
Cubicles	CUBL	12590000
Door	DOOR	08100000 through 08439000
Egress Door	EDOOR	08300000
Dumbwaiter	DW	14100000
Elevator	ELEV	14210000 - Electric Traction; 14240000 - Hydraulic
Escalator	ESC	14310000
Lecture Hall Chairs	LHCR	12610000
Lockers	LCKR	10510000
Motorized Shades	MWT	12240000
Partitions	PARTNS	10220000
Overhead Door	OHD	08332600
Toilet Compartments	TLTCP	10211300
Toilet Accessories	TLTAC	10281313
Roofing Material	ROOF	0722000 through 07690000
Shower and Dressing Compartments	SADC	10211600
Wall and Door Protection	WADP	10260000
Wardrobe and Closet Specialties	WACS	10570000

-- End of ARCH Section --

Equipment Category - HVAC: HVAC		
Equipment	**Type**	**CSI Number**
AC Split Unit	ACSU	23812613 (> or = 6 tons) 23812616 (> 6 tons)
AC Unit	ACU	23811600
Air Compressor (HVAC only)	AIRC	22151900 (See PLBG or SPEQ for Non HVAC Equip)
Air Curtain	ARCN	23343300
Air Dryer	AIRD	42311600-Desiccant Air Dryers, 42311900-Regerative Air Dryers, 42312300-Refrigerant Dryers
Air Handling Unit	AHU	22151900
Boiler Feed-water Pump	BFWP	23531300
Boiler	BOIL	23520000
Boiler Deaerator	BODR	23531600
Cabinet Unit Heater	CUH	23823913
Ceiling Return Diffuser	CGRD	23371300
Ceiling Supply Diffuser	CGSD	23371300
Chemical Water Treatment Pump	CHEP	23250000
Convector Radiator Unit	CORU	23250000
Chilled Water Loop	CWL	23210000
Chilled Water Pump	CHWP	23212316
Chiller	CHIL	23640000-Packaged Water Chillers, 23641600-Centrifugal Water, 23642600-Air cooled Rotary screw

Cooling Tower	COTR	23650000
Cooling Tower Water Filtration	CTWF	23253300
Condensate Pump	CONDP	23212900-Automatic Condensate Pump, 23222300-Steam Condensate Pump
Condenser (HVAC only)	CNDU	23630000; 23631300; 23633300 (See KITC for Freezer/Cooler Condensers (CNDU)
Constant Air Volume Box	CAVB	23361300
Control Valve	CV	23092311
Controls	CTL	25550000
Computer Room AC (Regulates room humidification)	CRAC	23812311 Small (> or = 6 tons), 23812312 Large (> 6 tons), 23812313 Ceiling Mounted Units, 238123 Other CRAC units
Convector Radiation Unit	CORU	23823300
Damper	DAMP	23331300-Dampers; 23331313-Volume Control
Dehumidifier	DHUM	23841600
Ductless Mini Split AC	DMAC	23812613 Small (> or = 6 tons), 23812616 Large (>6 tons)
Energy Recovery Ventilation	ERV	22151900
Exhaust Fan	EXHF	23422300 (See KITC for Kitchen Exhaust Hood, SPEQ for Fume Exhaust and LFSF for Fire Smoke Exhaust Fan)
Fan Coil Unit	FCU	23821900
Fan Powered VAV	FPVAV	23360000
Fan	FAN	23340000-HVAC Fans, 23311300-Axial HVAC Fans, 23341600-Centrifugal HVAC Fans
Freeze Protection Pump	FPPMP	22112300
Fuel Oil Pump (HVAC only)	FUOP	23121300
Furnace	FURN	23540000–Furnaces, 23541300-Electric Resistance, 23541600-Fuel Fired Furnaces
Glycol Make Up Unit	GMU	23210000
Glycol Pump	GPUMP	23122300
Heat Exchanger	HEX	23570000
Heat Pump	HP	23814300
Hot Water Loop	HWL	23210000
Hot Water Pump	HOWP	23122300
Space Heater	HTR	23820000
Humidifier	HUMR	23841300
Infrared Radiant Tube Heater	IRTH	23833300
Kitchen Exhaust Hood	KEXH	23381316 - integrated with Make-up Air Unit (MAU)
Linear Supply Diffuser	LSD	23371300
Louver	LVR	08920000
Make-Up Air Handling Unit	MAU	23742300
Mobile Heated Cabinet	MHCT	11431300
Refrigerant Gas Monitoring System	REFM	28440000
Relief Fan	RELF	23340000
Return Fan	RETF	23340000-HVAC Fans, 23311300-Axial HVAC Fans, 23341600-Centrifugal HVAC Fans
Return Fan Motor	RETM	40991000
Return Air Silencer	RAS	23331900
Roof Top Unit	RTU	23741600-Rooftop Air-Conditioning Units; 23741611-Small Capacity RTUs (6 ton or less); 23741612-Packaged (=7.5 to 25 tons); 23741613-Packaged (= or > 25 tons)
Smoke Damper	SDAMP	23331319

Sound Attenuator	SA	23331900
Static Pressure Sensor	SPS	23091300
Steam Trap	STRAP	23220000
Supply Fan	SUPF	23340000-HVAC Fans, 23311300-Axial HVAC Fans, 23341600-Centrifugal HVAC Fans
Supply Fan Motor	SUPM	40991000
Supply Air Silencer	SAS	23331900
Thermostat	TH	23091300
Variable Air Volume	VAV	23361300-Constant Air Volume; 23361600-Variable Air Volume
Wall Return Diffuser	WRD	23371300
Wall Supply Diffuser	WSD	23371300
Water Cooled Condensing Unit	WCCU	23632300
Water Source Heat Pump	WSHP	23814600

-- End of HVAC Section --

Equipment Category - Plumbing: PLBG

Equipment	Type	CSI Number
Area Drain	AD	22142600
Air Compressor - (Non HVAC Equip)	AIRC	22151900 (See SPEQ- Lab/Medical or HVAC-Equip)
Back Flow Preventer	BFPR	40056713-Reduced Pressure (RP) BFPR; 40056716-Double Check (DC) BFPR
Circulator Pump	CRP	22112300
Deionized Water Booster System	DZWB	22671919
Domestic Water Boiler	DHWB	23522319
Domestic Gas Water Heater	DGWH	22343600
Domestic Water Heater	DHWH	22333300
Domestic Water Pump	DOWP	22112300
Drinking Fountain Water Chiller	DFWC	22471600
Domestic Water Booster System	DWBS	22112313
Emergency Shower	EMSH	22451300
Expansion Tank	EXPT	43420000
Eye Wash Station	EMEY	22451600
Floor Sink	FSNK	22400000
Flow Meter	FLMT	22051900
Gas Meter	GASM	22051900
Grease Trap	GTRP	22131923
Green Water Booster System	GWBS	22132300
Hose Bib	HB	22111900
Hot Water Storage Pump	HWSP	22120000
Hot Water Storage Tank	HWST	22120000
Lavatory	LAV	22400000
Pump (Other pumps not covered by the acronym list)	PUMP	22112300
Roof Top Solar Thermal Panel	STP	22361300
Sand Filter	SF	23322600
Sanitary Sewage Pumps	SSP	22132900
Shut-Off Valve	SOV	40056500

Sink	SINK	22400000
Solar System Circulation Pump	SSCP	23122300
Solar Thermal Panel	STP	22361300
Sound Attenuator	SATU	23331900
Storage Tank	STRT	22120000
Storm Water Ejector Pump	SWEP	22142900
Sump Pump	SUMP	22142900-Sump Pump; 22142913-Pit Vertical; 22142916-Submersible; 22142919-Sump Basin
Urinal	UR	22400000
Ultraviolet Light Disinfection System	ULDS	43326300
Water Closet	WC	22400000
Water Filter	WFLT	22320000
Water Filter System	WAFS	22320000
Water Flow Meter	WFMT	22051900
Water Fountain	WFTN	22471300
Water Hammer Arrestor	WHR	22111900
Water Meter	WM	33190000
Water Softener	WS	22311600
Water Valve	WV	40056216

-- End of PLBG Section --

Equipment Category - Electrical: ELEC		
Equipment	**Type**	**CSI Number**
AC Motor	AMTR	40991000
Automatic Transfer Switch	TNSW	26241300
Battery Equipment	BATT	26330000
Breaker	BKR	26281600
Ceiling Light Fixture	CLGLT	26510000, 26511300-Incandescent, 26511600-Fluorescent, 26511900-LED, 26512300-HID
Ceiling Outlet	CLGEO	26053300
Control Panel	CP	26241600
DC Motor	DMTR	40991000
Disconnect Box	DCNB	26272300
Disconnect Switch	DCNS	26281616
Distribution Panel Board	DPLBD	26241600
Electric Meter	ELM	26271300
Electric Lights Building Interior	ELBI	26510000 – Lights General; 26511300 – Incandescent; 26511600 – Fluorescent; 26511900 - LED
Electrical Transformer	ELTR	26220000 – Low Voltage
Emergency Lighting Control Panel	ELCP	26092600
Electrical Panel	EP	26241600
Emergency Panel Board	EPLBD	26241600
Emergency Transformer	ETFMR	26120000-Medium Voltage; 26220000-Low Voltage; 33730000-Utility High Voltage
Exterior Lighting	EXLT	26560000
Floor Outlet	FEO	26053300
Generator	GENR	26321300
Generator Annunciator Panel	GENAP	40783300

High Voltage Switch	HVSW	33753000
HVAC Panel Board	HPLBD	26241600
HVAC Transformer	HTFMR	26220000 - Low Voltage
Inverter	IVTR	48191600
Junction Box	JB	26272300
Kitchen Panel Board	KPLBD	26241600
Light	LGHT	26510000
Lighting Control Panel	LCP	26092600
Lighting Panel Board	LPLBD	26241600
Main Disconnect Panel	MDP	26273300
Main Switch Board	MSB	26241600
Motor Control Center	MCC	26241900
Motion Sensor	MS	23092321
Occupancy Sensor	OS	23092321
Panel Board	PLBD	26241600
Photo Cell	PCELL	23092321
Power Panel Board	PPLBD	26241600
Power Unit	POWU	14281900
PV Panels	PVP	48141300
Solar Water Pump Motor	SPMTR	40991000
Standby Panel Board	SPLBD	26241600
Standby Transformer	STFMR	26120000-Medium Voltage; 26220000-Low Voltage; 33730000-Utility High Voltage
Surge Arrester	SA	26431300
Switchgear	SW	26230000-Low-voltage, 26130000-Medium-voltage
Track Lighting	TLT	26510000-General; 26511300-Incandescent; 26511600-Fluorescent; 26511900-LED; 26512300-HID
Transformer	TFMR	26220000-Low Voltage; 33730000-Utility High Voltage
Transformer-Medium Voltage	MVT	26120000
Uninterrupted Power Supply	UPS	28050700
Variable Frequency Drive	VFD	26292300

-- End of ELEC Section –

Equipment Category - Life Safety: LFSF		
Equipment	**Type**	**CSI Number**
Alarm Check Valve	ACV	40911300
Auto External Defibrillator	AED	10431300
Backdraft Damper	BDAMP	23331323
Clean Agent System	CASS	21221605-Sapphire Ansul system; 21221610-FM200 Chemtron system
Call Box	CB	27512300
Carbon-Dioxide Fire Extinguishing System	CO2S	26521316
Double Check Valve	DCV	40056700
Duct Detector	DD	23310000
Elevator Fire Service Testing	EFST	14281913
Emergency Light	EMLT	26521313
Emergency Exit Light Sign	EELS	26521316
Emergency Telephone	EMPH	27322600

Emergency Elevator Telephone	EEPH	27322300
Emergency Panelboard	EPBLD	26241600
Emergency Elevator Telephone	EEPH	27322300
Emergency Exit Light Sign	EELS	26521316
Fire Alarm Annunciator Panel	FAAP	28310000
Fire Alarm Strobe Speaker	FASS	28462311
Fire Alarm System	FALRM	28462400
Fire Alarm Terminal Cabinet	FATC	26241600
Fire Control Panel	FCP	26241600
Fire Damper	FDAMP	23331316
Fire Extinguisher	FEXT	10441613
Fire Equipment Panel	FEQP	21131300
Fire Extinguisher Cabinet	FEC	10441300
Fire Hose Cabinet	FHS	10441300
Fire Pump	FIRP	21300000-Fire Pumps; 2130311300-Electric Drive Centrifugal FP; 21301600-Diesel Drive Centrifugal FP
Fire Pump Controller	FIRPC	26362300
Fire Smoke Exhaust Fan	FSEF	23350000
Flow Switch	FS	28461212
Fire Sprinkler System	FSS	21131300
Fire Suppression System-Dry	FSSD	21131600
Fire Suppression System-Dry Chemical	FSSDC	21241600
Standpipe and Hose System	FSTP	21200000
Fire Pump Transfer Switch	FPTS	26362300
Flow & Tamper Switch	FTSW	28461215
Heat Detector	HD	28410000
Jockey Pump	JKP	21300000-Fire Pumps; 2130311300-Electric Drive Centrifugal FP; 21301600-Diesel Drive Centrifugal FP
Jockey Pump Controller	JKPC	26291300
Knox Box	KNOX	10411600
Leak Detector	LD	28300000
Pre-action Sprinkler System	PSS	21131900
Combined Dry-Pipe and Pre-action Sprinkler System	PSSC	21132300
Outdoor Warning Siren System	OWSS	28470000
Panic Button	PB	08710000
Post Indicating Valve	PIV	21052300
Radiation Detector	RAD	28410000
Refrigerant Gas Monitoring System	RGMS	28440000
Smoke Detector	SD	28461100
Sprinkler Head	SPKH	21130000
Standpipe & Hose System	FSTP	21120000

-- End of LFSF Section --

Equipment Category - Communication: COMM		
Equipment	**Type**	**CSI Number**
Access Control	ACC	28130000
Access Control Panel	ACCP	28130000
Alarm	ALM	28400000
Building Automation System	BAS	23090000
Ceiling Data Port	CGDP	10553300
Ceiling Speaker	CGSP	27511600
Clock	CLK	27531300
Cable Tray	CT	26251300
Digital Video Recorder	NVR	28051911
PA System	PAS	27511300
Projector Lift	PL	11521600
Security Access Panel	SPNL	28141900
Security Camera	SC	28210000
Security Card Reader	SCR	28151111
Sound Masking System	SMS	13480000
TV Port	TVPRT	27410000
Video Camera	VDC	28052100
Wall Speaker	WSP	27511600
Wireless Transceiver	WT	27321600

-- End of COMM Section –

Equipment Category - Kitchen: KITC		
Equipment	**Type**	**CSI Number**
Bread/Butter Cabinet	BBCT	11463300
Broiler	BROL	11440000
Brewer	BRWR	11440000
Mobile Food Service Cart	CART	11431300
Char-broiler	CHAR	11421300
Convection Double Oven	CNOD	11441600
Convection Steamer	CNSR	11421300
Condensing Unit (Kitchen Equipment)	CNDU	23630000 – Refrigeration Condenser; 23631300 – Air Cooled Refrigeration Condenser; 23632300 – Water Cooled Refrigeration Condenser
Coffee Machine	COFM	11462300
Compactor	CPTR	11822600
Countertop Conveyor Oven	CTCO	11441600
Drawer Warmer	DRWA	11440000
Dishwasher	DSHW	11481300
Disposal	DISP	22422600
Food Warmer	WRMR	11461600
Fixtures General	FIXT	11461300
Freezer	FREZ	11411300
Fryer	FRYR	11440000
French Fry Warmer	FFDW	10421300
Gas Grill	GGRLL	11440000

Grill	GRLL	11440000
Gas Hot Plate	GSHOTPL	11440000
Heat Holding bin	HBIN	11461600
Hot Dog Roller Grill	HDRG	11440000
Heated Shelves	HESH	11431300
Hot Well	HOTPAN	11461600
Ice Machine	ICEM	11468300
Kettle	KETL	11440000
Kitchen Exhaust Hood (w/out Make Up Air Unit)	KEXH	23381316
Kitchen Equipment – General	KIEQ	11421300
Meat Slicer	SLCR	11423200
Mop Receptor	MORP	11811300
Microwave	MCRW	11440000
Oven	OVEN	11441600
Pizza Oven	PAON	11441600
Popcorn Display Case	PCDC	11461600
Popcorn Popper	PCPR	11440000
Pulper	PLPR	11480000
Range	RNGE	11441300
Refrigerator	REFR	11411300
Pressure Steamer	STMR	11440000
Toaster	TOSTR	11421300
Walk-In Cooler	WINC	11412300
Walk-In Freezer	WINF	11412600

-- End of KITC Section --

Equipment Category – Specialty Equipment: SPEQ		
Equipment	**Type**	**CSI Number**
Air Compressor (Non HVAC or PLBG Equip)	AIRC	22151900 (See PLBG or HVAC for specific Equip)
Fume Exhaust Hood (Laboratory or Medical Uses)	FEXH	11531300
Laboratory Freezer	LFREZ	11532300
Laboratory Refrigerator	LREFR	11532600
Specialized Air Compressor or Vacuum	SARC	22610000

-- End of SPEQ Section --

Equipment Category - Communication: EQUP		
Equipment	**Type**	**CSI Number**
Clothes Dryer Machine	CDRM	11217316
Cloths Washing Machine	CWAM	11217326
Dock Leveler	DLVLR	11131900
Dust Collection System	DUCS	23351300
Fuel Pump	FP	23122600-Liquified Petro Gas

Fuel Storage Tank	FUST	23130000-Fuel Storage Tanks; 23131300-Underground; 23132300- Above Ground; 23132600 - Liquid Gas
Gasoline Dispensing Pump	GDSP	23121600
Gantry Crane	GACE	41221316
Portable Fume Collector	PFCR	11531300
Pressure Differential Monitor	PRDM	23090000
Special Function Hardware Access	SFHA	08791300

-- End of EQUP Section --

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Exhibit 5-Equipment Asset Details

Parameters shown below should be collected/tracked for All Assets listed in ***Exhibit 4-Equipment Assets*** that are installed on the project, along with attachments. Attachments are to be filed via the ***Exhibit 7-Digital Management Exchange*** and/or in the Field Equipment Registry application if so desired. Fields listed here are to be tracked in the Field Equipment Registry by the Contractor/CM and/or Sub-trades.

Metadata Fields for ALL Equipment			
Field	**Definition**	**Format**	**Data Format**
Equipment Type	Equipment Type Abbreviation	Test	See Exhibit 4-Equipment Assets
Equipment Name	Name of the equipment on the drawings, should match the Revit Tag/Mark. Project Unique ID.	Text	See Exhibit 4-Equipment Assets
Equipment Code	Unique FM Identifier associated to the equipment in the model. Portfolio Unique ID.	Text	See Exhibit 4-Equipment Assets
Location (Room)	Physical location of the piece of equipment.	Drop-Down	Based on application standard and Owner's Room Numbering Standard.
Location Description	Short description of the equipment location within the space	Text	In 140 characters or less description of where the equipment is located in the room or building.
Description	Brief description of the equipment as needed	Text	In 140 characters or less add any description or special instructions.
Classification Code	CSI number, Per CSI MasterFormat standards	Numeric	See Exhibit 4-Equipment Assets, number should not exceed 9 digits
Subcomponent Of	Track the Parent-Child relationship of equipment	Text	Enter the Equipment Code of the Parent piece of equipment, should not exceed 20 characters.
Manufacture	Equipment Manufacturer name	Text	Name of Manufacture, if exceeding 32 characters inform Owner.
Model Number	Equipment Model Number	Text	Model number, if exceeding 32 characters inform Owner.
Equipment Standard	Equipment Standard for like pieces of equipment	Text	See Exhibit 4-Equipment Assets
Serial Number	Equipment Serial Number	Text	Serial number, if exceeding 32 characters inform Owner.
Submittal	Project submittal number	Numeric	
Status	Position of progress on a piece of equipment in relation to the project schedule.	Text	Contractor/CM discretion
Purchase Cost	Cost of Equipment only	Numeric	
Barcode	Number on Owners supplied tag.	Numeric	Scan or enter as shown on tag.
Purchase Date	Date the equipment was purchased	Date	mm/dd/yyyy
Install Date	Date equipment was installed in the building	Date	mm/dd/yyyy
Cost of Replacement	Cost of Equipment only	Numeric	If value is over 8 characters please inform owner, and no use of special characters or commas.
Expected Life	Estimated life in years	Numeric	Number of years
Date in Service	Date of functional testing and put into use	Date	mm/dd/yyyy
Warranty Start Date	Should equal the Substantial Completion Date	Date	mm/dd/yyyy
Warranty Length	Manufacturer's warranty length.	Date	mm/dd/yyyy
OMSI documentation for all Equipment is listed in Digital Management Exchange, Exhibit 7.			

Exhibit 6-Equipment Specific Asset Details

Parameters shown below are to be collected/tracked in addition to those listed in ***Exhibit 5-Equipment Asset Details.*** These parameters in ***Exhibit 6*** are specific to the Category or Type of Equipment.

Metadata Fields for Specific Equipment			
Equipment Type	**Data Parameter**	**Format**	**Data Format**
HVAC Category			
ALL HVAC Equipment where Applicable	Warranty Guarantor Labor	Text	Warranty Labor Party
	Warranty Guarantor Parts	Text	Warranty Parts Party
	Electrical Panel Name	Text	Panel Equipment Code
	Electrical Panel Circuit	Text	Circuit Name/Number
	Voltage/ Phase/Hertz	Text	V/PH/HZ
	Minimum Circuit Ampacity	Text	A
	Maximum Over Amps Protection	Text	FLA
	Preventive Maintenance	Text	Manufacturer recommended periodic maintenance intervals.
	Preventive Maintenance Procedures	Text	Maintenance steps should be noted in a series of steps in a numeric list.
Air Handling Unit	Full Load Kilowatts	Text	KW
	Variable Speed Drive	Drop-Down	Yes or No
	Pre-filter Size	Text	LxWxH
	Quantity of Filters	Text	# Pre filers/# Filters
	Belt Size	Text	
	Quantity of Belts	Number	
Chiller	Full Load Kilowatts	Text	KW
	Variable Speed Drive?	Drop-Down	Yes or No
	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
	Evaporator Flow Rate	Text	GPM
	Evaporator Fluid Type	Text	
	Condenser Flow Rate	Text	GPM
Exhaust Fan	Voltage/ Phase/Hertz	Text	V/PH/HZ
	Minimum Circuit Ampacity	Text	A
	Maximum Over Amps Protection	Text	FLA
	Fan Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
Cooling Tower	Capacity	Text	Tons
	Full Load Kilowatts	Text	KW

	Variable Speed Drive	Drop-Down	Yes or No
	Evaporator Flow Rate	Text	GPM
	Evaporator Fluid Type	Text	
Duct Heater	CFM	Text	
	Belt Size	Text	
	Quantity of Belts	Number	
Chilled Water Pump	Motor Speed	Text	RPM
	Frame	Text	
	Horse Power	Number	HP
	NEMA Efficiency	Number	%
	Motor Class	Text	
Condenser Water Pump	Motor Speed	Text	RPM
	Frame	Text	
	Horse Power	Number	HP
	NEMA Efficiency	Number	%
	Motor Class	Text	
Exhaust Fan	Fan Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
VAV	Air Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
Fan Powered Terminal Box	Air Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
Outside Air Fan	Fan Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
Unit Heater	Fan Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
	Total Watts	Number	
Boiler	Full Load Kilowatts	Text	KW
	Pounds per Hour	Text	LBS/HR
	Boiler Horsepower	Number	HP
	Net Output Million	Number	BTUs/HR
	Heat Medium (Steam Pressure or Water): High, Low, Water	Text	Steam Pressure or Water: High, Low

	Fuel Type	Drop-Down	Gas, #2 Fuel, Both, Electric
Air Conditioner	Full Load Kilowatts	Text	KW
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
	Fan Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
Dehumidifier	Full Load Kilowatts	Text	KW
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
	Fan Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
Fan	Fan Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
Compressor	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Fan Coil Unit	Fan Volume	Number	CFM
	Transmission	Drop-Down	Belt Drive/Direct Drive
	Belt Size	Text	
	Quantity of Belts	Number	
Desiccant Dehumidifier	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Refrigeration Condenser Unit	Full Load Kilowatts	Text	KW
	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Computer Room Air Conditioning Units (CRAC)	Full Load Kilowatts	Text	KW
	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS

	Pre-filter Size	Text	LxWxH
	Filter Size	Text	LxWxH
	Quantity of Filters	Text	# Pre filers/# Filters
	Belt Size	Text	
	Quantity of Belts	Number	
Ductless Mini-split Air Conditioning Units (DMAC)	Full Load Kilowatts	Text	KW
	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
	Pre-filter Size	Text	LxWxH
	Filter Size	Text	LxWxH
	Quantity of Filters	Text	# Pre filers/# Filters
	Belt Size	Text	
	Quantity of Belts	Number	
Electric Motor	Motor Speed	Number	RPM
	Frame	Text	
	Horse Power	Number	HP
	NEMA Efficiency	Number	%
	Motor Class	Text	
PLBG Category			
ALL PLBG Equipment where Applicable	Warranty Guarantor Labor	Text	Warranty Labor Party
	Warranty Guarantor Parts	Text	Warranty Parts Party
	Electrical Panel Name	Text	Panel Equipment Code
	Electrical Panel Circuit	Text	Circuit Name/Number
	Voltage/ Phase/Hertz	Text	V/PH/HZ
	Minimum Circuit Ampacity	Text	A
	Maximum Over Amps Protection	Text	FLA
	Preventive Maintenance	Text	Manufacturer recommended periodic maintenance intervals.
	Preventive Maintenance Procedures	Text	Maintenance steps should be noted in a series of steps in a numeric list.
Expansion Tank	Capacity	Text	
Drinking Fountain	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Water Meter	Pressure Rating	Text	
ELEC Category			
ALL ELEC Equipment where Applicable	Warranty Guarantor Labor	Text	Warranty Labor Party
	Warranty Guarantor Parts	Text	Warranty Parts Party
	Electrical Panel Name	Text	Panel Equipment Code
	Electrical Panel Circuit	Text	Circuit Name/Number

	Voltage/ Phase/Hertz	Text	V/PH/HZ
	Minimum Circuit Ampacity	Text	A
	Maximum Over Amps Protection	Text	FLA
	Preventive Maintenance	Text	Manufacturer recommended periodic maintenance intervals.
	Preventive Maintenance Procedures	Text	Maintenance steps should be noted in a series of steps in a numeric list.
Generator	KW Capacity	Text	
	Fuel Type (Nat. Gas/ Diesel)	Drop-Down	Natural Gas/ Diesel
	Power Rating	Text	
	Engine HP	Number	HP
Transformer	High Voltage In	Number	
	Secondary Voltage	Number	
	Insulating Fluid	Text	
	Internal Switch	Drop-Down	Yes or No
Panel Board	Amps Rating	Text	
	A/C Rating	Text	
Distribution Panel Board	Amps Rating	Text	
	A/C Rating	Text	
Uninterruptable Power Supply (UPS)	Practical Power Range	Text	kVA
	Battery Voltage	Number	
	Battery Type	Drop-Down	VRLA or VLA
Main Switchgear Panel	High Voltage In	Number	
	Secondary Voltage	Number	
	Insulating Fluid	Text	
	Internal Switch	Drop-Down	Yes or No
	Switchgear Type	Drop-Down	Air/Gas/Vacuum
Switchgear	High Voltage In	Number	
	Secondary Voltage	Number	
	Insulating Fluid	Text	
	Internal Switch	Drop-Down	Yes or No
	Switchgear Type	Drop-Down	Air/Gas/Vacuum
COMM Category			
ALL COMM Equipment where Applicable	Warranty Guarantor Labor	Text	Warranty Labor Party
	Warranty Guarantor Parts	Text	Warranty Parts Party
	Electrical Panel Name	Text	Panel Equipment Code
	Electrical Panel Circuit	Text	Circuit Name/Number
	Voltage/ Phase/Hertz	Text	V/PH/HZ
	Minimum Circuit Ampacity	Text	A
	Maximum Over Amps Protection	Text	FLA
	Preventive Maintenance	Text	Manufacturer recommended periodic maintenance intervals.

	Preventive Maintenance Procedures	Text	Maintenance steps should be noted in a series of steps in a numeric list.
Security Camera	Electrical Aff	Text	
	Connection	Text	
Security Card Reader (Access Control)	Electrical Aff	Text	
	Connection	Text	
Building Automation System	Electrical Aff	Text	
	Connection	Text	
LFSF Category			
ALL LFSF Equipment where Applicable	Warranty Guarantor Labor	Text	Warranty Labor Party
	Warranty Guarantor Parts	Text	Warranty Parts Party
	Electrical Panel Name	Text	
	Electrical Panel Circuit	Text	
	Voltage/ Phase/Hertz	Text	V/PH/HZ
	Minimum Circuit Ampacity	Text	A
	Maximum Over Amps Protection	Text	FLA
	Preventive Maintenance	Text	Manufacturer recommended periodic maintenance intervals.
	Preventive Maintenance Procedures	Text	Maintenance steps should be noted in a series of steps in a numeric list.
Fire Pump	Flow Rate		GPM
Jockey Pump	Flow Rate		GPM
Knox Box	Connected to System	Drop-Down	Yes or No
	Tamper Protection Feature	Drop-Down	Yes or No
Fire Extinguisher	Type	Text	
	Type File Class	Text	
Stair Pressurization Fan	CFM		
	Activation	Drop-Down	Local or System
Smoke Supply Fan	CFM		
	Activation	Drop-Down	Local or System
Clean Agent System	Mfg-Model-Series # of Release Mechanism	Text	
	Release Mechanism Model/Serial	Text	
	Suppression Agent Type	Drop-Down	CO2, Dry Chemical, FM200, Sapphire
KITC Category			
ALL KITC Equipment where Applicable	Warranty Guarantor Labor	Text	Warranty Labor Party
	Warranty Guarantor Parts	Text	Warranty Parts Party
	Voltage/ Phase/Hertz	Text	V/PH/HZ
	Minimum Circuit Ampacity	Text	A
	Maximum Over Amps Protection	Text	FLA

	Preventive Maintenance	Text	Manufacturer recommended periodic maintenance intervals.
	Preventive Maintenance Procedures	Text	Maintenance steps should be noted in a series of steps in a numeric list.
Walk-In Cooler	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Walk-In Freezer	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Refrigerated Display Cases	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Freezer Display Cases	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Refrigerator	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Freezer	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS
Ice Machine	Chiller Compressor Type	Text	
	Number of Compressors	Number	
	Refrigerant Type	Text	
	Full Factory Refrigerant Charged	Text	LBS

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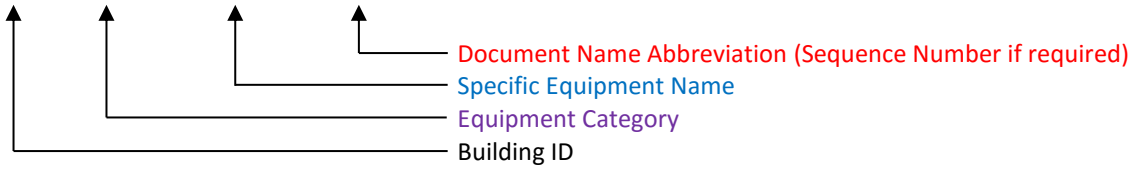
Exhibit 7-Digital Management Exchange (Deliverables)

This Digital Management Exchange was developed for efficient and timely transfer of deliverables, metadata and document files electronically throughout Design and Construction. Document naming will require looking at standards related to Equipment Category, Equipment Type, Document Type and the Filing Structure. This list outlines the documents to be uploaded electronically into UNC Charlotte's document portal.

Documents are to first be named per the listing below and then be uploaded in digital format to the location following the protocol listed in this Exhibit 6 and the overall VDC/BIM Requirements. When attaching a document to a specific Standard or Instance the document is to be pertinent and specific to that particular Standard or Instance. Scanning documents will be accepted limited bases, if at all, and any scanned documents must be scanned to read horizontally left to right and be OCR readable with no hand written information.

Instance Level = A specific piece of equipment with unique attributes and document to it alone will use the unique Equipment Name in its description.

0080-HVAC-CLR2-101-OMM001

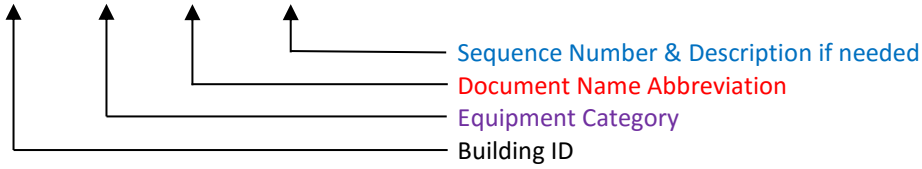


Standard Level= A Type of equipment with attributes and documentation that are the same for multiple Types of the same equipment. The Equipment Standard will be used to create the documents description in this case.

AHU-TRANE-HE500x234Q-OMM001

Facility Level = Facility systems and other diagram will need to be documented at a higher level than the items listed above as they will contain multiple pieces of equipment over the entire facility.

0080-HVAC-SFD-001Xxxx



Document Management: Individual Document Name Abbreviations

Document Type	Abbreviation	Association Level
Control Drawings	CTD	Facility
Commissioning Functional Tests	CFT	Instance
Commissioning Test & Balance Report	CTB	Instance
Field Test Reports	FTR	Instance
Resource Information	INF	Standard
Manufacturer Certificates	MFC	Standard
Manufacturer Installation Instructions	MFI	Standard
Manufacturer Test Reports	MFT	Standard
Material Test Reports	MTR	Standard
Preventative Maintenance	PRM	Standard
Safety Data	SAD	Standard
Materials Certificates	MTC	Standard
Operations & Maintenance Manual	OMM	Standard
Equipment Type Photos	PHO	Standard
Room MEP Exact Builts*	Room#-PHO	Instance*
Product Certificates	PRC	Standard
Product Data	PRD	Standard
Product Test Reports	PRT	Standard
Shop Drawings	SDW	Floor
Spare Parts List	SPL	Standard
Start-Up Report	SUR	Instance
Sustainability Documents	SBD	Standard
Test and Balance Report	TBR	Instance
Warranty	WAR	Standard
Videos	VID	Standard
System Flow Diagrams	SFD	Facility
Valve Charts	VLC	Facility

*Individual photos or a 360° photo of a rooms exact built conditions before everything is closed up offer visuals inside a wall or above a ceiling to the facilities management professional of the buildings Mechanical, Electrical, and Plumbing systems.

Document Management: BIM Specific Deliverables			
Required Information	**Required By**	**Format**	**Filing Location**
Design Models	Design Team	Revit RVT file	…\Drawing Files\(Phase)\Models
Design & Construction Drawing Files	Design Team	Individual PDF Sheets	…\Drawing Files\Shop Drawings\(Level)
Shop Drawings (SDW)	CM/Contractor	Individual PDF Sheets per Floor	…\Drawing Files\(Phase)\Drawings\(Discipline)
2D System Diagrams	CM/Contractor	Diagrams using single lines to indicate the path and components of MEP Systems	…\Drawing Files\As-Built\Models\System Diagrams\2D Line Diagrams
3D System Diagrams	CM/Contractor	3D models indicating the components of the MEP Systems	…\Drawing Files\As-Built\Models\System Diagrams\3D Model Diagrams
As-Built Constructability and Coordination Model	CM/Contractor	Navisworks NWF file	…\Drawing Files\As-Built\Models\Navisworks\NWF
As-Built Model	CM/Contractor	Navisworks NWC files	…\Drawing Files\As-Built\Models\Navisworks\NWC
As-Built Model	CM/Contractor	Per Level 3D PDFs	…\Drawing Files\As-Built\Models\3D PDF
Record Model	Design Team-CM/Contractor	Revit RVT file	…\Drawing Files\Record\Models\Revit
Record Drawings	Design Team-CM/Contractor	Individual PDF Sheets	…\Drawing Files\Record\Drawings\(Discipline)

-- End of Section --

Document Management: Architectural/Engineering and Construction Deliverables			
Required Information	**Required By**	**Format**	**Filing Location**
Final Punch List	CM/Contractor	Completed in BIM 360 Filed, exported to PDF at completion of project.	…\Document Files\Contract Administration\Punchlist
General Photographs	CM/Contractor	JPEG, MP4, WAV in date taken folder	…\Document Files\Photographs\(Date Taken Folder)
Equipment Type Photos (PHO)	CM/Contractor	Individual Photo of each equipment standard.	…\Document Files\Photographs\Equipment Type Photos\(CSI Division)\(Equipment Type)
Room MEP Exact Builts (PHO)*	CM/Contractor	*Building Code-Room Number-PHO-Sequential Number. Individual Photos or 360 degree Room photo of in wall as-built conditions before covered up.	…\Document Files\Photographs\Room MEP Exact Builts\(Room Number Folder)
Start-Up/Shut Down Videos (VID)	CM/Contractor	Video training for correct Start-Up and Shut Down of equipment for operators and maintenance personnel.	…\Document Files\OMSI Documentation\(CSI Division)\Equipment Standard\ Operating Procedures
Instructional Videos (VID)	CM/Contractor	Video training on equipment for operators and maintenance personnel.	…\Document Files\OMSI Documentation\(CSI Division)\Equipment Standard\Training Videos
Inspection & Certification	CM/Contractor	PDF	…\Document Files\Regulatory Documentation\Building Inspections
Permits	CM/Contractor	PDF	
Certificate of Substantial Completion	CM/Contractor	PDF	…\Document Files\Regulatory Documentation\Certificate of Occupancy
Submittals Index Log	CM/Contractor	PDF	…\Document Files\Contract Administration\Submittals
Submittal Files	CM/Contractor	PDF in folder w/ Submittal Number	…\Document Files\Contract Administration\Submittals\(CSI Division)
Specifications	Design Team	PDFs filed per Phase	…\Document Files\Specifications\(Phase)
Record Specifications	CM/Contractor	PDF	
Record Test Certificates	CM/Contractor	PDF	
Construction Documents Project Manual	Design Team	PDF files per CSI Division	…\Document Files\Specifications\Construction Documents\(CSI Division)

Close Out Letter	Design Team	PDF	…\Document Files\Contract Administration
Certificate of Substantial Completion	CM/Contractor	PDF	…\Document Files\Regulatory Documentation\Certificate of Occupancy
Sustainability Documents (SBD)	Multiple Parties	LEED, Energy Star, etc., also see Commissioning Documents Scope of Work	See Below….
Field Test Report (FTR)	CM/Contractor	Sampling and testing of construction materials to determine their conformance to the specifications.	…\Document Files\Contract Administration\Reports\(CSI Division)
System Flow Diagram (SFD)	CM/Contractor	As-installed flow diagrams indicating system operation during normal operations (liquid, air, gas, or electricity). Integrate all system components into the diagram. Note that a compilation of non-integrated flow diagrams for the individual system components is not acceptable.	…\Document Files\OMSI Documentation\(CSI Division)
Valve Charts (VLC)	CM/Contractor	Provide charts of valve tag numbers with location and function of each valve clearly keyed to the respective system flow diagram.	…\Document Files\OMSI Documentation\(CSI Division)
Control Drawings (CTD)	CM/Contractor	Include the control drawings for the piece of equipment and its components, including the sequence of operation.	…\Document Files\OMSI Documentation\(CSI Division)

-- End of Section --

Document Management: Commissioning Documents			
Required Information	**Required By**	**Description/Format**	**Filing Location**
Executive Summary	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Plan
Report Summary	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Reports
Cx Plan	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Plan
Cx Design Review Comments	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Plan
Correspondence	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Plan
Cx Issue Log	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Plan
Submittal Review Log/Comments	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Logs
Construction Verification Forms	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Plan
Functional Testing (CFT)	Cx	The testing of the dynamic function and operation of components, equipment and systems using manual (direct observation) and monitoring (data-logging/trending) methods.	…\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\(Equipment Instance)\ Commissioning Functional Test
Trending Plan	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Plan
Tending Logs	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Logs
Test & Balance Report (CTB)	Cx	HVAC Testing, Adjusting and Balancing (TAB) is the process of checking and adjusting all environmental systems in a building to produce the design objectives.	…\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\(Equipment Instance)\ Commissioning Test & Balance
System Setpoints	Cx		…\Document Files\Commissioning

			Documentation\Reports
Training Sign-In Log	Cx	Individual PDF from Commissioning Report	…\Document Files\Commissioning Documentation\Logs
Scorecard	Design Team	Excel or PDF	…\Document Files\Commissioning Documentation\Logs
OPR	Cx	Individual PDF from Commissioning Report	
BOD	Cx	Individual PDF from Commissioning Report	
Credit Documents	LEED Admin	PDF	…\Document Files\Commissioning Documentation\Reports
Building Energy Model	Design Engineer	Original files and output documents	…\Document Files\Commissioning Documentation\Energy Modeling
IAQ Plans	Contractor	PDF	…\Document Files\Commissioning Documentation\Plan
M&V Plan(s)	Cx or Design Engineer	PDF	…\Document Files\Commissioning Documentation\Plan

-- End of Section --

Document Management: Operations & Maintenance Support Information (OMSI) Scope			
Required Information	**Description**	**Format**	**Filing Location**
Manufactures' Literature (MFC)	Identifying manuals, cut sheets, certificates, etc., from equipment manufacturers that amplify information provided within the system-level O&M manual. Manufacturers' literature generally provides procedures to operate, maintain, troubleshoot, and repair specific items at the equipment level. This information is contained in a separate volume of binders, identified by facility/system, for easy reference. Specific material or complete documents can also be electronically scanned for its 'on-line' use, such as linking from the system-level manual.	PDF files	…\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\Manuals
Certified Tests & Reports (MFT)	Equipment and System Tests	PDF files	…\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\(Equipment Instance)\Test Reports
Operations & Maintenance Manuals (OMM)	Maintenance charts including maintenance frequency checklists, maintenance summary, lamp replacement data sheet, equipment data sheets, recommended maintenance and service contacts, and recommended work order form.	PDF files	…\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\Manuals
Start-Up, Shut Down and Operating Procedures (SUR)	Controls/Startup/Shutdown/Emergency Over-Ride/Seasonal Changeover: Include equipment configurations for each mode of operation	PDF files	…\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\Operating Procedures
Installation Instructions (MFI)	For Equipment or Component Parts of Equipment put into service during construction.	PDF files	…\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\Manuals
Resource Information (INF)	List of resources required for proper operations and maintenance.	PDF files	…\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\ Preventive Maintenance
Spare Parts List (SPL)	List of spare parts, replacement parts and consumable parts required for O&M.	PDF files	…\Document Files\OMSI Documentation\(CSI

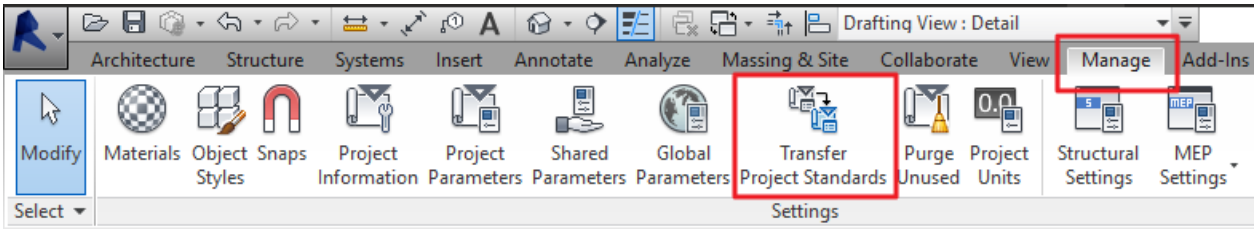
			Division)\(Equipment Standard)\ Preventive Maintenance
Preventive Maintenance (PRM)	Preventative Maintenance steps listed in series of steps as metadata in Field Asset Management application. Equipment and System-level table guide maintenance, via fault tree analysis, in a sequential, step-by-step isolation of a system problem to identify faulty equipment. Typical malfunctions, tests or inspections, and corrective actions or recommendations to correct malfunctions are included	Metadata & PDF Files	Logged in BIM 360 Field & …\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\ Preventive Maintenance
Warranty & Bond Documents (WAR)	For Systems, Equipment or Component Parts of Equipment put into service during construction.	Metadata & PDF Files	Logged in BIM 360 Field & …\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\ Warranties
Safety Data (SFD)	Safety hazards commonly associated with the operation of system/equipment applicable to the facility	PDF files	…\Document Files\OMSI Documentation\(CSI Division)\(Equipment Standard)\Manuals
Materials Test Reports (MTR)	Quality assurance document that is used in most metal-making industries which certifies a material's compliance to certain specifications or standards.	PDF files	…\Document Files\OMSI Documentation\(CSI Division)
Material Certificates (MTC)	Certified Material Test Report	PDF files	…\Document Files\OMSI Documentation\(CSI Division)
Product Certificates (PRC)	Certifications that a certain product has passed performance and quality assurance tests, and meets qualification criteria stipulated in contracts, regulations, or specifications.	PDF files	…\Document Files\OMSI Documentation\(CSI Division)
Product Data (PRD)	Document summarizing the performance and other technical characteristics of a product, component, material or subsystem in sufficient detail.	PDF files	…\Document Files\OMSI Documentation\(CSI Division)
Product Test Reports (PRT)	Document defining the properties and/or performance of a product, component, material or subsystem.	PDF files	…\Document Files\OMSI Documentation\(CSI Division)

-- End of Section --

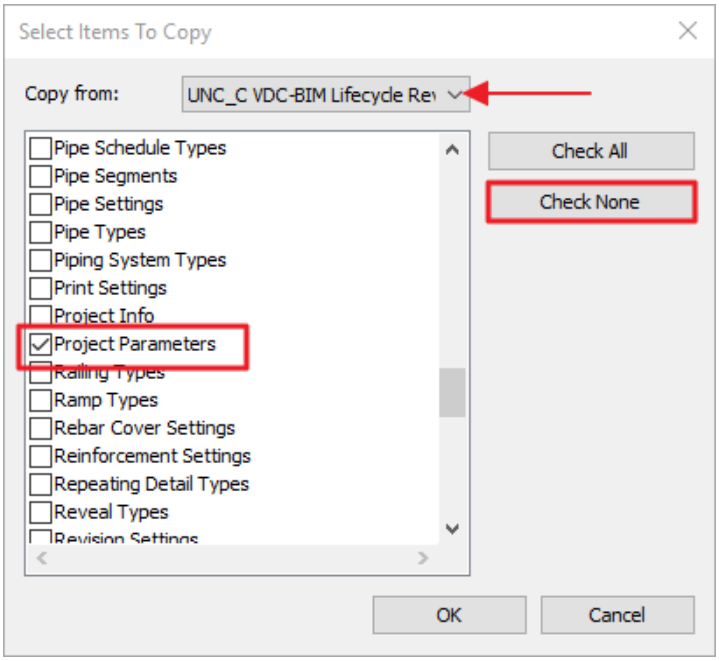
Exhibit 8-Revit Template Information

- This is an electronic file named *UNC_C VDC-BIM Lifecycle Revit Template_v2.0*.
- Use this Revit .rte file to transfer Project Standards from the Template File to the Revit Design Models, both Revit Architecture & MEP.
- This will create the Instance Parameter fields for metadata requested by the University of North Carolina Charlotte for Rooms & Equipment.
- Author the requested information into these fields.

Process:

1. Open the *UNC Charlotte VDC/BIM Lifecycle Revit Template* while also having one of the MEP files listed above open.
2. Using the model file as the active and open window, go the 'Mange' tab and select 'Transfer Project Standards'.
3. 

4. The following 'Select Items to Copy' window will pop up. In the 'Copy from:' drop down select the *UNC Charlotte UNC_C VDC-BIM Lifecycle Revit Template_v2.0*.
5. Then select the 'Check None' button to deselect all the checked items in the window.
6. Find the 'Project Parameters' field and re-select it.
7. Then click the 'OK' button.



8. At the Instance Level in Revit you will now add these Shared Parameters to the project so that metadata required by UNC Charlotte can be authored into the model by the design team.

   Additional Room Parameters Requiring Data Input:

Materials and Finishes	
Base Finish Code	
Base Finish Color	
Base Finish Manufacturer	
Wall Finish Code	
Wall Finish Color	
Wall Finish Manufacturer	
Ceiling Finish Code	
Ceiling Finish Color	
Ceiling Finish Manufacturer	
Floor Finish Code	
Flooring Finish Color	

Identity Data	
Number	
Name	
Image	
Comments	
Occupancy	
Department	
Base Finish	
Ceiling Finish	
Wall Finish	
Floor Finish	
Room Category	
Ceiling Height	

   Additional Door Parameters Requiring Data Input:

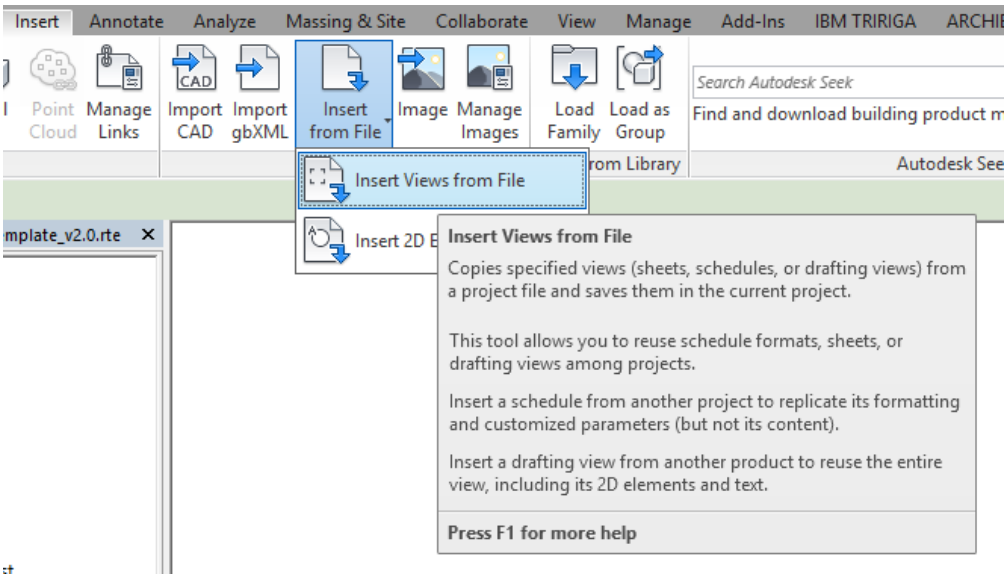
Identity Data	
Image	
Comments	
Mark	
Door Hand	
Hardware Set	
CSI Code	

9. Materials and Finishes need to be populated at the instance level by populating at either the Room Tag level or via the schedule.
10. The built in Revit Finishes should be used for the Room Finish Material for Floor, Base, Wall and Ceiling. A Ceiling Height and Room Category parameter have also been added to each Room instance to be populated.
11. Each Door instance to be populated with the required built in Revit Parameters at the Instance level as well as the additional ones listed above. The Door Type should be added at the Family Level in the Type Mark field.
12. For Equipment the Equipment Code and Equipment Category parameter has been added for each MEP Equipment instance to be populated. The Equipment Type should be added at the Family Level in the Type Mark field.

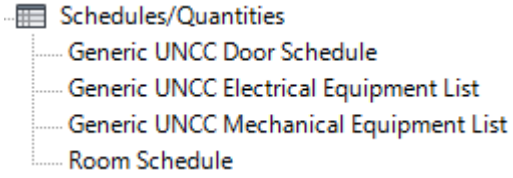
Image	
Comments	
Mark	
Equipment Code	
Equipment Category	
CSI Code	

13. To transfer schedules just have the target project open, navigate to Insert tab and choose Insert from File>Insert Views from File tool. Find your source project click Open. Pick the views you

need in your project, the Schedules in this Template File, and click OK. You might experience some warnings about duplicate types which you can close by clicking OK.



14. Now you will find four (4) schedules added to the project. The *Generic* schedules should be populated automatically and will be used by the University and will be accessed for QA/QCing as well. The *Room Finish* Schedule is a Template by the designers, it should also auto populate on the Room Instance Parameters and can be used for design and construction documents is needed.



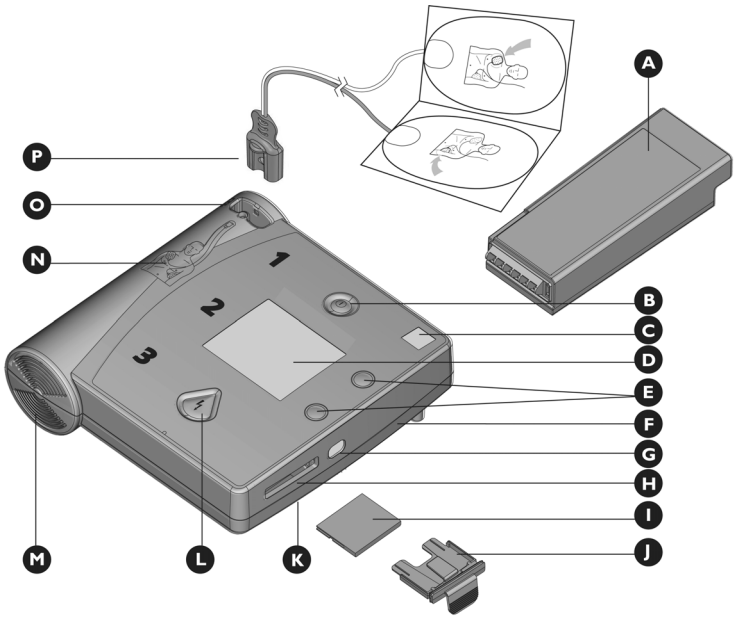
PHILIPS

HeartStart FR2+ Defibrillator

INSTRUCTIONS FOR USE

M3860A, M3861A
Edition 15

Cabinet: 19.25” height, 13” width, and 6” depth.



The HeartStart FR2+ Defibrillator

A Battery. Standard long-life or rechargeable battery used to power the FR2+.

B On/Off button. Turns on the FR2+ and starts voice and text prompts. Second press turns off the FR2+.

C Status Indicator. Shows you the readiness status of the FR2+.

D Display screen. Displays text prompts and incident data. The FR2+ M3860A screen also displays the patient's ECG.

E Option buttons. Adjust the contrast of the screen display and control special functions.

F Beeper port. Broadcasts alert beeps when required. It is located under the right edge of the FR2+.

G Infrared (IR) communications port. A special lens, or "eye," used to transfer data directly to or from another device.

H Data card port. Receptacle for data card tray.

I Data card (optional). Used to store and review information about an incident, including ECG and optional voice recording.

J Data card tray. Special sleeve that holds the data card and fits into the data card port to help seal the FR2+ against fluids. *The tray should be kept installed in the FR2+ even if no data card is used.*

K Microphone. Used optionally to record surrounding audio during an incident. It is located under the right edge of the FR2+.

L Shock button. Controls shock delivery. The button flashes when the HeartStart FR2+ is ready to deliver a shock.

M Speaker. Amplifies voice prompts during use of the FR2+.

N Pads placement diagram. Illustrates correct placement of adult pads. *Diagrams are also shown on the defibrillator pads.*

O Defibrillator pads connector socket. Receptacle for connector of the defibrillator pads cable. An adjacent LED light flashes to show socket location and is covered when connector is inserted.

P Defibrillator pads. Self-adhesive pads with attached cable and connector. (Adult pads shown.)

HeartStart FR2+ Defibrillator

QUICK REFERENCE CARD

PHILIPS MEDICAL SYSTEMS

Intentionally blank.

PHILIPS

HeartStart FR2+

M3860A/M3861A
Automated External Defibrillator

INSTRUCTIONS FOR USE

Edition 15

IMPORTANT NOTE:

It is important to understand that survival rates for sudden cardiac arrest are directly related to how soon victims receive treatment. For every minute of delay, the chance of survival declines by 7% to 10%.

Defibrillation cannot assure survival. In some patients, the underlying problem causing the cardiac arrest is simply not survivable despite any available care.

PHILIPS MEDICAL SYSTEMS

HEARTSTART
DEFIBRILLATORS

About this edition

The information in this guide applies to the model M3860A/M3861A HeartStart FR2+ Defibrillator. This information is subject to change. Please contact Philips at www.medical.philips.com/heartstart or your local Philips representative for information on revisions.

Edition history

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Authorized EU Representative

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CAUTION: Federal law (USA) restricts this device to sale by or on the order of a physician.

The HeartStart FR2+ is designed to be used only with Philips-approved accessories. The HeartStart FR2+ may perform improperly if non-approved accessories are used.

Device Tracking

This device is subject to tracking requirements by the manufacturer and distributors. If the defibrillator has been sold, donated, lost, stolen, exported, or destroyed, notify Philips Medical Systems or your distributor.

Device Manufacturer

The HeartStart FR2+ Defibrillator is manufactured by Philips Medical Systems, Seattle, Washington, USA.

Patents

This product is manufactured and sold under one or more of the following United States patents: U.S. Pat. No US6047212, US6317635, US5892046, US5891049, US6356785, US5650750, US6553257, US5902249, US6287328, US6662056, US5617853, US5951598, US6272385, US6234816, US6346014, US6230054,US6299574, US5607454, US5803927, US5735879, US5749905, US5601612, US6441582, US5889388, US5773961, US6016059, US6075369, US5904707, US5868792, US5899926, US5879374, US5632280, US5800460, US6185458, US5611815, US6556864, and other patents pending.

CONTENTS

7 DATA MANAGEMENT AND REVIEW

APPENDICES

1 Introduction to the HeartStart FR2+

Device description

The HeartStart FR2+ Defibrillator ("FR2+") is a compact, lightweight, portable, and battery powered automated external defibrillator designed for use by a trained responder to treat ventricular fibrillation (VF), the most common cause of sudden cardiac arrest (SCA).

The FR2+ has a Status Indicator that is always active, so you can tell at a glance if it has passed its last selftest. The front panel of the FR2+ has an On/Off button at the top and a Shock button at the bottom. A display screen in the center of the panel provides text prompts and incident information. Voice prompts are provided through a speaker located at the base of the FR2+. See the diagram on the inside front cover for details.

The FR2+ is available in two models, the M3860A and the M3861A. They share a set of basic features, detailed in Chapter 6. The principle differences between the two models are identified below:

Model M3860A	Model M3861A
Configurable ECG display on screen	Text prompt display on screen, no ECG display
Configurable manual charge in advanced mode (See Chapter 6)	No manual charge in advanced mode (See Chapter 6)

NOTE: The FR2+ comes with a factory default setup that can be modified. (See Chapter 6, "Configuration, Setup, and Advanced Mode Features," for a description of setup defaults and options.)

Indications for use

The HeartStart FR2+ is intended to be used with disposable defibrillator pads applied to victims of sudden cardiac arrest exhibiting the following symptoms:

- Unresponsiveness
- Absence of normal breathing

If in doubt, apply the pads.

To use the FR2+ on children under 8 years or 55 pounds (25 kg), apply FR2 Infant/child reduced-energy defibrillator pads, if available. Otherwise, apply the standard pads.

WARNING: Performance of the SMART CPR AUTO1 and AUTO2 settings has not been established in patients under 8 years or 55 lb. (25 kg). See Appendix E for more information.

The FR2+ is intended for use by responders who have been trained in its operation. The user should be qualified by training in Basic Life Support (BLS), in Advanced Life Support (ALS), or another physician-authorized emergency medical response program.

At the discretion of emergency care personnel, the FR2+ M3860A can also be used with the FR2+ ECG assessment module to provide non-diagnostic display and evaluation of the heart rhythm of a responsive or breathing patient, regardless of age, for attended patient monitoring. While connected to the FR2+ ECG assessment module, the FR2+ M3860A disables its shock capability.

Principles of operation

The HeartStart FR2+ Defibrillator is designed to provide external defibrillation therapy to someone experiencing sudden cardiac arrest caused by ventricular fibrillation (VF), the most common cause of SCA. The only effective treatment for VF is defibrillation.The FR2+ treats VF by sending a shock across the heart, so it can start beating regularly again.

The FR2+ is extremely easy to use. When connected to defibrillator pads that are properly applied to the patient's bare chest, the FR2+:

1. prompts you to take specific actions,
2. automatically analyzes the patient's heart rhythm and advises you whether or not the rhythm is shockable, and
3. arms the Shock button, if appropriate, and instructs you to press it to deliver a biphasic electric pulse designed to defibrillate the heart.

Detailed instructions for use are provided in Chapter 3.

2 Getting Started

Package contents

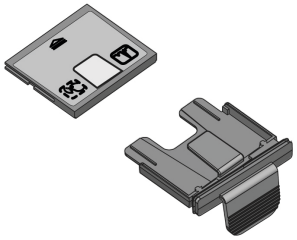
The HeartStart FR2+ Defibrillator is supplied with a standard long-life battery, two sets of adult defibrillator pads with integrated cable and connector, and a data card tray. Other accessories, including FR2 infant/child reduced-energy defibrillator pads, an FR2+ rechargeable battery, and (for M3860A only, with ECG display enabled) a three-wire FR2+ ECG assessment module, are available. See Appendix A for a list of accessories and other recommended supplies.

Setup overview

Setting up the HeartStart FR2+ for use is quick and simple.

- Install a data card. (optional)
- Install a battery.
- Set the clock in the FR2+. (optional)
- Run the battery insertion selftest.
- Place the FR2+ with recommended accessories in a convenient location.

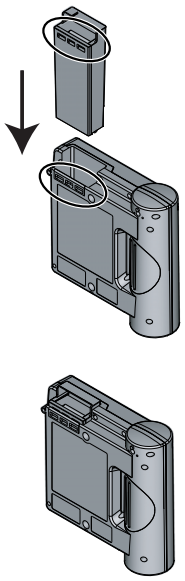
Installing the data card



The HeartStart FR2+ comes with a data card tray, which should be kept in the data card port even if no data card is used. If a data card is to be used, install it as follows:

1. Load the data card face up into the data card tray, with the tray's "tongue" fitting over the matching yellow area on the data card.
2. Press the On/Off button to turn off the HeartStart FR2+ if it is on.
3. Hold the loaded data card tray by its handle and gently insert the tray all the way into the defibrillator's data card port until only the tab remains outside the case.

The data card will automatically record incident data the next time the HeartStart FR2+ is turned on.



Installing the battery and setting the clock

The HeartStart FR2+ Defibrillator is shipped with an M3863A standard, long-life battery. The battery is enclosed in a gray plastic case with a yellow latch at one end, designed to hold the battery in place when it is correctly installed. (The optional M3848A FR2+ rechargeable battery case is blue, and it also has a yellow latch. Except where otherwise noted, the following information applies to both battery types.) To install the battery:

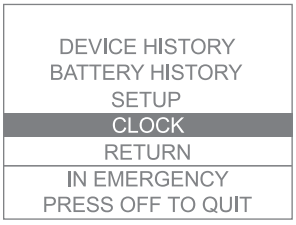
1. Hold the battery by the latch end and slide it into the battery compartment at the top of the HeartStart FR2+.
2. Slide the battery all the way into the opening, until the latch clicks into place.

CAUTION: Follow all instructions supplied with the battery. Install the battery before the install-by date shown on the battery.

When the battery is installed, the FR2+ automatically turns on. The Status Indicator displays a flashing black hourglass. The Shock button light and the indicator light for the defibrillator pads connector socket turn on briefly. The display screen brings up the main menu.

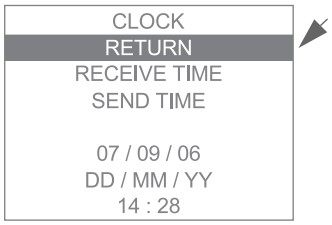
It is recommended that you set the FR2+'s internal clock to the correct date and local time at this point.

1. Within 10 seconds of installing the battery, press the lower Option button to move the highlight bar on the displayed main menu to NEXT.
2. Press the upper Option button to select NEXT to bring up the second menu screen.



3. Press the lower Option button to move the highlight bar to CLOCK.
4. Press the upper Option button to bring up the CLOCK menu.
5. To receive clock settings from another FR2+, see directions provided in Chapter 6. To manually set the time and date, follow the remaining steps.

6. Press the lower Option button to move the highlight bar to the date or time field to be changed.
7. Using the upper Option button, scroll through the available settings to the desired value.
8. Use the lower Option button to move to any other date or time field to be changed, and repeat step 6.
9. When all selections have been made, use the lower Option button to move the highlight bar to RETURN, then press the upper Option button to return to the second menu.
10. After ten seconds, the HeartStart FR2+ automatically starts the battery insertion selftest.*



If you choose not to set the clock at this point, the HeartStart FR2+ automatically starts the battery insertion selftest within ten seconds of battery insertion. You can remove and reinsert the battery at any time to review or adjust the clock settings.

Running the Battery Insertion Test

The battery insertion selftest has two parts, an automatic part, during which the screen displays a bar that fills in as the test continues, followed by an interactive part. Follow the defibrillator's prompts during the interactive part of the test. When the FR2+ has passed the battery insertion selftest, it turns off and goes to standby mode to be ready for use. Standby mode is indicated by the flashing black hourglass status indicator.

NOTE: If the battery is removed from the FR2+ for more than two hours, the clock settings will be lost and must be reset.

Placing and securing the HeartStart FR2+

Place the HeartStart FR2+ Defibrillator in an accessible area with the Status Indicator easily visible. The defibrillator can be secured in a carrying case suitable for use with a wallmount bracket or defibrillator cabinet. Useful accessories for

* See Chapter 4 for details about the battery insertion selftest.

storage with the HeartStart FR2+ include a spare battery, spare pads, spare data card (if used), and a Fast Response Kit containing a pocket mask, a disposable razor, 2 pairs of gloves, a pair of paramedics scissors, and an absorbent wipe. See Appendix A for a list of accessories.

NOTE: Be careful not to overpack the carrying case, to avoid placing inadvertent pressure on the control buttons. Do not store the FR2+ with the defibrillator pads attached. Do not open the pads package until ready for use.

With the battery installed and the FR2+ stored in appropriate environmental conditions,* the FR2+ performs detailed daily, weekly, and monthly selftests to check its readiness for use. These periodic selftests are described in Chapter 4.

While the FR2+ is in the standby mode, the Status Indicator shows the flashing black hourglass unless the periodic selftest detects a problem. If a problem is detected, the Status Indicator will show a flashing red **X** or a solid red **X** and the FR2+ will chirp to alert you. Chapter 4 contains instructions for troubleshooting.

* See Appendix B for environmental specifications.

3 Using the HeartStart FR2+

Overview

This chapter describes how to use the HeartStart FR2+ Defibrillator in an emergency. Some general things to remember are:

- Try to relax and stay calm. The HeartStart FR2+ automatically provides voice and text prompts to guide you through each step of its use.
- The defibrillator pads must have good contact with the patient's skin. The pads have a layer of sticky, conductive gel beneath the protective backing.
- It may be necessary to dry the patient's skin or to clip or shave excessive chest hair to provide good contact between the defibrillator pads and the patient's skin.

Be sure to read the Warnings and Cautions on the last page of this chapter.

Detailed directions for use based on default configuration are provided on the following pages.

NOTE: These directions apply to both the model M3860A and the model M3861A FR2+, except where otherwise noted.

Treating infants and children

WARNING: Most cardiac arrests in children are not caused by heart problems. When responding to cardiac arrest in an infant or child:

- Provide infant/child CPR while a bystander calls EMS and brings the FR2+.
- If no bystander is available, provide 1-2 minutes of CPR before calling EMS and retrieving the FR2+.
- If you witnessed the child's collapse, call EMS *immediately* and *then* get the FR2+.

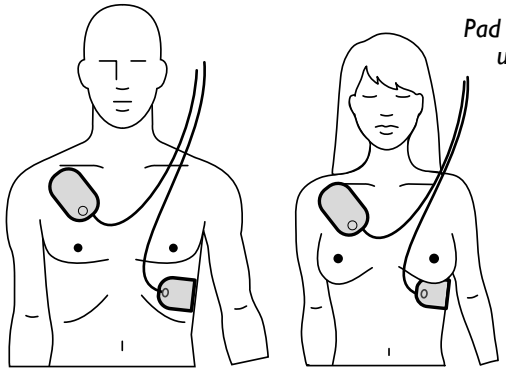
Alternatively, follow your local protocol.

Step 1: Preparation

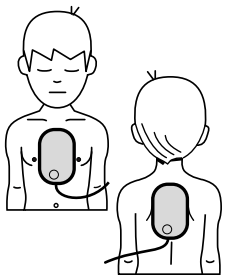
Press the On/Off button to turn on the HeartStart FR2+ Defibrillator. Follow the instructions provided by the FR2+ voice and text prompts.

- Remove clothing from the patient's upper body. If needed, wipe moisture from the patient's skin and clip or shave excessive chest hair.
- If the patient appears to be under eight years of age or 55 lb. (25 Kg), use M3870A FR2 infant/child reduced-energy defibrillator pads, if available. If the infant/child pads are not available, or if the child appears older/larger, use adult defibrillator pads. DO NOT DELAY TREATMENT TO DETERMINE THE CHILD'S EXACT AGE/WEIGHT.
- Open the defibrillator pads package. Pull off the protective backing from the defibrillator pads.
- Place the sticky side of each pad on the patient's bare skin, exactly as shown on the drawing on each pad.

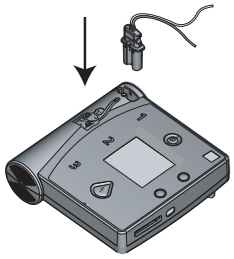
Pad placement for adults and children 8 years old or 55 pounds or more.



Pad placement for infants and children under 8 years old or 55 pounds.

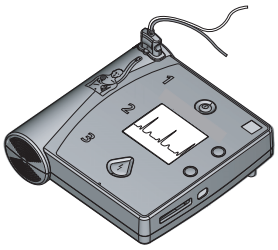


- Insert the defibrillator pads connector firmly into the defibrillator's connector socket, indicated by a flashing light at the top left of the FR2+.



Step 2: ECG analysis and CPR interval

Follow the instructions provided by the FR2+ Defibrillator's voice and text prompts.



As soon as the FR2+ detects that the defibrillator pads are connected properly, it automatically begins analyzing the patient's heart rhythm. Do not touch the patient during rhythm analysis.

If no shock is advised, the HeartStart FR2+ provides voice and text prompts to tell you so and provides a CPR interval with a prompt to perform CPR, if needed. The duration of the CPR interval is determined by CPR Timer setting.

Following the CPR interval, the FR2+ reanalyzes the patient's heart rhythm. If no shock is again advised, the device goes into a patient care interval, during which you can perform CPR if needed or otherwise tend to the patient. The duration of the patient care interval is determined by the NSA Action setting.

NOTE: CPR may interfere with background heart rhythm monitoring by the FR2+ in monitoring mode. During CPR, periodically pause for 15 seconds to reassess the patient and allow the FR2+ to analyze the patient's heart rhythm without possible interference from CPR artifact.

If a shock is advised, the HeartStart FR2+ charges to prepare for shock delivery. It gives the voice and text prompts to tell you that a shock is advised.

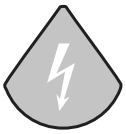
Step 3: Shock delivery

First, make sure that no one is touching the patient or the pads. While the FR2+ is charging, it continues to analyze the patient's heart rhythm. If the rhythm changes and a shock is no longer appropriate, the FR2+ disarms. Voice and text prompts advise you what action to take.

There are four ways you can tell that the defibrillator is ready to deliver a shock:

- you hear a voice prompt telling you to deliver a shock,
- you see the Shock button flashing,
- you hear a steady tone, and/or
- you see a text prompt telling you to press the orange (Shock) button.

Press the Shock button to deliver the shock.



IMPORTANT: You must press the button for a shock to be delivered. The HeartStart FR2+ Defibrillator will not automatically deliver a shock. This safety feature allows you to verify that the patient is clear before a shock is delivered.

NOTE: If you do not press the Shock button within 30 seconds of being prompted, the HeartStart FR2+ will disarm itself and provide a pause. It will resume analyzing heart rhythm after 30 seconds or when the Resume Analyzing key is pressed.

After you press the Shock button, a voice prompt tells you the shock was delivered. Then the FR2+ pauses to allow you to perform CPR. The duration of this CPR interval is determined by the CPR Timer setting.

CPR Interval

After telling you that it has paused, the FR2+ gives no more voice prompts during the CPR interval, so that you can provide uninterrupted patient care. During the CPR interval, the FR2+ screen shows a bar that fills in as the CPR interval is used up. The HeartStart FR2+ M3860A also displays the ECG, if enabled, during this period.

NOTE: It is important to perform CPR for the entire duration of the CPR interval, until you hear the voice prompt telling you to stop CPR.

ECG display for ongoing observation

At the discretion of emergency care personnel, the HeartStart FR2+ M3860A with ECG display enabled can also be used with the M3873A/M3874A FR2+ ECG assessment module to provide a non-diagnostic ECG display of the patient's heart rhythm for attended patient monitoring. The system is intended for use on a conscious or breathing patient, regardless of age. While connected to the FR2+ ECG assessment module, the FR2+'s shock capability is disabled, but the FR2+ continues to evaluate the patient's ECG. There are no known contraindications to use of the FR2+ ECG assessment module.

The module is designed for connection to ECG electrodes per AAMI (M3873A) or IEC (M3874A) color convention. The module's colored leadwires are connected to ECG electrodes, which are then placed on the patient's bare chest, and the module's device connector is inserted in the FR2+'s connector socket.

NOTE: It is not necessary to turn the FR2+ Defibrillator off prior to connecting the ECG assessment module.

Once connected, the HeartStart FR2+ displays and evaluates the patient's ECG (Lead II). Follow all prompts from the defibrillator. If a data card is used when the ECG assessment module is connected, all recorded events can be viewed using one of the Event Review data management software products.

Check the patient if:

- indicated by the observed ECG display,
- the patient becomes unresponsive or stops breathing, or
- the FR2+ prompts IF NEEDED, ATTACH DEFIBRILLATION PADS.

If appropriate, unplug the ECG assessment module from the FR2+, attach the defibrillator pads to the patient, and connect the defibrillator pads to the FR2+. Verify that the defibrillator pads are at least one (1) inch (2.5 cm) away from the ECG electrodes.

WARNING: During defibrillation, air pockets between the skin and defibrillator pads can cause patient skin burns. To help prevent air pockets, make sure defibrillator pads completely adhere to the skin.

WARNING: Do not let the defibrillator pads touch each other or other ECG electrodes, lead wires, dressings, transdermal patches, etc. Such contact can cause electrical arcing and patient skin burns during defibrillation and may divert defibrillating current away from the heart.

WARNING: Handling or transporting the patient during heart rhythm analysis can cause an incorrect or delayed diagnosis. If the FR2+ gives a SHOCK ADVISED prompt, keep the patient as still as possible for at least 15 seconds so the HeartStart FR2+ can reconfirm the rhythm analysis before a shock is delivered.

WARNING: CPR rates significantly above 100 compressions per minute can cause incorrect or delayed analysis by the FR2+. Under certain circumstances, this may result in a prompt to stop all movement so that the device can confirm rhythm analysis.

WARNING: Defibrillation current can cause operator or bystander injury. Do not touch the patient during defibrillation. Do not allow the defibrillator pads to touch any metal surfaces. Disconnect the pads connector from the FR2+ before using any other defibrillator.

CAUTION: Aggressive handling of the pads in storage or prior to use can damage the pads. Discard the defibrillator pads if they become damaged.

CAUTION: Do not place the pads directly over an implanted pacemaker or defibrillator. A noticeable lump with a surgical scar should indicate its position.

4 Maintaining, Testing, and Troubleshooting

Maintenance

Maintenance of the FR2+ is very simple, but it is a very important factor in its dependability. When in standby mode (with the battery installed), the FR2+ performs many maintenance activities itself. These include daily and weekly selftests to verify readiness for use and more detailed monthly selftests that also verify the shock waveform delivery system. In addition, each time the FR2+ is first turned on, it executes a selftest. Further, a detailed battery insertion selftest is run whenever a battery is installed in the FR2+.

The FR2+ requires no calibration or verification of energy delivery. The FR2+ has no user-serviceable parts.

CAUTION: Improper maintenance may damage the FR2+ or cause it to function improperly. Maintain the FR2+ only as described in these Instructions for Use or as designated by your program's Medical Director.

CAUTION: Electrical shock hazard. Dangerous high voltages and currents are present. Do not open the FR2+, remove its covers, or attempt repair. There are no user-serviceable components in the FR2+. The FR2+ should be returned to Philips for repair.

Suggested maintenance schedule

The following table presents a sample maintenance schedule for the FR2+. Different frequency intervals may be appropriate, depending upon the environment in which the FR2+ is used. The required maintenance frequency is at the discretion of your program's Medical Director.

daily	monthly	maintenance task/response
✓		Check the Status Indicator. If you see the flashing black hourglass: The FR2+ is ready to use. No action required. If you see anything other than a flashing black hourglass, remove and reinstall the battery to run the selftest. • If the selftest passes and the Status Indicator shows the flashing black hourglass, the FR2+ is ready to use. • If the selftest fails, install a new battery and run the selftest. If the selftest passes, the FR2+ is ready to use. If the selftest fails, contact Philips Medical Systems. • If the selftest does not run, check to be sure that there is no pads connector installed in the FR2+.
	✓	Check supplies, accessories, and spares for damage and expiration dating. Do not use damaged or expired accessories. Replace them immediately. If a LOW BATTERY or REPLACE BATTERY message is displayed: Replace the battery and run the selftest. • Do not attempt to charge the M3863A FR2 standard battery. It is not rechargeable. • The M3848A FR2+ battery is rechargeable. Recharge it, using the M3849A Charger only.
	✓	Check the outside of the FR2+ and the connector socket for cracks or other signs of damage. If you see signs of damage: Contact Philips for technical support.

After using the HeartStart FR2+

After each use of the FR2+, in addition to the maintenance tasks described in the table above, perform the following post-use checks before returning the FR2+ to service:

- Check the operation of the FR2+ by removing and reinstalling the battery and running the battery insertion selftest.
- Check the outside of the FR2+ and the connector socket for signs of dirt or contamination. If the FR2+ is dirty or contaminated, clean it according to the guidelines provided in this manual.

- Check the data card if one has been used. If the data card has been used to record incident data, remove and replace it with a blank data card. Deliver the recorded data card to appropriate personnel according to your local guidelines and medical protocol.
- Check the connector socket to make sure that defibrillator pads are disconnected from the FR2+ when it is not in use.
- Check to make sure the data card tray is installed, even if a data card is not being used.

Cleaning the HeartStart FR2+

The outside of the FR2+, including the defibrillator pads connector socket, can be cleaned with a soft cloth dampened in one of several appropriate cleaning agents (see list below). The following guidelines include some important reminders:

- Do not immerse the FR2+ in fluids.
- Make sure a battery (or the M3864A Training & Administration Pack) and a data card tray are installed when cleaning the FR2+, to keep fluids out of the device.
- Do not use abrasive materials, cleaners, strong solvents such as acetone or acetone-based cleaners, or enzymatic cleaners.
- Clean the FR2+ and the connector socket with a soft cloth dampened with one of the cleaning agents listed below.
  - Isopropyl alcohol (70% solution)
  - Soapy water
  - Chlorine bleach (30 ml/l water)
  - Ammonia-based cleaners
  - Glutaraldehyde-based cleaners
  - Hydrogen peroxide

CAUTION: Do not immerse any portion of the FR2+ in water or other fluids. Do not allow fluids to enter the FR2+. Avoid spilling any fluids on the FR2+ or accessories. Spilling fluids into the FR2+ may damage it or present a fire or shock hazard. Do not sterilize the FR2+ or accessories.

Operator's checklist

The following checklist is for your reference. You may want to photocopy it or use it as the basis for creating your own checklist.

OPERATOR'S CHECKLIST

HeartStart FR2+ Model No.: _____ Serial No.: _____

HeartStart FR2+ Location or Vehicle ID: _____

Date							
Scheduled frequency							
HeartStart FR2+ Clean, no dirt or contamination; no signs of damage							
Supplies available • Two sets defibrillator pads, sealed, undamaged, within expiration date • Ancillary supplies (hand towel, scissors, razor, pocket mask, gloves) • Spare M3863A battery, within "Install Before" date • Data cards, undamaged, and spare data card tray							
Status indicator Shows alternating hourglass/square; selftest passed.							
Inspected by Signature or initials of operator completing the maintenance inspection							
Remarks, problems, corrective actions							

Testing

The HeartStart FR2+ Defibrillator has several ways of testing itself and alerting you if it finds a problem. In addition to the selftest performed each time it is turned on and each time a battery is installed, the FR2+ also automatically performs periodic selftests daily.

NOTE: The FR2+ selftests are designed to check that the FR2+ is ready for use. However, in the event that the FR2+ has been dropped or mishandled, it is recommended that the battery be removed and reinstalled to initiate a selftest. If the FR2+ has visible signs of damage, contact Philips for technical support.

Battery insertion selftest

Before running the battery insertion selftest, be sure that neither the defibrillator pads nor the FR2+ ECG assessment module are connected to the device. When you insert the battery, the main menu is displayed and a two-part selftest will run unless you make another selection from the menu* within 10 seconds. The selftest includes an automatic part and an interactive part.

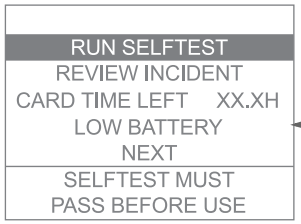
NOTE: The menu screen *will not* appear when a battery is inserted if:
- the defibrillator pads are attached to a patient, indicating that the FR2+ is in use,
- the FR2+ ECG assessment module is connected to the FR2+, or
- the battery is completely depleted.

If less than five minutes have passed since the FR2+ was last used, the menu screen *will* be displayed, but after 10 seconds the FR2+ will go to standby mode if you make no selection.

To run the battery insertion selftest, remove and reinstall the battery. The screen tells you whether or not a data card is installed. If it is, a screen message displays how much recording time is left until the data card is full.

* To move around the menus displayed, use the Option buttons as follows:
- Press the lower Option button to move the highlight bar from one item to another on the menu.
- Press the upper Option button to select the highlighted item or to scroll through the settings for that item.

NOTE: The data card is typically capable of storing a number of incidents. However, it is recommended that it be cleared or replaced after every use. In the unlikely event that the card fills up during an incident, no further data can be recorded, so it is important for you to monitor the CARD TIME LEFT information on this screen.



Text prompts tell you if the battery power is low. If so, replace the battery. If a previous selftest has failed, the screen displays a message that the FR2+ must pass a selftest before being used.

It is a best practice to always have a spare battery available. However, if you do not have a spare battery when a screen display prompts you to replace the battery or the Status Indicator shows a flashing red **X**, you can continue to use the FR2+ until the battery is completely depleted. This may be necessary in an emergency.

NOTE: The M3848A FR2+ rechargeable battery should not be used as a spare or backup battery.

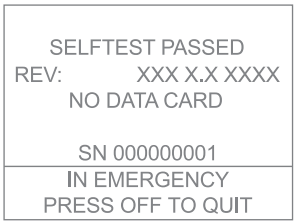
NOTE: If you connect defibrillator pads (that are applied to the patient) or the FR2+ ECG assessment module to the FR2+ during a battery insertion selftest, the selftest will stop and the FR2+ will go to its standby mode to be ready for use.

During the automatic part of the selftest, the screen displays a bar that fills in as the test continues. When that part of the test is finished, the FR2+ beeps. If a data card was inserted in the FR2+ prior to installing the battery, the results of the selftest are automatically recorded on the data card.

If the automatic part of the selftest detects a problem:

- The screen displays a message that the selftest has failed. After a short time, an error code is displayed. Write down the error code and serial number.
- The Status Indicator shows a flashing or solid red **X**.

Replace the battery with a new battery and repeat the test. If the second selftest fails, contact Philips for technical support.

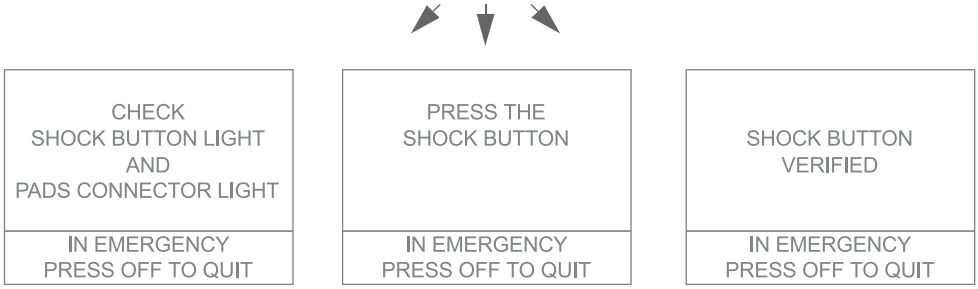


If the automatic part of the selftest passes:

- The screen displays a message that the selftest passed, then begins the interactive part of the test.

The interactive part of the selftest requires you to respond to prompts in order to make sure the display, buttons, lights, and speaker on the FR2+ are working properly.

Text prompts guide you through a series of steps in the interactive part of the selftest. Some ask you to observe that a feature of the FR2+ works properly. Others ask you to take certain actions — for example, to press a button. The screen then displays a message showing that the button's operation has been verified. If you do not press the button, or if you do but the button is not working, the screen displays a message that the button's function is not verified.

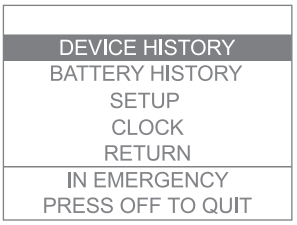


If something does not work correctly — for example, if lights do not come on or you do not hear beeps when expected — make a note of the problem and contact Philips for technical support.

NOTE: Do not use the FR2+ if any parts of the interactive selftest indicate a problem. Be sure to note and report any problems you find.

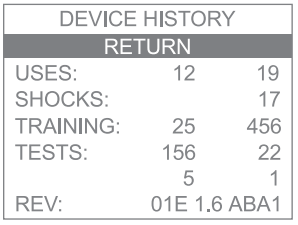
When the interactive part of the battery insertion selftest is complete, the FR2+ turns off and goes to standby mode to be ready for use.

If it detects a problem during any selftest, the FR2+ beeps and displays a flashing red **X** or a solid red **X** on the Status Indicator.



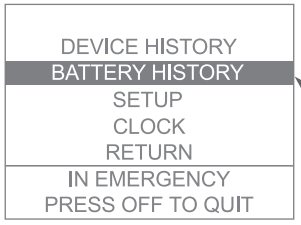
Device history

The FR2+ stores key information about its history in internal memory. To review the history of your FR2+, select NEXT from the main menu screen displayed when you insert the battery, then select DEVICE HISTORY from the next menu displayed.



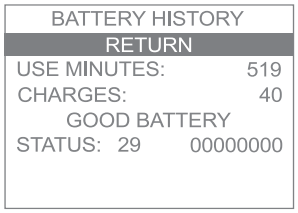
The device history information includes:

- USES — how many times the FR2+ has been used (shown in the left column of numbers) and the total time in minutes it has been used (shown in the right column of numbers);
- SHOCKS — the total number of shocks it has delivered;
- TRAINING — how many times it has been used with the Training & Administration Pack for training (left column) and the total time in minutes it has been used for training (right column); and
- TESTS — how many tests have been run. Four figures are shown: daily (upper left), weekly (upper right), and monthly (lower left) periodic selftests, and battery insertion selftests (lower right).
- REV — device model, software version and language.



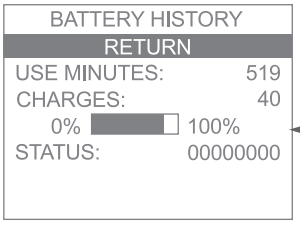
Battery History

Information about use of the battery currently installed in your FR2+ is also available. To review the history of the battery, select NEXT from the menu screen displayed when you insert the battery, then select BATTERY HISTORY from the next menu displayed.



The battery history information is read from the internal memory of the battery. It includes:

- USE MINUTES — the total operating time (in minutes), including selftest time, for this battery;
- CHARGES — the total number of full defibrillation charges that have been provided by this battery, including selftest charges;
- BATTERY READINESS — a GOOD BATTERY message (M3863A) or a fuel gauge display (M3848A) showing 25%, 50%, 75% or 100%, or a LOW BATTERY or REPLACE BATTERY message, as appropriate.



- STATUS — the current status of the M3863A battery. Make a note of this code if technical service is needed.

Troubleshooting Guide

Status indicator summary

status indicator	meaning
Flashing black hourglass	The FR2+ passed the battery insertion selftest or the last periodic selftest and is therefore ready for use.
Flashing red **X** accompanied by a chirping sound.	A selftest error has occurred or the battery power is low.
Solid red **X**	The battery is completely depleted or a selftest failure occurred.

Recommended action during an emergency

If the status indicator displays the flashing black hourglass, follow all voice and text prompts.

The HeartStart FR2+ Defibrillator is designed to deliver therapy even if the status indicator displays a flashing red **X**, although the device may not perform to all of its specifications. Voice and text prompts should be followed whenever they are given. If for any reason you cannot hear voice prompts during use of the defibrillator, periodically check the device screen for text prompts.

NOTE: After completing emergency use of the FR2+, if you are unable to clear the problem as described in this Troubleshooting section, and the Status Indicator does not show the flashing black hourglass, contact Philips for technical support.

In the unlikely event that the device becomes unresponsive during use:

1. cycle power (press the On/Off button once, wait one second, then press it again), or
2. remove and reinstall the battery (use a new M3863A FR2 standard battery, if available, or a charged M3848A FR2+ rechargeable battery).

If neither of these actions clears the problem, do not use the FR2+. Attend to the patient, providing CPR if needed, until emergency medical personnel arrive.

NOTE: Perform CPR (if needed) any time there is a delay before or an interruption in use of the FR2+.

Troubleshooting during patient use

symptom	possible cause	recommended action
STATUS INDICATOR: FLASHING RED **X**		
Screen and voice prompts: LOW BATTERY Screen and voice prompts: REPLACE BATTERY NOW	• The energy remaining in the battery is low but sufficient to deliver a shock. • The energy in the battery is nearly depleted. The FR2+ will turn off if a new battery is not installed.	Replace the battery with a new M3863A FR2 standard or a charged M3848A FR2+ rechargeable battery as soon as possible.
STATUS INDICATOR: FLASHING BLACK HOURGLASS		
Screen and voice prompts: APPLY PADS PRESS PADS FIRMLY or PLUG IN CONNECTOR Or voice prompts: INSERT CONNECTOR FIRMLY or PRESS PADS FIRMLY TO PATIENT'S BARE CHEST or POOR PADS CONTACT	• The defibrillator pads are not properly applied to the patient, or • The pads are not making good contact with the patient's bare chest because of moisture or excessive hair, or • The pads are touching each other, or • The defibrillator pads connector is not firmly inserted in the connector socket.	• Make sure that the defibrillator pads are sticking completely to the patient's skin. • If the pads are not sticking, dry the patient's chest and shave or clip any excessive chest hair. • Reposition the pads. • Make sure the pads connector is completely inserted in the connector socket. If the prompt continues after you do these things, replace the pads.
Voice and text prompts: REPLACE PADS	• The defibrillator pads, cable, or connector may be damaged. • The FR2+ has detected a possible problem with the defibrillator pads or pads cable.	Replace the defibrillator pads with new defibrillator pads.

symptom	possible cause	recommended action
Voice prompts: ANALYZING INTERRUPTED or STOP ALL MOTION or CANNOT ANALYZE	• The patient is being moved or jostled.	• Stop CPR; do not touch the patient. Minimize patient motion. If the patient is being transported, stop the vehicle if needed.
	• Radio or electrical sources are interfering with ECG analysis.	• Check for possible causes of radio and electrical interference and remove them from the area.
	• The environment is dry and movement around the patient is causing static electricity to interfere with ECG analysis.	• Responders and bystanders should minimize motion, particularly in dry environments that can generate static electricity.
Voice and text prompts: NO SHOCK DELIVERED	The patient impedance is not within the specifications for the FR2+ to deliver a shock.	• Make sure the defibrillator pads are correctly positioned on the patient according to the diagram on the back of the pads. • Make sure the defibrillator pads connector is completely inserted in the connector socket. • Press the defibrillator pads firmly to the patient's chest. • Replace the defibrillator pads if necessary.
Voice prompt: SHOCK BUTTON NOT PRESSED	Shock has been advised but not delivered within 30 seconds. (FR2+ has been disarmed.)	When next prompted, press the Shock button to deliver shock.

General troubleshooting

symptom	possible cause	recommended action
Status Indicator: FLASHING RED **X** Audio signal: CHIRPING	• The energy remaining in the battery is low. (Nine shocks remain when the flashing red **X** first appears.)	• Replace battery with a new M3863A FR2 standard or a charged M3848A FR2+ rechargeable battery as soon as possible.
	• The FR2+ has been stored outside the recommended temperature range.	• Remove and reinstall the battery and run a battery insertion selftest. A text prompt will tell you if the FR2+ has been stored outside the recommended temperature range. (See Appendix B for recommended range.)
	• An error has been detected as part of the selftest.	• Remove and reinstall the battery and perform the battery insertion selftest. If it fails, install a new battery and repeat the test. If it fails again, do not use the FR2+.
	• The FR2+ has been unable to perform its daily selftests.	• Make sure defibrillator pads are not attached to the FR2+.
Status Indicator: FLASHING OR SOLID RED **X** Audio signal: CHIRPING Text prompt (displayed for 10 seconds at the end of a BIT, before FR2+ turns off): NOT READY FOR USE or SELFTEST FAILED	A test revealed a failure or error. The FR2+ performs selftests every time it is turned on, when a battery is inserted, and periodically while it is in standby mode.	• Unplug the pads connector from the FR2+, if connected. • Remove and reinstall the battery and check the results of the battery insertion selftest. If it fails, install a *new* M3863A FR2 standard battery or a charged M3848A FR2+ rechargeable battery and repeat the test. If it fails again, do not use the FR2+. *NOTE: You can stop the tests and use the FR2+ as soon as you see the Status Indicator change to the flashing black hourglass. Simply press the On/Off button to stop the test and put the FR2+ into standby mode. The FR2+ is then ready for use.*

symptom	possible cause	recommended action
Status Indicator: SOLID RED **X** Audio signal: NONE	• The battery is missing or completely depleted.	• Install a *new* M3863A FR2 standard battery or a charged M3848A FR2+ rechargeable battery in the FR2+ and perform the battery insertion test (BIT).
	• The Training & Administration Pack is being used in the administration function (the solid red **X** is normal in this case) or has been left in the FR2+ by mistake.	• Remove the Training & Administration Pack and install a battery.
	• A selftest detected a failure.	• Remove and reinstall the battery and perform the battery insertion selftest. If it fails, install a *new* M3863A FR2 standard battery or a charged M3848A FR2+ rechargeable battery and repeat the test. If it fails again, do not use the FR2+.
Status Indicator: SOLID RED **X** Audio signal: CHIRPING	• The Training & Administration Pack is being used in the ADMINISTRATION function and more than 10 minutes have passed without user interaction (button press or pads change).	• To continue using the Training & Administration Pack, press any button (except On/Off).
	• The Training & Administration Pack is being used in the TRAINING function and more than 30 minutes have passed without user interaction (button press or pads change).	• To return the FR2+ to standby mode, remove the Pack and install a battery.
Status Indicator: NONE	The FR2+ has been physically damaged.	• Check for visible damage. Do not use the FR2+ if it appears to be damaged. • Remove and reinstall the battery to perform the battery insertion selftest. If it fails, install a *new* M3863A FR2 standard battery or a charged M3848A FR2+ rechargeable battery and repeat the test. If it fails again, do not use the FR2+.

Notes

5 Safety Considerations

You should be aware of the safety concerns listed here when you use the HeartStart FR2+. Read them carefully. You will also see some of these messages in other parts of this manual. The messages are labeled Danger, Warning, or Caution.

- DANGER— immediate hazards that will result in personal injury or death.
- WARNING— conditions, hazards, or unsafe practices that can result in serious personal injury or death.
- CAUTION — conditions, hazards, or unsafe practices that can result in minor personal injury, damage to the HeartStart FR2+, or loss of data stored in the device.

These safety considerations are divided into four groups: safety concerns about the HeartStart FR2+ in general use, defibrillation, monitoring, and maintenance activities. Unless otherwise noted, the dangers, warnings, and cautions listed in the following tables apply to the FR2+ M3860A and M3861A.

General dangers, warnings, and cautions

safety level	possible shock or fire hazard, or explosion
DANGER	THERE IS A POSSIBILITY OF EXPLOSION IF THE HEARTSTART FR2+ IS USED IN THE PRESENCE OF FLAMMABLE ANESTHETICS OR CONCENTRATED OXYGEN. MOVE SUPPLEMENTAL OXYGEN AND OXYGEN DELIVERY DEVICES AWAY FROM THE DEFIBRILLATION PADS. HOWEVER, IT IS SAFE TO USE THE FR2+ ON SOMEONE WEARING AN OXYGEN MASK.
DANGER	THE HEARTSTART FR2+ HAS NOT BEEN EVALUATED OR APPROVED FOR USE IN HAZARDOUS LOCATIONS AS DEFINED IN THE NATIONAL ELECTRICAL CODE (ARTICLES 500-503). IN ACCORDANCE WITH THE IEC CLASSIFICATIONS (SECTION 5.5.), THE HEARTSTART FR2+ IS NOT TO BE USED IN THE PRESENCE OF FLAMMABLE SUBSTANCE/AIR MIXTURES.
DANGER	DO NOT RECHARGE THE M3863A FR2 STANDARD BATTERY.
WARNING	Use the HeartStart FR2+ only as described in this manual. Improper use of the HeartStart FR2+ can cause death or injury. Do not press the Shock button if the defibrillator pads are touching each other or are open and exposed.

safety level	possible shock or fire hazard, or explosion
CAUTION	Hazardous electrical output. The HeartStart FR2+ is for use only by qualified personnel.
CAUTION	Do not immerse any portion of the HeartStart FR2+ in water or other fluids. Do not allow fluids to enter the HeartStart FR2+. Avoid spilling any fluids on the HeartStart FR2+ or accessories. Spilling fluids into the HeartStart FR2+ may damage it or present a fire or shock hazard. Do not sterilize the HeartStart FR2+ or accessories.

safety level	possible improper device performance
WARNING	Prolonged or aggressive CPR to a patient with defibrillator pads attached can damage the pads. Replace the defibrillator pads if they are damaged during use or handling.
WARNING	Using damaged or expired equipment or accessories may cause the HeartStart FR2+ to perform improperly, and/or injure the patient or the user.
WARNING	CPR rates significantly above 100 compressions per minute can cause incorrect or delayed analysis by the HeartStart FR2+. Under certain circumstances, this may result in a prompt to stop all movement so that the device can confirm rhythm analysis.
WARNING	Poor electrode pad-to-patient contact may result in a related defibrillator prompt or other indication. Check all electrical and patient connections.
CAUTION	The HeartStart FR2+ is designed to be used only with Philips-approved accessories. The HeartStart FR2+ may perform improperly if non-approved accessories are used.
CAUTION	Follow all instructions supplied with the HeartStart defibrillator pads. Use the defibrillator pads before the expiration date shown on the package. Do not reuse the defibrillator pads. Discard them after use.
CAUTION	Aggressive handling of the defibrillator pads in storage or prior to use can damage the pads. Discard the defibrillator pads if they become damaged.
CAUTION	Follow all instructions supplied with the M3863A FR2 standard battery. Install the battery before the “Install by” date shown on the battery.
CAUTION	Follow all instructions supplied with the M3848A FR2+ rechargeable battery. Recharge using the M3849A charger only.
CAUTION	Do not use the M3849A charger on aircraft.
CAUTION	The HeartStart FR2+ was designed to be sturdy and reliable for many different field use conditions. However, excessively rough handling can result in damage to the HeartStart FR2+ or its accessories. Inspect the unit and accessories periodically according to instructions.

safety level	possible improper device performance
CAUTION	Alteration of the factory default setup of the FR2+ can affect its performance and should be performed under the authorization of your Medical Director. Modifications to device operation resulting from changes to the default settings should be specifically covered in user training.
CAUTION	Use only Philips-approved data cards. The HeartStart FR2+ may record improperly if a non-approved data card is used. Install empty data card after each use to avoid loss of data.

safety level	possible electrical interference with ECG monitoring
WARNING	Radio-frequency (RF) interference from devices such as cellular phones and two-way radios can cause improper HeartStart FR2+ operation. The HeartStart FR2+ should be used at least 6 feet (2 meters) away from RF devices, as stated in accordance with EN 61000-4-3:2002.

Defibrillation warnings and cautions

safety level	possible shock hazard
WARNING	Defibrillation current can cause operator or bystander injury. Do not touch the patient during defibrillation. Do not allow the defibrillator pads to touch any metal surfaces. Disconnect the pads connector from the HeartStart FR2+ before using any other defibrillator.
WARNING	Before delivering a shock, it is important to disconnect the patient from other medical electrical equipment, such as blood-flow meters, that may not incorporate defibrillation protections. In addition, make sure the pads are not in contact with metal objects such as a bedframe or stretcher.

safety levels	possible ECG misinterpretation
WARNING	For patient safety reasons, some very low-amplitude or low-frequency heart rhythms may not be interpreted by the HeartStart FR2+ as shockable VF rhythms. Also, some VT rhythms may not be interpreted as shockable rhythms.
WARNING	Handling or transporting the patient during heart rhythm analysis can cause an incorrect or delayed diagnosis. If the HeartStart FR2+ gives a shock advised prompt, keep the patient as still as possible for at least 15 seconds so the HeartStart FR2+ can reconfirm the rhythm analysis before a shock is delivered.

safety levels	possible burns and ineffective energy
WARNING	Do not allow the defibrillator pads to touch each other or other ECG electrodes, lead wires, dressings, transdermal patches, etc. Such contact can cause electrical arcing and patient skin burns during defibrillation and may also divert the defibrillation current away from the heart.
WARNING	During defibrillation, air pockets between the skin and defibrillator pads can cause patient skin burns. To help prevent air pockets, make sure defibrillator pads completely adhere to the skin. Do not use dried out pads.

safety level	possible patient injury
CAUTION	The HeartStart FR2+ advanced mode's manual charge feature is intended for use only by authorized operators who have been specifically trained in cardiac rhythm recognition and in defibrillation therapy using manual charge and shock delivery.

Monitoring cautions

safety level	possible misinterpretation of ECG recordings
CAUTION	The LCD screen on the HeartStart FR2+ model M3860A is intended only for basic ECG rhythm identification. The frequency response of the monitor screen is not intended to provide the resolution needed for diagnostic and ST segment interpretation.

Maintenance cautions

safety level	possible fire or shock hazard
CAUTION	Electrical shock hazard. Dangerous high voltages and currents are present. Do not open the HeartStart FR2+, remove its covers, or attempt repair. There are no user-serviceable components in the HeartStart FR2+. The HeartStart FR2+ should be returned to Philips for repair.
CAUTION	Improper maintenance may damage the HeartStart FR2+ or cause it to function improperly. Maintain the HeartStart FR2+ only as described in these Instructions for Use or as designated by your program's Medical Director.

6 Configuration, Setup, and Advanced Mode Features

Configuration

The FR2+ comes with a factory default configuration designed to meet the needs of most users. If desired, your Medical Director can revise the setup. Some setup parameters govern specific features that are not related to the patient care protocol, some are used to define the automatic patient care protocol used by the FR2+, and some provide options for manual override of the protocol.

NOTE: The configuration features discussed in this manual are for FR2 software version 1.7. Certain functions of this software are new or differ from previous software versions. Contact Philips for information on how to upgrade your FR2 or FR2+ to the latest software version.

In addition, the configuration settings information provided in Edition 5 or earlier of the Training & Administration Pack Instructions for Use is superseded by the information in this chapter. Other directions for use of the Training & Administration Pack provided in its Instructions for Use remain unchanged.

Non-protocol parameters

The following table presents parameters that do not affect the treatment protocol.

parameter	settings	default	description
speaker volume	1, 2, 3, 4, 5, 6, 7, 8	8	Sets volume of the FR2+'s speaker. 1 is lowest; 8 highest. The speaker is used for voice prompts and the armed-for-shock tone.
record voice	yes, no	no	Enables or disables the audio recording during incident. Voice recording requires use of a data card.
ECG display	on, off	on	Enables (ON) or disables (OFF) ECG display on the screen of the M3860A only. FR2+ rhythm analysis does not require ECG display to be on. (ECG display cannot be changed from the default, OFF, for M3861A.)
ECG Out	on, off	off	Enables (ON) or disables (OFF) ECG data transmission from the infrared communications port of the FR2+. ECG data can be sent even if ECG display is disabled or (M3861A) unavailable. *NOTE: If ECG out is set to ON,* ***autosend PST*** *is automatically set to OFF.*

parameter	settings	default	description
autosend PST	N/A	on	No longer configurable. Transmission of the results of the FR2+'s periodic selftests (PST) from its infrared communications port is always on.

Automatic protocol parameters

The HeartStart FR2+ is designed to follow an automatic patient care protocol defined by the parameters in the following table. Many of these parameters interact with each other, so it is very important to understand how each parameter affects the protocol. The description of each parameter identifies any interacting parameters in **boldface type**.

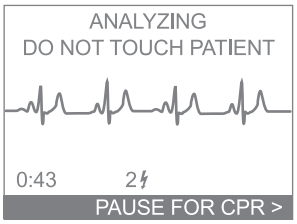
parameter	settings	default	description
shock series	1, 2, 3, 4	1	Sets the number of shocks that must be delivered to activate an automatic CPR interval. A new Shock Series begins when a shock is delivered: • after the FR2+ is turned on • after the automatic CPR interval, or • after the **Pause Key** (if enabled) has been pressed, or • (with shock series set to a non-default value) if the time since the previous shock exceeds the **protocol timeout** setting.
protocol timeout (minutes)	0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, ∞ (infinite)	1.0	Sets the time interval used to determine if a delivered shock should be counted as part of the current shock series. This parameter is relevant only when the **shock series** is set to a non-default value.
CPR timer (minutes)	0.5, 1.0, 1.5, 2.0, 2.5, 3.0	2.0	Sets the length of the CPR Interval as well as **CPR First** and manually initiated pauses. After the CPR Interval, the FR2+ returns to automatic rhythm analysis. *NOTE: The actual CPR Interval may be up to 10 seconds longer than the selected setting, to allow time for initial voice prompting.*

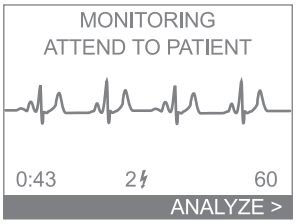
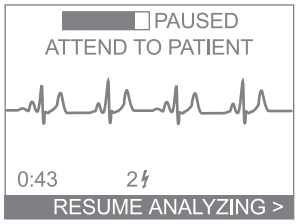
parameter	settings	default	description
NSA action (No Shock Advised action) (minutes)	monitor, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0	2.0	Sets how the FR2+ behaves during ongoing care of patients not in a shockable rhythm. MONITOR — provides continuous background analysis of the non-shockable rhythm. However, if the ECG changes, the FR2+ automatically leaves monitoring mode and begins rhythm analysis to determine if a shock is needed. When the ECG display is enabled or the user puts the device into the advanced mode, the patient's heart rate is displayed during background monitoring. *NOTE: CPR may interfere with background heart rhythm monitoring by the FR2+ in monitoring mode. during CPR, periodically pause for 15 seconds to reassess the patient and allow the FR2+ to analyze the patient's heart rhythm without possible interference from CPR artifact.* TIME SETTING — provides patient care pause intervals of the selected duration, alternating with rhythm analysis. *NOTE: If a shock series is set to a non-default value and an NSA decision occurs within a partially complete shock series, the CPR timer setting overrides the NSA Action.*

parameter	settings	default	description
CPR First	no, auto1, auto2, user	no	Enables a Medical Director to configure the FR2+ to provide the opportunity for an interval of uninterrupted CPR prior to defibrillation. This parameter has been developed in response to research findings that some SCA patients — especially those presenting in fine VF (typical of long down time) — are not likely to experience a return to spontaneous circulation following an immediate shock. The SMART CPR AUTO1 and AUTO2 settings automate the decision of whether to provide CPR first or deliver a shock first, based on characteristics of the presenting arrhythmia. *NOTE: Refer to Appendix E for detailed guidance on choosing a setting.* NO (default) — CPR First option is disabled; FR2+ will not provide an initial CPR interval. SMART CPR AUTO1 — Provides immediate defibrillation for more than 90% of shockable patients who are likely to achieve ROSC (less than 10% receive CPR first). Of those shockable patients who are unlikely to achieve ROSC, more than 50% will receive CPR first. SMART CPR AUTO2 — Provides immediate defibrillation for more than 80% of shockable patients who are likely to achieve ROSC (less than 20% receive CPR first). Of those shockable patients who are unlikely to achieve ROSC, more than 60% will receive CPR first. USER (User-initiated CPR Interval) — This setting provides a protocol under which responders decide whether to perform CPR first. If so, the responder presses the CPR Pause key to initiate a CPR interval. The FR2+ will continue with rhythm analysis unless the CPR Pause key is pressed. The duration of the CPR First interval for AUTO1 and AUTO2 and USER is determined by the **CPR Timer** parameter.
CPR prompt	long, short	short	Sets the level of detail provided in the CPR reminder voice prompts provided at the start of a CPR interval or **CPR First** interval (User setting). LONG — prompts the user to assess the patient before beginning CPR. SHORT — simply directs user to begin CPR.
monitor prompt interval (minutes)	1.0, 1.5, 2.0, 2.5, 3.0, ∞ (infinite)	1.0	Sets the interval for patient care prompts provided during FR2+ monitoring of the patient's ECG following an NSA decision. Selection of ∞ (infinite) means that no repeat prompting will be provided during ECG monitoring. This parameter only applies when the **NSA action** is set to monitor.

Manual override parameters

The parameters in the following table are used to enable different kinds of manual override.

parameter	settings	default	description
advanced	off, analyze, charge	off	Enables or disables advanced mode entry for ALS or tiered-response systems. OFF — disables advanced mode features. ANALYZE — enables user-initiated rhythm analysis and disarm, and (M3860A only) automatically turns on ECG display when advanced mode is entered. CHARGE (M3860A only) — in addition to enabling the analyze feature, enables user-initiated charging and disarming.
pause key	on, off	off	Enables (ON) or disables (OFF) a user-initiated CPR interval in the automatic protocol. The interval length is defined by the **CPR timer** setting. The pause key is disabled when an advanced mode feature (analyze or charge) is enabled and accessed, and during Monitoring. If either the **CPR timer** or the **NSA action** setting is programmed to 2.5 minutes or longer, the Resume Key setting is automatically enabled (on). The Resume Key is always automatically enabled for any **CPR First** interval. OFF — disables availability of user-initiated pause. ON — enables user-initiated pause by pressing the lower Option button indicated by an arrow on the FR2+ display, at any time except when the device is monitoring or is already paused. If enabled, the pause is initiated by pressing the lower Option button indicated by an arrow on the FR2+ display, as shown in the sample screen. 

parameter	settings	default	description
resume key	on, off	off	Enables (ON) or disables (OFF) user-initiated interruption of CPR and patient care intervals and return to analyzing, by pressing the lower Option button indicated by an arrow on the FR2+ display. If either the **CPR timer** or the **NSA action** setting is programmed to 2.5 minutes or longer, the Resume Key setting is automatically enabled (ON). The Resume Key is always automatically enabled for any CPR First interval. If enabled, analysis is initiated by pressing the lower Option button indicated by an arrow on the FR2+ display, as shown in the sample screen:  
advanced use prompt interval (minutes)	0.5, 1.0, 1.5, 2.0, 2.5, 3.0	0.5	Sets the interval for patient care prompts provided during advanced mode operation.

Using setup features

NOTE: To move around the menus displayed, use the Option buttons as follows:

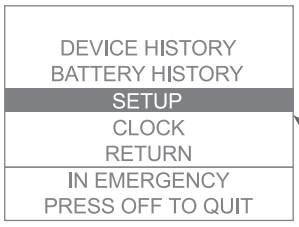
- Press the LOWER Option button to move the highlight bar from one item to another on the menu.
- Press the UPPER Option button to select the highlighted item or to scroll through the settings for that item.

The FR2+ comes with a factory default setup designed to meet the needs of most users. The setup feature of the FR2+ lets you review the current setup of your HeartStart FR2+ or install a revised setup if appropriate. To go to the SETUP menu:

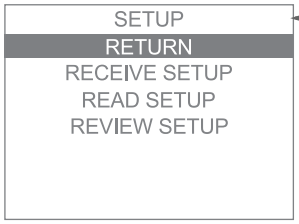
1. Remove and reinstall the battery to bring up the first menu on the screen.

NOTE: This screen will *not* be displayed if the FR2+ is connected to defibrillator pads (that are applied to the patient) when the battery is inserted, and you will not be able to access the menu items. In addition, the battery insertion selftest and periodic automatic selftests cannot run while the defibrillator pads are connected. *Be sure to unplug the pads connector from the FR2+ after each use. Do not store the FR2+ with the pads connected.*

2. Within 10 seconds of installing the battery, press the lower Option button to move the highlight bar to NEXT.



3. Press the upper Option button to select NEXT.
4. Press the lower Option button to move the highlight bar to SETUP.
5. Press the upper Option button to bring up the SETUP menu.

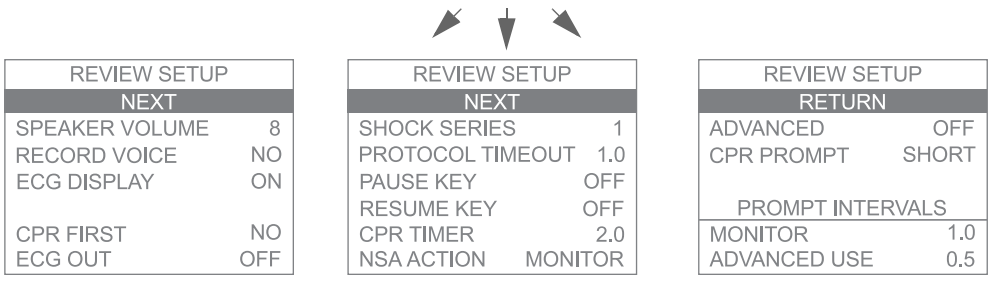


The SETUP menu allows you to receive setup directly from another HeartStart FR2+, read setup from a data card, or review current setup.

Reviewing current setup

A good way to understand the setup of your FR2+ is to review the setup it currently uses.

1. Select REVIEW SETUP from the SETUP menu. The first of a series of REVIEW SETUP screens is displayed.
2. After reviewing the screen contents, press the upper Option button to select NEXT and move to the next screen.
3. The last screen allows you to select RETURN and go back to the SETUP menu.



Revising setup

There are several ways to change the setup of your HeartStart FR2+. All of them require use of products or accessories available separately from Philips Medical Systems.

- Use the M3864A Training & Administration Pack to enable software within the FR2+ to modify its setup. (Instructions are provided with the Pack.)
- Read a revised setup from a data card containing the setup. (Instructions are provided later in this chapter.)
- Use the infrared communications feature of the FR2+ to receive the revised setup from another FR2+. (Instructions are provided later in this chapter.)

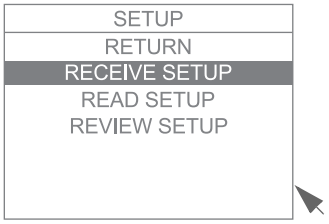
CAUTION: Alteration of the factory default setup of the FR2+ can affect its performance and should be performed under the authorization of your Medical Director. Modifications to device operation resulting from changes to the default settings should be specifically covered in user training.

See the tables describing the various setup parameters at the beginning of this chapter and Appendix D for definitions of setup items.

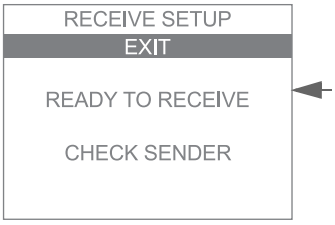
Receiving setup

This method uses the infrared communications feature of the HeartStart FR2+ to receive setup directly from one HeartStart FR2+ (which must have the Training & Administration Pack installed in it) to another. To receive setup from another FR2+, follow these steps:

1. Locate the infrared communications port on each HeartStart FR2+ and line them up with one another, so that the infrared "eye" in each one has an uninterrupted view of the "eye" in the other. (See the diagram on the inside front cover.) The two devices should be no more than 1 meter apart.
2. Make sure the "sending" FR2+ has the Training & Administration Pack installed and is ready to send. (See the M3864A Training & Administration Pack Instructions for Use for directions.)

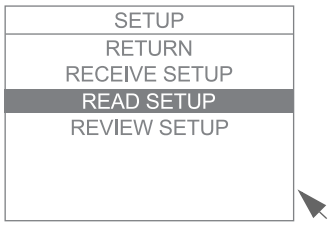


3. Select RECEIVE SETUP from the setup menu:



4. A new screen comes up. Until the two HeartStart FR2+ devices are properly positioned, the screen displays READY TO RECEIVE and prompts you to check the sending FR2+.

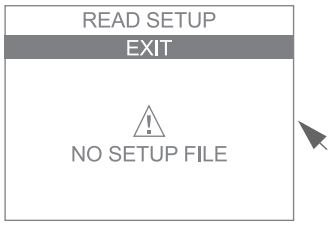
5. Setup data are automatically transferred as soon as the infrared ports are correctly aligned.
6. If you select EXIT before the transfer is complete, the revised setup will *not* be received. When the transfer is complete, the screen on the "receiving" FR2+ displays a SETUP COMPLETE message. Your HeartStart FR2+ immediately uses the new setup.



Reading setup

This method copies setup data from a data card to your HeartStart FR2+. To read the setup, follow these steps:

1. Insert the data card in the data card tray and install the loaded tray into the data card slot in the FR2+, then insert the battery.
2. Select READ SETUP from the setup menu.
3. A new screen comes up. If the FR2+ cannot read the data card or cannot find a valid setup on the data card, the screen displays a NO SETUP FILE error message. Otherwise, the FR2+ begins reading the setup information from the data card immediately.



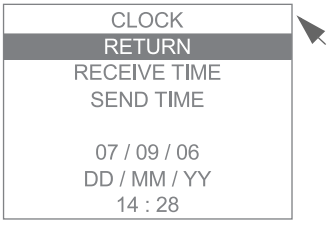
4. If you select EXIT before the transfer is complete or if the data card is not fully inserted into the FR2+, the revised setup will *not* be copied. When the transfer is finished, the screen displays a SETUP COMPLETE message. Your FR2+ immediately uses the revised setup.

Sending and receiving clock settings

To synchronize the clock settings of your HeartStart FR2+ with the clock of another FR2+, you can use the infrared communications feature.

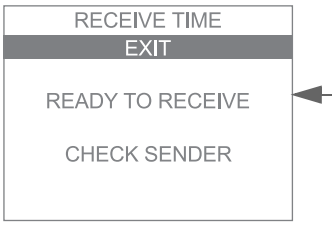
To transfer clock settings from one FR2+ to another:

1. Remove and reinstall the battery of both FR2+ devices to bring up the first menu screen.
2. Select NEXT to go to the second menu screen.



3. Select CLOCK from the second menu screen. The CLOCK screen then comes up.

4. Locate the infrared communications port on each FR2+ and line them up with one another, so that the infrared "eye" in each one has an uninterrupted view of the "eye" in the other. (See the diagram on the inside front cover.) The two devices should be no more than 1 meter apart.
5. Select SEND TIME from the CLOCK screen on the "sending" HeartStart FR2+.
6. Select RECEIVE TIME from the CLOCK screen of the "receiving" FR2+.



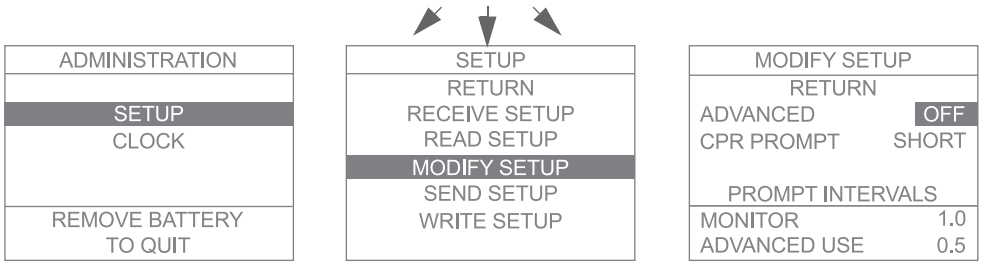
7. A new screen comes up. Until the two FR2+ devices are properly positioned, the screen on the receiving FR2+ displays READY TO RECEIVE and prompts you to check the sending FR2+. The screen on the sending FR2+ displays READY TO SEND and prompts you to check the receiving FR2+.
8. Clock settings are automatically transferred as soon as the infrared ports are correctly aligned.

Using advanced mode features

The HeartStart FR2+ provides an advanced mode that allows responders who are appropriately trained to override the programmed FR2+ protocol and take responsibility for certain aspects of the operating sequence used by the FR2+ to treat the patient.

As described earlier in this chapter, the factory default setup of the FR2+ must be modified to provide access to advanced mode features. This requires use of the administration function of the M3864A Training & Administration Pack.

If you are an expert user authorized by your Medical Director to modify setup, hold down both the Option buttons while installing the Training & Administration Pack in the FR2+, then select SETUP. Then select MODIFY SETUP from the SETUP menu. Select ADVANCED from the third menu of the MODIFY SETUP menu.



Using the upper Option button, scroll through the available settings for ADVANCED. The advanced mode options available are based on the FR2+ model used. For the M3860A, the user can select ANALYZE, CHARGE, or OFF. For the M3861A the user can select only ANALYZE or OFF. (Detailed directions for use are supplied with the Training & Administration Pack.)

CAUTION: Alteration of the factory default setup of the FR2+ can affect its performance and should be performed under the authorization of your Medical Director. Modifications to device operation resulting from changes to the default settings should be specifically covered in user training.

CAUTION: The HeartStart FR2+ advanced mode's manual charge feature is intended for use only by authorized operators who have been specifically trained in cardiac rhythm recognition and in defibrillation therapy using manual charge and shock delivery.

The analyze feature is particularly useful for organizations that include responders who have Basic Life Support (BLS) training as well as more highly trained responders who may be certified in Advanced Life Support (ALS). In such situations, the Medical Director may set up a "tiered-response" system. The HeartStart FR2+ is specifically designed to provide different product features appropriate to each tier of responder.

In a scenario where a BLS responder is the first on the scene of an incident, he or she is trained to treat the patient immediately — for example, to check for breathing and responsiveness; to apply the defibrillator pads and connect them to the HeartStart FR2+; and to follow the voice and text prompts provided by the HeartStart FR2+ in its automated (AED) mode. When an ALS-trained responder arrives, the BLS responder "hands off" the patient's care to the more highly trained responder.

Because these second-tier responders have advanced training and developed clinical skills, they may be authorized to access the advanced mode features of the HeartStart FR2+. These include user-initiated analysis as well as manual charge and disarm control.

Using the manual analyze feature

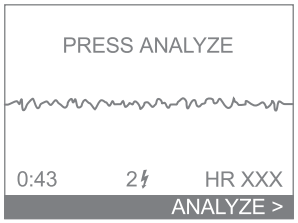
The manual analyze feature is available in both the M3860A and the M3861A models, when enabled in setup.

To enter the advanced mode during use of an FR2+ that has this feature enabled, make sure pads are attached to the patient, then press both Option buttons simultaneously. This brings up a screen that includes a highlighted line at the bottom, labeled ANALYZE, with an arrowhead pointing to the lower Option button.

In the M3861A HeartStart FR2+, the patient's ECG is not displayed; in the M3860A, the display includes the patient's ECG and heart rate.

Press the lower Option button (ANALYZE) to initiate rhythm analysis by the FR2+. If a shock is advised, the FR2+ automatically charges, and prompts you to press the Shock button.

After shock delivery, the HeartStart FR2+ returns to the advanced mode display and monitors the patient's heart rhythm. If a potentially shockable rhythm is detected, the text and voice prompts advise you to PRESS ANALYZE.



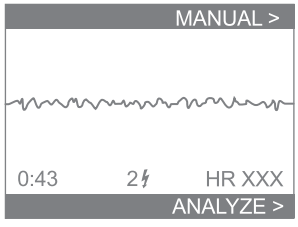
NOTE: If you do *not* press the lower Option button (labeled ANALYZE) to initiate rhythm analysis when prompted, the HeartStart FR2+ does *not* analyze and prompt if a shock is advised. It is important that you understand that entering the advanced mode entails taking responsibility for these functions.

If the rhythm analysis results in a Shock Advised decision, the FR2+ begins charging, prompts you to press the Shock button, and displays a MANUAL DISARM option at the top of the screen. If for any reason you want to cancel the shock, press the upper Option button to disarm the FR2+.

To return to non-manual, AED mode operation, turn the FR2+ off by pressing the On/Off button. Then turn the FR2+ on by pressing the On/Off button again.

Using the manual charge feature (M3860A only)

The manual charge feature is available only in the M3860A, when enabled in setup.

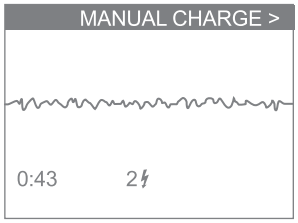


To enter the advanced mode during use of an FR2+ that has this feature enabled, make sure pads are attached to the patient, then press both Option buttons simultaneously. This brings up a screen that includes a highlighted line at the top, labeled MANUAL, with an arrowhead pointing to the upper Option button, and another at the bottom, labeled ANALYZE, with an arrowhead pointing to the lower Option button.

When the advanced mode is entered, display of the patient's ECG and heart rate is automatically initiated.

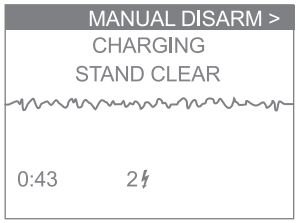
Pressing the lower Option button (ANALYZE) provides user-initiated rhythm analysis as described above. Pressing the upper Option button (MANUAL) brings up a new screen.

The highlighted top line is labeled MANUAL CHARGE, with an arrowhead pointing to the upper Option button.



If the ECG display shows that, in your expert clinical judgment, the patient has a shockable rhythm, press the upper Option button (MANUAL CHARGE). The HeartStart FR2+ will immediately charge for shock delivery.

As soon as charging begins, the screen message changes to CHARGING, STAND CLEAR, and the label for the arrowhead pointing to the upper Option button changes to MANUAL DISARM.



The FR2+ beeps while it is charging. When the beeping changes to a continuous tone and the Shock button light flashes, press the Shock button to deliver a shock. However, if the ECG display shows that the patient's rhythm has changed to a non-shockable rhythm, press the upper Option button to disarm the HeartStart FR2+.

After shock delivery, the HeartStart FR2+ returns to the initial advanced mode screen. To return to non-manual, AED mode operation, turn the FR2+ off by pressing the On/Off button. Then turn the FR2+ on by pressing the On/Off button again.

Notes

7 Data Management and Review

Overview

The HeartStart FR2+ is designed to make it easy to manage incident data. Some information is automatically stored in the internal memory of the HeartStart FR2+. More detailed data can be stored on a data card if desired. The incident information stored in the HeartStart FR2+'s internal memory, or a summary of the information recorded on the data card, can then be displayed on the HeartStart FR2+ screen for review. In addition, HeartStart Event Review software can be used on a personal computer to store and review the detailed recorded information from a data card.

Recording incident data

The HeartStart FR2+ has two ways of recording information about an emergency incident so that it can be reviewed after the incident: in internal memory and on an optional data card.

Recording data in internal memory

Summary data for an incident is automatically recorded in internal memory by the FR2+ while you are using it.

Recording data on a data card

The M3854A data card can be used to store several hours of detailed incident data, including events, ECG, and, optionally, audio.

IMPORTANT NOTE: To record incident data on a data card, the data card must be installed *before* you turn on the FR2+.

CAUTION: The FR2+ is designed to be used only with Philips-approved accessories. The FR2+ may perform improperly if non-approved accessories are used.

Directions for installing a data card are provided in Chapter 2. To remove or replace a data card after use, be sure to turn off the FR2+ in order to ensure that no incident data are lost. Pull the data card tray out of the port in the FR2+ and

remove the card. Give it to the appropriate person in your organization. Either load a new data card into the tray or insert the empty data card tray into the port.

NOTE: Because it helps seal the FR2+ against moisture, the data card tray should always be reinserted into the port of the FR2+.

To avoid running out of data card space during an incident, it is recommended that each data card be used to record the information for only one incident and that it be replaced, or erased and reinstalled, after each use of the FR2+.

If you record information from more than one incident on a data card, it is important to review how much time is left on the used data card before recording a new incident. To do this, load the data card into the data card tray, insert the tray in the FR2+, then remove and reinstall the battery. The first screen displayed shows how much recording time remains on the card.

NOTE: During an incident, if for any reason you turn off the FR2+ *for less than five minutes,* the FR2+ considers this to be a "continued use" situation, and:

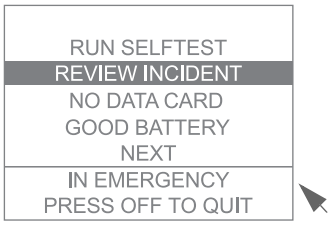
- the information stored about the incident is saved,
- additional events recorded after the device is turned back on will be treated as part of the same incident, and
- the selftest will *not* automatically run if the battery is replaced.

IMPORTANT: Do not remove the battery while incident data are being recorded to a data card. To ensure that no incident data are lost, turn the FR2+ off (return it to standby mode) before replacing the battery.

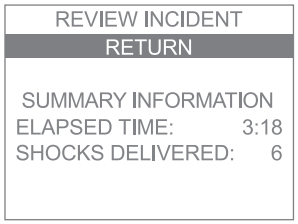
Reviewing Incident Data

Reviewing data from internal memory

Summary information from the last incident that is stored in the internal memory of the HeartStart FR2+ can be displayed on its screen for review. To review this information:



1. Remove the data card if one is installed and unplug the pads connector.
2. Remove and reinstall the battery. (Make sure you are using the gray M3863A FR2 standard battery or the blue M3848A rechargeable battery, not the yellow Training & Administration Pack.)
3. Select REVIEW INCIDENT from the menu. A new screen comes up.



4. Observe and record, if desired, the summary information displayed on the screen:
   - how long the incident recorded by the FR2+ lasted, and
   - how many shocks were delivered during the incident.

This information remains in the FR2+'s memory and can be displayed for review until the next time the FR2+ is used. At that time, the data from the new incident will be displayed. Summary data for the most recent use is always saved in the FR2+ memory until the FR2+ is used again.

Reviewing data from a data card

If a data card is installed when the HeartStart FR2+ is turned on for use during an incident, the HeartStart FR2+ automatically records detailed information on the data card. To review this information on the HeartStart FR2+ screen:

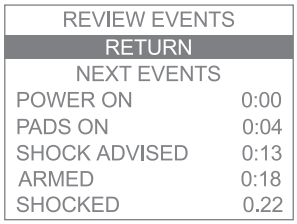
1. Make sure the Training & Administration Pack is *not* installed.
2. Make sure the data card is installed. Unplug the pads connector.
3. Remove and reinstall the battery.

4. Select REVIEW INCIDENT from the menu. A new screen comes up. This screen displays:
   - ELAPSED TIME — how long the incident recorded by the FR2+ lasted,*
   - SHOCKS DELIVERED — how many shocks were delivered during the incident, and
   - FIRST SHOCKS AT — the times at which the first three shocks were delivered.

NOTE: If the data card does not contain event data, only the summary information from FR2+ internal memory will be displayed when REVIEW INCIDENT is selected.

5. To review the events that occurred during the incident, select REVIEW EVENTS. A new screen comes up. This and following screens, accessed by

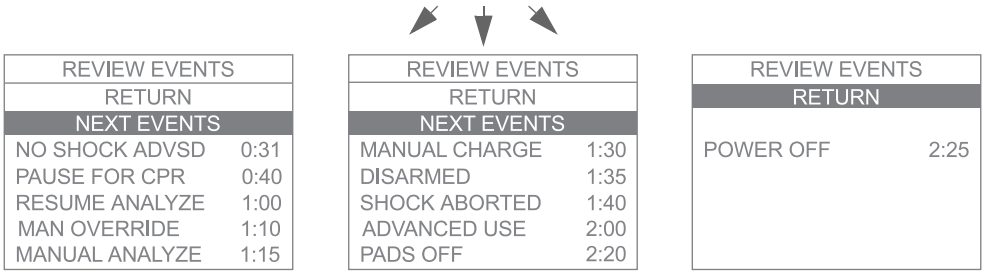
* The FR2+ displays elapsed time to a maximum of 99:59 minutes. If the elapsed time of use extends beyond this figure, the minutes are represented by "??" but the seconds are displayed. However, total elapsed time will be recorded on an installed data card for later review with HeartStart Event Review data management software.



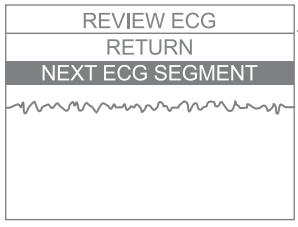
selecting NEXT EVENTS, display elapsed time information for critical activities in using the FR2+. These include:

- POWER ON — when the FR2+ was turned on,
- PADS ON — when the defibrillator pads were connected,
- SHOCK ADVISED — when a shock was advised,
- ARMED — when the FR2+ is fully charged for shock delivery,
- SHOCKED — when a shock was delivered,
- PAUSE FOR CPR — when a pause occurred
- POWER OFF — when the FR2+ was turned off

Additional information may be displayed if your FR2+ is using a revised setup allowing advanced mode operation.



6. To review the first six seconds of the recorded ECG for the incident, select REVIEW ECG. A new screen comes up. This screen displays a three-second segment of the presenting ECG from the incident.
7. Select NEXT ECG SEGMENT to review the second three-second segment of the presenting ECG.



Data cards can be reused if desired. Using a personal computer running HeartStart Event Review software and an appropriate card reader for your computer, you can copy the information from a data card, then erase the card and reuse it in the FR2+.

A Accessories for the HeartStart FR2+

NOTE: The HeartStart FR2+ is an enhanced version of the defibrillator previously sold as the Heartstream FR2. The FR2+ has all the features of the FR2. All accessories compatible with the FR2 are compatible with the FR2+. However, the FR2+ can be used with certain accessories (labeled FR2+) that are not compatible with the FR2.

Accessories* for the HeartStart FR2+ available separately from Philips Medical Systems include the following:

- Batteries
  - Spare FR2 standard battery (recommended) [REF: M3863A]
  - FR2+ rechargeable battery† [REF: M3848A]
  - Charger, for the M3848A FR2+ rechargeable battery only; includes power cord [REF: M3849A]
  - FR2 battery for aviation applications [REF: 989803136291]
- Pads
  - Adult defibrillator pads [REF: DP2/DP6]
  - FR2 infant/child reduced-energy defibrillator pads [REF: M3870A]
- Carry cases
  - Fabric carrying case [REF: M3868A]
  - Vinyl carrying case [REF: M3869A]
  - Hardshell waterproof carrying case [REF: YC]
  - Temperature-control carrying case [REF: 989803133171]
- Data cards and tray
  - Spare data card tray [REF: M3853A]
  - Data card and tray [REF: M3854A]
- Cabinets and mounts
  - Wall mount bracket [REF: M3857A]
  - Defibrillator cabinet, semi-recessed [REF: PFE7023D]
  - Defibrillator cabinet, wall surface mount [REF: PFE7024D]
  - Defibrillator cabinet, basic [REF: 989803136531]

* Certain accessories require a prescription in the United States.

† The M3848A FR2+ rechargeable battery is designed for environments in which the FR2+ Defibrillator is expected to see frequent use. This battery is not designed for use in aircraft. It is recommended that this battery not be used as a spare or backup battery and, due to its shorter standby life, that it not be used as the primary or spare battery in applications where the FR2+ Defibrillator is infrequently used.

- Fast Response Kit (pouch containing a pocket mask, a disposable razor, 2 pairs of gloves, a pair of paramedics scissors, and an absorbent wipe) [REF: 68-PCHAT]
- FR2+ ECG Assessment Module, for use only with an M3860A FR2+, for connection to ECG electrodes per AAMI (M3873A) or IEC (M3874A) convention [REF: M3873A/M3874A]
- Data Management Software
  - HeartStart Review Express Connect [REF: 861311 option A01]
  - HeartStart Event Review, single PC license [REF: M3834A]
  - HeartStart Event Review, organization-wide license [REF: 989803141811]
  - HeartStart Event Review Pro, single PC license [REF: 861276 option A01]
  - HeartStart Event Review Pro, 3-PC license [REF: 861276 option A02]
  - HeartStart Event Review Pro, organization-wide license [REF: 861276 option A03]
- CompactFlash card reader [REF: M3524A]
- Training
  - Training & Administration Pack [REF: M3864A]
  - Charger, for the Training & Administration Pack only; includes power cord [REF: M3855A]
  - HeartStart HS1 and FR2+ Instructor's Training Toolkit, NTSC [REF: M5066-89100] or PAL [REF: M5066-89101]
  - AED Trainer 2 [REF: 3752A]
  - Remote control for AED Trainer 2 [REF: M3753A]
  - Programming Kit for AED Trainer 2 [REF: M3754A]
  - Adult training pads [REF: 07-10900]
  - Pediatric training pads [REF: M3871A]

Suggested additional items

It may be useful to keep some additional items with your HeartStart FR2+ for use if needed when an incident occurs. Some suggested supplies include:

- a pair of paramedic's shears or scissors*
- a disposable razor designed for removing chest hair*
- a pocket mask or face shield*
- disposable gloves*
- a towel or antiseptic wipes*
- a source of oxygen

Your Medical Director may have other requirements for supplies.

* Included in the Fast Response Kit.

B Technical Specifications

The specifications for the HeartStart FR2+ provided in this chapter apply to both the M3860A and M3861A, unless otherwise noted. Additional information can be found in the Technical Reference Manual for HeartStart Defibrillators, located online at www.medical.philips.com/heartstart.

HeartStart FR2+ Defibrillator specifications

Physical

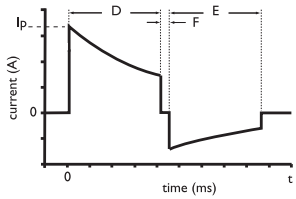
category	nominal specifications
size	2.6" high x 8.6" wide x 8.6" deep (6.6 cm x 21.8 cm x 21.8 cm).
weight	4.7 lbs (2.1 kg) with M3863A FR2 standard battery installed. 4.5 lbs (2 kg) with optional M3848A FR2+ rechargeable battery installed.

Environmental

category	nominal specifications
temperature and relative humidity	Operating (battery installed, pads connected): 32° to 122° F (0° to 50° C); 0% to 95% relative humidity (non-condensing). Standby (battery installed and stored with defibrillator pads): 32° to 109° F (0° to 43° C); 0% to 75% relative humidity (non-condensing). Storage/shipping: -4° to 140° F (-20° to 60° C); 85% relative humidity (non-condensing)
altitude	Meets MIL-810E 500.3, Procedure II (-500 feet to 15,000 feet).
shock/drop abuse tolerance	Meets MIL-810E 516.4, Procedure IV (after a 1 meter drop to any edge, corner, or surface, in standby mode).
vibration	Meets MIL-810E 514.4-16 and 514.4-17.
sealing	With data card tray and battery installed, meets IEC 529 class IP54.
ESD/EMI	See Appendix F.
aircraft: method	Meets RTCA/DO-160D:1997 Section 21 (Category M - Charging).

Defibrillator

category	nominal specifications
waveform parameters	Biphasic truncated exponential. Waveform parameters are automatically adjusted as a function of patient defibrillation impedance. In the diagram at left, D is the duration of phase 1 and E is the duration of phase 2 of the waveform, F is the interphase delay (400 µs), and Ip is the peak current.



The HeartStart FR2+ delivers shocks to load impedances from 25 to 180 ohms. The duration of each phase of the waveform is dynamically adjusted based on delivered charge, in order to compensate for patient impedance variations, as shown below:

adult defibrillation

load resistance (Ω)	phase 1 duration (ms)	phase 2 duration (ms)	peak current (A)	delivered energy (J)
25	2.8	2.8	60	140
50	4.1	4.1	33	150
75	5.8 or 7.2	3.8 or 4.8	23	153
100	9.0	6.0	17	157
125	12.0	8.0	14	161
150	12.0	8.0	12	157
175	12.0	8.0	10	151

pediatric defibrillation
(using M3870A FR2 infant/child reduced-energy defibrillator pads)

load resistance (Ω)	phase 1 duration (ms)	phase 2 duration (ms)	peak current (A)	delivered energy (J)
25	4.1	4.1	22	35
50	5.8	3.8	17	48
75	5.8	3.8	14	53
100	7.2	4.8	11	55
125	7.2	4.8	10	54
150	9.0	6.0	9	54
175	9.0	6.0	8	53

NOTE: The values given are nominal. The actual phase durations for a given load resistance on the pediatric table above could be those of an adjacent row.

category	nominal specifications
energy	Using adult defibrillator pads: 150 J nominal (±15%) into a 50 ohm load. Using infant/child reduced-energy defibrillator pads: 50 J nominal (±15%) into a 50 ohm load. Sample pediatric energy doses: age — energy dose newborn — 14 J/kg 1 year — 5 J/kg 2 - 3 years — 4 J/kg 4 - 5 years — 3 J/kg 6 - 8 years — 2 J/kg Doses indicated are based on CDC growth charts for the 50th percentile weights for boys.* * National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion. *CDC growth charts: weight-for-age percentiles, revised and corrected* November 28, 2000. Atlanta, GA: Centers for Disease Control and Prevention © 2000.
charge control	Controlled by Patient Analysis System for automated operation. Can be programmed for manual initiation using advanced mode of the M3860A.
charge time from "shock advised"	< 10 seconds, including confirming analysis. *NOTE: Charge time increases near end of battery service life.*
manual mode charge time	< 5 seconds.
Quick Shock	End of "Stop CPR" prompt to armed time: < 10 seconds.
"charge complete" indicator	Shock button flashes, audio tone sounds.
disarm (AED mode)	Once charged, the HeartStart FR2+ will disarm if: • patient's heart rhythm changes to non-shockable rhythm, • a shock is not delivered within 30 seconds after the FR2+ is armed, • the Pause button (if enabled) is pressed, • the On/Off button is pressed to turn off the FR2+, or • the defibrillator pads are removed from the patient or the pads connector is disconnected from the FR2+.

category	nominal specifications
disarm (advanced mode)	Once charged, the HeartStart FR2+ will disarm if: in advanced mode ANALYZE • the manual disarm button is pressed, • a patient's heart rhythm changes to non-shockable rhythm, • a shock is not delivered within 30 seconds after the FR2+ is armed, • the On/Off button is pressed to turn off the FR2+, • the defibrillator pads are removed from the patient, or • the pads connector is disconnected from the FR2+. in advanced mode CHARGE (M3860A only) • the manual disarm button is pressed, • a shock is not delivered within 30 s after charging, • the On/Off button is pressed to turn off the FR2+, • the defibrillator pads are removed from the patient, or • the pads connector is disconnected from the FR2+.
shock delivery vector	Via adult defibrillator pads placed in the anterior-anterior (Lead II) position or via FR2 infant/child reduced-energy defibrillator pads placed in the anterior-posterior position.

ECG Analysis System

category	nominal specifications
function	Evaluates impedance of defibrillator pads for proper contact with patient skin, and evaluates the ECG rhythm and signal quality to determine if a shock is appropriate.
protocols	Follows pre-programmed settings to match local EMS guidelines or medical protocols. The settings can be modified using the setup options.
shockable rhythms	Ventricular fibrillation (VF) and certain ventricular tachycardias, including ventricular flutter and polymorphic ventricular tachycardia (VT). The HeartStart FR2+ uses multiple parameters to determine if a rhythm is shockable. *NOTE: For patient safety reasons, some very low-amplitude or low-frequency rhythms may not be interpreted as shockable VF rhythms. Also, some VT rhythms may not be interpreted as shockable rhythms. CPR rates significantly above 100 compressions per minute can cause incorrect or delayed analysis by the HeartStart FR2+.*
asystole	On detection of asystole, provides CPR prompt at programmed interval.

category	nominal specifications
pacemaker detection	On detection of a pacemaker (in advanced mode or with M3873A/M3874A FR2+ ECG assessment module), provides screen display of PACEMAKER DETECTED alert. M3860A includes pacemaker artifact in ECG display. In both models, pacemaker artifact is removed from the signal for rhythm analysis.

ECG analysis performance
(based on default configuration)

rhythm class	ECG test sample[a] size	meets AHA recommendations[b] for adult defibrillation	
		observed performance	90% one-sided lower confidence limit
shockable rhythm — ventricular fibrillation	300	sensitivity >90% (meets AAMI DF80 requirement)	(87%)
shockable rhythm — ventricular tachycardia	100	sensitivity >75% (meets AAMI DF80 requirement)	(67%)
non-shockable rhythm — normal sinus rhythm	300	specificity >99% (meets AAMI DF80 requirement)	(97%)
non-shockable rhythm — asystole	100	specificity >95% (meets AAMI DF80 requirement)	(92%)
non-shockable rhythm — all other non-shockable rhythms[c]	450	specificity >95% (meets AAMI DF80 requirement)	(88%)

a. From Philips Medical Systems Heartstream ECG rhythm databases.

b. American Heart Association (AHA) AED Task Force, Subcommittee on AED Safety & Efficacy. Automatic External Defibrillators for Public Access Use: Recommendations for Specifying and Reporting Arrhythmia Analysis Algorithm Performance, Incorporation of New Waveforms, and Enhancing Safety. *Circulation* 1997;95:1677-1682.

c. Supraventricular tachycardia (SVT) is specifically included in the non-shockable rhythm class, in accordance with AHA recommendations[b] and the AAMI standard DF80.

Display

category	nominal specifications
monitored ECG lead	ECG information is received from adult defibrillator pads in anterior-anterior (Lead II) position or from FR2 infant/child reduced-energy defibrillator pads in anterior-posterior position. (Displayed on M3860A only.) ECG information can also be displayed in the M3860A using the FR2+ ECG assessment module. *NOTE: The ECG display provided by the FR2+ Defibrillator is not intended to provide diagnostic or ST segment interpretation.*
display range (M3860A only)	Differential: ±2 mV full scale, nominal.
screen type	High-resolution liquid crystal display (LCD) with backlight.
screen dimensions	2.8" wide x 2.3" high (70 mm x 58 mm).
sweep speed (M3860A only)	23 mm/s nominal.
ECG display	3 second-segments displayed (M3860A only).
frequency response (bandwidth)	Nondiagnostic rhythm monitor 1 Hz to 20 Hz (-3 dB), nominal.
sensitivity	1.16 cm/mV, nominal.
heart rate displayed (normal sinus rhythm)	30 to 300 bpm, updated each analysis period. Displayed (M3860A only) during monitoring and advanced modes.

Controls and indicators

category	nominal specifications
LCD screen	High-resolution, backlighted LCD screen, displays text messages and (model M3860A only) ECG.
controls	On/Off button Shock button Option buttons
LED indicators	Connector socket LED, flashes to indicate socket location. LED is covered when defibrillator pad connector is properly inserted. Shock button LED flashes when defibrillator is armed.

category	nominal specifications
audio speaker	Provides voice prompts (volume is adjustable via setup screen).
beeper	Chirps when a selftest has failed. Provides various warning beeps during normal use.
status indicator	Status indicator LCD displays device readiness for use.
low battery detection	Automatic during daily periodic selftesting and during use.
low battery indicator	Solid or flashing red **X** Status Indicator on front panel; screen display LOW BATTERY or REPLACE BATTERY warning, as appropriate.

Accessories specifications

M3863A FR2 battery and 989803136291 TSO certified battery*

category	nominal specifications
battery type	12 VDC, 4.2 Ah, lithium manganese dioxide. Disposable, long-life primary cell.
capacity	When new, a minimum of 300 shocks or 12 hours of operating time at 77° F (25° C).
shelf life (prior to installation)	Typically, 5 years from date of manufacture when stored under standby environmental conditions in original packaging.
standby life (after installation)	Typically, 5 years. >4 years when stored under standby environmental conditions (battery installed, FR2+ unused).
status indicators	Good battery: flashing black hourglass on the front panel of the FR2+. Low battery: flashing red **X** on the front panel of the FR2+. Dead battery: solid red **X** on the front panel of the FR2+.
storage/transport temperature	32° to 109° F (0° to 43° C).
battery limitations	Never charge, short circuit, puncture, deform, incinerate, heat above 60° C, or expose contents to water. Remove the battery when discharged.

* The conditions and tests required for TSO approval of this battery are minimum performance standards. It is the responsibility of those desiring to install this battery in a specific class of aircraft to determine that the aircraft installation conditions are within the TSO standards. Lithium battery safety concerns include the possibility of fire, venting violently, and venting of toxic gases.

category	nominal specifications
maintenance and calibration requirements for continued airworthiness (989803136291 only)	There are no periodic maintenance or calibration requirements that are necessary for continued airworthiness of the 989803136291 battery. For battery maintenance with respect to performance within the AED, please see Chapter 4. There are no user-serviceable parts in the battery.
environmental qualification	Meets the applicable requirements of RTCA/DO-227, Section 2.3.

(Optional) M3848A FR2+ rechargeable battery

category	nominal specifications
battery type	12 VDC, 2.2 Ah, lithium ion. Rechargeable cell using the M3849A charger.
capacity	When freshly charged and used at 77° F (25° C), provides a minimum of 80 shocks (typically 100 shocks), or 3.5 hours (typically 5 hours) of ECG display time only, before recharging is indicated.
standby life (after installation)	6 months when installed fully charged in a defibrillator labeled FR2+.
status indicators	Good battery: bar graph on display screen indicating remaining power level. Low battery: flashing red **X** on the front panel of the FR2+ (When low battery indicator appears, there is still enough energy to deliver 9 shocks plus 15 minutes of ECG display time). Dead battery: solid red **X** on the front panel of the FR2+.
storage/transport temperature	32° to 109° F (0° to 43° C).

(Optional) M3849A charger

category	nominal specifications
application	For use with M3848A FR2+ rechargeable battery only.
power requirements	100 to 240 VAC, 47 to 63 Hz, 30 Watts
storage/transport temperature	32° to 122° F (0° to 50° C).
conformance testing	International: EN60335-1:1994 Class 1. North America: UL 1310 Class 2.

M3870A and DP2/DP6 defibrillator pads

category	nominal specifications
pads, cable, and connector	Disposable and self-adhesive. DP2/DP6 adult defibrillator pads and M3870A FR2 infant/child reduced-energy defibrillator pads have a minimum active surface area of 85 cm^2 each and are provided in a sealed package with an integrated 122 cm (48 inch), typical, cable and connector. The M3870A connector incorporates attenuating electronics.
storage/transport temperature	32° to 110° F (0° to 43° C).
defibrillator pad requirements	Use only DP2/DP6, M3870A, M3713A, and M3716A defibrillator pads with the HeartStart FR2+. Place the pads on the patient as illustrated on each pad.

(Optional) M3854A data card

category	nominal specifications
capacity	8 hours of event and ECG data, or 60 minutes with voice recording.

(Optional) M3864A training & administration pack

category	nominal specifications
battery type	12 V, 1.1 Ah, nickel metal hydride. Disposable, rechargeable cell using the M3855A charger.
capacity	Provides 4 hours of operating time at 77 °F (25 °C).
status indicators	Low battery: flashing red **X** on the front panel of the FR2+. Dead battery: solid red **X** on the front panel of the FR2+.
storage/transport temperature	50° to 104° F (10° to 40° C).

(Optional) M3855A charger

category	nominal specifications
application	For use with M3864A Training & Administration Pack only.

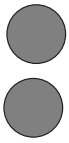
category	nominal specifications
power requirements	With appropriate power cord, any AC mains power input or inverter-type power sources.
storage/transport temperature	32° to 113° F (0° to 45° C).
conformance testing	International: EN60335-1:1994 Class I North America: UL 1310 Class 2

(Optional) M3873A/M3874A FR2+ ECG assessment module

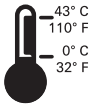
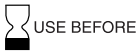
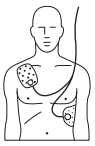
category	nominal specifications
application	For use with the FR2+ M3860A with ECG display enabled and running version 1.5 software or higher (denoted by *FR2+* on the front panel or rear label).
length and weight	100 inches (182 cm); 1 lb. (2.2 kg).
operating temperature	32° to 122° F (0° to 50° C).
storage/transport temperature	32° to 109° F (0° to 43° C).
patient lead wire designation	M3873A (AAMI): positive lead — red negative lead — white reference lead — black M3874A (IEC): positive lead — green negative lead — red reference lead — yellow
typical (lead II) connection	Lead II vectors: positive — left leg negative — right arm reference — left arm Other limb vectors can be obtained by different electrode positions.
battery type	3 V, 1 Ah, poly-carbonmonofluoride lithium (LiCFx). Non-replaceable disposable primary cell.
service life	Typically, 5 years.
performance with FR2+ defibrillator	Meets environmental specifications cited for FR2+ Defibrillator on page B-1 through B-2.

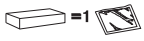
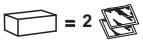
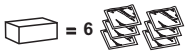
C Glossary of symbols and controls

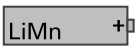
The following table explains the symbols used on the HeartStart FR2+ Defibrillator, its accessories, and their packaging.

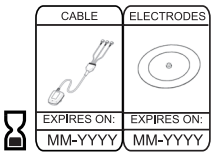
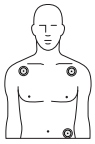
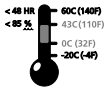
symbol	description
	On/Off button. Turns the HeartStart FR2+ on or off; disarms HeartStart FR2+, stops automatic selftest. When the optional Training & Administration Pack is being used in the Training function, this button is used to select and exit training scripts.
	Shock button. Delivers shock to patient when the HeartStart FR2+ is charged.
	Upper and lower Option buttons. Allow you to move around in and select an item from a display menu, provide adjustment of display screen contrast. Permit access to advanced mode, if so configured.
	Defibrillation protection. Defibrillation protected, type BF patient connection.
	High voltage.
IP54	With data card tray and battery installed, meets IEC 529 class IP54.
HR XXX	Heart rate.
XX	Number of shocks delivered.
XX:XX	Time (minutes:seconds). How much time has passed since the HeartStart FR2+ was turned on.
⚠ TEMPERATURE	Temperature. Recommended storage temperature range has been exceeded since the last battery insertion selftest.

symbol	description
⚠ SETUP	Setup. Setup has been lost from memory; factory default setup is being used. Contact Medical Director for revised setup.
REV: XXX X.X XXXX	Software. The version of software used in your HeartStart FR2+.
	Flashing black hourglass. Ready for use.
	Solid red **X**. Not ready for use. (See Chapter 4, “Maintaining, Testing, and Troubleshooting.”)
	Flashing red **X**. Troubleshooting required. (See Chapter 4, “Maintaining, Testing, and Troubleshooting.”)
CE 0123	Meets the requirements of the European medical device directives 93/42/EEC.
CE	Meets the requirements of the applicable European directive.
	This product has passed relevant safety tests by CSA, a nationally recognized test lab.
	This product has been certified by the Australian Communication Authority.
	Refer to operating instructions.
	Printed on recycled paper.
	These pads are disposable and are for single patient use only.

symbol	description
	Pouch contents: one pair of defibrillator pads.
	Store the pads at temperatures between 0° and 43° C (32° and 110° F).
NON-STERILE	Non-sterile.
LATEX	This product does not contain natural rubber latex.
LOT	Lot number.
	Use the pads before the date shown. Date format is MM-YYYY.
Rx only	CAUTION: Federal law (USA) restricts this device to sale by or on the order of a physician.
	Pad placement for adults. (DP2/DP6)
	For use with Philips Heartstream/HeartStart and Laerdal HeartStart ForeRunner, FR, and FR2 AEDs.
	Not for use with Laerdal HeartStart models 911, 1000, 2000, 3000. (DP2/DP6)

symbol	description
	Pad placement for infants and children younger than 8 years or lighter than 55 pounds (25 Kg). (M3870A)
	
	Box contents = 1 pouch. (M3870A)
	Box contents = 2 pouches. (DP2)
	Box contents = 6 pouches. (DP6)
	This side up.
	Handle with care.
	Protect from moisture.
	Do not crush.
	Do not expose to high heat or open flames. Do not incinerate.
	Do not mutilate or open.

symbol	description
	Install before the date shown on this label. Date format is MM-YYYY.
	Lithium manganese dioxide battery chemistry (M3863A and 989803136291)
	Lithium ion battery chemistry (M3848A)
	Nickel metal hydride battery chemistry (Training & Administration Pack).
	12 volts direct current output.
	FAA TSO C-142 authorized battery (989803136291 only).
	Date of manufacture.
	Insert into FR2+ in this direction.
	Class 9 miscellaneous dangerous goods. (Symbol required on outer packaging by freight carrier regulations to identify shipments containing lithium batteries.)
	Contains one battery.
	On/Off indicator.
	Charger status indicator.
	Electrical input.

symbol	description
	Electrical output.
	Use the cable and electrodes before the respective dates shown on this label.
	Place the ECG electrodes as shown.
	Kit contains Training & Administration Pack, Instructions for Use, and set of training pads.
	Transportation requirements (refer to associated thermometer symbol).
	Storage requirements (refer to associated thermometer symbol).
	Environmental (temperature and relative humidity) requirements.
	Dispose of in accordance with your country's requirements.
	Indicates that this device is optimized for Guidelines 2005.

D Glossary of terms

The terms listed in this Glossary are defined in the context of the HeartStart FR2+ and its use.

advanced mode A programmable treatment mode that permits an authorized user to control when the FR2+ starts rhythm analysis and (model M3860A only) when to begin defibrillator charging for shock delivery.

AED Automated external defibrillator.

AED mode The standard FR2+ treatment mode, with voice and text prompts guiding the responder through connecting the defibrillator pads, waiting for rhythm analysis, and delivering a shock if needed. In this mode, heart rhythm analysis and monitoring, and shock decision and charging for shock delivery are automatically performed by the FR2+.

ALS Advanced Life Support.

analysis See "SMART analysis."

arrhythmia An unhealthy, often irregular, beating of the heart.

background analysis/ monitoring Analysis for potentially shockable rhythms during monitoring mode.

battery See "standard battery" and "rechargeable battery."

BLS Basic Life Support.

configuration The settings for all operating options of the FR2+, including treatment protocol. The factory default configuration can be modified by authorized personnel using a Training & Administration Pack.

continued use A condition in which use of the HeartStart FR2+ is interrupted for less than five minutes (e.g., for battery replacement). When the battery is reinserted or the unit is turned on again, the information stored about the interrupted incident is saved, any additional events recorded after the battery is reinstalled are treated as part of the same incident, and the selftest does *not* automatically run when the battery is reinstalled.

CPR First A configurable protocol parameter that, either automatically or by manual selection, enables a CPR interval before rhythm analysis and shock decision for patients with a shockable rhythm.

CPR timer	A programmable period provided by the HeartStart FR2+ during which the responder can administer CPR.
defibrillation	Termination of cardiac fibrillation by applying electrical energy
defibrillation charge	Electrical energy stored in the capacitor of the HeartStart FR2+ as it arms for shock delivery.
defibrillation shock	See “SMART biphasic waveform.”
defibrillator pads	The self-adhesive electrode pads applied to the adult patient’s bare chest or pediatric (under 8 years of age or less than 55 lb./25 kg) patient’s bare chest and back, and used to detect the patient’s heart rhythm and transfer the defibrillation shock.
ECG	Electrocardiogram, the electrical rhythm of the heart as detected through defibrillator pads.
event	An action recognized or performed by the HeartStart FR2+ as a step in the sequence of using the device in an incident. Examples include: applying the pads and connecting them to the HeartStart FR2+, analyzing heart rhythm, delivering a shock, etc.
fibrillation	A disturbance of the normal heart rhythm that results in chaotic, disorganized activity that cannot effectively pump blood. Ventricular fibrillation (fibrillation in the lower chambers of the heart) is associated with sudden cardiac arrest.
heart rhythm (ECG) analysis	A system used by the FR2+ to determine if the patient’s heart rhythm is shockable — ventricular fibrillation (VF) or certain ventricular tachycardias (VTs). See “SMART analysis.”
HeartStart Event Review	A suite of data management software applications for use by trained personnel to review and analyze FR2+ Defibrillator use on a patient. Information is available from Philips on the internet at http://www.medical.philips.com/goto/eventreview.
impedance	Electrically, this is the total opposition offered by the body to the flow of the electrical shock waveform delivered by the HeartStart FR2+. The FR2+ automatically monitors the electrical impedance between the defibrillator pads placed on the patient’s bare skin, and adjusts the shock waveform appropriately.
incident	The series of events involved in treating a patient with the HeartStart FR2+.
infrared communications	A method of sending information using a special part of the light spectrum. It is used to transmit information to and from the HeartStart FR2+ and another FR2+ or a computer running HeartStart Event Review software.

manual charge	A feature of the advanced mode used by an authorized ALS-certified responder that allows the user to arm the HeartStart FR2+ for shock delivery.
manual disarm	A feature of the advanced mode used by an authorized ALS-certified responder that allows the user to dump the HeartStart FR2+ charge internally.
monitoring mode	A mode of background analysis to determine if patient rhythm has changed to a shockable rhythm.
non-shockable rhythm	A heart rhythm that the HeartStart FR2+ determines is not appropriate for shock delivery.
NSA	No Shock Advised decision, made by the HeartStart FR2+ based on analysis of the patient's heart rhythm.
pacemaker	External or implanted cardiac pulse generator that stimulates the heart electronically.
pads	See "defibrillator pads."
pause	A defined period during which the HeartStart FR2+ does not perform rhythm analysis.
pediatric defibrillation	Defibrillation of a child under eight years of age or 55 lbs. (25 Kg). It is recommended that FR2 infant/child reduced-energy defibrillator pads be used for pediatric patients.
periodic selftests	Daily, weekly, and monthly tests automatically conducted by the FR2+ when it is in the standby mode. The tests monitor many key functions and parameters of the FR2+, including battery capacity and the state of its internal circuitry.
presenting ECG	The heart rhythm seen by the HeartStart FR2+ when it is first connected to the patient (via the defibrillator pads) and begins rhythm analysis.
prompts	The voice commands and screen text used to guide the responder through use of the HeartStart FR2+ to treat the patient.
protocol	A sequence of operations performed by the HeartStart FR2+ to direct patient care in the AED mode.
protocol timeout	A programmable interval used by the HeartStart FR2+ to decide if the shocks are part of the same shock series.
Quick Shock	A feature of the FR2+ that provides a patient care pause-to-shock time of less than 10 seconds, typical, from end of a patient care pause to shock delivery.

read (data)	A feature of the HeartStart FR2+ that allows it to read setup data from a M3854A data card.
receive (data)	A feature of the HeartStart FR2+ that allows use of its infrared (IR) communications port to receive revised setup and clock settings directly from another device.
rechargeable battery	The M3848A FR2+ rechargeable battery, used with the M3849A charger only.
record voice	An optional feature of the HeartStart FR2+ that allows sound recording to a data card during use of the device in an incident. Activation of this feature requires revision of the HeartStart FR2+'s default configuration settings.
rhythm analysis	See "SMART analysis."
send (data)	A feature of the HeartStart FR2+ that allows use of its infrared (IR) communications port to send data directly to another FR2+ or a computer running HeartStart Event Review software.
sensitivity	A measure of the ability of the HeartStart FR2+ to reliably detect and identify shockable heart rhythms.
setup	The settings of all programmable operating parameters of the HeartStart FR2+. The factory default setup can be modified using the M3864A Training & Administration Pack.
shock series	One or more shocks, each separated by no more than a preset interval (programmed Protocol Timeout). After completion of a shock series, the HeartStart FR2+ automatically pauses for CPR.
shockable rhythm	Ventricular fibrillation and certain ventricular tachycardias associated with sudden cardiac arrest.
shock waveform	See "SMART biphasic waveform."
SMART analysis	The proprietary algorithm used by the FR2+ to analyze the patient's heart rhythm and determine whether a shock is advised.
SMART biphasic waveform	The patented, low-energy defibrillation shock waveform used by the FR2+. It is an impedance-compensated biphasic waveform with 150 Joules, nominal, delivered to a 50 ohm load. When delivered via FR2 infant/child reduced-energy defibrillator pads, the energy is attenuated to 50 Joules, nominal.
specificity	A measure of the ability of the HeartStart FR2+ to reliably detect and identify non-shockable heart rhythms.

standard battery	The M3863A battery, 12 VDC, 4.2 Ah, lithium manganese dioxide, disposable, long-life primary cell.
standby mode	The operating mode of the HeartStart FR2+ when a battery has been installed, and the unit is turned off and ready for use when needed. Shown by flashing black hourglass on the Status Indicator.
status indicator	This is a special window in the upper right-hand corner of the front panel of the HeartStart FR2+ that lets you know the status of the device.
sudden cardiac arrest (SCA)	The sudden cessation of the heart's pumping rhythm.
Training & Administration Pack	An optional accessory for the FR2+ that enables training and administrative functions. The integral battery should be charged only using the M3855A charger.
waveform	See "SMART biphasic waveform."
write (data)	A feature of the HeartStart FR2+ that allows it to record setup information on a data card.

Notes

E CPR First Configuration

The CPR First parameter provides a tool for Medical Directors and Administrators to implement existing or emerging protocols. Currently, some emergency response protocols incorporate a CPR interval prior to applying the AED. Although this provides for initial CPR treatment, since the device is not attached to the patient it cannot collect data or provide the responder with prompts or an initial CPR interval. Note that previous versions of the FR2+ could be attached for data collection during initial CPR, via an enabled Pause key.

Research has shown that some SCA patients – particularly those presenting with low-amplitude, low-frequency VF rhythms typical of long down times – may not benefit from an initial shock, and for these patients an interval of CPR prior to defibrillation may improve outcome.[1-3]

Accordingly, some Medical Directors may wish to configure the FR2+ to be able to provide an initial CPR interval prior to defibrillation. Before making that decision, the Medical Director should consider the overall impact the selected setting would have on the SCA emergency response system, and train responders accordingly. If a system-wide change is desirable, software upgrades for existing FR2/FR2+ defibrillators are available from Philips. Other factors to be considered include:

- Emergency system response times
- Responder skill level
- Prevailing protocols and time and cost for training
- Expected changes in response protocols

Based on a consideration of these factors, the Medical Director can configure the FR2+ to any of four CPR First settings: NO, SMART CPR AUTO1, SMART CPR AUTO2, and USER. These are defined in greater detail below.

1 Wik L, Hansen TB, Fylling F, Steen T, Vaagenes P, Auestad B, Steen PA. Delaying defibrillation to give basic cardiopulmonary resuscitation to patients with out-of-hospital ventricular fibrillation: a random trial. *JAMA* March 19, 2003. 289:11:1389-1395.

2 Cobb LA, Fahrenbruch CE, Walsh TR, Copass MK, Olsufka M, Breskin M, Hallstrom AP. The influence of cardiopulmonary resuscitation prior to defibrillation in patients with out-of-hospital ventricular fibrillation. *JAMA*, April 7, 1999, 281:13:1182-1188.

3 Weisfeldt ML, Becker LB. Resuscitation after cardiac arrest: a 3-phase time-sensitive model. *JAMA*, December 18, 2002. 288:23:3035-3038.

NO setting

The NO setting means the FR2+ will not provide an initial CPR interval prior to defibrillation of a shockable rhythm. Thus, once the FR2+ is attached, it will advise an immediate shock for all SCA patients presenting with a shockable rhythm — even those who may benefit from CPR first — before it provides a CPR interval. This setting represents the historical behavior of AEDs, including the ForeRunner and FR2+. It is therefore the default setting for CPR First.

SMART CPR AUTO1 and AUTO2 settings

It is often not possible for the responder to know whether an individual patient might benefit from CPR first or defibrillation first. When set to AUTO1 or AUTO2, the FR2+ analyzes the patient's initial rhythm and automates the decision as to whether an individual patient will receive an initial shock or CPR first. Based on a database of ECG recordings of actual resuscitation attempts,* the SMART CPR algorithm evaluates the initial ECG's amplitude and frequency characteristics — both known predictors of shock success — and calculates the likelihood of the return of spontaneous circulation (ROSC) following a defibrillation shock. If the likelihood is low, the FR2+ will provide a CPR interval prior to defibrillation. If high, the device will advise immediate defibrillation. In either case, the device adjusts its voice and text prompts appropriately.

WARNING: Performance of the SMART CPR AUTO1 and AUTO2 settings has not been established in patients under 8 years or 55 lb. (25 kg).

SMART CPR AUTO1. Provides immediate defibrillation for more than 90%† of shockable patients who are likely to achieve ROSC (less than 10% receive CPR first). Of those shockable patients who are unlikely to achieve ROSC, more than 50% will receive CPR first.

SMART CPR AUTO2. Provides immediate defibrillation for more than 80%† of shockable patients who are likely to achieve ROSC (less than 20% receive CPR first). Of those shockable patients who are unlikely to achieve ROSC, more than 60% will receive CPR first.

* Data collected from multi-center, multi-national out-of-hospital and in-hospital adult sudden cardiac arrest rhythms. The SMART CPR algorithm was developed based on VF, polymorphic VT, and ventricular flutter rhythms.

† Based on observed performance. ROSC was determined by several parameters, including patient assessment, ECG analysis, and/or patient impedance cardiography.

USER setting

The USER setting provides the responder with a means to manually initiate a CPR interval, based on either a patient assessment protocol or standing orders from the Medical Director. The FR2+ can thus be applied immediately to the patient, enabling the device to collect data and provide reminder text prompts that the CPR Pause key is available. The responder presses the CPR Pause key to start a CPR interval. The FR2+ will continue with rhythm analysis unless the CPR Pause key is pressed.

With the FR2+ CPR First setting set to USER, the FR2+ provides an opportunity for the responder to initiate a CPR interval for all patients — even those who may benefit from immediate defibrillation.

Notes

F Additional technical data required for European conformity

Environmental considerations

product	information
defibrillator	The defibrillator contains electronic components. Dispose of it at an appropriate recycling facility in accordance with local regulations.
battery	The battery cells contain chemicals. Recycle the battery at an appropriate recycling facility in accordance with local regulations.
pads	The used pads may be contaminated with body tissue, fluid, or blood. Cut them off and dispose of them as infectious waste. Recycle the remaining cartridge components at an appropriate recycling facility in accordance with local regulations.

Important warnings and reminders

- Do not allow the pads to contact other electrodes or metal parts that are in contact with the patient.
- Before delivering a shock, it is important to disconnect the patient from other medical electrical equipment, such as blood-flow meters, that may not incorporate defibrillation protections. In addition, make sure the pads are not in contact with metal objects such as a bedframe or stretcher.
- Check supplies, accessories, packaging, and spares for damage and expiration dating.

Electromagnetic conformity

Guidance and manufacturer's declaration: The HeartStart FR2+ is intended for use in the electromagnetic environment specified in the tables below. The customer or user of the HeartStart FR2+ should assure that it is used in such an environment.

Electromagnetic emissions

emissions test	compliance	electromagnetic environment – guidance
RF CISPR 11	Group 1 Class B	The FR2+ uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment. The FR2+ is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.

Electromagnetic immunity

immunity test	IEC 60601 test level	compliance level	electromagnetic environment - guidance
electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	There are no special requirements with respect to electrostatic discharge.[a]
power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial/hospital environment. There are no special requirements for non-commercial/non-hospital environments.
radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2.5 GHz	20 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the HeartStart FR2+, including cables, than is absolutely necessary.[b,c] The recommended separation distances for various transmitters and the AED are shown in the following table. Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1. At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2. These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a. Generally, AEDs are sometimes susceptible to interference generated by patient and/or responder motion in environments in which a high static electric field is present (e.g., low humidity, synthetic carpets, etc.). As a safety measure, Philips AEDs incorporate a patented method to sense possible corruption of the ECG signal by such interference and to respond by directing the user to stop all motion. In these cases, it is important to minimize movement in the vicinity of the patient during rhythm analysis in order to ensure that the signal being analyzed accurately reflects the patient's underlying heart rhythm.
b. The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6,765 MHz to 6,795 MHz; 13,553 MHz to 13,567 MHz; 26,957 MHz to 27,283 MHz; and 40,660 MHz to 40,700 MHz.
c. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the HeartStart FR2+ is used exceeds the applicable RF compliance level above, the HeartStart FR2+ should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the HeartStart.

Recommended separation distances between portable and mobile RF communications equipment and the HeartStart FR2+ Defibrillator

The HeartStart FR2+ Defibrillator is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the FR2+ can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the FR2+ as recommended below, according to the maximum output power of the communications equipment.

rated maximum output power of transmitter (W)	separation distance according to frequency of transmitter (m)	
	80 MHz to 800 MHz $d = 0.6\sqrt{P}$	800 MHz to 2.5 GHz $d = 1.15\sqrt{P}$
0.01	0.06	0.115
0.1	0.19	0.36
1	0.6	1.15
10	1.9	3.64
100	6.0	11.5

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be determined using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1. At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2. The ISM (industrial, scientific and medial) bands between 150 kHz and 80 MHz are 6,765 MHz to 6,795 MHz; 13,553 MHz to 13, 567 MHz; 26,957 MHz to 27,283 MHz; and 40,660 MHz to 40,700 MHz.
NOTE 3. An additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2.5 GHz to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas.
NOTE 4. These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.
NOTE 5. Transmitters/antenna of this power-level are most likely mounted on an emergency vehicle chassis. The distances cited here are for open field. For an external antenna, the separation distance is most likely shorter.

Shock cycle timing

The HeartStart FR2+'s Quick Shock feature allows it to deliver a shock within 10 seconds, typical, following the prompt ending a CPR interval. From shock to shock, the FR2+ takes <20 seconds, typical, including analysis. After 15 shocks, the FR2+ takes <30 seconds from analyzing to ready-to-shock. After 200 shocks, the FR2+ takes <40 seconds from initial power-on to ready-to-shock.

Index

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Notes

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PHILIPS

Philips Medical Systems is part of

Royal Philips Electronics

Philips Medical Systems

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REF: M3860-91900

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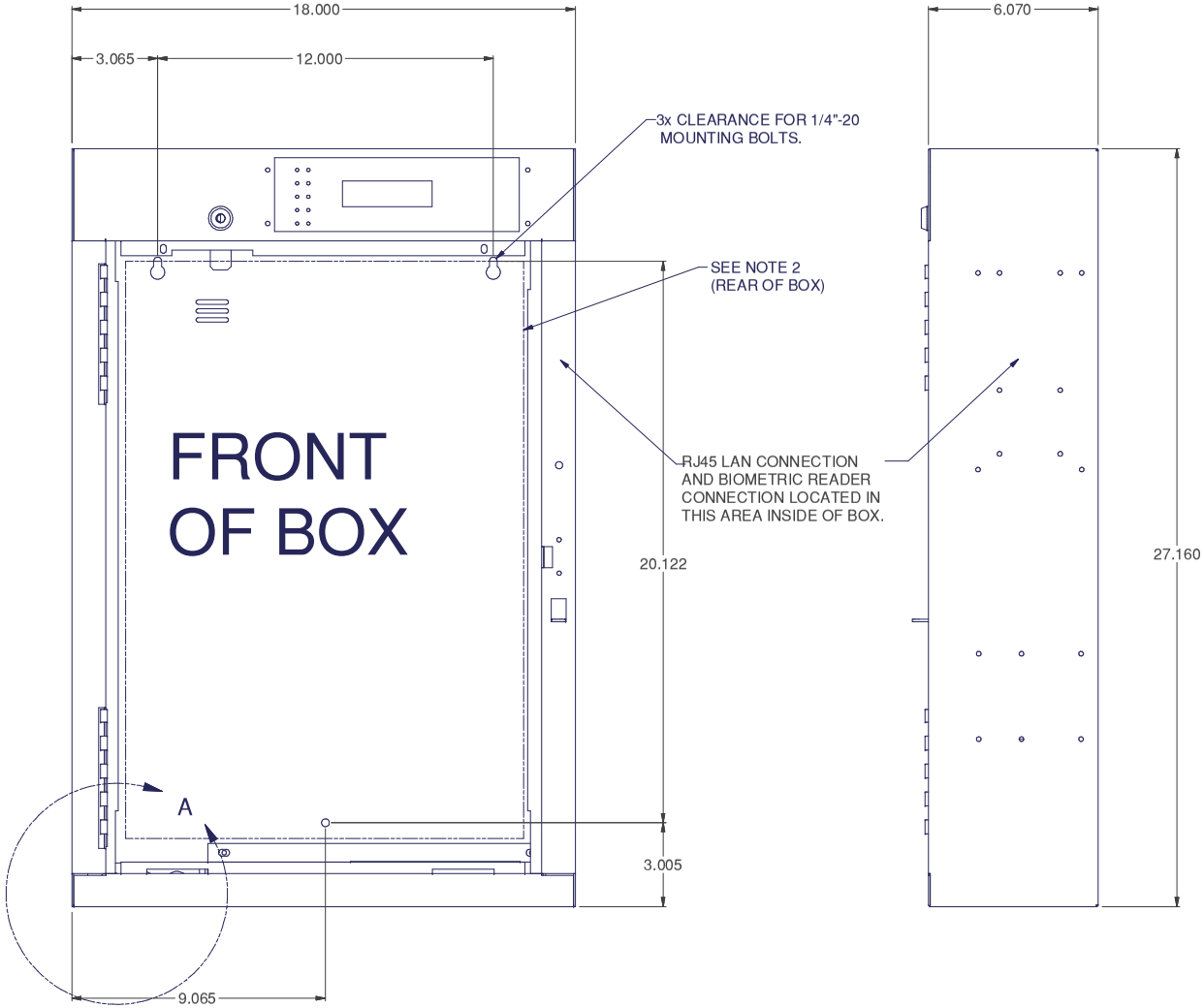
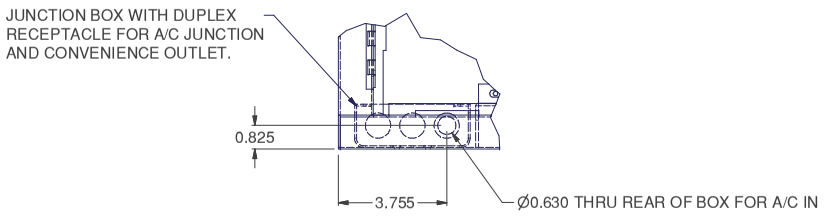


NOTES:
1) ESTIMATED WEIGHT = 59 LBS. (STANDARD UNIT)
2) STANDARD MOUNTING PROVISIONS SHOWN. ALTERNATE OR ADDITIONAL MOUNTING MAY BE ADDED IN THIS AREA AT CUSTOMERS DISCRETION.
3) NECESSARY PRECAUTIONS SHOULD BE TAKEN TO PROTECT ELECTRICAL BOARDS AND EQUIPMENT PRIOR TO ANY DRILLING.
4) ALTERNATE AREAS IN WHICH A/C CAN BE BROUGHT IN ARE AVAILABLE. CONTACT KEY SYSTEMS, INC. TECHNICAL SUPPORT FOR APPROVAL.
5) A DEDICATED CIRCUIT IS RECOMMENDED. IF YOUR POWER DOES NOT MEET STANDARDS THEN IT MAY BE NECESSARY TO CONDITION IT. POWER REQUIREMENTS: 120 vac, 2.5 AMPS, 300 WATTS, 50-60 Hz.



DETAIL A

REV	DATE	DESCRIPTION	IN T

DRAWN: George Masters 6/14/2002
CHECKED:
MATERIAL :
FINISH :
TOLERANCE UNLESS SPECIFIED:
HOLE SIZES ± .002
DECIMAL ± .010
FORM LOCATIONS ± .015

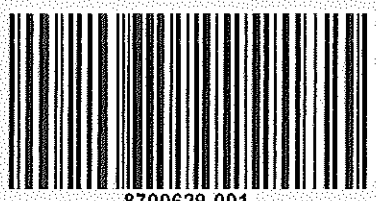
Key Systems INC
7635 GLACIER HILL
VICTOR, NEW YORK
14564

DESCRIPTION:
32 KEY - PHYSICAL SIZE AND MOUNTING

SIZE C | DWG NO 32K10001 | REV 3
SCALE | SHEET 1 OF 1

Kronos InTouch® 9100 Manual Kit

8700629-001
Rev A01
CP/43/16



Part Number: 4704986-003, Revision A

Safety and Compliance Information

Touchscreen Data Collection Device

Safety Agency Approvals

This device complies with EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03

CE This product complies with EN 55022, 2010.

EN 55022 (CISPR 22)

This product is a Class A product. In a domestic environment, it may cause radio interference in which case the user may be required to take adequate measures.

Canadian DOC Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications. This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

IC: 1416A-8609K003 is used with part numbers: 8609100-003, 8609100-053, 8609100-103, 8609100-403
IC: 1416A-8609K004 is used with part numbers: 8609100-004, 8609100-054, 8609100-104, 8609100-404
IC: 1416A-8609K007 is used with part numbers: 8609100-007, 8609100-057, 8609100-107, 8609100-407

Additional EMI/RFI Compliance

This device complies with FCC part 15, ACMA AS/NZS CISPR 22:2009 + A1:2010 Class A Emissions, and EN 55024:2010 Immunity. This digital apparatus complies with Canadian ICES-003, Issue 5.

RoHS Directive

This data collection device and all hardware options currently qualified to work with this device are designed in accordance with Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (known as RoHS2 or RoHS recast). The RoHS directive prohibits the sale of electronic equipment containing certain hazardous substances such as lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls ("PBB") and polybrominated diphenylethers ("PBDE") in the European Union. The manufacturer has a program in place to address the requirements of the RoHS Directive in respect to the various categories of electronic products.

Veiligheid- en nakominginligting

Raakskerm-datakolleksietoestel

Goedkeuring deur veiligheidsagentskap

Hierdie toestel voldoen aan EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 No. 60950-1-07, tweede uitgawe, 2007-03.

CE Hierdie produk voldoen aan EN 55022, 2010.

EN 55022 (CISPR 22)

Hierdie produk word as 'n Klas A-produk geklassifiseer. In 'n huishoudelike omgewing kan dit moontlik radiosteuring veroorsaak in welke geval dit vir die gebruiker nodig kan wees om geskikte stappe te doen.

BoGS-voorskrif

Hierdie datakolleksietoestel en alle hardeware-opsies wat tans gekwalifiseer is om hierdie toestel te bedryf, is ontwerp ingevolge riglyn 2011/65/EU van die Europese Unie rakende die beperking van die gebruik van sekere gevaarlike stowwe in elektriese en elektroniese toerusting, bekend as BoGS2 of BoGS gewysig (Engelse benaming: Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Directive (2011/65/EU)). Die BoGS-riglyn verbied die verkoop van elektroniese toerusting wat sekere gevaarlike stowwe soos lood, kadmium, kwik, heksavalent chroom, polibromeerde bifeniele ("PBB") en polibromeerde difenieleters ("PBDE") bevat in die Europese Unie. Die vervaardiger het 'n program gereed om ten opsigte van die verskillende kategorieë elektroniese produkte aan die vereistes van die BoGS-voorskrif te voldoen.

Sikkerheds- og overholdelsesoplysninger

Dataopsamlingsenhed med touchskærm

Sikkerhedsgodkendelser

Denne enhed er i overensstemmelse med EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 nr. 60950-107, anden udgave, 2007-03.

CE Dette produkt er i overensstemmelse med EN 55022, 2010.

EN 55022 (CISPR 22)

Dette produkt er et produkt i Klasse A. I en almindelig husholdning kan produktet frembringe radiostøj. Er dette tilfældet, skal brugeren træffe passende forholdsregler.

RoHS-direktivet

Denne dataopsamlingsenhed og alle de mulige former for hardware, der aktuelt kan fungere med denne enhed, er konstrueret i overensstemmelse med RoHS-direktivet 2011/65/EU om begrænsning af anvendelsen af visse farlige stoffer i elektrisk og elektronisk udstyr (kaldes RoHS2 eller RoHS-omarbejdning). RoHS-direktivet forbyder salg af elektronisk udstyr, der indeholder visse farlige stoffer som f.eks. bly, cadmium, kviksølv, hexavalent chrom, polybromerede biphenyler ("PBB") og polybromerede diphenylethere ("PBDE") i den Europæiske Union. Producenten har iværksat et program til behandling af kravene i RoHSdirektivet i sammenhæng med de forskellige kategorier af elektroniske produkter.

Informatie over veiligheid en voorschriften

Touchscreen-terminal voor gegevensverzameling

Goedkeuringen van veiligheidsinstanties

Dit toestel voldoet aan de normen EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 nr. 60950-1-07, 2nd edition, 2007-03.

CE Dit toestel voldoet aan de norm EN 55022, 2010.

EN 55022 (CISPR 22)

Dit product is een product van klasse A. Binnenshuis kan het radiostoring veroorzaken, waarvoor de gebruiker mogelijk passende maatregelen moet treffen.

RoHS-richtlijn

Deze terminal voor gegevensverzameling en alle optionele hardwareapparaten die gecertificeerd zijn voor gebruik met deze terminal, zijn ontworpen in overeenstemming met richtlijn 2011/65/EC betreffende de beperking van het gebruik van bepaalde gevaarlijke stoffen in elektrische en elektronische apparatuur (bekend onder de naam "RoHS2" of "RoHS recast"). De RoHS-richtlijn verbiedt de verkoop in de Europese Unie van elektronische toestellen die bepaalde gevaarlijke stoffen bevatten, zoals lood, cadmium, kwik, zeswaardig chroom, polybroombifenylen (PBB's) en polybroomdifenylethers (PBDE's). De fabrikant heeft een programma geïmplementeerd om te beantwoorden aan de vereisten van de RoHS-richtlijn met betrekking tot de verschillende categorieën elektronische producten.

Informationen zu Sicherheit und Konformität

Touchscreen-Gerät zur Datenerfassung

Einhaltung von Vorschriften für Sicherheit und Gesundheitsschutz

Dieses Gerät entspricht EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008 und CSA C22.2 No. 60950-1-07, 2nd Edition, 2007-03.

CE Dieses Produkt entspricht EN 55022, 2010.

EN 55022 (CISPR 22)

Dies ist ein Produkt der Klasse A. Es kann in Wohnbereichen Funkstörungen hervorrufen. In diesem Falle sind vom Benutzer geeignete Gegenmaßnahmen zu ergreifen.

RoHS-Richtlinie

Dieses Datenerfassungsgerät und alle derzeit für die Verwendung mit diesem Gerät zugelassenen Hardwareoptionen wurden entsprechend der EU-Richtlinie 2011/65/EU zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (auch als RoHS2 oder RoHS-Neufassung bezeichnet) entwickelt. Diese kurz „RoHS" (Restriction of Hazardous Substances) genannte Richtlinie verbietet das Neuinverkehrbringen von Geräten, die Blei, Quecksilber, Cadmium, sechswertiges Chrom und/oder bromierte Flammschutzmittel (PBB, PBDE) enthalten. Der Hersteller hat zur Erfüllung der RoHS-Richtlinie in Bezug auf verschiedene Kategorien elektronischer Produkte ein entsprechendes Programm eingeführt.

Πληροφορίες περί ασφάλειας και συμμόρφωσης

Συσκευή συλλογής δεδομένων με οθόνη αφής

Έγκριση Οργανισμού Ασφαλείας

Αυτή η συσκευή πληροί τα πρότυπα EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008 και CSA C22.2 αριθ. 60950-1-07, 2η έκδοση, 2007-03.

CE Αυτό το προϊόν πληροί το πρότυπο EN 55022, 2010.

EN 55022 (CISPR 22)

Το προϊόν αυτό είναι ένα προϊόν της Κατηγορίας A. Σε οικιακό περιβάλλον, το προϊόν αυτό ενδέχεται να προκαλέσει ραδιοπαρεμβολές. Σε μια τέτοια περίπτωση, ο χρήστης καλείται να λάβει τα απαραίτητα μέτρα.

Οδηγία RoHS

Αυτή η συσκευή συλλογής δεδομένων και όλες οι επιλογές hardware που έχουν εγκριθεί για λειτουργία με αυτή τη συσκευή, έχουν σχεδιαστεί σύμφωνα με την οδηγία 2011/65/ΕΕ για τον περιορισμό στη χρήση ορισμένων επικίνδυνων ουσιών στα είδη ηλεκτρικού και ηλεκτρονικού εξοπλισμού (γνωστή και ως «RoHS2» ή «αναδιατύπωση RoHS»). Η οδηγία RoHS απαγορεύει την πώληση ηλεκτρονικού εξοπλισμού που περιλαμβάνει συγκεκριμένες επικίνδυνες ουσίες, όπως μόλυβδο, κάδμιο, υδράργυρο, εξασθενές χρώμιο, πολυβρομιωμένο διφαινύλιο (PBB) και πολυβρομιωμένο διφαινυλεθέρα (PBDE) εντός της Ευρωπαϊκής Ένωσης. Ο κατασκευαστής έχει υλοποιήσει ένα πρόγραμμα για την κάλυψη των απαιτήσεων της Οδηγίας RoHS σύμφωνα με τις διάφορες κατηγορίες των ηλεκτρονικών προϊόντων.

Turvallisuus- ja vaatimustenmukaisuustiedot

Kosketusnäytöllä varustettu tiedonkeruulaite

Turvallisuushyväksynnät

Tämä laite on seuraavien vaatimusten mukainen: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 No. 60950-1-07 toinen versio, 2007-03.

CE Tämä tuote on seuraavien vaatimusten mukainen: EN 55022, 2010.

EN 55022 (CISPR 22)

Tämä tuote on luokan A laite. Kotitalouksissa se saattaa aiheuttaa radiovastaanoton häiriöitä, jolloin käyttäjän pitää tehdä soveltuvat toimenpiteet häiriöiden välttämiseksi.

RoHS2-direktiivi

Tämä tiedonkeruulaite ja kaikki lisälaitteet, jotka tällä hetkellä on hyväksytty tämän laitteen kanssa käytettäviksi, on suunniteltu Euroopan yhteisön tiettyjen haitallisten aineiden käyttöä sähkö- ja elektroniikkalaitteissa koskevan (RoHS2) -direktiivin mukaisesti (2011/65/EU). RoHS2-direktiivi kieltää myymästä Euroopan Unionin alueella sellaisia elektronisia laitteita, jotka sisältävät tiettyjä haitallisia aineita kuten lyijyä, kadmiumia, elohopeaa, kuusiarvoista kromia, polybromioituja bifenyylejä (PBB) ja polybromioituja difenyylieettereitä (PBDE). Valmistaja toteuttaa ohjelmaa, jolla täytetään RoHS2-direktiivin vaatimukset koskien eri luokkien elektronisia tuotteita.

Renseignements sur la sécurité et la conformité

Dispositif de collecte de données à écran tactile

Approbations des agences de sécurité

Ce dispositif se conforme aux normes EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 No. 60950-1-07, 2e édition, 2007-03

CE Se produit se conforme à la norme EN 55022, 2010.

EN 55022 (CISPR 22)

Ce produit est un produit de classe A. Dans un environnement domestique, ce dispositif peut produire des interférences radio, auquel cas l'utilisateur sera tenu d'adopter les mesures appropriées.

Conformité du ministère des Communications du Canada

Cet appareil numérique respecte les limites de rayonnement de bruits radio électriques applicables aux appareils numériques de classe A, prévues au Règlement sur le matériel brouilleur du ministère des Communications du Canada. Ce dispositif est conforme aux normes RSS sans licence d'Industrie Canada. Son utilisation est soumise aux deux conditions suivantes : (1) ce dispositif ne provoque pas d'interférence et (2) ce dispositif doit accepter toute interférence, y compris les interférences pouvant provoquer un mauvais fonctionnement du dispositif.

IC: 1416A-8609K003 est utilisé avec les numéros de pièce suivants : 8609100-003, 8609100-053, 8609100-103, 8609100-403
IC: 1416A-8609K004 est utilisé avec les numéros de pièce suivants : 8609100-004, 8609100-054, 8609100-104, 8609100-404
IC: 1416A-8609K007 est utilisé avec les numéros de pièce suivants : 8609100-007, 8609100-057, 8609100-107, 8609100-407

Conformité EMI/RFI supplémentaire

Cet appareil se conforme aux normes FCC partie 15, ACMA AS/NZS CISPR 22:2009 + émissions A1:2010 de classe A et résistance EN 55024:2010. Cet appareil est conforme à la norme ICES-003, édition 5 du Canada.

Directive RoHS

Ce dispositif de collecte de données et toutes les options de matériel actuellement qualifiées pour fonctionner avec ce dispositif sont conçus conformément à la Directive 2011/65/EU sur la limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques (connu comme RoHS2 ou RoHS refondue). La Directive RoHS interdit la vente de produits électroniques contenant certaines substances dangereuses, comme le plomb, le cadmium, le mercure, le chrome hexavalent, les polybromobiphényles (« PBB ») ou les éthers diphényliques polybromés (« PBDE ») dans l'Union européenne. Le fabricant a mis en place un programme pour aborder les exigences de la Directive RoHS à l'égard aux diverses catégories de produits électroniques.

Enfòmasyon sou Sekirite ak Konfòmite

Aparèy Ekran Taktil pou Rasanble Done

Apwobasyon ajans sekirite yo

Aparèy sa a konfòm ak EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 No. 60950-1-07, Dezyèm Edisyon, 2007-03.

CE Pwodui sa a konfòm ak EN 55022, 2010.

EN 55022 (CISPR 22)

Pwodui sa a se yon pwodui kategori A. Nan yon anviwònman domestik, li kab lakoz entèferans radyo kote nan ka sa a, moun k ap sèvi avèk li a bezwen pran yon seri prekosyon apwopriye.

Direktiv RoHS

Aparèy sa a pou rasanble done yo ak tout posiblite materyèl ki kalifye kounye a pou travay avèk aparèy sa a deziyen yon fason ki konfòm avèk Direktiv 2011/65/EU pou Restriksyon sou Itilizasyon Sèten Sibstans Danjere nan Ekipman Elektrik ak Elektwonik (ki te rele avan RoHS2 ou RoHS remanye). Direktiv RoHS yo entèdi pou vann ekipman elektwonik ki gen yon seri sibstans danjre tankou plon, kadmyòm, mèki, kwomyòm egzavalan, bifenil polibwominate ("PBB") ak difeniletè polibwominate ("PBDE") nan Inyon Ewopeyèn nan. Fabrikatè a mete anplas yon pwogram espesyal ki la pou regle kesyon egzijans direktiv RoHS yo nan domèn divès kategori pwodui elektwonik yo.

Öryggisupplýsingar og upplýsingar til að uppfylla lög og reglugerðir

Tæki til söfnunar gagna gegnum snertiskjá

Viðurkenningar vottunarstofa

Búnaðurinn er í samræmi við staðlana EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 Nr. 60950-1-07, 2. útgáfu, 2007-03.

CE Þessi búnaður er í samræmi við EN 55022, 2010.

EN 55022 (CISPR 22)

Þessi búnaður tilheyrir A flokki. Innanhúss getur hann valdið rafsegultruflunum og notandinn verður þá að gera viðeigandi ráðstafanir.

RoHS tilskipunin

Þetta tæki til söfnunar gagna og allir valkostir vélbúnaðar sem eru vottaðar í dag til að starfa með þessu tæki eru hönnuð í samræmi við tilskipun 2011/65/ESB um takmarkanir á notkun tiltekinna hættulegra efna í rafbúnaði og rafeindabúnaði (þekkt sem RoHS2 eða endurútgáfa RoHS). Samkvæmt tilskipuninni er innan ESB bannað að selja rafbúnað sem inniheldur tiltekin, hættuleg efni svo sem kadmíum, kvikasilfur, sexgilt króm, fjölbrómað bífenýl ("PBB"), og fjölbrómaða dífenýletra ("PBDE"). Framleiðandinn hefur áætlun tiltæka til að uppfylla kröfur RoHS tilskipunarinnar hvað snertir mismunandi tegundir raftækja.

Informazioni di sicurezza e conformità

Dispositivo touchscreen per la raccolta dati

Omologazioni di enti per la sicurezza

Questo dispositivo è conforme alle norme EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 No. 60950-1-07, Seconda Edizione, 2007-03.

CE Questo prodotto è conforme alla norma EN 55022, 2010.

EN 55022 (CISPR 22)

Questo dispositivo è un prodotto di Classe A. In ambiente domestico può causare interferenze radio; in questo caso, l'utente potrebbe dover prendere le misure necessarie.

Direttiva RoHS

Questo dispositivo per la raccolta dati e tutte le opzioni hardware, attualmente qualificate per funzionare insieme al dispositivo, sono progettati in base alla Direttiva 2011/65/UE sulle restrizioni dell'uso di determinate sostanze pericolose nelle apparecchiature elettriche ed elettroniche (chiamata RoHS2 o RoHS Recast). La Direttiva RoHS proibisce la vendita nell'Unione Europea di equipaggiamenti elettronici che contengono determinate sostanze pericolose come piombo, cadmio, mercurio, cromo esavalente, bifenili polibromurati ("PBB") ed etere di difenile polibromurato ("PBDE"). Il produttore ha un programma volto a rispondere ai requisiti della Direttiva RoHS relativamente alle diverse categorie di prodotti elettronici.

Sikkerhets- og samsvarsinformasjon

Datainnsamlingsenhet med berøringsskjerm

Godkjenninger fra sikkerhetsorgan

Dette apparatet er i samsvar med EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 nr. 60950-1-07, 2. utgave, 2007-03.

CE Dette produktet er i samsvar med EN 55022, 2010.

EN 55022 (CISPR 22)

Dette er et klasse A-produkt. I et hjemmemiljø kan det forårsake radiostøy. I så fall kan brukeren bli pålagt å utbedre problemet.

RoHS-direktivet: bruk av farlige stoff i elektrisk og elektronisk utstyr

Denne datainnsamlingsenheten og all maskinvare som for øyeblikket er kvalifisert til å fungere med denne enheten er utformet i samsvar med EU-direktivet 2011/65/EU om bruk av farlige stoff i elektrisk og elektronisk utstyr (ofte omtalt som "RoHS" eller «RoHS recast»). Direktivet forbyr salg av elektronisk utstyr som inneholder visse farlige stoffer som bly, kadmium, kvikksølv, seksverdig krom, polybromerte bifenyler (PBB) eller polybromerte difenyletere (PBDE) i EU. Produsenten har truffet tiltak for å oppfylle kravene i nevnte direktiv om de forskjellige kategoriene elektroniske produkter.

Informações sobre segurança e conformidade

Dispositivo de coleta de dados sensível ao toque

Aprovações da Agência de segurança

Este dispositivo está em conformidade com EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 Nº 60950-1-07, 2ª edição, 2007-03

CE Este produto está em conformidade com EN 55022, 2010.

EN 55022 (CISPR 22)

Este é um produto de Classe A. Em um ambiente doméstico, ele pode causar radiointerferência, o que pode exigir que o usuário adote as medidas apropriadas.

Diretiva RoHS

Este dispositivo de coleta de dados e todas as opções de hardware atualmente qualificadas para funcionar com ele são projetados de acordo com a diretiva 2011/65/EU sobre a restrição de uso de determinadas substâncias perigosas em equipamentos elétricos e eletrônicos (conhecida como RoHS2 ou RoHS recast). A diretiva RoHS proíbe, na União Europeia, a venda de equipamentos eletrônicos contendo determinadas substâncias perigosas, como chumbo, cádmio, mercúrio, cromo hexavalente, bifenilos polibromados ("PBB") e éteres de difenila polibromados ("PBDE"). O fabricante tem um programa estabelecido para tratar das exigências da diretiva RoHS com relação às diversas categorias de produtos eletrônicos.

Informações de segurança e conformidade

Dispositivo de recolha de dados com ecrã tátil

Certificações da empresa de segurança

Este dispositivo está em conformidade com as normas EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 N.° 60950-1-07, 2.ª Edição, 2007-03

CE Este dispositivo está em conformidade com a norma EN 55022, 2010.

EN 55022 (CISPR 22)

Este produto é um produto de Classe A. Em ambientes domésticos, poderá causar interferências de rádio. Nestas situações, o utilizador poderá ter de tomar medidas adequadas.

Diretiva RoHS

Este dispositivo de recolha de dados e todas as opções de hardware atualmente qualificadas para funcionarem com este dispositivo são concebidas de acordo com a Diretiva 2011/65/UE sobre a Restrição do Uso de Determinadas Substâncias Perigosas em Equipamentos Elétricos e Eletrónicos (conhecida como RoHS2 ou reformulação da RoHS). A diretiva RoHS proíbe a venda de equipamentos eletrónicos que contenham determinadas substâncias perigosas, como chumbo, cádmio, mercúrio, crómio hexavalente, bifenilos polibromados ("PBB") e éteres de difenilo polibromado ("PBDE"), na União Europeia. O fabricante tem um programa a decorrer para abordar os requisitos da Diretiva RoHS no que diz respeito às várias categorias de produtos eletrónicos.

Сведения по технике безопасности и нормативному соответствию

Устройство сбора данных с сенсорным экраном

Аттестация органами технической безопасности

Устройство соответствует стандартам и нормативам EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 № 60950-1-07, 2 ред., 2007-03.

CE Изделие соответствует стандартам EN 55022, 2010.

EN 55022 (CISPR 22)

Изделие отнесено к классу A. В случае применения в жилых помещениях изделие может создавать радиочастотные помехи, в этом случае пользователю, возможно, потребуется принять адекватные меры.

Директива RoHS

Устройство сбора данных и все аппаратные дополнительные приспособления, в настоящее время одобренные к использованию с устройством, разработаны в соответствии с директивой Европейского Союза об ограничении использования некоторых вредных веществ в электрическом и электронном оборудовании («RoHS2 или обновленная версия RoHS») (2011/65/EC). Директива RoHS запрещает продажу электронного оборудования, содержащего ряд опасных веществ, таких как свинец, кадмий, ртуть, шестивалентный хром, полибромдифенилов («PBB») и полибромдифенилэфиров («PBDE») в Европейском Союзе. Производитель следует своей программе по выполнению требований директивы RoHS в различных категориях электронной продукции.

Información sobre seguridad y cumplimiento

Dispositivo de pantalla táctil para recopilación de datos

Aprobaciones de la agencia de seguridad

Este dispositivo cumple con EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 N.º 60950-1-07, 2.ª edición, 2007-03

CE Este producto cumple con EN 55022, 2010.

EN 55022 (CISPR 22)

Este producto es de Clase A. En un entorno doméstico, puede causar interferencia a las señales de radio, en cuyo caso es posible que se le pida al usuario que tome medidas adecuadas.

Directiva RoHS

Este dispositivo de recopilación de datos y todas las opciones de hardware actualmente cualificadas para trabajar con este dispositivo están diseñados conforme a la Directiva 2011/65/EU sobre la restricción del uso de ciertas sustancias peligrosas en equipos eléctricos y electrónicos (conocida como RoHS2 o modificación de RoHS). La directiva RoHS prohíbe la venta de equipo electrónico que contenga ciertas sustancias peligrosas como plomo, cadmio, mercurio, cromo hexavalente, bifenilos polibromados ("PBB") y difeniléteres polibromados ("PBDE") en la Unión Europea. El fabricante tiene implementado un programa para abordar los requisitos de la Directiva RoHS relacionados con las diferentes categorías de productos electrónicos.

Information om säkerhet och normuppfyllelse

Datainsamlingsenhet med pekskärm

Godkännande från säkerhets- och standardiseringsorganisationer

Enheten uppfyller villkoren enligt EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011, EN 62311:2008, CSA C22.2 Nr 60950-1-07, 2nd ED, 2007-03.

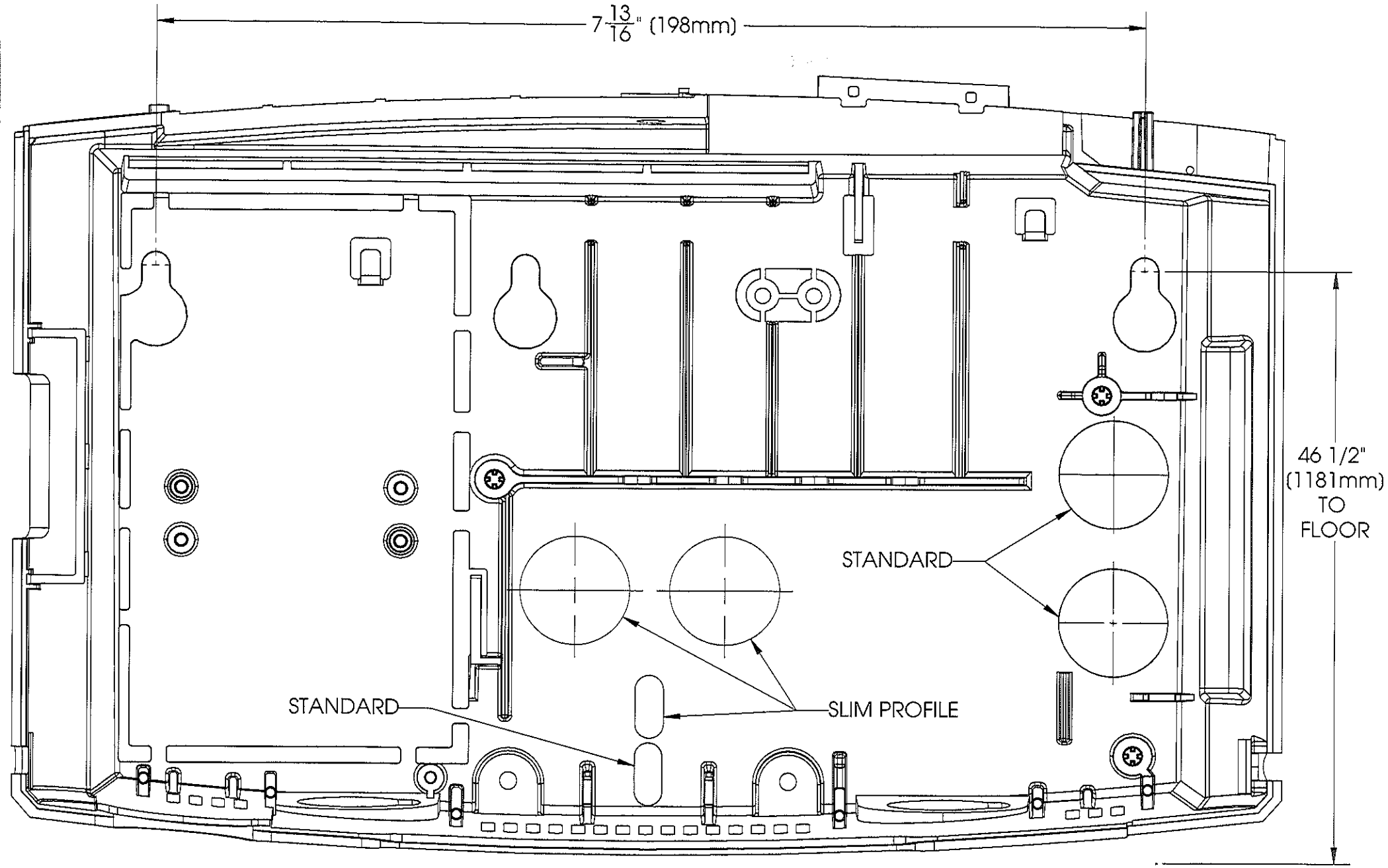
CE Produkten uppfyller kraven i EN 55022, 2010.

EN 55022 (CISPR 22)

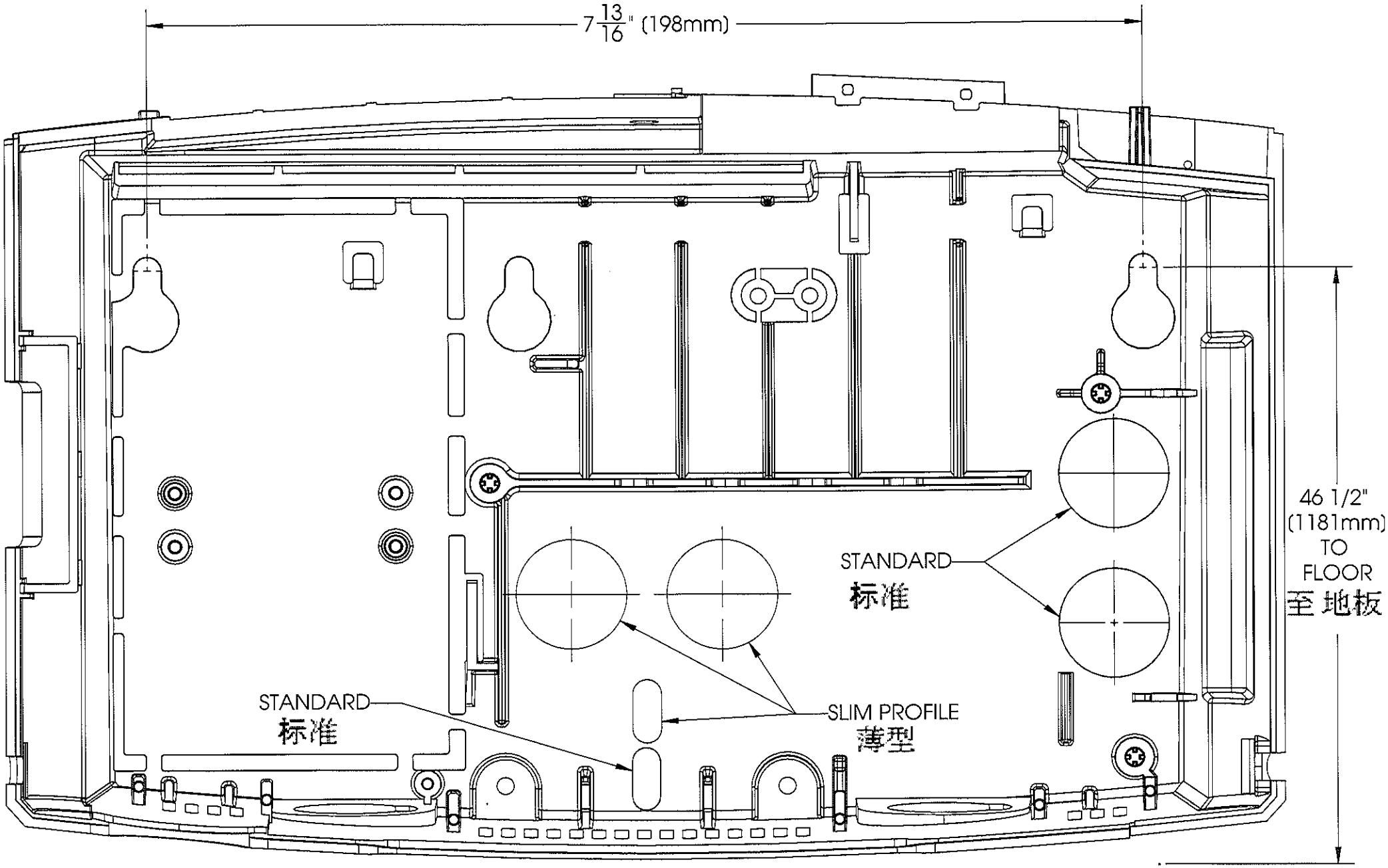
Detta är en Klass A-produkt. I hemmiljö kan den ge upphov till radiostörningar vilket användaren kan behöva åtgärda.

RoHS-direktiv

Den här datainsamlingsenheten, och alla maskinvaruenheter som kan väljas till och som för närvarande uppfyller kraven för att fungera tillsammans med enheten, har utformats i enlighet med direktiv 2011/65/EU för begränsning av användningen av vissa farliga ämnen i elektriska och elektroniska produkter (RoHS2 eller obearbetning av RoHS). RoHS-direktivet förbjuder försäljning av elektronisk utrustning innehållande vissa farliga ämnen som bly, kadmium, kvicksilver, hexavalent krom, polybromerade bifenyler ("PBB") och polybromerade difenyletrar ("PBDE") inom EU. Tillverkaren arbetar med att möta RoHS-direktivets krav för företagets alla olika typer av elektroniska produkter.



PART NUMBER 4704549-003 REV-C



PART NUMBER 4704549-003 REV-C 部件号

GB/T 26572-2011 遵循信息

《中华人民共和国电子行业标准》，《电子信息产品中有毒有害物质的限量要求》（标准号：GB/T 26572-2011）

根据《电子信息产品污染控制标识要求》（标准号：SJ/T 11364-2014）的规定，上述符号表示在产品或部件的任一均质材料中包含超出以下最大浓度值的物质（如下表详述）：(a) 铅、汞、六价铬、多溴联苯、多溴二苯醚的含量不超过 0.1%（按重量）或 (b) 镉含量不超过 0.01%（按重量）。除非 Kronos 另有书面说明，否则此信息表示 Kronos 了解的全部信息（根据第三方供应商向 Kronos 提供的信息）。

上述符号中的数字参考不应视为表示产品寿命或延长产品保修期。

有害物质或成分的名称和含量

O：表示部件所有均质材料中的有害物质含量均*低于* GB/T 26572-2011 中的限制要求

X：表示部件所有均质材料中包含的有害物质均*高于* GB/T 26572-2011 中的限制要求

Kronos InTouch®	PBB/PBDE (Br)	汞 (Hg)	铅 (Pb)	铬 (Cr)	镉 (Cd)
顶部护盖组件	O	O	X	O	O
底座组件	O	O	X	O	O
终端包装（放置硬件和胸卡）	O	O	O	O	O

文档部件号：4704867-081
文档修订：B

Kronos InTouch® 9100 QuickStart Guide

Document Part Number: 4704866-001
Document Revision: B

KRONOS®

http://community.kronos.com

Important

The examples in this QuickStart guide show common installation scenarios for the Standard and Slim Profile models of the Kronos InTouch. For more complex installations, download the comprehensive installation guide from the web site listed on this page. If you do not have access to the documentation site, contact your Kronos representative or dealer.

Importante

Gli esempi riportati in questa guida di avvio rapido illustrano gli scenari di installazione comuni per i modelli con profilo Standard e Slim di Kronos InTouch. Per installazioni più complesse, scaricare la guida di installazione completa dal sito Web indicato in questa pagina. Se non si dispone dell'accesso al sito contenente la documentazione, contattare il rappresentante o il rivenditore Kronos.

Importante

Os exemplos neste guia QuickStart mostram os cenários de instalação comuns para os modelos padrão e de perfil simples do Kronos InTouch. Para instalações mais complexas, faça o download do guia completo de instalação no site relacionado nesta página. Se você não tiver acesso ao site de documentação, entre em contato com um revendedor ou representante da Kronos.

重要事项

此快速入门指南中的示例对标准型和超薄型 Kronos InTouch 的常见安装方法进行了说明。 对于较为复杂的安装，请从本页所列的网站下载完整的安装指南。 如果您没有访问文档站点的权限，请联系 Kronos 的销售代表或经销商。

重要事項

這份快速上手指南中的範例，說明 **Kronos InTouch** 標準版和窄版機型的共通安裝方式。 若要了解更複雜的安裝方式，請從本網頁列出的網站下載完整版安裝說明。 若您無法連結說明文件網站，請洽 **Kronos** 服務代表或經銷商。

Ważne

Zawarte w niniejszym przewodniku Szybki start przykłady przedstawiają scenariusze standardowej instalacji dla modeli Standard i Slim Profile urządzenia Kronos InTouch. W przypadku bardziej zaawansowanych instalacji należy pobrać odpowiedni podręcznik instalacji z witryny internetowej wyszczególnionej na niniejszej stronie. W przypadku braku dostępu do strony z dokumentacją należy skontaktować się z przedstawicielem lub dostawcą firmy Kronos.

Wichtig

Die Beispiele in dieser Kurzanleitung zeigen häufige Installationsszenarien für die Standard- und Flachprofilmodelle des Kronos InTouch. Laden Sie bei umfangreicheren Installationen das vollständige Installationshandbuch von der auf dieser Seite aufgeführten Website herunter. Wenn Sie nicht auf die Dokumentationswebsite zugreifen können, wenden Sie sich an Ihren Kronos-Vertreter oder -Händler.

Importante

Los ejemplos de la guía QuickStart muestran situaciones de instalaciones comunes para los modelos Standard y Slim Profile de Kronos InTouch. Para instalaciones más complejas, descargue la guía completa de instalación desde el sitio web que figura en esta página. Si no tiene acceso al sitio de documentación, comuníquese con el representante o distribuidor de Kronos.

Important

Les exemples de ce guide de démarrage rapide illustrent des scénarios d'installation courants des modèles Standard et Slim Profile de Kronos InTouch. Pour des installations plus complexes, téléchargez le guide d'installation complet à partir du site Web indiqué sur cette page. Si vous n'avez pas accès au site de documentation, communiquez avec votre représentant ou détaillant Kronos.

중요사항

이 QuickStart 설명서에서는 예제를 통해 Kronos InTouch의 표준 및 슬림 프로파일 모델에 대한 공통적인 설치 시나리오를 설명합니다. 복잡한 설치에 대한 설명이 필요한 경우 이 페이지에 표시된 웹 사이트에서 종합 설치 설명서를 다운로드하십시오. 이 문서 사이트에 액세스할 수 없는 경우 Kronos 담당자나 판매업체에 문의하십시오.

Важно

Примеры в этом кратком руководстве пользователя соответствуют наиболее распространенным сценариям установки стандартной и тонкой моделей устройства Kronos InTouch. В более сложных случаях установки следует загрузить полное руководство по установке с веб-сайта, указанного на этой странице. Если доступ к веб-сайту с документацией невозможен, обратитесь к своему представителю или дилеру Kronos.

Belangrijk

De voorbeelden in deze handleiding Snel aan de slag hebben betrekking op veel voorkomende installatiescenario's voor de modellen Standaard en Smal profiel van de Kronos InTouch. Voor complexere installaties kunt u de uitgebreide installatiehandleiding downloaden van de op deze pagina genoemde website. Als u geen toegang tot de documentatiesite hebt, neemt u contact op met uw Kronos-accountmanager of Kronos-dealer.

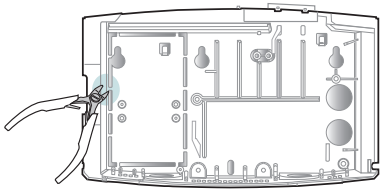
Installation Instructions

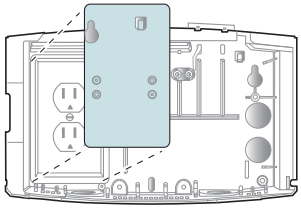
1. Gather the following tools: security wrench (in kit), level, tape measure, small wire cutter, drill, number 1 or 2 Phillips and slotted screwdrivers (magnetic tips).

2. Use a level and a tape measure with the paper mounting template or the base of the unit itself to mark the locations for screws, cable entry points, and the AC outlet (Standard model only). To ensure ADA compliance, be sure the top of the unit is 48 inches (1219 millimeters) from the floor.

Note: The examples in this guide show the Standard model mounted over an AC wall outlet and the Slim Profile model mounted near an external AC outlet, or with a Power-over-Ethernet (PoE) or PoE Plus cable. For other installation scenarios, such as replacing a Kronos® 4500™ timeclock, download and review the InTouch installation guide.

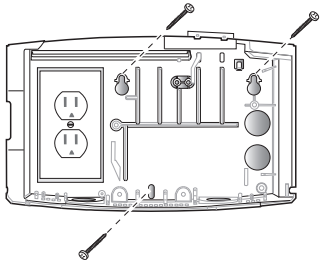
3. (Standard Model Only) Use a small wire cutter to remove the outlet cover plate from the base.



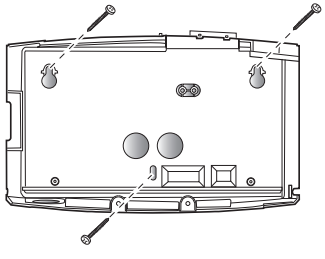


4. Mount the base on the wall. Use the 10 X 1-1/4 screws (and wall anchors, if necessary).

Standard Model

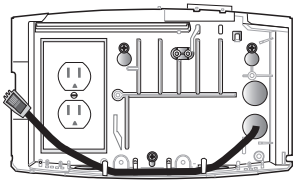


Slim Profile Model

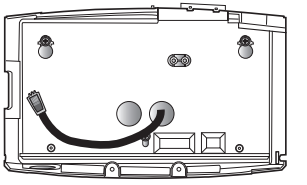


5. Route the Ethernet cable. (The cable can also be routed through either of the holes at the bottom of the base.)

Standard Model



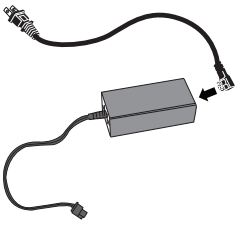
Slim Profile Model

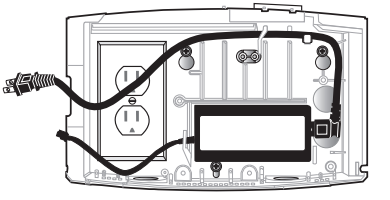


Warning: Do not plug in the power cable or backup battery cable until you are instructed to do so.

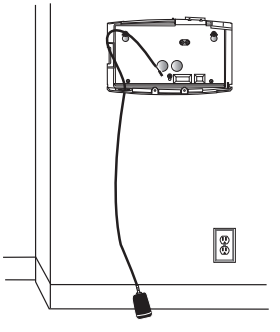
Avertissement : Ne branchez pas le câble d'alimentation ou le câble de batterie de rechange avant qu'on vous demande de le faire.

6. (Standard Model Only) Install the transformer. Do not plug it in to the AC outlet yet.





7. (Slim Profile Model Only) If using the wall transformer for power, route that cable in to the base. Do not plug the cable in to the AC outlet yet.



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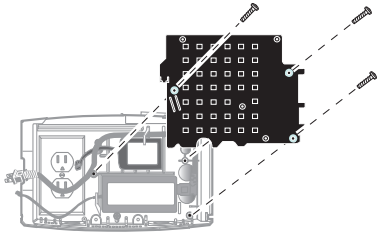
Installation Instructions

8. (Standard Model Only) If you ordered the optional backup battery, install it now (see the separate backup battery installation guide). Then, use a number 1 or 2 Phillips screwdriver and the M3 X 6 screws to attach the plastic transformer holder to the base. Do not plug in the transformer or battery yet.

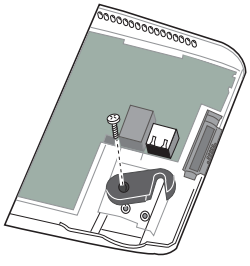


9. Install other options, including the finger scan device. See the installation guides for those kits.

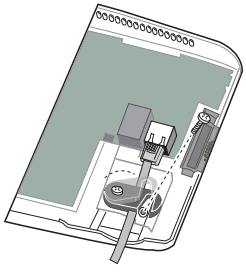
10. Use the M3 X 10 screws to attach the Ethernet strain relief clip to the inside front cover. Then connect the Ethernet cable to the main board.

Note: If using PoE or PoE Plus, the unit turns on when you plug in the Ethernet cable.

a.

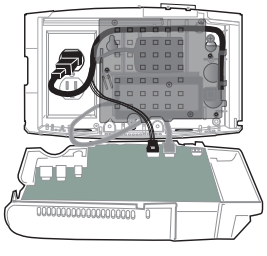


b.

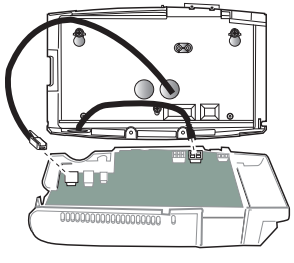


11. If not using PoE or PoE Plus, connect the power cable (and optional battery) to the main board. Ensure that the locking clip snaps over the tab on the receptacle. Plug the transformer into the outlet.

Standard Model

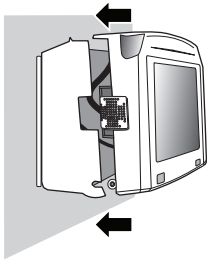


Slim Profile Model

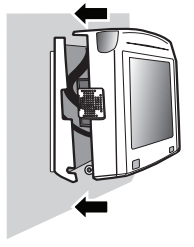


12. Verify that the unit is on. Then carefully close the cover.

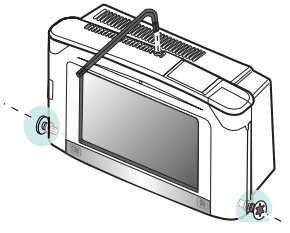
Standard Model



Slim Profile Model



13. Insert the M4 X 10 torx screw into the top of the cover. Use the security wrench to secure each screw so that the fit is snug, but not too tight.



14. After the unit powers up, complete the initial setup and configuration tasks that are described in the Maintenance Mode chapter of the user guide. Configure other device settings on the host application server as directed.