DANE COUNTY DEPARTMENT of PUBLIC WORKS, HIGHWAY and TRANSPORTATION

County Executive
Joseph T. Parisi

1919 Alliant Energy Center Way ◆ Madison, Wisconsin 53713
Phone: (608) 266-4018 ◆ Fax: (608) 267-1533

Commissioner / Director
Gerald J. Mandli

February 12, 2015

ATTENTION ALL REQUEST FOR BID RFB HOLDERS

RFB NO. 313083 - ADDENDUM NO. 1

CONSTRUCTION OF EAST HIGHWAY GARAGE – SALT STORAGE FACILITY (BID PACKAGE A) AND MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

DEPARTMENT OF PUBLIC WORKS, HIGHWAY & TRANSPORTATION 3562 COUNTY HIGHWAY AB MCFARLAND, WISCONSIN

BIDS DUE MARCH 2, 2015, 2:00 PM. DUE DATE AND TIME ARE CHANGED BY THIS ADDENDUM.

This Addendum is issued to modify, explain or clarify the original Request for Bid (RFB) and is hereby made a part of the RFB. Please attach this Addendum to the RFB. Acknowledge this addendum on the Bid Form.

PLEASE MAKE THE FOLLOWING CHANGES:

1. **All Cover Pages – Bid Due Date Change**
   CONSTRUCTION OF EAST HIGHWAY GARAGE – SALT STORAGE FACILITY (BID PACKAGE A) AND
   MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)
   The bid due date has changed. On all cover pages for both projects,
   Replace: "Due Date / Time: **THURSDAY, FEBURARY 19, 2015, 2:00 P.M."**
   With: "Due Date / Time: **MONDAY, MARCH 2, 2015, 2:00 P.M."**

2. **Cover Letter**
   - Change on both projects the two references to due date from "**2:00 p.m., THURSDAY, FEBURARY 19, 2015."** to read "**2:00 p.m., MONDAY, MARCH 2, 2015."**

   - Delete: Please be sure to complete one unbound original and four bound copies of the entire proposal package. To return your proposal, please follow these instructions:
     1. Place the signed Signature Page on top as page 1.
     2. Place the signed Fair Labor Practices Certification after the Signature Page as page 2.
     3. Place the Proposal information after Fair Labor Practices Certification.
     4. Place the Equal Benefits Compliance Payment Certification after the Proposal information.
     5. Clearly label your envelope containing your proposal in the lower left-hand corner as follows:

   - Replace with issued with this Addendum.
     Please be sure to complete one unbound original copy of the entire bid package **A** and bid package **B**. To return your bid, please follow these instructions:
     1. Place the signed Fair Labor Practices Certification after Bid Form.
     2. Place the Bid information after Fair Labor Practices Certification.
     3. Place the Equal Benefits Compliance Payment Certification after the Bid information.
     4. Clearly label your envelope containing your bid in the lower left-hand corner as follows:

        Bid No. 313083
        Construction of East Highway Garage – Salt Storage Facility (Bid Package A) and Medical Examiner Office Building (Bid Package B)
        2:00 p.m., Monday, March 2, 2015

2. **Bid Package A**
   This Addendum is issued to modify, explain or correct the original Drawings and Specifications as noted in Addendum #A1 – Bid Package A attached, and is hereby made a part of the Contract documents. Please attach this Addendum to the Specifications in your possession. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.
   This Addendum consists of 14 written pages, (1) 15 page added specification section, and 7 revised sheets.

3. **Bid Package B**
   This Addendum is issued to modify, explain or correct the original Drawings and Specifications as noted in Addendum B1 – Bid Package B attached, and is hereby made a part of the Contract documents. Please attach this Addendum to the Specifications in your

possession. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.

This Addendum consists of 87 written pages, 29 revised sheets and 3 Addendum B1 Bid Questions and Answers written pages.

- **There will be an <u>Addendum 2</u> to follow before the revised bid date.**

If any additional information about this Addendum is needed, please call Rob Nebel at 608/267-0119 or 608/575-0890 nebel@countyofdane.com or neitzel-knox@countyofdane.com

Sincerely,
Rob Nebel
Assistant Public Works Director

Enclosures:
Addendum A1 – East Highway Garage – Salt Storage Facility (Bid Package A)
Drawings
E-212 Waste Heat Loop Pump Enclosure
A-208 Salt Building Plans
A-209 Salt Building Elevations & Sections
A-410 Salt building Sections and Details
A-601 Door Schedule
A-701 Interior Elevations
A-702 Interior Elevations, Floor Finish & Details
Addendum B1- Medical Examiner Office Building (Bid Package B)
Drawings
C100 Site Grading Plan
C200 Site Utilities
C600 Site and Planting Details
A200 First Floor Plan
A201 Roof Plan
A210 Enlarged Floor Plans
A503 Exterior Wall Sections
A604 Exterior Details
A606 Exterior Details
A609 Exterior Details
A800 Interior Elevations
Q210 Enlarged Floor Plan
Q821 Autopsy Details
S100 Foundation Plan
S200 Roof Framing Plan
S201 Misc Framing Plans
S300 Foundation Details
S301 Foundation Details
S401 Framing Details
P100 Plumbing Underfloor Plan
P200 Plumbing First Floor Plan
P701 Plumbing Process Waste and Vent Isometrics
P702 Plumbing Domestic Water Isometrics
P900 Plumbing Schedules
M200 HVAC First Floor Plan
M201 HVAC Roof Plan and Details
M300 HVAC First Floor and Penthouse Plans
M401 HVAC Enlarged Plans and Sections
M900 HVAC Schedules
Addendum B1 Bid Questions and Answers

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ADDENDUM 1

EAST HIGHWAY GARAGE – SALT STORAGE FACILITY (BID PACKAGE A)

BID NO. 313083

ADDENDUM A1 (Bid Package A): The following pages are addendum1 for East Highway Garage – Salt Storage Facility (Bid Package A)

February 12, 2015

ADDENDUM #A1 – BID PACKAGE A

Dane County Bid No. 313083
Madison, Wisconsin

BIDS DUE: MONDAY, MARCH 2, 2015 AT 2:00 (REVISED) at the Dane County Public Works, Highway & Transportation Dept., 1919 Alliant Energy Center Way, Madison, WI 53713 At that time Bids will be opened publicly for consideration by the Owner.

To all Contract Bidders of record.

This Addendum is issued to modify, explain or correct the original Drawings and Specifications as noted below, and is hereby made a part of the Contract documents. Please attach this Addendum to the Specifications in your possession. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.

This Addendum consists of fourteen (14) written pages, one (1) 15 page added specification section, and seven (7) revised sheets.

GENERAL COMMENTS

1. The specifications included in the contract documents consist of two separate projects. The specifications for Bid Package A do not apply to Bid Package B and vice versa.

QUESTIONS & ANSWERS

1. **Q:** I am looking through the spec book for this project and I believe spec sections 22 13 53, 23 74 00, and 27 60 00 are missing. Do you have any information on these? **A**: See information provided in this addendum.

2. **Q:** I am contacting you in regard to the current ornamental fence specification. I was hoping to discuss the way the spec is currently written. It calls for Ameristar's "Aegis II" product. This product a 1" x 14GA Steel Industrial Grade system. It is one of our older product lines and something we keep around when custom heights or custom colors are needed. The product comes with a 10 year warranty. The issue we are seeing is that, the spec is calling for our Aegis II as a 1" x 16GA Steel Picket. We do not offer a 16GA Steel Picket in Aegis II. If you are wanting an Industrial Grade Product but, don't need the biggest one, I would encourage you to issue an addendum changing the spec to Ameristar's "Montage Industrial". Montage Industrial is a 1" x 16GA Steel Picket. This product is available in Black or Bronze, comes with a 20 year warranty, and is available in 3', 3 ½' , 4', 5', 6', 7', & 8' Heights. This product is fusion welded (preassembled) and will reduce the labor costs as well. I have attached a Word Document Spec that may be formatted to for your project along with a warranty, Ameristar's E-Coat Process, and our LEED Letter. Would you let me know which product you would like to have bid on this job? **A:** See information provided in this addendum.

3. **Q:** Civil Drawings – The curb and gutter work along Luds Lane and C.T.H. AB is unclear as to who provides that work. Are the bolder curved curb & gutter at the intersection and any of the road side curb be included in the project? **A:** See information provided in this addendum.

4. **Q:** Civil Drawings – Is there a new turn lane going in along C.T.H. AB where it turns right onto Luds Lane? **A:** See information provided in this addendum.

5. **Q:** Dtl 9/A406 – Please confirm the screen wall at Wash Area along column line 'B' is a precast panel or provide reinforcing requirements for a C.I.P. wall. **A:** See information provided in this addendum.

6. **Q:** S-901 & A-407 – Please provide slab thickness at Fire Pump Bldg. **A:** Sheet S-901 shows the concrete in the fire pump room as Type 'B'.

7. **Q:** Detail 4/ A501 – Please provide sizing, number of shear studs per and spacing of embeds at footing & wall Precast connections. **A:** See information provided in this addendum.

8. **Q:** Sheet P-204 – Should there be plumbing schedules included on plan sheet for the alternate Satellite Bldg? **A:** See information provided in this addendum.

9. **Q:** Sect. 3/A-405, Sheet P-200 – Please provide details or product data for the elevator sump pit and what is it made of? **A:** See information provided in this addendum.

10. **Q:** Sheet A-701 – Elevation 13/A-701 references two cuts thru that view but neither appears to apply. 6/A-409 refers to Entrance details and 6/A-205 refers to a section cut of Stairs 133 & 155 that doesn't extend far enough over to show the casework depths and heights. Please provide casework clarifications. **A:** See information provided in this addendum.

11. **Q:** Section 4/A-413 – At the alternate Satellite Building, slab-on-grade is shown as 8" thick with 6 mil vapor barrier in Support 302 and Toilet 303, but on Plan 1/S-910 it calls for concrete type "A" which, according to the concrete slab notes on S-901, is a 4" thick slab w/ 10 mil barrier. Please clarify if the concrete slab notes on S-901 should be referenced and take precedence for all buildings in this Bid Package or just the Highway Building. **A:** See information provided in this addendum.

12. **Q:** Sheet A-210, Plan 1 – At alternate Satellite Bldg exterior concrete pavement calls for Concrete Type "C". Please verify if 10 mil vapor barrier should be installed, per concrete slab notes on S-901. **A:** See information provided in this addendum.

13. **Q:** We have reviewed the (asphalt paving) plans and specifications for this project and are missing some information and also may have some conflicting specs that need to be clarified. Please review the following and provide direction within the plans and specifications where we can find the missing information or clarify in writing. **A:** See information provided in this addendum.

14. **Q:** Sheet E001 & sheet E-101 from Bid Pkg A: Please clarify which bid package is responsible for setting and sizing of the conductors coming from the Medical Examiner building's site transformer depicted on the south side of the ME bldg. It was noted at the pre-bid meeting that site utilities to within 5' of the Medical Examiner building are to be included in A, please confirm that is true for the electrical service side too. **A:** See information provided in this addendum.

15. **Q:** Please see the attached Request for Approved Equal regarding the East Garage Salt Storage Facility/Medical Examiner Office Bid Packet A project. (Request for Approved Equal - ABT Trench Drains.) **A:** See information provided in this addendum.

16. **Q:** Please review the attached data on Advanced Floor Products RetroPlate System for polishing concrete. Advanced Floor Products (AFP) was formed over 15 years ago to create and develop a state-of-the-art concrete polishing system. AFP was the originator of the concrete polishing industry, and is the source from which all other systems are based upon. AFP manufactures RetroPlate 99, a catalyzed sodium silicate sealer, hardener, and dust proofing material which is applied during the polishing process. **A:** See information provided in this addendum.

17. **Q:** Drawing sheet P-001 - Who is responsible for installation of the piping from the well location to the building? **A:** See information provided in this addendum.

18. **Q:** Drawing sheet P-001 - Who is responsible for the installation of the FP piping from FP room to both buildings and storage tank? **A:** See information provided in this addendum.

19. **Q:** Drawing sheet P-001 - Who is responsible for the 4' wet well for the fire pump (~21'deep)? **A:** See information provided in this addendum.

20. **Q:** Drawing sheet P-204 - Who is responsible for the LP piping? **A:** The Plumber.

21. **Q:** Drawing sheet P-204 - Who is responsible for the underground LP line from tank to building? **A:** The Plumber.

22. **Q:** Drawing sheet P-305 detail 1: is the 4" PSan at the bottom of the detail coming from item (39) overflow tank for evaporator system (and attached vent) part of alternate #6? **A:** See information provided in this addendum.

23. **Q:** Drawing sheet P-305 detail 2: Are items number (9), (12), (17) and (36) to be included in base bid or alternate #3? **A:** See information provided in this addendum.

24. **Q:** Specification section 22 05 14 (page4 and 5): Water make-up for fire protection tank is listed twice under Part 2 - Products. Is this a typo? **A:** See information provided in this addendum.

25. **Q:** In reference to the Hwy Garage project. We (Metropolitan Crane) would like to be listed as one of your qualified manufactures of the bridge cranes going up in the parking garage. Please see our qualification letter attached and let me know if there is anything else you will need from us on your end. **A:** See information provided in this addendum.

26. **Q:** Per the specifications, the flat roof is to be EPDM. Would you consider the use of Duro-Last material? It is a mechanically installed material. I am asking because we do not want to have our bid dismissed due to bidding an unacceptable material. **A:** Dane County requires a black fully adhered roof. As this product cannot meet these requirements, it is not an approved equal.

27. **Q:** The plans call for vinyl coated chain link. Can you tell me what the 32 31 19 Ornamental Fences and Gates spec is for? **A:** See information provided in this addendum.

28. **Q:** Sheet A-601 – Please provide door schedule information for door S1001 (Salt Building entrance door). **A:** See information provided in this addendum.

29. **Q:** Sheet A-210 – Please provide door schedule information for all doors in the Satellite Building. **A:** See information provided in this addendum.

30. **Q:** We have been told by our Franklin Fueling Products representative that their products will come out as spec'd in an addendum. To whom do we "submit specifications and other data" for other "or equal" products we would like to use? 11 11 28 1.1 B states they must be in 8 days prior to closing of bids. **A:** See information provided in this addendum.

31. **Q:** Section 11 11 28 2.1 I states that stage II Vapor Recovery line is to be installed. Stage II vapor recovery is not required by the state of Wisconsin. **A:** See information provided in this addendum.

32. **Q:** P-001, Spec.s 21 05 00 & 21 40 00: The plumbing drawings call for a 4' diameter, 21' deep wet well under the fire pump building, page 3 of spec section 21 05 00 notes a pump wet well with no sizing and spec 21 40 00 notes a vertical pump vault with no sizing. Please confirm these are all one in the same units and that it is a prefabricated unit that wouldn't require additional cast-in-place concrete work. **A:** It is to be a prefabricated fiberglass vault provided and installed by Division 21 00 00 contractor.

33. **Q:** Do the tanks shown on sheet P-305 for the car wash reclaim need to be traffic rated H-20? **A:** See information provided in this addendum.

34. **Q:** What is the capacity of the overflow tank for evaporation system? **A:** See information provided in this addendum.

35. **Q:** Please provide a door schedule for the salt storage and satellite buildings. **A:** See information provided in this addendum.

36. **Q:** Please provide specification 07 60 00 referenced on drawing A-212. **A:** Section 07 60 00 is Flashing and Sheet Metal and is part of the project manual.

37. **Q:** P-001 calls for a4" diameter wet well for the fire pump, what is this constructed of? Precast? No details on the pump, is this provided by owner? **A:** See information provided in this addendum.

38. **Q:** What is the size of the buried FP water storage tank shown on sheet P-001? **A:** This will be determined by Fire Protection contractor.

39. **Q:** What is the size of the septic tank (informative bid b) shown on sheet P-001? **A:** This to be determined by Section 22 13 53 contractor.

40. **Q:** What is the size of the sanitary pump chamber (informative bid b) shown on sheet P-001? **A:** This to be determined by Section 22 13 53 contractor.

41. **Q:** Are the 5000 gallon process sanitary pump tank and 6000 gallon process sanitary holding tank included in the base bid A? **A:** Yes.

SPECIFICATIONS

Section 01 23 00 – Alternates

1. Paragraph 2.2 B 9 – Additional Information – LED lights for Alternate Bid #9 are as follows:

   Type A: 2x4 architectural LED, Lithonia, 2ALL4-49L-MVOLT-D50-LP840-BLD, 120V/277V, 4900 Lumens, 4000K, bi-level dimming driver, L80 at 50,000 hours, 50W, recess mount in ceiling grid.

   Type B: 2x2 architectural LED, Lithonia, 2ALL2-37L-MVOLT-D37-LP840-NX or BLD, 277V, 3700 Lumens, 4000K, dimming or bi-level dimming driver, L80 at 50,000 hours, 37W, recess mount in ceiling grid. The dimming or bi-level dimming option will not be used. Light switch and/or occupancy sensors to turn on lights to full brightness.

   Type C: Remains as LED downlight specified in light fixture schedule or equal on sheet E-501.

   Type D: 2x4 architectural LED, Lithonia, 2ALL4-49L-MVOLT-D50-LP840-NX or BLD, 277V, 4900 Lumens, 4000K, dimming or bi-level dimming driver, L80 at 50,000 hours, 50W, recess mount in ceiling grid. The dimming or bi-level dimming option will not be used. Light switch and/or occupancy sensors to turn on lights to full brightness.

Type E: Remains as LED downlight specified in light fixture schedule or equal on sheet E-501.

Type F: 2x4 lensed troffer LED, Lithonia, 2TL4-46L-FW-A19-MVOLT-D50-LP840-NX or BLD, 277V, 4600 Lumens, 4000K, dimming or bi-level dimming driver, L80 at 50,000 hours, 50W, recess mount in ceiling grid, A19 #19 pattern acrylic .156", flush white aluminum door. The dimming or bi-level dimming option will not be used. Light switch and/or occupancy sensors to turn on lights to full brightness.

Type G: 2x2 lensed troffer LED, Lithonia, 2TL2-33L-FW-A19-MVOLT-D38-LP840-NX or BLD, 277V, 3300 Lumens, 4000K, dimming or bi-level dimming driver, L80 at 50,000 hours, 38W, recess mount in ceiling grid, A19 #19 pattern acrylic .156", flush white aluminum door. The dimming or bi-level dimming option will not be used. Light switch and/or occupancy sensors to turn on lights to full brightness.

Type H (lower level areas and satellite building): lensed LED striplight, Lithonia, ZL2N-L48-5000LM-MDD-MVOLT-40K-80CRI-WH, 120/277V, 5000 Lumens, 4000K, 0-10VDC dimming driver, L85 at 44,000 hours, 42W, aircraft cable mount. The dimming option will not be used. Light switch and/or occupancy sensors to turn on lights to full brightness.

Type H (pump enclosure, fire pump building, all lights shown on mezzanine lighting plan E-204): linear LED striplight, Lithonia, PTNSL4-WD-MVOLT-OSR-LP841, 120/277V, 3600 Lumens, 4100K, 0-10VDC dimming driver, 47W, aircraft cable mount, +41 Deg F to +105 Deg F ambient temperature. The dimming option will not be used. Light switch to turn on lights to full brightness.

Type K: LED rated high bay, Lithonia, IBL-18L-WD-SD125-MVOLT-LP740DLC-CS93W-DWH-ZACVH-MSE360, 277V, 18,000 Lumens, 4000K, 0-10VDC dimming driver, L95 at 60,000 hours, 192W, 360 degree occupancy sensor, aircraft cable mount, +131 Deg F Ambient temperature, semi-diffuse acrylic lens. The dimming option will not be used. Light switch and lighting control panel to turn on lights to full brightness.

Type L (all lights shown on mezzanine lighting plan E-204): linear LED striplight, Lithonia, PTNSL8-WD-MVOLT-OSR-LP841, 277V, 7200 Lumens, 4100K, 0-10VDC dimming driver, 92W, aircraft cable mount, +41 Deg F to +105 Deg F ambient temperature. The dimming option will not be used. Light switch to turn on lights to full brightness.

Type M (lower level): lensed LED striplight with occupancy sensor, Lithonia, ZL2N-L48-5000LM-MDD-MVOLT-40K-80CRI-WH-LSXR-610, 120/277V, 5000 Lumens, 4000K, 0-10VDC dimming driver, L85 at 44,000 hours, 42W, aircraft cable mount, 360 degree occupancy sensor with high and low bay lenses. The dimming option will not be used. Light switch and/or occupancy sensors to turn on lights to full brightness.

Type N: No LED alternate. Light as shown in light fixture schedule will be used in the base bid and alternate bid #9.

Type O: LED rated high bay, Lithonia, IBL-24L-WD-SD125-MVOLT-LP740DLC-CS93W-DWH-ZACVH, 277V, 24,000 Lumens, 4000K, 0-10VDC dimming driver, L95 at 60,000 hours, 241W, aircraft cable mount, +131 Deg F Ambient temperature, semi-diffuse acrylic lens. The dimming option will not be used. Light switch and lighting control panel to turn on lights to full brightness.

Type P: LED rated high bay, Lithonia, IBL-18L-WD-SD125-MVOLT-LP740DLC-CS93W-DWH-ZACVH, 277V, 18,000 Lumens, 4000K, 0-10VDC dimming driver, L95 at 60,000 hours, 192W, aircraft cable mount, +131 Deg F Ambient temperature, semi-diffuse acrylic lens. The dimming option will not be used. Light switch and lighting control panel to turn on lights to full brightness.

Type R: LED vaporproof, RAB, VXBRLED26NDG, 120V, 1473 Lumens, 4000K, LED driver, 100,000 hours based on LM-80, 30W, wall mount, includes die cast guard and frosted globe.

Type T: LED IP rated high bay, Lithonia, JHBL-24000LM-GL-WD-MVOLT(208V)-GZ10-40K-70CRI-DF-HA-DWH-CR, 208V, 24,000 Lumens, 4000K, 0-10VDC dimming driver, L70 at 100,000+ hours, 238W, pendant mount, +149 Deg F Ambient temperature, corrosion resistant finish, dual fuses, glass lens, white housing. The dimming option will not be used. Light switch to turn on lights to full brightness.

Typical of all light fixtures: include all accessories and mounting hardware as required for a complete installation. Above light fixtures are as specified or equals from Genlyte Thomas, Hubbell, Ruud, Cree, LSI and Cooper lighting. Equivalent light fixtures will be equal or better than the specified light fixture. Any light fixture that is not equal will be rejected.

Section 03 35 43 – Polished Concrete

1. Section 2.1 A – Add the following to Acceptable Manufacturers:
    a. Advanced Floor Products at PO Box 50533, Provo, UT 84605, (801)812-3420

2. Section 2.2 A – Add the following to Acceptable Products and Manufacturers:
    a. Advanced Floor Products – Retro Plate System.

3. Section 2.2 D – The following Substitution will be permitted:
    a. Advanced Floor Products, Retro-Plate 99 penetrating liquid floor densifying agent.
    b. Advanced Floor Products, Retro-Pel oil repellent.
    c. Advanced Floor Products, Retro Guard penetrating stain repellent.
    d. ChemSystems, Inc, Helix Color Systems Dye for use with the Retro Plate Concrete Dye System. Allow three colors for the project.
    e. CureCrete, CreteClean Plus concrete cleaner.

Section 08 30 00 – Special Doors

1. Coiling Door for Salt Shed – Basis of Design – Overhead Door Company, 610 Series.
2. Section 2.1 B – Operable Coiling Doors – Section 1 - General shall be revised as follows:
    a. Slats shall be No. F265, 20 gauge.
    b. Bottom bar angles shall be galvanized.
    c. Slat and Hood Finish shall be – Galvanized Steel: Slats and hood galvanized in accordance with ASTM A 653 and receive rust-inhibitive, roll coating process, including 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on polyester top coat.
    d. Guides Finish shall be -- PowderGuard Zinc Finish for guides, bottom bar and head plate.
    e. Brackets shall be – Galvanized steel to support counterbalance, curtain and hood.

3. Section 2.1 B – Operable Coiling Doors – Section 2 – Electrically Operated Doors shall be revised as follows:
    a. Electric Motor Operation: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot or more than 1 foot per second.
        i. Sensing Edge Protection:
            1) Pneumatic sensing edge.
            2) Electric sensing edge.
        ii. Operator Controls:
            1) Push-button operated control stations with open, close, and stop buttons.
            2) Controls for exterior location, surface mounted inside building;
        iii. Motor Voltage: Per electrical drawings.

4. Section 2.1 B – Operable Coiling Doors – Sections 3, 4, and 5 are omitted.

Section 08 71 00 – Hardware

1. Weatherstripping shall be as follows:
    a. Head and Jamb – Zero #326 aluminum to sizes, color and profiles to fit door application and hardware color.
    b. Sill Sweep – Zero #39W aluminum to color to fit hardware color.

Section 09 91 00 – Painting

1. Paragraph 3.6 C 13 – Exposed Overhead Work – Change references to waterborne and acrylic to oil-based.

Section 10 14 19 – Flat Cut Letters and Logos

1. Paragraph 2.5 A – Cast Aluminum Letters will also be acceptable. Thickness of cast letters shall be ¾"

Section 11 11 28 – Vehicle Fuel Equipment and Canopy

1. Paragraph 2.1 A – Xerxes double wall, fiberglass reinforced plastic tanks meeting or exceeding the specifications will be acceptable. Provide all required tie-downs.

2. Paragraph 2.1 I – Stage II Vapor Recovery is not required.

3. OPW and Franklin Fueling Systems components are acceptable provided they meet or exceed the specifications, including the following:
    a. 1½ hp Fixed Speed Submersible Turbine Pumps.
    b. UPP Dispenser Sumps.
    c. XP Pressure and Suction Product Piping
    d. Defender Series Overfill Prevention Valve
    e. TS-1001 Full Feature Compliance Consoles

4. The following components are acceptable provided they meet or exceed the specifications.
    a. EBW FlexCatch Below Grade Spill Containers
    b. Bennett Series 3700S pumps and dispensers.
    c. Hose Master Inc 300 Series stainless Hydroformed corrugated hose.

Section 11 11 30 – Card Activated Management System

1. Section 6.0 – Software: The Owner currently owns and operates the PC Software. The work of this project includes necessary programming and troubleshooting to allow the new installation to communicate remotely with the existing system off site.

2. Section 8.0 – Required Equipment, Installation, and Training. The following changes apply to this section:
    a. Software is not required, program existing software to communicate with new installation.
    b. New card encoder and 100 cards are still to be included. Encoder will be located at the existing Madison shop located at 2302 Fish Hatchery Road, Madison, WI 53713.

Section 22 05 14 – Plumbing Specialties

1. On Page 2, at “Trench Drain”, add the following:
    a. ABT #2010 Channel with #2513 ductile iron grate and frame with all accessories as needed to meet specifications.

2. On Page 4, add the following:
    a. 1” aluminum Nozzle, Kochek # NZ030 (FireHoseDirect).
    b. Thread Adapter, Grainger 6ANXO, 1”NTP male to 1”NPSH male adapter.
    c. 1” NTP brass coupler.

3. On Page 5, delete second reference in Specifications for Water Make-up for Fire Protection Tank.

Section 22 13 53 - Septic System

1. Footer is incorrect (22 13 00 Facility Sanitary Sewerage)

Section 22 30 00 – Plumbing Equipment

1. Page 2 – See Gas Fired Water Heater Schedule on Sheet P301 for Information on Gas Water heater, DWH6.

2. Page 4 – At Water Reclaim System, Water Reclaim Separator Tanks (Underground) (4 reqd.) ADD:
    a. Tanks are to be 1500 gallons.
    b. Tanks are to be H20 rated for truck traffic.

3. Page 4 – At Water Reclaim System, Overflow Tank for Evaporator System (Underground) (1 reqd.) ADD:
    a. Tank is to be H20 rated for truck traffic.

Section 23 09 14 – Electric Instrumentation and Control Devices for HVAC

1. Page 7 – Eliminate Electronic thermostats section. Radiant heat controlled shall be controlled through the DDC system

2. Page 8 – Gas detectors table – CO 1st alarm limit should be changed from 100ppm to 35ppm

Section 23 09 15 – Direct Digital Control Input / Output Point Summary (New Section)

1. See attached Direct Digital Control Input / Output Point Summary Tables as referenced in Section 23 09 23.

Section 23 09 93 – Sequence of Operation for HVAC Controls

1. Page 5 – Make up air unit MUA-1 - change the sequence to the following to remove the building pressure controls.
    a. *Make up air unit MUA-1 shall be interlocked with CO/NO2/NG detection system in large vehicle storage garage. The burner shall be controlled by a discharge air sensor mounted in the discharge air plenum. The discharge air shall be held at 70°F(adjustable). The Make-up air unit shall be equipped with a VFD for soft start operation. For softsart operation the VFD shall be programmable to slowly ramp up to full speed within 30seconds of control signal to start.*

2. Page 5 – Make up air unit MUA-3 - change the OA temp to enable the gas heat in the make-up air unit from 35°F to 40°F

3. Page 5 – Make up air unit MUA-3 - add the follow control sequence to make up air MUA-3
    a. *When the outside air temp is below 35°F and the make-up air unit is off the coil valve shall remain open for freeze protection.*

4. Page 6 – Radiant floor – add the text to the second second sentence to read as follows:
    a. *The radiant floor zone shall be controlled through the DDC system with a room temperature sensor and a slab temperature sensor.*

Section 23 74 00 – Package Rooftop Units

1. This section has been removed from the project.

Section 26 36 23 – Automatic Transfer Switches

1. Paragraph 2.1 A – Paragraph indicates a Kohler KPS (programmed transition) with MPAC 1500 solid state control for optional emergency transfer switch ATS2. The Kohler KPS is no longer made and shall be replaced with the KCP (programmed transition) model or equal.

2. Paragraph 2.1 A – Paragraph indicates a Kohler KSS (standard transition) with MPAC 1500 solid state control for emergency load automatic transfer switch ATS3. The emergency load automatic transfer switch ATS3 shall be a Kohler KSS with MPAC 1200 solid state control or equal.

Section 32 12 00 – Asphaltic Concrete Paving

1. Paragraph 1.3 B – Mix Designs shall comply with Sheet C-105 as further defined in this Addendum.

2. Paragraph 2.2 A – Mix Designs shall comply with Sheet C-105 as further defined in this Addendum.

Section 32 31 19 – Ornamental Metal Fences and Gates

1. Delete this section; there is no ornamental fence work for Bid Package A.

Section 33 21 00 – Well System

1. At SCOPE, Change the Well requirements to:
    a. Depth of well to be 500'.
    b. 8" grouted casing to extend 200'
    c. See REVISED BID FORM for unit prices for additional well depth and casing depth.
    d. Contractor will be responsible for High Capacity well Permit from DNR.
    e. Include test pumping of well.

Section 41 22 00 – Hoists and Cranes

1. Paragraph 1.1 A – Clarification: The structural steel runway which includes the beam and channel cap, and related haunches is part of Section 05 12 00. The crane rail itself is part of this section. Available lift is to be +/- 28'-5"
2. Add Paragraph 1.1 B (Existing Paragraph B to become Paragraph C – Related Work) – ALTERNATE #A7 – One (1) Seven and One Half (7.5) Ton Capacity Crane – Location – Large Vehicle Storage 138
    a. (Large Vehicle Storage 138) The work under this Alternate Bid Section includes all labor, materials, and equipment for fabrication and installation on one (1) Seven and One Half (7.5) Ton capacity, floor controlled, bridge mounted overhead traveling crane; 95'-3" span, 25'-5" available lift, for operation of 480 volt, 3 phase, 60, A.C. All motors controlled from pendant festoon system.

3. Paragraph 2.2 A – Make the following corrections to the crane specifications:
    a. Crane is for Weld Bay 145, not Vehicle Repair 131 as listed.
    b. Span = 34'-2"
    c. Lift = 28'-5"
    d. Wheel Load = 6,300 lbs.
    e. Bridge Endtruck = Std. 6'-7" wheel base.
    f. ASCE Rail = 40#/yd
    g. Runway Length = 96'-4"

4. Paragraph 2.2 A – Add the following crane specifications for the 7.5 ton crane listed above for ALTERNATE #A7:

Crane Type	Top Running Double Girder	# of Cranes	1
Capacity	7.5 tons	Operation	Indoors
Span	95'-3"	Power	480V3ph/60Hz
Lift	25'-5"	Reeving	6 Part double
Hoist	7.5 tons wire rope	Control Encl.	NEMA 12
Whl Load	17,700 lbs.	CMAA Class	C Moderate Duty
Bridge Endtruck	Std. 9'-9" wheel base	Operation Type	Sliding PB
Configuration	Double Girder	Control Voltage	110V
Girder T.	Welded box construction	Cross Conductors	Festooned
Walkway	N/A	Paint	Yellow
Runway	N/A	Runway Conduct.	Cond. Bar
ASCE Rail	40#/yd ASCE rail	Runway Collect.	SpringShoe
Columns	By Bldg. Contractor	Runway Length	196'-6"

5. Paragraph 2.3 A – Add the following to the list of acceptable manufacturers:
    a. Metropolitan Crane & Hoist Company

DRAWINGS

Sheet C-102 – Phase 1 Site Plan

1. The curb & gutter off of Luds Lane and Luds Lane itself are not part of this bid. This bid stops at the line shown at the entrances on sheet C-102 and noted "DESIGN BY DANE COUNTY".

2. The turn lane off of CTH AB is not part of this bid.

Sheet C-105 – Phase 1 Paving Plan

1. For exterior concrete pavement, See Sheet A-201 for required reinforcing.

2. Asphaltic Concrete Pavement shall be as follows:
    a. Passenger Vehicle Parking / Low Traffic Areas Detail
        i. Type: WisDOT Type E-1.0
        ii. Lower Layer Thickness: 2.25 inches
        iii. Lower Layer Gradation: 19.0 mm
        iv. Lower Layer Performance Grade: PG 58-28
        v. Upper Layer Thickness: 1.75 inches
        vi. Upper Layer Gradation: 12.5 mm
        vii. Upper Layer Performance Grade: PG 58-28
    b. Truck Traffic Areas Detail
        i. Type: WisDOT Type E-10
        ii. Lower Layer Thickness: 4.0 inches
        iii. Lower Layer Gradation: 19.0 mm
        iv. Lower Layer Performance Grade: PG 58-28
        v. Upper Layer Thickness: 2.0 inches
        vi. Upper Layer Gradation: 12.5 mm
        vii. Upper Layer Performance Grade: PG 58-28

Sheet A-208 – Salt Building Plans

1. See revised sheet showing door tags.

Sheet A-209 – Salt Building Elevations and Sections

1. See revised sheet showing door and hardware schedules.

Sheet A-210 – Satellite Building – Floor Plan and Roof Plan

1. Exterior concrete slabs called out at Type C: Slabs shall follow the details on Sheet S-901 with the exception of the vapor barrier. A vapor barrier is not required for exterior concrete slabs.

Sheet A-406 – Wall Sections

1. Section 9 – Screen Wall @ Wash Area – The note at the top of the section is incorrect. The screen wall is a precast concrete wall per Section 03 41 00. The footing shown remains cast in place concrete.

Sheet A-410 – Wall Sections

1. Section 2 – See revised sheet showing Coiling Door, exterior face mounted.

Sheet A-413 – Satellite Building Wall Sections

1. Section 4 – Concrete slab notes are incorrect. Concrete slab-on-grade in Support 302, Toilet 303, and Toilet 304 shall be Concrete Type 'A' as shown on Sheet S-910.

Sheet A-501 – Building Details

1. Detail 4 is a typical detail for all base wall connections at precast concrete. Cast-in plates will be designed and provided by the precast wall panel contractor. The size and number will be dependent on their design.

Sheet A-601 – Door Schedule

1. See revised sheet showing Door and Hardware Schedule for the Outbuidling.

Sheet A-701 – Interior Elevations

1. See revised Sheet showing section references for millwork shown on revised Sheet A-702 in this addendum.

Sheet A-702 – Interior Elevations, Floor Finish & Details

1. See revised Sheet for new section Details 2, 7, 8, and 9.

Sheet S-910 – Satellite Building Foundation and Framing Plans

1. Concrete slab-on-grade types called out on this sheet refer to the same slab types as the main building. See Sheet S-901.

Sheet P-001 – Plumbing Site Plan

1. See Section 33 21 00 for piping from well to building.

2. See Section 21 05 00 for fire protection piping from fire protection room to both buildings and storage tank.

3. See Section 21 05 00 and 21 40 00 for the 4' wet well for the fire pump.

Sheet P-200 – Plumbing Overall Underground Plan

1. Specifications for Elevator Sump and pump are in Specification Section 22 30 00.

Sheet P-201 – Plumbing Overall Above Ground Plan

1. Drawing 2, there is a CB1 between Columns A&B/9.7, see P200 for exact location.

2. Drawing 1, Add Labels at WR1 & AR1 at Column E.6 &2 (RM 140 NW corner).

Sheet P-203 – Plumbing Office Plan

1. Drawing 1, ADD a FD at SH1's & 2's in drying area of stall (total of 6), include additional venting.

Sheet P-204 – Plumbing Plan (and Schedules)

1. DELETE "and Schedules" from Sheet name, there are NO schedules on this sheet.

2. Drawing 1, ADD note at underground Propane piping:
    a. Buried (3'depth) 1"K copper piping in 4"PVC sleeve provide moisture stops at end of pipe, 2nd stage regulator at building 425MBH, strainer and valve.
    b. At four (4) Propane connections to HVAC equipment: Install drip leg, union, valve and SS flex hose, connect to equipment.

3. Drawing 1, ADD:
    a. NOTE for above ground Propane piping use SCH 40 black steel pipe with screw thread fittings, Pipe and installation to conform to Fuel Gas code requirements.

Sheet P-301 – Plumbing Domestic Isometrics, Schedules, and Details

1. Drawing 2, ADD 1" RPBP for pressure washer (located on south side of wall), See P201 Drawing 2 for location.

2. Drawing 4, WR1, Change ¾"Watts 008PCQT to 1"Watts 008 PCQT.

Sheet P-305 – Car Wash Supplemental Drawing

1. Drawing 2, the 4" sanitary drain piping from Tank 39 is part of ALTERNATE BID #2.

2. Drawing 2, Items 9,12,17,17 & 36 are part of ALTERNATE BID #3.

Sheet M-300 – Mechanical Schedules

1. Eliminate Note #5 on Make-up Air Unit Schedule. – Control shall be provided through DDC system.

Sheet E-101 – Electrical Site Plan

1. Sheet Note #15 indicates that the electrical contractor is to stub 4" primary conduits out from utility pad mount transformer. To clarify, the electrical contractor is to stub two 5" primary conduits out from the utility pad mount transformer. Conductors themselves will be provided and installed by Alliant Energy. As noted on this site plan, coordinate electrical service with

Alliant Energy. Any work related to the electrical service for the ME Building is to be part of Bid Package B.

Sheet E-205 – Office and Small Vehicle Storage Power and Systems Plan

1. Added sub-feeds from solar electrical panel to inverters and 120V circuit to combiner boxes. Sheet note #29 changed to: "Photovoltaic panels and distribution system - Alternate Bid #8: provide 225A circuit breaker (must be listed as a back fed device) in panel MDP. Provide 225A feeder to solar electrical panel on roof near column line H.6-2. From solar electrical panel, provide 90A feeder to west inverter (near column G-2) and 125A feeder to east inverter (near column G-4). In addition to power conduits, provide three 4" conduit sleeves thru roof for solar panel controls. Verify location with solar contractor. Provide 15/1 circuit (RP1-10) to three solar combiner boxes. Solar combiner boxes located near columns G-2 and G-4 (two combiner boxes near G-4)". Solar electrical panel, inverters and combiner boxes provided and mounted by solar contractor.

Sheet E-212 – Waste Heat Loop Pump Enclosure

1. Waste heat loop pump enclosure electrical plans shown in following figures 1 thru 3 on added Sheet E-212. Feeder from an existing building or a new service lateral to panel MDP to be determined and added to a future addendum.

Sheet E-501 – Schedules, Details

1. See information in this Addendum regarding light fixtures for Alternate #9.

CONTACT INFORMATION

Architect:
Kueny Architects, LLC
Jon Wallenkamp
(262) 857-8101
jonw@kuenyarch.com

Fire Protection & Plumbing
Southport Engineered Systems
Bob Novak
(262) 818-4409
bnovak@southportengsys.com

Structural:
Kueny Architects, LLC
John Schmidbauer
(262) 857-8101
johns@kuenyarch.com

HVAC:
Southport Engineered Systems
Tim Pann
(262) 654-6630
tpann@southportengsys.com

Civil:
Snyder & Associates
Brett Biwer
(608) 838-0444
bbiwer@snyder-associates.com

Electrical:
David L. Hanson Associates
Dave Hanson
(262) 654-2010
davehansoneci@sbcglobal.net

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DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354

DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25

PROJECT:

Dane County Highway Facility

LOCATION:

Luds Lane and County AB

Office Locker room air handler

HARDWARE

	OUTPUT								INPUT											
	DIGITAL				ANALOG				DIGITAL						ANALOG					
POINT DESCRIPTION	Control Relay	24VAC	Contactor	2-Pos Actuator	Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow
Cooling Enable										X					X					
Outside Air Temperature																				
Supply Air Temperature															X					
Return Air Temperature															X					
Mixed Air Temperature															X					
Return Air Rel Humidity																X				
Supply Air Rel Humidity																X				
Supply Air Flow																				X
Return Air Damper								X												
Relief Air Damper								X												
Minimum OA Damper								X												
Economizer OA Damper								X												
Supply Fan VFD Speed								X												
Supply Fan VFD Fault																				
Supply Fan Status									X											
Supply Fan Start/Stop	X																			
Supply Air Static Pressure																			X	
Filter Differential Pressure																	X			
High Press Static Shutdown												X								
Freeze Stat												X								
Fire Alarm Shutdown												X								
Service Shutdown Switch											X									
Shutdown Reset Switch											X									
Smoke Damper End Switches											X									
Smoke Dampers				X																

SOFTWARE

	ALARMS								ENERGY MANAGEMENT SYSTEM FUNCTIONS																				
	DIGITAL			ANALOG																									
POINT DESCRIPTION	Equipment Status	Maintenance	Pressure	High Limit	Low Limit	Maintenance		Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Cooling Enable				X	X										X												
Outside Air Temperature																							X				Globally shared point.
Supply Air Temperature				X	X										X												
Return Air Temperature				X	X										X												
Mixed Air Temperature				X	X										X												
Return Air Rel Humidity				X	X										X												
Supply Air Rel Humidity				X											X												
Supply Air Flow				X											X												
Return Air Damper															X							X					
Relief Air Damper															X							X					
Minimum OA Damper															X												
Economizer OA Damper															X							X					
Supply Fan VFD Speed																											
Supply Fan VFD Fault	X																X										
Supply Fan Status	X														X												
Supply Fan Start/Stop												X	X														
Supply Air Static Pressure				X											X												
Filter Differential Pressure				X		X																					
High Press Static Shutdown	X		X																								
Freeze Stat	X																										Electric freezestat
Fire Alarm Shutdown	X																									X	
Service Shutdown Switch																											
Shutdown Reset Switch																											Reset latchout of supply fans.
Smoke Damper End Switches																											
Smoke Dampers																											

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

Air cooled condensing units for AHU-1

POINT DESCRIPTION	HARDWARE: OUTPUT: DIGITAL: Control Relay	24VAC	Contactor	2-Pos Actuator	ANALOG: Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	HARDWARE: INPUT: DIGITAL: Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	ANALOG: Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	SOFTWARE: ALARMS: DIGITAL: Equipment Status	Maintenance	Pressure	ANALOG: High Limit	Low Limit	Maintenance	ENERGY MANAGEMENT SYSTEM FUNCTIONS: Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Compressor Status									X												X													X													
Cooling Enable										X																								X													

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

Boiler control

POINT DESCRIPTION	HARDWARE: OUTPUT: DIGITAL: Control Relay	24VAC	Contactor	2-Pos Actuator	ANALOG: Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	INPUT: DIGITAL: Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	ANALOG: Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	ALARMS: DIGITAL: Equipment Status	Maintenance	Pressure	ANALOG: High Limit	Low Limit	SOFTWARE: ENERGY MANAGEMENT SYSTEM FUNCTIONS: Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Outside Air Temperature															X																		X								X				Globally shared point.
Heating Enable																					X																								
Current Boiler Heating Stage																					X												X		X										Shared point from Boiler Integration
Boiler EWT															X																		X											
Boiler LWT															X																													
Boiler Start/Stop	X																																											
Boiler run time																					X												X	X		X								Shared point from Boiler Integration

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

Locker Room Energy Recovery Ventilator

	HARDWARE																		SOFTWARE																																		
	OUTPUT								INPUT										ALARMS						ENERGY MANAGEMENT SYSTEM FUNCTIONS																																	
	DIGITAL				ANALOG				DIGITAL						ANALOG							DIGITAL			ANALOG																															
POINT DESCRIPTION	Control Relay	24VAC	Contactor	2-Pos Actuator	Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	Equipment Status	Maintenance	Pressure	High Limit	Low Limit	Maintenance		Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Outside Air Temperature															X																			X															Globally shared
Exhaust Air Temperature Out															X																			X															
Exhaust Air Temperature In															X																			X															
Supply Air Temperature															X									X	X									X															
Supply Fan Status									X												X													X															
Supply Fan Start/Stop	X																															X	X															
Exhaust Fan Status									X												X													X															
Exhaust Fan Start/Stop	X																															X	X															

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility	HARDWARE																	SOFTWARE																								
LOCATION: Luds Lane and County AB	OUTPUT								INPUT									ALARMS						ENERGY MANAGEMENT SYSTEM FUNCTIONS																		
	DIGITAL				ANALOG				DIGITAL							ANALOG			DIGITAL			ANALOG																						
Exhaust Fans	Control Relay	Solenoid	Contactor	2-Pos Actuator	Elect/PneuTransducr	Electric Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	Equipment Status	Maintenance	Pressure	High Limit	Low Limit			Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Lighting Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Manual Changeover	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	**Comments**
POINT DESCRIPTION																																										
Gas Detection Alarm Fans																																										
Fan Enable									X	X											X												X									
																															X	X										
Constant Exhaust Garage Vent																																										
Exhaust Fan Status									X												X												X									
Exhaust Fan Start/Stop	X																														X	X										
Garage Source Capture Exhaust Fan																																										
Exhaust Fan Status									X												X												X									

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

Hwy Bldg Heat Exchanger HX-1	HARDWARE																		SOFTWARE																																
	OUTPUT								INPUT										ALARMS						ENERGY MANAGEMENT SYSTEM FUNCTIONS																																
	DIGITAL				ANALOG				DIGITAL						ANALOG						DIGITAL			ANALOG																																
POINT DESCRIPTION	Control Relay	24VAC	Contactor	2-Pos Actuator	Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	Equipment Status	Maintenance	Pressure	High Limit	Low Limit		Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
HOT WATER																																																		
Bldg Hot Water Pump P-9 S/S	X																				X																														
Bldg Hot Water Pump P-9 Status									X												X											X	X																	
Bldg HW Pump P-9 VFD Speed								X																									X																	
BldgHW Pump P-9 VFD Fault																					X														X																
Loop HW Supply Temp															X									X	X								X								X									Used to Calculate BTU's and modulate VFD
Bldg HW Supply Temp															X									X	X								X								X									Used to Calculate BTU's
Loop HW Return Temp															X																		X																	Used to Calculate BTU's
Bldg HW Return Temp															X																		X																	Used to Calculate BTU's
Loop HW Supply Press																		X						X	X								X																	
HW Heat Exch 3-way Valve								X																									X																	
Loop Water Flow								X																									X																	Used to Calculate BTU's
Bldg Water Flow								X																									X																	Used to Calculate BTU's

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility	HARDWARE																				SOFTWARE																										
LOCATION: Luds Lane and County AB	OUTPUT								INPUT												ALARMS																										
Heat Exchangers at the generator HX-1,2 and pumps for underground loop	DIGITAL				ANALOG				DIGITAL						ANALOG						DIGITAL			ANALOG				ENERGY MANAGEMENT SYSTEM FUNCTIONS																			
POINT DESCRIPTION	Control Relay	24VAC	Contactor	2-Pos Actuator	Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	Equipment Status	Maintenance	Pressure	High Limit	Low Limit			Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
HOT WATER																																															
Gen HW Supply Temp															X									X	X										X								X				
Gen HW Return Temp															X																				X												
HW Heat Exch 3-way Valve								X																											X												3-way valve on Generator side
Pump Diff Press																	X							X	X										X												
HX2&3 Supply Temp															X									X	X										X								X				Used to Calculate BTU's and VFD Speed
HX2&3 Supply Temp															X									X	X										X								X				Used to Calculate BTU's and VFD Speed
Gen Loop Flow								X												X															X												
Loop Hot Water Pump 6,7&8 S/S	X																																														
Loop Hot Water Pump 6,7&8 Status									X												X													X	X												
Loop HW Pump 6,7&8 VFD Speed								X																											X												
Loop HW Pump 6,7&8 VFD Fault																					X																X										
HX2 Water Flow								X																											X												Used to Calculate BTU's
HX3 Water Flow								X																											X												Used to Calculate BTU's

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

Hydronic Unit heaters	HARDWARE																		SOFTWARE																									
	OUTPUT								INPUT										ALARMS						ENERGY MANAGEMENT SYSTEM FUNCTIONS																			
	DIGITAL				ANALOG				DIGITAL						ANALOG						DIGITAL			ANALOG																					
POINT DESCRIPTION	Control Relay	24VAC	Contactor	2-Pos Actuator	Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	Equipment Status	Maintenance	Pressure	High Limit	Low Limit	Maintenance		Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	**Comments**
Space Temp Setpoint															X									X	X									X										
Heating Coil Valve								X																																					
Heating Enable										X					X																				X										
Zone/Space Temperature															X									X	X									X										

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility	HARDWARE																	SOFTWARE																								
LOCATION: Luds Lane and County AB	OUTPUT								INPUT									ALARMS						ENERGY MANAGEMENT SYSTEM FUNCTIONS																		
	DIGITAL				ANALOG				DIGITAL						ANALOG							DIGITAL			ANALOG																			
Miscellaneous contol points	Control Relay	Solenoid	Contactor	2-Pos Actuator	Elect/PneuTransducr	Electric Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow		Equipment Status	Maintenance	Pressure	High Limit	Low Limit			Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Lighting Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Manual Changeover	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	**Comments**
POINT DESCRIPTION																																										
Fire Pump Room																																										
Cooling Enable										X					X										X	X								X								
IT Room																																										
Room Temperature															X										X	X								X								
Room Humidity																X																										
ELEVATOR																																										
Elevator Fault Alarm												X																									X						
Fire Alarm/Protection																																										
Alarm												X																									X						
Trouble												X																									X						
Supervisory												X																														
CO/NO2/CH4																																										Inerface with BACNet for Gas Detection Central Control Panels
Alarm												X																									X						
Trouble												X																									X						
Supervisory												X																														

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354

DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

MUA-1

	HARDWARE																			
	OUTPUT								INPUT											
	DIGITAL				ANALOG				DIGITAL						ANALOG					
POINT DESCRIPTION	Control Relay	24VAC	Contactor	2-Pos Actuator	Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow
Outside Air Temperature																				
Supply Air Temperature															X					
Heating Enable										X					X					
Space Temperature															X					
Supply Fan VFD Speed								X												
Supply Fan VFD Fault																				
Supply Fan Status									X											
Supply Fan Start/Stop	X																			
Freeze Stat												X								
Service Shutdown Switch											X									
Shutdown Reset Switch											X									
OA Damper								X												

	SOFTWARE																											
	ALARMS																											
	DIGITAL			ANALOG				ENERGY MANAGEMENT SYSTEM FUNCTIONS																				
POINT DESCRIPTION	Equipment Status	Maintenance	Pressure	High Limit	Low Limit	Maintenance		Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Outside Air Temperature																							X				Globally shared point.
Supply Air Temperature				X	X										X												
Heating Enable				X	X										X												
Space Temperature				X	X										X												
Supply Fan VFD Speed																											
Supply Fan VFD Fault	X																X										
Supply Fan Status	X														X												
Supply Fan Start/Stop												X	X														
Freeze Stat	X																										Electric freezestat
Service Shutdown Switch																											
Shutdown Reset Switch																											Reset latchout of supply fans.
OA Damper																											

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354

DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

MUA-2

HARDWARE

POINT DESCRIPTION	OUTPUT DIGITAL: Control Relay	24VAC	Contactor	2-Pos Actuator	OUTPUT ANALOG: Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	INPUT DIGITAL: Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	INPUT ANALOG: Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow
Outside Air Temperature															X					
Supply Air Temperature															X					
Heating Enable										X					X					
Space Temperature															X					
Supply Fan Status									X											
Supply Fan Start/Stop	X																			
Freeze Stat												X								
Fire Alarm Shutdown												X								
Service Shutdown Switch											X									
Shutdown Reset Switch											X									
OA Damper								X												

SOFTWARE

POINT DESCRIPTION	ALARMS DIGITAL: Equipment Status	Maintenance	Pressure	ALARMS ANALOG: High Limit	Low Limit	Maintenance		ENERGY MANAGEMENT SYSTEM FUNCTIONS: Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Outside Air Temperature																							X				Globally shared point.
Supply Air Temperature				X	X										X												
Heating Enable				X	X										X												
Space Temperature				X	X										X												
Supply Fan Status	X														X												
Supply Fan Start/Stop												X	X														
Freeze Stat	X																										Electric freezestat
Fire Alarm Shutdown	X																									X	
Service Shutdown Switch																											
Shutdown Reset Switch																											Reset latchout of supply fans.
OA Damper																											

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

MUA-3

	HARDWARE																				SOFTWARE																									
	OUTPUT								INPUT												ALARMS																									
	DIGITAL				ANALOG				DIGITAL						ANALOG						DIGITAL			ANALOG			ENERGY MANAGEMENT SYSTEM FUNCTIONS																			
POINT DESCRIPTION	Control Relay	24VAC	Contactor	2-Pos Actuator	Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	Equipment Status	Maintenance	Pressure	High Limit	Low Limit	Maintenance	Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Outside air Temperature																																										X				Globally shared point.
Supply Air Temperature After Direct Fired Burner															X									X	X									X												
Heating Enable										X					X									X	X									X												
Supplty Air Temperature After HW Coil															X									X	X									X												
Space Temperature															X									X	X									X												
Heating Coil Valve								X																																						
Minimum OA Damper								X																										X												
Supply Fan Status									X												X													X												
Supply Fan Start/Stop	X																														X	X														
Freeze Stat												X									X																									Electric freezestat
Fire Alarm Shutdown												X									X																								X	
Service Shutdown Switch											X																																			
Shutdown Reset Switch											X																																			Reset latchout of supply fans.
OA Damper								X																																						

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

MUA-4

POINT DESCRIPTION	HARDWARE: OUTPUT / DIGITAL: Control Relay	24VAC	Contactor	2-Pos Actuator	OUTPUT / ANALOG: Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	INPUT / DIGITAL: Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	INPUT / ANALOG: Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	ALARMS / DIGITAL: Equipment Status	Maintenance	Pressure	ALARMS / ANALOG: High Limit	Low Limit	Maintenance		SOFTWARE / ENERGY MANAGEMENT SYSTEM FUNCTIONS: Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Outside Air Temperature																																								X				Globally shared point.
Supply Air Temperature															X									X	X										X									
Heating Enable										X					X									X	X										X									
Space Temperature															X									X	X										X									
Supply Fan VFD Speed								X																																				
Supply Fan VFD Fault																					X																X							
Supply Fan Status									X												X														X									
Supply Fan Start/Stop	X																															X	X										
Building Static Pressure																			X					X										X									
Freeze Stat												X									X														X									Electric freezestat
Service Shutdown Switch											X																																	
Shutdown Reset Switch											X																																	Reset latchout of supply fans.
OA Damper								X																																				

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

Pumps in the Hwy building

HARDWARE

Pumps in the Hwy building	OUTPUT DIGITAL				OUTPUT ANALOG				INPUT DIGITAL						INPUT ANALOG					
POINT DESCRIPTION	Control Relay	24VAC	Contactor	2-Pos Actuator	Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow
Boiler Pumps																				
Heating Enable										X					X					
Hot Water Pump S/S	X																			
Hot Water Pump 1 Status									X											
HW Supply Temp															X					
HW Return Temp															X					
Secondary Loop Pump																				
Hot Water Pump S/S	X																			
Hot Water Pump Status									X											
HW Pump VFD Speed								X												
HW Pump 1 VFD Fault																				
HW Supply Temp															X					
HW Return Temp															X					
Radiant Loop Pumps																				
Hot Water Pump S/S	X																			
Hot Water Pump Status									X											
HW Pump VFD Speed								X												
HW Pump VFD Fault																				
HW Supply Temp															X					
HW Return Temp															X					
HW Diff Press																	X			
HW Flow														X						
Injection Pump 1 S/S	X																			
Injection Pump 1 Status									X											
Indirect Water Heater Pump																				
Hot Water Pump S/S	X																			
Hot Water Pump Status									X											
HW Supply Temp															X					
HW Return Temp															X					
HW Tank Temp															X					
Domestic HW Outlet Temp															X					
Domesic Recirc Pump																				
Recirc Pump S/S	X																			
Recirc Pump Status									X											

SOFTWARE

Pumps in the Hwy building	ALARMS DIGITAL			ALARMS ANALOG				ENERGY MANAGEMENT SYSTEM FUNCTIONS																			
POINT DESCRIPTION	Equipment Status	Maintenance	Pressure	High Limit	Low Limit			Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend		Equipment Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Dry-bulb Economizer	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Boiler Pumps																											
Heating Enable															X								X				
Hot Water Pump S/S																											
Hot Water Pump 1 Status	X													X	X												
HW Supply Temp				X	X										X								X				
HW Return Temp															X												
Secondary Loop Pump																											
Hot Water Pump S/S																											
Hot Water Pump Status	X													X	X												
HW Pump VFD Speed															X												
HW Pump 1 VFD Fault	X																X										
HW Supply Temp				X	X										X								X				
HW Return Temp															X												
Radiant Loop Pumps																											
Hot Water Pump S/S																											
Hot Water Pump Status	X													X	X												
HW Pump VFD Speed															X												
HW Pump VFD Fault	X																X										
HW Supply Temp				X	X										X								X				
HW Return Temp															X												
HW Diff Press				X	X										X												
HW Flow															X												
Injection Pump 1 S/S																											
Injection Pump 1 Status	X													X	X												
Indirect Water Heater Pump																											
Hot Water Pump S/S																											
Hot Water Pump Status	X													X	X												
HW Supply Temp				X	X										X								X				
HW Return Temp															X												
HW Tank Temp				X	X										X								X				
Domestic HW Outlet Temp				X	X										X								X				
Domesic Recirc Pump																											
Recirc Pump S/S																							X				
Recirc Pump Status	X													X	X												

DDC INPUT / OUTPUT SUMMARY TABLE

Project No 49-1354 — **DDC CONTROLLERS PROVIDED UNDER SPECIFICATION SECTION 23 09 25**

PROJECT: Dane County Highway Facility

LOCATION: Luds Lane and County AB

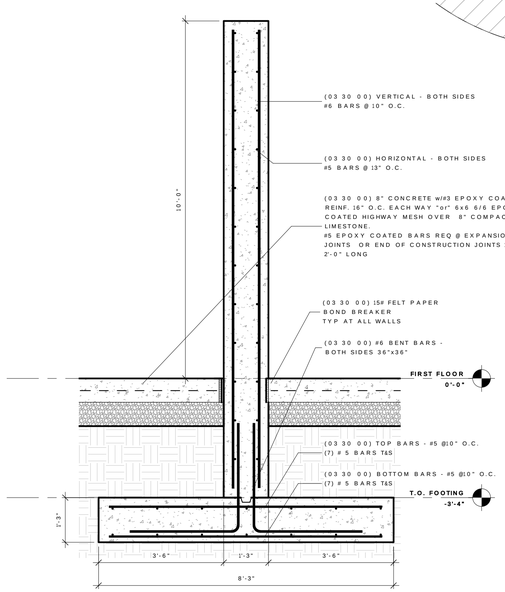
VAV Boxes

POINT DESCRIPTION	HARDWARE: OUTPUT: DIGITAL: Control Relay	Solenoid	Contactor	24 VAC	ANALOG: Tri-State Actuator	Duration Adjust Actuator	4-20 mA	0-10 VDC	HARDWARE: INPUT: DIGITAL: Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	ANALOG: Temperature	Resistive	Differential Pressure	Feedback for Tri-State	Static Pressure	Flow	SOFTWARE: ALARMS: DIGITAL: Equipment Status	Maintenance	Pressure	ANALOG: High Limit	Low Limit	Run Time		ENERGY MANAGEMENT SYSTEM FUNCTIONS: Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Occ/Unoc	Totalization	Trend	Redundancy Control	Lighting Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	CFM Offset	OA Lockout	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Zone Temperature															X									X	X										X											
Cooling Enable										X						X																			X											
						X	X	X										X																		X											
Supply Air Flow [4]																				X															X											
Discharge Air Temperature															X																				X											
Reheat Valve [1 & 5]					X	X	X	X										X																	X											
HW Radiation ACV [1&9]					X	X	X	X																											X									X			Where applicable - see plans.
Mens locker lighting occupancy												X																																		
Womens locker lighting occupancy												X																																		
Software Points [3]																																														
Occupied Heating Setpoint																																														
Occupied Cooling Setpoint																																													
Unoccupied Heating Setpoint																																													
Unoccupied Cooling Setpoint																																														
OccMin Clg Flow Setpoint																																														
Occ Min Htg Flow Setpoint																																														
Unocc Min Clg Flow Setpoint																																														
Unocc Min Htg Flow Setpoint																																														
Occupied/Unoccupied Command [7 & 10]																																				X											
Actual Flow Setpoint [10]																																						X										
Actual Heating Setpoint [10]																																						X										
Actual Cooling Setpoint [10]																																						X										
Temperature Setpoint Adjust Range [8]																																															

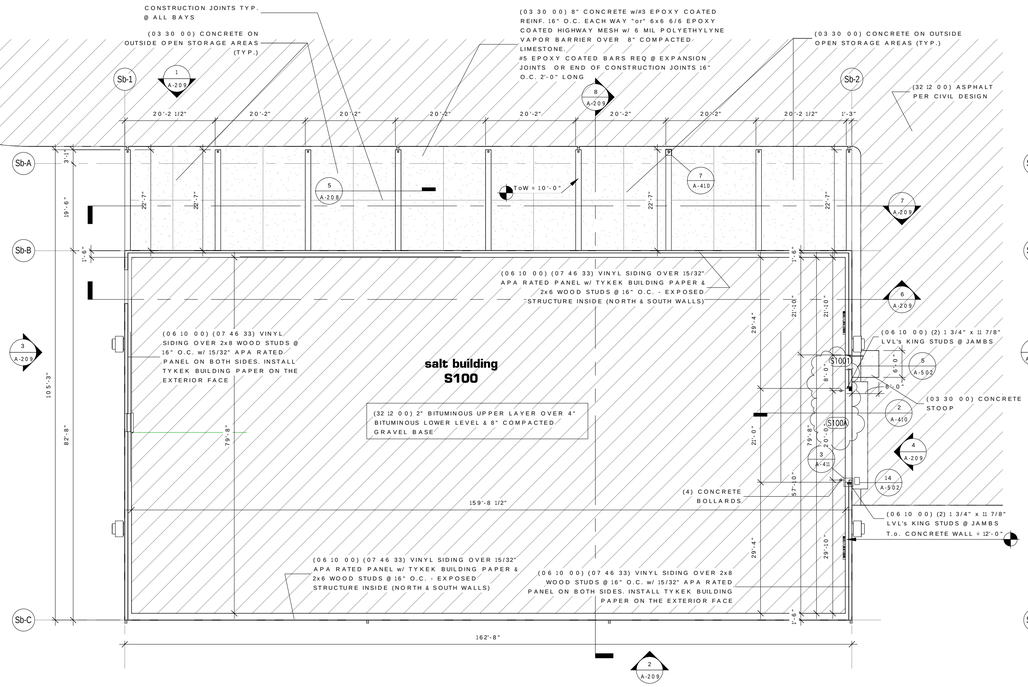
Notes:

1. All outputs from these controllers shall be programmed by the 23 09 25 contractor to be able to be overridden from the Enterprise Level Data Manager (ELDM)/operator workstation and be mapped by the 23
2. Not Used
3. The minimum software points listed will be made available by the 23 09 25 contractor and be available either through the 23 09 24 ELDM. Any additional software points that are available and requested by the user Agency shall be mapped by the 23 09 24 contractor. All setpoints should be adjustable through ELDM & operator workstation.
4. If auto-zero of supply air flow differential pressure transducer is provided, schedule the timing of this function with user Agency building management personnel.
5. Analog outputs must utilize a calculated proportional command from software. Actual output can be any type but floating outputs shall have feedback from the acutator so actual actuator position is known. Pulse width outputs shall utilize actuators that accept pulse width inputs or utilize transducers to provide a proportional output.
6. Not Used
7. 23 09 24 contractor will provide necessary number of schedules zoned per user Agency needs to command these software inputs.
8. Separate heating and cooling setpoints are preferred. If temperature setpoint is a single input that will offset the heating and cooling supervisory setpoints up or down together by an adjustable range.
9. Can be tri-state or proportional actuation.

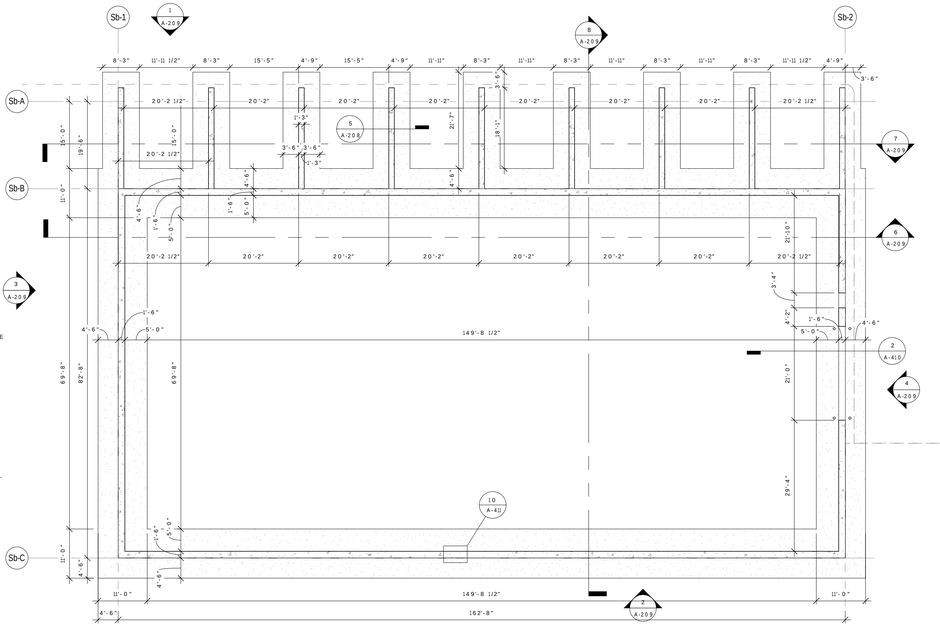
10. Points need to be mapped as an object on the ELDM and operator workstation screen



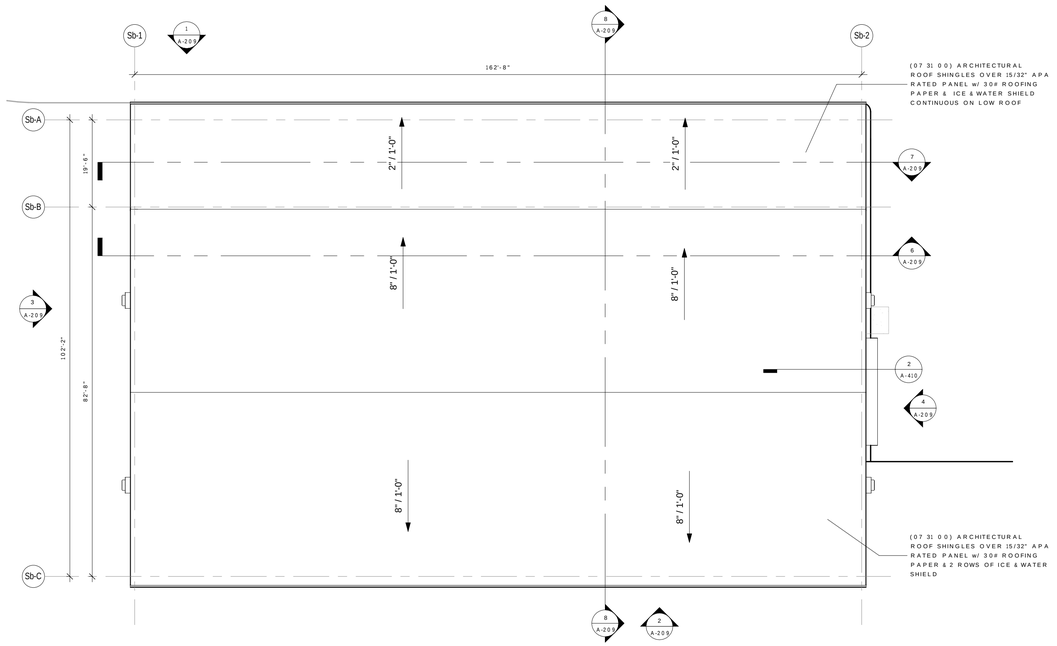
5 Salt Building - Side Bins Typ. Wall
1/2" = 1'-0"



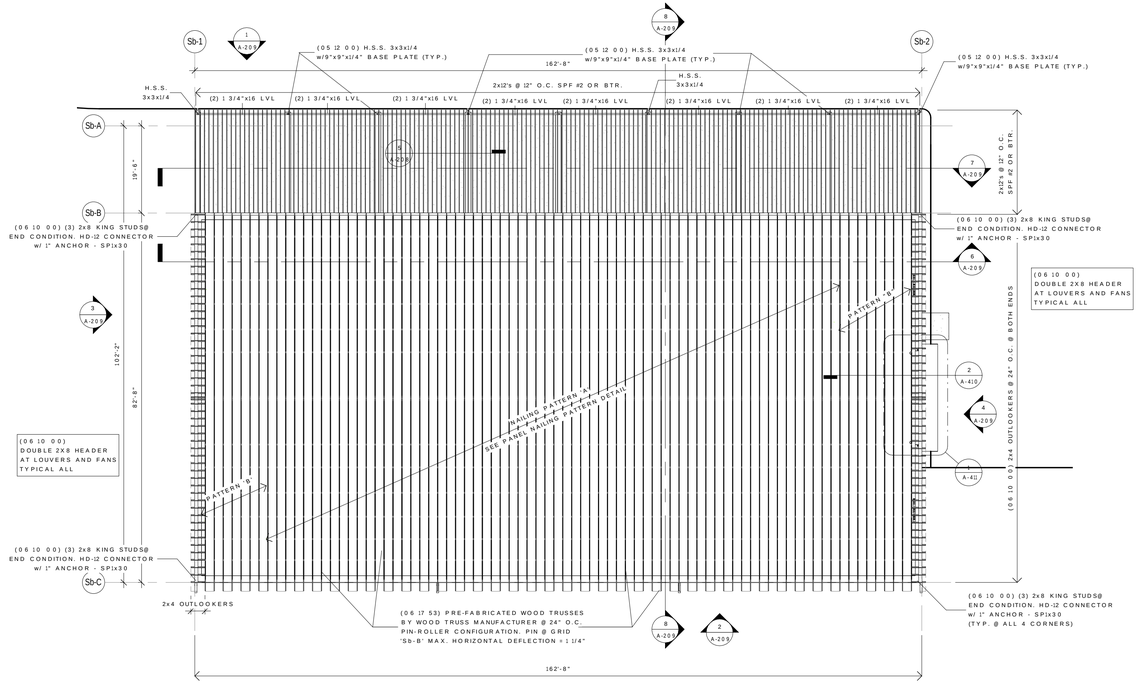
2 Salt Building - Floor Plan - Phase 1
1/16" = 1'-0"



1 Salt Building - Foundation Plan - Phase 1
1/16" = 1'-0"



4 Salt Building - Roof Plan - Phase 1
1/16" = 1'-0"



3 Salt Building - Framing - Phase 1
1/16" = 1'-0"

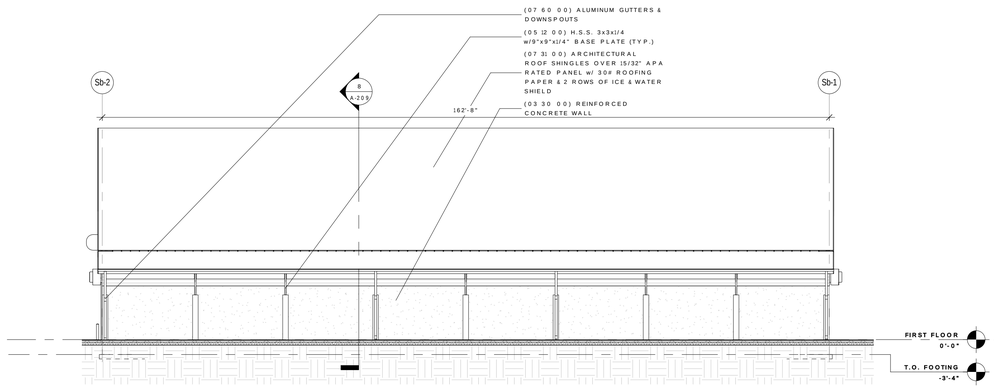
Addendum A1 February 10, 2015

Salt Building Plans

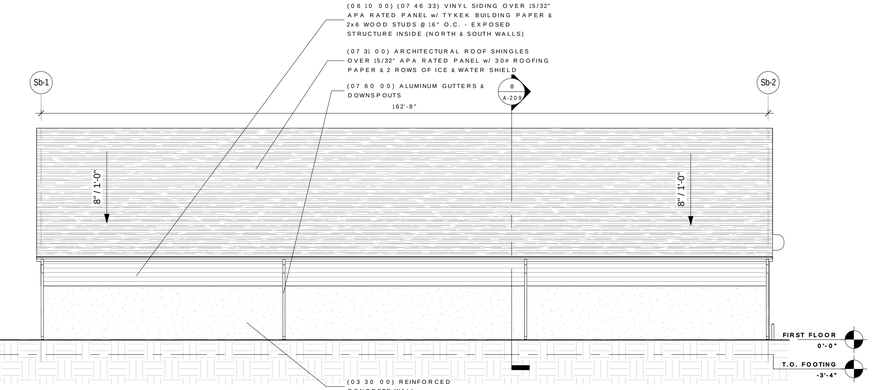
Dane County - Dane County Highway Facility
3562 County Highway AB, Cottage Grove, WI 53558
January 12, 2015

PLAN NORTH
SCALE: As indicated

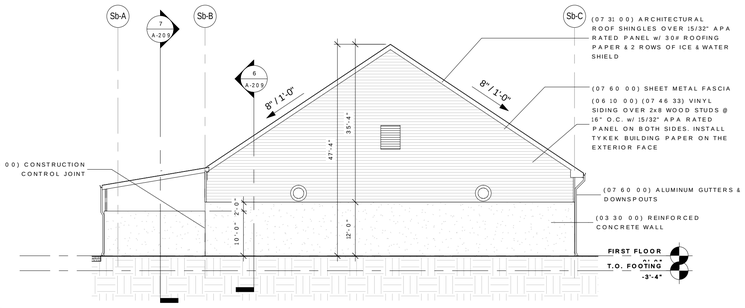
A-208



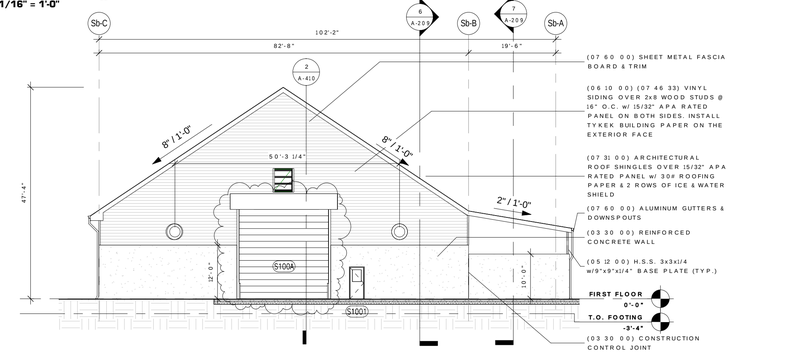
1 Salt Building - North Elevation
1/16" = 1'-0"



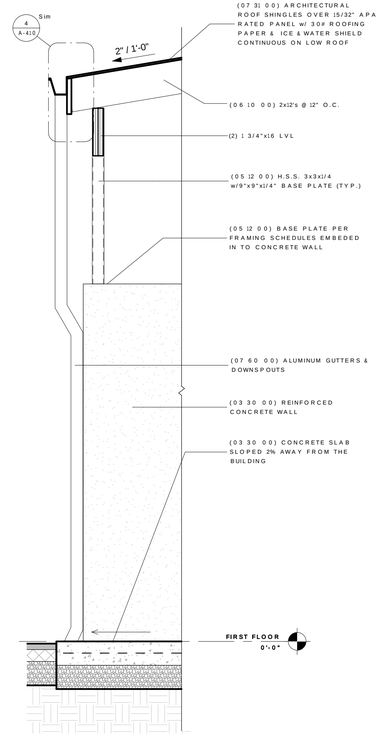
2 Salt Building - South Elevation
1/16" = 1'-0"



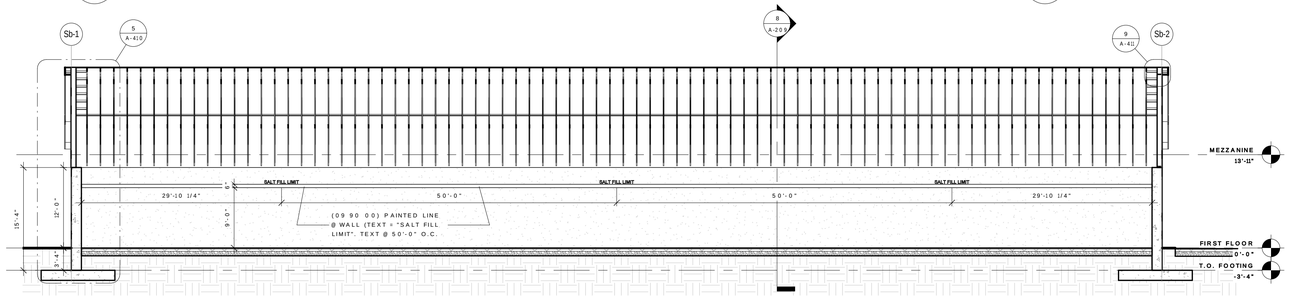
3 Salt Building - West Elevation
1/16" = 1'-0"



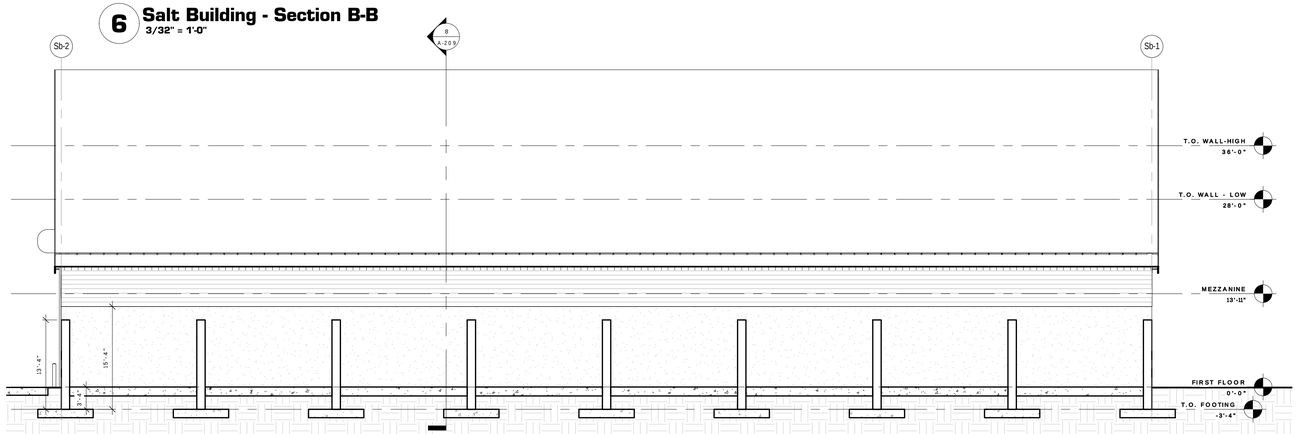
4 Salt Building - East Elevation
1/16" = 1'-0"



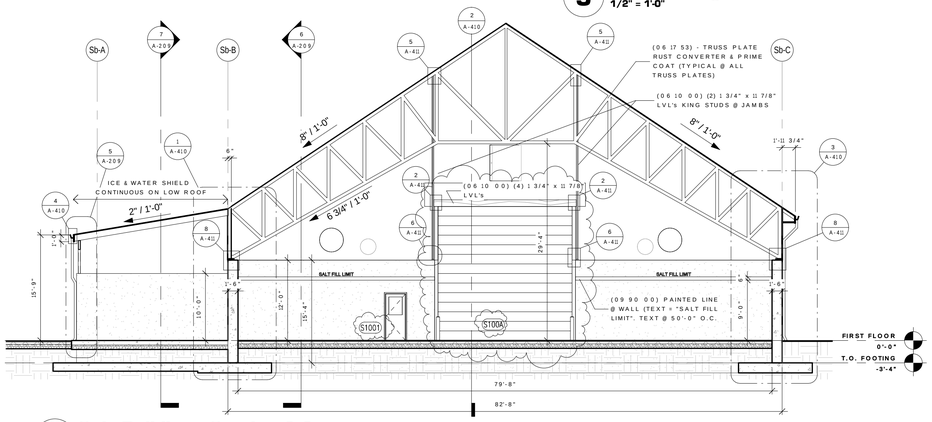
5 Salt Building - Wall Section 2
1/2" = 1'-0"



6 Salt Building - Section B-B
3/32" = 1'-0"



7 Salt Building - Section C-C
3/32" = 1'-0"



8 Salt Building - Section A-A
3/32" = 1'-0"

DOOR SCHEDULE - SALT BUILDING

	FROM ROOM		TO ROOM		DOOR							FRAME			
MARK	NUM	NAME	NUM	NAME	TYPE	MATERIAL	SWING	WIDTH	HEIGHT	THICKNESS	LOUVER	GLASS	TYPE	MATERIAL	GLASS	REMARKS
S100A	S100	salt building	-	exterior	CD			20' - 0"	20' - 0"	2"						Hardware by (08 30 00)
S1001	-	exterior	S100	salt building	HG	FRP	RHR	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	ALUMINUM	-	-

HARDWARE SCHEDULE - SALT BUILDING

MARK	LOCKSET	PUSH-PULL	HOLD OPEN	CLOSER	HINGE	DOOR STOP	THRESHOLD	WEATHER STRIP	KICK PLATE	SOUND STOP	NAMEPLATE	NOTES
S100A												
S1001	Entrance	-	-	X	B.B.	-	X	X	X	-	-	-

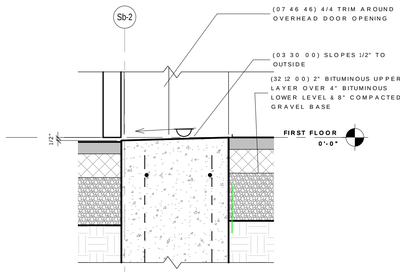
Addendum A1 February 10, 2015

Salt Building Elevations & Sections

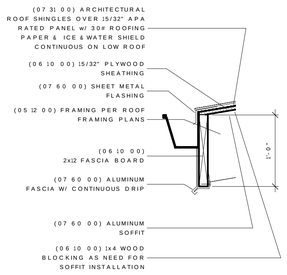
Dane County - Dane County Highway Facility
3562 County Highway AB, Cottage Grove, WI 53558
January 12, 2015

PLAN NORTH
SCALE: As indicated

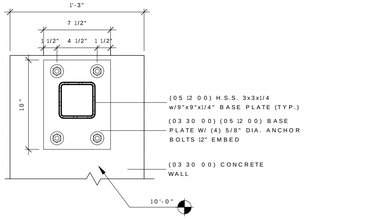
A-209



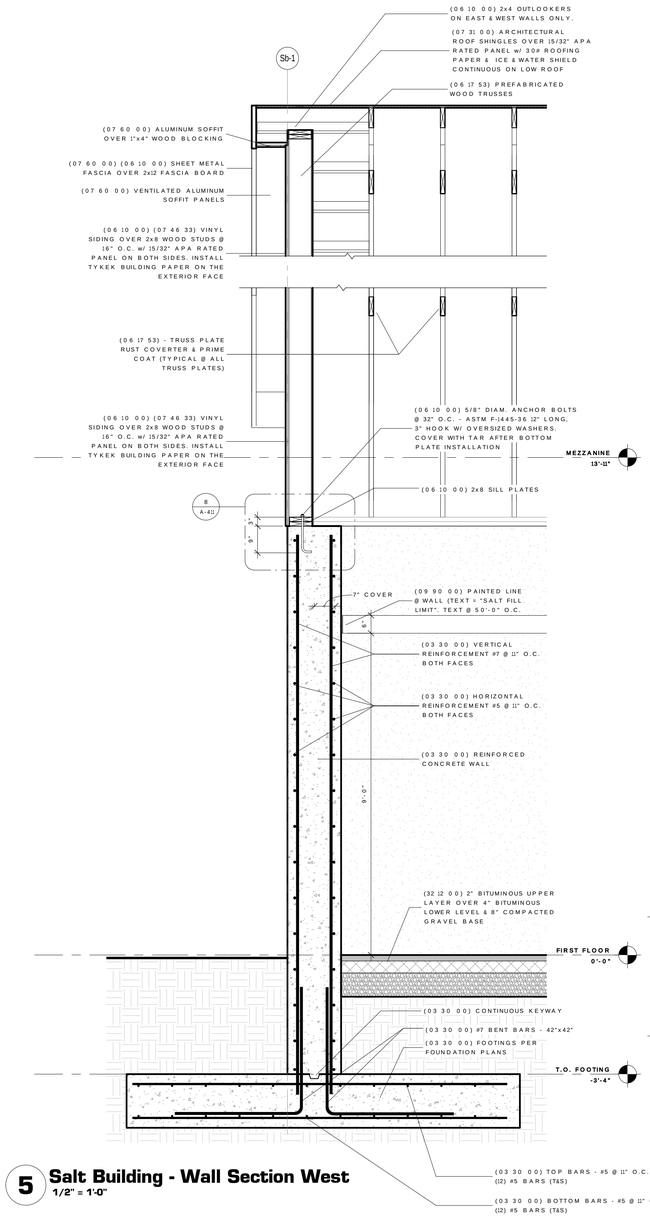
6 Salt Building - Slab Detail @ OH Door
1" = 1'-0"



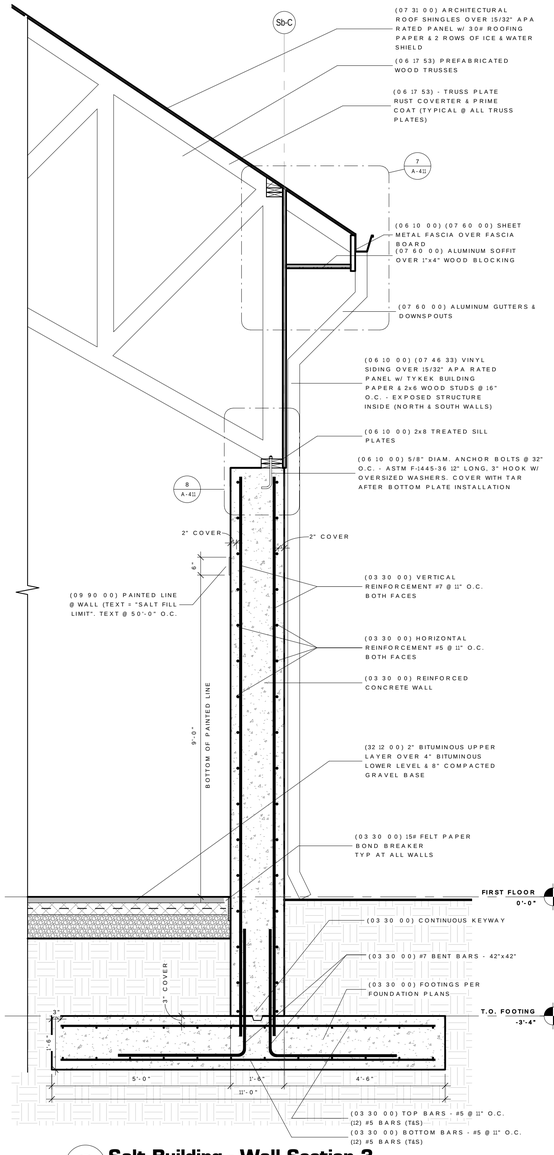
4 Salt Building - Fascia Board Detail
1" = 1'-0"



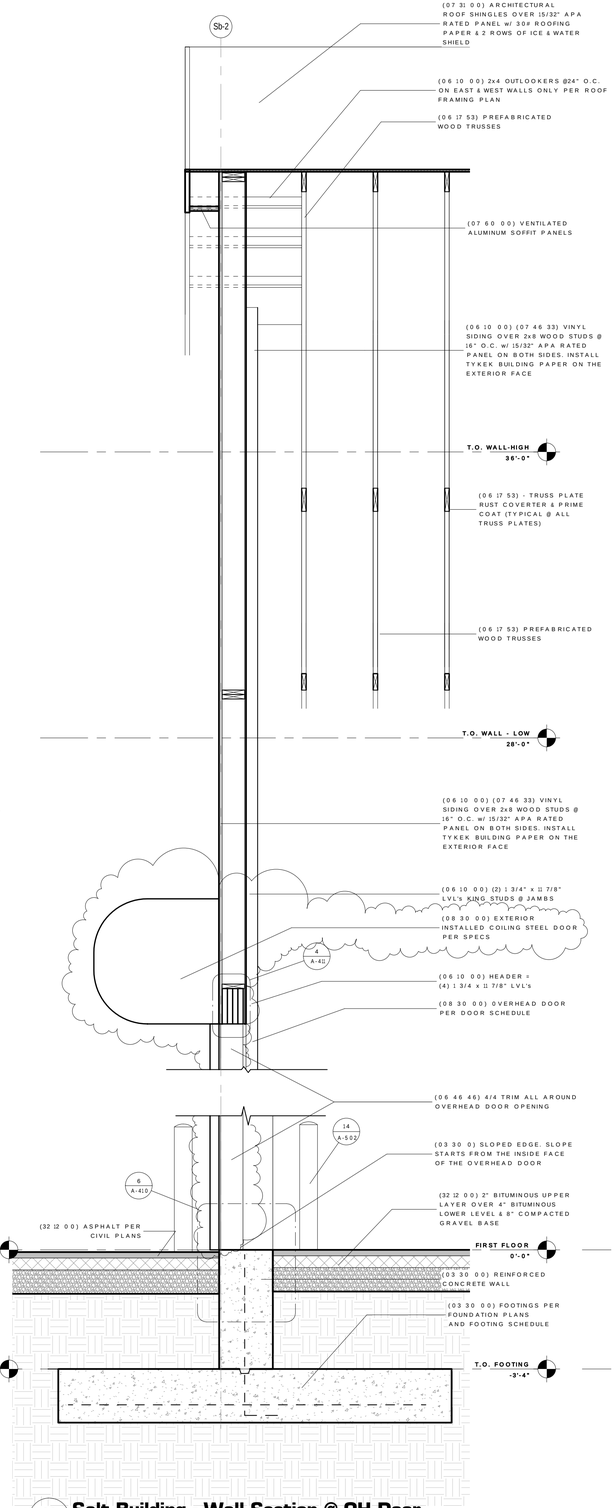
7 Salt Building - Column Base Plate Detail
1 1/2" = 1'-0"



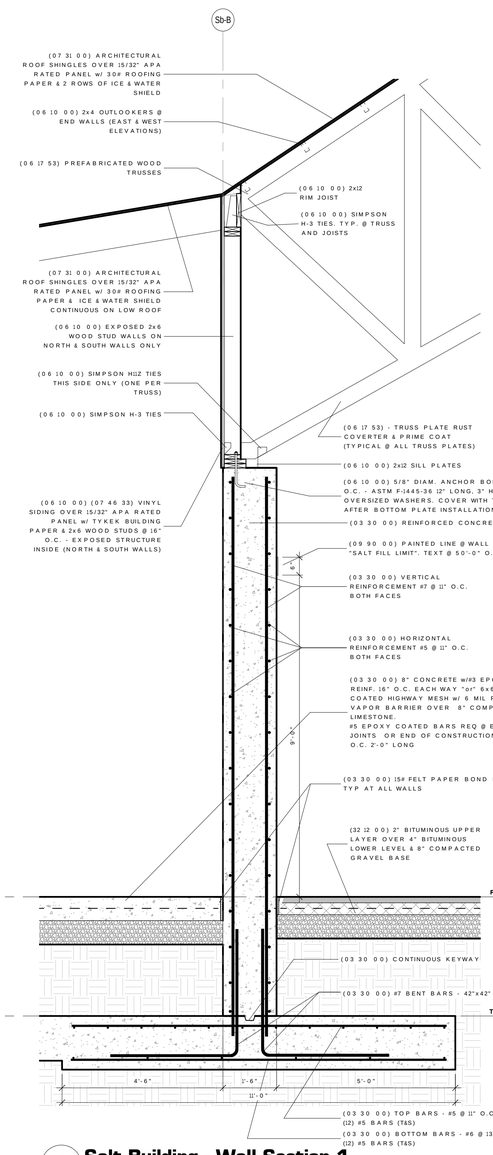
5 Salt Building - Wall Section West
1/2" = 1'-0"



3 Salt Building - Wall Section 3
1/2" = 1'-0"



2 Salt Building - Wall Section @ OH Door
1/2" = 1'-0"



1 Salt Building - Wall Section 1
1/2" = 1'-0"

Addendum A1 February 10, 2015

Salt Building Sections and Details

Dane County - Dane County Highway Facility
3562 County Highway AB, Cottage Grove, WI 53558
January 12, 2015

PLAN NORTH
SCALE: As indicated

A-410

DOOR SCHEDULE

	FROM ROOM		TO ROOM		DOOR								FRAME				
MARK	NUM	NAME	NUM	NAME	TYPE	MATERIAL	SWING	LAB EL	WIDTH	HEIGHT	THICKNESS	LOUVER	GLASS	TYPE	MATERIAL	LABEL	GLASS	REMARKS
1201	146-A	hall	120	office	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	B	METAL	-	GL-1	4 in Header in block walls (typ.)
1202	138	large vehicle storage	120	office	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	A	METAL	-	-	Door W/ Door drop sound seal / 4 in Header
1203	151	large vehicle storage	120	office	HG	METAL	LH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1211	138	large vehicle storage	121	office	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	C	METAL	-	GL-2	Door W/ Door drop sound seal / 4 in Header
1212	146-A	hall	121	office	HG	METAL	LH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	B	METAL	-	GL-1	4 in Header in block walls (typ.)
1221	138	large vehicle storage	122	office	HG	METAL	LH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	C	METAL	-	GL-2	Door W/ Door drop sound seal / 4 in Header
1222	146-A	hall	122	office	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	B	METAL	-	GL-1	4 in Header in block walls (typ.)
1231	138	large vehicle storage	123	office	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	C	METAL	-	GL-2	Door W/ Door drop sound seal / 4 in Header
1232	146-A	hall	123	office	HG	METAL	LH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	B	METAL	-	GL-1	4 in Header in block walls (typ.)
1241	137	parts	124	office	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	B	METAL	-	GL-1	4 in Header in block walls (typ.)
1251	138	large vehicle storage	125	counter	HGD	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	A	METAL	-	-	Dutch Door w/ Stainless Steel Shelf / 4in Header
1261	138	large vehicle storage	126	tool	F (2)	METAL	L/RH	-	3' - 0"	7' - 0"	1 3/4"	-	-	E	METAL	-	-	-
1271	138	large vehicle storage	127	oil	F	METAL	LH	B	3' - 0"	7' - 0"	1 3/4"	-	-	E	METAL	B	-	-
1272	140	small vehicle storage	127	oil	F (2)	METAL	L/RHR	B	4' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	B	-	4 in Header in block walls (typ.)
1281	140	small vehicle storage	128	stair	NV	METAL	RHR	B	3' - 0"	7' - 0"	1 3/4"	-	GL-3	A	METAL	B	-	4 in Header in block walls (typ.)
1291	140	small vehicle storage	129	entry	HG	METAL	RHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	A	METAL	-	-	4 in Header in block walls (typ.)
1292	129	entry	137	parts	HG	METAL	RHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	A	METAL	-	-	4 in Header in block walls (typ.)
1301	146-B	hall	130-A	womens locker	F	METAL	LH	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	4 in Header in block walls (typ.)
1311	146-B	hall	131	store	F	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	4 in Header in block walls (typ.)
1321	146-B	hall	132	breakroom	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	A	METAL	-	-	4 in Header in block walls (typ.)
1322	151	large vehicle storage	132	breakroom	HG	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1331	134	entry	133	stair	NV	METAL	RHR	B	3' - 0"	7' - 0"	1 3/4"	-	GL-3	A	METAL	B	-	4 in Header in block walls (typ.)
1342	134	entry	146-B	hall	NV	METAL	LHR	B	3' - 0"	7' - 0"	1 3/4"	-	GL-3	A	METAL	B	-	4 in Header in block walls (typ.)
1343	-	exterior	134	entry	FG	ALUMINUM	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	D	ALUMINUM	-	-	-
1351	146-B	hall	135-A	mens locker	F	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	4 in Header in block walls (typ.)
1352	146-A	hall	135-A	mens locker	F	METAL	LH	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	4 in Header in block walls (typ.)
1361	136	kit	137	parts	HGD	METAL	RHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	A	METAL	-	-	Stainless Steel shelve / 4 in Header
1371	146-A	hall	137	parts	HG	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	A	METAL	-	-	4 in Header in block walls (typ.)
1381	-	exterior	138	large vehicle storage	HG	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1383	-	exterior	138	large vehicle storage	HG	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1384	-	exterior	138	large vehicle storage	HG	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1385	-	exterior	138	large vehicle storage	HG	METAL	RHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1386	151	large vehicle storage	138	large vehicle storage	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	E	METAL	-	-	-
1387	151	large vehicle storage	138	large vehicle storage	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	E	METAL	-	-	-
1401	-	exterior	140	small vehicle storage	HG	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1402	140	small vehicle storage	138	large vehicle storage	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	-	E	METAL	-	-	-
1403	-	exterior	140	small vehicle storage	HG	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	G	METAL	-	GL-2	-
1411	137	parts	141	support	F	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	4 in Header in block walls (typ.)
1421	146-A	hall	142	data	F	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	4 in Header in block walls (typ.)
1451	-	exterior	145	weld bay	HG	METAL	RHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1452	138	large vehicle storage	145	weld bay	HG	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	E	METAL	-	-	-
1453	138	large vehicle storage	145	weld bay	HG (2)	METAL	L/RHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	E	METAL	-	-	-
1461	151	large vehicle storage	146-A	hall	HG	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1471	140	small vehicle storage	147	electric	F	METAL	RHR	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	-
1481	140	small vehicle storage	148	electric	F	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	-
1491	140	small vehicle storage	149	electric	F	METAL	RH	B	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	B	-	-
1501	146-A	hall	150	mud	HG	METAL	LH	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	4 in Header in block walls (typ.)
1511	-	exterior	151	large vehicle storage	HG (2)	METAL	L/RHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1512	-	exterior	152	wash area	HG	FRP	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	ALUMINUM	-	-	-
1513	-	exterior	151	large vehicle storage	HG	METAL	RHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1514	-	exterior	151	large vehicle storage	HG	METAL	RHR	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	E	METAL	-	-	-
1561	-	exterior	156	fire pump	F	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	-	F	METAL	-	GL-2	-
2011	133-A	stair	201	mezzanine	NV	METAL	LHR	B	3' - 0"	7' - 0"	1 3/4"	-	GL-3	E	METAL	B	-	-
2012	128-A	stair	201	mezzanine	NV	METAL	RHR	B	3' - 0"	7' - 0"	1 3/4"	-	GL-3	E	METAL	B	-	-
2021	201	mezzanine	202	elev room	F	METAL	LHR	-	3' - 0"	7' - 0"	1 3/4"	-	-	E		B	-	-

HARDWARE SCHEDULE

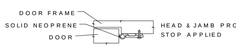
MARK	LOCKSET	PUSH-PULL	HOLD OPEN	CLOSER	HINGE	DOOR STOP	THRESHOLD	WEATHER STRIP	KICK PLATE	SOUND STOP	NAMEPLATE	NOTES
1201	Office	-	-	-	X	X	-	-	-	X	OFFICE 120	-
1202	Entrance	-	-	X	B.B.	X	-	X	X	-	OFFICE 120	(1) Kick plate on path of direction side / (2) Door W/ Door sweep / (5) Drop Down Sound Seal
1203	Entrance	-	-	X	B.B.	X	-	-	X	X	OFFICE 120	(1) / (2) / (5) Drop Down Sound Seal
1211	Entrance	-	-	X	B.B.	X	-	X	X	-	OFFICE 121	(1) / (2) / (5)
1212	Office	-	-	-	X	X	-	-	-	X	-	-
1221	Entrance	-	-	X	B.B.	X	-	X	X	-	OFFICE 122	(1) / (2) / (5)
1222	Office	-	-	-	X	X	-	-	-	X	OFFICE 122	-
1231	Entrance	-	-	X	B.B.	X	-	X	X	-	OFFICE 123	(1) / (2) / (5)
1232	Office	-	-	-	X	X	-	-	-	X	OFFICE 123	-
1241	Office	-	-	-	X	X	-	-	-	X	OFFICE 124	-
1251	Entrance	-	-	X	B.B.	X	-	X	X	-	-	(1) / (2)
1261	Entrance	-	-	-	X	X	-	-	X	X	TOOLS	(1) / (3) Left hand inactive with flush bolts
1271	Entrance	-	-	X	B.B.	X	-	-	X	X	OIL	(1)
1272	Entrance	-	-	X	B.B.	X	-	-	X	X	OIL	(1) / (3)
1281	Entrance	-	-	X	B.B.	-	-	-	X	X	STAIR	(1)
1291	Entrance	-	-	X	B.B.	-	-	X	X	-	PARTS	(1) / (2)
1292	Entrance	-	-	X	B.B.	X	-	-	X	X	PARTS	(1)
1301	Cylinder	X	-	X	B.B.	X	-	-	X	X	WOMEN LOCKER	(1)
1311	Entrance	-	-	-	X	-	-	-	X	X	STORAGE	(1)
1321	Office	-	X	-	X	X	-	-	X	X	BREAKROOM	(1)
1322	Entrance	-	-	X	B.B.	X	-	X	X	-	BREAKROOM	(1) / (2) / (5)
1331	Entrance	-	-	X	B.B.	X	-	-	X	X	STAIR	(1)
1342	Panic - L / Cylinder	X	-	X	B.B.	X	-	-	-	-	-	(6) Entrance Function
1343	Panic - NL / Cylinder	X	-	X	PIANO	-	X	X	-	X	ENTRANCE	(4) Hardware by aluminum door contractor / (7) Electric Strike
1351	Cylinder	X	-	X	B.B.	X	-	-	X	X	MEN	(1)
1352	Cylinder	X	-	X	B.B.	X	-	-	X	X	MEN	(1)
1361	Entrance	-	-	X	B.B.	X	-	X	X	-	PARTS	(1) / (2)
1371	Entrance	-	-	X	B.B.	X	-	-	X	X	PARTS	(1)
1381	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1) / (2) / (7)
1383	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1) / (2)
1384	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1) / (2)
1385	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1) / (2)
1386	Entrance	-	-	X	B.B.	-	-	-	X	X	-	(1)
1387	Entrance	-	-	X	B.B.	-	-	-	X	X	-	(1)
1401	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1) / (7)
1402	Entrance	-	-	X	B.B.	-	-	-	X	X	-	(1)
1403	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1)
1411	Storage	-	-	-	X	X	-	-	X	-	-	(1)
1421	Storage	-	-	-	X	X	-	-	-	X	DATA ROOM	-
1451	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1) / (7)
1452	Entrance	-	-	X	B.B.	-	-	-	X	-	WELD	(1)
1453	Entrance	-	X	X	B.B.	-	-	-	X	-	WELD	(1) / (3)
1461	Entrance	-	-	X	B.B.	X	-	X	X	-	OFFICES	(1) / (2) / (5)
1471	Panic - NL / Cylinder	-	X	-	X	X	-	-	-	-	ELECTRIC ROOM	(8) Storeroom Function
1481	Storage	-	X	-	X	X	-	-	-	-	ELECTRIC ROOM	-
1491	Storage	-	-	X	B.B.	X	-	-	-	-	EQUIPMENT	-
1501	Office	-	-	X	B.B.	X	-	-	X	X	MUD ROOM	(1)
1511	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1) / (3)
1512	Entrance	-	-	X	PIANO	-	X	X	X	-	-	(1) / (4)
1513	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1) / (7)
1514	Entrance	-	-	X	B.B.	-	X	X	X	-	-	(1) / (7)
1561	Entrance	-	-	-	X	-	X	X	-	-	FIRE PUMP	-
2011	Entrance	-	-	X	B.B.	X	-	-	-	X	STAIR	(1)
2012	Entrance	-	-	X	B.B.	X	-	-	-	X	STAIR	(1)
2021	Entrance	-	X	-	X	X	-	-	X	-	ELEVATOR ROOM	(1)

SPECIAL DOOR SCHEDULE

	FROM ROOM		TO ROOM		DOOR						
MARK	NUM	NAME	NUM	NAME	TYPE	MATERIAL	LABEL	WIDTH	HEIGHT	R-Value	REMARKS
137A	137	parts	140	small vehicle storage	OH			12' - 0"	10' - 0"	R-17	Hardware by (08 30 00)
138A	-	exterior	138	large vehicle storage	OH			20' - 0"	18' - 0"	R-17	Hardware by (08 30 00)
138B	138	large vehicle storage	151	large vehicle storage	OH			20' - 0"	16' - 0"	R-17	Hardware by (08 30 00)
140A	-	exterior	140	small vehicle storage	OH			18' - 0"	18' - 0"	R-17	Hardware by (08 30 00)
145A	-	exterior	145	weld bay	OH			20' - 0"	18' - 0"	R-17	Hardware by (08 30 00)
145B	145	weld bay	138	large vehicle storage	OH			20' - 0"	18' - 0"	R-17	Hardware by (08 30 00)
151A	-	exterior	151	large vehicle storage	OH			20' - 0"	16' - 0"	R-17	Hardware by (08 30 00)
151B	-	exterior	151	large vehicle storage	OH			20' - 0"	18' - 0"	R-17	Hardware by (08 30 00)
301A	-	exterior	301	vehicle storage	OH			18' - 0"	18' - 0"	R-17	OUTBUIILDING - Hardware by (08 30 00)
301B	-	exterior	301	vehicle storage	OH			18' - 0"	18' - 0"	R-17	OUTBUIILDING - Hardware by (08 30 00)
301C	-	exterior	301	vehicle storage	OH			18' - 0"	18' - 0"	R-17	OUTBUIILDING - Hardware by (08 30 00)
301D	-	exterior	301	vehicle storage	OH			18' - 0"	18' - 0"	R-17	OUTBUIILDING - Hardware by (08 30 00)
305A	-	exterior	305	vehicle storage	OH			18' - 0"	18' - 0"	R-17	OUTBUIILDING - Hardware by (08 30 00)

Drop Down Sound Seal

Door Bottom Sweep Detail



Door Threshold Detail

SINGLE CYLINDER CLASSROOM LOCK
Deadbolt locked or unlocked by key from outside. Deadbolt unlocked by thumbturn only from inside.

LEVER CLASSROOM LOCK
Outside lever locked and unlocked by key. Inside lever always unlocked.

LEVER STOREROOM LOCK
Outside lever fixed, unlocked by key. Inside lever always unlocked.

LEVER OFFICE LOCK
Push-button locking. Pushing button locks outside lever until unlocked by key outside or by turning inside lever.

LEVER ENTRANCE LOCK
Turn/Push-button locking. Pushing and turning button locks outside lever requiring use of key until button in manually unlocked. Push-button locking. Push button locks outside lever until locked by outside key or by turning inside lever.

COMBINATION LOCK
Outside lever fixed. Entrance by use of multi-digit combination. Inside lever always unlocked.

LEVER PRIVACY LOCK
Push-botton locking. Can be opened from outside by emergency key, scredriver, or similar tool.

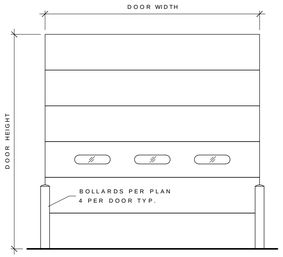
Lockset Types

DOOR SCHEDULE - OUTBUILDING

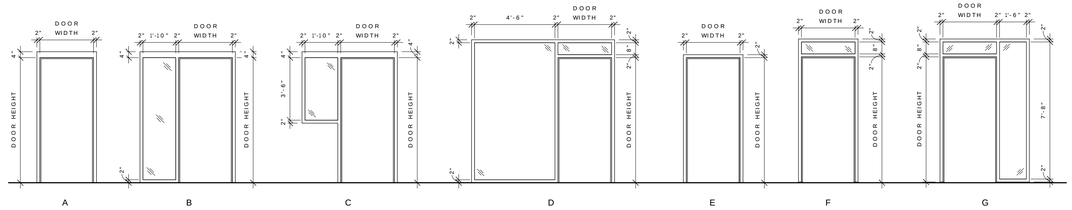
	FROM ROOM		TO ROOM		DOOR									FRAME				
MARK	NUM	NAME	NUM	NAME	TYPE	MATERIAL	SWING	LABEL	WIDTH	HEIGHT	THICKNESS	LOUVER	GLASS	TYPE	MATERIAL	LABEL	GLASS	REMARKS
3011	-	exterior	301	vehicle storage	HG	METAL	RHRB	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	A	METAL	-	-	OUTBUILDING
3012	301	vehicle storage	305	vehicle storage	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	A	METAL	-	-	OUTBUILDING
3021	305	vehicle storage	302	support	HG	METAL	RH	-	3' - 0"	7' - 0"	1 3/4"	-	GL-1	A	METAL	-	-	OUTBUILDING
3031	301	vehicle storage	303	toilet	F	METAL	RHRB	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	OUTBUILDING
3041	301	vehicle storage	304	toilet	F	METAL	LHRB	-	3' - 0"	7' - 0"	1 3/4"	-	-	A	METAL	-	-	OUTBUILDING
3051	-	exterior	305	vehicle storage	HG	METAL	LHRB	-	3' - 0"	7' - 0"	1 3/4"	-	GL-2	A	METAL	-	-	OUTBUILDING

HARDWARE SCHEDULE - OUTBUILDING

MARK	LOCKSET	PUSH-PULL	HOLD OPEN	CLOSER	HINGE	DOOR STOP	THRESHOLD	WEATHER STRIP	KICK PLATE	SOUND STOP	NAMEPLATE	NOTES
3011	Entrance	-	-	X	B.B.	-	X	X	X	X	-	OUTBUILDING
3012	Entrance	-	-	X	B.B.	X	-	-	X	X	-	OUTBUILDING
3021	Entrance	-	X	-	X	-	-	-	X	X	-	OUTBUILDING
3031	Privacy	-	-	X	B.B.	X	-	-	X	X	-	OUTBUILDING
3041	Privacy	-	-	X	B.B.	-	-	-	X	X	-	OUTBUILDING
3051	Entrance	-	-	X	B.B.	-	X	X	X	X	-	OUTBUILDING



Typ. OH Door



Door Frame Types

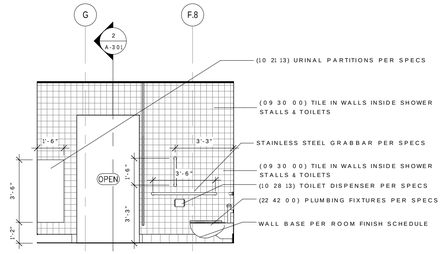
Addendum A1 February 10, 2015

Door Schedule

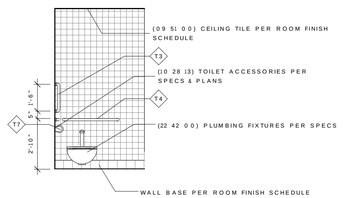
Dane County - Dane County Highway Facility
3562 County Highway AB, Cottage Grove, WI 53558
January 12, 2015

SCALE: As indicated

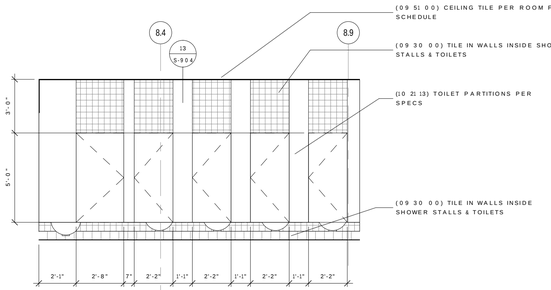
A-601



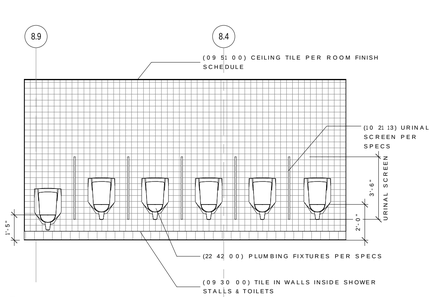
1 Men's Toilets 135-C - ADA stall West Wall
1/4" = 1'-0"



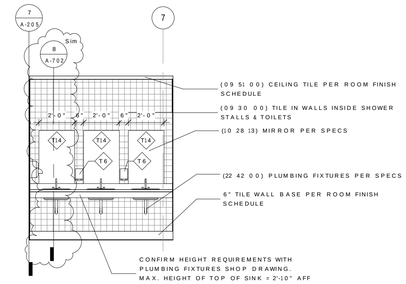
2 Men's Toilets 135-C - ADA Stall North Wall
1/4" = 1'-0"



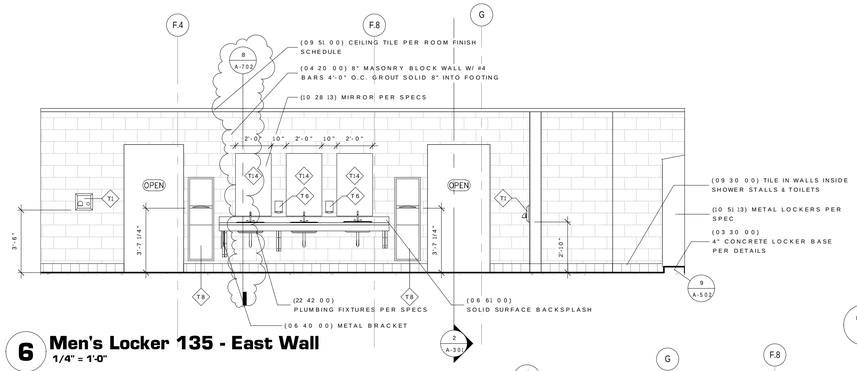
3 Men's Toilets 135-C - north wall
1/4" = 1'-0"



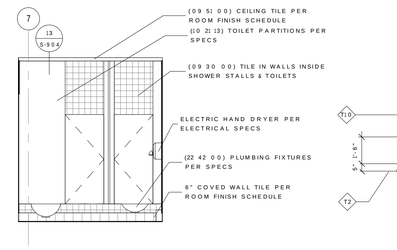
4 Men's Toilets 135-C - South Wall
1/4" = 1'-0"



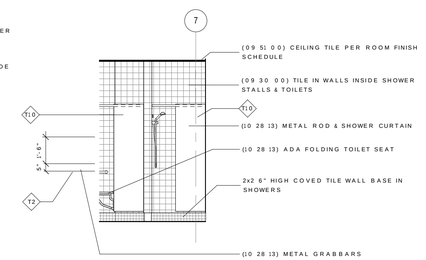
5 Women's Locker 130-B - Elevation 1
1/4" = 1'-0"



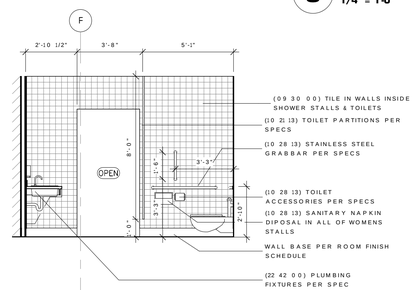
6 Men's Locker 135 - East Wall
1/4" = 1'-0"



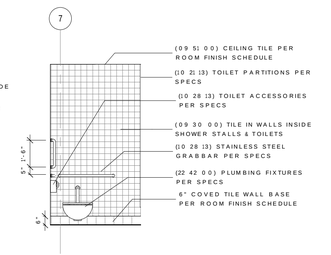
7 Women's Locker 130-B - Elevation 2
1/4" = 1'-0"



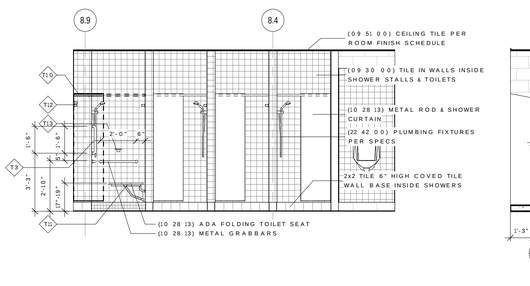
8 Women's shower 130-C - Elevation 1
1/4" = 1'-0"



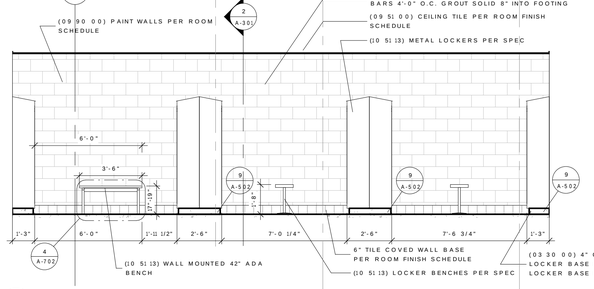
9 Women's Toilet 130-B - Elevation 1
1/4" = 1'-0"



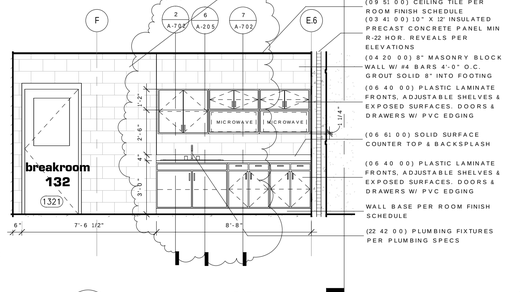
10 Women's Toilet 130-B - Elevation 2
1/4" = 1'-0"



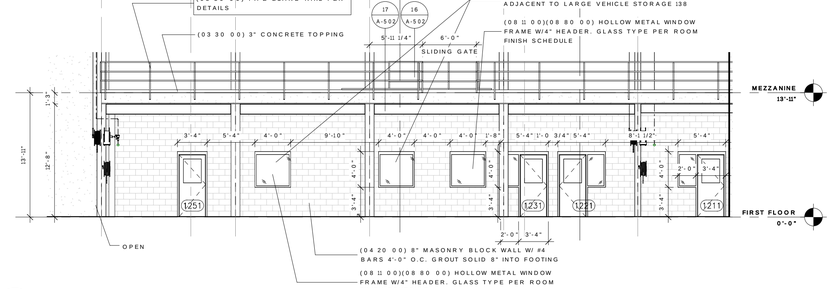
11 Men's Showers 135-B
1/4" = 1'-0"



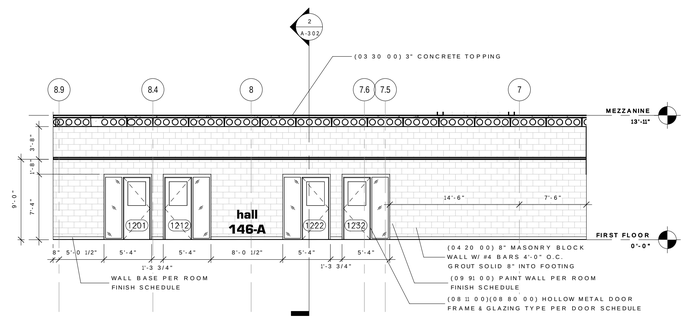
12 Men's Locker 135-A - Elevation
1/4" = 1'-0"



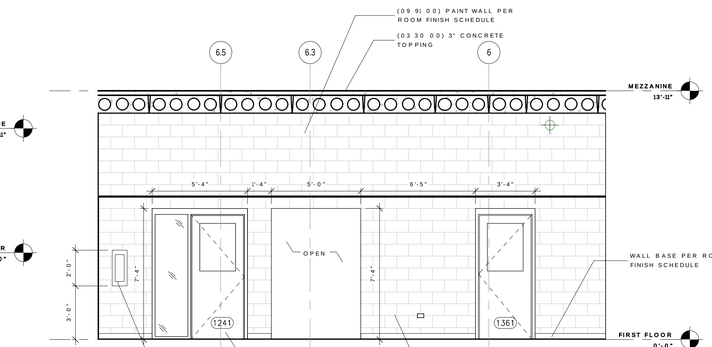
13 Breakroom 132 - west
1/4" = 1'-0"



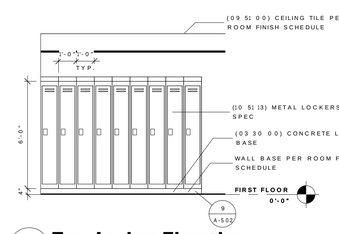
14 Large Vehicle Storage 138 - Elevation
1/8" = 1'-0"



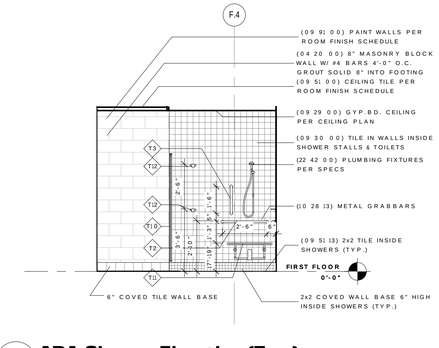
15 Hall 146-A - South Wall Elevation
1/8" = 1'-0"



16 Parts 137 - South Wall Elevation
1/4" = 1'-0"



19 Typ. Locker Elevation
1/4" = 1'-0"



17 ADA Shower Elevation (Typ.)
1/4" = 1'-0"

Addendum A1 February 10, 2015

Interior Elevations

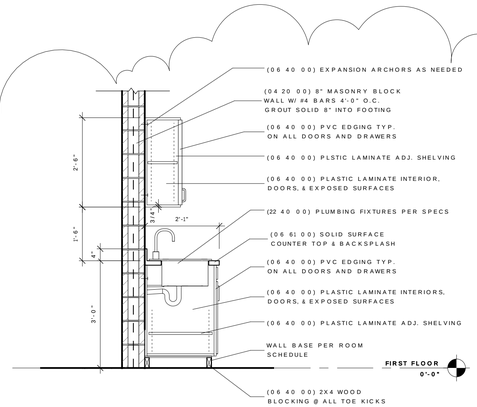
Dane County - Dane County Highway Facility
3562 County Highway AB, Cottage Grove, WI 53558
January 12, 2015

SCALE: As indicated

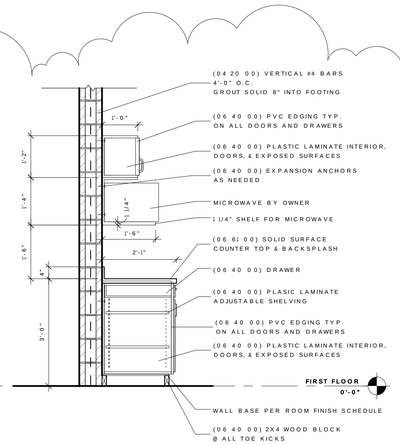
A-701

TOILET ROOM & SHOWERS ACCESSORIES

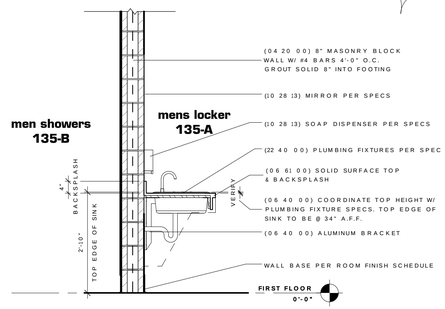
Type Mark	Description	Comments	Option 1	Option 2
T1	Electric Hand Dryer	Per Electric Specs		
T2	Heavy Duty Shower Grab Bars	Spec Section 10 28 13		
T3	Heavy Duty Grab Bar - 18"	Spec Section 10 28 13		
T4	Heavy Duty Grab Bar - 36"	Spec Section 10 28 13		
T5	Heavy Duty Grab Bar - 42"	Spec Section 10 28 13		
T6	Wall Mounted Soap Dispenser	Spec Section 10 28 13	Bay West # 91210	Kimberly Clark # 92145
T7	Toilet Paper Dispenser	Spec Section 10 28 13	Bay West # 80200 Dubl-Serv	Kimberly Clark # 09604
T8	Paper Towel Dispenser w/ Waste Receptacle	Spec Section 10 28 13	Bobrick # B-3944	Bradley #234
T9	Sanitary Napkin Disposal	Spec Section 10 28 13	Bobrick # B-353	Bradley #4737
T10	Shower Rod w/Curtain	Spec Section 10 28 13	Bobrick # B-207	Bradley #9538
T11	Folding Shower Seat	Spec Section 10 28 13	Bobrick # B-5181	Bradley # 956
T12	Shower Hook	Spec Section 10 28 13	Bobrick # B-672	Bradley # 9124
T13	Soap Dish - Wall Mounted	Spec Section 10 28 13	Bobrick # B-680	Bradley # 901
T14	Tempered Glass Mirror w/ Channel Frame	Spec Section 10 28 13	Bobrick # B-2436	Bradley # 781



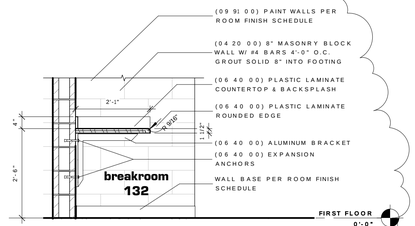
2 Breakroom 132- Cabinet Section
1/2" = 1'-0"



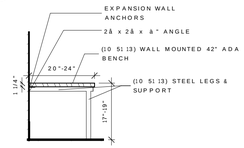
7 Breakroom 132- Cabinet Section Through Microwave
1/2" = 1'-0"



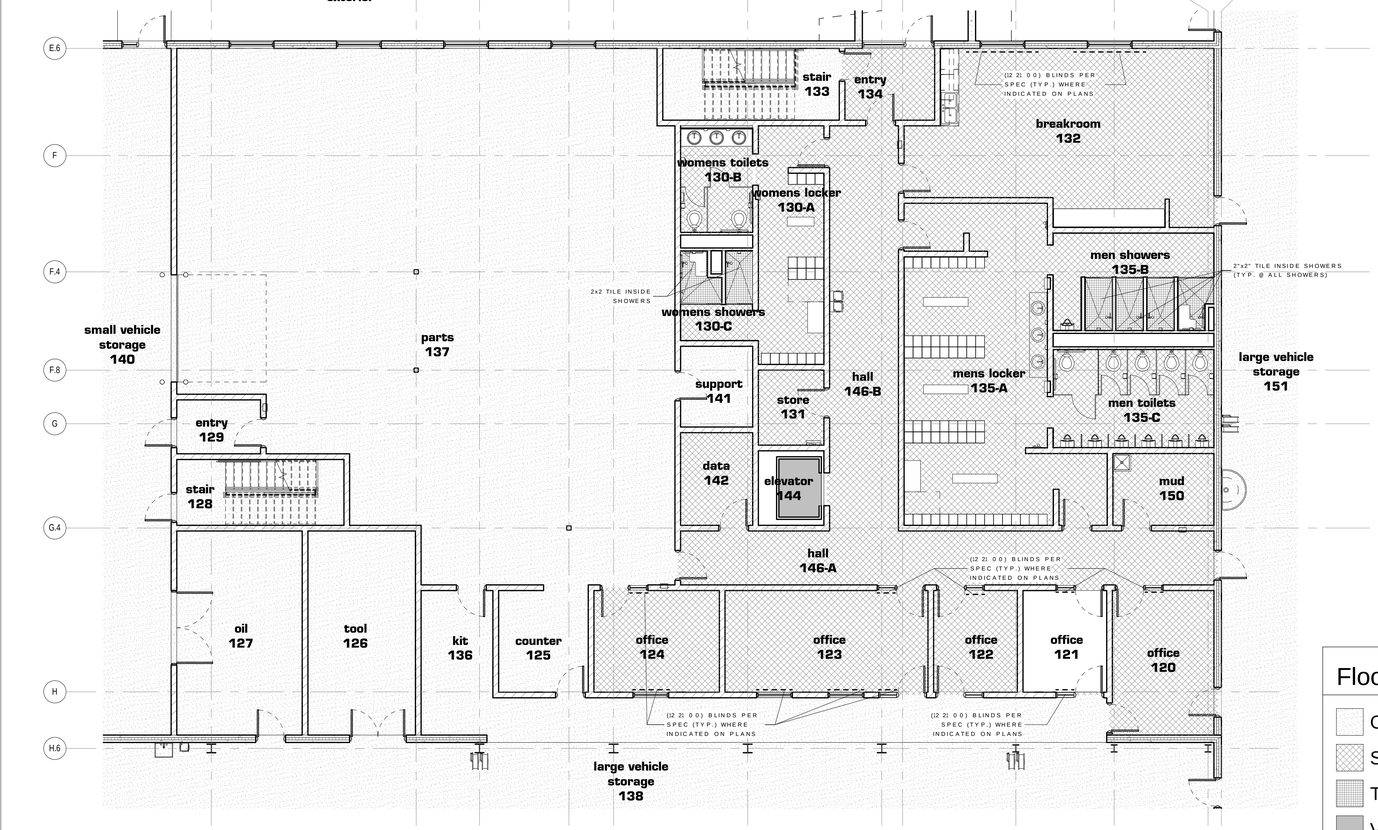
8 Mens Locker 135-A- Sink Section
1/2" = 1'-0"



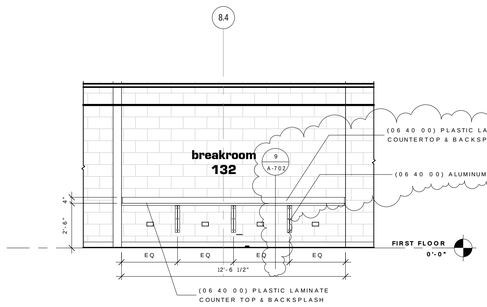
9 Breakroom 132 - Counter Detail
1/2" = 1'-0"



5 ADA Bench - Detail 2
1/2" = 1'-0"

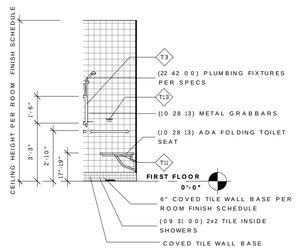


6 Floor Finish Plan - Offices
1/8" = 1'-0"

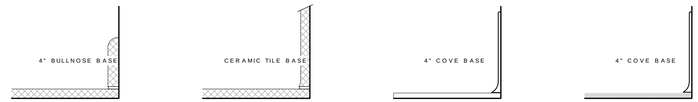


1 Counter @ Break Room 132
1/4" = 1'-0"

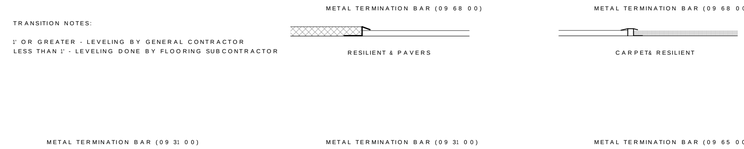
4 ADA Bench - Detail 1
1/2" = 1'-0"



3 ADA Shower Elevation
1/4" = 1'-0"



Base Details



Threshold Details **Joint Details**

Floor Finish Legend

- Concrete
- Stained Polished Concrete
- Tile 2x2
- VCT

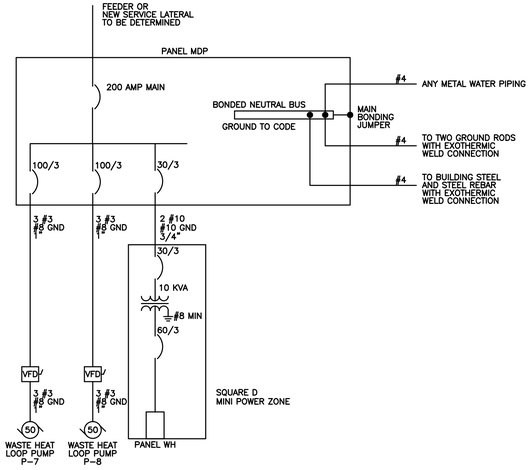
Addendum A1 February 10, 2015

Interior Elevations, Floor Finish & Details

Dane County - Dane County Highway Facility
3562 County Highway AB, Cottage Grove, WI 53558
January 12, 2015

PLAN NORTH
SCALE: As indicated

A-702



2 PUMP ENCLOSURE ONE-LINE

NO SCALE

PANEL MDP – PUMP ENCLOSURE

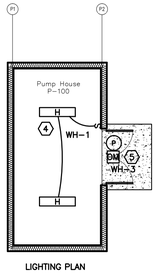
225A MLO 27" SPACE 480V 3 PHASE 4 WIRE COPPER BUS W/GRD BUS SQUARE D HCN I-LINE NEMA 3R				
CIRCUIT BREAKERS: 65 KAIC MINIMUM				
NO.	DESCRIPTION	BKR	KW	SPACE
1	WASTE HEAT LOOP PUMP P-7	100/3	54.04	4.5"
2	WASTE HEAT LOOP PUMP P-8	100/3	54.04	4.5"
3	PANEL A TRANSFORMER	30/2	–	3.0"
4	SPACE FOR 225 AMP FRAME CIRCUIT BREAKER	–	–	4.5"
5	SPACE FOR 225 AMP FRAME CIRCUIT BREAKER	–	–	4.5"
6	SPACE FOR 225 AMP FRAME CIRCUIT BREAKER	–	–	4.5"
	TOTAL SPACE AVAILABLE	–	–	27"
	TOTAL SPACE USED	–	–	12.0"
	TOTAL SPACE REMAINING	–	–	15.0"

PANEL WH – WASTE HEAT PUMP ENCLOSURE

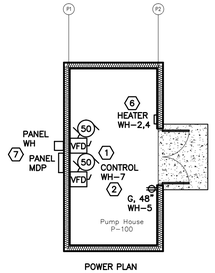
SQUARE D MINI POWER-ZONE MPZB10S40F65K NEMA 3R 480V – 120/240V 1 PH, 3 W 10 KVA SINGLE PHASE TRANSFORMER								
30 AMP PRIMARY CIRCUIT BREAKER 60 AMP SECONDARY CIRCUIT BREAKER 10 POLE PANEL								
MAIN CIRCUIT BREAKER: 65 KAIC MINIMUM BRANCH CIRCUIT BREAKERS: 10 KAIC MINIMUM								
NO.	DESCRIPTION	BKR	KW	PHASE	KW	BKR	DESCRIPTION	NO.
1	INTERIOR LIGHTS	15/1	.10	A	2.00	15/2	HEATER	2
3	EXTERIOR LIGHT	15/1	.01	B				4
5	RECEPTACLE	20/1	.18	A	–	20/1	SPARE	6
7	PUMP CONTROL MODULE	15/1	.18	B	–	20/1	SPARE	8
9	SPARE	20/1	–	A	–	20/1	SPARE	10

3 PUMP ENCLOSURE PANEL SCHEDULES

NO SCALE



LIGHTING PLAN



POWER PLAN

PUMP HOUSE NOTES

1. PUMP P-7 AND PUMP P-8 VARIABLE FREQUENCY DRIVES AND DISCONNECTS PROVIDED BY HVAC CONTRACTOR AND MOUNTED AND WIRED BY THE ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO PROVIDE POWER WIRING ONLY. LOW VOLTAGE CONTROL WIRING BY HVAC CONTRACTOR.
2. PROVIDE CIRCUIT TO HVAC CONTROL MODULE TO BE MOUNTED NEAR THE VARIABLE FREQUENCY DRIVES. PROVIDE RECEPTACLE OR LIGHT SWITCH AS A DISCONNECT AS REQUIRED.
3. GENERAL NOTE: VERIFY ALL ELECTRICAL EQUIPMENT AND DEVICE LOCATIONS WITH MECHANICAL CONTRACTORS.
4. CHAIN MOUNT TYPE H LIGHTS AROUND PIPING. VERIFY BEST LOCATION.
5. CENTER TYPE OM OUTDOOR LIGHT BETWEEN TOP OF DOOR AND SOFFIT. TYPE OM LIGHT IS A DARK BRONZE LED CUT OFF SECURITY LIGHT WITH PHOTOCELL (RAB SLIM12N/PC, 1372 LUMEN, 4000K, 120 VOLT, 14 WATT OR EQUAL).
6. VERIFY HEATER LOCATION WITH HVAC CONTRACTOR.
7. USE GALVANIZED STRUT TO MOUNT PANELS TO BUILDING.

1 PUMP ENCLOSURE ELECTRICAL PLANS

SCALE: 1/8" = 1'

Waste Heat Loop Pump Enclosure

Dane County - Dane County Highway Facility
3562 County Highway AB, Cottage Grove, WI 53558
January 12, 2015

PLAN NORTH
SCALE: 1/8" = 1'0"

E-212

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ADDENDUM 1

MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

BID NO. 313083

ADDENDUM B1 (Bid Package B): The following pages are addendum 1 for Medical Examiner Office Building (Bid Package B)

DANE COUNTY DEPARTMENT of PUBLIC WORKS, HIGHWAY and TRANSPORTATION

County Executive
Joseph T. Parisi

1919 Alliant Energy Center Way ◆ Madison, Wisconsin 53713
Phone: (608) 266-4018 ◆ Fax: (608) 267-1533

Commissioner / Director
Gerald J. Mandli

February 12, 2015

CONSTRUCTION OF EAST HIGHWAY GARAGE – SALT STORAGE FACILITY (BID PACKAGE A) AND MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

DEPARTMENT OF PUBLIC WORKS, HIGHWAY & TRANSPORTATION 3562 COUNTY HIGHWAY AB MCFARLAND, WISCONSIN

MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

This Addendum is issued to modify, explain or clarify the original Request for Bid (RFB) and is hereby made a part of the RFB. Acknowledge this addendum on the Bid Form. The portion of this Addendum relating to Bid Package B is referenced as Addendum B1 for clarity.

CHANGES TO SPECIFICATIONS

1. Document Index
   a. Add 10 21 23 Cubicle Curtains
   b. Add 23 57 00 Heat Exchangers
   c. Add 23 84 13 Humidifiers

2. 01 00 00 Basic Requirements
   a. 1.19 C. Revise to indicate “Temporary Water Service: Refer to Bid Package A”.

3. 04 20 00 Unit Masonry
   a. 2.04.A.1.b: Revise to: “Size: 4 inch high by 12 inch wide by 4 inch deep”.
   b. 2.04.A.1.c: Revise to: “Type - 1 Field Brick Color: Medium Ironspot, 46, Smooth”.

4. 07 42 13 Metal Wall Panels:
   a. 2.05.B.1: Modify to include additional profile option: “Basis-of Design Product Centria Architectural System Profile BR5-36 or Style-Rib, solid and Ecoscreen Perforated Screenwall.”

5. 07 62 00 Sheet Metal Flashing and Trim:
   a. Replace in its entirety to add gutter (gutter liner) to the work included as part of this specification.

6. 09 51 00 Acoustic Ceilings
   a. 2.01.A.2: Modify to “Or USG Halcyon, 98225, or approved equal”.
   b. 2.01.B.2: Modify to “Or USG Clean Room, 56099, or approved equal.”.

c. 2.01.C.2: Modify to "Or USG, Sheetrock™ Lay-in Ceiling Panels, ClimaPlus ™, or approved equal".
d. 2.02.B.2.c Modify to "Donn/USG: CE Grid with Gaskets".

7. 09 90 00 Painting
   a. 3.08A. revise to read "General".
   b. Add 3.08.B Exterior Paint Schedule.

System	Material	Type/Sheen	Number and Type of Coating
EPS-1	Ferrous Metal (hollow metal, exposed plates, angles, bolts, etc.)	Latex /Semi-Gloss	One coat "Kem-Kromik Universal" primer; Two coats "DTM Acrylic"
EPS-2	Galvanized Metal (hollow metal, equipment housings, steel, etc.)	Latex /Semi-Gloss	One coat "Pro-Cryl Univeral" primer; Two coats "DTM Acrylic"

8. Add Section 10 21 23 Cubicle Curtains in its entirety.

9. 10 56 26 Moble Storage Shelving
   a. Revise 2.01 F. 2. to read: "Provide end face panels at control end of movable shelving units: Steel."
   b. Remove 2.03 Item B.
   c. 2.05 F. 1. Add: "Closed upright style at ends of rows, open upright style acceptable at intermediate uprights provided all performance requirements are met."
   d. Add Section 2.09 "Accessories, A. Bins: Flex Containers, Carousel Container, 16" length x 10" width x 10" height, straight wall, steel reinforced corrugated plastic containers. One color to be selected from manufacturer's standard colors. Quantity: 546. Or approved equal."
   e. Revise 3.05 3. a. width to "36"W".
   f. Revise 3.05 3. b. quantity to "(12)".
   g. Revise 3.05 3. c. quantity to "(10)".

10. 11 78 10 Autopsy & Morgue Equipment
    a. Modify 2.1 A. to "2.1 Acceptable Manufacturers A. Provide products as manufactured by Mortech Manufacturing, 411 North Aerojet Way, Azusa, CA 91702, www.mortechmfg.com (phone 626-334-1471), or Mopec, 21750 Coolidge Highway, Oak Park, MI, 48237, www.mopec.com (phone 800-362-8491) or equal products pre-approved in writing 10 days prior to bid date."
    b. Modify 2.7 to be as follows: "2.7 RECESSED BODY SCALE WITH DIGITAL READOUT (Equipment Number **ME2**): Model LW458 QC by Rice Lake Weighing Systems Roughdeck QC (*Quick Clean*) #50411 with model 420 Plus HMI Digital Weight Indicator, or equal products pre-approved in writing 10 days prior to bid date.
    c. Modify 2.13 to be as follows: 2.13 TISSUE GROSSING STATION (**Equipment Number H1**): Provide products as manufactured by Mortech Manufacturing, 411 North Aerojet Way, Azusa, CA 91702, www.mortechmfg.com (phone 626-334-1471), Model GL105, or equal products pre-approved in writing 10 days prior to bid date."

11. 12 48 40 Entrance Floor Mats and Frames:
    a. 2.01.B.1 Revise to read "Acceptable Manufacturers/Product: 1. Kadee Industries Inc., a. KD38 Stainless Steel Grating.
    b. Add 2.01.B.2 to read "Or approved equal".

12. 13 34 19 Metal Building Systems

a. Replace in its entirety to clarify and modify the Scope of the Work in this section. General modifications: Gutter support/framings work remains as part of this specification section. The gutter (gutter liner) scope of the work has been moved to 07 62 00, Sheet Metal Flashing and Trim. Parapet support/framing has been clarified as part of the scope of work for this section. Approved equals have been indicated.

13. 22 13 00 Facility Sanitary Sewerage
    a. Under TRENCH DRAINS add "**ABT PolyDrain**" and after Manufacturers.

14. 22 30 00 Plumbing Equipment
    b. Page 3, line 2, under PLATE AND FRAME HEAT EXCHANGERS add "Bell and Gossett" and "Alfa Laval" after Manufacturers.

15. 23 09 14 Pneumatic and Electric Instrumentation and Control Devices for HVAC
    a. Page 1, Line 44: **Add** the following: "Fume Hood Sash Position and Face Velocity Sensors"
    b. Page 11, Line 31: **Add** the following:

"Fume Hood Sash Position and Face Velocity Sensors
Provide Safety Monitor/Alarm System for each fume hood, which monitors face velocity / sash position and provides audible and visual alarm if face velocity drops below safe levels. As the internal fume hood pressure changes while the sash is closed and opened, the flow passing over the thermistor is calibrated to a face velocity, which is displayed on the monitor front.

Safety Monitor: UL listed, tamper proof, with all alarm circuits, electric components, external tubing, and manifolds furnished complete and factory installed.

Calibration is the responsibility of the fume hood manufacturer, to be accomplished in the field. and is required once the hood is stationed and the hood exhausts and room supply systems are balanced. A secondary calibration has been factory set into the alarm's memory only to determine that the alarm is functional and ready for shipment. The primary calibration must be completed in the field.

Airflow Sensor: Thermally compensated glass-beaded thermistor, factory connected to a sidewall port on the interior of the fume hood.

Alarm Signal: Audible and visual signal.

Silence pushbutton, which disables the audible alarm, shall be accessible on the front of the safety monitor.

Provide alternate mode in which audible alarm is silenced indefinitely but visual alarm remains activated until the alarm condition is corrected.

Provide test circuit to verify proper Safety Monitor operation."

    c. Page 16, Line 62: Add the following:

"Fume Hood Presence Sensors
Fume hood presence sensors shall be calibrated and set to existing site conditions by a certified technician. Document certified calibration and include in the project Operation and Maintenance Manuals.

Fume Hood Sash Position and Face Velocity Sensors
Coordinate sensors and controller with fume hood manufacturer for seamless integration. Turn over sensors, operator interface, controllers, etc. to fume hood manufacturer for

factory installation. Fume hood safety monitors / alarm systems shall be calibrated by the fume hood manufacturer. Document certified calibration and include in the project Operation and Maintenance Manuals."

16. 23 09 15 DDC Input / Output Summary Table
    a. Page 9: Under Supply Air Terminals, add a point for "Space Pressure Switch (Tissue Recovery). Point to have digital input.
    b. Remove existing page 23 09 15-13, and replace with new page 23 09 15-13, attached.
    c. Add page 23 09 15-14 and 23 09 15-15, attached.

17. 23 09 23 – Direct Digital Control System for HVAC
    a. Page 13: Delete lines 25 thru 64. Replace with "The existing system server located at the City County Building shall be used for the building automation system. All BAS graphics and controls shall be accessible from any computer with an internet brower."

18. 23 09 93 – Sequence of Operation for HVAC Controls
    a. Remove existing Section (pages 1 thru 31) and replace with revised Section, attached (Pages 1 thru 42).

19. 23 21 23 Hydronic Pumps
    a. Page 2, line 27: Add Armstrong as an acceptable manufacturer.
    b. Page 2, line 56: Add Armstrong as an acceptable manufacturer.

20. 23 34 00 HVAC Fans
    a. Page 3, line 9. Add "**Loren Cook is an acceptable manufacturer**."

21. 23 52 00 Heating Boilers
    a. Page 3: Delete lines 31 thru 44 and replace with: "Boilers will be controlled by the building automation system. Boilers shall be able to receive an on/off signal and modulating capacity signal (0-10 Vdc or 4-20 mA) from the building automation system utilizing BacNet MSTP or LonWorks communication protocol."

22. 23 57 00 Heat Exchangers
    a. Add Section 23 57 00 Heat Exchangers, attached.

23. 23 84 13 Humidifiers
    a. Add Section 23 84 13 Humidifiers, attached.

24. Section 25 00 00
    c. Add in 1.03 "D. The SI shall integrate the IACS with the gate controls in Section 32 31 16 for control of the gates via the IACS."

25. Section 26 23 00
    a. In 2.01D, revise "65KA" to "35KA."

26. Section 26 31 10
    a. In 1.04A, add "8. Meet with Alliant Energy Distributed Resources Specialist David Sinner (DavidSinner@alliantenergy.com, phone 608-458-3215) prior to any work, including preparation of shop drawings to review all aspects of the installation and to clarify all Alliant Energy requirements."
    b. In 1.04C, add "3. Complete application for interconnection (PSCW 6028). Assist owner in completing Interconnection Agreement (PSCW 6030)."
    c. Add in 2.02 "E. Auto-disconnection contactor: provide contactor to disconnect system upon failure of utility. System to remain isolated even when utility power is temporarily reestablished by recloser action. Contactor is also to be locked out when automatic transfer switch is in emergency position."
    d. Add in 2.02A "4. With integral DC disconnect."

27. Section 26 32 13
    a. In 2.06A, add "2. Provide auxiliary contact to close on signal to start for use by controls contractor in initiating motor starting timed sequence."

28. Section 26 41 00
    a. In 2.01A, add "Equivalent materials by Preferred Lightning Protection are acceptable."

29. Section 27 60 00
    a. Add attached section

30. Section 28 31 00
    a. In 1.07, add "D. Acceptable manufacturers are Notifier, Simplex and Edwards. Gamewell equipment is acceptable IF IN FULL COMPLIANCE WITH THE SPECIFICATIONS IN EVERY DETAIL."

31. 32 12 16 Asphalt Paving
    a. 2.02.A Replace "PG 62-22" with "PG 58-28."
    b. 2.04.A.1 Omit "Provide Mixture Type E-3.0 from the WisDOT SSHSC Section 460-2 per Geotechnical Report recommendations".
    c. 2.04.A. Add item 2:
        Passenger Vehicle Parking / Low Traffic Areas Detail
        a. Type: WisDOT Type E-1.0
        b. Lower Layer Thickness: 2.25 inches
        c. Lower Layer Gradation: 19.0 mm
        d. Lower Layer Performance Grade: PG 58-28
        e. Upper Layer Thickness: 1.75 inches
        f. Upper Layer Gradation: 12.5 mm
        g. Upper Layer Performance Grade: PG 58-28
    d. 2.04.A. Add item 3: Truck Traffic Areas Detail
        a.Type: WisDOT Type E-10
        b.Lower Layer Thickness: 4.0 inches
        c.Lower Layer Gradation: 19.0 mm
        d.Lower Layer Performance Grade: PG 58-28
        e.Upper Layer Thickness: 2.0 inches
        f.Upper Layer Gradation: 12.5 mm
        g.Upper Layer Performance Grade: PG 58-28

32. 32 31 16 Welded Wire Fences and Gates
    a. 1.2. B.2. Replace section "270000 Communications Cable and Equipment" with "275123 'Intercom System' for gate control communications."
    b. 2.4.A. Replace "Master Halco, Access Control, Orange, CA Phone (800) 229-5615 Fax (714) 385-0104" with "LiftMaster; 845 Larch Avenue; Elmhurst, IL 60126-1196. Toll-Free: 800.282.6225. Email: specs@LiftMaster.com. Web: LiftMaster.com."
    c. 2.4.C. Replace "For gates up to 20'- MODEL: MHAC 076047, H.P. ½, VOLTS-110VAC, PHASE- Single" with
        "Gate Operators: LiftMaster SL585 Industrial Gear-Driven Slide Gate Operator.
        1. Compliance: UL 325 listed, UL 991 and CSA C22.2 No. 247 standards.
            a. Ratings: Class II.
        2. Warranty: 2 years.
        3. Operator Speed: 11 inches per second.
        4. Electrical Power Requirements: 115/208/230V AC, single phase, 60 Hz.
        5. Electrical Power Requirements: 208/230/460/575V AC, 3-phase, 60 Hz.
        6. Accessory Electrical Power Requirements: 24V AC.
        7. Gear Reduction: 20:1 wormgear reducer in synthetic oil bath."
    d. 2.4.D. Replace "For gates 20' to 30'- MODEL: MHAC 076108, H.P.- 1, VOLTS-230VAC, PHASE- Single" with

"Motor for gates up to 20': 1/2 HP, continuous duty.
1. Capacity: Supports gate lengths up to 45 feet and gate weights up to 1,000 pounds.
2. Recommended Cycles per Hour: 20.

Motor for gates up to 35': 1 HP, continuous duty.
1. Capacity: Supports gate lengths up to 70 feet and gate weights up to 1,600 pounds.
2. Recommended Cycles per Hour: 20."

e. 2.4 Renumber Emergency Access Requirements from A. to H.
f. 2.4 Renumber Item beginning Motorized gate from B. to I.
g. 2.4 Renumber Interface with radio controlled devices and loop detectors from C. to J.
h. 2.4 Renumer item beginning Gate reader from D. to K.
i. 2.4 Add item "L. The gates are to open on a successful card read from the associated reader. Gate card reader furnished under section 28 13 00. Intercoms shall be furnished under Section 27 51 23. The gates are to open on a signal entered from the telephone system. Gate installer to coordinate with owner's telephone vendor."

CHANGES TO DRAWINGS

33. SHEET C100:
    a. Added dimensions to proposed building from property lines.
    b. Modified 884 contour.
    c. Removed utilities not in the scope of this Bid Package.

34. SHEET C200
    a. Removed electric from southeast corner of building.
    b. Added Note 3, "Refer to Electric, Plumbing and Mechanical Drawings for Detailed Utility Information."

35. SHEET C600:
    a. 3/C600: Revise surface course to 1.75" depth and binder course to 2.25" depth.
    b. 4/C600: Revise surface course to 2" depth and binder course to 4" depth.

36. SHEET A200:
    a. Replace in its entirety.
    b. 1/A200, First Floor Plan: Added details and dimensions at door 1012b (Column H/3.8).
    c. 1/A200, First Floor Plan: Clarified dimensions on floor plan.
    d. 1/A200: Added Detail references to Door 1012b.
    e. 1/A200: Revised P-Types.
    f. Floor Plan Keynotes: Added the following to Keynote"5" – "See 2/A821 for locations".

37. SHEET A201:
    a. Replace in its entirety.
    b. 1/A201, Roof Plan: Added the following note, "Air Cooled Condensing Units By Others".
    c. 1/A201: Added garage downspouts on north and south side.

38. SHEET A210:
    a. Replace in its entirety.
    b. 1/A210, Unisex Toilet: Clarified dimensions as shown.
    c. 2/A210, Toilet Rooms: Clarified dimensions as shown.
    d. 3/A210: Eliminated reference to P-Type 1E, and referenced 1/A800 and 10/A820 for wall information.
    e. 6/A210, Mens and Womens Lockers: Clarified dimensions and added notes as shown. Added interior elevations 31, 32, 33, and 34/A800.
    f. 8/A210, Changed title to "Unisex Toilets". Clarified dimensions as shown.

39. SHEET A300:
    a. Ceiling Plan Keynotes: Revise keynote 3 to read “Not Used”.
    b. Added the following to the end of keynote 8 – “See 2/A821 for locations”.

40. SHEET A503:
    a. Replace in its entirety.
    b. 1, 2 and 3/A503: Revised wall sections for clarification of Pre-Engineered Metal Building responsibilities.

41. SHEET A604:
    a. Replace in its entirety.
    b. 3, 10 and 11/A603: Modified details for clarification of Pre-Engineered Metal Building responsibilities.

42. SHEET A606:
    a. Replace in its entirety.
    b. 7 and 8/A606: Revised details to account for aluminum framed storefront type 1 conditions.

43. SHEET A609:
    a. Replace in its entirety.
    b. Added details 8/A609 and 10/A609 for hollow metal door conditions.

44. SHEET A701:
    a. Door Schedule: Door “125A” – Revised hardware set to “13”. Door “200” – Revised hardware set to “16”.

45. SHEET A800:
    a. Replace in its entirety.
    b. Added the following Interior Elevations: 31, 32, 33, and 34/A800.

46. SHEET A830:
    a. 9/A830, Window Stool: Added the following note “Align edge of window stool with face of Gypsum Wallboard”.

47. SHEET Q210
    a. Replace with the attached drawing, deleted South monitor at Autopsy station (KN#27).
    b. Replace with the attached drawing, revise reference to Key Note 23 to Key Note 73 located pointing to the grossing station (H1) exhaust duct in General Lab 133.
    c. Revise Key Notes to indicate: 25. Not Used, 36. Not Used, 39. Not Used, 50. Not Used, 62. Not Used, 64. Not Used, 75. Not Used.

48. SHEET Q211:
    a. Revise Key Notes to indicate: 25. Not Used, 36. Not Used, 39. Not Used, 50. Not Used, 62. Not Used, 64. Not Used, 75. Not Used.

49. SHEET Q800:
    a. Revise Key Notes to indicate: 25. Not Used, 36. Not Used, 39. Not Used, 50. Not Used, 62. Not Used, 64. Not Used, 75. Not Used.

50. SHEET Q821:
    a. Replace in its entirety.
    b. Modified detail 7/Q821 so that the 1-inch dimension changed to “varies see plan”.

51. SHEET S100:
    a. Replace in its entirety.
    b. Detail 1/S100: Sloped slabs in locker rooms near grid E-4 and E-6. Added room outlines.

c. Detail 1/S100: Body Cooler room 103E. Added sloped floor designation to plan.
d. Detail 1/S100: Grid D.2-8. Dropped footing elevation to clear scale pit.
e. Keyed Notes: Revised note 1. Added notes 21,22.

52. SHEET S200:
    a. Replace in its entirety.
    b. Detail 1/S200: Added unit weight for EF-4 in the Garage building.
    c. Detail 1/S200: Added note 62 to garage plan noting the location of cord reel supports.
    d. Detail 1/S200: Added note 63 to garage plan noting the roof deck at the garage.
    e. Detail 1/S200: Added note 4 to the "Notes for Framing of Pre-Engineered Metal Building Garage".
    f. Keyed Notes: Revised note 49.Added notes 62,63.

53. SHEET S201:
    a. Replace in its entirety.
    b. Detail 2/S201: Added location of cord reel supports.
    c. Misc Framing Plan Keyed Notes: Added note 14.

54. SHEET S300:
    a. Replace in its entirety.
    b. Details 5,6,7,9,11,12,24/S300:Added underfloor rigid insulation.

55. SHEET S301:
    a. Replace in its entirety.
    b. Details 7,8/S301:Added underfloor rigid insulation.
    c. Added detail 17/S301.

56. SHEET S401:
    a. Replace in its entirety.
    b. Added detail 11/S401.

57. SHEET P100:
    a. See revised drawing, P100, attached.

58. SHEET P200:
    a. See revised drawing, P200, attached.

59. SHEET P701
    a. See revised drawing, P701, attached.

60. SHEET P702
    a. See revised drawing, P702, attached.

61. SHEET P900
    a. See revised drawing, P900, attached.

62. SHEET M200
    a. See revised drawing, M200, attached.

63. SHEET M201
    a. See revised drawing, M201, attached.

64. SHEET M300
    a. See revised drawing, M300, attached.

65. SHEET M401
    a. See revised drawing, M401, attached.

66. SHEET M500
    a. Detail 5/M500: Remove reference to double wall duct.
67. SHEET M900
    a. See revised drawing, M900, attached.

68. SHEET E001:
    a. In keyed note 1, add “twelve inches” after rebar.
    b. Relocate the CT cabinet/meter to a concrete pad adjacent to the utility transformer.

69. SHEET E101:
    a. Add TV outlet in 105-north wall, east corner at 8’-0” AFF. Provide duplex receptacle adjacent on ckt. LA-15.
    b. Add a special outlet TCP and voice/data outlet in 154 on south wall, east of doors. Wire to LB-34.
    c. Add a special outlet TCP and voice/data outlet in 110, west wall. Wire to LA-6.
    d. Add EF-7 in Electrical Room 139-1/4 HP, 120V. Provide manual starter. Wire fan speed control. Wiring 3#12-1/2”c. from 20A, 1P breaker (LB-36).
    e. Add UH-10 in Electrical Room 139-9W, 120V. Provide manual starter. Wiring 3#12-1/2”c. from 20A, 1P breaker (LB-36).
    f. Revise General Note 3 to read: “CNG vehicles will be stored in Garage 150. Keep all wiring 18” below ceiling. Any wiring closer than 18” to ceiling must be Class 1 Division 2.”
    g. In keyed note 30 add “or 132” after 130.
    h. Relocate electric meter/termination compartment to a concrete pad adjacent to the pad mounted transformer.
    i. Add a special outlet – Humidifier-in Chiller Room 154-18KW-480volts, three phase – wiring 4# 10-1”conduit from 30A, 3P breaker (HB-31, 33, 35)

70. SHEET E102:
    a. In keyed note 2, change “1 inch conduit” to “2 inch conduit terminated on a weatherhead”.

71. SHEET E103:
    a. In 140, wire two special outlets TCP for CRAC-1, 2. Wire to LB-34. See M200 for locations. Provide a voice/data outlet at each TCP.

72. SHEET E200:
    a. Wiring Diagram – Occupancy Sensor: Add a second power pack controlled by daylight sensor, occupancy sensor and local switch to provide off-override for 50% lighting level when daylight level is adequate. Other local switch to control remaining 50% of lighting via occupancy sensor.

73. SHEET E300:
    a. Add note regarding incoming primary “Stub (2) 5” conduits out 10’-0” past distributed earth for incoming primary cables.”
    b. Revise breaker AIC to 35KA
    c. Add general note 3 “Provide 3 1/2” concrete housekeeping pad for service entrance rated automatic transfer switch.”

74. SHEET E400:
    a. Light Fixture Schedule - Alternate Bid - LED
        i. Revise type M to (6) lamp fluorescent-F54THO/SPX35/ECO - Daybrite ST8245-3/F/F8240/277/ECB. Apply notes 2, 6, 8.
        ii. Revise type N to (3) lamp fluorescent- F54THO/SPX35/ECO - Daybrite ST8145-2/F/F8140/277/ECB. Apply note 2.
        iii. Change OB to Gardco 101L-3-35LA-NW-UNIV-BRP.

iv. Change OC to Gardco 101L-3-55 LA-NW-UNIV-BRP.

75. SHEET E401:
    a. Special Outlet Schedule
        i. Revise note 13 to read "Provide fire alarm monitor modules to indicate panel in alarm, panel trouble, clean agent discharge and tank supervisory alarm."
    b. Special Outlet Schedule – Medical Examiners Equipment
        ii. Add "8. See Detail A on E101." Apply to outlet ME13.

76. SHEET E402:
    a. In panel HB, revise AIC to 35KA.
    b. In panel HB, add one 30A, 3P.

77. SHEET E403
    a. Motor Schedule
        i. Delete note 1 for CRAC-1, 2. Apply new note "5. Provide duct detector at supply duct with RTS/I in room 140 and control module. Program control module to control smoke damper in supply duct. Provide area detector at return grille. Provide control module to control smoke damper in return duct."
        ii. Revise P-9 to 120V – 1/6HP wired to LA-1.
        iii. Revise AHU-2 to 30HP, wiring to #6 in 1"c.
        iv. Revise starter type for P-5, 6 to VFD.
        v. Revise starter type for P-12, 13 and EF-5 to VFD. delete note 1.

END OF ADDENDUM B1

Enclosures:

Section 07 62 00 Sheet Metal Flashing and Trim
Section 10 21 23 Cubicle Curtains
Section 13 34 19 Metal Building Systems
Pages 23 09 15-13, 23 09 15-14 and 23 09 15-15
Section 23 09 93 Sequence of Operation for HVAC Controls
Section 23 57 00 Heat Exchangers
Section 23 84 13 Humidifiers
Section 27 60 00 Radio Reinforcement

C100, C200, C600, A200, A201, A210, A503, A604, A606, A609, A800, Q210, Q821, S100, S200, S201, S300, S301, S401, P100, P200, P701, P702, P900, M200, M201, M300, M401, M900

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

A. Metal Counter Flashing.

B. Exposed Metal Trim/Fascia/Copings.

C. Miscellaneous Sheet Metal Accessories.

D. Flashing.

E. Gutter (Gutter Liner).

1.03 RELATED WORK

A. Sections 04 01 00, 04 20 00, 04 43 00 and 04 72 00 for Thru-Wall Flashing at Masonry.

B. Section 06 10 00, Rough Carpentry for Wood Blocking, Nailers.

C. Section 07 53 23, Ethylene-Propylene-Diene-Monomer Roofing

D. Section 07 92 00, Joint Sealants

E. Section 13 41 19, Metal Building Systems

F. Division 22: Plumbing

G. Division 23: HVAC

1.04 PERFORMANCE REQUIREMENTS

A. General: Manufacture and install copings, fascia, and scuppers to resist thermally induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. FMG Listing: Manufacture and install copings, fascia, and scuppers that are listed in FMG's "Approval Guide" and approved for Windstorm Classification, Class 1-60. Identify materials with FMG markings.

C. Thermal Movements: Provide manufactured copings, fascia, and scuppers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base

engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

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

1.05 REFERENCES

A. Referenced Standards Recommended practices and details as set forth by the 1993 Edition of the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) in the "Architectural Sheet Metal Manual" are incorporated by reference made a part of this work.
   1. AISI – American Iron and Steel Institute.
   2. ASTM 240 Type 304 Stainless Steel
   3. ASTM A653 - Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   4. ASTM B32 - Solder Metal.
   5. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
   6. ASTM C920 – Elastomeric Joint Sealants.
   7. ASTM D2244 – Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
   8. ASTM D4214 – Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
   9. NRCA - Roofing and Waterproofing Manual.
   10. SMACNA - Architectural Sheet Metal Manual.

1.06 SUBMITTALS

A. Submit in accordance with the General Conditions of the Contract.
   1. Shop Drawings showing profiles, joint treatment, fastening methods, gauge and finish of materials.
   2. Actual samples of pre-finished sheet metal showing the exact color(s) and texture(s) available for selection from manufacturer’s full range.

B. Provide mock-ups as indicated on Drawings.
   1. All components of wall construction, wall openings, wall base, window sills, flashing, etc. to be included in mock-up as indicated on drawings.
   2. Mock-up to be stand-alone assembly separate from work at the building.
   3. Provide Shop Drawings for Mock-up as is shown on drawings.
   4. Refer to Section 01 00 00 for more information.

1.07 GUARANTEE

A. Manufacturer’s Warranty: Provide the sheet metal manufacturer’s standard twenty (20) year warranty stating at a minimum that the metal finish will not chalk in excess of an eight (8) rating, or fade in excess of a five (5) rating, when tested in accordance with ASTM D2244 and ASTM D4214.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Low-Emitting Materials, Adhesives, and Sealants: Materials used on the interior of the building (defined as inside the weatherproofing system and applied on site) must not exceed the following requirements.
   1. Adhesives, Sealants and Sealant Primers: South Coast Air Quality Management (SCAQMD) Rule # 1168, requirements in effect on July 1, 2005, and rule amendment date January 7, 2005.
   2. Aerosol Adhesives: Green Seal Standard for Commercial Adhesives GS-36, requirements in effect on October 19, 2000.

B. Recycled Content of Aluminum Materials: Provide aluminum materials containing the maximum possible amount of postconsumer and preconsumer recycled aluminum content.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to requirements, provide products of one of the following:
1. Cheney Flashing Company.
2. Hickman, W. P. Company.
3. Metal-Era, Inc.
4. MM Systems Corporation.
5. Perimeter Systems, a division of Southern Aluminum Finishing Co.
6. Petersen Aluminum Corp.

2.02 METAL COUNTER FLASHING

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.

B. Minimum 22 gauge stainless steel or as indicated on drawings.

2.03 EXPOSED METAL TRIM, FASCIA, COPINGS, SCUPPERS

A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and finish indicated, finished as follows:
1. Aluminum: Coping, fascia and trim: 0.080 inch thick; Scupper: 0.063 inch thick.
2. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet, concealed anchorage, concealed splice plates with same finish as coping caps, mitered corner units, and end cap units.
   a. Acceptable Manufacturer: Econosnap, or approved equal.
   b. Corners: Mechanically clinched and sealed watertight.
   c. Anchor Plates: Concealed, galvanized steel sheet, 12 inches wide, 0.028 inch thick, with integral cleats.
   d. Coping dimensions as indicated in drawings.
3. Surface: Smooth, flat finish.
4. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat. Color as selected by Architect

2.04 ACCESSORIES

A. Fasteners: Where not specified, size fasteners to suit conditions. No dissimilar metals allowed.

B. Blind rivets: 1/8” copper “pop” rivets.

C. Solder: As specified by manufacturer.

D. Flux: As specified by manufacturer.

E. Self-Adhering, High-Temperature Sheet Flashing: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.
2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
c. Henry Company; Blueskin PE200 HT.
d. Metal-Fab Manufacturing, LLC; MetShield.
e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

F. Flexible Flashing: 0.045" EPDM.

G. Other products, not specifically described, but required for a complete and proper installation of the work in this section shall be selected by the Contractor subject to the approval of the A/E.

2.05 GUTTERS:

A. Material:
1. 18 gauge stainless steel, type 304.
2. Size: Custom break metal shape as indicated on drawings.

2.06 SEALANT:

A. Meets ASTM C-920, Type M, Grade NS, Class 25, use T, NT, M, G, A, O.

B. Federal Specification TT-S-00227E;

C. CRD C 506, Type II, Multi-part polyurethane base, elastomeric joint sealing compound;
1. Color: Selected by A/E from manufacturer’s full range of colors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces to be covered by sheet metal. Report any improper defective surfaces to Contractor in writing. Beginning of sheet metal work over surfaces: Presumed as acceptance of surfaces as satisfactory by sheet metal sub-contractor.

3.02 FABRICATION

A. Fabricate sections as detailed. Form sections true to shape, accurate in size, square and free from distortion or defects. Do not “punch” metal at brake points.

B. Form all pieces in lengths of 8'-0" or 10'-0" where practical. Sections less than 3' long are unacceptable unless that section comprises the entire run.

C. Unless detailed otherwise, hem exposed edges on underside 1/2"; fabricate vertical faces with bottom edge formed outward 3/4" at 30 degrees and hemmed to form drip.

D. Miter and seam inside and outside corners using rivets and multi-part polyurethane sealant. Outside corners shall be prefabricated with outside face of section broken at corner; seam at corner is unacceptable. Pieces shall be a minimum of 18" in length, in both directions from the corner.

E. Utilize a minimum 4" back dam and 1 ½" end dams.

F. Metal Counter Flashing:
   1. Formed in 8-foot minimum sections, lap end joints 3 inches.
   2. Do not seal joints; make continuous at angles; overlap base flashing minimum of 3 inches.

3.03 INSTALLATION

A. General: Install copings, fascia, and scuppers according to manufacturer's written instructions. Anchor copings and scuppers securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.
   1. Install with provisions for thermal and structural movement.
   2. Torch cutting is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
   1. Underlayment: Where installing exposed-to-view components of manufactured roof specialties directly on cementitious or wood substrates, install a course of polyethylene underlayment.

C. Installation to have seams and lines as established by the approved shop erection drawings.

D. Coping/Scuppers: Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

E. Minimize all exposed fasteners, utilize cleated seams whenever possible.

F. Anchor to resist uplift and outward forces according to performance requirements.

G. Install level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.

H. Install to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

I. Expansion Provisions: Provide for thermal expansion of exposed copings and scuppers. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections.

J. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

K. Details should be per SMACNA ARCHITECTURAL SHEET METAL MANUAL recommended details.

L. Parapet Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior and exterior wall faces, over cants or tapered edge strips, and under roofing membrane.

M. Gutters (Gutter liner):
1. Joints in gutter should be lapped one inch minimum, welded or rivited 2 inches on center and soldered.
2. The allowance for expansion: 1-1 /8 inches for 50-foot lengths.
a. Expansion joints must be located as to be a minimum of 15-feet from outlets.
3. Width of the cap for the expansion joint is 3-1/4" 50-foot lengths.
4. Support for gutter (built-in) by Section 13 34 19.
5. Install gutters to form watertight assembly.
a. Form gutters without longitudinal seams.
b. Gutter joints and expansion joint caps shall be lapped 1-5/8" in the direction of waterflow. Riveted and soldered.
1) Rivets shall be 3/16" in diameter with burrs under peened heads. Rivets shall be spaced not more than 3" apart in two staggered rows, with 1/2" edge and end distance.
c. Slope gutter bottoms as indicated to roof drain conductor as indicated on Drawings.
d. Complete all soldering with joints flat, before installing gutter. Block and band gutter, as necessary, to prevent deflection and breaking solder joints while installing gutter.
e. Outlet tubes shall extend into roof drain conductor at least 3".
1) Upper end of tube shall be flanged 1/2" and soldered to gutter. Longitudinal seam shall be locked and soldered.
2) Provide removable strainers at all outlets.

3.04 WORKMANSHIP

A. Make all work weather and watertight throughout; provide allowances for material expansion and contraction.

B. Sections shall be uniform, accurately fitted so as to line up straight and true and rigidly secured in place, without kinks or buckles. Joints at corners and angles shall be smooth, tight and neatly mitered and seamed.

C. Unless detailed otherwise, lap all vertical joints between adjacent sections a minimum of 2".

D. Where metal is hooked to a continuous cleat, crimp metal to cleat along entire length.

E. Repair or replace all damaged or defective work.

F. Soldering:

1. Rivet pieces prior to soldering.

2. Soldering shall be done with heavy soldering coppers of blunt design, properly tinned before using. Coppers shall weigh not less than 10 pounds per pair. Use of a gas torch is not allowed.

3. Follow manufacturer's recommendations for cleaning, tinning and soldering metal.

4. Soldering shall be done slowly to heat sheet metal thoroughly and to sweat solder completely through full width of seam. Whenever possible, soldering shall be done in flat position; seams on slopes shall be soldered a second time.

5. Clean all flux from metal after soldering is completed.

3.05 COUNTERFLASHING RECEIVER:

A. Install new receiver as detailed or where required.

B. Notch and lap joints 3" between sections.

C. Apply sealant at the joint between the receiver and the masonry wall where receiver is not part of a thru-wall flashing; DO NOT APPLY SEALANT between masonry and thru-wall flashings.

3.06 COUNTERFLASHING:

A. Fasten counterflashing to receiver with stainless steel sheet metal screws 24" O.C.

B. Notch and lap joints 3" between sections; bayonet joints are unacceptable. Do not fasten joints between sections.

C. Counterflashing shall be creased longitudinally just enough to provide a spring action that will hold bottom edge firmly against flashing.

3.07 WALL FLASHING: (FOR THOUGH-WALL FLASHINGS FOR MASONRY CAVITY WALLS.)

A. Install flashings in accordance with Division 4.

3.08 MISCELLANEOUS FLASHINGS:

A. Install appropriate flashings at all exhausts, vents and penetrations not specifically called out but required.

B. Remount and secure all rooftop equipment. Use threaded fasteners.

3.09 CLEANING

A. Clean exposed sheet metal of roofing materials, mortar, hand marks, other foreign materials.

B. Remove temporary protective coverings and strippable films as copings and scuppers are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

C. Replace items that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

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SECTION 10 21 23

CUBICLE CURTAINS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 WORK INCLUDED

A. Cubicle tracking systems.

B. Overhead curtain track and guides.

C. Track accessories and attachments.

D. Cubicle curtains.

1.03 RELATED WORK

A. Metal Fabrications: Section 05 50 00.

B. Gypsum Board: Section 09 29 00.

1.04 REFERENCES

A. National Fire Protection Association (NFPA).

1.05 SUBMITTALS

A. Submit in accord with the General Conditions of the Contract.
   1. Product Data: Manufacturer's printed product data for each type of cubicle tracking system specified.
   2. Detail Drawings: Mounting details with the appropriate fasteners for specific project substrates.
   3. Track Samples: Verification samples of cubicle track, 4" long, in full size, with carriers and end cap.
   4. Curtain Samples: Fabric samples showing manufacturer’s full color range for selection by A/E.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in unopened factory packaging to the jobsite.

B. Store in original packaging in a climate controlled location away from direct sunlight.

1.07 PROJECT CONDITIONS

A. Environmental Requirements: Products must be installed in an interior climate controlled environment.

1.08 WARRANTY

A. Warranty: Manufacturer’s standard, limited lifetime warranty against material and manufacturing defects.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers: Basis of Design is Clickeze, InPro Corporation, Muskego, WI; (800) 222-5556, www.inprocorp.com. Other manufacturers not limited to the following:
   1. Coldraco, Inc.
   2. Covoc Corporation.
   3. Or approved equal.

B. Provide all cubicle tracking systems and curtains from a single source.

2.02 TRACK MATERIALS

A. Cubicle Tracking System, Bracket Support Mounted.
   1. Equal to Clickeze, “Ultra Cube”, heavy duty extruded aluminum cubicle track with white baked acrylic enamel finish. Dimensions: height 1 1/8" (13mm), width 1 1/4" (16mm).

2.03 TRACK COMPONENTS

A. Track Attachment: Provide appropriate attachment accessories as required for gypsum board ceiling including Ultra Cube hard ceiling support brackets.

B. Ultra/Whisper Pop-Out Curtain Carriers: Non-binding canted wheel carrier of self-lubricating Delrin, fitted to curtain with "pop-out hook" for safety.
   1. (2.2) carriers per lineal foot of track length.

2.04 CURTAINS

A. Fire Performance Characteristics: Provide curtains that are fire retardant or fire resistant.

B. Privacy Curtain: Equal to Clickeze, InPro Corporation, “Shield Antimicrobial Fabric” collection.
   1. Fabric: Provide 100% polyester curtains. Fabric is to be opaque, washable, flame retardant and closely woven.
   2. Shield Fabric: Provide 100% polyester, impregnated and multi-coated with Aqueous based microporous polymers.

C. Finish and Color, Privacy Curtain Fabric.
   1. Solid or patterned fabric from selected by A/E from manufacturer's standard selections.

D. FABRICATION
   1. Curtain Width: Manufacture curtains of one piece, sized to 10 percent wider than the track length but no less than 1 foot extra fullness.
   2. Curtain Height: Refer to drawings.
      a. Bottom of privacy curtains hang 12" - 15" above floor.
      b. Verify existing conditions.
   3. Curtain Heading: Manufacture with heading of open mesh cloth, to the same width as the curtain fabric. Include 4-ounce nickel-plated grommets, 6" on center for carriers.
   4. Seams

a. Privacy Curtain: Bottom hem shall be double-fold and 1 1/4" wide. Curtains shall be seamless if possible or lock stitch seams in two rows. Turn seam edges and lock stitch. Sewing thread to be triple-ply twisted nylon.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions in which the cubicle tracking systems will be installed.
   1. Complete all finishing operations, including painting, before beginning installation of cubicle tracking system materials.
   2. Verify that surfaces and above ceiling supports are ready to receive work.

3.02 PREPARATION

A. General: Prior to installation, clean substrate to remove dust, debris and loose particles.

3.03 INSTALLATION

A. General: Locate the cubicle track as indicated on the approved detail drawing for the appropriate substrate and in compliance with manufacturer's installation instructions.

B. Installation of Cubicle Tracking Systems:
   1. Fasten cubicle track, secure and rigid, and true to ceiling line with mechanical fasteners.
   2. Slide carriers onto the track.
   3. Install end cap or stop device.
   4. Install curtains on carriers ensuring smooth operation.

3.04 CLEANING

A. At completion of the installation, remove any debris and clean surfaces in accordance with manufacturer's instructions.

END OF SECTION 10 21 23

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SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1- GENERAL

1.01 RELATED DOCUMENTS

A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 SUMMARY

A. Pre-engineered metal building including: engineering, supplying and installing of steel structural members, structural framing, girts, parapet support/framing, gutter support/framing, insulation, flashing, closure components and trim.

1.03 RELATED SECTIONS

A. Section 03 30 00: Cast-in-Place Concrete

B. Section 04 20 00: Unit Masonry

C. Section 05 31 00: Steel Decking

D. Section 05 40 00: Cold Formed Metal Framing

E. Section 06 10 00: Rough Carpentry

F. Section 07 42 13: Metal Wall Panels

G. Section 07 53 23: Ethylene-Propylene-Diene-Monomer Roofing

H. Section 08 11 13: Hollow Metal Doors and Frames

I. Section 08 36 13: Sectional Overhead Doors

J. Section 08 71 00: Door Hardware

K. Section 23 33 00: Air Duct Accessories

L. Division 26: Electrical and Photovoltaic

1.04 REFERENCES

A. AISI – Specification for the Design of Cold-Formed Steel Structural Members – 1986 Edition with 1989 Addendum.

B. AISC – Specification for Structural Steel Buildings – 1999.

C. AISC – Code of Standard Practice for Steel Buildings and Bridges – 2000.

D. ASTM A36-00 – Specification for Structural Steel.

E. ASTM A-153-00 – Specification for Zinc Coated (Hot Dip) on Iron and Steel Hardware.

F. ASTM A307-00 – Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.

G. ASTM A325-00 – Specification for High Strength Bolts for Structural Steel Joists.

H. ASTM A123-00 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

I. ASTM A653-00 – Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvanealed) by the Hot-Dip Process.

J. ASTM A490-00 – Specification for Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.

K. ASTM A501-99 – Hot Formed Welded and Seamless Carbon Steel Structural Tubing.

L. ASTM A529-96 – Structural Steel with 50,000 psi Minimum Yield Point.

M. ASTM A1011-00 – Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.

N. ASTM 792-99 – Specification for Steel Sheet Aluminum Zinc Alloy Coated by the Hot-Dip Process, General Requirements.

O. ASTM C991-98 – Specification for Flexible Glass Fiber Insulation for Metal Buildings

P. ASTM E1514-98 – Specification for Structural Standing Seam Steel Roof Panel Systems.

Q. AWS A2.4-98 – Standard Welding Symbols.

R. AWS D1.1-2000 – Structural Welding Code – Steel.

S. AWS D1.3-98 – Structural Welding Code – Sheet Steel.

T. IBC (International Building Code) – 1604.3.1. Deflections – 2000 Edition.

U. MBMA Low Rise Building Systems Manual – 1996 Edition.

V. NAIMA 404-96 – Standard for Flexible Fiberglass Insulation Systems in Metal Buildings.

W. SJI – Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders – 1994.

1.05 SUBMITTALS

A. Contractor will submit the following documents for review: Engineer's Letter of Certification, Permit Drawings, Column Reactions, Anchor Rod Plan, Building Erection Drawings.

B. Installation Instructions: Manufacturer will provide installation instructions that indicate preparation requirements and assembly sequence.

1.06 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with MBMA Low Rise Building Systems Manual, and, for items not covered, AISC – Specification for Structural Steel for Buildings.

1.07 QUALIFICATIONS

A. Manufacturer: The Manufacturer shall have a minimum of five (5) years experience in the manufacture of metal building systems.

B. Quality System: Manufacturer shall submit a Quality Policy document stating the Manufacturer's commitment to quality.

C. Licensed Engineer: Structural framing shall be designed by a Professional Engineer licensed in the state in which the Project is located.

D. Field Measurements: Metal building contractor shall verify that field measurements are as indicated on the drawings.

1.08 WARRANTY

A. Workmanship: Manufacturer's Workmanship Warranty shall be for of 1 year.

B. Panel Warranty: Manufacturer's Panel Warranty shall be for 20 years.

C. All nomenclature shall conform to the MBMA Low Rise Building Systems Manual.

D. Coordination and administration of the work shall be in accordance with the MBMA Low Rise Building Systems Manual – Common Industry Practices.

PART 2-PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design:
   1. Butler Manufacturing Company, Landmark 2000, or equal by the following manufacturers
      a. Varco-Pruden Buildings.
      b. Foremost Buildings, Inc.
      c. American Buildings Company.
      d. Inland Buildings.
      e. Metallic Building. Co.
      f. Ceco Building Systems.
      g. Or approved equal.

   2. Refer to drawings for details.

2.02 DESIGN REQUIREMENTS

A. Members to withstand the following loads:
   1. Building system dead loads.
   2. Live Load: 20 psf, without tributary area load reduction
   3. Collateral Load: 5 psf
   4. Refer to Drawings for any additional actual or estimated loads
   5. Ground Snow Load: 35 psf , Snow Exposure C.
   6. Wind Velocity: 90 mph , Wind Exposure C.
   7. Seismic Acceleration: Ss: 11.1%g, S1=4.4%g, Site class to be verified by Geotechnical Engineer.
   8. MBMA Building Use Category: 2.
   9. All loads shall be proportioned and applied in accordance with the latest edition of the MBMA Low Rise Building Systems Manual.

a. MATERIALS

A. Sheet Steel Stock: Zinc-aluminum coated to AZ55 designation as required by manufacturer's design.

B. Roof Insulation: ASTM C991-98 roll glass fiber type, faced with white vinyl, UL frame spread classification of 25 or less where exposed, 4 inches thick. Provide external wire support.
   1. Or system with equal R Value as recommended by manufacturer.

C. Steel Decking as per drawings and Specification Section 05 31 00.

D. Fully adhered EPDM Roof. See Specification Section 07 53 23.

E. Fasteners:
   1. Through-fastened System: Panels shall be attached to the secondary framing members by means of a self-drilling structural carbon steel screw with a zinc-alloy head, finished to match roof panel, and assembled with an EPDM washer.

F. Wall Systems
   1. Refer to Section 04 20 00 for masonry
   2. Refer to Section 05 40 00 for cold form metal framing (structural steel studs).
   3. Refer to Section 07 42 13 for metal wall panels Type MP-1.
   4. Wall Insulation: ASTM C991-98 roll glass fiber type, faced with white vinyl, UL frame spread classification of 25 or less where exposed, 4 inches thick. Provide external wire support.
      a. Or unless noted otherwise on drawings.
   5. Closures and miscellaneous fasteners (clips): Manufacturer's standard type, unless noted otherwise on drawings.
   6. Fasteners: Wall panels shall be attached to the secondary framing members by means of a self-drilling fastener of carbon steel, hex washer head with EPDM bonded washers.
   7. Exterior Panel Finish: Refer to 07 42 13.

G. Trim:
   1. Flashings, internal and external corners, closure pieces, and etc. shall be the same material and finish as adjacent material. Profiles shall be Manufacturer's standard. Custom colors to match Architects sample refer to 07 42 13.
   2. Continuous Closure: Provide weathertight, sheet metal closure where building abuts existing construction. Closure to match color and material of roof panels. Allow for thermal movement and differential settlement between building and existing construction.

H. Metal Personnel Doors and Frames:
   1. Refer to Section 08 11 13 for hollow metal doors and frames.
   2. Door jambs shall be constructed for non-hand installation.
   3. Door frames shall be provided with head and jamb flashing and optional weather strip.
   4. See Section 08 71 00 for door hardware. Coordinate keying with User.
   5. Door threshold shall be aluminum, supplied with flat head screws and expansion shields for attachment to concrete floor.

I. Sectional Overhead Doors
   1. Refer to Section 08 36 13: Sectional Overhead Doors

b. FABRICATIONS - PRIMARY FRAMING

A. Framing/enclosure dimensional criteria:
   1. A minimum of 14'-0" clear must be maintained from the finished floor to the bottom of the structural framing members in alignment with the overhead doors.

2. The ridge of the pre-engineered building component including all enclosure elements must not exceed 16’-6” AFF.

B. Framing Members: Clean in accordance with SSPC-SP2, prepare, and coat with Manufacturer’s standard primer.

C. Hot rolled members shall be fabricated in accordance with AISC Specification for pipe, tube, and rolled structural shapes.

D. Fabricate built-up members in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.

c. FABRICATION – WALL AND ROOF FRAMING

A. Framing Members: Clean in accordance with SSPC-SP2, prepare, and coat with Manufacturer’s standard primer.

B. Cold Formed Members: Cold formed shapes shall be fabricated in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.

d. FABRICATION – GUTTER

A. Refer to drawings for location of full insulated inside parapet gutter

B. Refer to Section 07 62 00 for gutter (gutter liner) fabrication.

C. Gutter (gutter liner) profile as indicated on drawings.

D. Metal Building System Manufacturer is responsible for gutter (gutter liner) support/framing.

e. FABRICATION – PARAPET

A. Parapet profile and size as indicated on drawings.

B. Metal Building System Manufacturer is responsible for parapet support/framing.

PART 3 – EXECUTION

3.01 EXAMINATION:

A. Verify that placed anchor rods are in correct position.

B. Provide access to the work as scheduled for Owner provided inspections, if required. The cost of any required inspection is the responsibility of the Contractor.

3.02 ERECTION – FRAMING

A. Erect framing in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.

B. The Erector shall furnish temporary guys and bracing where needed for squaring, plumbing, and securing the structural framing against loads, such as wind loads acting on the exposed framing and seismic forces, as well as loads due to erection equipment and erection operation, but not including loads resulting from the performance of work by others. Bracing furnished by the

Manufacturer for the metal building system cannot be assumed to be adequate during erection. The temporary guys, braces, falseworks and cribbing are the property of the Erector, and the Erector shall remove them immediately upon completion of erection.

C. Do not cut or alter structural members without approval of the Manufacturer.

D. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION – WALL AND ROOFING SYSTEMS

A. Install in accordance with Manufacturer's instructions.

B. Exercise care when cutting pre-finished material to ensure cuttings do not remain on finish surface.

C. Fasten cladding to structural supports, aligned level and plumb.

3.04 TOLERANCES

A. All work shall be performed in a workmanlike manner.

B. Install framing in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.

END OF SECTION 13 34 19

DDC INPUT / OUTPUT SUMMARY TABLE

PROJECT: Medical Examiner Office Bldg	HARDWARE																				SOFTWARE																												
LOCATION: Madison, WI	OUTPUT								INPUT												ALARMS																												
	DIGITAL				ANALOG				DIGITAL						ANALOG						DIGITAL			ANALOG				ENERGY MANAGEMENT SYSTEM FUNCTIONS																								
SYSTEM: Miscellaneous Points POINT DESCRIPTION	Control Relay	Solenoid	Contactor	2-Pos Actuator	Elect/PneuTransducr	Electric Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	Equipment Status	Maintenance	Pressure	High Limit	Low Limit			Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend	Equipment Integration	Lighting Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Manual Changeover	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
PHOTOVOLTAIC SYSTEM																																																
Power Generation																																	X	X	X													
FIRE ALARM																																																
Alarm												X																										X									
Trouble												X																										X									
Supervisory												X																																			
PROCESS WASTE TANKS																																																
Tank #1 Level																					X													X														
Tank #1 High Level Alarm										X												X		X																							
Tank #2 Level																					X													X														
Tank #2 High Level Alarm										X												X		X																							
DOMESTIC WATER METER																																																
Domestic Water Volume																																	X	X	X													Domestic water volume.
NATURAL GAS METER																																																
Natural Gas Volume																																	X	X	X													Natural gas volume from utility meter.
ELECTRIC METER																																																See Note Below
Electric Consumption																																	X	X	X													Electric consumption.
Electric Demand																																																KYZ pulse from Alliant Electric Meter
EMERGENCY GENERATOR																																															
Status																					X																										
Transfer Switch											X																																			
General Fault																						X														X											
Gen Tank Rupture Alarm																									X											X											
Gen Tank Critical Low Level																									X											X											
Gen Tank Low Level																									X											X											

Note: Alliant Energy will provide wiring from electric meter to weatherproof box(approximatley 3'-0" from meter) and isolation relay for meter pulses. This contractor to provide mounting platform for relay enclosure and all wiring from relay enclosure to BAS system. Meter pulses will come in the form of a kyz pulse.

DDC INPUT / OUTPUT SUMMARY TABLE

PROJECT:

Medical Examiner Office Bldg

LOCATION:

Madison, WI

SYSTEM: Miscellaneous Points

	HARDWARE																				SOFTWARE																										
	OUTPUT								INPUT												ALARMS																										
	DIGITAL				ANALOG				DIGITAL						ANALOG						DIGITAL			ANALOG				ENERGY MANAGEMENT SYSTEM FUNCTIONS																			
POINT DESCRIPTION	Control Relay	Solenoid	Contactor	2-Pos Actuator	Elect/PneuTransducr	Electric Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	Equipment Status	Maintenance	Pressure	High Limit	Low Limit			Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend	Equipment Integration	Lighting Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Manual Changeover	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Body Cooler																																															
Temperature							X																												X	X											
Humidity							X																												X	X											
Low Temp Alarm												X																								X											
High Temp Alarm												X																								X											
High Humidity Alarm												X																								X											
General Alarm												X																								X											
Body Freezer																																															
Temperature							X																												X	X											
Humidity							X																												X	X											
Low Temp Alarm												X																								X											
High Temp Alarm												X																								X											
High Humidity Alarm												X																								X											
General Alarm												X																								X											
Fume Hoods																																															
Fume Hood - Room 132																																															
Alarm												X																																			
Pressence Sensor												X																							X												
Fume Hood - Room 133												X																																			
Alarm												X																																			
Pressence Sensor												X																							X												
Building DP Sensors																																															
DP Sensor - Office to Lab Area																	X																		X												
DP Sensor - Lab Area to Intake																	X																		X												
DP Sensor - Lab Area to Garage																	X																		X												

DDC INPUT / OUTPUT SUMMARY TABLE

PROJECT: Medical Examiner Office Bldg	HARDWARE																				SOFTWARE																										
LOCATION: Madison, WI	OUTPUT								INPUT												ALARMS																										
	DIGITAL				ANALOG				DIGITAL						ANALOG						DIGITAL			ANALOG				ENERGY MANAGEMENT SYSTEM FUNCTIONS																			
SYSTEM: Miscellaneous Points POINT DESCRIPTION	Control Relay	Solenoid	Contactor	2-Pos Actuator	Elect/PneuTransducr	Electric Actuator	4-20 mA	0-10 VDC	Current Sensing Switch	Control Relay Contact	Switch Closure	Auxiliary Contact	Diff Pressure Switch	Flow Switch	Temperature	Relative Humidity	Differential Pressure	Gauge Pressure	Static Pressure	Flow	Equipment Status	Maintenance	Pressure	High Limit	Low Limit			Day/Night Setback	Demand Limiting	Dial-up I/O	Duty Cycling	Optimum Start/Stop	Scheduled Start/Stop	Totalization	Trend	Equipment Integration	Lighting Integration	Fire Alarm Integration	Security/Access Integration	Elect PQM Integration	Chiller Integration	Manual Changeover	HW/OA Reset	CHW Reset	Smoke Control	Fire Alarm Override	Comments
Humidifier (H-1)																																															
High Discharge Humidity Alarm							X															X		X																							
General Humidfier Alarm																						X														X											
Humidifier Capacity							X																												X												
Enable	X																																														
Maintenance Alarm																						X																									

SECTION 23 09 93

SEQUENCE OF OPERATION FOR HVAC CONTROLS

P A R T 1 - G E N E R A L

SCOPE

This section includes control sequences for HVAC equipment as well as equipment furnished by others that may need monitoring or control. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Description of Work
- Submittals
- Operation and Maintenance Data
- Design Criteria

PART 2 - PRODUCTS
- Not Applicable

PART 3 - EXECUTION
- General Control
- Heat Exchanger (HX-1)
- Boiler Plant
- Pumps P-3 and P-4
- Heat Exchanger (HX-2)
- Pumps P-5 and P-6
- Snowmelt System
- Chilled Water Plant
- Pumps P-12 and P-13
- In-Floor Radiant Pump System (P-8)
- In-Floor Radiant Pump System (P-9)
- Rooftop Air Handling Unit (AHU-1)
- Rooftop Air Handling Unit (AHU-2)
- Rooftop Air Handling Unit (AHU-3)
- Air Handling Unit and Exhaust F and (AHU-4 and EF-4)
- Office Area – VAV Terminal Unit with Reheat and In-Floor Radiation
- Lab/Autopsy Area – VAV Terminal Unit with Reheat and In-Floor Radiation and Exhaust Valve
- Chiller Room Ventilation (EF-5 and UH-9)
- Exhaust Fan (EF-1)
- Exhaust Fan (EF-2)
- Exhaust Fan (EF-3)
- Exhaust Fan (EF-6)
- Exhaust Fan (EF-7)
- Cabinet Unit Heaters (CUH-1 and CUH-2)
- Unit Heaters (UH-1 thru 8, UH-10)
- Convectors (C-1 and C-2)
- Emergency Generator Operation / Staging

RELATED WORK

Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

Applicable provisions of Division 1 govern work under this Section.

Section 01 91 01 – Commissioning Process
Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC – Coordination
Section 23 09 23 - Direct Digital Controls (DDC)
Division 23 - HVAC - Equipment provided to be controlled or monitored

Division 26 - Electrical - Equipment provided to be controlled or monitored

REFERENCE
Section 23 09 23 work includes furnishing and installing all field devices, including electronic sensors for the DDC of this section, equipment, and all related field wiring, interlocking control wiring between equipment, pneumatic tubing, sensor mounting, etc., that is covered in that section.
Motorized control dampers and actuators, thermowells (temperature sensing wells), automatic control valves and their actuators are also covered in Section 23 09 23.

DESCRIPTION OF WORK
Control sequences are hereby defined as the manner and method by which automatic controls function. Requirements for each type of operation are specified in this section.

Operation equipment, devices and system components required for automatic control systems are specified in other Division 23 control sections of these specifications.

Sequences for equipment controlled by Direct Digital Controls (DDC) as specified are accomplished by hardware and software provided under Section 23 09 23.

SUBMITTALS
Refer to Division 1, General Conditions, Submittals, Section 23 05 00 and Sections 23 09 23 for descriptions of what should be included in the submittals.

Shop drawings shall be provided by contractor(s) providing equipment under Sections 23 09 23. The contractor providing the DDC equipment shall provide a complete narrative of the sequence of operations for equipment that is controlled through the DDC system. The narrative of the sequence of operation shall not be a verbatim copy of the sequences contained herein, but shall reflect the actual operation as applied by the contractor.

DESIGN CRITERIA
Reference Section 23 09 23.

P A R T 2 - P R O D U C T S

Not applicable to this Section – reference Sections 23 09 23 for product descriptions.

P A R T 3 - E X E C U T I O N

CONTROL SEQUENCES

GENERAL:

SETPOINTS:
All setpoints indicated in the control specification are to be adjustable. The setpoints shall be readily available to be modified in the mechanical system software system summary (either textual or graphic based) and under the same software level as hardware points. The setpoints indicated herein are only specified as a calculated starting point (or initial system operation). It is expected that setpoint adjustments and control loop tuning shall be required to provide optimum system operation based on requirements of the building. The control contractor shall work with the balancing contractor and the Owner to provide the final system setpoint adjustments and control loop tuning after the system is in operation and building is in

use. Document all final setpoints on the as-built control drawings. Any questions regarding the intended operation of the HVAC equipment and control systems shall be referred to the HVAC design engineer through the appropriate construction communication process. The following setpoints should be used as initial setpoints unless otherwise specified in the individual control sequences or instructed by the Owner. If the contractor fails to check with the user Owner for final setpoints, they shall adjust setpoints at no additional cost.

- Occupied Space Terminal Unit Heating: 68º F
- Occupied Space Terminal Unit Cooling: 72º F
- Unoccupied Space Terminal Unit Heating: 62º F
- Unoccupied Space Terminal Unit Cooling: 82º F
- Entry Way Heating: 60° F
- Mechanical or Unoccupied Space Ventilation: 82º F
- Mechanical or Unoccupied Space Heating: 60º F

ANTI-CYCLING:

When HVAC equipment or a sequence is specified to be started and stopped by a temperature, humidity, pressure setpoint or any other controlled variable, there shall be an adjustable differential setpoint that shall be set to prevent short cycling of the systems and equipment due to minor changes in the controlled variable. Temperature differential setpoints shall be set at 2º F and non-temperature setpoints shall be set at 10% of the controlled range unless otherwise specified. Setpoints shall indicate at when the process should be turned on. Heating and cooling differentials shall be set for above setpoint and will be used to turn the process off. For example, an economizer sequence called to switch at 68º F, would turn on at 68º F and off at 70º F since it is a cooling function. A heating lockout setpoint of 50º F would turn on heating control at 50º F and off at 52º F Non-temperature differentials shall be set above setpoint if the setpoint is indicating a minimum value or below setpoint if the setpoint is indicating a maximum value. Provide minimum runtime timers for loads that are cycled to prevent over-cycling. Timers shall be set as specified or as needed to prevent damage or excessive wear to the equipment. Unless otherwise specified in the individual control sequences, fans and pumps shall have a minimum runtime on timers of 15 minutes (adj.) and off timers of 5 minutes (adj.). Safeties shall override runtime timers.

DEADBANDS:

Provide deadbands for all DDC control loops to prevent constant hunting of output signals to controlled devices. Deadbands shall be set to provide adequate control around setpoint as follows unless otherwise specified in the individual control sequences:

- Temperature Control: ±0.5º F
- Humidity Control: ±1% RH
- Airflow Control: ±2% of total flow
- AHU Static Pressure Control: ±0.01 in. w.c.

ALARMS:

Provide all alarmed points with adjustable time delays to prevent nuisance tripping under normal operation and on equipment start-up. For all commanded outputs that have status feedback, provide an alarm that will indicate the commanded output is not in its commanded state. Provide alarms on all points as indicated on point charts. For existing campus automations systems, add/delete what is called on the point charts for after consultation with user Agency to provide consistent alarming throughout the automation system.

For devices that have form “C” contacts available for alarm monitoring, use closed contacts for the Normal condition and open contacts on Alarm condition. This will provide a level of supervision by detecting a break in the wiring.

EQUIPMENT START/STOP FAILURE STATES:

All start/stop points for equipment shall utilize normally open contacts unless called out specifically in the individual control sequences.

LEAD/LAG SEQUENCING:
For sequences that call for lead/lag of equipment connected to building automation systems, the lead device shall be able to be chosen through a selectable day of the week and time of day through the building automation system. Coordinate with the user Agency for scheduling switchover and frequency. Unless otherwise directed, switchover shall occur at 10AM Tuesday and shall rotate the lead device on a weekly cycle rotating through all devices sequentially. For standalone lead/lag sequence controllers (non-DDC), the lead device shall be selected by a switch on the panel face.

VARIABLE FREQUENCY DRIVE (VFD) MOTOR RUN STATUS:
Use the VFD programmable relay dry contact output specified to be provided with the VFD under Section 23 05 20 to prove motor run status and detect belt loss or coupling break. If a bypass contactor is provided with the VFD, provide an adjustable current switch and wire it in parallel with the VFD output for proving motor status.

VFD BYPASS & SAFETY INTERLOCKS:
VFD's equipped with bypass starters shall be interlocked so that the start/stop and safety circuits that are called out for VFD operation shall be functional when the VFD is indexed to the bypass starter mode. Unless otherwise specified in the sequence below, the switch from inverter to bypass starter modes shall be through a manual switch provided on the VFD/bypass starter package.

VFD MINIMUM SPEED & RAMP TIMERS:
The VFD start-up technician shall work with the DDC Temperature Control Contractor determine the minimum speed required for the motor controlled by the VFD to provide cooling of the motor as installed to prevent heat related problems. This minimum speed shall be set in the VFD controller. The VFD start-up technician shall work with the DDC Temperature Control Contractor to set the acceleration and deceleration timers in the VFD controller at 30 seconds for motors less than 40 HP and 60 seconds for motors 40 HP and greater.

CURRENT SWITCH SETUP:
When current switches are used for proving fan or pump status, they shall be set up so that they will detect belt or coupling loss by the reduction in current draw on loss of coupled load. The current switch set up shall be redone by the 23 09 23 contractor after the balancer is complete.

DAMPER INTERLOCKS FOR FANS WITH VFD'S:
For fan systems with VFD's and shutoff dampers specified with end switches, hardwire interlock the shutoff damper with the fan VFD. When the fan is remotely or locally commanded to start, VFD contacts shall energize damper actuator to open damper. The damper position end switch shall be wired to run permissive input on the VFD and enable the VFD to start when the damper position end switch provides the damper is open. This operation shall be provided for VFD and bypass operation if the VFD is provided with a bypass. The damper end switch shall also be monitored by the DDC system. For fan systems that are ducted in parallel, see specific sequence for fan system on additional interlock requirements.

FAN INTERLOCKING:
Provide interlocks between supply and return or exhaust fan systems as scheduled on the plans or called out in individual control sequences. If DDC controlled, interlocks shall be done through DDC start/stop points unless otherwise specified in individual control sequences. If not DDC controlled, interlocks shall be accomplished via hardwire interlocks between fan starters or VFD's.

THERMOSTATS AND SENSORS:
All devices and equipment including terminal units, specified to be controlled in a control sequence by a thermostat or sensor, shall be provided with a thermostat or sensor, whether or not the device is indicated on the plans. Consult the HVAC design engineer for the thermostat or sensor location.

ORIGINAL EQUIPMENT MANUFACTURER (OEM) CONTROLLER DDC INTEGRATION:

Provide DDC programming to define all equipment integral input/output points, setpoints, data points, calculations, etc. that are available through the manufacturers communication interface. Consult with the Agency DDC operations personnel to determine if some of the points should be omitted (for clarity or lack of value). The following equipment shall be integrated into the DDC system:

- Boilers
- Chillers
- Pumps with Integral Variable Frequency Drives.
- Variable Frequency Drives
- Laboratory Fume Hood Control
- Computer Room Air Conditioners
- BTU / Energy Meters

WATCH DOG TIMER

Where the integrated system consists of programmable DDC controllers with BACnet objects mapped to an enterprise level Building Automation System (BAS) and it is shown that the BACnet objects do not indicate when they are offline on the enterprise level BAS when communication is lost between the two systems, software algorithms shall be provided to alarm when communication is lost. The integrated system shall program a binary data object that is toggled on and off at an adjustable rate (initially one minute) that shall be monitored by the enterprise level BAS which shall alarm if the toggling ceases.

WEEKLY SCHEDULING

Provide scheduling of DDC terminal units in groups based on occupancy. Work with the user Agency to determine how many groups are required and which zones should be included. Individual terminal units shall be able to receive temporary schedules that will override the group schedules. Temporary override buttons at the zone sensor (where specified on point charts) shall override the scheduling to occupied. When groups that consist of more than 20% of terminal units are indexed to occupied, the associated air handling unit shall start if not already running.

DDC CONTROLLER COMMUNICATION BUS CONFIGURATION

The actively controlled primary mechanical equipment (AHU's, hot water, chilled water, boilers, etc.) DDC controllers shall be configured to be located on the same supervisory controller BACnet MSTP communication trunk unless the supervisory controller capacity prevents it. If this is the case, the primary mechanical equipment DDC controllers shall be separated onto supervisory controllers in such a way that the systems that need to share information for operation and interlocking shall reside on the same supervisory controllers. When AHU systems have associated exhaust fan systems that are interlocked and designed to operate together as a combined air system within a building, these must be on the same BACnet MSTP trunk. Peer to peer communication shall be used for interlocks and data sharing between the AHU and exhaust fans systems when possible to limit air system disruptions in the event of a supervisory controller failure. Other critical building systems that require communication between DDC controllers to operate shall be on the same BACnet MSTP communication trunk. Terminal unit controllers shall be located on a separate BACnet MSTP trunks if necessary to allow for primary equipment to reside on the same BACnet MSTP trunk. If the DDC controllers used for control of primary mechanical equipment and interlocks or point information is required for proper operation as described above do not use BACnet MSTP communication but use Ethernet communication, the DDC controllers shall be connected to the same Ethernet switch. If the controllers cannot be connected to the same switch, hardwired points between controllers shall be used to share information.

CONTROLLED VARIABLE REQUIREMENTS

All controlled variables, i.e. static pressure, differential pressure, temperature, humidity, etc., shall be wired directly to the DDC controller in which the software PID loop or other similar software loop resides unless the control sequence specifically allows the controlled variable to be routed over the network. Where a controlled variable is used for reset of a PID loop, the controlled variable shall be allowed to be shared over the network unless specified to be directly wired to the DDC controller.

CALCULATED DATA POINTS

Provide a calculated data point for outside airflow for all fans that have return and outside air mixing dampers and the points required to allow for the following equation:

- Outside Airflow = Supply CFM x (MAT-RAT)/(OAT-RAT)

Where Supply CFM is measured either on variable volume fans or as balanced on constant volume units, MAT is Mixed Air Temperature, RAT is Return Air Temperature, and OAT is Outside Air Temperature. This point is designed as a check for outside air flow stations accuracy and outside air ventilation minimum damper positions. It should be noted that the accuracy of the calculated outside airflow will diminish as outside air temperature approaches return air temperature. It should be used as a check only when the RAT and OAT are greater than 20 DegF and the accuracy of the RAT and OAT temperature sensors are assured.

HEAT EXCHANGER (HX-1):

This is a "site" hot water to "building" hot water heat exchanger.

This water to water heat exchanger system consists of:

- Plate and frame heat exchanger.
- Temperature sensors:
  - Site HWS (inlet of HX).
  - Site HWR (outlet of HX).
  - Building HWS (outlet of HX).
  - Building HWR (in main loop piping).
- Modulating 2-way temperature control valve (fail to heat exchanger) for "site" hot water (waste heat from site generator reclaim system).
- Two position 2-way temperature control valve (fail closed) for building hot water.
- Water flow and BTU management station on "site" side of heat exchanger.

The 2-way control valve on the "site" side of the heat exchanger shall modulate to maintain a minimum 180°F (Adj.) leaving (building) water temperature from the heat exchanger. The 2-way valve (site) shall have a minimum position of 10%open to maintain flow from the waste heat loop.

On a rise in "building" return water temperature the control valve (site) shall modulate closed. When the building return water temperature drops below setpoint the valve shall modulate open.

The control valve (site) shall fail to full flow through the heat exchanger.

The "building" hot water supply setpoint shall be 180°F (adj.) at an outside air dry bulb reference temperature of 10° F (adj.) and shall be reset to 140°F (adj.) at an outside air dry bulb reference temperature of 60° F (adj.).

The 2-way, 2-position control valve on the "building" hot water shall be closed whenever "Site" hot water is available (flow and temperature) and the "site" hot water is at least 5°F (adj.) above the "Building" return hot water temperature.

If "site" hot water is not available, or if the "site" hot water temperature is less than 5°F (adj.) above the "building" return hot water temperature, the building valve shall be open to bypass HX-1.

If the "building" hot water supply temperature exceeds 210º F (adj.) the building automation system shall send an alarm and the "site" 2-way control valve shall modulate closed.

The building automation system shall trend site hot water usage thru the BTU management system.

BOILER PLANT

The boiler plant consists of:

- (2) Modular high efficiency modulating boilers (B-1 and B-2)
- (2) constant volume in-line primary boiler pumps (P-1 and P-2)
- 2-way, 2 position natural gas emergency shutdown valve (normally open).
- Natural gas emergency shutdown switch with pilot light.

The hot water boiler plant is a back-up heating system to heat exchanger (HX-1). When HX-1 cannot maintain system setpoint temperature for any 15 minute period (adj.), or when the 2-way valve bypasses water thru HX-1 is open, the boiler plant shall be enabled.

If the 2-way valve forcing water thru HX-1 closes, the boiler plant shall be disabled.

Boiler (B-1 & B-2) shall be indexed and sequenced by the building automation system. The building automation system shall:

- Energize and stage the boiler plant operation.
    - On a call for boiler plant operation with HWS temperature below setpoint, the lead boiler shall energize and fire up to 80% capacity. Upon exceeding 80% capacity, the lag boiler shall also energize, the lead boiler shall reduce capacity and both boilers shall modulate in parallel. The opposite shall occur when the HWS temperature is above setpoint.
- Rotate boiler operation for maintenance and to equalize operating hours.
- Provide alarm signals through BAS on any boiler fault.

The BAS shall provide the boiler plant, when enabled, with the desired hot water supply temperature as described under the control sequence for HX-1.

The primary inline pump for each boiler shall be interlocked and controlled by the building automation system. When water flow is proved in the boiler, the boiler burner shall be enabled and shall fire as required. Provide a current sensor for each pump to provide pump operation.

Upon a manual initiation of the emergency natural gas shutdown switch, the emergency natural gas shutdown valve shall close.

This Contractor shall be responsible for installing and providing complete control wiring for the installation.

PUMPS P-3 AND P-4

These pumps serve the building hot water heating loop.

This system consists of:

- Base mounted variable volume pump P-3 with associated variable frequency drive (VFD-1).
- Base mounted variable volume Pump P-4 with associated variable frequency drive (VFD-2).
- System differential pressure sensor.
- Modulating 2-way by-pass valve.
- Temperature sensor
    - HWS to building (downstream of boiler plant).

These pumps operate in a 100% standby (lead/lag) arrangement and shall be controlled by the DDC system.

Start/Stop: The DDC system shall start the lead pump whenever the outside air temperature is below 60º F (adj) or on a call for system VAV reheat or infloor heating. The lag pump shall normally remain off. The hot water pump start/stop relays shall utilize normally closed contacts so upon failure of the relay or DDC controller the pump will fail on.

Lead / Lag Control: Current status switches, either integral to the VFD and/or discreet devices, shall prove lead and lag pump operation. If the lead pump is called to run and the current status switch indicates that the lead pump is not operating for 30 seconds (adj.), an alarm shall be sent to the operator interface and the BAS shall start the lag pump. Upon sensing the lead pump is operating, the lag pump shall be stopped. The DDC system shall index the lag pump to become the lead pump through weekly scheduling feature of the building automation system. The BAS shall also allow for manual lead/lag selection between the two pumps.

Speed Control: Install a differential pressure sensor across the supply and return piping at the point in the system with the highest pressure drop as indicated on plans. The DDC system shall control the operating pump VFD to maintain a setpoint as described below.

Constant Differential Pressure Setpoint Control: The operating pump VFD shall be modulated to maintain a constant setpoint of 10 psig (adj.) at the differential pressure sensor. Final setpoint shall be optimized by the Balancing Contractor.

By-Pass Valve Control:
Provide modulating, 2-way bypass control valve at remote location in system for minimum pump flow maintenance. Control valve shall be set to maintain pressure at 5 ft (adj) above differential pressure setpoint. As pressure increases to 5 ft above differential pressure setpoint, valve shall modulate open. On a decrease in pressure, valve shall modulate closed.

HEAT EXCHANGER (HX-2):
This is a "building hot water" to "building glycol water" heat exchanger.

This water to water heat exchanger system consists of:

- Plate and frame heat exchanger.
- Temperature sensors:
  - Glycol HWS (outlet of HX).
  - Glycol HWR (inlet of HX).
  - Building HWR (outlet of HX).
- Modulating 2-way temperature control valve (fail to heat exchanger) for building hot water.

The 2-way control valve on the "building hot water" side of the heat exchanger shall modulate to maintain a minimum 175°F (Adj.) leaving (building glycol) water temperature from the heat exchanger.

On a rise in "building glycol) return water temperature the control valve (site) shall modulate closed.
When the building return water temperature drops below setpoint the valve shall modulate open.

The control valve (site) shall fail to full flow through the heat exchanger.

The building glycol water supply setpoint shall be 175° F (adj.) at an outside air dry bulb reference temperature of 10° F (adj.) and shall be reset to 140° F (adj.) at an outside air dry bulb reference temperature of 60° F (adj.).

If the "building glycol" water supply temperature exceeds 210º F (adj.) the building automation system shall send an alarm and the "building hot water" 2-way control valve shall modulate closed.

PUMPS P-5 AND P-6
These pumps serve the building chilled water loop.

This system consists of:

- Inline variable volume pump P-5 with associated variable frequency drive (VFD-3).
- Inline variable volume Pump P-6 with associated variable frequency drive (VFD-4).
- System differential pressure sensor.

These pumps operate in a 100% standby (lead/lag) arrangement.

Start/Stop: The DDC system shall start the lead pump whenever the outside air temperature is below 60º F (adj). The lag pump shall normally remain off. The glycol water pump start/stop relays shall utilize normally closed contacts so upon failure of the relay or DDC controller the pump will fail on. Glycol water pumps shall be commanded off if all associated AHU's and unit heaters are off and the outside air temperature is above 60º F.

Lead / Lag Control: Current status switches, either integral to the VFD and/or discreet devices, shall prove lead and lag pump operation. If the lead pump is called to run and the current status switch indicates that the lead pump is not operating for 30 seconds (adj.), an alarm shall be sent to the operator interface and the DDC system shall start the lag pump. Upon sensing the lead pump is operating, the lag pump shall be stopped. The DDC system shall index the lag pump to become the lead pump through weekly scheduling feature of the building automation system.

Speed Control: Install a differential pressure sensor across the supply and return piping at the point in the system with the highest pressure drop as indicated on plans. The DDC system shall control the operating pump VFD to maintain a setpoint as described below.

Constant Differential Pressure Setpoint Control: The operating pump VFD shall be modulated to maintain a constant setpoint of 10 psig (adj.) at the differential pressure sensor. Final setpoint shall be optimized by the Balancing Contractor.

SNOWMELT SYSTEM

This system provides snowmelt to areas of exterior pavement.

This system consists of:

- Inline constant volume pump P-7.
- 3-way modulating mixing valve
- (4) exterior slab mounted temperature/moisture sensors.
- Temperature Sensors:
  - Glycol HWS (to exterior slab)
  - Glycol HWR (from exterior slab)
- Pump pressure switch.

On a call for slab heating from any of the (4) moisture sensors, the building automation system shall start associated pump P-7. The 3-way modulating temperature control valve shall modulate to maintain a constant snowmelt glycol water supply temperature of 130°F (adj.).

During snowmelt operation, the system shall operate to maintain a slab temperature of 36°F (adj.), as averaged by the (4) sensors.

The setpoint shall be 130° F (adj.) at an outside air dry bulb reference temperature of 0° F (adj.) and shall be reset to 105° F (adj.) at an outside air dry bulb reference temperature of 25° F (adj.).

Provide a pressure differential switch to prove pump operation. Should the pump fail to start within 60 seconds of being enabled by the building automation system, send an alarm.

If the outside air temperature is -5°F (adj.) or below, the system shall not be permitted to operate.

If the outside air temperature is above 40 deg F, the snowmelt system shall not be allowed to operate. If the slab temperature is above 50 deg F, and no precipitation is falling, the snowmelt system shall not be allowed to operate.

CHILLED WATER PLANT

This system provides cooling to the building and data room.

The central chiller plant consists of:

- One indoor mounted air cooled screw chiller.
- One outdoor mounted refrigerant condensing unit.
- Two primary constant volume inline chilled water pumps (P-10 and P-11)
- Temperature sensors:
    - CWS (to building).
    - CWR (from building).

The primary pumps operate in a 100% standby (lead/lag) arrangement.

Chiller Point Integration: The chiller will be integrated into the DDC system through the communication method specified in the chiller specification. Provide DDC programming to define all chiller input and output information available through the chiller manufacturer's integration data port.

Primary pump system lead/lag selections: One primary pump and one secondary chilled water pumps will be designated as lead and standby by the chiller unit mounted controls.

Chiller Enable: When outside air temperature is greater than 50 ºF (adj.), or on a call for cooling by AHU-1, AHU-2 or AHU-3, the chiller shall be enabled. The chiller unit mounted controls shall start the lead primary chilled water pump. The chiller unit mounted controls shall monitor its evaporator flow and safety statuses and shall provide a chiller failure alarm in the event of a flow or safety failure.

The chiller unit mounted controls shall modulate chiller capacity to maintain chilled water supply setpoint temperature 42 ºF (adj.)

Condensing Unit Control: The chiller unit mounted controls shall control the associated refrigerant condensing unit.

If the lead primary pump is called to run and the current status switch indicates that the lead pump is not operating for 30 seconds (adj.), an alarm shall be sent from the chiller unit mounted controls to the building automation system and the chiller unit mounted controls shall start the lag pump. Upon sensing the lead pump is operating, the lag pump shall be stopped.

The chiller mounted controller shall index the lag pump to become the lead pump through weekly scheduling.

PUMPS P-12 AND P-13

These are secondary chilled water pumps for building and data room cooling.

The secondary pumps consist of:

- Base mounted pump P-12 with associated variable frequency drive (VFD-5).
- Base mounted Pump P-13 with associated variable frequency drive (VFD-6).
- System differential pressure sensor.

These pumps operate in a 100% standby (lead/lag) arrangement.

Secondary Chilled Water Pump Control: Start/Stop: The DDC system shall enable the secondary chilled water pump when a chiller status is on. The chilled water pump start/stop relays shall utilize normally open contacts so upon failure of the relay or DDC controller the pump will fail off.

Lead / Standby Control: Current status switches, either integral to the VFD and/or discreet devices, shall prove lead and standby pump operation. If the lead pump is called to run and the current status switch indicates that the lead pump is not operating for 30 seconds (adj.), an alarm shall be sent to the operator interface and the DDC system shall start the standby pump. The DDC system shall index the lead pump through weekly scheduling feature of the building automation system or manually as determined by the chiller plant operator.

System Differential Pressure Control: The secondary chilled water pump shall be started first and shall be modulated to maintain a differential pressure setpoint at the lowest reading differential pressure sensor. Final setpoint shall be optimized by the Balancing Contractor. The DDC system shall maintain a differential pressure setpoint as described below.

Constant Differential Pressure Setpoint Control: The operating pump VFD shall be modulated to maintain a constant setpoint of 10 psig (adj.) at the differential pressure sensor. Final setpoint shall be optimized by the Balancing Contractor.

IN-FLOOR RADIANT PUMP SYSTEM (P-8)

This system provides radiant floor heating to areas served by AHU-2.

This system consists of:

- Inline variable volume pump P-8 with integral speed control.
- 3-way modulating mixing valve
- Temperature Sensors:
  - HWS (to floor slab)
  - HWR (from floor slab)
- Pump pressure switch.

The radiant pump shall be controlled by the BAS and shall operate on a call for heat by any radiant floor zone. The pump internal variable frequency drive shall modulate pump speed to maintain the system pressure required to satisfy system flow.

The modulating 3-way mixing valve shall maintain 105°F (adjustable) supply water temperature setpoint to the radiant floor.

IN-FLOOR RADIANT PUMP SYSTEM (P-9)

This system provides radiant floor heating to areas served by AHU-1.

This system consists of:

- Inline variable volume pump P-8 with integral speed control.
- 3-way modulating mixing valve
- Temperature Sensors:
  - HWS (to floor slab)
  - HWR (from floor slab)
- Pump pressure switch.

The radiant pump shall be controlled by the BAS and shall operate on a call for heat by any radiant floor zone. The pump internal variable frequency drive shall modulate pump speed to maintain the system pressure required to satisfy system flow.

The modulating 3-way mixing valve shall maintain 105°F (adjustable) supply water temperature setpoint to the radiant floor.

ROOFTOP AIR HANDLING UNIT (AHU-1):

This is a rooftop mounted variable air volume air handling system controlled by the BAS.

The system consists of:

- Supply fan with variable frequency drive (VFD-7).
- Return Fan with variable frequency drive (VFD-8).
- Motorized modulating outside air damper (fail closed) (damper furnished by 23 73 13, actuator by 23 09 14).
- Motorized modulating return air damper (fail open) (damper furnished by 23 73 13, actuator by 23 09 14).
- Motorized modulating relief air damper (fail closed) (damper furnished by 23 73 13, actuator by 23 09 14).
- Chilled water cooling coil with modulating 2-way temperature control valve (fail closed).
- Hot water heating coil with modulating 2-way temperature control valve (fail open).
- Heating coil freezestat.
- Return air duct smoke detector.
- Sensors:
    - Supply duct discharge air temperature sensor.
    - Preheat coil discharge air temperature sensor.
    - Mixed air temperature sensor.
    - Return air temperature sensor.
    - Return air humidity sensor.
    - Supply duct static pressure sensor.
    - Supply duct high static limit sensor.
    - Supply duct low static limit sensor.
    - Return duct static pressure sensor.
    - Return duct high static limit sensor.

FAN CONTROL:

Start/Stop: The DDC system shall start the supply and return fan via the VFD.

Current Status Switch: Provide as described under GENERAL, VFD Motor Run Status, in this Section for both the supply and return fans.

Supply Fan Speed Control: The purpose of the supply fan control is to maintain a minimum static pressure in the supply ductwork to insure proper terminal air box operation. Install a static pressure sensing probe in the main supply duct located at approximately 3/4" of the way down the main supply duct as shown on the plans and pipe to the differential pressure transmitter that shall be located in the unit temperature control panel. The inputs to the differential pressure transmitter shall be the static pressure inside of the duct and the reference input shall sense the actual space served by the air system located in the ceiling below the duct probe. The DDC system shall modulate the supply fan VFD to maintain the static pressure setpoint as sensed by the static pressure sensor. If multiple supply fans are used, the same speed signal will be sent to all operating fans unless the fan is in start or stop mode as described above. If multiple sensing locations are shown, the DDC system shall maintain the static pressure setpoint at the lowest reading sensor. If the static sensors deviate by more than 0.5 in. w.c. (adj.), an alarm shall be sent through the DDC system. Static pressure setpoint shall be as described in the Static Pressure Reset Control below.

Static Pressure Reset Control: Static pressure setpoint shall be reset using Trim & Respond logic within the range 0.15 in. w.c. to 1.3 in. w.c. When the fan is off, the setpoint shall be reset to 0.8 in. w.c. (adj.) and this setpoint shall be used on system start up While the fan is proven on, every two minutes, trim the setpoint by 0.04 in. w.c. if there are two or fewer zone pressure requests. If there are more than two zone pressure requests, respond by increasing the setpoint by 0.06 in. w.c.

A zone pressure request is generated when a VAV damper is greater than 95% open until it drops to 80% open. Provide a binary data enable point for each zone to enable/disable the zone damper in the trim and

respond algorithm. All setpoints, timers, and zone pressure request threshold for the static pressure reset shall be adjustable. Tune the reset to prevent cyclic instability after the space is occupied. Provide a trend graph to show the relative stability of the static pressure setpoint. Final maximum setpoint shall be determined by the Balancing Contractor to satisfy the worst case zone at maximum design condition.

When more than 10% of the air terminals are indexed to occupied and the static pressure setpoint is below the fan start static setpoint, reset the static pressure to the fan start setpoint and release to trim and respond control. This is to prevent slow system recovery on scheduled start-up.

Return Fan Speed Control: The purpose of the return fan control is to maintain a slightly positive building pressure. The return fan VFD shall modulate to maintain a constant CFM offset 960 CFM (adj.) from the supply fan to account for total exhaust from the area in which it serves while maintaining a positive pressure in relation to AHU-2. The sum of all the air terminal VAV boxes shall be used as the supply CFM total.

Minimum Ventilation Air Flow Control:
Fixed Ventilation Air Flow Setpoint: The AHU outside air ventilation rate shall be maintained at 960 CFM. (The Office Area is to be positive to the Lab Area by 400 CFM)

Minimum Ventilation Air Flow Control Using Volume Matching: The minimum outside air damper position will be reset between a high minimum position and a low minimum position reset from the full design turndown fan speed and maximum fan speed. The Temperature Control Contractor shall work with the Balancing Contractor to determine these damper position setpoints to provide an even mixed air static pressure over the full range of fan turndown.

Install a temperature sensor in the supply duct downstream of the supply fan, all water coils and humidifiers.

Discharge Air Temperature Setpoint: Discharge air temperature setpoint shall be 55º F (adj.).

Discharge Air Temperature Control: The heating coil and cooling coil shall be controlled to maintain the discharge air setpoint temperature. At no time shall the heating coil be operating when the chilled water coil valve is open.

Preheat Coil Discharge Air Temperature Control – Normal Operation: The heating control valve (FO) shall modulate to maintain 55°F (adj.) at probe type sensor located in the supply duct downstream of the AHU. The preheat coil control valve shall be locked in the closed position whenever outside air temperature is above 55°F (adj.) for 10 consecutive minutes (adj.)

Preheat Coil Discharge Air Temperature Control – AHU- Not Running Operation: The Preheat coil discharge air temperature control sensor located immediately downstream of preheat coil shall modulate preheat coil control valve to maintain 52°F (adj.) preheat coil discharge air temperature anytime AHU is not running and safety low temperature limit control (freezestat) is not in alarm.

Cooling Coil Discharge Air Temperature Control: Cooling coil control valve (FC) shall modulate to maintain unit discharge air temperature of 55°F (adj.) via probe type sensor located in the supply duct downstream of the unit discharge. In the cooling mode when the outside air temperature is above 50°F (adj.) as unit discharge air temperature increases, cooling coil control valve shall modulate open to maintain unit discharge air temperature setpoint. The reverse shall occur as unit discharge air temperature decreases. Cooling coil control valve shall be locked in the closed position whenever outside air temperature is below 50°F (adj.) for 10 consecutive minutes (adj.) or whenever associated supply fan is not operating.

Dehumidification Control: Override the cooling coil valve position open to maintain a return air humidity of 60% RH (adj.). Lockout this control when outside air is below 55º F.

Economizer Control: Provide dry bulb economizer control. Whenever outside air dry bulb temperature exceeds the return air temperature plus 4°F (adj.), economizer control shall override mixed air control and modulate AHU-1 outside economizer damper closed.

Economizer control shall be released to mixed air control when outside air dry bulb temperature is less than return air temperature minus 5°F (adj.) for 10 consecutive minutes (adj.)

Mixed Air Temperature Control: The unit includes a single modulating outside air damper, modulating return air damper, and modulating outside air damper. The modulating outside economizer air damper shall be enabled as determined by the economizer mode sequence stated above. The economizer outside air damper and the return air damper shall be controlled by the mixed air temperature controller with averaging type sensor located at the upstream side of the pre-filter to maintain mixed air temperature of 52°F (adj.). As the mixed air temperature decreases, the outside air damper shall close and the return air damper shall open to maintain the mixed temperature setpoint. The reverse shall occur as mixed air temperature increases. The return air damper position may not be proportionally opposite of the outside air damper. Final test and balancing will need to determine the position of the return air damper in order to keep the relief air static pressure positive in all scenarios (min/max CFM).

Relief Air Damper Control: A static pressure control with its pressure transmitter located in the return duct at least three feet from the fan discharge and upstream of the control damper, shall modulate the relief air damper (FC) to maintain initial relief static pressure setpoint of 0.6” WC (adj.). On a drop in return static pressure below setpoint, as measured by the return system static pressure transmitter, relief damper shall modulate closed until return static pressure setpoint has been satisfied. On rise in return static pressure above return system static pressure setpoint, relief damper shall modulate open until return static pressure setpoint is satisfied. Control contractor shall work in association with test and balance contractor to determine actual required static pressure setpoint. Setpoint indicated is to be used for initial system startup. Actual static pressure shall be minimum static pressure required to achieve system design flow.

General Safeties Note: All safeties shall be hard wired to the supply and return fan starters or VFD safety circuits. Starters shall not function in the “Hand” or “Auto” and VFD’s shall be disabled if they are indexed to the “Auto” or “Hand” position in either the VFD or bypass modes.

Freezestat: Install an electric freezestat to shut down the unit (see Unit Shutdown for additional information) if the temperature downstream of the heating coil drops below 35º F (adj.). The electric freezestat shall act independently of the DDC system via hardwire interlock and shall override the DDC system control signal to open the heating coil control valve(s) to maintain an 80°F (adj.) preheat coil discharge air temperature setpoint. The cooling coil control valve shall fully open upon a trip of the freezestat. A freezestat trip shall notify the DDC system that shall send an alarm to the operator interface.

Supply Fan High Pressure Limit: Install a static pressure probe located in the air handling unit main discharge duct at least six feet or as far as physically possible downstream of the fan and upstream of any dampers and pipe to a differential pressure switch located in the temperature control panel. Wire in series with the safety circuit of the supply and return fan. Differential pressure switch shall be a manual reset type and the DDC system shall monitor the status of the differential pressure switch. Initial setpoint shall be +4.0" w.c. (adj.)

Return Fan High Pressure Limit: Install a static pressure probe located in the discharge duct at least six feet or as far as physically possible downstream of the fan and upstream of any dampers and pipe to a differential pressure switch located in the temperature control panel. Wire in series with the safety circuit of the supply and return fan. Differential pressure switch shall be a manual reset type and the DDC system shall monitor the status of the differential pressure switch. Initial setpoint shall be +2.0" w.c.

Supply Fan Low Pressure Limit: Install a low static suction pressure safety switch between the inlet of the supply fan and the cooling coil and wire in series with VFD safety circuit to stop the supply fan. The pressure switch shall be adjusted to -2.0” WC (adj.). The status of the pressure switch shall be wired to the

BAS system for alarming. The pressure switch must be manually reset locally before the air handling unit can be restarted. Low static pressure safety switch shall be functional in VFD mode of operation.

Return Fire Alarm Shutdown: Upon a Fire Alarm System alarm, the fire alarm control module provided by the electrical contractor at the temperature control panel shall change state of its contacts. This shall cause the unit to be shut down (see Unit Shutdown for additional information). An auxiliary contact shall be provided to notify the DDC system of a fire alarm shutdown.

Unit Shutdown: Whenever the air handling unit is indexed off, the supply and return fans shall stop, outside air damper shall close, return damper shall fully open, relief damper shall close, chilled water valve shall close, heating coil valve shall remain under control to maintain a 52ºF (adj.) temperature at the preheat discharge air sensor.

If an AHU supply fan failure occurs, as detected by a current switch, or VFD fault indication from VFD output, the fan shall be stopped and an alarm shall be annunciated at the BAS. This alarm interlock shall be disabled for 60 seconds (adj.) after the fan is initially commanded to start. Upon failure the following shall occur:

- The outside air dampers and relief air dampers shall fully close.
- The return air damper shall fully open.
- The return fan shall be commanded to stop.
- The chilled water control valve shall close
- The heating coil control valve shall remain under control from the preheat discharge air temperature sensor to maintain 52°F (adj.)

When failed AHU fan is reset through BAS, AHU shall restart as indicated above.

If return fan failure occurs, as detected by a current switch, or VFD fault indication from VFD output, the AHU shall be stopped and an alarm shall be annunciated at the BAS. This alarm interlock shall be disabled for 60 seconds (adj.) after the fan is initially commanded to start. Upon failure the following shall occur:

- The outside air dampers and relief air dampers shall fully close.
- The return air damper shall fully open.
- The supply fan shall be commanded to stop.
- The chilled water control valve shall close
- The heating coil control valve shall remain under control from the preheat discharge air temperature sensor to maintain 52°F (adj.)

When failed AHU fan is reset through BAS, AHU shall restart as indicated above.

Unoccupied Control General Note: Occupied/unoccupied schedule shall be set at the DDC operator interface. When indexed to unoccupied the unit shall shutdown. Where provided, index DDC controlled heating and cooling terminal units associated with this air handling unit to maintain setback and setup temperature setpoints unless overridden by occupancy sensor or manual pushbutton.

Unoccupied Control - Unit Cycling to Maintain Setback/Setup Temperatures: Cycle the air handling unit on to maintain the setback and setup temperature zone setpoints to maintain 58 ºF (adj.) and 86 ºF (adj.) respectively.

Reset supply return fan volume offset for return air fan control to zero. Supply fan shall be limited to the maximum return fan airflow. In the heating mode, the outside air and relief air dampers shall fully close and the return air damper shall fully open and heating discharge temperature control shall function as specified. In the cooling mode, the economizer and chilled water discharge temperature control shall be allowed to function as specified. Minimum on runtime timer shall be set for 15 minutes (adj.) and the off timer for 30 minutes (adj.).

Monitor and Alarm: Monitor, through BAS, the following points associated with the air handling system and generate the alarms indicated:

- Unit discharge air temperature: Generate alarm if temperature exceeds setpoint by +/- 3°F (adj.) for 10 consecutive minutes (adj.)
- Preheat coil discharge air temperature: Generate alarm if temperature deviates from setpoint by -3.0°F (adj.) for 10 consecutive mintues (adj.)
- Mixed air temperature: Generate alarm if temperature goes below setpoint by 5°F (adj.) for 10 consecutive minutes (adj.)
- High Return airflow: Generate alarm is airflow exceeds setpoint by +/- 500 CFM (adj.) for 10 consecutive minues (adj.)
- Low Limit thermostat (freezestat): Generate alarm and stop AHU
- Supply fan current switch: Generate alarm if fan status proven by current switch does not match commanded state.
- Return fan current switch: Generate alarm if fan status proven by current switch does not match commanded state.
- Supply duct static pressure: Generate alarm if pressure exceeds setpoint by +/- 0.5" WC (adj.) for 5 consecutive minutes (adj.)
- Relief duct static pressure: Generate alarm if pressure goes below 0.0" WC (adj.) for 5 consecutive minutes (adj.)
- Supply discharge static pressure safety switch: Generate alarm and stop AHU if pressure exceeds 4.0" WC (adj.)
- Return discharge static pressure safety switch: Generate alarm and stop AHU if pressure exceeds 2.0" WC (adj.)
- Return suction static pressure safety switch: Generate alarm and stop AHU if pressure exceeds -2.0" WC (adj.)
- Return air smoke detector: Generate alarm and stop AHU.

ROOFTOP AIR HANDLING UNIT (AHU-2)

This is a 100% outside air variable air volume air handling system controlled by the BAS.

The system consists of:

- Supply fan with variable frequency drive (VFD-9)
  - Motorized outside air damper (fail closed) (damper by 23 73 13, actuator by 23 09 14).
  - Chilled water cooling coil with modulating 2-way temperature control valve (fail closed).
  - Hot water heating coil with modulating 2-way temperature control valve (fail open).
  - Heating coil freezestat.
  - Supply air smoke detector.
  - Sensors:
    - Supply duct discharge air temperature sensor.
    - Preheat coil discharge air temperature sensor.
    - Supply duct static pressure sensor.
    - Supply duct high static limit sensor.
    - Supply duct low static limit sensor.

FAN CONTROL:

Start/Stop: The DDC system shall start the supply and return fan via the VFD.

Current Status Switch: Provide as described under GENERAL, VFD Motor Run Status, in this Section for both the supply and return fans.

Supply Fan Speed Control: The purpose of the supply fan control is to maintain a minimum static pressure in the supply ductwork to insure proper terminal air box operation. Install a static pressure sensing probe in the main supply duct located at approximately 3/4" of the way down the main supply duct as shown on the plans and pipe to the differential pressure transmitter that shall be located in the unit temperature control panel. The inputs to the differential pressure transmitter shall be the static pressure inside of the duct and the reference input shall sense the actual space served by the air system located in the ceiling below the duct probe. The DDC system shall modulate the supply fan VFD to maintain the static pressure setpoint as sensed by the static pressure sensor. If multiple supply fans are used, the same speed signal will be sent to all operating fans unless the fan is in start or stop mode as described above. If multiple sensing locations are shown, the DDC system shall maintain the static pressure setpoint at the lowest reading sensor. If the static sensors deviate by more than 0.5 in. w.c. (adj.), an alarm shall be sent through the DDC system. Static pressure setpoint shall be as described in the Static Pressure Reset Control below.

Static Pressure Reset Control: Static pressure setpoint shall be reset using Trim & Respond logic within the range 0.15 in. w.c. to 1.3 in. w.c. When the fan is off, the setpoint shall be reset to 0.8 in. w.c. (adj.) and this setpoint shall be used on system start up While the fan is proven on, every two minutes, trim the setpoint by 0.04 in. w.c. if there are two or fewer zone pressure requests. If there are more than two zone pressure requests, respond by increasing the setpoint by 0.06 in. w.c.

A zone pressure request is generated when a VAV damper is greater than 95% open until it drops to 80% open. Provide a binary data enable point for each zone to enable/disable the zone damper in the trim and respond algorithm. All setpoints, timers, and zone pressure request threshold for the static pressure reset shall be adjustable. Tune the reset to prevent cyclic instability after the space is occupied. Provide a trend graph to show the relative stability of the static pressure setpoint. Final maximum setpoint shall be determined by the Balancing Contractor to satisfy the worst case zone at maximum design condition.

When more than 10% of the air terminals are indexed to occupied and the static pressure setpoint is below the fan start static setpoint, reset the static pressure to the fan start setpoint and release to trim and respond control. This is to prevent slow system recovery on scheduled start-up.

Ventilation Air Control: The unit is 100% outside air. Outside air damper to open prior to fan starting.

Install a temperature sensor in the supply duct downstream of the supply fan and all water coils.

Discharge Air Temperature Setpoint: Discharge air temperature setpoint shall be 48º F (adj.).

Discharge Air Temperature Control: The heating coil and cooling coil shall be controlled to maintain the discharge air setpoint temperature. At no time shall the heating coil be operating when the chilled water coil valve is open.

Preheat Coil Discharge Air Temperature Control – Normal Operation: The heating control valve (FO) shall modulate to maintain 55°F (adj.) at probe type sensor located in the supply duct downstream of the AHU. The preheat coil control valve shall be locked in the closed position whenever outside air temperature is above 55°F (adj.) for 10 consecutive minutes (adj.)

Preheat Coil Discharge Air Temperature Control – AHU- Not Running Operation: The Preheat coil discharge air temperature control sensor located immediately downstream of preheat coil shall modulate preheat coil control valve to maintain 52°F (adj.) preheat coil discharge air temperature anytime AHU is not running and safety low temperature limit control (freezestat) is not in alarm.

Cooling Coil Discharge Air Temperature Control: Cooling coil control valve (FC) shall modulate to maintain unit discharge air temperature of 48°F (adj.) via probe type sensor located in the supply duct downstream of the unit discharge. In the cooling mode when the outside air temperature is above 50°F (adj.) as unit discharge air temperature increases, cooling coil control valve shall modulate open to maintain unit discharge air temperature setpoint. The reverse shall occur as unit discharge air temperature decreases. Cooling coil control valve shall be locked in the closed position whenever outside air temperature is below 50°F (adj.) for 10 consecutive minutes (adj.) or whenever associated supply fan is not operating.

Dehumidification Control: Override the cooling coil valve position open to maintain a return air humidity of 50% RH (adj.). Lockout this control when outside air is below 40º F (adj.).

General Safeties Note: All safeties shall be hard wired to the supply VFD safety circuit. Starters shall not function in the "Hand" or "Auto" and VFD's shall be disabled if they are indexed to the "Auto" or "Hand" position in either the VFD or bypass modes.

Freezestat: Install an electric freezestat to shut down the unit (see Unit Shutdown for additional information) if the temperature downstream of the heating coil drops below 35º F (adj.). The electric freezestat shall act independently of the DDC system via hardwire interlock and shall override the DDC system control signal to open the heating coil control valve(s) to maintain an 80°F (adj.) preheat coil discharge air temperature setpoint. The cooling coil control valve shall fully open upon a trip of the freezestat. A freezestat trip shall notify the DDC system that shall send an alarm to the operator interface.

Supply Fan High Pressure Limit: Install a static pressure probe located in the air handling unit main discharge duct at least six feet or as far as physically possible downstream of the fan and upstream of any dampers and pipe to a differential pressure switch located in the temperature control panel. Wire in series with the safety circuit of the supply and return fan. Differential pressure switch shall be a manual reset type and the DDC system shall monitor the status of the differential pressure switch. Initial setpoint shall be +4.0" w.c. (adj.)

Supply Fan Low Pressure Limit: Install a low static suction pressure safety switch between the inlet of the supply fan and the cooling coil and wire in series with VFD safety circuit to stop the supply fan. The pressure switch shall be adjusted to -2.0" WC (adj.). The status of the pressure switch shall be wired to the BAS system for alarming. The pressure switch must be manually reset locally before the air handling unit can be restarted. Low static pressure safety switch shall be functional in VFD mode of operation.

Supply Fire Alarm Shutdown: Upon a Fire Alarm System alarm, the fire alarm control module provided by the electrical contractor at the temperature control panel shall change state of its contacts. This shall cause the unit to be shut down (see Unit Shutdown for additional information). An auxiliary contact shall be provided to notify the DDC system of a fire alarm shutdown.

Unit Shutdown: Whenever the air handling unit is indexed off, the supply fan shall stop, outside air damper shall close, chilled water valve shall close, heating coil valve shall remain under control to maintain a 52ºF (adj.) temperature at the preheat discharge air sensor.

If an AHU supply fan failure occurs, as detected by a current switch, or VFD fault indication from VFD output, the fan shall be stopped and an alarm shall be annunciated at the BAS. This alarm interlock shall be disabled for 60 seconds (adj.) after the fan is initially commanded to start. Upon failure the following shall occur:

- The outside air damper shall fully close.
- The chilled water control valve shall close
- The heating coil control valve shall remain under control from the preheat discharge air temperature sensor to maintain 52°F (adj.)

When failed AHU fan is reset through BAS, AHU shall restart as indicated above.

When failed AHU fan is reset through BAS, AHU shall restart as indicated above.

Unoccupied Control General Note: Occupied/unoccupied schedule shall be set at the DDC operator interface. When indexed to unoccupied the unit shall shutdown. Where provided, index DDC controlled heating and cooling terminal units associated with this air handling unit to maintain setback and setup temperature setpoints unless overridden by occupancy sensor or manual pushbutton.

Unoccupied Control - Unit Cycling to Maintain Setback/Setup Temperatures: Cycle the air handling unit on to maintain the setback and setup temperature zone setpoints to maintain 58 ºF (adj.) and 86 ºF (adj.) respectively. Reset supply fan volume to 2770 CFM. In the heating mode, the outside air damper shall open and heating discharge temperature control shall function as specified. In the cooling mode, the outside air damper shall open and chilled water discharge temperature control shall be allowed to function as specified. Minimum on runtime timer shall be set for 15 minutes (adj.) and the off timer for 30 minutes (adj.).

Monitor and Alarm: Monitor, through BAS, the following points associated with the air handling system and generate the alarms indicated:

- Unit discharge air temperature: Generate alarm if temperature exceeds setpoint by +/- 3°F (adj.) for 10 consecutive minutes (adj.)
- Preheat coil discharge air temperature: Generate alarm if temperature deviates from setpoint by -3.0°F (adj.) for 10 consecutive mintues (adj.)
- Low Limit thermostat (freezestat): Generate alarm and stop AHU
- Supply fan current switch: Generate alarm if fan status proven by current switch does not match commanded state.
- Supply duct static pressure: Generate alarm if pressure exceeds setpoint by +/- 0.5” WC (adj.) for 5 consecutive minutes (adj.)
- Supply discharge static pressure safety switch: Generate alarm and stop AHU if pressure exceeds 4.0” WC (adj.)
- Supply air smoke detector: Generate alarm and stop AHU.

ROOFTOP AIR HANDLING UNIT (AHU-3)

This is a rooftop mounted mixed air variable air volume air handling system controlled by the BAS.

The system consists of:

- Supply fan with variable frequency drive (VFD-10).
- Return Fan with variable frequency drive (VFD-11).

- Motorized modulating outside air damper (fail closed) (damper furnished by 23 73 13, actuator by 23 09 14).
- Motorized modulating return air damper (fail open) (damper furnished by 23 73 13, actuator by 23 09 14).
- Motorized modulating relief air damper (fail closed) (damper furnished by 23 73 13, actuator by 23 09 14).
- Chilled water cooling coil with modulating 3-way temperature control valve (fail to bypass coil).
- Hot water heating coil with modulating 3-way temperature control valve (fail to coil).
- Heating coil freezestat.
- Return air duct smoke detector.
- Sensors:
    - Supply duct discharge air temperature sensor.
    - Preheat coil discharge air temperature sensor.
    - Mixed air temperature sensor.
    - Return air temperature sensor.
    - Return air humidity sensor.
    - Space mounted humiditat.
    - High limit humidistat (downstream of distribution tube).

FAN CONTROL:
Start/Stop: The DDC system shall start the supply and return fan via the VFD.
Current Status Switch: Provide as described under GENERAL, VFD Motor Run Status, in this Section for both the supply and return fans.

Supply Fan Speed Control: The purpose of the supply fan control is to maintain temperature within the space. See discharge air temperature control sequence below.

Return Fan Speed Control: The purpose of the return fan control is to maintain a slightly positive building pressure. The return fan VFD shall modulate to maintain a constant CFM offset of 300(adj.) from the supply fan to account for total exhaust from the area in which it serves while maintaining a slightly positive pressure. Control contractor shall coordinate with the balancing contractor to optimize this setting.

Minimum Ventilation Air Flow Control:
Fixed Ventilation Air Flow Setpoint: The AHU outside air ventilation rate shall be maintained at 300 CFM. (The Office Area is to be positive to the Lab Area by 400 CFM)

Minimum Ventilation Air Flow Control Using Volume Matching: The minimum outside air damper position will be reset between a high minimum position and a low minimum position reset from the full design turndown fan speed and maximum fan speed. The Temperature Control Contractor shall work with the Balancing Contractor to determine these damper position setpoints to provide an even mixed air static pressure over the full range of fan turndown.

Install a temperature sensor in the supply duct downstream of the supply fan, all water coils and humidifiers.

DISCHARGE AIR TEMPERATURE CONTROL
Discharge Air Temperature Setpoint Reset from Zone Temperature (Heating and Cooling Unit): Reset the discharge air temperature setpoint based on the zone temperature between 55º F (adj.) and 90º F (adj.) to maintain a zone heating and economizer setpoint of 72º F (adj.). Mechanical cooling shall maintain a zone mechanical cooling setpoint of 72º F (adj.). Mechanical cooling shall be locked out below the mechanical cooling setpoint unless dehumidification control is required.

Discharge Air Temperature Control: The heating coil and mixed air dampers shall be controlled in sequence to maintain the discharge air setpoint temperature. At no time shall the heating coil be operating when the mixed air dampers are economizing or the chilled water coil valve is open. Whenever the discharge air temperature is above the setpoint, the following shall occur in sequence: The heating coil control shall modulate closed as sequenced below. When heating is completely off and the economizer sequence is enabled, the economizer outside air damper, return air damper, and relief damper will be modulated together in sequence to maintain discharge air temperature setpoint. When the outside air economizer damper is completely open, or the economizer sequence is not enabled, the chilled water valve will modulate open to maintain the zone mechanical cooling temperature setpoint as described above. The cooling control will be limited to the low discharge temperature reset setpoint. When the discharge air setpoint is below setpoint the reverse shall occur. Cooling coil control shall be locked out below 50º F (adj.) outside air temperature.

Preheat Coil Discharge Air Temperature Control – AHU- Not Running Operation: The Preheat coil discharge air temperature control sensor located immediately downstream of preheat coil shall modulate preheat coil control valve to maintain 52°F (adj.) preheat coil discharge air temperature anytime AHU is not running and safety low temperature limit control (freezestat) is not in alarm.

Humidification Control: Control return air humidity sensor to maintain a reset humidity setpoint. The setpoint shall be 35% RH (adj.) at an outside air dry bulb temperature of 50° F (adj.) and shall be reset to 20% RH (adj.) at an outside air dry bulb temperature of 0° F (adj.). Provide an electronic discharge air humidity sensor that shall limit the discharge humidity to 90% RH (adj.) by overriding the signal to the humidifier. Mount the humidity high limit device a minimum of 6 feet or greater if required by manufacturer.

Dehumidification Control: Override the cooling coil valve position open to maintain a return air humidity of 60% RH (adj.). Lockout this control when outside air is below 55º F.

Economizer Control: Provide dry bulb economizer control. Whenever outside air dry bulb temperature exceeds the return air temperature plus 4°F (adj.), economizer control shall override mixed air control and modulate AHU-1 outside economizer damper closed.
Economizer control shall be released to mixed air control when outside air dry bulb temperature is less than return air temperature minus 5°F (adj.) for 10 consecutive minutes (adj.)

Mixed Air Temperature Control: The unit includes a single modulating outside air damper, modulating return air damper, and modulating outside air damper. The modulating outside economizer air damper shall be enabled as determined by the economizer mode sequence stated above. The economizer outside air damper and the return air damper shall be controlled by the mixed air temperature controller with averaging type sensor located at the upstream side of the pre-filter to maintain mixed air temperature of 52°F (adj.). As the mixed air temperature decreases, the outside air damper shall close and the return air damper shall open to maintain the mixed temperature setpoint. The reverse shall occur as mixed air temperature increases. The return air damper position may not be proportionally opposite of the outside air damper. Final test and balancing will need to determine the position of the return air damper in order to keep the relief air static pressure positive in all scenarios (min/max CFM).

Relief Air Damper Control: A static pressure control with its pressure transmitter located in the return duct at least three feet from the fan discharge and upstream of the control damper, shall modulate the relief air damper (FC) to maintain initial relief static pressure setpoint of 0.6” WC (adj.). On a drop in return static pressure below setpoint, as measured by the return system static pressure transmitter, relief damper shall modulate closed until return static pressure setpoint has been satisfied. On rise in return static pressure above return system static pressure setpoint, relief damper shall modulate open until return static pressure setpoint is satisfied. Control contractor shall work in association with test and balance contractor to determine actual required static pressure setpoint. Setpoint indicated is to be used for initial system startup. Actual static pressure shall be minimum static pressure required to achieve system design flow.

General Safeties Note: All safeties shall be hard wired to the supply and return fan starters or VFD safety circuits. Starters shall not function in the "Hand" or "Auto" and VFD's shall be disabled if they are indexed to the "Auto" or "Hand" position in either the VFD or bypass modes.

Freezestat: Install an electric freezestat to shut down the unit (see Unit Shutdown for additional information) if the temperature downstream of the heating coil drops below 35º F (adj.). The electric freezestat shall act independently of the DDC system via hardwire interlock and shall override the DDC system control signal to open the heating coil control valve(s) to maintain an 80°F (adj.) preheat coil discharge air temperature setpoint. The cooling coil control valve shall fully open upon a trip of the freezestat. A freezestat trip shall notify the DDC system that shall send an alarm to the operator interface.

Return Fire Alarm Shutdown: Upon a Fire Alarm System alarm, the fire alarm control module provided by the electrical contractor at the temperature control panel shall change state of its contacts. This shall cause the unit to be shut down (see Unit Shutdown for additional information). An auxiliary contact shall be provided to notify the DDC system of a fire alarm shutdown.

Unit Shutdown: Whenever the air handling unit is indexed off, the supply and return fans shall stop, outside air damper shall close, return damper shall fully open, relief damper shall close, chilled water valve shall close, heating coil valve shall remain under control to maintain a 52ºF (adj.) temperature at the preheat discharge air sensor.

If an AHU supply fan failure occurs, as detected by a current switch, or VFD fault indication from VFD output, the fan shall be stopped and an alarm shall be annunciated at the BAS. This alarm interlock shall be disabled for 60 seconds (adj.) after the fan is initially commanded to start. Upon failure the following shall occur:

- The outside air dampers and relief air dampers shall fully close.
- The return air damper shall fully open.
- The return fan shall be commanded to stop.
- The chilled water control valve shall close
- The heating coil control valve shall remain under control from the preheat discharge air temperature sensor to maintain 52°F (adj.)

When failed AHU fan is reset through BAS, AHU shall restart as indicated above.

If return fan failure occurs, as detected by a current switch, or VFD fault indication from VFD output, the AHU shall be stopped and an alarm shall be annunciated at the BAS. This alarm interlock shall be disabled for 60 seconds (adj.) after the fan is initially commanded to start. Upon failure the following shall occur:

- The outside air dampers and relief air dampers shall fully close.
- The return air damper shall fully open.
- The supply fan shall be commanded to stop.
- The chilled water control valve shall close
- The heating coil control valve shall remain under control from the preheat discharge air temperature sensor to maintain 52°F (adj.)

When failed AHU fan is reset through BAS, AHU shall restart as indicated above.

Unoccupied Control General Note: Occupied/unoccupied schedule shall be set at the DDC operator interface. When indexed to unoccupied the unit shall shutdown. Where provided, index DDC controlled heating and cooling terminal units associated with this air handling unit to maintain setback and setup temperature setpoints unless overridden by occupancy sensor or manual pushbutton.

Unoccupied Control - Unit Cycling to Maintain Setback/Setup Temperatures: Cycle the air handling unit on to maintain the setback and setup temperature zone setpoints to maintain 58 ºF (adj.) and 86 ºF (adj.) respectively.

Reset supply return fan volume offset for return air fan control to zero. Supply fan shall be limited to the maximum return fan airflow. In the heating mode, the outside air and relief air dampers shall fully close and the return air damper shall fully open and heating discharge temperature control shall function as specified. In the cooling mode, the economizer and chilled water discharge temperature control shall be allowed to function as specified. Minimum on runtime timer shall be set for 15 minutes (adj.) and the off timer for 30 minutes (adj.).

Monitor and Alarm: Monitor, through BAS, the following points associated with the air handling system and generate the alarms indicated:

- Unit discharge air temperature: Generate alarm if temperature exceeds setpoint by +/- 3°F (adj.) for 10 consecutive minutes (adj.)
- Preheat coil discharge air temperature: Generate alarm if temperature deviates from setpoint by -3.0°F (adj.) for 10 consecutive mintues (adj.)
- Mixed air temperature: Generate alarm if temperature goes below setpoint by 5°F (adj.) for 10 consecutive minutes (adj.)
- High Return airflow: Generate alarm is airflow exceeds setpoint by +/- 500 CFM (adj.) for 10 consecutive minues (adj.)
- Low Limit thermostat (freezestat): Generate alarm and stop AHU
- Supply fan current switch: Generate alarm if fan status proven by current switch does not match commanded state.
- Return fan current switch: Generate alarm if fan status proven by current switch does not match commanded state.
- Return air smoke detector: Generate alarm and stop AHU.

AIR HANDLING UNIT AND EXHAUST FAN (AHU-4 AND EF-4)

This is an indoor mounted 100% outside air constant volume air handling system controlled by the BAS

This system consists of:

- AHU-4 supply fan with starter.
- AHU-4 motorized modulating outside air damper (fail closed) (damper furnished by 23 73 13, actuator by 23 09 14).
- AHU-4 hot water heating coil with modulating 3-way temperature control valve (fail to coil).
- AHU-4 heating coil freezestat.
- Supply air duct smoke detector.
- AHU-4 sensors:
  - Supply duct discharge air temperature sensor.
  - Preheat coil discharge air temperature sensor.
- Exhaust fan EF-4 with starter.
- Exhaust air damper and motorized actuator (damper furnished by 23 73 13, actuator by 23 09 14).

FAN CONTROL:
Start/Stop: The DDC system shall start and stop AHU-4 and EF-4.

Current Status Switch: Provide as described under GENERAL for the supply fan and exhaust fan.

The BAS shall operate AHU-4 and EF-4 as follows:

- For a minimum of 5 hours each day, 7 days per week, 365 days per year.
- Upon a “low level” (first alarm) alarm signal from the space mounted gas detection system when the system detects CO, CO2 or Methane (natural gas) levels above the set minimum of the gas detection system.

On a call for AHU-4 and EF-4 to operate, the outside air damper will open 100% and exhaust air damper will open 100%. Upon proving that both dampers are open, AHU-4 and EF-4 shall start Upon an

expiration of the minimum 5 hour run-time, or an all clear signal from the gas detection and monitoring system the reverse shall occur.

Preheat Coil Discharge Air Temperature Control – Normal Operation: The heating control valve (FO) shall modulate to maintain 55°F (adj.) at probe type sensor located in the supply duct downstream of the AHU. The preheat coil control valve shall be locked in the closed position whenever outside air temperature is above 60°F (adj.) for 10 consecutive minutes (adj.)

Preheat Coil Discharge Air Temperature Control – AHU- Not Running Operation: The Preheat coil discharge air temperature control sensor located immediately downstream of preheat coil shall modulate preheat coil control valve to maintain 52°F (adj.) preheat coil discharge air temperature anytime AHU is not running and safety low temperature limit control (freezestat) is not in alarm.

General Safeties Note: All safeties shall be hard wired to the supply VFD safety circuit. Starters shall not function in the "Hand" or "Auto" and VFD's shall be disabled if they are indexed to the "Auto" or "Hand" position in either the VFD or bypass modes.

Freezestat: Install an electric freezestat to shut down the unit (see Unit Shutdown for additional information) if the temperature downstream of the heating coil drops below 35º F (adj.). The electric freezestat shall act independently of the DDC system via hardwire interlock and shall override the DDC system control signal to open the heating coil control valve(s) to maintain an 80°F (adj.) preheat coil discharge air temperature setpoint. The cooling coil control valve shall fully open upon a trip of the freezestat. A freezestat trip shall notify the DDC system that shall send an alarm to the operator interface.

Supply Fire Alarm Shutdown: Upon a Fire Alarm System alarm, the fire alarm control module provided by the electrical contractor at the temperature control panel shall change state of its contacts. This shall cause the unit to be shut down (see Unit Shutdown for additional information). An auxiliary contact shall be provided to notify the DDC system of a fire alarm shutdown.

Unit Shutdown: Whenever the air handling unit is indexed off, the supply fan shall stop, outside air damper shall close, chilled water valve shall close, heating coil valve shall remain under control to maintain a 52ºF (adj.) temperature at the preheat discharge air sensor.

If an AHU supply fan failure occurs, as detected by a current switch, or VFD fault indication from VFD output, the fan shall be stopped and an alarm shall be annunciated at the BAS. This alarm interlock shall be disabled for 60 seconds (adj.) after the fan is initially commanded to start. Upon failure the following shall occur:

- The outside air damper shall fully close.
- The chilled water control valve shall close
- The heating coil control valve shall remain under control from the preheat discharge air temperature sensor to maintain 52°F (adj.)

When failed AHU fan is reset through BAS, AHU shall restart as indicated above.

When failed AHU fan is reset through BAS, AHU shall restart as indicated above.

Unoccupied Control General Note: Occupied/unoccupied schedule shall be set at the DDC operator interface. When indexed to unoccupied the unit shall shutdown. Where provided, index DDC controlled heating and cooling terminal units associated with this air handling unit to maintain setback and setup temperature setpoints unless overridden by occupancy sensor or manual pushbutton.

Unoccupied Control - Unit Cycling to Maintain Setback/Setup Temperatures: Cycle the air handling unit on to maintain the setback and setup temperature zone setpoints to maintain 58 ºF (adj.) and 86 ºF (adj.) respectively. Reset supply fan volume to 2770 CFM. In the heating mode, the outside air damper shall open and heating discharge temperature control shall function as specified. In the cooling mode, the outside air damper shall open and chilled water discharge temperature control shall be allowed to function

as specified. Minimum on runtime timer shall be set for 15 minutes (adj.) and the off timer for 30 minutes (adj.).

Monitor and Alarm: Monitor, through BAS, the following points associated with the air handling system and generate the alarms indicated:

- Unit discharge air temperature: Generate alarm if temperature exceeds setpoint by +/- 3°F (adj.) for 10 consecutive minutes (adj.)
- Preheat coil discharge air temperature: Generate alarm if temperature deviates from setpoint by -3.0°F (adj.) for 10 consecutive mintues (adj.)
- Low Limit thermostat (freezestat): Generate alarm and stop AHU
- Supply fan current switch: Generate alarm if fan status proven by current switch does not match commanded state.
- Exhaust fan current switch: Generate alarm if fan status proven by current switch does not match commanded state.
- Supply air smoke detector: Generate alarm and stop AHU.
- Gas detection alarm
    - Level “one” alarm.
    - Level “two” alarm.

OFFICE AREA - VAV TERMINAL UNITS WITH REHEAT AND INFLOOR RADIATION

Systems consist of:

- Variable air volume terminal
- Hot water reheat coil with 2-way or 3-way temperature control valve (see plans).
- DDC space sensor.
- Discharge air temperature sensor.
- Occupancy sensor (lighting occupancy sensor – provided by EC, wiring from sensor to BAS by 23 09 14) (where indicated).

Provide a DDC space temperature sensor to control, in sequence, a modulating electronic control valve for the hot water reheat coil and actuator for terminal air flow. When space temperature is below setpoint, the air terminal damper shall modulate toward the cooling minimum flow position. After the air terminal damper is at its minimum flow, the radiant floor valve shall open to maintain setpoint. If setpoint cannot be maintained, the reheat coil valve shall modulate open. If the air terminal has a heating airflow, the hot water reheat control valve and air terminal shall open in parallel to the heating airflow.

The reverse shall occur when space temperature is above setpoint. The heating coil valve shall be commanded closed whenever the associated AHU is off. Provide a discharge air temperature sensor for monitoring purposes.

Each space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.). If an occupancy sensor is specified, it shall index the terminal unit DDC controller to occupied mode for a minimum of 30 minutes (adj.).

Lighting occupancy sensors are to be interlocked to the terminal unit for signalling occupancy to the terminal unit zone: When the occupancy sensor signals the zone is unoccupied, the minimum flow setpoint shall be zero CFM (adj.) and the heating and cooling temperature setpoints will be maintained at either the occupied or unoccupied heating and cooling setpoints (as determined by the owner). When the occupancy sensor signals the zone is occupied, the occupied minimum flow setpoint shall be as scheduled and the occupied heating and cooling temperature setpoints shall be maintained. All programming for the above sequence shall reside in the terminal unit controller and a supervisory controller shall not be required to reset any flow or temperature setpoints based on the occupancy sensor.

This contractor shall provide all control wiring, including control wiring from occupancy sensor to controller.

Provide separate adjustable cooling and heating setpoints for both the occupied and unoccupied modes. When the space temperature is between the heating and cooling setpoints, the heating valve shall be closed and the airflow at heating and cooling minimum flow.

When the space is "unoccupied", the infloor radiation shall be the source of "unoccupied" heating.

The radiant floor hot water valve shall be locked out whenever outside air is above 50º F (adj.).

LAB/AUTOPSY AREA – VAV TERMINAL UNIT WITH REHEAT AND IN-FLOOR RADIATION AND EXHAUST VALVE

130 - AUTOPSY

System consists of:

- Supply air variable air volume terminals (VAV-2-1, VAV-2-2 and VAV-2-4) with:
  - Hot water reheat coils and associated 2-way or 3-way modulating TCV.
  - Discharge air temperature sensor.
- Infloor hot water radiation with:
  - 2-way modulating temperature control valve.
  - In-floor temperature sensor.
- Exhaust air valves
  - EV-1 – General Autopsy Exhaust
  - EV-2 - General Autopsy Exhaust
  - EV-10 – Janitor / Cart Storage Exhaust
- DDC Space Thermostat with temperature override button.
- DDC Space Humidistat
- Wall Mounted High/Low Ventilation Air Switch
  - Low Ventilation Switch with Amber Pilot Light
  - High Ventilation Switch with Green Pilot Light
  - Red Pilot Light - Alarm

This space shall always be at a negative pressure in relation to the adjacent Corridor (1007).

The space shall have 4 airflow modes of operation:

- A1 – Day / Occupied Building – "Inactive" – Low Ventilation.
- A2 – Day / Occupied Building - "Active" – High Ventilation.
- B1 – Night / Unoccupied Building – "Inactive" – Low Ventilation.
- B2 – Night / Unoccupied Building – "Active" – High Ventilation.

Wall mounted high/low ventilation switch shall be labelled as follows:

- High Airflow – Green Pilot Light
- Low Airflow – Amber Pilot Light
- Alarm – Red Pilot Light

At all times, the pilot lights shall reflect current space airflow ("low" or "high").

Design Intent: During periods where procedures and autopsies are being performed in the space, the airflow shall be "high". During periods when the space is inactive, the airflow shall be "low".

Airflow Schedule (Adj.): The schedule shall default to "low" airflow at all times.

- VAV-2-1, VAV-2-2 and VAV-2-4 shall be at minimum airflow.
- EV-1, EV-2 and EV-10 shall be at minimum airflow.

Temperature Schedule: The temperature schedule shall be as follows (adj.):

- Building "Occupied": 6:00am – 6:00pm
  - Heating Setpoint: 68º
  - Cooling Setpoint: 75º
- Building "Unoccupied": 6:00pm – 6:00am
  - Heating Setpoint: 65º
  - Cooling Setpoint: 78º
- Whenever in "high" airflow mode:
  - Heating Setpoint: 68º
  - Cooling Setpoint: 68º

"High" Airflow Activation: The system shall be manually indexed to "high" airflow via the wall mounted ventilation air switch. Once manually activated to "high" airflow, the system shall be timed to operate at high airflow for 4 hours (adj) before automatically being indexed back to "low" airflow by the building automation system.

Provide a DDC space temperature sensor to control, in sequence, a VAV modulating electronic control valves (in parallel) for the hot water reheat coil and radiant floor electronic control valve.

When space temperature is below setpoint, the hot water radiation floor valve shall modulate open as a first source of heat to maintain space temperature. On a further drop in space temperature, the reheat coil valves shall modulate open in parallel. The reverse shall occur when space temperature is above setpoint. Provide a discharge air temperature sensor for monitoring purposes.

When the space temperature rises above setpoint, and the space is at "low" airflow, the supply air terminals and exhaust air terminals shall modulate open in parallel, maintaining their "offset" to maintain space temperature setpoint. On a drop in space temperature below setpoint, the reverse shall occur until the supply air terminals and exhaust air terminals reach their minimum airflows.

The radiant floor control valve shall be locked out whenever the outside air is above 50º F (adj.).

Space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.). If an occupancy sensor is specified, it shall index the terminal unit DDC controller to occupied mode for a minimum of 30 minutes (adj.).

<u>131 – AUTOPSY VIEWING</u>

System consists of:

- Supply air variable air volume terminals (VAV-2-6) with:
  - Hot water reheat coil and associated 2-way or 3-way modulating TCV.
  - Discharge air temperature sensor.
- Exhaust air valves
  - EV-4 – General Exhaust
- DDC Space Thermostat with temperature override button.
- Occupancy sensor (lighting occupancy sensor – provided by EC, wiring from sensor to BAS by 23 09 14) (where indicated).

Provide a DDC space temperature sensor to control, in sequence, a modulating electronic control valve for the hot water reheat coil and actuator for terminal air flow. When space temperature is below setpoint, the air terminal damper shall modulate toward the cooling minimum flow position. After the air terminal damper is at its minimum flow, the radiant floor valve shall open to maintain setpoint. If setpoint cannot be maintained, the reheat coil valve shall modulate open. If the air terminal has a heating airflow, the hot water reheat control valve and air terminal shall open in parallel to the heating airflow.

The reverse shall occur when space temperature is above setpoint. The heating coil valve shall be commanded closed whenever the associated AHU is off. Provide a discharge air temperature sensor for monitoring purposes.

Exhaust valve EV-4 shall track VAV-2-6 and maintain offset.

Each space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.). If an occupancy sensor is specified, it shall index the terminal unit DDC controller to occupied mode for a minimum of 30 minutes (adj.).

Lighting occupancy sensors are to be interlocked to the terminal unit for signalling occupancy to the terminal unit zone: When the occupancy sensor signals the zone is unoccupied, the minimum flow setpoint shall be zero CFM (adj.) and the heating and cooling temperature setpoints will be maintained at either the occupied or unoccupied heating and cooling setpoints (as determined by the owner). When the occupancy sensor signals the zone is occupied, the occupied minimum flow setpoint shall be as scheduled and the occupied heating and cooling temperature setpoints shall be maintained. All programming for the above sequence shall reside in the terminal unit controller and a supervisory controller shall not be required to reset any flow or temperature setpoints based on the occupancy sensor.

This contractor shall provide all control wiring, including control wiring from occupancy sensor to controller.

Provide separate adjustable cooling and heating setpoints for both the occupied and unoccupied modes. When the space temperature is between the heating and cooling setpoints, the heating valve shall be closed and the airflow at heating and cooling minimum flow.

When the space is “unoccupied”, the infloor radiation shall be the source of “unoccupied” heating.

The radiant floor hot water valve shall be locked out whenever outside air is above 50º F (adj.).

<u>132 – DECOMPOSITION AUTOPSY</u>

System consists of:

- Supply air variable air volume terminal (VAV-2-3) with:
  - Hot water reheat coil and associated 2-way or 3-way modulating temperature control valve.
  - Discharge air temperature sensor.
- Infloor hot water radiation with:
  - 2-way modulating temperature control valve.
  - In-floor temperature sensor.
- Exhaust air valves
  - EV-3 – General Autopsy Exhaust
  - EV-12 - Fume Hood
- Fume Hood with Occupancy Presence Sensor
- DDC Space Thermostat with override button
- Wall Mounted High/Low Ventilation Air Switch
  - Low Ventilation Switch with Amber Pilot Light
  - High Ventilation Switch with Green Pilot Light
  - Red Pilot Light - Alarm

This space shall always be at a negative pressure in relation to the adjacent Autopsy Suite.

The space shall have 8 airflow modes of operation:

- A1 – Day / Occupied Building – “Inactive” – Low Ventilation and No Fume Hood Use
- A2 – Day / Occupied Building – “Inactive” – Low Ventilation with Fume Hood Use
- A3 – Day / Occupied Building - “Active” – High Ventilation and No Fume Hood Use.
- A4 – Day / Occupied Building - “Active” – High Ventilation with Fume Hood Use.
- B1 – Night / Unoccupied Building – “Inactive” – Low Ventilation and No Fume Hood Use
- B2 – Night / Unoccupied Building – “Inactive” – Low Ventilation with Fume Hood Use

- B3 – Day / Occupied Building - “Active” – High Ventilation and No Fume Hood Use.
- B4 – Day / Occupied Building - “Active” – High Ventilation with Fume Hood Use.

Wall mounted high/low ventilation switch shall be labelled as follows:

- High Airflow – Green Pilot Light
- Low Airflow – Amber Pilot Light
- Alarm – Red Pilot Light

At all times, the pilot lights shall reflect current space airflow (“low” or “high”).

Design Intent: During periods where procedures and autopsies are being performed in the space, the airflow shall be “high”. During periods when the space is inactive, the airflow shall be “low”. The fume hood airflow shall be controlled via the occupancy presence sensor.

Airflow Schedule (Adj.): The schedule shall default to “low” airflow at all times.

- VAV-2-3 shall be at minimum airflow.
- EV-3 shall be at minimum airflow.
- EV-12 shall be at minimum airflow (unless activated by the zone presence sensor).

Temperature Schedule: The temperature schedule shall be as follows (adj.):

- Building “Occupied”: 6:00am – 6:00pm
  - Heating Setpoint: 68º
  - Cooling Setpoint: 75º
- Building “Unoccupied”: 6:00pm – 6:00am
  - Heating Setpoint: 65º
  - Cooling Setpoint: 78º
- Whenever in “high” airflow mode:
  - Heating Setpoint: 68º
  - Cooling Setpoint: 68º

Fume Hood: When the fume hood is not in use, as sensed by the fume hood presence sensor, the associated exhaust valve (EV-12) shall be in its minimum position. When the fume hood is in use, as sensed by the fume hood presence sensor, the associated exhaust valve (EV-12) shall be at its maximum position. If the fume hood face velocity detects a face velocity less than 78 fpm while “in use” then an alarm shall be activated.

“High” Airflow Activation: The system shall be manually indexed to “high” airflow via the wall mounted ventilation air switch. Once manually activated to “high” airflow, the system shall be timed to operate at high airflow for 4 hours (adj) before automatically being indexed back to “low” airflow by the building automation system.

Provide a DDC space temperature sensor to control, in sequence, a VAV modulating electronic control valves (in parallel) for the hot water reheat coil and radiant floor electronic control valve.

When space temperature is below setpoint, the hot water radiation floor valve shall modulate open as a first source of heat to maintain space temperature. On a further drop in space temperature, the reheat coil valves shall modulate open in parallel. The reverse shall occur when space temperature is above setpoint. Provide a discharge air temperature sensor for monitoring purposes.

When the space temperature rises above setpoint, and the space is at “low” airflow, the supply air terminals and exhaust air terminals shall modulate open in parallel, maintaining their “offset” to maintain space temperature setpoint. On a drop in space temperature below setpoint, the reverse shall occur until the supply air terminals and exhaust air terminals reach their minimum airflows.

The radiant floor control valve shall be locked out whenever the outside air is above 50º F (adj.).

Space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.). If an occupancy sensor is specified, it shall index the terminal unit DDC controller to occupied mode for a minimum of 30 minutes (adj.).

133 – GENERAL LAB

System consists of:

- Supply air variable air volume terminal (VAV-2-5) with:
  - Hot water reheat coil and associated 2-way or 3-way modulating temperature control valve.
  - Discharge air temperature sensor.
- Infloor hot water radiation with:
  - 2-way modulating temperature control valve.
  - In-floor temperature sensor.
- Exhaust air valves
  - EV-6 – General Autopsy Exhaust
  - EV-5 - Fume Hood
- Fume Hood with Occupancy Presence Sensor
- DDC Space Thermostat with override button
- Wall Mounted High/Low Ventilation Air Switch
  - Low Ventilation Switch with Amber Pilot Light
  - High Ventilation Switch with Green Pilot Light
  - Red Pilot Light - Alarm

This space shall always be at a negative pressure in relation to the adjacent surrounding spaces.

The space shall have 8 airflow modes of operation:

- A1 – Day / Occupied Building – "Inactive" – Low Ventilation and No Fume Hood Use
- A2 – Day / Occupied Building – "Inactive" – Low Ventilation with Fume Hood Use
- A3 – Day / Occupied Building - "Active" – High Ventilation and No Fume Hood Use.
- A4 – Day / Occupied Building - "Active" – High Ventilation with Fume Hood Use.
- B1 – Night / Unoccupied Building – "Inactive" – Low Ventilation and No Fume Hood Use
- B2 – Night / Unoccupied Building – "Inactive" – Low Ventilation with Fume Hood Use
- B3 – Day / Occupied Building - "Active" – High Ventilation and No Fume Hood Use.
- B4 – Day / Occupied Building - "Active" – High Ventilation with Fume Hood Use.

Wall mounted high/low ventilation switch shall be labelled as follows:

- High Airflow – Green Pilot Light
- Low Airflow – Amber Pilot Light
- Alarm – Red Pilot Light

At all times, the pilot lights shall reflect current space airflow ("low" or "high").

Design Intent: During periods when the lab is actively used, the airflow shall be "high". During periods when the lab is inactive, the airflow shall be "low". The fume hood airflow shall be controlled via the occupancy presence sensor.

Airflow Schedule (Adj.): The schedule shall default to "low" airflow at all times.

- VAV-2-5 shall be at minimum airflow.
- EV-6 shall be at minimum airflow.
- EV-5 shall be at minimum airflow (unless activated by the zone presence sensor).

Temperature Schedule: The temperature schedule shall be as follows (adj.):

- Building "Occupied": 6:00am – 6:00pm
  - Heating Setpoint: 68º
  - Cooling Setpoint: 75º
- Building "Unoccupied": 6:00pm – 6:00am
  - Heating Setpoint: 65º
  - Cooling Setpoint: 78º
- Whenever in "high" airflow mode:
  - Heating Setpoint: 68º
  - Cooling Setpoint: 72º

Fume Hood: When the fume hood is not in use, as sensed by the fume hood presence sensor, the associated exhaust valve (EV-5) shall be in its minimum position. When the fume hood is in use, as sensed by the fume hood presence sensor, the associated exhaust valve (EV-5) shall be at its maximum position. If the fume hood face velocity detects a face velocity less than 78 fpm while "in use" then an alarm shall be activated.

"High" Airflow Activation: The system shall be manually indexed to "high" airflow via the wall mounted ventilation air switch. Once manually activated to "high" airflow, the system shall be timed to operate at high airflow for 4 hours (adj) before automatically being indexed back to "low" airflow by the building automation system.

Provide a DDC space temperature sensor to control, in sequence, a VAV modulating electronic control valves (in parallel) for the hot water reheat coil and radiant floor electronic control valve.

When space temperature is below setpoint, the hot water radiation floor valve shall modulate open as a first source of heat to maintain space temperature. On a further drop in space temperature, the reheat coil valves shall modulate open in parallel. The reverse shall occur when space temperature is above setpoint. Provide a discharge air temperature sensor for monitoring purposes.

When the space temperature rises above setpoint, and the space is at "low" airflow, the supply air terminals and exhaust air terminals shall modulate open in parallel, maintaining their "offset" to maintain space temperature setpoint. On a drop in space temperature below setpoint, the reverse shall occur until the supply air terminals and exhaust air terminals reach their minimum airflows.

The radiant floor control valve shall be locked out whenever the outside air is above 50º F (adj.).

Space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.). If an occupancy sensor is specified, it shall index the terminal unit DDC controller to occupied mode for a minimum of 30 minutes (adj.).

<u>138A/138B – LONG TERM STORAGE AND PROPERTY STORAGE</u>
<u>(134 – TISSUE STORAGE & 135/137 TOILETS SIMILAR)</u>
Each system consists of:

- Supply air variable air volume terminal with:
  - Hot water reheat coil and associated 2-way or 3-way modulating TCV.
  - Discharge air temperature sensor.
- Exhaust air valve
  - General Exhaust
- DDC Space Thermostat with temperature override button.
- Infloor hot water radiation with:
  - 2-way modulating temperature control valve.
  - In-floor temperature sensor.

Provide a DDC space temperature sensor to control, in sequence, a modulating electronic control valve for the hot water reheat coil and actuator for terminal air flow. When space temperature is below setpoint the radiant floor valve shall open to maintain setpoint. If setpoint cannot be maintained, the reheat coil valve shall modulate open.

The reverse shall occur when space temperature is above setpoint. The heating coil valve shall be commanded closed whenever the associated AHU is off. Provide a discharge air temperature sensor for monitoring purposes.

Exhaust valve maintain offset from VAV terminal.

Each space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.).

Provide separate adjustable cooling and heating setpoints for both the occupied and unoccupied modes. When the space temperature is between the heating and cooling setpoints, the heating valve shall be closed and the airflow at heating and cooling minimum flow.

When the space is "unoccupied", the infloor radiation shall be the source of "unoccupied" heating.

The radiant floor hot water valve shall be locked out whenever outside air is above 50º F (adj.).

<u>141 – X-RAY</u>

System consists of:

- Supply air variable air volume terminals (VAV-2-10) with:
  - Hot water reheat coil and associated 2-way or 3-way modulating TCV.
  - Discharge air temperature sensor.
- Infloor hot water radiation with:
  - 2-way modulating temperature control valve.
  - In-floor temperature sensor.
- Exhaust air valves
  - EV-13 – General Exhaust
- DDC Space Thermostat with temperature override button.
- Wall Mounted High/Low Ventilation Air Switch
  - Low Ventilation Switch with Amber Pilot Light
  - High Ventilation Switch with Green Pilot Light
  - Red Pilot Light - Alarm

This space shall always be at a negative pressure in relation to the adjacent space.

The space shall have 4 airflow modes of operation:

- A1 – Day / Occupied Building – "Inactive" – Low Ventilation.
- A2 – Day / Occupied Building - "Active" – High Ventilation.
- B1 – Night / Unoccupied Building – "Inactive" – Low Ventilation.
- B2 – Night / Unoccupied Building – "Active" – High Ventilation.

Wall mounted high/low ventilation switch shall be labelled as follows:

- High Airflow – Green Pilot Light
- Low Airflow – Amber Pilot Light
- Alarm – Red Pilot Light

At all times, the pilot lights shall reflect current space airflow ("low" or "high").

Design Intent: During periods where procedures are being performed in the space, the airflow shall be "high". During periods when the space is inactive, the airflow shall be "low".

Airflow Schedule (Adj.): The schedule shall default to "low" airflow at all times.

- VAV-2-10 shall be at minimum airflow.
- EV-13 shall be at minimum airflow.

Temperature Schedule: The temperature schedule shall be as follows (adj.):

- Building "Occupied": 6:00am – 6:00pm
  - Heating Setpoint: 68º
  - Cooling Setpoint: 75º
- Building "Unoccupied": 6:00pm – 6:00am
  - Heating Setpoint: 65º
  - Cooling Setpoint: 78º
- Whenever in "high" airflow mode:
  - Heating Setpoint: 68º
  - Cooling Setpoint: 68º

"High" Airflow Activation: The system shall be manually indexed to "high" airflow via the wall mounted ventilation air switch. Once manually activated to "high" airflow, the system shall be timed to operate at high airflow for 4 hours (adj) before automatically being indexed back to "low" airflow by the building automation system.

Provide a DDC space temperature sensor to control, in sequence, a VAV modulating electronic control valves (in parallel) for the hot water reheat coil and radiant floor electronic control valve.

When space temperature is below setpoint, the hot water radiation floor valve shall modulate open as a first source of heat to maintain space temperature. On a further drop in space temperature, the reheat coil valves shall modulate open in parallel. The reverse shall occur when space temperature is above setpoint. Provide a discharge air temperature sensor for monitoring purposes.

When the space temperature rises above setpoint, and the space is at "low" airflow, the supply air terminals and exhaust air terminals shall modulate open in parallel, maintaining their "offset" to maintain space temperature setpoint. On a drop in space temperature below setpoint, the reverse shall occur until the supply air terminals and exhaust air terminals reach their minimum airflows.

The radiant floor control valve shall be locked out whenever the outside air is above 50º F (adj.).

Space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.). If an occupancy sensor is specified, it shall index the terminal unit DDC controller to occupied mode for a minimum of 30 minutes (adj.).

<u>144 – BODY RECEIVING / PROCESSING & 144A &144B – CART WASH AND LAUNDRY</u>

System consists of:

- Supply air variable air volume terminals (VAV-2-11) with:
  - Hot water reheat coil and associated 2-way or 3-way modulating TCV.
  - Discharge air temperature sensor.
- Infloor hot water radiation with:
  - 2-way modulating temperature control valve.
  - In-floor temperature sensor.
- Exhaust air valves
  - EV-14 – General Exhaust
- DDC Space Thermostat with temperature override button.

This space shall always be at a negative pressure in relation to the adjacent space.

Airflow Schedule (Adj.): The schedule shall default to "low" airflow at all times.

- VAV-2-10 shall be at minimum airflow.
- EV-13 shall be at minimum airflow.

Temperature Schedule: The temperature schedule shall be as follows (adj.):

- Building "Occupied": 6:00am – 6:00pm
  - Heating Setpoint: 68º
  - Cooling Setpoint: 75º
- Building "Unoccupied": 6:00pm – 6:00am
  - Heating Setpoint: 65º
  - Cooling Setpoint: 78º
- Whenever in "high" airflow mode:
  - Heating Setpoint: 68º
  - Cooling Setpoint: 68º

Provide a DDC space temperature sensor to control, in sequence, a VAV modulating electronic control valves (in parallel) for the hot water reheat coil and radiant floor electronic control valve.

When space temperature is below setpoint, the hot water radiation floor valve shall modulate open as a first source of heat to maintain space temperature. On a further drop in space temperature, the reheat coil valves shall modulate open in parallel. The reverse shall occur when space temperature is above setpoint. Provide a discharge air temperature sensor for monitoring purposes.

When the space temperature rises above setpoint, and the space is at "low" airflow, the supply air terminals and exhaust air terminals shall modulate open in parallel, maintaining their "offset" to maintain space temperature setpoint. On a drop in space temperature below setpoint, the reverse shall occur until the supply air terminals and exhaust air terminals reach their minimum airflows.

The radiant floor control valve shall be locked out whenever the outside air is above 50º F (adj.).

Space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.). If an occupancy sensor is specified, it shall index the terminal unit DDC controller to occupied mode for a minimum of 30 minutes (adj.).

<u>144C – MORGUE TECH</u>

System consists of:

- Supply air variable air volume terminal with:
  - Hot water reheat coil and associated 2-way or 3-way modulating TCV.
  - Discharge air temperature sensor.
- Infloor hot water radiation with:
  - 2-way modulating temperature control valve.
  - In-floor temperature sensor.
- DDC Space Thermostat with temperature override button.

Provide a DDC space temperature sensor to control, in sequence, a modulating electronic control valve for the hot water reheat coil and actuator for terminal air flow. When space temperature is below setpoint the radiant floor valve shall open to maintain setpoint. If setpoint cannot be maintained, the reheat coil valve shall modulate open.

The reverse shall occur when space temperature is above setpoint. The heating coil valve shall be commanded closed whenever the associated AHU is off. Provide a discharge air temperature sensor for monitoring purposes.

Airflow shall remain constant for pressurization.

Each space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.).

Provide separate adjustable cooling and heating setpoints for both the occupied and unoccupied modes. When the space temperature is between the heating and cooling setpoints, the heating valve shall be closed and the airflow at heating and cooling minimum flow.

The radiant floor hot water valve shall be locked out whenever outside air is above 50º F (adj.).

144D – TISSUE RECOVERY

System consists of:

- Supply air variable air volume terminals (VAV-2-12) with:
  - Hot water reheat coil and associated 2-way or 3-way modulating TCV.
  - Discharge air temperature sensor.
- Infloor hot water radiation with:
  - 2-way modulating temperature control valve.
  - In-floor temperature sensor.
- Exhaust air valves
  - EV-11 – General Exhaust
- DDC Space Thermostat with temperature override button.
- DDC Space Humidistat
- Wall Mounted High/Low Ventilation Air Switch
  - Low Ventilation Switch with Amber Pilot Light
  - High Ventilation Switch with Green Pilot Light
  - Red Pilot Light – Alarm
- Wall Mounted Pressure Switch
  - Negative Ventilation Switch with Red Pilot Light
  - Positive Ventilation Switch with Green Pilot Light

Design Intent: This space shall primarily function as a positively pressurized space in relation to the adjacent space. When activated by the wall mounted pressure switch, the space will change from positive pressure to negative pressure in related to the adjacent space.

During periods where procedures being performed in the space, the airflow shall be “high”. During periods when the space is inactive, the airflow shall be “low”.

During periods where tissue recovery is being performed in the space, the space shall be at a positive pressure in relation to the adjacent spaces.

During periods where the space is being used as an autopsy room, the space shall be at a negative pressure in relation to the adjacent space.

When the space is positively pressurized, 200 cfm shall transfer out of the space.

When the space is negatively pressurized, 525 cfm shall transfer into the space.

The space shall have 4 airflow modes of operation:

- A1 – Day / Occupied Building – “Inactive” – Low Ventilation – Positive Pressure
- A2 – Day / Occupied Building - “Active” – High Ventilation – Positive Pressure.
- A3 – Day / Occupied Building – “Active” – High Ventilation – Negative Pressure.
- B1 – Night / Unoccupied Building – “Inactive” – Low Ventilation. – Positive Pressure
- B2 – Night / Unoccupied Building – “Active” – High Ventilation – Positive Pressure.
- B3 – Night / Unoccupied Building – “Active” – High Ventilation – Negative Pressure.

Wall mounted high/low ventilation switch shall be labelled as follows:

- "High Airflow" – Green Pilot Light
- "Low Airflow" – Amber Pilot Light
- "Alarm" – Red Pilot Light

At all times, the pilot lights shall reflect current space airflow ("low" or "high").

Wall mounted pressure switch shall be labelled as follows:

- "Negative Pressure" – Red Pilot Light
- "Positive Pressure" – Green Pilot Light

At all times, the pilot lights shall reflect current space pressure ("negative" or "positive").

Airflow Schedule (Adj.): The schedule shall default to "low" airflow and positive pressure at all times.

- VAV-2-12 shall be at minimum airflow.
- EV-11 shall be at minimum airflow.

Temperature Schedule: The temperature schedule shall be as follows (adj.):

- Building "Occupied": 6:00am – 6:00pm
  - Heating Setpoint: 68º
  - Cooling Setpoint: 75º
- Building "Unoccupied": 6:00pm – 6:00am
  - Heating Setpoint: 65º
  - Cooling Setpoint: 78º
- Whenever in "high" airflow mode:
  - Heating Setpoint: 68º
  - Cooling Setpoint: 72º

"High" Airflow Positive Pressure Activation: The system shall be manually indexed to "high" airflow and positive pressure via the wall mounted ventilation and air pressure switches. Once manually activated to "high" airflow, the system shall be timed to operate at high airflow and positive pressure for 4 hours (adj) before automatically being indexed back to "low" airflow and positive pressure by the building automation system.

"High" Airflow Negative Pressure Activation: The system shall be manually indexed to "high" airflow and negative pressure via the wall mounted ventilation and air pressure switches. Once manually activated to "high" airflow, the system shall be timed to operate at high airflow and positive pressure for 4 hours (adj) before automatically being indexed back to "low" airflow and positive pressure by the building automation system.

Provide a DDC space temperature sensor to control, in sequence, a VAV modulating electronic control valves (in parallel) for the hot water reheat coil and radiant floor electronic control valve.

When space temperature is below setpoint, the hot water radiation floor valve shall modulate open as a first source of heat to maintain space temperature. On a further drop in space temperature, the reheat coil valves shall modulate open in parallel. The reverse shall occur when space temperature is above setpoint. Provide a discharge air temperature sensor for monitoring purposes.

When the space temperature rises above setpoint, and the space is at "low" airflow, the supply air terminals and exhaust air terminals shall modulate open in parallel, maintaining their "offset" to maintain space temperature setpoint. On a drop in space temperature below setpoint, the reverse shall occur until the supply air terminals and exhaust air terminals reach their minimum airflows.

The radiant floor control valve shall be locked out whenever the outside air is above 50º F (adj.).

Space temperature sensor shall have a manual override button that shall index the space to the occupied mode for a period of two hours (adj.). If an occupancy sensor is specified, it shall index the terminal unit DDC controller to occupied mode for a minimum of 30 minutes (adj.).

CHILLER ROOM VENTILATION (EF-5 and UH-9)

The ventilation system consists of:

- Variable volume exhaust fan with motorized damper and variable frequency drive VFD-12 (motorized damper by 23 34 00).
- Motorized 2 position outside air intake damper (damper by Section 23 09 14).
- Hot water unit heater.
- 2-way, 2 position low voltage control valve for UH-9 by 23 09 14.
- Strap on thermostat for unit heater.
- DDC temperature sensors for EF-5 / UH-9.
- Refrigeration detection and monitoring system.

When the space temperature rises above setpoint (85°F adj.), the motorized outside air damper shall open, the exhaust fan motorized damper shall open and the fan shall be energized at its lowest fan speed. On a continued rise in space temperature above setpoint, the fan speed shall increase proportionally until the variable speed drive is at 100%. At all times UH-9 shall be off and control valve closed.

On a drop in space setpoint temperature, the reverse shall occur until the exhaust fan is "off", exhaust fan motorized damper is closed and outside air damper is closed.

On a further drop below space temperature setpoint (65°F adj.), and hot water is available, the hot water unit heater control valve shall open and the unit heater fan shall cycle on. The reverse shall occur on a rise in space temperature above setpoint.

When the refrigerant detection and monitoring system senses a refrigerant leak, three different levels of alarm will be initiated by the refrigerant detection and monitoring system.

- Level 1 Alarm: The refrigeration and detection system will notify the BAS. The BAS will initiate an alarm.
- Level 2 Alarm: The refrigeration and detection system will notify the BAS. The BAS will initiate an alarm. The outside air damper shall open, the exhaust fan motorized damper shall open and the exhaust fan shall be energized at its maximum speed. Upon the alarm being "cleared", the exhaust fan shall turn "off", the exhaust fan motorized damper shall close and the outside air damper shall close.
- Level 3 Alarm: The refrigeration and detection system will notify the BAS. The BAS will initiate an alarm. The outside air damper shall open, the exhaust fan motorized damper shall open and the exhaust fan shall be energized at its maximum speed. Upon the alarm being "cleared", the exhaust fan shall turn "off", the exhaust fan motorized damper shall close and the outside air damper shall close.

EXHAUST FAN (EF-1)

System consists of:

- Roof mounted exhaust fan.
- Motorized backdraft damper (normally closed)

The exhaust fan shall be interlocked with AHU-1. When AHU-1 is in the "occupied" mode, EF-1 motorized damper shall open and fan shall energize.

When AHU-1 is in the "unoccupied" mode, EF-1 shall turn "off" and motorized damper shall close.

EXHAUST FAN (EF-2)

This is a variable air volume exhaust system serves laboratory exhaust.

System consists of:

- Two exhaust fans with variable frequency drives.
- Two isolation air dampers (dampers by 23 34 00, actuators by 23 09 14).
- Two outside air bleed dampers (dampers by 23 34 00, actuators by 23 09 14).
- Sensors:
    - Exhaust duct static pressure sensor.
    - Exhaust duct high static limit sensor.

FAN CONTROL:

Current Status Switch: Provide for all exhaust fans and set up as described under GENERAL, Current Switch Setup, in this Section.

Start/Stop: The DDC system shall start the exhaust fans via their VFD's. One exhaust fan shall operate and second fan will be a standby fan that shall only run if required by a failure of first fan.

Lead Fan Selection: There will be one fan designated lead and one standby fan. Lead fan selection shall be based on rotational sequencing. Provide a single software point that shall designate the lead fan.

Shutdown Service Switch: Provide a software point and hardware switch located inside the control panel for each fan to be taken out of service that will initiate the shutdown sequence for the fan. If the lag fan is available, it's start sequence shall be initiated and come into control before the shutdown sequence for the fan being taken out of service is stopped.

Exhaust Fan Start/Stop Sequencing: Sequence fans on based on exhaust fan flow and outside air bleed damper position in the order designated by the Lead Fan Selection sequence. If a fan has failed or has been designated "out of service" per the sequence below, the next fan in sequence will initiate its start sequence without delay.

Minimum exhaust fan speed shall maintain minimum exhaust ejection velocity by maintaining a minimum flow of 6875 CFM. The DDC controller shall prevent the exhaust fan from falling below this minimum speed to prevent the ejection velocity from falling below design.

When starting a fan, command the fan to start and run at minimum speed set in the VFD. When fan status is proven on, command the isolation damper open and release the fan to control. If a fan status does not prove on or the isolation damper end switch does not prove open within 2 minutes (adj.) of the fan start or damper open commands, command the exhaust fan off and the isolation damper closed, latch out this exhaust fan, and send an exhaust fan failure alarm through the DDC system. Provide a manual push-button switch located in the control panel and a software point to reset the shutdown latch out of the fan.

When stopping a lag fan, command the damper to close and ramp the fan down to minimum speed at the same rate as the damper actuator stroke time (typically 90 seconds). After the fan is at minimum speed and the damper end switch indicates the damper is closed, command the fan off.

When switching lead fans and stopping a lag fan, prove operation of the new lead fan and allow 2 minutes (adj.) for the fan to come up to speed before initiating the stop fan sequence. Provide a software point for each fan to be taken out of service that will initiate the shutdown sequence for the fan. If there is a lag fan that is available, the fan start sequence shall be initiated and come into control before the shutdown sequence for the fan being taken out of service is stopped.

The above sequences may need to be modified to prevent static pressure variances as specified General, Parallel Fan Bumpless Transfer sequence. This may entail adjusting minimum speeds and/or ramping dampers or fans at different rates than specified above.

STATIC PRESSURE CONTROL:

Exhaust Fan Speed Control: The purpose of the exhaust fan control is to maintain a minimum static pressure in the exhaust ductwork to insure proper terminal air box operation. Install a static pressure sensing probe(s in the main exhaust duct located at approximately ¾ of the way down the main exhaust duct and the reference input shall sense the actual space served by the air system located in the ceiling below the duct probe. Pipe to the differential pressure transmitter that shall be located in the unit temperature control panel. The DDC system shall modulate the exhaust fan VFD's and outside air bleed dampers in sequence to maintain the static pressure setpoint as sensed by the static pressure probe(s). As exhaust airflow requirements decrease and the static pressure becomes more negative than setpoint, decrease the exhaust fans VFD speed signals simultaneously and in parallel to maintain the static pressure setpoint until the minimum fan flow setpoint is reached. If the static pressure continues to fall, modulate open the outside air bleed dampers (in parallel, if more than one) to maintain the static pressure setpoint. If static pressure continues to fall below setpoint, stage off a lag exhaust fan as described in the Exhaust Fan Start/Stop Sequencing.

As exhaust airflow requirements increase and duct static pressure becomes less negative than setpoint, the fans will continue to operate at their minimum fan flow setpoints and the outside air bleed dampers shall be modulated closed to maintain duct static setpoint. When the outside air bleed dampers are fully closed, the exhaust fans will then be modulated up in speed to maintain static. If exhaust airflow requirements continue to increase and duct static pressure cannot be maintained, initiate the start sequence for the next lag fan as described in the Exhaust Fan Start/Stop Sequencing.

If multiple sensors are used, the DDC system shall maintain the static pressure setpoint at the lowest reading sensor. If the static sensors deviate by more than 0.5 in. w.c. (adj.), an alarm shall be sent through the DDC system. Static pressure setpoint shall be as described in the Static Pressure Setpoint Control below.

Constant Static Pressure Setpoint Control: The duct static pressure shall be controlled to maintain a negative 1.0 in. w.c. Final setpoint shall be determined by the Balancing Contractor to satisfy the worst case zone at maximum design condition.

Static Pressure Setpoint Reset Control: Static pressure setpoint shall be reset using Trim & Respond logic within the range of negative 0.6 in. w.c. to 1.3 in. w.c. When the fan is off, the setpoint shall be reset to 1.0 in. w.c. (adj.) and this setpoint shall be used on system start up. While the fan is proven on, every two minutes, trim the setpoint by raising the setpoint 0.04 in. w.c. if there are two or fewer zone pressure requests. If there are more than two zone pressure requests, respond by lowering the setpoint by 0.06 in. w.c.

A zone pressure request is generated when an exhaust VAV damper is greater than 95% open until it drops to 80% open. Provide a binary data enable point for each zone to enable/disable the zone damper in the trim and respond algorithm. All setpoints, timers, and zone pressure request threshold for the static pressure reset shall be adjustable. Tune the reset to prevent cyclic instability after the space is occupied. Provide a trend graph to show the relative stability of the static pressure setpoint. Final maximum setpoint shall be determined by the Balancing Contractor to satisfy the worst case zone at maximum design condition.

Exhaust Plenum High Static Pressure Control: Install a static pressure probe located in the exhaust fan plenum or common exhaust ductwork between the fan isolation dampers and the heat reclaim coil outlet isolation dampers and pipe to a differential pressure sensor located in the temperature control panel. This sensor shall override the speed signal to exhaust fan VFD's to limit the static pressure to negative 6" w.c. (adj.) (this setpoint should be set to the pressure class of the ductwork). This override control shall reduce the speed below the minimum exhaust fan minimum flow setpoints if necessary. If this control is invoked, send an exhaust plenum low pressure alarm to the DDC system.

Exhaust System Low Pressure Limit: Install a static pressure probe located in the exhaust fan plenum or common exhaust ductwork between the fan isolation dampers and the heat reclaim coil outlet isolation damper and pipe to a differential pressure switch located in the temperature control panel. Wire in series with the safety circuit of the exhaust fans VFD's. Differential pressure switch shall be a manual reset type and the DDC system shall monitor the status of the differential pressure switch. Initial setpoint shall be - negative 8.0" w.c. (adj.) (this setpoint should be set to two inches more negative than the pressure class of the ductwork).

EXHAUST FAN (EF-3)

System consists of:

- Indoor mounted in-line exhaust fan.
- Motorized backdraft damper (normally closed)

The exhaust fan shall operate continuously 24 hrs day / 7 days week / 365 days year.

When the fan is "on", the motorized damper shall be open. When the fan is "off", the motorized damper shall be closed.

EXHAUST FAN (EF-6)

System consists of:

- Roof mounted exhaust fan.
- Motorized backdraft damper (normally closed)

The exhaust fan shall be interlocked with AHU-3. When AHU-3 is in the "occupied" mode, EF-6 motorized damper shall open and fan shall energize.

When AHU-3 is in the "unoccupied" mode, EF-6 shall turn "off" and motorized damper shall close.

EXHAUST FAN (EF-7)

This system serves the electrical room.

System consists of:

- Roof mounted exhaust fan.
- Motorized backdraft damper (normally closed)
- Motorized outside air damper (normally closed).
- DDC Space Thermostat.

Fan shall be normally "off", fan motorized damper closed and outside air damper closed.

When the space temperature rises above setpoint (85°F adj.), the motorized outside air damper shall open, the exhaust fan motorized damper shall open and the fan shall be energized. At all times UH-10 shall be off and control valve closed.

On a drop in space setpoint temperature, the reverse shall occur until the exhaust fan is "off", exhaust fan motorized damper is closed and outside air damper is closed.

CABINET UNIT HEATERS (CUH-1 and CUH-2):

Each system consists of:

- DDC space thermostat by 23 09 14.
- 2-way, 2 position low voltage control valve by 23 09 14.
- Strap on pipe thermostat.

Cabinet unit heaters shall be controlled thru the BAS.

On a drop below space temperature setpoint (65°F adj.), and hot water is available, the control valve shall open and the fan shall cycle on. The reverse shall occur on a rise in space temperature above setpoint.

The strap on thermostat shall be mounted on the hot water return line, set at 100º F (adj.). The unit fan shall not be permitted to run unless the hot water temperature is above strap on thermostat setpoint.

HOT WATER UNIT HEATERS (UH-1 thru UH-8 and UH-10)

Each system consists of:

- Hot water unit heater.
- DDC space thermostat by 23 09 14.
- 2-way, 2 position low voltage control valve by 23 09 14.
- Strap on pipe thermostat.

Unit heaters shall be controlled thru the BAS.

Cabinet unit heaters shall be controlled thru the BAS.

On a drop below space temperature setpoint (60°F adj.), and hot water is available, the control valve shall open and the fan shall cycle on. The reverse shall occur on a rise in space temperature above setpoint.

The strap on thermostat shall be mounted on the hot water return line, set at 100º F (adj.). The unit fan shall not be permitted to run unless the hot water temperature is above strap on thermostat setpoint.

Unit heaters shall be locked out and not operate at outside air temperatures above 60º F (adj.).

CONVECTORS (C-1 and C-2):

Each system consists of:

- DDC space thermostat by 23 09 14.
- 2-way, 2 position low voltage control valve by 23 09 14.

Convectors shall be controlled thru the BAS.

On a drop below space temperature setpoint (65°F adj.), the control valve shall open. The reverse shall occur on a rise in space temperature above setpoint.

EMERGENCY GENERATOR STAGING / OPERATION:

When the emergency generator is indicted to be in operation, as sensed by the state of the emergency generator transfer switch, the building automation system shall stage “on” HVAC equipment as follows:

Group 1

- All exhaust fans, supply fans and air handlers.

Group 2

- All CRAC units and associated condensing units.

Group 3

- All heating pumps and boilers.

Group 4

- Chiller, associated condensing units and all chilled water pumps.

Group 5

- All other HVAC motors and equipment.

Coordinate all time delays between groups and motor groups with generator manufacturer and electrical contractor.

END OF SECTION

SECTION 23 57 00

HEAT EXCHANGERS FOR HVAC

PART 1 - GENERAL

SCOPE
This section includes specifications for shell and tube heat exchangers and plate heat exchangers. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Reference
- Reference Standards
- Quality Assurance
- Submittals
- Operation and Maintenance Data

PART 2 - PRODUCTS
- Plate Heat Exchangers

PART 3 - EXECUTION
- Installation
- Plate Heat Exchangers

RELATED WORK
Section 01 91 01 – Commissioning Process
Section 23 21 13 - Hydronic Piping

REFERENCE
Applicable provisions of Division 1 govern work under this section.

REFERENCE STANDARDS
ASME Boiler and Pressure Vessel Code VIII - Rules for Construction of Pressure Vessels-Latest Edition.

QUALITY ASSURANCE
Refer to division 1, General Conditions, Equals and Substitutions

SUBMITTALS
Refer to division 1, General Conditions, Submittals.

Include data concerning dimensions, capacities, and material of construction.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

PART 2 - PRODUCTS

PLATE HEAT EXCHANGERS
Manufactures: Alfa Laval, Bell & Gossett, Graham, ITT Standard, Taco or approved equal.

Plate and frame type with gasketed heat transfer channel plates mounted on carrying bars and held between a stationary frame plate and a moveable pressure plate. Design pressure of 150 psig at 230 degrees F in each circuit with no pressure in the other circuit. Heat exchangers shall be constructed and stamped in accordance with the latest ASME Pressure Vessel Code Section VIII.

316 stainless steel corrugated channel plates with one piece Nitrile or EPDM gaskets (whichever material suitable for the fluids used). Gaskets may be glued or non-glued type. Provide relieving grooves on gaskets to prevent cross contamination between fluids. Provide OSHA compliant aluminum splashguard over channel plate rack.

Carbon steel pressure plates with enamel paint or epoxy coating. Plates shall not require additional stiffeners for support. Carbon steel carrying bars with zinc yellow chromate finish or epoxy coated finish.

Studded port type pipe connections to accept ANSI flanges for 3" and larger. Carbon steel NPT tappings or stainless steel NPT nozzles for connections 2" and smaller. Factory seal all connections prior to shipment to prevent entrance of foreign material.

Provide heat exchangers with capacities and operating characteristics indicated on drawings.

PART 3 - EXECUTION

INSTALLATION

Install units as shown on plans, as detailed, and according to manufacturer's installation instructions. Provide clearance around units as shown on the drawings and as recommended by the manufacturer for service access. Provide elbows, flanges and unions on piping to allow for servicing heat exchangers.

PLATE HEAT EXCHANGERS

Bolt to concrete pad. Apply grease to the threaded surfaces of the compression bolts and cover with plastic sleeving.

END OF SECTION

SECTION 23 84 13
HUMIDIFIERS

P A R T 1 - G E N E R A L

SCOPE
This section includes specifications for humidifiers. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Reference
- Quality Assurance
- Submittals
- Operation and Maintenance Data

PART 2 - PRODUCTS
- Short Absorption Dispersion Grids
- Electric Steam Humidifiers (Electrode Type)
- Electric Steam Humidifiers (Resistive Element Type)

PART 3 - EXECUTION
- Short Absorption Dispersion Grids
- Evaporative Humidifiers

RELATED WORK
Section 01 91 01 – Commissioning Process
Section 23 09 14 - Pneumatic and Electric Instrumentation and Control Devices for HVAC

REFERENCE
Applicable provisions of Division 1 govern work under this Section.

QUALITY ASSURANCE
Refer to division 1, General Conditions, Equals and Substitutions.

SUBMITTALS
Refer to division 1, General Conditions, Submittals.

Include data concerning dimensions, capacities, materials of construction, ratings, weights, wiring diagrams, and appropriate identification.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

P A R T 2 - P R O D U C T S

SHORT ABSORPTION DISPERSION GRIDS
Manufacturers: Armstrong, Dri-Steem, Nortec, Pure Humidifier or approved equal.

Factory-assembled steam dispersion unit shall include the following components:

1. Steam supply header/separator.
2. Condensate collection header.
3. Steam dispersion tubes spanning distance between two headers.

Each dispersion tube shall be fitted with steam discharge nozzles inserted into tube wall. Each nozzle shall be metallic or thermoplastic material designed for high steam temperatures. Two rows of nozzles in each dispersion tube shall discharge steam in diametrically opposite directions, perpendicular to airflow.

Each nozzle shall extend through wall of and into center of dispersion tube and contain steam orifice sized for its required steam capacity.

Furnish unit complete with normally closed [pneumatic, electric] control valve, inlet strainer, float and thermostatic trap sized in accordance with manufacturer's recommendations.

Each packaged humidifier panel assembly of tubes and headers shall be contained within galvanized metal casing to allow duct mounting, or to facilitate stacking of and/or end-to-end mounting of multiple humidifier panels in ducts or air handling unit casings.

Tubes and headers shall be 304 stainless steel and be welded.

ELECTRIC STEAM HUMIDIFIERS

Manufacturers: Dri-Steem, Armstrong, Nortec, Carel, Pure Humidifier Co. or approved equal.

Unit shall be self contained, electric steam generating humidification system. Steam shall be generated by boiling off [softened water][purified RO/DI water].

Unit shall be completely pre-wired and include built-in transformer to provide 24 volt supply for control circuit. Provide fused disconnect switch.

Vaporizing chamber, cover and fittings shall be constructed of series 300 stainless steel with welded seams and fitted for quick access for cleaning. Immersion Heaters shall be INCOLOY alloy-sheathed resistance type designed for no more than 80 watts per square inch. A single element shall be provided for each electrical phase.

Electronic water level control system shall provide for automatic refill, low water cut off and skimmer bleed-off functions. System shall consist of:

1. Water level sensing unit comprised of three Teflon-coated stainless steel probes screwed into threaded probe head.
2. A solenoid operated fill valve factory mounted on front of the humidifier.
3. Microprocessor controls.
4. Heater Protection:
    a. First step shall be low water probe. In the event of failure, second step shall be a manual reset over-temperature switch factory installed on the humidifier.]

Surface water skimmer system shall be furnished to provide for optimum precipitated mineral removal with minimum water waste.

Control cabinet shall be UL-and CUL-listed JIC enclosure. Control devices shall be mounted on sub-panel within enclosure isolated from vaporizing chamber. Control devices shall include microprocessor, magnetic contactor for each heater group, control circuit transformer, fuses for each heater, numbered terminal strip and all internal wiring. As-built wiring diagram is to be included.

Microprocessor controls shall be factory mounted and wired in humidifier control panel. Mounting instructions and wiring diagram shall be included. The following features and functions shall be provided:

1. LED fault indicator. Performs software self diagnosis at every start-up.
2. Water make-up valve control and low-water safety shut down.
3. Auto drain valve and drain/flush sequence whereby microprocessor accumulates actual humidifying "on" time, and activates auto drain/flush sequence.
4. End of season drain.
5. Switch on microprocessor board for, "AUTO", "STANDBY", "DRAIN", "TEST".
6. Airflow proven switch.
7. 100% solid state, power controller shall be mounted and wired in control cabinet. A compatible humidity sensor shall be shipped loose for field installation in return duct. System shall modulate humidifier output from 0% to 100% of maximum capacity.
8. A two position high limit humidistat shall be shipped loose for field installation. Humidistat shall sense humidity level within duct and protect against saturation of air stream.

Unit shall communicate with building automation system using BACnet communication protocol.

Furnish associated steam distribution tube.

Furnish unit with condensate after cooler.

P A R T 3 - E X E C U T I O N

SHORT ABSORPTION DISPERSION GRIDS

Mount units in air handling units or ductwork as indicated on the drawings. Provide additional duct reinforcing or support required for the humidifier body and/or distribution manifold(s). Install piping specialties and controls as detailed and in accordance with manufacturer's instructions.

Install steam and condensate branch lines with a minimum of three elbows to allow for expansion and contraction. Use pipe size indicated on drawings or recommended by the manufacturer, whichever is larger. Ream pipe and blow out at full steam pressure before making final connection to humidifier.

Mount units in air handling units or ductwork with sufficient elevation to drain condensate by non-pressurized gravity condensate lines. Condensate from this type of dispersion grid shall not be wasted to drain. Install condensate piping and specialties as detailed and in accordance with manufacturer’s instructions.

ELECTRIC STEAM HUMIDIFIERS

Mount manifold(s) in air handling units or ductwork as indicated on the drawings with proper pitch for condensate drainage. Mount steam generating cylinder assembly and control panel on wall or angle iron stand where indicated. Provide duct reinforcing or support required for the humidifier body and/or distribution manifold(s) as required. Install piping specialties and controls as detailed and in accordance with manufacturer's instructions. Install make-up water line with solenoid control and shutoff valves, coordinating final connection point with the Plumbing Contractor. Install drain line to nearest drain location or as indicated on the drawings.

END OF SECTION

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SECTION 27 60 00

RADIO REINFORCEMENT

PART 1 - GENERAL

1.01 SCOPE

A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.

1.02 GENERAL REQUIREMENTS

A. Provide a complete operating VHF radio reinforcement system as herein specified.

B. The radio reinforcement system shall provide access to the DaneCom radio communications system at a level of -95dBm throughout 95% of the building.

C. The installation will comply with all FCC requirements.

1.03 SUBMITTALS

A. Submit product data:

1. Bidirectional amplifiers (BDA)
2. Distributed Antenna devices
3. Coaxial Cable (plenum)
4. Splitters and directional couplers
5. Other components necessary to complete the system

B. Submit the following information:

1. Maintenance agreements
2. Qualifications
3. Proposed installation schedule
4. Wiring diagram with wiring requirements indicated
5. Floor plans indicating locations of distributed antennas, splitters, routing of cables, and locations of donor antenna and BDA. Overlay coverage radii indicating -95dBm signal strength.
6. Wall elevation showing equipment to be mounted on telephone backboard in IT Room.
7. Detail of antenna grounding and surge suppression.
8. Detail of antenna mounting.

1.04 GENERAL

A. All products provided by Contractor shall be new and unused, and shall be of manufacturer's current and standard production.

B. Where two or more equipment items of the same kind are provided, all shall be identical and provided by the same manufacturer.

C. Specifications indicate major system components and does not show every component, connector, module or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory operation.

1.05 REGULATIONS

A. Codes, regulations and standards referenced in the Section are:

1. NFPA 70- The National Electrical Code
2. 47 CFR Part 90.219-2007 Private Land Mobile Radio Services-Use of Signal Boosters

3. FCC's OET 65 Standards "Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields".
4. FCC Rules Part 22, Part 90 and Part 101.

1.06 QUALIFICATIONS

A. Contractor: Company specializing in installing products as specified in this section with a minimum of five (5) years documented experience. Provide a list of installations of similar size with bid documents.

B. Contractor shall prove their ability to install and maintain similar systems.

C. Contractor shall show evidence that they can provide the necessary maintenance support for the proposed system. This should include:

1. Identification of adequate staffing to meet stated response time to minimize system down time.
2. List recent customer references that have had similar systems installed in a similar environment.
3. Specify which office(s) shall be responsible for maintaining the system.
4. Identify the number of technicians in the supporting office who have been factory trained on installation and maintenance.

D. The contractor/installer of the selected system is solely responsible for all equipment, software, etc., and third-party contractors used in any and all capacities, as they relate to meeting all codes, OSHA requirements, compatibility, etc. The installer shall assume all responsibilities in meeting these requirements, laws, compatibility needs, etc.

E. Certain products specified may only be available through factory-authorized dealers and distributors. Contractor shall verify his ability to procure the products specified prior to submitting a proposal.

F. Obtain radio system components from a single source who assumes responsibility for compatibility of system components.

1.07 COORDINATION

A. Coordinate work with all other trades at site.

B. Coordinate with City of Madison Radio Shop. Contact Dave Nachreiner at 608-266-4150.

1.08 INTEGRATOR

A. Materials and layout assistance is available from:

General Communications
2880 Commerce Park Drive
Madison, Wisconsin 53719
Contact Rick Krasnowski (phone 608-310-7114)

1.09 DEFINITIONS

A. Delivered Audio Quality Definitions (DAQ): this is a universal standard often cited in system designs and specifications.

1. DAQ 1: Unusable, speech present but unreadable.
2. DAQ 2: Understandable with considerable effort. Frequent repetition due to noise/distortion.
3. DAQ 3: Speech understandable with slight effort. Occasional repetition required due to noise/distortion.
4. DAQ 3.5: Speech understandable with repetition only rarely required. Some noise/distortion.
5. DAQ 4: Speech easily understood. Occasional noise/distortion.
6. DAQ 4.5: Speech easily understood. Infrequent noise distortion.

7. DAQ 5: Speech easily understood. Coupled Bonding Conductor (CBC) – The term "Coupled Bonding Conductor": shall mean a bonding conductor placed, e.g. strapped, on the outside of any technology cable, used to suppress transient noise.

B. FCC: Federal Communications Commission

C. OET 65 Standards: FCC's Bulletin 65 provides Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

1.10 WARRANTY

A. Contractor warrants that all work furnished (material and labor) under this contract will be of good quality, free from faults and defects, and in conformance with the Project Drawings and Specifications.

B. Contractor shall provide a parts and labor guarantee on all work. Unless otherwise specified herein, Contractor's guarantee shall be for a period of two years from date of acceptance, except where any specific guarantees from a supplier or equipment manufacturer extends for a longer time.

C. Contractor's guarantee shall cover all costs associated with troubleshooting, repair and replacement of defective work, including costs of labor, transportation, lodging, materials and equipment.

D. Guarantee shall not cover any damage to material or equipment caused by accident, misuse, unauthorized modification or repair by Client or acts of God.

E. Contractor shall promptly respond to Client's requests for service during the guaranteed period. Contractor shall repair service as soon as reasonably possible upon request from client.

PART 2 - PRODUCTS

2.01 AMPLIFIER

A. Bi-Directional Amplifier

Manufacture:	EMR
Model #:	840622/1SC-10
Down Link Frequency:	154.0925 -155.8575 MHZ
Up Link Frequency:	158.745 - 159.3075 MHZ
Frequency Range:	150-174 MHz
Gain:	60 dB
Composite Power Uplink:	31 dBm
RF Connectors:	N Female
Composite Power Downlink:	31 dBm
Maximum Passband:	1.5
Passband Separation (MHz):	3.5
Noise Figure (U/L, D/L):	4dB
Item Height:	7.25 in
Item Width:	12 in
Item Length:	16 in
Temperature Range:	-30-60 deg C
Item Weight:	52 lb

2.02 DOOR ANTENNA

A. Outside Donor Antenna:

Manufacture:	PCTEL
Model #:	MYA1503K

B. Provide 2" Rigid Conduit stubbed out 48" above the roof from the IT room with a 2" weather head. This will be used to route donor antenna cable and will be used to mount the antenna.

C.	Specific Frequency:	150-174 MHz
D.	Gain dBi:	9.2 dBi
E.	Gain dBd:	7.1 dBd
F.	Polarization:	Linear
G.	Vertical Beamwidth:	57 deg
H.	Horizontal Beamwidth:	72 deg
I.	Maximum VSWR:	1.5:1
J.	Maximum Power:	250 W
K.	Lightning Protection:	DC Ground
L.	RF Connectors:	N Female
M.	Jumper Included:	No
N.	Type of Hardware Included:	MYK1 Mount
O.	Maximum Rated Wind Velocity:	100 mile/h
P.	Item Length:	42 in
Q.	Item Weight:	3 lb

2.03 DISTRIBUTED ANTENNA DEVICES

A. Through –hole ceiling mount

B. Omnidirectional 360˚ horizontal

C. Beamwidth 80 degrees vertical, nominal

D. Impedance: 50 ohm

E. With plenum rated pigtail cable

F. Regulatory compliance: RoHS 2002/95/EC

G. VSWR: less than 1.8:1.

2.04 AIR DIELECTRIC, PLENUM RATED CABLE:

A. Material Characteristics:

1. Jacket: Halogenated, Fire-Retardant
2. Outer Conductor Material: Corrugated Aluminum or Corrugated Copper
3. Inner Conductor Material: Copper-Clad Aluminum Wire

B. Electrical Characteristics:

1. Impedance: 50 ± 2.0 Ω
2. Frequency Band: 1 - 8800 MHz
3. Peak Power Rating: ≥ 40.0 kW

C. Mechanical Characteristics:

1. Diameter Over Jacket: ≤ .627 in
2. Minimum Bending Radius: ≤ 5 in
3. One Time Minimum Bending Radius: ≤ 3 in

D. Attenuation Characteristics:

Frequency (MHz)	Attenuation (dB/100ft)
150	≤ 0.848
450	≤ 1.53
800	≤ 2.105
2000	≤ 3.564

Standard Conditions: VSWR 1.0, ambient temperature 20 °C (68 °F)

2.05 FOAM DIELECTRIC CABLE:

A. Material Characteristics:

1. Jacket: Non-halogenated, Fire-Retardant Ployolefin
2. Outer Conductor Material: Corrugated Copper
3. Inner Conductor Material: Copper-Clad Aluminum Wire or Copper Tube

B. Electrical Characteristics:

1. Impedance: 50 ± 1.0 Ω
2. Frequency Band: 1/2” Nominal: 1 - 8800 MHz, 7/8” Nominal: 1 - 5000 MHz
3. Peak Power Rating: ≥ 40.0 kW

C. Mechanical Characteristics:

1. Diameter Over Jacket: 1/2” Nominal: ≤ .630 in, 7/8” Nominal: ≤ 1.1 in
2. Minimum Bending Radius: 1/2” Nominal: ≤ 5 in, 7/8” Nominal: ≤ 10 in
3. One Time Minimum Bending Radius: 1/2” Nominal: ≤ 2 in, 7/8” Nominal: ≤ 5 in

D. Attenuation Characteristics: 1/2” Nominal

Frequency (MHz)	Attenuation (dB/100ft)
150	≤ 0.815
450	≤ 1.447
800	≤ 1.968
2000	≤ 3.251

Standard Conditions: VSWR 1.0, ambient temperature 20 °C (68 °F)

E. Attenuation Characteristics: 7/8” Nominal:

Frequency (MHz)	Attenuation (dB/100ft)
150	≤ 0.417
450	≤ .744
800	≤ 1.014
2000	≤ 1.683

Standard Conditions: VSWR 1.0, ambient temperature 20 °C (68 °F)

2.06 SPLITTERS, COMBINERS, COUPLERS, COAX JUMPERS AND CONNECTORS:

A. As required.

PART 3 - EXECUTION

3.01 SYSTEM STARTUP

A. Power shall only be applied to the system after re-checking for proper grounding of the system and measuring all loops for lack of shorts, grounds, and open circuits.

B. System supplier shall be responsible for coordinating all programming of the system with the Owner.

3.02 OWNER'S INSTRUCTIONS

A. Contractor shall closely schedule and coordinate his activities with the Owner’s Project Representative.

B. Coordinate with the owner all operating, and monitoring functions which shall be included within the programming.

3.03 COMMISSIONING

A. After all work is completed and prior to requesting acceptance test, Contractor shall conduct a final inspection and pre-test all equipment and system features. Contractor shall correct any deficiencies discovered as the result of the inspection and pre-test of all contractor installed equipment and materials.

B. Contractor shall submit a request for the acceptance test in writing to the Owner’s Project Representative no less than fourteen days prior to the requested test date. The request for acceptance test shall be accompanied by a certification from Contractor that all work is complete and has been pre-tested, and that all corrections have been made.

C. During acceptance test, Contractor shall demonstrate all equipment and system features to the Owner’s Project Representative. Contractor shall remove covers, open wiring connections, operate equipment, and perform other reasonable work as requested by the Owner’s Project Representative.

D. Any portions of the work found to be deficient or not in compliance with the Project Drawing and Specifications will be rejected. The Project Representative will prepare a list of any such deficiencies observed during the acceptance test. Contractor shall promptly correct all deficiencies. Upon correction of deficiencies, Contractor shall submit a request in writing to the Project Representative for another acceptance test.

E. Before final approval is issued, the Radio Reinforcement System shall be subject to a formal Acceptance Test Plan (ATP) of all components and the system as a whole: said plan to be developed to the satisfaction of Dane County. The ATP shall ensure that two-way coverage on each floor of the building meets the coverage requirements of these specifications.

The ATP shall consist of the following items:

1. RSSI-Radio Signal Strength Index
2. DAQ-Delivered Audio Quality

3.04 PREPARATION

A. Contractor shall order all required parts and equipment upon notification of award of the work.

B. Contractor shall verify power where required.

3.05 INSTALLATION

A. All components shall be securely mounted.

B. Contractor shall carefully follow the instructions in the manufacturers' Installation Manual to insure all steps have been taken to provide a reliable, easy to operate system.

C. Perform all work as indicated in the drawings and specifications.

3.06 WORKMANSHIP

A. Perform work with persons experienced and qualified to produce workmanship specified.

B. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.

C. Maintain quality control over suppliers and Subcontractors.

D. Quality of workmanship is considered important. The Project Representative will have the authority to reject work that does not conform to the Drawings and Specifications.

3.07 EQUIPMENT PRE-TEST

A. All equipment shall be bench tested prior to delivery to job site and prior to installation. Bench test per manufacturers installation instructions.

3.08 GROUNDING

A. Provide grounding of equipment as required by equipment manufacturer.

3.09 SPARE PARTS

A. Not included in the scope of this contract.

END OF SECTION 27 60 00

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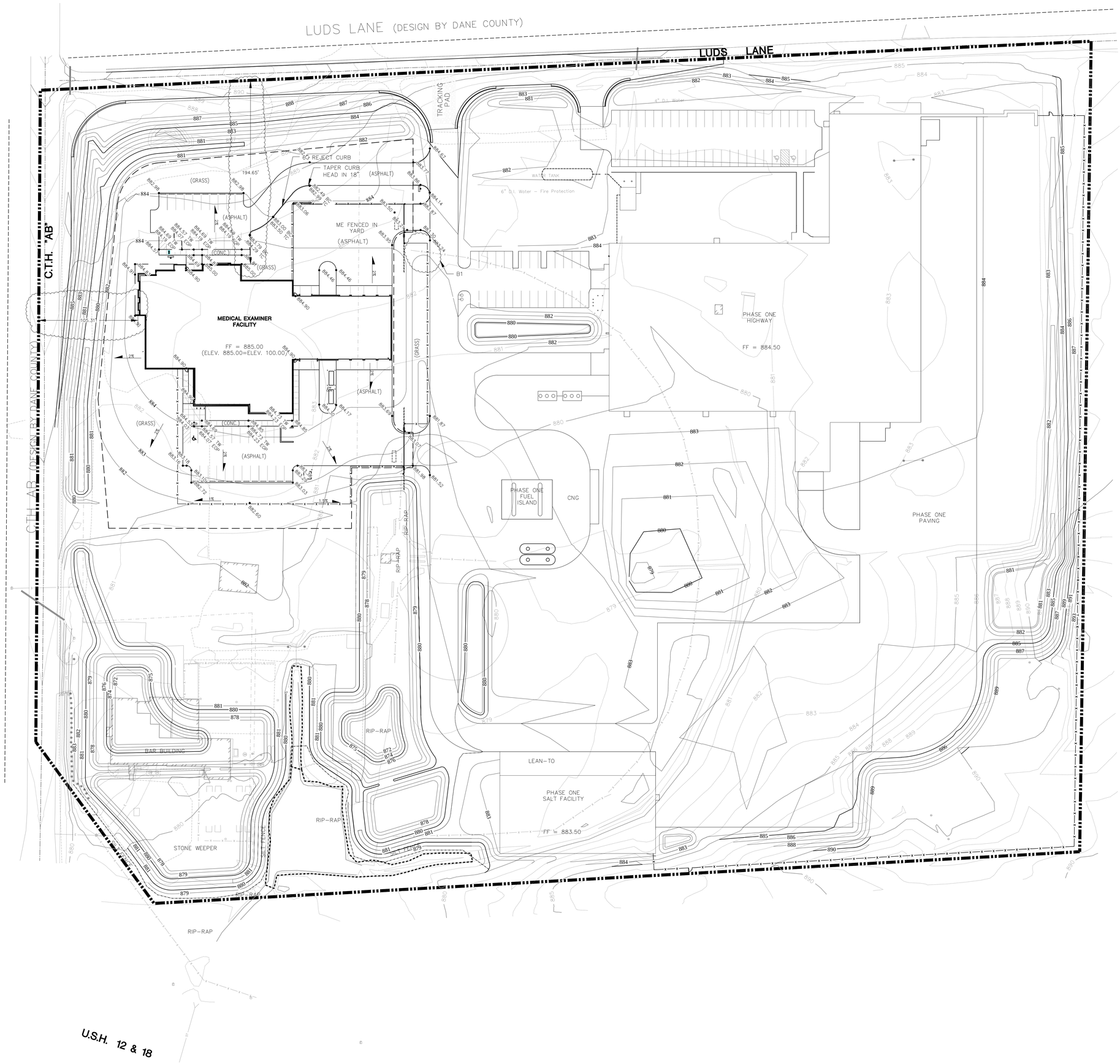

LEGEND

	PROPERTY LINE
	RIGHT-OF-WAY
	EXISTING EASEMENT
	EXISTING GRADE (5' CONTOUR)
	EXISTING GRADE (1' CONTOUR)
	EXISTING PAVED ROAD
	EXISTING UNPAVED ROAD
x x x	EXISTING FENCE
	LIMITS OF CONSTRUCTION
883	PROPOSED GRADE (1' CONTOUR)
880	PROPOSED GRADE (5' CONTOUR)
• 884.30	PROPOSED SPOT ELEVATION
x x x	PROPOSED FENCE
EOP	EDGE OF PAVEMENT
TW	TOP OF WALK
TC	TOP OF CURB
BC	BOTTOM OF CURB

N

40 0 40

SCALE: 1" = 40'

INFORMATIONAL BID PACKAGE B SCOPE OF WORK:

BID PACKAGE B INCLUDES THE AREA OF SITE GRADING DEFINED ON C100. BID PACKAGE A SCOPE IS SHOWN FOR REFERENCE. NOTE BID PACKAGE A INCLUDES THE CLEARING AND ROUGH GRADING WITHIN THIS BOUNDARY.

GENERAL NOTES:

1. EXISTING CONDITIONS BASED ON PLAT OF SURVEY MAP PREPARED BY WISCONSIN MAPPING, LLC., DEERFIELD, WISCONSIN. DATE OF SURVEY IS MAY 5, 2013.
2. DRAWING IS REFERENCED TO THE DANE COUNTY COORDINATE SYSTEM.
3. PROPOSED GRADES ARE FINISH GRADE.
4. REFER TO LANDSCAPE PLAN FOR VEGETATED RESTORATION.

DORSCHNER ASSOCIATES

Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

ISSUE

01.12.15	CONSTRUCTION DOCUMENTS
02.12.15	ADDENDUM B1

CIVIL ENGINEER

SCS ENGINEERS
2830 Dairy Drive
Madison, Wisconsin 53718
Phone: 608.224.2830
Fax: 608.224.2839
SCS Project No. 25213160.00

PROJECT
MEDICAL EXAMINER
OFFICE BUILDING
(BID PACKAGE B)
3562 COUNTY HIGHWAY
AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
SITE GRADING PLAN

DATE
02.11.15

C100

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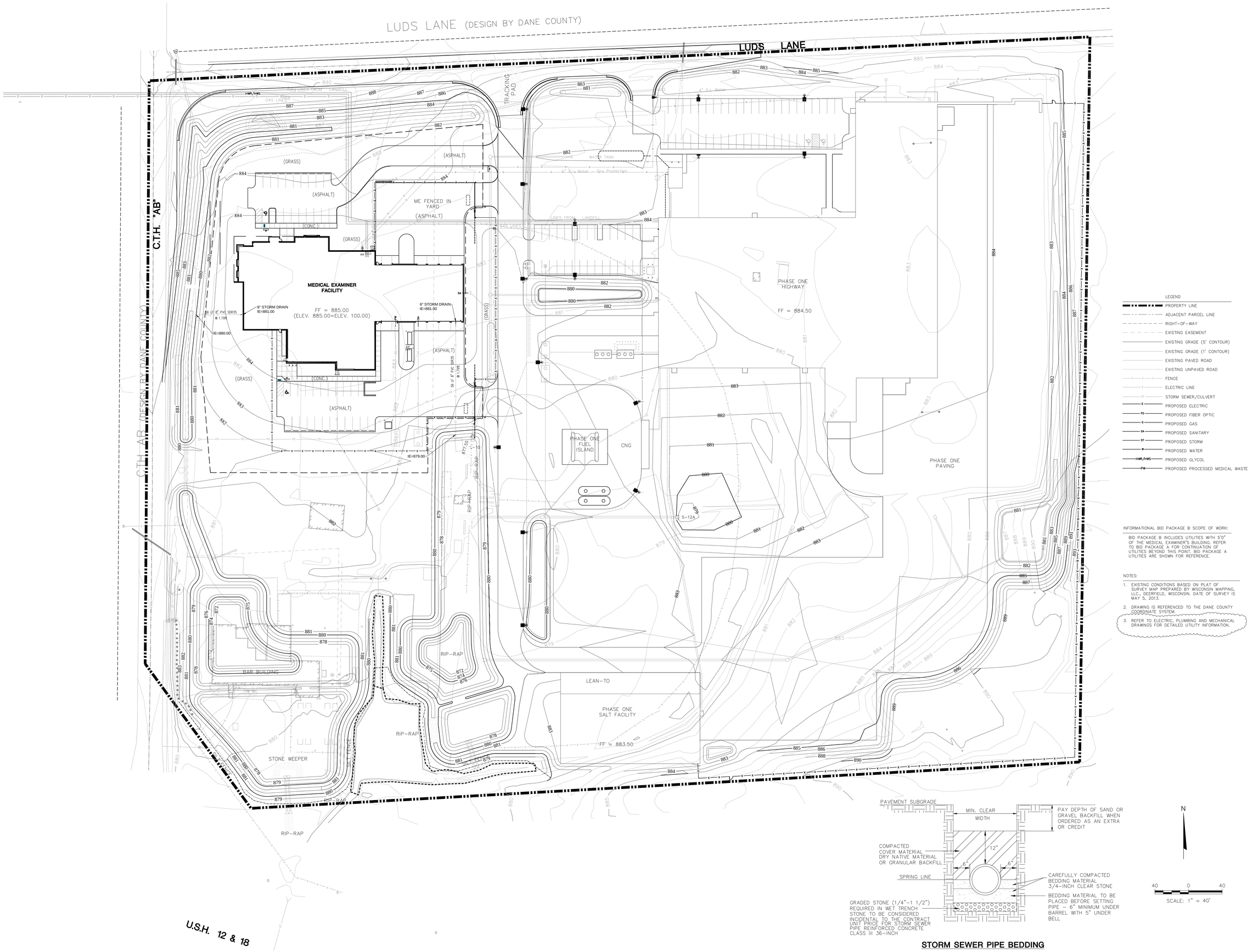

LEGEND

- PROPERTY LINE
- ADJACENT PARCEL LINE
- RIGHT-OF-WAY
- EXISTING EASEMENT
- EXISTING GRADE (5' CONTOUR)
- EXISTING GRADE (1' CONTOUR)
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- FENCE
- E — ELECTRIC LINE
- ST — STORM SEWER/CULVERT
- E — PROPOSED ELECTRIC
- FO — PROPOSED FIBER OPTIC
- G — PROPOSED GAS
- SA — PROPOSED SANITARY
- ST — PROPOSED STORM
- W — PROPOSED WATER
- HWR/HWS — PROPOSED GLYCOL
- PW — PROPOSED PROCESSED MEDICAL WASTE

INFORMATIONAL BID PACKAGE B SCOPE OF WORK:

BID PACKAGE B INCLUDES UTILITIES WITH 5'0" OF THE MEDICAL EXAMINER'S BUILDING. REFER TO BID PACKAGE A FOR CONTINUATION OF UTILITIES BEYOND THIS POINT. BID PACKAGE A UTILITIES ARE SHOWN FOR REFERENCE.

NOTES:

1. EXISTING CONDITIONS BASED ON PLAT OF SURVEY MAP PREPARED BY WISCONSIN MAPPING, LLC., DEERFIELD, WISCONSIN. DATE OF SURVEY IS MAY 5, 2013.
2. DRAWING IS REFERENCED TO THE DANE COUNTY COORDINATE SYSTEM.
3. REFER TO ELECTRIC, PLUMBING AND MECHANICAL DRAWINGS FOR DETAILED UTILITY INFORMATION.

STORM SEWER PIPE BEDDING

N

40 0 40

SCALE: 1" = 40'

DORSCHNER ASSOCIATE

Architecture
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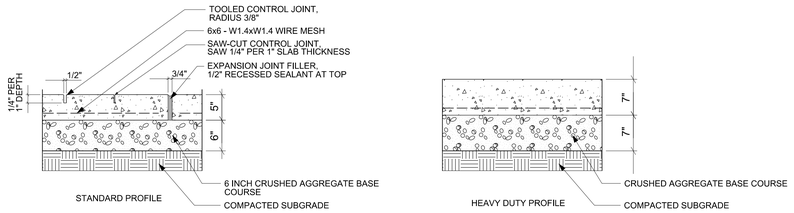
MEDICAL EXAMINER
OFFICE BUILDING
(BID PACKAGE B)
3562 COUNTY HIGHWAY
AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
SITE UTILITIES

DATE
02.11.15



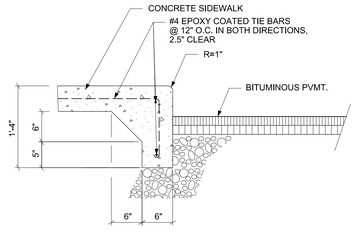
NOTE:
1.MEDIUM BROOM FINISH PERPENDICULAR TO DIRECTION OF TRAVEL

2. SEE LAYOUT PLAN FOR EXPANSION AND CONTROL JOINT SPACING AND PAVING PATTERN.

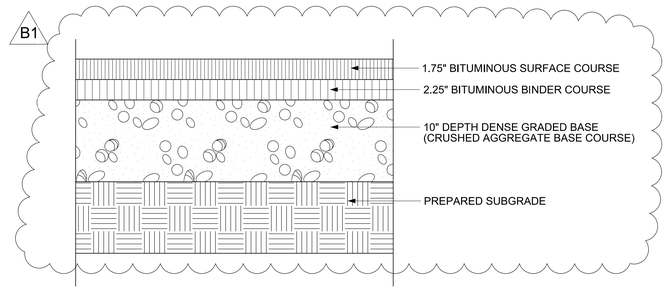
3. PROVIDE EXPANSION JOINTS AT CONNECTIONS TO EXISTING SIDEWALK, CURB RAMPS, AT EITHER END OF FLUSH SIDEWALK FOR ACCESSIBLE STALLS, ALONG CURBS, STAIR LANDINGS, OR OTHER FIXED OBJECTS AND AT 30' MAX. SPACING.

4. SEE 1/M601 FOR HEATED EXTERIOR SLAB DETAIL

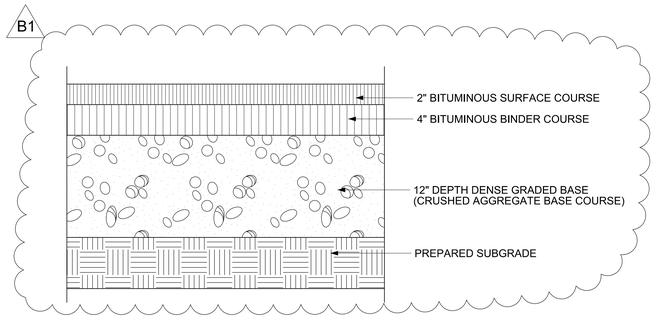
1 C600 CONCRETE PAVEMENT
SCALE: 1"=1'-0"



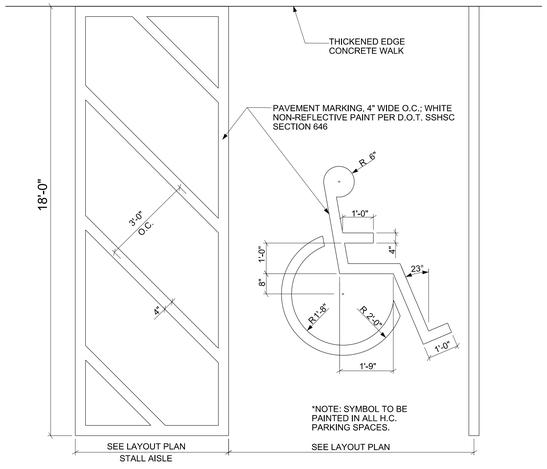
2 C600 THICKENED EDGE CONCRETE PAVEMENT
SCALE: 1"=1'-0"



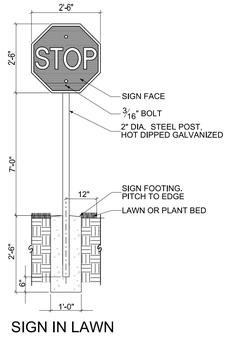
3 C600 ASPHALT PAVEMENT
NTS



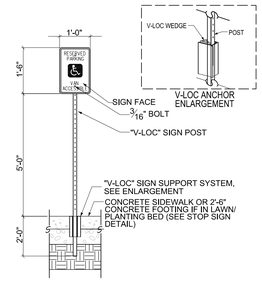
4 C600 HEAVY DUTY ASPHALT PAVEMENT
NTS



5 C600 ACCESSIBLE STALL LAYOUT
SCALE: 1/2"=1'-0"

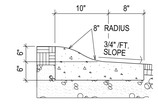


SIGN IN LAWN

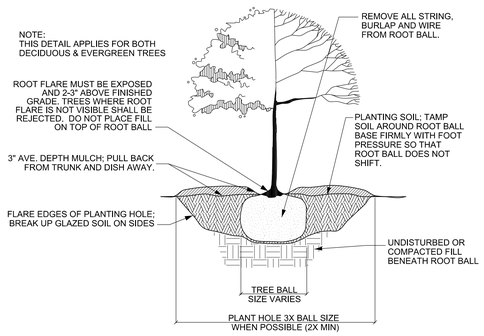


ACCESSIBLE SIGN IN CONCRETE

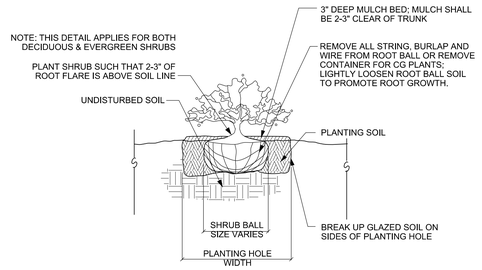
6 C600 POLE-MOUNTED SIGNS
SCALE: 1/2"=1'-0"



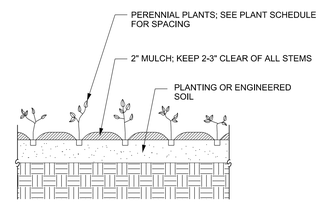
7 C600 REJECT CURB & GUTTER
NTS



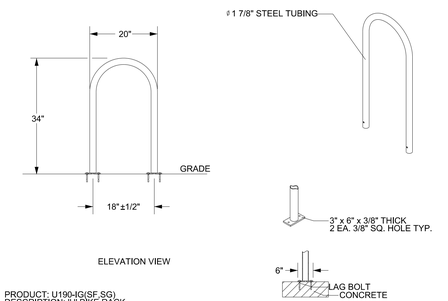
8 C600 TREE PLANTING
SCALE: NTS



9 C600 SHRUB PLANTING
SCALE: NTS



10 C600 PERENNIAL PLANTING
SCALE: NTS



ELEVATION VIEW

SURFACE FLANGE MOUNT (SF) SECTION VIEWS

PRODUCT: U190-IG(SF,SG)
DESCRIPTION: 'U' BIKE RACK
2 BIKE, SURFACE OR IN GROUND MOUNT
DATE: 8-8-14
ENG: SMC

NOTES:
1. INSTALL BIKE RACKS ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
2. CONSULTANT TO SELECT COLOR(FINISH), SEE MANUFACTURER'S SPECIFICATIONS.
3. SEE SITE PLAN FOR LOCATION OR CONSULT OWNER.

11 C600 BIKE RACKS
SCALE: 1"=1'-0"

DORSCHNER
Architecture
Planning
Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

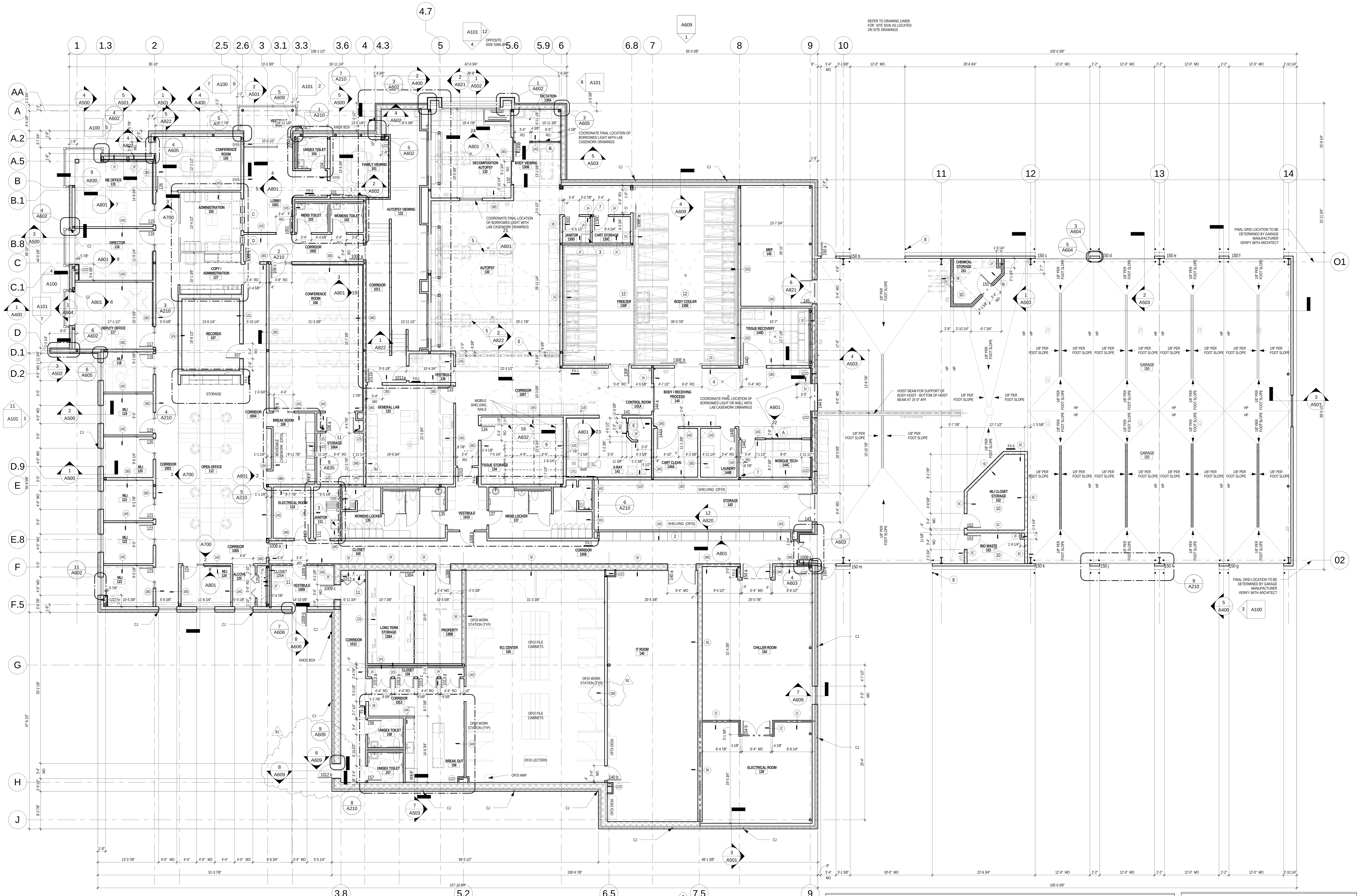
ISSUE
01.12.15 CONSTRUCTION DOCUMENTS
02.12.15 ADDENDUM B1

PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)
3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
SITE AND PLANTING DETAILS

DATE
01.12.15



1 FIRST FLOOR PLAN
1/8" = 1'-0"

NORTH

FLOOR PLAN GENERAL NOTES

1. SEE SHEET A850 FOR PARTITION TYPES.
2. SEE SHEET A700 FOR BORROWED LIGHT ELEVATIONS. SEE SHEET A701 FOR DOOR AND FRAME ELEVATIONS AND DOOR SCHEDULE. SEE SHEET A702 FOR DOOR AND WINDOW FRAME DETAILS.
3. DIMENSIONS ARE TO FACE OF PAINTED SURFACE U.N.O.
4. SEE SHEETS Q000 THRU Q821 FOR AUTOPSY SUITE PLANS AND DETAILS.
5. SEE FINISH PLANS FOR ROOM FINISH INFORMATION
6. MECHANICAL AND ELECTRICAL EQUIPMENT SHOWN HERE FOR REFERENCE ONLY. SEE MEP FOR ADDITIONAL INFORMATION.
7. SEE ENLARGED PLANS FOR DIMENSIONS OF TOILET ROOMS, LOCKER ROOMS, ADMINISTRATIVE AREAS, AND AUTOPSY VIEWING AREA.
8. CJ = REFER TO 3/A606 FOR CONTROL JOINT AND CORNER CAVITY CLOSURE DETAIL. REFER TO BUILDING ELEVATIONS A100 & A101 FOR CORNER JOINT LOCATIONS.
9. SEE SHEETS Q000 THRU Q821 FOR EXTENT AND DETAILS OF WALL PROTECTION SYSTEM.
10. ALL CONCRETE FLOORS IN GARAGE TO SLOPE AT 1/8" PER FOOT MAXIMUM TOWARDS FLOOR DRAINS.
11. ALL FLOORS IN LOCKERS AND SHOWERS TO SLOPE TOWARD FLOOR DRAIN. SEE ARCHITECTURAL PLANS FOR FLOOR DRAIN LOCATIONS.
12. SEAL ALL DUCT AND STRUCTURAL PENETRATIONS INTO THE AUTOPSY SUITE FOR ODOR AND PRESSURIZATION.

FLOOR PLAN KEY NOTES

1. WALL MOUNTED MONITOR - PROVIDE BLOCKING IN WALL AS REQUIRED.
2. TYPE 1 LOCKERS - LOCKER SUPPLIER TO PROVIDE COORDINATION DRAWINGS PRIOR TO POURING CONCRETE PADS.
3. 24" x 24" FLOOR MOUNTED MOP SINK.
4. RECESSED BODY SCALE - SEE Q210 FOR SIZE AND DETAILS.
5. TUBE STEEL OVERHEAD FOR MOUNTING AUTOPSY LIGHTS - BOTTOM OF TUBE AT 10'-8" AFF - SEE STRUCTURAL DRAWINGS FOR TUBE SIZE. SEE 2/A821 FOR LOCATIONS. (B1)
6. HOIST BEAM TO SUPPORT BODY LIFT - BOTTOM OF BEAM AT 10'-2 5/8" AFF - SEE 15 / A832 FOR DETAILS - SEE STRUCTURAL FOR BEAM SIZE
7. 12" WIDE OVERHEAD SHELF
8. 4" DIAMETER CONCRETE FILLED BOLLARDS SEE 12 / A832 FOR DETAILS
9. MOBILE SHELVING SYSTEM WITH RECESSED RAIL - MOBILE SHELVING SUPPLIER TO PROVIDE COORDINATION DRAWINGS PRIOR TO POURING CONCRETE.
10. STORAGE ROOM TO HAVE 4" TOTAL THICKNESS CONCRETE SLAB ABOVE. TOP OF SLAB AT 10'-4" AFF. SEE STRUCTURAL DRAWINGS FOR SUPPORT FRAMING AND DETAILS.
11. COAT HANGER ROD AND SHELF
12. REFER TO "Q" SERIES SHEETS FOR LAYOUT AND DETAILS OF BODY COOLER AND FREEZER

DORSCHNER | ASSOCIATES

Architecture
Planning

Dorschner|Associates, Inc.
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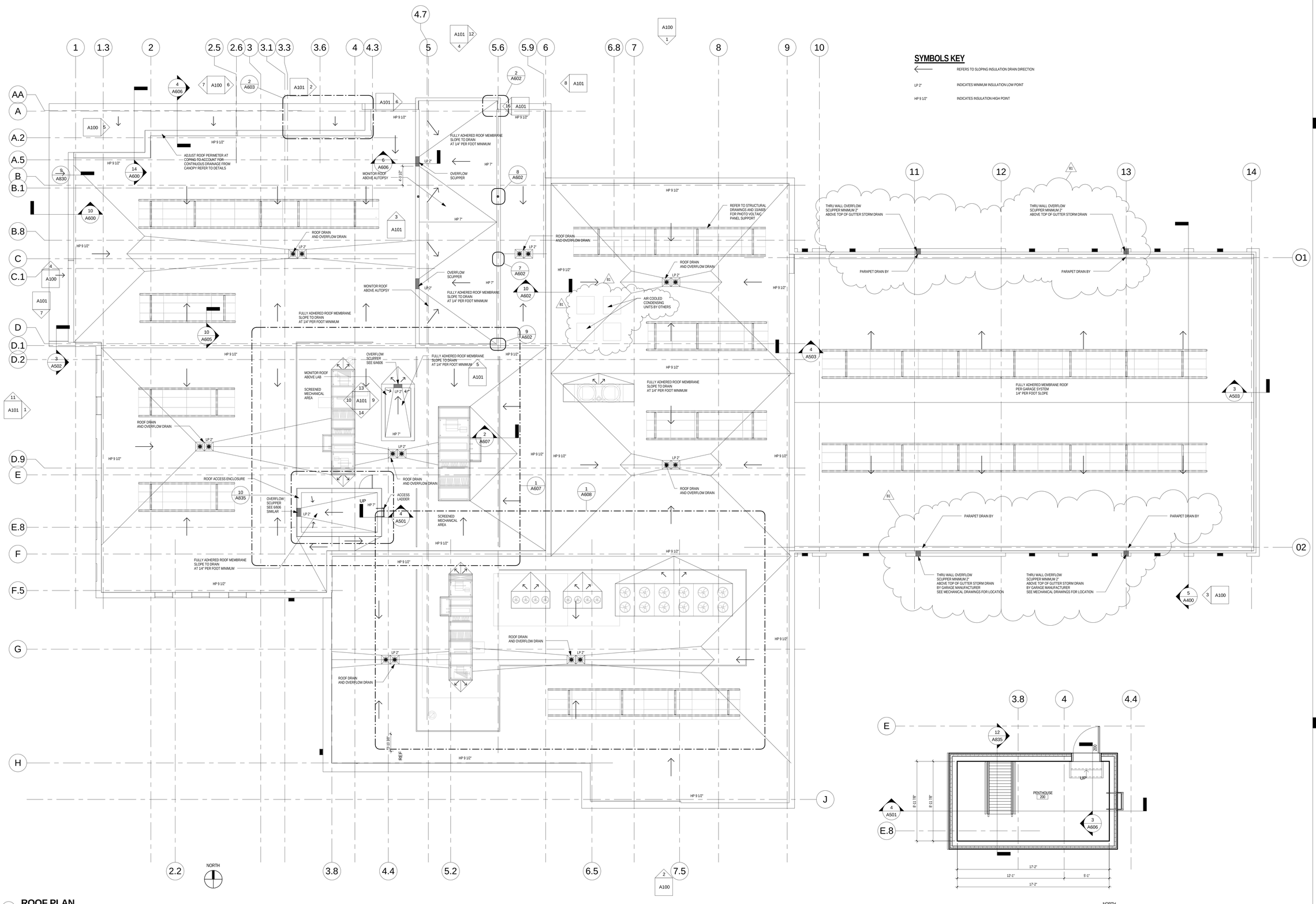
DRAWING
FIRST FLOOR PLAN

DATE
01.12.15

A200



1 **ROOF PLAN**
1/8" = 1'-0"

2 **PENTHOUSE FLOOR PLAN**
1/4" = 1'-0"

NORTH

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BID NO.
313083

DRAWING
ROOF PLAN

DATE
01.12.15

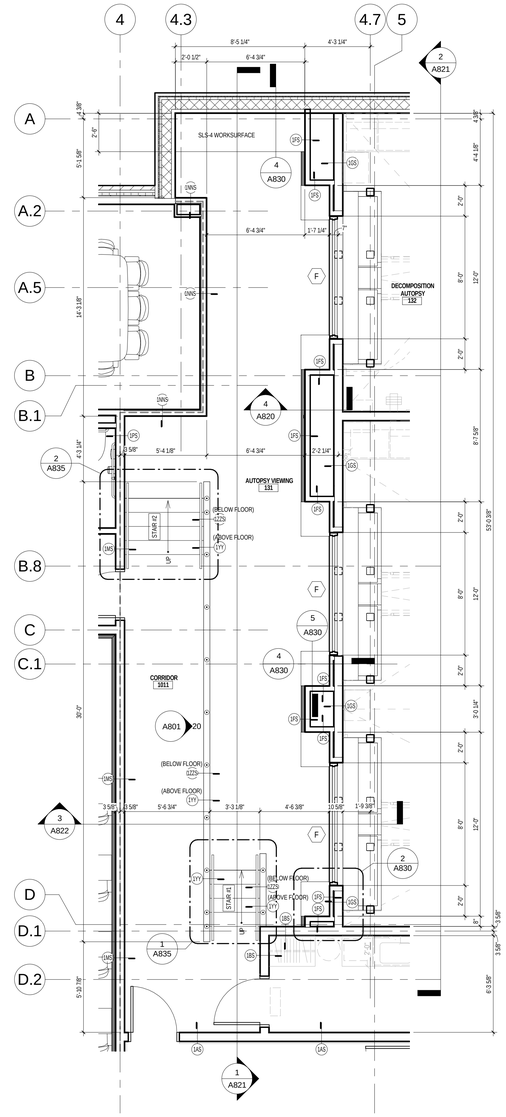
A201

FLOOR PLAN GENERAL NOTES

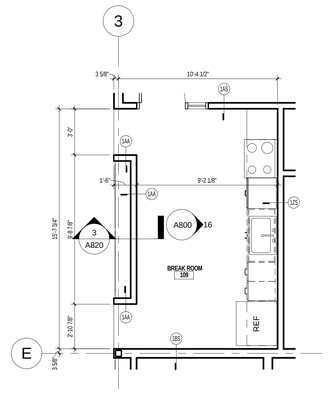
1. SEE SHEET A850 FOR PARTITION TYPES.
2. SEE SHEET A700 FOR BORROWED LIGHT ELEVATIONS. SEE SHEET A701 FOR DOOR AND FRAME ELEVATIONS AND DOOR SCHEDULE. SEE SHEET A702 FOR DOOR AND WINDOW FRAME DETAILS.
3. DIMENSIONS ARE TO FACE OF PAINTED SURFACE U.N.O.
4. SEE SHEETS Q000 THRU Q821 FOR AUTOPSY SUITE PLANS AND DETAILS.
5. SEE FINISH PLANS FOR ROOM FINISH INFORMATION AND EXTENT OF WALL PROTECTION SYSTEMS.
6. MECHANICAL AND ELECTRICAL EQUIPMENT SHOWN HERE FOR REFERENCE ONLY. SEE MEP DRAWINGS FOR ADDITIONAL INFORMATION.
7. SEE ENLARGED PLANS FOR DIMENSIONS OF TOILET ROOMS, LOCKER ROOMS, ADMINISTRATIVE AREAS, AND AUTOPSY VIEWING AREA.
8. CJ = REFER TO 3/A606 FOR CONTROL JOINT AND CORNER CAVITY CLOSURE DETAIL. REFER TO BUILDING ELEVATIONS A100 & A101 FOR CORNER JOINT LOCATIONS.
9. SLOPE ALL FLOORS IN LOCKER ROOMS AND BATHROOMS TO FLOOR DRAINS SHOWN.

FLOOR PLAN KEY NOTES

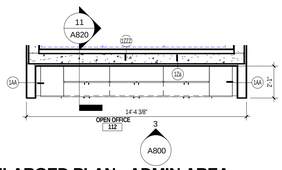
1. TYPE 2 LOCKERS - LOCKER SUPPLIER TO PROVIDE COORDINATION DRAWINGS PRIOR TO POURING CONCRETE PADS.
2. 72" LONG X 20" WIDE WALL MOUNTED BENCH.
3. 60" LONG X 20" WIDEWALL MOUNTED BENCH.



7 ENLARGED PLAN - AUTOPSY VIEWING AREA
1/4" = 1'-0"



5 BREAK ROOM
1/4" = 1'-0"



4 ENLARGED PLAN - ADMIN AREA
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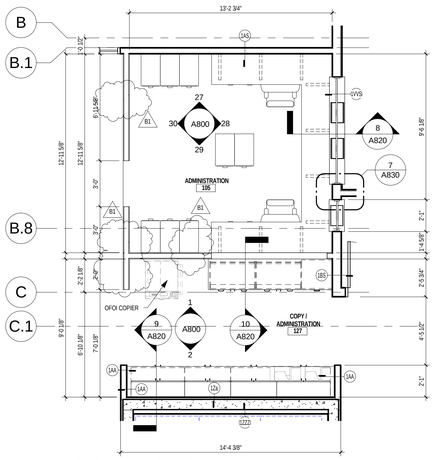
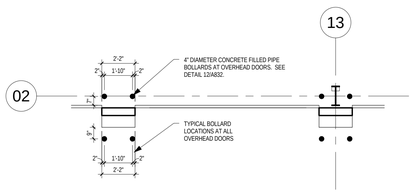
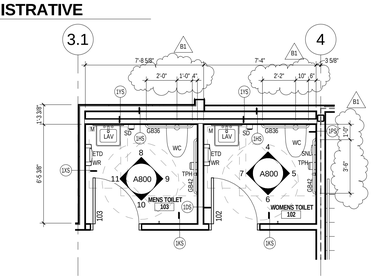


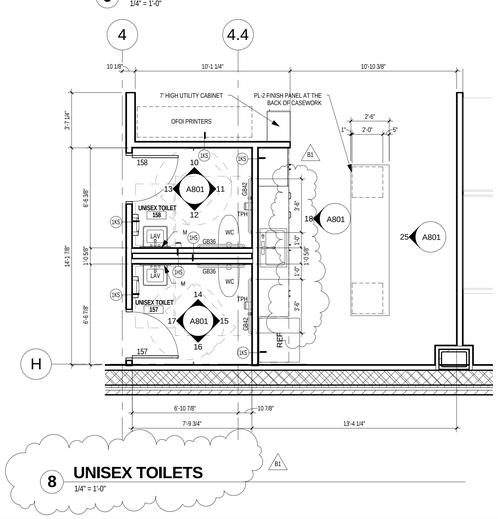
3 COPY / ADMINISTRATIVE
1/4" = 1'-0"



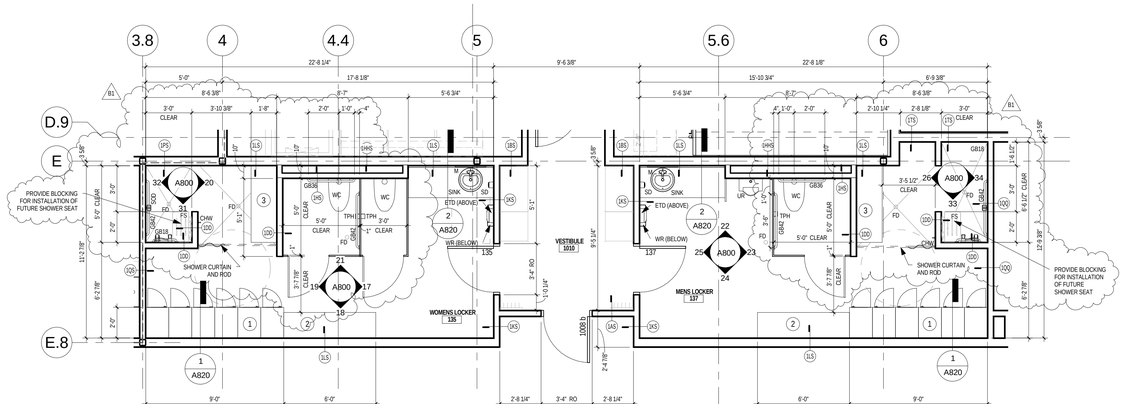
9 TYPICAL BOLLARD LOCATIONS
1/4" = 1'-0"



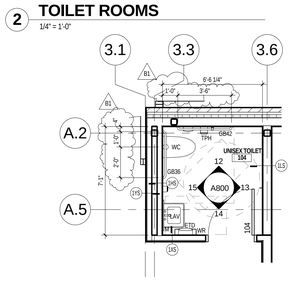
2 TOILET ROOMS
1/4" = 1'-0"



8 UNISEX TOILETS
1/4" = 1'-0"



6 MENS AND WOMENS LOCKERS
1/4" = 1'-0"



1 UNISEX TOILET
1/4" = 1'-0"

DORSCHNER ASSOCIATES

Architecture
Planning

Dorschner|Associates, Inc.
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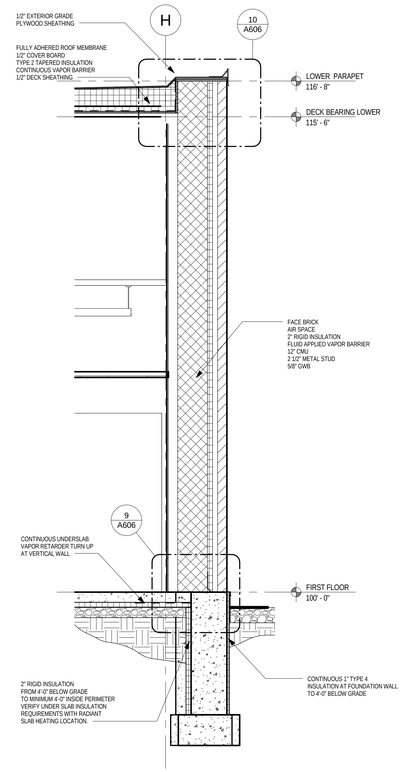
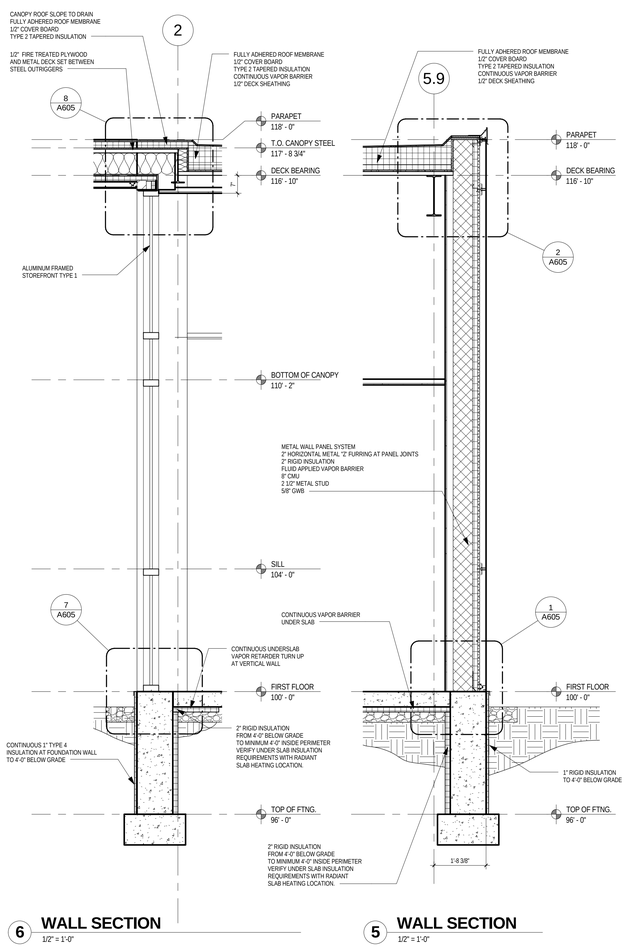
DRAWING
ENLARGED FLOOR PLANS

DATE
01.12.15



7 **WALL SECTION**
1/2" = 1'-0"



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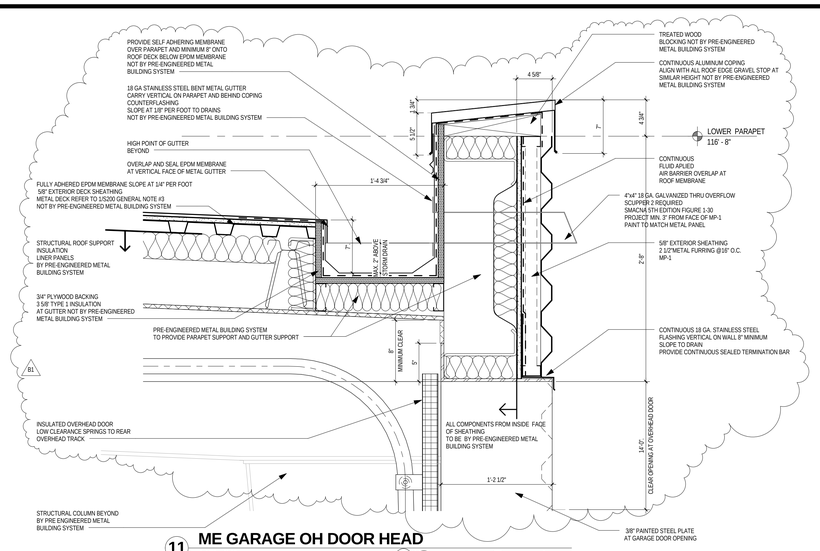
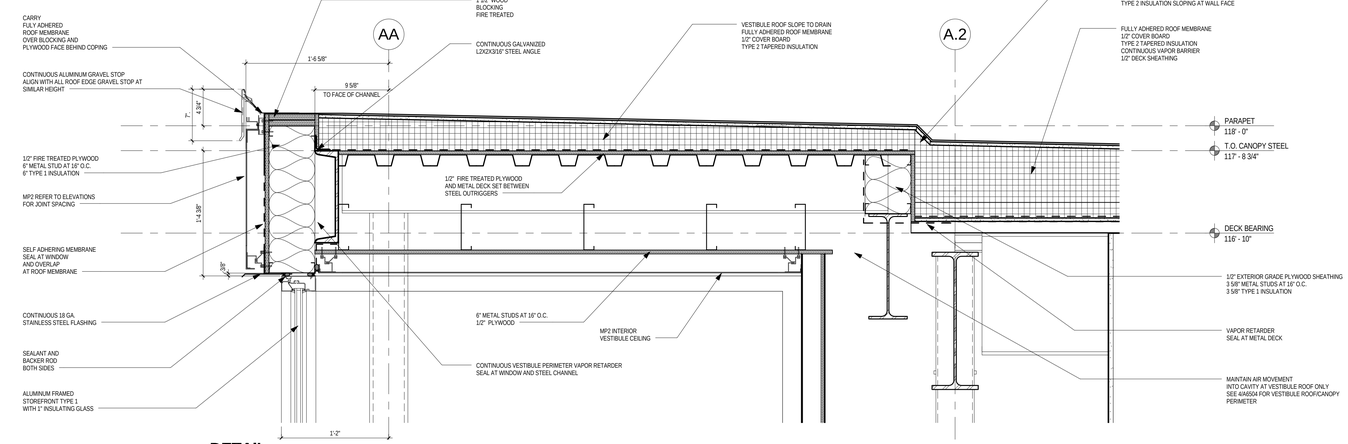
DRAWING
EXTERIOR WALL SECTIONS

DATE
01.12.15

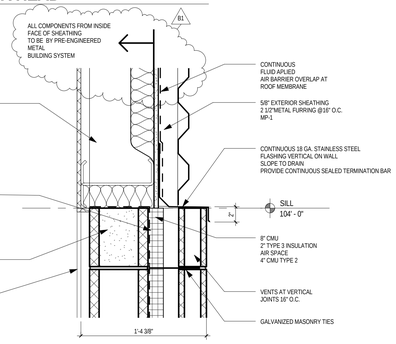
A503



11 ME GARAGE OH DOOR HEAD
1 1/2" = 1'-0"

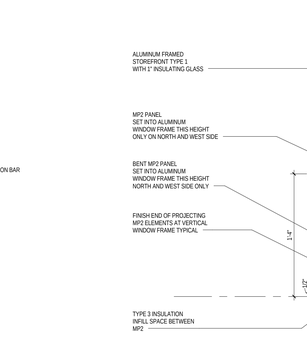


8 DETAIL
1 1/2" = 1'-0"

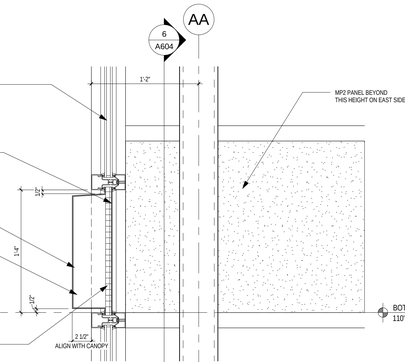


10 GARAGE SILL
1 1/2" = 1'-0"

7 DETAIL
1 1/2" = 1'-0"

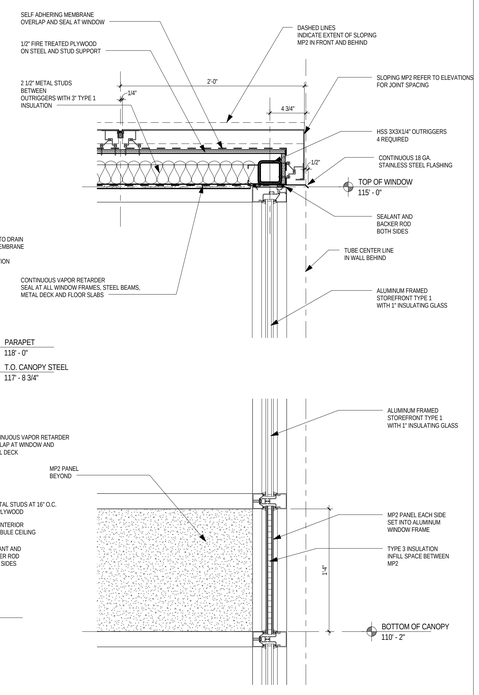


3 DETAIL
1 1/2" = 1'-0"

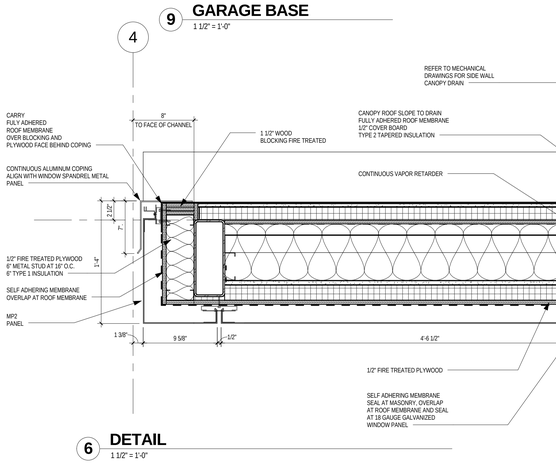


5 DETAIL
1 1/2" = 1'-0"

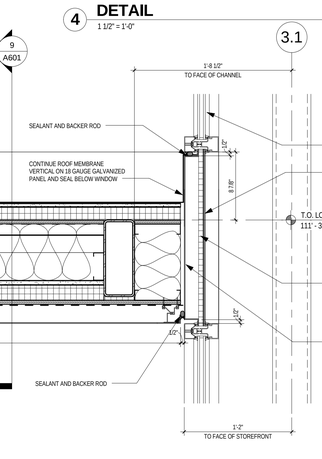
4 DETAIL
1 1/2" = 1'-0"



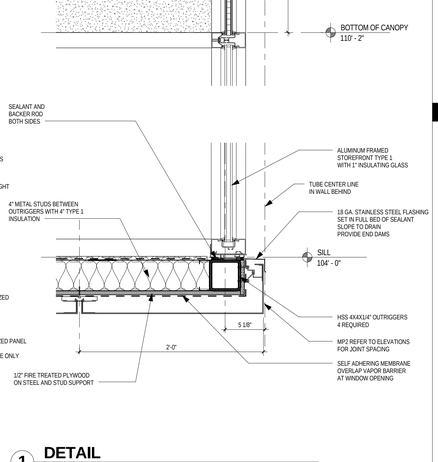
1 DETAIL
1 1/2" = 1'-0"



6 DETAIL
1 1/2" = 1'-0"



9 GARAGE BASE
1 1/2" = 1'-0"



2 DETAIL
1 1/2" = 1'-0"

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Planning
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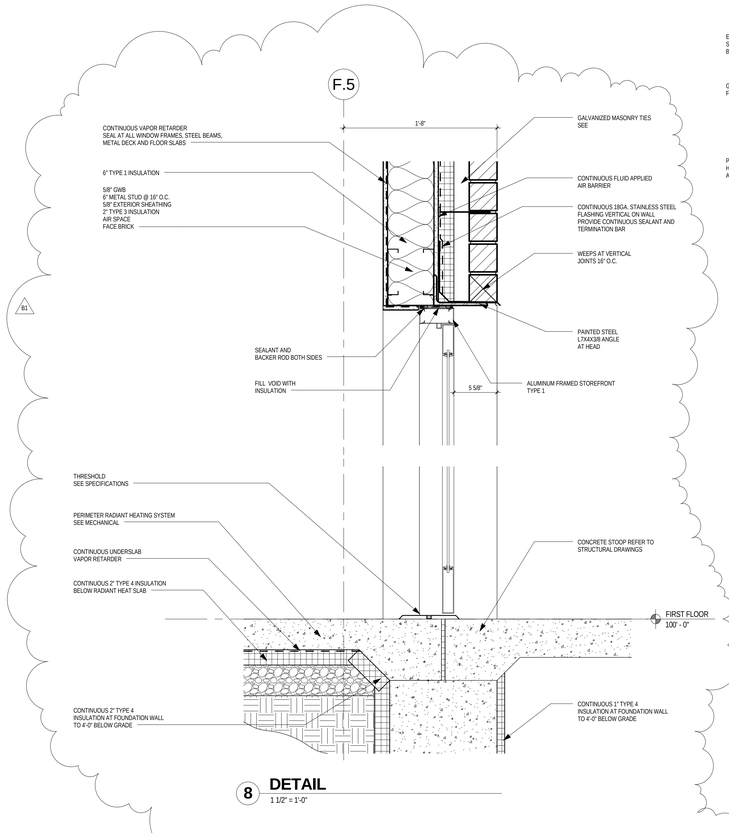
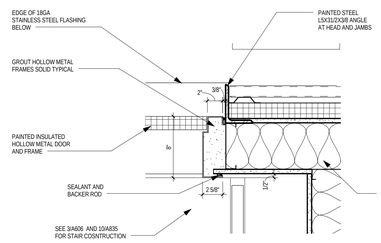


8 DETAIL
1 1/2" = 1'-0"



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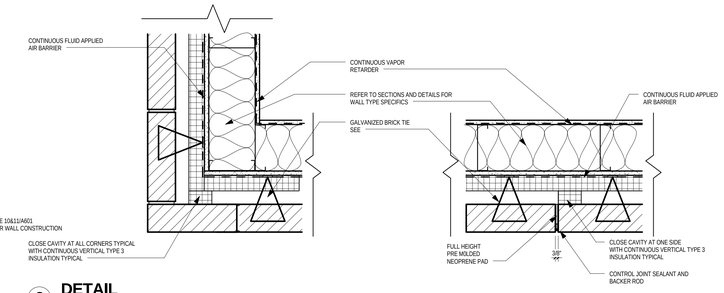
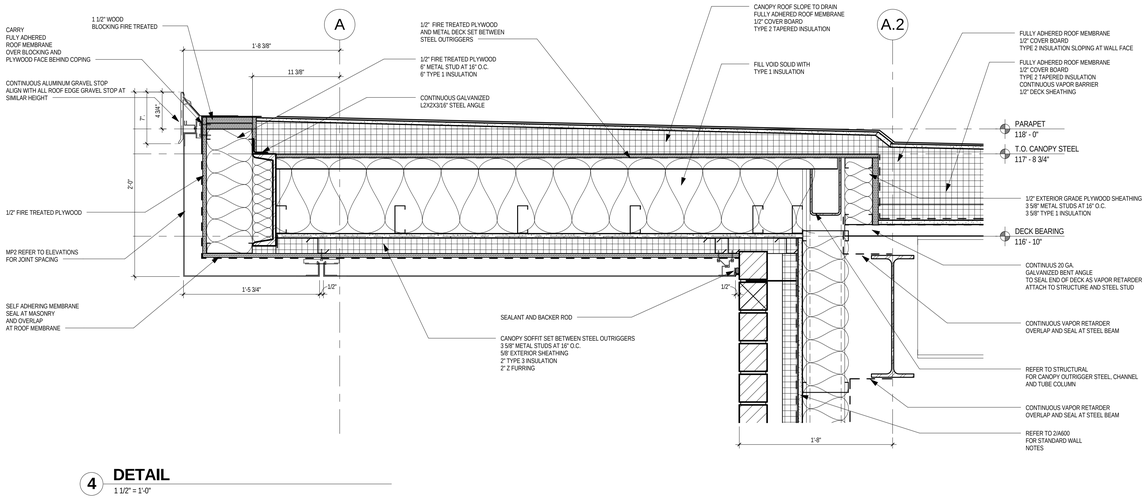
1 1/2" = 1'-0"



2 DETAIL
1 1/2" = 1'-0"



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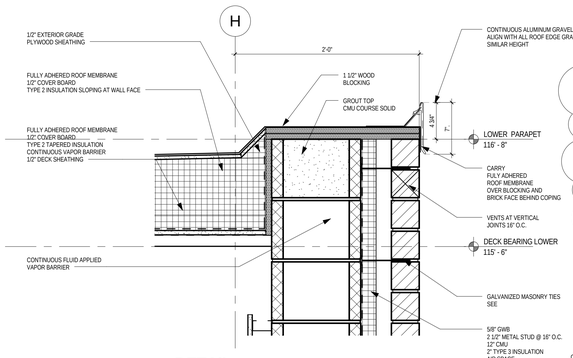

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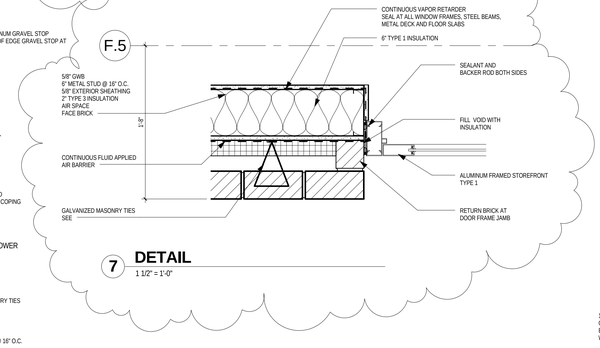
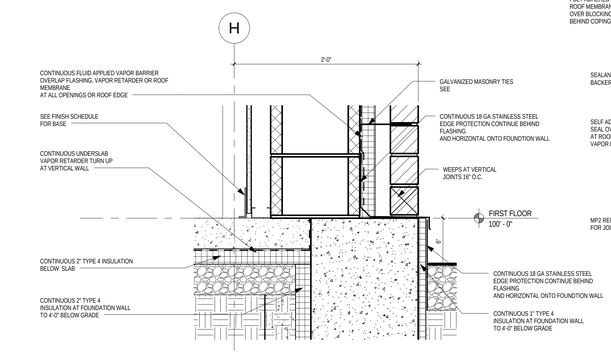
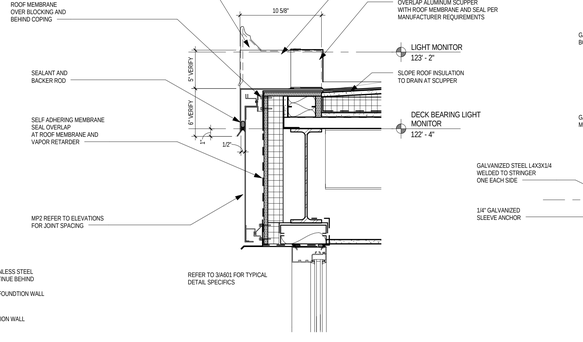


7 DETAIL
1 1/2" = 1'-0"



9 DETAIL
1 1/2" = 1'-0"



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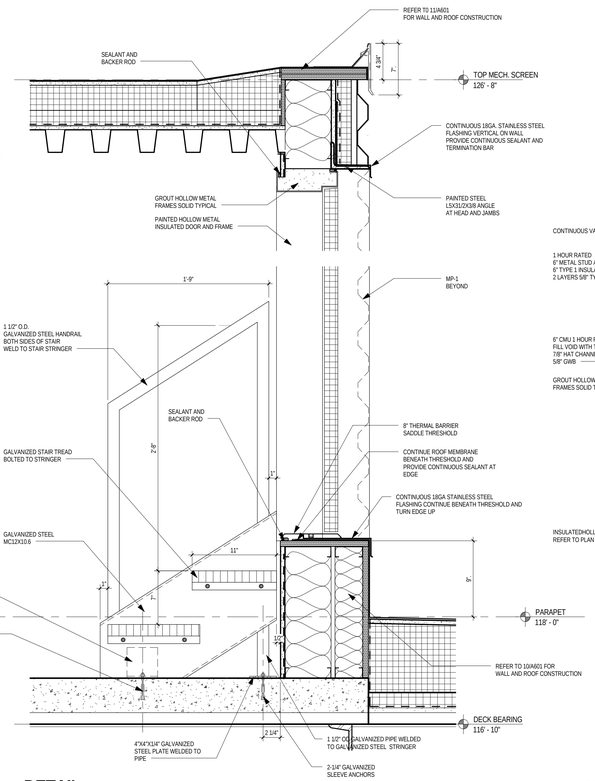
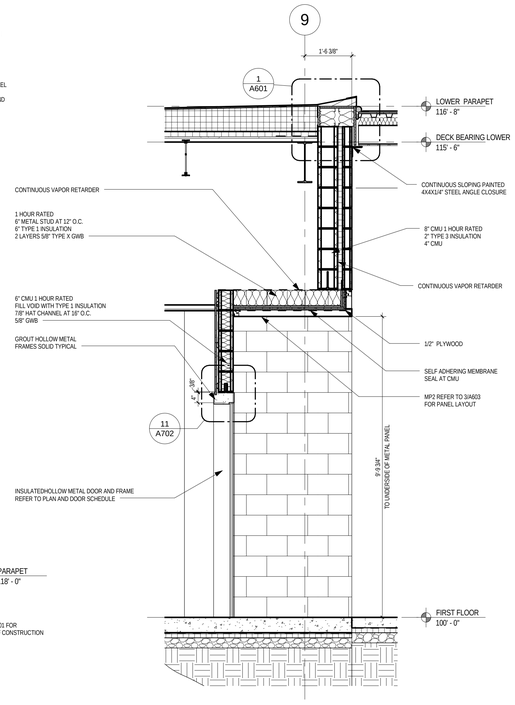


3 DETAIL
1 1/2" = 1'-0"



1 WALL SECTION DETAIL
1/2" = 1'-0"

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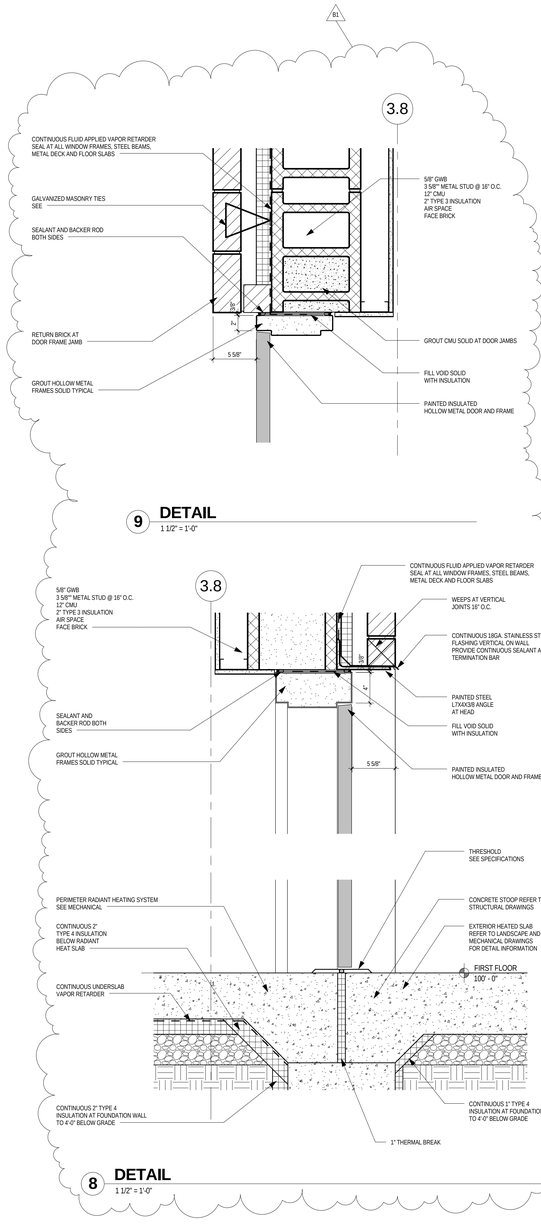
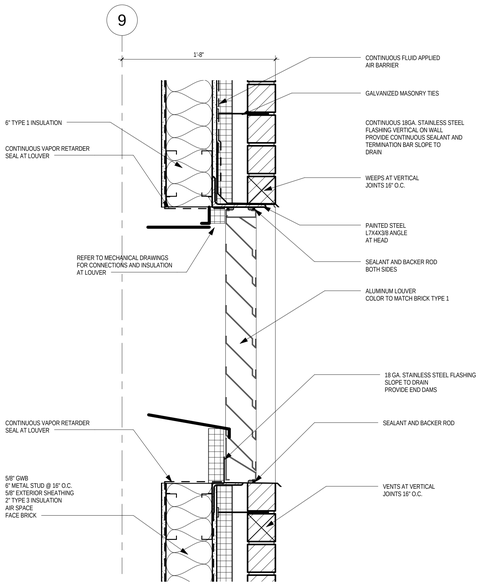
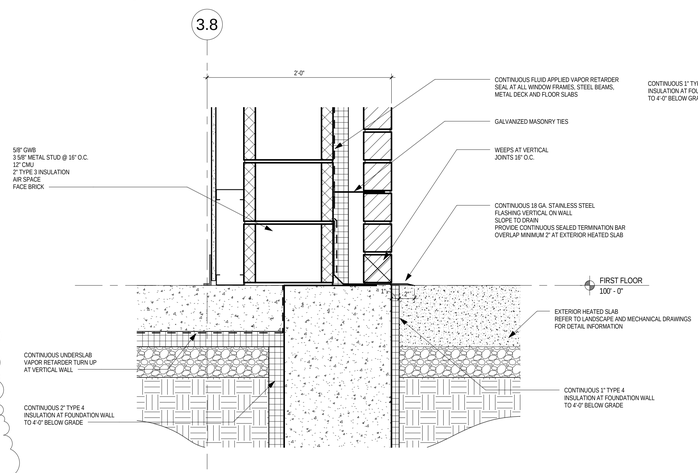


9 DETAIL
1 1/2" = 1'-0"

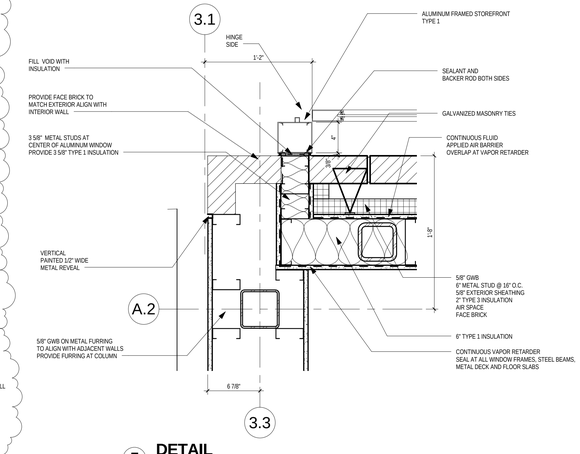
8 DETAIL
1 1/2" = 1'-0"



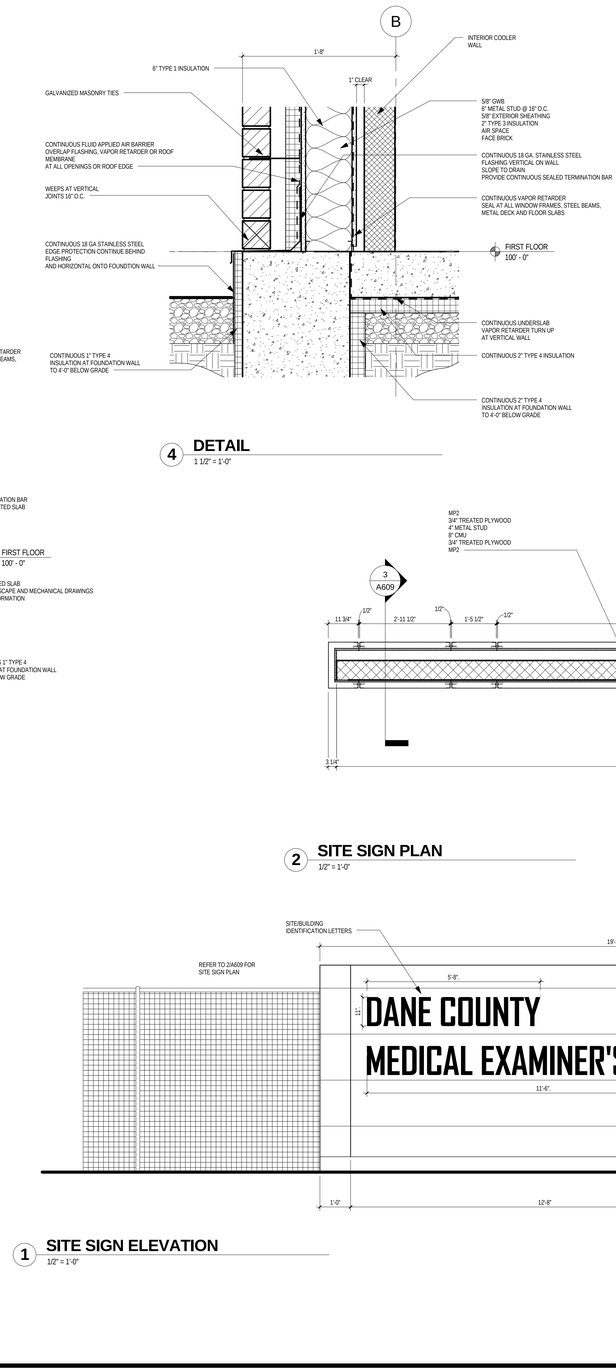
7 DETAIL
1 1/2" = 1'-0"



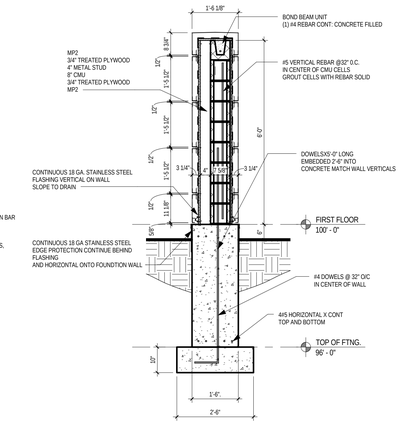
6 DETAIL
1 1/2" = 1'-0"



5 DETAIL
1 1/2" = 1'-0"



4 DETAIL
1 1/2" = 1'-0"



3 SITE SIGN SECTION
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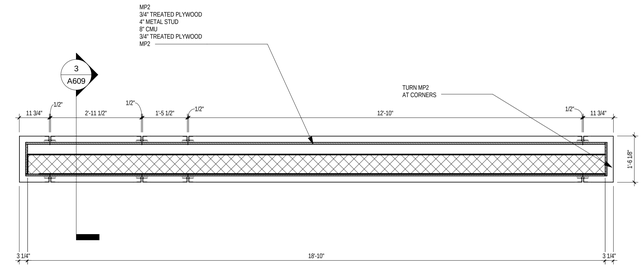


2 SITE SIGN PLAN
1/2" = 1'-0"

1 SITE SIGN ELEVATION
1/2" = 1'-0"

DORSCHNER ASSOCIATES
Architecture
Planning
Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

ISSUE

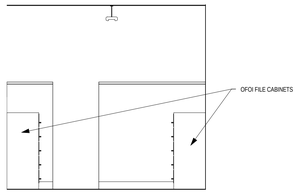
01.12.15	CONSTRUCTION DOCUMENTS
02.12.15	ADDENDUM B1

PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)
3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
EXTERIOR DETAILS

DATE
01.12.15



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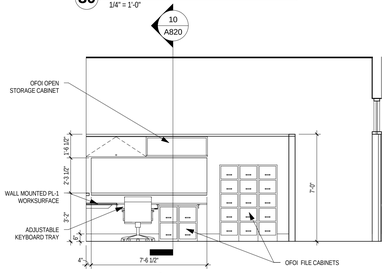

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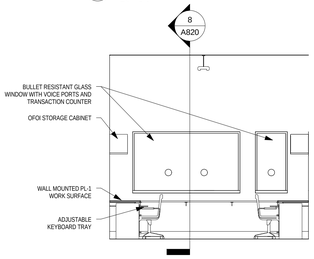

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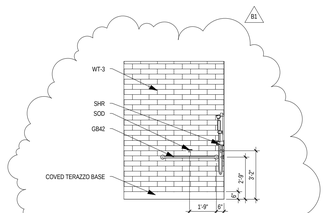

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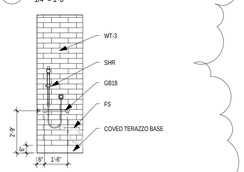

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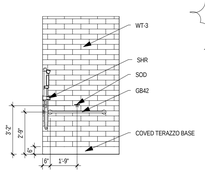

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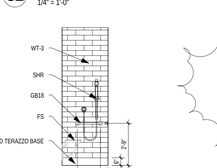

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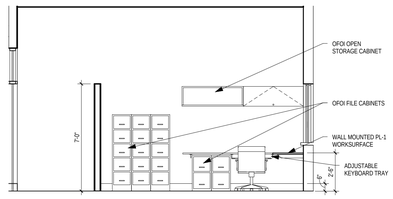

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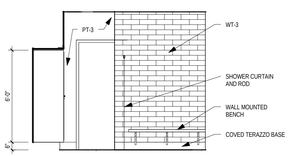

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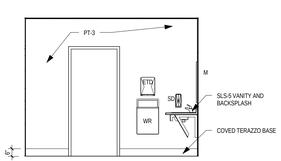

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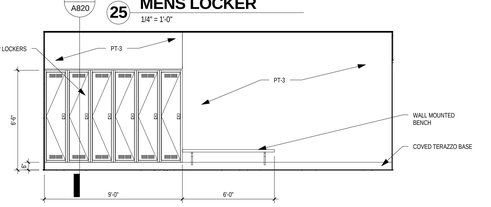

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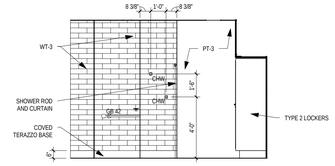

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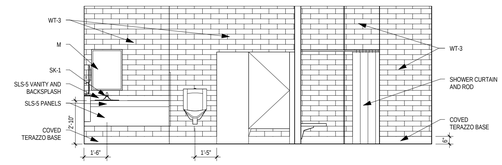

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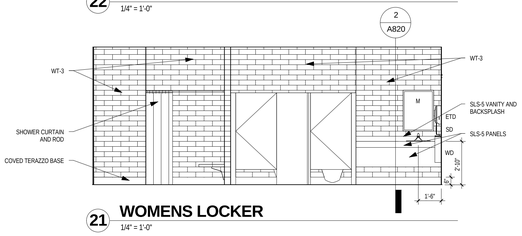

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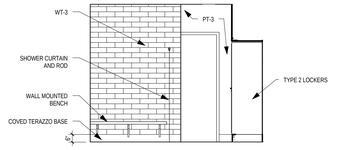

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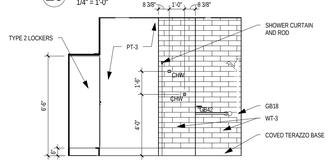

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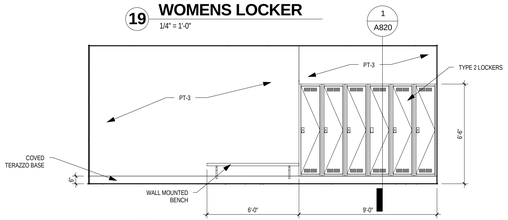

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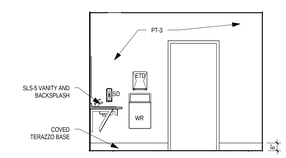

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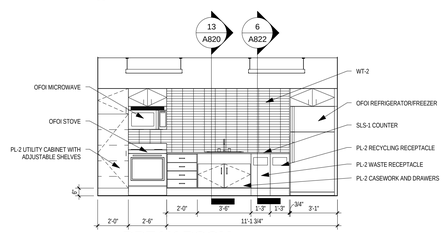

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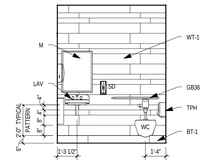

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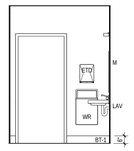

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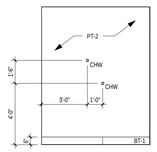

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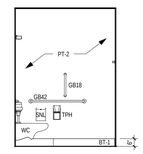

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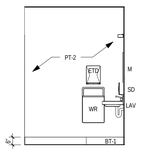

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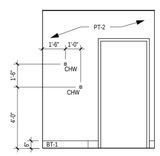

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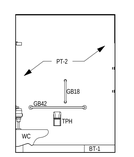

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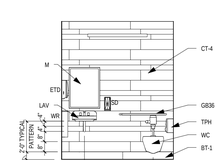

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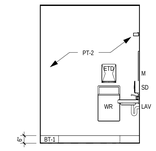

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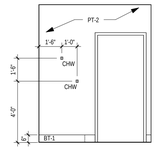

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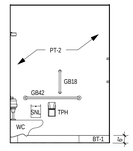

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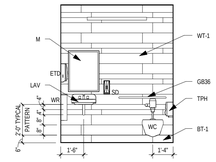

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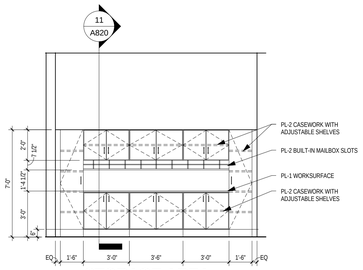

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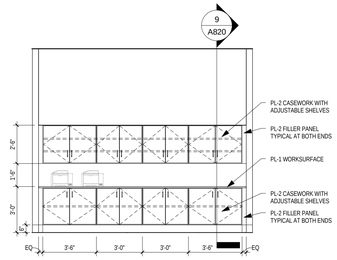

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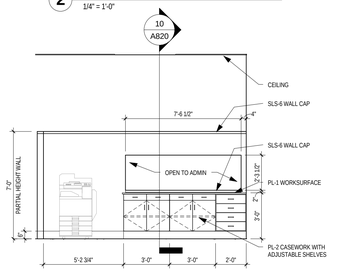

1 COPY AREA
1/4" = 1'-0"

DORSCHNER ASSOCIATES
Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
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02.12.15	ADDENDUM B1

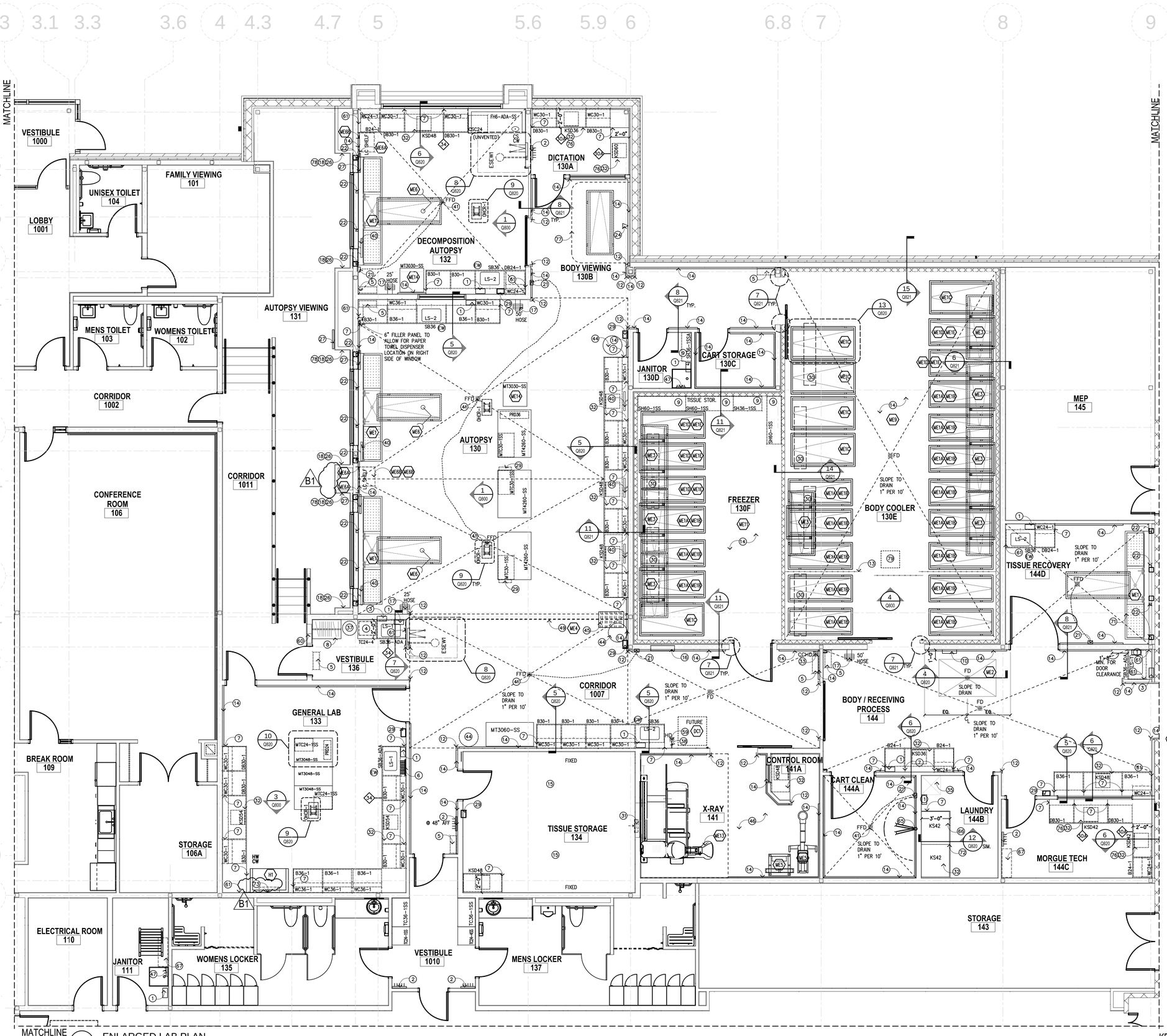
PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
INTERIOR ELEVATIONS

DATE
01.12.15



KEY SYMBOLS

- (L) LOCKING
- (M) MONITOR TO BMS
- (DW) DECK MOUNTED DRENCH HOSE EYEWASH FIXTURE
- (XX) MARINE EDGE COUNTER ELEVATION IN INCHES
- (XX) NON-MARINE EDGE COUNTER ELEVATION IN INCHES
- (X) KEY NOTES
- XX EQUIPMENT
- XXX ROOM NUMBERS

ABBREVIATIONS

CCHD –COOLER CONDENSATE HD
HD –HUB DRAIN
FD –FLOOR DRAIN
FFD –FLUSHABLE FLOOR DRAIN
SS –STAINLESS STEEL

KEY NOTES

1. PAPER TOWEL DISPENSER– BY DIV. 10.
2. COAT HOOKS MOUNTED AT 60" U.N.O.–SPEC. 116000
3. SAFETY CABINET–SPEC. 116000
4. SPILL CART–SPEC. 116000
5. BUG ZAPPER MOUNTED @ +84" A.F.F.–BY DIV 26
6. EPOXY DRYING RACK – 18"x36" – SPEC. 123450
7. FILLER PANEL – MATCH CASEWORK MATERIAL
8. COAT RACK & SHELF–SPEC 116000
9. SS SHELVING–SPEC. 116000
10. DIGITAL READ OUT FOR SCALE @ 48" A.F.F.–SPEC. 117810
11. BOLLARD– REFER TO ARCHITECTURAL DETAILS
12. S.S. CORNER GUARD – REFER TO DET. 9/Q821
13. GALVANIZED FENCE WITH MANUAL SLIDE GATE INSIDE BODY COOLER BY COOLER MFR.
14. S.S. WALL GUARD – REFER TO DET. 10/Q821. S.S. WALL GUARDS IN ROOMS 130E AND 130F ARE TO BE BY COOLER MFR.
15. HIGH DENSITY SHELVING– BY DIV. 10
16. COOLER CONTROL PANEL–(SEMI–RECESSED)
17. HOT & COLD WATER MIXING STATION–BY DIV. 22
18. POWER BY DIVISION 26
19. ELECTRICAL RACEWAY TYPICAL–REFER TO ELECTRICAL DRAWINGS
20. SPRAY HOSE ASSEMBLY – 2 PER STATION, TYP. – SPEC. 117810
21. FLUSHING FLOOR DRAIN PUSH BUTTONS–BY DIV. 22
22. STEEL STRUCTURE TO SUPPORT DISSECTING STATIONS CONCEALED IN WALL – REFER TO STRUCTURAL
23. LIMS SYSTEM (NIC)
24. BODY VIEWING CAMERA– BY DIV. 26
25. NOT USED B1
26. DATA BY DIVISION 26
27. FLAT PANEL DIGITAL MONITOR w/ ARTICULATING ARM–OFOI
28. HYDRO ASPIRATOR HOSE – SPEC. 117810
29. GLOVE BOX– BY DIV. 123450 REFER TO DETAIL 15/Q820
30. APPROXIMATE LOCATION OF EVAPORATING UNITS IN COLD ROOMS MOUNTED NEAR CEILING
31. LOW ELEVATION EXHAUST–REFER TO MECHANICAL
32. OPEN TO FINISH WALL SURFACE
33. COOLER CONDENSATE HUB FLOOR DRAIN. –BY DIV. 22
34. 6" WALL BASE–REFER TO FINISH SCHEDULE.
35. SS–UTILITY SINK–BY DIV. 22
36. NOT USED B1
37. CLOTHING HAMPER (NIC)
38. COLD WATER HOSE BIB MOUNTED @48" AFF– BY DIV. 22
39. NOT USED B1
40. ARTICULATING WHITE BOARD–SPEC 116000
41. FLUSHABLE FLOOR DRAIN, BY DIV. 22
42. 2" CONDUIT TO ABOVE CEILING AND LIGHT REFER TO ELEVATION 1/Q800
43. S.S. SHELF – 8'L X 11"D–BY AUTOPSY TABLE MFR
44. TRASH CAN– (NIC)
45. ULTIMATE 1000 LB BODY LIFT– SPEC 117810
46. X–RAY ROOM TO BE SHIELDED PER QUALIFIED PHYSICIST CONSULTANT PRIOR TO CONSTRUCTION. COORDINATE WITH COUNTY.
47. MOP AND BROOM HOLDER RACK–SPEC. 116000
48. EXHAUST DUCT TO TACD–36– BY DIV. 23
49. BODY HOIST BEAM BY STRUCTURAL
50. NOT USED B1
51. SCALE POLE BRACKET
52. INSTRUMENT DRAWER
53. DISPOSAL SWITCH
54. GFCI OUTLET W/ WEATHERPROOF COVER
55. 2 HP DISPOSAL– SPEC. 117810
56. END RINSE CONTROL VALVE
57. GOOSENECK HW & CW FAUCET
58. EXHAUST VENTS BY DISSECTING STATION MFR. (6"X28") –COORDINATE DUCTWORK WITH DIV. 23
59. HUB DRAIN FOR DRYING CABINET
60. RECESSED GUN LOCKERS MT @ 54" C AFF– SPEC 123450
61. INTEGRAL COUNTERTOP SIDE SPLASH
62. NOT USED B1
63. EXHAUST VENTS BY DISSECTING STATION MFR. (6"X22") –COORDINATE DUCTWORK WITH DIV. 23
64. NOT USED B1
65. SWING ARM WASH DOWN– BY DIV. 22
66. UNDER COUNTER WASHER AND DRYER. BENCH HEIGHT TO BE DETERMINED BY OWNER FURNISHED EQUIPMENT
67. 3'LX12"D METAL SHELF MOUNTED AT 60" AFF–BY CASEWORK MFR. REFER TO ELECTRICAL DRAWINGS FOR ASSOCIATED ELECTRICAL RECEPTACLES
68. FORMALIN SPIGOT
69. FORMALIN CONTAINER AND DISPENSING PUMP ON 18" DEEP SHELF
70. PUMP CONTROL FOR FORMALIN DISPENSER
71. DISSECTING STATION IN TISSUE RECOVERY 144D WILL BE THE TYPICAL STATION LAYOUT EXCEPT: NO FORMALIN DISPENSER, NO CUTTING BOARDS AND NO SCALE POLE, BUT INCLUDE SCALE POLE BRACKET
72. SUPPORT APRON– REFER TO DETAIL 12/Q820
73. EXHAUST DUCT–BY DIV 23
74. HOSE RACK– BY DIV. 22
75. NOT USED B1
76. 30" MOST KNEE SPACE REDUCE SUPPORT RAIL HEIGHTS TO 3" TO ALLOW FOR ADEQUATE KNEE SPACE.
77. BODY VIEWING CURTAIN AND TRACK–BY DIV. 10
78. CONDUIT TO AUTOPSY AUDIO EQUIPMENT
79. COOLER DEHUMIDIFICATION UNIT– REFER TO MEP DRAWINGS FOR EXACT LOCATION. LOCATE WITHIN 25 FEET OF THE COLD ROOM.

DORSCHNER ASSOCIATES
Architecture
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Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
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MWL
McClaren, Wilson & Lawrie, Inc.
11798 North Lakeridge Parkway
Ashland, Va 23005
(804)228.7465
www.mwlarchitects.com

PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

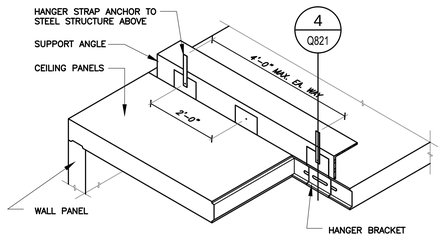
3562 County Highway AB
MCFARLAND, WI 53558

BID NO.
313083

DRAWING
ENLARGED FLOOR PLAN

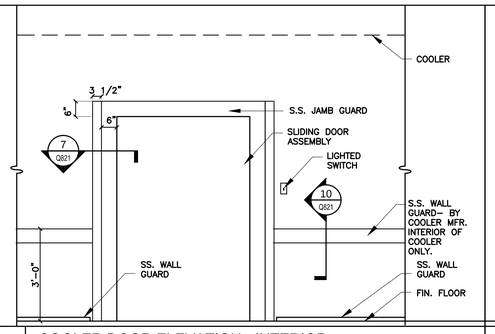
DATE
01.12.15

Q210

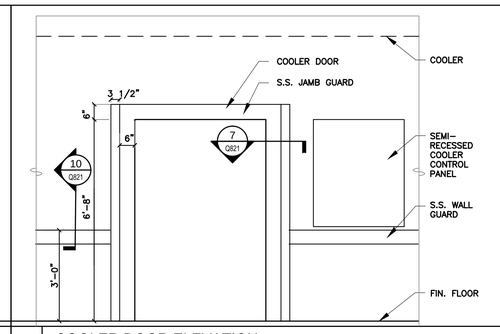


NOTE: DESIGN ALL COOLER AND FREEZER CEILING PANELS TO SUPPORT A LIVE LOAD OF 50 PSF.

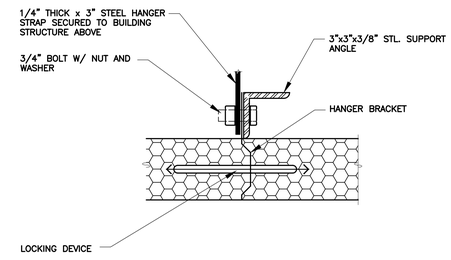
1 SUSPENDED COOLER CEILING 1–1/2" = 1'–0"



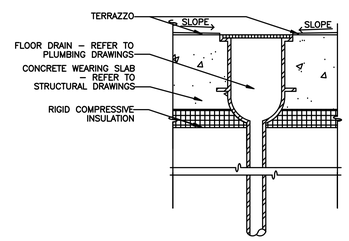
2 COOLER DOOR ELEVATION - INTERIOR 1/2" = 1'–0"



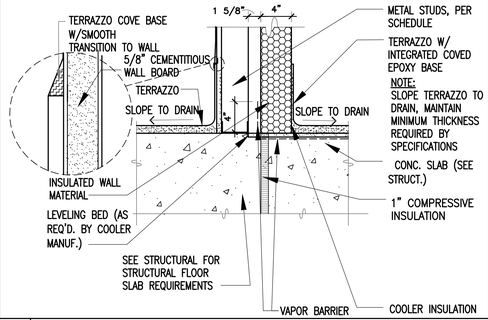
3 COOLER DOOR ELEVATION 1/2" = 1'–0"



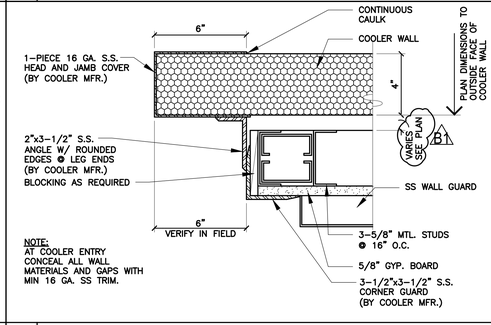
4 COOLER CEILING HANGER 3" = 1'–0"



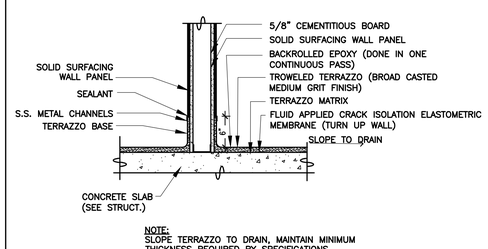
5 COOLER FLOOR DRAIN DETAIL NTS



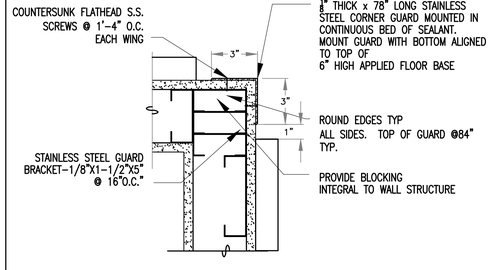
6 COOLER WALL TO SLAB DETAIL 1–1/2"=1'–0"



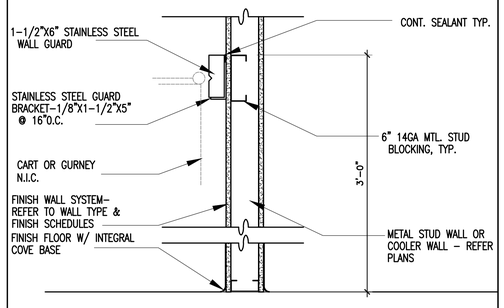
7 DOOR COOLER JAMB & HEADER 3" = 1'–0"



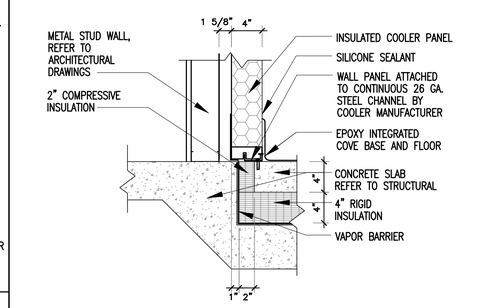
8 FLOOR SYSTEM SECTION 1/2" = 1'–0"



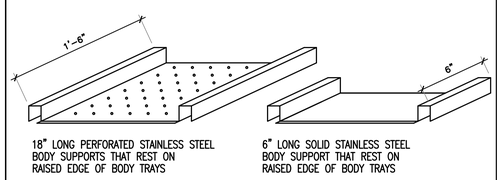
9 TYPICAL S.S. CORNER GUARD DETAIL 3"=1'–0"



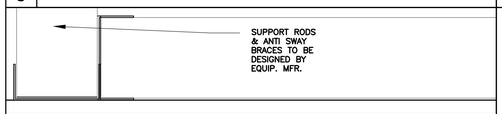
10 TYPICAL S.S. WALL GUARD DETAIL 1 1/2" = 1'–0"

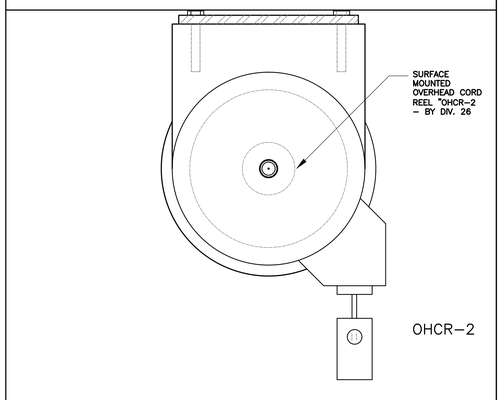


11 FREEZER SLAB DETAIL 1 1/2" = 1'–0"

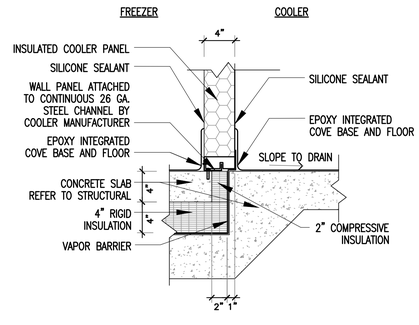


12 CUSTOM SS BODY SUPPORT 1 1/2" = 1'–0"

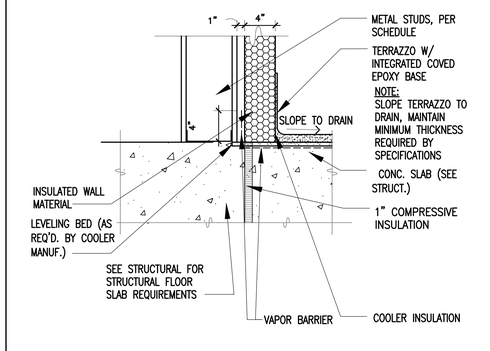




13 SURFACE MOUNTED CORD REEL 3"=1'–0"



14 FREEZER AND COOLER DETAIL 1 1/2"=1'–0"



15 COOLER WALL TO SLAB AT EXTERIOR 1 1/2"=1'–0"

DORSCHNER ASSOCIATES

Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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MWL
McClaren, Wilson & Lawrie, Inc.
11798 North Lakeridge Parkway
Ashland, Va 23005
(804)228.7465
www.mwlarchitects.com

PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

3562 County Highway AB
MCFARLAND, WI 53558

BID NO.
313083

DRAWING
AUTOPSY DETAILS

DATE
01.12.15

Q821

NOTES FOR FOUNDATION OF PRE-ENGINEERED METAL BUILDING AT GARAGE

1. BASE PLATE AND ANCHORS SIZES / QUANTITIES WILL NOT BE AVAILABLE UNTIL A SUPPLIER IS CHOSEN FOR THE METAL BUILDING.
2. FOR BID PURPOSES, THE ANCHOR BOLTS SHALL BE BID AS (4) ±1"Ø x 2'-0" LONG w/ NUTS AND WASHERS FOR EACH COLUMN. THE EMBEDDED END OF THE ANCHOR BOLT SHALL BE HOOKED 3".
3. PIER SIZES AND REINFORCING IS DETAILED FOR BID PURPOSES. THESE WILL BE CONFIRMED OR CORRECTED WHEN A METAL BUILDING SUPPLIER IS CHOSEN.
4. FRAME OUT OPENING IN WALL FOR LOUVERS. SEE ARCH DRAWINGS FOR LOCATIONS.

4" CONCRETE SLAB ON GRADE SET ON 10 mil VAPOR RETARDER ON 6" GRANULAR FILL w/ LESS THAN 7% PASSING #200 SLEEVE. PLACE CONTROL JOINTS @ MAX SPACING 12'-0" - 15'-0". SLAB ON GRADE IS REINFORCED w/ 6x6 - 10/10 WWF. NOMINAL TOP OF SLAB EL = 100'-0"

4" CONCRETE SLAB ON GRADE SET ON 10 mil VAPOR RETARDER ON 6" GRANULAR FILL w/ LESS THAN 7% PASSING #200 SLEEVE. PLACE CONTROL JOINTS @ MAX SPACING 12'-0" - 15'-0". SLAB ON | GRADE IS REINFORCED w/ 6x6 - 10/10 WWF. NOMINAL TOP OF SLAB EL = 100'-0"

6" CONCRETE SLAB ON GRADE AT GARAGE SET ON 10 mil VAPOR RETARDER ON 6" GRANULAR FILL w/ LESS THAN 7% PASSING #200 SLEEVE. SEE PLAN FOR SUGGESTED CONTROL / CONSTRUCTION JOINT LOCATIONS. SLAB ON GRADE IS REINFORCED w/ 6x6 - 6/6 WWF. SLOPE TO DRAINS AS SHOWN ON ARCH DRAWINGS. NOMINAL TOP OF SLAB EL = 100'-0"

OUTLINE OF RAISED VIEWING PLATFORM

HOLES IN VIEWING FLOOR

@ DROPPED FOOTINGS

FOUNDATION PLAN KEYED NOTES

MARK	DESCRIPTION	MARK	DESCRIPTION
1	4" CONCRETE TOPPING SLAB REINFORCED w/ 6x6 - 10/10 WWF ON 4" RIGID INSULATION. TOP OF TOPPING SLAB ELEVATION = 100'-0". 4" CONCRETE SLAB ON GRADE IS DROPPED 8" AT THIS LOCATION (SEE DETAIL 1/S301)	12	PROVIDE 8 - #4 x 12'-0" LONG REBAR IN A GRID @ 12"OC EACH WAY WHERE THE RADIANT TUBING CONVERGES. THIS REBAR IS SUPPLIED AND PLACED BY GC.
2	#5 HAIRPIN INTO SLAB	13	DROP FOOTINGS FOR STORM DRAIN. INVERT ELEVATION = 96'-0".
3	PROVIDE JOINT IN CONCRETE FLOORS PER 6/Q821	14	TRENCH DRAIN LOCATION, REFER TO SHEET P200 FOR LOCATIONS & SHEET P400 FOR DETAIL @ DRAIN.
4	PLACE INSULATION ON INSIDE SURFACE OF OF FOUNDATION WALL PER Q DRAWINGS.	15	THIS COLUMN ON GRID 2.5
5	AT TISSUE STORAGE, SLAB ON GRADE WILL BE 6" THICK w/ #4 @ 18"OC REBAR EACH WAY CHAIRED 3" OFF OF SUB-GRADE. PROVIDE 7" WIDE BLOCK OUTS FOR TRACKS FOR ROLLING SHELVING UNITS. SEE 24/S300.	16	THIS COLUMN ON GRID 2.6
6	RECESS SLAB 5" FOR BODY SCALE. REFER TO ARCHITECTURAL FOR EXACT LOCATION.	17	THIS COLUMN ON GRID AA
7	6" THICK CONCRETE HOUSEKEEPING PAD w/ 6x6 - 10/10 WWF FOR AUTOPSY CASEWORK AND LOCKER TYPES 1 & 2, VERIFY LOCATIONS w/ SUPPLIER.	18	THIS COLUMN ON GRID A
8	12" CMU WALL (f'm = 2000 psi) w/ #5 @ 16"OC (CENTERED) TYPICAL @ EF3 RATED AREA @ 911 CENTER.	19	THIS COLUMN ON GRID 5.9
9	16" x 24" MASONRY PILASTER ABOVE w/ 1- #5 VERTICAL EACH CELL & #2 TIES @ 8"OC VERTICAL LOCATED IN JOINTS. SEE 23/S300 FOR CONCRETE PIER BELOW GRADE. TOP OF CONCRETE PIER EL = 100' - 0". (NO CONCRETE PIER AT SIM)	20	THIS COLUMN ON GRID 6
10	8" CMU WALL (f'm = 2000 psi) w/ #5 @ 40"OC (CENTERED).	21	PLACE CONCRETE SLAB ON 2" RIGID INSULATION AT COOLER ROOM. SEE ARCH DRAWINGS. SLOPE FLOOR TO DRAIN PER Q DRAWINGS. PROVIDE 1" THICK RIGID INSULATION AT THE PERIMETER OF THE COOLER ROOM PER DETAILS ON Q DRAWINGS.
11	PROVIDE 1- #5 (CENTERED) EACH CELL FOR 2- CELLS UP TO BEAM BEARING ABOVE.	22	DROP TOP OF FOOTING TO CLEAR SCALE RECESS.

1/S100 FOUNDATION PLAN

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

NOTES:
1. SEE SHEET S001 FOR ALL STRUCTURAL NOTES & SCHEDULES.
2. SEE SHEET S300 FOR TYPICAL FOUNDATION DETAILS NOT NECESSARILY CUT ON PLAN.
3. THE SLAB ON GRADE AND STOOPS WILL CONTAIN RADIANT HEAT TUBES AND UNDER SLAB INSULATION WHERE SHOWN ON MECHANICAL DRAWINGS. REFER TO SHEET M301 FOR LOCATION AND TO DETAIL 5/M600 FOR DETAILS OF CONSTRUCTION. SUPPLY WIRE MESH IN SHEETS, NOT ROLLS TO PROVIDE ACCURATE PLACEMENT OF RADIANT TUBING. CONTROL JOINT DEPTH 1 1/4" TO MISS RADIANT TUBING.

DORSCHNER

Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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PIERCE ENGINEERS INC
CONSULTING STRUCTURAL ENGINEERS
10 West Mifflin St, Suite 101 | Madison, WI 53703
Phone: 608.256.7304 | Fax: 608.256.7306
PE PROJECT: 136-42

PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

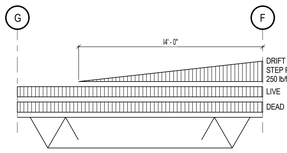
DRAWING
FOUNDATION PLAN

DATE
01.12.15

NOTES FOR FRAMING OF PRE-ENGINEERED METAL BUILDING GARAGE

1. USE 5psf COLLATERAL LOADING TO PURLINS AND MAIN FRAMES.
2. END WALL FRAME IS NOT EXPANDABLE.
3. THERE IS AN EXPANSION JOINT ALONG GRID 9 BETWEEN THE METAL BUILDING AND THE MAIN BUILDING. METAL BUILDING CONSTRUCTION WILL NOT RELY ON CMU WALL FOR VERTICAL OR LATERAL SUPPORT.
4. THE MAXIMUM ALLOWED PURLIN SPACING SHALL BE 5'- 0" BASED ON THE METAL DECK SPECIFIED. THE SPACING IS MEASURED ALONG THE SLOPE OF THE ROOF.

SPECIAL JOIST NOTES:
1. LIVE LOAD DEFLECTION INDEX L/360.
2. CHECK FOR 12 psf NET UPLIFT.
3. ALL LOADS ARE WORKING.



14KSP1

2 S200 SPECIAL JOISTS
SCALE: NTS

ROOF FRAMING PLAN KEYED NOTES

MARK	DESCRIPTION
(1)	PROVIDE HSS4x6x1/4 OUTRIGGERS ON A DIAGONAL OFF BUILDING COLUMN FOR OUTBOARD WINDOW SUPPORT.
(2)	BEAM COPED FOR 2 1/2" DEEP BEARING SEAT. SEE DETAIL 10/S400.
(3)	ROOF SCREEN, SEE 1/S402, 2/S402, 3/S402 & 4/S402 FOR FRAMING.
(4)	CONCRETE TOPPING ON TYPICAL METAL ROOF DECK FLOORING SYSTEM. CONCRETE SLAB SHALL BE 4" TOTAL THICKNESS (2 1/2" OVER THE DECK). REINFORCE SLAB w/ 6x6 - 6/6. TOP OF SLAB ELEVATION = 116'-4". ROOF DECK REMAINS WIDE FLANGE DOWN.
(5)	SEE 11/S400 FOR WINDOW BUMPOUT FRAMING.
(6)	1 1/2" x 18 GA GALVANIZED WIDE RIB METAL DECK @ CANOPIES. TOP OF DECK IS DROPPED TO BE 1/2" BELOW THE TOP OF TUBE SUPPORTS, TYP. THIS IS TO ALLOW THE 1/2" PLYWOOD TO FLUSH OUT WITH THE TUBE SUPPORTS.
(7)	STEEL BEAM FRAMES INTO SIDE OF CONCRETE SHELTER PER DETAIL 1/S401.
(8)	CONCRETE CAP OF SHELTER CONSTRUCTION. SEE DETAIL 8/S301.
(9)	4" TOTAL THICKNESS CONC. SLAB ON 1 1/2"x22 GA GALV. METAL FORMED DECK. REINFORCED w/ 6x6-6/6 WWF. TSLAB ELEVATION = 112'-4". SUPPORT FOR AHU UNIT. NOT SIZED FOR STORAGE SUPPORT. SLAB ON 800/200-97 @ 24"OC COLD-FORMED JOISTS. BRIDGE @ MIDSPAN.
(10)	8" CMU BELOW.
(11)	W10X26 TROLLEY SUPPORT BEAM. TROLLEY BEAM AND SUPPORTS BY METAL BUILDING SUPPLIER. DESIGN LIFT CAPACITY IS 2000# w/o IMPACT. THE TROLLEY SUPPORT BEAM SHALL BE SUPPORTED VERTICALLY AND LATERALLY ON BOTH AXIS AT THE MAIN FRAME SUPPORTS. PROVIDE L3x3x1/4 EACH END TO SERVE AS TROLLEY STOPS. BOTTOM OF TROLLEY BEAM ELEVATION = 15'-0" AFF. VERIFY w/ ARCH DWGS.
(12)	METAL BUILDING SUPPLIER TO PROVIDE SUPPORT FOR EQUIPMENT.
(13)	DOUBLE JOIST OF TYPICAL SIZE FOR SNOW DRIFT.
(14)	HSS8x4x1/4 w/ DECK BRG ANGLE ALONG WALL. (117'-8 3/4") TO FLUSH w/ TOP OF PLYWOOD.
(15)	HSS10x10x5/8 COLUMN. THIS COLUMN IS OFF GRID.
(16)	CAMBER UP STEEL @ CORNER 1".
(17)	HSS12x6x1/2 COLUMN / OUTRIGGER ASSEMBLY.
(18)	HSS5x5x1/2 COLUMN w/ HSS12x4x1/2 OUTRIGGER (HIGH) (117'-8 3/4") AND HSS10x4x1/4 OUTRIGGER (LOW) (111'-3 1/2"). PROVIDE TYPICAL RECESSED METAL DECK AT BOTH LEVELS.
(19)	HSS5x5x1/2 COLUMN / HSS12x4x1/2 OUTRIGGER (117'-8 3/4") ASSEMBLY.
(20)	HSS12x8x1/2 (LSV) OUTRIGGER (117'-8 3/4").
(21)	ODOR LINE INDICATED w/ HATCHING.
(22)	DECK BEARING ANGLE PER 8/S301.
(23)	POSITION JOIST IN ALIGNMENT w/ INSIDE FACE OF CONCRETE WALL.
(24)	C8x11.5
(25)	ANCHOR STEEL COLUMN TO CMU WALL w/ ADJUSTABLE STRAP ANCHORS @ 16"OC.
(26)	HSS12x6x1/2 COLUMN / HSS12x4x1/2 OUTRIGGER ASSEMBLY. TOP OF OUTRIGGER ASSEMBLY = 117'-8 3/4".
(27)	PROVIDE WINDOW OUTRIGGER TUBES AT THIS CANOPY COLUMN PER 11/S400.
(28)	OFFSET W21x TO NORTH 1/2" FROM COLUMN CENTERLINE. (THUS 4 5/8" SOUTH OF GRID D.)
(29)	MC8x20 BETWEEN ROOF JOISTS (116'-10") TO SUPPORT POP UP ROOF WALLS.
(30)	HSS5x5x1/2 COLUMNS AT ALL FOUR CORNERS. SEE DETAIL 2/S401.
(31)	AHU-2 WEIGHT = 8,500#
(32)	HSS6x6x1/4 TUBES @ AUTOPSY ROOM. REFER TO 10/S410, 2/A821 AND 6/A821.
(33)	4' - 8" WIDE OPENING IN ROOF FOR HV. VERIFY SIZE.
(34)	EF-2 WEIGHT = 12,000#. FRAME OUT OPENINGS PER 2/S400.
(35)	ACC UNITS WEIGHT = 350#
(36)	EF-1 WEIGHT 200#, FRAME OUT OPENING PER 2/S400.
(37)	CHANNELS ON TOP OF DECK FOR UNIT LEGS PER 1/S400.
(38)	HSS8x6x1/4 FOR LIGHT SUPPORT, SEE DETAIL 9/S402.
(39)	MULTI WYTHE WALL PER ARCH DRAWINGS. THE 8" CMU BACK UP WILL BE GROUTED AND REINFORCED w/ #4 REBAR AT 48"OC VERTICALLY IN THE CENTER OF THE 8" WALL. LAP SPLICE 2'-0" ON THE REBAR. THIS WILL OCCUR THE FULL LENGTH OF THE WALL.
(40)	VERIFY w/ OPENING DIMENSION REQUIRED.
(41)	FRAME OUT FOR STAIR OPENING.
(42)	FRAME OUT FOR ROOF MONITOR. SEE 3/S201.
(43)	ONE SIDE CONNECTION DUE TO FRAMING OFFSET. USE 1- L4x3 1/2x5/16 x 1'-2 1/2" w/ 5- 7/8"Ø A325 BOLTS IN FIELD CONNECTION.
(44)	HSS8x4x1/4 (117'-8 3/4") ON COLUMN CENTERLINE w/ DECK SUPPORT ANGLE, SEE 7/S401 (SIM).
(45)	W10x22 (116'-10") AROUND PERIMETER OF POP-UP ROOF.
(46)	TROLLEY SUPPORT BEAM W10x26. BOTTOM OF BEAM EL = 110'-2 5/8". BEAM SIZED FOR 1000 # LIFT. SEE ARCH FOR POSITION. SEE 1/S403 FOR SUPPORT DETAIL @ COLUMNS D.1-4.7, D.1-5.8. PROVIDE L3x3x1/4 SHOP WELDED ANGLE @ EACH END AS TROLLEY STOP.
(47)	DECK SPAN DIRECTION @ CANOPY.
(48)	THIS SCREEN WALL COLUMN WILL STRADDLE THE BEAM JOINT.
(49)	ROOF MOUNTED PV CELLS. REFFER TO SHEET S203 &DETAILS 9/S403 & 10/S403 FOR ATTACHMENT. PROVIDE HSS 4.0 x .250 @ POST LOCATIONS SHOWN. REFER TO 11/S403 FOR TYP. FRAMING OF RACK SUPPORTS. (SUPPORTED ON METAL BLDG ROOF MEMBERS @ SIM)
(50)	RTU. SEE PLAN FOR WEIGHTS.
(51)	ROOF OPENING. VERIFY SIZE & LOCATION w/ MECH DWGS. REFER TO 2/S400.
(52)	COORDINATE X-BRACES w/ LOUVER OPENINGS IN WALLS.
(53)	W14x22 (116'-10") ON CMU WALL CENTERLINE.
(54)	3/8" x 10" SQUARE BEARING PLATE w/ 2- 1/2"Ø x 4" HEADED STUDS BELOW. BEAR ON SOLID GROUTED CMU DOWN 3- COURSES.
(55)	DIAGONAL BRACES @ EQUIPMENT SCREEN COLUMNS.
(56)	DOUBLE COLUMNS @ EQUIPMENT SCREEN. SPACE @ 10"OC. NO HORIZONTAL MEMBERS BETWEEN. THIS GAP TO ALLOW EXPANSION/CONTRACTION DUE TO TEMPERATURE CHANGES
(57)	COPE BEAM ENDS PER 12/S403.
(58)	L3x3x1/4 DECK BEARING ANGLE. ANCHOR TO GROUT FILLED CMU w/ 1/2"Ø x 4" SIMPSON TITEN HD (OR EQUAL) @ 24"OC.
(59)	MC8X20 (116'-10"), NORTH & SOUTH SIDE OF OPENING.
(60)	OPENING IN PRECAST FOR PLAN FOR 1FT DUCT. VERTIFY SIZE & LOCATION w/ MECH DRAWINGS. PRECASTER TO DESIGN AND SUPPLY STEEL HEADER.
(61)	ROOF TOP ACCU UNIT. WEIGHT = 500lbs (4) THUS. PROVIDE INTERNAL JOIST REINFORCING PER DETAIL 1/S400.
(62)	STR. STEEL SUPPLIERS SHALL SUPPLY LOOSE ANGLES SIM TO DETAIL 18/S301 FOR SUPPORT OF CORD REELS. METAL BUILDING SUPPLIER SHALL NOTE EXISTENCE OF CORD REELS.
(63)	METAL ROOF DECK OVER THE GARAGE AREA SHALL BE SUPPLIED AND ERECTED UNDER SPEC SECTION 052100. DECK SHALL BE AS DEFINED UNDER GENERAL NOTE 3 ON THIS PAGE AND ANCHORED PER THE STEEL DECK NOTES NUMBER 7.

1 S200 ROOF FRAMING PLAN
SCALE: 1/8" = 1'-0"

NOTES:
1. SEE SHEET S001 FOR ALL STRUCTURAL NOTES & SCHEDULES.
2. TOP OF STEEL ELEVATION = JOIST BEARING ELEVATION = 116'-7 1/2", UNLESS NOTED OTHERWISE, i.e. RELATIVE (2 1/2") OR ACTUAL (117'-8 3/4"). AT LOW ROOF: TOP OF STEEL ELEVATION = JOIST BEARING ELEVATION = 115-3 1/2", UNLESS NOTED OTHERWISE, i.e. RELATIVE (2 1/2") OR ACTUAL (117'-8 3/4").
3. ROOF DECK SHALL BE 1 1/2" x 22 GA GALVANIZED WIDE RIB METAL DECK. ERECT (3) SPANS OR (4) SUPPORTS (MIN.). ANCHOR PER S000.

DORSCHNER
Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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PIERCE ENGINEERS INC
CONSULTING STRUCTURAL ENGINEERS
10 West Mifflin St. Suite 201 | Madison, WI 53703
Phone: 608.204.2264 | Fax: 608.204.7006
PE PROJECT 1136-12

PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
ROOF FRAMING PLAN

DATE
01.12.15

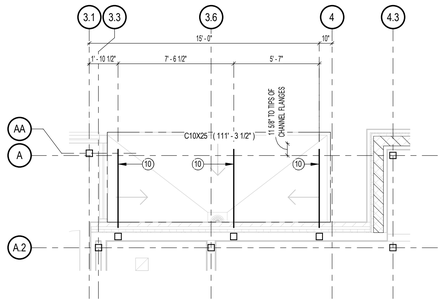
S200

MISC. FRAMING PLAN KEYED NOTES

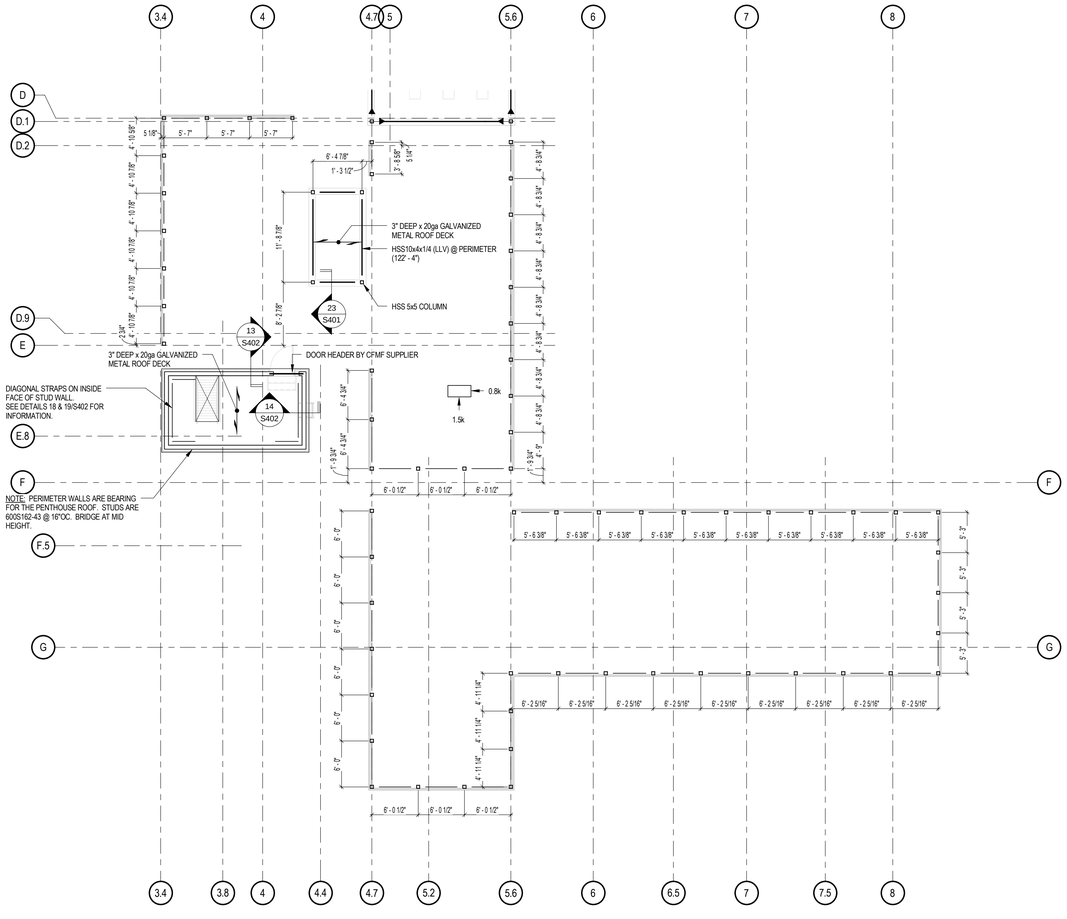
MARK	DESCRIPTION
1	BUILDING COLUMN.
2	WINDOW FRAME COLUMN.
3	HSS4x4 OUTRIGGERS (104'-0").
4	LOW OUTRIGGERS CONCEALED BY A BUILT-IN BENCH.
5	L4x4x1/4 x CONT. FOR WINDOW SUPPORT / STABILIZATION @ 104' - 0".
6	1 1/2" x 22 GA PAINTED WIDE RIB METAL ROOF DECK. ERECT 3- SPANS OR 4- SUPPORTS (MIN). ANCHOR PER S000.
7	TOP OF COLUMN = TOP OF METAL DECK. PLACE 20 GA x 2'-0" SQUARE COVER PLATE ON DECK.
8	SECTION OF W12x22 SHOP WELDED TO COLUMN AS AN OUTRIGGER.
9	HSS4x4x1/4 (104'-0").
10	HSS10x4x1/4 (111'-3 1/2").
11	HSS8x3x3/8 LSV (115'-6").
12	L4x3x1/4 LLH FOR WINDOW SUPPORT / STABILIZATION.
13	HSS3x3x1/4 OUTRIGGERS (115'-3").
14	CORD REEL BELOW. SEE 11/S401 FOR SUPPORT DETAIL.

VIEWING PLATFORM FRAMING NOTES

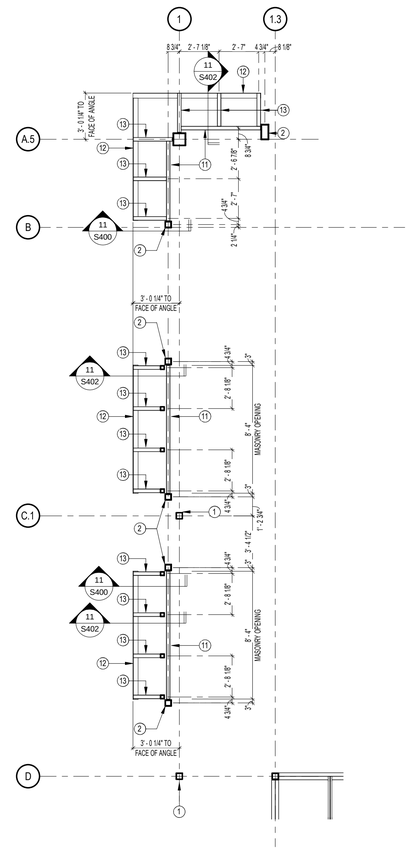
1. EXTEND CONCRETE SLAB ON GRADE UNDER RAISED VIEWING AREA.
2. PROVIDE METAL STUD WALLS AROUND ENTIRE PERIMETER OF RAISED VIEWING PLATFORM AND AT MAX 3'-0"OC INTERNALLY.
3. PROVIDE DIAGONAL X BRACE PANELS WHERE SHOWN ON PLAN. USE 2"x14ga STRAP ON EACH SIDE OF WALL PLACED IN AN X SHAPE. SEE DETAIL 22/S402.
4. RAISED FLOOR SYSTEM IS 4 1/2" TOTAL THICKNESS CONCRETE SLAB ON 1 1/2" x 22ga GALVANIZED METAL FORM DECK INSTALLED WIDE FLUTES UP. REINFORCE w/ 6x6 - 6/6 WWF.



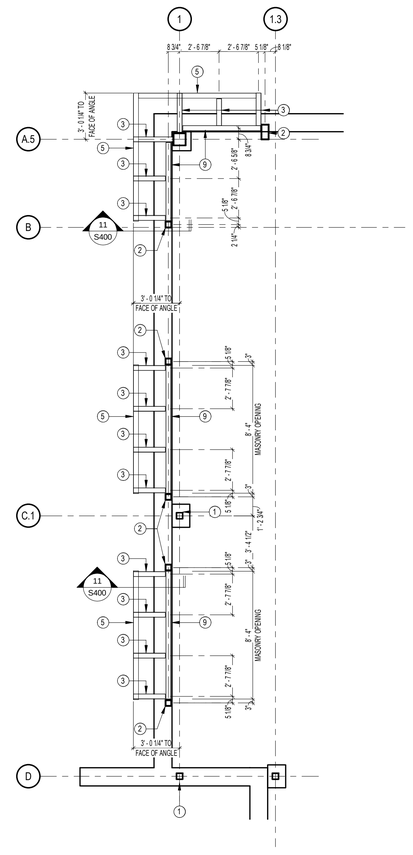
6 S201 **LOWER CANOPY FRAMING PLAN**
SCALE : 1/4" = 1'-0"



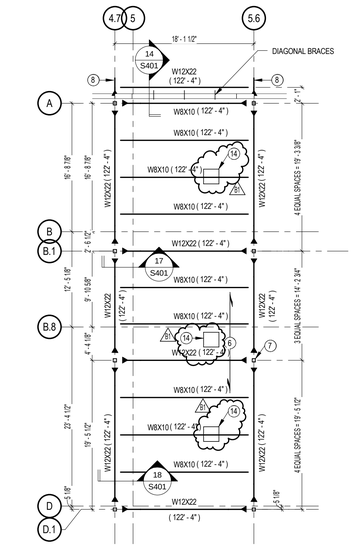
3 S201 **HIGH ROOF FRAMING PLAN**
SCALE: NTS



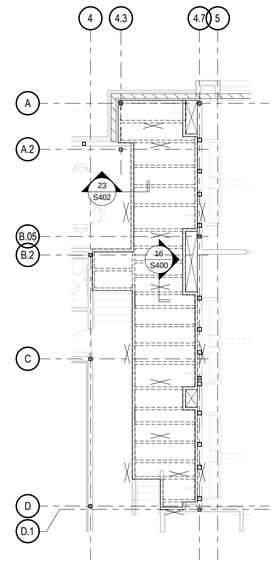
5 S201 **WINDOW LEVEL FRAMING (HIGH)**
SCALE : 1/4" = 1'-0"



4 S201 **WINDOW LEVEL FRAMING (LOW)**
SCALE : 1/4" = 1'-0"



2 S201 **LIGHT MONITOR ROOF FRAMING PLAN**
SCALE : 1/8" = 1'-0"



1 S201 **VIEWING PLATFORM FRAMING PLAN**
SCALE : 1/8" = 1'-0"

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Architecture
Planning

Dorschner\Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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PIERCE ENGINEERS INC
CONSULTING STRUCTURAL ENGINEERS
10 West Mifflin St, Suite 205 | Madison, WI 53703
Phone: 608.256.7304 | Fax: 608.256.7306
PE PROJECT 13642

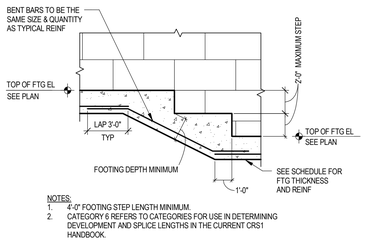
PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

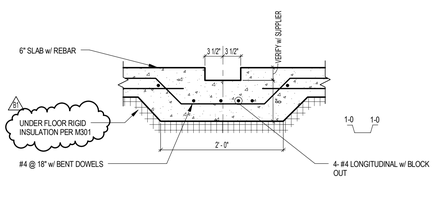
BID NO.
313083

DRAWING
MISC FRAMING PLANS

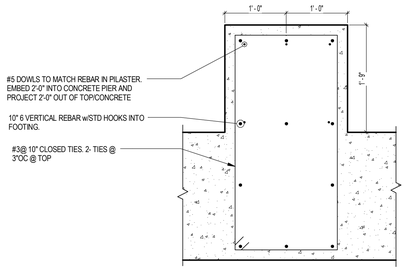
DATE
01.12.15



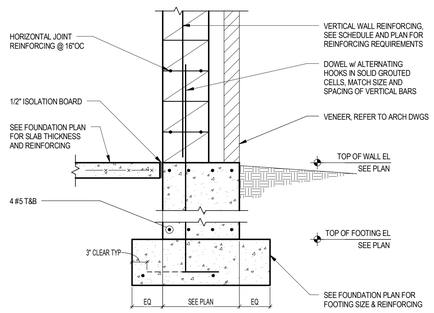
25 S300 STEPPED FOOTING @ MASONRY WALL
SCALE: NTS



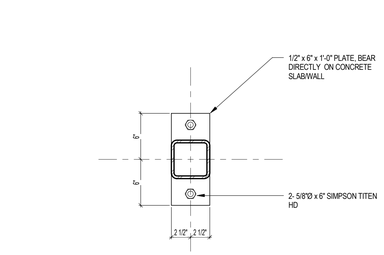
24 S300 DETAIL @ TRENCH FOR ROLLING SHELVING UNITS
SCALE: NTS
VERIFY ALL DIMS w/ SUPPLIER



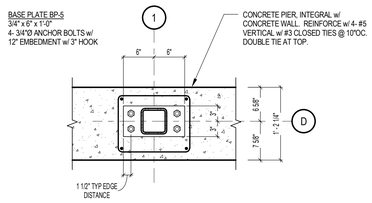
23 S300 CONCRETE PIER DETAIL @ MASONRY PILASTER
SCALE: NTS



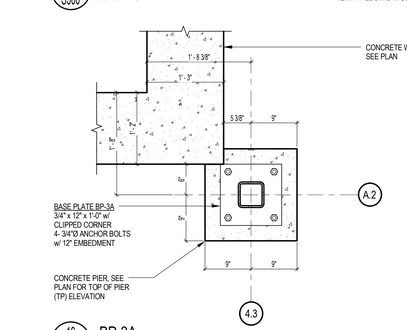
22 S300 EXTERIOR MASONRY w/ FOOTING
SCALE: NTS



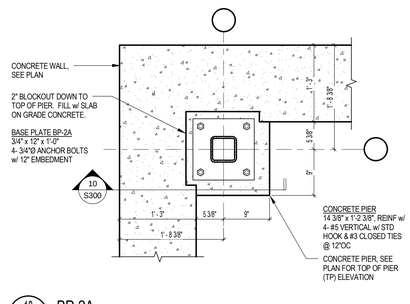
21 S300 BP-6
SCALE: NTS



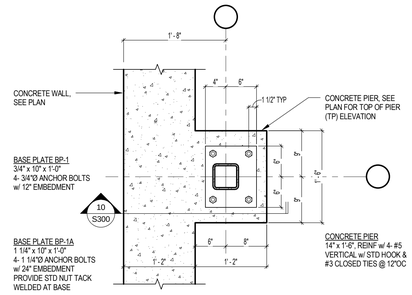
20 S300 BP-5
SCALE: NTS



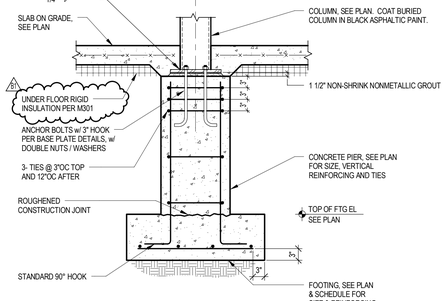
19 S300 BP-3A
SCALE: NTS



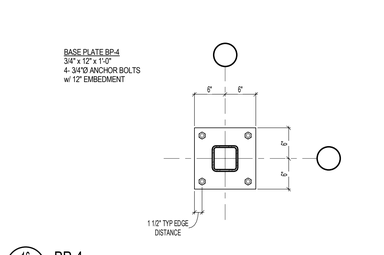
14 S300 BP-2
SCALE: NTS



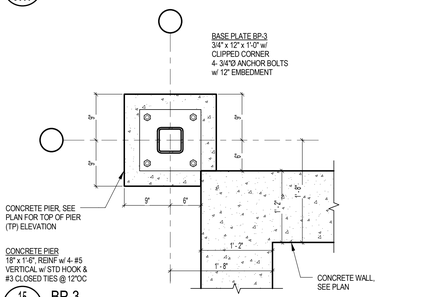
18 S300 BP-2A
SCALE: NTS



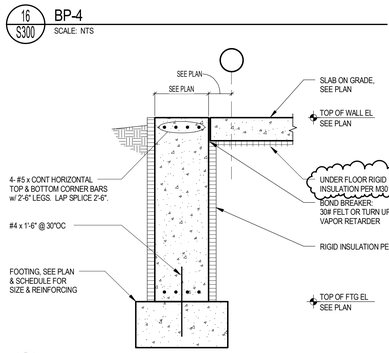
17 S300 BP-1B
SCALE: NTS



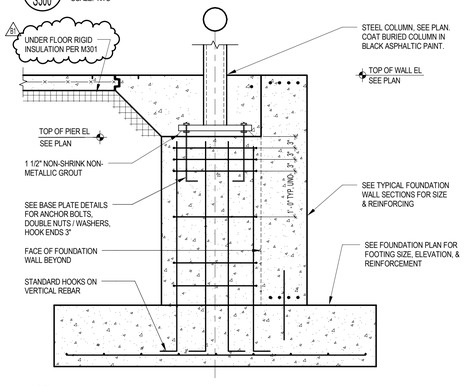
16 S300 BP-4
SCALE: NTS



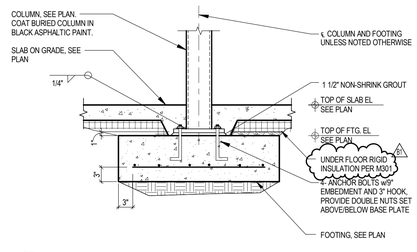
15 S300 BP-3
SCALE: NTS



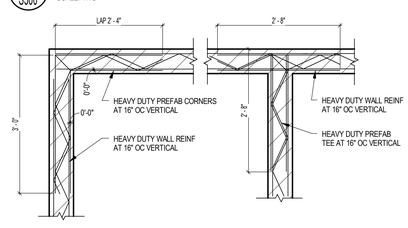
11 S300 TYPICAL FROST WALL
SCALE: NTS



10 S300 FOOTING & PIER @ EXTERIOR COLUMN
SCALE: NTS

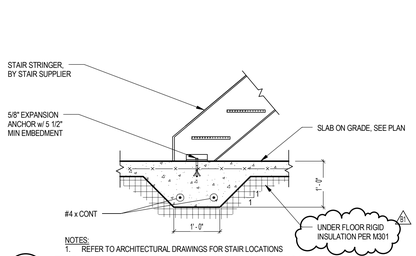


9 S300 COLUMN FOOTING @ NON-METAL BUILDING
SCALE: NTS

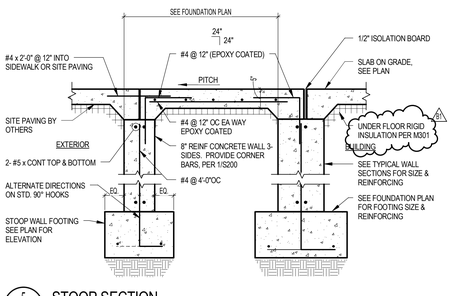


8 S300 HORIZ. MASONRY WALL REINF.
SCALE: NTS

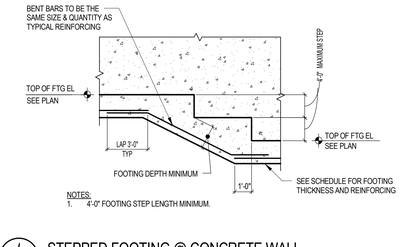
7 S300 INTERIOR MASONRY WALL FOOTING
SCALE: NTS



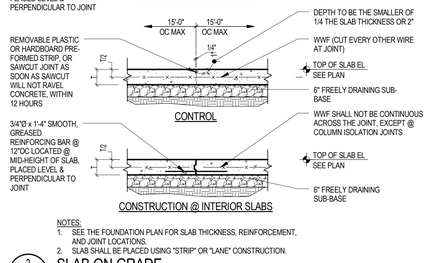
6 S300 TYPICAL STAIR FOOTING / FOUNDATION
SCALE: NTS



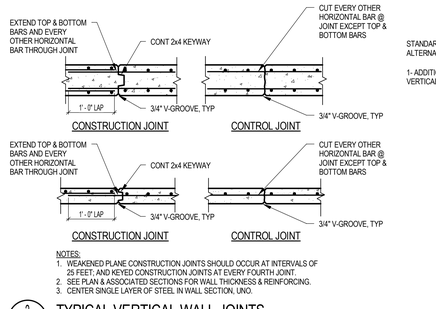
5 S300 STOOP SECTION
SCALE: NTS



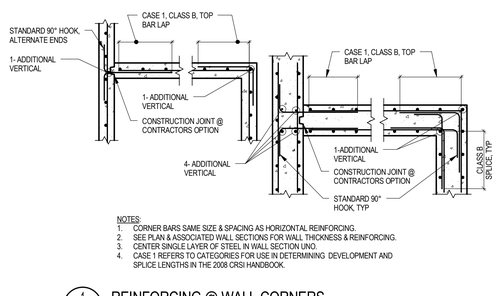
4 S300 STEPPED FOOTING @ CONCRETE WALL
SCALE: NTS



3 S300 SLAB ON GRADE
SCALE: NTS



2 S300 TYPICAL VERTICAL WALL JOINTS
SCALE: NTS



1 S300 REINFORCING @ WALL CORNERS
SCALE: NTS

DORSCHNER
Architecture
Planning
Dorschner\Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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CONSULTING STRUCTURAL ENGINEERS
10 West Mifflin St, Suite 205 | Madison, WI 53703
Phone: 608.256.7304 | Fax: 608.256.7306
PE PROJECT: 1 36-42

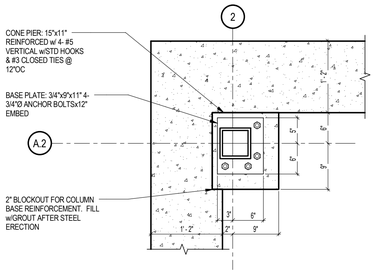
PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)
3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

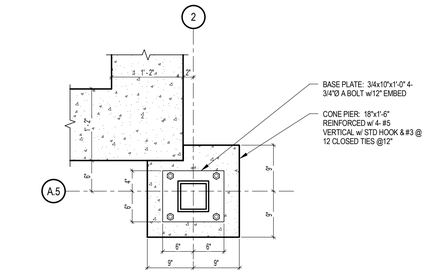
DRAWING
FOUNDATION DETAILS

DATE
01.12.15

S300



15 S301 SECTION
SCALE: NTS



14 S301 SECTION
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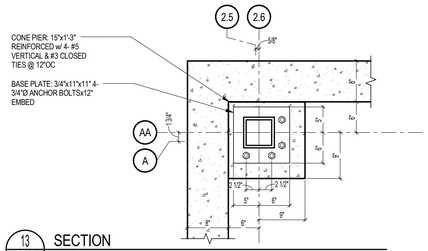

13 S301 SECTION
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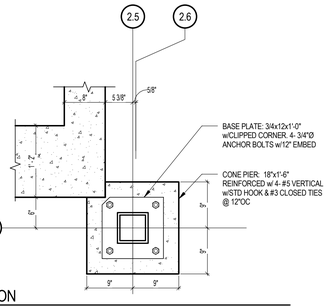

12 S301 SECTION
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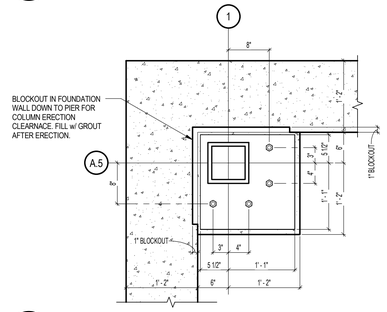
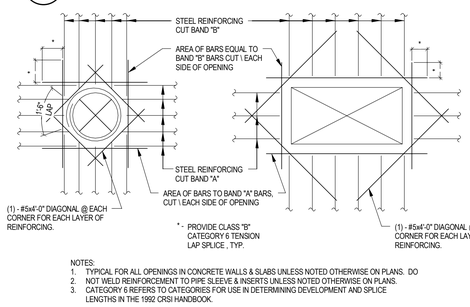


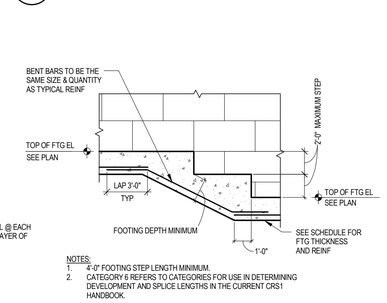
11 S301 SECTION
SCALE: NTS



* - PROVIDE CLASS "B" CATEGORY 6 TENSION LAP SPLICE , TYP.

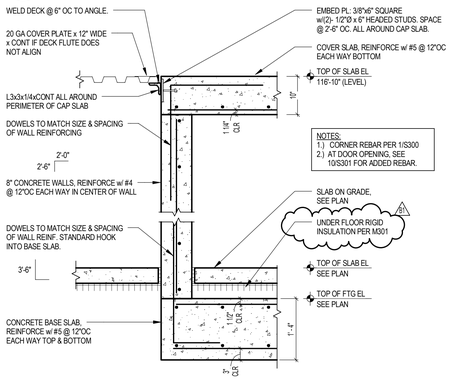
NOTES:
1. TYPICAL FOR ALL OPENINGS IN CONCRETE WALLS & SLABS UNLESS NOTED OTHERWISE ON PLANS. DO
2. NOT WELD REINFORCEMENT TO PIPE SLEEVE & INSERTS UNLESS NOTED OTHERWISE ON PLANS.
3. CATEGORY 6 REFERS TO CATEGORIES FOR USE IN DETERMINING DEVELOPMENT AND SPLICE LENGTHS IN THE 1992 CRSI HANDBOOK.

10 S301 REINFORCING @ CONCRETE OPENINGS
SCALE: NTS



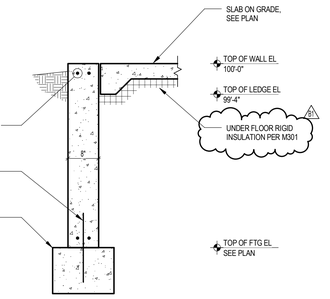
NOTES:
1. 4'-0" FOOTING STEP LENGTH MINIMUM.
2. CATEGORY 6 REFERS TO CATEGORIES FOR USE IN DETERMINING DEVELOPMENT AND SPLICE LENGTHS IN THE CURRENT CRSI HANDBOOK.

9 S301 STEPPED FOOTING @ MASONRY WALL
SCALE: NTS

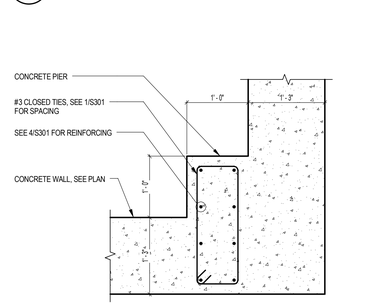


NOTES:
1.) CORNER REBAR PER 1/S300
2.) AT DOOR OPENING, SEE 10/S301 FOR ADDED REBAR.

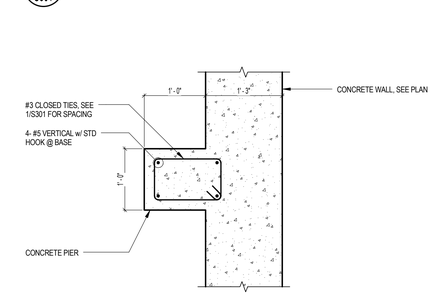
8 S301 SECTION @ RECORDS 107
SCALE: NTS



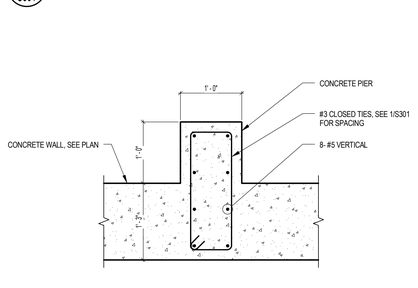
7 S301 FROST WALL @ VESTIBULE
SCALE: NTS



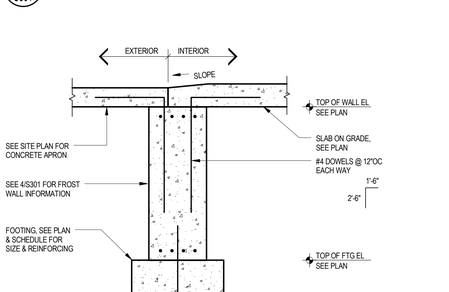
6 S301 CORNER PIER DETAIL - GARAGE
SCALE: NTS



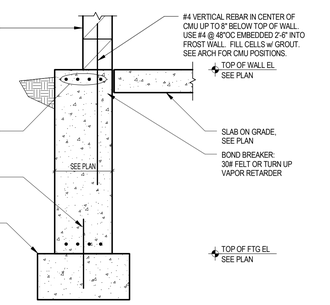
5 S301 END WALL COLUMN PIER DETAIL
SCALE: NTS



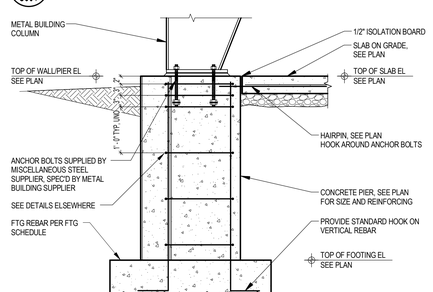
4 S301 PIER DETAIL @ MAIN FRAME COLUMN
SCALE: NTS



3 S301 SECTION @ GARAGE DOOR
SCALE: NTS



2 S301 FROST WALL @ GARAGE
SCALE: NTS



1 S301 PERIMETER PIER DETAIL
SCALE: NTS

DORSCHNER
Architecture
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Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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CONSULTING STRUCTURAL ENGINEERS
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Phone: 608.256.7304 | Fax: 608.256.7306
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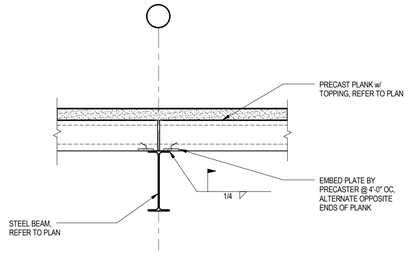
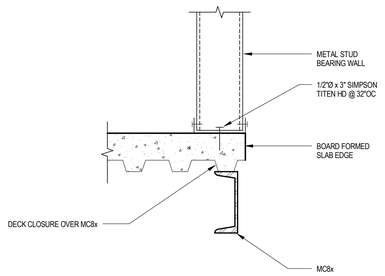
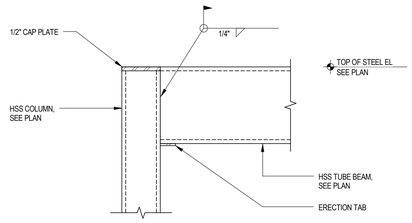


25 S401 PRECAST BRG@ STEEL BEAM
SCALE: NTS



24 S401 SECTION
SCALE: NTS



23 S401 SECTION
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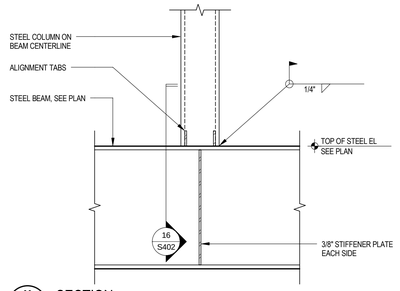

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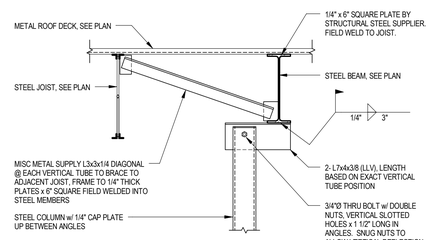

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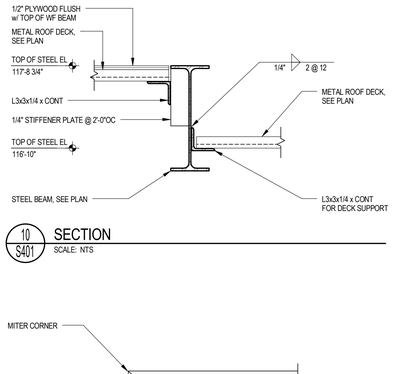

20 S401 SECTION
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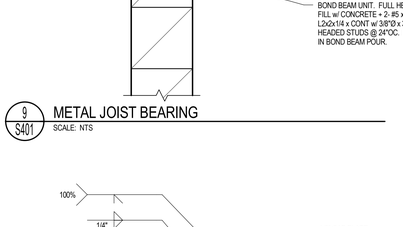
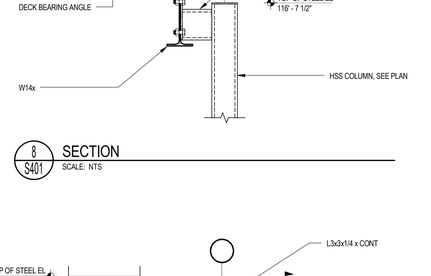


19 S401 MASONRY WALL ANCHORAGE, TYP @ CMU BACKUP
SCALE: NTS



18 S401 SECTION
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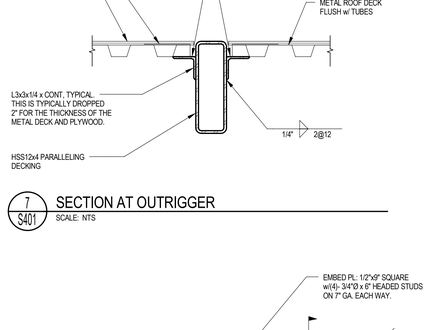
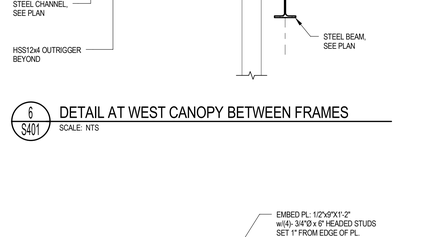
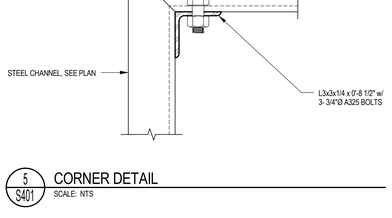


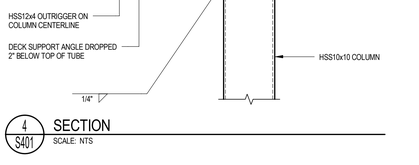
17 S401 MOMENT CONNECTION AT MONITOR ROOF
SCALE: NTS



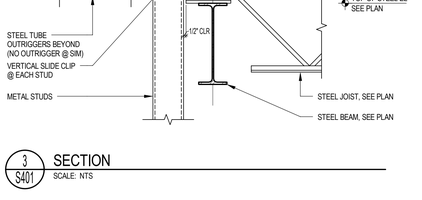
16 S401 SECTION
SCALE: NTS



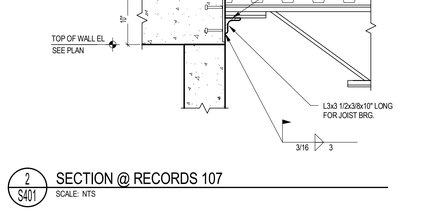
15 S401 SECTION AT HIGH / LOW ROOF
SCALE: NTS



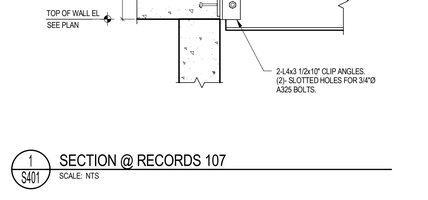
14 S401 SECTION AT ROOF EDGE
SCALE: NTS



13 S401 ROOF EDGE
SCALE: NTS



12 S401 SECTION AT HIGH/LOW ROOF CONDITION
SCALE: NTS



A1
11 S401 CORD REEL SUPPORT @ AUTOPSY 132
SCALE: NTS

10 S401 SECTION
SCALE: NTS

9 S401 METAL JOIST BEARING
SCALE: NTS

8 S401 SECTION
SCALE: NTS

7 S401 SECTION AT OUTRIGGER
SCALE: NTS

6 S401 DETAIL AT WEST CANOPY BETWEEN FRAMES
SCALE: NTS

5 S401 CORNER DETAIL
SCALE: NTS

4 S401 SECTION
SCALE: NTS

3 S401 SECTION
SCALE: NTS

2 S401 SECTION @ RECORDS 107
SCALE: NTS

1 S401 SECTION @ RECORDS 107
SCALE: NTS

DORSCHNER
Architecture
Planning
Dorschner\Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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02.12.15 ADDENDUM B1

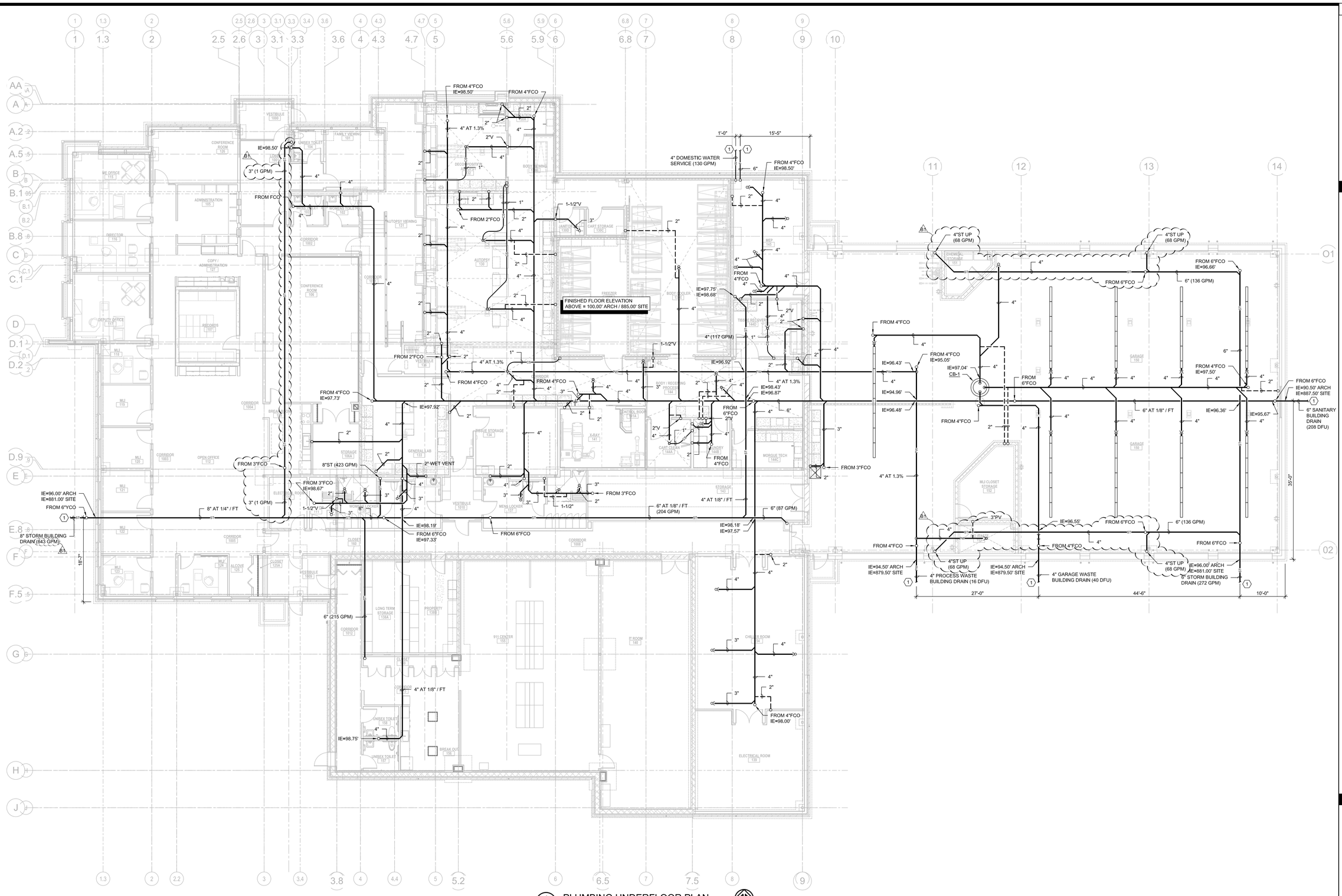
PIERCE ENGINEERS INC
CONSULTING STRUCTURAL ENGINEERS
10 West Mifflin St, Suite 205 | Madison, WI 53703
Phone: 608.256.7304 | Fax: 608.256.7306
PE PROJECT: 136-42

PROJECT
MEDICAL EXAMINER OFFICE
BUILDING (BID PACKAGE B)
3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
FRAMING DETAILS

DATE
01.12.15



1 P100 PLUMBING UNDERFLOOR PLAN

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

NORTH

GENERAL NOTES:

1. ALL PROCESS WASTE (PW) PIPING UP TO 2" SHALL BE PITCHED AT 1/4" PER FOOT SLOPE, AND PW PIPING 3" AND OVER SHALL BE PITCHED AT 1.3% SLOPE.

KEYED NOTES:

1. PC SHALL ROUTE SERVICE TO 5'-0" OUTSIDE BUILDING STRUCTURE, CONTINUATION BY SITE UTILITY CONTRACTOR. COORDINATE EXACT LOCATION AND DEPTH WITH SITE UTILITY CONTRACTOR.

DORSCHNER ASSOCIATES

Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

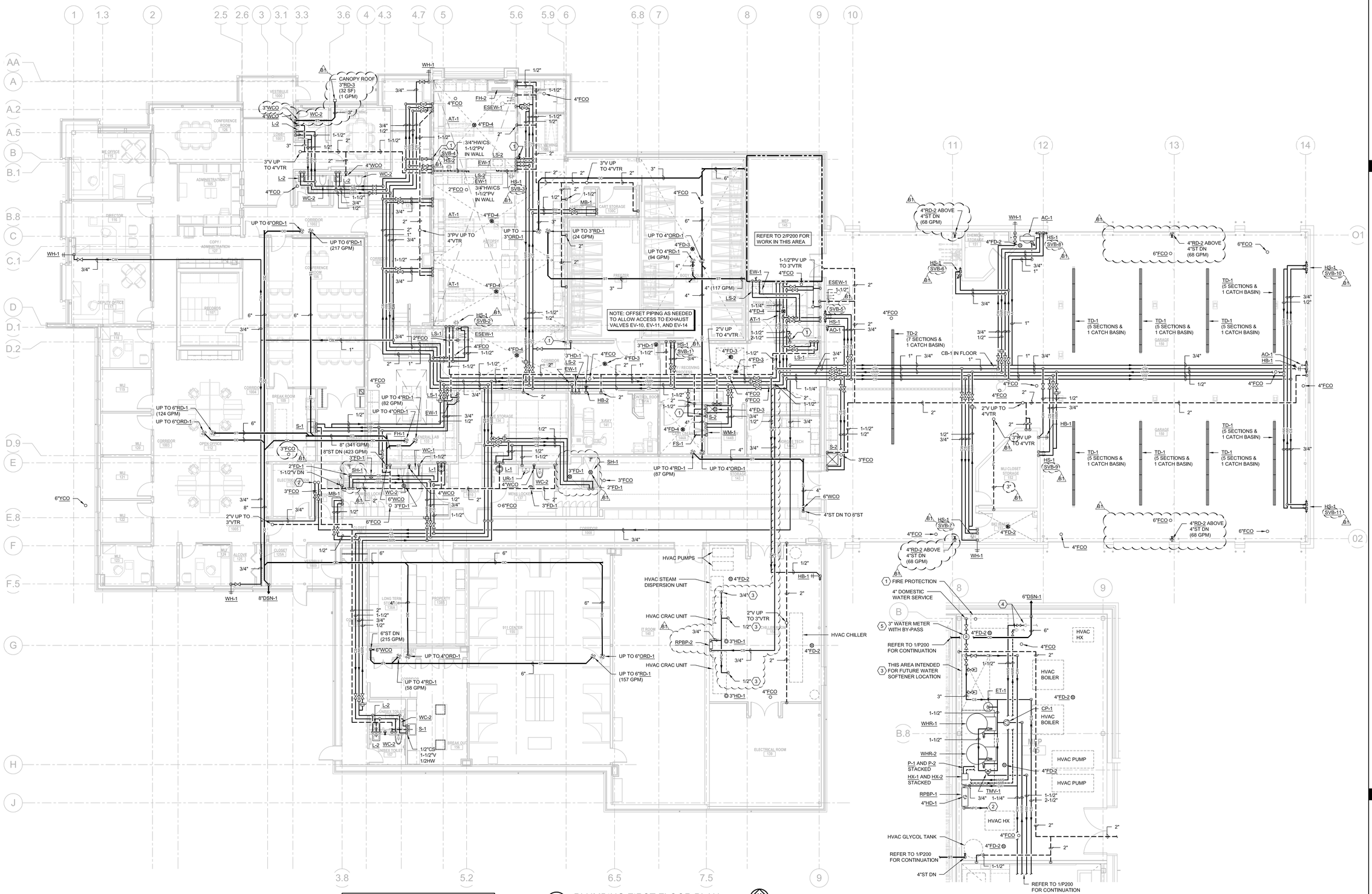
BID NO.
313083

DRAWING
PLUMBING UNDERFLOOR PLAN

DATE
01.12.15

JDR
ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
ph:608.277.1728 fax:608.271.7046
JDR Project No. 130099

P100



PLENUM NOTE:
RETURN AIR CEILING PLENUMS ARE UTILIZED ON THIS PROJECT IN THE OFFICE AREA OF THE FACILITY. DURING THE COURSE OF CONSTRUCTION, THE CONTRACTOR SHALL ASCERTAIN THAT ALL ROOMS TO WHICH AIR IS SUPPLIED, HAVE RETURN AIR PATHS BACK TO AND THRU THE CEILING PLENUM. ANY SPACES OBSERVED WHICH DO NOT HAVE SUCH OPENINGS SHALL BE REPORTED TO AJE IMMEDIATELY FOR RESOLUTION. PIPING AND DUCTWORK SHALL BE INSTALLED IN SUCH A MANNER SO AS NOT TO BLOCK THE RETURN AIR PATH. RETURN AIR OPENINGS TO SHAFTS & INTAKE DUCTWORK. ALL MATERIALS IN PLENUMS SHALL BE PLENUM RATED NON-COMBUSTIBLE MATERIALS.

1 P200 PLUMBING FIRST FLOOR PLAN

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

NORTH

GENERAL NOTES:

1. REFER TO M400 SERIES DRAWINGS FOR BUILDING SECTIONS. COORDINATE ALL PLUMBING PIPING WITH OTHER TRADES.
2. REFER TO LABORATORY DRAWINGS AND SPECIFICATIONS FOR PLUMBING CONNECTIONS TO LAB AND/OR AUTOPSY EQUIPMENT AND FIXTURES. ALL PLUMBING RELATED CONNECTIONS BY PC.

KEYED NOTES:

1. FLUSH VALVE LOCATION FOR FLUSHING FLOOR DRAIN FD-4.
2. INSTALL 3/4"CW AND 3/4"A UP TO PENTHOUSE, PENETRATE EXTERIOR WALL OF PENTHOUSE, AND INSTALL WH-1 AND AO-1 THRU WALL FOR EQUIPMENT MAINTENANCE ON ROOF.
3. COORDINATE NPC CONNECTION TO HVAC EQUIPMENT WITH HC.

2 P200 ENLARGED MECHAINCAL ROOM - PLUMBING

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

NORTH

KEYED NOTES:

1. PROVIDE 6" BLIND FLANGE FOR FIRE PROTECTION SERVICE. CONTINUATION BY FPC.
2. PROVIDE 3/4" NPC FOR BOILER MAKE-UP WATER. COORDINATE WITH HC.
3. DOMESTIC WATER CAMPUS SYSTEM SOFTENED BY COUNTY INFRASTRUCTURE PROJECT. THIS AREA IS DESIGNATED FOR FUTURE SOFTENERS IN THE EVENT THE CAMPUS WATER SYSTEM IS NO LONGER SOFTENED.
4. PC SHALL CONNECT TO 1-1/2" TAPS ON HEATING HOT WATER SUPPLY AND RETURN PIPES (HWS AND HWR). HWS/HWR MAINS AND TAPS INSTALLED BY HC, COORDINATE CONNECTIONS WITH HC.
5. PC SHALL PROVIDE 3" BADGER RECORDALL WATER METER FOR BUILDING DOMESTIC WATER SERVICE AND TIE IN TO BUILDING AUTOMATION SYSTEM. COORDINATE WITH HC/BAS CONTRACTOR.

DORSCHNER ASSOCIATES
Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

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MC FARLAND, WI 53558

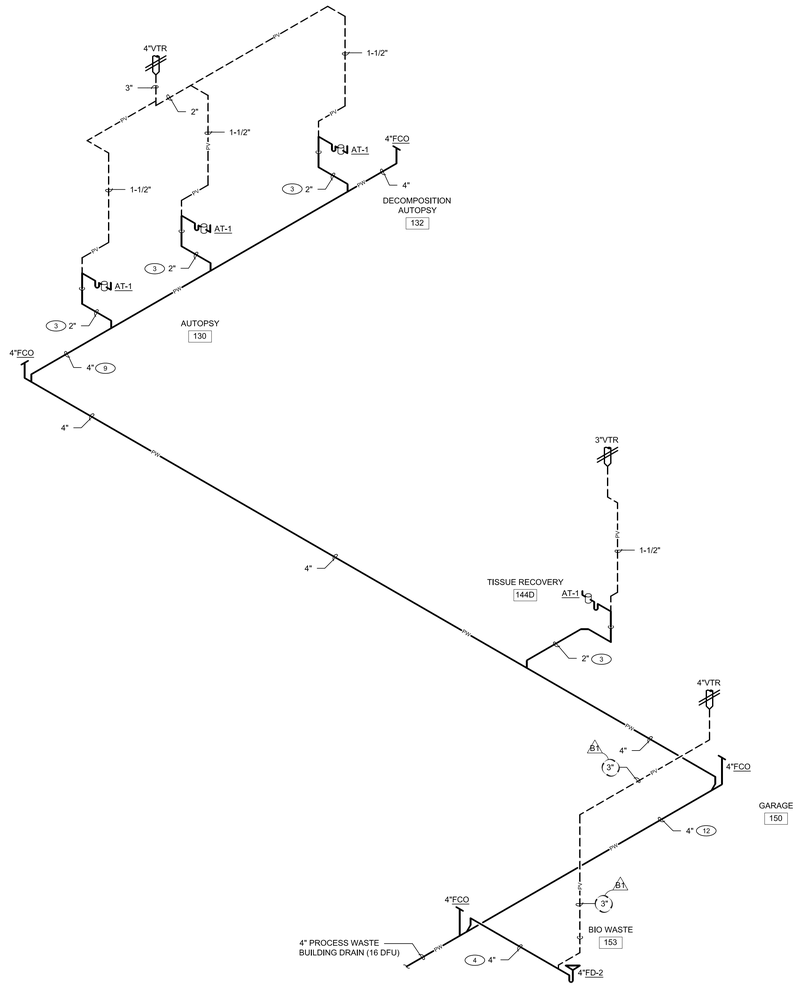
BID NO.
313083

DRAWING
PLUMBING FIRST FLOOR PLAN

DATE
01.12.15

JDR
ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
ph:608.277.1728 fax:608.271.7046
JDR Project No. 130099

P200



1 P701 PLUMBING PROCESS WASTE ISOMETRICS

SCALE: NONE

DORSCHNER ASSOCIATES

Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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MEDICAL EXAMINER OFFICE
BUILDING (BID PACKAGE B)

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BID NO.
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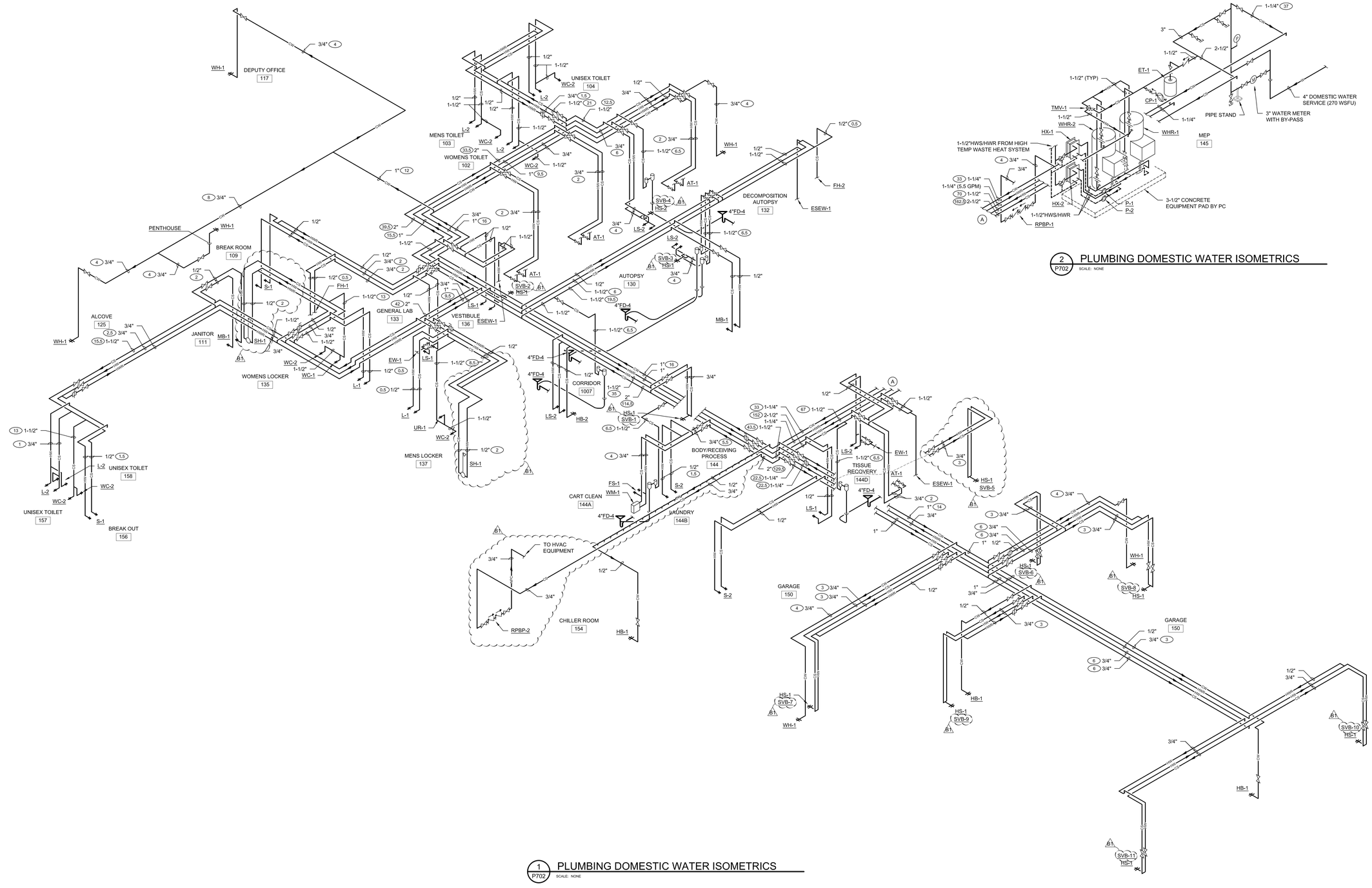
DRAWING
PLUMBING PROCESS
WASTE AND VENT
ISOMETRICS

DATE
01.12.15

JDR
ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
ph:608.277.1728 fax:608.271.7046
JDR Project No. 130099

P701



1 P702 PLUMBING DOMESTIC WATER ISOMETRICS

SCALE: NONE

2 P702 PLUMBING DOMESTIC WATER ISOMETRICS

SCALE: NONE

DORSCHNER ASSOCIATES

Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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MEDICAL EXAMINER OFFICE
BUILDING (BID PACKAGE B)

3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
PLUMBING DOMESTIC
WATER ISOMETRICS

DATE
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JDR
ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
ph:608.277.1728 fax:608.271.7046
JDR Project No. 130099

P702

GAS WATER HEATERS SCHEDULE

ID	MANUFACTURER MODEL #	GAS CFH	GAS PRESS IN WC	RECOVERY		TANK CAP GAL	DETAIL/ SHEET	DESCRIPTION/REMARKS
				GPH	RISE °F			
WHR-1 & WHR-2	PHOENIX PH199-119SNHX	40 - 199	12	294	80	119	5/P400	TANK TYPE NATURAL GAS FIRED WATER HEATER, 96% EFFICIENT,SEALED COMBUSTION, MODULATING 5:1 TURNDOWN, 3" INTAKE AND VENT, 316L STAINLESS STEEL TANK, LCD DISPLAY, AUXILIARY INLET AND OUTLET FOR CONNECTIONS FROM HEAT EXCHANGER, LESS INTERNAL HEAT EXCHANGER COIL. INCLUDE 3" PVC CONCENTRIC VENT TERMINATION KIT.

HEAT EXCHANGER SCHEDULE

ID	MANUFACTURER MODEL #	MBH	HOT SIDE					COLD SIDE					FOULING FACTOR	DETAIL/ SHEET	DESCRIPTION/REMARKS
			IN TEMP	OUT TEMP	GPM IN	GPM OUT	PRESS DROP	IN TEMP	OUT TEMP	GPM IN	GPM OUT	PRESS DROP			
HX-1 & HX-2	AIC LC110DW-20	300	200°F	170°F	22.99	22.71	3.67	72.0	97.0	23.98	24.05	3.91	0.0065	5/P400	DOUBLE WALL PLATE AND FRAME HEAT EXCHANGER, BRAISED BRONZE CONNECTIONS.

EXPANSION TANK SCHEDULE

ID	MANUFACTURER MODEL #	SIZE		SYSTEM	VOLUME GALLON	PRESSURE RATING PSI	DETAIL/ SHEET	DESCRIPTION/REMARKS
		DIA	HEIGHT					
ET-1	AMTROL ST-20VC	12"	19"	DOMESTIC	8	150	5/P400	STEEL THERMAL EXPANSION TANK, RATED FOR DOMESTIC WATER, HEAVY DUTY BUTYL NSF/ANSI 61 DIAPHRAGM, POLYPROPYLENE LINER, PRECHARGED, STAINLESS STEEL CONNECTION, WITH AIR VALVE.

PUMPS SCHEDULE

ID	MANUFACTURER MODEL #	ELECTRICAL				VFD	DISCHARGE		DETAIL/ SHEET	DESCRIPTION/REMARKS
		HP	AMPS	VOLTS	PHASE		GPM	HD FT		
CP-1	GRUNDFOS UPS15-55SFC	0.12	0.75	115	1	NO	5.5	13	5/P400	BRONZE BODY, CERAMIC SHAFT, STAINLESS STEEL ROTOR CAN AND BEARING PLATE, BRONZE BODY, THREE SPEEDS.
P-1	GRUNDFOS UPS26-99BFC	1/6	1.8	115	1	NO	24	9	5/P400	BRONZE BODY, CERAMIC SHAFT, STAINLESS STEEL ROTOR CAN AND BEARING PLATE, BRONZE BODY, THREE SPEEDS.
P-2	GRUNDFOS UPS26-99BFC	1/6	1.8	115	1	NO	24	9	5/P400	BRONZE BODY, CERAMIC SHAFT, STAINLESS STEEL ROTOR CAN AND BEARING PLATE, BRONZE BODY, THREE SPEEDS.

REDUCED PRESSURE BACKFLOW PREVENTER SCHEDULE

ID	MANUFACTURER MODEL #	SIZE	GPM	PRESS DROP	SYSTEM	DETAIL/SHEET	DESCRIPTION/REMARKS
RPBP-1	WATTS 919QT-S	3/4"	12	13	HVAC MAKE-UP	6/P400	BRONZE BODY, SILICONE RUBBER DISC IN BOTH CHECK SEATS, STAINLESS STEEL RELIEF VALVE SEATS, INCLUDE AIR GAP FITTING.
RPBP-2	WATTS 919QT-S	3/4"	12	13	HVAC MAKE-UP	6/P400	BRONZE BODY, SILICONE RUBBER DISC IN BOTH CHECK SEATS, STAINLESS STEEL RELIEF VALVE SEATS, INCLUDE AIR GAP FITTING.

PLUMBING DRAIN & CLEANOUT SCHEDULE

ID	FIXTURE	WASTE			WATER		DETAIL/ SHEET	DESCRIPTION/REMARKS
		DFU	TRAP	VENT	WSFU	SIZE		
CB-1	CATCH BASIN	4	---	2	---	---	9/P400	FIXTURE: PRECAST CATCH BASIN WITH FRAME AND GRATE, MONILITHICALLY FACTORY FORMED BASIN, 6" CONCRETE WALLS, GASKETED PIPE PENETRATIONS. REFER TO DETAIL.
FD-1	FLOOR DRAIN	2 3	2" 3"	1-1/2" 1-1/2"	---	---	---	FIXTURE: ZURN ZN415B, CAST IRON BODY, 6" DIAMETER NICKEL BRONZE "TYPE B" STRAINER, COMBINATION INVERTIBLE MEMBRANE CLAMP, AND ADJUSTABLE COLLAR.
FD-2	FLOOR DRAIN	4	4"	2"	---	---	---	FIXTURE: ZURN ZN508, CAST IRON BODY, 9" DIAMETER NICKEL BRONZE TOP, SEEPAGE PAN, COMBINATION MEMBRANE FLASHING CLAMP & FRAME, AND HEAVY DUTY DEEP FLANGE SLOTTED GRATE.
FD-3	FLOOR DRAIN (AUTOPSY AND LAB)	4	4"	2"	---	---	---	FIXTURE: ZURN ZN415B-AR, ACID RESISTING COATED CAST IRON BODY, 6" DIAMETER NICKEL BRONZE "TYPE B" STRAINER, COMBINATION INVERTIBLE MEMBRANE CLAMP, AND ADJUSTABLE COLLAR.
FD-4	FLUSHING FLOOR DRAIN (AUTOPSY AND LAB)	6	4"	2"	6.5	1-1/2"	8/P400	FIXTURE: JR SMITH 2505T, ACID RESISTING COATED CAST IRON BODY, 11-1/2" DIAMETER NICKEL BRONZE STRAINER, FLASHING CLAMP, HINGED PERFORATED GRATE, INTEGRAL P-TRAP, FLUSHING CONNECTIONS ON DRAIN BODY AND P-TRAP. FLUSH VALVE: SLOAN 152-1.6-WB CONCEALED FLUSHOMETER, DIAPHRAGM, 1" ANGLE STOP, VACUUM BREAKER, PUSH BUTTON OPERATION. INCLUDE SLOAN WB-1-A WALL BOX, 13-1/2"x13-1/2" FOR 12"x12" WALL OPENING, 16 GAUGE BRUSHED STAINLESS STEEL.
TD-1	TRENCH DRAIN	4	4"	2"	---	---	4/P400	FIXTURE: ACO POWERDRAIN S100K TRENCH DRAIN SYSTEM, 4" INTERNAL WIDTH, ONE (1) IN-LINE CATCH BASIN 901D AND FIVE (5) ONE METER LENGTH SECTIONS STARTING AT SK1-6 THRU SK1-10, NO NEUTRAL SECTIONS, 4° ROUND SIDE OUTLET, LOWEST BOTTOM INVERT 5.91, INTEGRAL GALVANIZED FRAME, NO CROSS BARS, CONTINUOUS SLOPE SYSTEM AT 0.5%, INCLUDE END CAPS AT BEGINNING AND END OF TRENCH RUN, IRON SLOTTED LOCKING GRATE, PROVIDE INSTALLATION DEVICES FOR CHANNELS. REFER TO FLOOR PLANS FOR HIGH POINTS AND LENGTHS OF TRENCH RUN.
TD-2	TRENCH DRAIN	4	4"	2"	---	---	4/P400	FIXTURE: ACO POWERDRAIN S100K TRENCH DRAIN SYSTEM, 4" INTERNAL WIDTH, ONE (1) IN-LINE CATCH BASIN 901D AND SEVEN (7) ONE METER LENGTH SECTIONS STARTING AT SK1-4 THRU SK1-10, NO NEUTRAL SECTIONS, 4° ROUND SIDE OUTLET, LOWEST BOTTOM INVERT 5.91, INTEGRAL GALVANIZED FRAME, NO CROSS BARS, CONTINUOUS SLOPE SYSTEM AT 0.5%, INCLUDE END CAPS AT BEGINNING AND END OF TRENCH RUN, IRON SLOTTED LOCKING GRATE, PROVIDE INSTALLATION DEVICES FOR CHANNELS. REFER TO FLOOR PLANS FOR HIGH POINTS AND LENGTHS OF TRENCH RUN.
HD-1	HUB DRAIN - AT GRADE	6	4"	2"	---	---	---	EXTEND HUB 2" AFF (MIN), INSTALL PIPE INCREASER ONE PIPE SIZE LARGER.
DSN-1	DOWNSPOUT NOZZLE	---	---	---	---	---	---	FIXTURE: ZURN ZANB-199 DOWNSPOUT NOZZLE, ALL NICKEL BRONZE BODY, THREADED INLET, DECORATIVE FACE OF WALL FLANGE AND OUTLET NOZZLE.
ORD-1	OVERFLOW ROOF DRAIN	---	---	---	---	---	---	FIXTURE: ZURN ZC100-C-EA-R-W2 OVERFLOW ROOF DRAIN, CAST IRON BODY, 15" DIA, COMBINATION MEMBRANE FLASHING CLAMP/GRAVEL GUARD, UNDERDECK CLAMP, ADJUSTABLE EXTENSION, ROOF SUMP RECEIVER, CAST IRON STRAINER, AND 2" INTERNAL WATER DAM.
RD-1	ROOF DRAIN	---	---	---	---	---	---	FIXTURE: ZURN ZC100-C-EA-R ROOF DRAIN, CAST IRON BODY, 15" DIA, COMBINATION MEMBRANE FLASHING CLAMP/GRAVEL GUARD, UNDERDECK CLAMP, ADJUSTABLE EXTENSION, ROOF SUMP RECEIVER, AND CAST IRON STRAINER.
RD-2	ROOF DRAIN	---	---	---	---	---	---	FIXTURE: ZURN ZC125-C-R ROOF DRAIN, CAST IRON BODY, 8-3/8" DIA, COMBINATION MEMBRANE FLASHING CLAMP/GRAVEL GUARD, UNDERDECK CLAMP, ROOF SUMP RECEIVER, AND CAST IRON STRAINER.
RD-3	ROOF DRAIN (CANOPY DRAIN)	---	---	---	---	---	---	FIXTURE: ZURN Z167 SCUPPER ROOF DRAIN, CAST IRON BODY, 7-1/2" X 6-3/8", COMBINATION MEMBRANE FLASHING CLAMP/GRAVEL GUARD, AND CAST IRON STRAINER.
FCO	FLOOR CLEANOUT	---	---	---	---	---	---	FINISHED AREAS WITH HARD FLOORS: ZURN ZN1400-BP, CAST IRON, ADJUSTABLE FLOOR CLEANOUT WITH NICKEL BRONZE TOP & BRONZE PLUG. FINISHED AREAS WITH CARPETED FLOORS: ZURN ZN1400-BP-CM, CAST IRON, ADJUSTABLE FLOOR CLEANOUT WITH NICKEL BRONZE TOP & BRONZE PLUG, WITH CARPET MARKER. UNFINISHED AREAS: ZURN ZN1400-BP, HEAVY DUTY, CAST IRON, ADJUSTABLE FLOOR CLEANOUT WITH NICKEL BRONZE TOP AND BRONZE PLUG.
WCO	WALL CLEANOUT	---	---	---	---	---	---	FIXTURE: ZURN ZS1468, POLISHED STAINLESS STEEL, ROUND ACCESS COVER, SECURING SCREW & BRONZE RAISED HEX HEAD PLUG. VERIFY LENGTH OF SCREW REQUIRED WITH WALL CONSTRUCTION.
YCO	YARD CLEANOUT	---	---	---	---	---	3/P400	FIXTURE: PLUMBING CREATIONS CI-48-8, PIPE RISER WITH FROST SLEEVE EXTENDING 5 FEET BELOW FINISHED GRADE.

AIR COMPRESSOR SCHEDULE

ID	MANUFACTURER MODEL #	ELECTRICAL				TOTAL (SCFM)	PRESS PSI	COOLING TYPE	RECEIVER TANK SIZE	DETAIL/ SHEET	DESCRIPTION/REMARKS
		HP	AMPS	VOLTS	PHASE						
AC-1	QUINCY QT-5 253D80VCB46M	5	7.6	480	3	17.2	175	AIR	80 GALLON	---	RECIPROCATING PISTON AIR COMPRESSOR, TWO-STAGE, SPLASH LUBRICATED, TANK MOUNTED ON VERTICAL TANK, PROVIDE ISOLATION MOUNTING PADS. INCLUDE NANO 20 CFM CYCLING REFRIGERATED AIR DRYER, AND NANO F1 DRYER PRE-FILTER.

SPILL-RESISTANT BACKFLOW PREVENTER SCHEDULE

ID	MANUFACTURER MODEL #	SIZE	GPM	PRESS DROP	SYSTEM	DETAIL/SHEET	DESCRIPTION/REMARKS
SVB-1 SVB-2 SVB-3 SVB-4 SVB-5 SVB-6 SVB-7 SVB-8 SVB-9 SVB-10 SVB-11	WATTS LF008PCQT	3/4"	7	3	HOSE STATION WATER	---	ANTI-SIPHON, SPILL-RESISTANT ELEVATED BACKFLOW PREVENTER, ONE-PIECE MODULAR CHECK AND FLOAT ASSEMBLY, LEAD-FREE, CAST COPPER SILICON ALLOY BODY, STAINLESS STEEL SPRINGS, INTEGRAL BALL VALVES ON INLET AND OUTLET, TEST PORT, 180°F MAX TEMPERATURE, ASSE 1056. INSTALL EXPOSED ON WALL IN ACCESSIBLE LOCATION ON TEMPERED WATER OUTLET FROM HOSE STATION, MOUNT 60" AFF (MIN).

PLUMBING FIXTURE SCHEDULE

REFER TO SPECIFICATION SECTION 22 40 00 FOR ACCEPTABLE EQUAL MANUFACTURERS

ID	FIXTURE	WASTE			WATER				DETAIL/ SHEET	DESCRIPTION/REMARKS
		DFU	TRAP	VENT (MIN)	COLD		HOT			
					CWFU	SIZE	HWFU	SIZE		
AO-1	AIR OUTLET	---	---	---	---	---	---	---	---	FIXTURE: MILTON S-775 STYLE 'A' QUICK DISCONNECT AIR OUTLET, MOUNT 48" AFF, PROVIDE BALL VALVE WITH DIRT LEG.
AT-1	AUTOPSY TABLE WITH SINK (PROVIDED BY DIV 11)	3	2"	1-1/2"	2	3/4"	2	3/4"	---	FIXTURE: SINK, DRAIN STRAINER, AND TAILPIECE PROVIDED BY DIV 11, INSTALLED BY PC. FAUCET: FAUCET PROVIDED BY DIV 11, INSTALLED BY PC. TRAP & DRAIN: 17 GAUGE CAST BRASS P-TRAP, GRID STRAINER DRAIN. STOPS & SUPPLIES: McGUIRE H2167LK, LOOSE KEY QUARTER TURN ANGLE STOPS WITH CHROME PLATED ESCUTCHEONS & CHROME PLATED COPPER RISER SUPPLIES.
EW-1	EMERGENCY EYEWASH (PROVIDED BY DIV 11)	---	---	---	---	1/2"	---	1/2"	---	FIXTURE: DRENCH TYPE EYEWASH PROVIDED BY DIV 11, INSTALLED BY PC. MIXING VALVE: BRADLEY S19-2000 THERMOSTATIC MIXING VALVE, MEETS ANSI Z358.1, CHECKSTOPS ON INLETS, ADJUSTABLE TEMPERATURE RANGE, COLD WATER BYPASS, POSITIVE SHUTOFF ON HOT SUPPLY WHEN COLD SUPPLY IS LOST, DIAL THERMOMETER. PROVIDED AND INSTALLED BY PC, INSTALLED UNDER SINK IN CABINET WITH BALL VALVES.
ESEW-1	EMERGENCY SHOWER / EYEWASH (PROVIDED BY DIV 11)	---	1-1/2"	1-1/2"	---	1-1/4"	---	1-1/4"	---	FIXTURE: SHOWER AND EYEWASH UNIT PROVIDED BY DIV 11, INSTALLED BY PC. MIXING VALVE: BRADLEY S19-2200 THERMOSTATIC MIXING VALVE, MEETS ANSI Z358.1, INTEGRAL STRAINER, CHECKSTOPS ON INLETS, ADJUSTABLE TEMPERATURE RANGE, COLD WATER BYPASS, POSITIVE SHUTOFF ON HOT SUPPLY WHEN COLD SUPPLY IS LOST, DIAL THERMOMETER. PROVIDED AND INSTALLED BY PC, INSTALL ABOVE CEILING AT ESEW-1 LOCATION WITH BALL VALVES.
FH-1	FUME HOOD (PROVIDED BY DIV 11)	0.5	1-1/4"	1-1/2"	0.5	1/2"	0.5	1/2"	---	FIXTURE: FUME HOOD WITH CUP SINK PROVIDED BY DIV 11, CUP SINK INSTALLATION AND ALL CONNECTIONS BY PC. TRAP & DRAIN: PRE-WRAPPED OFFSET DRAIN & P-TRAP, WITH GRID STRAINER DRAIN. STOPS & SUPPLIES: McGUIRE H2167LK, LOOSE KEY QUARTER TURN ANGLE STOPS WITH CHROME PLATED ESCUTCHEONS & CHROME PLATED COPPER RISER SUPPLIES.
FH-2	FUME HOOD (PROVIDED BY DIV 11)	0.5	1-1/4"	1-1/2"	0.5	1/2"	---	---	---	FIXTURE: FUME HOOD WITH CUP SINK PROVIDED BY DIV 11, CUP SINK INSTALLATION AND ALL CONNECTIONS BY PC. TRAP & DRAIN: PRE-WRAPPED OFFSET DRAIN & P-TRAP, WITH GRID STRAINER DRAIN. STOPS & SUPPLIES: McGUIRE H2167LK, LOOSE KEY QUARTER TURN ANGLE STOPS WITH CHROME PLATED ESCUTCHEONS & CHROME PLATED COPPER RISER SUPPLIES.
FS-1	FAUCET STATION	---	---	---	2	1/2"	2	1/2"	---	FIXTURE: CHICAGO FAUCETS 610-GCLVBABCP FAUCET WITH HOSE SPRAY, WALL MOUNTED FAUCET ON 8" CENTERS, LEVER HANDLES, 23" RISER PIPE FITTING, 29" FLEXIBLE HOSE, 1.0 GPM SPRAY VALVE, IN-LINE BACKFLOW PREVENTER, PIPE STRAP AND HOOK ASSEMBLY.
HB-1	HOSE BIBB	---	---	---	3	1/2"	---	---	---	FIXTURE: WOODFORD MODEL 24 ANTI-SIPHON HOSE BIBB, EXPOSED COLD WATER, INTEGRAL VACUUM BREAKER, 3/4" HOSE CONNECTION.
HB-2	HOSE BIBB	---	---	---	3	1/2"	---	---	---	FIXTURE: WOODFORD MODEL 24 ANTI-SIPHON HOSE BIBB, EXPOSED COLD WATER, INTEGRAL VACUUM BREAKER, INCLUDE DIVERTER FOR TWO (2) 3/4" HOSE CONNECTIONS.
HS-1	HOSE STATION AND HOSE	---	---	---	3	3/4"	3	3/4"	---	FIXTURE: STRAHMAN M200TS THERMOSTATICALLY CONTROLLED MIXING WALL MOUNTED FAUCET, BRONZE BODY, SINGLE ON/OFF OPERATION, ADJUSTABLE LIMIT STOP, 1/2" INLET, 5-7 GPM, TEMPERATURE GAUGE. COORDINATE LOCATION & MOUNTING WITH GC. HOSE: STRAHMAN 5/8" ID / 1-1/8" OD HOSE, YELLOW, STAINLESS STEEL FITTINGS, FDA APPROVED INTERNAL TUBE, 50 FOOT LENGTH. NOZZLE: STRAHMAN HYDRO-PRO 150 SPRAY NOZZLE, STAINLESS STEEL HOUSING, LOCKING TRIGGER, BLACK WATERPROOF NYLON COVER, 7 GPM AT 80 PSIG, WITH SWIVEL ADAPTER.
HS-2	HOSE STATION AND HOSE	---	---	---	3	3/4"	3	3/4"	---	FIXTURE: STRAHMAN M200TS THERMOSTATICALLY CONTROLLED MIXING WALL MOUNTED FAUCET, BRONZE BODY, SINGLE ON/OFF OPERATION, ADJUSTABLE LIMIT STOP, 1/2" INLET, 5-7 GPM, TEMPERATURE GAUGE. COORDINATE LOCATION & MOUNTING WITH GC. HOSE: STRAHMAN 5/8" ID / 1-1/8" OD HOSE, YELLOW, STAINLESS STEEL FITTINGS, FDA APPROVED INTERNAL TUBE, 25 FOOT LENGTH. NOZZLE: STRAHMAN HYDRO-PRO 150 SPRAY NOZZLE, STAINLESS STEEL HOUSING, LOCKING TRIGGER, BLACK WATERPROOF NYLON COVER, 7 GPM AT 80 PSIG, WITH SWIVEL ADAPTER.
L-1	LAVATORY (ADA COMPLIANT)	1	1-1/4"	1-1/2"	0.5	1/2"	0.5	1/2"	2/P400	FIXTURE: KOHLER PENNINGTON K-2196-4 SELF-RIMMING LAVATORY SINK, VITREOUS CHINA, THREE FAUCET HOLES ON 2" CENTERS, 20.25" x 17.5", OVERFLOW, ADA COMPLIANT. FAUCET: CHICAGO FAUCETS 2200-4-2300-4KCP MANUAL FAUCET, SINGLE LEVER, SOLID BRASS CONSTRUCTION, CHROME FINISH, CERAMIC CARTRIDGE, 1.5 GPM AERATOR, MOUNTED ON 4" CENTERS, ADA COMPLIANT. TRAP & DRAIN: PRE-WRAPPED OFFSET DRAIN & P-TRAP, WITH GRID STRAINER DRAIN. STOPS & SUPPLIES: McGUIRE H2167LK, LOOSE KEY QUARTER TURN ANGLE STOPS WITH CHROME PLATED ESCUTCHEONS & CHROME PLATED COPPER RISER SUPPLIES.
L-2	LAVATORY (ADA COMPLIANT)	1	1-1/4"	1-1/2"	0.5	1/2"	0.5	1/2"	2/P400	FIXTURE: KOHLER KINGSTON K-2005 WALL HUNG LAVATORY SINK, WHITE VITREOUS CHINA, THREE FAUCET HOLES ON 2" CENTERS, 21.25" x 18.125", WITH OVERFLOW, ADA COMPLIANT. FAUCET: CHICAGO FAUCETS 2200-4-2300-4KCP MANUAL FAUCET, SINGLE LEVER, SOLID BRASS CONSTRUCTION, CHROME FINISH, CERAMIC CARTRIDGE, 1.5 GPM AERATOR, MOUNTED ON 4" CENTERS, ADA COMPLIANT. TRAP & DRAIN: PRE-WRAPPED OFFSET DRAIN & P-TRAP, WITH GRID STRAINER DRAIN. STOPS & SUPPLIES: McGUIRE H2167LK, LOOSE KEY QUARTER TURN ANGLE STOPS WITH CHROME PLATED ESCUTCHEONS & CHROME PLATED COPPER RISER SUPPLIES.
LS-1	LAB SINK (PROVIDED BY DIV 11) (ADA COMPLIANT)	2	1-1/2"	1-1/2"	1	1/2"	1	1/2"	2/P400	FIXTURE: SINK, DRAIN STRAINER, AND TAILPIECE PROVIDED BY DIV 11, INSTALLED BY PC. FAUCET: FAUCET PROVIDED BY DIV 11, INSTALLED BY PC. TRAP & DRAIN: PRE-WRAPPED OFFSET DRAIN & P-TRAP, WITH GRID STRAINER DRAIN. STOPS & SUPPLIES: McGUIRE H2167LK, LOOSE KEY QUARTER TURN ANGLE STOPS WITH CHROME PLATED ESCUTCHEONS & CHROME PLATED COPPER RISER SUPPLIES.
LS-2	LAB SINK (PROVIDED BY DIV 11)	2	1-1/2"	1-1/2"	1	1/2"	1	1/2"	---	FIXTURE: SINK, DRAIN STRAINER, AND TAILPIECE PROVIDED BY DIV 11, INSTALLED BY PC. FAUCET: FAUCET PROVIDED BY DIV 11, INSTALLED BY PC. TRAP & DRAIN: PRE-WRAPPED OFFSET DRAIN & P-TRAP, WITH GRID STRAINER DRAIN. STOPS & SUPPLIES: McGUIRE H2167LK, LOOSE KEY QUARTER TURN ANGLE STOPS WITH CHROME PLATED ESCUTCHEONS & CHROME PLATED COPPER RISER SUPPLIES.
MB-1	MOP BASIN	3	3"	1-1/2"	2	1/2"	2	1/2"	---	FIXTURE: MUSTEE 63M 24"x24"x10" HIGH BASIN, ONE PIECE MOLDED DURASTONE, INTEGRAL MOLDED-IN DRAIN, 3" DRAIN CONNECTION. FAUCET: CHICAGO FAUCETS SERVICE SINK FAUCET 305-RCF WITH ROUGH CHROME FINISH, 3/4" MALE HOSE THREADED OUTLET, PAIL HOOK, ADJUSTABLE SUPPLY ARMS WITH INTEGRAL SERVICE STOPS AND LEVER HANDLES, PROVIDE WATTS MODEL 8AC NON-REMOVABLE CHROME VACUUM BREAKER. ACCESSORIES: PROVIDED BY DIV 11, COORDINATE LOCATIONS.
S-1	SINK (BREAK ROOM SINK) (ADA COMPLIANT)	2	1-1/2"	1-1/2"	1.5	1/2"	1.5	1/2"	---	FIXTURE: ELKAY LRAD2521-6.5, 18 GAUGE TYPE 304 STAINLESS STEEL SINK, SELF-RIMMING, 25"x21.25"x6.5" DEEP, THREE FAUCET HOLES ON 4" CENTERS, CUSTOM DRILL FOURTH HOLE FOR SIDE SPRAY 6" TO RIGHT OF FAUCET HOLE, ADA COMPLIANT. FAUCET: CHICAGO FAUCETS 1102-317CP, MANUAL FAUCET WITH SIDE SPRAY, BRASS CONSTRUCTION, 2.2 GPM AERATOR, POLISHED CHROME FINISH, 8" CAST BRASS SWING SPOUT, TWO 4" WRISTBLADE HANDLES, TWO HOLE MOUNTING ON 8" CENTERS, DECK MOUNTED. TRAP & DRAIN: CHROME PLATED CAST BRASS P-TRAP, WITH BASKET STRAINER DRAIN. STOPS & SUPPLIES: McGUIRE H2167LK, LOOSE KEY QUARTER TURN ANGLE STOPS WITH CHROME PLATED ESCUTCHEONS & CHROME PLATED COPPER RISER SUPPLIES.
S-2	SINK	2	1-1/2"	1-1/2"	1.5	1/2"	1.5	1/2"	---	FIXTURE: ADVANCE TABCO 4-OP-18, 16 GAUGE TYPE 304 STAINLESS STEEL SINK, FLOOR STANDING WITH FOUR LEGS, 24"x21"x8" DEEP WITH 8" HIGH BACKSPLASH, TWO FAUCET HOLES ON 8" CENTERS ON BACKSPLASH. FAUCET: CHICAGO FAUCETS W8W-GN0AE35-317AB, MANUAL FAUCET, BRASS CONSTRUCTION, 1.5 GPM AERATOR, POLISHED CHROME FINISH, 5-1/4" CAST BRASS GOOSENECK SPOUT, TWO 4" WRISTBLADE HANDLES, TWO HOLE MOUNTING ON 8" CENTERS, BACKSPLASH MOUNTED. TRAP & DRAIN: CHROME PLATED CAST BRASS P-TRAP, WITH BASKET STRAINER DRAIN. STOPS & SUPPLIES: McGUIRE H2167LK, LOOSE KEY QUARTER TURN ANGLE STOPS WITH CHROME PLATED ESCUTCHEONS & CHROME PLATED COPPER RISER SUPPLIES.
SH-1	SHOWER (ADA COMPLIANT)	2	2"	1-1/2"	2	1/2"	2	1/2"	---	ENCLOSURE: FIELD BUILT BY OTHERS. FIXTURE: SYMMONS 3505-H321-V-CYL-X-2.0 SHOWER SYSTEM, ON/OFF MIXING VALVE, DIVERTER VALVE, FIXED SHOWER HEAD, HAND HELD SHOWER HEAD WITH 60" HOSE & IN-LINE VACUUM BREAKER WALL CONNECTION, 30" SLIDE BAR WITH CRADLE FROM HAND SHOWER, ALL CHROME FINISH, 2.0 GPM FLOW RATE, ADA COMPLIANT. DRAIN: FLOOR DRAIN FD-1 IN SHOWER FLOOR.
TMV-1	THERMOSTATIC MIXING VALVE	---	---	---	---	---	---	---	5/P400	FIXTURE: ETV-SS 1" ELECTRONIC THERMOSTATIC MIXING VALVE, HOT WATER SHUT-OFF FAILURE, FULLY PROGRAMMABLE, 120 VAC / 1 PHASE, STAINLESS STEEL VALVE CONSTRUCTION, INCLUDE AQUASTAT ON HOT WATER INLET. PROVIDE SOLENOID ON HOT WATER INLET TO VALVE.
UR-1	URINAL (ADA HEIGHT)	2	2	1-1/2"	2	3/4"	---	---	---	FIXTURE: KOHLER BARDON K-4904-ET VITREOUS CHINA URINAL, WALL MOUNTED, WASHOUT, 3/4" TOP SPUD, 0.5 GPF, ADA HEIGHT. FLUSH VALVE: SLOAN ROYAL 186-0.5 MANUAL FLUSH VALVE, EXPOSED VALVE, CHROME FINISH, 0.5 GPF, FOR 3/4" TOP SPUD, 3/4" SCREWDRIVER ANGLE STOP, RUBBER DIAPHRAGM, ADA COMPLIANT. SUPPORT: COMMERCIAL GRADE, WALL HUNG URINAL SUPPORT, STEEL STANCHIONS, IRON WELDED FEET, STEEL SLEEVES, FASTEN TO FLOOR.
WC-1	WATER CLOSET	6	4"	2"	6.5	1-1/2"	---	---	---	FIXTURE: KOHLER KINGSTON K-4325, WALL HUNG, FLUSH VALVE TOILET, WHITE VITREOUS CHINA, ELONGATED BOWL, 1.6 GPF MAX, 2.25" TRAPWAY, 1-1/2" TOP SPUD. FLUSH VALVE: SLOAN ROYAL 111-1.6 MANUAL FLUSH VALVE, EXPOSED VALVE, CHROME FINISH, 1.6 GPF, FOR 1-1/2" TOP SPUD, 1" SCREWDRIVER ANGLE STOP, RUBBER DIAPHRAGM, ADA COMPLIANT. SEAT: KOHLER LUSTRA K-4670-CA, OPEN FRONT TOILET SEAT, ELONGATED BOWL, INJECTION MOLDED, WITH ANTI-MICROBIAL AGENT. SUPPORT: COMMERCIAL GRADE, WALL HUNG WATER CLOSET SUPPORT, STEEL STANCHIONS, IRON WELDED FEET, STEEL SLEEVES, FASTEN TO FLOOR.
WC-2	WATER CLOSET (ADA HEIGHT)	6	4"	2"	6.5	1-1/2"	---	---	---	FIXTURE: SAME AS WC-1, MOUNTED AT ADA HEIGHT. FLUSH VALVE: SAME AS WC-1, MOUNTED AT ADA HEIGHT. SEAT: KOHLER LUSTRA K-4670-CA, OPEN FRONT TOILET SEAT, ELONGATED BOWL, INJECTION MOLDED, WITH ANTI-MICROBIAL AGENT. SUPPORT: COMMERCIAL GRADE, WALL HUNG WATER CLOSET SUPPORT, STEEL STANCHIONS, IRON WELDED FEET, STEEL SLEEVES, FASTEN TO FLOOR.
WH-1	WALL HYDRANT	---	---	---	4	3/4"	---	---	---	FIXTURE: WOODFORD MODEL 67, EXTERNAL FREEZELESS WALL HYDRANT, AUTOMATIC DRAINING, INTEGRAL VACUUM BREAKER, 3/4" HOSE CONNECTION, LOOSE TEE KEY.
WM-1	WASHING MACHINE WALL BOX	4	2"	1-1/2"	2	3/4"	2	3/4"	7/P400	FIXTURE: GUY GRAY T200TPCPVCHA WASHING MACHINE RECESSED WALL BOX, WHITE POWDER COATED FINISH, 1/2" QUARTER TURN HOT & COLD VALVES, INTEGRAL WATER HAMMER ARRESTORS, 2" DRAIN OUTLET.

JDR
ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
ph:608.277.1728 fax:608.271.7046
JDR Project No. 130099

DORSCHNER ASSOCIATES
Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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02.12.15	ADDENDUM B1

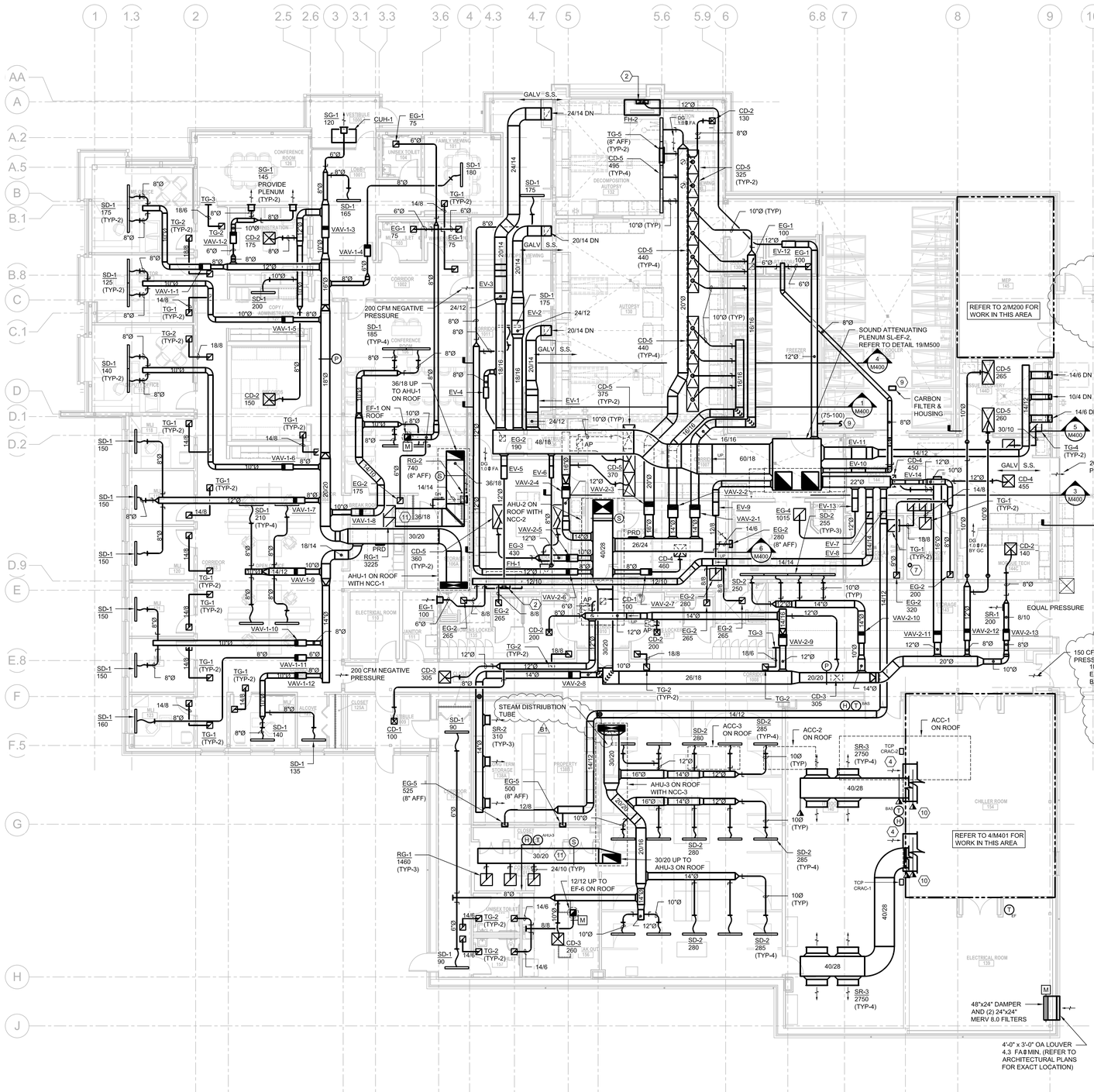
PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)

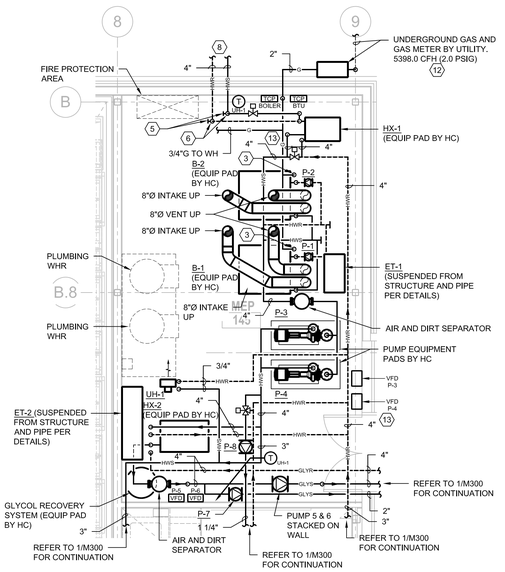
3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
PLUMBING SCHEDULES

DATE
01.12.15





1 M200 HVAC FIRST FLOOR PLAN

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

NORTH

2 M200 ENLARGED MECHAINCAL ROOM - HVAC

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

SHEET KEYED NOTES:

1. 8" VENT AND OA UP THRU ROOF. TERMINATE PER MANUFACTURERS REQUIREMENTS.
2. TRANSITION TO 24x8 CONNECTION ON FUME HOOD.
3. 1 1/4"G (2.0 PSIG) DN TO BOILER.
4. PROVIDE EXPANDED METAL SCREEN OVER RETURN AIR OPENINGS.
5. PROVIDE 4" X 1 1/2" TEE IN HWS AND HWR PIPES FOR PLUMBING CONNECTIONS. COORDINATE WITH PC.
6. PROVIDE WATER FLOW AND BTU MEASUREMENT STATION ON INCOMING HEATING HOT WATER FROM SITE GENERATOR HEAT RECOVERY LOOP. INSTALL IN VERTICAL PIPE RISE.
7. EXTEND AN ALL ALUMINUM DRYER VENT UP THRU ROOF AND TERMINATE MINIMUM 18" ABOVE FINISHED ROOF WITH GOOSENECK.
8. EXTEND AND CONNECT 4" HWS AND HWR TO 4" HHWS AND HHWR PIPING LEFT BY PHASE 1 PROJECT.
9. PROVIDE 5'Ø INSULATED (3" RIGID INSULATION) SUPPLY AND RETURN AIR DUCTS FROM AND TO COLD ROOM GRILLES (GRILLES BY COLD ROOM SUPPLIER) TO THE DEHUMIDIFICATION UNIT. PROVIDE A FILTER RACK WITH 12" CARBON FILTER IN THE RETURN AIR DUCT (COORDINATE WITH THE COLD ROOM SUPPLIER FOR DEHUMIDIFICATION AND FILTER RACK LOCATIONS). CONNECT 3'Ø DUCT FROM THE DEHUMIDIFICATION UNIT (BALANCE TO CFM LISTED) TO EXHAUST SYSTEM AS INDICATED.
10. PROVIDE ISOLATION FIRE/SMOKEDAMPERS ON SUPPLY AND RETURN DUCTS AT EACH COMPUTER ROOM AIR CONDITIONING UNIT.
11. LINE ALL RETURN AIR DUCTWORK.
12. GAS UTILITY TO PROVIDE METER WITH OUTPUT FOR CONNECTION INTO THE BAS (FOR METER TRENDING PURPOSES).
13. NATURAL GAS EMERGENCY SHUTDOWN VALVE AND SWITCH (OUTSIDE OF MECHANICAL ROOM DOOR).

DORSCHNER ASSOCIATES

Architecture
Planning

Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

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HVAC FIRST FLOOR PLAN

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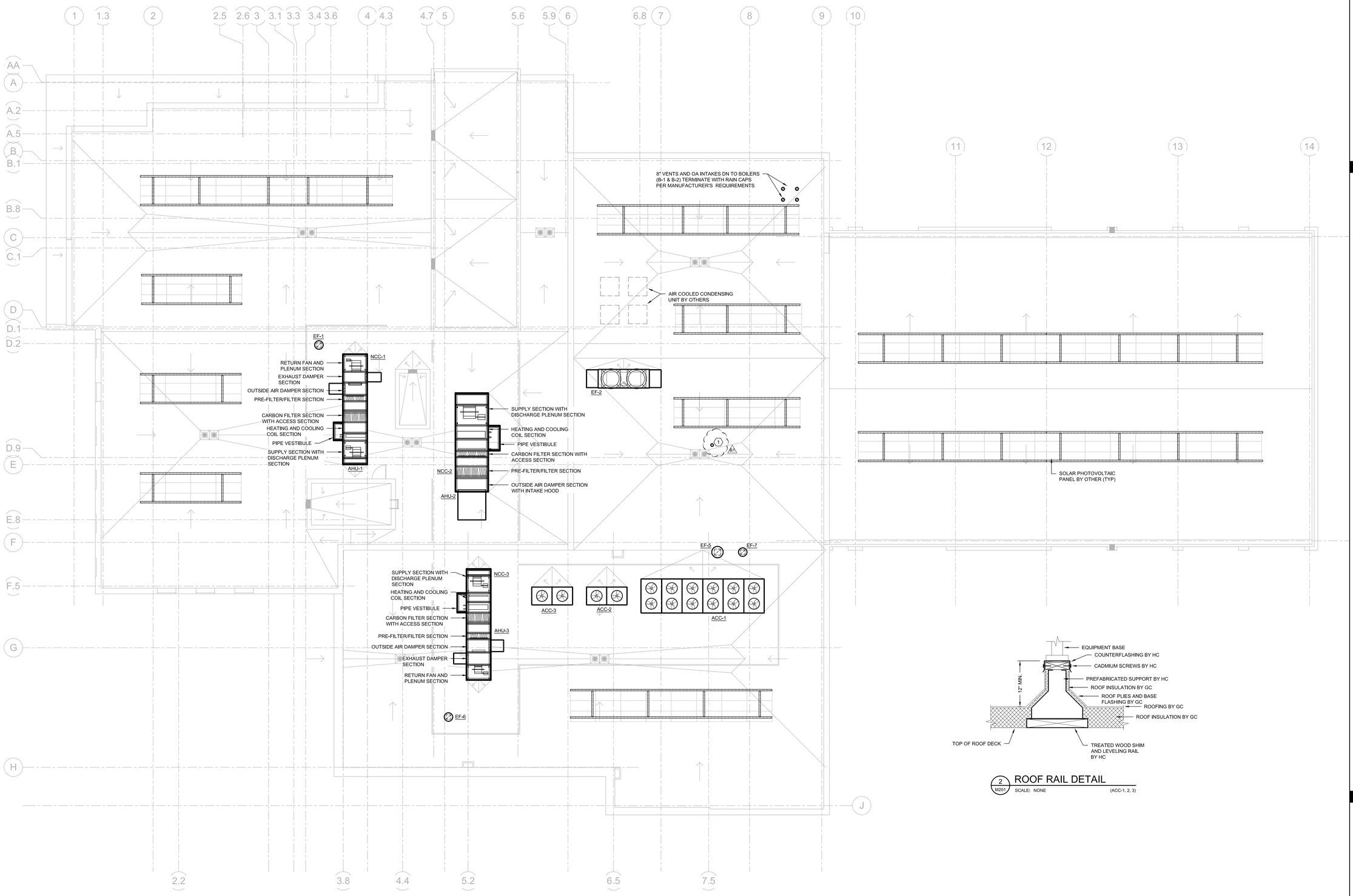
JDR ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
ph:608.277.1728 fax:608.271.7046
JDR Project No. 130099

M200



2 M201 ROOF RAIL DETAIL
SCALE: NONE (ACC-1, 2, 3)

1 M201 HVAC ROOF PLAN
SCALE: 1/8"=1'-0"

NORTH

KEYED NOTES:

1 EXTEND AN ALL ALUMINUM DRYER VENT UP THRU ROOF AND TERMINATE MINIMUM 18" ABOVE FINISHED ROOF WITH GOOSENECK. REFER TO DETAIL 15/M500.

DORSCHNER ASSOCIATES
Architecture
Planning

Dorschner|Associates, Inc.
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Madison, Wisconsin 53703
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HVAC ROOF PLAN, AND DETAILS

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ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
ph:608.277.1728 fax:608.271.7046
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DORSCHNER | ASSOCIATES
Architecture
Planning
Dorschner|Associates, Inc.
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Madison, Wisconsin 53703
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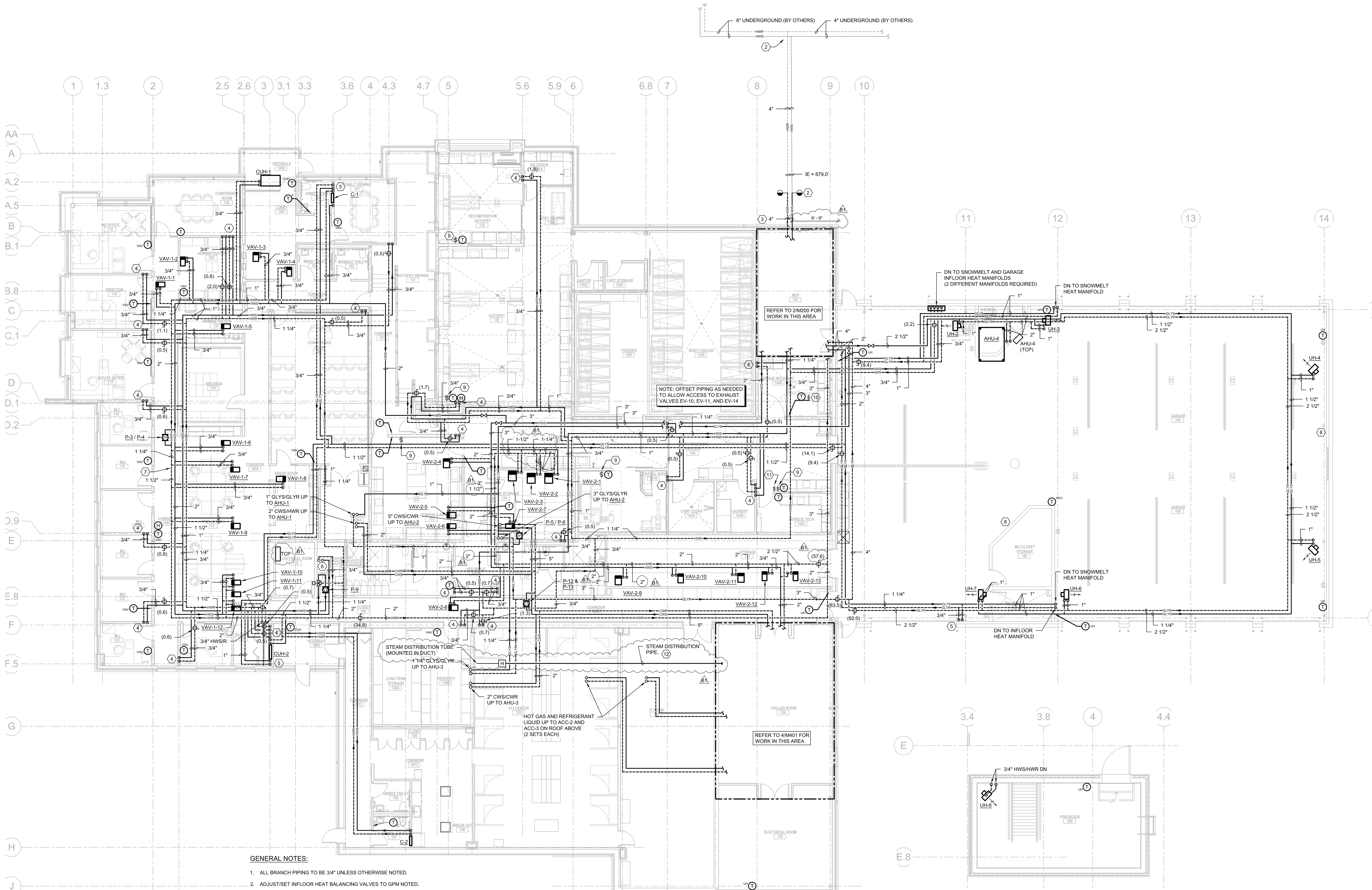

HVAC PIPING FIRST FLOOR PLAN
1/M300 SCALE: 1/8"=1'-0"
NORTH

HVAC PENTHOUSE FLOOR PLAN
2/M300 SCALE: 1/4"=1'-0"
NORTH

GENERAL NOTES:

1. ALL BRANCH PIPING TO BE 3/4" UNLESS OTHERWISE NOTED.
2. ADJUST/SET INFLOOR HEAT BALANCING VALVES TO GPM NOTED.

KEYED NOTES:

1. UNDERGROUND HWS/HWR PIPING PROVIDED AND INSTALLED BY OTHERS FROM LANDFILL EMERGENCY GENERATORS TO PROJECT SITE.
2. THIS CONTRACTOR TO CONNECT TO UNDERGROUND 4" HWS/HWR PIPING WITH NEW 4" UNDERGROUND HWS/HWR PIPING.
3. 4" UNDERGROUND HWS PIPING ROUTED INTO BUILDING. THIS CONTRACTOR SHALL PROVIDE ALL NEW UNDERGROUND PIPING, CONNECTIONS TO EXISTING 4" HWS/HWR PIPING , EXCAVATION, BACKFILL AND OPENINGS THRU FOUNDATION WALL INTO MECHANICAL ROOM.
4. DROP PIPING IN WALL DOWN TO INTERIOR INFLOOR RADIANT HEAT. SEE M301 FOR CONTINUATION.
5. DROP PIPING IN WALL DOWN TO EXTERIOR SNOWMELT HEAT. SEE M301 FOR CONTINUATION.
6. 3/4" HWS/HWR PIPING UP TO PENTHOUSE. SEE 2/M300 FOR CONTINUATION.
7. LOCATION OF HW SYSTEM BY-PASS VALVE.
8. LOCATION OF GAS DETECTION SENSOR. PROVIDE QUANTITY OF SENSORS REQUIRED FOR COMPLETE COVERAGE OF FLOOR AREA.
9. LOW/HIGH VENTILATION AIR SWITCH.
10. POSITIVE/NEGATIVE AIR SWITCH.
11. AHU-2 OVERRIDE SWITCH LOCATION.
12. STEAM DISTRIBUTION TUBE. SIZE PER MANUFACTURERS RECOMMENDATIONS. PITCH TUBING BACK TO HUMIDIFIER. RUN TUBING IN PVC CONDUIT ACROSS IT ROOM. INSULATE DISTRIBUTION TUBE. B1

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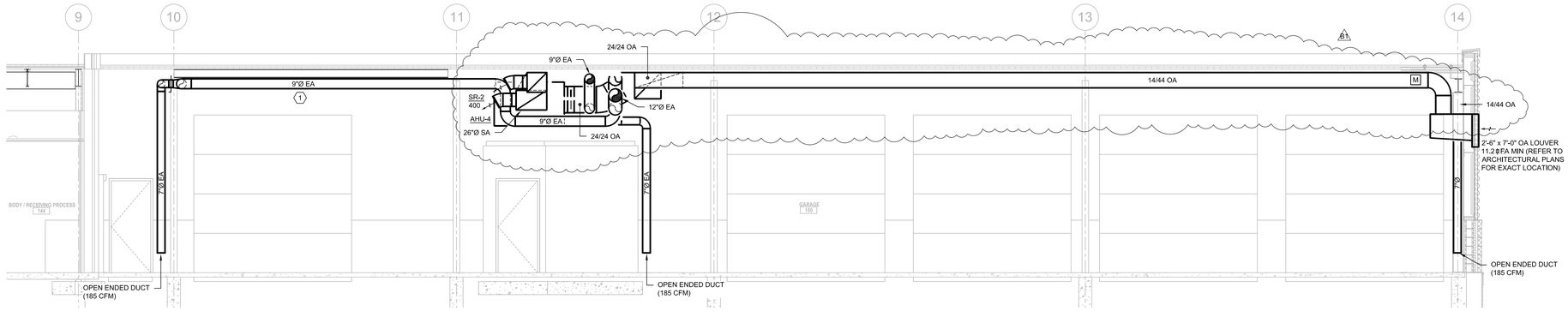
PROJECT
MEDICAL EXAMINER OFFICE BUILDING (BID PACKAGE B)
3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
313083

DRAWING
HVAC PIPING FIRST FLOOR AND PENTHOUSE PLANS

DATE
01.12.15

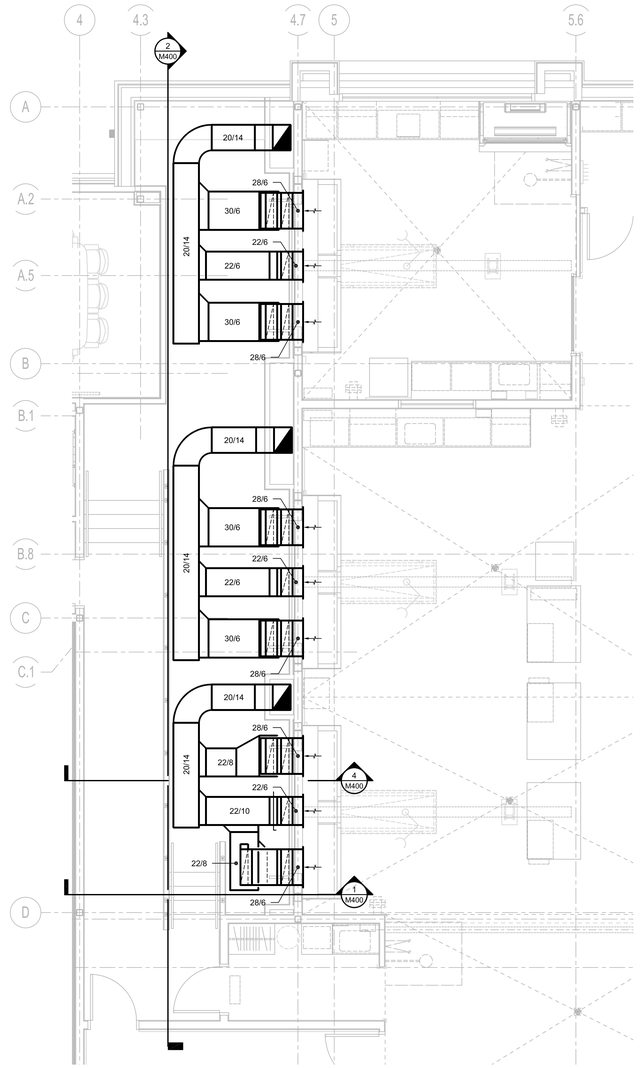
M300



1 M401 HVAC SECTION
SCALE: 1/4"=1'-0"

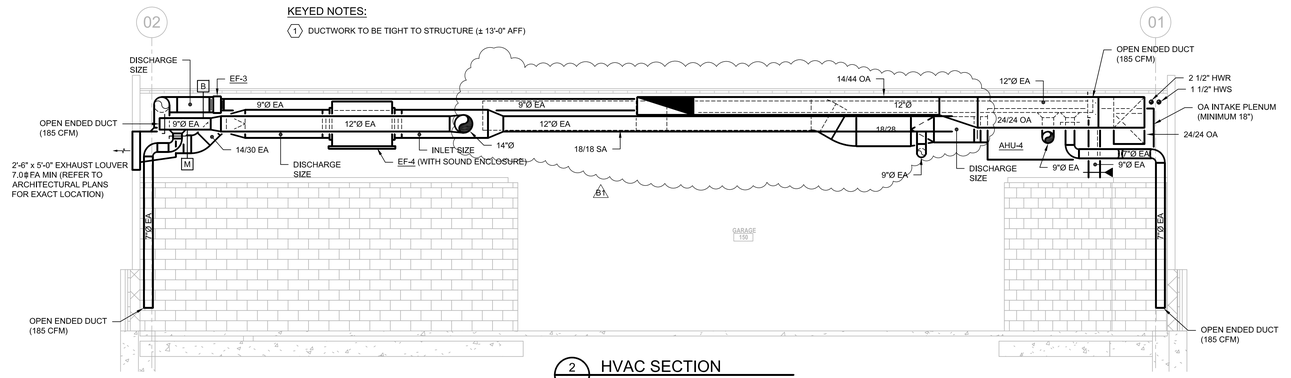
KEYED NOTES:

1 DUCTWORK TO BE TIGHT TO STRUCTURE (± 13'-0" AFF)



3 M401 ENLARGED FLOOR PLAN - HVAC
SCALE: 1/4"=1'-0"

NORTH



2 M401 HVAC SECTION
SCALE: 1/4"=1'-0"

KEYED NOTES:

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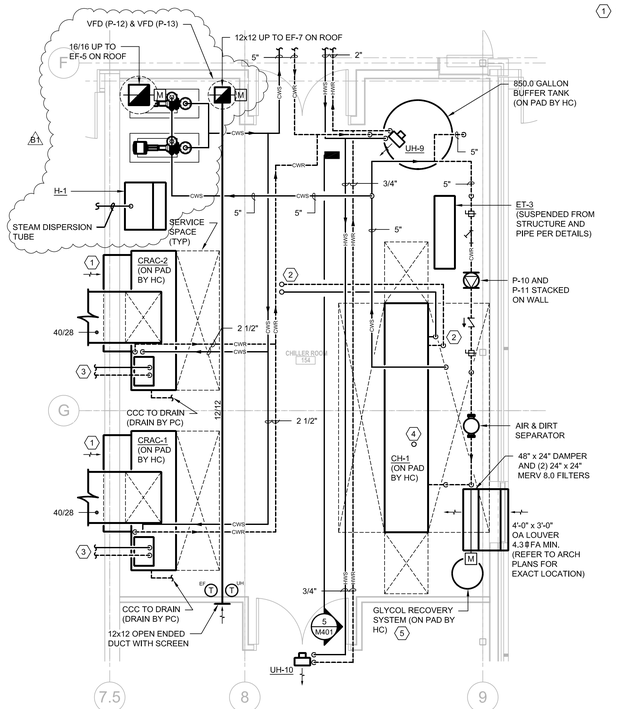
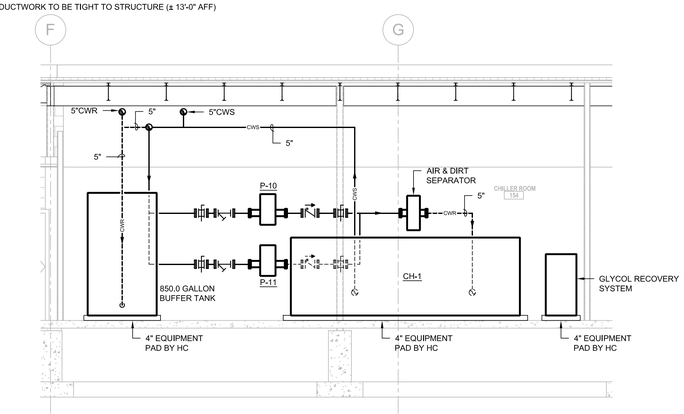


4 M401 ENLARGED CHILLER ROOM - HVAC
SCALE: 1/4"=1'-0"

NORTH

KEYED NOTES:

1. PROVIDE EXPANDED METAL SCREEN OVER RETURN AIR OPENINGS.
2. REFRIGERANT LIQUID AND HOT GAS (2 SETS) BETWEEN CH-1 AND ACC-1 ON ROOF.
3. REFRIGERANT LIQUID AND HOT GAS (2 SETS) BETWEEN CRAC AND ACC ON ROOF.
4. RELIEF VALVE PIPING UP THRU ROOF (SIZE PER CODE AND MANUFACTURERS REQUIREMENTS).
5. PIPE GLYCOL PRESSURE RELIEF DISCHARGE PIPING TO GLYCOL RECOVERY TANK.



5 M401 HVAC SECTION
SCALE: 1/4"=1'-0"

DORSCHNER ASSOCIATES
Architecture
Planning
Dorschner|Associates, Inc.
849 E. Washington Ave., Ste. 112
Madison, Wisconsin 53703
Phone: 608.204.0777
Fax: 608.204.0778

ISSUE

01.12.15	CONSTRUCTION DOCUMENTS
02.12.15	ADDENDUM B1

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3562 COUNTY HIGHWAY AB
MC FARLAND, WI 53558

BID NO.
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DRAWING
HVAC ENLARGED
PLANS AND SECTIONS

DATE
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JDR
ENGINEERING, INC.
5525 NOBEL DRIVE
SUITE 110
MADISON, WI 53711
ph:608.277.1728 fax:608.271.7046
JDR Project No. 130099

M401

AIR DEVICE SCHEDULE

EG - 1 (3) / 12x12/10"ø / 300
- UNIT NUMBER
- THROW (IF OTHER THAN NORMAL)
- NECK SIZE (SQ/RO)
- CFM

SG = SUPPLY GRILLE
RG = RETURN GRILLE
EG = EXHAUST GRILLE

LD = LINEAR DIFFUSER (SUPPLY)
CD = CEILING DIFFUSER (SUPPLY)
TG = TRANSFER GRILLE

UNIT NO.	SD-1	SD-2	CD-1	CD-2	CD-3	CD-4	CD-5	SG-1	SG-2	SR-1	SR-2	SR-3	RG-1	RG-2	EG-1	EG-2	EG-3	EG-4	EG-5	TG-1	TG-2	TG-3	TG-4	TG-5
MANUFACTURER	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS	TITUS
MODEL NO.	TBDI-30	TBDI-30	TDCA-A	TDCA-A	TDCA-A	TDCA-A	TRI-TEC SS	300 FS	300 FS	300 FS	300 FS	300 FS	50F	63FS	350FL	350FL	350FL	50F	33R	350FL	350FL	350FL	50F	350RL-SS
FACE STYLE	SLOTTED	SLOTTED	LOUVERED	LOUVERED	LOUVERED	LOUVERED	LAMINAR	DOUBLE DEFLECT	DOUBLE DEFLECT	DOUBLE DEFLECT	DOUBLE DEFLECT	DOUBLE DEFLECT	EGGCRATE	LOUVERED	LOUVERED	LOUVERED	LOUVERED	LOUVERED	LOUVERED	LOUVERED	LOUVERED	LOUVERED	LOUVERED	LOUVERED
MATERIAL	STEEL	STEEL	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	STAINLESS STEEL	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM 6|1	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	STEEL	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	STAINLESS STEEL
SIZE (FACE/NECK)	1 / 8"ø	2 / 10"ø	9x9 / 6"ø	12x12 / 8"ø	12x12 / 10"ø	15x15 / 12"ø	48x24 / 12"ø	20x8 / 18x6	14x10 / 12x8	14x8 / 12x6	24x10 / 22x8	44x22 / 42x20	24x24 / 22x22	14x32 / 12x30	10x10 / 8x8	14x14 / 12x12	20x20 / 18x18	24x24 / 22x22	12x20 / 10x18	14x14 / 12x12	14x14 / 12x12	20x8 / 18x6	24x24 / 22x22	38x20 / 36x18
CFM RANGE	125 - 210	215 - 360	75 - 105	110 - 245	250 - 330	340 - 475	200 - 500	75 - 150	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	75 - 140	145 - 325	570 - 655	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS
MOUNTING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	SIDEWALL	SIDEWALL	SIDEWALL	DUCT	DUCT	CEILING	SIDEWALL	CEILING	CEILING OR SIDEWALL	CEILING	CEILING	SIDEWALL	CEILING	CEILING	CEILING	CEILING	CEILING
DAMPER	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
REMARKS			3	3	3	3																		

GENERAL NOTES:
1. CONTRACTOR SHALL VERIFY MOUNTING SURFACE / FRAME REQUIREMENTS.
2. BRANCH DUCT SIZE TO DIFFUSER SHALL BE THE NECK SIZE OF THE DIFFUSER UNLESS NOTED OTHERWISE.
3. SEE SPECIFICATION FOR GRILLE, REGISTER, AND DIFFUSER FINISHES.
4. MAXIMUM STATIC PRESSURE DROP THROUGH GRILLE, REGISTER, OR DIFFUSER SHALL NOT EXCEED 0.1".
5. MAXIMUM NC LEVELS FOR GRILLES, REGISTERS, OR DIFFUSERS SHALL NOT EXCEED 25.
6. UNLESS THROW IS NOTED OTHERWISE, ALL DIFFUSERS SHALL BE 4-WAY THROW.

KEYED NOTES:
1. (2) 3/4" SLOTS x 48"L.
2. (4) 3/4" SLOTS x 48"L.
3. PROVIDE 24x24 PANEL FOR LAY-IN APPLICATIONS AND BEVELED FRAME FOR HARD CEILING APPLICATIONS.

VAV TERMINAL UNIT WITH HOT WATER REHEAT SCHEDULE

UNIT NO.		VAV-1-1	VAV-1-2	VAV-1-3	VAV-1-4	VAV-1-5	VAV-1-6	VAV-1-7	VAV-1-8	VAV-1-9	VAV-1-10	VAV-1-11	VAV-1-12	VAV-2-1	VAV-2-2	VAV-2-3	VAV-2-4	VAV-2-5	VAV-2-6	VAV-2-7	VAV-2-8	VAV-2-9	VAV-2-10	VAV-2-11	VAV-2-12	VAV-2-13
SERVICE		SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS
INLET SIZE		6	8	10	6	6	6	8	10	10	6	6	6	14	14	16	12	10	6	8	12	10	10	10	8	6
MAX PD (* WC)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
AIRFLOW (CFM)	MAXIMUM	350	290	810	180	250	280	450	740	840	300	160	275	1760	1760	2760	1120	720	350	460	925	1210	1015	905	525	340
	MINIMUM	105	90	240	55	75	85	135	220	250	90	50	85	475	475	555	570	555 6|1	0	460	925	1210	270	905	140	340
	HEATING CFM	350	290	810	180	250	280	450	740	840	300	160	275	1760	1760	2760	1120	720	350	460	925	1210	1015	905	525	340
HOT WATER REHEAT COIL DATA	EWT (°F)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
	LWT (°F)	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170
	EAT (°F)	55	55	55	55	55	55	55	55	55	55	55	55	48	48	48	48	48	48	48	48	48	48	48	48	48
	LAT (°F)	116.0	107.0	93.0	106.0	104.0	107.0	100.0	93.0	98.0	100.0	112.0	106.0	85.0	85.0	85.0	83.7	86.8	110.5	79.4	90.0	92.0	85.0	90.5	87.0	95.6
	CAPACITY (MBH)	23.0	16.3	33.3	9.9	13.2	15.8	21.8	30.6	39.3	14.5	9.9	15.3	57.0	57.0	90.0	34.9	23.0	23.6	15.6	42.0	57.6	33.0	41.5	18.2	17.5
	GPM	1.5	1.1	2.2	0.7	0.9	1.1	1.5	2.0	2.6	1.0	0.7	1.0	3.8	3.8	6.8	2.3	1.5	1.6	1.0	2.8	3.8	2.2	2.8	1.25	1.2
	MAX. WPD (FT WC)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	TCV TYPE	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY	2-WAY
REMARKS		1	1		1	1	1		1	1		1	1				6|1		1 6|1					6|1	6|1	

KEYED NOTES:
1. VAV BOX TO BE INTERLOCKED AND CONTROLLED WITH OCCUPANCY SENSOR LOCATED IN THE SPACE.

ELECTRIC STEAM HUMIDIFIER SCHEDULE

UNIT NO.	H-1	
SERVICE	155 - 911 CENTER	
LOCATION	154	
TYPE	ELECTRIC	
MANUFACTURER	DRI-STEEM	
MODEL NO.	VAPORSTEAM	
CAPACITY (LBS/HR)	17.8	
AIRFLOW (CFM)	4,000	
DESIGN CONDITIONS	72°F / 30% RH	
MAX ABSORPTION DISTANCE	18"	
DUCT/UNIT SIZE (IN)	30 / 20	
# DISTRIBUTING TUBES	1	
KW INPUT	9.0	
STAGE OF CAPACITY	1	
VOLTS	460	
PHASE	3	
REMARKS	1 2	

KEYED NOTES:
1. PROVIDE UNIT WITH MOUNTING STAND, DRAIN / CONDENSATE COOLER, ALL DISTRIBUTION PIPING, AND DUCT MOUNTED STEAM DISTRIBUTION TUBE.
2. CONTRACTOR TO CONNECT WATER TO UNIT, FROM POINT LEFT BY PLUMBING CONTRACTOR. PROVIDE ISOLATION VALVE, DRAIN VALVE AND SHOCK ARRESTOR. PROVIDE ALL DRAIN PIPING BETWEEN UNIT, DRAIN COOLER AND DRAIN.

6|1

FAN SCHEDULE

SF = SUPPLY FAN
RF = RETURN FAN
EF = EXHAUST FAN
TF = TRANSFER FAN
CF = CEILING (DESTRATIFICATION) FAN
CEF = CEILING EXHAUST FAN

UNIT NO.		EF-1	EF-2	EF-3	EF-4	EF-5	EF-6	EF-7
LOCATION		ROOF	ROOF	GARAGE	GARAGE	ROOF	ROOF	ROOF
SERVICE		TLT/JC	LAB AREA	CHEM STORAGE	GARAGE	CHILLER RM	911 TOILETS	ELECT RM
FAN TYPE		ROOF	MIXED FLOW	INLINE	MIXED FLOW	ROOF	ROOF	ROOF
ARRANGEMENT		DOWN BLAST	UP BLAST	HORIZONTAL	HORIZONTAL	DOWN BLAST	DOWN BLAST	DOWN BLAST
DESIGN CFM		400.0	13800	300	5650	2120	300	940
EXT. SP (IN WC)		0.375	1.0	0.5	0.75	0.375	0.25	0.375
FAN WHEEL TYPE		BI	MIXED FLOW	-	MIXED FLOW	BI	BI	BI
FAN DIAMETER (IN)		9.0	-	8.0	16.0	16.0	8.0	9.0
APPROXIMATE FAN RPM		1000	1200	2750	1750	920	910	1511
BHP		0.07	9.6	-	2.0	0.35	0.05	0.16
MOTOR HP (W)		1/4	(2) 10.0	122W	3.0	1/2	1/4	1/4
VOLTS/PHASE		120/1	460/3	120/1	460/3	460/3	120/1	120/1
DRIVE		BELT	DIRECT	DIRECT	BELT	DIRECT	BELT	DIRECT
TWO SPEED		NO	NO	NO	NO	NO	NO	NO
VFD/FSC		NO	NO	FSC	NO	VFD	NO	FSC
MAX. SONES		5.6	-	-	22.0	10.6	3.8	10.7
MAX. FAN INLET AND DISCHARGE SOUND POWER BY OCTAVE BAND (dB)	1	69	-	-	72	73	65	73
	2	67	-	-	76	76	63	76
	3	65	-	-	80	77	60	76
	4	58	-	-	80	68	53	68
	5	53	-	-	76	64	49	64
	6	51	-	-	74	60	43	63
	7	45	-	-	72	55	37	57
	8	42	-	-	63	49	34	51
REMARKS			1	2	3			

KEYED NOTES:
1. THIS FAN IS MADE UP OF TWO FANS, ON FAN OPERATES 24/7 AND THE OTHER IS REDUNDANT TO THE FIRST.
2. FAN TO BE EQUAL TO FANTECH MODEL FR-200 WITH BACKDRAFT DAMPER RSK-08.
3. PROVIDE FAN WITH BELT TUBE AND SOUND ENCLOSURE.

PUMP SCHEDULE

UNIT NO.	P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8	P-9	P-10	P-11	P-12	P-13
SERVICE	BOILER (B-1)	BOILER (B-2)	HEATING HW	HEATING HW	GLYCOL HW	GLYCOL HW	SNOW MELT	INFLOOR (AHU-2)	INFLOOR (AHU-1)	WC-1 (PRIMARY)	WC-1 (PRIMARY)	WC-1 (SECONDARY)	WC-1 (SECONDARY)
LOCATION	MECHANICAL RM	MECHANICAL RM	MECHANICAL RM	MECHANICAL RM	MECHANICAL RM	MECHANICAL RM	MECHANICAL RM	MECHANICAL RM	RM 111	RM 154	RM 154	RM 154	RM 154
TYPE	INLINE	INLINE	BASE MOUNTED	BASE MOUNTED	INLINE	INLINE	INLINE	INLINE	INLINE	INLINE	INLINE	BASE MOUNTED	BASE MOUNTED
CAPACITY GPM	108.0	108.0	227.0	227.0 6|1	144.0	144.0	24.0	13.0	10.0	331.0	331.0	375.0	375.0 6|1
PRESSURE HEAD (FT)	25.0	25.0	55.0	55.0	55.0	55.0	60.0	28.0	25.0	30.0	30.0	75.0	75.0
GLYCOL TYPE / %	N/A	N/A	N/A	N/A	PROP / 40%	PROP / 40%	PROP / 40%	N/A	N/A	PROP / 40%	PROP / 40%	PROP / 40%	PROP / 40%
INLET/OUTLET (IN)	3.0 / 3.0	3.0 / 3.0	2.5 / 2.0	2.5 / 2.0	2.5 / 2.5	2.5 / 2.5	1.5 / 1.5	1.5 / 1.5	1.5 / 1.5	5.0 / 5.0	5.0 / 5.0	4.0 / 3.0	4.0 / 3.0
IMPELLER DIAMETER	5.25	5.25	8.5	8.5	8.125	8.125	7.875	-	-	6.0	6.0	8.75	8.75
MIN. EFF. %	66%	66%	72%	72%	56%	56%	40%	-	-	64%	64%	71%	71%
RPM	1750	1750	1750	1750	1750	1750	1750	3300	3300	1750	1750	1750	1750
BHP	0.96	0.96	4.2	4.2	3.8	3.8	1.2	-	-	3.8	3.8	8.5	8.5
HP	1.5	1.5	7.5	7.5	5.0	5.0	3.0	1/6	1/6	5.0	5.0	15.0	15.0
VOLTAGE/PHASE	460/3	460/3	460/3	460/3	460/3	460/3	460/3	120/1	120/1	460/3	460/3	460/3	460/3
UNIT WEIGHT (LBS)	90.0	90.0	250.0	250.0	225.0	225.0	180.0	13.0	13.0	275.0	275.0	460.0	460.0
REMARKS													

EXHAUST VALVE SCHEDULE

UNIT NO.	EV-1	EV-2	EV-3	EV-4	EV-5	EV-6	EV-7
SERVICE	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS
INLET SIZE	DUAL 12	DUAL 12	DUAL 14	8	12	8	14
MAX. AIR PRESSURE DROP (WC)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
MAXIMUM CFM	2000	2000	2550	190	650	430	1160
MINIMUM CFM	575	575	400	0	650	100	1160
REMARKS							

EXHAUST VALVE SCHEDULE

UNIT NO.	EV-8	EV-9	EV-10	EV-11	EV-12	EV-13	EV-14
SERVICE	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS	SEE PLANS
INLET SIZE	12	12	8	12	12	12	8
MAX. AIR PRESSURE DROP (WC)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
MAXIMUM CFM	1025	560	200	1050	650	1015	520
MINIMUM CFM	1025	560	200	325	325	270	320
REMARKS							

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SUITE 110
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ph:608.277.1728 fax:608.271.7046
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DORSCHNER ASSOCIATES
Architecture
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Dorschner|Associates, Inc.
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Madison, Wisconsin 53703
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BID NO.
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DRAWING
HVAC SCHEDULES

DATE
01.12.15

ADDENDUM B1 BID QUESTIONS AND ANSWERS

1. QUESTION/COMMENT
   a. Section 27 60 00 is missing from Bid Package B.

   AE RESPONSE
   a. Refer to Addendum for addition of Specification Section 27 60 00.

2. QUESTION/COMMENT
   a. Can Mortech Manufacturing Company be an approved equal for the Tissue Grossing Station in Section 11 78 10 Part 2.13?

   AE RESPONSE
   a. Refer to Addendum for modification of Specification Section 11 78 10.

2. QUESTION/COMMENT
   a. Metal Building @ Medical Examiner Office Building - The wall section details 1,2, and 3/A503 and 2/A604 appear to be missing some of the framing required to construct the parapet and the internal gutter. The Z girt at elevation 116'-8" is not attached to the metal building frame. There also does not appear to be anything supporting the internal gutter on the bottom or the sides. Please provide a detail that shows the light gage framing required to construct the parapet and the bottom and sides of the internal gutter. The way this is detailed it is not something that is provided by the metal building manufacturer. The wall girt at the top of the parapet has nothing to attach to. The internal gutter needs to be supported.

   AE RESPONSE
   a. Refer to Addendum for modification of drawings and Specification Section 13 34 19 for revisions and clarification of scope.

2. QUESTION/COMMENT/REQUEST
   a. Preferred Lightening Protection provided information for Engineer's review as an approved equal for lightening protection.

   AE RESPONSE
   a. Refer to Addendum for modification of Specification Section 26 41 00.

3. QUESTION/COMMENT/REQUEST
   a. ABT, Inc. provided information for Engineer's review as an approved equal for plumbing drains.

   AE RESPONSE
   a. Refer to Addendum for modification of Specification Section 22 13 00.

4. QUESTION/COMMENT
   a. This project is missing some information and also may have some conflicting asphalt specifications that need to be clarified.

   AE RESPONSE
   a. Refer to Addendum for modification of Specification Section 32 12 16.

5. QUESTION/COMMENT
   a. Detail 11/S410: Please reference roof framing plan key note #49 on sheet S200. This note refers us to detail 11/S410. There is no detail 11/S410, please provide or revise reference.

   AE RESPONSE
   a. Refer to Addendum for clarification in drawings.

6. QUESTION/COMMENT
   a. Spec 05 12 00: In paragraph 1.04 subparagraph A, there is a requirement that the steel fabricator's plant is AISC Certified. This has reduced competition significantly in the past even though most fabricators meet the AISC requirements but simply don't apply for the certification. Subs have noted that Pkg A doesn't have that requirement. Is it needed for the Medical Examiner's building?

   AE RESPONSE

Dorschner|Associates, Inc. 849 E. Washington Ave., Ste 112 Madison, WI 53703 608.204.0777 fax: 608.204.0778

a. Bid as per Contract Documents.

7. QUESTION/COMMENT
   a. Drawing Q210: SS Wall Guard in Rooms 130E and 130F- Please clarify the extent of SS Wall Guard (Key Note 14 on Sheet Q210) in rooms 130E and 130F. The specific note 14 in these rooms appears to indicate that SS Wall Guard should go around the entire, interior perimeter of the rooms. However, at all other locations with note 14, there is a "hatching" that indicates SS Wall Guard. Please clarify.

   AE RESPONSE
   a. Refer to Addendum for clarification in drawings.

8. QUESTION/COMMENTS
   a. Drawing Q210: Please clarify where or if these items or conditions apply on this or other sheets. Items 25, 36, 39, 50, 62, 64, 73, and 75.

   AE RESPONSE
   a. Refer to Addendum for clarification in drawings.

11. QUESTION/COMMENT
   a. Creative Sign Company requested to be approved equal for the signs found in Information Specialties, 10 14 00.

   AE RESPONSE
   a. Architect requested information/documentation to review that they met the specified material. None was received. No, bid as per Contract Documents.

12. QUESTION/COMMENT
   a. Wisconsin Automatic Door, Inc. to be approved equal for the sliding doors found in Sliding Automatic Entrances, 18 42 29.23.

   AE RESPONSE
   a. Architect requested information/documentation to review that they met the specified material. Incomplete information was received. Upon a call with the Wisconsin Automatic Door, Inc., it was found they could not meet the specified criteria. No, bid as per Contract Documents.

13. QUESTION/COMMENT
   a. Mopec D.A.I. Scientific would like to substitute the recessed body scale found in Specification Section 11 78 10, Autopsy & Morgue Equipment with an alternate scale.

   AE RESPONSE
   a. No, bid as per Contract Documents.

14. QUESTION/COMMENT
   a. TAB Products Co. would like TAB TRAC to be considered as an approved equal to the product specified in Specification Section 10 56 26, Mobile Storage Shelving.

   AE RESPONSE
   a. No, bid as per Contract Documents. The submitted product information did not meet all the specification requirements.

15. QUESTION/COMMENT
   a. Montel Inc. would like one of their products to be considered as an approved equal to the product specified in Specification Section 10 56 26, Mobile Storage Shelving.

   AE RESPONSE
   a. No, bid as per Contract Documents. The submitted product information did not meet all the specification requirements.

16. QUESTION/COMMENT
   a. Spec 10 56 26: At the mobile storage shelving units, are the uprights on the ends all closed, or closed ends with intermediate supports? There are 7 shelves specified. Is this 7 total

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shelves per section, or 7 openings, making 8 shelves? Is the shelving to be single face or double face?

AE RESPONSE

a. See addendum for clarification of upright style and end face panel locations. Section 10 56 26 specifies 7 levels per shelving unit. Section 10 56 26 specifies back stop and acrylic bin front and shelving configuration is per floor plan A200.

17. QUESTION/COMMENT

a. For Specification Section 09 51 00, Acoustic Ceilings, USG would like to be considered as an provide equal for the following: Armstrong Optima 3251 (specified) , USG Halcyon 98225 (equivalent), Armstrong Clean Room 868 (specified), USG Clean Room 56099 and CE Grid w/gaskets (equivalent), Certainteed VinylRock (specified), and USG Sheetrock Gypsum Lay-in Panels (equivalent).

AE RESPONSE

a. Refer to Addendum for addition of USG as approved equal for the above.

18. QUESTION/COMMENT/REQUEST

a. There is no drain shown on the mechanical drawings for the canopy.

AE RESPONSE

a. Refer to Addendum for modification of plumbing drawing.

14. QUESTION/COMMENT/REQUEST

a. Can Loren Cook be an approved equal for Mixed-Flow Induced Dilution Fans?

AE RESPONSE

a. Refer to Addendum for modification of Section 23 34 00.

14. QUESTION/COMMENT/REQUEST

a. Can Lochinvar Crest be an approved equal for Heating Boilers?

AE RESPONSE

a. No, bid as per Contract Documents. The submitted product information did not meet all the specification requirements.

14. QUESTION/COMMENT/REQUEST

a. Can Armstrong be an approved equal for Hydronic Pumps?

AE RESPONSE

a. Refer to Addendum for modification of Specification Section 23 21 21.

14. QUESTION/COMMENT/REQUEST

a. Can Johnson Controls be an approved equal for Building Controls?

AE RESPONSE

a. No, bid as per Contract Documents.

14. QUESTION/COMMENT/REQUEST

a. Can Trane Controls be an approved equal for Building Controls?

AE RESPONSE

a. No, bid as per Contract Documents.

14. QUESTION/COMMENT/REQUEST

a. Is there any dual wall duct as indicated on Detail 5/M500

AE RESPONSE

a. See Addendum B1.

END OF ATTACHMENT

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