

ORANGE COUNTY GOVERNMENT

ORANGE COUNTY MAYOR
TERESA JACOBS

DISTRICT 1 COMMISSIONER
S. SCOTT BOYD

DISTRICT 2 COMMISSIONER
BRYAN NELSON



DISTRICT 3 COMMISSIONER
PETE CLARKE

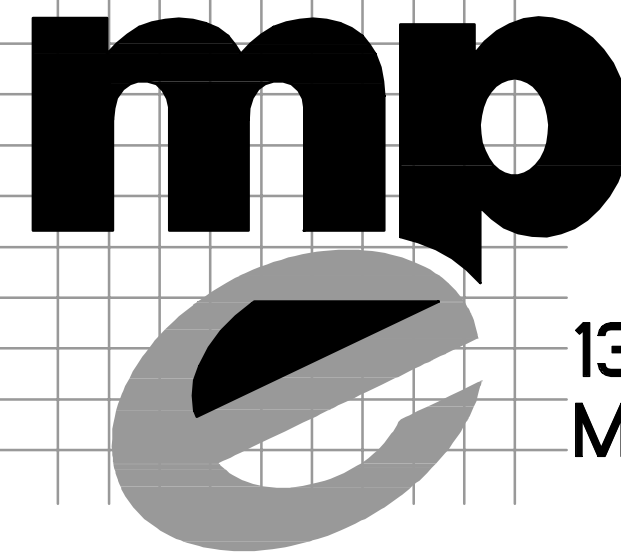
DISTRICT 4 COMMISSIONER
JENNIFER THOMPSON

DISTRICT 5 COMMISSIONER
TED B. EDWARDS

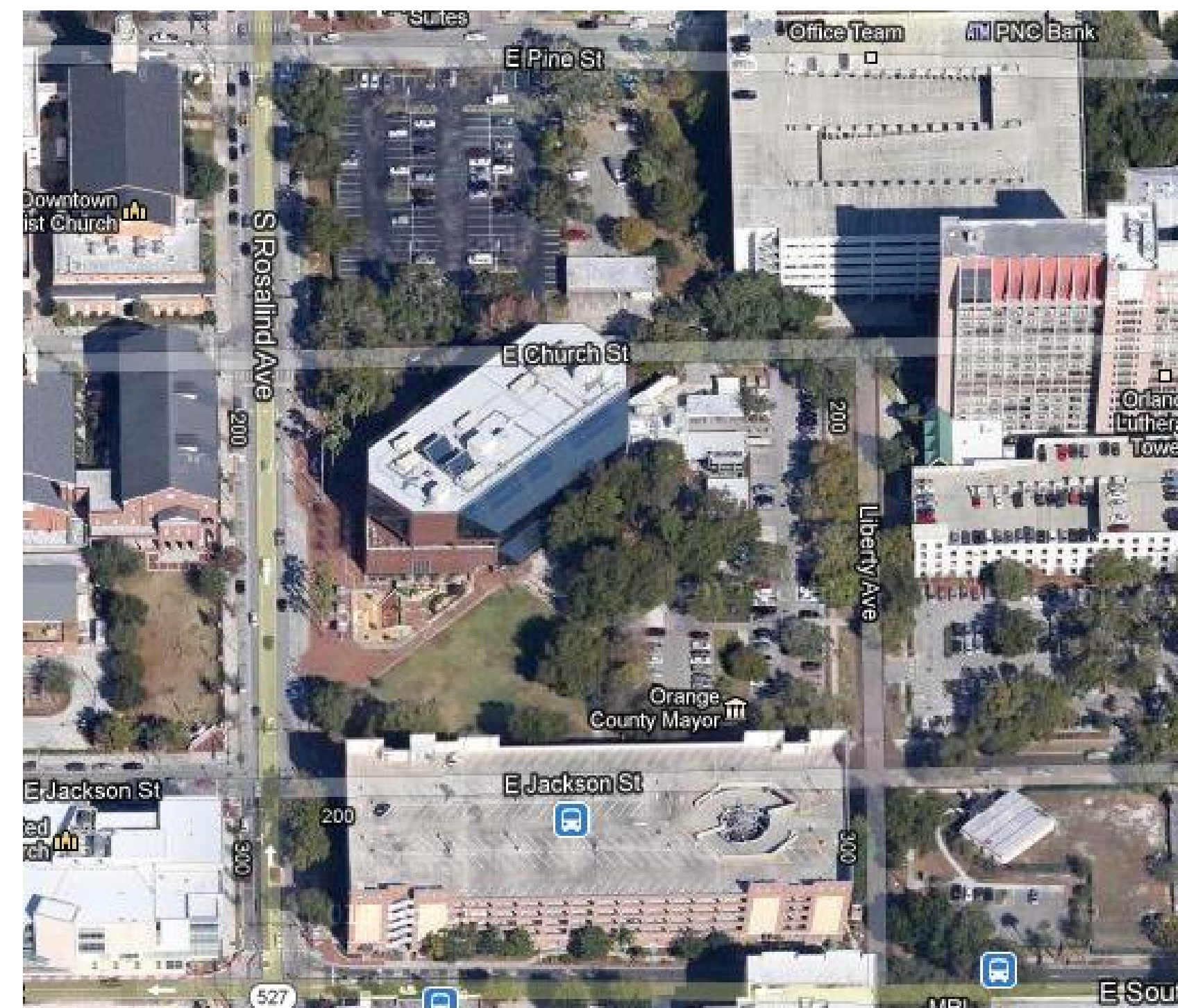
DISTRICT 6 COMMISSIONER
VICTORIA P. SIPLIN

UPPER ROOF RTU REPLACEMENT

ORANGE COUNTY ADMINISTRATION BUILDING
201 S. ROSALIND AVE.
ORLANDO, FLORIDA 32801



**MATERN
PROFESSIONAL
ENGINEERING, INC.**
ENG. BUS. No. EB-0005096
CERT. OF AUTH. No. 5096
130 Candace Drive
Maitland, FL 32751-3331
PHONE (407) 740-5020
FAX (407) 740-0365



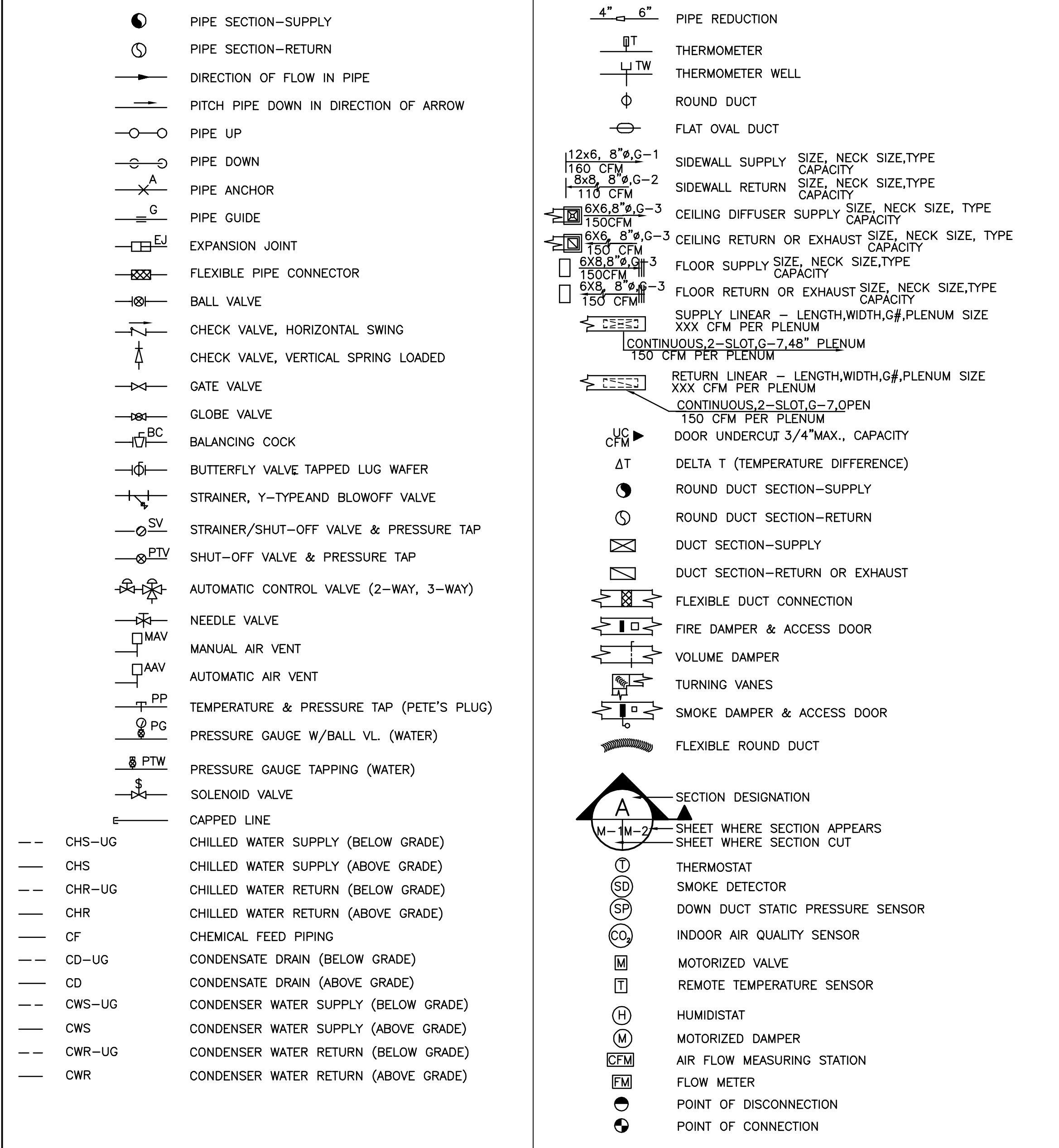
NO.	DESCRIPTION	SCALE
ME-1	MECHANICAL SCHEDULES	NONE
ME-2	LOADING DOCK GREEN NOTE-MECHANICAL	NONE
ME-3	MECHANICAL SCHEDULES	1/8" = 1'-0"
ME-4	MECHANICAL SCHEDULES	1/8" = 1'-0"
ME-5	MECHANICAL SCHEDULES	1/8" = 1'-0"
ME-6	MECHANICAL SCHEDULES	1/8" = 1'-0"
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ME-9	MECHANICAL SCHEDULES	NONE
ME-10	MECHANICAL SCHEDULES	NONE

NO.	DESCRIPTION	SCALE
EE-1	GENERAL NOTES, HISTORY SCHEDULES & SHEET INDEX	NONE
EE-2	MECHANICAL SCHEDULES	1/8" = 1'-0"
EE-3	MECHANICAL SCHEDULES	1/8" = 1'-0"
EE-4	MECHANICAL SCHEDULES	1/8" = 1'-0"
EE-5	MECHANICAL SCHEDULES	1/8" = 1'-0"
EE-6	MECHANICAL SCHEDULES	NONE
EE-7	MECHANICAL SCHEDULES	NONE
EE-8	MECHANICAL SCHEDULES	NONE
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EE-10	MECHANICAL SCHEDULES	NONE

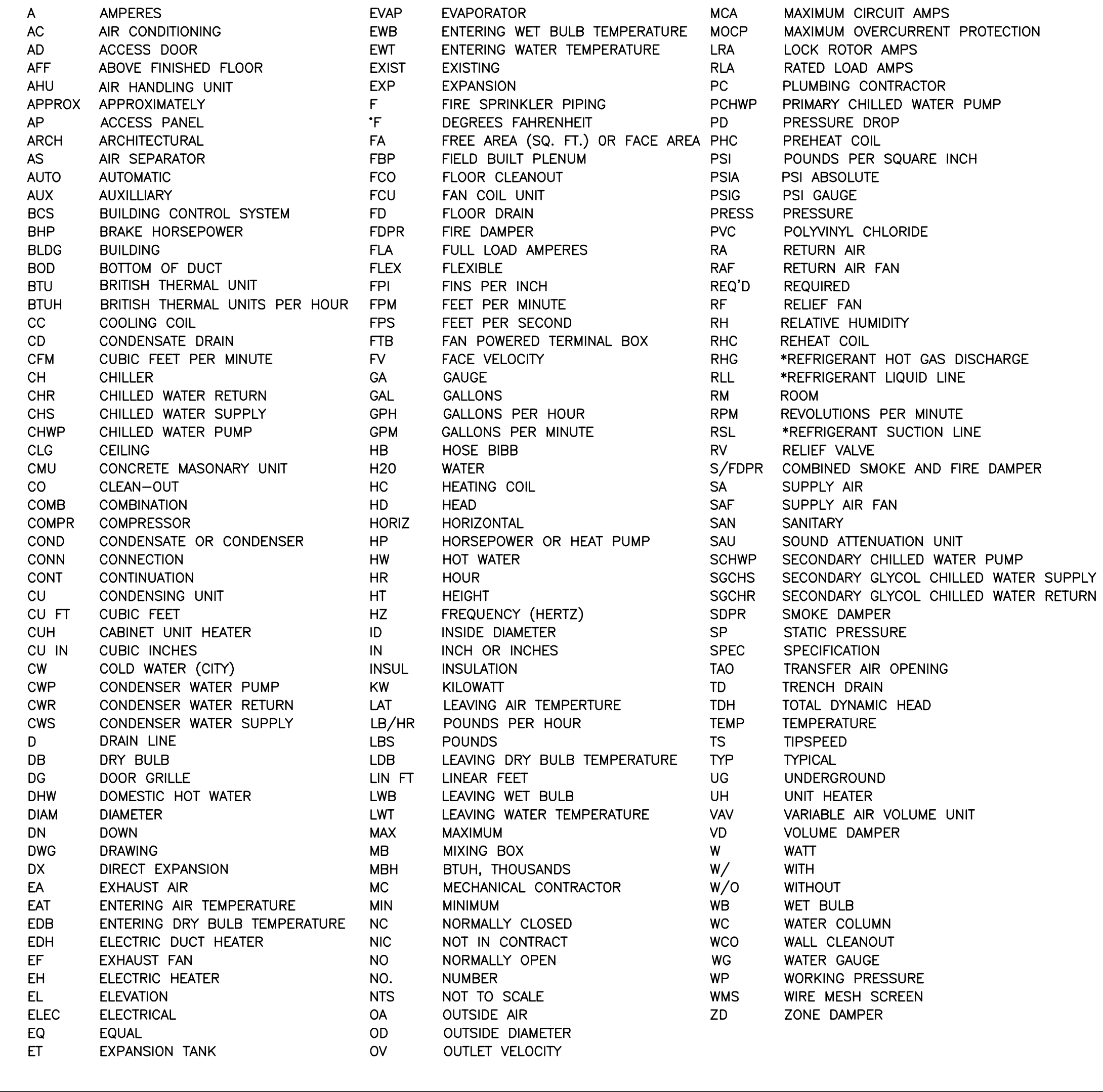
BID DOCUMENTS
JUNE 24, 2015

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GENERAL LEGEND



MECHANICAL ABBREVIATIONS

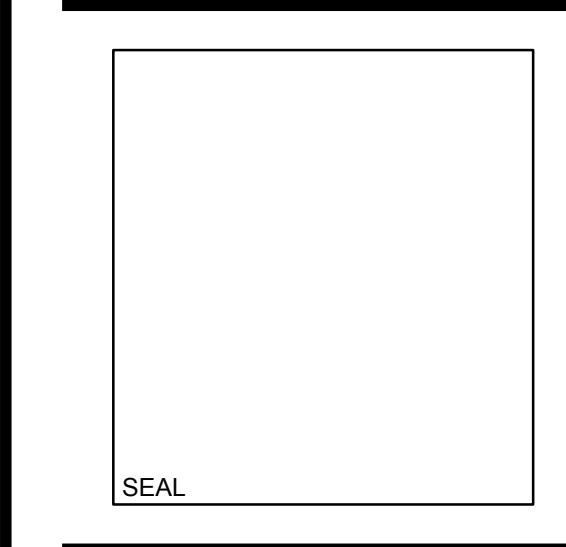


- GENERAL NOTES
- REFER TO THE DIVISION 23 SPECIFICATIONS.
 - VERIFY EXACT LOCATION OF ALL ELECTRICAL EQUIPMENT INCLUDING WALL SWITCHES, FIRE ALARM DEVICES, ETC. WITH ELECTRICAL CONTRACTOR AND ELECTRICAL DRAWINGS.
 - INSTALL A SMOKE DETECTOR IN THE SUPPLY AND RETURN DUCTWORK AS SHOWN. DETECTOR SHALL DE-ENERGIZE THE SUPPLY FAN WHEN SMOKE IS DETECTED. CONNECT TO THE FIRE ALARM SYSTEM, SO THAT THE ALARM ENUNCIATED AT THE FIRE ALARM PANEL CORRESPONDS TO THE AREA IN ALARM.
 - ALL DUCT SIZES INDICATED ON THE DOCUMENTS ARE NET FREE AREA DIMENSIONS.
 - UNFORESEEN CONDITIONS MAY EXIST AND WORK MAY NOT BE FIELD LOCATED EXACTLY AS SHOWN ON THE DRAWINGS. COOPERATION WITH OTHER TRADES IN ROUTING AND/OR BURIAL DEPTHS AS DETERMINED DURING CONSTRUCTION AND AS DIRECTED BY THE ENGINEER MAY BE NECESSARY. IT IS INTENDED THAT SUCH DEVIATIONS SHALL BE CONSIDERED AS PART OF THIS CONTRACT. SUCH DEVIATIONS MAY NOT BE CONSIDERED AS PART OF THIS CONTRACT WHEN PROPERLY DOCUMENTED IN WRITING. THE PLANS ARE NOT COMPLETELY TO SCALE.
 - ALL PIPING AND DUCT IS TO BE CONCEALED ABOVE CEILING OR IN NEW WALLS, UNLESS SPECIFICALLY NOTED AS EXPOSED OR SURFACE MOUNTED. CONTRACTOR TO COORDINATE WITH THE GENERAL CONTRACTOR TO PAINT ALL EXPOSED PIPING TO MATCH CORRESPONDING EXPOSED AREAS.
 - WORK SHALL BE PERFORMED, IN STRICT COMPLIANCE WITH THE ESTABLISHED WORK SCHEDULE BEING SET FORTH BY OWNER. COORDINATE ALL WORK WITH GENERAL CONTRACTOR. THIS CONTRACTOR SHALL FURNISH ADEQUATE FORCES, CONSTRUCTION PLANT AND EQUIPMENT, AND SHALL WORK SUCH HOURS, INCLUDING NIGHT SHIFTS, OVERTIME OPERATIONS, SUNDAYS AND HOLIDAYS IN ACCORDANCE WITH THE OWNER'S OPERATIONAL SCHEDULE AS LISTED IN DIVISION 1 OF THE SPECIFICATIONS. IF THE CONTRACTOR DOES NOT MAINTAIN THE CONSTRUCTION SCHEDULE BECAUSE OF INADEQUATE FORCES, SUPERVISION OR ANY OTHER REASON UNDER THE CONTRACTOR'S CONTROL, THE OWNER MAY REQUIRE THE CONTRACTOR TO INCREASE THE NUMBER OF SHIFTS AND/OR OVERTIME OPERATIONS, DAY OF WORK AND/OR THE AMOUNT OF CONSTRUCTION PLANT, AT NO ADDITIONAL COST TO THE OWNER UNDER THIS CONTRACT. FAILURE TO MAINTAIN THE CONSTRUCTION SCHEDULE DUE TO OWNER'S OPERATIONAL INTERFERENCES, WHICH WERE NOT IDENTIFIED IN OR PRIOR TO THE PRE-BID CONFERENCE, SHALL NOT BE THE CONTRACTOR'S LIABILITY.
 - ALL CONCRETE, WALL PATCHING, CEILING REPAIR, FENCE WORK AND OTHER GENERAL CONSTRUCTION WORK REQUIRED FOR INSTALLING MECHANICAL/PLUMBING OR FIRE PROTECTION SYSTEMS SHALL BE PROVIDED BY MECHANICAL CONTRACTOR AND FULLY COORDINATED WITH GENERAL CONTRACTOR USING THE APPROPRIATE CONSTRUCTION TRADES.
 - ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE LISTED WHERE APPLICABLE.
 - THE ROOF DECK SHALL NOT SUPPORT DUCTWORK, PIPING, EQUIPMENT OR ANY OTHER DEVICES. ALL SUPPORTS SHALL BE SPAN BETWEEN THE STRUCTURAL BEAMS TO SUPPORT THE MECHANICAL EQUIPMENT. PENETRATION OF THE ROOF DECK WILL NOT BE ACCEPTED.
 - IN GENERAL PLANS AND DIAGRAMS ARE SCHEMATIC ONLY AND SHOULD NOT BE SCALED. CONTRACTOR SHALL COORDINATE ALL PLUMBING, HEATING AND ELECTRICAL WORK AT THE SITE, SO AS NOT TO CONFLICT IN LOCATION WITH OTHER WORK UNDER THE CONTRACT.
 - ANY CONFLICT WITH DOORS, WINDOWS, CABINETS OR ANY OTHER EQUIPMENT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
 - THE MECHANICAL CONTRACTOR IS DIRECTED TO COMPLY WITH DIVISION 16 OF THE CONTRACT SPECIFICATIONS REFERRING TO MOTORS, STARTERS, ETC.
 - WHENEVER A REFERENCE IS MADE TO STANDARD, INSTALLATION AND MATERIALS SHALL COMPLY WITH THE LATEST PUBLISHED EDITION AT THE TIME THE PROJECT IS BID UNLESS OTHERWISE SPECIFIED.
 - ALL MATERIAL STORED ON SITE SHALL BE PROPERLY PROTECTED FROM INJURY OR DETERIORATION. MATERIAL SHALL NOT BE STORED IN CONTACT WITH THE GROUND OR FLOOR. ALL DUCTWORK AND EQUIPMENT STORED SHALL BE SEALED AT ANY OPENING TO PREVENT ANY DEBRIS OR DIRT ENTERING THE INSIDE OF THE DUCTWORK AND EQUIPMENT. IF DEBRIS OR DIRT IS FOUND INSIDE THE DUCTWORK DURING ANY INSPECTION, THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL COSTS INCURRED TO CLEAN THE DUCTWORK TO THE SATISFACTION OF THE OWNER AND ENGINEER.
 - ALL EXTERNAL FIBROUS GLASS WRAPPED INSULATION JOINTS, SEAMS AND CONNECTIONS SHALL BE CONSTRUCTED WITH FAB AND STAPLES AND THEN SEALED WITH MASTIC. HEAT AND PRESSURE SENSITIVE TAPE ARE NOT ACCEPTABLE AS A FINAL CLOSURE.
 - CONTRACTOR SHALL COORDINATE WORK WITH ALL OTHER TRADES.
 - MECHANICAL CONTRACTOR TO TEST AND BALANCE HVAC SYSTEMS TO PROVIDE MAXIMUM PERFORMANCE WITH REGARDS TO CFM, TEMPERATURE AND STATIC PRESSURE. REFER TO SPECIFICATIONS FOR TEST AND BALANCE REQUIREMENTS.
 - ALL DUCTWORK AND PIPING SHALL TRANSITION UP INTO JOIST SPACE TO GIVE MAXIMUM CLEARANCES TO CEILING AND LIGHTING DEVICES.
 - ALL WORK IN ACCORDANCE WITH THE FLORIDA BUILDING CODE, FLORIDA PLUMBING CODE, AND FLORIDA MECHANICAL CODE & STANDARDS AS REFERENCED IN DIVISION 1 AND THROUGHOUT THE SPECIFICATIONS.
 - THE "CV" RATINGS AND CONTROL VALVE SIZES "L" LISTED ON THE MECHANICAL AIR HANDLING UNIT SCHEDULE ARE A BASIS ONLY FOR THE CONTROL CONTRACTOR. THE CONTROL CONTRACTOR MUST VERIFY AND RESELECT THE "CV" RATINGS AND SIZES OF THE CONTROL VALVES PRIOR TO INSTALLATION. THE PRESSURE DROP THROUGH THE CONTROL VALVE SHALL BE BETWEEN 4-5 POUNDS OF PRESSURE DROP.
 - PROJECT DESIGNED PER THE 2010 FLORIDA MECHANICAL CODE WITH SUPPLEMENTAL MATERIAL.
 - MAINTAIN CONTINUITY OF SYSTEM FOR BUILDING OPERATIONAL HOURS DURING CONSTRUCTION. ALL WORK SHALL BE DONE AT NIGHT AND ON WEEKENDS. REFER TO SPECIFICATION SECTION 01 11 00.
 - THE FACILITY SHALL REMAIN FULLY OCCUPIED AND OPERATIONAL FOR THE DURATION OF THE PROJECT. ALL INDOOR AND OUTDOOR WORK SHALL BE PERFORMED AFTER NORMAL BUSINESS HOURS DURING THE WEEK, EXCEPT ON TUESDAY NIGHTS. NORMAL BUSINESS HOURS ARE DEFINED AS 7:00 AM TO 5:00 PM, MONDAY TO FRIDAY. MATERIAL AND EQUIPMENT DELIVERIES WILL BE AFTER NORMAL BUSINESS HOURS. AFTER HOURS IS DEFINED AS 5:00 PM TO 7:00 AM MONDAY THROUGH FRIDAY.
 - THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING DUCT LEAKAGE TESTING ON ALL DUCTWORK WITHIN THEIR SCOPE OF WORK. REFER TO SPECIFICATION SECTION 23 31 01 FOR MORE INFORMATION.
 - COMMISSIONING SHALL BE PROVIDED AND SPECIFIED BY THE OWNER.



ORANGE COUNTY ADMINISTRATION BUILDING UPPER ROOF RTU REPLACEMENT

MATERN PROFESSIONAL ENGINEERING, INC.
 CERT. OF AUTH. No. 5096
 ENG. BUS. No. EB-000596
 130 Candace Drive
 Maitland, FL 32751-3331
 PHONE (407) 740-0020
 FAX (407) 740-0365
 MPE JOB #: 2012-085D



Revisions

No.	Date	Description

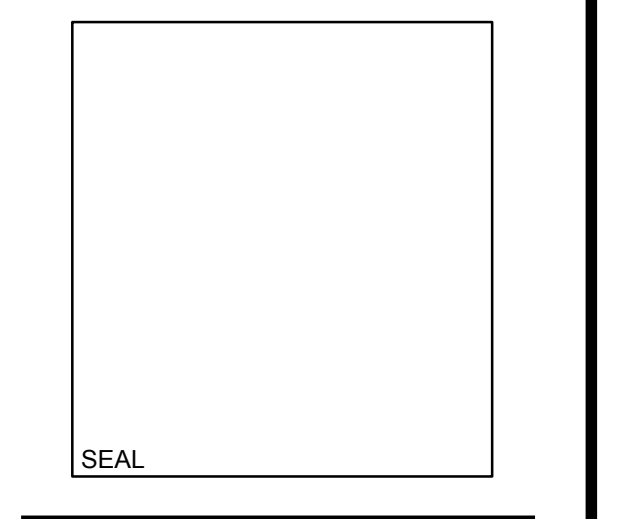
Key Plan

Designed By: JS
 Drawn By: JS/DS
 Checked By: BWP
 Issue Date: 06/24/15
 Drawing Scale: 1/8"=1'-0"

Drawing Title:
GENERAL NOTES, LEGENDS AND ABBREVIATIONS - MECHANICAL

BID DOCUMENTS

Drawing No.
M-001

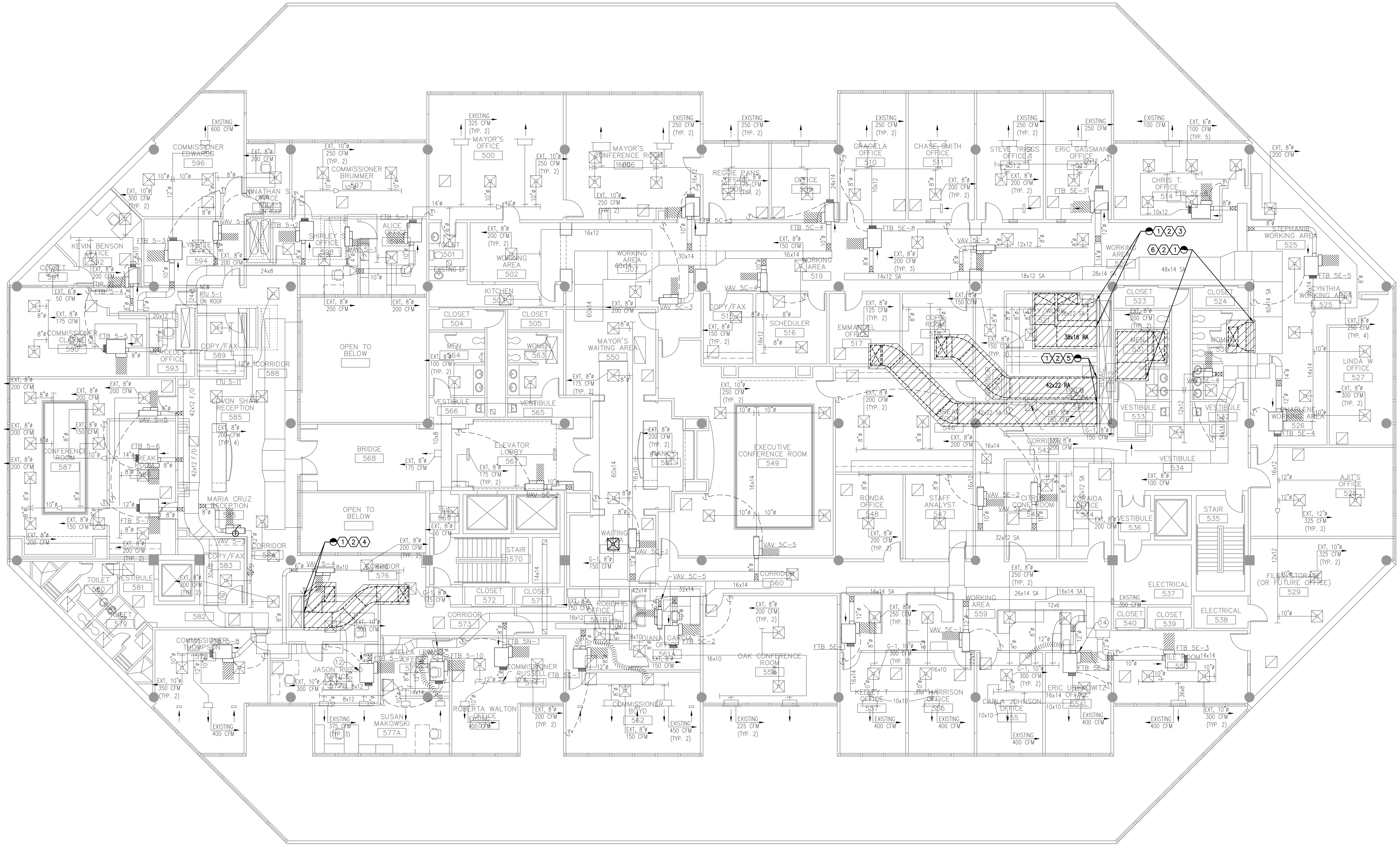


Revisions

No.	Date	Description

Key Plan

Designed By: JS
 Drawn By: JS/DS
 Checked By: BWP
 Issue Date: 06/24/15
 Drawing Scale: 1/8"=1'-0"
 Drawing Title:
DEMO FLOOR PLAN - 5TH FLOOR - MECHANICAL
 BID DOCUMENTS
 Drawing No.

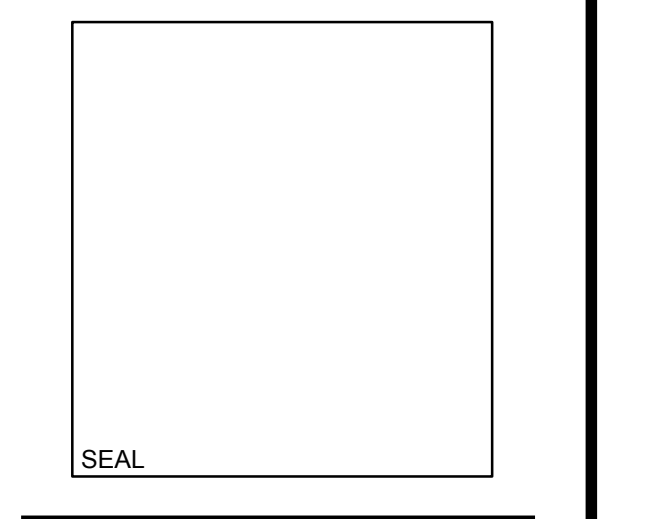


DEMO FLOOR PLAN - 5TH FLOOR - MECHANICAL
 1/8"=1'-0"
 0 4' 8' 16'

- | GENERAL NOTES | HEX NOTES |
|---|---|
| <ol style="list-style-type: none"> REFER TO GENERAL NOTES FOR THIS DISCIPLINE. REFER TO SPECIFICATIONS. ALL HEX NOTES NOT NECESSARILY USED ON ALL SHEETS. ALL UNUSED SLAB PENETRATIONS SHALL BE PROPERLY SEALED. ALL UNUSED ROOF AND EXTERIOR PENETRATIONS SHALL BE PROPERLY CAPPED AND SEALED WATER TIGHT. ALL EXISTING MECHANICAL EQUIPMENT, DUCTWORK, PIPING AND ACCESSORIES ARE SCHEDULED TO REMAIN UNLESS NOTED OTHERWISE. MAINTAIN CONTINUITY OF SYSTEM FOR BUILDING OPERATIONAL HOURS DURING CONSTRUCTION. ALL WORK SHALL BE DONE AT NIGHT AND ON WEEKENDS. REFER TO SPECIFICATION SECTION 01 11 00. PRESERVE ALL REMOVED MECHANICAL EQUIPMENT TO FACILITIES FOR VERIFICATION AND DISPOSAL. THE FACILITY SHALL REMAIN FULLY OCCUPIED AND OPERATIONAL FOR THE DURATION OF THE PROJECT. ALL INDOOR AND OUTDOOR WORK SHALL BE PERFORMED AFTER NORMAL BUSINESS HOURS DURING THE WEEK, EXCEPT ON TUESDAY NIGHTS. NORMAL BUSINESS HOURS ARE DEFINED AS 7:00 AM TO 5:00 PM, MONDAY TO FRIDAY. MATERIAL AND EQUIPMENT DELIVERIES WILL BE AFTER NORMAL BUSINESS HOURS. AFTER HOURS IS DEFINED AS 5:00 PM TO 7:00 AM MONDAY THROUGH FRIDAY. | <ol style="list-style-type: none"> CONTRACTOR TO REMOVE AND PRESERVE CEILING TILES IN ORDER TO FACILITATE THE REMOVAL OF DUCTWORK AS NEEDED THROUGHOUT THE FLOOR. ALL CEILING GRIDS ARE TO BE RE-INSTALLED BACK INTO ORIGINAL PLACEMENT AS FOUND BEFORE CONSTRUCTION. CONTRACTOR TO REPLACE ALL BROKEN CEILING TILES AND GRID WITH NEW AS REQUIRED. REFER TO SPECIFICATION SECTION 09 51 13. CONTRACTOR TO REMOVE AND PRESERVE LIGHT FIXTURES IN ORDER TO FACILITATE THE REMOVAL OF DUCTWORK AS NEEDED. ALL LIGHT FIXTURES ARE TO BE RE-INSTALLED BACK INTO ORIGINAL PLACEMENT AS FOUND BEFORE CONSTRUCTION. CONTRACTOR TO REPLACE ALL BROKEN CEILING TILES AND GRID WITH NEW AS REQUIRED. SUPPLY AND RETURN DUCTWORK TO AND FROM RTU-3. DUCTWORK TO BE REMOVED AS SHOWN FROM THE 5TH FLOOR AND DISCONNECT FROM DUCTWORK AT WALL OF THE CHASE. DUCTWORK IN CHASE IS TO REMAIN AS IS. SUPPLY AND RETURN DUCTWORK TO AND FROM RTU-4C. DUCTWORK TO BE REMOVED AS SHOWN FROM THE 5TH FLOOR AND DISCONNECT FROM DUCTWORK AT WALL OF THE CHASE. DUCTWORK IN CHASE IS TO REMAIN AS IS. SUPPLY AND RETURN DUCTWORK TO AND FROM RTU-4E. DUCTWORK TO BE REMOVED AS SHOWN FROM THE 5TH FLOOR AND DISCONNECT FROM DUCTWORK AT WALL OF THE CHASE. DUCTWORK IN CHASE IS TO REMAIN AS IS. |

⑥ SUPPLY AND RETURN DUCTWORK TO AND FROM RTU-5E. DUCTWORK TO BE REMOVED AS SHOWN ON 5TH FLOOR.

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 MATERN PROFESSIONAL ENGINEERING



Revisions

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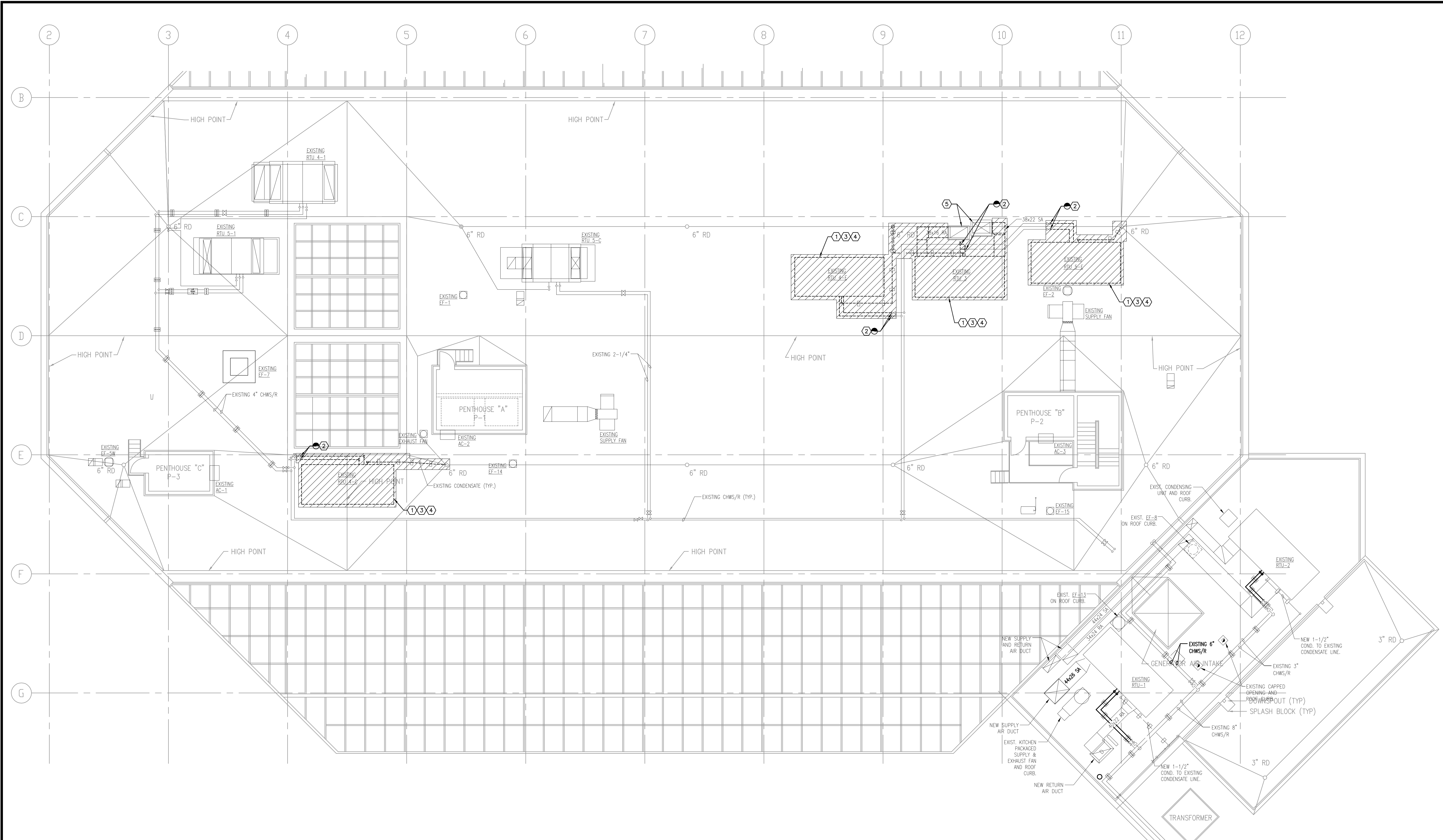
Key Plan

Designed By:	JS
Drawn By:	JS/DS
Checked By:	BWP
Issue Date:	06/24/15
Drawing Scale:	1/8"=1'-0"

Drawing Title:
DEMO ROOF PLAN - MECHANICAL

BID DOCUMENTS
 Drawing No.

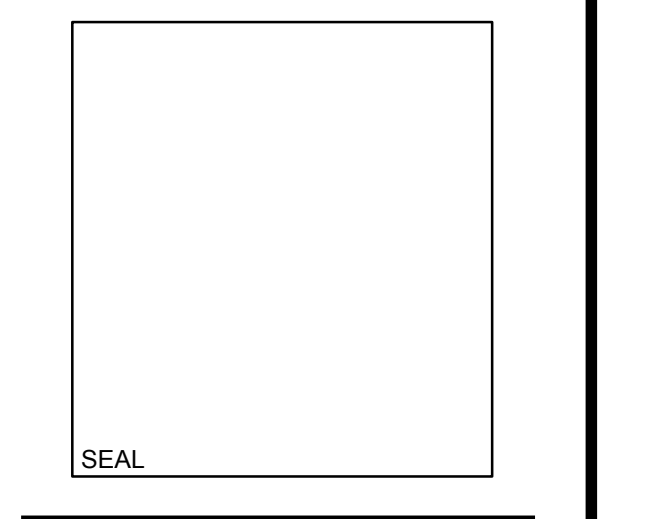
MD-106



DEMO ROOF PLAN - MECHANICAL
 1/8"=1'-0"
 0 4' 8' 16'

- | GENERAL NOTES | HEX NOTES |
|--|--|
| 1. REFER TO GENERAL NOTES FOR THIS DISCIPLINE. | ① EXISTING ROOF CURB FROM REMOVED RTU TO REMAIN. |
| 2. REFER TO SPECIFICATIONS. | ② EXISTING CHWS/R PIPING TO BE REMOVED FROM BUTTERFLY VALVE TO RTU. EXISTING LINES TO BE CAPPED AFTER BUTTERFLY VALVE FOR FUTURE CONNECTION. SEE SHEET M-106 FOR RENOVATION WORK. |
| 3. ALL HEX NOTES NOT NECESSARILY USED ON ALL SHEETS. | ③ ODC CONTROLLER FOR RTU'S PRESENTLY LOCATED IN THE 3RD FLOOR MECHANICAL ROOM IS TO BE REMOVED BY JG3 AND PRESENTED TO FACILITIES. |
| 4. ALL UNUSED SLAB PENETRATIONS SHALL BE PROPERLY SEALED. | ④ EXISTING SUPPLY AND RETURN DUCTWORK FROM RTU IN ROOF CURB IS TO BE DISCONNECTED AND REMOVED. REFER TO SHEET MD-105 FOR CONTINUATION OF DEMOLITION DUCTWORK. EXISTING DUCT OPENINGS TO REMAIN AS IS FOR NEW RTU SUPPLY AND RETURN DUCTWORK. |
| 5. ALL UNUSED ROOF AND EXTERIOR PENETRATIONS SHALL BE PROPERLY CAPPED AND SEALED WATER TIGHT. | ⑤ EXISTING SUPPLY AND RETURN DUCTWORK THAT SERVES RTU-3 ON ROOF TO BE REMOVED TO CURB. DUCTWORK INSIDE CURB IS TO REMAIN. REFER TO MD-105 FOR DUCTWORK ON 5TH FLOOR THAT IS TO BE REMOVED. |
| 6. ALL EXISTING MECHANICAL EQUIPMENT, DUCTWORK, PIPING AND ACCESSORIES ARE SCHEDULED TO REMAIN UNLESS NOTED OTHERWISE. | |
| 7. MAINTAIN CONTINUITY OF SYSTEM FOR BUILDING OPERATIONAL HOURS DURING CONSTRUCTION. ALL WORK SHALL BE DONE AT NIGHT AND ON WEEKENDS. REFER TO SPECIFICATION SECTION 01010. | |
| 8. PRESENT ALL MECHANICAL EQUIPMENT TO OWNER FOR VERIFICATION. | |
| 10. THE FACILITY SHALL REMAIN FULLY OCCUPIED AND OPERATIONAL FOR THE DURATION OF THE PROJECT. ALL INDOOR AND OUTDOOR WORK SHALL BE PERFORMED AFTER NORMAL BUSINESS HOURS DURING THE WEEK, EXCEPT ON TUESDAY NIGHTS. NORMAL BUSINESS HOURS ARE DEFINED AS 7:00 AM TO 5:00 PM, MONDAY TO FRIDAY. MATERIAL AND EQUIPMENT DELIVERIES WILL BE AFTER NORMAL BUSINESS HOURS. AFTER HOURS IS DEFINED AS 5:00 PM TO 7:00 AM, MONDAY THROUGH FRIDAY. | |

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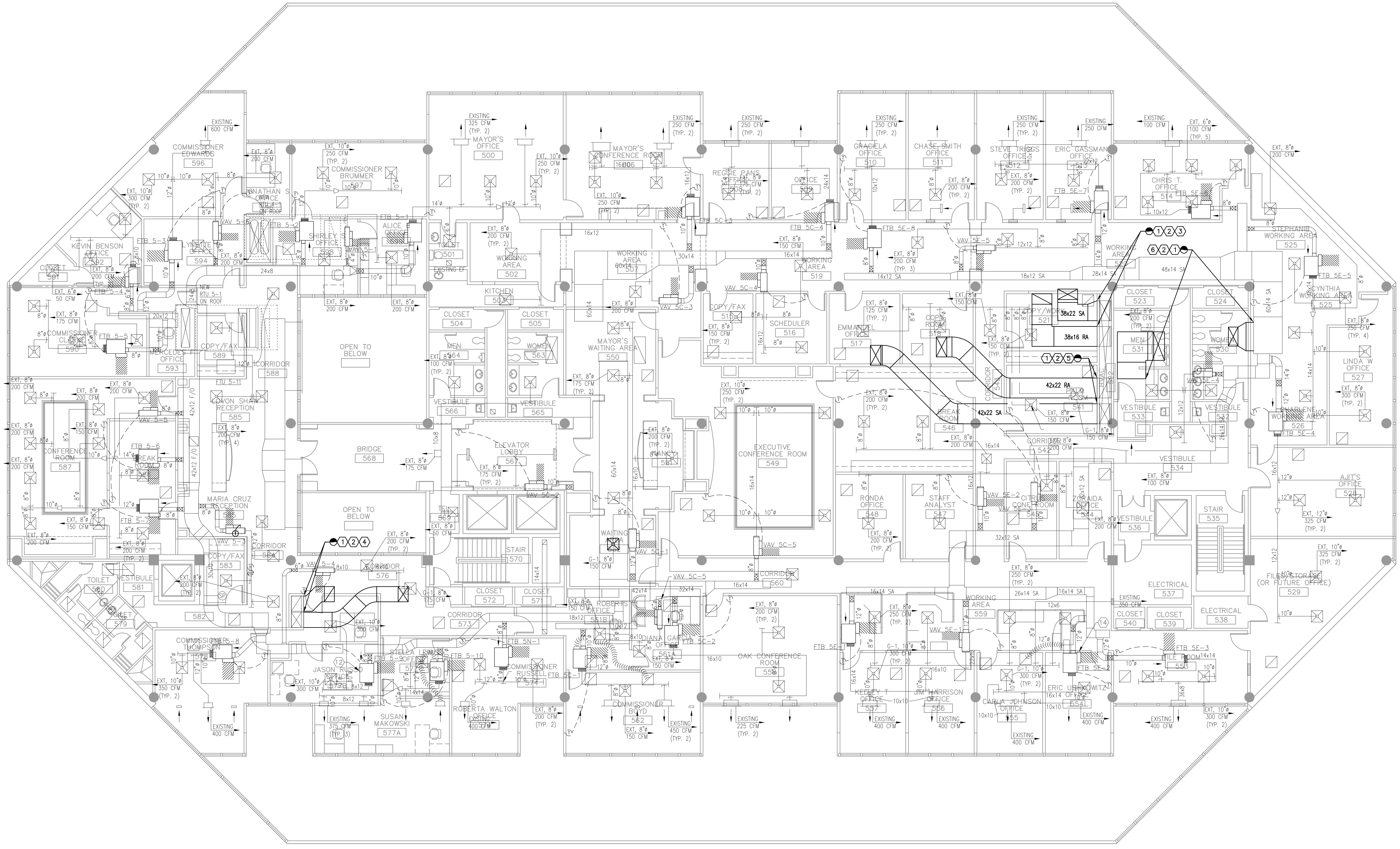
Key Plan

Designed By:	JS
Drawn By:	JS/DS
Checked By:	BWP
Issue Date:	06/24/15
Drawing Scale:	1/8"=1'-0"

RENO FLOOR PLAN - 5TH FLOOR - MECHANICAL

BID DOCUMENTS

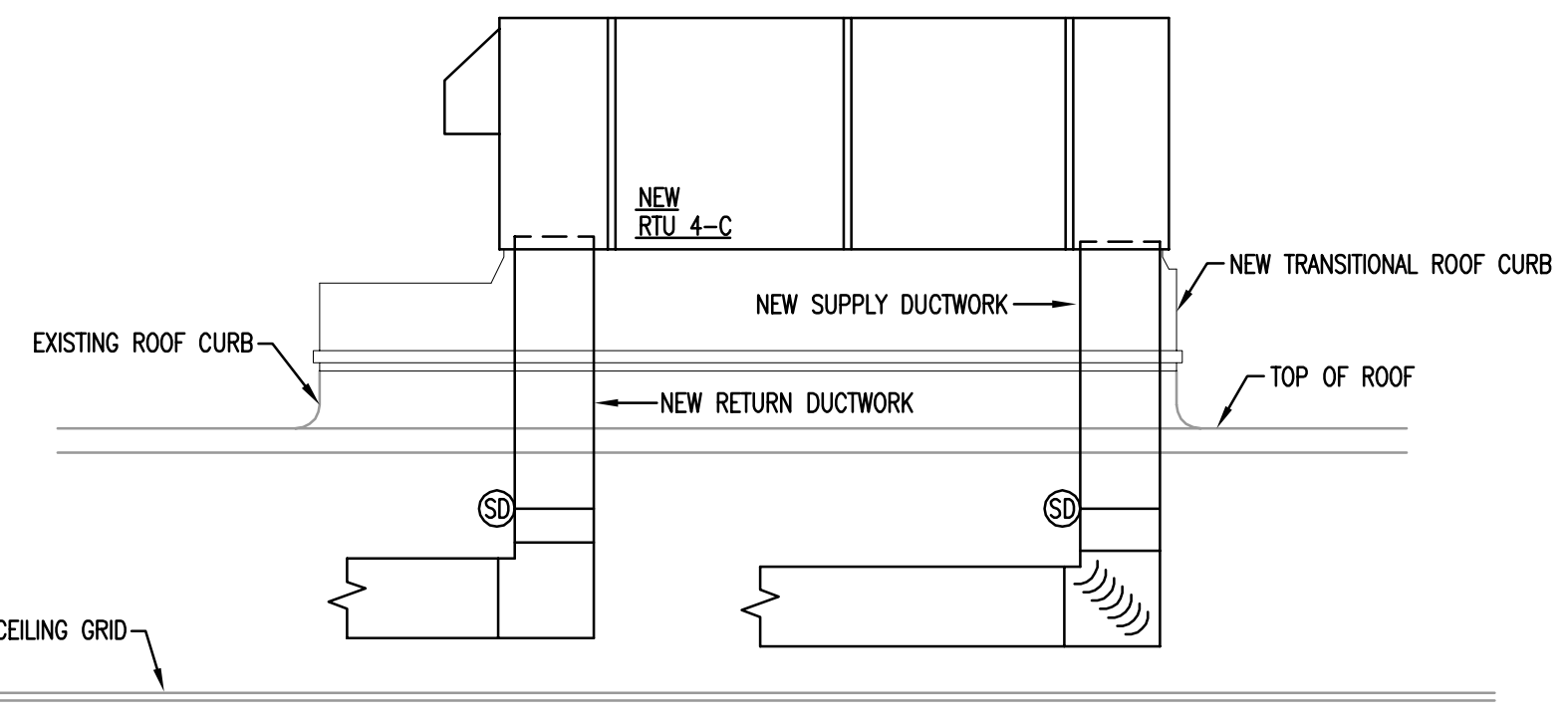
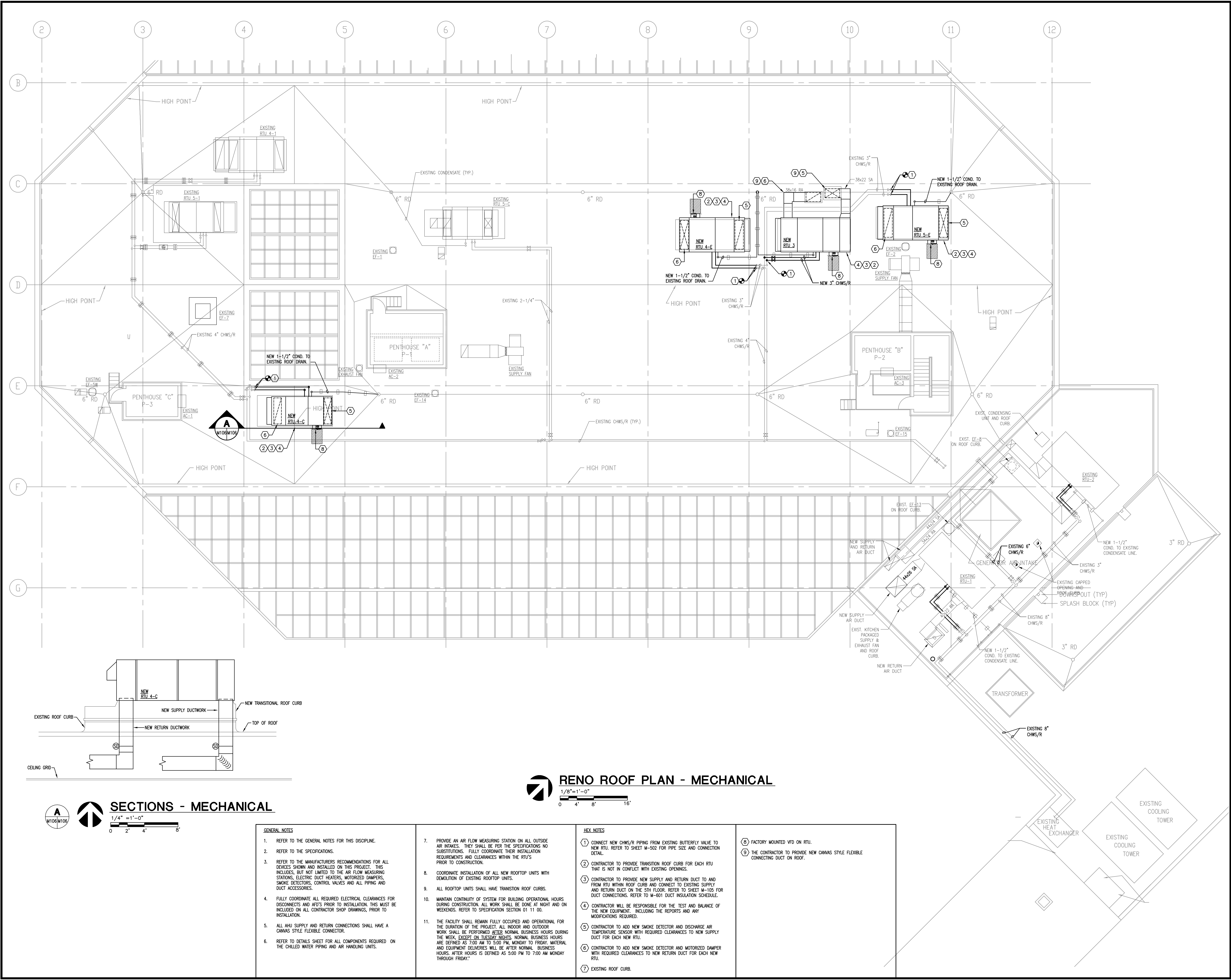
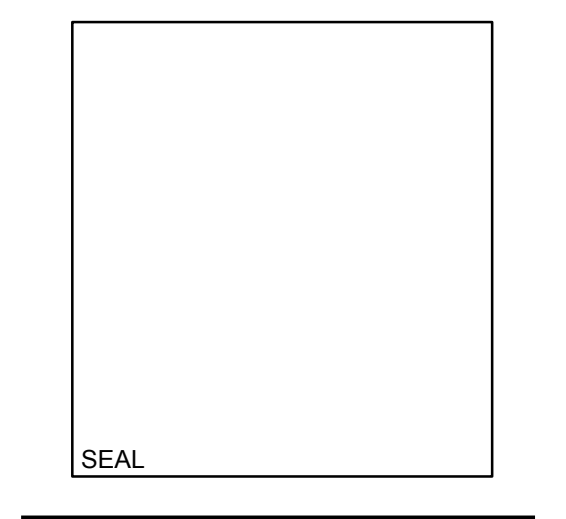
M-105



RENO FLOOR PLAN - 5TH FLOOR - MECHANICAL
1/8"=1'-0"
0 4 8 16'

- | GENERAL NOTES | HEX NOTES |
|---|--|
| 1. REFER TO GENERAL NOTES FOR THIS DISCIPLINE. | ① CONTRACTOR TO REMOVE AND PRESERVE CEILING TILES IN ORDER TO FACILITATE THE INSTALLATION OF DUCTWORK AS NEEDED THROUGHOUT THE FLOOR. ALL CEILING GRIDS ARE TO BE RE-INSTALLED BACK INTO ORIGINAL PLACEMENT AS FOUND BEFORE CONSTRUCTION. CONTRACTOR TO REPLACE ALL BROKEN CEILING TILES AND GRID WITH NEW AS REQUIRED. REFER TO SPECIFICATION SECTION 09 51 13. |
| 2. REFER TO SPECIFICATIONS. | ② CONTRACTOR TO REMOVE AND PRESERVE LIGHT FIXTURES IN ORDER TO FACILITATE THE INSTALLATION OF DUCTWORK AS NEEDED. ALL LIGHT FIXTURES ARE TO BE RE-INSTALLED BACK INTO ORIGINAL PLACEMENT AS FOUND BEFORE CONSTRUCTION. CONTRACTOR TO REPLACE ALL BROKEN CEILING TILES AND GRID WITH NEW AS REQUIRED. |
| 3. ALL HEX NOTES NOT NECESSARILY USED ON ALL SHEETS. | ③ SUPPLY AND RETURN DUCTWORK CONNECTED WITH RTU-3. DUCTWORK TO BE INSTALLED AS SHOWN ON THE 5TH FLOOR AND TO CONNECT TO EXISTING DUCTWORK IN CHASE. |
| 4. MAINTAIN CONTINUITY OF SYSTEM FOR BUILDING OPERATIONAL HOURS DURING CONSTRUCTION. ALL WORK SHALL BE DONE AT NIGHT AND ON WEEKENDS. REFER TO SPECIFICATION SECTION 01 11 00. | ④ SUPPLY AND RETURN DUCTWORK CONNECTED WITH RTU-4C. DUCTWORK TO BE INSTALLED AS SHOWN FROM THE 5TH FLOOR AND TO CONNECT TO EXISTING DUCTWORK IN CHASE. |
| 5. ALL EXISTING AIR HANDLING SYSTEMS UTILIZE A PLENUM RETURN AIR SYSTEM WITH AIR TRANSFER DUCTS AND OPENINGS ABOVE CEILING. | ⑤ SUPPLY AND RETURN DUCTWORK CONNECTED WITH RTU-4E. DUCTWORK TO BE INSTALLED AS SHOWN FROM THE 5TH FLOOR AND TO CONNECT TO EXISTING DUCTWORK IN CHASE. |
| 9. THE FACILITY SHALL REMAIN FULLY OCCUPIED AND OPERATIONAL FOR THE DURATION OF THE PROJECT. ALL INDOOR AND OUTDOOR WORK SHALL BE PERFORMED AFTER NORMAL BUSINESS HOURS DURING THE WEEK, EXCEPT ON TUESDAY NIGHTS. NORMAL BUSINESS HOURS ARE DEFINED AS 7:00 AM TO 5:00 PM, MONDAY TO FRIDAY. MATERIAL AND EQUIPMENT DELIVERIES WILL BE AFTER NORMAL BUSINESS HOURS. AFTER HOURS IS DEFINED AS 5:00 PM TO 7:00 AM, MONDAY THROUGH FRIDAY. | ⑥ SUPPLY AND RETURN DUCTWORK CONNECTED WITH RTU-5E. DUCTWORK TO BE INSTALLED AS SHOWN ON 5TH FLOOR. |
| 10. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING DUCT LEAKAGE TESTING ON ALL DUCTWORK WITHIN THEIR SCOPE OF WORK. REFER TO SPECIFICATION SECTION 23 31 01 FOR MORE INFORMATION. | |

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 PLOT DATE: 06/20/15 4:05 PM
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RENO ROOF PLAN - MECHANICAL
1/8" = 1'-0"
0 4 8 16'

SECTIONS - MECHANICAL
1/4" = 1'-0"
0 2 4 8'

GENERAL NOTES		HEX NOTES	
1. REFER TO THE GENERAL NOTES FOR THIS DISCIPLINE.	7. PROVIDE AN AIR FLOW MEASURING STATION ON ALL OUTSIDE AIR INTAKES. THEY SHALL BE PER THE SPECIFICATIONS NO SUBSTITUTIONS. FULLY COORDINATE THEIR INSTALLATION REQUIREMENTS AND CLEARANCES WITHIN THE RTU'S PRIOR TO CONSTRUCTION.	① CONNECT NEW CHWS/R PIPING FROM EXISTING BUTTERFLY VALVE TO NEW RTU. REFER TO SHEET M-502 FOR PIPE SIZE AND CONNECTION DETAIL.	⑤ FACTORY MOUNTED VFD ON RTU.
2. REFER TO THE SPECIFICATIONS.	8. COORDINATE INSTALLATION OF ALL NEW ROOFTOP UNITS WITH DEMOLITION OF EXISTING ROOFTOP UNITS.	② CONTRACTOR TO PROVIDE TRANSITION ROOF CURB FOR EACH RTU THAT IS NOT IN CONFLICT WITH EXISTING OPENINGS.	⑥ THE CONTRACTOR TO PROVIDE NEW CANVAS STYLE FLEXIBLE CONNECTING DUCT ON ROOF.
3. REFER TO THE MANUFACTURERS RECOMMENDATIONS FOR ALL DEVICES SHOWN AND INSTALLED ON THIS PROJECT. THIS INCLUDES, BUT NOT LIMITED TO THE AIR FLOW MEASURING STATIONS, ELECTRIC DUCT HEATERS, MOTORIZED DAMPERS, SMOKE DETECTORS, CONTROL VALVES AND ALL PIPING AND DUCT ACCESSORIES.	9. ALL ROOFTOP UNITS SHALL HAVE TRANSITION ROOF CURBS.	③ CONTRACTOR TO PROVIDE NEW SUPPLY AND RETURN DUCT TO AND FROM RTU WITHIN ROOF CURB AND CONNECT TO EXISTING SUPPLY AND RETURN DUCT ON THE 5TH FLOOR. REFER TO SHEET M-105 FOR DUCT CONNECTIONS. REFER TO M-601 DUCT INSULATION SCHEDULE.	
4. FULLY COORDINATE ALL REQUIRED ELECTRICAL CLEARANCES FOR DISCONNECTS AND APDS PRIOR TO INSTALLATION. THIS MUST BE INCLUDED ON ALL CONTRACTOR SHOP DRAWINGS, PRIOR TO INSTALLATION.	10. MAINTAIN CONTINUITY OF SYSTEM FOR BUILDING OPERATIONAL HOURS DURING CONSTRUCTION. ALL WORK SHALL BE DONE AT NIGHT AND ON WEEKENDS. REFER TO SPECIFICATION SECTION 01 11 00.	④ CONTRACTOR WILL BE RESPONSIBLE FOR THE TEST AND BALANCE OF THE NEW EQUIPMENT, INCLUDING THE REPORTS AND ANY MODIFICATIONS REQUIRED.	
5. ALL AHU SUPPLY AND RETURN CONNECTIONS SHALL HAVE A CANVAS STYLE FLEXIBLE CONNECTOR.	11. THE FACILITY SHALL REMAIN FULLY OCCUPIED AND OPERATIONAL FOR THE DURATION OF THE PROJECT. ALL INDOOR AND OUTDOOR WORK SHALL BE PERFORMED AFTER NORMAL BUSINESS HOURS DURING THE WEEK, EXCEPT ON TUESDAY NIGHTS. NORMAL BUSINESS HOURS ARE DEFINED AS 7:00 AM TO 5:00 PM, MONDAY TO FRIDAY. MATERIAL AND EQUIPMENT DELIVERIES WILL BE AFTER NORMAL BUSINESS HOURS. AFTER HOURS IS DEFINED AS 5:00 PM TO 7:00 AM MONDAY THROUGH FRIDAY.	⑤ CONTRACTOR TO ADD NEW SMOKE DETECTOR AND DISCHARGE AIR TEMPERATURE SENSOR WITH REQUIRED CLEARANCES TO NEW SUPPLY DUCT FOR EACH NEW RTU.	
6. REFER TO DETAILS SHEET FOR ALL COMPONENTS REQUIRED ON THE CHILLED WATER PIPING AND AIR HANDLING UNITS.		⑥ CONTRACTOR TO ADD NEW SMOKE DETECTOR AND MOTORIZED DAMPER WITH REQUIRED CLEARANCES TO NEW RETURN DUCT FOR EACH NEW RTU.	
		⑦ EXISTING ROOF CURB.	

Revisions

No.	Date	Description

Key Plan

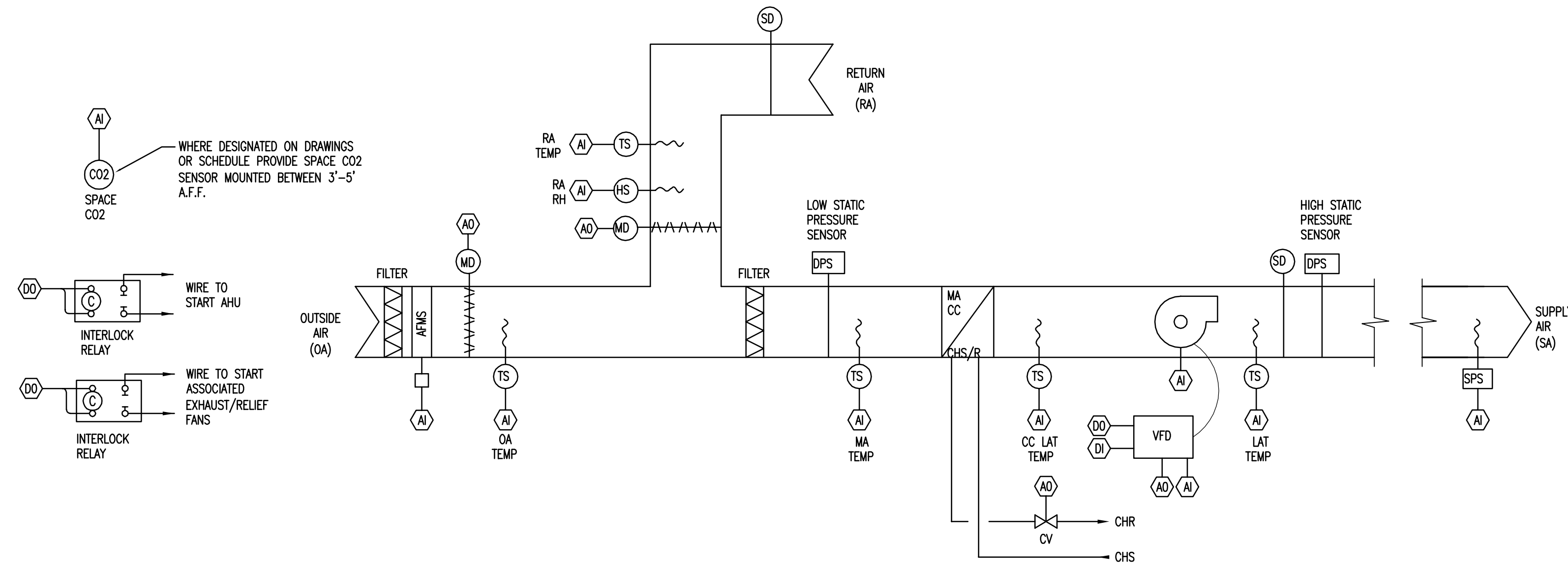
Designed By:	JS
Drawn By:	JS/DS
Checked By:	BWP
Issue Date:	06/24/15
Drawing Scale:	1/8"=1'-0"

Drawing Title:
RENO ROOF PLAN - MECHANICAL

BID DOCUMENTS
Drawing No.
M-106

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LAST SAVED: 06/24/15 4:51:11 PM
ORIGINATOR: SYB0274 4:58:39 PM
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MATERN PROFESSIONAL ENGINEERING
PLOT DATE: 06/20/15 4:51:15 PM

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 LAST SAVED: 06/26/15 12:51:17 PM
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 MATEM PROFESSIONAL ENGINEERING PLOT DATE: 06/26/15 12:52:25 PM
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SINGLE PATH - MIXED AIR - VAV AHU CONTROL SCHEMATIC
 NO SCALE

SEQUENCE OF OPERATION - AIR HANDLING UNITS

VAV WITH AFD, 1 SAF, NO ELECTRIC HEAT, MIXED AIR (RTU-3, RTU 4-C, RTU 4-E AND RTU 5-E):

- UNOCCUPIED: WHEN THE BUILDING IS INDEXED FOR UNOCCUPIED OPERATION, THE UNIT SUPPLY FAN SHALL BE STOPPED, THE CHILLED WATER VALVES POSITIONED CLOSED, THE OUTSIDE AIR DAMPER SHALL BE POSITIONED CLOSED AND THE RETURN AIR DAMPER SHALL BE POSITIONED OPEN. ALL THE ASSOCIATED INTERLOCKED EXHAUST FANS SHALL BE STOPPED.
- NIGHT SET-BACK: THE SPACE TEMPERATURE SENSOR SHALL SIGNAL THE AIR HANDLING UNIT TO START WHEN ANY SPACE TEMPERATURE DROPS TO 64F. THE UNIT SHALL OPERATE AS DESCRIBED IN THE WARM-UP MODE.
- NIGHT SET-UP: THE SPACE TEMPERATURE SENSOR SHALL SIGNAL THE AIR HANDLING UNIT TO START WHEN ANY SPACE TEMPERATURE RISES TO 82F. THE UNIT SHALL STOP WHEN ALL TEMPERATURES DROP TO 80F. THE UNIT SHALL OPERATE AS DESCRIBED UNDER COOL-DOWN MODE.
- WARM-UP: WHEN THE OPTIMAL START PROGRAM CALLS FOR WARM-UP, THE UNIT SHALL BE STARTED AND OPERATE WITH 100% RETURN AIR. THE UNIT SHALL BE STAGED TO RUN AT THE RETURN AIR CFM VALUE LISTED ON THE SCHEDULE, THE OA DAMPER SHALL REMAIN CLOSED AND ALL EXHAUST FANS SHALL BE OFF. THIS SHALL OCCUR AT A MINIMUM OF 30 MINUTES PRIOR TO THE OCCUPIED MODE.
- COOL-DOWN: WHEN THE OPTIMAL START PROGRAM CALLS FOR COOL-DOWN OPERATION, THE UNIT SHALL BE STARTED, AND SHALL OPERATE WITH 100% RETURN AIR. THE UNIT SHALL BE STAGED TO RUN AT THE RETURN AIR CFM VALUE LISTED ON THE SCHEDULE, THE OA DAMPER SHALL REMAIN CLOSED AND ALL EXHAUST FANS SHALL BE OFF. THE UNIT SHALL CONTROL THE COOLING COIL AS DESCRIBED UNDER THE RETURN AIR COIL CONTROL.
- UNOCCUPIED OVERRIDE: AN OVERRIDE MODE SHALL BE PROVIDED THAT WILL PERMIT OPERATION OF THE AIR HANDLING UNIT TO FEED THE ZONE IN OVERRIDE. WHEN IN OVERRIDE, THE UNIT SHALL OPERATE AS DESCRIBED FOR OCCUPIED OPERATION EXCEPT THAT THE OUTDOOR AIR DAMPER SHALL REMAIN CLOSED, THE ASSOCIATED EXHAUST FANS SHALL REMAIN OFF. OVERRIDE MAY BE ACCOMPLISHED BY USE OF THE OVERRIDE BUTTON ON THE ROOM TEMPERATURE SENSOR OR BY MANUAL INPUT TO THE COMPUTER. SHOULD THE CO2 SENSOR IN THE AHU ZONE EXCEED THE MINIMUM SETPOINT, THE OUTDOOR AIR DAMPER SHALL BE MODULATED OPEN TO MAINTAIN THE MINIMUM OUTSIDE AIR SETPOINT.
- OCCUPIED: WHEN THE BUILDING IS INDEXED FOR OCCUPIED OPERATION, IF THE UNIT IS NOT RUNNING, THE UNIT SHALL BE STARTED AND THE UNIT OUTDOOR AIR DAMPER SHALL BE MODULATED 100% OPEN OR UNTIL THE OA SET POINT IS MET. IF THE OA IS STILL LOW WHEN THE DAMPER IS 100% OPEN, THEN THE RETURN AIR DAMPER SHALL BE MODULATED TO MAINTAIN THE MINIMUM OUTSIDE AIR QUANTITY SCHEDULED. ALL ASSOCIATED EXHAUST FANS SHALL BE STARTED ONLY AFTER THE UNIT OA DAMPERS HAS BEEN PROVEN OPEN, THE ACTUAL TIME FOR OCCUPIED OPERATION SHALL BE ONE HOUR PRIOR TO THE NORMAL OCCUPANCY TIME TO PERMIT AN IAQ PRE-OPERATION PERIOD.
- HUMIDITY CONTROL: ALL VAV AND SINGLE ZONE VAV UNITS FULLY COMPLY WITH FBC-ENERGY CONSERVATION 503.4.5.5 EXCEPTION #1. THESE UNITS WILL BE REDUCED TO ONLY RUN IN THE PRIMARY RECIRCULATION MODE AND FOR THE ZONE THAT SENSED THE HUMIDITY. ALL VAV UNITS CAN BE REDUCED TO 5-10% OF THEIR MAXIMUM FLOW AND BE WELL UNDER THE 50% REQUIREMENT OF EXCEPTION #1. ON A RISE IN RETURN AIR OR SPACE RELATIVE HUMIDITY ABOVE 65% RH, THE CHILLED WATER CONTROL VALVE SHALL BE MODULATED TO FULL OPEN, AND THE VAV ZONE HEATING COIL SHALL BE MODULATED TO MAINTAIN THE SPACE TEMPERATURE. THE SYSTEM SHALL REMAIN UNDER THIS CONTROL UNTIL THE RETURN AIR RELATIVE HUMIDITY DROPS BELOW 52% RH.
- SPACE TEMPERATURE CONTROL:
 - COOLING COIL CONTROL: ON A RISE IN DISCHARGE TEMPERATURE, THE CHILLED WATER VALVES SHALL BE MODULATED OPEN. THE COOLING COIL CONTROL VALVES SHALL MODULATE TO MAINTAIN A COIL DISCHARGE TEMPERATURE OF 52F.
 - COOLING MODE SUPPLY AIR TEMPERATURE RESET:
 - COIL DISCHARGE TEMPERATURE SETPOINT SHALL RESET UP IN A "STEP" FASHION BASED ON AFD SPEED AND SPACE HUMIDITY. RESET SET POINTS TO BE ADJUSTABLE THROUGH THE BCS. PROVIDE ONE STEP OF RESET TO STEP UP COOLING COIL LEAVING AIR TEMPERATURE 2 DEGREES F. IF THE AFD SPEED IS GREATER THAN 80 PERCENT OR IF THE SPACE HUMIDITY EXCEEDS 580%RH, SUPPLY AIR RESET SHALL BE DISCONTINUED AND COIL DISCHARGE TEMPERATURE SET BACK TO 52F. MAXIMUM DISCHARGE TEMPERATURE TO BE 60F, SO THERE ARE (4) FOUR MAXIMUM STEPS OF SUPPLY AIR RESET.
 - SUPPLY AIR TEMPERATURE RESET MODE SHALL HAVE AN ENABLE/DISABLE COMMAND ON THE AHU GRAPHICS SCREEN.
- SUPPLY FAN AND DUCT PRESSURE CONTROL:
 - THE BUILDING CONTROL SYSTEM (BCS) SHALL CONTINUOUSLY MONITOR THE DAMPER POSITION OF ALL VAV TERMINAL UNITS. THE DISCHARGE DUCT STATIC PRESSURE SHALL BE SENSED DIRECTLY AT THE DISCHARGE OF EACH AIR HANDLER. THE SENSOR MUST BE MOUNTED IN A NON-TURBULENT LOCATION.
 - WHEN ANY VAV DAMPER IS MORE THAN 75% (ADJ.) OPEN, THE SUPPLY FAN DISCHARGE DUCT STATIC PRESSURE SETPOINT SHALL BE RESET UPWARD BY 0.1 IN W.C. (ADJ.), AT A FREQUENCY OF 15 MINUTES (ADJ.). UNTIL NO DAMPER IS MORE THAN 75% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET UPWARD TO THE SYSTEM MAXIMUM DUCT STATIC PRESSURE SETPOINT OR THE AHU VARIABLE-FREQUENCY DRIVE IS AT THE MAXIMUM SPEED SETTING.
 - WHEN ALL VAV DAMPERS ARE LESS THAN 65% (ADJ.) OPEN, THE SUPPLY FAN DISCHARGE DUCT STATIC PRESSURE SETPOINT SHALL BE RESET DOWNWARD BY 0.1 IN W.C. (ADJ.), AT A FREQUENCY OF 15 MINUTES (ADJ.). UNTIL AT LEAST ONE DAMPER IS MORE THAN 65% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET DOWNWARD TO THE SYSTEM MINIMUM DUCT STATIC PRESSURE SETPOINT OR THE AHU VARIABLE-FREQUENCY DRIVE IS AT THE MINIMUM SPEED SETTING.
 - THE CONTROL BANDS, SETPOINT INCREMENT VALUES, SETPOINT DECREMENT VALUES AND ADJUSTMENT FREQUENCIES SHALL BE ADJUSTED TO MAINTAIN MAXIMUM STATIC PRESSURE OPTIMIZATION WITH STABLE SYSTEM CONTROL AND MAXIMUM COMFORT CONTROL.
 - THE BCS SHALL HAVE THE CAPABILITY TO ALLOW THE OPERATOR TO EXCLUDE "PROBLEM" ZONES THAT SHOULD NOT BE CONSIDERED WHEN DETERMINING THE OPTIMIZED SETPOINT.
 - THE BCS SHALL ALSO READ THE STATUS OF THE SUPPLY AIR STATIC PRESSURE SENSOR AND THE ACTIVE DUCT STATIC PRESSURE READING ON THE STATUS SCREEN.
 - THE BCS SHALL HAVE THE ABILITY TO IDENTIFY, AND DISPLAY TO THE USER, THE VAV BOX THAT SERVES THE CRITICAL ZONE (THAT IS, THE ZONE WITH THE MOST WIDE-OPEN VAV DAMPERS). THIS INFORMATION SHALL UPDATE DYNAMICALLY AS THE LOCATION OF THE CRITICAL ZONE CHANGES BASED ON BUILDING LOAD, AND DUCT STATIC PRESSURE SETPOINT OPTIMIZATION CONTROL.
- SMOKE CONTROL: SHOULD PRODUCTS OF COMBUSTION BE DETECTED BY THE SUPPLY OR RETURN AIR SMOKE DETECTORS, THE SUPPLY FAN SHALL BE STOPPED AND THE FAN DISCHARGE SMOKE DAMPER, OUTDOOR AND RETURN AIR DAMPERS SHALL BE CLOSED.
- DEMAND VENTILATION CONTROL: WHEN THE AIR HANDLING UNIT IS INDEXED FOR OCCUPIED OPERATION, THE INDOOR AIR QUALITY SHALL BE MONITORED BY A CO2 SENSOR LOCATED IN THE SPACE MOUNTED BETWEEN 3'-5' ABOVE FINISHED FLOOR (REFER TO THE DRAWINGS).
- FREEZE PROTECTION ALARM: SHOULD THE TEMPERATURE SENSED BY THE OA TEMPERATURE SENSOR DROP BELOW 36F FOR MORE THAN 10 MINUTES THE OUTSIDE AIR OR MIXED AIR COOLING COIL CONTROL VALVE SHALL MODULATE TO 100% OPEN AND THE SECONDARY PUMPS SHALL BE STAGED ON TO CIRCULATE WATER THROUGH THE SECONDARY LOOP. AFTER THE TEMPERATURE RISES ABOVE 36F FOR MORE THAN 20 MINUTES THE UNIT SHALL RETURN TO NORMAL OPERATION. IF THE TEMPERATURE SENSED BY THE OA TEMPERATURE SENSOR DROPS BELOW 36F FOR MORE THAN 30 MINUTES AN ALARM SHALL BE GENERATED AND THE UNIT STOPPED AND THE OUTSIDE AIR DAMPER CLOSED.

SEQUENCE OF OPERATIONS - AHU POINTS LIST

POINT	TYPE	DESCRIPTION	ALARM	COMMENTS	TREND
1	AO	COOLING COIL CONTROL VALVE (CV)			YES
2	AI	COOLING COIL LEAVING AIR TEMPERATURE (TS)	(H) (L)		YES
3	AI	DOWN DUCT STATIC PRESSURE (SPS)			YES
4	DO	EXHAUST FAN START/STOP (S/S)	FA		YES
5	DI	EXHAUST FAN STATUS (DP)			YES
6	DI	HIGH STATIC PRESSURE SENSOR (DPS)	FA		YES
7	AI	LEAVING AIR TEMPERATURE (TS)	(H) (L)		YES
8	DI	LOW STATIC PRESSURE SENSOR (DPS)	FA		YES
9	AI	MIXED AIR TEMPERATURE (TS)	(H) (L)		YES
11	AI	OUTDOOR AIR TEMPERATURE (TS)			YES
12	AI	OUTDOOR AIRFLOW RATE (AFMS)			YES
13	AO	OUTSIDE AIR DAMPER CONTROL (MD)			YES
16	AO	RETURN AIR DAMPER CONTROL (MD)			YES
16	AI	RETURN AIR RELATIVE HUMIDITY (HS)	(H) (L)		YES
17	AI	RETURN AIR TEMPERATURE (TS)			YES
18	AO	SUPPLY FAN CAPACITY CONTROL (VFD)			YES
19	DO	SUPPLY FAN START/STOP (S/S)			YES
20	DI	SUPPLY FAN STATUS (DP)	FA		YES
21	DI	SUPPLY FAN STATUS (DP)			YES
22	AI	SUPPLY AIR TEMPERATURE RESET ENABLE/DISABLE			YES
22	AI	CO2 SENSOR (CO2)	(H) (L)		YES
23	AI	LIGHTING CONTROL			YES

*PROVIDE CURRENT SENSING RELAYS AND TRANSMITTERS AS SHOWN ON THE CONTROL DRAWINGS

CONTROLS LEGEND

Symbol	Description	Symbol	Description
AFD	ADJUSTABLE FREQUENCY DRIVE	LAT	LEAVING AIR TEMP.
AFMS	AIR FLOW MEASURING STATION	M/S	MOTOR STARTER/DISC.
AI	ANALOG INPUT	OA	OUTSIDE AIR
AO	ANALOG OUTPUT	PD	DISCHARGE STATIC PRESSURE
BOD	BACK DRAFT DAMPER	R	RELAY
CC	COOLING COIL	RA	RETURN AIR
CHS	CHILLED WATER SUPPLY	RH	RELATIVE HUMIDITY
CHR	CHILLED WATER RETURN	SA	SAFETY ALARM/SHUT-DOWN
CSR	CURRENT SENSING RELAY	SA	SUPPLY AIR
CV	CONTROL VALVE	SD	SMOKE DETECTOR
MD	MOTORIZED DAMPER	SPS	STATIC PRESSURE SENSOR
DI	DIGITAL INPUT	S/S	START-STOP
DO	DIGITAL OUTPUT	TEMP	TEMPERATURE
DP	DIFFERENTIAL PRESSURE	TS	TEMPERATURE SENSOR
DPS	DIFFERENTIAL PRESSURE SWITCH		
EDC	ELECTRIC HEATING COIL		
ES	END SWITCH		
F	AFD FAILURE ALARM		
Fa	FAILURE ALARM		
FR	FREEZESTAT		
FS	FLOW SWITCH		
HS	HUMIDITY SENSOR		
HC	HEATING COIL		
HLS	HIGH LIMIT SWITCH		
IAQ	INDOOR AIR QUALITY SENSOR		

-ALL MOTORIZED DAMPERS ARE FULLY MODULATING

ORANGE COUNTY ADMINISTRATION BUILDING UPPER ROOF RTU REPLACEMENT

MATEM PROFESSIONAL ENGINEERING, INC.
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Revisions

No.	Date	Description

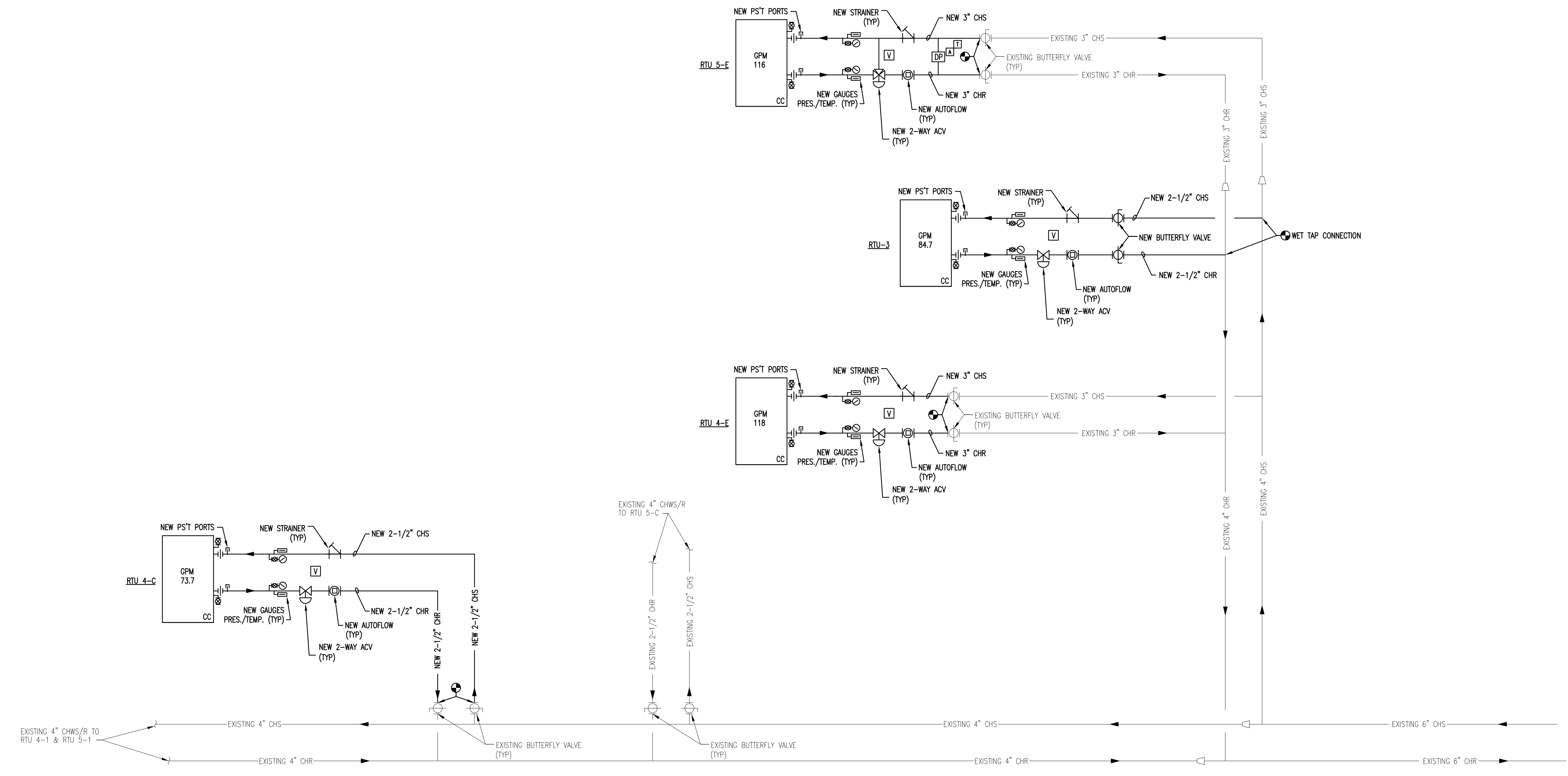
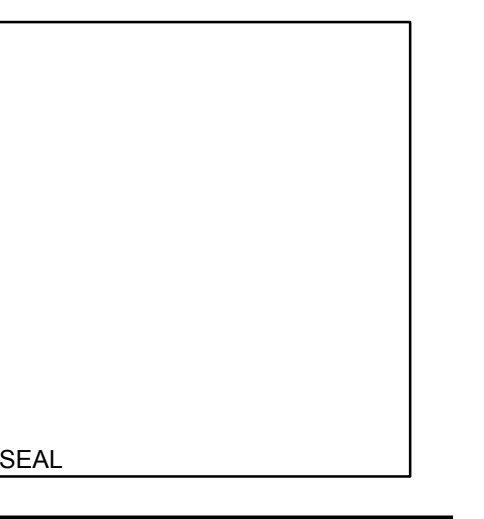
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Designed By: JS
 Drawn By: JS/DS
 Checked By: BWP
 Issue Date: 06/24/15
 Drawing Scale: NO SCALE
 Drawing Title:

SEQUENCE OF OPERATIONS - MECHANICAL

BID DOCUMENTS

Drawing No. **M-501**



ROOFTOP CHILLED WATER PIPING SCHEMATIC - MECHANICAL
NO SCALE

CONTROLS LEGEND			
AFD	ADJUSTABLE FREQUENCY DRIVE	LAT	LEAVING AIR TEMP.
AFMS	AIR FLOW MEASURING STATION	M/S	MOTOR STARTER/DISC.
AI	ANALOG INPUT	OA	OUTSIDE AIR
AO	ANALOG OUTPUT	PD	DISCHARGE STATIC PRESSURE
BDD	BACK DRAFT DAMPER	R	RELAY
CC	COOLING COIL	RA	RETURN AIR
CHS	CHILLED WATER SUPPLY	RH	RELATIVE HUMIDITY
CHR	CHILLED WATER RETURN	So	SAFETY ALARM/SHUT-DOWN
CSR	CURRENT SENSING RELAY	SA	SUPPLY AIR
CV	CONTROL VALVE	SD	SMOKE DETECTOR
MD	MOTORIZED DAMPER	SPS	STATIC PRESSURE SENSOR
DI	DIGITAL INPUT	S/S	START-STOP
DO	DIGITAL OUTPUT	TEMP	TEMPERATURE
DP	DIFFERENTIAL PRESSURE	TS	TEMPERATURE SENSOR
DPS	DIFFERENTIAL PRESSURE SWITCH		
EHC	ELECTRIC HEATING COIL		
ES	END SWITCH		
F	AFD FAILURE ALARM		
Fa	FAILURE ALARM		
FR	FREESTAT		
FS	FLOW SWITCH		
HS	HUMIDITY SENSOR		
HC	HEATING COIL		
HLS	HIGH LIMIT SWITCH		
IAQ	INDOOR AIR QUALITY SENSOR		

CONTROL LEGEND (15950)	
	DIFFERENTIAL PRESSURE SENSOR
	START - STOP
	ADJUSTABLE FREQUENCY DRIVE
	CURRENT SENSING RELAY
	TEMPERATURE SENSOR
	CONTROL VALVE - AUTOMATIC
	TRANSDUCER ON DUAL TURBINE INSERTION FLOWMETER FOR BTUH METERING (ONICON MODEL F-1200) W/ DIGITAL READ OUT
	2 SPEED CONTROLLER
	VIBRATION SWITCH
	OIL LEVEL SWITCH
	ALARM
	CURRENT TRANSFORMER FOR CURRENT DRAW

---ALL MOTORIZED DAMPERS ARE FULLY MODULATING

Revisions		
No.	Date	Description

Designed By:	JS
Drawn By:	JS/DS
Checked By:	BWP
Issue Date:	06/24/15
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Key Plan
ROOFTOP CHILLED WATER PIPING SCHEMATIC - MECHANICAL

BID DOCUMENTS
Drawing No.
M-502

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 MATERN PROFESSIONAL ENGINEERING

PACKAGED ROOFTOP AIR HANDLING UNIT SCHEDULE:

UNIT NO.	SERVING	TOTAL MAX. CFM	PRIMARY CFM	O.A. CFM	SUPPLY AIR FAN DATA											COOLING COIL DATA														SELECTION BASED ON		REMARKS			
					FAN DATA			OCTAVE BANDS			MOTOR DATA					EAT F		LAT F		AIR PD IN H2O		FACE AREA		AIR PRESSURE DROP AT MID LIFE CONDITION	QUANTITY & SIZE	MANUF.	MODEL								
					FAN QTY	ESP IN H2O	TSP IN H2O	FAN DIA.	BLADE TYPE	DISCHARGE 63/125/250/500/1000	INLET 63/125/250/500/1000	RADIATED 63/125/250/500/1000	HP PER FAN	BHP PER FAN	FAN RPM	VOLT	PH	CFM	DB	WB	DB	WB	AIR PD IN H2O	GPM	EWT F	LWT F	WATER PD FT H2O	MIN. ROWS	FINS/FT.	FACE AREA					
RTU-3	THIRD FLOOR	10,000	5,900	4,100	1	3.0	4.39	24.5	DIRECT DRIVE PLENUM	84/83/92/8789	7677/92/8279	7372/80/8766	15	10.1	1750	480	3	10,000	85	71.5	51.0	80.8	0.68	84.7	42	56	13.9	8	108	24.33	0.66	(2) 20x24x2	MCQUAY	OAH025	1,2,3,4,5,6
RTU-4C	4TH FLOOR	8,700	7,200	1,500	1	3.0	4.44	22.25	DIRECT DRIVE PLENUM	83/80/88/8583	7676/89/8271	72/69/77/65/60	10	9	1750	460	3	8,700	80.9	68.9	51.3	81.1	0.74	73.7	42	56	14.6	8	120	16.75	0.67	(6) 20x24x2	MCQUAY	OAH012	1,2,3,4,5,6
RTU-4E	4TH FLOOR	14,000	11,550	2,450	1	2.5	4.22	27"	DIRECT DRIVE PLENUM	86/84/93/89/89	80/80/95/85/80	7573/82/69/66	15	14.2	1750	480	3	14,000	81	68.9	51.4	81.2	0.68	118	42	56	15.9	6	144	33.38	0.64	(15) 20x20x2	MCQUAY	OAH030	1,2,3,4,5,6
RTU-5E	5TH FLOOR	13,700	12,700	1,000	1	2.5	4.18	27"	DIRECT DRIVE PLENUM	86/84/93/89/89	80/80/95/85/80	7573/82/69/66	15	4.18	1750	480	3	13,700	79.2	67.8	51.4	81.2	0.68	116	42	56	15.9	6	144	33.38	0.64	(15) 20x20x2	MCQUAY	OAH030	1,2,3,4,5,6

REMARKS:
 1 UNIT TO HAVE TOP/BOTTOM/SIDE DISCHARGE (AS SHOWN ON DRAWINGS) AND DISCHARGE AIR PLENUM
 2 VAV - VFD CONTROLLED - PROVIDE DUAL MOTOR OUTPUT VFD FOR DUAL MOTOR UNITS
 3 PROVIDE ACCESS DOORS UPSTREAM AND DOWNSTREAM OF ALL HEATING AND COOLING COILS
 4 REFER TO THE SPECIFICATIONS FOR ALL REQUIREMENTS BEYOND THIS SCHEDULE
 5 PANELS AND ACCESS DOORS SHALL HAVE 2-INCH THICK, THERMAL BROKE DOUBLE WALL ASSEMBLY, INJECTED WITH FOAM INSULATION EQUAL TO R-13.
 6 FACTORY MOUNTED VFD

NOTE: THE VENTILATION RATE PROCEDURE USED FOR THIS PROJECT COMPLIES WITH ASHRAE STANDARD 62.1-2007.

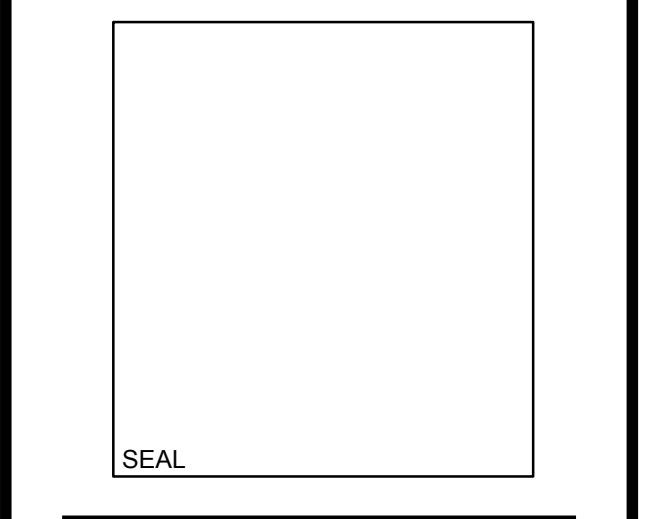
Duct & Pipe Construction & Insulation Requirements Schedule

Service	Thickness	Type	Notes
Factory Packaged Air Conditioning Unit Casing		Factory Furnished	
Factory Built Return Air Plenums/Mixing Boxes	Double Wall	Factory Furnished	No Field Built Plenums
Supply Air Ducts			
From AHU's connection to 50 feet downstream on supply side for all air handling unit systems:	1" Internally lined	with perforated inner liner and mylar film separating insulation from air stream	Double Wall Duct
After 50 feet downstream of AHU on supply side for all air handling units:		Concealed - 2" thick external wrap with corner angles.	Exposed - 1-1/2" rigid board
Ducts located outdoors or in soffit exposed to weather:	Installed R-6	Exposed: Rigid fiberglass with corner angles with outer weatherproof sheet metal jacket sealed with Flex-Clad 400 as manufactured by MFM Building Products Corp. Concealed: 75# density blanket	
AC Unit to Terminal - Balance of ductwork to terminal 50 deg air system:	Installed R-6	Exposed: 2" rigid fiberglass with corner angles Concealed: 2" with 1.5# density blanket	
AC Unit to Terminal - Balance of ductwork to terminal exposed 50 deg air system:	Installed R-6	Exposed: 2" rigid fiberglass with corner angles. Concealed: 75# density blanket.	
Terminal to Outlet:	Installed R-6	75# density blanket.	
Fire Dampers and reheat coils in internally insulated duct:		Exposed: 1" rigid fiberglass with corner angles. Concealed: installed R-6 with 75# density blanket.	
Return Air Ducts			
From AHU connection to 50 feet upstream on return side for all air handling unit systems	1" Internally lined	with perforated inner liner and mylar film separating insulation from air stream	Double Wall Duct
All other return air ductwork:		Concealed - 2" thick external wrap with corner angles	Exposed - 1-1/2" rigid board
Ducts located outside:		Internal Specified in Specification Section 23 31 01. Insulating duct specified in Specification Section 23 33 00 or Flex-Clad 400 as manufactured by MFM Building Products Corp.	
Chilled Water (46 deg F)			
Chilled Water (CHS) (CHR) (42 deg F and above) - Conditioned:		Up to 2": 1-1/2" Closed Cell Elast. 2-1/2" thru 4": 1-1/2" Foamglas 5" thru 8": 2" Foamglas 10" thru Larger: 2-1/2" Foamglas	with Aluminum Jacket for all rooftop piping
Chilled Water (CHS) (CHR) (42 deg F and above) - Unconditioned:		Up to 2": 1-1/2" Foamglas 2-1/2" thru 4": 2" Foamglas 5" thru 14": 2-1/2" Foamglas 16" thru Larger: 3" Foamglas	with Aluminum Jacket in the CEP or to any exterior chillers
Cold Pipe Hanger Support Blocks:		Match - Foamglas Insulation	
NOTES:			
Refer to specification section 23 07 00 for more details and information			
Insulation must meet or exceed ASHRAE 90.1-2010, Table 6.8.3 (whichever is greater)			



ORANGE COUNTY ADMINISTRATION BUILDING UPPER ROOF RTU REPLACEMENT

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 MPE JOB #: 2012-085D



Revisions

No.	Date	Description

Key Plan

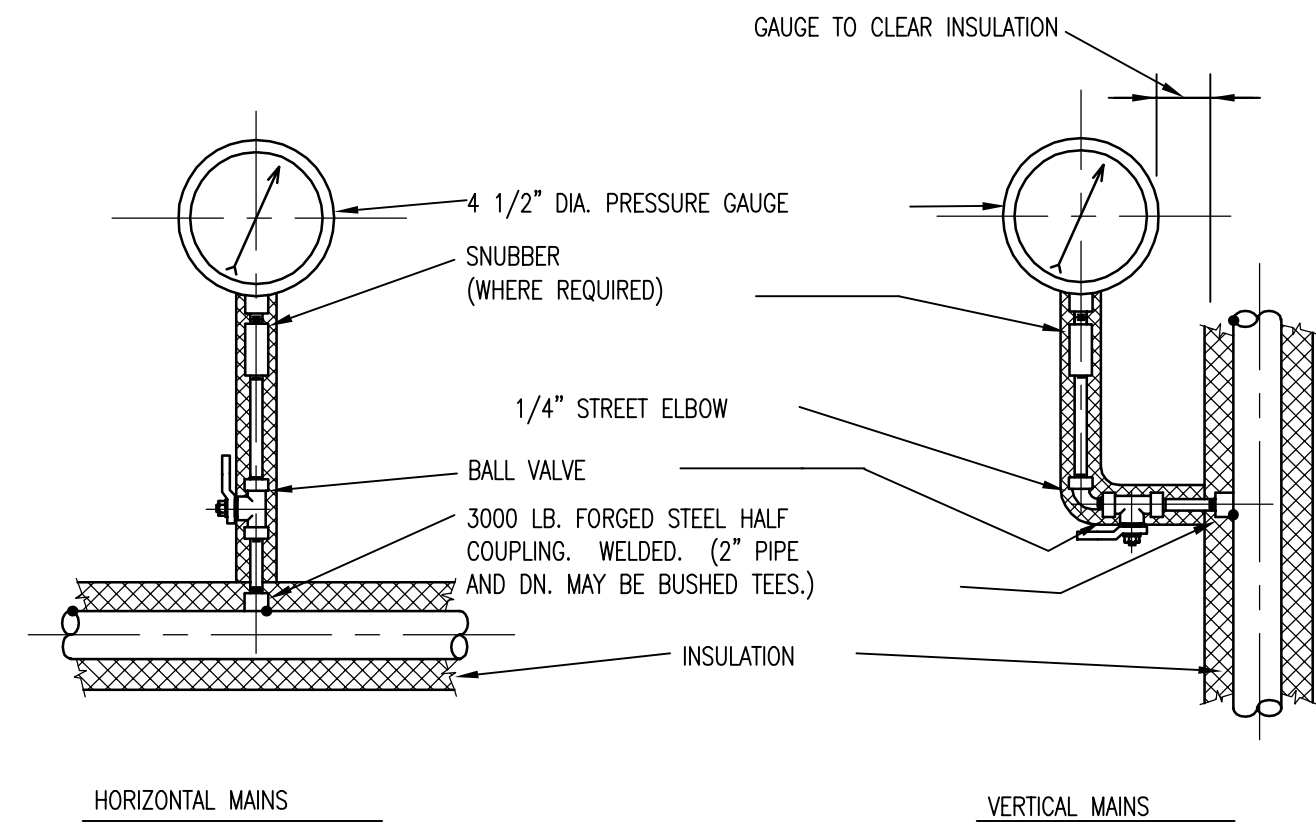
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 Drawn By: JS/DS
 Checked By: BWP
 Issue Date: 06/24/15
 Drawing Scale: NO SCALE

Drawing Title:

SCHEDULES - MECHANICAL
 BID DOCUMENTS

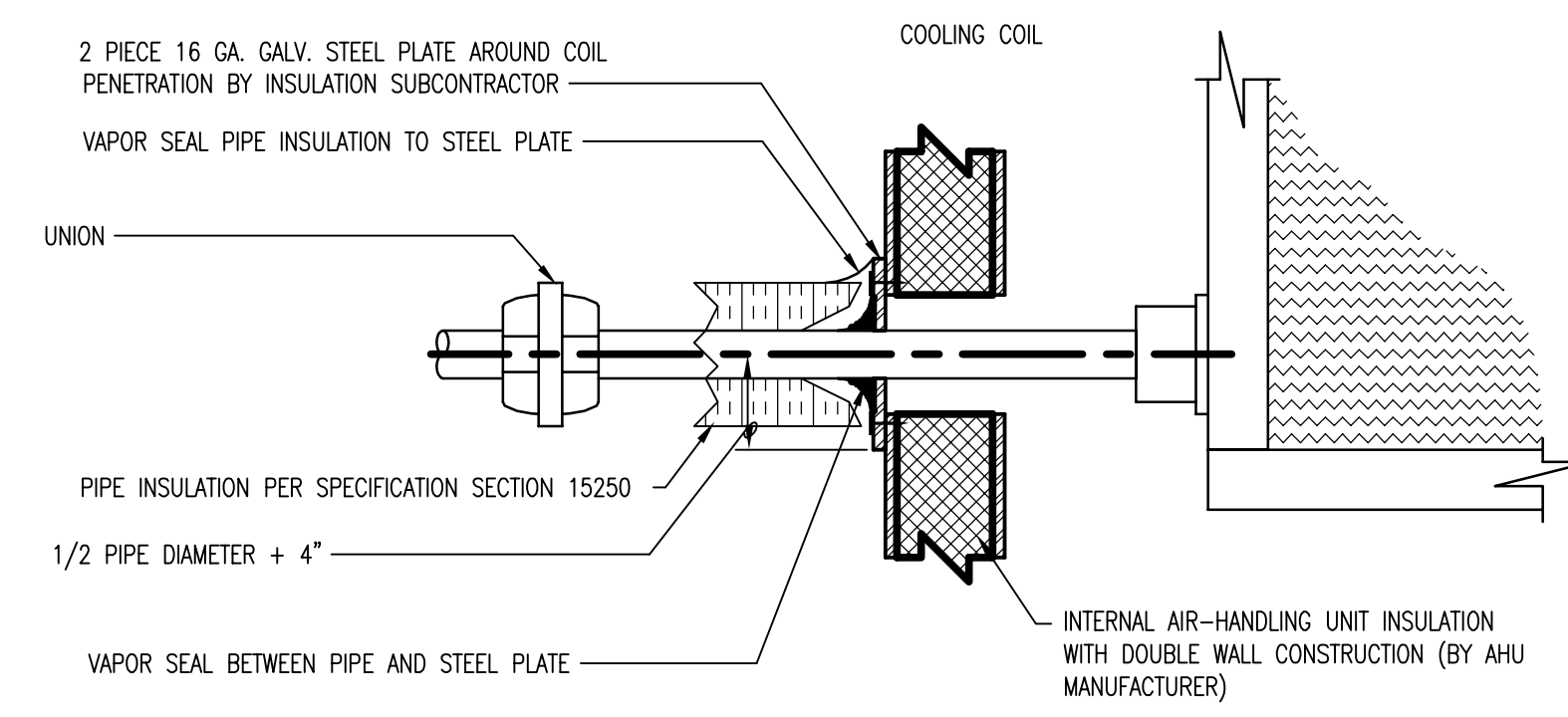
Drawing No.
M-601

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 MATERN PROFESSIONAL ENGINEERING
 PLOT DATE: 06/20/15 4:04:44 PM



WATER SYSTEMS PRESSURE GAUGE MOUNTING
NO SCALE

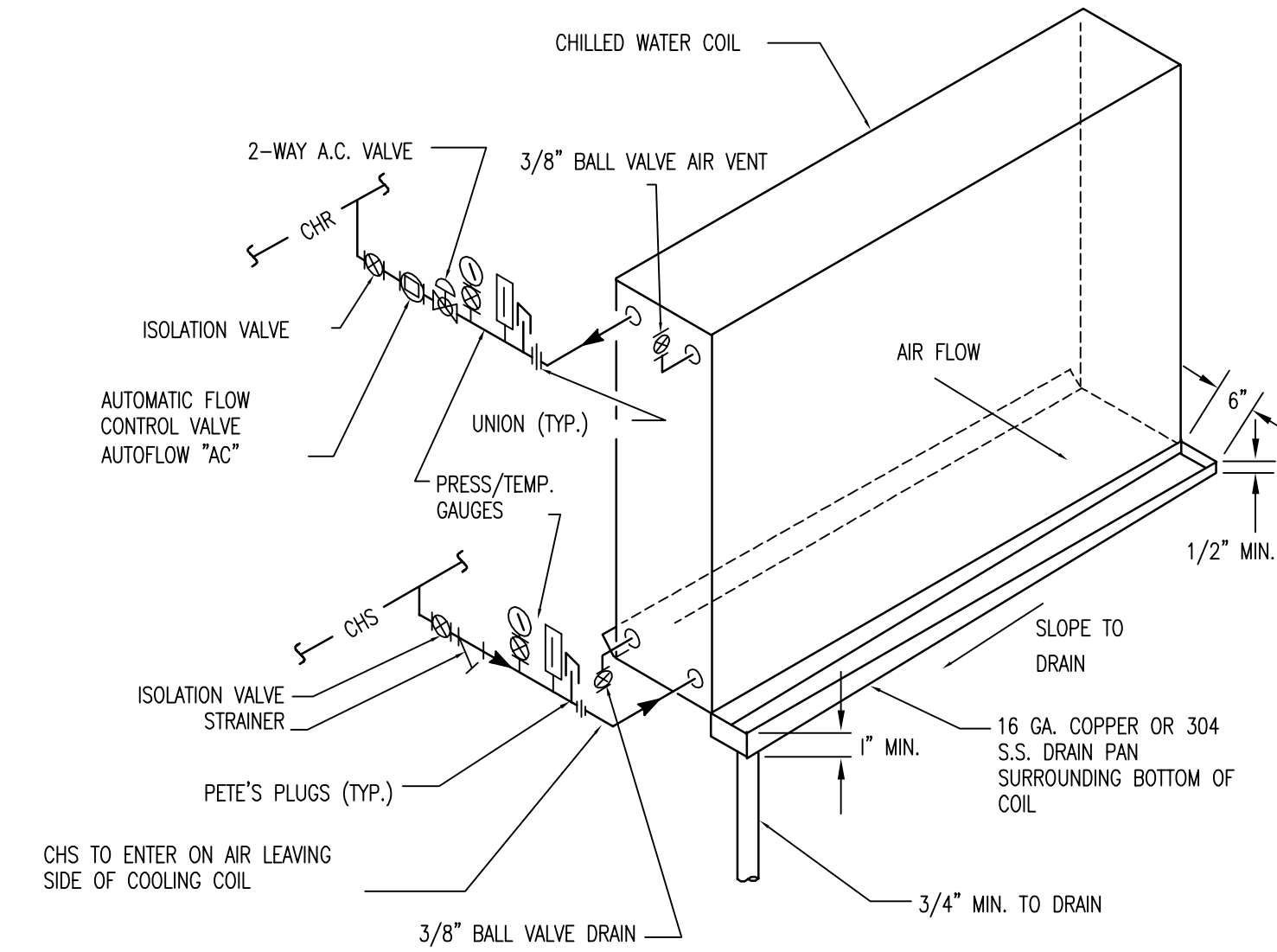
NOTES: 1. WHERE PRESSURE TAPS ONLY ARE CALLED FOR, INSTALL PIPE PLUG IN VALVE OUTLET.



CHILLED WATER COIL INSULATION REQUIREMENTS
NO SCALE

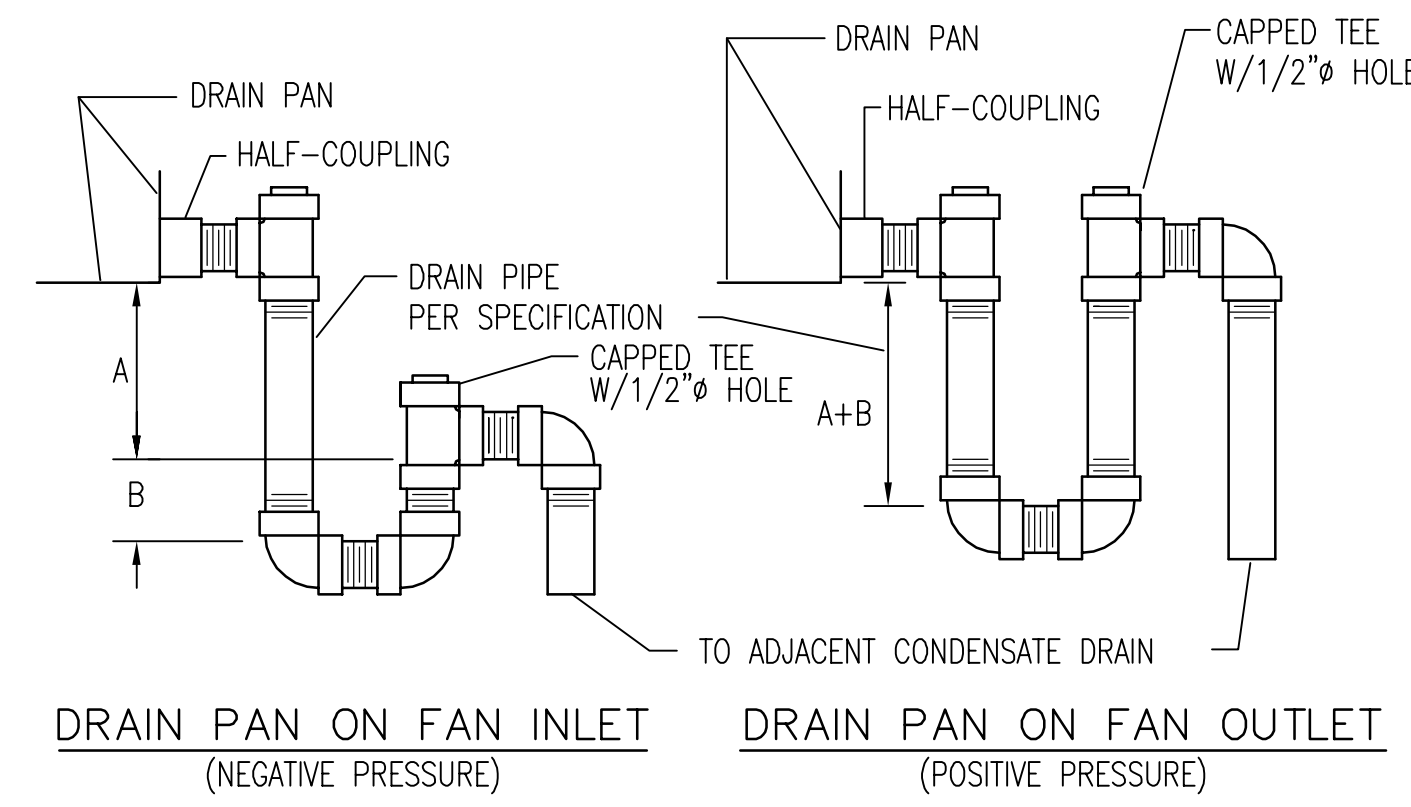


DUCT HANGERS
NO SCALE



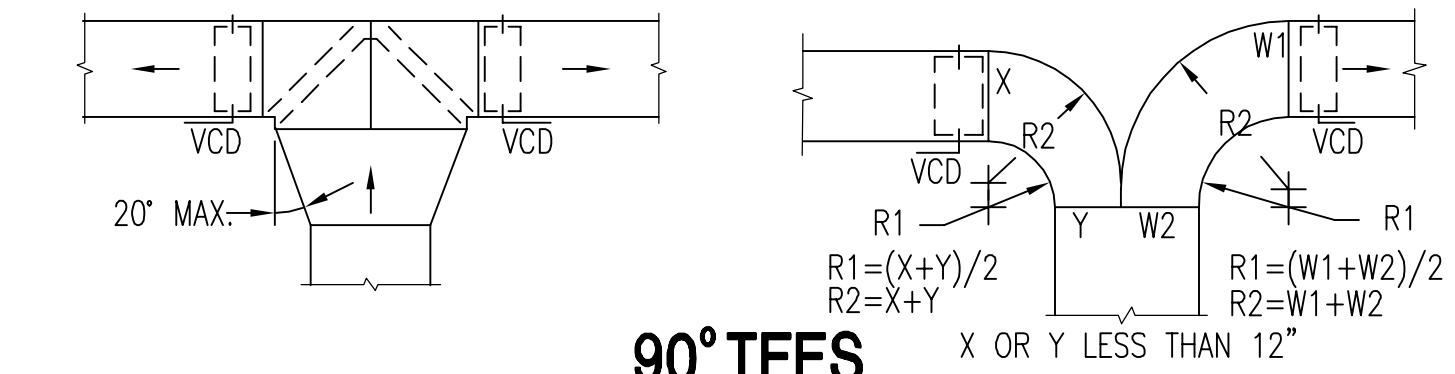
CHILLED WATER PIPING SINGLE COIL, 2-WAY VALVE
N.T.S. DTL-60

NOTES: IF RUNOUTS FROM COILS EXCEED 2' IN SIZE USE BUTTERFLY AND Y-STRAINER ON SUPPLY, AND BUTTERFLY WITH URT OR FL ON RETURN. THIS COIL IS SHOWN PIPED FOR RIGHT HAND COIL CONNECTIONS, BOTTOM INLET, TOP OUTLET, & COUNTER FLOW (ENTERING WATER TO THE LEAVING AIR). SOME MANUFACTURERS USE AN OPPOSITE DESIGNATION FOR "HAND". COILS MAY HAVE THE SUPPLY IN THE TOP, CENTER, OR BOTTOM. HOWEVER THE COILS MUST BE PIPED FOR COUNTER FLOW, (ENTERING WATER TO LEAVING AIR). ALL COOLING COILS MUST BE PROVIDED WITH A CONDENSATE COLLECTING DRAIN PAN AND TIED TO DRAIN. DRAIN PANS NOT FURNISHED AS A PART OF FACTORY BUILT A.C. UNITS SHALL BE CONSTRUCTED OF NOT LESS THAN 16 GA. COPPER SHEET OR 304 S.S.



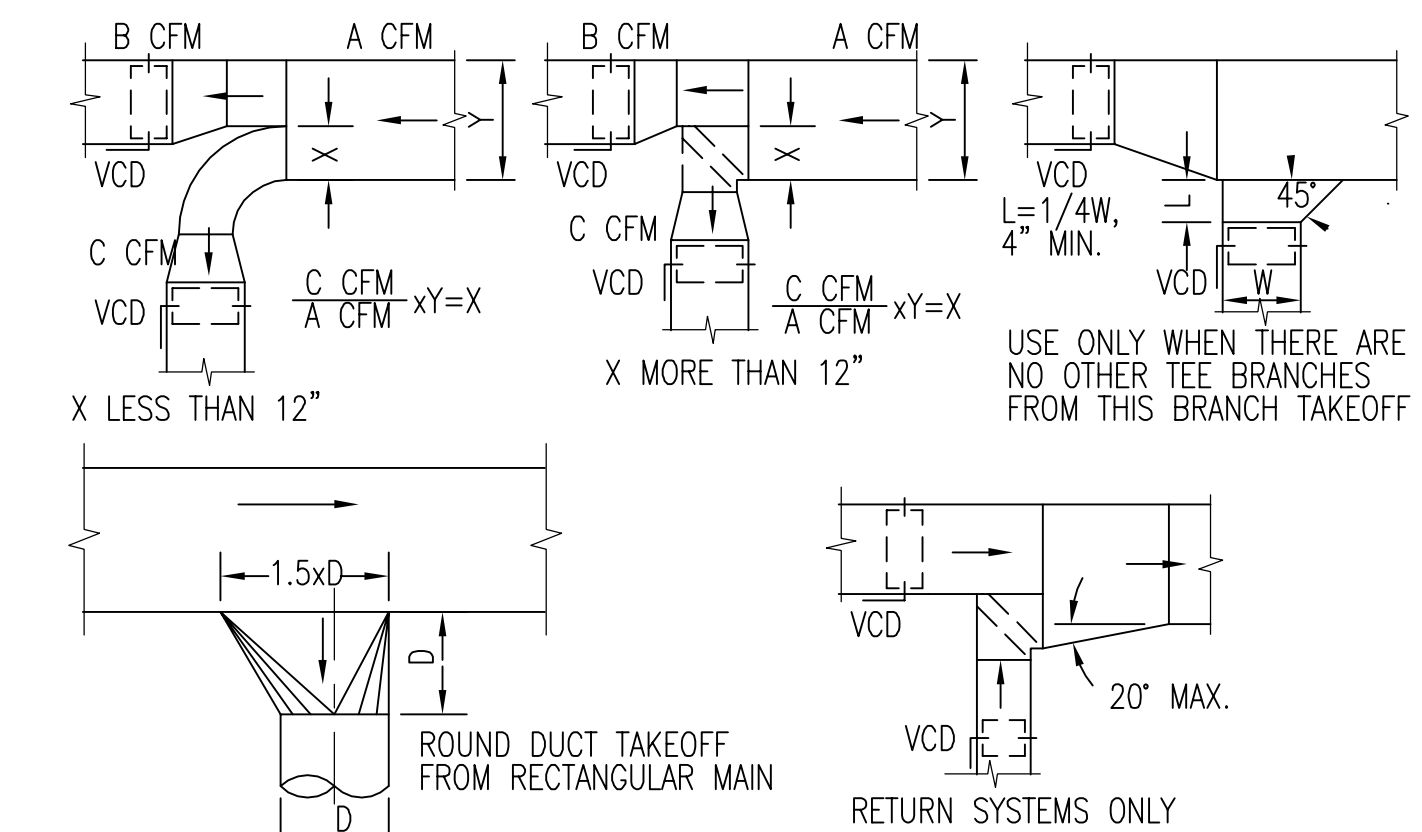
AIR HANDLING UNIT DRAINS
NO SCALE

NOTE: 1. DRAIN PIPE TO BE SAME SIZE AS UNIT OUTLET, BUT NOT LESS THAN 3/4" PIPE SIZE. 2. "A"=SYSTEM STATIC IN INCHES AT DRAIN POINT. "B"=1/2 SYSTEM STATIC IN INCHES AT DRAIN POINT.

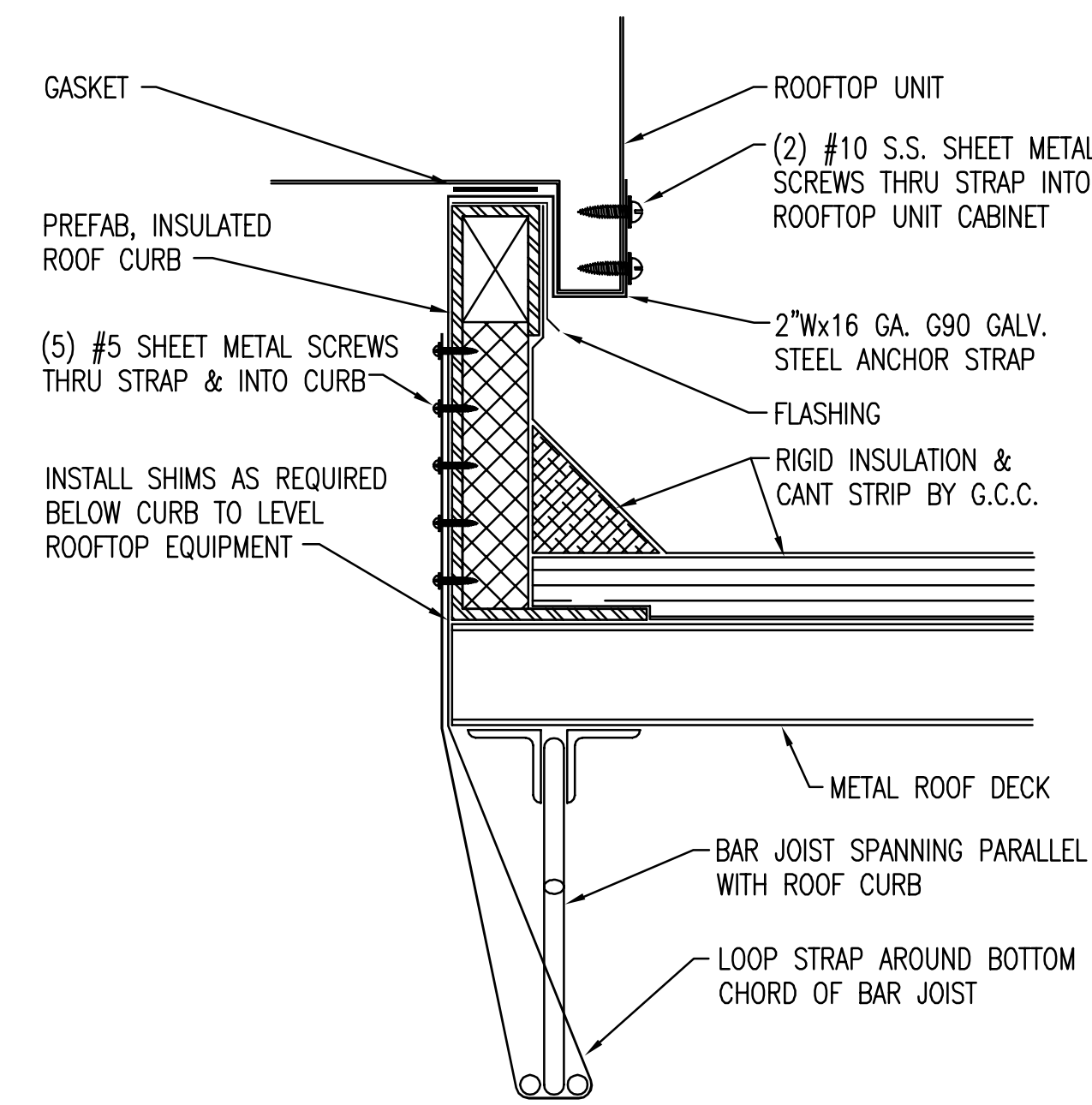


OFFSETS

90° RADIUS ELBOWS

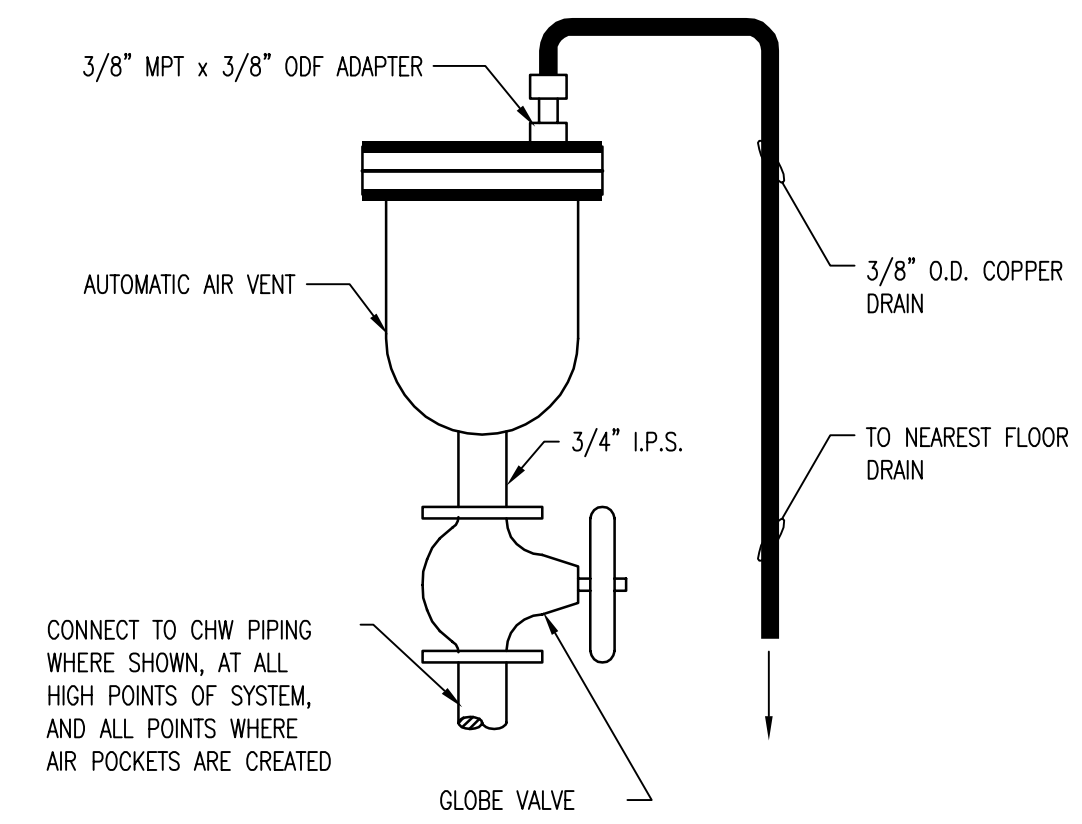


BRANCH TAKEOFFS
NO SCALE

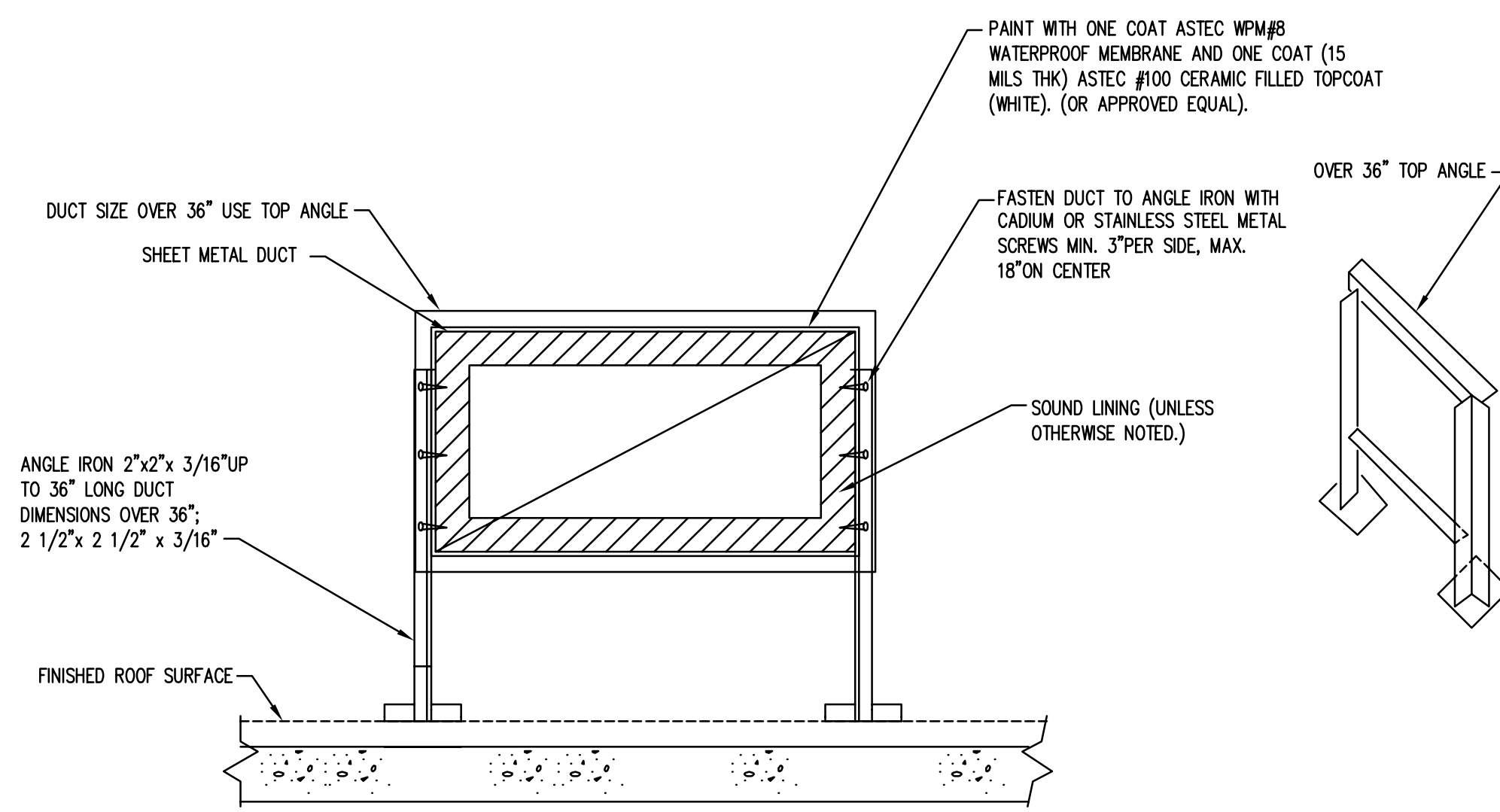


ROOFTOP AIR UNIT CURB ANCHORING DETAIL
NO SCALE

NOTE: INSTALL (1) ANCHOR STRAP ARRANGEMENT AT EACH CORNER OF ROOFTOP UNIT CURB. UTILIZE BAR JOISTS LOCATED NEAREST CURB. EQUIPMENT SHALL BE ANCHORED TO WITHSTAND TOTAL WIND LOAD AT 127 MPH.



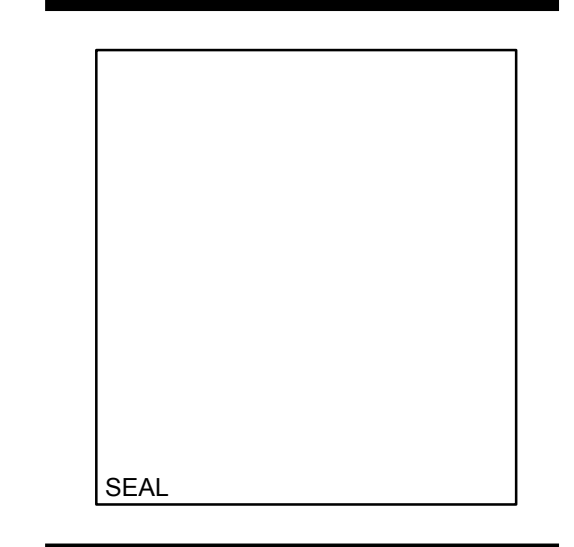
AUTOMATIC AIR VENT DETAIL
NO SCALE



DETAIL OF SUPPORT FOR ROOF MOUNTED DUCTWORK
N.T.S.

ORANGE COUNTY ADMINISTRATION BUILDING UPPER ROOF RTU REPLACEMENT

mp MATERN PROFESSIONAL ENGINEERING, INC.
ENG. BUS. No. EB-000596
CERT. OF AUTH. No. 5096
130 Candace Drive
Melbourne, FL 32751-3331
PHONE (407) 740-5020
FAX (407) 740-0365
MPE JOB #: 2012-085D



Revisions

No.	Date	Description

Key Plan

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Drawn By:	JS/DS
Checked By:	BWP
Issue Date:	06/24/15
Drawing Scale:	NO SCALE
Drawing Title:	

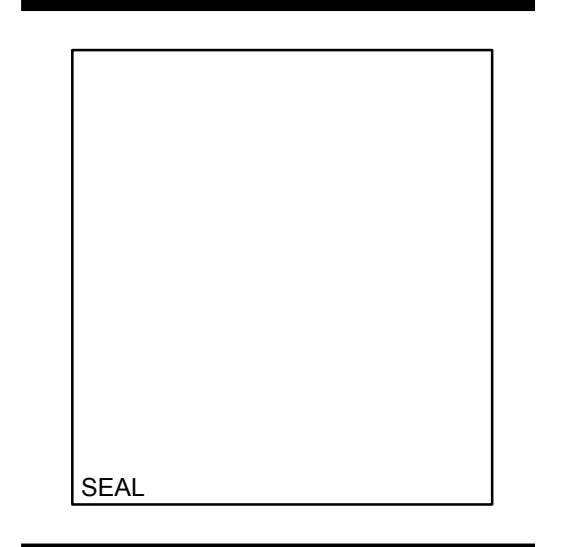
DETAILS - MECHANICAL

BID DOCUMENTS

Drawing No.

M-901

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LAST SAVED: 06/24/15 3:34 PM
CREATED DATE: 05/20/15 12:40 PM
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LAST SAVED: 06/24/15 4:24 PM
MATEMN PROFESSIONAL ENGINEERING



Revisions

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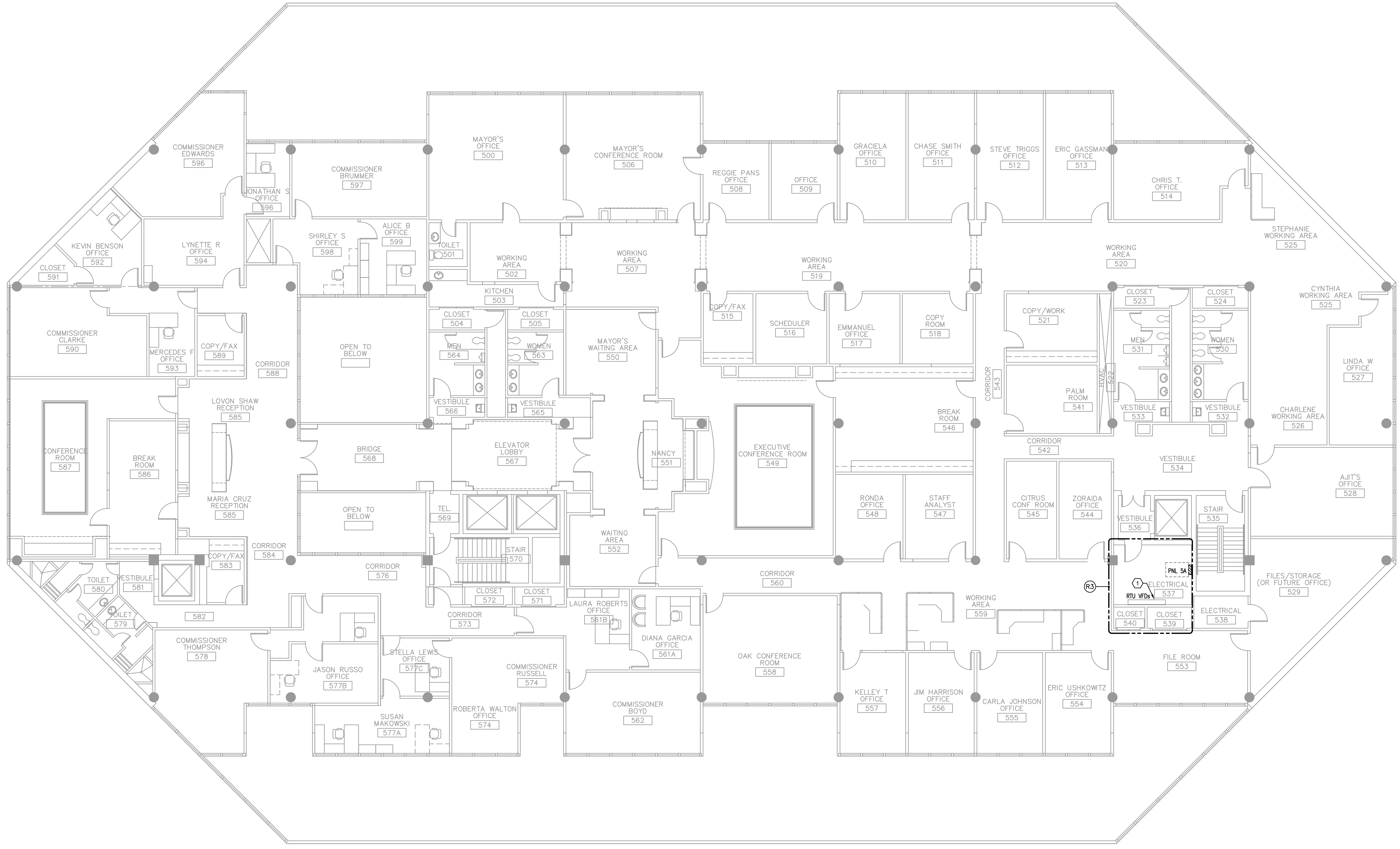
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Designed By:	MN
Drawn By:	MN/DS
Checked By:	CET
Issue Date:	06/24/15
Drawing Scale:	1/8"=1'-0"

Drawing Title:
DEMO FLOOR PLAN - 5TH FLOOR - ELECTRICAL

BID DOCUMENTS
Drawing No.

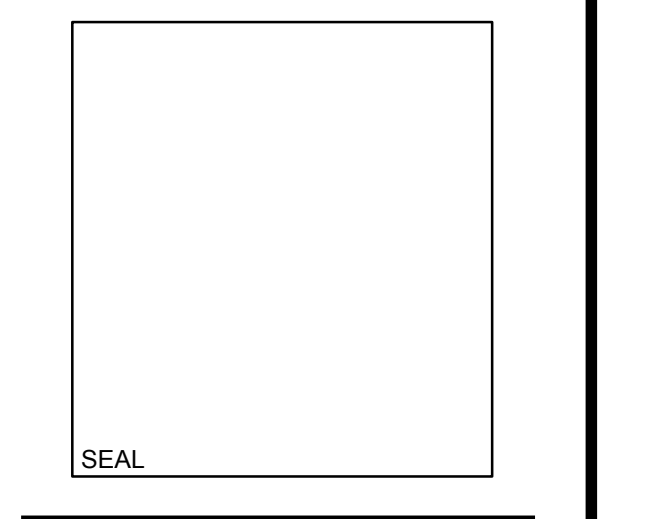
ED-105



DEMO FLOOR PLAN - 5TH FLOOR - ELECTRICAL
1/8"=1'-0"
0 4 8 16'

- | GENERAL NOTES | HEX NOTES |
|--|--|
| 1) REFER TO GENERAL NOTES FOR THIS DISCIPLINE. | ① REFER TO MECHANICAL EQUIPMENT SCHEDULE FOR VFD LOCATION. |
| 2) REFER TO SPECIFICATIONS. | |
| 3) NO MULTI-WIRE BRANCH CIRCUITS ARE TO BE USED. EACH CIRCUIT IS TO HAVE SEPARATE INDIVIDUAL NEUTRAL. | |
| 4) REWORK/RELOCATE EXISTING ELECTRICAL AS REQUIRED TO FACILITATE REMODELING. | |
| 5) CONTRACTOR SHALL MAINTAIN CONTINUITY TO EXISTING DEVICES REMAINING. | |
| 6) ALL DISCONNECTING MEANS (SWITCHES) FEEDING FAN TERMINAL BOXES SHALL BE MOTOR RATED SWITCHES. | |
| 7) REFER TO MECHANICAL EQUIPMENT FEEDER AND PANEL SCHEDULES FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL AND PLUMBING EQUIPMENT. | |
| 8) MOUNT ALL DISCONNECT SWITCHES FOR MECHANICAL EQUIPMENT WITHIN SIX (6) FEET OF EQUIPMENT AS REQUIRED BY APPLICABLE CODES AND STANDARDS. RELOCATE DISCONNECT SWITCHES SHOWN ON DRAWINGS TO LOCATION REQUIRED TO COMPLY WITH THIS REQUIREMENT AND APPLICABLE CODES/STANDARDS. LOCATIONS FOR DISCONNECT SWITCHES SHOWN ON DRAWINGS IS FOR GENERAL INFORMATION ONLY. | |

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Revisions

No.	Date	Description

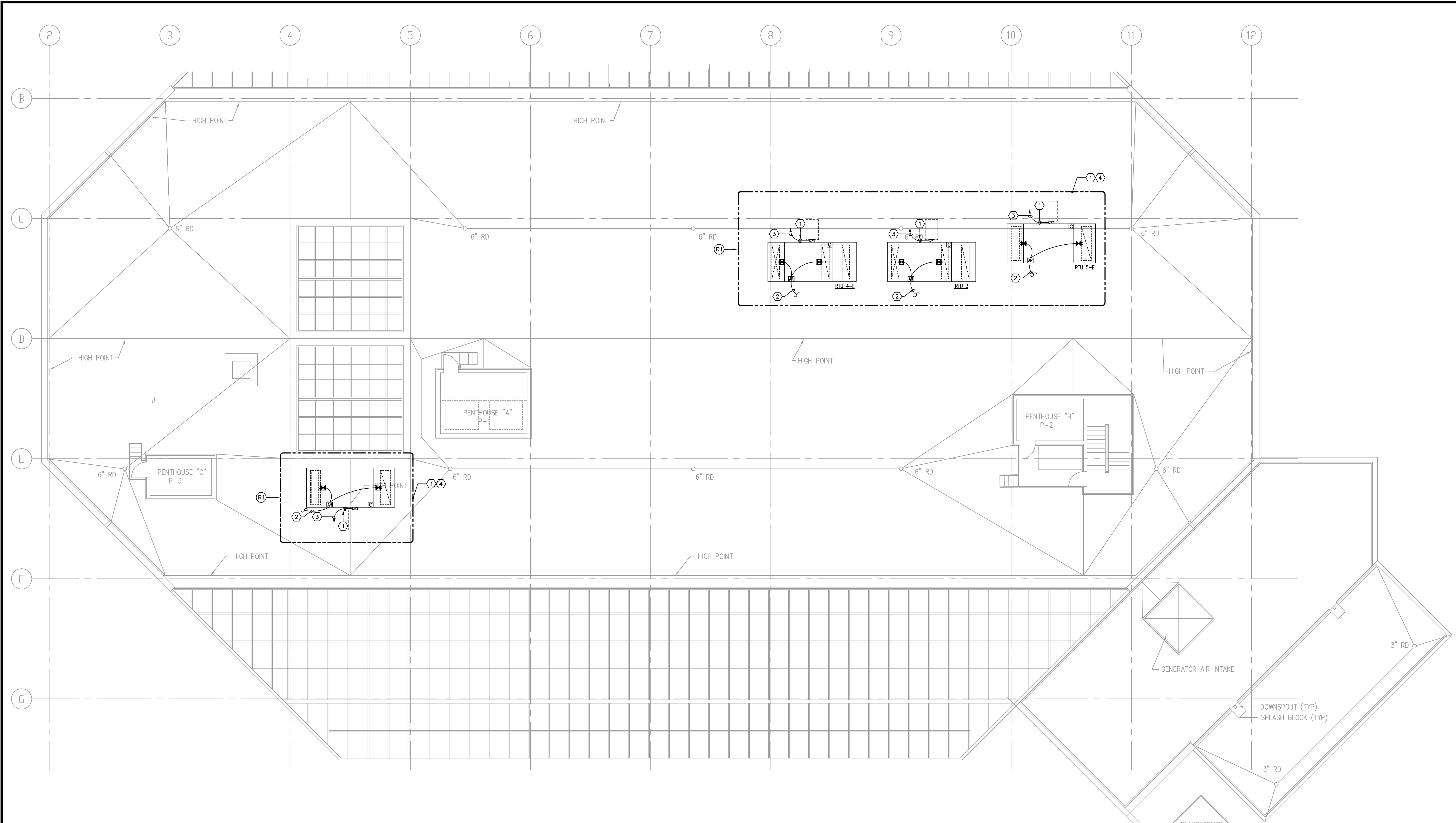
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Drawn By:	MN/DS
Checked By:	CET
Issue Date:	06/24/15
Drawing Scale:	1/8"=1'-0"

Drawing Title:
DEMO ROOF PLAN - ELECTRICAL

BID DOCUMENTS
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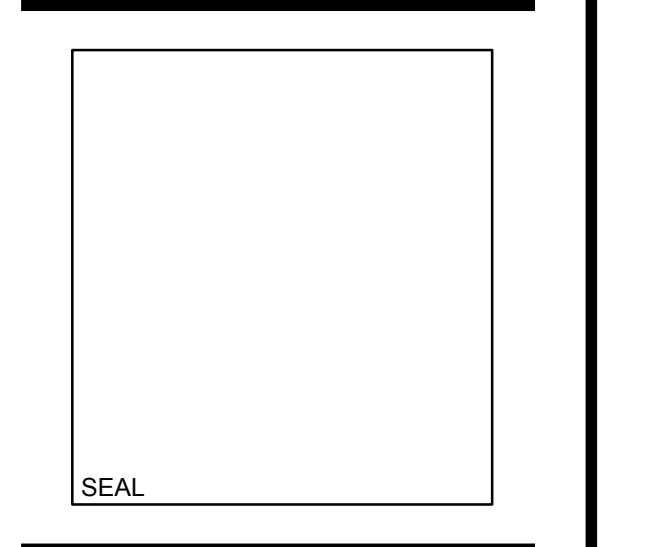
ED-106



DEMO ROOF PLAN - ELECTRICAL
 1/8"=1'-0"
 0 4 8 16'

- | GENERAL NOTES | KEY NOTES |
|--|--|
| 1) REFER TO GENERAL NOTES FOR THIS DISCIPLINE. | ① EXISTING CONDUIT PENETRATION TO 5TH FLOOR CEILING SPACE TO REMAIN AND BE REUSED. |
| 2) REFER TO SPECIFICATIONS. | ② CONNECTION TO EXISTING FIRE ALARM CIRCUIT ABOVE 5TH FLOOR CEILING. |
| 3) REWORK/RELOCATE EXISTING ELECTRICAL AS REQUIRED TO FACILITATE REMODELING. | ③ EXISTING HOME RUN, EXISTING CONDUIT MAY BE RE-USED TO FEED NEW REPLACEMENT RTU'S. SEE RENOVATION PLANS. REWORK AS REQUIRED TO FACILITATE RENOVATION. |
| 4) CONTRACTOR SHALL MAINTAIN CONTINUITY TO EXISTING DEVICES REMAINING. | ④ REMOVE EXISTING LIGHTNING PROTECTION CONDUCTORS AND AIR TERMINAL ON RTU'S BEING DEMOLISHED AND PREPARE FOR RECONNECTION DURING RENOVATION. |

2012/02/20/2012/085D, D.C. Administration Building HVAC Replacement Upper Roof RTU Replacement 03/20/12/085D, ED-106.dwg
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 MATERN PROFESSIONAL ENGINEERING



Revisions

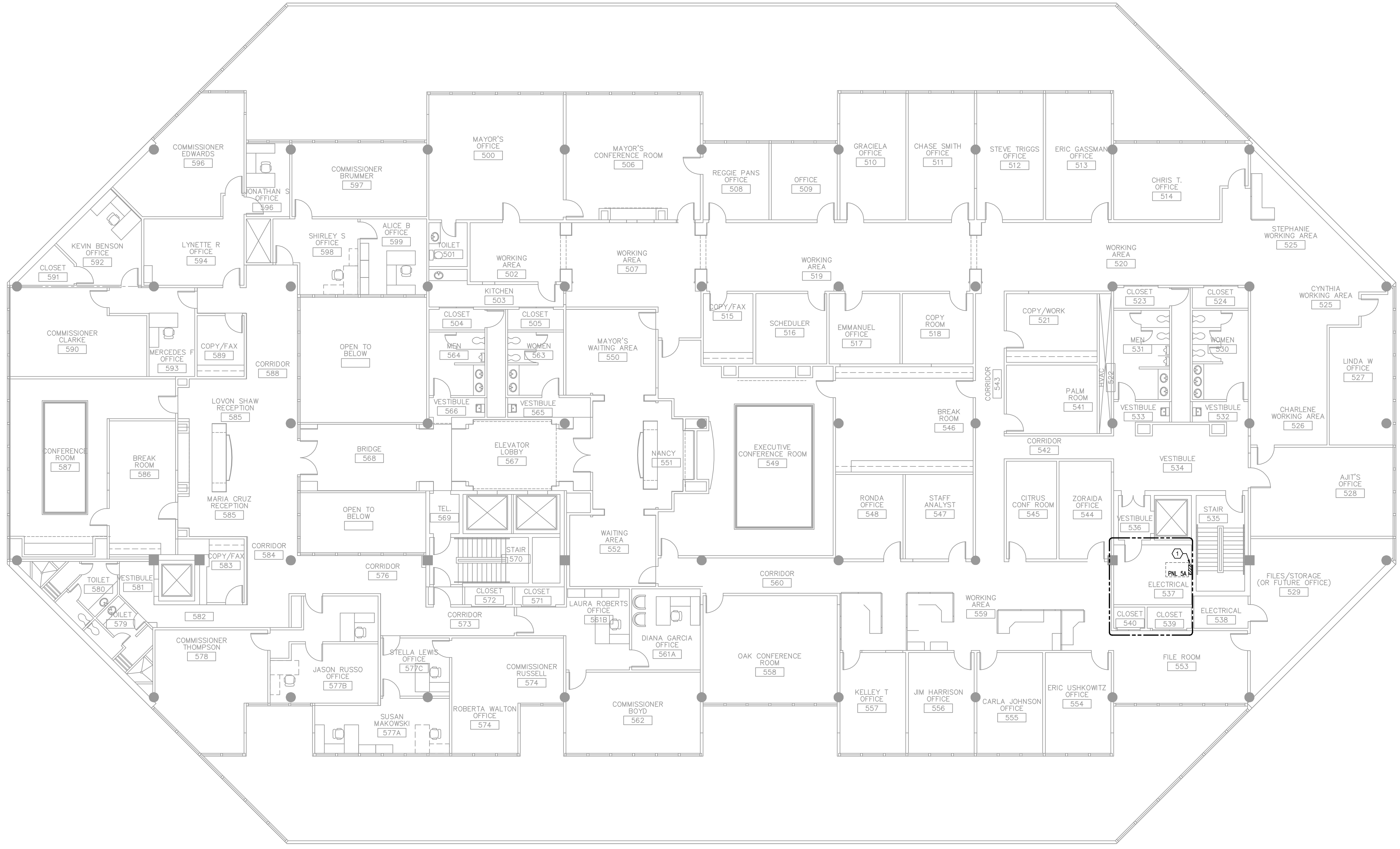
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Drawn By:	MN/DS
Checked By:	CET
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Drawing Scale:	1/8"=1'-0"

Drawing Title:
RENO FLOOR PLAN - 5TH FLOOR - ELECTRICAL

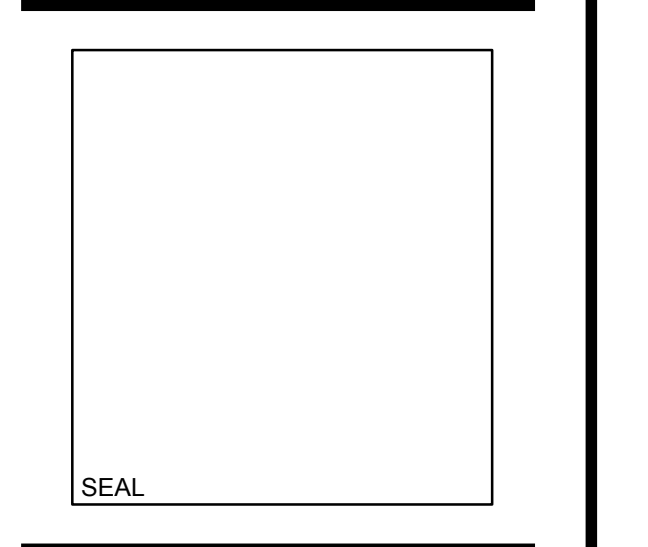
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RENO FLOOR PLAN - 5TH FLOOR - ELECTRICAL
1/8"=1'-0"
0 4 8 16'

GENERAL NOTES	HEX NOTES
1) REFER TO GENERAL NOTES FOR THIS DISCIPLINE.	① REFER TO PANEL/FEEDER SCHEDULES.
2) REFER TO SPECIFICATIONS.	
3) NO MULTI-WIRE BRANCH CIRCUITS ARE TO BE USED. EACH CIRCUIT IS TO HAVE SEPARATE INDIVIDUAL NEUTRAL.	
4) REWORK/RELOCATE EXISTING ELECTRICAL AS REQUIRED TO FACILITATE REMODELING.	
5) CONTRACTOR SHALL MAINTAIN CONTINUITY TO EXISTING DEVICES REMAINING.	
6) ALL DISCONNECTING MEANS (SWITCHES) FEEDING FAN TERMINAL BOXES SHALL BE MOTOR RATED SWITCHES.	
7) REFER TO MECHANICAL EQUIPMENT FEEDER AND PANEL SCHEDULES FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL AND PLUMBING EQUIPMENT.	
8) MOUNT ALL DISCONNECT SWITCHES FOR MECHANICAL EQUIPMENT WITHIN SIX (6) FEET OF EQUIPMENT AS REQUIRED BY APPLICABLE CODES AND STANDARDS. RELOCATE DISCONNECT SWITCHES SHOWN ON DRAWINGS TO LOCATION REQUIRED TO COMPLY WITH THIS REQUIREMENT AND APPLICABLE CODES/STANDARDS. LOCATIONS FOR DISCONNECT SWITCHES SHOWN ON DRAWINGS IS FOR GENERAL INFORMATION ONLY.	

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 LAST SAVED: 5/19/2015 8:15:10 AM



Revisions

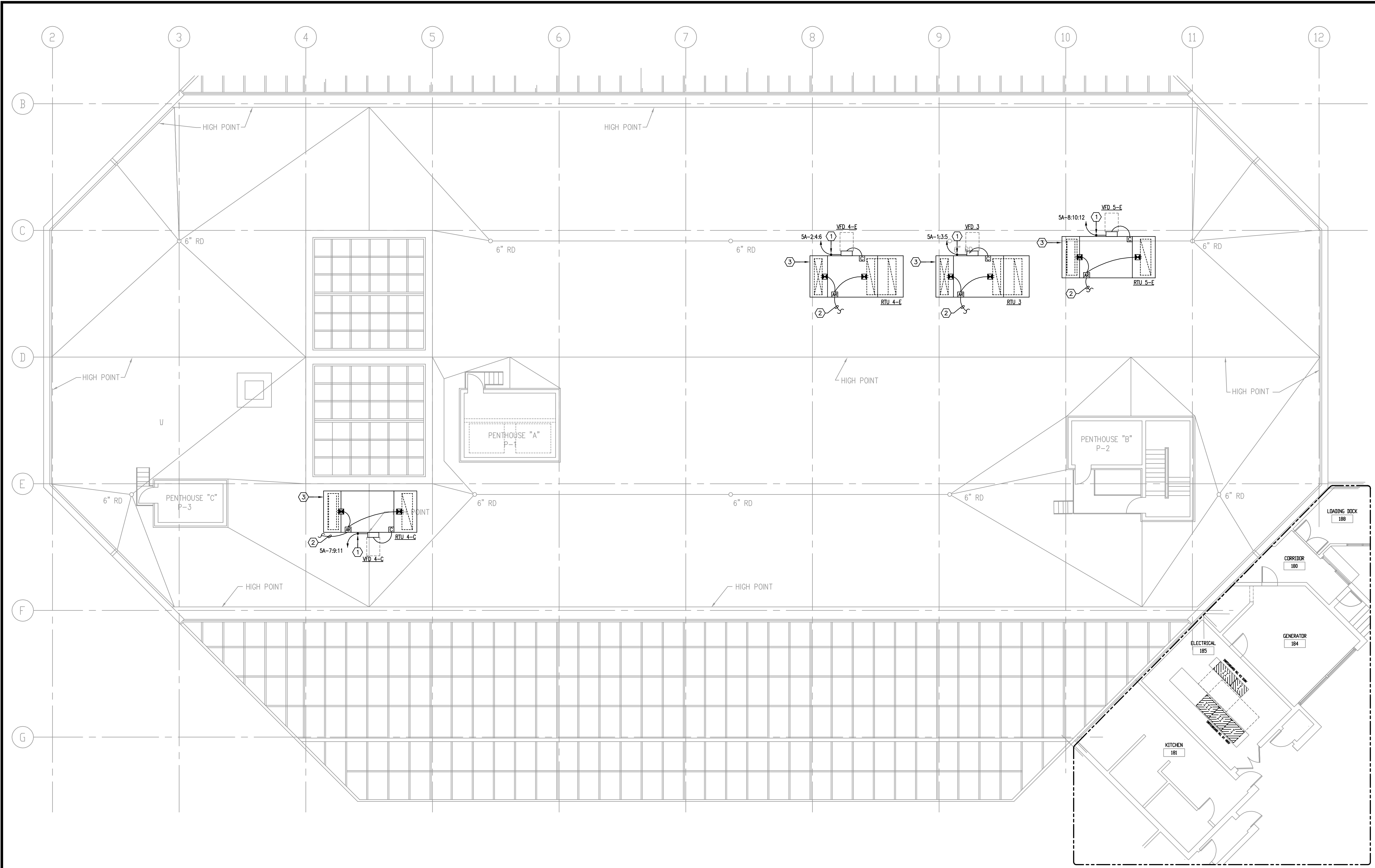
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Key Plan

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 Checked By: CET
 Issue Date: 06/24/15
 Drawing Scale: 1/8"=1'-0"

Drawing Title:
RENO ROOF PLAN - ELECTRICAL

BID DOCUMENTS
 Drawing No.



RENO ROOF PLAN - ELECTRICAL
 1/8"=1'-0"
 0 4 8 16'

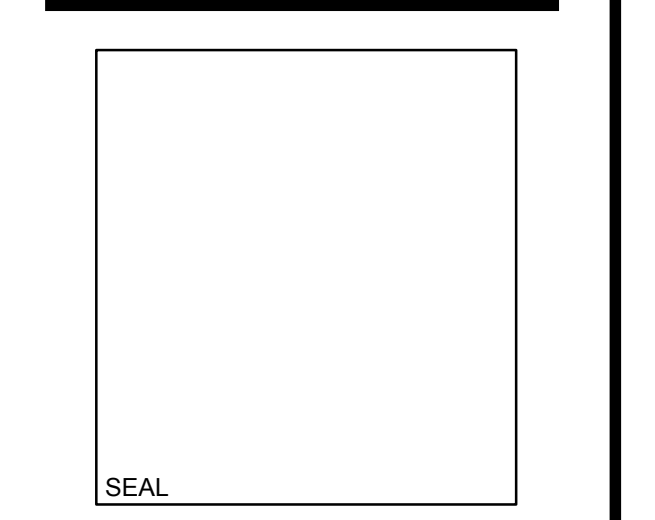
FIRST FLOOR PLAN - ELECTRICAL
 1/8"=1'-0"
 0 4 8 16'

- | GENERAL NOTES | HEX NOTES |
|--|---|
| 1) REFER TO GENERAL NOTES FOR THIS DISCIPLINE. | ① EXISTING CONDUIT PENETRATION TO 5TH FLOOR CEILING SPACE TO BE REUSED. |
| 2) REFER TO SPECIFICATIONS. | ② CONNECTION TO EXISTING FIRE ALARM CIRCUIT ABOVE 5TH FLOOR CEILING. PROVIDE ALL PROGRAMMING TO EXISTING SYSTEM REQUIRED TO FACILITATE RENOVATION. |
| 3) NO MULTI-WIRE BRANCH CIRCUITS ARE TO BE USED. EACH CIRCUIT IS TO HAVE SEPARATE INDIVIDUAL NEUTRAL. | ③ PROVIDE NEW BONDING CONDUCTORS AND AIR TERMINALS, ETC. ON NEW RTU TO PROVIDE A LIGHTING PROTECTION SYSTEM IN ACCORDANCE TO NFPA AND SPECIFICATIONS. |
| 4) REWORK/RELOCATE EXISTING ELECTRICAL AS REQUIRED TO FACILITATE REMODELING. | |
| 5) CONTRACTOR SHALL MAINTAIN CONTINUITY TO EXISTING DEVICES REMAINING. | |
| 6) ALL DISCONNECTING MEANS (SWITCHES) FEEDING FAN TERMINAL BOXES SHALL BE MOTOR RATED SWITCHES. | |
| 7) REFER TO MECHANICAL EQUIPMENT FEEDER AND PANEL SCHEDULES FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL AND PLUMBING EQUIPMENT INCLUDING CIRCUIT NUMBERS. | |
| 8) MOUNT ALL DISCONNECT SWITCHES FOR MECHANICAL EQUIPMENT WITHIN SIX (6) FEET OF EQUIPMENT AS REQUIRED BY APPLICABLE CODES AND STANDARDS. RELOCATE DISCONNECT SWITCHES SHOWN ON DRAWINGS TO LOCATION REQUIRED TO COMPLY WITH THIS REQUIREMENT AND APPLICABLE CODES/STANDARDS. LOCATIONS FOR DISCONNECT SWITCHES SHOWN ON DRAWINGS IS FOR GENERAL INFORMATION ONLY. | |

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 LAST SAVED BY: MNRD

ORANGE COUNTY ADMINISTRATION BUILDING UPPER ROOF RTU REPLACEMENT

mp MATERN PROFESSIONAL ENGINEERING, INC.
130 Candace Drive
Melbourne, FL 32751-3331
PHONE (407) 740-5020
FAX (407) 740-0395
MPE JOB #: 2012-085D



Revisions

No.	Date	Description

Key Plan

Designed By: MN
 Drawn By: MN/DS
 Checked By: CET
 Issue Date: 06/24/15
 Drawing Scale: 1/8"=1'-0"

Drawing Title:
ELECTRICAL SCHEDULES AND RISER DIAGRAMS
 BID DOCUMENTS

Drawing No.

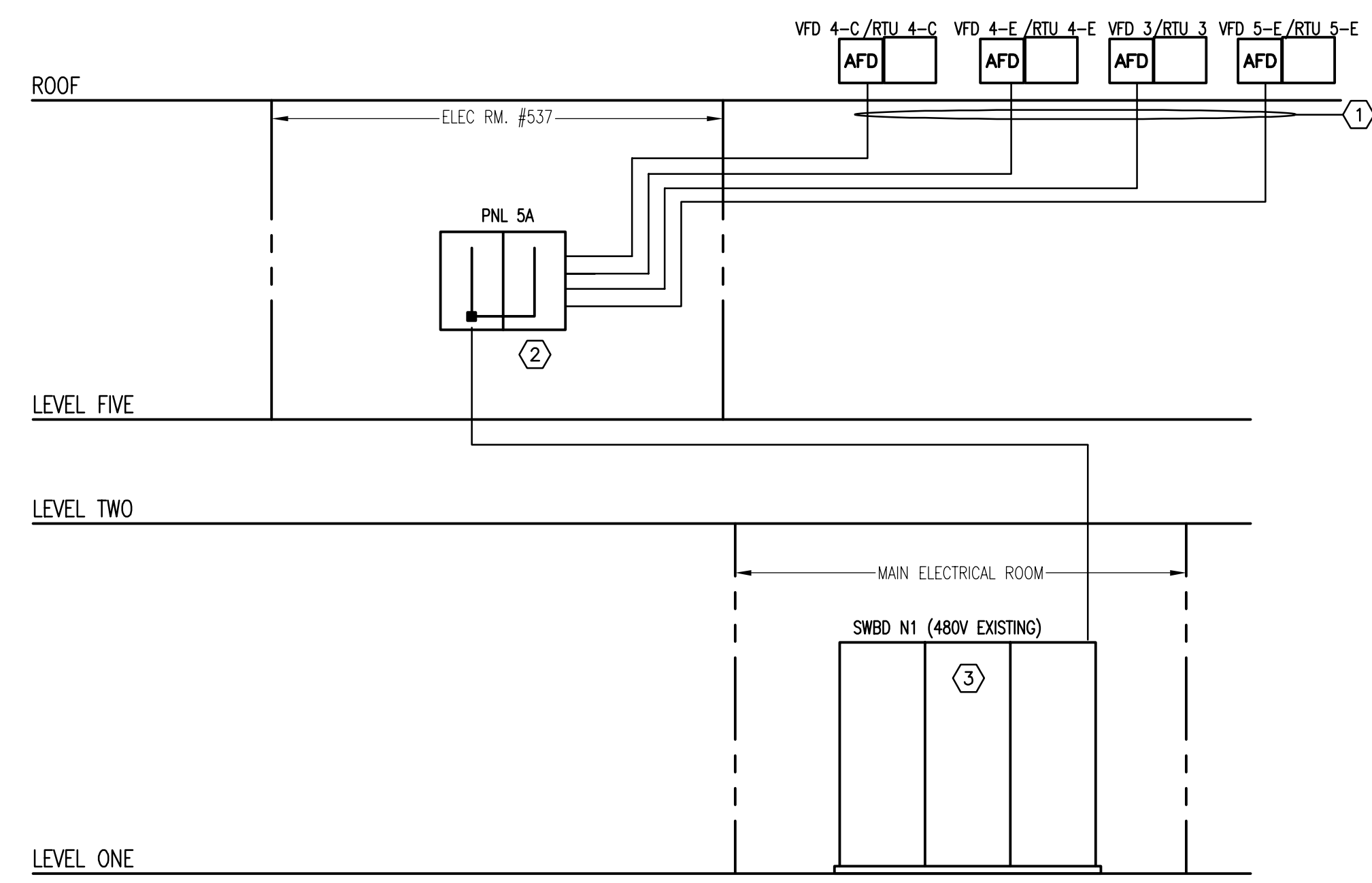
E-501

MECHANICAL/KITCHEN EQUIPMENT FEEDER SCHEDULE FOR (9): 2012-085D OC Admin Bldg. RTU Replacement														COPYRIGHT ME, LLC Version: W11a REVISED: April 6, 2015 DATE: June 15, 2015																	
EQUIPMENT DESCRIPTION	VOLTS	PH	NEUTRAL Y/N	LARGEST MOTOR			COMPRESSOR		ADD'L MOTORS			HEAT STRIPS		MISC AMPS	TOTAL FLA	MCA (10)	MOCIP (10)	PANEL CB (9)	DISCONNECT SWITCH				STARTER TYPE	WIRE PER PHASE (6)	NEUTRAL WIRE (7)	GROUND WIRE	WIRE MATERIAL	# OF RUNS	CONDUIT SIZE	% VD	NOTES (SEE BELOW)
				HP	FLA	LRA	FLA(11)	LRA	FLA	LRA	KW	AMPS	CODE						SIZE (1)	FUSE (2)	TYPE (3)	CODE									
RTU 3	480	3	N	15.00	21.0	116.0								21			45			3R	6	VFD/AFD	#10		#10	COPPER	1	0.50	0.80	C	
RTU 4-C	480	3	N	10.00	14.0	81.0								14			30			3R	6	VFD/AFD	#12		#10	COPPER	1	0.50	0.80	C	
RTU 4-E	480	3	N	15.00	21.0	116.0								21			45			3R	6	VFD/AFD	#10		#10	COPPER	1	0.50	0.80	C	
RTU 5-E	480	3	N	15.00	21.0	116.0								21			45			3R	6	VFD/AFD	#10		#10	COPPER	1	0.50	0.80	C	

NOTES (1)
 (1) PROVIDE DISC SW AT ALL PIECES OF EQUIPMENT AS REQUIRED BY THE N.E.C. AND AHJ UNLESS PROVIDED BY OTHERS (INCLUDING AT MOTORS AND AT STARTERS).
 (2) FUSES SHOWN FOR REFERENCE ONLY. PROVIDE FUSES AS RECOMMENDED BY EQUIPMENT MANUFACTURER.
 (3) PROVIDE NEMA OUTDOOR RATED ENCLOSURES FOR ALL DISC SWS MOUNTED OUTDOORS.
 (4) COORDINATE STARTER TYPE WITH MECH EQUIP INSTALLER.
 (5) CONTRACTOR TO VERIFY THAT C.B. FOR COMPRESSORS IS SUFFICIENT TO ALLOW STARTING OF UNIT, IF REQUIRED FOR STARTING C.B. TO BE INCREASED TO A MAX ALLOWED BY N.E.C. CB TO BE HACR RATED.
 (6) #12 FEEDERS SHOWN AND OVER 50FT. LONG TO BE #10 FOR 120V CIRCUITS. #12 FEEDERS SHOWN AND OVER 100 FT. LONG TO BE #10 FOR 277 V CIRCUITS.
 (7) NEUTRAL CONDUCTOR TO BE SAME SIZE AS PHASE CONDUCTORS.
 (8) MOTOR CB IS SIZED BASED ON NEMA CODE "F" OR HIGHER. CHANGE CB SIZE IF REQUIRED DUE TO NEMA CODE OF MOTOR PER N.E.C.
 (9) ALL FEEDERS 100 AMP AND LESS ARE BASED ON 90 DEGREE CONDUCTOR/TERMINATION RATING. ALL OTHER FEEDERS ARE BASED ON 75 DEGREE CONDUCTOR TERMINATIONS. PROVIDE AND INSTALL PROPER TERMINATIONS ON ALL EQUIPMENT PROVIDED BY ANY DIVISION AND/OR SECTION OF THE CONTRACT DOCUMENTS. PROPER TERMINATIONS TO BE AS REQUIRED TO MATCH CONDUCTOR WITH REQUIRED AMPACITY.
 (10) BASED ON MANUFACTURER'S RECOMMENDATION.
 (11) OR BRANCH CIRCUIT SELECTION CURRENT WHEN AVAILABLE.

MCP = MOTOR CIRCUIT PROTECTOR W/COMBINATION STARTER
 MMS = MANUAL MOTOR STARTER SWITCH WITH OVERLOADS AND PILOT LIGHT
 I = NEMA 1 ENCLOSURE
 3R = NEMA 3R ENCLOSURE
 4SS = NEMA 4 WATER TIGHT STAINLESS STEEL ENCLOSURE
 4 = NEMA 4 WATER TIGHT NON-CORROSIVE ENCLOSURE
 VFD/AFD = VARIABLE (ADJUSTABLE-AFD) FREQ DRIVE UNIT
 NF = NON-FUSED. WHERE ACCEPTABLE TO AHJ, CONTRACTOR MAY USE PROPERLY RATED MOTOR SWITCH FOR DISCONNECT SWITCH
 AHJ = AUTHORITY HAVING JURISDICTION.
 FNVR = FULL VOLTAGE NON-REVERSING
 DFNVR = DUAL VOLTAGE NON-REVERSING
 FVC = FULL VOLTAGE CONTACTOR

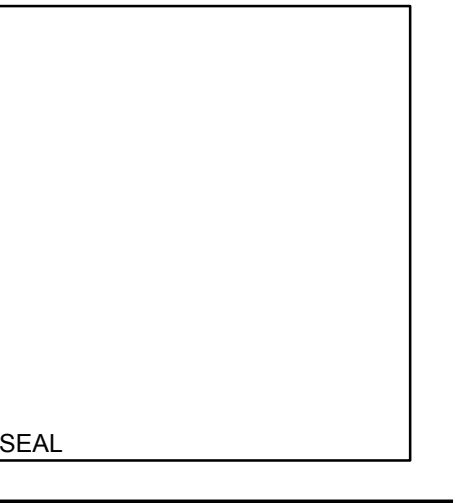
NOTES:
 (A)=CONNECT VIA LINE VOLTAGE T'STAT BY DIV. 1523 CONTRACTOR.
 (B)=CONNECT VIA CONTROL DEVICES BY DIV. 1523 CONTRACTOR.
 (C)=CONNECT VIA VFD/AFD WITH INTEGRAL DISC. SW.
 (D)=CONNECT VIA COMBINATION DISC/STARTER BY DIV. 1523 CONTRACTOR.
 (E)=CONNECT VIA DISC SWITCH AT EQUIP. BY DIV. 1523 CONTRACTOR.
 (F)=PROVIDE FULL SIZE NEUTRAL.
 (G)=MMS WITHOUT OVERLOADS.
 (H)=CONNECT VIA STARTER IN MCC (BY DIV 1626).
 (I)=2 SPEED, 1 WINDING MOTOR/STARTER.
 (J)=COORDINATE WITH DIV.15 TO BALANCE LOAD OF 1 PHASE FTB MOTORS.
 (K)=PROVIDE NEW STARTER IN MCC TO MATCH EXISTING. SEE MCC SCHED.
 (L)=WHERE MOTOR IS FED FROM MCC, PANEL CB NOT REQUIRED
 (M)=CONNECT EXIST DISC SWITCH AT MOTOR. MODIFY AS NOTED ON DRWSG
 (N)=
 (O)=
 (P)=



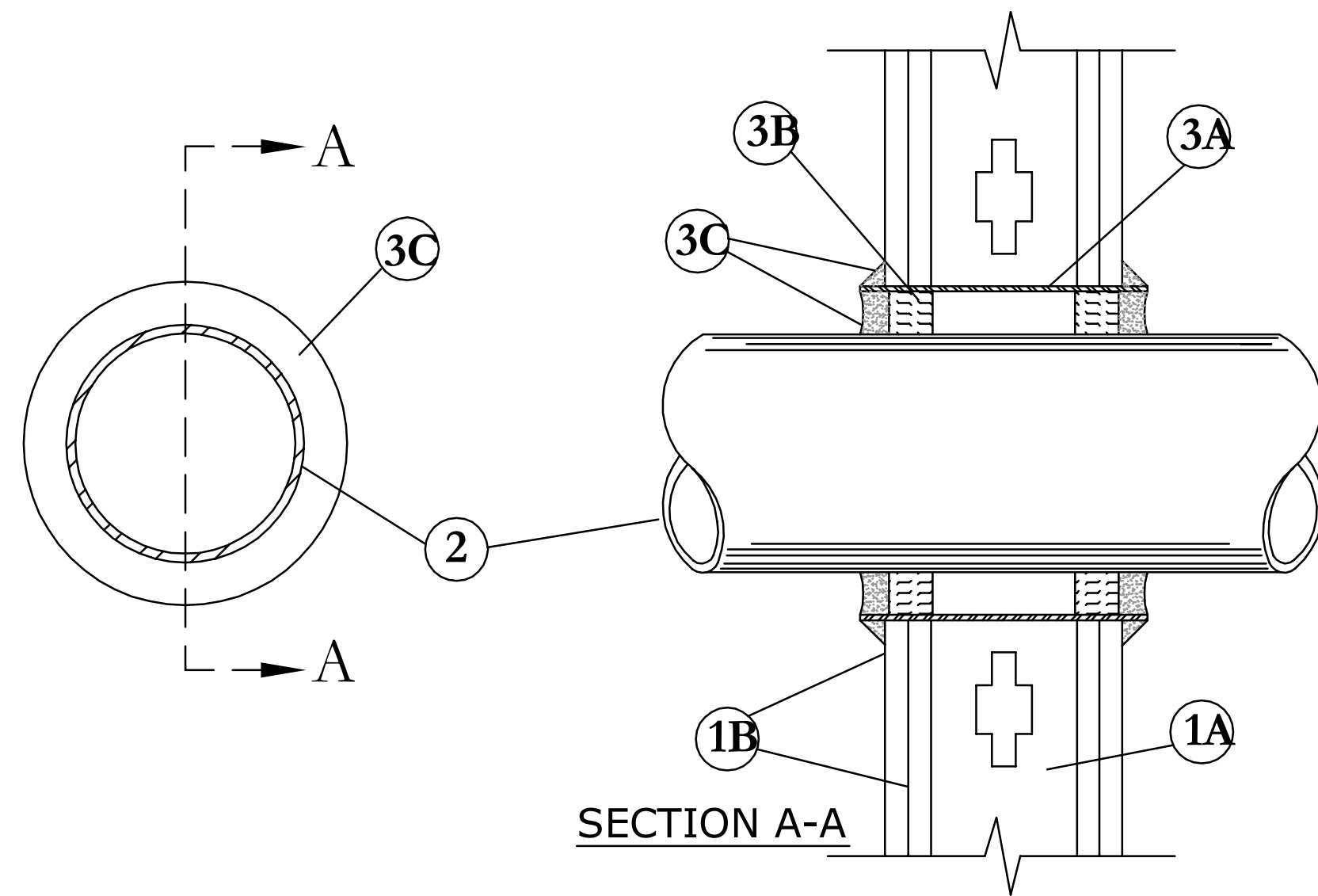
GENERAL NOTES
 1) REFER TO GENERAL NOTES FOR THIS DISCIPLINE.
 2) REFER TO SPECIFICATIONS.
 3) NO MULTI-WIRE BRANCH CIRCUITS ARE TO BE USED. EACH CIRCUIT IS TO HAVE SEPARATE INDIVIDUAL NEUTRAL.
 4) REWORK/RELOCATE EXISTING ELECTRICAL AS REQUIRED TO FACILITATE REMODELING.
 5) CONTRACTOR SHALL MAINTAIN CONTINUITY TO EXISTING DEVICES REMAINING.
 6) ALL DISCONNECTING MEANS (SWITCHES) FEEDING FAN TERMINAL BOXES SHALL BE MOTOR RATED SWITCHES.
 7) REFER TO MECHANICAL EQUIPMENT FEEDER AND PANEL SCHEDULES FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL AND PLUMBING EQUIPMENT INCLUDING CIRCUIT NUMBERS.
 8) MOUNT ALL DISCONNECT SWITCHES FOR MECHANICAL EQUIPMENT WITHIN SIX (6) FEET OF EQUIPMENT AS REQUIRED BY APPLICABLE CODES AND STANDARDS. RELOCATE DISCONNECT SWITCHES SHOWN ON DRAWINGS TO LOCATION REQUIRED TO COMPLY WITH THIS REQUIREMENT AND APPLICABLE CODES/STANDARDS. LOCATIONS FOR DISCONNECT SWITCHES SHOWN ON DRAWINGS IS FOR GENERAL INFORMATION ONLY.

KEY NOTES
 ① EXISTING CONDUIT, PENETRATIONS AND FEEDERS FROM 5TH FLOOR TO ROOF TO BE REUSED. REFER TO MECHANICAL FEEDER SCHEDULE.
 ② PANEL TO REMAIN ACTIVE. SEE PANEL SCHEDULE FOR NEW BREAKERS.
 ③ TO REMAIN ACTIVE.

MPE JOB #: 2012-085D, D.C. Administration Building HVAC Replacement Upper Roof RTU Replacement 06/24/15, EBT1.dwg
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 PLOT DATE: 06/24/15 12:33 PM
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 DATE: 06/24/15 12:33 PM
 PLOT DATE: 06/24/15 12:33 PM



System No. W-L-1003
September 03, 2004
(Formerly System No. 147)
F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr



PENETRATION FIRESTOP FOR 12" MAX. DIA. METAL PIPE/CONDUIT THROUGH GYPSUM WALLBOARD ASSEMBLY
N.T.S. UL SYSTEM #147A (1 OR 2 HOUR RATING) FIREST5

1. Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. Studs - Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC with nom 2 by 4 in. lumber end plates and cross braces. Steel studs to be min 3-1/2 in. wide by 1-3/8 in. deep channels spaced max 24 in. OC.
 - B. Gypsum Board* - Nom 5/8 in. thick, 4 ft. wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 15 in.
- The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. Through Penetrant - One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The space between pipes, conduits or tubing and the steel sleeve (Item 3A) shall be min of 0 in. (point contact) to max 2-3/8 in. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

- A. Steel Pipe - Nom 12 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. Iron Pipe - Nom 12 in. diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in. diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.
- C. Conduit - Nom 6 in. diam (or smaller) steel conduit or nom 4 in. diam (or smaller) steel electrical metallic tubing.
- D. Copper Tubing - Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
- E. Copper Pipe - Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.

3. Firestop System - Installed symmetrically on both sides of wall assembly. The details of the firestop system shall be as follows.

A. Steel Sleeve - Cylindrical sleeve fabricated from min 0.019 in. thick (No. 28 gauge) galv sheet steel and having a min 2 in. lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of wall plus 1 to 4 in. such that, when installed, the ends of the sleeve will project approximately 1/2 to 2 in. beyond the surface of the wall on both sides of the wall assembly. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the circular cutouts in the gypsum wallboard layers.

B. Packing Material - Min 1 in. thickness of mineral wool batt insulation firmly packed into steel sleeve on both sides of the wall assembly as permanent forms. Packing material to be recessed min 1/2 in. from end of steel sleeve (flush with or recessed into gypsum wallboard surface) on both sides of wall assembly.

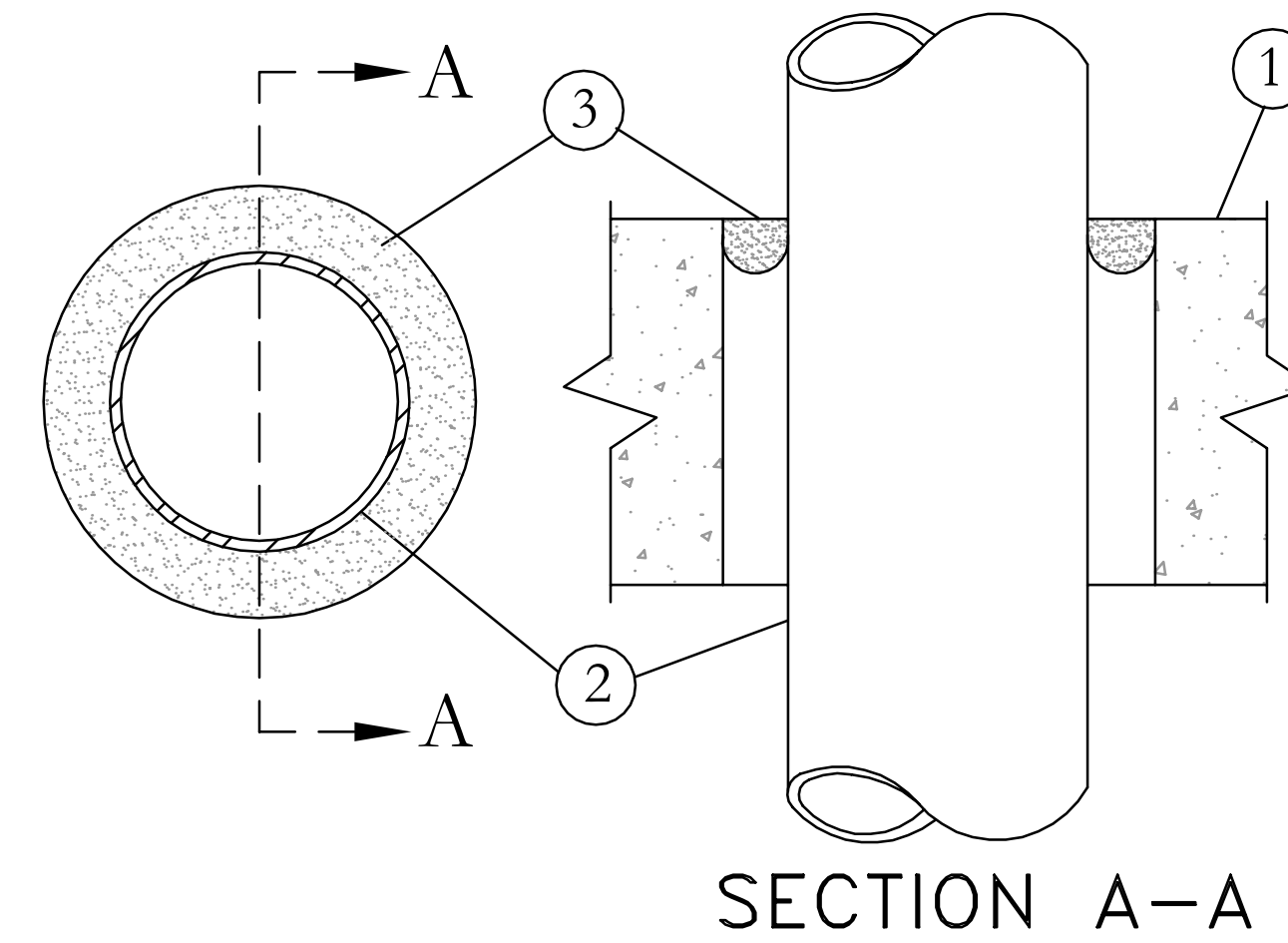
B1. Packing Material - (Not shown) - As an alternate to Item B, nom 1 in. thick polyethylene backer rod may be used. The backer rod is to be recessed within the steel sleeve a min of 1 in. from each surface of wall.

C. Fill/void or Cavity Material* - Caulk or Sealant - When mineral wool batt insulation is used, applied to fill the steel sleeve to a min depth of 1/2 in. on both sides of wall assembly. When backer rod is used, a min thickness of 1 in. of CP-25WB+ caulk is required flush with surface of wall. A nom 1/4 in. diam continuous bead of caulk or sealant shall be applied around the circumference of the steel sleeve at its egress from the gypsum wallboard layers on both sides of the wall assembly.

3M COMPANY - CP 25WB+ caulk or FB-3000 WT sealant.

*Bearing the UL Classification Marking

SYSTEM NO C-AJ-1027
F RATING-3 HR
T RATING-0 HR



PENETRATION FIRESTOP FOR 10" MAX. DIA. METAL PIPE/CONDUIT THROUGH A CONCRETE WALL
N.T.S. UL SYSTEM #202 (1 OR 2 HOUR RATING)

1. Floor or Wall Assembly - Min 4-1/2 in. thick lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of through opening is 12-1/4 in. See Concrete Blocks (CAZ) category in Fire Resistance Directory for names of manufacturers.

2. Through Penetrants - One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. Min annular space between pipe, conduit or tubing and edge of opening is 0 in. (point contact). Max annular space is dependent on pipe, conduit or tubing type and size as well as the F Rating of the system, as shown in the table below. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

- A. Steel Pipe - Nom 10 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. Conduit - Nom 6 in. diam (or smaller) rigid steel conduit.
- C. Conduit - Nom 4 in. diam (or smaller) steel electrical metallic tubing or steel conduit.
- D. Copper - Tubing Nom 3 in. diam (or smaller) Type L (or heavier) copper tubing.
- E. Copper - Pipe Nom 3 in. diam (or smaller) Regular (or heavier) copper pipe.
- F. Iron Pipe - Nom 10 in. diam (or smaller) cast or ductile iron pipe.

Pipe Conduit or Tubing Type	Max Nom Pipe Conduit or Tubing Diam In.	F Rating Hr	Max Annular Space In.
2-1/2	1/2-12	3	3/4
2-1/2	1/2-12	3	3/4
4-1/2	1/2-6	3	1-1/2
4-1/2	1/2-12	3	3/4
4-1/2	1/2-20	2	7/8

3. Fill/void or Cavity Material* - Putty - Mouldable putty material kneaded by hand and applied to fill annular space to a min depth of 1 in., flush with top surface of floor. In wall assemblies, required putty thickness to be installed symmetrically on both sides of wall.

MINNESOTA MINING & MFG CO - MPS-2+
*Bearing the UL Classification Marking

Revisions

No.	Date	Description

Key Plan

Designed By:	JS
Drawn By:	JS/DS
Checked By:	BWP
Issue Date:	06/24/15
Drawing Scale:	NO SCALE

Drawing Title:

DETAILS - ELECTRICAL

BID DOCUMENTS

Drawing No.

E-901

LAST SAVED BY: MWRDO
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 MPE JOB #: 2012-085D
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 PLOT DATE: 05/01/15 4:28:20 PM
 MATERN PROFESSIONAL ENGINEERING