HOUSTON COMMUNITY COLLEGE
WEST LOOP CAMPUS

5601 WEST LOOP SOUTH, HOUSTON, TX 77081

HVAC SYSTEM
REPLACEMENT AND RENOVATION

100% CONSTRUCTION DRAWINGS
JUNE 24, 2016

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Texas Registered Engineering Firm F-4882

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HOUSTON COMMUNITY COLLEGE
WEST LOOP CAMPUS
5601 WEST LOOP SOUTH

COVER SHEET

STATE OF TEXAS
BRIAN P. CLARK
111337
LICENSED
PROFESSIONAL ENGINEER

DATE
June 24
2016

REVISIONS :

NO.	REV.	DATE
SD	CC	12-15
95% CD	CC	4.18.16
REV-1	CC / BC	6.10.16
100% CD	CC / BC	6.24.16

SCALE:
As noted.

SHEET INFO.

T-1

GENERAL SCOPE OF WORK KEYED NOTES

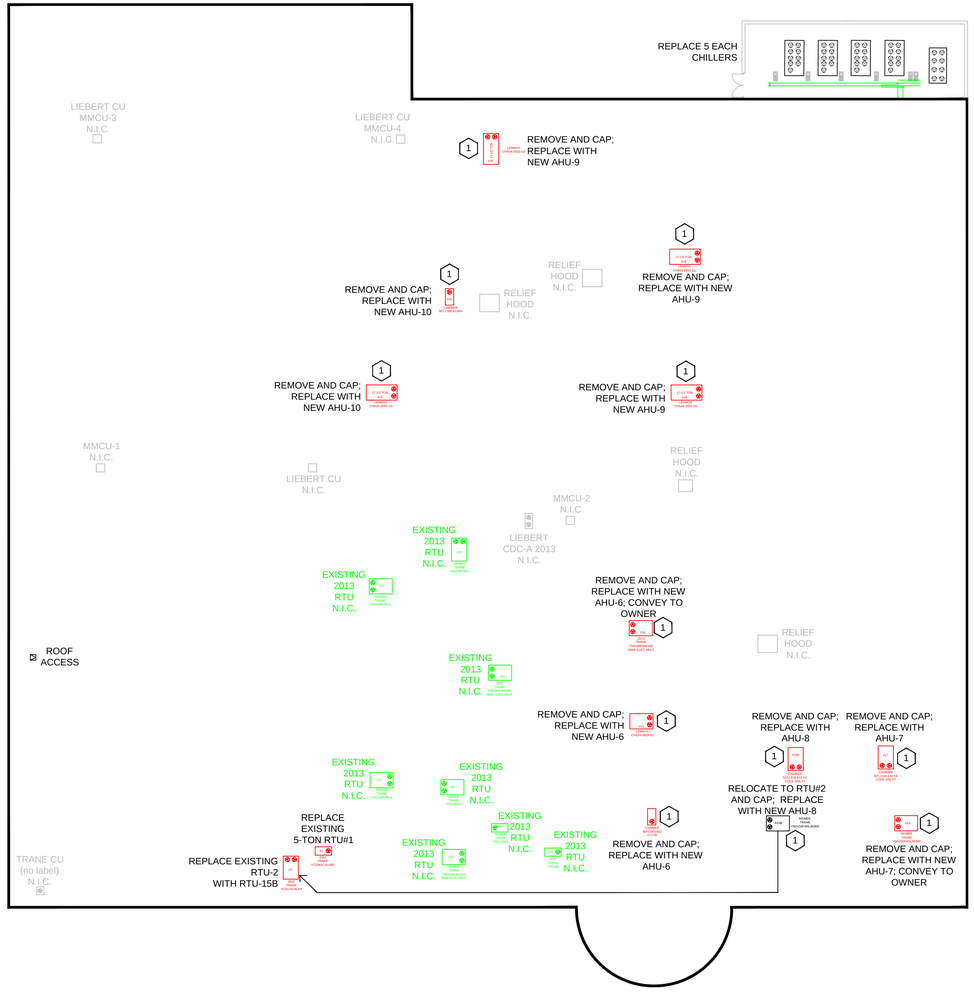
1 REMOVE EXISTING RTUs AND CAP CURBS PER DETAIL "B" ON SHEET WL-8. EXISTING DUCTWORK TO REMAIN IN PLACE AND BE RE-CONNECTED TO NEW INDOOR AIR HANDLING UNIT AS SHOWN SHEET WL-4 AND WL-5.

SCOPE OF WORK GENERAL NOTES

1. REMOVE RTUs AS SHOWN; ZONES TO BE SERVED BY NEW INDOOR AHUs WITH CHILLED WATER/HOT WATER COILS.

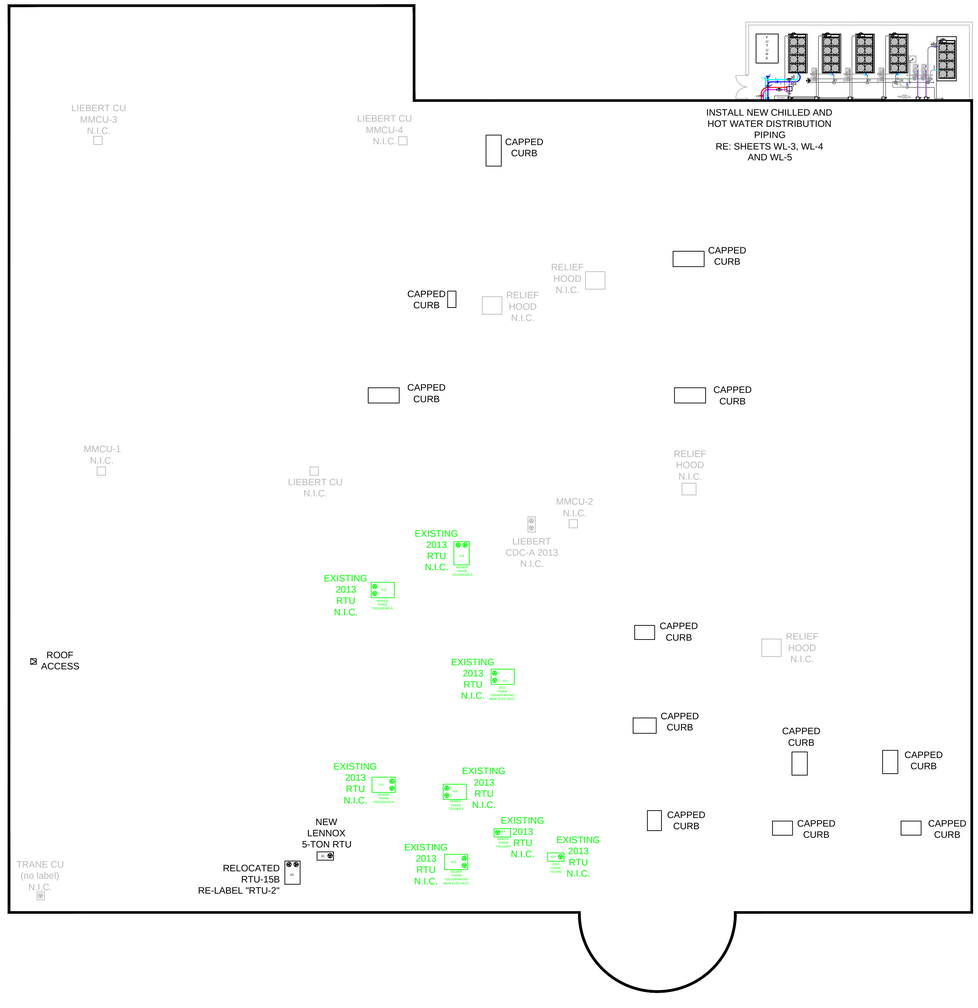
2. REPLACE CHILLERS. ADD NEW CHILLED WATER AND HOT WATER PIPING AND NEW OUTDOOR BOILER SYSTEM TO SERVE NEW AHUs.

3. FUTURE PHASE II SCOPE (NOT IN CONTRACT): REPLACE GREEN-COLORED RTUs WITH INDOOR AIR HANDLERS. ADD FUTURE CHILLER #6.



A EXISTING CONDITIONS PROJECT SCOPE OF WORK

SCALE: NONE



B END OF PROJECT CONDITIONS

SCALE: NONE

NOTE: PROJECT IS FUNDED THROUGH A PROGRAM SPONSORED BY THE AMERICAN RECOVERY AND REINVESTMENT ACT (ARRA). CONTRACTOR WILL BE REQUIRED TO CERTIFY THAT ALL EQUIPMENT SUPPLIED IN THIS PROJECT COMPLIES WITH THE REQUIREMENTS OF "BUY AMERICAN CERITIFICATION" AND WAS MANUFACTURED IN THE UNITED STATES. CONTRACTOR WILL ALSO BE RESPONSIBLE TO COMPLETE DEPARTMENT OF LABOR FORM WH347 AND WAGES PAID WILL BE FILED AS CERTIFIED PAYROLLS AND COMPLY WITH THE DAVIS BACON ACT.

TRUE NORTH

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PROJECT SCOPE OF WORK

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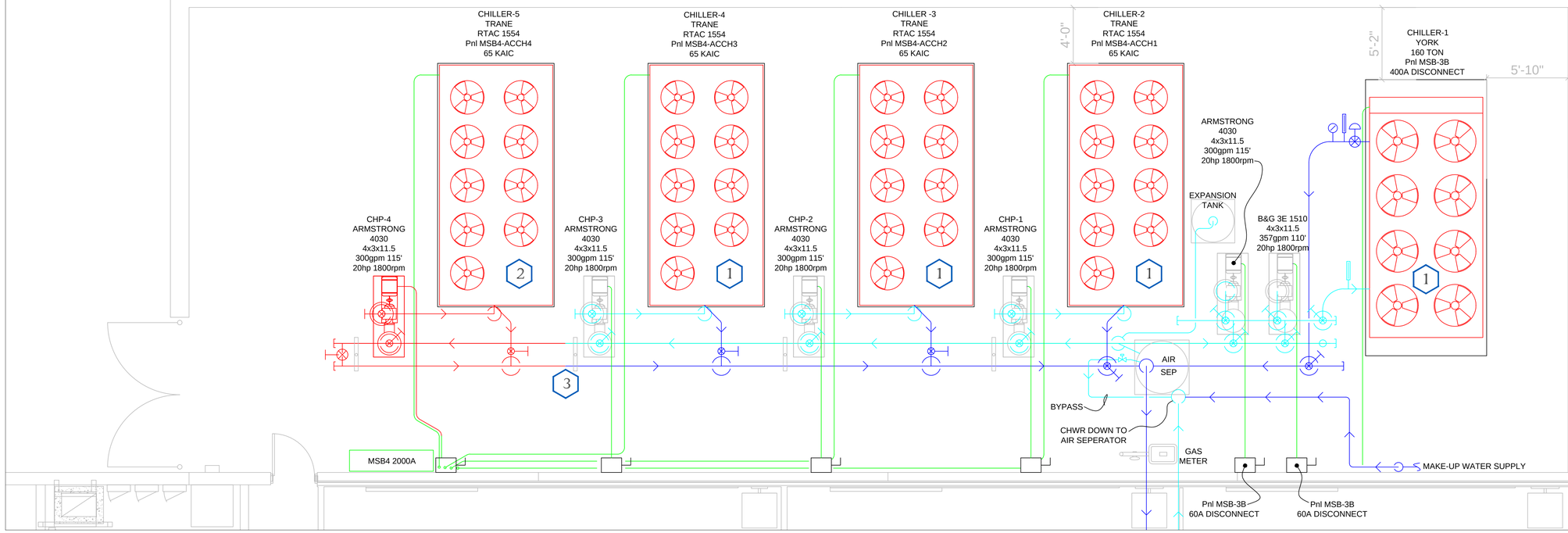
SHEET INFO.

WL-1



A CHILLER DEMOLITION PLAN

SCALE: NONE

REPLACEMENT PLAN KEYED NOTES:

1. REMOVE EXISTING CHILLER. EXISTING ELECTRICAL CIRCUIT AND CHWS/R PIPING WILL BE RE-USED WITH NEW CHILLERS.
2. REMOVE EXISTING CHILLER. EXISTING ELECTRICAL CIRCUIT WILL BE RE-USED WITH NEW CHILLER. EXISTING CHWS/R PIPING WILL NOT BE RE-USED. REFER TO RENOVATION CHILLER DRAWING FOR NEW CHWS/R PIPING.
3. ISOLATE EXISTING COMMON HEADER TO CHILLERS #1 THROUGH #4 BY RELOCATING EXISTING DOUBLE BLIND FLANGES, BYPASS PIPING AND MANUAL BYPASS VALVE TO NEW LOCATION.

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CHILLER YARD
DEMOLITION PLAN

STATE OF TEXAS
BRIAN P. CLARK
111337
LICENSED
PROFESSIONAL ENGINEER
6/24/2016

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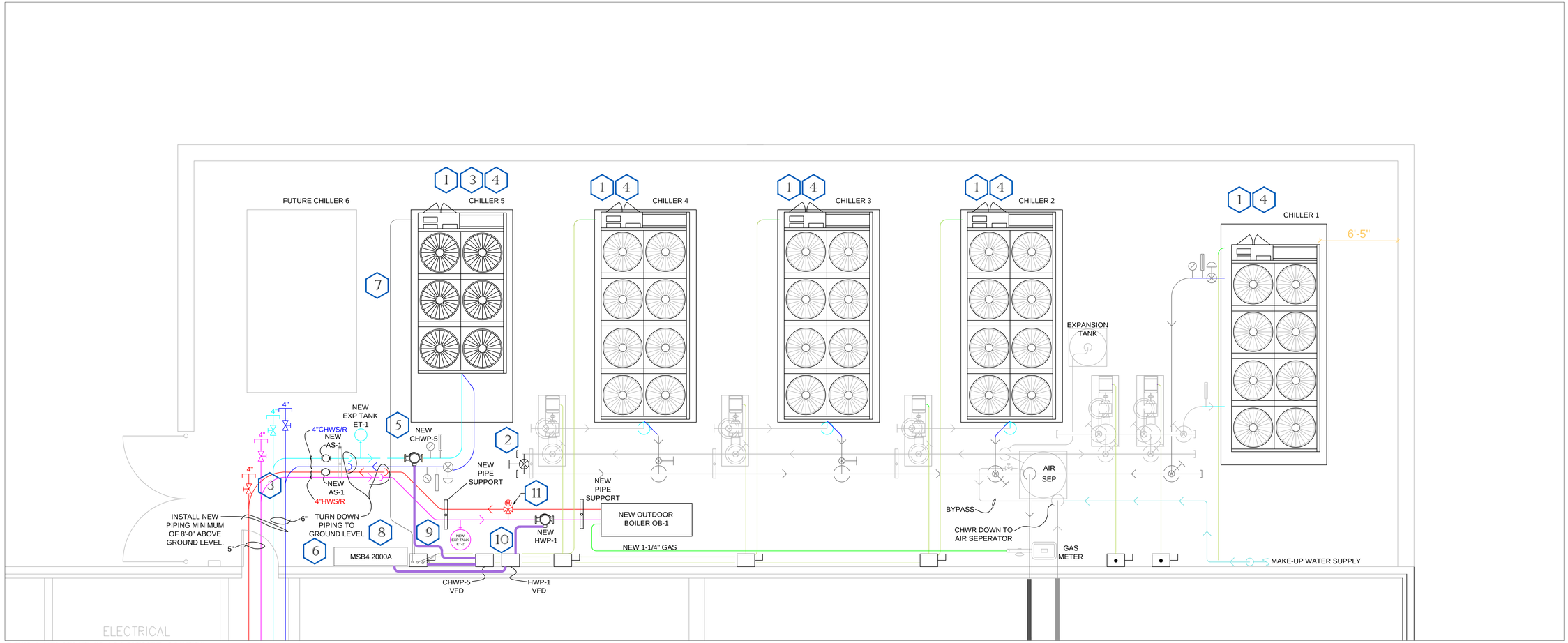
SCALE:
As noted.

SHEET INFO.

WL-2

EXISTING AND REPLACEMENT CHILLER SCHEDULES

Chiller	Make	Assignment	Model	Quantity	Nominal Tonnage	MINIMUM LOAD (%)	REFRIGERANT	GPM MAX (gallons)	CONSTANT SPEED GPM MIN (gallons)	VARIABLE FLOW GPM MIN (gallons)	# OF FANS	FAN hp (EACH)	TOTAL AIRFLOW (CFM)	EAT (°F)	EWT (°F)	LWT (°F)	CHILLER PD (FT H2O)	# COMPRESSORS	FULL LOAD EFFICIENCY	IPLV (EER)	PPLV (EER)	ELECTRICAL	MCA	MOCP (AMPS)	UNIT LENGTH (')	UNIT WIDTH (')	UNIT HEIGHT (')
Existing	Trane	Chillers 2-5	RTAC 1554	4	155	15.00	R134A	606.00	182.00	NOT AVAILABLE	9	1.5	84542.00	97.2	N/A	44.0	7.00	2 (85/70)	1.5 kW/TON (NEW)	NOT AVAILABLE	12.9 EER (NEW)	460V / 3Ph / 60Hz	313	400 (350F)	195.0	88.25	93.25
Existing	York	Chiller 1	ILLEGIBLE	1	160	N/A	N/A	357	N/A	N/A	8	N/A	N/A	97.2	N/A	44.0	N/A	2	N/A	N/A	N/A	460V / 3Ph / 60Hz	N/A	400	237" (PAD)	104" (PAD)	N/A
New	Smardt	Chillers 1-4	AC054.2BG06.F2EHA.A008AA.010	4	155	NOT AVAILABLE	HFC 134a	300	220.2	144.5	8	1.5	113578	97	56.3	44.0	7.52	2	1.119 kW/TON	20.5 EER	20.2 EER	460V / 3 Ph / 60Hz	267	374	126.0	84.0	108.0
New	Smardt	Chiller 5	AC040.1EG09.F4AKDA.A006AA.010	1.00	100	NOT AVAILABLE	HFC 134a	270	198.2	96.3	6	1.5	85184	97	52.8	44.0	16.86	1	1.027 kW/TON	20.6 EER	20.2 EER	460V / 3 Ph / 60Hz	179	306	158.1	91.7	100.5



REPLACEMENT PLAN KEYED NOTES:

1. REPLACE EXISTING CHILLER WITH NEW CHILLER PER SCHEDULE.
2. ISOLATE EXISTING COMMON HEADER TO CHILLERS #1 THROUGH 4
3. SUPPLY AND INSTALL NEW CHILLER SUPPLY AND RETURN WATER PIPING AS SHOWN WITH COMMON HEADER BETWEEN CHILLER 5 AND FUTURE CHILLER #6. COMMON HEADER TO FUTURE CHILLER WILL HAVE ISOLATION VALVES AND DOUBLE FLANGES FOR FUTURE USE. NEW CHILLED WATER SUPPLY AND RETURN PIPING WILL SERVE NEW INDOOR AIR HANDLERS AS SHOWN ON SHEET WL-4.
4. ELECTRICAL SUBCONTRACTOR TO RE-USE EXISTING ELECTRICAL CIRCUIT FOR NEW CHILLERS. REPLACE EXISTING OVERCURRENT PROTECTION DEVICES WITH NEW DEVICES AS SHOWN.
5. ELECTRICAL SUBCONTRACTOR TO SUPPLY AND INSTALL NEW CONDUIT TO NEW LOCATION OF CHILLER PUMP #5. RE-USE EXISTING CONDUCTORS.
6. PROVIDE AND INSTALL AIR VENTS AT THE TOP OF EACH PIPE RISER AT THIS LOCATION.
7. REPLACE EXISTING 450A CHILLER-1 CIRCUIT BREAKER IN PANEL MSB-4 WITH NEW 306A TRIP RATING CIRCUIT BREAKER COMPATIBLE WITH EXISTING SWITCHBOARD MSB-4. RE-LABEL CIRCUIT BREAKER AS SERVING "CH-5".
8. RE-LABEL THE CHILLER CIRCUITS FROM PANEL MSB-4 TO MATCH NEW CHILLER 2-4 FOLLOWING CHILLER REPLACEMENT.
9. REPLACE EXISTING 60A CHP-1 CIRCUIT BREAKER IN PANEL MSB-4 WITH NEW CUTLER HAMMER 15A CIRCUIT BREAKER COMPATIBLE WITH EXISTING SWITCHBOARD - EATON CUTLER HAMMER POW-R-LINE SWITCHBOARD, 480Y/277V, 3 PH, 4W. CIRCUIT TO BE ROUTED TO NEW PUMP DISCONNECT LOCATED AT EXISTING DISCONNECT LOCATION, NEW PUMP VFD AS SHOWN AND NEW CHILLED WATER #5 PUMP LOCATION. NEW CIRCUIT TO BE 4 EACH #12 THWN PLUS ONE EACH #12 COPPER GROUND IN 1" EMT CONDUIT.
10. SUPPLY AND INSTALL NEW 15A CUTLER HAMMER CIRCUIT BREAKER, COMPATIBLE WITH EXISTING SWITCHBOARD MSB-4, IN CIRCUIT BREAKER LOCATION. NEW CIRCUIT TO INCLUDE PUMP VFD, ELECTRICAL DISCONNECT AND TO BE 4 EACH #12 THWN PLUS ONE EACH #12 COPPER GROUND IN 1" EMT CONDUIT. SUPPORT CONDUIT ABOVE CONCRETE WITH UNISTRUT ANCHOR AS REQUIRED BY SPECIFICATIONS.
11. BOILER COLD WATER START BYPASS; REFER TO DETAIL #05 ON SHEET WL-9.

A CHILLER RENOVATION PLAN
SCALE: NONE

NEW CHILLER #5 CHILLED WATER PUMP SCHEDULE

TAG	Make	Assignment	Model	Quantity	NOMINAL POWER (hp)	BHP@DESIGN (hp)	ELECTRICAL	GPM MAX (gallons)	HEAD	SPEED (rpm)	EFFICIENCY @ DESIGN
CHWP-5	Armstrong	Chiller #5	4380 NON-SENSORLESS 3x3x5	1	5	3.16	460 / 3 / 60	200	45'	3105	71.99%

NEW HOT WATER PUMP SCHEDULE

TAG	Make	Assignment	Model	Quantity	NOMINAL POWER (hp)	BHP@DESIGN (hp)	ELECTRICAL	GPM MAX (gallons)	HEAD	SPEED (rpm)	EFFICIENCY @ DESIGN
HWP-1	Armstrong	Boiler OD-1	4380 NON-SENSORLESS 3x3x6	1	3	1.72	460 / 3 / 60	144	35'	1836	73.84

NEW OUTDOOR BOILER SCHEDULE

TAG	DESCRIPTION	MAKE	MODEL	QUANTITY	TYPE	PASS	HEAT INPUT (MBH)	HEAT OUTPUT (MBH)	MAX FLOW (GPM)	MIN FLOW (GPM)	DESIGN FLOW (GPM)	DELTA T (°F)	BOILER PD AT DESIGN FLOW (FEET)	RECOVERY (GPH)	WATER CONNECTIONS (")	NG PIPE CONNECTION (")
OB-1	RAYTHERM OUTDOOR BOILER	RAYPAK	OUTDOOR MODEL H9-1758	1	NATURAL GAS	SINGLE	1758	1441.5	200	90	144	20	7.3	8737	2-1/2"	1-1/4

OUTDOOR BOILER SCHEDULE NOTES:
1. CONSTRUCTED FOR OUTDOOR INSTALLATION WITH CAST-IRON HEADERS AND COPPER FINNED TUBE HEAT EXCHANGER, 82% EFFICIENCY.
2. PROVIDE 4-STAGE FIRING CONTROL.

AIR SEPARATOR SCHEDULE

TAG	Make	Model	Quantity	RECOMMENDED FLOW	WEIGHT (FLANGED)	VOLUME	PIPE SIZE	DIMENSIONS
AS-1	Spirovent	DRAIN VDN 400	2	< 240 GPM	233 POUNDS	6.6 GALLONS	4"	20.6" LONG X 31.4 TALL

EXPANSION TANK SCHEDULE

MARK	SERVICE	TANK VOL (GAL.)	ACCEPTANCE VOL (GAL.)	MAX PRESS. (PSIG)	MIN PRESS. (PSIG)	MAX TEMP. (°F)	MIN TEMP. (°F)	MAKE / MODEL:
ET-1	CHW DISTRIBUTION	11.0	8.8	50	10	90	40	ARMSTRONG AX-20V
ET-2	HW DISTRIBUTION	45.0	36.0	50	10	180	40	ARMSTRONG AX-80V

EXPANSION TANK SCHEDULE NOTES:
1. PROVIDE ASME PRE-CHARGED DIAPHRAGM EXPANSION TANK STAMPED FOR 125 PSI WORKING PRESSURE, WITH HEAVY DUTY BUTYL DIAPHRAGM.
2. PROVIDE AIR CHARGING VALVE CONNECTION ON TANK FOR FIELD ADJUSTMENT OF AIR PRESSURE.
3. SUPPLY WITH LIFTING RINGS AND BASE FOR INSTALLATION ON CONCRETE PAD.
4. ACCEPTABLE MANUFACTURERS INCLUDE ARMSTRONG, AMTROL, BELL & GOSSETT, TACO.

PUMP VFD SCHEDULE

MARK	SERVICE	MAKE	MODEL	ELECTRICAL	PUMP (hp)	CONTROL INTERFACE	CABINET
CHWP-5 VFD	CHILLED WATER PUMP CHILLER #5	ABB	ACH550 - PCR	460 / 3 / 60	5	BACNET	NEMA 3R
HWP-1 VFD	HOT WATER PUMP HWP-1	ABB	ACH550 - PCR	460 / 3 / 60	3	BACNET	NEMA 3R

PUMP VFD SCHEDULE NOTES:
1. PROVIDE ABB DRIVE AS SPECIFIED OR ENGINEER APPROVED EQUAL.
2. CONTRACTOR TO INSTALL VFD IN SPECIFIED LOCATION.
3. SUPPLY DRIVE WITH BACNET (MS/TP) PROTOCOL.

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CHILLER YARD RENOVATION PLAN

STATE OF TEXAS
BRIAN P. CLARK
111337
LICENSED PROFESSIONAL ENGINEER
4/29/16

DATE
June 24
2016

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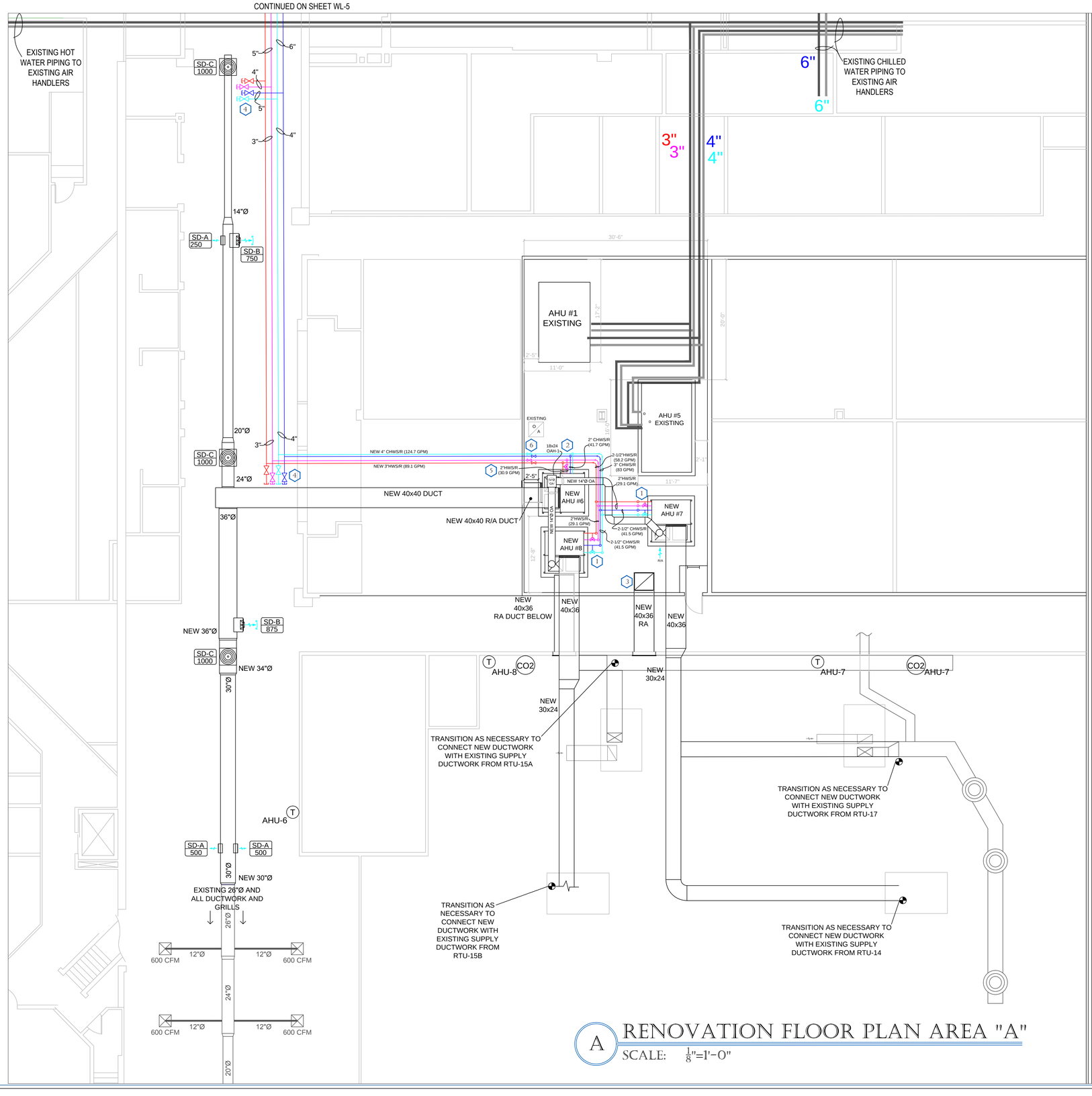
SCALE:
As noted.

SHEET INFO.

WL-3



REPLACEMENT PLAN KEYED NOTES:

1. INSTALL 3-WAY VALVES AND BYPASS PIPING FOR CHILLED WATER COIL AND HOT WATER COIL ON AHU-7 AND AHU-8. REFER TO AHU COIL CONNECTION DETAIL ON SHEET WL-9.
2. INSTALL CHILLED AND HOT WATER PIPING AIR VENTS AT HIGHEST POINT; ROUTE DRAIN TUBING TO NEAREST FLOOR DRAIN.
3. RETURN AIR SOUND BOOT, INTERNALLY LINED WITH 1" THICK ANTI-MICROBIAL THICK INSULATION. COVER DUCT OPENING IN MEZZANINE WITH WIRE MESH.
4. TAKE-OFF TO SERVE FUTURE INDOOR AIR HANDLING UNITS. PROVIDE BLIND FLANGES AND BUTTERFLY ISOLATION VALVES.
5. INSTALL 3-WAY VALVE AND BYPASS PIPING AT AHU-6 FOR HOT WATER COIL ONLY.
6. INSTALL SHUT-OFF VALVES FOR CHILLED WATER AND HOT WATER PIPING AT ENTRANCE TO MEZZANINE.

A RENOVATION FLOOR PLAN AREA "A"

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

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5601 WEST LOOP SOUTH

2ND FLOOR AREA A
FLOOR PLAN

STATE OF TEXAS
BRIAN P. CLARK
11337
LICENSED PROFESSIONAL ENGINEER
6/24/2016

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SCALE:
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SHEET INFO.

WL-4

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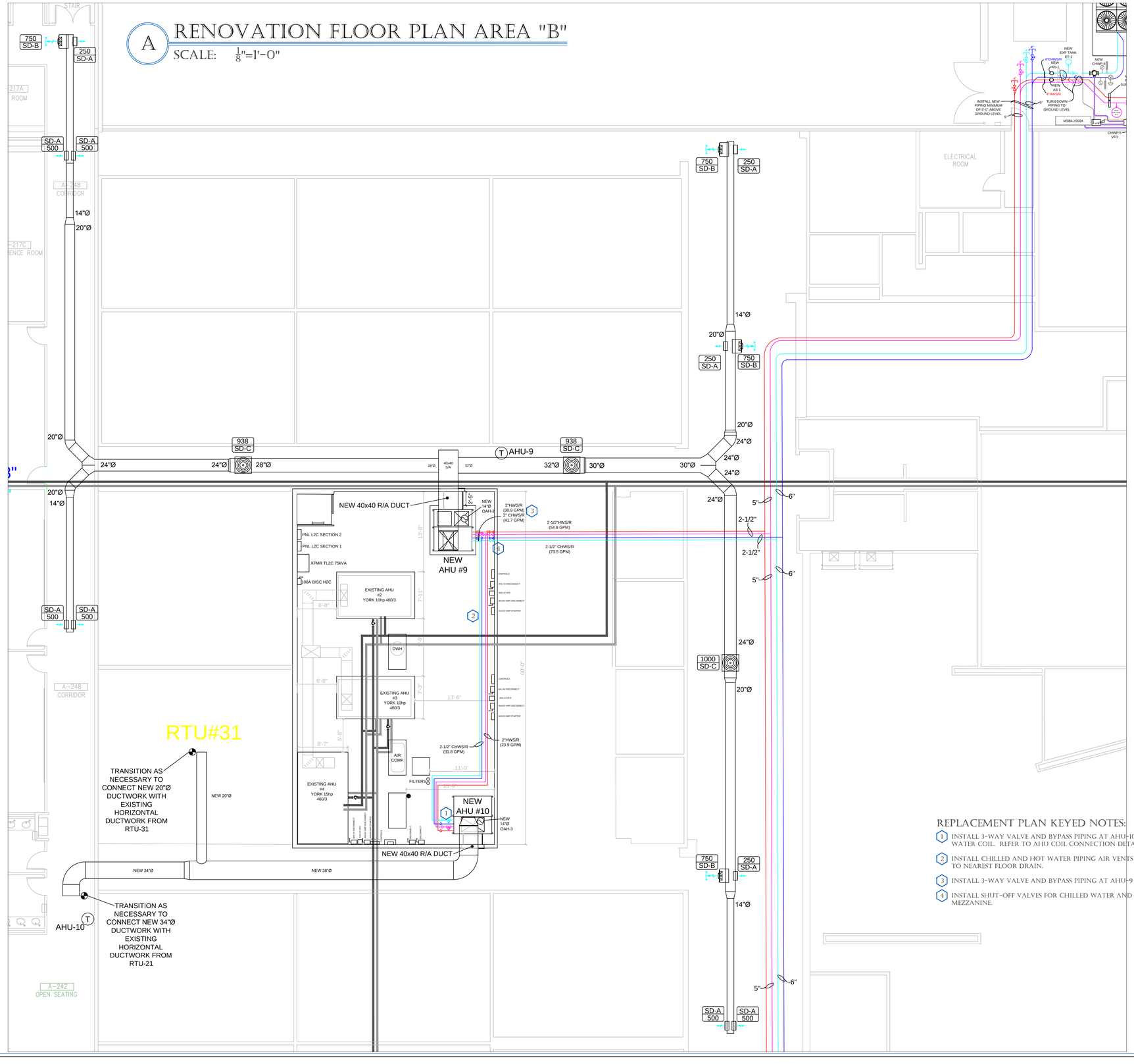
A RENOVATION FLOOR PLAN AREA "B"

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



REPLACEMENT PLAN KEYED NOTES:

1. INSTALL 3-WAY VALVE AND BYPASS PIPING AT AHU-10 FOR CHILLED WATER COIL AND HOT WATER COIL. REFER TO AHU COIL CONNECTION DETAIL ON SHEET WL-9.
2. INSTALL CHILLED AND HOT WATER PIPING AIR VENTS AT HIGHEST POINT; ROUTE DRAIN TUBING TO NEAREST FLOOR DRAIN.
3. INSTALL 3-WAY VALVE AND BYPASS PIPING AT AHU-9 FOR HOT WATER COIL ONLY.
4. INSTALL SHUT-OFF VALVES FOR CHILLED WATER AND HOT WATER PIPING AT ENTRANCE TO MEZZANINE.

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2ND FLOOR AREA B
FLOOR PLAN

STATE OF TEXAS
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SCALE:
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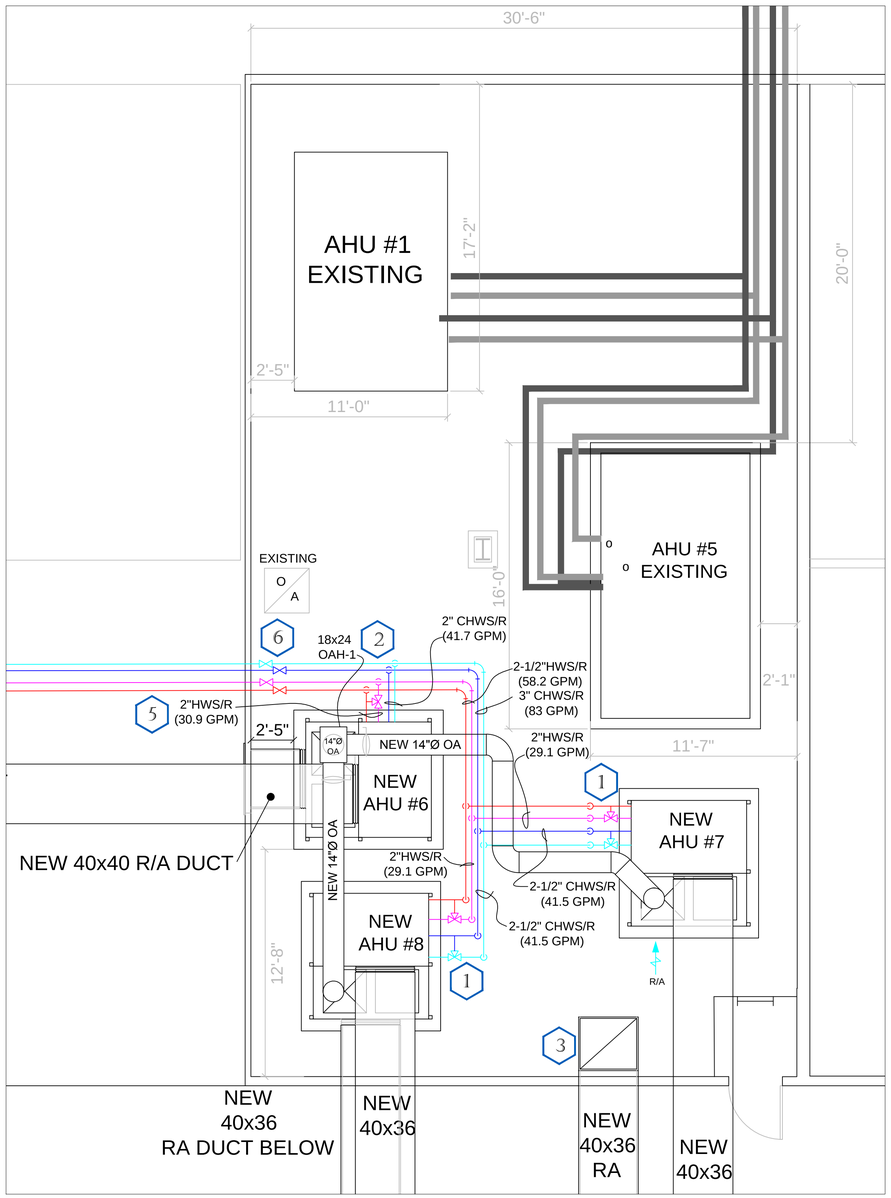
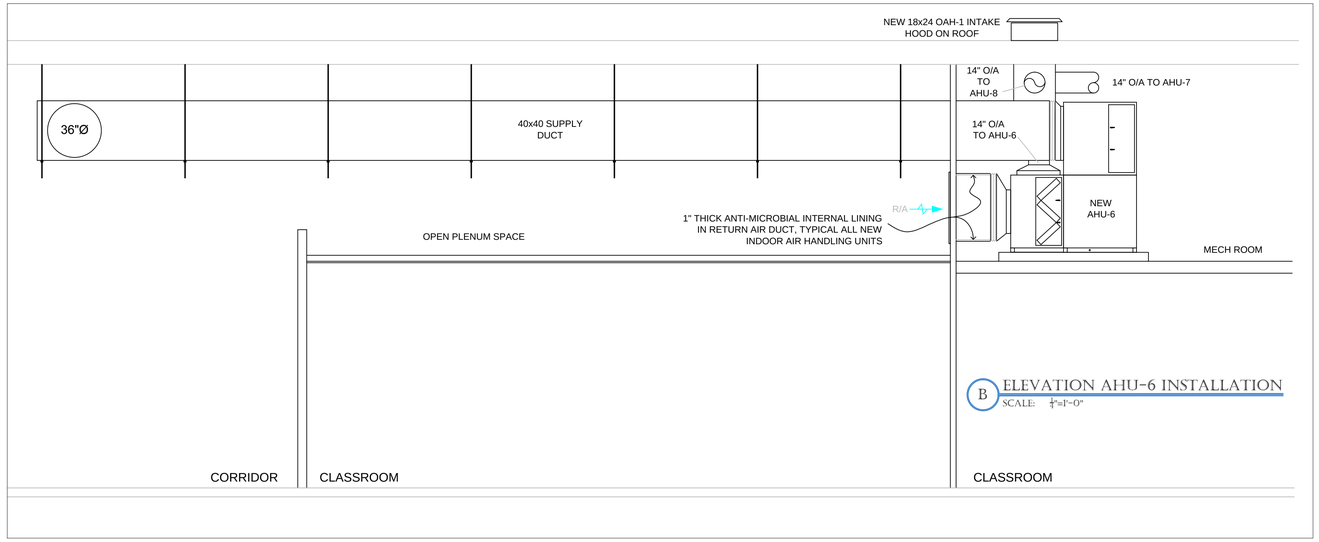
SHEET INFO.

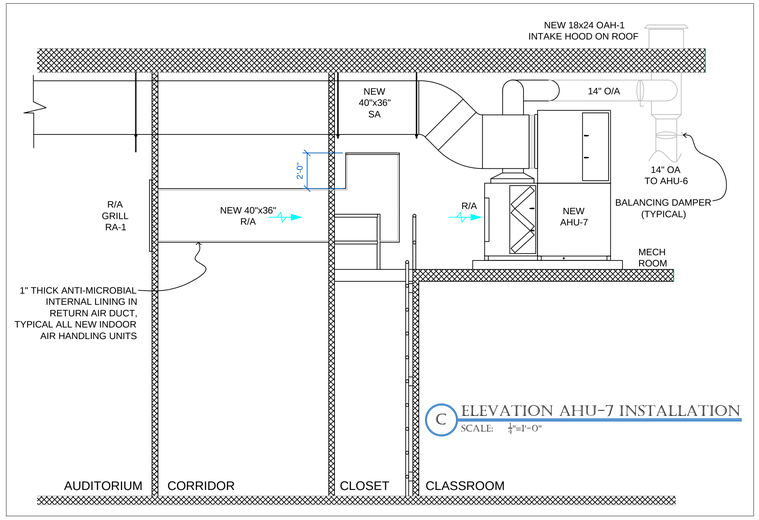
WL-5



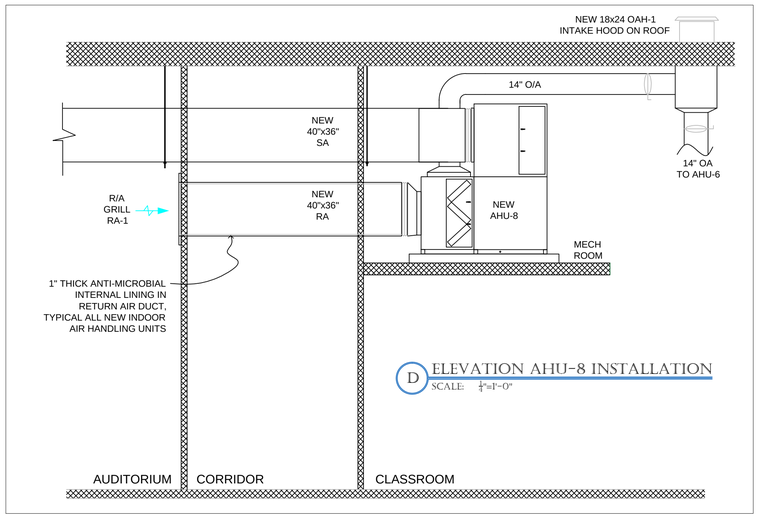
A RENOVATION FLOOR PLAN NEW AHU #6, #7 AND #8 MEZZANINE
SCALE: 1/4"=1'-0"



B ELEVATION AHU-6 INSTALLATION
SCALE: 1/4"=1'-0"



C ELEVATION AHU-7 INSTALLATION
SCALE: 1/4"=1'-0"



D ELEVATION AHU-8 INSTALLATION
SCALE: 1/4"=1'-0"

OUTSIDE AIR INTAKE HOOD SCHEDULE

MARK	MAKE / MODEL	VOLUME (CFM)	SP (IN.WC)	THROAT DIMENSIONS	WEIGHT (LBS.)	OPTIONS
OAH-1	COOK 18x24GI	2788	0.1	18" x 24"	68	1, 2
OAH-2	COOK 16 PR	988	0.056	16" DIAMETER	60	1, 2
OAH-3	COOK 16 PR	800	0.037	16" DIAMETER	60	1, 2

REMARKS / NOTES:
A) ROOF CURB AND ROOF PENETRATIONS SHALL BE COMPATIBLE WITH ROOF SYSTEM AND ROOF SLOPE. SHIM UNDER CURB AS REQUIRED TO MAKE EQUIPMENT LEVEL.
B) HOODS SHALL BE ALL-ALUMINUM CONSTRUCTION.
C) REFER TO MECHANICAL DETAIL SHEET FOR APPLICABLE DETAILS.

OPTION / ACCESSORIES:
1) MINIMUM 12" HIGH FACTORY INSULATED ROOF CURB TO MATCH ROOF PITCH
2) ALUMINUM BIRDSCREEN

ACCEPTABLE MANUFACTURERS:
A) COOK, GREENHECK

REPLACEMENT PLAN KEYED NOTES:

1. INSTALL 3-WAY VALVES AND BYPASS PIPING FOR CHILLED WATER COIL AND HOT WATER COIL ON AHU-7 AND AHU-8. REFER TO AHU COIL CONNECTION DETAIL ON SHEET WL-9.
2. INSTALL CHILLED AND HOT WATER PIPING AIR VENTS AT HIGHEST POINT; ROUTE DRAIN TUBING TO NEAREST FLOOR DRAIN.
3. RETURN AIR SOUND BOOT, INTERNALLY LINED WITH 1" THICK ANTI-MICROBIAL THICK INSULATION. COVER DUCT OPENING IN MEZZANINE WITH WIRE MESH.
4. NOTE NOT USED THIS SHEET.
5. INSTALL 3-WAY VALVE AND BYPASS PIPING AT AHU-6 FOR HOT WATER COIL ONLY.
6. INSTALL SHUT-OFF VALVES FOR CHILLED WATER AND HOT WATER PIPING AT ENTRANCE TO MEZZANINE.

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AHU 6, 7 AND 8
MEZZANINE DETAIL PLAN
AND ELEVATIONS

STATE OF TEXAS
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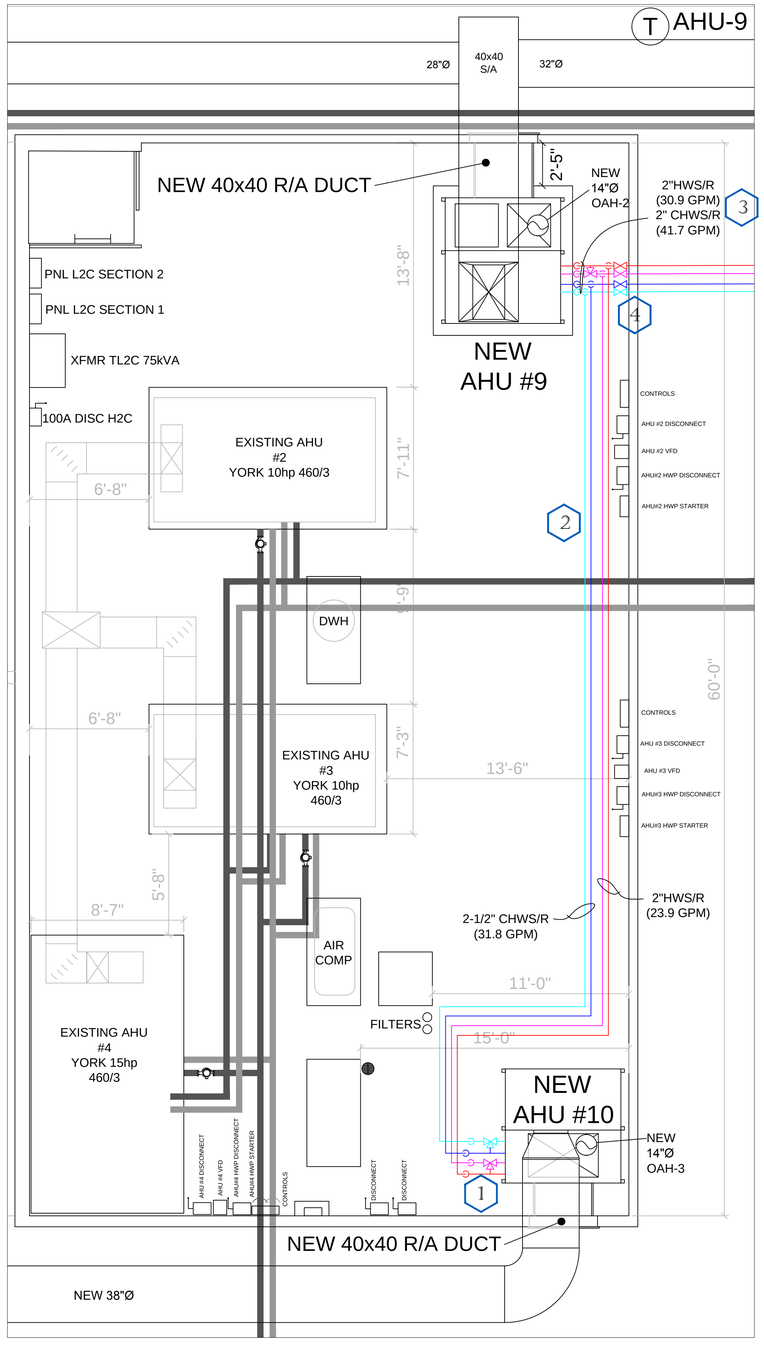
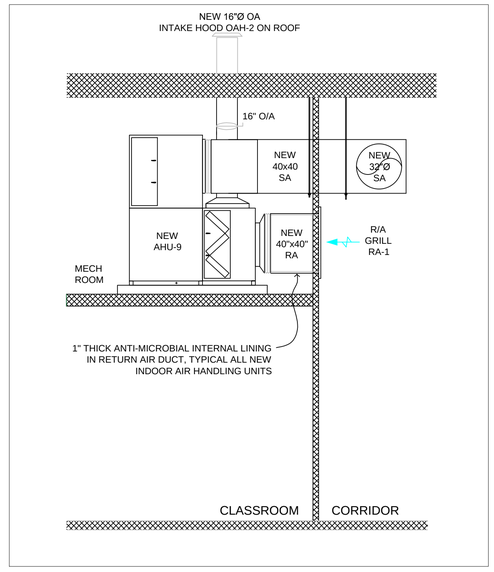
WL-6



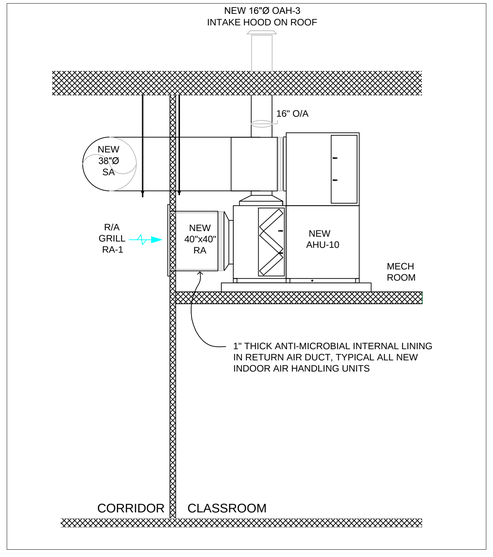
A RENOVATION FLOOR PLAN NEW AHU #9 AND #10 MEZZANINE
SCALE: 1/4"=1'-0"

REPLACEMENT PLAN KEYED NOTES:

1. INSTALL 3-WAY VALVE AND BYPASS PIPING AT AHU-10 FOR CHILLED WATER COIL AND HOT WATER COIL. REFER TO AHU COIL CONNECTION DETAIL ON SHEET WL-9.
2. INSTALL CHILLED AND HOT WATER PIPING AIR VENTS AT HIGHEST POINT; ROUTE DRAIN TUBING TO NEAREST FLOOR DRAIN.
3. INSTALL 3-WAY VALVE AND BYPASS PIPING AT AHU-9 FOR HOT WATER COIL ONLY.
4. INSTALL SHUT-OFF VALVES FOR CHILLED WATER AND HOT WATER PIPING AT ENTRANCE TO MEZZANINE.



B ELEVATION AHU #9 INSTALLATION
SCALE: 1/4"=1'-0"



C ELEVATION AHU #10 INSTALLATION
SCALE: 1/4"=1'-0"

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ESA
ENERGY SYSTEMS ASSOCIATES, INC.

HOUSTON COMMUNITY COLLEGE
WEST LOOP CAMPUS
5601 WEST LOOP SOUTH

AHU 9 AND 10
MEZZANINE DETAIL PLAN
AND ELEVATIONS

STATE OF TEXAS
BRIAN P. CLARK
11337
LICENSED
PROFESSIONAL ENGINEER
6/24/2016

DATE
June 24
2016

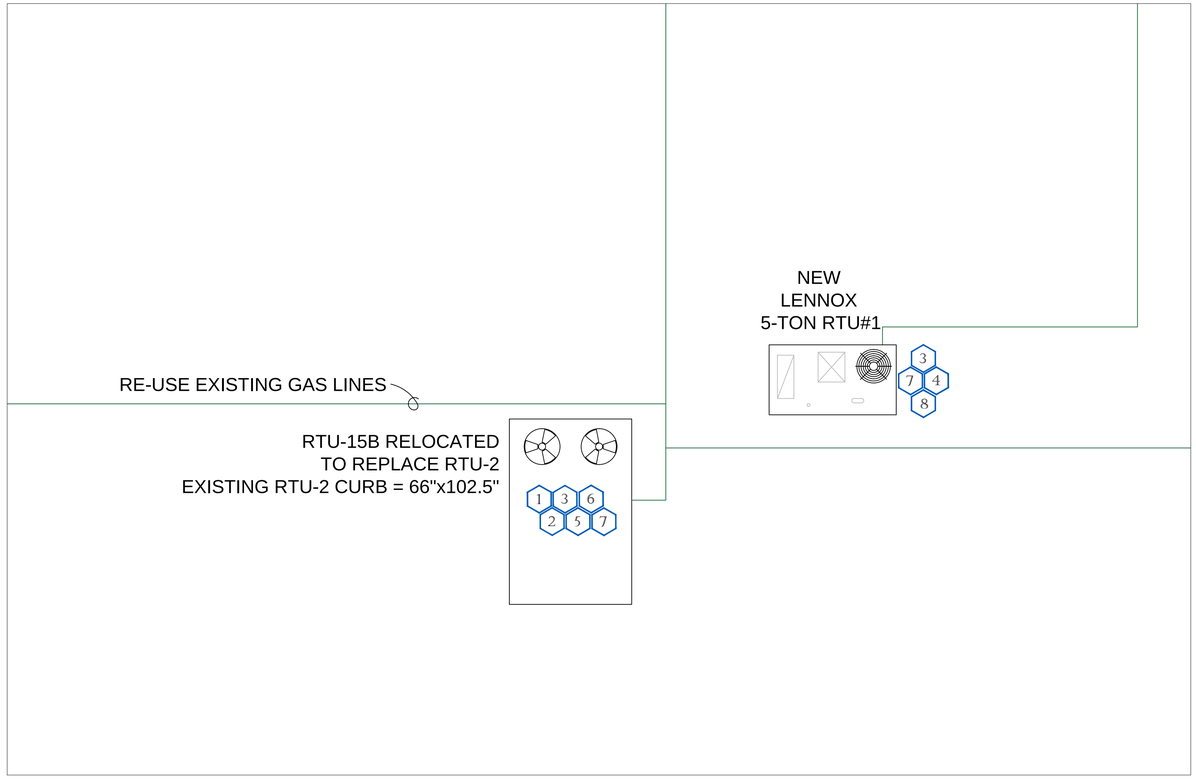
REVISIONS :

NO.	REV.	DATE
SD	CC	12-15
95% CD	CC	4.18.16
REV-1	CC / BC	6.10.16
100% CD	CC / BC	6.24.16	

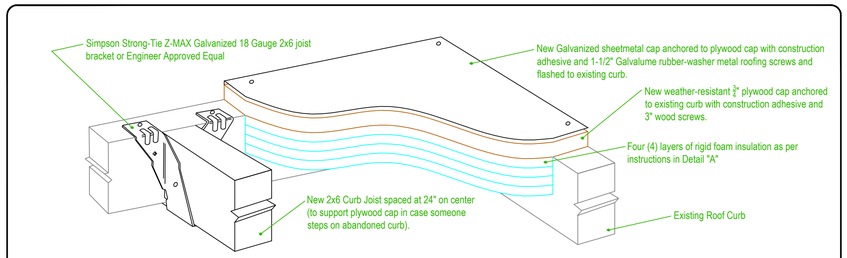
SCALE:
As noted.

SHEET INFO.

WL-7



A RENOVATION FLOOR PLAN
SCALE: 1/4"=1'-0"



B ABANDONED ROOFTOP CURB COVER DETAIL
NO SCALE

RTU #1 AND #2 PLAN KEYED NOTES:

1. RELOCATE EXISTING RTU-15B TO BOOKSTORE RTU#2 LOCATION. CAP EXISTING RTU#15B CURB AS PER DETAIL "B" THIS PAGE.
2. TRANE CATALOG STATES THAT RTU-15B AND RTU-2 SHOULD HAVE THE SAME CURB REQUIREMENTS AND CAN BE RELOCATED WITHOUT THE NEED FOR CURB TRANSITION. IF FIELD CONDITIONS VARY FROM CATALOG DATA, PROVIDE AND INSTALL ADAPTER CURB TO TRANSITION FROM EXISTING TRANE YCD121 TO YSD150 UNIT.
3. PROVIDE AND INSTALL NEW FLEXIBLE GAS CONNECTION TO CONNECT UNIT TO EXISTING NATURAL GAS PIPING.
4. RE-USE EXISTING ELECTRICAL CIRCUIT AND CONDENSATE DRAIN FOR NEW RTU; ADJUST FOR CHANGE IN HEIGHT DUE TO NEW ADAPTER CURB AS REQUIRED.
5. RE-USE EXISTING CONDENSATE DRAIN FOR RELOCATED RTU; ADJUST FOR CHANGE IN HEIGHT DUE TO NEW ADAPTER CURB AS REQUIRED.
6. RENOVATED RTU#2 CIRCUIT MUST CONSIST OF 40A MOCP; MINIMUM CONDUCTOR SIZE #8. REPLACE EXISTING MOCP AND/OR CIRCUIT CONDUCTORS AS REQUIRED FOR NEW SERVICE OF RTU#15B AT RTU #2 LOCATION.
7. SUPPLY AND INSTALL DUCT MATERIAL AS REQUIRED TO TRANSITION EXISTING SUPPLY AND RETURN DUCTWORK TO NEW UNIT.
8. PROVIDE AND INSTALL NEW RTU#1 PER SCHEDULE THIS DRAWING.

NEW RTU #1 SCHEDULE

UNIT INFORMATION		Fan Data				Cooling Data				Heating Data			Electrical					NOTES
TAG NEW	MODEL # NEW	CFM	Outside Air (CFM)	ESP (" w.g.)	INDOOR MOTOR HP	Total (MBH)	Sensible (MBH)	OAT (F)	EAT (db/wb)	NG Input Max (MBH)	Heat Stages	Htg Efficiency (%)	VOLTAGE	PHASE	MCA	MOCP	SEER/EER	
A	LGH060H4ES_G	2000	300	0.6	1	61.45	46.09	100	80 / 67	65	1	80%	460	3	15	20	12.7 / 17	REPLACING 2002 TRANE YCD061C4LABF

NOTES:
1. MODEL NUMBERS AND PERFORMANCE DATA FOR NEW EQUIPMENT SUPPLIED AS LENNOX. CONTRACTOR MAY ALSO SUBMIT OTHER MANUFACTURER'S FOR CONSIDERATION AS ENGINEER APPROVED EQUAL.
2. EQUIPMENT TO BE INSTALLED IN AND AROUND HOUSTON, TEXAS. ELEVATION IS APPROXIMATELY 40 FEET ABOVE SEA LEVEL.
3. ROOFTOP PACKAGED EQUIPMENT WILL INCLUDE THE FOLLOWING APPURTENANCES:
   A. NEW MANUFACTURER CURB OR ADAPTER CURB AS REQUIRED BY NOTES ON FACILITY DRAWINGS.
   B. UNITS WILL HAVE INTEGRAL CIRCUIT BREAKER FOR OVERCURRENT AND DISCONNECT PROTECTION.
   C. STAINLESS STEEL HEAT EXCHANGER.
   D. MOTORIZED AIR DAMPERS, ECONOMIZER ON UNITS 5 TONS OR LARGER.
   E. MULTI-STAGE AIR VOLUME.
   F. HINGED ACCESS DOORS.
   G. ENVIRON COIL SYSTEM.
   H. 2" MERV 8 FILTERS.
   I. HAIL GUARD AND DRAIN PAN OVERFLOW SWITCH WIRED TO DE-ENERGIZE UNIT.
   J. INTEGRAL CONVENIENCE OUTLET
   K. FIRST UNIT INSTALLED IN PROJECT WILL BE FACTORY REPRESENTATIVE STARTUP.
4. CONTRACTOR INSTALLING EQUIPMENT TO SUPPLY NEW REPLACEMENT CIRCUIT BREAKERS AS REQUIRED FOR CHANGES IN MOCP PROTECTION LISTED BEWTEEN NEW AND EXISTING EQUIPMENT.

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RTU #1 AND #2 DETAIL

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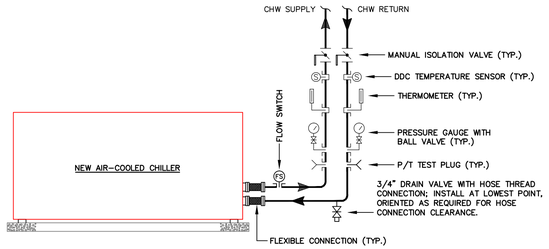
SHEET INFO.

WL-8

NEW AIR DEVICE SCHEDULE

AIR DEVICE SCHEDULE

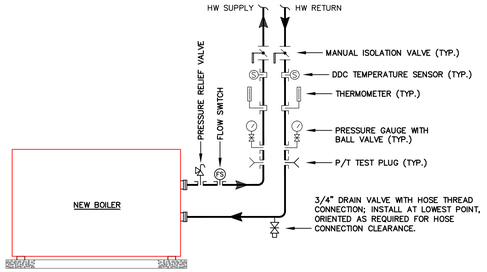
TAG	SYMBOL	DESCRIPTION	MAKE	MODEL	REMARKS	MOUNTING INSTRUCTIONS	MOUNTING GRAPHIC
SD-A		SPIRAL DUCT LINEAR GRILL	PRICE	18x12-620DAL-SDF-L-A-B17	ALUMINUM DOUBLE DEFLECTION GRILL, BLACK, WITH ALUMINUM DAMPER AND SPIRAL DUCT FRAME THAT VARIES IN CURVATURE TO DUCT SIZE	MOUNT TO SPIRAL DUCT AT 4PM AND 8PM POSITION RELATIVE TO NOON AT TOP OF DUCT	
SD-B		SWIVEL JET NOZZLE	PRICE	JNA / 21 / SV / AL	SWIVEL JET ADJUSTABLE NOZZLE COMPLETE WITH SERVO TO ALLOW FOR ADJUSTMENT WITH ENERGY MANAGEMENT SYSTEM	MOUNTED ON 28"x28" TAKEOFF FROM SPIRAL DUCT	
SD-C		ROUND CONE	PRICE	14 / ARCD / B17	ALUMINUM ROUND CONE DIFFUSER, ADJUSTABLE FLOW PATTERN WITH CONE ADJUSTMENT, BLACK FINISH; CAN BE ADJUSTED BETWEEN HORIZONTAL AND VERTICAL AIR PATTERN	MOUNT ON VERTICAL TAKEOFF OFF SPIRAL DUCT; INCLUDE BALANCING DAMPER	
RA-1	N/A	LOUVERED RETURN	PRICE	48x48 / 610Z / F / L / A / B17	LOUVERED RETURN GRILL, 45° DEFLECTION, BLACK	SURFACE MOUNT AT RETURN AIR OPENING	N/A



NOTES:

1) THIS SCHEMATIC DRAWING IS NOT TO SCALE AND DOES NOT SHOW ALL PIPE FITTINGS AND LENGTHS REQUIRED. REFER TO DEMOLITION AND RENOVATION PLANS FOR APPROXIMATE PIPE ROUTING.
2) REFER TO DRAWINGS, SPECIFICATIONS, AND MANUFACTURER INSTRUCTIONS FOR ADDITIONAL CONNECTION AND INSTALLATION REQUIREMENTS.

01 AIR-COOLED CHILLER PIPING CONNECTION DETAIL
Scale: NONE



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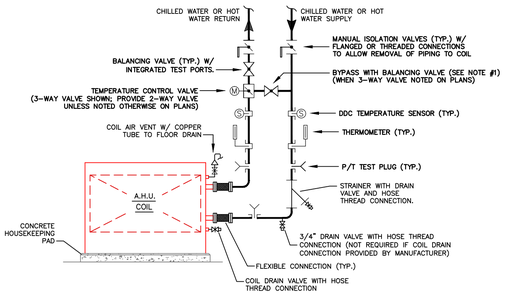
2) REFER TO DRAWINGS, SPECIFICATIONS, AND MANUFACTURER INSTRUCTIONS FOR ADDITIONAL CONNECTION AND INSTALLATION REQUIREMENTS.

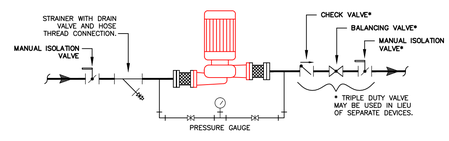
02 BOILER PIPING CONNECTION DETAIL
Scale: NONE



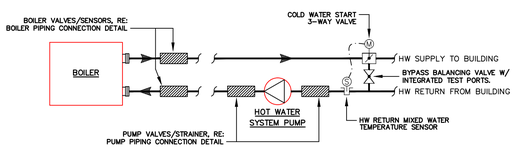
NOTES:

1. TEST & BALANCE CONTRACTOR SHALL ADJUST ALL COIL BYPASS BALANCING VALVES SO THAT THE TOTAL SYSTEM FLOW MATCHES THE MINIMUM FLOW REQUIREMENTS OF THE CHILLER AND BOILER WHEN ALL CONTROL VALVES ARE CLOSED TO THE COILS. THE PRESSURE DROP ACROSS EACH BYPASS SHALL BE GREATER THAN OR EQUAL TO THE PRESSURE DROP ACROSS THE BYPASSED COIL.
2. THIS SCHEMATIC DRAWING IS NOT TO SCALE AND DOES NOT SHOW ALL PIPE FITTINGS AND LENGTHS REQUIRED. REFER TO DEMOLITION AND RENOVATION PLANS FOR APPROXIMATE PIPE ROUTING.
3. REFER TO DRAWINGS, SPECIFICATIONS, AND MANUFACTURER INSTRUCTIONS FOR ADDITIONAL CONNECTION AND INSTALLATION REQUIREMENTS.

03 AHU COIL CONNECTION DETAIL
Scale: NONE



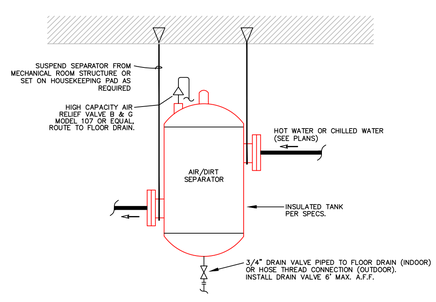
04 VERTICAL INLINE PUMP PIPING CONNECTION DETAIL
Scale: NONE



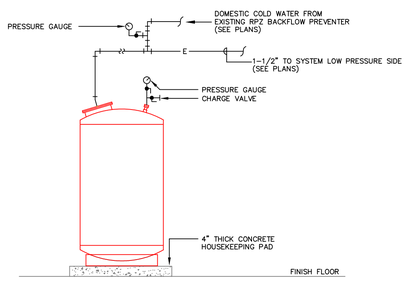
NOTES:

1. THE COLD WATER START 3-WAY VALVE WILL BE CONTROLLED TO OPEN THE BYPASS WHENEVER THE HW RETURN MIXED WATER TEMPERATURE IS BELOW 105°F (OR MANUFACTURER'S RECOMMENDED MINIMUM BOILER ENTERING WATER TEMPERATURE, IF DIFFERENT). THE 3-WAY VALVE SHALL BE MODULATED TO MAINTAIN THE MIXED WATER TEMPERATURE AT 105°F UNTIL THE RETURN WATER REACHES ACCEPTABLE OPERATING TEMPERATURE. ONCE THE MIXED WATER TEMPERATURE RISES ABOVE 105°F, THE 3-WAY VALVE SHALL FULLY CLOSE THE BYPASS AND ALLOW FULL FLOW TO THE BUILDING.
2. THE BOILER ENTERING WATER TEMPERATURE SENSOR MAY BE USED IN LIEU OF A SEPARATE MIXED WATER TEMPERATURE SENSOR AS SHOWN.
3. THE BYPASS BALANCING VALVE SHALL BE ADJUSTED TO MATCH THE FULL SYSTEM PRESSURE DROP IN ORDER TO MAINTAIN CONSTANT FLOW THROUGH THE BOILER REGARDLESS OF THE COLD WATER START 3-WAY VALVE POSITION.

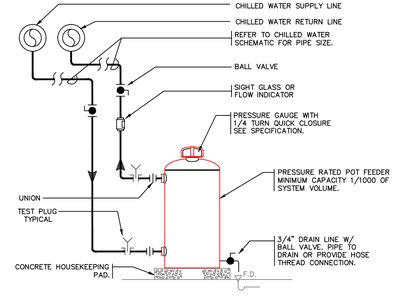
05 BOILER COLD WATER START BYPASS DETAIL
Scale: NONE



06 AIR/DIRT SEPARATOR DETAIL
Scale: NONE



07 EXPANSION TANK/MAKE UP WATER LINE DETAIL
Scale: NONE



08 CHEMICAL POT FEEDER DETAIL
Scale: NONE

NEW HYDRONIC AIR HANDLER SCHEDULE

REPLACE	UNIT DATA						COOLING DATA											HEATING DATA								ELECTRICAL		
EXISTING RTUs	NEW AHU	Model	TOTAL CFM	OA CFM	ORIENTATION	MOTOR HP	Nominal tons	Total MBH	Sensible MBH	GPM	Coil PD (' wg)	EAT (°F) DB	EAT (°F) WB	LAT (°F) DB	LAT (°F) WB	FLUID TEMPERATURE RISE (°F)	COIL FACE VELOCITY (fpm)	Coil	Total MBH	GPM	Coil PD (' wg)	EAT (°F) DB	LAT (°F) DB	FLUID TEMPERATURE DROP (°F)	COIL FACE VELOCITY (fpm)	Coil	V/Ph	MCA	MOCP
11/18																												
12	6	39LF-25	9875	987.5	RIGHT	7.5	20.92	251.06	227.03	41.7	3.1	75.5	62.3	54	53.27	12	482.4	28NA-6/11/FL	303.16	30.9	4.1	61.9	89.58	20	482.4	28NB-1/14/HF	460 / 3	11.8	20
16																												
14																												
17	7	39LF-25	9000	900	RIGHT	7.5	20.78	249.46	221.26	41.5	3.1	76.7	62.9	53.66	53.08	12	439.6	28NA-6/11/FL	286.07	29.1	3.7	61.9	90.56	20	439.6	28NB-1/14/HF	460 / 3	11.8	20
15A																												
15B	8	39LF-25	9000	900	LEFT	7.5	20.78	249.46	221.26	41.5	3.1	76.7	62.9	53.66	53.08	12	439.6	28NA-6/11/FL	286.07	29.1	3.7	61.9	90.56	20	439.6	28NB-1/14/HF	460 / 3	11.8	20
18																												
19	9	39LF-25	9875	987.5	RIGHT	7.5	20.92	251.06	227.03	41.7	3.1	75.5	62.3	54	53.27	12	482.4	28NA-6/11/FL	303.16	30.9	4.1	61.9	89.58	20	482.4	28NB-1/14/HF	460 / 3	11.8	20
20																												
21																												
31	10	39LF-21	8000	800	RIGHT	7.5	15.95	191.5	176.11	31.8	2.5	76	62.5	55.4	54.07	12	468.9	28NA-6/8/FL	234.87	23.9	2.9	61.9	88.37	20	468.9	28NB-1/11/HF	460 / 3	11.8	20

NEW INDOOR AIR HANDLER SCHEDULE NOTES:
1. UNITS TO BE 1" 1.5 POUND TUF-SKINii INSULATED DOUBLE WALL CONSTRUCTION
2. COMBINATION FILTER MIXING BOX WITH DUAL OPPOSED BLADE DAMPERS AND 2" PLEATED MERV 8 FILTERS.
3. PREMIUM EFFICIENCY ODP MOTOR.
4. PROVIDE NEOPRENE VIBRATION ISOLATION PADS FOR EACH AHU. FAN SHALL BE INTERNALLY ISOLATED ON SPRING MOUNTS.
5. PROVIDE AND INSTALL VFD FOR EACH NEW INDOOR AIR HANDLING UNIT.

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SCHEDULES AND DETAILS

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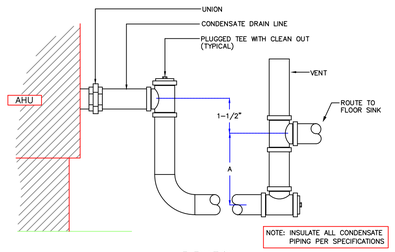
SCALE:
As noted.

SHEET INFO.

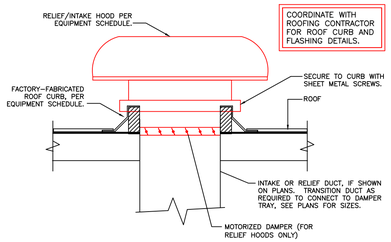
WL-9



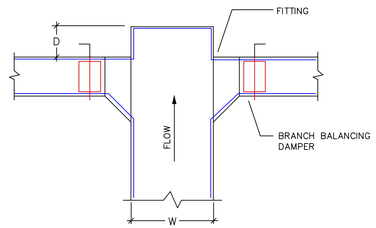
ELEVATION

"A"= MINIMUM = TOTAL POSITIVE STATIC PRESSURE (BLOW THRU)
"A"= MINIMUM = TOTAL NEGATIVE STATIC PRESSURE (DRAW THRU)

01 CONDENSATE DRAIN DETAIL
Scale: NONE

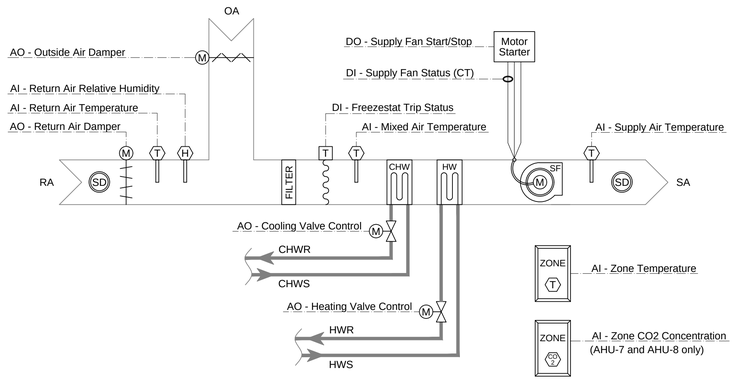


02 INTAKE/RELIEF HOOD DETAIL
Scale: NONE

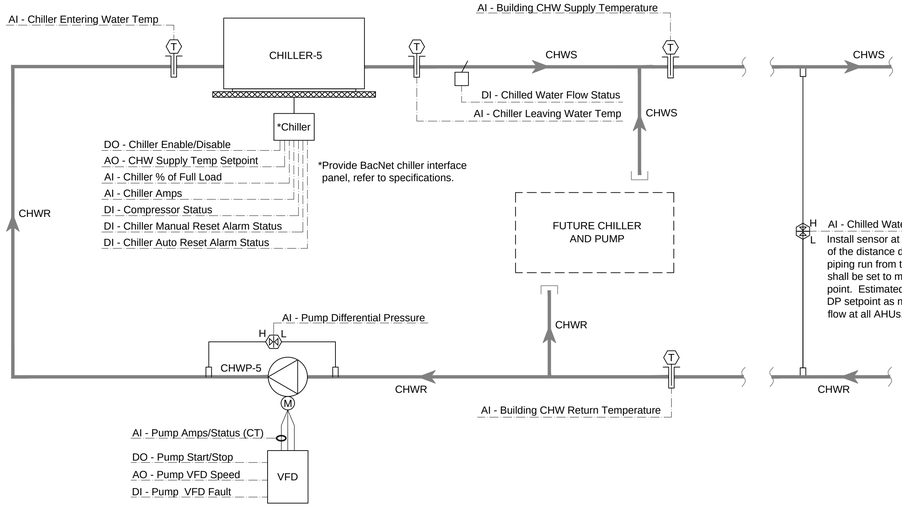


NOTES:
1 AIR CUSHION REQD AT END OF RUN FOR BRANCH TAKE OFFS ILLUSTRATED
2 CUSHION DEPTH, D, EQUAL TO 1/2 THE GREATER OF H OR W, SUBJECT TO 6" MIN, WHERE H = HEIGHT OF DUCT

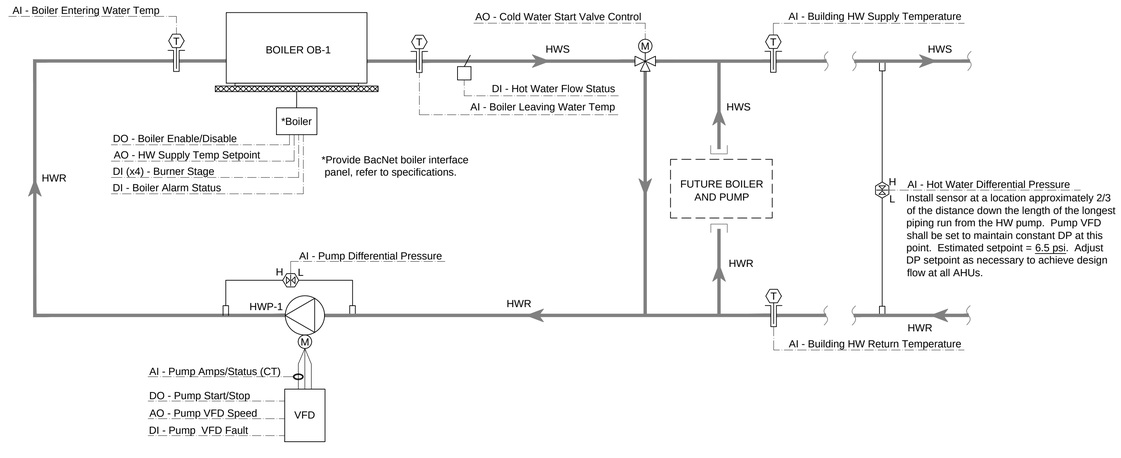
03 TYPICAL DUCTWORK TEE DETAIL
Scale: NOT TO SCALE



04 CV SINGLE ZONE AIR HANDLING UNIT CONTROL SCHEMATIC
Scale: None



05 CHILLER PLANT CONTROL SCHEMATIC
Scale: None



06 HEATING PLANT CONTROL SCHEMATIC
Scale: None

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