

SYMBOLS

ITEMS TO BE REMOVED	
CHILLED WATER SUPPLY	
CHILLED WATER RETURN	
CONDENSER WATER SUPPLY	
CONDENSER WATER RETURN	
CONDENSATE DRAIN	
WATER MAKE-UP SUPPLY	
PIPE RISING	
PIPE TURNING DOWN	
CONTROL VALVE, 3-WAY	
CONTROL VALVE, 2-WAY	
ORIFICE OR VENTURI FLANGE	
UNION	
PIPE REDUCER	
DIRECTION OF FLOW	
STRAINER	
VALVE, GATE, HORIZONTAL AND IN RISER	
VALVE, BALL	
VALVE, BUTTERFLY	
VALVE, MANUAL CONTROL	
VALVE, SOLENOID	
VALVE, GATE (OS&Y), HORIZONTAL AND IN RISER	
VALVE, GLOBE	
VALVE, CHECK	
VALVE, TRIPE DUTY	
BALANCING COCK	
BACK FLOW PREVENTER	
FLEXIBLE CONNECTOR (PIPING)	
PUMP, CENTRIFUGAL	
VALVE, MAGNETIC STOP	
VALVE, AIR RELEASE	
VALVE, PRESSURE-REDUCING	
PRESSURE SWITCH	
THERMOSTAT, REMOTE SENSING ELEMENT	
THERMOSTAT	
WATER METER	
FLOW METER	
BASKET STRAINER	

PRESSURE GAUGE	
THERMOMETER	
AIR ENTERS GRILLE OR DUCT	
AIR LEAVES GRILLE OR DUCT	
SECTION, SUPPLY AIR DUCT	
SECTION, DUCT ON SUCTION SIDE OF FAN	
DUCT SIZE, FIRST DIMENSION IS FOR SIDE SHOWN	
DUCT SECTION, FIRST DIMENSION IS FOR DUCT WIDTH	
DUCT TRANSITION	
DUCT TRANSITION	
SQUARE ELBOW WITH TURNING VANES	
DIRECTION OF FLOW	
INCLINED DROP (WITH RESPECT TO AIR FLOW)	
INCLINED RISE (WITH RESPECT TO AIR FLOW)	
TURNING VANES	
FLEXIBLE DUCT AND EQUIPMENT CONNECTOR	
POINT OF CONNECTION TO EXISTING WORK	
POINT OF DISCONNECTION TO EXISTING WORK	



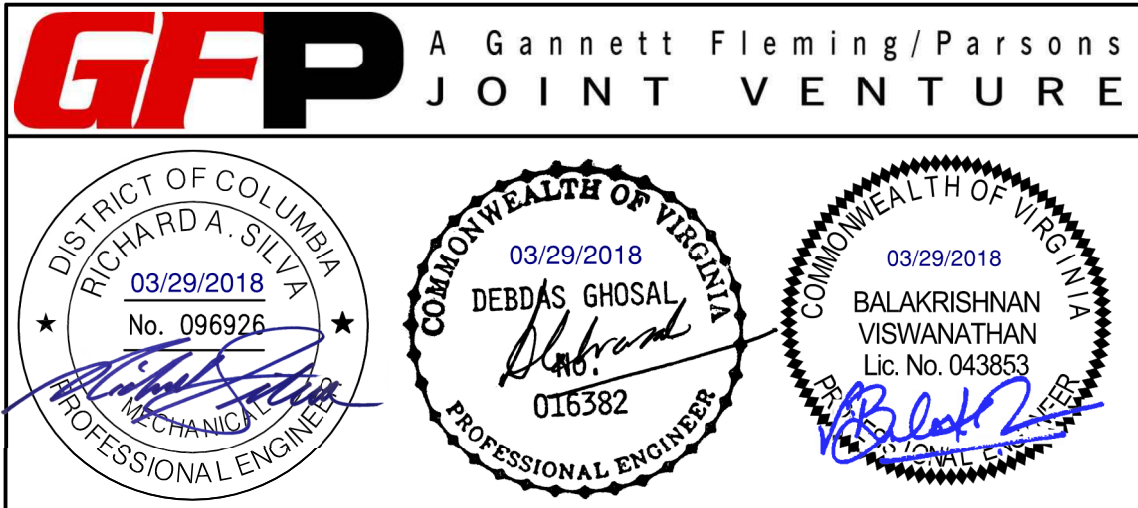
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ABBREVIATIONS

AIR CONDITIONING UNIT	ACU	HERTZ	HZ
AIR SEPARATOR	AS	HORIZONTAL MULTISTAGE CENTRIFUGAL PUMP	HSC
AUTHORIZED REPRESENTATIVE	AR	INCHES	IN
AUTOMATED ENERGY MANAGEMENT SYSTEM	A.E.M.S.	LEAVING AIR TEMPERATURE	LAT
AXIAL FAN	AF	POUNDS	LBS
BRITISH THERMAL UNITS	BTU	LEAVING WATER TEMPERATURE	LWT
BTU PER HOUR	BTUH	LOCKED ROTOR AMPERES	LRA
CEILING	CLG	MAKEUP WATER PUMP	MP
CENTRIFUGAL	CENT	MANHOLE	MH
CENTRIFUGAL FAN	CF	MAXIMUM OVER CURRENT PROTECTION	MOCP
CENTERLINE ELEVATION	CL. EL.	MINIMUM CIRCUIT AMPS	MCA
CUBIC FEET PER MINUTE	CFM	NATIONAL ELECTRICAL CODE	NEC
CHILLER	CH	NORMALLY CLOSED	NC
CHILLED WATER PUMP	CHWP	NORMALLY OPEN	NO
CHILLED WATER SUPPLY	CHWS	OUTSIDE AIR	OA
CHILLED WATER RETURN	CHWR	PARTS PER MINUTE	PPM
COOLING TOWER	CT	PHASE	PH
COLD WATER	CW	POUNDS PER SQUARE INCH	PSI
CONDENSER WATER SUPPLY	CWS	POUNDS PER SQUARE INCH GAGE	PSIG
CONDENSER WATER RETURN	CWR	PRESSURE GAUGE	P.G.
CONDENSER WATER PUMP	CWP	QUANTITY	QTY
DAMPER	DPR	RETURN GRILLE	R.G.
DATA TRANSMISSION SYSTEM	DTS	RATED LOADS AMPS	RLA
DEGREES FAHRENHEIT	*F	REMOTE TERMINAL UNIT	RTU
DIAMETER	DIA	RESISTANCE TEMPERATURE DETECTOR	RTD
DOWN	DN	RETURN AIR	RA
DRAWING	DWG	REVOLUTION PER MINUTE	RPM
ENTERING AIR TEMPERATURE	EAT	SOLENOID VALVE	SOL
ENTERING WATER TEMPERATURE	EWT	STATION	STA
EXHAUST AIR	EA	SUPPLY AIR	SA
EXHAUST FAN	EF	THOUSANDS BTU PER HOUR	MBH
EXISTING	(E)	TEMPERED WATER	TW
EXPANSION TANK	ET	TYPICAL	TYP
FLEXIBLE CONNECTION	F.C.	VARIABLE FREQUENCY DRIVE	VFD
FAN COIL UNIT	FCU	VOLT-AMPERE	VA
FLOOR DRAIN	FD	VOLTS ALTERNATING CURRENT	VAC
FEMALE PIPE THREAD	FPT	WITH	W/
FINISHED FLOOR	F.F.		
FLOW SWITCH	F		
GALLONS	GAL		
GALLONS PER MINUTE	GPM		
HEATER	HTR		
HORSEPOWER	HP		



DESIGNED <u>K. STOCKINGER</u> 09/20/17 DATE DRAWN <u>A. PINKOWSKI</u> 09/20/17 DATE CHECKED <u>B. VISWANATHAN</u> 03/23/18 DATE		REFERENCE DRAWINGS		REVISIONS			<div><div><div>M</div><div>metro</div></div><div>WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY</div><div>DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES</div><div>OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP</div><div><div>APPROVED <i>Mark H. Magnusson</i> 03/2018</div><div>MARK MAGNUSSEN MANAGER, ENV. PLANNING AND COMP</div><div>DATE</div></div><div><div>APPROVED <i>Gabe Spiller</i> 03/2018</div><div>GRAHAM SPILLER GFP DEPUTY PROGRAM MANAGER</div><div>DATE</div></div></div>		REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS				
		NUMBER	TITLE	DATE	NUM	DESCRIPTION			MECHANICAL SYMBOLS AND ABBREVIATIONS				
				03/30/2018	0	FINAL CONTRACT DRAWINGS							
							M NO. M1304	CONTRACT NO. FQ-18102	SCALE NONE	DRAWING NO. M-001	SHEET NO. 08 of 173		

ABBREVIATIONS

AC	ALTERNATING CURRENT, AIR CONDITIONING
A, AMP	AMPERE
AF	AMPERES FRAME
AHU	AIR HANDLING UNIT
AR	AUTHORITY REPRESENTATIVE
AT	AMPERES TRIP
AWG	AMERICAN WIRE GAUGE
BRKR	BREAKER
C, CND	CONDUIT
CF	CENTRIFUGAL FAN
CH	CHILLER
CHW, CHWP, CHP	CHILLED WATER PUMP
CP	CONTROL PANEL
CT	COOLING TOWER
CTL	CONTROL
CWP	CONDENSER WATER PUMP
DWG	DRAWING
(E)	EXISTING
EF	EXHAUST FAN
EG	EQUIPMENT GROUND
EHC	ELECTRIC HEATING COIL
ELEC	ELECTRICAL
ELEV	ELEVATOR
EM	EMERGENCYZ
EUH	ELECTRIC UNIT HEATER
EXIST	EXISTING
FCU	FAN COIL UNIT
FLA	FULL LOAD AMPERES
G, GND	GROUND
GFP	GROUND FAULT PROTECTION
GRS	GALVANIZED RIGID STEEL
HP	HORSE POWER, HEAT PUMP
HTR	HEATER
HVAC	HEATING, VENTILATING, AIR CONDITIONING
Hz	HERTZ
IWH	INSTANTANEOUS WATER HEATER
JB	JUNCTION BOX
KCMIL	THOUSAND CIRCULAR–MIL
KVA	KILO–VOLT AMPERE
KW	KILOWATT
LTFC	LIQUIDTIGHT FLEXIBLE CONDUIT
LTG	LIGHTING
LTS	LIGHTS
MACH	MACHINE
MD	MOTORIZED DAMPER
MEZZ	MEZZANINE
MCA	MAXIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MCOP, MOP	MINIMUM OVER–CURRENT PROTECTION
MFR	MANUFACTURER
MECH	MECHANICAL
MLO	MAIN LUG ONLY
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
#, NO.	NUMBER
P	POLE
PASS	PASSAGEWAY
ø,PH	PHASE
PLT	PLANT
PNL	PANEL
PWR	POWER
QTY	QUANTITY
RECPT	RECEPTACLE
RLA	RUNNING LOAD AMPERES
RM	ROOM
RMS	ROOT MEAN SQUARE
SWBD	SWITCHBOARD
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES
UON	UNLESS OTHERWISE NOTED
V	VOLT
VFD	VARIABLE FREQUENCY DRIVE
W	WIRE
XFMR	TRANSFORMER

SYMBOLS

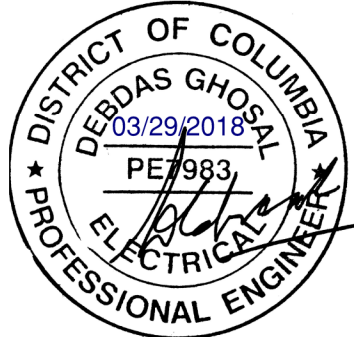
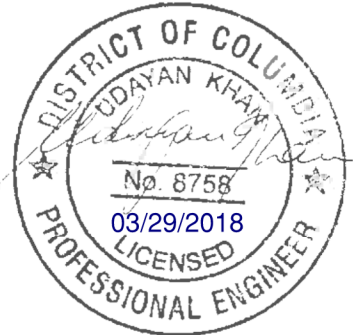
	CIRCUIT BREAKER, RATING AS SHOWN.
	TRANSFORMER – SIZED AS NOTED ON SCHEDULE, SUBSCRIPT IS IDENTIFIER.
	JUNCTION BOX – CEILING MOUNTED TYPE AS INDICATED OR AS REQUIRED BY CODE.
	JUNCTION BOX – WALL MOUNTED.
	MOTOR CONNECTIONS, NUMBER IS HP.
	NON–FUSED SAFETY SWITCH, RATING AS SHOWN (AMPACITY/POLES).
	MAGNETIC STARTER, FVNR, SIZED AS REQUIRED.
	CONDUIT OR CABLE TURNING AWAY OR DOWN.
	CONDUIT OR CABLE TURNING UPWARD OR TOWARDS VIEWER.
	CONDUIT OR CABLE EXPOSED.
	CONDUIT RUN CONCEALED.
	HOMERUN TO DISTRIBUTION EQUIPMENT. EQUIPMENT GROUND WIRE SHALL BE PROVIDED FOR ALL CIRCUITS. MINIMUM 3/4” AND #12 WIRING.
	ELECTRICAL EQUIPMENT, TYPE AS INDICATED.
	PANELBOARD, DISTRIBUTION AND LIGHTING, 480/277V.
	PANELBOARD, LIGHTING AND APPLIANCE, 208/120V.
	VARIABLE FREQUENCY DRIVE (VFD).
	SINGLE POLE SWITCH, +48 AFF U.O.N LETTER INDICATES FIXTURES CONTROLLED.
	4’ SURFACE–MOUNTED FLUORESCENT STRIP LIGHT LETTER INDICATES CONTROLLING SWITCH.
	4’ SURFACE–MOUNTED FLUORESCENT STRIP EMERGENCY LIGHT.
	4’ SURFACE–MOUNTED FLUORESCENT STRIP LIGHT FOR DEMOLITION.
	KEYED NOTE FOR DEMOLITION PLAN.
	KEYED NOTE FOR NEW WORK PLAN.
	EMERGENCY STOP PUSH BUTTON.
	WORK TO BE REMOVED. SHOWN DOTTED.

GENERAL NOTES

- REFER TO DRAWING NO. G–002 FOR INDEX OF DRAWINGS.
- THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD AND SHALL REPORT DISCREPANCIES, IF ANY, TO THE AUTHORITY REPRESENTATIVE (AR) FOR CLARIFICATION, PRIOR TO STARTING ANY WORK. THE DRAWINGS ARE INTENDED TO INDICATE THE EXTENT OF THE WORK DIAGRAMMATICALLY ONLY.
- THE CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE THEMSELVES WITH ALL VISIBLE EXISTING CONDITIONS, IN PARTICULAR ACCESSIBILITY INTO EACH OF THE EQUIPMENT ROOMS FOR THE REMOVAL AND DELIVERY OF EQUIPMENT.
- EXACT LOCATION OF ALL EQUIPMENT AND ACCESSORIES SHALL BE VERIFIED IN THE FIELD.
- IDENTIFY ALL ITEMS TO BE DEMOLISHED. DEMOLISHED ITEMS SHALL BE REMOVED AND PROPERLY DISPOSED OFF SITE. NO ITEMS SHALL BE CAP AND ABANDON ON SITE.
- ALL SURFACES DAMAGED IN THE COURSE OF THE WORK SHALL BE RESTORED TO THE ORIGINAL CONDITION TO THE COMPLETE SATISFACTION OF THE AR.
- ALL WORK SHALL BE COORDINATED WITH EXISTING SERVICES AND OTHER TRADES DURING INSTALLATION.
- ALL EXISTING LIGHTING FIXTURES THAT ARE IN THE WAY OF THE DEMO WORK SHALL BE REMOVED AND REINSTALLED AFTER NEW WORK IS DONE. THIS NOTE IS ALSO APPLICABLE TO OTHER EQUIPMENT THAT POSES AN OBSTRUCTION.
- SCALE ON THE DRAWINGS IS APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR ALL FIELD MEASUREMENTS.
- THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING ELECTRICAL AND MECHANICAL WORK, PROVIDE CLEARANCE FOR MAINTENANCE BETWEEN EXISTING EQUIPMENT AND NEW WORK ALSO, COORDINATE WITH THE ELECTRICAL DRAWINGS.
- THE EQUIPMENT NAMES/NUMBERS FOR THIS DESIGN ARE THE SAME AS IN THE ORIGINAL DESIGN. THIS IS DONE TO AVOID ANY CONFUSION FOR THE MAINTENANCE AND THE FILING SYSTEM, IN FUTURE.
- PERFORM WORK AND PROVIDE MATERIALS AND EQUIPMENT AS SHOWN ON DRAWINGS. COORDINATE ELECTRICAL WORK WITH WORK OF OTHER TRADES.
- MATERIAL AND EQUIPMENT SHALL BE NEW AND UL APPROVED AND SHALL MEET NEMA, ANSI, IEEE & NEC REQUIREMENTS FOR INTENDED SERVICE. MATERIAL AND INSTALLATION SHALL MEET REQUIREMENTS OF NATIONAL AND LOCAL ELECTRICAL CODES.
- MAINTAIN RECORD DRAWINGS ON SITE. RECORD SET MUST BE COMPLETE AND CURRENT AND AVAILABLE FOR INSPECTION WHEN REQUISITIONS FOR PAYMENT ARE SUBMITTED.
- GUARANTEE WORK IN WRITING FOR ONE YEAR FROM DATE OF FINAL ACCEPTANCE. REPAIR OR REPLACE DEFECTIVE MATERIALS OR INSTALLATION AT NO COST TO THE AUTHORITY. CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE AT NO COST TO THE AUTHORITY.
- STATEMENT OF GUARANTEE REQUIREMENTS SHALL NOT BE INTERPRETED TO LIMIT AUTHORITY’S RIGHTS UNDER LAW AND THIS CONTRACT.
- DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS.
- TEMPORARY LIGHT AND POWER SHALL BE PROVIDED ON SITE BY THE CONTRACTOR.
- SUBMIT SHOP DRAWINGS AND PRODUCT DATA WITHIN 30 DAYS AFTER AWARD OF CONTRACT. CHECK, STAMP AND MARK SUBMITTALS WITH PROJECT NAMES BEFORE TRANSMITTING TO ENGINEER. INDICATE DEVIATIONS FROM CONTRACT DOCUMENTS. SHOP DRAWINGS SHALL BE PROVIDED FOR ALL EQUIPMENT SHOWN ON THE DRAWINGS.
- DEVIATION FROM CONTRACT DOCUMENTS, OR PROPOSED SUBSTITUTION OF MATERIALS OR EQUIPMENT FOR THOSE SPECIFIED, SHALL BE REQUESTED IN SEPARATE LETTER, WHETHER DEVIATIONS ARE DUE TO FIELD CONDITIONS, STANDARD SHOP PRACTICE, OR OTHER CAUSE.
- ALL WIRING SHALL BE RUN CONCEALED IN FINISHED AREAS AND EXPOSED IN UNFINISHED AREAS.
- ALL GROUNDING SHALL BE PERFORMED IN ACCORDANCE WITH WMATA SPECIFICATION AND THE NATIONAL AND LOCAL ELECTRICAL CODES.
- NEW CIRCUIT BREAKER RATING SHALL BE COMPARABLE WITH EXISTING PANELBOARD CIRCUIT BREAKERS AND AIC RATINGS.
- AT LOCATIONS WHERE NEW CONDUITS AND CABLES EXIT MECHANICAL AND/OR AC SWITCHBOARD ROOMS, THE CONTRACTOR SHALL PROVIDE DRILLED HOLES IN CONCRETE FLOORS AND WALLS AS REQUIRED. EXISTING CONDUIT SLEEVES MAY BE USED FOR THIS PURPOSE IF AVAILABLE.
- CONDUIT SIZE AND CABLE SIZE/TYPE INDICATED ON DRAWINGS ARE APPLICABLE TO ENTIRE LENGTH OF BRANCH CIRCUIT UNLESS OTHERWISE NOTED.
- EXISTING CONDUITS ASSOCIATED WITH NEW ACU/FAN WORK THAT ARE NOT REUSED SHALL BE REMOVED, PROVIDED THAT THEY DO NOT CONTAIN ACTIVE CIRCUITS/WIRING FOR PROJECT WORK AND/OR EXISTING ADJACENT EQUIPMENT THAT IS NOT IN CONTRACT.
- EXPOSED CONDUITS SHALL BE GALVANIZED RIGID STEEL TYPE.
- ALL WIRING SHALL BE UL LISTED TYPE RHW–2, LOW SMOKE ZERO HALOGEN.
- INSULATION RESISTANCE TEST SHALL BE PERFORMED ON ALL NEW AND REUSED CABLES. IF

RESISTANCE FOR REUSED CABLE FAILS, THE CABLE SHALL BE REMOVED AND REPLACED WITH A NEW CABLE.

- ALL NEW AND REUSED CONDUITS, CABLES AND ELECTRICAL DEVICES ARE TO BE LABELED AS PER WMATA SPECIFICATIONS.



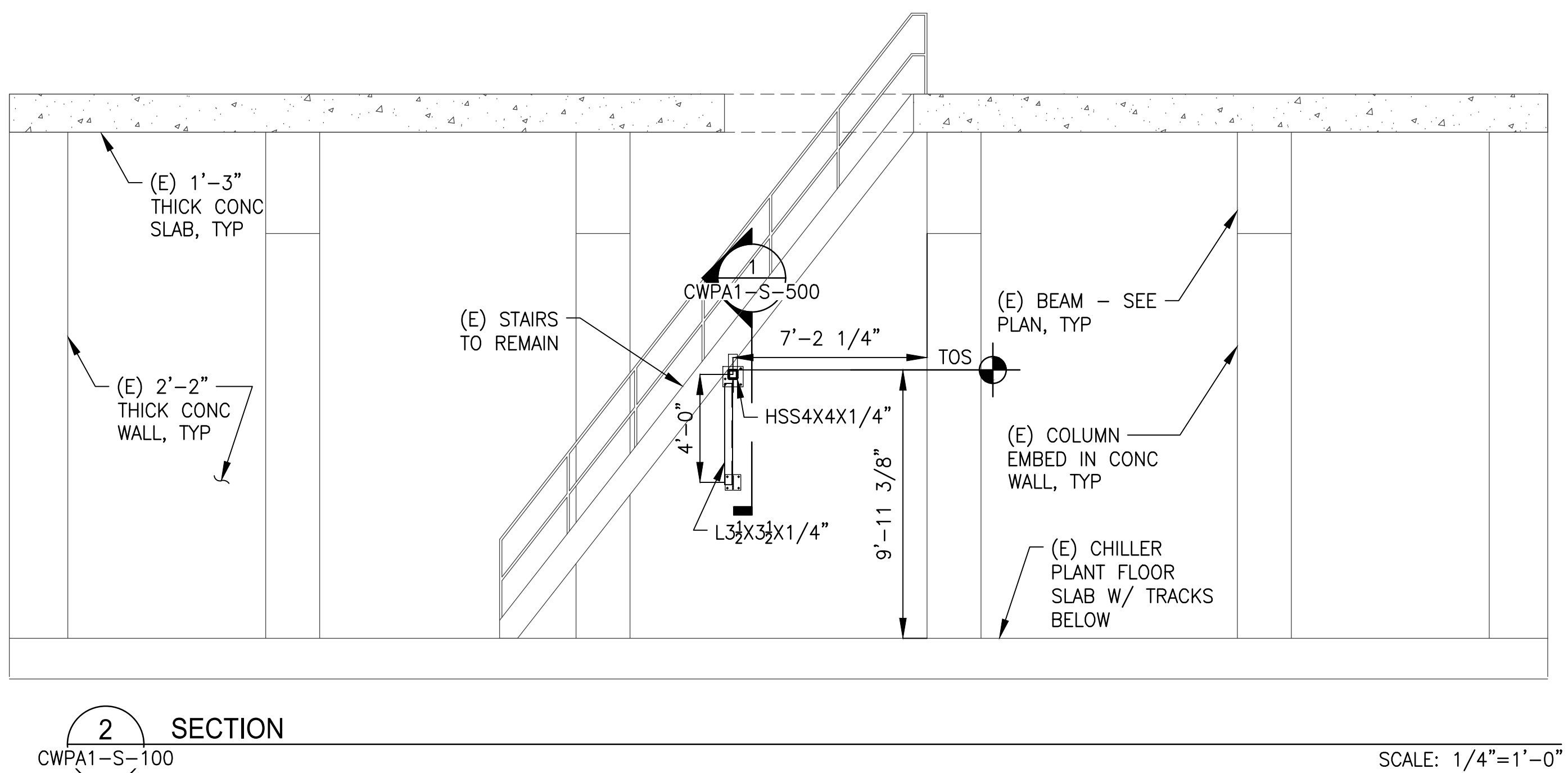
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DESIGNED B.IDILBI 09/30/17 DATE			REFERENCE DRAWINGS			REVISIONS			WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP			REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS ELECTRICAL SYMBOLS AND ABBREVIATIONS								
			NUMBER	TITLE	DATE	NUM	DESCRIPTION													
DRAWN J.ZHU 09/30/17 DATE					03/30/2018	0	FINAL CONTRACT DRAWINGS	APPROVED Mark H. Magnusson 03/2018 MARK MAGNUSSEN MANAGER, ENV. PLANNING AND COMP			APPROVED Gabe Spiller 03/2018 GRAHAM SPILLER GFP DEPUTY PROGRAM MANAGER			M NO. M1304	CONTRACT NO. FQ-18102	SCALE NONE	DRAWING NO. E-001		SHEET NO. 09 of 173	
CHECKED D. KHAN 03/23/18 DATE																				



- NOTES:**
1. EXISTING STEEL STAIR IS TO REMAIN DURING INSTALLATION OF SUPPORT.
 2. FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE STARTING CONSTRUCTION AND/OR SUBMITTING SHOP DRAWINGS. ANY DISCREPANCIES SHALL BE REPORTED TO THE WMATA. ALL EXISTING INFORMATION IS BASED ON SITE VISITS AND EXISTING DRAWINGS BY KCE STRUCTURAL ENGINEERS P.C. DATED AUGUST 13, 1976.
 3. EXISTING CONCRETE SHALL BE SCANNED WITH GROUND PENETRATING RADAR (GPR) AT ALL AREAS WHERE ANCHORAGE IS MADE TO EXISTING CONCRETE. NO EXISTING REINFORCING SHALL BE CUT.

SCALE: 1/4"=1'-0"

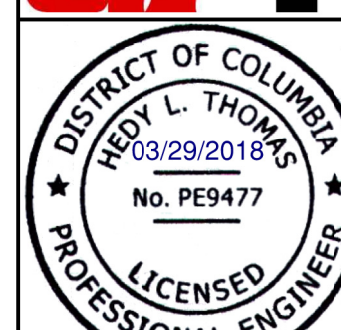
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M1304	FQ-18102	AS NOTED	CWPA1-S-100	10 of 173

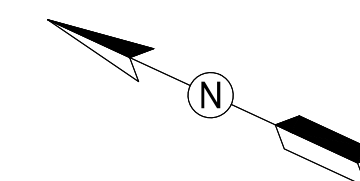


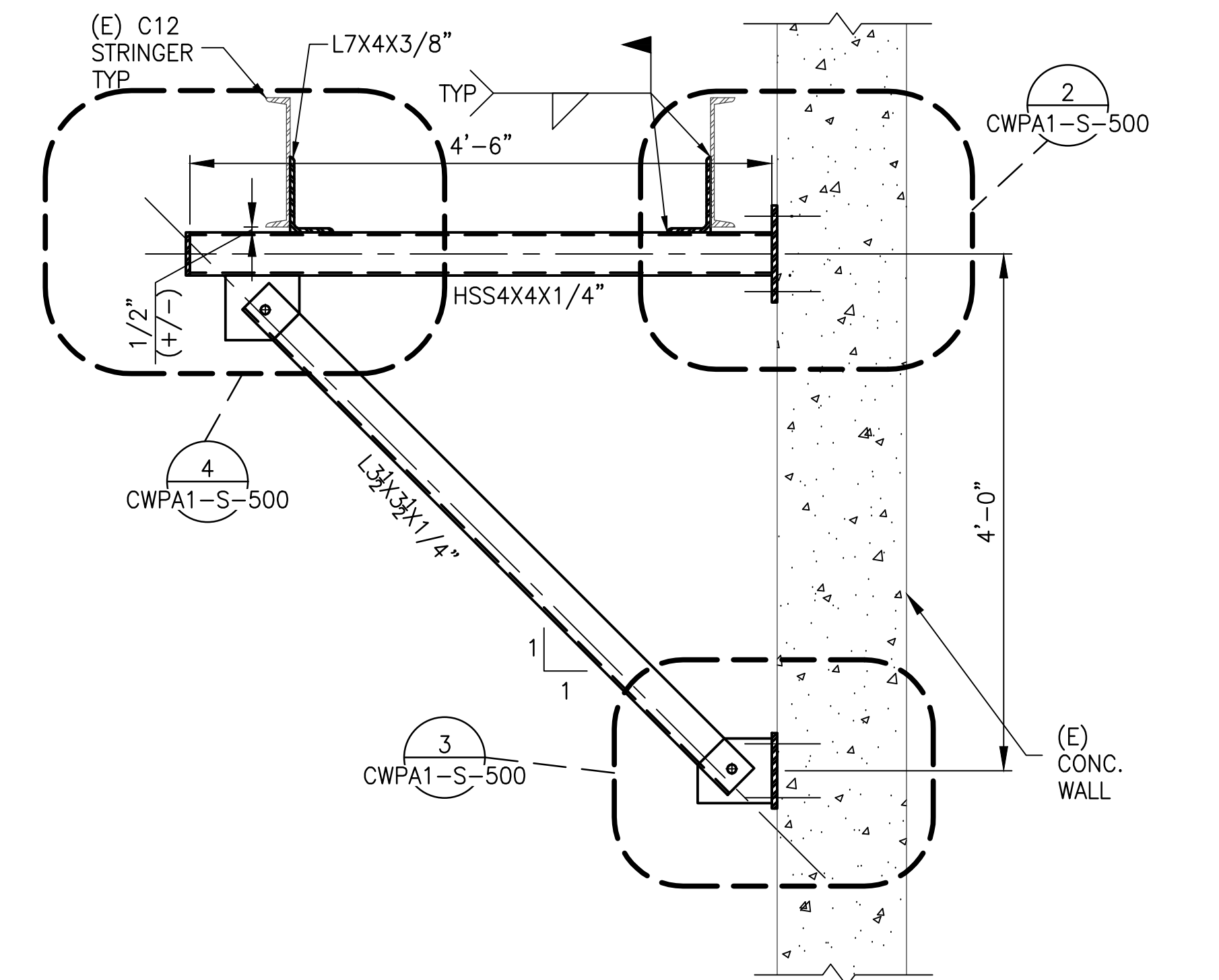
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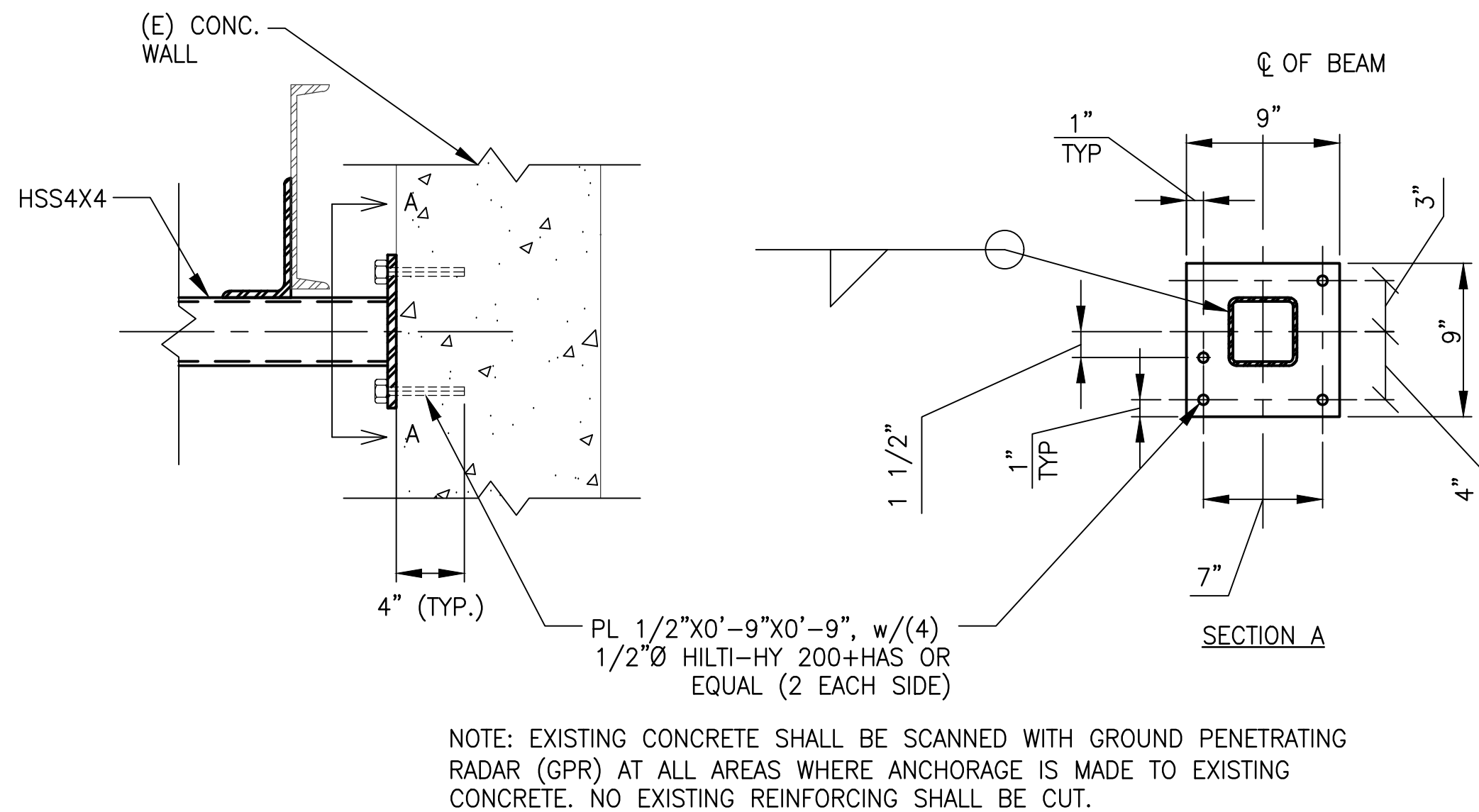


Healy & Healy

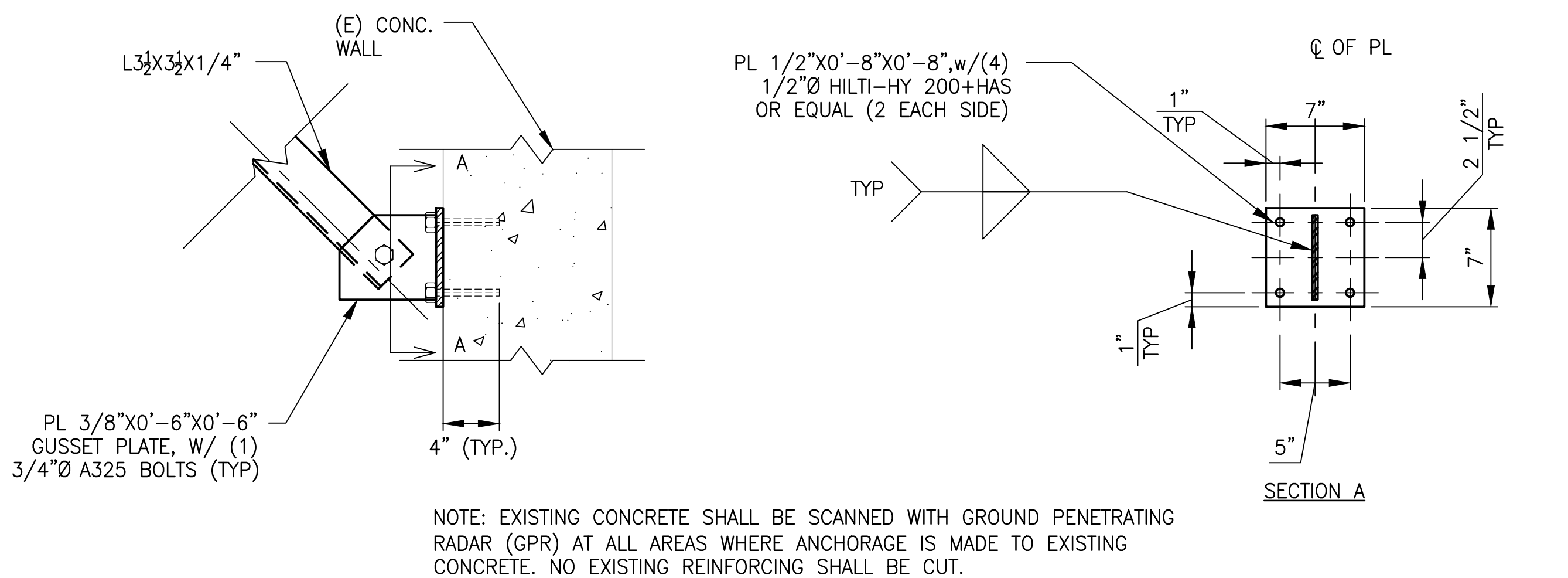




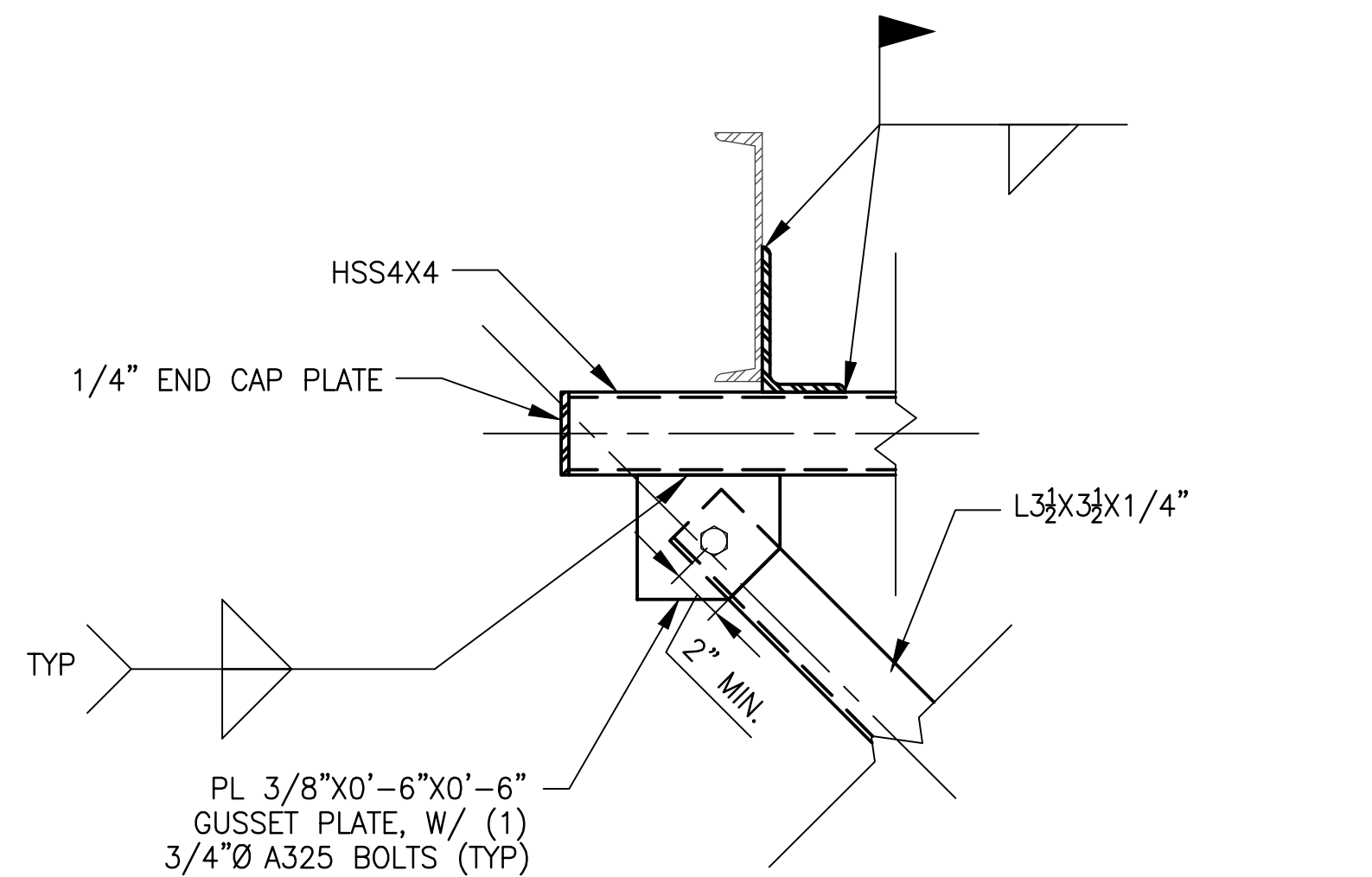
1 SECTION
CWPA1-S-500 SCALE: 1"=1'-0"



2 DETAIL 1
CWPA1-S-500 SCALE: 1-1/2"=1'-0"



3 DETAIL 2
CWPA1-S-500 SCALE: 1-1/2"=1'-0"



4 DETAIL 3
CWPA1-S-500 SCALE: 1-1/2"=1'-0"




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Fred L. Thomas

DESIGNED <u>E. PEREZ</u> 08/11/17 DATE DRAWN <u>E. PEREZ</u> 08/11/17 DATE CHECKED <u>J. OZUSTA</u> 03/23/18 DATE			REFERENCE DRAWINGS NUMBER TITLE DATE NUM DESCRIPTION 03/30/2018 0 FINAL CONTRACT DRAWINGS			REVISIONS NUMBER TITLE DATE NUM DESCRIPTION			 WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP APPROVED <i>Mark H. Magnusson</i> 03/2018 MARK MAGNUSSEN DATE MANAGER, ENV. PLANNING AND COMP			APPROVED <i>Gabe Spiller</i> 03/2018 GRAHAM SPILLER DATE GFP DEPUTY PROGRAM MANAGER			REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS CWPA1 - FARRAGUT NORTH (A2) STRUCTURAL DETAILS			M NO. CONTRACT NO. SCALE DRAWING NO. SHEET NO. M1304 FQ-18102 AS NOTED CWPA1-S-500 11 of 173	
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GENERAL NOTES:

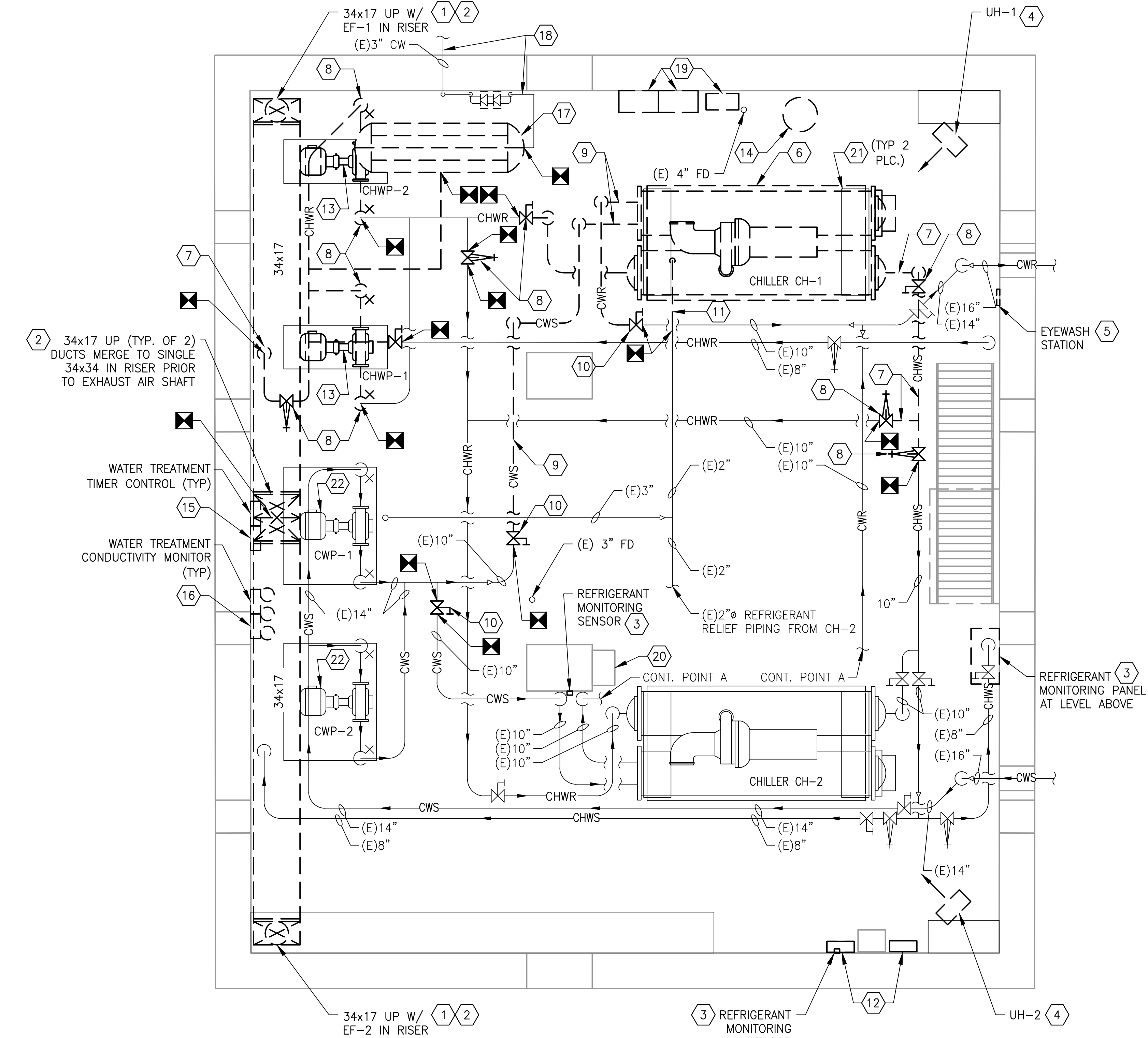
A. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION AND QUANTITIES OF EQUIPMENT, PIPING, VALVES, DUCTWORK, ELECTRICAL AND CONTROL WIRING PRIOR TO DEMOLITION. ITEMS SHOWN ON THIS PLAN ARE APPROXIMATE.

B. REFER TO LEGEND SHEET FOR GENERAL ABBREVIATIONS AND SYMBOLS.

KEYNOTES:

- 1 REMOVE AND DISPOSE OF EXHAUST FANS EF-1 AND EF-2, INCLUDING FAN MOTORS, SUPPORTS, WIRING, AND OTHER RELATED ACCESSORIES.
- 2 REMOVE AND DISPOSE OF DUCTWORK, INCLUDING DUCT FITTINGS, DUCT SUPPORTS, GRILLES AND SCREENS, DAMPERS, AND OTHER RELATED ACCESSORIES AS INDICATED. DEMOLITION SHALL BE UP TO POINT OF DUCTWORK CONNECTION TO EXHAUST AIR SHAFT.
- 3 REMOVE AND DISPOSE OF REFRIGERANT MONITORING SENSORS AND PANEL, INCLUDING ALL TUBING, WIRING, CONDUIT, JUNCTION AND PULL BOXES, AND DEVICES. REFRIGERANT MONITORING PANEL IS LOCATED AT THE INTERMEDIATE PLANT ENTRANCE STAIR LANDING (NOT SHOWN ON DRAWINGS).
- 4 REMOVE AND DISPOSE OF UNIT HEATERS UH-1 AND UH-2, INCLUDING SUPPORTS, WIRING, CONDUIT, JUNCTION AND PULL BOXES, AND ANY ASSOCIATED THERMOSTATS.
- 5 REMOVE AND DISPOSE OF EXISTING WALL-MOUNTED EYEWASH STATION.
- 6 REMOVE AND DISPOSE OF CHILLER CH-1, CHILLER SUPPORT, STARTER, WIRING, CONDUIT, JUNCTION AND PULL BOXES, DISCONNECT, AEMS SENSORS, AND CONTROLS. REMOVAL SHALL INCLUDE R-134a EVACUATION BY A CERTIFIED COMPANY. RECOVERED REFRIGERANT SHALL BE CLEANED AND RETURNED TO WMATA PLANT MAINTENANCE IN 125 POUND BULLET CONTAINERS.
- 7 REMOVE AND DISPOSE OF CHILLED WATER PIPING (CHWS, CHWR), INSULATION, SUPPORT, TEMPERATURE, AND PRESSURE GAUGES. EXTENT OF PIPING REMOVAL SHALL BE, IN GENERAL, TO THE FIRST ISOLATION VALVE FLANGE AFTER THE VALVE. EXACT DEMOLITION POINT SHALL BE FIELD COORDINATED BY CONTRACTOR TO ACCOMMODATE NEW PIPING CONNECTIONS.
- 8 REMOVE AND DISPOSE OF CHILLED WATER PIPING VALVES AS IDENTIFIED ON PLANS. EXACT QUANTITY OF VALVES SHALL BE VERIFIED BY INSTALLING CONTRACTOR. THE EXTENT OF ALL VALVE REPLACEMENTS SHALL BE INCLUSIVE OF THE VALVE CONNECTION FLANGES.
- 9 REMOVE AND DISPOSE OF CONDENSER WATER PIPING (CWR, CWS), TEMPERATURE AND PRESSURE GAUGES. EXTENT OF PIPING REMOVAL SHALL BE, IN GENERAL, TO THE FIRST ISOLATION VALVE FLANGE AFTER THE VALVE. EXACT DEMOLITION POINT SHALL BE FIELD COORDINATED BY CONTRACTOR TO ACCOMMODATE NEW PIPING CONNECTIONS.
- 10 REMOVE AND DISPOSE OF CONDENSER WATER PIPING VALVES AS IDENTIFIED ON PLANS. EXACT QUANTITY OF VALVES SHALL BE FIELD VERIFIED BY INSTALLING CONTRACTOR. THE EXTENT OF ALL VALVE REPLACEMENTS SHALL BE INCLUSIVE OF THE CONNECTION FLANGES.
- 11 REMOVE EXISTING 2"Ø REFRIGERANT RELIEF (VENT) PIPING TO EXTENT SHOWN.
- 12 REMOVE AND DISPOSE OF ABANDONED JOHNSON CONTROLS CHILLER CONTROL PANEL.

- 13 REMOVE AND DISPOSE OF CHILLED WATER PUMPS, CHWP-1 AND CHWP-2. REMOVAL SHALL INCLUDE PUMP, MOTOR, CONTROL AND POWER WIRING, CONDUIT, JUNCTION AND PULL BOXES, PIPING, SUPPORTS, ISOLATION VALVES, STRAINERS, AND CHECK VALVES, WITH ALL INSTRUMENTATION AND CONTROLS. EXISTING EQUIPMENT PAD SHALL REMAIN AND BE RE-USED. EXTENT OF PIPING REMOVAL SHALL BE, IN GENERAL, TO THE INDICATED ISOLATION VALVE FLANGE FROM THE PUMPS. EXACT DEMOLITION POINT SHALL BE FIELD COORDINATED BY CONTRACTOR TO ACCOMMODATE NEW PIPING CONNECTIONS.
- 14 REMOVE AND DISPOSE OF CHEMICAL POT FEEDER AND ACCESSORIES FOR CHILLED WATER AND CONDENSER WATER SYSTEM.
- 15 REMOVE AND DISPOSE OF EXISTING CONDENSER WATER TREATMENT SYSTEM INCLUDING VALVES, PIPING, SUPPORTS, CHEMICAL DRUMS, METERING PUMPS, AND RELATED ELECTRICAL/CONTROL ACCESSORIES.
- 16 REMOVE AND DISPOSE OF EXISTING CONDUCTIVITY MONITORS.
- 17 REMOVE AND DISPOSE OF EXISTING EXPANSION TANK, ASSOCIATED PIPING, AND VALVES. TANK SUPPORTS SHALL BE RE-USED.
- 18 EXISTING DOMESTIC CW INLET PIPING, INCLUDING BACKFLOW PREVENTER, VALVES, AND HOSE REEL TO REMAIN.
- 19 REMOVE AND DISPOSE OF ABANDONED CONDENSER WATER TREATMENT SYSTEM AND ALL ASSOCIATED PIPING, PUMPS, AND VALVES.
- 20 EXISTING AEMS PANEL AND DTS PANEL TO REMAIN.
- 21 CHILLER CONCRETE BASE PAD TO REMAIN AND BE RE-USED.
- 22 REMOVE AND DISPOSE OF EXISTING MOTOR ON CONDENSER WATER PUMPS CWP-1 AND CWP-2. REFER TO ELECTRICAL DRAWINGS FOR FURTHER INFORMATION.



1 MECHANICAL PLAN - DEMOLITION
CWP1-M-100

SCALE: 1/4" = 1'-0"

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

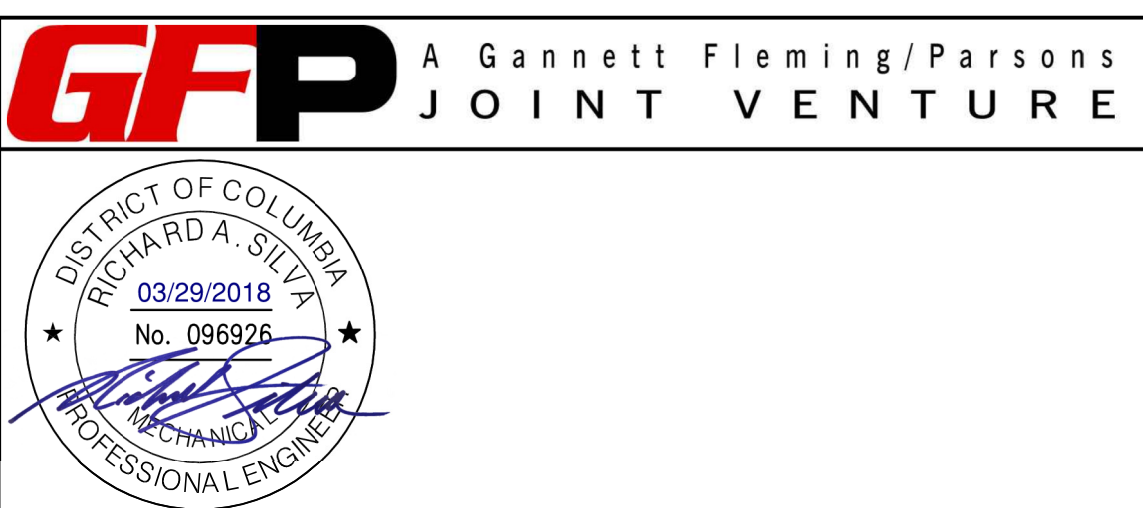
DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES
OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

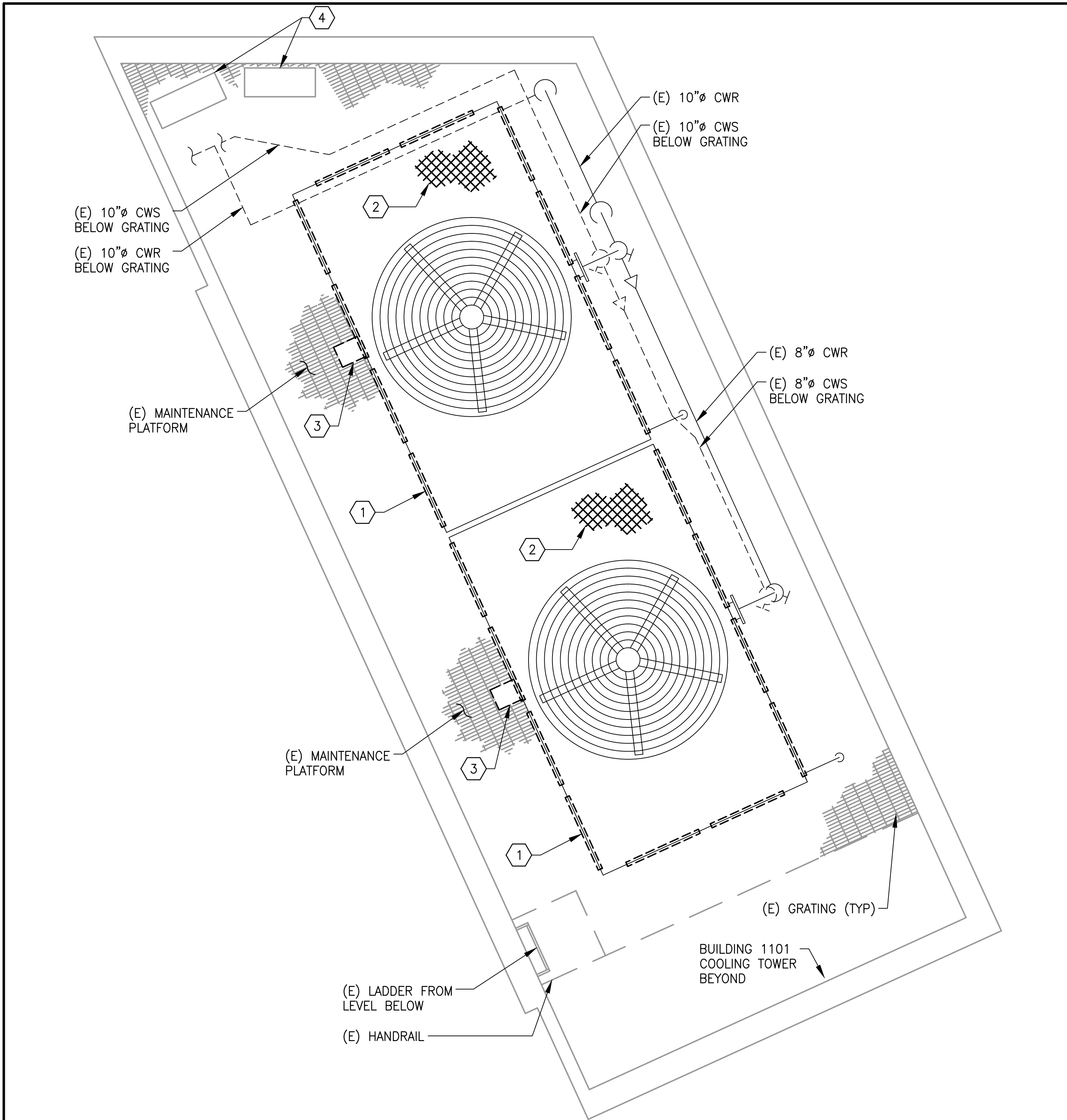
APPROVED *Mark H. Magnusson* 03/2018
MARK MAGNUSSEN
MANAGER, ENV. PLANNING AND COMP

APPROVED *Gabe Spiller* 03/2018
GRAHAM SPILLER
GFP DEPUTY PROGRAM MANAGER

**REPLACEMENT OF CHILLERS
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS
CWP1 - FARRAGUT NORTH (A02)
MECHANICAL PLAN - DEMOLITION**

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	1/4" = 1'-0"	CWP1-M-100	12 of 173





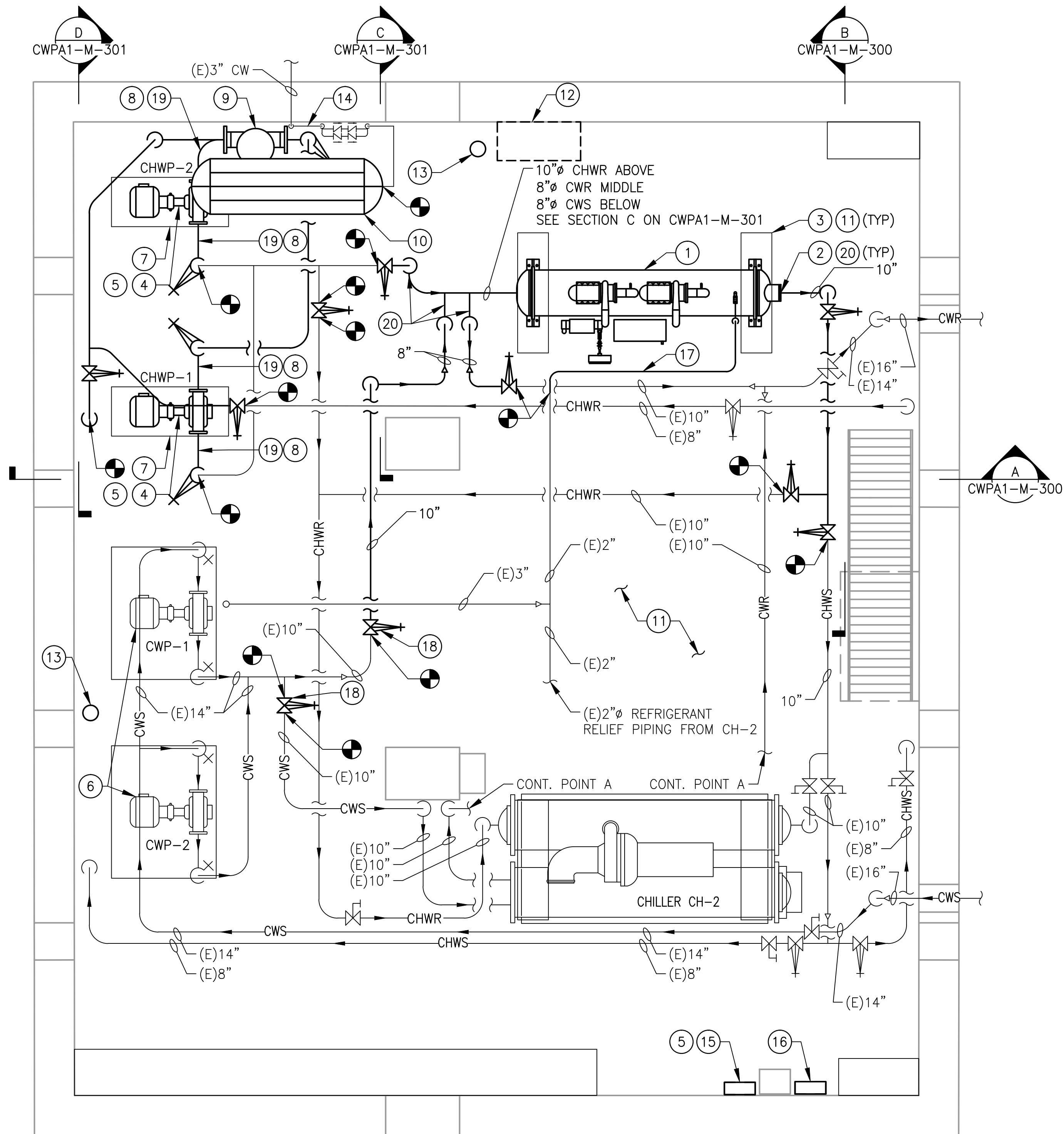
- GENERAL NOTES:
- A. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION AND QUANTITIES OF EQUIPMENT, PIPING, VALVES, DUCTWORK, ELECTRICAL AND CONTROL WIRING PRIOR TO DEMOLITION. ITEMS SHOWN ON THIS PLAN ARE APPROXIMATE.
 - B. REFER TO LEGEND SHEET FOR GENERAL ABBREVIATIONS AND SYMBOLS.
 - C. COOLING TOWER IS LOCATED ON THE PENTHOUSE LEVEL OF BUILDING 1101 CONNECTICUT AVENUE NW, WASHINGTON, DC.
 - D. ALL COOLING TOWER COMPONENTS THAT ARE REMOVED ARE TO BE REPLACED IN KIND. INSTALLING CONTRACTOR SHALL COORDINATE WITH COOLING TOWER MANUFACTURER PRIOR TO REMOVAL.

- KEYNOTES:
- 1 REMOVE AND DISPOSE OF EXISTING LOUVER ON COOLING TOWER.
 - 2 REMOVE AND DISPOSE OF EXISTING FILL IN THE COOLING TOWER.
 - 3 REMOVE AND SALVAGE EXISTING FAN MOTOR, BELT DRIVEN FAN DRIVE ASSEMBLY, BELTS, SHEAVES, AND MOUNTING HARDWARE. RETURN ALL SALVAGED MATERIALS TO THE AR.
 - 4 REMOVE AND DISPOSE OF EXISTING COOLING TOWER FAN CONTROLLER, VFD, AND DISCONNECT.

1 MECHANICAL PLAN - DEMOLITION
CWPA1-M-101
SCALE: 3/8" = 1'-0"



DESIGNED <u>D. ROMNESS</u> 08/11/17 DATE DRAWN <u>D. ROMNESS</u> 08/11/17 DATE CHECKED <u>R. SILVA</u> 03/23/18 DATE			REFERENCE DRAWINGS		REVISIONS			<div><div><div>M</div><div>metro</div></div><div>WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY</div><div>DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES</div><div>OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP</div><div><div>APPROVED <i>Mark H. Magnusson</i> 03/2018</div><div>MARK MAGNUSSEN MANAGER, ENV. PLANNING AND COMP</div><div>DATE</div></div><div><div>APPROVED <i>Graham Spiller</i> 03/2018</div><div>GRAHAM SPILLER GFP DEPUTY PROGRAM MANAGER</div><div>DATE</div></div></div>		REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS CWPA1 - FARRAGUT NORTH (A02) MECHANICAL PLAN - DEMOLITION				
			NUMBER	TITLE	DATE	NUM	DESCRIPTION			M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
					03/30/2018	0	FINAL CONTRACT DRAWINGS							



GENERAL NOTES:

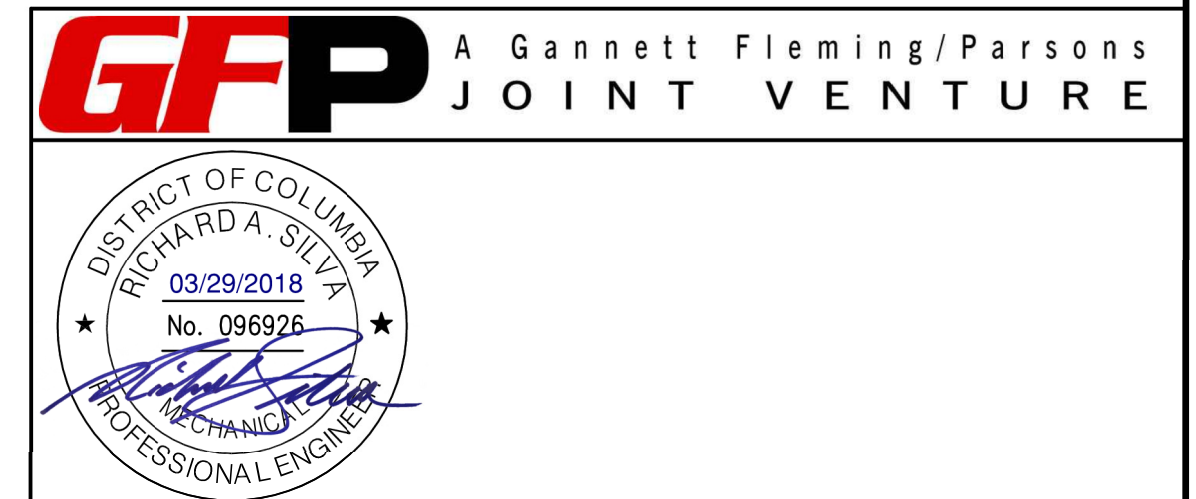
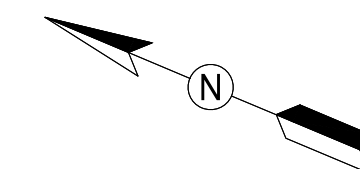
- CONTRACTOR SHALL FIELD VERIFY AND COORDINATE LOCATION OF NEW EQUIPMENT, PIPING, VALVES, DUCTWORK, ELECTRICAL AND CONTROL WIRING WITH EXISTING PRIOR TO INSTALLATION. ITEMS SHOWN ON THIS PLAN ARE APPROXIMATE.
- REFER TO LEGEND SHEET FOR GENERAL ABBREVIATIONS AND SYMBOLS.
- REFER TO CHILLER PIPING SCHEMATIC FOR ALL VALVES. ALL VALVES MAY NOT BE SHOWN ON THIS DRAWING FOR CLARITY.
- INSTALL ALL EQUIPMENT AND COMPONENTS PER MANUFACTURER'S RECOMMENDATION. PROVIDE ACCESS CLEARANCE AT ALL LOCATIONS OF VALVES, STRAINER, INSTRUMENTATION, AND EQUIPMENT AS REQUIRED BY MANUFACTURER AND FOR EASE OF MAINTENANCE.

KEYNOTES:

- PROVIDE AND INSTALL CHILLER, CORRESPONDING VIBRATION ISOLATION, ANCHOR AND SUPPORT.
- PROVIDE AND INSTALL ALL PIPING, FITTINGS, VALVES, PIPING INSULATION AND INSTRUMENTATION FOR CONNECTION TO CHILLER. PROVIDE A VICTAULIC COUPLING CONNECTION PIECE AT EACH PIPE CONNECTION TO CHILLER FOR EASE OF MAINTENANCE.
- REUSE EXISTING EQUIPMENT PAD. REPAIR AND MODIFY AS REQUIRED TO FIT NEW INSTALLATION.
- PROVIDE AND INSTALL CHILLED WATER PUMPS, CHWP-1 AND CHWP-2. INSTALLATION SHALL INCLUDE PUMP, INVERTER DUTY RATED MOTOR FOR VFD APPLICATION, VIBRATION SUPPORT, IMMEDIATE PIPING, ISOLATION VALVES, CHECK VALVES, STRAINER, FLEXIBLE CONNECTORS AND CORRESPONDING INSTRUMENTATION AND CONTROLS. INSULATE PUMPS AND PIPING.
- INTEGRATE PUMP VFD DRIVES WITH CHILLER CONTROL PANEL. REFER TO ELECTRICAL DRAWINGS FOR EXACT LOCATION OF VFDs.
- PROVIDE NEW INVERTER DUTY RATED MOTOR, COMPATIBLE WITH VFD, FOR CONDENSER WATER PUMPS CWP-1 AND CWP-2. REFER TO ELECTRICAL DRAWINGS FOR FURTHER INFORMATION
- PROVIDE AND INSTALL NEW SPRING VIBRATION ISOLATION AND INERTIA PAD.
- PROVIDE AND INSTALL ALL APPROPRIATE PIPE FITTINGS FOR CONNECTION TO PUMPS.
- PROVIDE AND INSTALL AIR SEPARATOR, CORRESPONDING PIPING, AND SUPPORTS. INSULATE AIR SEPARATOR AND PIPING.
- PROVIDE AND INSTALL EXPANSION TANK AND CORRESPONDING PIPING. REUSE EXISTING EXPANSION TANK SUPPORTS.
- CONTRACTOR SHALL PAINT CHILLER PLANT FLOORS AND EQUIPMENT PADS WITH BATTLE SHIP GREY OR APPROVED EQUAL. SAFETY LINES AND TRIPPING HAZARDS SHALL BE PAINTED YELLOW OR RED.
- A. COORDINATE WITH OTHER WMATA CONTRACT INSTALLING WATER TREATMENT SYSTEM.
B. PROVIDE AND INSTALL A NEW WMATA CHILLED WATER SYSTEM LOOP. THE LOOP SHALL INCLUDE PIPING, VALVES, HACH INDUCTIVE CONDUCTIVITY SENSOR - 3725E2T, FLOW SWITCH GEM SENSORS FS-500 170231, AND CONVERTIBLE DIGITAL pH SENSOR HACH DPC1R2A. REFER TO REFERENCE DRAWING DD-ME-HVAC-007.
C. PROVIDE AND INSTALL A NEW WMATA CONDENSER WATER SYSTEM LOOP. THE LOOP SHALL INCLUDE PIPING, VALVES, HACH INDUCTIVE CONDUCTIVITY SENSOR - 3725E2T, FLOW SWITCH GEM SENSORS FS-500 170231. REFER TO REFERENCE DRAWING DD-ME-HVAC-008.
- PROVIDE AND INSTALL CHEMICAL FEEDING POT FOR CHILLED WATER AND CONDENSER WATER SYSTEM. FEEDING POT SHALL BE NEPTUNE VTF-5HF.
- 2" CHWR MAIN WITH A 1-1/4" BRANCH TO FCU-1.
- PROVIDE AND INSTALL ONE CHILLER PLANT CONTROL PANEL (CPCP). REFER TO REFERENCE DRAWING DD-ME-HVAC-009 FOR CPCP DETAILS. PANEL SHALL BE INSTALLED 48" ABOVE FINISHED FLOOR.
- PROVIDE AND INSTALL CHILLED WATER AND CONDENSER WATER FLOW MONITORING SYSTEM. PROVIDE AND INSTALL COMMUNICATIONS WIRING IN RIGID CONDUIT FROM FLOW MONITORING PANEL TO CHILLER PLANT CONTROL PANEL, UTILIZING BELDEN 89842 MULTI-CONDUCTOR; LOW CAPACITANCE TO COMPUTER POINT OF SERVICE (POS) CABLE OR EQUIVALENT. INSTALL 48" ABOVE FINISHED FLOOR. FLOW METER SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES. FLOW METERS AND SENSOR CABLES SHOULD NOT BE INSTALLED WITHIN EIGHT FEET OF VFDs OR FLORESCENT LIGHT FIXTURES.
- PROVIDE AND INSTALL REFRIGERANT VENT/RELIEF PIPING FROM CHILLER (AS PER CHILLER MANUFACTURER). FIELD VERIFY AND CONNECT NEW 2" REFRIGERANT RELIEF PIPING FROM CHILLER TO EXISTING REFRIGERANT RELIEF MAIN.
- PROVIDE AND INSTALL NEW CONDENSER WATER AND CHILLED WATER PIPING VALVES AS IDENTIFIED ON PLANS. EXACT QUANTITY OF VALVES SHALL BE FIELD VERIFIED BY INSTALLING CONTRACTOR.
- PROVIDE 10" TO 8" SUCTION GUIDE WITH STRAINER, ANGLE FLANGE FOR 10" CHILLED WATER PIPING INLET INTO CHILLED WATER PUMP. PROVIDE A 6" TO 10" ANGLE FLANGE AT CHILLED WATER PUMP OUTLET FOR CONNECTION TO CHILLED WATER DISCHARGE PIPING.
- PROVIDE FLOOR MOUNTED PIPE SADDLE SUPPORT WITH BASE STAND AS NECESSARY FOR NEW PIPING. CHILLED WATER PIPING SUPPORTS SHALL BE PRE-INSULATED.

1 MECHANICAL PLAN - NEW WORK
CWPA1-M-102

SCALE: 1/4" = 1'-0"



	REFERENCE DRAWINGS		REVISIONS		
	NUMBER	TITLE	DATE	NUM	DESCRIPTION
DESIGNED	D. ROMNESS	08/11/17	03/30/2018	0	FINAL CONTRACT DRAWINGS
DRAWN	D. ROMNESS	08/11/17			
CHECKED	R. SILVA	03/23/18			



WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES
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APPROVED *Mark H. Magnusson* 03/2018
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GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS
CWPA1 - FARRAGUT NORTH (A02)
MECHANICAL PLAN - NEW WORK

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	1/4" = 1'-0"	CWPA1-M-102	14 of 173