



## ABBREVIATIONS

L	ANGLE	L-1	LOUVER MARK - SEE SCHEDULE
AD	ACCESS DOOR	LAT	LEAVING AIR TEMPERATURE
AFF	ABOVE FINISHED FLOOR	LBS/HR	POUND PER HOUR
AFG	ABOVE FINISHED GRADE	LDB	LEAVING DRY BULB
APD	AIR PRESSURE DROP	LWB	LEAVING WET BULB
APPROX	APPROXIMATELY	LWT	LEAVING WATER TEMPERATURE
AS-1	AIR SEPARATOR MARK - SEE SCHEDULE	MAX	MAXIMUM
BD	BALANCING DAMPER	MOCP	MAXIMUM OVER CURRENT PROTECTION
BDD	BACK DRAFT DAMPER	MIN	MINIMUM
BTUH	BRITISH THERMAL UNIT PER HOUR	MBH	THOUSAND BTU/HR
CFH	CUBIC FEET PER HOUR	MCA	MINIMUM CIRCUIT AMPS
CFM	CUBIC FEET PER MINUTE	MFS	MAXIMUM FUSE SIZE
CHLR-1	CHILLER MARK - SEE SCHEDULE	NOM	NOMINAL
COP	COEFFICIENT OF PERFORMANCE	NO	NUMBER
CP-1	CONDENSATE PUMP MARK - SEE SCHEDULE	OA	OUTSIDE AIR
CU-1	CONDENSING UNIT MARK - SEE SCHEDULE	OD	OUTSIDE DIAMETER
CHWR	CHILLED WATER RETURN	PD	PRESSURE DROP
CHWS	CHILLED WATER SUPPLY	PH	PHASE
DN	DOWN	PSIG	POUNDS PER SQUARE INCH GAGE
DSS-1	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE	%RH	PERCENT RELATIVE HUMIDITY
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE RELIEF VALVE
EDB	ENTERING DRY BULB	RA	RETURN AIR
EMD	END OF MAIN DRIP	RBJ	RUN BETWEEN JOIST
EWB	ENTERING WET BULB	RIH-1	ROOF INTAKE HOOD MARK - SEE SCHEDULE
EWT	ENTERING WATER TEMPERATURE	RLA	RATED LOAD AMPS
ESP	EXTERNAL STATIC PRESSURE	RPM	REVOLUTIONS PER MINUTE
EXIST	EXISTING	RTJ	RUN THRU JOIST
FD	FIRE DAMPER WITH ACCESS DOOR	SA	SUPPLY AIR
FDB	DEGREE FAHRENHEIT DRY BULB	SCT	SATURATED CONDENSING TEMPERATURE
FF	FINISHED FLOOR	SEER	SEASONAL ENERGY EFFICIENCY RATING
FPM	FEET PER MINUTE	SF	SQUARE FEET
FT	FEET	SP	STATIC PRESSURE
FWB	DEGREE FAHRENHEIT WET BULB	SST	SATURATED SUCTION TEMPERATURE
GA	GAUGE	TS	TIP SPEED
GPH	GALLONS PER HOUR	T'STAT	THERMOSTAT TYPICAL
GPM	GALLONS PER MINUTE	UH-1	UNIT HEATER MARK - SEE SCHEDULE
"HG	INCHES OF MERCURY	VAV-1	VARIABLE AIR VOLUME UNIT AND MARK - SEE SCHEDULE
HP	HORSE POWER	"WC	INCHES WATER COLUMN
HWC	HOT WATER CONVERTER MARK - SEE SCHEDULE	WPD	WATER PRESSURE DROP
HWR	HOT WATER RETURN	SCR	SILICON CONTROLLED RECTIFIER
HWS	HOT WATER SUPPLY	CWS	CHILLED WATER SUPPLY
ID	INSIDE DIAMETER	CWR	CHILLED WATER RETURN
KW	KILOWATT		

## MECHANICAL LEGEND

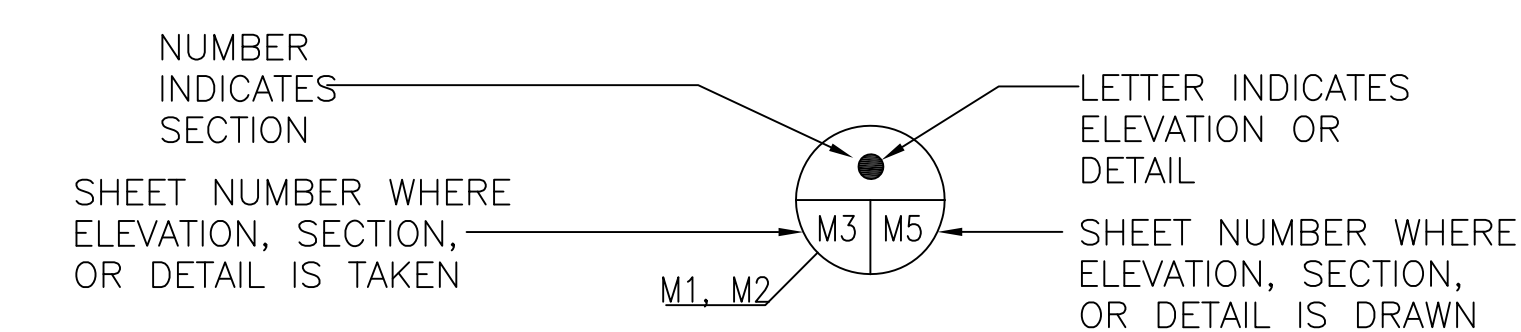
NOTE: HEAVY LINE WEIGHT INDICATES NEW EQUIPMENT OR EQUIPMENT TO BE REMOVED, LIGHT LINE WEIGHT INDICATES EQUIPMENT WHICH IS EXISTING TO REMAIN

— HWS —	HOT WATER SUPPLY PIPING		PIPE SLOPE (DOWN IN ARROW DIRECTION)		(AD) ACCESS DOOR
--- HWR ---	HOT WATER RETURN PIPING		FLOW CONTROL BALANCING VALVE WITH PRESSURE TAPS (GPM NOTED)		MOTORIZED CONTROL DAMPER
— CHS —	CHILLED WATER SUPPLY PIPING		GAS SHUT-OFF COCK		POINT OF CONNECTION-NEW TO EXISTING
--- CHR ---	CHILLED WATER RETURN PIPING		RELIEF VALVE		POINT OF DEMOLITION TERMINATION
— RL —	REFRIGERANT LIQUID PIPING		ECCENTRIC PIPE REDUCER		DUCT SMOKE DETECTOR
— RS —	REFRIGERANT SUCTION PIPING		PIPE CAP	P-1	PUMP MARK - SEE SCHEDULE
— D —	CONDENSATE DRAIN PIPING		DIRECTION OF FLOW	EF-1	EXHAUST FAN MARK - SEE SCHEDULE
	BACKFLOW PREVENTER		THERMOMETER WELL	AHU-1	AIR HANDLING UNIT MARK - SEE SCHEDULE
	BALANCING VALVE (GLOBE VALVE/SQUARE HEAD COCK)		PIPE ANCHOR	VAV-1	VARIABLE AIR VOLUME BOX MARK - SEE SCHEDULE
	BALL VALVE		SUPPLY DUCT SECTION	B-1	BOILER MARK - SEE SCHEDULE
	CHECK VALVE		EXHAUST DUCT SECTION	CU-1	CONDENSING UNIT MARK - SEE SCHEDULE
	BUTTERFLY VALVE		RETURN DUCT SECTION	DSS-1	DUCTLESS SPLIT SYSTEM MARK - SEE SCHEDULE
	STRAINER WITH BLOW DOWN VALVE		BOILER EMERGENCY SHUT-OFF SWITCH	(A) 100	GRILLE OR DIFFUSER MARK - SEE SCHEDULE OR SPECIFICATION (CFM NOTE)
	3-WAY AUTO CONTROL VALVE	FD	FIRE DAMPER WITH ACCESS DOOR	1	NEW WORK NOTE MARK
	PRESSURE REDUCING VALVE		THERMOSTAT/SENSOR MOUNT 60" ABOVE FLOOR SUBSCRIPT INDICATES EQUIPMENT BEING CONTROLLED	1	DEMOLITION WORK NOTE MARK
	2-WAY AUTO CONTROL VALVE		ELBOW WITH TURNING VANES		FLEXIBLE DUCT CONNECTION WITH BALANCING DAMPER
	THERMOMETER		MANUAL BALANCING DAMPER WITH LOCKING QUADRANT		EMERGENCY BOILER SHUT-OFF SWITCH
	FLEXIBLE PIPING CONNECTION		CONTROL VALVE		LOW PRESSURE SUPPLY OR RETURN DUCT WORK
	PRESSURE GAUGE SHUT-OFF COCK		MEDIUM PRESSURE SUPPLY DUCT WORK		
	AUTOMATIC AIR VENT				
	UNION				

ALL EQUIPMENT AND ASSOCIATED COMPONENTS SCHEDULED OR OTHERWISE INDICATED ON DRAWINGS BY MANUFACTURER'S NAME AND ASSOCIATED MODEL NUMBER SERVE AS THE BASIS OF DESIGN AND ARE INTENDED TO SHOW THE GENERAL SIZE, CONFIGURATION, LOCATION, CONNECTIONS, AND/OR SUPPORT FOR EQUIPMENT OR SYSTEMS SPECIFIED WITH RELATION TO THE OTHER BUILDING SYSTEMS. THERE IS NO INTENT TO LIMIT COMPETITION. SEE SPECIFICATIONS FOR TECHNICAL REQUIREMENTS PERTAINING TO THE PRODUCTS.

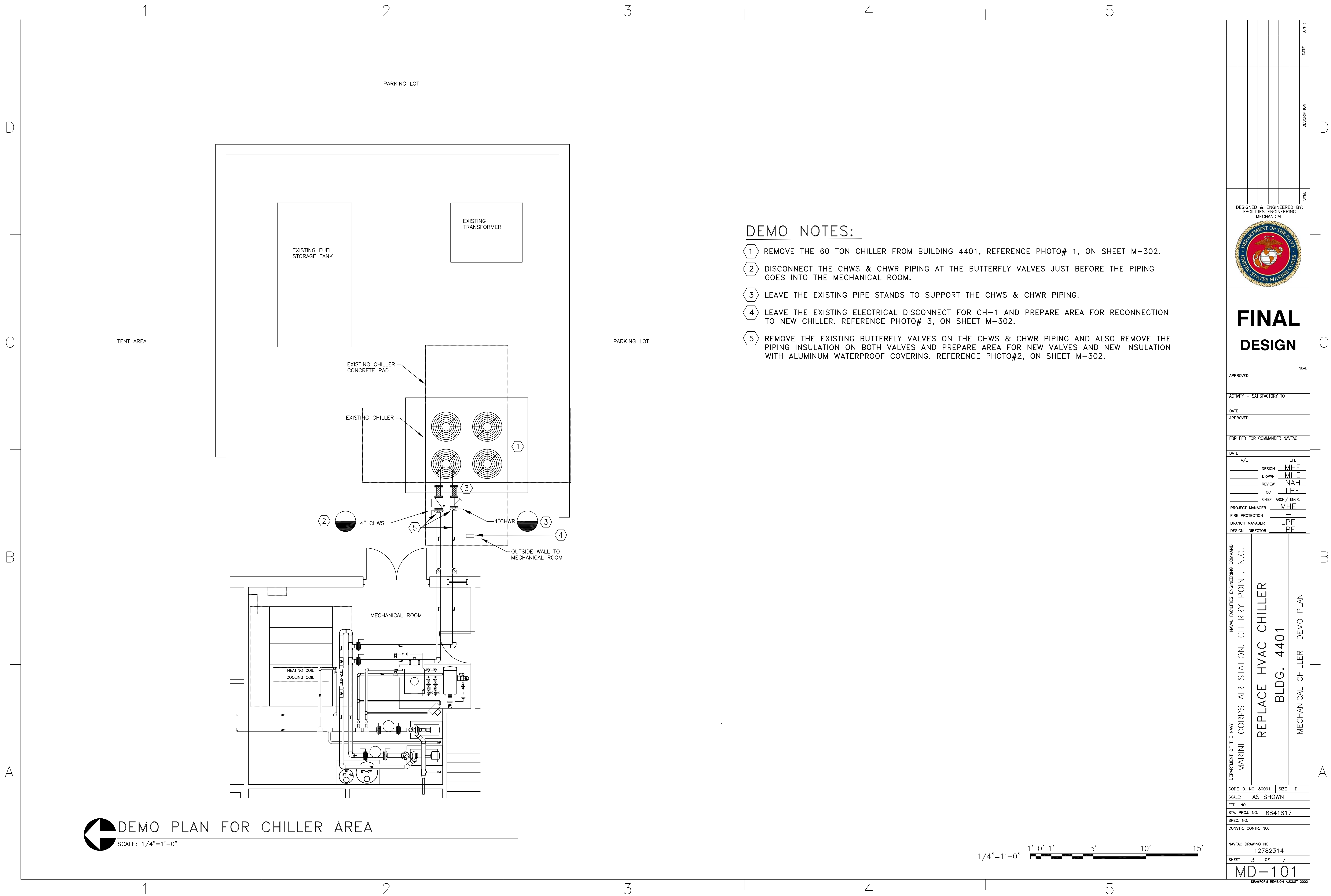
## GENERAL NOTES

- SCOPE OF WORK INCLUDES PROVIDING A FIRST CLASS WORKING SYSTEM IN COMPLIANCE WITH THESE DRAWINGS AND SPECIFICATIONS, TESTED READY FOR OPERATION COMPLETE WITH LABOR, MATERIALS, APPARATUS, TRANSPORTATION, AND TOOLS REQUIRED FOR THE INSTALLATION.
- COORDINATE WORK WITH THAT OF OTHER TRADES. INSTALL THE NEW EQUIPMENT IN THE EXACT LOCATIONS OF THE EXISTING DEVICE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFICATIONS, CHANGES, ETC. FOR THE EQUIPMENT HE PROVIDES, EVEN IF APPROVED AS AN EQUAL.
- MISCELLANEOUS ITEMS NOT SHOWN ON THE PLANS BUT NECESSARY FOR A COMPLETE OPERABLE SYSTEM, SHALL BE SUPPLIED AND INSTALLED.
- INSTALL EQUIPMENT PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. MAINTAIN ALL RECOMMENDED CLEARANCES.
- REPAIR ANY MATERIAL OR WORK WHICH THE CONTRACTOR HAS DAMAGED.
- BALANCE AIR AND WATER SYSTEMS WITHIN ±5% OF THE VALUES INDICATED.
- TEST THE ENTIRE SYSTEM IN ALL MODES OF OPERATION TO INSURE PROPER OPERATION.
- FURNISH AND INSTALL ALL EQUIPMENT AND MATERIALS FOR A COMPLETE INSTALLATION IN ALL RESPECTS READY OF INTENDED USE AND IN STRICT ACCORDANCE WITH ALL STATE AND LOCAL CODES AND MANUFACTURER'S RECOMMENDATIONS. INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY PRECAUTIONS AND PROCEDURES.



## ELEVATION, SECTION, OR DETAIL SYMBOL

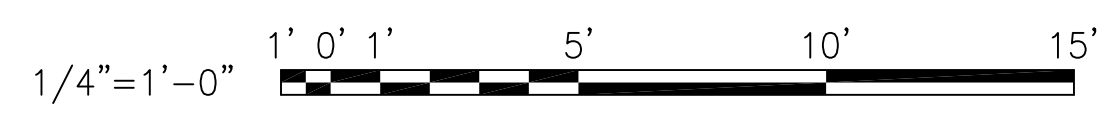
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DESIGNED & ENGINEERED BY: FACILITIES ENGINEERING MECHANICAL	
USE THIS SPACE FOR YOUR ADDRESS INFO.	
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FOR EFD FOR COMMANDER NAVAC	
DATE	
A/E	EFD
DESIGN	MHE
DRAWN	MHE
REVIEW	NAH
QC	LPF
CHEF	ARCH/ ENGR
PROJECT MANAGER	MHE
FIRE PROTECTION	
BRANCH MANAGER	LPF
DESIGN DIRECTOR	LPF
NAVAL FACILITIES ENGINEERING COMMAND MARINE CORPS AIR STATION, CHERRY POINT, N.C.	
REPLACE HVAC CHILLER BLDG. 4401	
LEGEND, ABBREVIATIONS & GENERAL NOTES	
CODE ID. NO. 80091	SIZE D
SCALE: AS SHOWN	
FED. NO.	
STA. PROJ. NO. 6841817	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVAC DRAWING NO. 12782313	
SHEET 2 OF 7	
<b>M-001</b>	
DRAWING REVISION JULY 2003	



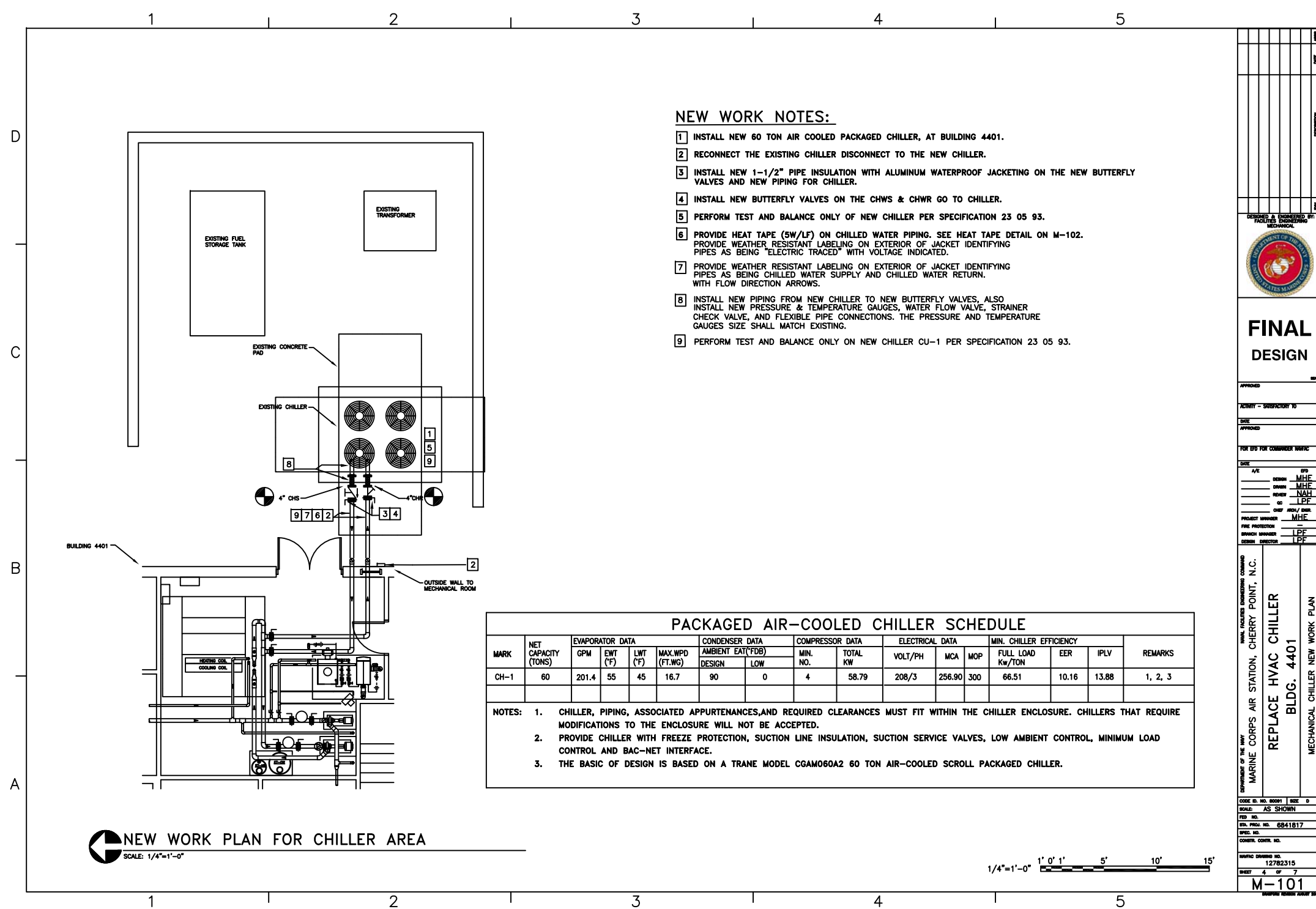
**DEMO NOTES:**

- ① REMOVE THE 60 TON CHILLER FROM BUILDING 4401, REFERENCE PHOTO# 1, ON SHEET M-302.
- ② DISCONNECT THE CHWS & CHWR PIPING AT THE BUTTERFLY VALVES JUST BEFORE THE PIPING GOES INTO THE MECHANICAL ROOM.
- ③ LEAVE THE EXISTING PIPE STANDS TO SUPPORT THE CHWS & CHWR PIPING.
- ④ LEAVE THE EXISTING ELECTRICAL DISCONNECT FOR CH-1 AND PREPARE AREA FOR RECONNECTION TO NEW CHILLER. REFERENCE PHOTO# 3, ON SHEET M-302.
- ⑤ REMOVE THE EXISTING BUTTERFLY VALVES ON THE CHWS & CHWR PIPING AND ALSO REMOVE THE PIPING INSULATION ON BOTH VALVES AND PREPARE AREA FOR NEW VALVES AND NEW INSULATION WITH ALUMINUM WATERPROOF COVERING. REFERENCE PHOTO#2, ON SHEET M-302.

**DEMO PLAN FOR CHILLER AREA**  
SCALE: 1/4"=1'-0"



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CHEF	ARCH/ ENGR.	
PROJECT MANAGER	MHE	
FIRE PROTECTION		
BRANCH MANAGER	LPF	
DESIGN DIRECTOR	LPF	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND MARINE CORPS AIR STATION, CHERRY POINT, N.C. <b>REPLACE HVAC CHILLER</b> BLDG. 4401 MECHANICAL CHILLER DEMO PLAN		
CODE ID. NO. 80091	SIZE	D
SCALE: AS SHOWN		
FED. NO.		
STA. PROJ. NO. 6841817		
SPEC. NO.		
CONSTR. CONTR. NO.		
NAVAC DRAWING NO. 12782314		
SHEET 3 OF 7		
<b>MD-101</b>		
DRAWING REVISION AUGUST 2002		



**NEW WORK NOTES:**


- 1 INSTALL NEW 60 TON AIR COOLED PACKAGED CHILLER, AT BUILDING 4401.
- 2 RECONNECT THE EXISTING CHILLER DISCONNECT TO THE NEW CHILLER.
- 3 INSTALL NEW 1-1/2" PIPE INSULATION WITH ALUMINUM WATERPROOF JACKETING ON THE NEW BUTTERFLY VALVES AND NEW PIPING FOR CHILLER.
- 4 INSTALL NEW BUTTERFLY VALVES ON THE CHWS & CHWR GO TO CHILLER.
- 5 PERFORM TEST AND BALANCE ONLY OF NEW CHILLER PER SPECIFICATION 23 05 93.
- 6 PROVIDE HEAT TAPE (SW/LF) ON CHILLED WATER PIPING. SEE HEAT TAPE DETAIL ON M-102. PROVIDE WEATHER RESISTANT LABELING ON EXTERIOR OF JACKET IDENTIFYING PIPES AS BEING "ELECTRIC TRACED" WITH VOLTAGE INDICATED.
- 7 PROVIDE WEATHER RESISTANT LABELING ON EXTERIOR OF JACKET IDENTIFYING PIPES AS BEING CHILLED WATER SUPPLY AND CHILLED WATER RETURN. WITH FLOW DIRECTION ARROWS.
- 8 INSTALL NEW PIPING FROM NEW CHILLER TO NEW BUTTERFLY VALVES, ALSO INSTALL NEW PRESSURE & TEMPERATURE GAUGES, WATER FLOW VALVE, STRAINER CHECK VALVE, AND FLEXIBLE PIPE CONNECTIONS. THE PRESSURE AND TEMPERATURE GAUGES SIZE SHALL MATCH EXISTING.
- 9 PERFORM TEST AND BALANCE ONLY ON NEW CHILLER CU-1 PER SPECIFICATION 23 05 93.

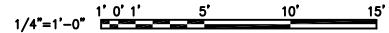
**NEW WORK PLAN FOR CHILLER AREA**  
SCALE: 1/4"=1'-0"

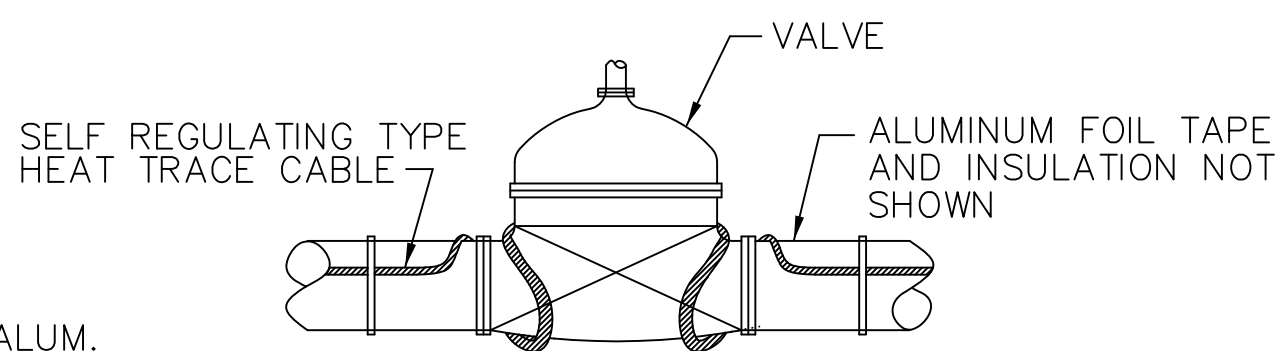
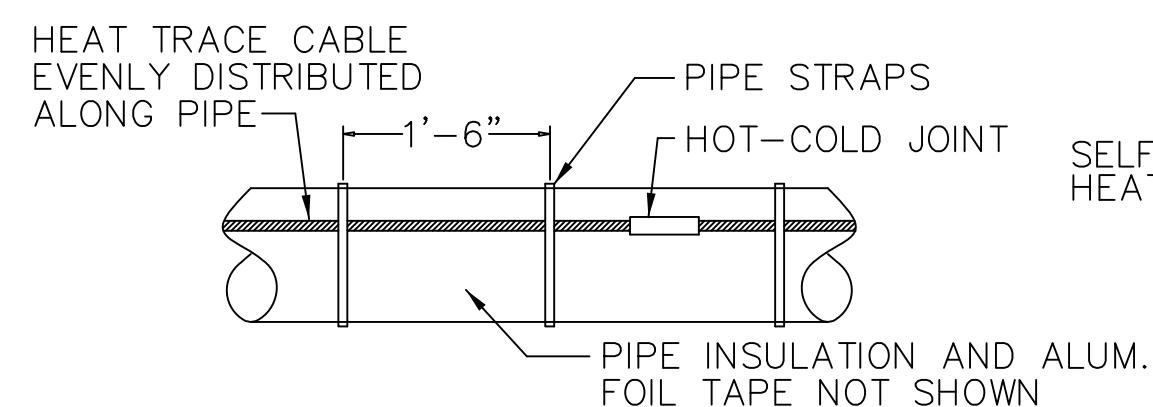
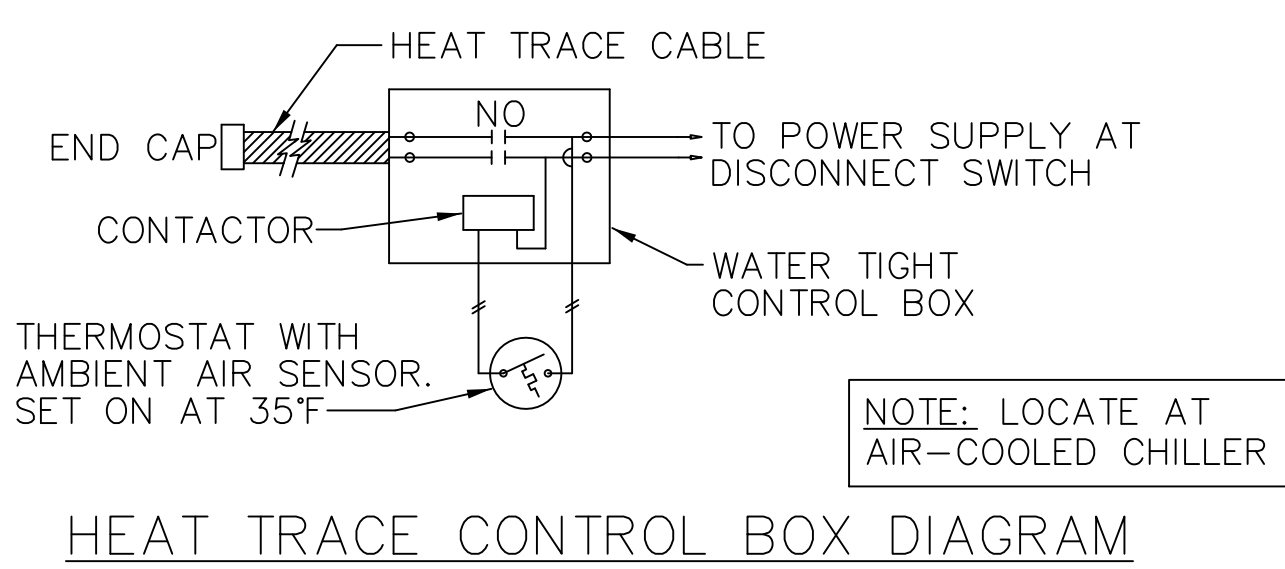
**PACKAGED AIR-COOLED CHILLER SCHEDULE**

MARK	NET CAPACITY (TONS)	EVAPORATOR DATA				CONDENSER DATA		COMPRESSOR DATA		ELECTRICAL DATA			MIN. CHILLER EFFICIENCY			REMARKS
		GPM	EWI (°F)	LWT (°F)	MAX.WPD (FT.WG)	DESIGN	LOW	MIN. NO.	TOTAL KW	VOLT/PH	MCA	MOP	FULL LOAD Kw/TON	EER	IPLV	
CH-1	60	201.4	55	45	16.7	90	0	4	58.79	208/3	256.90	300	66.51	10.16	13.88	1, 2, 3

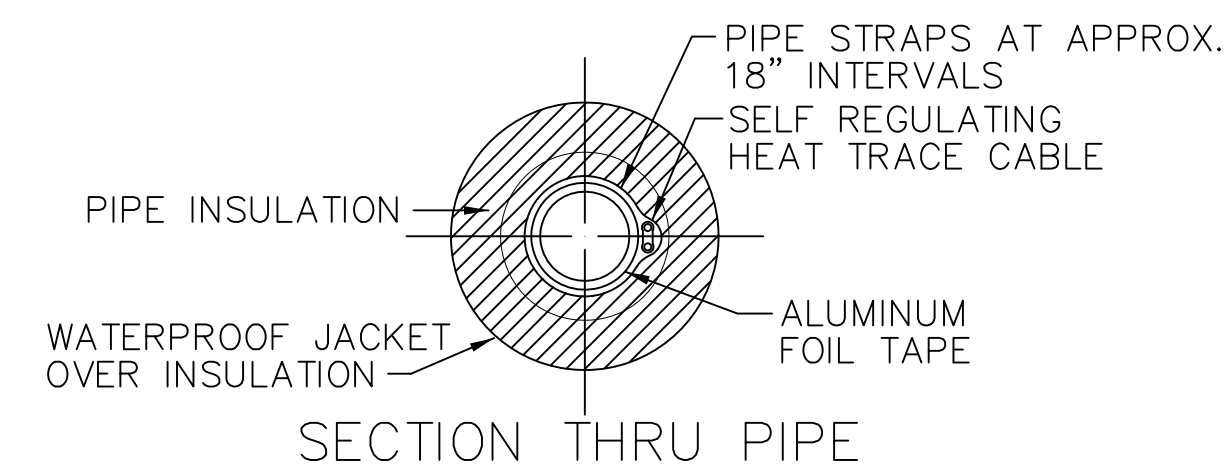
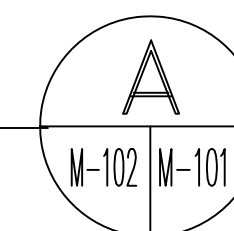
- NOTES:
- 1. CHILLER, PIPING, ASSOCIATED APPURTENANCES, AND REQUIRED CLEARANCES MUST FIT WITHIN THE CHILLER ENCLOSURE. CHILLERS THAT REQUIRE MODIFICATIONS TO THE ENCLOSURE WILL NOT BE ACCEPTED.
  - 2. PROVIDE CHILLER WITH FREEZE PROTECTION, SUCTION LINE INSULATION, SUCTION SERVICE VALVES, LOW AMBIENT CONTROL, MINIMUM LOAD CONTROL AND BAC-NET INTERFACE.
  - 3. THE BASIC OF DESIGN IS BASED ON A TRANE MODEL CGAM060A2 60 TON AIR-COOLED SCROLL PACKAGED CHILLER.

 <b>FINAL DESIGN</b>	DEPARTMENT OF THE NAVY MARINE CORPS AIR STATION, CHERRY POINT, N.C. <b>REPLACE HVAC CHILLER BLDG. 4401</b> MECHANICAL CHILLER NEW WORK PLAN
APPROVED: _____ ACTIVITY - SUBFACTORY ID: _____ DATE: _____ APPROVED: _____ FOR ETO FOR COMMANDER USMC: _____ DATE: _____ AVE: _____ DESIGN: MHE DRAWN: MHE REVIEW: NAH IN CHARGE: LPF PROJECT MANAGER: MHE FIRE PROTECTION: _____ BRANCH MANAGER: LPF DESIGN DIRECTOR: LPF	
CODE ID. NO. ROOM: _____   SIZE: D SCALE: AS SHOWN FEB. NO.: _____ ETO PROJ. NO.: 0841817 SPEC. NO.: _____ CONSTR. CONTR. NO.: _____ NAVFAC DRAWING NO.: 12782315 SHEET 4 OF 7 <b>M-101</b> <small>REVISIONS: 01/20/01</small>	






NOTES: 1. PROVIDE WEATHER RESISTANT LABELING ON EXTERIOR OF JACKET IDENTIFYING PIPES AS BEING "ELECTRIC TRACED" WITH VOLTAGE INDICATED.



HEAT TAPE TRACING DETAILS  
NO SCALE

DATE	APPR
DESCRIPTION	SYN
DESIGNED & ENGINEERED BY: FACILITIES ENGINEERING MECHANICAL	
 U.S. DEPARTMENT OF THE NAVY UNITED STATES MARINE CORPS <small>PLEASE USE THIS SPACE FOR YOUR ADDRESS INFO.</small>	
<b>FINAL DESIGN</b>	
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DESIGN	MHE
DRAWN	MHE
REVIEW	NAH
QC	LPF
CHEF ARCH/ENGR.	
PROJECT MANAGER	MHE
FIRE PROTECTION	
BRANCH MANAGER	LPF
DESIGN DIRECTOR	LPF
NAVAL FACILITIES ENGINEERING COMMAND MARINE CORPS AIR STATION, CHERRY POINT, N.C. <b>REPLACE HVAC CHILLER</b> <b>BLDG. 4401</b> MECHANICAL DETAILS	
CODE ID. NO. 80091	SIZE D
SCALE: AS SHOWN	
FED. NO.	
STA. PROJ. NO. 6841817	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO. 12782316	
SHEET 5 OF 7	
<b>M-102</b> <small>DRAWING REVISION JULY 2003</small>	





**1** EXISTING 60 TON CHILLER TO BE REMOVED AT, BLDG. 4401  
 W-302 W-302 NO TO SCALE

CHILL WATER PIPING TO BE REPLACED AT BLDG. 4401



CHILL WATER PIPING VALVES TO BE REPLACED AT BLDG. 4401

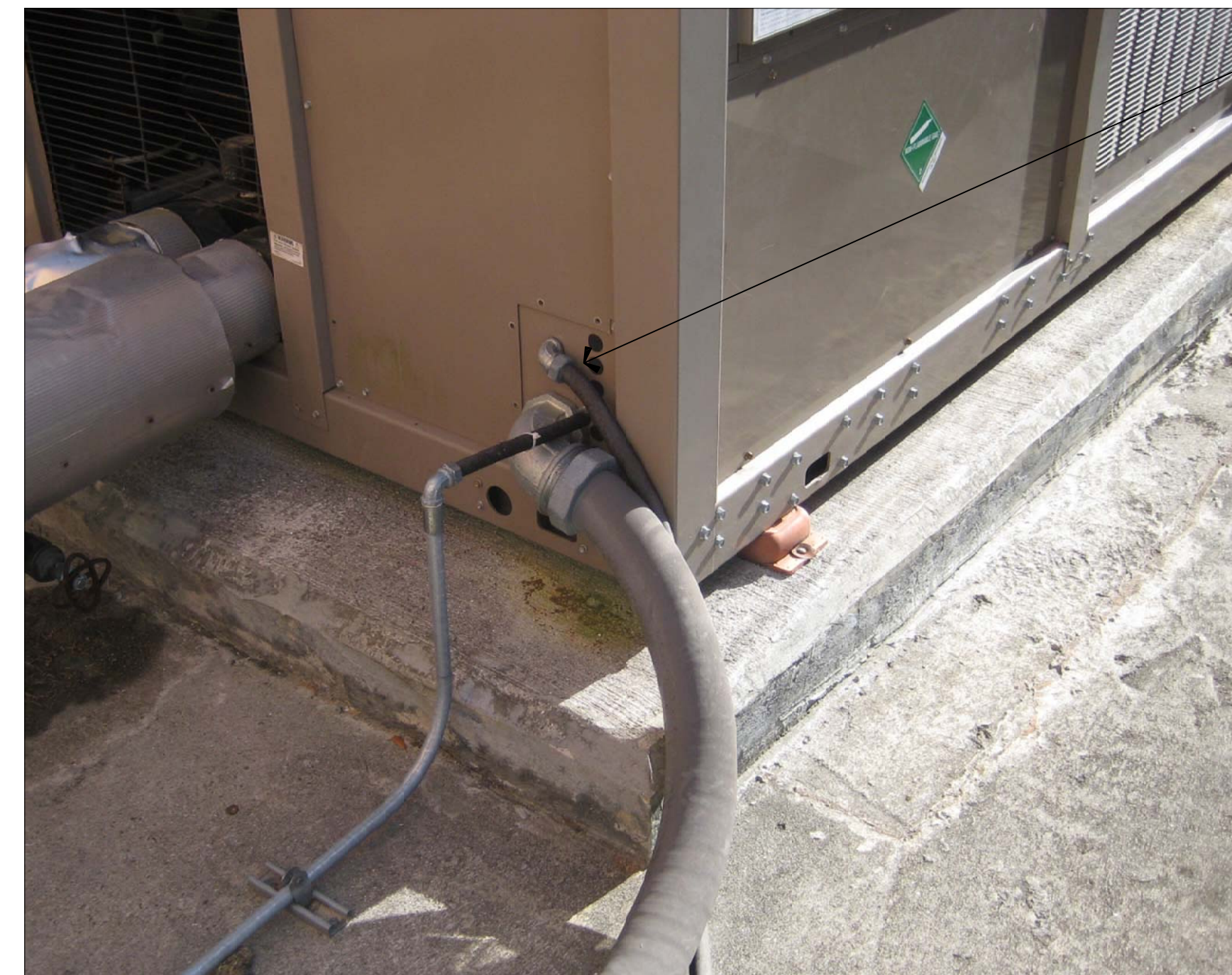
**2** REPL. CHWS & CHWR VALVES & INSULATION ON CHILLER  
 W-302 W-302 NO TO SCALE

EXISTING CHILLER DISCONNECT TO REMAIN FOR CONNECTION TO NEW CHILLER



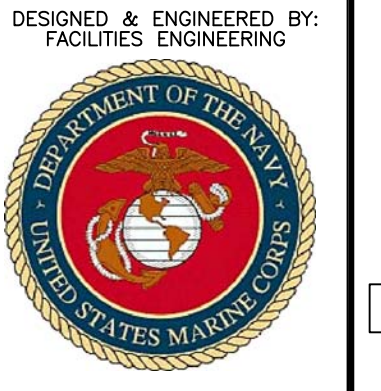
**3** EXISTING CHILLER DISCONNECT TO REMAIN  
 W-302 W-302 NO TO SCALE

DISCONNECT EXISTING CONDUIT & WIRING FROM EXISTING CHILLER AND SAVE FOR NEW CHILLER



**4** EXISTING CHILLER CONDUIT & WIRING TO REMAIN  
 W-302 W-302 NO TO SCALE

SYN	DESCRIPTION	DATE	APPR



DESIGNED & ENGINEERED BY:  
 FACILITIES ENGINEERING

DEPARTMENT (MECHANICAL)  
**FINAL DESIGN**

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CHEF ARCH/ENGR	
PROJECT MANAGER	MHE
FIRE PROTECTION	
BRANCH MANAGER	LPF
DESIGN DIRECTOR	LPF

NAVAL FACILITIES ENGINEERING COMMAND  
 MARINE CORPS AIR STATION, CHERRY POINT, N.C.  
**REPLACE HVAC CHILLER**  
**BLDG. 4401**  
 MECHANICAL EXISTING CHILLER PHOTOS

CODE ID. NO. 80091	SIZE D
SCALE: AS SHOWN	
FED. NO.	
STA. PROJ. NO. 6841817	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO. 12782318	
SHEET 7 OF 7	