

# MECHANICAL SPECIFICATIONS

## COOLING TOWER (STAINLESS STEEL, INDUCED DRAFT, COUNTERFLOW) 23 06 11

### PART 1 GENERAL

- 1.01 Work Included
- Provide and install an induced draft, crossflow type, factory assembled, film fill, industrial duty, stainless steel cooling tower situated as shown on the plans.
  - All work specified in this section shall comply with all Sections of Division 23.
- 1.02 Certifying Agent Requirements
- Cooling Tower Institute (CTI).
  - Underwriters Laboratories (UL).
- 1.03 Submittals
- Submit Manufacturer's complete product data for review.

### PART 2 - PRODUCTS

- 2.01 Acceptable Manufacturers
- Baltimore Aircoil, Marley, Evapco.
- 2.02 Cooling Tower
- The tower shall be capable of cooling as listed on the Equipment Schedule and its thermal rating shall be certified by the Cooling Technology Institute and Eurovent.
  - CTI and Eurovent certification notwithstanding, the cooling tower manufacturer shall guarantee that the tower supplied will meet the specified performance conditions when the tower is installed according to plan. If, because of a suspected thermal performance deficiency, the owner chooses to conduct an on-site thermal performance test under the supervision of a qualified, disinterested third party in accordance with CTI, Eurovent or ASME standards during the first year of operation; and if the tower fails to perform within the limits of test tolerance; then the cooling tower manufacturer will pay for the cost of the test and will make such corrections as are appropriate and agreeable to the owner to compensate for the performance deficiency.
  - The tower structure, anchorage and all its components shall be designed by licensed professional engineers, employed by the manufacturer, per the International Building Code to withstand a wind load of 30 psf, as well as a .3g seismic load. The fan deck, hot-water basin covers and, where specified, maintenance platforms shall be designed for 60 psf live load or a 200 lb. concentrated load. Guardrails, where specified, shall be capable of withstanding a 200 lb. concentrated live load in any direction, and shall be designed in accordance with OSHA guidelines.
  - The tower shall be structurally capable of being supported at the four outer corners of the tower cell. Alternatively, the tower manufacturer shall provide supporting steel to adapt tower to be supported at four outer corners. Except where otherwise specified, all components of the cooling tower shall be fabricated of 304 stainless steel. The tower shall be capable of withstanding water having a chloride content (NaCl) up to 150 ppm, a sulfate content (SO4) up to 1200 ppm, a calcium content (CaCO3) up to 800 ppm, and silica (SiO2) up to 150 ppm. The circulating water shall contain no oil, grease, fatty acids, or organic solvents. Fiberglass casing, polyurethane barriers, and thermosetting hybrids and the components they are adhered to shall be considered non-recyclable and not allowed. (DN 20)
  - The specifications, as written, are intended to indicate those materials that will be capable of withstanding the above water quality in continuing service, as well as the loads described in paragraph C. They are to be regarded as minimum requirements. Where component materials peculiar to individual tower designs are not specified, the manufacturers shall take the above water quality and load carrying capabilities into account in the selection of their materials of manufacture.
  - Fan(s) shall be propeller-type, incorporating aluminum alloy blades attached to galvanized hubs with U-bolts. Blades shall be individually adjustable. Maximum fan tip speed shall be 13,000 ft./min. Fan(s) shall be driven through a right angle, industrial duty, oil lubricated, geared speed reducer that requires no oil changes for the first five (5) years of operation. All gearbox bearings shall be rated at an L10A service life of 100,000 hours or greater and the gear sets shall haveAGMA Quality Class of 9 or greater. The gearbox shall include any modifications to enable operation down to 10% of full speed.
  - Each cell of the cooling tower shall be equipped with a UL/CUL 50B listed SFPC (Single Point Power Connection) control panel in a NEMA 3R or 4X outdoor enclosure. The SFPC panel shall include a main circuit breaker with an external operating handle, lockable in the off position for safety. The SFPC main circuit breaker will feed various control circuits integrated into the SFPC panel including but not limited to: fan motor starter, basin heater controls and water level controls. In the event a VFD is furnished for the cooling tower fan, a feeder breaker in the SFPC panel shall be provided to feed power to a remotely mounted VFD. Operational status contacts wired to user terminal points shall be provided.
- 2.03 Fill, Louvers, and Drift Eliminators
- Fill shall be film type, thermoformed PVC, with louvers and eliminators formed as part of each fill sheet. Fill shall be suspended from stainless steel structural tubing supported from the tower structure, and shall be elevated above the floor of the cold-water basin to facilitate cleaning. Air inlet faces of the tower shall be free of water splash out.
  - Drift eliminators shall be PVC, triple-pass, and shall limit drift losses to 0.005% or less of the design water flow rate.
- 2.04 Hot Water Distribution System
- Two open 304L stainless steel basins (one above each bank of fill) shall receive hot water piped to each cell of the tower. These basin components shall be installed and sealed at the factory and assembled with bolted connections. Top screws shall not be acceptable due to their potential to develop leaks. The basins shall be equipped with removable, stainless steel covers capable of withstanding the loads described in paragraph 2.02 C. The water distribution system shall be accessible and maintainable during tower fan and water operation.
  - Each basin shall include an inlet hole and bolt circle to accept a 125# flange connection per ANSI B16.1. Removable, interchangeable, polypropylene nozzles installed in the floor of these basins shall provide full coverage of the fill by gravity flow.
  - The water distribution system shall be accessible and maintainable while tower is operating.
- 2.05 Casing, Fan Deck and Fan Guard
- The casing and fan deck shall be 304 stainless steel, and shall be capable of withstanding the loads described in paragraph 2.02 C. The top of the fan shall be equipped with a conical, non-sagging, removable fan guard, fabricated of welded 5/16" and 7 gauge rods, and hot dip galvanized after fabrication.
  - A large 304 stainless steel, rectangular access door shall be located on both cased faces for entry into the cold-water basin. Doors shall provide convenient access to the fan plenum area to facilitate inspection and allow maintenance to the fan drive system. The access doors shall be at least 30" wide by 33" high.
  - The top of the tower shall be equipped with a guardrail, complete with kneerail and toeboard, designed according to OSHA guidelines and factory welded into sub-assemblies for ease of field installation. Posts, toprails and kneerails shall be 1 1/2" square tubing. The guardrail assembly shall be hot dipped galvanized after welding and capable of withstanding a 200 pound concentrated live load in any direction. Posts shall be spaced on centers of 8'-0" or less. A 1'-6" wide aluminum ladder with 3" I-beam side rails and 1.25" diameter rungs shall be permanently attached to the endwall casing of the tower, rising from the base of the tower to the top of the guardrail.

- Provide a ladder extension for connection to the foot of the ladder attached to the tower casing. This extension shall be long enough to rise from grade level to the base of the tower. The installing contractor shall be responsible for cutting the ladder to length; attaching it to the foot of the tower ladder; and anchoring it at its base.
- A heavy gauge aluminum safety cage, welded into subassemblies for ease of field installation, shall surround the ladder, extending from a point approximately 1'-0" above the foot of the ladder to the top of the guardrail. Maximum weight of welded subassemblies shall not exceed 20 lb. for ease of installation.
- There shall be an access platform at the base of the tower extending from the vertical ladder to the endwall access door. The platform shall be surrounded by an OSHA compliant guardrail system welded into subassemblies for ease of installation. The walking surface of the platform shall be perforated to provide a non-slip surface for personnel safety.
- Provide a factory-installed walkway extending from one cased-face access door to the other cased face. A steel framework shall support the walkway and the top of the walkway shall be at or above the cold-water basin overflow level. The walkway and framework shall be stainless steel and have a minimum width of 36".
- Interior Mechanical Equipment Access Platform
  - Elevated stainless steel grating platform convenient to the core and maintenance of the tower's mechanical equipment shall be provided.
  - An interior ladder shall extend upward from the plenum walkway to an elevated fiberglass bar grating platform convenient for the care and maintenance of the tower's mechanical equipment. The platform shall be surrounded by an OSHA compliant guardrail system welded into sub-assemblies for ease of installation.

### 2.06 Cold Water Collection Basin

- The collection basin shall be welded 304 stainless steel construction. Only low-carbon stainless steel alloys will be accepted in order to minimize the risk of intergranular corrosion in the weld zones. The basin shall include the number and type of suction connections required to accommodate the outflow piping system shown on the plans. Suction connections shall be equipped with stainless steel debris screens and anti-vortex device. A factory-installed, float-operated, mechanical make-up valve shall be included. An overflow and drain connection shall be provided in each cell of the cooling tower. The basin floor shall slope toward the drain to allow the flow out of debris collection sumps that accumulate. Towers of more than one cell shall include a method for flow and equalization between cells. The basin shall be accessible and maintainable while water is circulating.
- Basin Sweeper Piping: The cold-water basin shall be equipped with PVC sweeper piping with plastic nozzles. The piping shall be factory installed under the fill and designed to force all dirt and debris to the depressed section of the collection basin.
- Water Level Control System: PVC, balanced piston type make-up valve with plastic float.

### 2.07 Control Options

- Control circuit to be wired out to terminal blocks for field connection to a remote vibration switch, overload trip alarms and remote temperature control devices. The temperature controller shall be adjustable for the required cold-water temperature. If a thermostatic controller is used it shall be mounted on the side of the tower with the temperature sensing bulb installed in the cold-water basin using a suspension mounting bracket. If a solid-state temperature controller is used the controller will be door mounted on the control panel. The solid-state temperature controller will display two temperatures, one for outgoing water and the other for set point. Water temperature input shall be obtained using a three-wire RTD with dry well in the outlet water piping and wired back to the solid-state temperature controller in the control panel.
- Fan Motor Variable Speed Drive: The Cooling Tower shall be provided with an inverter duty rated fan motor. A complete UL listed variable speed drive system shall be provided by others.
- Terminal Box: A factory installed terminal box shall be furnished and mounted to the outside of the tower where applicable. The fan motor and optional components including the vibration switch and water level probes shall be factory wired to terminal points inside the terminal box. Optional tower components which ship loose, including the oil level switch and immersion heaters shall be field wired to the terminal box. Enclosure shall be NEMA 4X with hinged and lockable door. Testing UL, CSA and IEC standards. Terminal box shall include lockable stainless steel snap-latch door fasteners, terminal blocks marked with wire numbers, sub-panel and a wiring diagram. Complete assembly shall be built to UL 508A standards. Conduit entry and exit points shall be the bottom of the enclosure preventing water collection in the enclosure.
- A vibration limit switch in a NEMA 4X housing shall be installed on the mechanical equipment support and wired to the shutdown circuit of the fan motor starter or VFD. The purpose of this switch will be to interrupt control power voltage to a safety circuit in the event of excessive vibration causing the starter or VFD equipment to de-energize the motor. It shall be adjustable for sensitivity and include a means to reset the switch.

### 2.08 Required Options

- Motor out of the Airstream: The motor shall be mounted outside the casing of the tower, and shall be connected to the gear reducer by a dynamically balanced, stainless steel tube and flange driveshaft.
- Inlet Flow Control Valves: Heavy-duty flow-regulator valves shall be provided at the hot-water inlet connections. These valves shall be disc-type, with cast iron bodies and stainless steel operating stems. There shall be a locking handle to maintain the valve setting in any position. Valves shall be right-angle configuration, precluding the need for inlet elbows.
- Equalizer Flume Weir Gates: The interconnecting flume between cells shall be equipped with a removable cover plate to permit the shutdown of one cell for maintenance purposes, or to permit independent cell operation.
- Basin Sweeper Piping: The cold water basin of the cooling tower will be equipped with PVC sump sweeper piping with plastic eductor nozzles. The piping must be designed specifically for the size and shape of the basin to ensure full agitation.

### PART 3 - EXECUTION

#### 3.01 Installation

- Install cooling tower as shown on the drawings and specified herein.
- Install cooling tower per the manufacturer's written recommendations.
- All support structures, steel beams, plates, mounting hardware placed for the tower support are to be painted with rust inhibiting paint prior to the setting of the tower.
- No holes are to be drilled through any surface, support joint, plate or seam seal member for anchoring of pipes or conduit. All items that are attached to the tower are to be retained by beam clams or electrical "Jiffy" clips.
- The vibration stop switch is to be wired to the respective cooling tower motor magnetic starter. The switch is to be wired ahead of the H-O-A switch to allow for stoppage in total motor assembly shall be hot dipped galvanized after welding. The control circuit conductor can be routed through the tower motor feed conductors as permitted by NEC using proper rated wire.

- Where multiple cooling towers are installed on a common return piping system provide basin equalizer provisions between tower cells larger than tower outlet nozzle size as indicated on the Drawings.
- Where towers are installed behind a screen enclosure coordinate top of tower height with screen wall height and the tower manufacturers written recommendations.
- The Mechanical Contractor shall procure the services of the Electrical Contractor to install all conduit and wiring required to operate the tower water treatment systems and the tower vibration stop switches on this project.

#### 3.02 Warranty

- The entire tower, including structure, casing, basins, decking, fan(s), motor(s), and all mechanical drive components (including belts, if used) shall be warranted against failure due to defects in materials and workmanship for a period of five (5) years from the date of shipment to the job. Towers not covered by a warranty of this scope will not be accepted.

#### 3.03 Performance Warranty

- CTI Certification notwithstanding, the cooling tower manufacturer shall guarantee that the tower supplied will meet the specified performance conditions when the tower is installed according to the plans. If, because of a suspected thermal performance deficiency, the Owner chooses to conduct an on-site thermal performance test under the supervision of a qualified, disinterested third party (in accordance with CTI and ASME Standards) during the first year of operation; and if the tower fails to perform within the limits of test tolerance, then the cooling tower manufacturer will pay for the cost of the test and will make such corrections as are appropriate and agreeable to the Owner to compensate for the performance deficiency.

#### 3.04 Vibration Isolators

- Provide factory-designed, spring-type, boxed rails for installation between the structural steel (or concrete piers) and the tower's bottom supporting framework. For one- or two-cell applications. Rails shall be constructed of continuous upper structural steel channels separated from a supporting steel baseplate by boxed spring elements. Standard rails shall be designed with a static one-inch deflection at the recommended total operating weight, and shall be suitable for wind velocities up to 50 MPH.

#### 3.05 Tower Support

- Cooling tower shall be supported at four corner points with concrete or steel piers. If a cooling tower cannot be supported in this manner without the addition of intermediate structural steel support beams along the perimeter of the tower, the cooling tower will not be accepted.

#### 3.06 Startup

- The supplier shall include in his bid the services of a factory-trained service engineer for a minimum of two 8-hour days on site to startup, test and concurrently instruct the Owner's operators.

### END OF SECTION 23 06 11

## CONDENSER WATER PIPING, DRAIN PIPING & FITTINGS - SECTION 23 07 01

### PART 1 GENERAL

- 1.01 Work Included
- Provide and install all piping for mechanical systems complete with all necessary pipe, tube, hangers, supports, restraints, isolators, fittings, hardware and pipe cleaning/testing as necessary for fully functional piping systems.
  - All work specified in this section shall comply with all Sections of Division 23.
- 1.02 Submittals
- Submit all piping and fittings for review by the Engineer.

### PART 2 PRODUCTS

- 2.01 Steel Pipe
- Acceptable Manufacturers for Steel Pipe and Fittings: Bethlehem, Le Barge Pipe Bending & Coiling, Ohio Pipe, Grinnell, U.S. Steel, Tube Turn, Victaulic, Tee & Mason, Gustin-Bacon, Allied, Daniel, Ladish, Naylor, Anvil, Galjon, American Tube Co., Gruvick.
  - Butt welded, electric resistance welded, or seamless black steel pipe, ANSI B36.10, ASTM A120, Grade B, or ASTM A53, A106, or A134 Schedule 40, for piping 10" and smaller; 0.375" wall thickness for piping 12" through 24" diameter, for:
    - Condenser water piping.

### 2.02 Strainers

- Acceptable Manufacturers: Armstrong, Sarco, Bush, Illinois, Strong, TACO, Mueller.

### 2.03 Steel Pipe Fittings

- Flanges, Fittings, Unions and Similar Items: Commercially available products marked in accordance with MSS-SP-25 marking on small size of odd shaped products may be omitted provided they are listed in the sequence so allowed by MSS-SP-25, but such products shall bear the manufacturer's name and trademark.
- Fittings 2-1/2" and Larger: Carbon steel, butt welded fittings, ASTM A234-08P, ANSI B16.9, and B16.28. Slip-on flanges are not permitted.
- Flanges: Carbon steel, ASTM A105 and ANSI B16.5 raised face weld neck or slip on raised face.
- Unions: Cast iron with bronze to iron ground joint rated at 150 lbs, 300 PSI on fuel gas piping.
- Mechanical Joints: Victaulic, cut or rolled groove, or equal mechanical joints may be used on steel piping for condenser water piping.
- Strainers: Strainers shall be wye self-cleaning flush type, gray cast iron, with bronze monel metal or stainless steel sediment strainer and 3/4" full port blow-off valve, piped to floor sink or drain. Strainers shall be separate from other components. Integral strainers and traps will not be approved. Strainers 3" and smaller shall have 1/32" perforations and strainers 4" and larger shall have 1/8" perforations and have a minimum open area of 3 times the area of strainer inlet pipe. Use 40 mesh screens and Everdur wool packing during initial cleaning of system.

### PART 3 EXECUTION

- 3.01 Installation - General
- Clean inside of pipe prior to installation. Keep installed piping clean, and protect ends from foreign matter by capping or plugging them.
  - Install pipe so that it does not interfere with opening of doors or apparatus, access to equipment, or any portion of electrical equipment.
  - Run pipes in straight lines and square with building. Install vertical piping plumb. Make offsets only where indicated and where necessary.

#### 3.02 Pipe Joining

- Preparing Pipe Ends:
  - Cut pipe ends square with pipe cutters only. Do not use hacksaws or torch.
  - Ream pipe ends, after cutting, to full inside diameter.
- Welding Joints:
  - Weld all black steel piping 2-1/2" and larger.
    - All procedures and welders must be qualified in accordance with the requirements of Section IX, ASME Boiler and Pressure Vessel Code and ANSI code for power piping B31.1. Procedure qualification test records and acceptance shall be submitted with the welding procedure prior to the start of fabrication. The qualification test shall show proficiency in overhead, vertical, and horizontal welding techniques. The qualification test shall have occurred within six months prior to performing any welding on this project.
    - Owner and/ or Engineer's inspector or authorized representative will review performance qualification records of individual welders.
  - Welding Processes: The following welding processes are permitted, provided that the procedure is qualified in accordance with Section IX, ASME Boiler and Pressure Vessel Code.
    - Manual shielded metal-arc.
    - Gas tungsten-arc.
    - Other welding processes may be used provided they are qualified in accordance with Section IX, ASME Boiler and Pressure Vessel Code.
  - Restrictions: Weld bevel preparations shall be provided on all welding fittings and shall be machined or ground to remove all discoloration if flame or arc cut.
  - Welding Filler Material:
    - A filler material control procedure shall be submitted to Owner for review and acceptance prior to performing any welding.
    - All shielded metal-arc welding shall be performed using low-hydrogen type electrodes such as E7018.
  - Preheat and Interpass Temperature:
    - Preheat for pressure components shall be as specified in Table 132 of ANSI B.1.
    - Preheat and interpass temperature shall be determined by temperature indicating crayons, contact pyrometers or other equally suitable means.
    - Postweld Heat Treatment: Postweld heat treatment for pressure components shall be as specified in Table 131 of ANSI B31.1.
  - Grooved Joints:
    - Grooved joint couplings and fittings shall be installed in accordance with the manufacturer's written installation instructions. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gaskets shall be verified as suitable for the intended service prior to installation. Gaskets shall be molded and produced by the coupling manufacturer. The grooved coupling manufacturer's factory trained representative shall provide on-site training for contractor's field personnel in the use of grooving tools, application of groove, and installation of grooved joint products. (A distributor's representative is not considered qualified to conduct the training.) The manufacturer's representative shall periodically visit the jobsite and review installation. Contractor shall remove and replace any joints deemed improperly installed.
      - AGS Series products shall be installed with the latest Victaulic installation instructions. Do not install AGS products with standard grooved end components. (Installation difficulties, joint separation, or leakage may occur.) Groove pipe using an approved Victaulic grooving tool equipped with an AGS roll set.

### END OF SECTION SECTION 23 07 01

## CONDENSER WATER VALVES - SECTION 23 01 00

### PART 1 GENERAL

- 1.01 Condenser Water
- Automatic Control Valves:
    - All modulating straight-through water valves shall be provided with equal percentage contoured throttling plugs. All modulating three-way mixing valves shall be provided with linear V-port plugs such that the total flow through the valve shall remain constant regardless of the valve's position. All diverting valves shall have two V-port plugs.

## MECHANICAL DRAWING INDEX

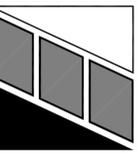
| SHT # | TITLE   |
|-------|---|
| M1-1  | MECHANICAL SPECIFICATIONS & DRAWING INDEX   |
| M1-2  | MECHANICAL SPECIFICATIONS AND CONTROLS  |
| M2-1  | MECHANICAL PARTIAL FLOOR PLAN - DEMOLITION  |
| M3-1  | MECHANICAL PARTIAL FLOOR PLAN - NEW, MECHANICAL PIPING DIAGRAM - NEW, MECHANICAL SCHEDULES, AND DETAIL(S) |

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REVISIONS



Expires 03/31/23

PALM VALLEY ELEMENTARY SCHOOL  
COOLING TOWER REPLACEMENT  
2801 N 135TH AVE  
GOODYEAR, AZ 85395

DATE: 01/28/22  
JOB No: 2022013  
DRAWN: NMC  
CHECKED: DMD  
APPROVED: RJW

SHEET TITLE  
MECHANICAL  
SPECIFICATIONS,  
AND  
DRAWING INDEX

M1-1

# MECHANICAL SPECIFICATIONS

## B. Valves 2-1/2" and Larger:

### 1. Butterfly Valves:

- a. Valves shall be lug body style manufactured in accordance with MSS-SP67 rated at least 200 PSI non-shock cold water working pressure. Body to have 2" extended neck for insulating and to be cast iron or ductile iron. Valve to have aluminum bronze alloy disc with EPDM rubber seat and seals, or EPDM rubber encapsulated disc with polymer-coated body. Stem shall be 400 series stainless steel and shall not have exposed stem to disc fasteners. Sizes 2-1/2" - 6" shall be lever operated with 10 position throttling plate. Lug-style shall be capable for use as isolation valves and recommended by manufacturer for dead-end service at full pressure without the need for downstream flanges.
- b. Acceptable Valves:
  1. Lug Body, Aluminum Bronze Disc: NIBCO LD2000-3 or Hammond 6211 (lever operator); NIBCO LD2000-5 or Hammond 5211 (gear).
  2. Lug Body, Rubber-Coated Disc: NIBCO LC2860-3 (lever); LC2860-5 gear.

### 2. Grooved End Butterfly Valves:

- a. IPS Steel Piping: Valves shall have cast ductile iron body with grooved ends rated to a maximum of 300 PSI cold water working pressure. Body to have extended neck for insulating. Valve to have electroless nickel coated ductile iron disc with pressure responsive EPDM seat and PPS (Polyphenylene Sulfide) coated body. Stem shall be 416 stainless steel and shall be offset from the disc centerline to provide full 360-degree circumferential seating. Sizes 2-1/2" - 6" shall be lever operated with 10 position throttling plate. Valves shall be capable for use as isolation valves and recommended by manufacturer for dead-end service at full pressure. Victaulic Vic-300 MasterSeal TM.
- b. Victaulic Series WTO6 for pipe sizes 14-inch through 24-inch with AGS grooved ends rated to a maximum of 300 PSI cold water working pressure. Body and disc to be PPS coated ductile iron, with disc mounted elastomer seal, two-piece T-4 FH 5/8 stem design, reinforced PTFE bearings and gear operator. Grooved end style shall be capable for use as isolation valves and recommended by manufacturer for dead-end service at full pressure. Victaulic Series WTO6.

END OF SECTION 23 01 00

## DOMESTIC WATER AND SAND FILTER PIPING - SECTION 22 04 01

### PART 1 - GENERAL

#### 1.01 Work Included

- A. Use Type "L" hard drawn copper for all water lines. Use wrought copper solder type fittings at all copper pipe connections; tube drawing is not approved.

### PART 2 - PRODUCTS

#### 2.01 Piping

- A. Type "L" hard drawn copper, conforming to ASTM B88, for all water pipe not set in or under concrete or in the ground.

#### 2.02 Fittings

- A. Provide wrought copper solder type fittings conforming to ASME B16.22 for all connections to copper piping.

#### 2.03 Solder

- A. Lines 1/2" Through 2": Use 95/5 or Stay-Brite B solder with suitable flux, except on ball valves.
- B. Press crimp fittings and polyethylene piping not approved.

#### 2.04 Test

- A. Fill system with water and pressurize to 125 PSI and hold for four hours with no pressure drop. Test and obtain approval on all underground piping before covering work.

END OF SECTION

## DOMESTIC WATER VALVES - SECTION 22 01 00

### PART 1 - GENERAL

#### 1.01 Work Included

- A. Drawings and General Requirements of Contract including General and Supplementary Conditions and Division 01 specification sections apply to work of this section.

- B. Extent of valves required by this section is indicated on drawings and/or specified in other Division 22 sections.

- C. Valves furnished as part of factory-fabricated equipment, are specified as part of the equipment assembly in other Division 22 sections.

- D. All work specified in this section shall comply with all sections in Division 22.

#### 1.02 Quality Assurance

- A. Valve Identification: Comply with MSS standard practice.

- B. Valves Types: All valves shall be of the same manufacturer unless otherwise specified.

#### 1.03 Submittals

- A. Product Data: Submit catalog cuts, specifications, installation instructions, and dimensioned drawings for each type of valve. Submit to Owner and/or Engineer for approval prior to ordering any valves.

### PART 2 - PRODUCTS

#### 2.01 General

- A. All valves shall be supplied with identification tags supplied by the manufacturer. All valves shall be same size as connected piping unless noted otherwise.

- B. Provide valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated. Where more than one type is indicated, selection is installer's option. Valves shall be of the same make for all these services.

#### C. Acceptable Manufacturers:

- Ball, Check: Grinnell, Nibco, Watts, Milwaukee, Apollo, FNN.

## 2.02 Domestic Cold Water Service

### Valves 4" and Smaller:

- A. Ball Valves: Valves shall be rated 150 PSI SWP and 600 PSI non-shock WOS and will have two-piece cast bronze bodies, TFE seats, full port, separate pack-nut with adjustable stem packing, anti-blowout stems, 316 stainless steel trim and 316 stainless steel ball. Valve ends shall have full depth ANSI threads or extended solder connections and be manufactured to comply with MSS-SP110.
- B. Acceptable Valves, Full Port: NIBCO T-585-TO-66 or Hammond 8401/8503/8301 (threaded); NIBCO S-585-TO-66 or Hammond 8411/8513/8311 (solder).

END OF SECTION SECTION 22 01 00

## PLUMBING SPECIALTIES - SECTION 22 04 10

### PART 1 - GENERAL

#### 1.01 Work Included

- A. All work specified in this section shall comply with all sections in Division 22.

- B. Provide and install all plumbing specialties as specified herein and as indicated on the drawings, complete with all necessary hardware and supports necessary for a fully functional installation.

#### 1.02 Submittals

- A. Submit all plumbing specialties for approval by Owner and/or Engineer.

### PART 2 - PRODUCTS

#### 2.01 Shock Absorbers

- A. Provide shock absorbers manufactured by Sioux Chief, Josam, Zurn, Wade, J. R. Smith, Precision Products, Watts Drainage, or equal.

- B. Placement of shock absorbers as indicated by drawings as recommended by Manufacturer.

- C. Provide dielectric fittings where dissimilar metals occur.

- D. Provide access panel for all shock absorbers not located in accessible locations.

1. Watts Drainage LF15M2-DR Lead Free copper shock absorber with pre-charged air chamber, EPDM seals and O-rings and threaded adaptor (1/2" - 1"). Wetted surfaces shall contain less than one quarter of one percent (0.25%) of lead by weight. ASSE 1010 and ANSI 112.26.1 approved, FDI WH-201 approved and certified, Listed by IAPMO.

#### 2.06 SDWA - Safe Drinking Water Act

##### A. General

1. All potable water components installed on this project shall meet or exceed the requirements of the SDWA in all respects.
2. All products on this project shall be certified by an independent third-party laboratory and certifying that is listed to NSF 61 Standards.
3. Piping, pipe fittings, plumbing fittings and fixtures that are installed on this project that do not meet or exceed the SDWA will be required to be removed at the Contractor's expense and replaced with an approved SDWA product.

#### 2.09 Hose Bibbs & Wall Hydrants

- A. Woodford Model #Y24FC, 3/4" lockshield faucet with integral flange, lockshield loose key and 3/4" hose end. All units shall have polished chrome-plated body and vacuum breaker.

### PART 3 - EXECUTION

#### 3.01 Shock Absorbers:

- A. Install shock absorbers so access and maintenance can be performed without disturbing walls and non-lift-out ceilings.

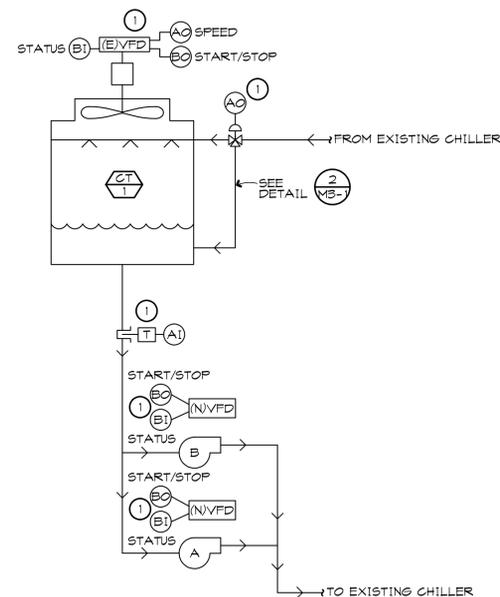
- B. Shock absorbers to be tested and certified by plumbing and drainage institute.

- C. Install in accordance with manufacturer's recommendations.

- D. Provide access doors at all concealed installations.

END OF SECTION SECTION 22 04 10

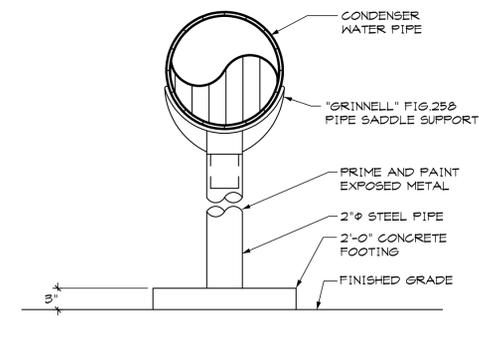
| CONTROLS LEGEND |                                    |
|-----------------|------------------------------------|
| SYMBOL          | DESCRIPTION                        |
| (A)             | ANALOG INPUT                       |
| (AO)            | ANALOG OUTPUT                      |
| (B)             | BINARY INPUT                       |
| (BO)            | BINARY OUTPUT                      |
| (VFD)           | VARIABLE FREQUENCY DRIVE           |
| (M)             | AUTOMATIC CONTROL VALVE            |
| (P)             | PUMP                               |
| (T)             | TEMPERATURE SENSOR IN THERMAL WELL |



NOTE(S):  
① RECONNECT EXISTING INPUTS AND OUTPUTS.

## CONTROL DIAGRAM - NEW

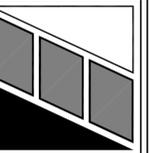
N.T.S.



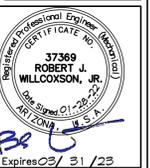
## EXTERIOR PIPE MOUNTING DETAIL

N.T.S.

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 PHOENIX, ARIZONA 85021  
 FAX: (602) 274-7542  
 SUITE 11  
 8825 N. 23RD AVENUE  
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REVISIONS



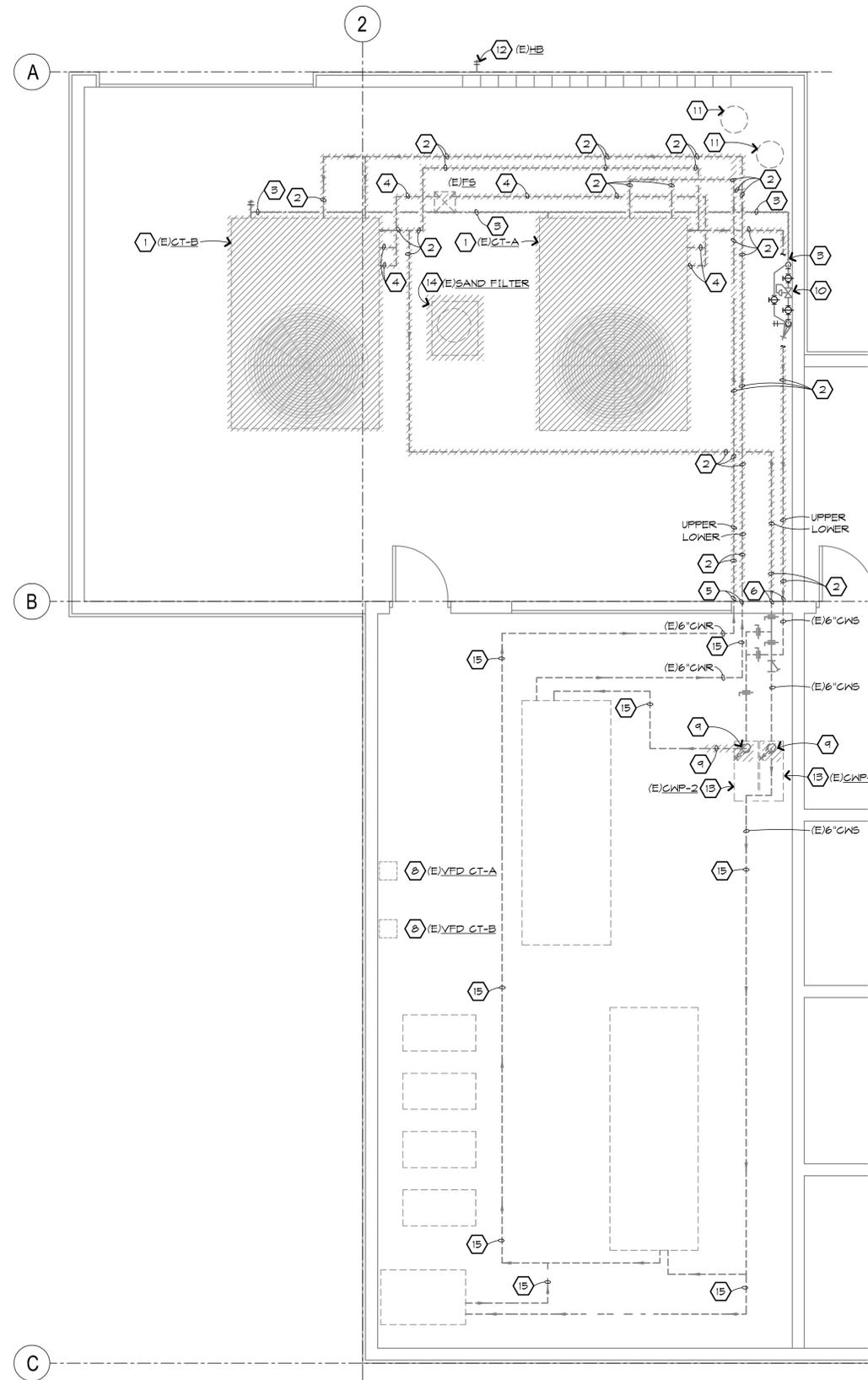
Expires 03/31/23

**PALM VALLEY ELEMENTARY SCHOOL**  
**COOLING TOWER REPLACEMENT**  
**2801 N 135TH AVE**  
**GOODYEAR, AZ 85395**

DATE: 01/28/22  
 JOB No: 2022013  
 DRAWN: NMC  
 CHECKED: DMD  
 APPROVED: RJW

**SHEET TITLE**  
**MECHANICAL**  
**SPECIFICATIONS,**  
**CONTROLS AND**  
**DETAILS**

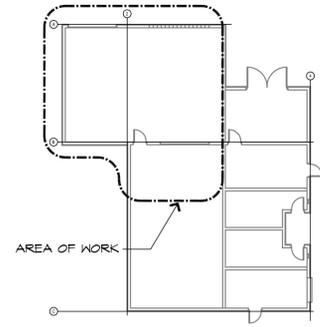
**M1-2**



**KEYNOTES**

- 1 REMOVE EXISTING COOLING TOWER
- 2 REMOVE ALL CONDENSER WATER PIPING, VALVES AND STRAINER UP TO WALL PENETRATION
- 3 REMOVE ALL MAKE UP WATER PIPING BACK TO EXISTING BYPASS TEE AT EXISTING PRESSURE REDUCING VALVE
- 4 REMOVE ALL DRAIN PIPING
- 5 EXISTING PIPING HIGH ON WALL TO REMAIN
- 6 EXISTING PIPING LOW ON WALL TO REMAIN
- 7 NOT USED
- 8 EXISTING VFD TO BE REMOVED - SEE ELECTRICAL DRAWINGS
- 9 REMOVE EXISTING CONDENSER WATER PIPING AND TRIPLE DUTY VALVE AT BOTH CONDENSER WATER PUMPS
- 10 EXISTING DOMESTIC COLD WATER SUPPLY AND PRESSURE REDUCING STATION TO REMAIN
- 11 EXISTING CHEMICAL FEED TAKES, PUMPS AND CONTROLS TO BE RE-USED - SEE SHEET M3-1
- 12 EXISTING HOSE BIBB AND ASSOCIATED PIPING TO REMAIN
- 13 EXISTING CONDENSER WATER PUMPS TO REMAIN
- 14 REMOVE SAND FILTER AND ASSOCIATED PIPING
- 15 CONDENSER WATER PIPING TO REMAIN

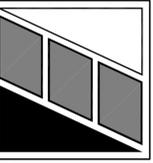
**PARTIAL MECHANICAL FLOOR PLAN - DEMOLITION**



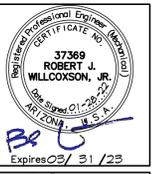
**KEY PLAN**

NTS

**PEARSON ENGINEERING ASSOCIATES INC.**  
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REVISIONS



**PALM VALLEY ELEMENTARY SCHOOL**  
**COOLING TOWER REPLACEMENT**  
 2801 N 135TH AVE  
 GOODYEAR, AZ 85395

|          |          |
|----------|----------|
| DATE     | 01/28/22 |
| JOB No.  | 2022013  |
| DRAWN    | NKC      |
| CHECKED  | DMD      |
| APPROVED | RJW      |

**SHEET TITLE**  
 MECHANICAL FLOOR PLAN - DEMOLITION

**M2-1**

File: L:\2022\2022013\Mech\2022013 M3-1 MECHANICAL FLOOR PLAN - NEW.dwg DATE: 01/28/22 TIME: 11:21 am Login Name: NMC

| COOLING TOWER SCHEDULE |        |                |          |      |      |     |            |          |              |            |           |
|------------------------|--------|----------------|----------|------|------|-----|------------|----------|--------------|------------|-----------|
| MARK                   | MANUF. | MODEL          | WATER    |      |      |     | ELECTRICAL |          | OPER. WEIGHT | REMARKS    |           |
|                        |        |                | QSA (MG) | EWT  | LWT  | GPM | FAN HP     | VOLTS/PH |              |            |           |
| 1                      | BAC    | 515E-1285-07KN | 79°F     | 95°F | 85°F | 540 | -          | 10       | 460/3        | 10,170 LBS | (1)(2)(3) |

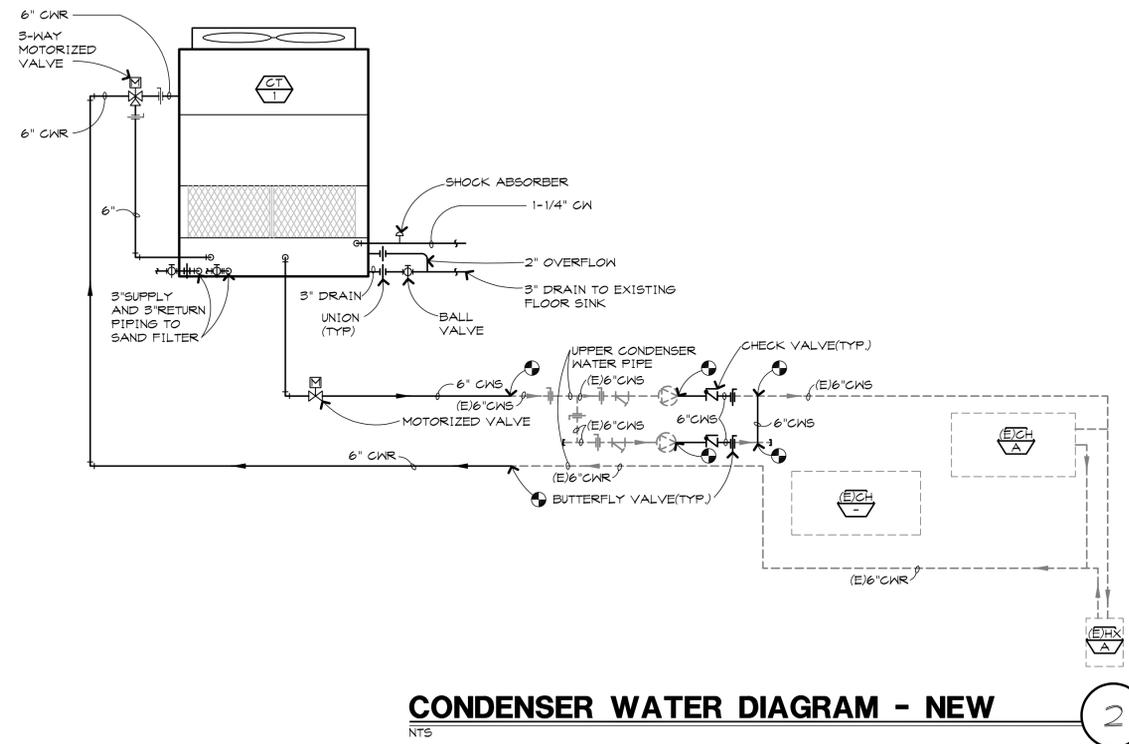
- ① UNIT TO BE PROVIDED WITH FAN VFD AND INVERTER DUTY RATED MOTOR
- ② UNIT TO BE STAINLESS STEEL CONSTRUCTION WITH BOTTOM DISCHARGE
- ③ UNIT TO BE PROVIDED WITH BASIN SWEEPER PVC PIPING IN COLD WATER BASIN

| SAND FILTRATION SCHEDULE |          |              |     |     |    |         |         |
|--------------------------|----------|--------------|-----|-----|----|---------|---------|
| MARK                     | MANUF.   | MODEL        | GPM | TDH | HP | VOLT/PH | REMARKS |
| 1                        | PURIFLUX | PF-60-020-AP | 110 | X   | 5  | 480/3Φ  |         |

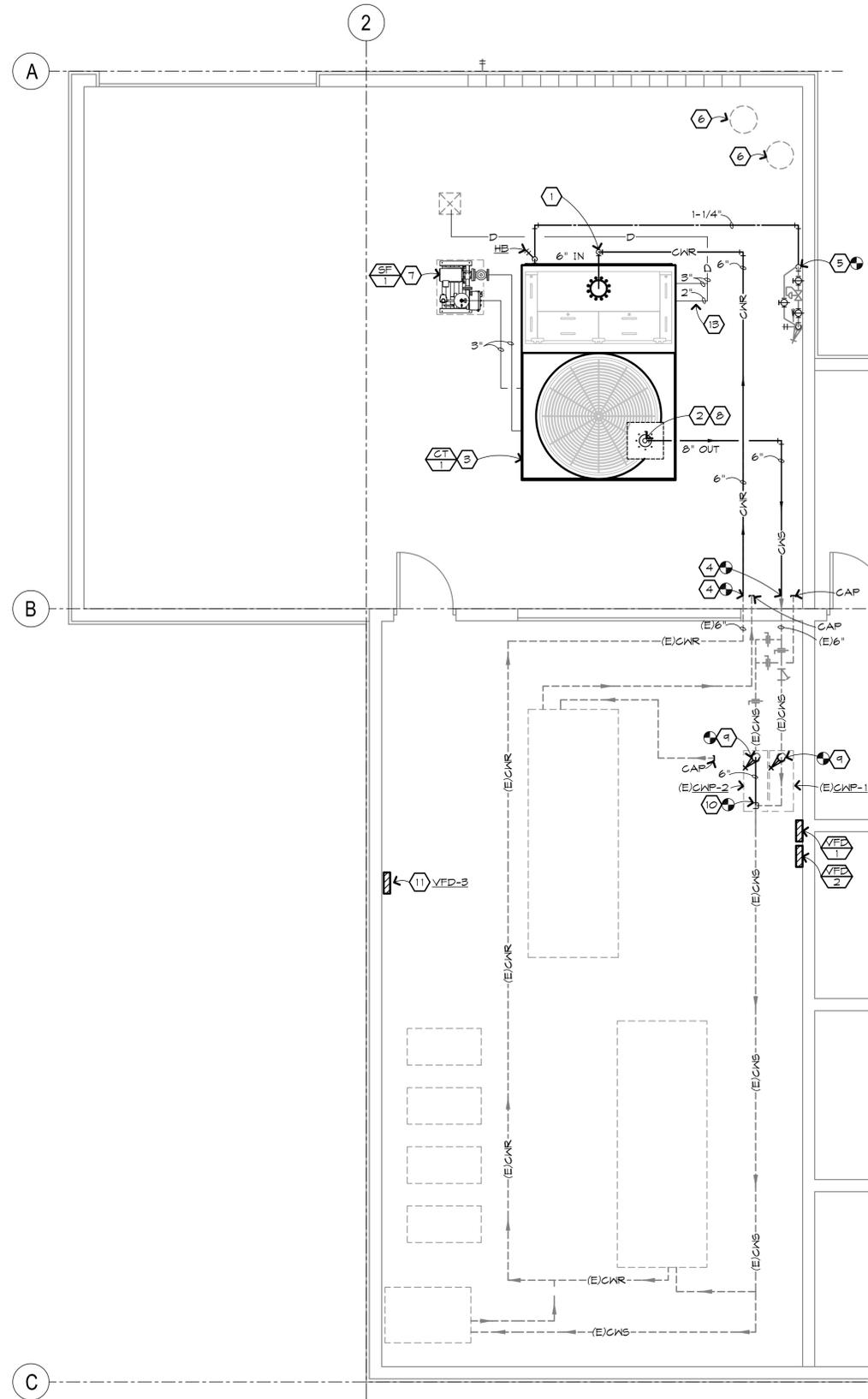
- ① UNIT TO BE PROVIDED WITH NEMA-3R CONTROL PANEL.

| VARIABLE FREQUENCY DRIVE SCHEDULE |        |                   |      |            |             |               |         |
|-----------------------------------|--------|-------------------|------|------------|-------------|---------------|---------|
| MARK                              | MANUF. | MODEL NO.         | HP   | VOLT/PH/Hz | UNIT SERVED | VFD LOCATION  | REMARKS |
| 1                                 | ABB    | ACH580-BCR-025A-4 | 15.0 | 480/3/60   | (E)CWP-1    | CENTRAL PLANT | (1)(2)  |
| 2                                 | ABB    | ACH580-BCR-025A-4 | 15.0 | 480/3/60   | (E)CWP-2    | CENTRAL PLANT | (1)(2)  |
| 3                                 | ABB    | ACH580-BCR-014A-4 | 10.0 | 480/3/60   | (E)CWP-2    | CENTRAL PLANT | (1)(2)  |

- ① PROVIDE VFD WITH OPTION PACK TO INCLUDE INTEGRATED BYPASS.
- ② PROVIDE BACnet COMMUNICATION PORT



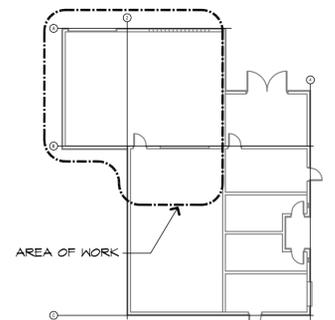
**CONDENSER WATER DIAGRAM - NEW**  
NTS



**PARTIAL MECHANICAL FLOOR PLAN - NEW**  
SCALE: 1/4" = 1'-0"  
FEET

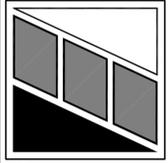
**KEYNOTES**

- ① 3-WAY MOTORIZED VALVE
- ② MOTORIZED VALVE
- ③ PROVIDE AND INSTALL NEW COOLING TOWER ON NEW 4'-0" HIGH CONCRETE PIERS - SEE STRUCTURAL DRAWINGS
- ④ PROVIDE AND INSTALL NEW CONDENSER WATER PIPING TO NEW COOLING TOWER
- ⑤ PROVIDE AND INSTALL NEW DOMESTIC WATER PIPING TO NEW COOLING TOWER
- ⑥ PROVIDE NEW CHEMICAL FEED PIPING FROM EXISTING CHEMICAL TANKS TO NEW COOLING TOWER
- ⑦ PROVIDE AND INSTALL NEW SAND FILTER - ON 4" HIGH CONCRETE PAD. PIPE TO NEW COOLING TOWER
- ⑧ CONDENSER WATER SUPPLY FROM COOLING TOWER
- ⑨ REPLACE TRIPLE DUTY VALVE WITH CHECK VALVE AND SHUT-OFF VALVE
- ⑩ CONNECT NEW CONDENSER WATER PIPING TO EXISTING CONDENSER WATER PIPING
- ⑪ PROVIDE AND INSTALL NEW VFD FOR NEW COOLING TOWER FAN - SEE ELECTRICAL DRAWINGS
- ⑫ PROVIDE AND INSTALL NEW VFD(S) FOR EXISTING CONDENSER WATER PUMPS - SEE ELECTRICAL DRAWINGS
- ⑬ PROVIDE AND INSTALL NEW DRAIN PIPING - ROUTE TO EXISTING FLOOR SINK



**KEY PLAN**  
NTS

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**SHEET TITLE**  
PARTIAL MECHANICAL FLOOR PLAN - NEW

**M3-1**