University of Idaho
State of Idaho Division of Public Works
Coffman Engineers, Inc.

A D D E N D U M N U M B E R ONE

May 22, 2025

To all contract bidders of record for the work titled:

University of Idaho

DPW #23251
UI: Replace Chiller, CNR BLD. 055
University of Idaho
Moscow, Idaho

Engineer's Project Number: 231760

Please notify everyone concerned (subcontractors and suppliers) as to the issuance and contents of this Addendum prior to the date of bid opening. This Addendum is a part of the contract documents and modifies them as follows:

GENERAL

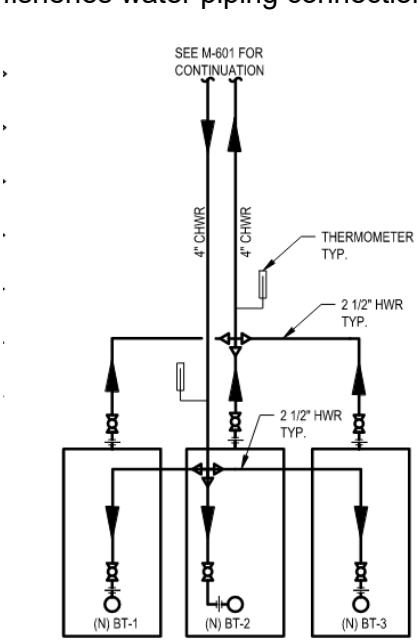
I. **Pre-Bid Conference:** A copy of the Pre-Bid Conference meeting minutes, questions and answers, and sign-in sheet are included in this addendum.

II. **Substitutions:** This is an acceptance of general quality only. No attempt has been made to check each material as to special features, capacities, or physical dimensions specially required for the project. It shall be the responsibility of the supplier, manufacturer, and contractor to check all requirements before submitting for final acceptance. Final acceptance of exact features, sizes capacities, etc., all of which must match materials indicated and specified, will be determined when submitted during the construction period. Certain acceptances are subject to conditions noted.

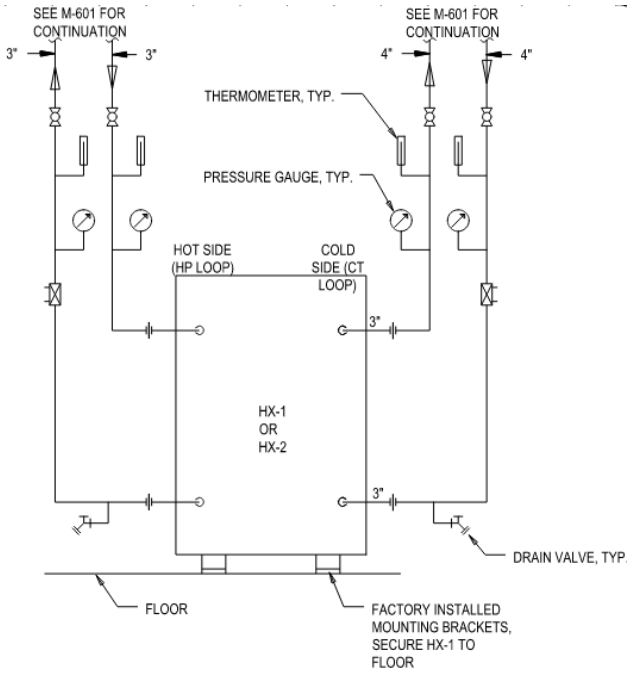
Section	Item	Manufacturer
Sheet M-701	Expansion Tank	American Wheatley
Sheet M-701	Buffer Tank	American Wheatley
Sheet M-701	Heat Exchanger	Polaris

MECHANICAL

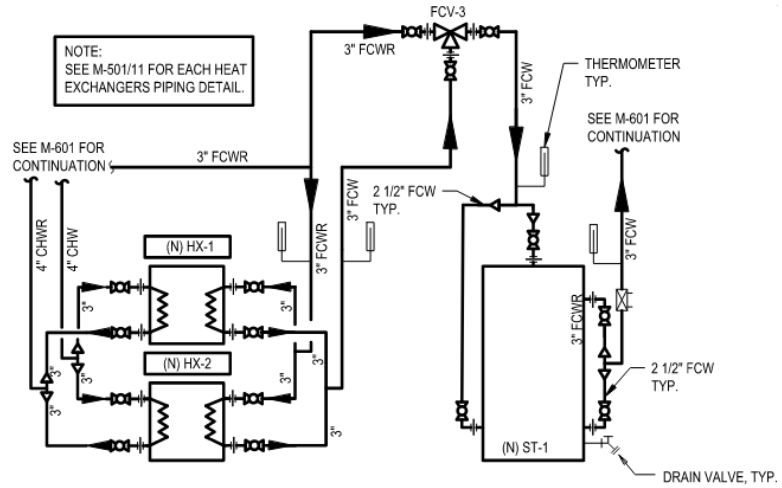
I. Design sheet M-502 Mechanical Details added details 10 BUFFER TANK PIPING, 11 HEAT EXCHANGER PIPING DETAIL, and 12 FISHERIES WATER PIPING DETAIL to clarify fisheries water piping connections.



10 BUFFER TANK PIPING
SCALE: NTS



11 HEAT EXCHANGER PIPING DETAIL
SCALE: NTS



12 FISHERIES WATER PIPING DETAIL
SCALE: NTS

II. Design sheetM-601 Mechanical Piping Diagram to have General note 7 added to specify fisheries water piping material.

III. Design sheet M-602 Mechanical Piping Diagram to have General note 7 added to specify fisheries water piping material.

IV. Design sheet M-701 Mechanical Schedules to have new schedule to specify plumbing materials and methods.

PLUMBING SYSTEM MATERIALS AND METHODS							
PIPE SYSTEM	SYSTEM ABBREV.	PIPE SIZE RANGE	MATERIAL	FLUID	JOINING METHODS	VALVES & ACCESSORIES	INSULATION REQUIREMENT
FISHERIES CHILLED WATER	FCW/FCWR	ALL SIZES	SCHEDULE 80 PVC	WATER	THREADED COUPLINGS OR SOLVENT CEMENT	PVC VALVES AND FITTINGS	IF PIPE ≤ 1.5", THEN 1/2" IF PIPE ≥ 2", THEN 1"
FISHERIES AMBIENT WATER	FAW	ALL SIZES	SCHEDULE 80 PVC	WATER	THREADED COUPLINGS OR SOLVENT CEMENT	PVC VALVES AND FITTINGS	NONE
FISHERIES HOT WATER	FHW/FHWR	ALL SIZES	SCHEDULE 80 CPVC	WATER	THREADED COUPLINGS OR SOLVENT CEMENT	CPVC VALVES AND FITTINGS	IF PIPE ≤ 1.5", THEN 1" IF PIPE ≥ 2", THEN 1 1/2"
FISHERIES MIXED WATER	-	ALL SIZES	SCHEDULE 80 CPVC	WATER	THREADED COUPLINGS OR SOLVENT CEMENT	CPVC VALVES AND FITTINGS	IF PIPE ≤ 1.5", THEN 1" IF PIPE ≥ 2", THEN 1 1/2"
CHILLED WATER	CHWS/CHWR	ALL SIZES	TYPE K OR L COPPER	30% PROPYLENE GLYCOL	PROPRESS OR BRAZED	COPPER VALVES AND FITTINGS	IF PIPE ≤ 1.5", THEN 1-1/2" IF PIPE ≥ 2", THEN 2"
COMPRESSED AIR	CA	ALL SIZES	TYPE L COPPER	AIR	PROPRESS OR SOLDERED	COPPER VALVES AND FITTINGS	NONE

V. Specification 22 0500 Common Work for Plumbing is updated to specify compresses air piping material. See attached addendum 1 exhibit.

2.2 COMPRESSED AIR PIPING

A. Drawn-Temper Copper Tubing: ASTM B 88, Type L.

B. Wrought-Copper Fittings: ASME B16.22.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide:

a. Anvil International, Inc.
b. S. P. Fittings; a division of Star Pipe Products.
c. Victaulic Company of America.
d. Stadler-Viega
e. Bronze Flanges and Flanged Fittings: ANSI/ASME B16.24.

3. Copper or Bronze Pressure-Seal Fittings:

a. Manufacturer: Subject to compliance with requirements, provide products manufactured by Stadler-Viega.
b. Housing: Copper.
c. O-Rings and Pipe Stops: EPDM.
d. Tools: Manufacturer's special tools.
e. Minimum 200-psig (1379-kPa) working-pressure rating at 250 degrees F (121 degree C.)

C. Wrought-Copper Unions: ASME B16.22.

VI. Specification 22 1100 Water Distribution Systems is updated to specify fisheries water piping material. See attached addendum 1 exhibit.

2.1 WATER PIPE AND FITTINGS (POTABLE AND NON-POTABLE WATER)

A. Industrial fisheries water piping is non-potable.

1. Fisheries Cold and Ambient Water Piping: PVC Plastic Pipe, ASTM D 1785, Schedules 80.
2. Fisheries Hot and Mixed Water Piping: CPVC Plastic Pipe, ASTM F 441/F 441M, Schedules 80.

B. Fittings for PVC and CPVC Piping:

1. PVC Plastic Pipe Fittings: Socket-type pipe fittings, ASTM D 2467 for Schedule 80 pipe.
2. PVC Solvent Cement: ASTM D 2564.
3. CPVC Plastic Pipe Fittings: Socket-type pipe fittings, ASTM F 439 for Schedule 80 pipe.
4. CPVC Solvent Cement: ASTM F 493.

DPW Project No: 23251; UI: Replace Chiller, CNR
Agenda for Pre-Bid Walk-Through

Date 05/13/2025

Project Number:	23251
Project Name:	UI: Replace Chiller, CNR
Location:	UI Facilities Building
Agency:	University of Idaho
Project Manager:	Gary Groff P.E.
PM Phone & Email:	(208) 332 – 1919 Email: Gary.Groff@adm.idaho.gov

1. **Project Manager Introduces Project Team Members**
   A. DPW Project Manager: Gary Groff
   B. DPW Field Representative: Ken Cook
   C. UI Architectural Project Manager: Daryle R. Faircloth
   D. Engineer Field Representative: Mark Boyer

Note: During the pre-bid walk-through meeting, all conversations are considered informal and are not contractually binding unless stated in the contract manual, drawings, or modified by a written addendum. The order of precedence is written addendum, project manual, and lastly contract drawings.

2. **Route a sign-in sheet to all attendees.**
   Meeting is not mandatory, parties must be signed clear and legible**.**

3. **Site walk will commence after this meeting.**

4. **The Architect/Engineer Presents the General Description of Scope**

Project description:

DPW PROJECT NO.: 23251 UI: Replace Chiller, College of Natural Resources

Base bid: Demolition of existing chiller at building exterior. Demolition of chilled water pumps tanks and heat exchanger in building basement. Demolition of chilled water piping in basement and laboratory. Installation of fisheries chilled water system comprising of chiller, pumps, controls, heat exchangers, tanks, valves and piping in basement mechanical room. Installation of new laboratory fisheries water distribution piping, mixing valves and headboxes in laboratory space. Installation at buildings exterior of new air-cooled condensers serving chillers. Removal of exterior fencing around existing chiller during demolition and reinstallation of fencing after demolition. Connection of existing chlorine monitoring system to new controls system for alarming. Installation of all controls and power equipment for operation of new fisheries water system. Installation of all structural members and concrete pads for installation of fisheries water

system and cistern supports. Installation of new chain-link fence around new air-cooled condenser. Base bid scope is specified on entirety of drawings and specifications.

Bid Alternate: Installation of exterior installation of new free-cooler (DC-1) at building exterior as bid alternate. Installation and piping of new free-cooler at building exterior to basement. Installation of all controls equipment, wiring and programming for integration of free-cooling unit into fisheries water system. Installation of all power equipment and wiring installation of free-cooling unit. Installation and programming of controls for dry-cooler operation and chiller interconnection. Installation of fence and gates around new free-cooling unit.

Project goals:

1. Reduce the risk of chiller failure and loss of experimentation.
2. Replace equipment that is at the end of it's useful life.
3. Improve chiller plant operating efficiency.
4. Reduce maintenance and improve efficiency.

5. **Obtaining plans and specifications.**
    a. Division of Public Works, 502 N. 4th St., Boise, ID, 83702 (208) 332-1900
    b. University of Idaho, Architectural and Engineering Services, 875 Perimeter Dr., Moscow, ID, 83844 Associated General Contractors, 1649 W Shoreline Dr., Ste. 100, Boise, ID 83702 (208) 344-2531
    c. https://www.idahoagc.org/plan-room
    d. Blueprint Specialties, 6205 W. Overland Rd., Boise, ID 83709 (208) 377-0294 www.docuproject.com
    e. Spokane Regional Plan Center, 209 N. Havana St., Spokane, WA 99202 (509) 328-9600
    f. Lewiston-Clarkston Plan Service, 2117 12th Ave,. Lewiston, ID 83501 (208) 746-3591
    g. Coffman Engineers, 221 N Wall St. Suite 500, Spokane WA. 99201 (509) 328-2994

6. **Information to Bidders: Provide all information outlined in the <u>Instructions To Bidders</u>**
    a. Bid Security Bond 5% of the total bid amount.
    b. Bid proposal form is to be completed in its entirety with no blank spaces, bid will be tossed out if it is incomplete.
    c. Affidavit concerning alcohol and drug-free workplace.
    d. A signed bidder’s acknowledgment statement is required.
    e. All addendums are required to be acknowledged on the bid.
    f. A Public Works Contractors License for the State of Idaho is required to bid on this Work.
    g. Provide Add Alternates review.

h. Requests for substitutions must be made in writing to the Design Professional no less than ten (10) calendar days prior to the bid closing unless provided otherwise via an addenda..
i. **Sealed proposals will be received by and bid opening will be held on: 2:00 PM, local time, Tuesday June 3, 2025.**
j. **Please read the instructions to bidders thoroughly prior to bidding.**

7. **Step by step through plans.**
    a. Construction Site Access and Lay-Down Area
    b. Mechanical, electrical, civil, structural
    c. Outline access and work area restrictions.

8. **Final remarks from DPW Project Manager, DPW Field Representative, Agency.**
    a. Contract Time - Bidder hereby agrees to commence Work under this Contract on a date to be specified in the written "Notice to Proceed" of the Owner and to substantially complete the Project within Three-Hundred-Sixty-Five (365) consecutive calendar days thereafter, as stipulated in the specifications.
    b. Work restrictions, work hours and operations outlined in specifications section 01 10 00 Summary.

9. **Question and Answers**

10. **Concluding remarks.**

11. **Site Walk**

COFFMAN ENGINEERS

Project: DPW #23251, UI: Replace Chiller, CNR BLD. 055
Issue Date: May 22, 2025
Bid Date: June 3, 2025
To: All Plan Holders
From: Coffman Engineers Inc.

Subject: Pre-bid Walk Questions and Answer

The following are questions posed by potential bidders during the pre-bid walk on May 13, 2025 at the U of I CNR building. The following questions and answers are to be incorporated into bid proposals that may be offered, and the subsequent construction. Bidders shall assess and include the full impact of the answers on any and all related systems and work. Receipt and incorporation of this information in the bid proposal shall be indicated on the Bid Form in the space provided.

Q1: Who removes the existing mechanical equipment in serving laboratory chilled water system?
A1: Contractor to remove fisheries chilled water system, chiller system, and laboratory piping per design scope of work.

Q2: Who will remove fisheries laboratory experimentation and tanks?
A2: U of I staff will remove all experimentation and tanks. Remaining laboratory shelving and tables are to remain in place and be reused. Contractor to install protective coverings on shelving and tables during construction.

Q3: When will fisheries laboratory experimentation and tanks be removed?
A4: Experimentation and tanks will be removed prior to contractors notice to proceed with construction.

Q4: When will last addendum be issued?
A4: No addendums will be issued after May 30, 2025.

Q5: If bid alternate #1 is not built, then can existing chiller pad be used for air-cooled condensers?
A5: No, install condensers as specified in design.

Q6: Can compressed air lines in laboratory be demoed without disruption to CNR air service?
A6: Demo lines in laboratory branch compressed air piping back to main campus compressed air pipe and cap. HVAC contractor to coordinate with CNR staff demo of compressed air lines to maintain service during construction.

Q7: Can U of I or DPW provide an asbestos survey for the CNR building/ Is asbestos testing and abatement part of the project scope of work?
A7: The University is reviewing available records and will advise upon completion of their review. For bidding assume that the pipe insulation does contain Asbestos and is to be removed by a contractor's subcontractor licensed to do the work.

Q8: What materials are to be used for fisheries water piping?
A8: Fisheries water piping is to be Sch.80 PVC for ambient fisheries water, Sch.80 CPVC for hot and mixed fisheries water. See addendum #1 M-701 for piping schedule.

Q9: What materials are to be used for fisheries compressed air piping?
A9: Compresses air piping to be type L copper. See addendum #1 M-701 for piping schedule.

Q10: What are the piping insulation requirements for fisheries water piping?
A10: See addendum #1 M-701 for piping schedule.

Q11: What is the CNR elevator load rating?
A11: 4,000Lbs.

Q12: Is it acceptable to core drill wall penetrations for piping instead of notching the wall per S-501/D1?
A12: Yes, core drilling is acceptable. Contractor to scan wall for rebar and core drill to miss the top bars. Coordinate size, location and elevation of wall penetration with mechanical drawings. Seal floor penetrations around pipes to prevent water seepage.

Q13: Do the heat exchangers need to be double wall and NSF rated?
A13: No

Q14: Do the fish water pumps need to be stainless steel and NSF rated?
A13: No

State of Idaho
Division of Public Works
PRE-BID CONFERENCE SIGN IN SHEET

DPW 23251 Replace Chiller, College of Natural Resources
Tuesday, May 13, 2025 - 10:00AM

NAME	COMPANY	TELEPHONE NUMBER	E-MAIL ADDRESS
Daryle Faircloth	UI AES PM	208-885-7346	darylef@uidaho.edu
Gary Groff	IDPW PM	208-332-1919	gary.groff@adm.idaho.gov
Mark Boyer	Coffman Engineers	509-328-2994	mark.boyer@coffman.com
Ken Cook	IDPW FR	208-669-1045	ken.cook@adm.idaho.gov
Doug Engel	4J Electric	208-791-4236	doug@4jelectric.com
Jerry Hansen	Copeland HTG & Electric	509-336-3972	JHANSEN@Moscow.com
Travis Schlueneger	Gropp Heating Air & Electric	509-595-8114	Groppestimator@gmail.com
Chris Roberson	ATS Inland NW	509.842.0085	chrisro@atsinw.com
Aaron Mangum	Mangum Construction	509-254-1034	aaron@mangum-construction.com
CHRIS KILLUP	K&G	208 553 4404	ckilcup@kandgconstructionllc.com
Scott Beach	Mckinstry	208-277-9359	Scottbe@mckinstry.com
Ben French	QC	208 596 8299	ben@quality-contractors.com
Kenny Oakes	RM	208 816 2137	Kenny@rmmechanical.net
Luke Wilder	Jefferson Lind	208.301.4842	JeffersonLind.Co@gmail.com
Kathryn Avaino	SWINERTON	509-490-1002	KATHRYN.AVAINO@SWINERTON.com
Austin Mead	SWINERTON	509-703-1671	AUSTIN.MEAD@SWINERTON.com
Doratt	CNR		
Frank Fiviano	MAC Miller	503.459 8099	frank.fiviano@macmiller.com
Dixon Burkett	Mac Miller		dixon.burkett@macmiller.com
Steven Hacker	UI-CNR	208-310-6332	shacker@uidaho.edu

SUBSTITUTION REQUEST

(To be completed by the contractor)

To: Coffman Engineer Project Name: U of I Replacement Chiller Project No.: DPW# 23251

We hereby submit for your consideration the following product in lieu of the specified item.

Section	Paragraph	Specified Item
Mechanical	M701	Amtrol AX-40

Proposed substitution: American Wheatley BDT Series BDT-013-150

A. Does the requested substitution affect dimensions shown on drawings?.....

Yes No X

B. Will the undersigned pay the cost for the changes caused by the requested substitution?.....

Yes No X

C. Does the requested substitution have effect on other trades? ……..

Yes NoX

D. Is the manufacturer's guarantee the same for the requested substitution as the specified item? ...

Yes X No

E. What is the cost / savings to the contract?.....N/A.....$

(more/less)

[*Requested Substitution $* *(+/-) Specified Item $*

]

F. Explain the differences between the requested substitution and the specified item, including changes
to the drawings and/or specification and why the requested substituted is necessary.

Different Manufacturer

For Architects Only

- [x] **Recommended**
- [ ] **Not Recommended**
- [ ] **Recommended as Noted**
- [ ] **No action**

By: Mark Boyer
Title: Engineer Date: 05/19/2025
Remarks: No exceptions taken to product.

DPW Approval By: _____

Travis Hurst
Signature
5-13-25
Date
Jensen Sales & Marketing Supplier
Contractor
5026 W Amelia Earhart Dr
Address
Salt Lake City UT 84116
City
801-746-4476
Phone Fax
travis@jsaminc.com
Email

SUBSTITUTION REQUEST

(To be completed by the contractor)

To: Coffman Engineer Project Name: U of I Replacement Chiller Project No.: DPW# 23251

We hereby submit for your consideration the following product in lieu of the specified item.

Section	Paragraph	Specified Item
Mechanical	M-701	Cemline V200CWB4 BT-1,2,3

Proposed substitution: American Wheatley CBT-0200

A. Does the requested substitution affect dimensions shown on drawings?.....

Yes No X

B. Will the undersigned pay the cost for the changes caused by the requested substitution?.....

Yes No X

C. Does the requested substitution have effect on other trades? ……..

Yes No X

D. Is the manufacturer's guarantee the same for the requested substitution as the specified item? ...

Yes X No

E. What is the cost / savings to the contract?.....N/A.....$

(more/less)

[*Requested Substitution $* *(+/-) Specified Item $*

]

F. Explain the differences between the requested substitution and the specified item, including changes
to the drawings and/or specification and why the requested substituted is necessary.

Different Manufacturer

For Architects Only

- ○ **Recommended**
- ○ **Not Recommended**
- ☒ **Recommended as Noted**
- ○ **No action**

By: Mark Boyer
Title: Engineer Date: 05/22/2025
Remarks: Provide with insulation option per design specifications.

DPW Approval By: _____

Travis Hurst
Signature
5-13-25
Date
Jensen Sales & Marketing Supplier
Contractor
5026 W Amelia Earhart Dr
Address
Salt Lake City UT 84116
City
801-746-4476 _____
Phone Fax
travis@jsaminc.com
Email

SUBSTITUTION REQUEST

(To be completed by the contractor)

To: Mark Boyer Project Name: UI: Replace Chiller, CNR BLD 005 Project No.: 23251

We hereby submit for your consideration the following product in lieu of the specified item.

Section	Paragraph	Specified Item
235700	2.2.A	Plate Heat Exchangers

Proposed substitution: Polaris Heat Exchanger

A. Does the requested substitution affect dimensions shown on drawings?.....

Yes No

B. Will the undersigned pay the cost for the changes caused by the requested substitution?.....

Yes No

C. Does the requested substitution have effect on other trades? ……..

Yes No

D. Is the manufacturer's guarantee the same for the requested substitution as the specified item? ...

Yes No

E. What is the cost / savings to the contract?.....$

(more/less)

[*Requested Substitution $* *(+/-) Specified Item $*

]

F. Explain the differences between the requested substitution and the specified item, including changes
to the drawings and/or specification and why the requested substituted is necessary.

None

For Architects Only

- [x] **Recommended**
- [ ] **Not Recommended**
- [ ] **Recommended as Noted**
- [ ] **No action**

By: Mark Boyer
Title: Engineer Date: 05/22/2025
Remarks: No exceptions taken to product.

DPW Approval By: _____

Signature May 20, 2025

Date TBD

Contractor 1213 S Pines Rd, Suite A

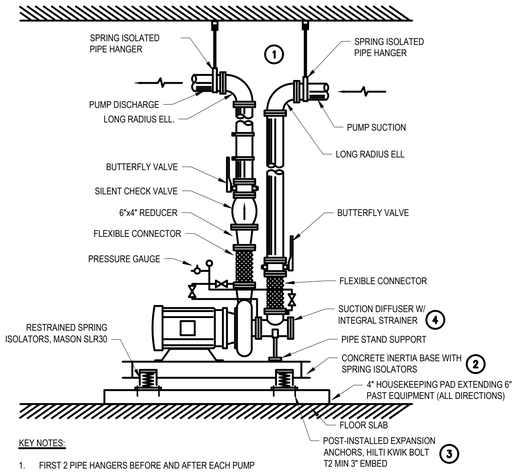
Address Spokane Valley

City 509.720.0290

Phone Fax

ryan@cmswa.com

Email

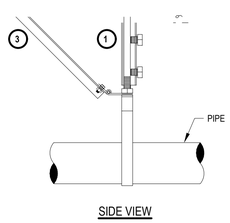


KEY NOTES:

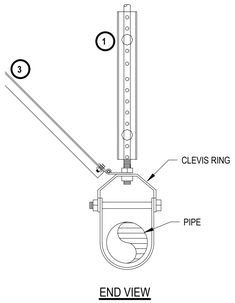
1. FIRST 2 PIPE HANGERS BEFORE AND AFTER EACH PUMP SHALL BE INSTALLED WITH SPRING ISOLATORS.
2. CONSTRUCT TYPE C CONCRETE BASE IN ACCORDANCE WITH SPECIFICATIONS AND ASHRAE HANDBOOK - HVAC APPLICATIONS GUIDELINES.
3. SIZE ANCHOR TO MATCH MAXIMUM BOLT SIZE GIVEN BY ISOLATOR MANUFACTURER.
4. 6" PIPE SIDE, 5" PUMPSIDE.

1 HORIZONTAL BASE MOUNT PUMP

SCALE: NTS



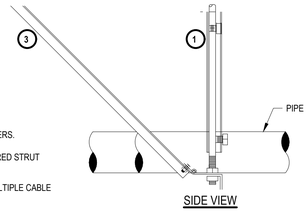
SIDE VIEW



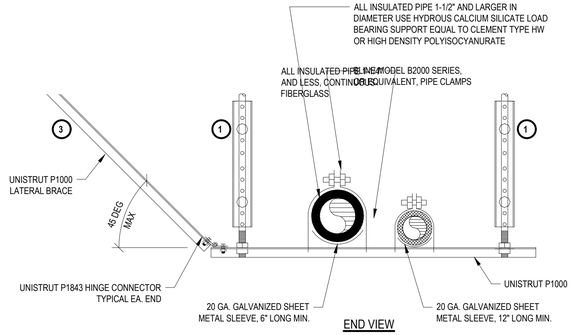
END VIEW

NOTES

1. HANGER RODS WITH STIFFENERS.
2. ANGLE IRON OR MANUFACTURED STRUT CROSS MEMBER.
3. RIGID BRACE (SHOWN) OR MULTIPLE CABLE BRACES.



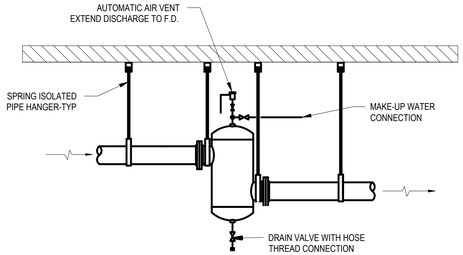
SIDE VIEW



END VIEW

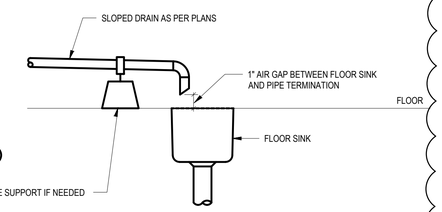
2 SUSPENDED PIPING (HYDRONIC)

SCALE: NTS



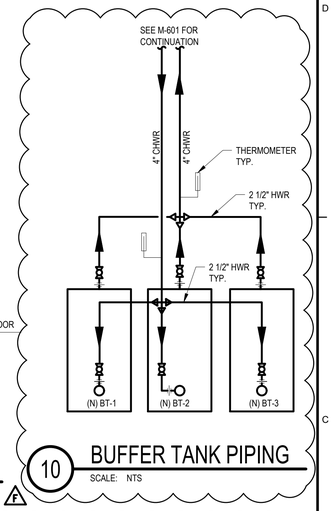
3 AIR SEPARATOR INSTALLATION

SCALE: NTS



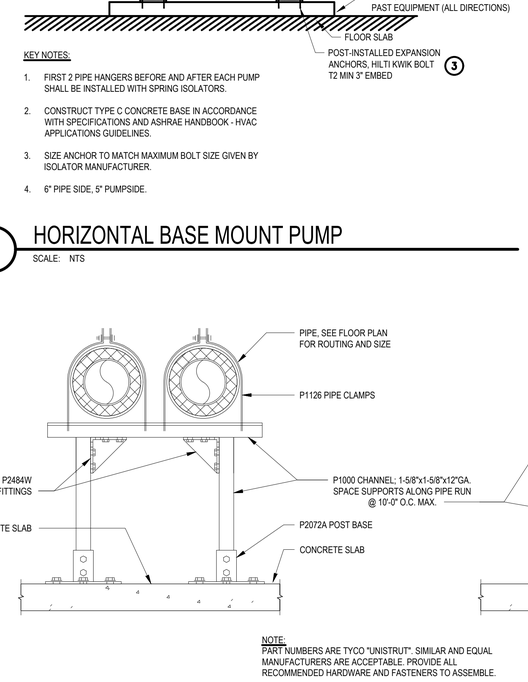
4 DRAIN TERMINATION AT FLOOR SINK

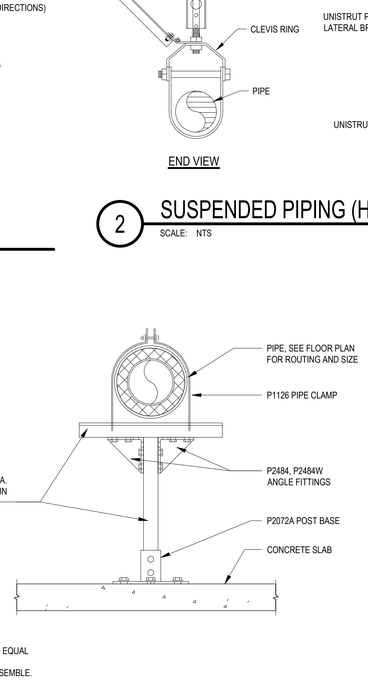
SCALE: NTS



10 BUFFER TANK PIPING

SCALE: NTS

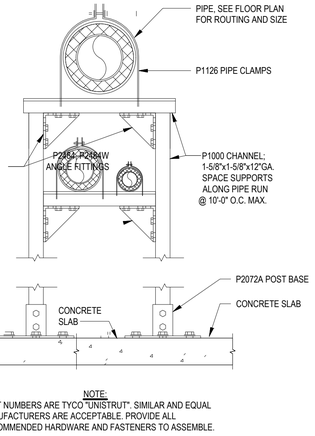




NOTE:
PART NUMBERS ARE TYCO "UNISTRUT". SIMILAR AND EQUAL MANUFACTURERS ARE ACCEPTABLE. PROVIDE ALL RECOMMENDED HARDWARE AND FASTENERS TO ASSEMBLE.

5 EXTERIOR PIPE SUPPORT

SCALE: NTS



NOTE:
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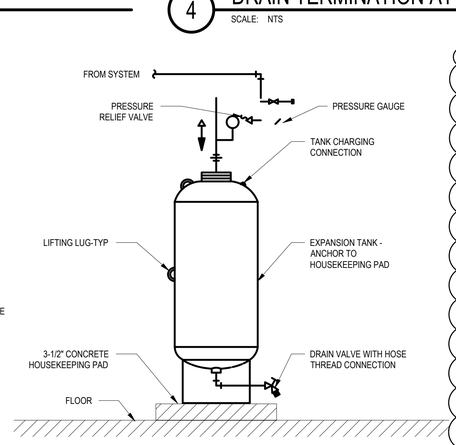
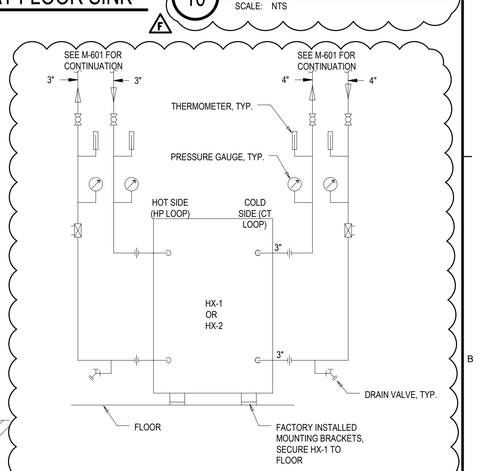
6 FLOOR PIPE SUPPORT

SCALE: NTS



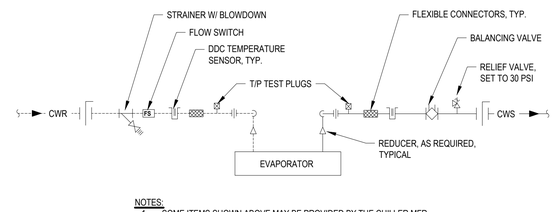
7 EXPANSION TANK INSTALLATION

SCALE: NTS



11 HEAT EXCHANGER PIPING DETAIL

SCALE: NTS

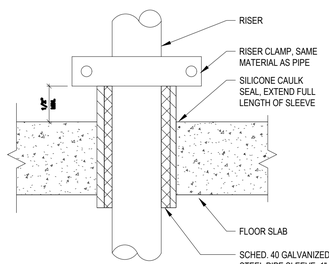


NOTES:

1. SOME ITEMS SHOWN ABOVE MAY BE PROVIDED BY THE CHILLER MFR.
2. COMPLETELY INSULATE ALL VALVES, STRAINER, FLOW SWITCH, FLEXIBLE CONNECTORS, ETC.
3. PROVIDE ALUMINUM JACKETING ON ALL EXPOSED, INSULATED PIPING.

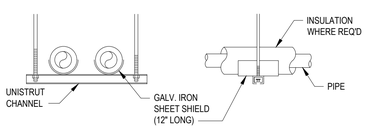
8 PIPING CONNECTIONS TO AIR COOLED WATER CHILLER

SCALE: NTS



9 PIPE PENETRATION THRU FLOOR SLAB

SCALE: NTS

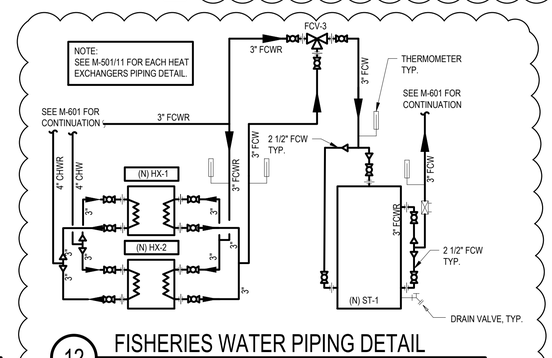


NOTES

1. ATTACH SUPPORTS FOR ALL PIPING SUSPENDED FROM THE CONCRETE ROOF STRUCTURE
2. PROVIDE COPPER OR PLASTIC COATED HANGERS FOR NON-INSULATED COPPER PIPE.

10 PIPE HANGER, TRAPEZE, 4" & SMALLER

SCALE: NTS



12 FISHERIES WATER PIPING DETAIL

SCALE: NTS

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COLLEGE OF NATURAL RESOURCES CHILLER REPLACEMENT

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PROJECT NO. UI 230001

UNIVERSITY OF IDAHO

COLLEGE OF NATURAL RESOURCES BLD. 055
975 W 6TH STREET,
MOSCOW, ID 83844

100% CONSTRUCTION DOCUMENTS

REV	DATE	DESCRIPTION
F	5/19/2025	ADDENDUM 1
E	2/14/2025	100% CD
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C	8/09/2024	50% SUBMITTAL
B	6/28/2024	DESIGN DEVELOPMENT
A	1/12/2024	SCHEMATIC DESIGN

PROJ. NO.	23251
DRAWN	RKC
CHECKED	TAH
DATE	02/14/2025

SHEET TITLE:

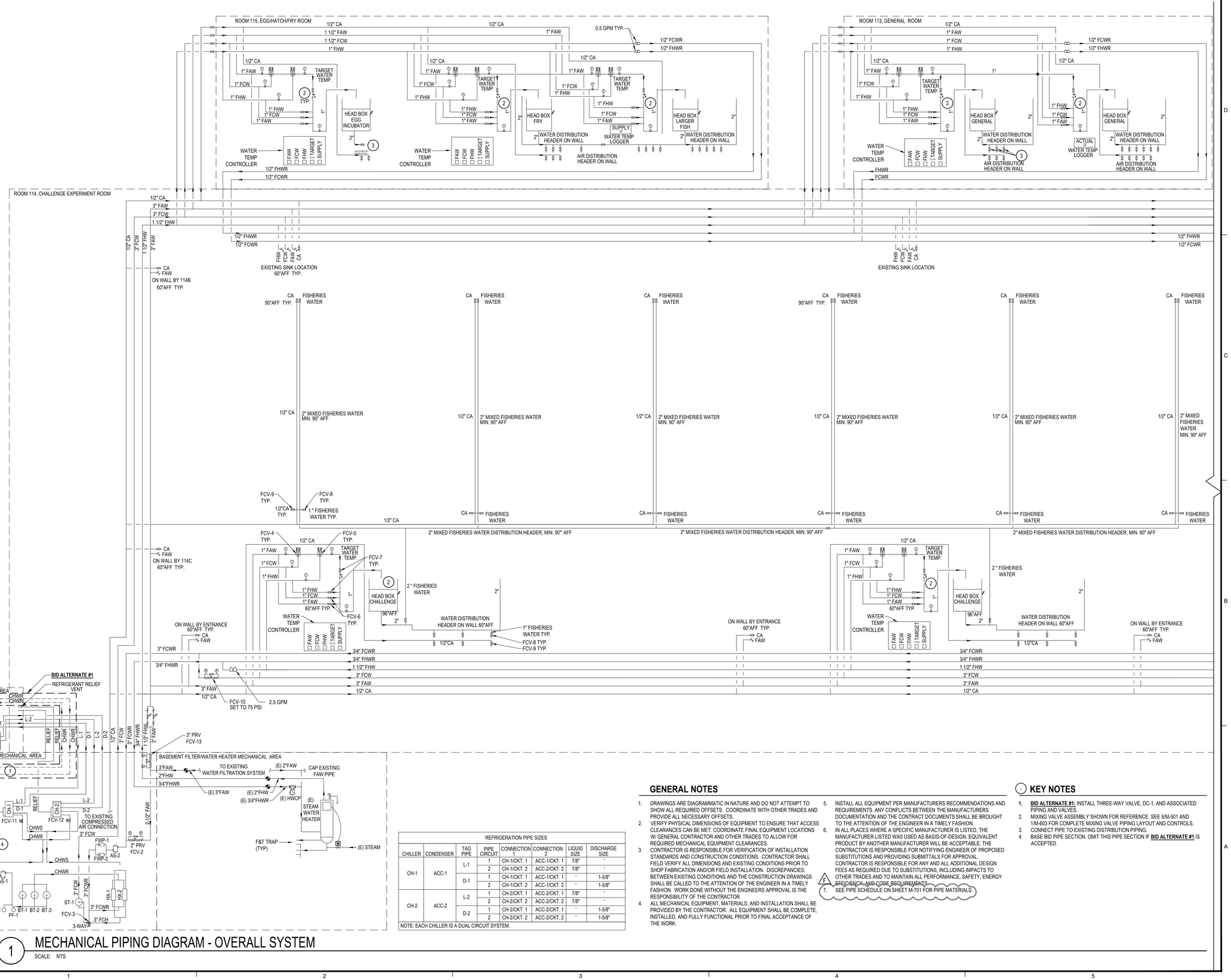
MECHANICAL DETAILS

SHEET NO:

M-502

SHEET 19 OF 33

P:\SPO\23\JOBS\231760 UI REPLACE CHILLERS CNR\0.0 DWGS\M\231760_M-502.DWG 231760_M-502 - BOYER, MARK - LAST SAVED: May 20, 2025 - PLOT DATE: 5/20/25



1 MECHANICAL PIPING DIAGRAM - OVERALL SYSTEM

SCALE: NTS

REFRIGERATION PIPE SIZES							
CHILLER	CONDENSER	TAG PIPE	PIPE CIRCUIT	CONNECTION 1	CONNECTION 2	LIQUID SIZE	DISCHARGE SIZE
CH-1	ACC-1	L-1	1	CH-1/CKT. 1	ACC-1/CKT. 1	7/8"	-
			2	CH-1/CKT. 2	ACC-2/CKT. 2	7/8"	-
		D-1	1	CH-1/CKT. 1	ACC-1/CKT. 1	-	1-5/8"
			2	CH-1/CKT. 2	ACC-1/CKT. 2	-	1-5/8"
CH-2	ACC-2	L-2	1	CH-2/CKT. 1	ACC-2/CKT. 1	7/8"	-
			2	CH-2/CKT. 2	ACC-2/CKT. 2	7/8"	-
		D-2	1	CH-2/CKT. 1	ACC-2/CKT. 1	-	1-5/8"
			2	CH-2/CKT. 2	ACC-2/CKT. 2	-	1-5/8"
NOTE: EACH CHILLER IS A DUAL CIRCUIT SYSTEM.							

GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC IN NATURE AND DO NOT ATTEMPT TO SHOW ALL REQUIRED OFFSETS. COORDINATE WITH OTHER TRADES AND PROVIDE ALL NECESSARY OFFSETS.
2. VERIFY PHYSICAL DIMENSIONS OF EQUIPMENT TO ENSURE THAT ACCESS CLEARANCES CAN BE MET. COORDINATE FINAL EQUIPMENT LOCATIONS W/ GENERAL CONTRACTOR AND OTHER TRADES TO ALLOW FOR REQUIRED MECHANICAL EQUIPMENT CLEARANCES.
3. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF INSTALLATION STANDARDS AND CONSTRUCTION CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO SHOP FABRICATION AND/OR FIELD INSTALLATION. DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE CONSTRUCTION DRAWINGS SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER IN A TIMELY FASHION. WORK DONE WITHOUT THE ENGINEERS APPROVAL IS THE RESPONSIBILITY OF THE CONTRACTOR.
4. ALL MECHANICAL EQUIPMENT, MATERIALS, AND INSTALLATION SHALL BE PROVIDED BY THE CONTRACTOR. ALL EQUIPMENT SHALL BE COMPLETE, INSTALLED, AND FULLY FUNCTIONAL PRIOR TO FINAL ACCEPTANCE OF THE WORK.
5. INSTALL ALL EQUIPMENT PER MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS. ANY CONFLICTS BETWEEN THE MANUFACTURERS DOCUMENTATION AND THE CONTRACT DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN A TIMELY FASHION.
6. IN ALL PLACES WHERE A SPECIFIC MANUFACTURER IS LISTED, THE MANUFACTURER LISTED WAS USED AS BASIS-OF-DESIGN. EQUIVALENT PRODUCT BY ANOTHER MANUFACTURER WILL BE ACCEPTABLE. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING ENGINEER OF PROPOSED SUBSTITUTIONS AND PROVIDING SUBMITTALS FOR APPROVAL. CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL ADDITIONAL DESIGN FEES AS REQUIRED DUE TO SUBSTITUTIONS, INCLUDING IMPACTS TO OTHER TRADES AND TO MAINTAIN ALL PERFORMANCE, SAFETY, ENERGY EFFICIENCY, AND CODE REQUIREMENTS.
7. SEE PIPE SCHEDULE ON SHEET M-701 FOR PIPE MATERIALS.

KEY NOTES

1. **BID ALTERNATE #1:** INSTALL THREE-WAY VALVE, DC-1, AND ASSOCIATED PIPING AND VALVES.
2. MIXING VALVE ASSEMBLY SHOWN FOR REFERENCE. SEE 5/M-501 AND 1/M-603 FOR COMPLETE MIXING VALVE PIPING LAYOUT AND CONTROLS.
3. CONNECT PIPE TO EXISTING DISTRIBUTION PIPING.
4. BASE BID PIPE SECTION. OMIT THIS PIPE SECTION IF **BID ALTERNATE #1** IS ACCEPTED.

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PROJ. NO.	23251
DRAWN	**RKC**
CHECKED	**TAH**
DATE	02/14/2025

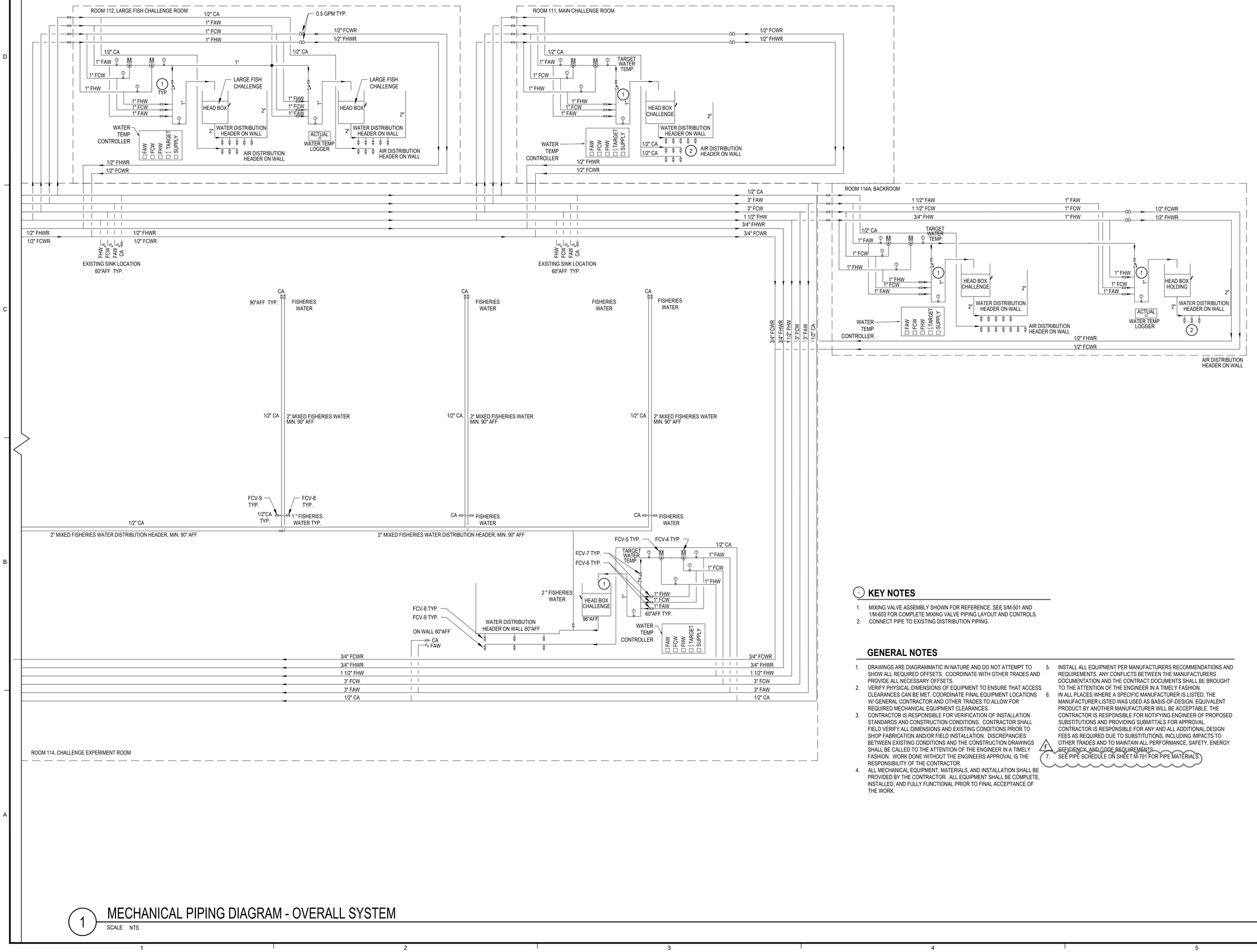
SHEET TITLE:

MECHANICAL PIPING DIAGRAMS

SHEET NO:

M-601

SHEET 20 OF 33



KEY NOTES

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2. CONNECT PIPE TO EXISTING DISTRIBUTION PIPING.

GENERAL NOTES

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7. SEE PIPE SCHEDULE ON SHEET M-701 FOR PIPE MATERIALS.

1 MECHANICAL PIPING DIAGRAM - OVERALL SYSTEM

SCALE: NTS

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PROJ. NO.	23251
DRAWN	RKC
CHECKED	TAH
DATE	02/14/2025

SHEET TITLE:

MECHANICAL PIPING DIAGRAMS

SHEET NO:

M-602

SHEET 21 OF 33

DESIGN CONDITIONS

2021 ASHRAE .04%, MOSCOW/PULLMAN AP, WMO:727857	
OUTDOORS	SUMMER 92.4°F DB / 63°F WB
	WINTER 7.1°F DB
INDOOR	COOLING 75°F
	HEATING 72°F
VENTILATION	PER ASHRAE 62.1-2010
ELEVATION	2,551 FT ABOVE SEA LEVEL

VARIABLE FREQUENCY DRIVE SCHEDULE (BASIS OF DESIGN)

TAG	LOCATION	EQUIPMENT SERVED	MANUFACTURER / MODEL	MOTOR DATA			BYPASS (Y/N)	DISCONNECT/ FUSES (Y/N)	NEMA ENCLOSURE	SIMULT. MOTOR OPER. (Y/N)	CONTACTOR SELECTOR (Y/N)	INPUT LINE REACTOR (Y/N)	OUTPUT LINE REACTOR (Y/N)	NOTES
				MOTOR QTY	MOTOR HP EA	VOLTS/ PH								
VFD-1	MECHANICAL ROOM	CWP-1	ABB/ ACH580	1	5	460/3	Y	Y	12	N	N	Y	N	1,2,3
VFD-2	MECHANICAL ROOM	CWP-2	ABB/ ACH580	1	5	460/3	Y	Y	12	N	N	Y	N	1,2,3
VFD-3	MECHANICAL ROOM	FWP-1	ABB/ ACH580	1	2	460/3	Y	Y	12	N	N	Y	N	1,2,3
VFD-4	MECHANICAL ROOM	FWP-2	ABB/ ACH580	1	2	460/3	Y	Y	12	N	N	Y	N	1,2,3

NOTES:
1. PROVIDE WITH ETHERNET ADAPTER
2. PROVIDE WITH UL TYPE 1 ENCLOSURE.
3. ELECTRICAL AND ELECTROMECHANICAL COMPONENTS OF THE VARIABLE FREQUENCY DRIVE (VFD) SHALL NOT CAUSE ELECTROMAGNETIC INTERFERENCE TO ADJACENT ELECTRICAL OR ELECTROMECHANICAL EQUIPMENT WHILE IN OPERATION. PER SPEC UFGS 262923

AIR COOLED CHILLER SCHEDULE (BASIS OF DESIGN)

TAG	MFR	MODEL NUMBER	LOCATION	REFRIG. TYPE	REFRIG. CHARGE (LBS)	FULL LOAD CAPACITY MBH	NO. CIRCUITS	EFFICIENCY		COMPRESSOR		EVAPORATOR				ELECTRICAL				SOUND (DBA)	SIZE (L"xW"xH")	MAX. OPER. WEIGHT (LBS)	NOTES
								FULL LOAD EER	IPLV (kW/ton)	QTY	TYPE	EWT (F)	LWT (F)	TOT GPM	WPD (FT)	VOLTS	PHASE	MCA	MOP				
CH-1	TRANE/JETSON	CCAR-050FA0E011D09150110300	MECH. ROOM	R-454B	52	41	2	-	1.215	2	SCROLL	48	38	120	17.6	460	3	88	125	88	87"x29"x45"	1,310	1,2,3,4,5,6,7,8,9,10
CH-2	TRANE/JETSON	CCAR-050FA0E011D09150110300	MECH. ROOM	R-454B	52	41	2	-	1.215	2	SCROLL	48	38	120	17.6	460	3	88	125	88	87"x29"x45"	1,310	1,2,3,4,5,6,7,8,9,10

NOTE
1. PROVIDE CHILLER AND REMOTE CONDENSER AS COMPLETE OPERATING SYSTEM, INCLUDING INTEGRATED CONTROLS, WIRING, PIPING, INSULATION, VALVES.
2. PROVIDE CHILLER AND REMOTE CONDENSERE WITH FACTORY INSTALLED MICROPROCESSOR-BASED CONTROLLER COMPATIBLE WITH BACNET AND N+1 CONTROL LOGIC.
3. PROVIDE WITH COMPRESSOR INVERTER FOR TURN DOWN, SCROLL COMPRESSOR, LOW AMBIENT OPERATION KIT, BAS INTERFACE.
4. PROVIDE WITH OPTIONAL SOUND ENCLOSURE.
5. EACH CHILLER TO BE 50 TON NOMINAL SIZE, WITH UNLOADING DOWN TO 25% CAPACITY.
6. PROVIDE WITH FACTORY INSTALLED FLOW SWITCH AND INTEGRAL WIRING TO CONTROLS.
7. PROVIDE CHILLER AND REMOTE CONDENSER AS COMPLETE SYSTEM WITH INTEGRATED CONTROL PANELS ALLOWING CHILLER TO OPERATE BETWEEN -20 F AND 104 F AMBIENT TEMPERATURE. PROVIDE HEAD PRESSURE CONTROLS, GAS BYPASS, CONDENSER FAN SPEED CONTROL OPTION, VALVES .
8. PROVIDE WITH SINGLE POINT POWER CONNECTION, UNIT MOUNTED NON-FUSED DISCONNECT, SERVICE OPTION, LOW SOUND OPTION, FREEZE PROTECTION.
9. CHILLED WATER SYSTEM TO HAVE 30% PROPYLENE GLYCOL.
10. CONTACT JETSON-HVAC FOR BASIS OF DESIGN UNIT SELECTION AND TECHNICAL INTEGRATION QUESTIONS. PHONE:903-758-2900 EXT.145, SALES@JETSONHVAC.COM

PLUMBING SYSTEM MATERIALS AND METHODS

PIPE SYSTEM	SYSTEM ABBREV.	PIPE SIZE RANGE	MATERIAL	FLUID	JOINING METHODS	VALVES & ACCESSORIES	INSULATION REQUIREMENT
FISHERIES CHILLED WATER	FCW/FCWR	ALL SIZES	SCHEDULE 80 PVC	WATER	THREADED COUPLINGS OR SOLVENT CEMENT	PVC VALVES AND FITTINGS	IF PIPE ≤ 1.5", THEN 1/2" IF PIPE ≥ 2", THEN 1"
FISHERIES AMBIENT WATER	FAW	ALL SIZES	SCHEDULE 80 PVC	WATER	THREADED COUPLINGS OR SOLVENT CEMENT	PVC VALVES AND FITTINGS	NONE
FISHERIES HOT WATER	FHW/FHWR	ALL SIZES	SCHEDULE 80 CPVC	WATER	THREADED COUPLINGS OR SOLVENT CEMENT	CPVC VALVES AND FITTINGS	IF PIPE ≤ 1.5", THEN 1" IF PIPE ≥ 2", THEN 1 1/2"
FISHERIES MIXED WATER	-	ALL SIZES	SCHEDULE 80 CPVC	WATER	THREADED COUPLINGS OR SOLVENT CEMENT	CPVC VALVES AND FITTINGS	IF PIPE ≤ 1.5", THEN 1" IF PIPE ≥ 2", THEN 1 1/2"
CHILLED WATER	CHWS/CHWR	ALL SIZES	TYPE K OR L COPPER	30% PROPYLENE GLYCOL	PROPRESS OR BRAZED	COPPER VALVES AND FITTINGS	IF PIPE ≤ 1.5", THEN 1-1/2" IF PIPE ≥ 2", THEN 2"
COMPRESSED AIR	CA	ALL SIZES	TYPE L COPPER	AIR	PROPRESS OR SOLDERED	COPPER VALVES AND FITTINGS	NONE

AIR-COOLED CONDENSER SCHEDULE (BASIS OF DESIGN)

TAG	LOCATION	SERVES	MANUFACTURER/ MODEL	PERFORMANCE CAPACITY			FAN DATA					COIL DATA		UNIT POWER REQUIREMENTS			SIZE	UNIT WT. (LBS)	NOTES
				NOM. TONS	TOT CLG (MBH)	EAT (F)	#	MTR (HP)	SIZE (IN)	TOTAL CFM	NOISE (DBA)	CONN. (IN) INLET	CONN. (IN) OUTLET	V/PH	MCA	MOCP	(L"xW"xH")		
ACC-1	SOUTH CNR	CH-1	TRANE-JETSON/ CAUJ-C5042_1302	50	800	95	6	1	26"	36,890	65	1-5/8" 1-5/8"	7/8" 7/8"	460/3	11.3	15	228"x88"x79"	4,451	1,2,3,4,5,6,7,8,9,10,11
ACC-2	SOUTH CNR	CH-1	TRANE-JETSON/ CAUJ-C5042_1302	50	800	95	6	1	26"	36,890	65	1-5/8" 1-5/8"	7/8" 7/8"	460/3	11.3	15			1,2,3,4,5,6,7,8,9,10,11

NOTE
1. PROVIDE CHILLER AND REMOTE CONDENSER AS COMPLETE OPERATING SYSTEM, INCLUDING INTEGRATED CONTROLS, WIRING, PIPING, INSULATION, VALVES.
2. PROVIDE CONDENSER WITH INTEGRATED LOW TEMPERATURE FAN SPEED CONTROL AND HEAD PRESSURE CONTROLS. PROVIDE PROPER HEAT OF REJECTION AND HEAD PRESSURE BETWEEN -20 F AND 104 F AMBIENT CONDITIONS.
3. PROVIDE CHILLER AND CONDENSER WITH FACTORY INSTALLED MICROPROCESSOR-BASED CONTROLLER COMPATIBLE WITH BACNET AND N+1 CONTROL LOGIC.
4. PROVIDE WITH SINGLE POINT POWER CONNECTION, UNIT MOUNTED NON-FUSED DISCONNECT, 120V SERVICE OPTION.
5. PROVIDE WITH LOW SOUND OPTION.
6. PROVIDE WITH MICROCHANNEL HEAT EXCHANGER CONDENSER COILS.
7. PROVIDE WITH INTEGRATED LOW AMBIENT TEMPERATURE FAN SPEED CONTROLS AND SENSORS FOR FAN CYCLING, FAN SPEED, LIQUID LINE PRESSURE SWITCHES, AND LOW AMBIENT TEMPERATURE DAMPER OPTION.
8. PROVIDE BOTH CONDENSERS IN A SIMILAR CONFIGURATION AS A CAUJ-100, WHERE THE CONDENSERS ARE INSTALLED END TO END WITH A SINGLE CONTROL PANEL PRE-WIRED TO CONTROL BOTH UNITS.
9. PROVIDE EACH CONDENSER WITH SEPARATE REFRIGERANT CONNECTIONS AND SEPARATE ELECTRICAL POWER CONNECTIONS IN A SINGLE CONTROL PANEL.
10. PROVIDE WITH HIGH EFFICACY FAN MOTORS.
11. CONTACT JETSON-HVAC FOR BASIS OF DESIGN UNIT SELECTION AND TECHNICAL INTEGRATION QUESTIONS. PHONE:903-758-2900 EXT.145, SALES@JETSONHVAC.COM

HEAT EXCHANGER SCHEDULE (BASIS OF DESIGN)

TAG	LOCATION	SERVES	MANUFACTURER/ MODEL	HOT SIDE					COLD SIDE					SIZE (IN)	UNIT WT. (LBS)	NOTES
				FLUID	FLOW RATE (GPM)	EWT (F)	LWT (F)	ΔP (PSI)	FLUID	FLOW RATE (GPM)	EWT (F)	LWT (F)	ΔP (PSI)			
HX-1	MECHANICAL ROOM	CHILLED/ FISHERIES WATER	TACO/ PF 205-79-4-NH	WATER	50	72	40	2	30% PG	240	38	48	10	38DX19WX46H	1100	1
HX-2	MECHANICAL ROOM	CHILLED/ FISHERIES WATER	TACO/ PF 205-79-4-NH	WATER	50	72	40	2	30% PG	240	38	48	10	38DX19WX46H	1100	1

NOTES
1. HEAT EXCHANGER TO BE SELECTED WITH 10% OVERDESIGN TO ACCOUNT FOR FOULING LOSSES.

BID ALTERNATE #1

DRY-COOLER SCHEDULE (BASIS OF DESIGN)

TAG	LOCATION	SERVES	MANUFACTURER/ MODEL	FLUID	FAN DATA					DRYCOOLER COIL DATA								UNIT POWER REQUIREMENTS			UNIT WT. (LBS)	REMARKS
					#	MTR (HP)	SIZE (IN)	TOTAL CFM	NOISE (DBA)	AAT (F)	EWT (F)	LWT (F)	FLOW (GPM)	W.P.D. (PSI)	REJECT (MBh)	CONN. (IN) INLET	CONN. (IN) OUTLET	V/PH	FLA	MOCP		
DC-1	SOUTH CNR	CH-1 CH-2	GUNTNER/ GFD 090	30% PG	8	5	36	143237	76	30	48	38	166	8	763	2"	2"	480/3	52	-	9,600	

EXPANSION TANK SCHEDULE (BASIS OF DESIGN)

TAG	LOCATION	SYSTEM	MANUFACTURER/ MODEL	TYPE	SYSTEM VOLUME (GAL.)	LOW TEMP. (°F)	HIGH TEMP. (°F)	REQ'D VOLUME (GAL)		FLUID	CHARGE PRESS. (PSIG)	OPER. PRESS. (PSIG)	CONN. SIZE (IN)	OPER. WT. (LBS)	NOTES
								TANK	ACCEPTANCE						
ET-1	MECHANICAL ROOM	CHILLED WATER	AMTROL/ AX-40	DIA.	700	35	70	23	11.3	30% PG	60	125	1/2"	35	1

NOTES:
1. CHARGE TANK TO SPECIFIED PRESSURE PRIOR TO FILLING THE PIPING SYSTEM AND CONNECTING TO TANK. RECORD CHARGE PRESSURE ON TANK.

BUFFER TANK/STORACE TANK/POT FEEDER SCHEDULE (BASIS OF DESIGN)

TAG	LOCATION	SERVES	MANUFACTURER / MODEL	FLUID	TANK SIZE (GAL)	RATED PRESS. (PSI)	CONNECTIONS	OPERTATING WEIGHT (LBS)	REMARKS
BT-1	MECHANICAL ROOM	CHILLED WATER SYSTEM	CEMLINE/ V200CWB4-F-SL-20-1	30% PG	200	125	4" FLANGE	1900	PROVIDE 2" OF EXTERIOR INSULATION. SECURE TANK ACCORDING TO ASCE 7.
BT-2	MECHANICAL ROOM	CHILLED WATER SYSTEM	CEMLINE/ V200CWB4-F-SL-20-1	30% PG	200	125	4" FLANGE	1900	PROVIDE 2" OF EXTERIOR INSULATION. SECURE TANK ACCORDING TO ASCE 7.
BT-3	MECHANICAL ROOM	CHILLED WATER SYSTEM	CEMLINE/ V200CWB4-F-SL-20-1	30% PG	200	125	4" FLANGE	1900	PROVIDE 2" OF EXTERIOR INSULATION. SECURE TANK ACCORDING TO ASCE 7.
ST-1	MECHANICAL ROOM	FISHERIES WATER SYSTEM	AO SMITH / TJV-200A	WATER	200	125	4" FLANGE	1900	PROVIDE 2" OF EXTERIOR INSULATION. SECURE TANK ACCORDING TO ASCE 7.
PF-1	MECHANICAL ROOM	CHILLED WATER SYSTEM	NEPTUNE /DBFC-5	30% PG	5	125	3/4"	85	PROVIDE ISOLATION VALVES SHIPPED LOOSE. SECURE TANK ACCORDING TO ASCE 7.

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COLLEGE OF NATURAL RESOURCES CHILLER REPLACEMENT

PROJECT NO. DPW 23251
PROJECT NO. UI 230001

UNIVERSITY OF IDAHO

COLLEGE OF NATURAL RESOURCES BLD. 055
975 W 6TH STREET,
MOSCOW, ID 83844

100% CONSTRUCTION DOCUMENTS

REV	DATE	DESCRIPTION
F	5/19/2025	ADDENDUM 1
E	2/14/2025	100% CD
D	11/08/2024	95% SUBMITTAL
C	8/09/2024	50% SUBMITTAL
B	6/28/2024	DESIGN DEVELOPMENT
A	1/12/2024	SCHEMATIC DESIGN

PROJ. NO.	23251
DRAWN	RKC
CHECKED	TAH
DATE	02/14/2025

SHEET TITLE:

MECHANICAL SCHEDULES

SHEET NO:

M-701

SHEET 24 OF 33

ADDENDUM 1

2.2 COMPRESSED AIR PIPING

A. Drawn-Temper Copper Tubing: ASTM B 88, Type L.

B. Wrought-Copper Fittings: ASME B16.22.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide:

a. Anvil International, Inc.
b. S. P. Fittings; a division of Star Pipe Products.
c. Victaulic Company of America.
d. Stadler-Viega
e. Bronze Flanges and Flanged Fittings: ANSI/ASME B16.24.

3. Copper or Bronze Pressure-Seal Fittings:

a. Manufacturer: Subject to compliance with requirements, provide products manufactured by Stadler-Viega.
b. Housing: Copper.
c. O-Rings and Pipe Stops: EPDM.
d. Tools: Manufacturer's special tools.
e. Minimum 200-psig (1379-kPa) working-pressure rating at 250 degrees F (121 degree C.)

C. Wrought-Copper Unions: ASME B16.22.

2.3 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

ADDENDUM 1

PART 2 - PRODUCTS

2.1 WATER PIPE AND FITTINGS (POTABLE AND NON-POTABLE WATER)

A. Industrial fisheries water piping is non-potable.

1. Fisheries Cold and Ambient Water Piping: PVC Plastic Pipe, ASTM D 1785, Schedules 80.
2. Fisheries Hot and Mixed Water Piping: CPVC Plastic Pipe, ASTM F 441/F 441M, Schedules 80.

B. Fittings for PVC and CPVC Piping:

1. PVC Plastic Pipe Fittings: Socket-type pipe fittings, ASTM D 2467 for Schedule 80 pipe.
2. PVC Solvent Cement: ASTM D 2564.
3. CPVC Plastic Pipe Fittings: Socket-type pipe fittings, ASTM F 439 for Schedule 80 pipe.
4. CPVC Solvent Cement: ASTM F 493.

C. Potable water piping (non-fisheries piping):

1. Pipe Above Ground: Seamless copper water tube, ASTM B88, Type L, hard-drawn.
2. Pipe Below Ground (3" Size and Smaller): Seamless copper water tube, ASTM B88, Type "K," annealed, ANSI/ASME B16.22 wrought copper fittings, joints made by soldering.

D. Fittings for Copper Tubing:

1. Wrought copper or bronze solder-joint pressure fittings conforming to ANSI/ASME B16.18 and ANSI/ASME B16.22.
2. Adapters may be used for connecting tubing to flanges and to threaded ends of valves and equipment.
3. Solder: Lead-free, silver bearing, NSF approved, for all joints in copper water tubing. Apply flux carefully and remove all excess.
4. Press Fittings: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM.
5. press fittings shall be EPDM.
6. Mechanically formed (T-Drill) TEE'S may be used above grade, have brazed connection and be in strict compliance with manufactures' recommendations.

E. Unions, Copper Piping: 125-lb. wrought copper or cast bronze, solder joint type; ANSI/ASME B16.22 or ANSI/ASME B16.18.

F. Dielectric Fittings: See section 220500.