



LANE COMMUNITY COLLEGE DOWNTOWN CAMPUS

Mechanical Basis of Design

PRESENTED TO: Lane Community College

PRESENTED BY: Marc Brune, PE, LEED AP



GOALS

Way back in 2010...

Mixed use building

- Academic and Residential Space

“A Building that Teaches”

- Energy Management Program

Energy & Comfort

- 80°F Cooling
- 70°F Heating
- Living Building Ready





GOALS

Way back in 2010...

Mixed use building

- Academic and Residential Space

“A Building that Teaches”

- Energy Management Program

Energy & Comfort

- 80°F Cooling
- 70°F Heating
- ~~Living Building Ready~~





GOALS

Way back in 2010...

Mixed use building

- Academic and Residential Space

“A Building that Teaches”

- Energy Management Program

Energy & Comfort

- 80°F Cooling
- 70°F Heating
- LEED Platinum/Gold





TEACHING, ENERGY & COMFORT

Results

	ACADEMIC	RESIDENTIAL
	GOALS	
EUI (kBTU/SF/YR)	10-13	10-13
% BETTER THAN CODE	35-40	50
LEED RATING	GOLD	PLATINUM
DIFFERENT SYSTEM TYPES	8	1
	PROJECTIONS	
EUI (kBTU/SF/YR)	25	39
% BETTER THAN CODE	31%	52%
LEED RATING	TARGETING	TARGETING
DIFFERENT SYSTEM TYPES	8	1
	ACHIEVAL	
EUI (kBTU/SF/YR)	NO	NO
% BETTER THAN CODE	NEARLY	EXCEEDING
LEED RATING	YES, TBD	YES, TBD
DIFFERENT SYSTEM TYPES	YES	YES



PRESENTATION OVERVIEW

Natural Ventilation

Academic
Mechanics

Academic Overlay

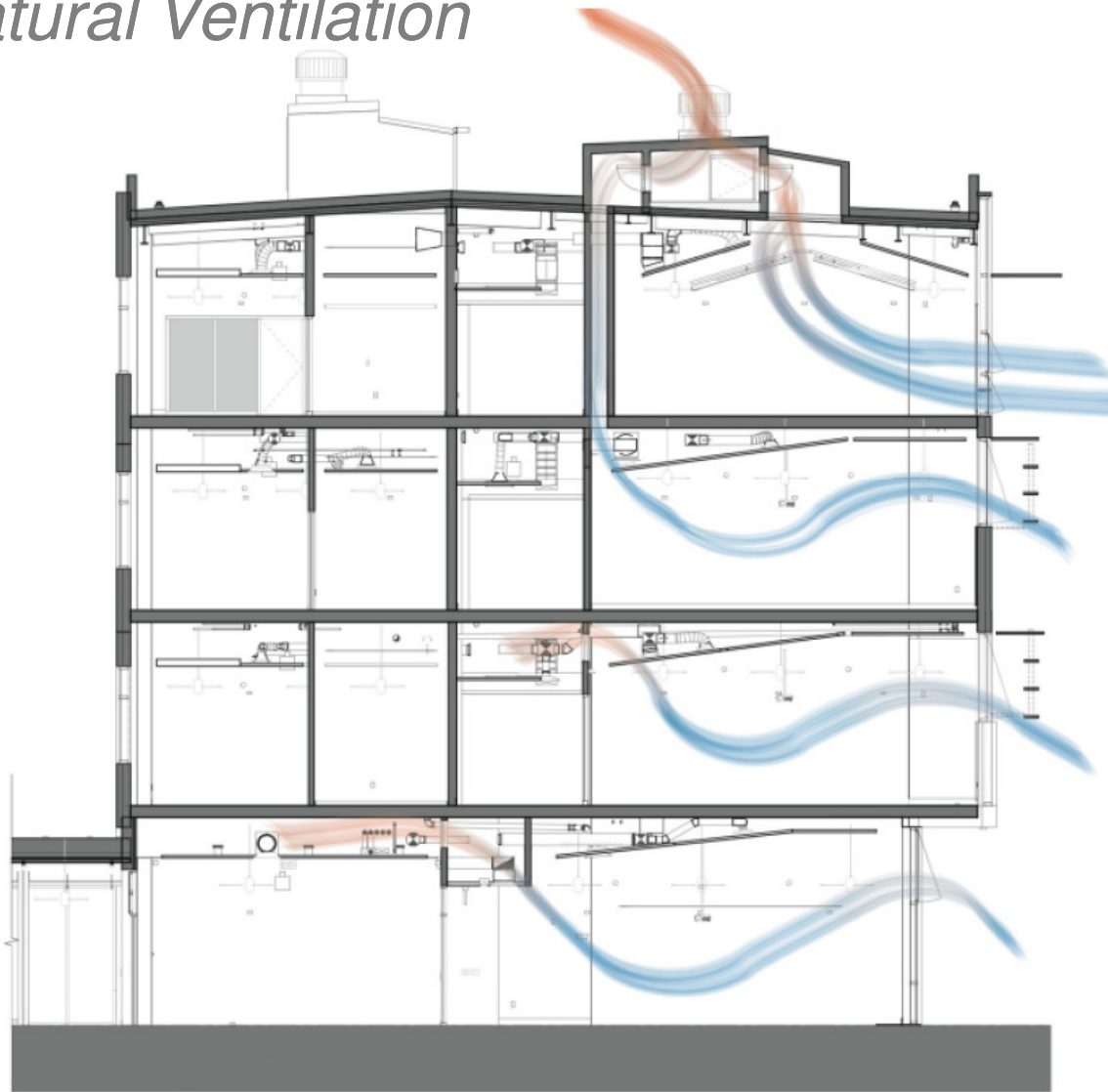
Residential
Mechanics





MECHANICAL BASIS OF DESIGN

Natural Ventilation



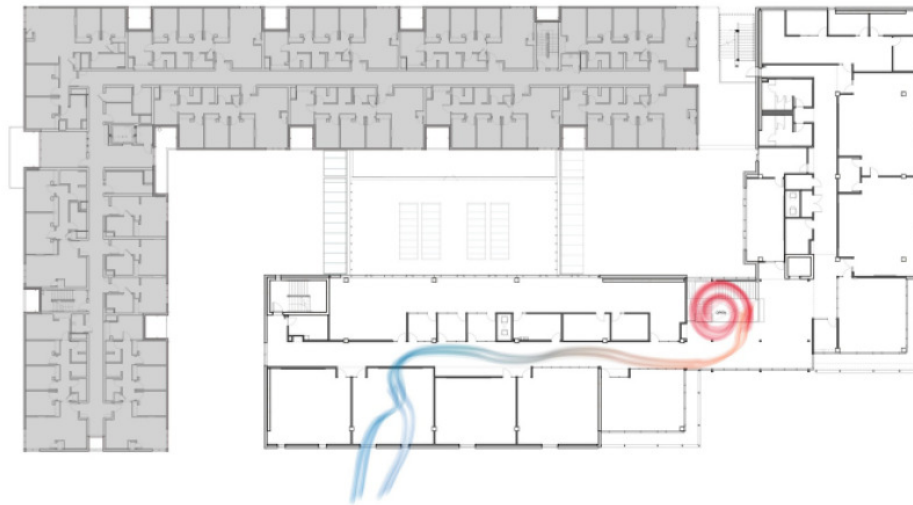
Section - South Classroom Looking East

Image courtesy of SRG Partnership



MECHANICAL BASIS OF DESIGN

Systems Overview: 1st Floor Natural Ventilation



Plan – Level 2



Section – Central Stair Looking West

Image courtesy of SRG Partnership



MECHANICAL BASIS OF DESIGN

Systems Overview: 2nd and 3rd Floor Natural Ventilation



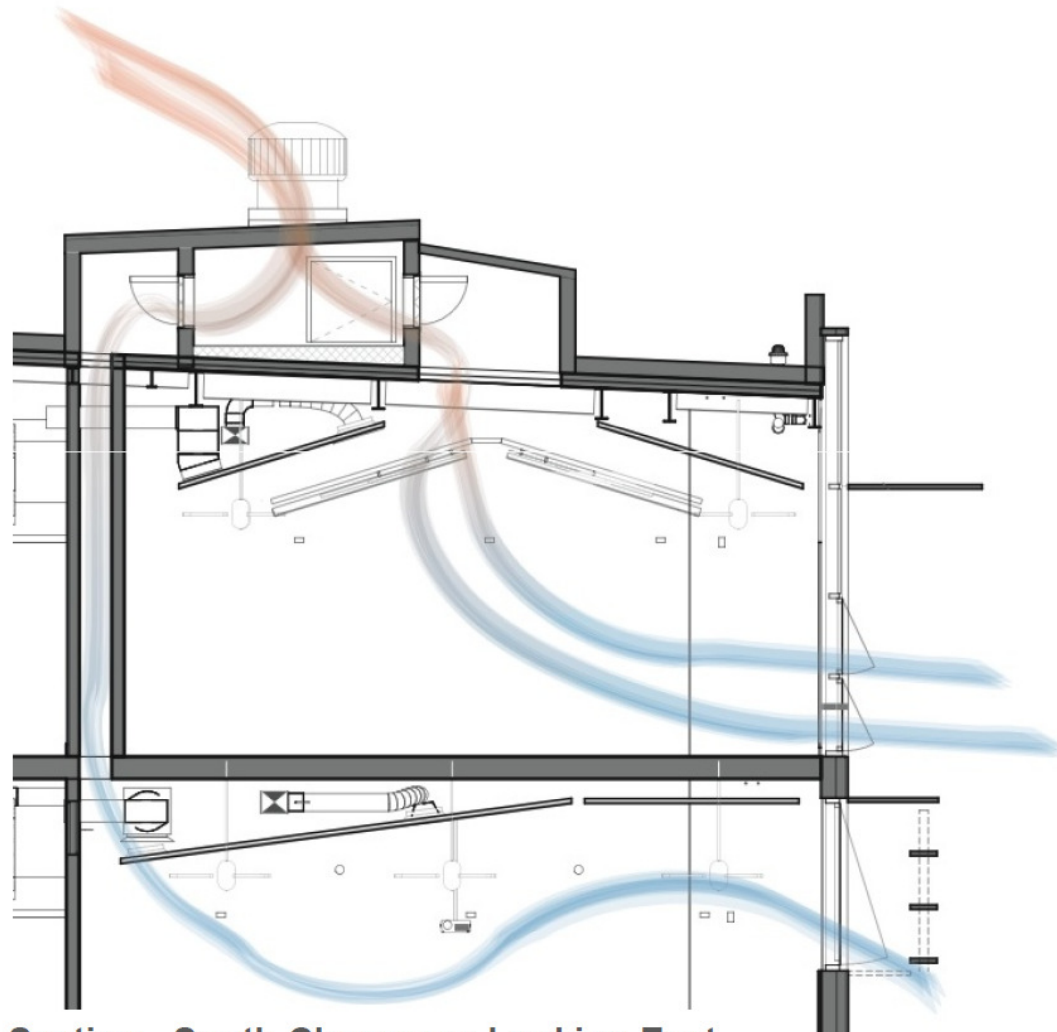
Section - South Classroom Looking East

Image courtesy of SRG Partnership



MECHANICAL BASIS OF DESIGN

Systems Overview: 4th Floor Natural Ventilation



Section - South Classroom Looking East

Image courtesy of SRG Partnership



MECHANICAL BASIS OF DESIGN

Systems Overview: 4th Floor Natural Ventilation

Passive
penthouses



Image courtesy of SRG Partnership



MECHANICAL BASIS OF DESIGN

Mechanical Systems





Systems Overview

A

2008-08-12 2:05:00 PM

1

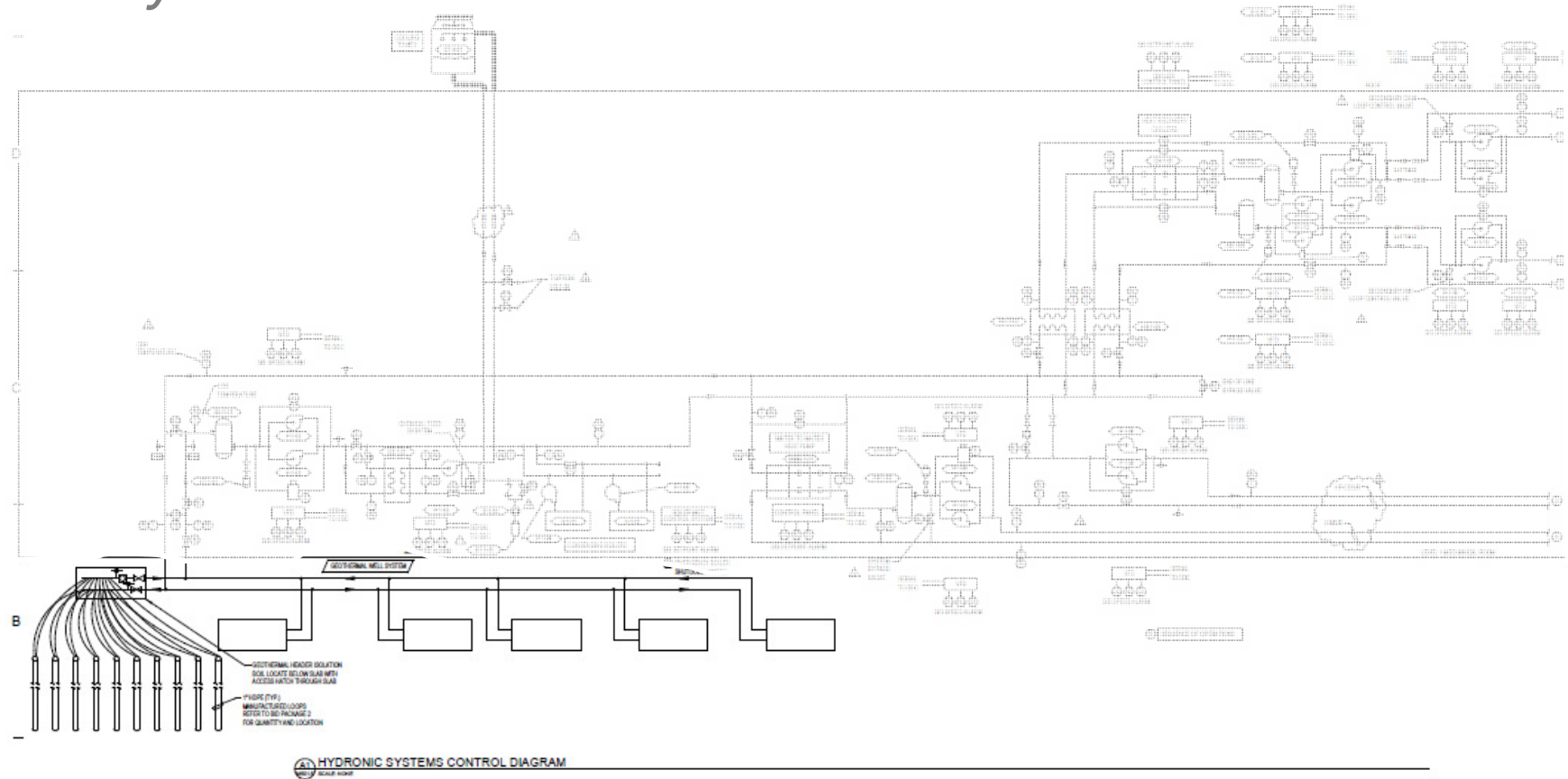
2

3



MECHANICAL BASIS OF DESIGN

Systems Overview: Geothermal



LANE COMMUNITY COLLEGE
DOWNTOWN CAMPUS
BP-05 SITE, SHELL AND INTERIORS
1101 NE Oregon Street
Eugene, OR 97401

CONSTRUCTION DOCUMENTS
COMPILED BY: JCH/MLH
Drawing Title:
HYDRONIC SYSTEMS
CONTROL DIAGRAM
SCALE:

No.	Description	Date
1	ISSUED FOR PERMIT	08/08/11
2	ISSUED FOR PERMIT	02/16/12
3	ISSUED FOR PERMIT	02/16/12
4	ISSUED FOR PERMIT	02/16/12
5	ISSUED FOR PERMIT	02/16/12

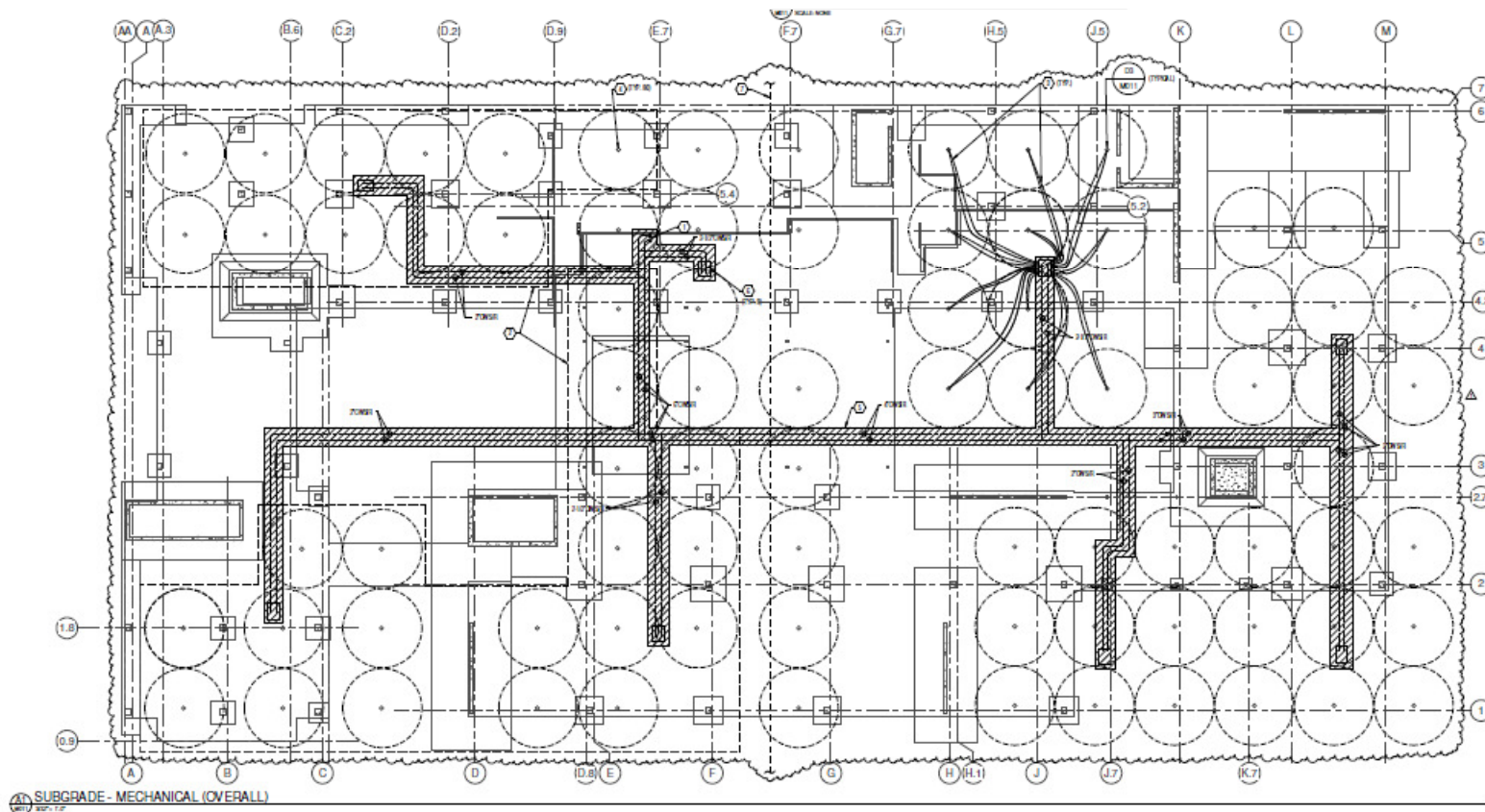
Designed by:
JCH/MLH
Checked by:
MLH
Date:
July 1, 2011
Project No.:
1101
Consultant Project No.:
1101
Owner Project No.:
1101
Drawing No.:
M501.5

M501.5



MECHANICAL BASIS OF DESIGN

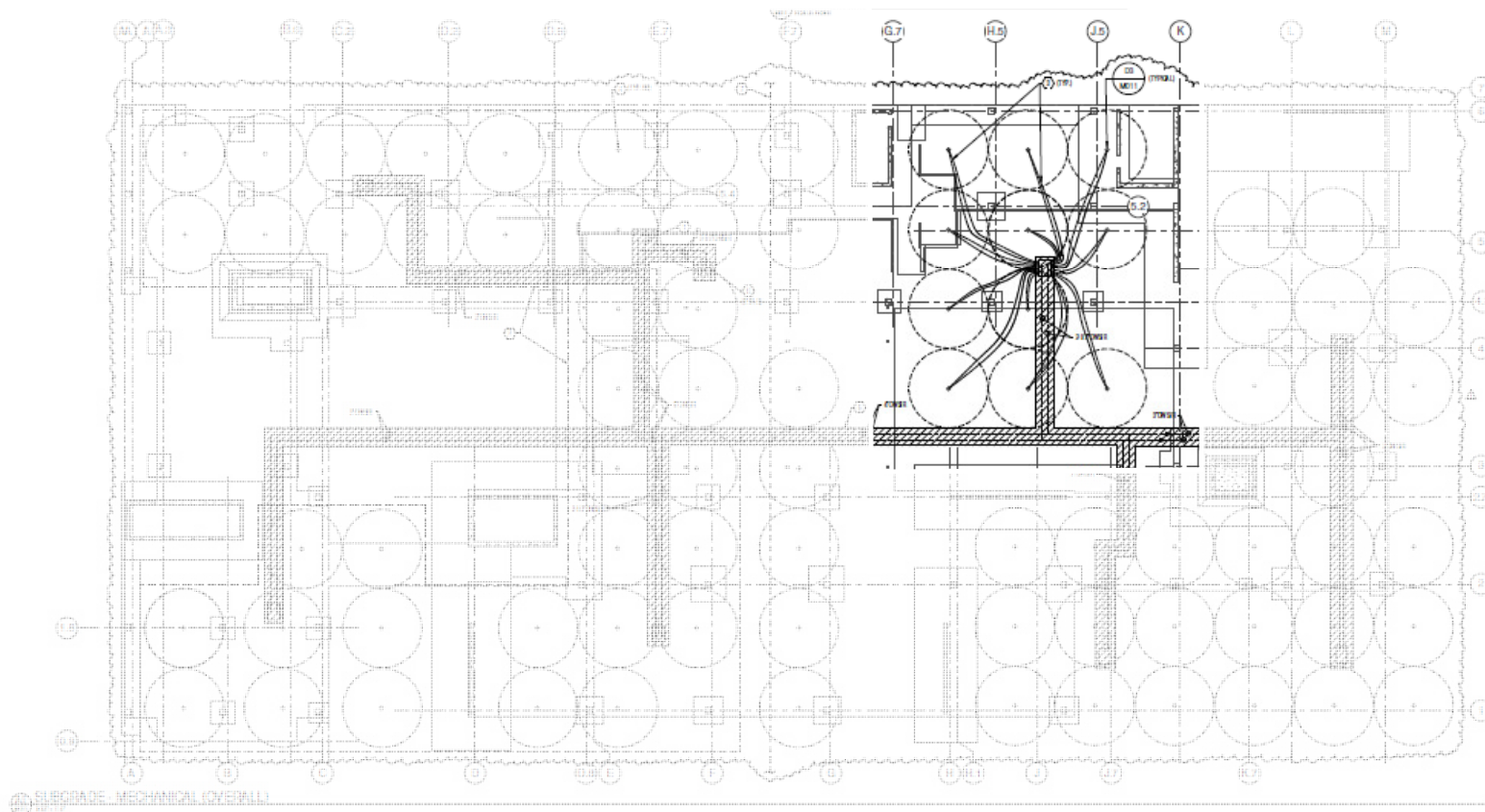
Systems Overview





MECHANICAL BASIS OF DESIGN

Systems Overview



RGO PARTNERS INC.
ARCHITECTS
1000 W. 10th Street, Suite 100
Portland, OR 97204
Tel: 503.222.1111 Fax: 503.222.1112

Portland, Oregon
ARCHITECTS
1000 W. 10th Street, Suite 100
Portland, OR 97204
Tel: 503.222.1111 Fax: 503.222.1112



LANE COMMUNITY COLLEGE
DOWNTOWN CAMPUS
Figure 1.001

DATE: 10/1/01

1.001

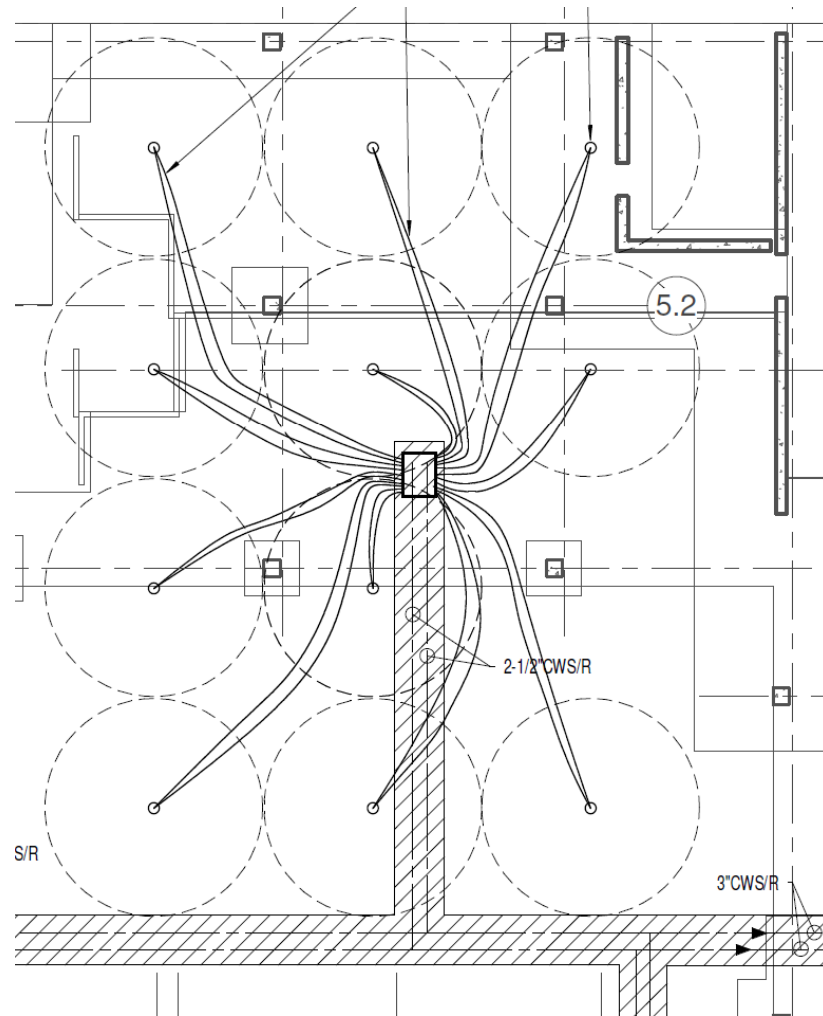
10/1/01

M011



MECHANICAL BASIS OF DESIGN

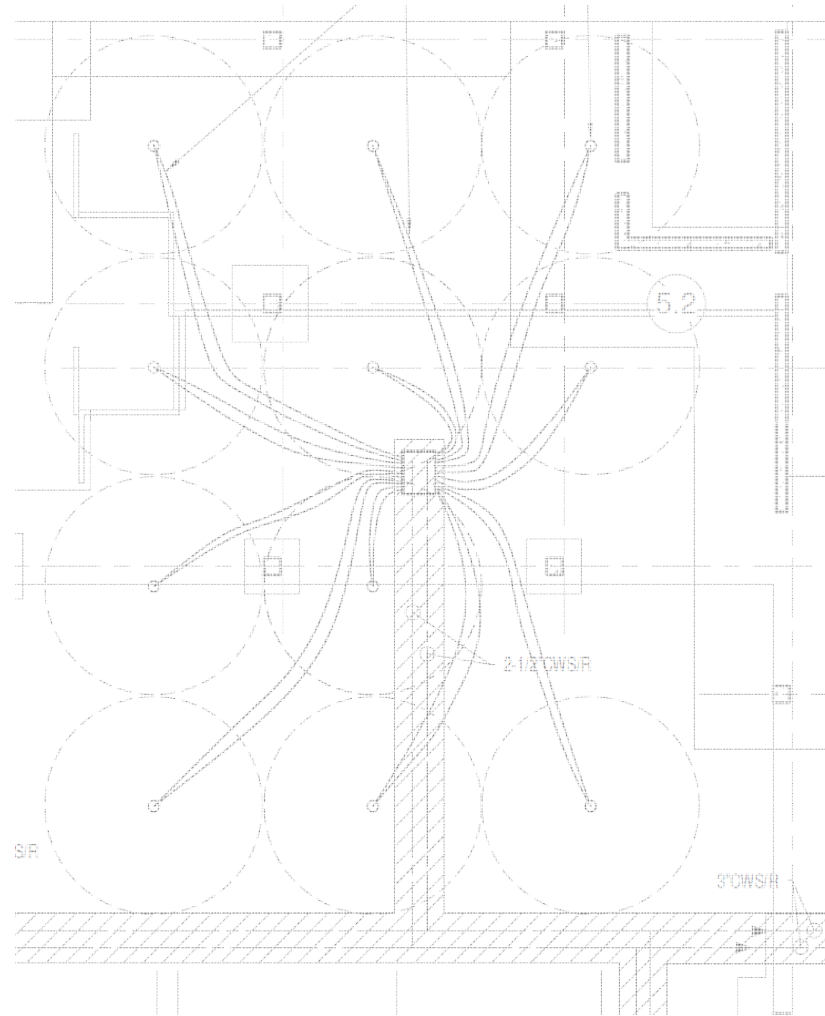
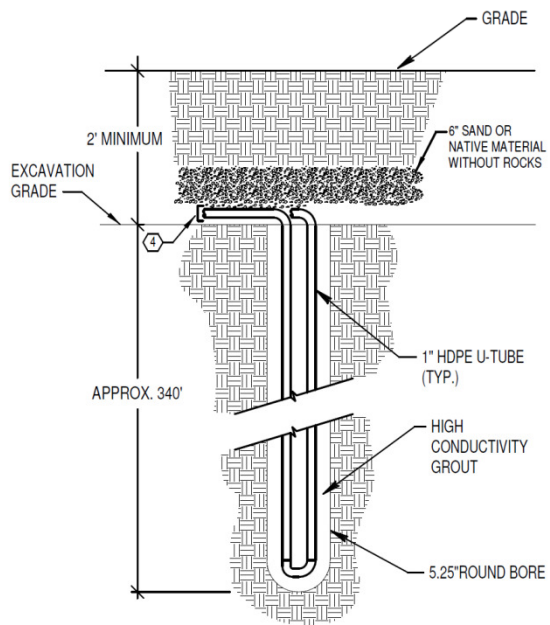
Systems Overview





MECHANICAL BASIS OF DESIGN

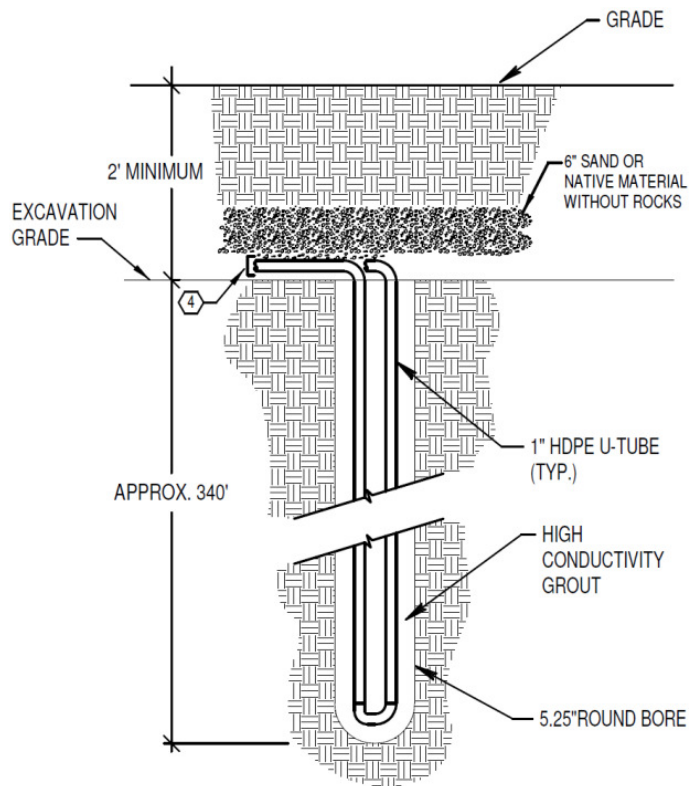
Systems Overview





MECHANICAL BASIS OF DESIGN

Systems Overview





MECHANICAL BASIS OF DESIGN

Systems Overview

E

-

D

-

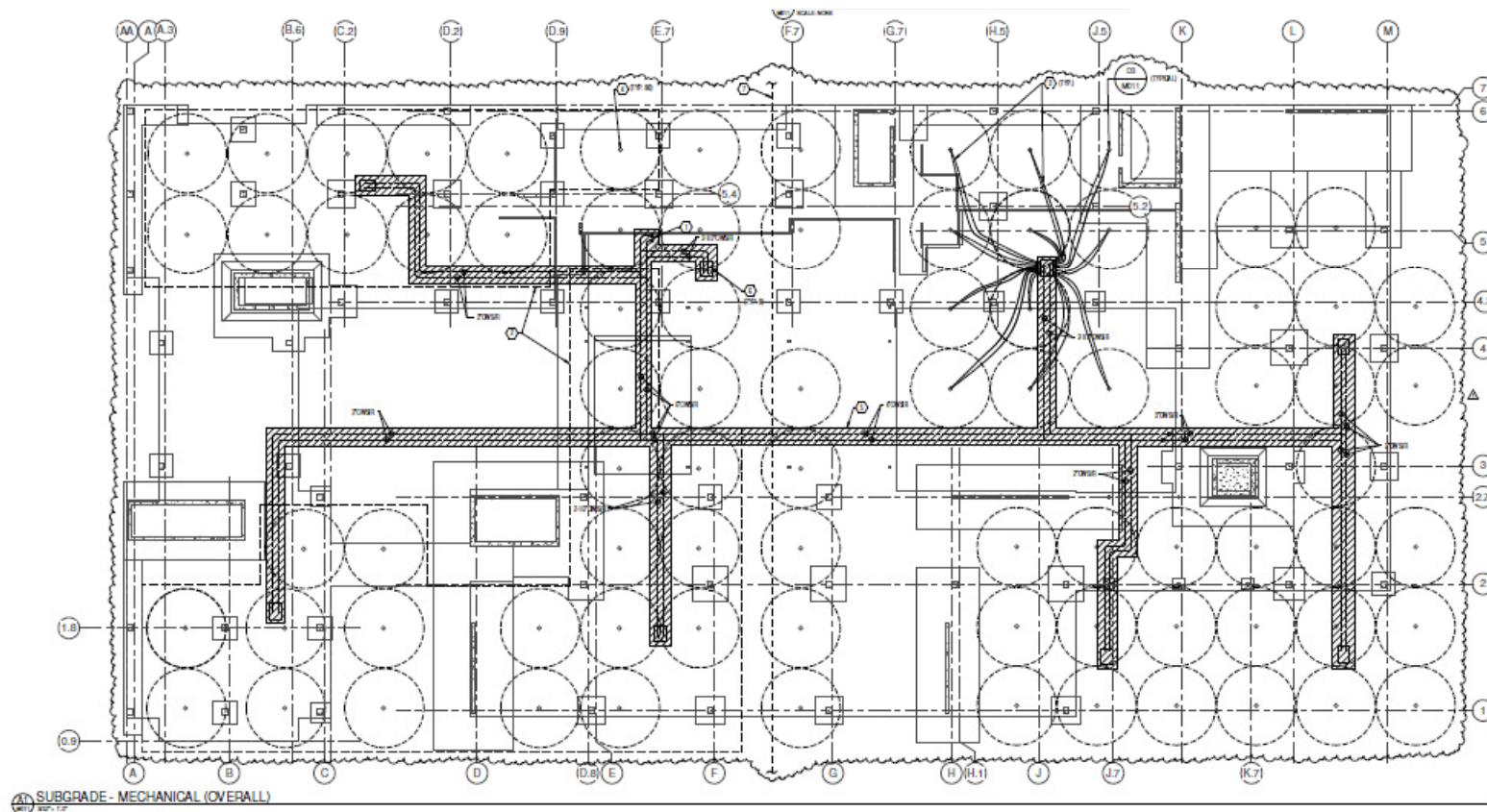
C

-

B

-

A



SUBGRADE - MECHANICAL (OVERALL)

1

1

2

1

3

1

4

1

5



RGO PARTNERSHIP INC.
ARCHITECTS
1000 W. 10th Street, Suite 100
Tulsa, Oklahoma 74103
Phone: (918) 438-1000
Fax: (918) 438-1001

Professional Engineer
State of Oklahoma
License No. 10000
Exp. 12/31/2010



LANE COMMUNITY COLLEGE
DOWNTOWN CAMPUS
Figure 1.00 1/1

Copyright © 2010

Revised: 1/10

1/10

1/10

1/10

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1/10

1/10

1/10

1/10

1/10

1/10

1/10

1/10

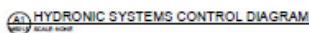
1/10

1/10

1/10



Systems Overview: Condenser Water



15-Aug-12 2:01:00 PM

1

2

3

M501.5



LANE COMMUNITY COLLEGE
DOWNTOWN CAMPUS
BP-05 SITE, SHELL AND INTERIORS
10.01 We will build, design and
manage, OR 9.75/yr

CONSTRUCTION DOCUMENT
COMPONENT SET - ECHV-11
Drawing Title
HYDRAULIC SYSTEM
CONTROL DIAGRAM
DATE

Expenditures		
No.	Description	Date
1	CCC 006	08/05/01
2	CCC 006	01/10/02
3	RR 4x7	02/10/02
4	RR 6x2	02/10/02
5	CCC 006	08/05/01

Designed by
GSI

Created by
GSI

Date
July 1, 2011

Product No
GSI

Consultant Project No

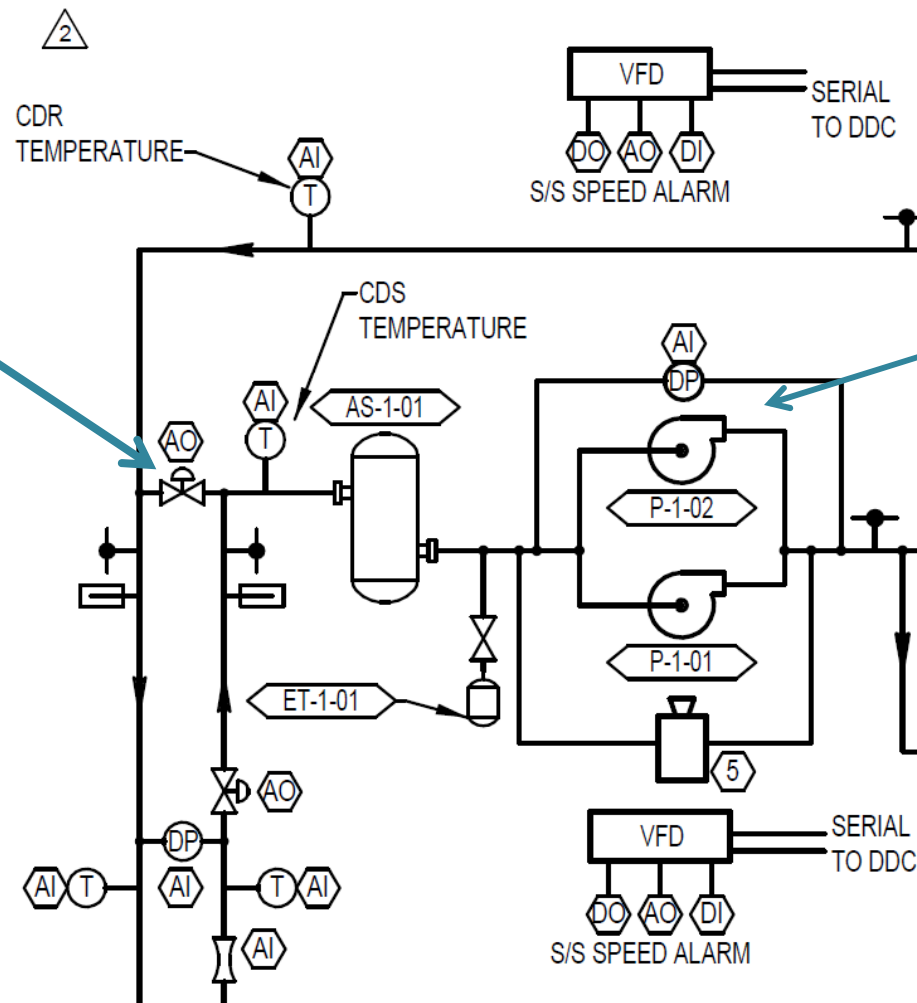
Owner Project No

GSI



Systems Overview: Condenser Water

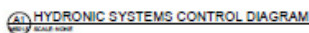
First stage of heating and cooling is geothermal wells.



Condenser water pumps vary speed based on DP signal.



Systems Overview: Condenser Water



26 Aug - 12:28:18 PM

1

2

3

1

M501.5



LANE COMMUNITY COLLEGE
DOWNTOWN CAMPUS
BP-05 SITE, SHELL AND INTERIORS
1001 W. 10th Ave. Ste. 100
Eugene, OR 97401

CONSTRUCTION DOCUMENT
COMPONENT SET - 2014-11

Drawing Title
HYDRAULIC SYSTEM
CONTROL DIAGRAM

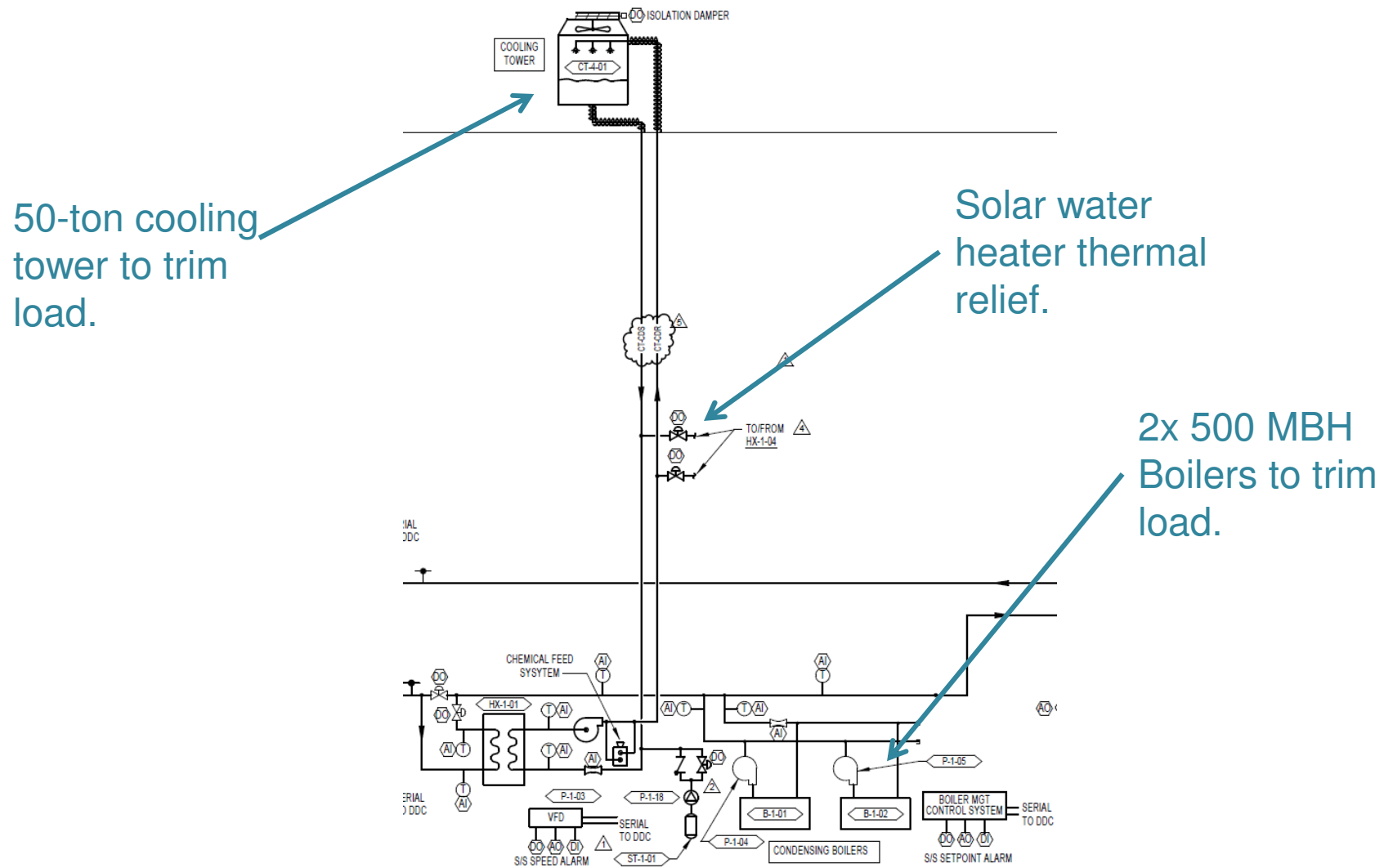
Reservations		
No.	Description	Date
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2	CC2-006	01/10/02
3	NR-ax7	02/10/02
4	NR-012	2/10/02
5	CC2-006	08/05/01

Drawn by
 5/8
 Checked by
 6/7/8
 Date
 July 1, 2011
 Project No.
 6201
 Consultant Project No.
 Owner Project No.
 6201



MECHANICAL BASIS OF DESIGN

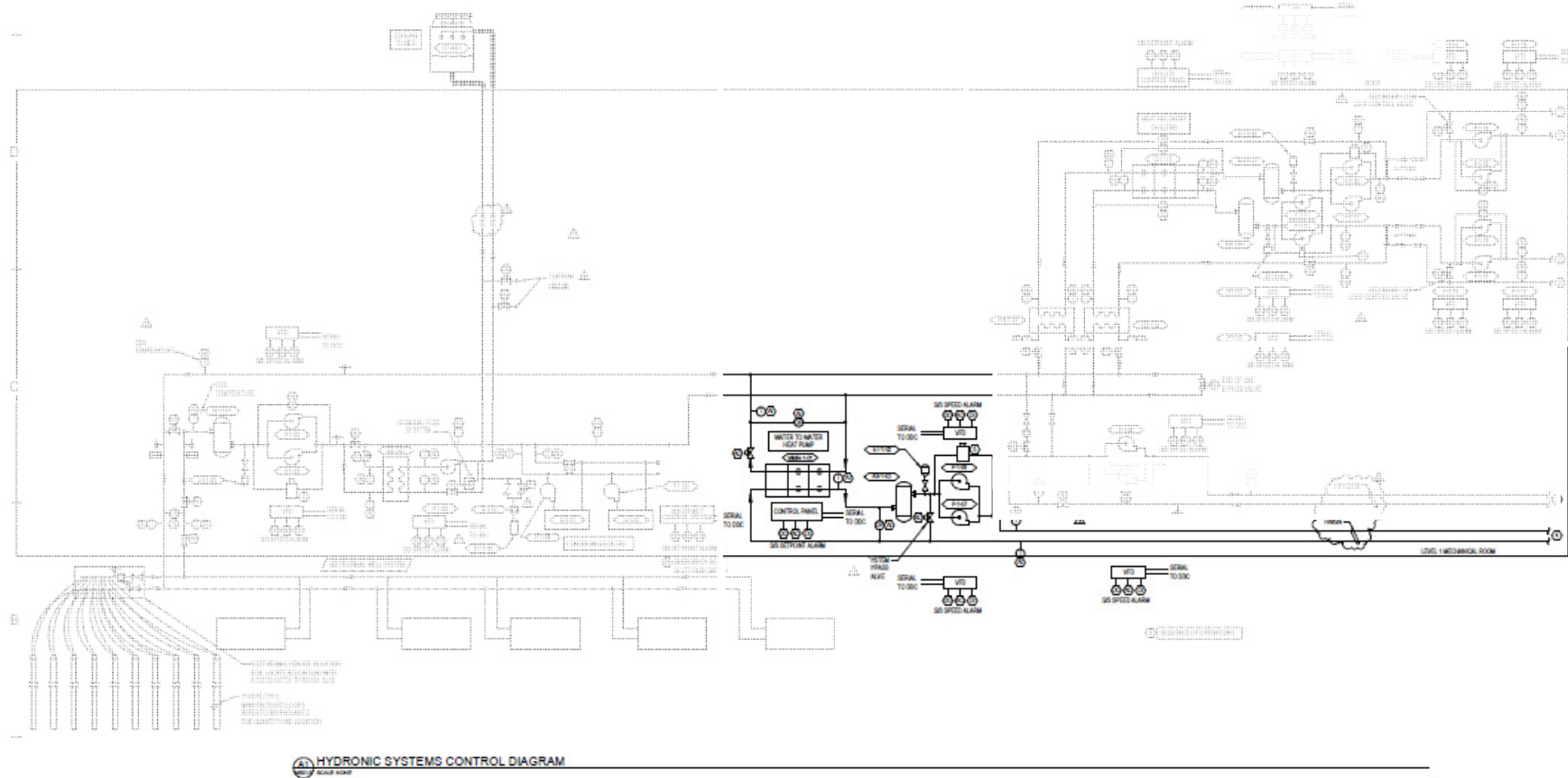
Systems Overview: Condenser Water





MECHANICAL BASIS OF DESIGN

Systems Overview: AHU Coils Plant Equipment



Robinson-Denwood Architects Inc.
1000-1000-1000-1000
1000-1000-1000-1000
1000-1000-1000-1000



LANE COMMUNITY COLLEGE
DOWNTOWN CAMPUS
BP-05 SITE, SHELL AND INTERIORS
1000-1000-1000-1000
1000-1000-1000-1000

CONSTRUCTION DOCUMENTS
CONFIRMED SET - 03/14/11
Drawing Title
HYDRONIC SYSTEMS
CONTROL DIAGRAM
RUC

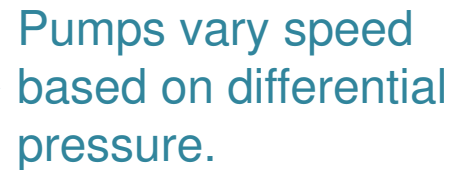
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5	ISSUED FOR PERMIT	03/14/11

Prepared by
Checked by
Date
10/11/11
Project No.
1000-1000-1000-1000
Consultant Project No.
1000-1000-1000-1000
Owner Project No.
1000-1000-1000-1000
Drawing No.
BP-05

M501.5



Water-to-water heat pumps provide hot or cold water for AHUs.

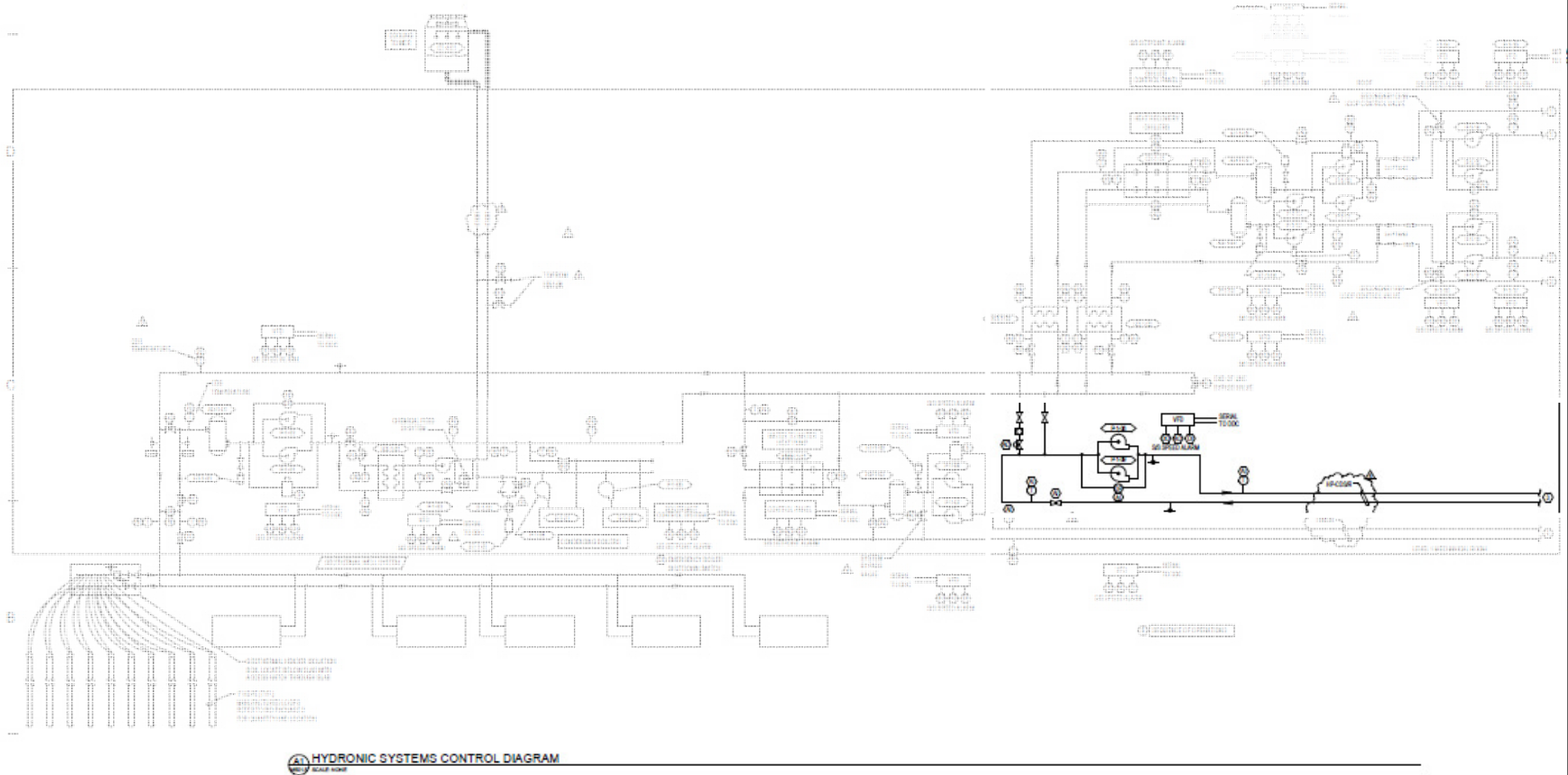


Supply and return for AHU-501,502, 503



MECHANICAL BASIS OF DESIGN

Systems Overview: AHU Coils Plant Equipment



HYDRONIC SYSTEMS CONTROL DIAGRAM

Robinson-Dornier Architects
1000 15th Street, Suite 1000
San Francisco, CA 94103
P 415 398 1000



LANE COMMUNITY COLLEGE

DOWNTOWN CAMPUS

BP-05 SITE, SHELL AND INTERIORS

1000 15th Street, Suite 1000
San Francisco, CA 94103

CONSTRUCTION DOCUMENTS
COMPILED BY: CDR/DAI
Drawing Title: HYDRONIC SYSTEMS
CONTROL DIAGRAM
DATE: 08/10/10

No.	Description	Date
1	ISSUED FOR PERMIT	08/10/10
2	ISSUED FOR BIDDING	02/10/11
3	ISSUED FOR CONSTRUCTION	02/10/11
4	ISSUED FOR OCCUPANCY	02/10/11

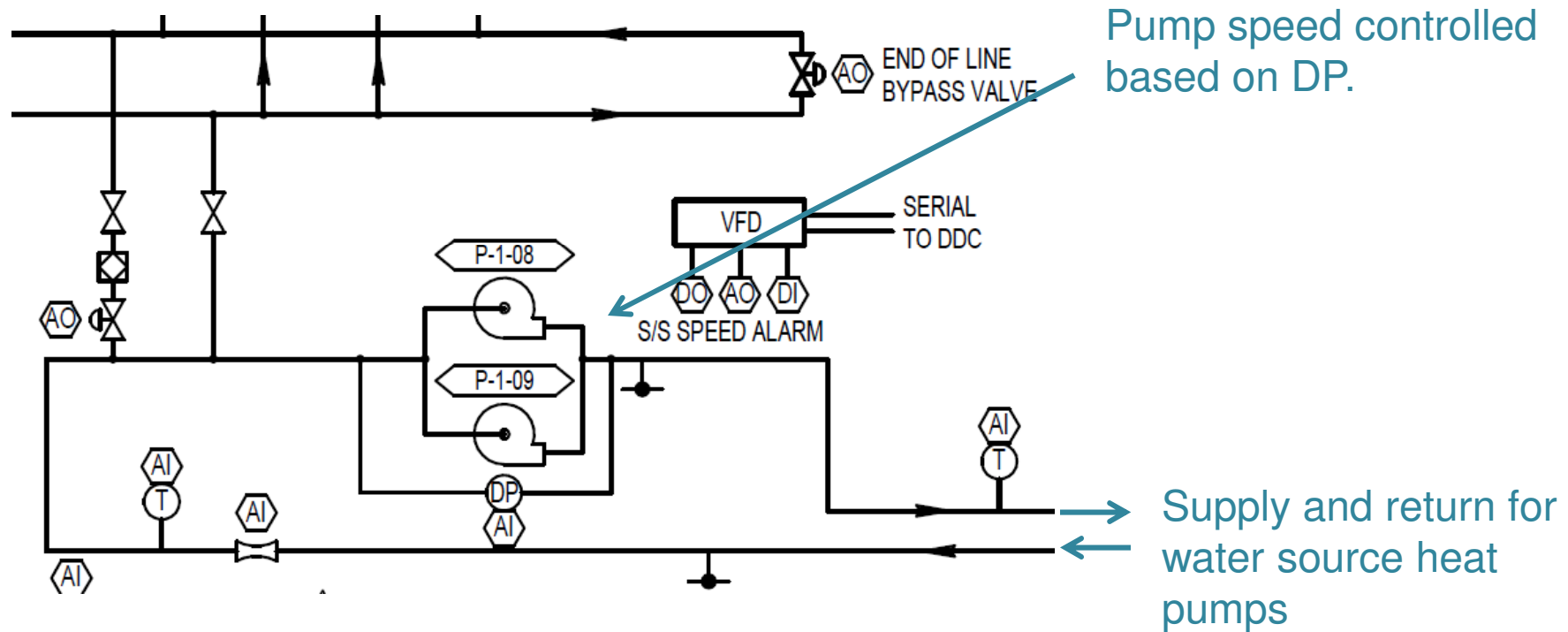
Prepared by:
Checked by:
Date: 08/10/10
Project No.:
Consultant Project No.:
Owner Project No.:
Drawing No.: BP-05

M501.5



MECHANICAL BASIS OF DESIGN

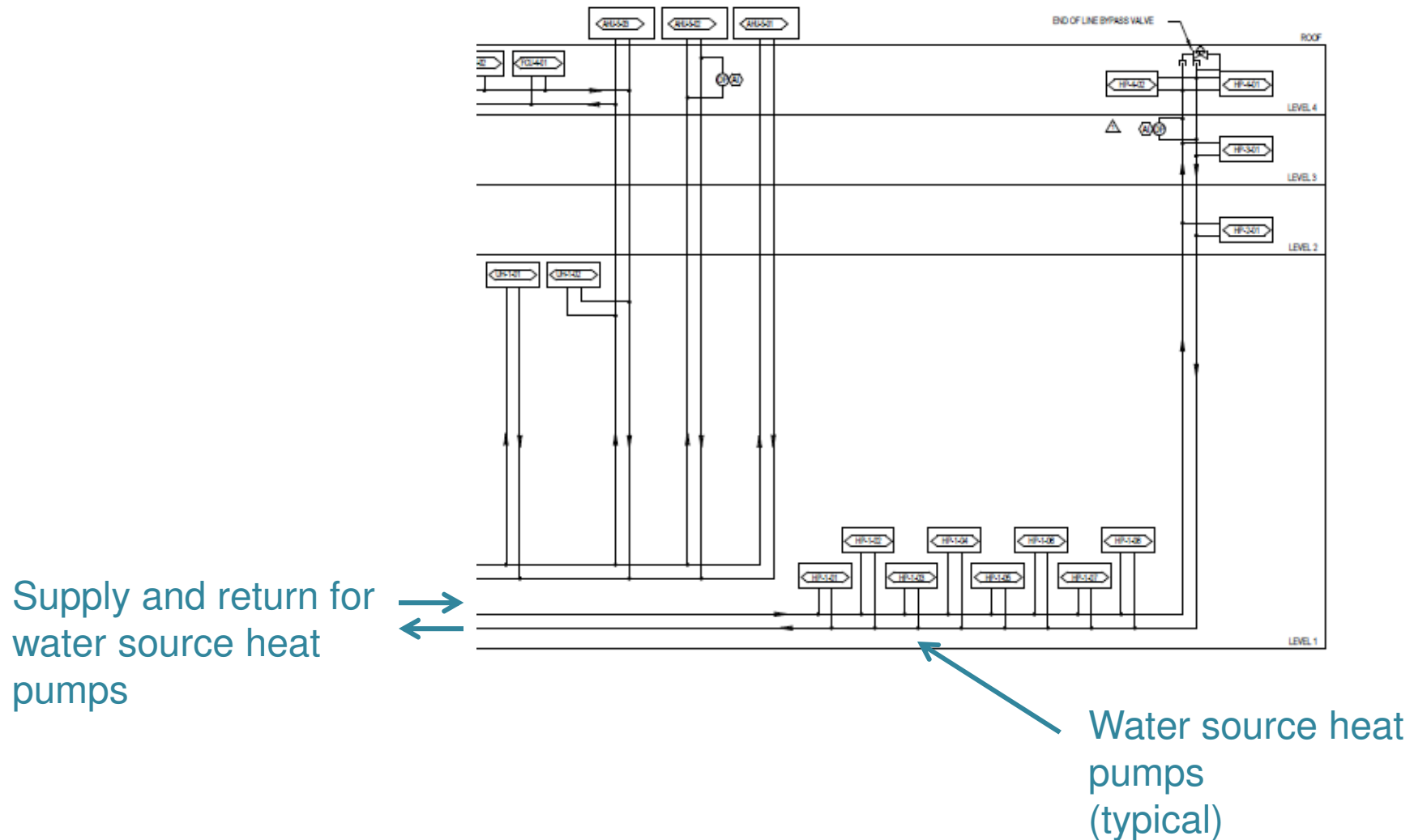
Systems Overview: Water-Source Heat Pump Loop





MECHANICAL BASIS OF DESIGN

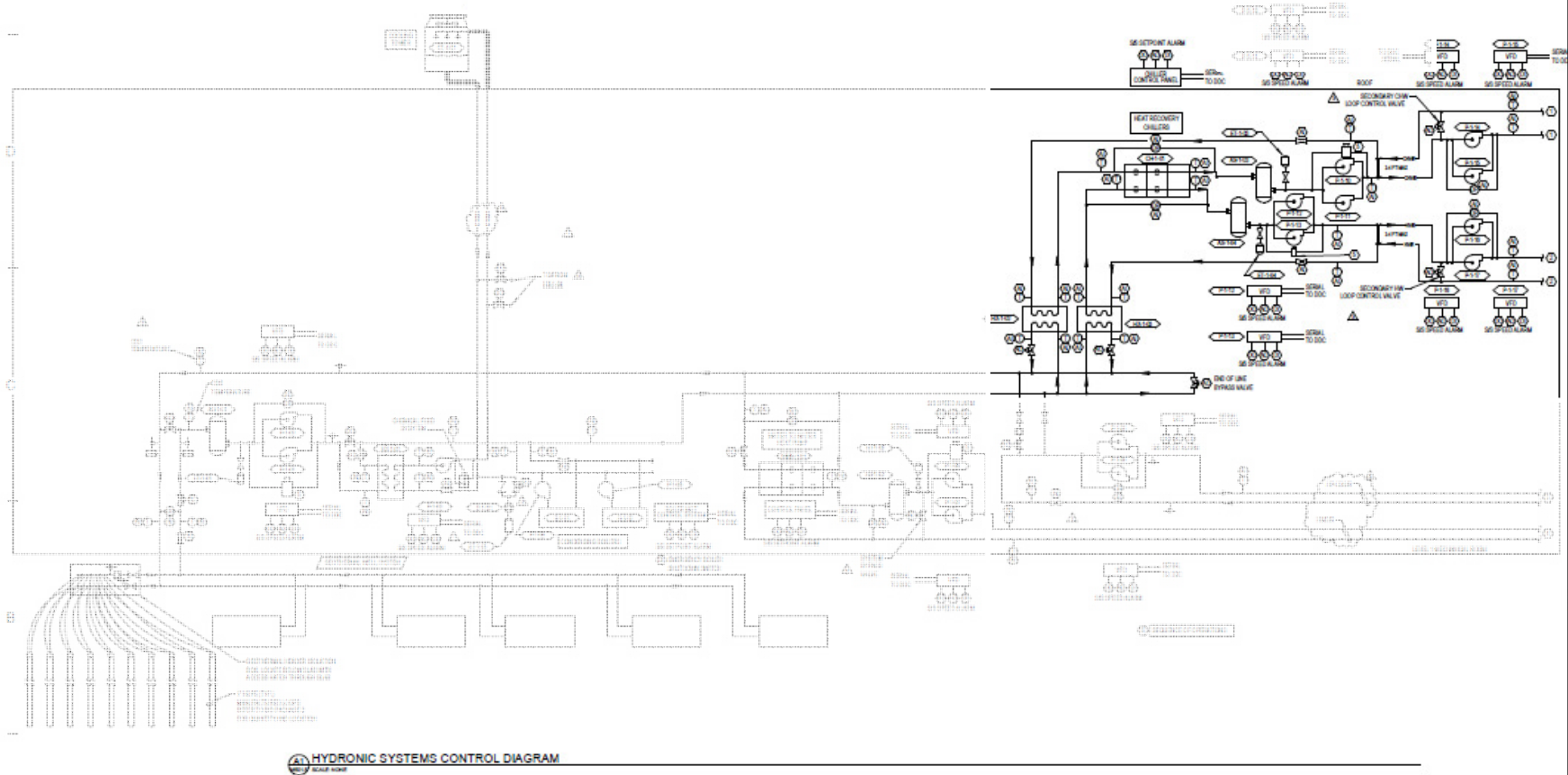
Systems Overview: Water-Source Heat Pump Loop





MECHANICAL BASIS OF DESIGN

Systems Overview: Radiant Panel System



Robinson-Dornier Architects
1000 Main Street, Suite 100
Burlington, MA 01803
P: 802.244.1000



LANE COMMUNITY COLLEGE
DOWNTOWN CAMPUS
BP-05 SITE, SHELL AND INTERIORS
1101 Main Street, Suite 100
Burlington, MA 01803

CONSTRUCTION DOCUMENTS
CONFIRMED SET: 03/14/11
Drawing Title: HYDRONIC SYSTEMS CONTROL DIAGRAM
Scale: NONE

No.	Description	Date
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2	ISSUED FOR PERMIT	03/14/11
3	ISSUED FOR PERMIT	03/14/11
4	ISSUED FOR PERMIT	03/14/11
5	ISSUED FOR PERMIT	03/14/11

Design by:
RDA
Checked by:
RDA
Date:
July 1, 2011
Project No:
100
Consultant Project No:
Owner Project No:
Drawing No: BP-05

M501.5

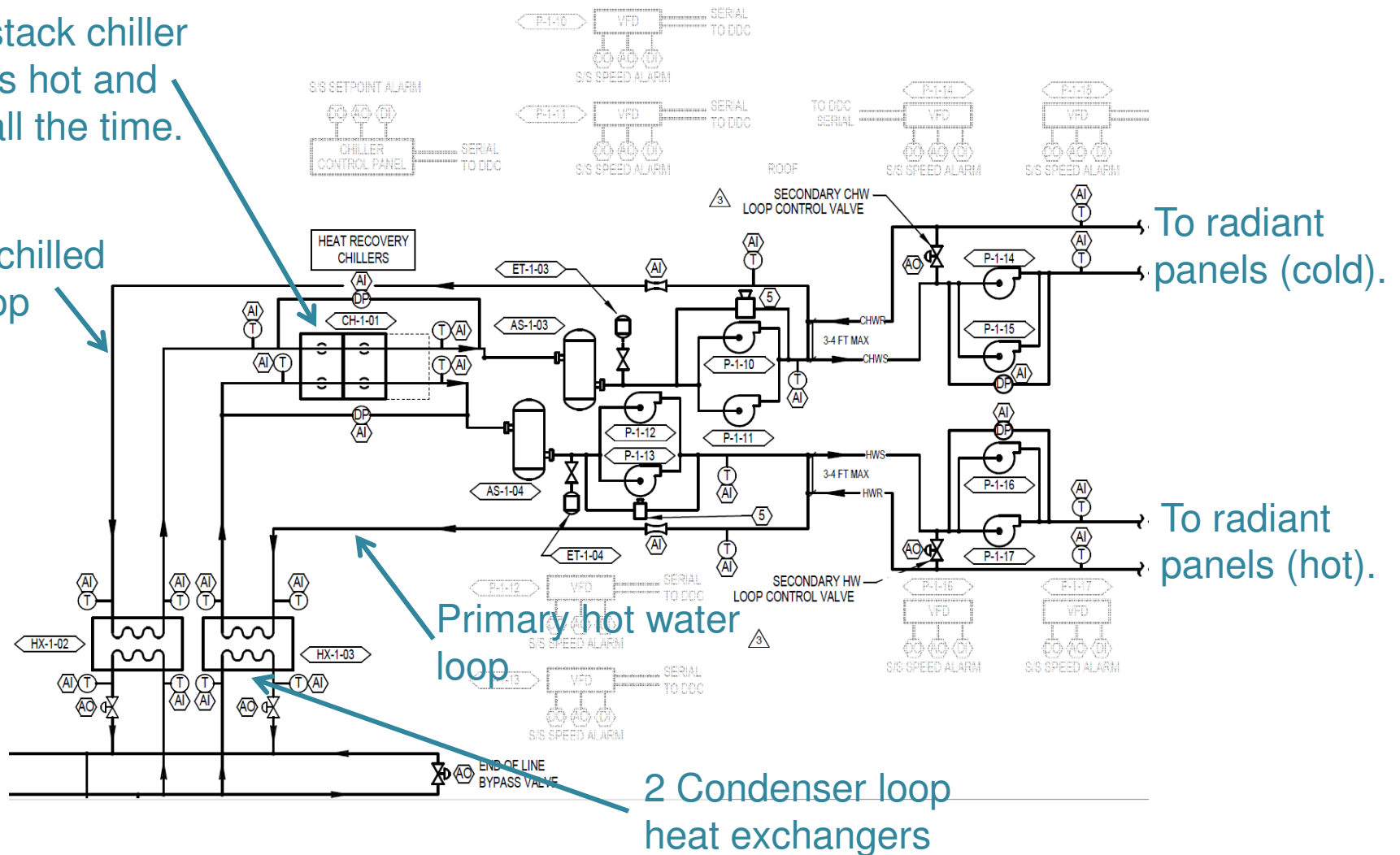


MECHANICAL BASIS OF DESIGN

Systems Overview: Water-Source Heat Pump Loop

Multistack chiller makes hot and cold all the time.

Primary chilled water loop

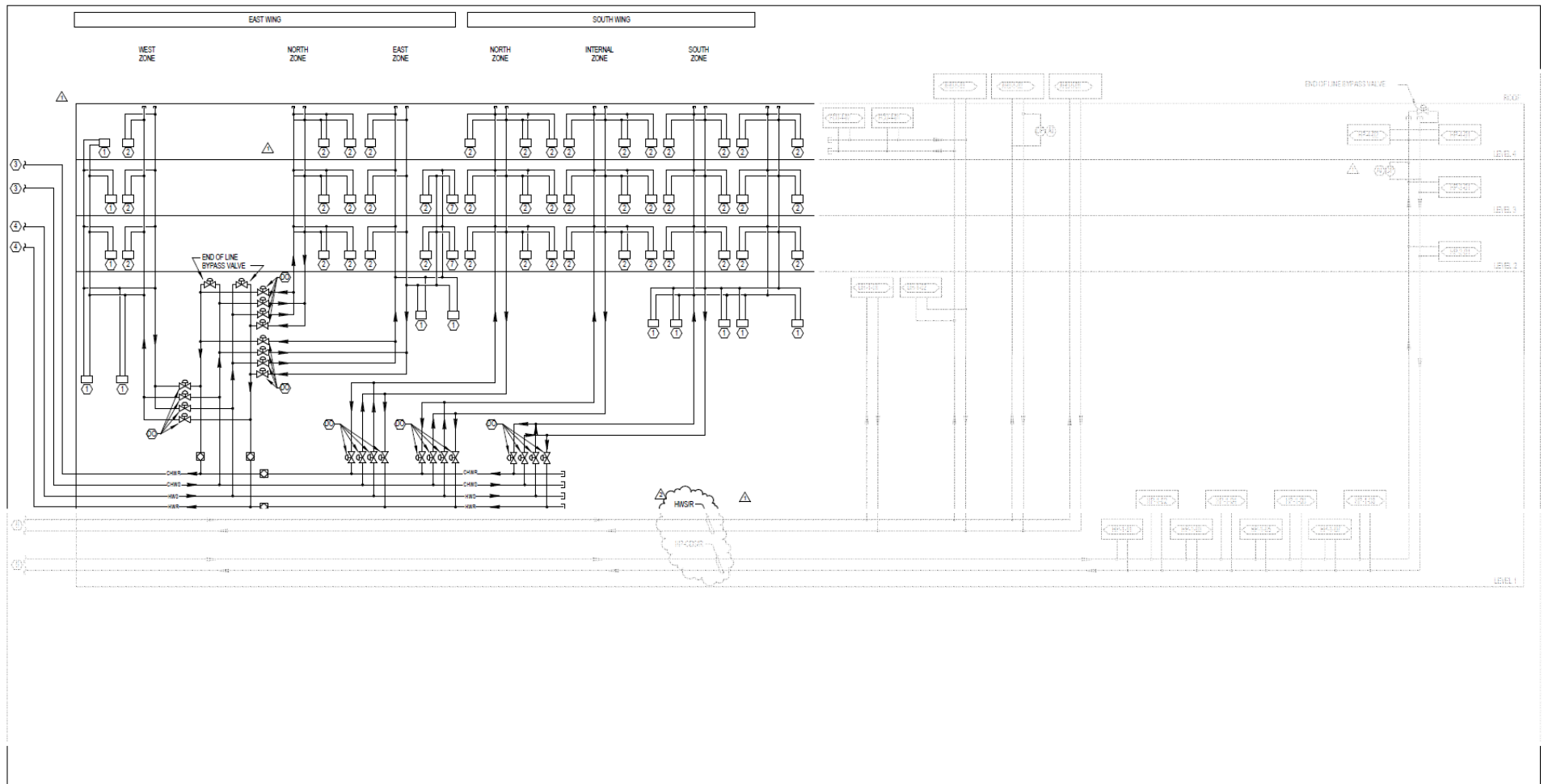


Primary hot water loop

2 Condenser loop heat exchangers



Systems Overview: Radiant Panel System

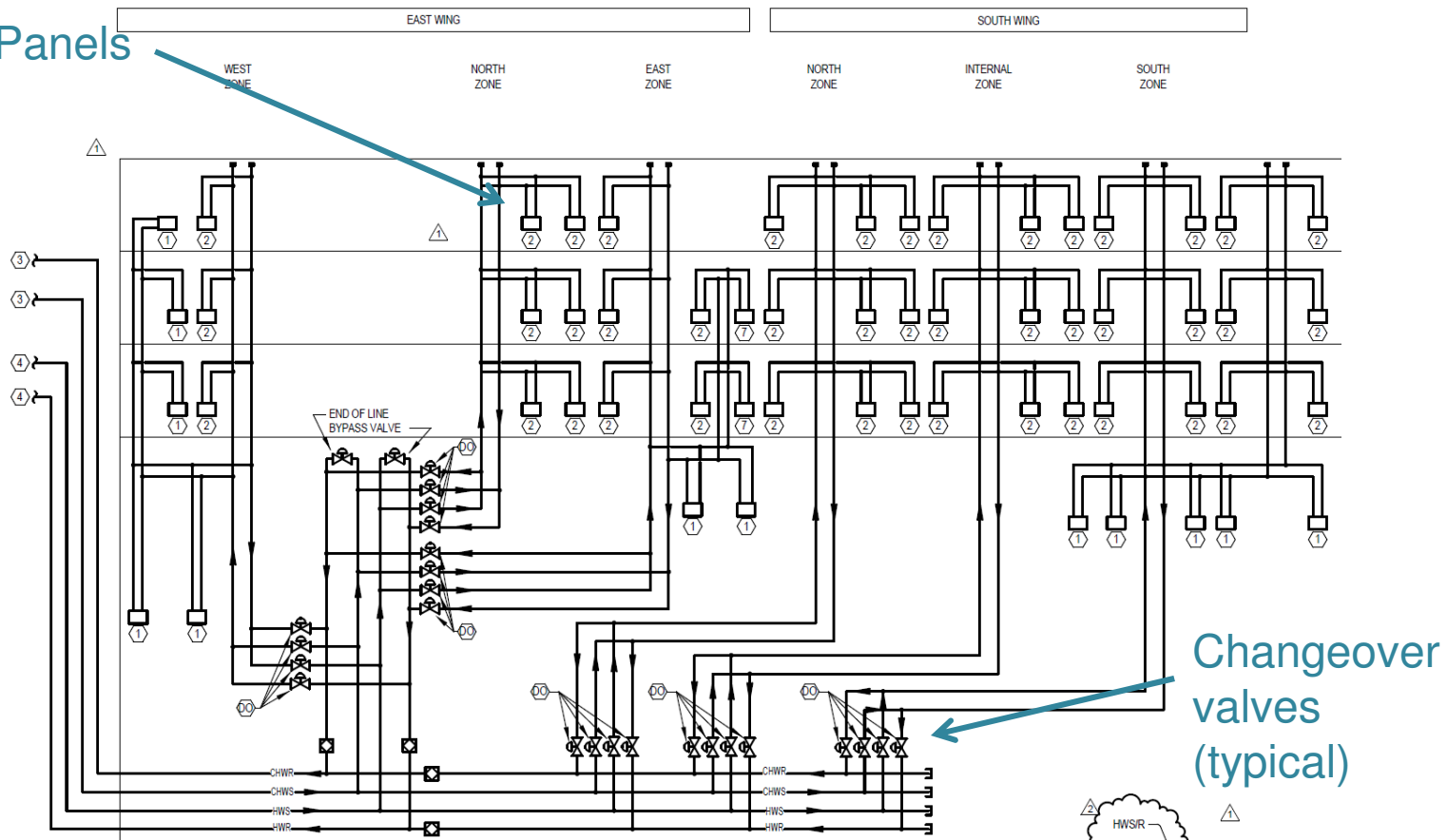




MECHANICAL BASIS OF DESIGN

Systems Overview: Water-Source Heat Pump Loop

Radiant Panels
(typical)





MECHANICAL BASIS OF DESIGN

Systems Overview: Academic Overlay

Packaged terminal
AC

Reheat terminal
bench

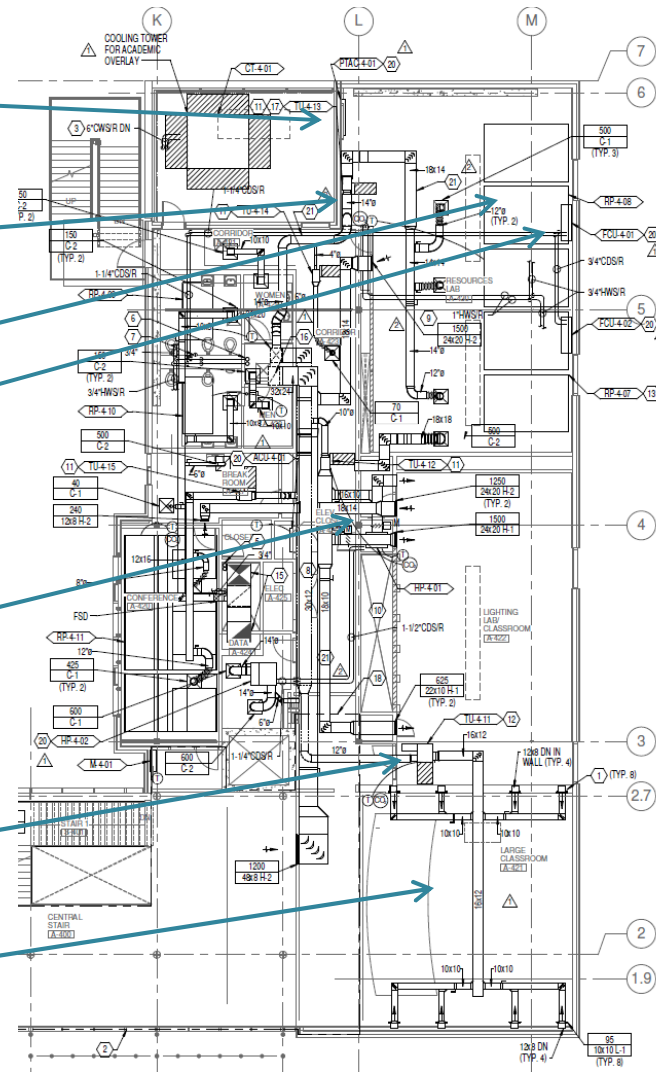
Radiant Panels

Fan coil

Water-to-air heat
pump

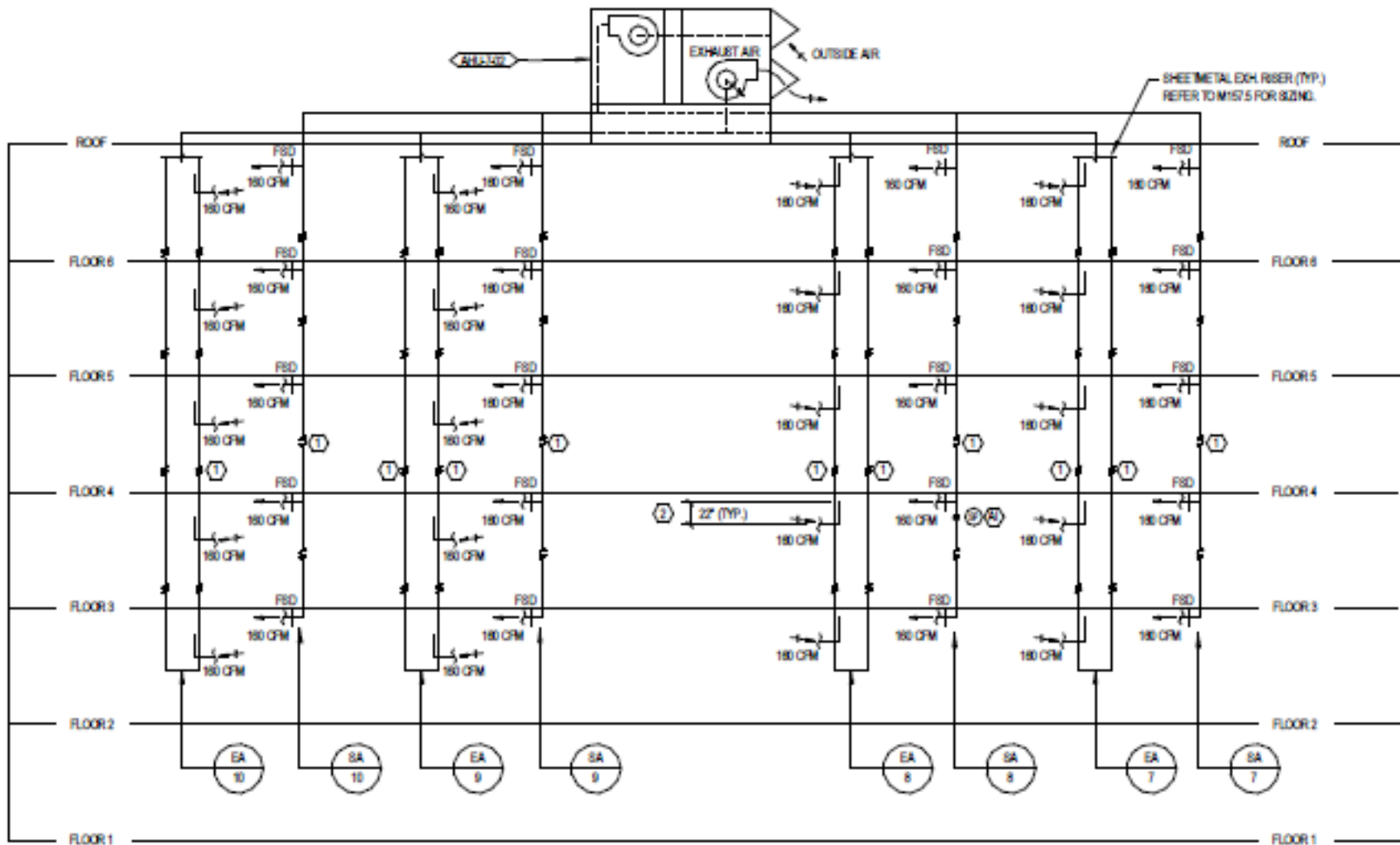
Fan-powered box

Displacement
ventilation





Systems Overview: Residential Systems





MECHANICAL BASIS OF DESIGN

Any questions?





LANE COMMUNITY COLLEGE DOWNTOWN CAMPUS

Plumbing Basis of Design

PRESENTED TO: Lane Community College

PRESENTED BY: Marc Brune, PE, LEED AP



GOALS

Way back in 2010...

“A Building that Teaches”

✦ Energy Management Program

Energy & Water

- ✦ LEED Platinum/Gold
- ✦ Minimal water use
- ✦ Solar water heating
- ✦ Rainwater reclamation.





PRESENTATION OVERVIEW

General Plumbing
Systems

Solar Hot Water

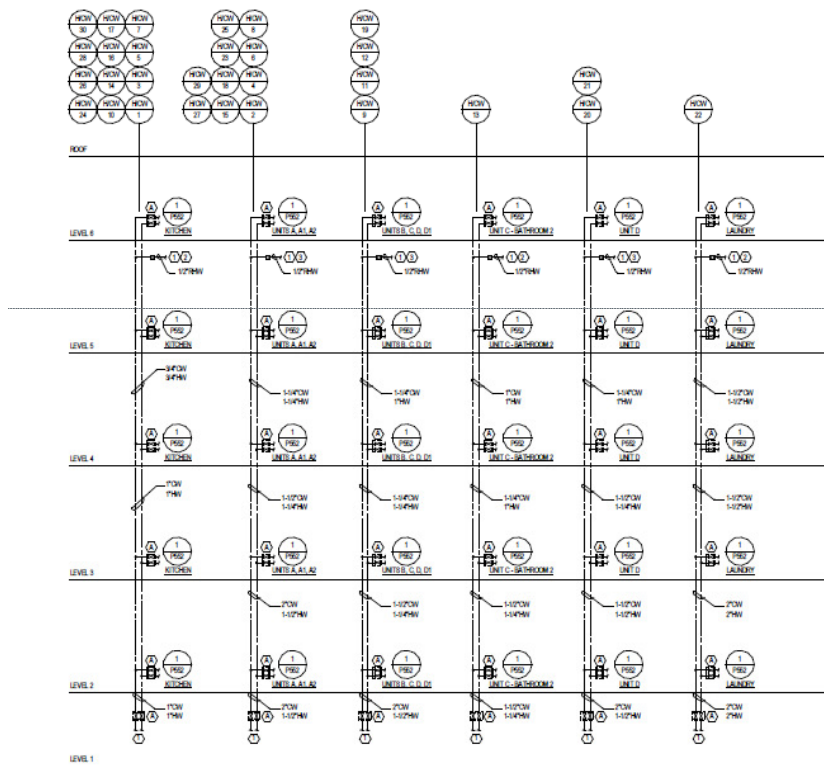
Rainwater
reclamation





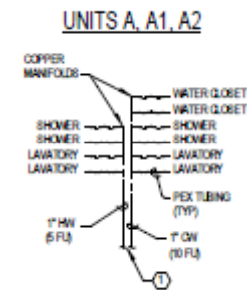
PLUMBING BASIS OF DESIGN

Housing Hot and Cold Water



NOTES:
 1. SEE SHEET 0505 FOR COORDINATION.
 2. SET BALANCING VALVE @ 0.5 GPM.
 3. SET BALANCING VALVE @ 0.75 GPM.

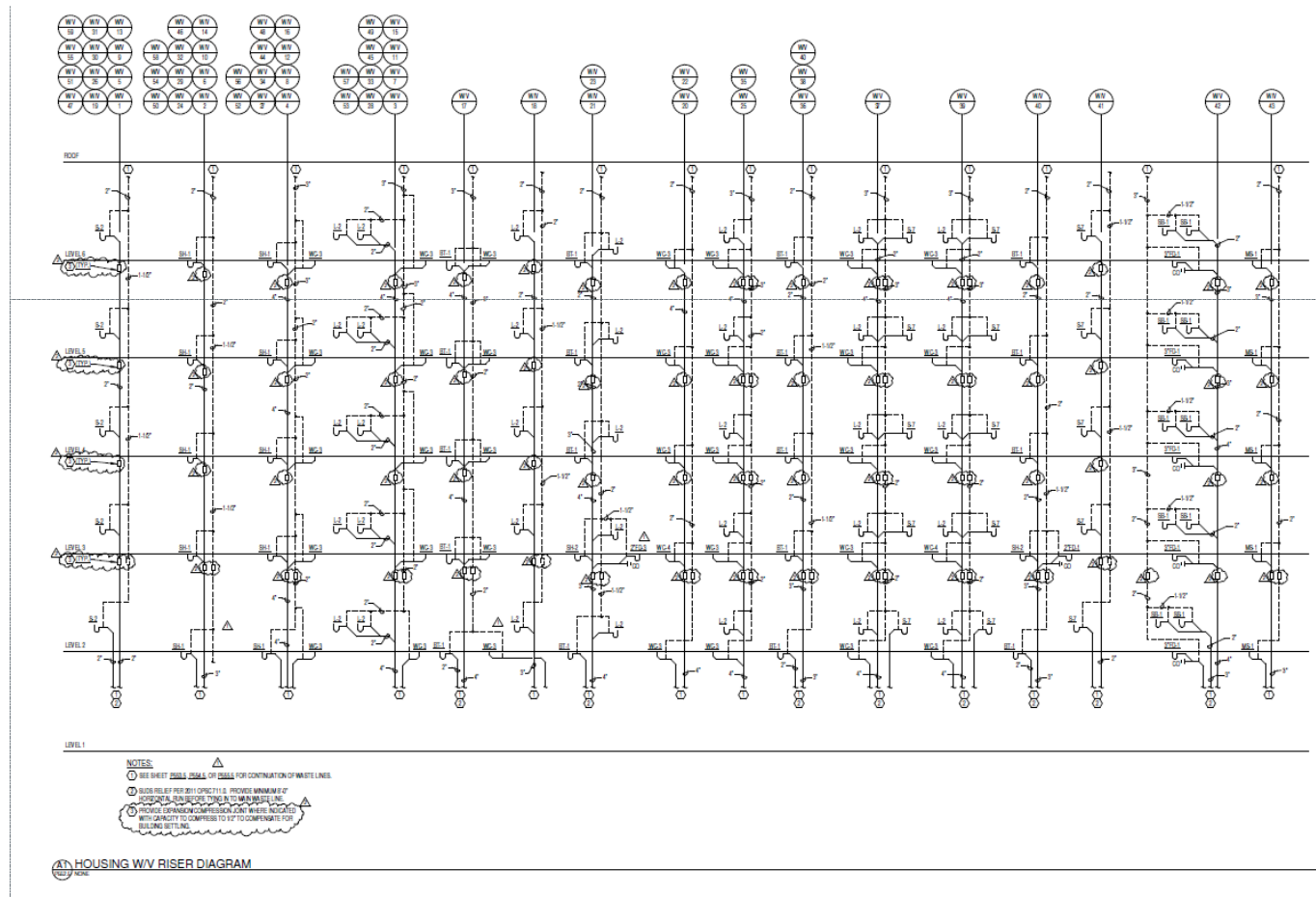
GENERAL NOTES:
 1. SEE PLUMBING FIXTURE SCHEDULE FOR PIPE SIZES TO INDIVIDUAL FIXTURES.
 2. WITHIN EACH CHASE/CLING UNIT, CONNECT INDIVIDUAL FIXTURES TO MAIN SUPPLY BRANCH WITH SHUTOFF VALVES. BRANCH/FLOOR MOUNTED ACCESS PANELS IMMEDIATELY UPSTREAM OF EACH PEX COPPER MANIFOLD. COORDINATE ACCESS PANEL LOCATION WITH ARCHITECT.





PLUMBING BASIS OF DESIGN

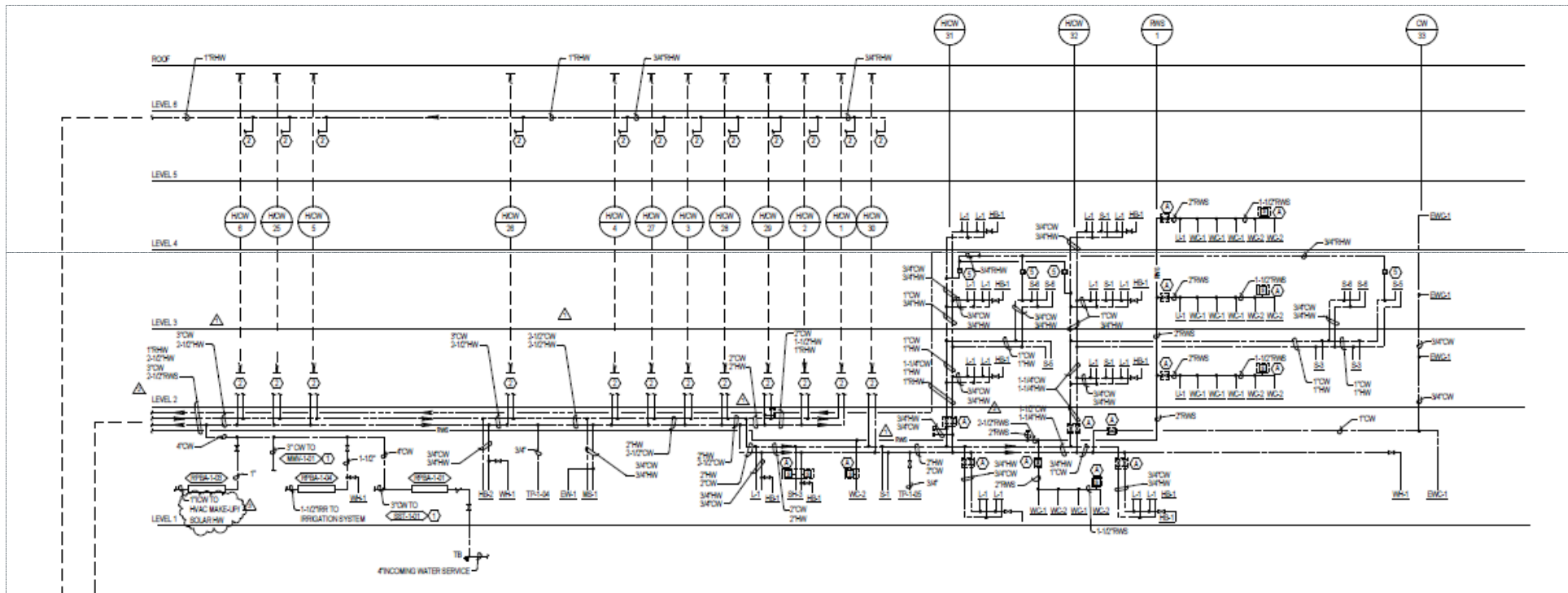
Housing waste and vent





PLUMBING BASIS OF DESIGN

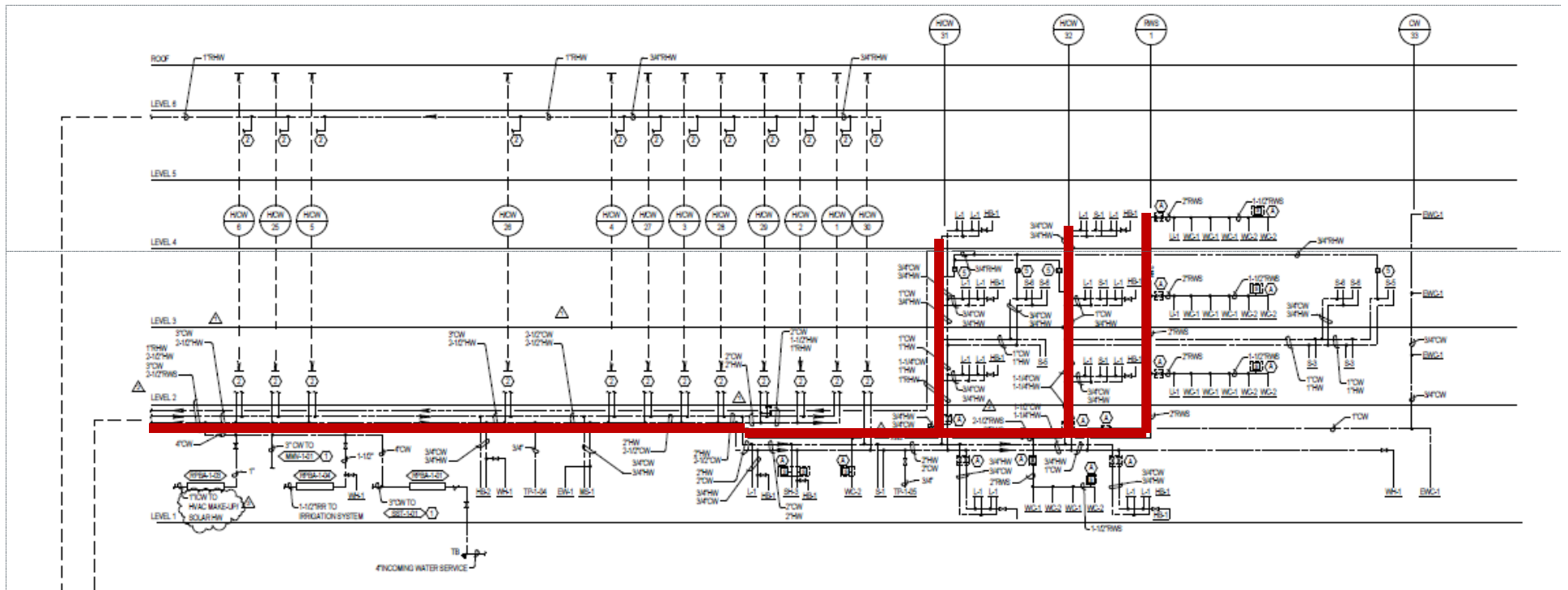
Academic Hot and Cold Water





PLUMBING BASIS OF DESIGN

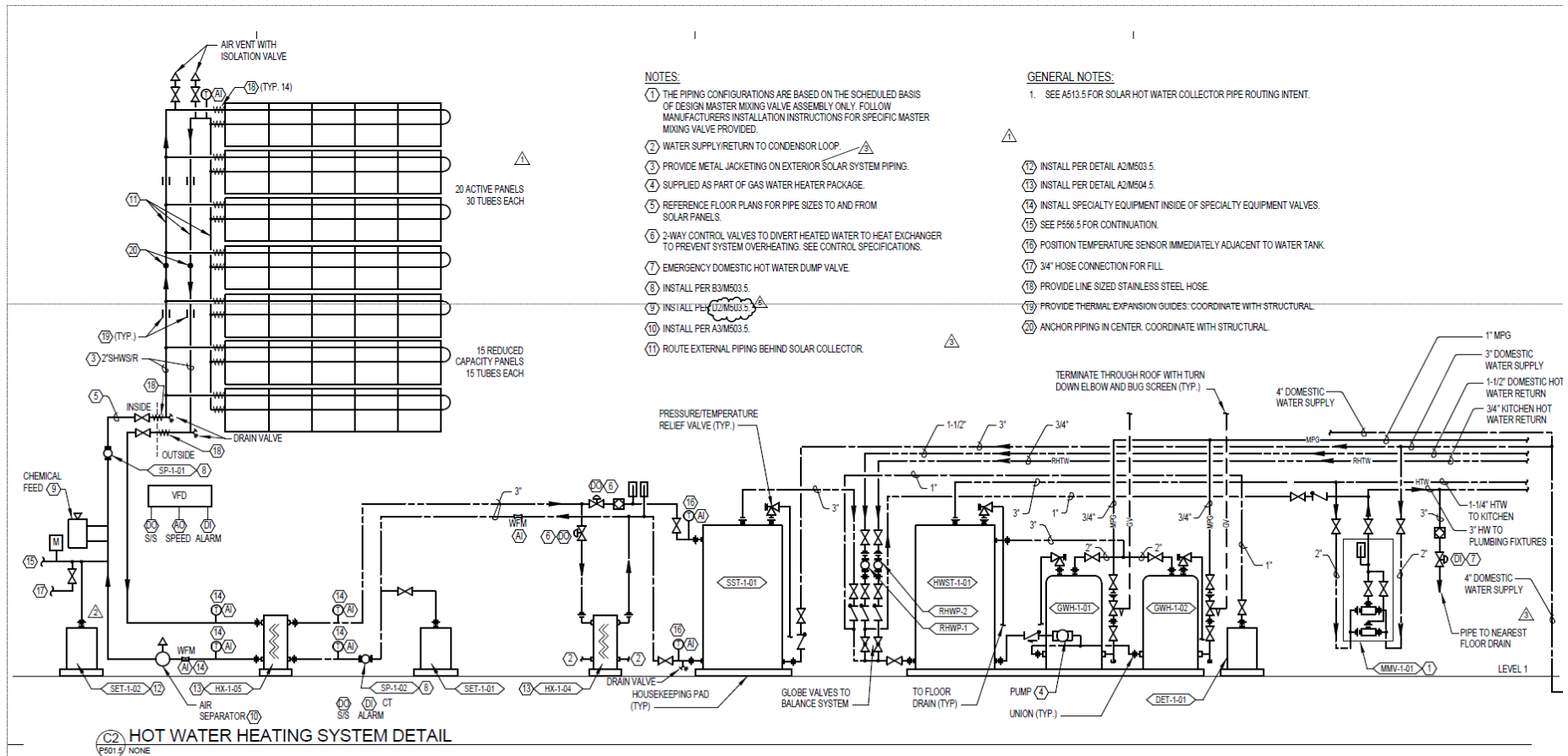
Rainwater





PLUMBING BASIS OF DESIGN

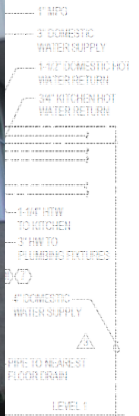
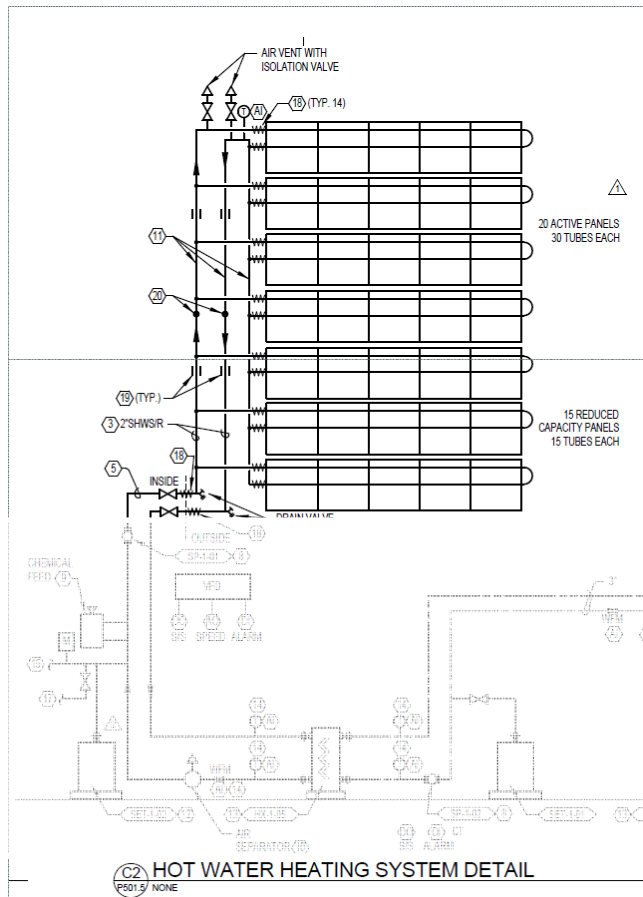
Solar Hot Water System





PLUMBING BASIS OF DESIGN

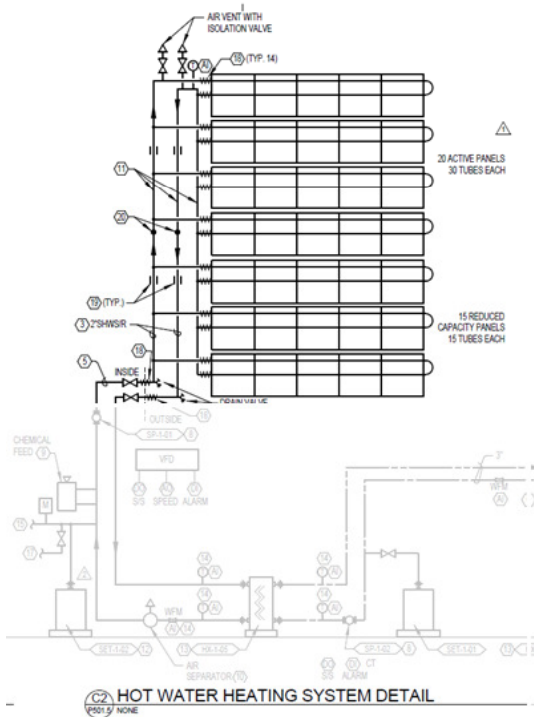
Solar Hot Water System





PLUMBING BASIS OF DESIGN

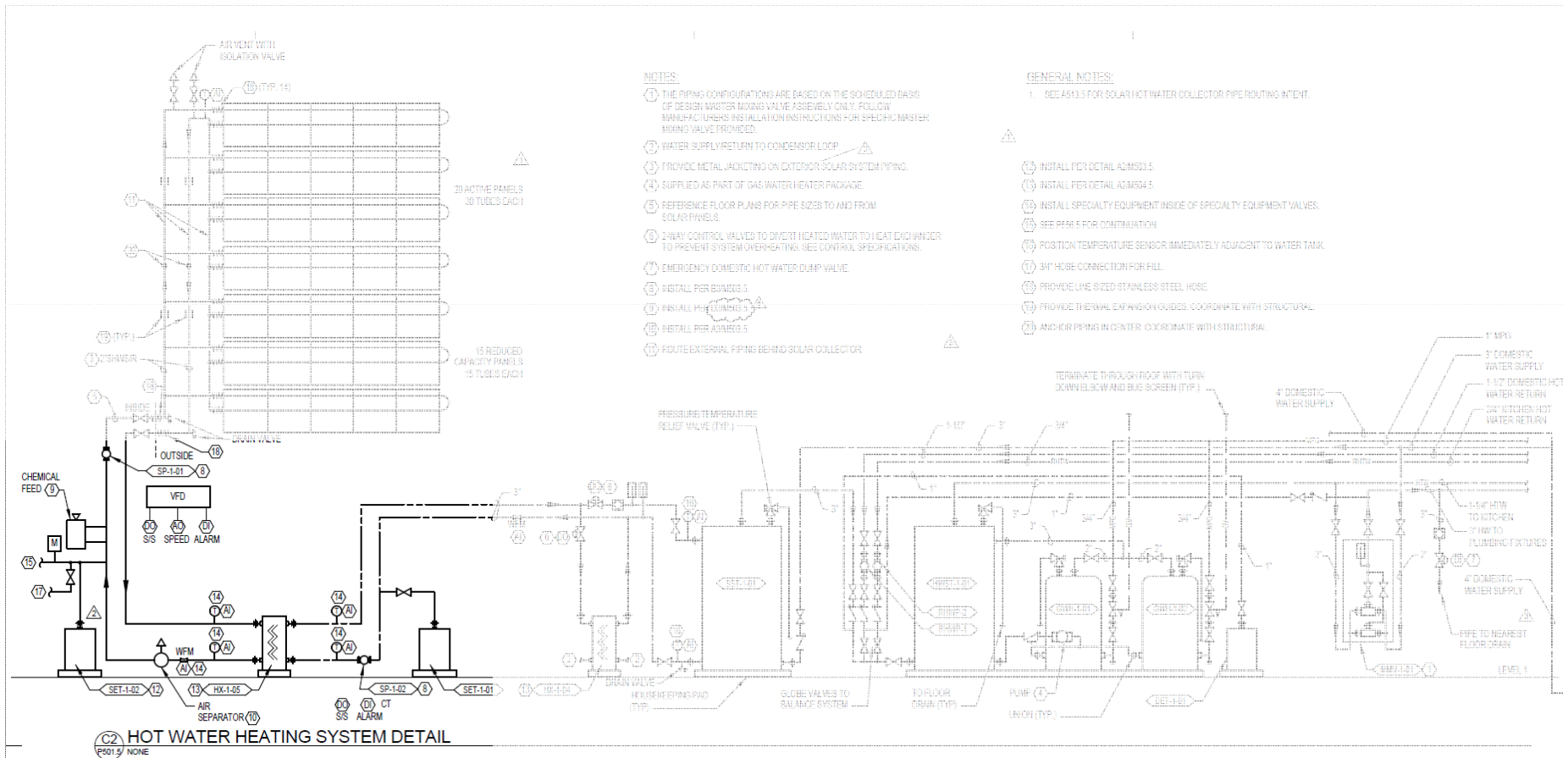
Solar Hot Water System





PLUMBING BASIS OF DESIGN

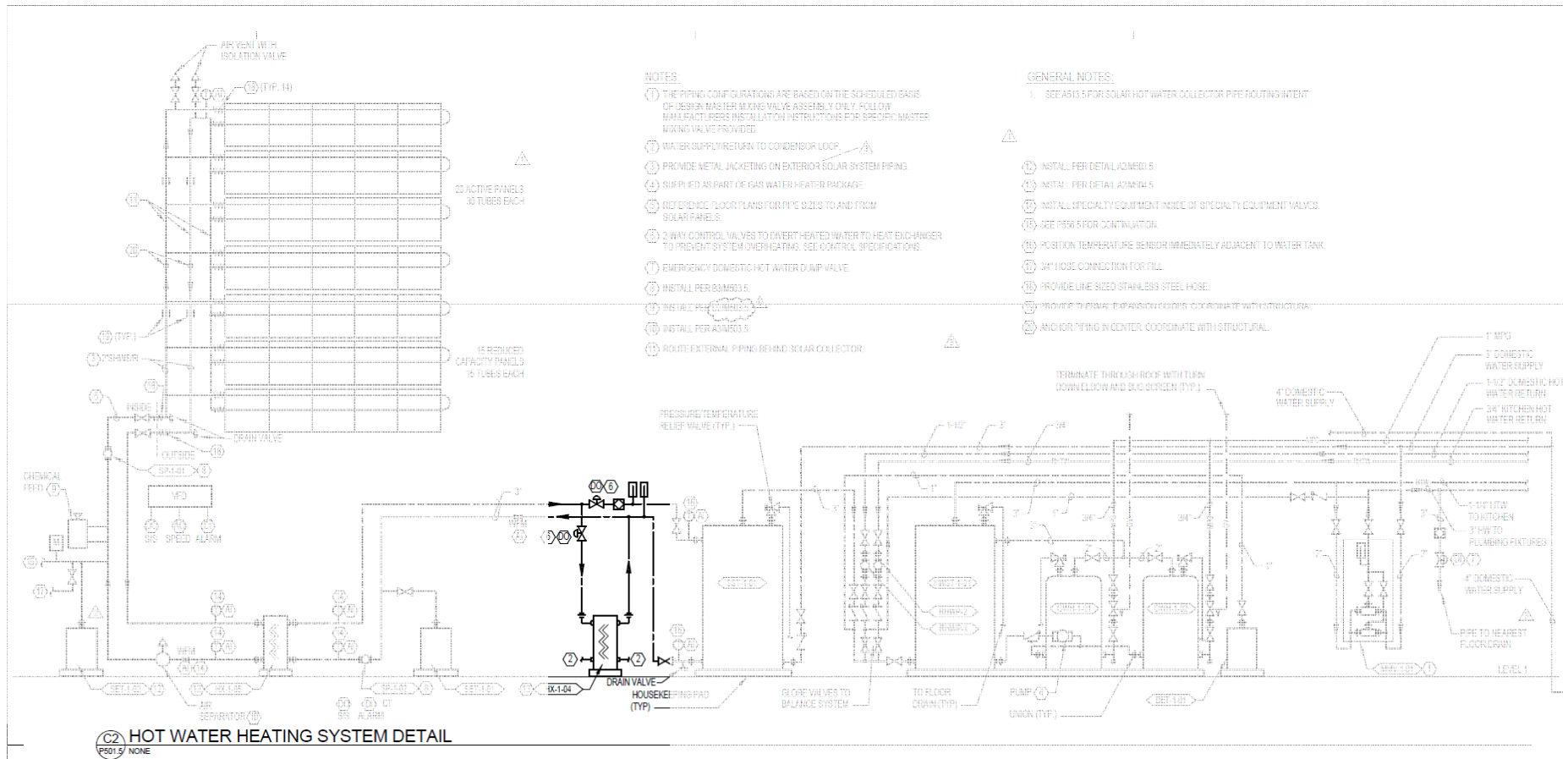
Solar Hot Water System





PLUMBING BASIS OF DESIGN

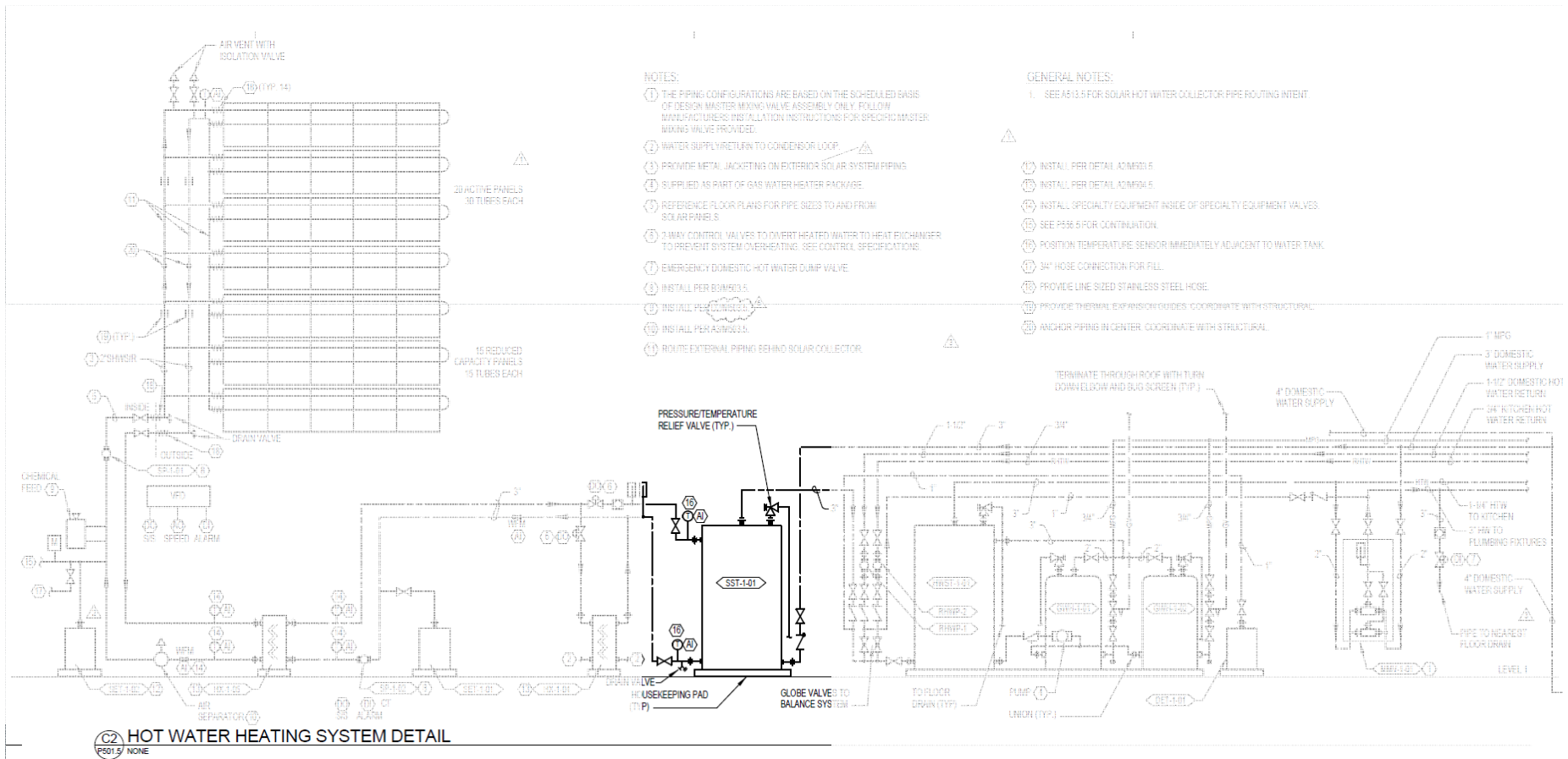
Solar Hot Water System





PLUMBING BASIS OF DESIGN

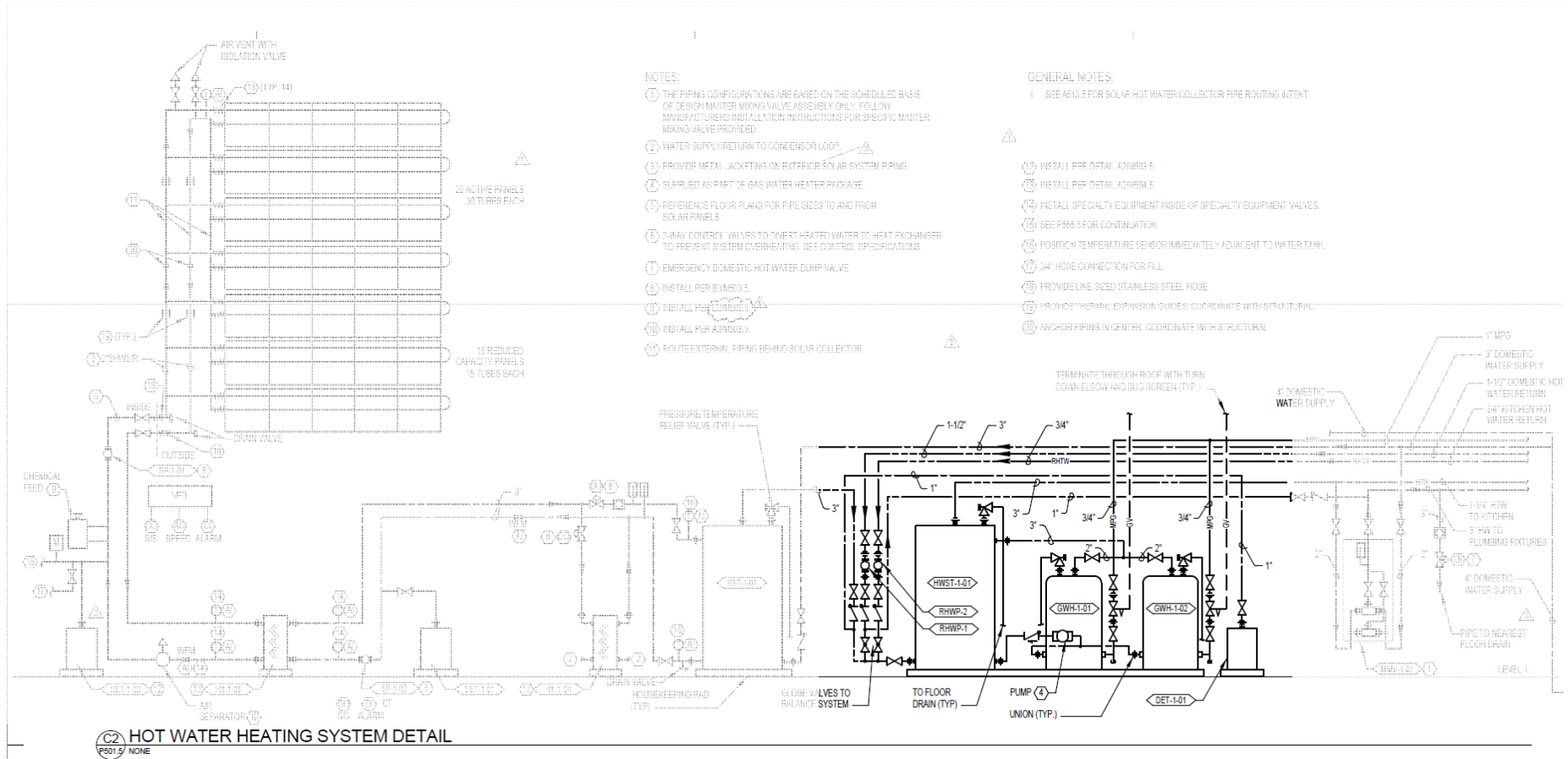
Solar Hot Water System





PLUMBING BASIS OF DESIGN

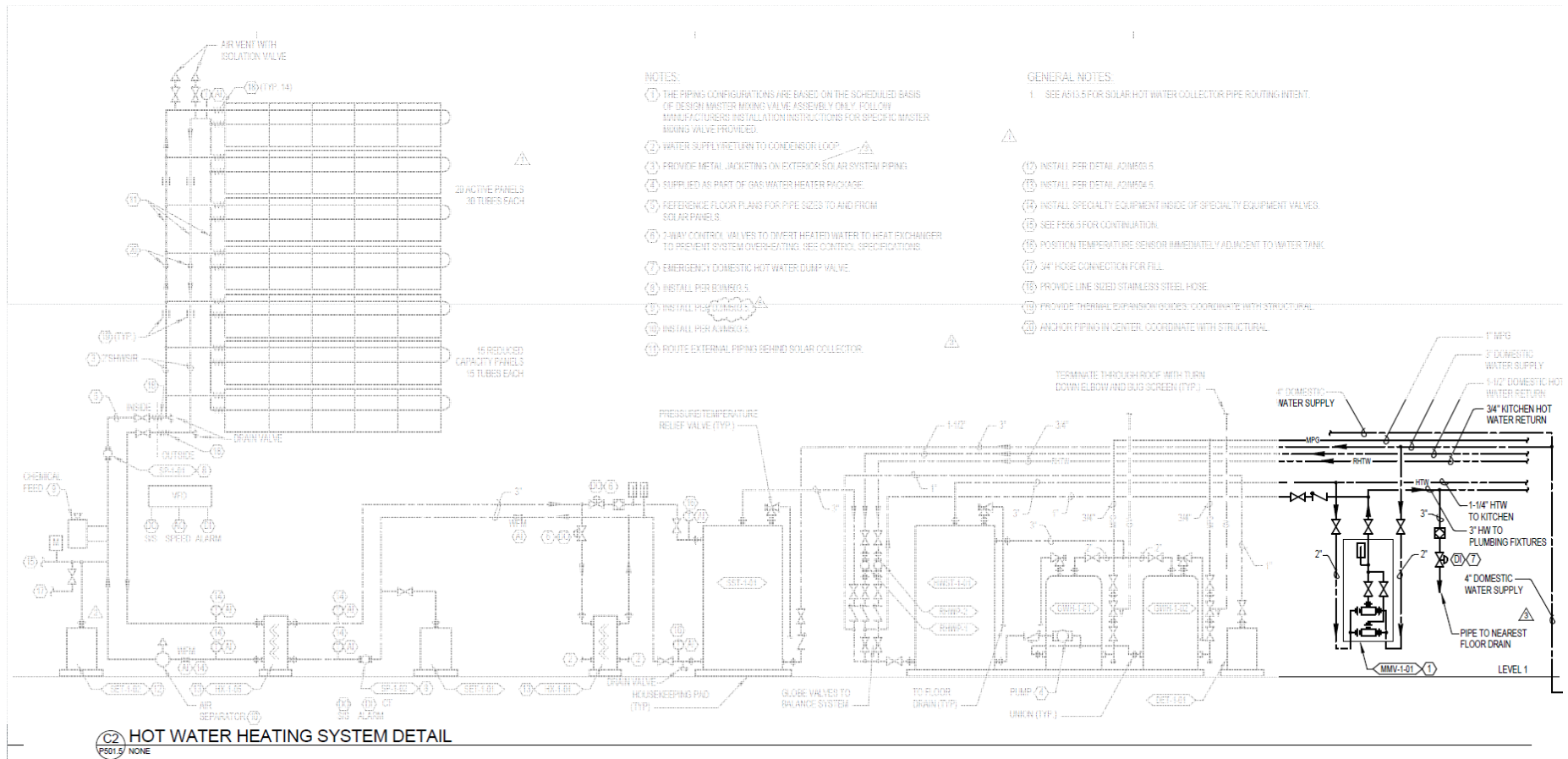
Solar Hot Water System





PLUMBING BASIS OF DESIGN

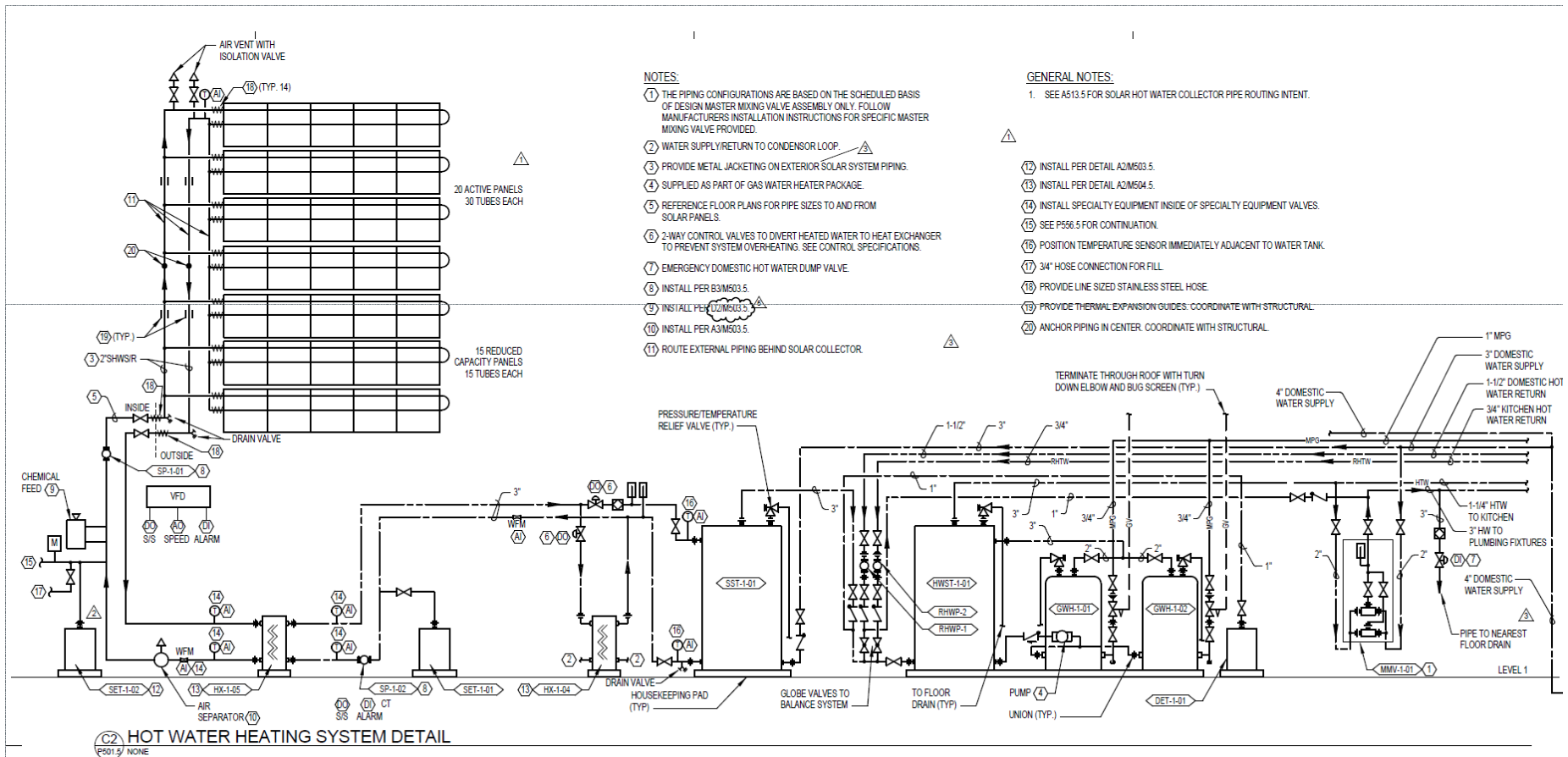
Solar Hot Water System





PLUMBING BASIS OF DESIGN

Solar Hot Water System





PLUMBING BASIS OF DESIGN

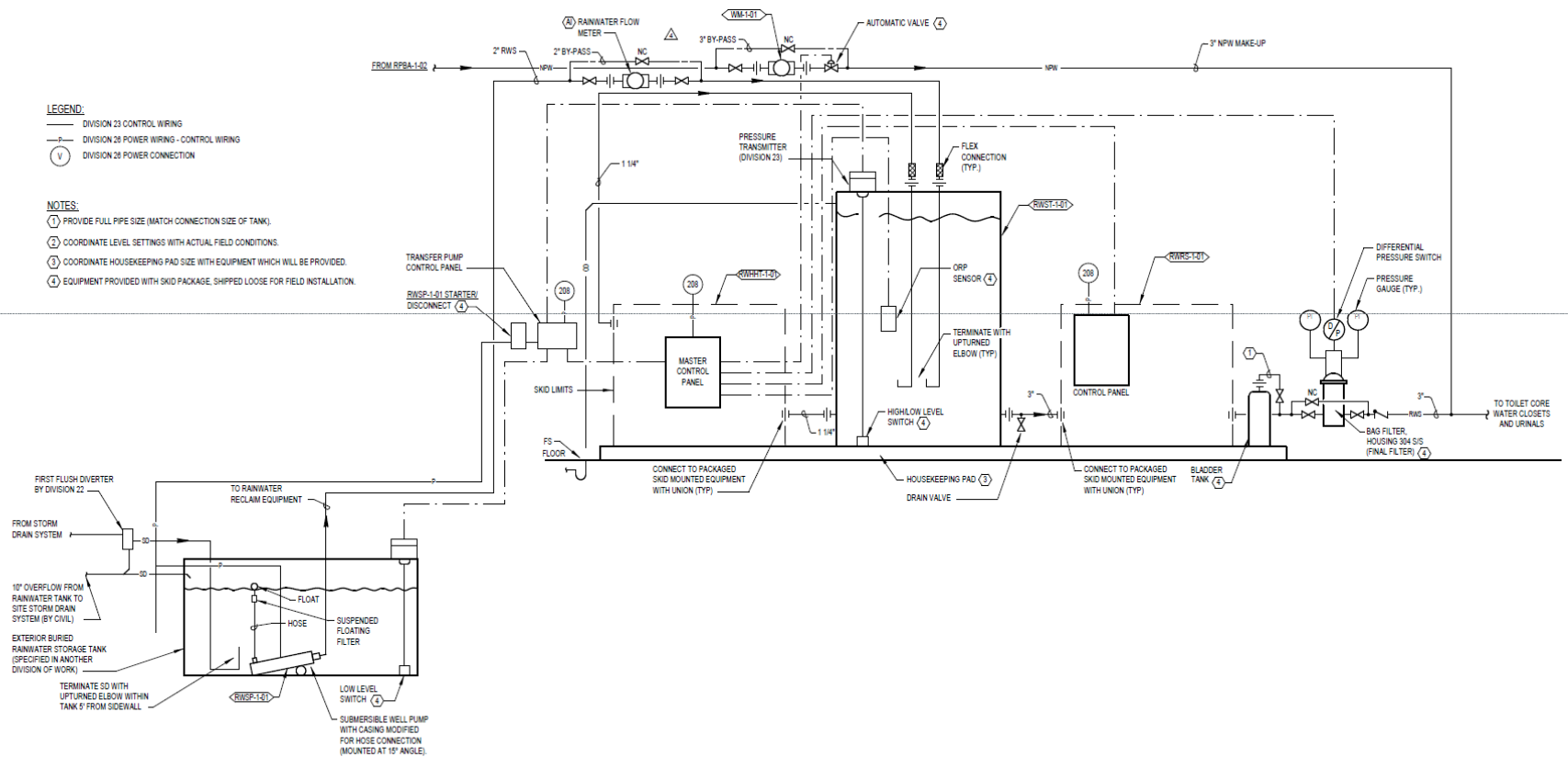
Rainwater System

LEGEND:

- DIVISION 23 CONTROL WIRING
- DIVISION 26 POWER WIRING - CONTROL WIRING
- DIVISION 26 POWER CONNECTION

NOTES:

- ① PROVIDE FULL PIPE SIZE (MATCH CONNECTION SIZE OF TANK).
- ② COORDINATE LEVEL SETTINGS WITH ACTUAL FIELD CONDITIONS.
- ③ COORDINATE HOUSEKEEPING PAD SIZE WITH EQUIPMENT WHICH WILL BE PROVIDED.
- ④ EQUIPMENT PROVIDED WITH SKID PACKAGE, SHIPPED LOOSE FOR FIELD INSTALLATION.





LEGEND

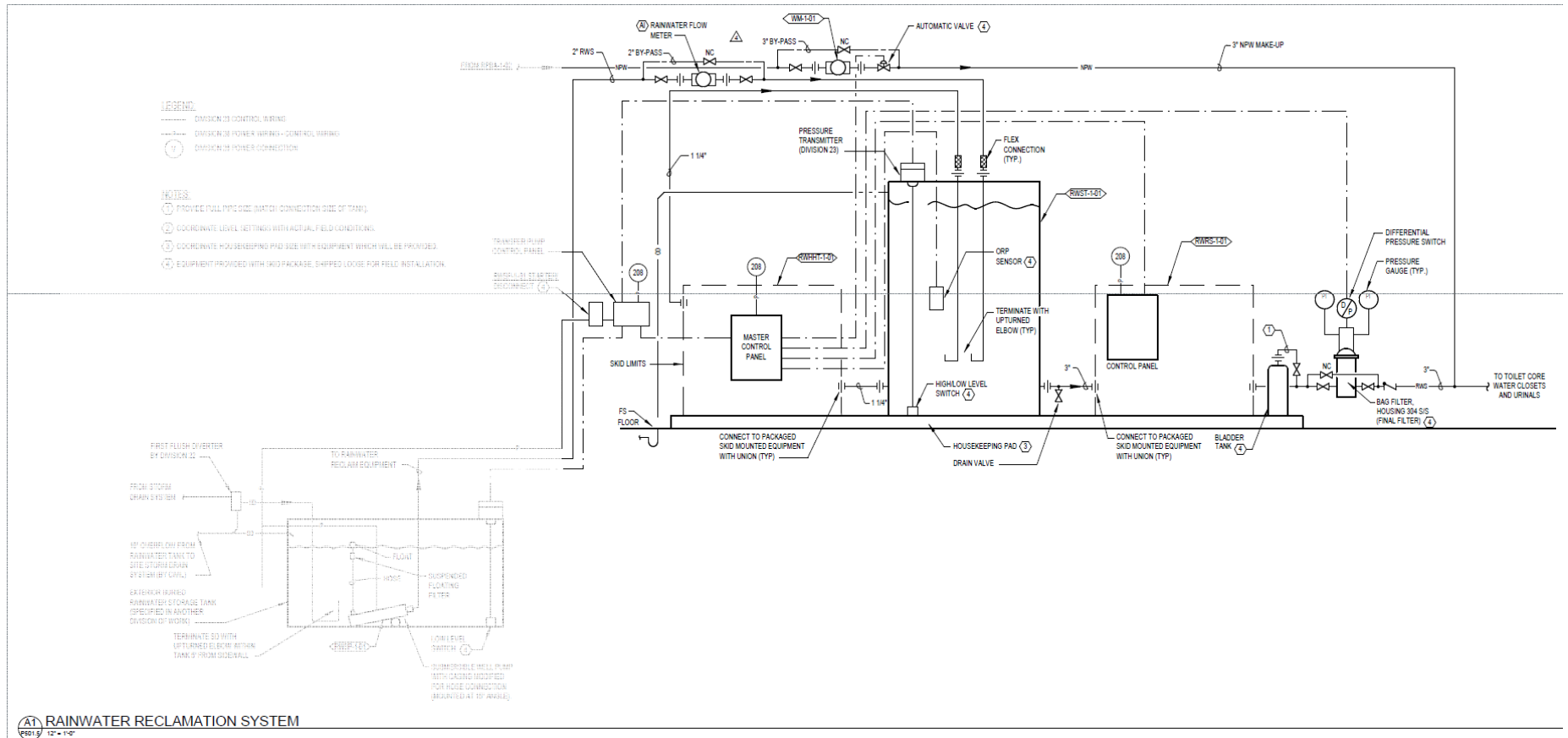
- NOTES:

- A1** RAINWATER RECLAMATION SYSTEM
PS01.5 12" x 1'-0"



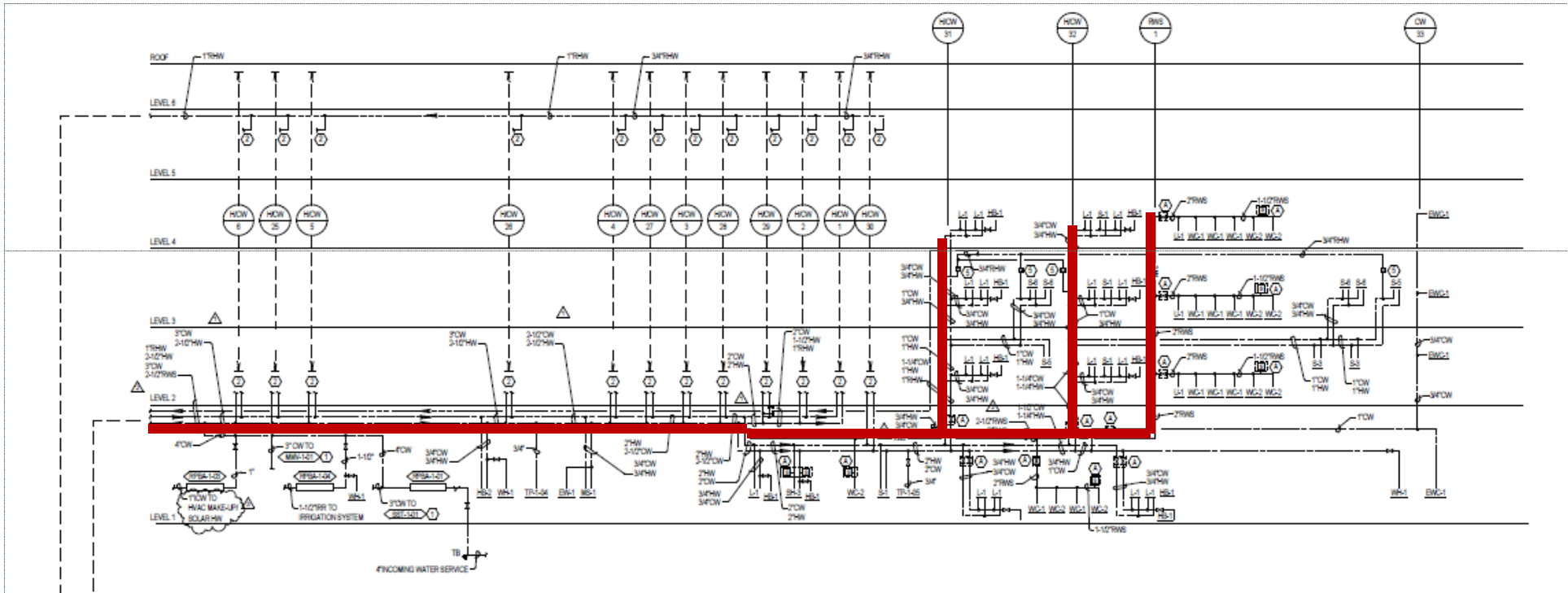
PLUMBING BASIS OF DESIGN

Rainwater System





Rainwater System





PLUMBING BASIS OF DESIGN

Any questions?

