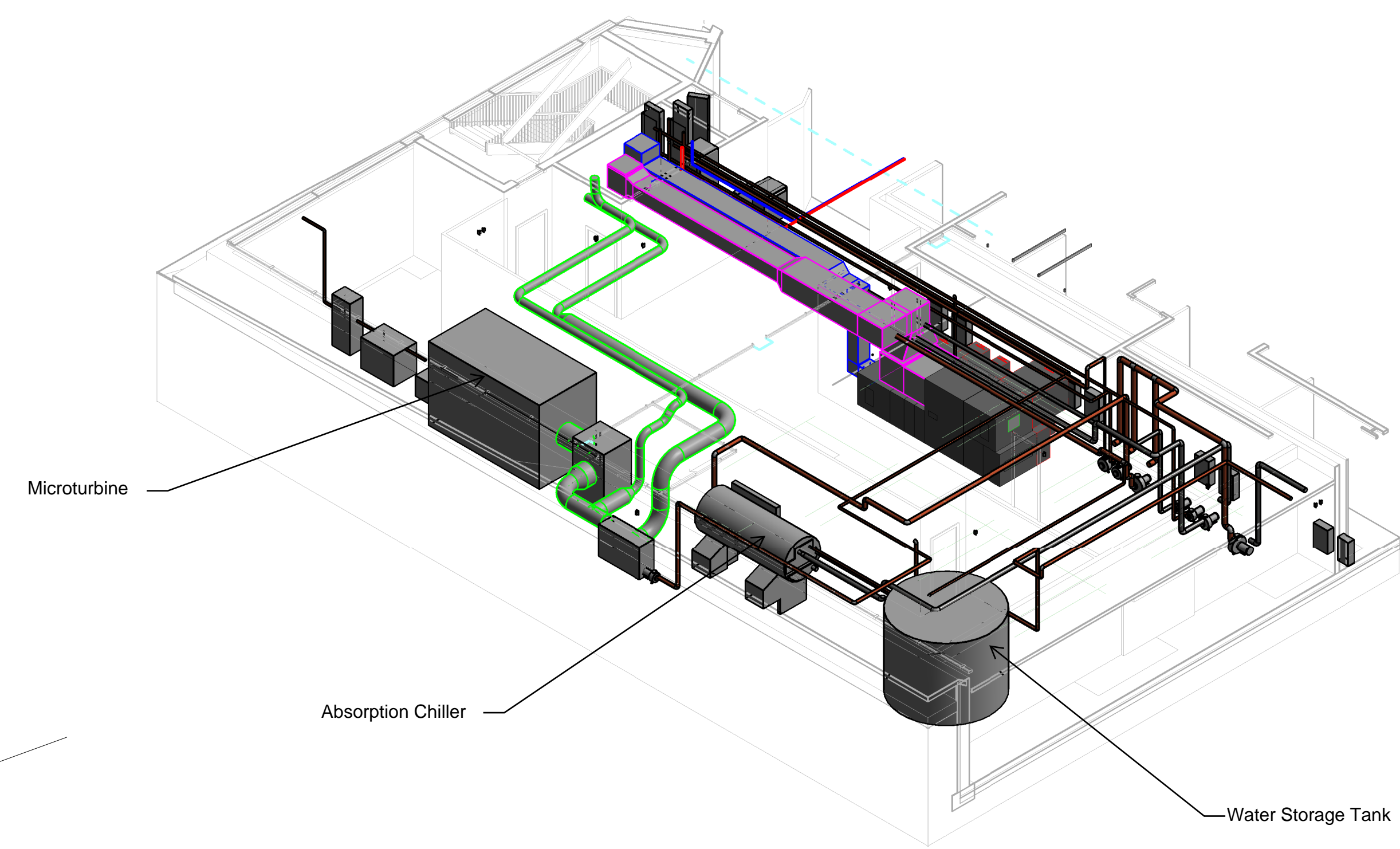


1 Basement HVAC Piping
1/8" = 1'-0"



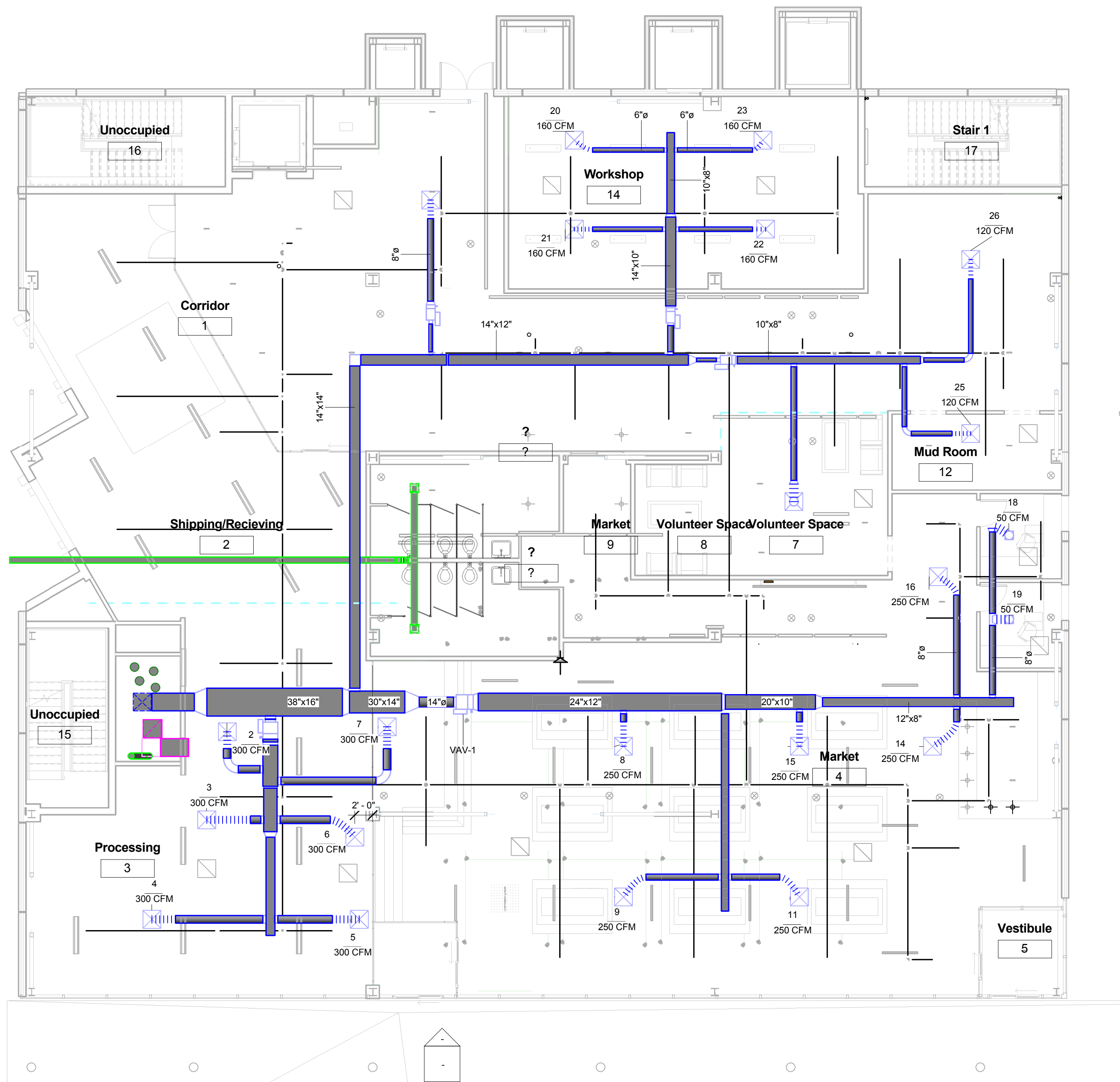
2 Mechanical Room

DRAWING NOTES

1. PROVIDE BIOGAS PRETREATMENT EQUIPMENT UPSTREAM OF MICROTURBINE
2. PROVIDE SCR AND OXIDATION CATALYSTS DOWNSTREAM OF MICROTURBINE
3. WATER STORAGE TANK DESIGNED FOR A CAPACITY OF 4,500 GALLONS
4. 2 HOUR FIRE RATED WALL ENCLOSURE OF MECHANICAL ROOM SPACES
5. DEDICATED FAN COIL UNIT SERVES ELECTRICAL ROOM

	
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Basement Mechanical Plan	
Team Number	09-2015
Date	2-11-2015
Drawn By	SYN
<h1>M101</h1>	
Scale	1/8" = 1'-0"

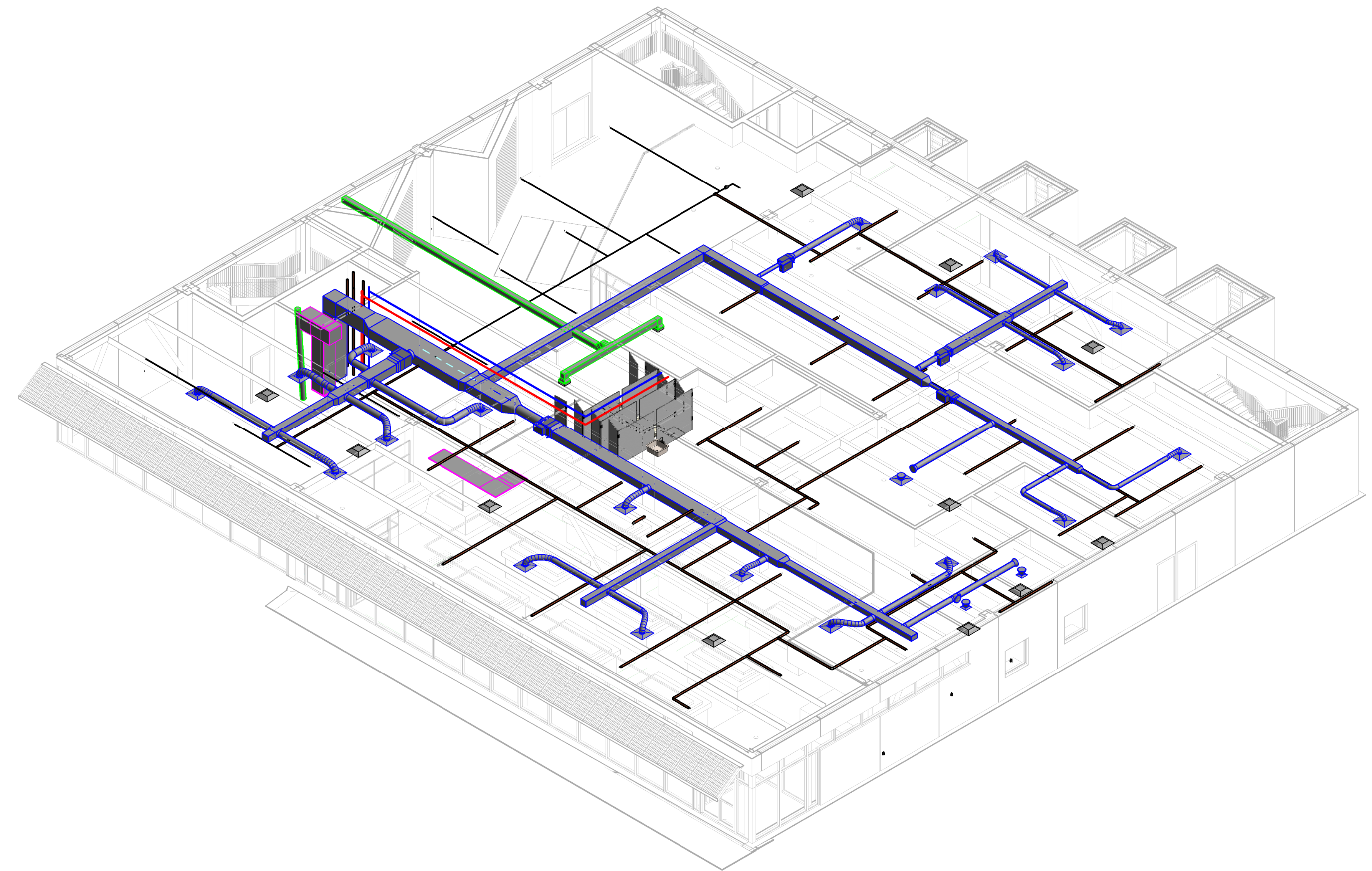
2/11/2015 6:42:13 AM



① Level 1 HVAC Ductwork
1/8" = 1'-0"

DRAWING NOTES:

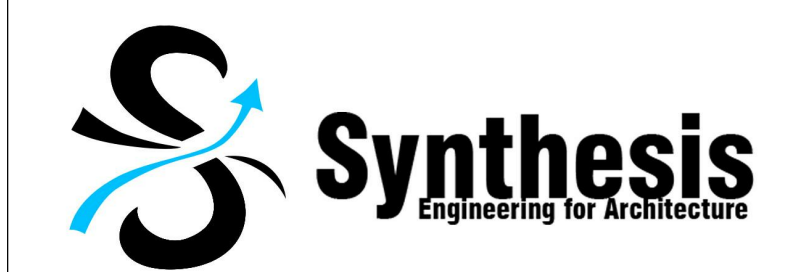
1. (22) 24" X 24" SUPPLY DIFFUSERS
2. (5) VAV TERMINAL UNIT BOXES



② First Floor View

DRAWING NOTES:

1. 100% OUTDOOR AIR HANDLING UNIT SUPPLIES 4,500 CFM TO FIRST FLOOR
2. COMMON RELIEF AIR PLENUM
3. PRESSURIZE SHIPPING/RECEIVING WITH RELIEF AIR FROM FIRST FLOOR SPACES



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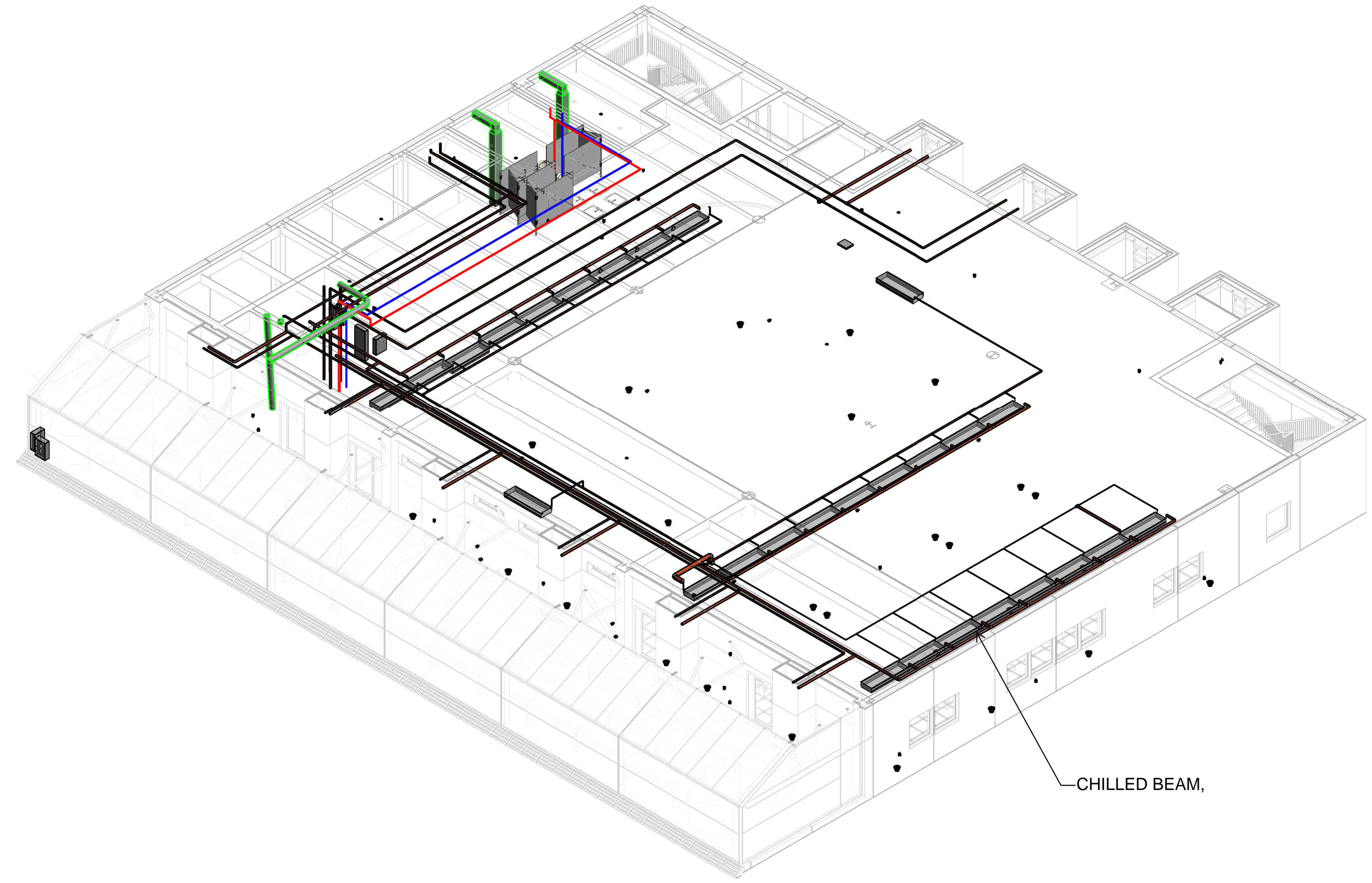
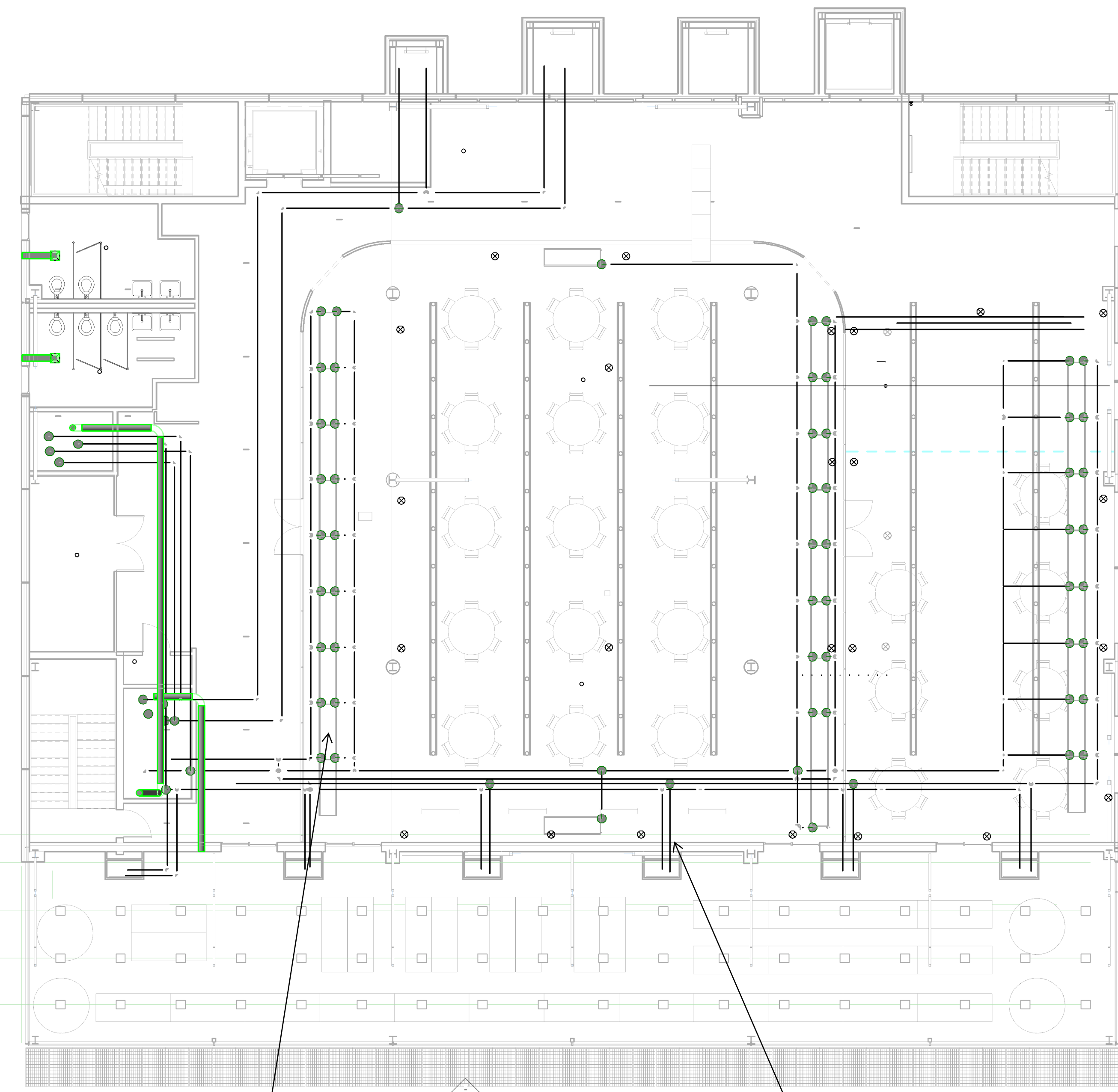
**First Floor Ductwork
Plan**

Team Number 09-2015
Date 2-11-2015
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M102

Scale 1/8" = 1'-0"

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CHILLED BEAM,

② Second Floor

① Level 2 Ductwork
1/8" = 1'-0"

CHILLED BEAM (TYP)

CONDENSER WATER SUPPLY TO GREENHOUSE SHAFTS

DRAWING NOTES:

1. CONDENSER WATER SUPPLY TO ALL CHILLED BEAMS
2. AIR RETURNED TO COMMON CEILING PLENUM



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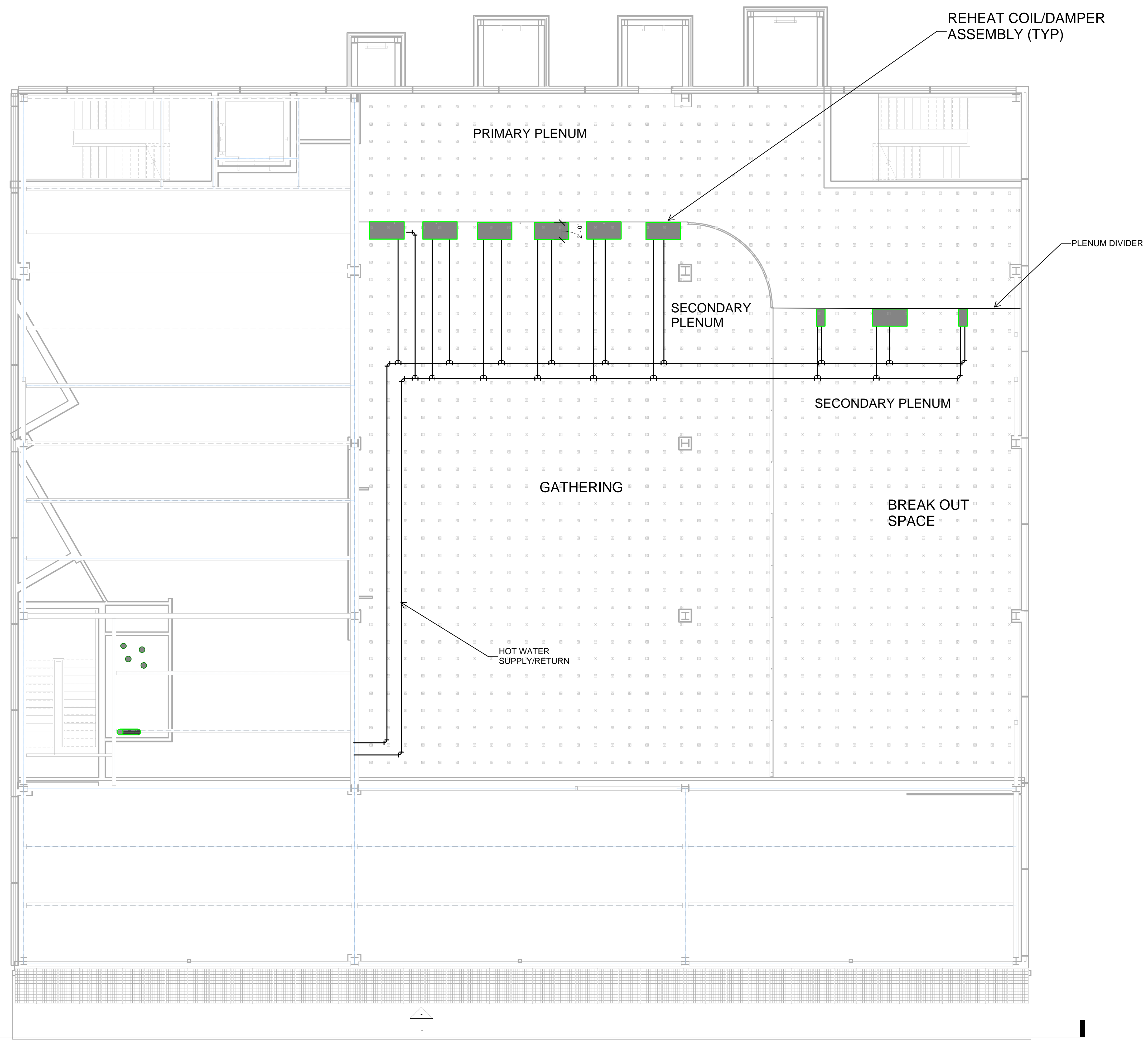
Second Floor Mechanical Plan

Team Number	09-2015
Date	2-11-2015
Drawn By	Author

M103

Scale 1/8" = 1'-0"

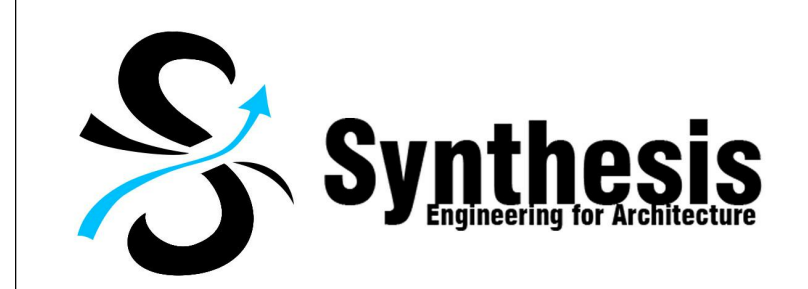
2/11/2015 10:44:24 AM



- DRAWING NOTES:**
1. PLAN OF UNDERFLOOR PLENUM OF SECOND FLOOR
 2. PROVIDE REHEAT COIL AND DAMPER ASSEMBLY BETWEEN PRIMARY AND SECONDARY PLENUMS
 3. PROVIDE PLENUM DAMPER BETWEEN BREAK-OUT SPACE AND CORRIDOR

SECOND FLOOR UNDERFLOOR PLENUM PLAN

① Level 2 Ductwork Copy 1
3/16" = 1'-0"



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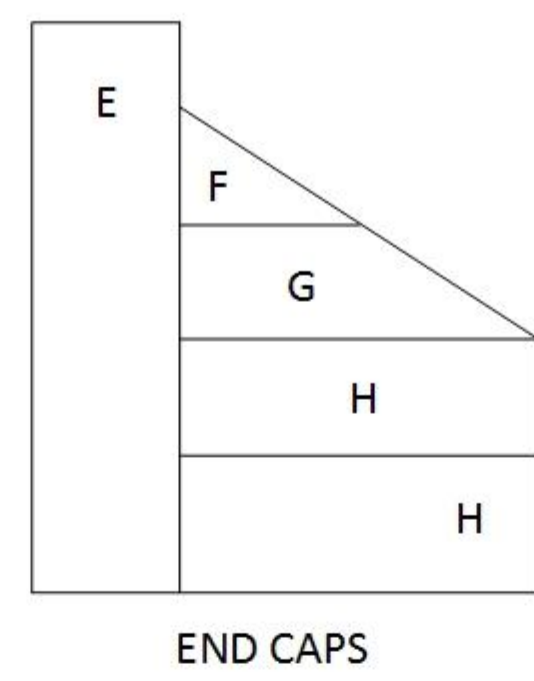
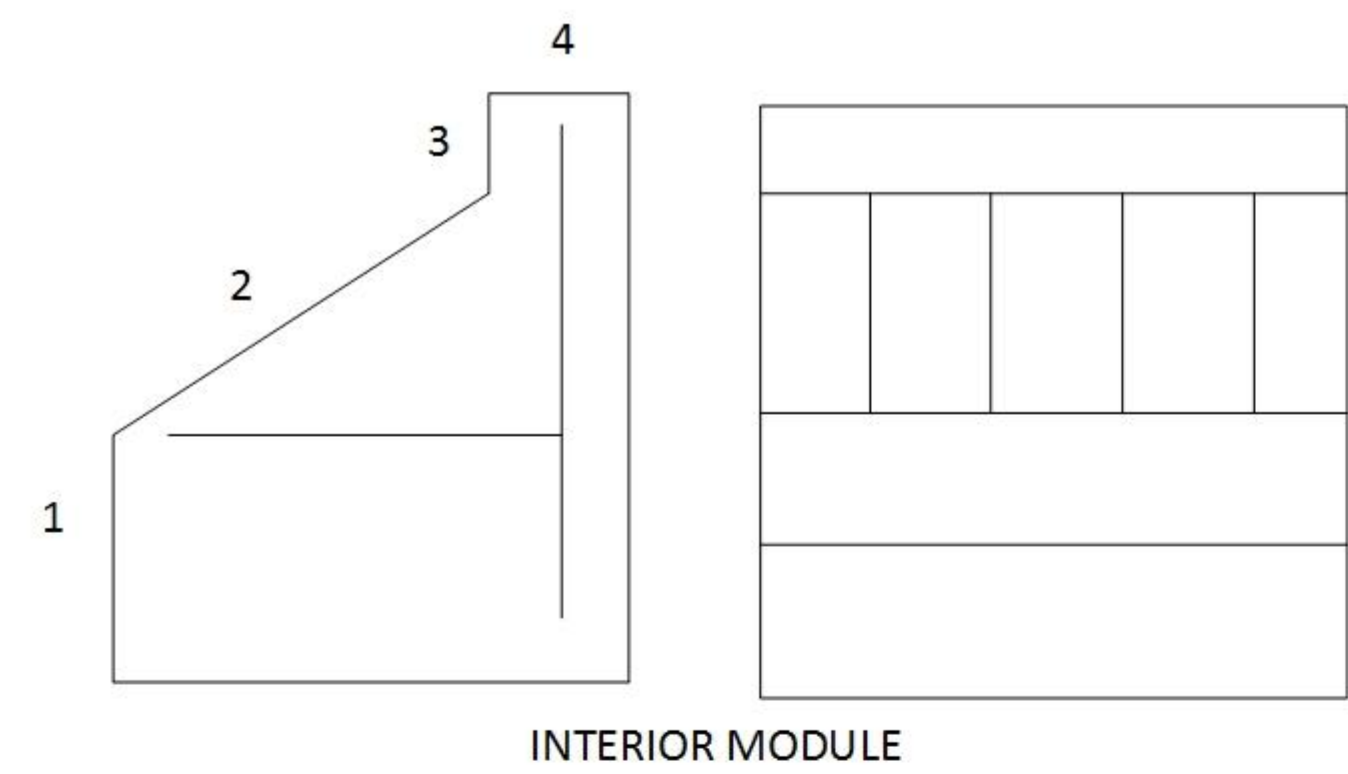
**Second Floor UFAD
Plan**

Team Number	09-2015
Date	2-11-2015
Drawn By	Author

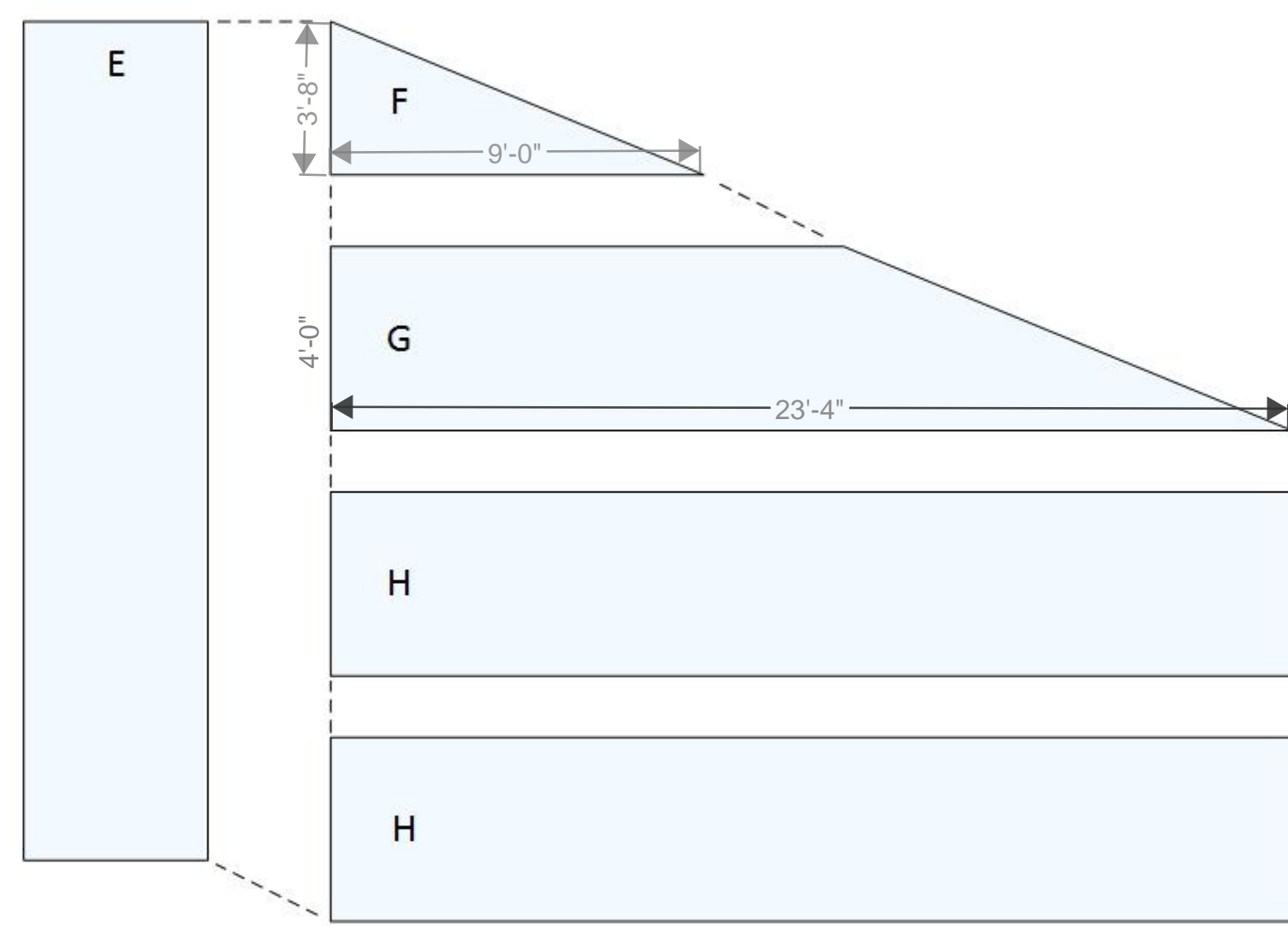
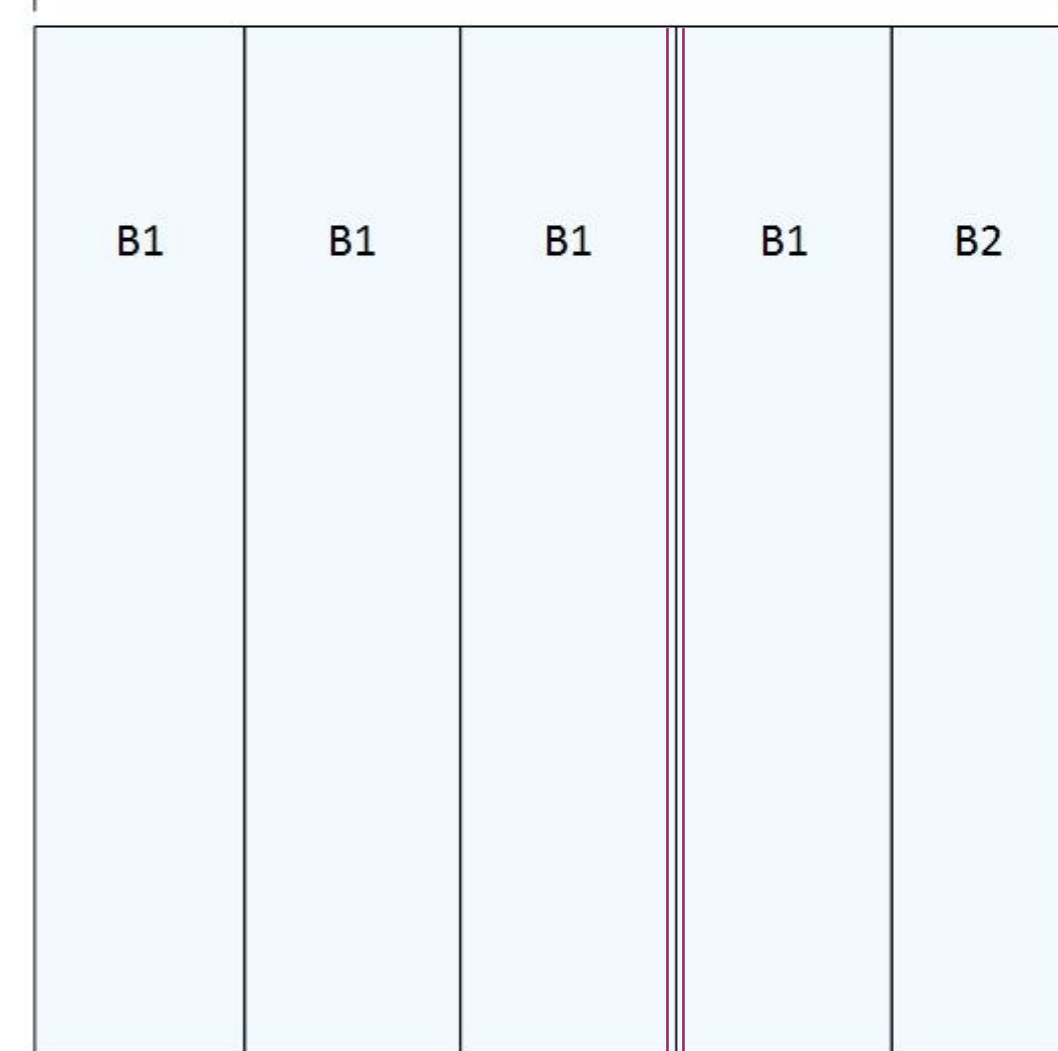
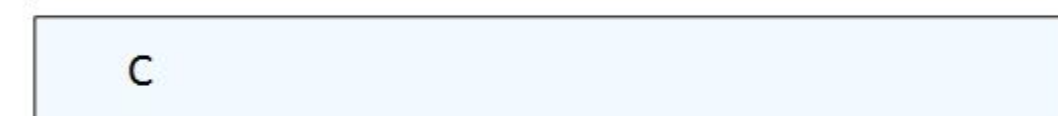
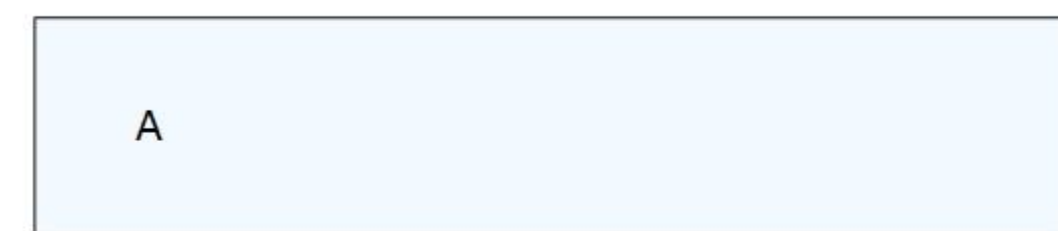
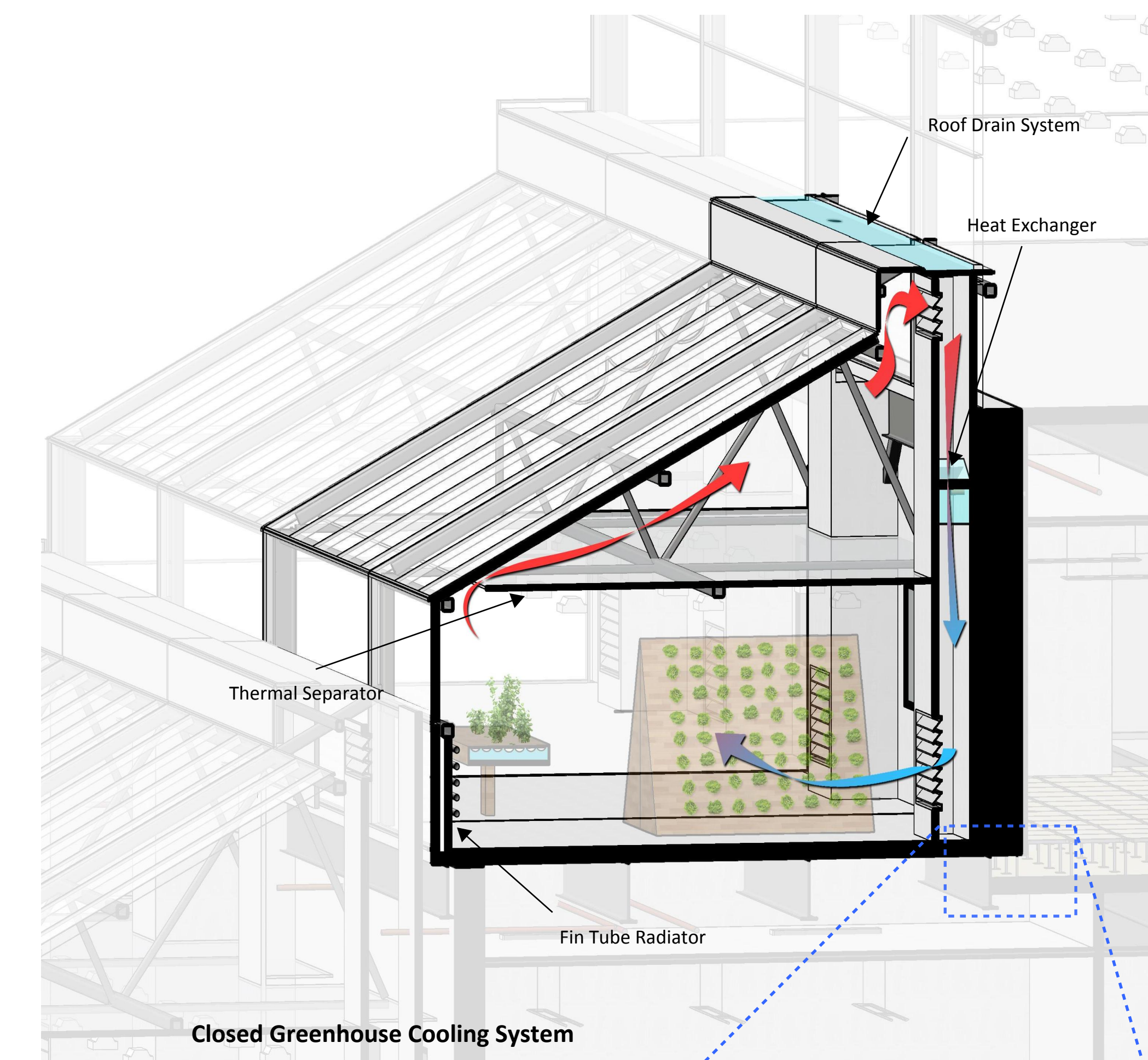
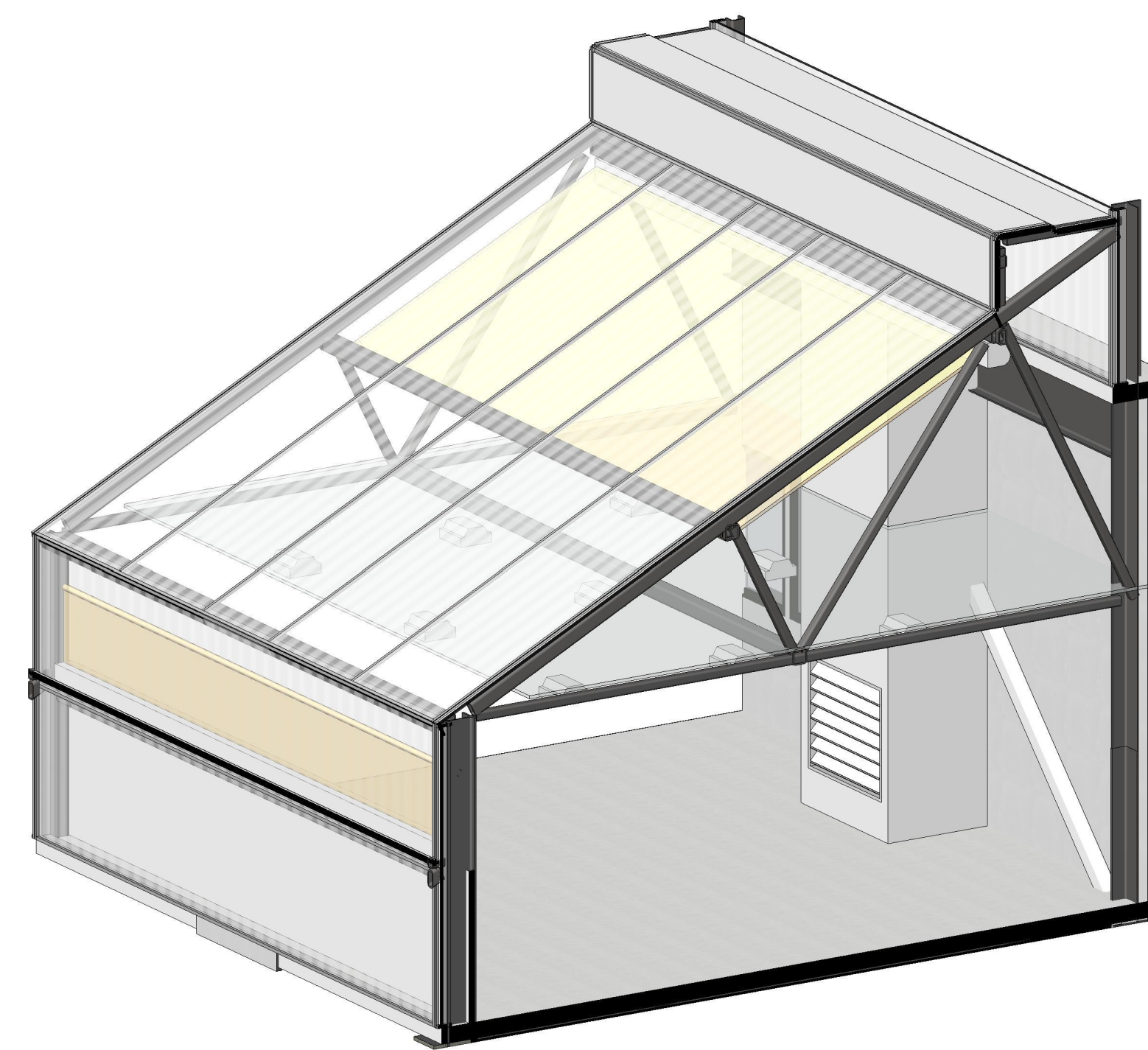
M104

Scale	3/16" = 1'-0"
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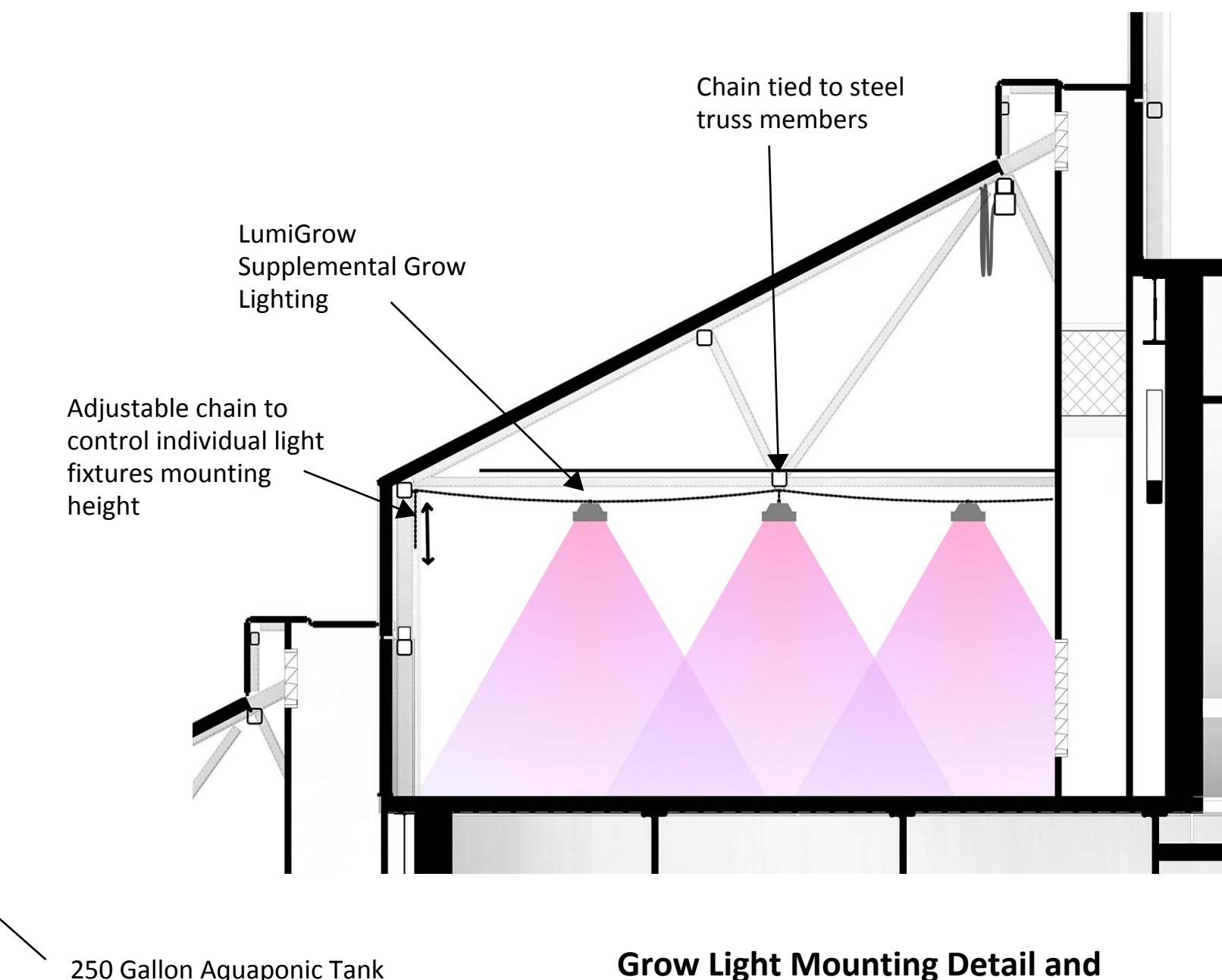
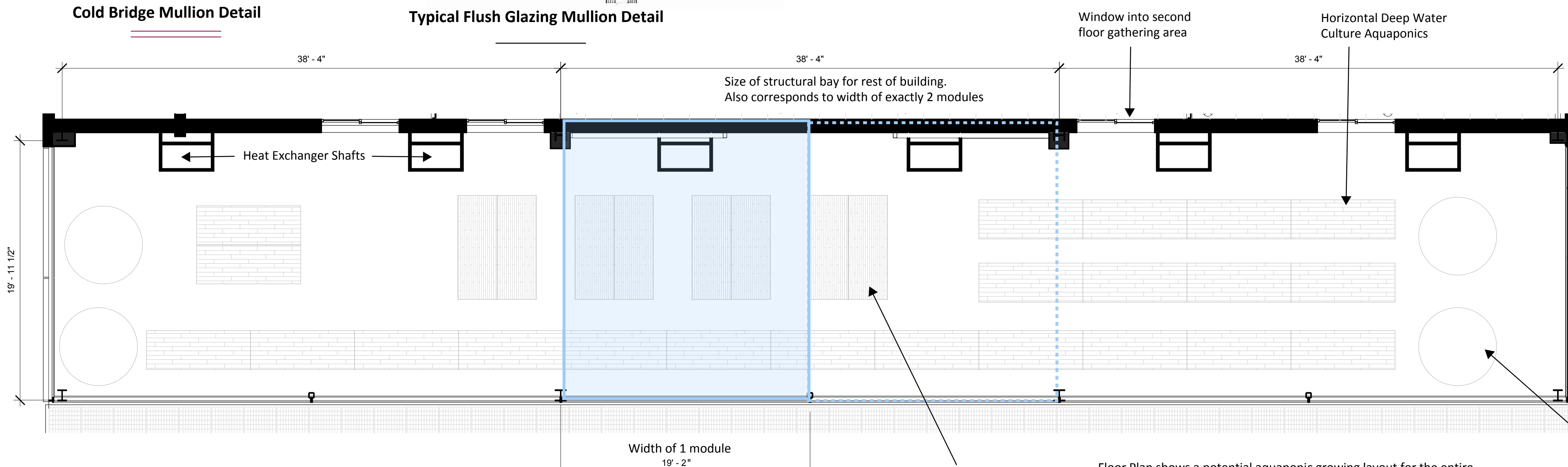
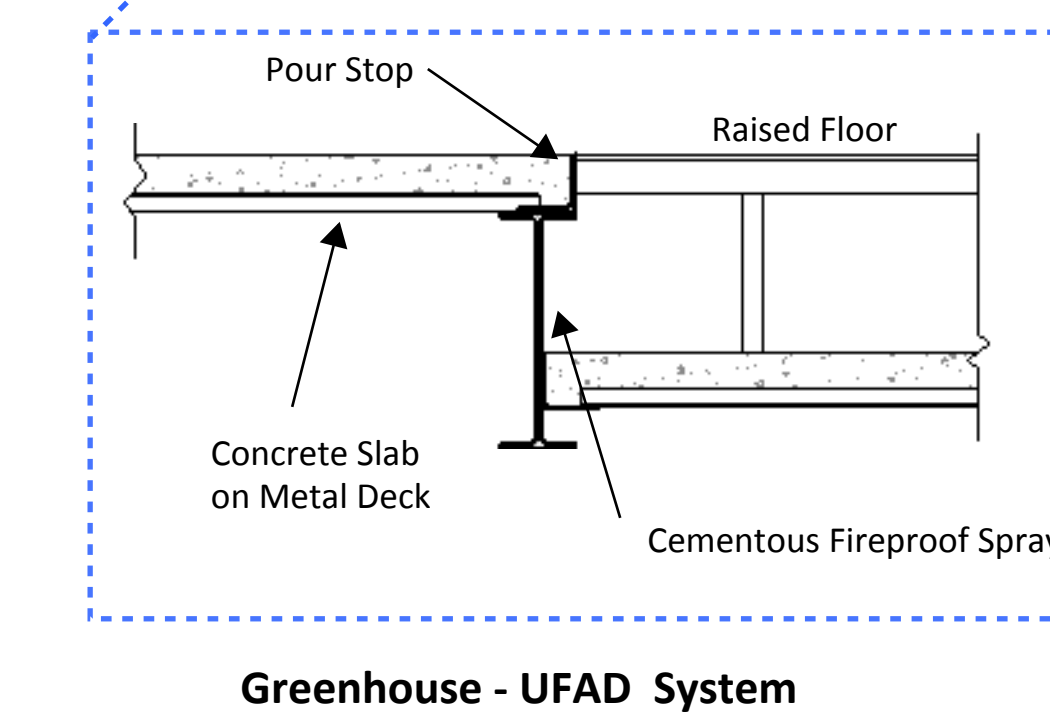
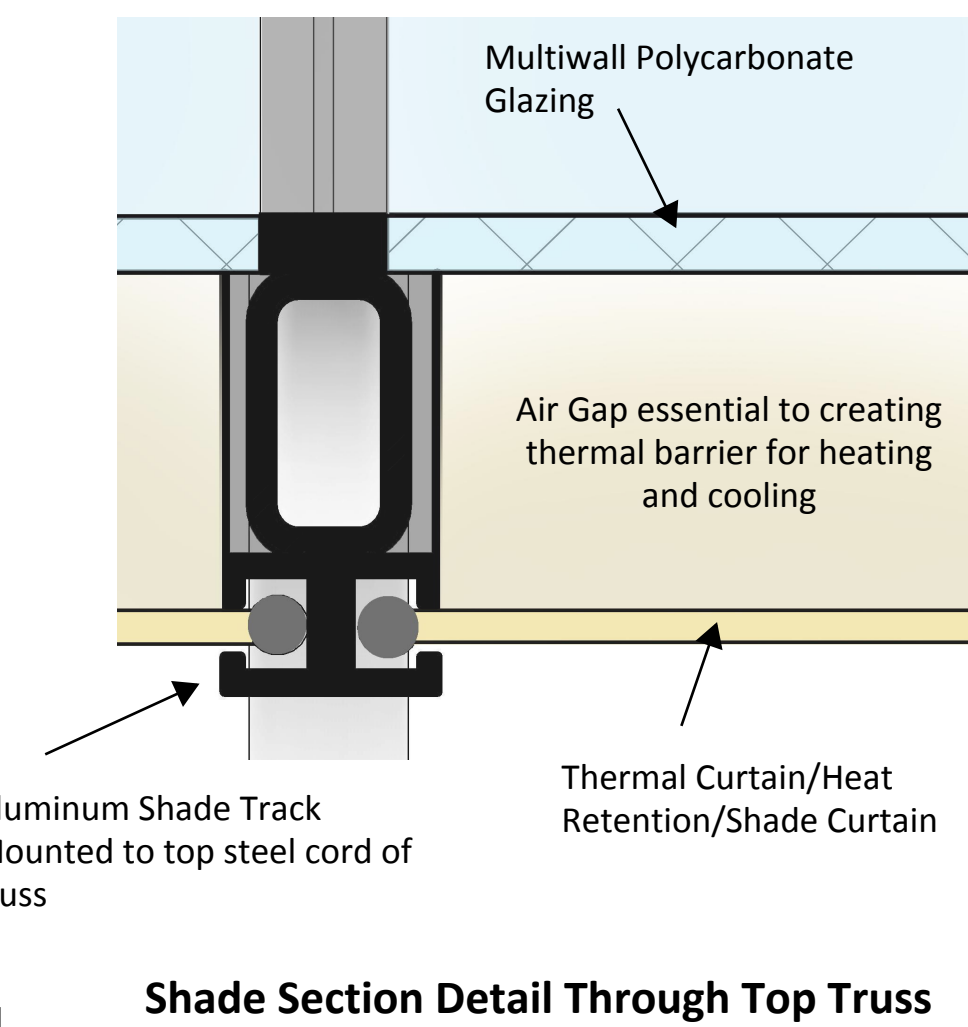
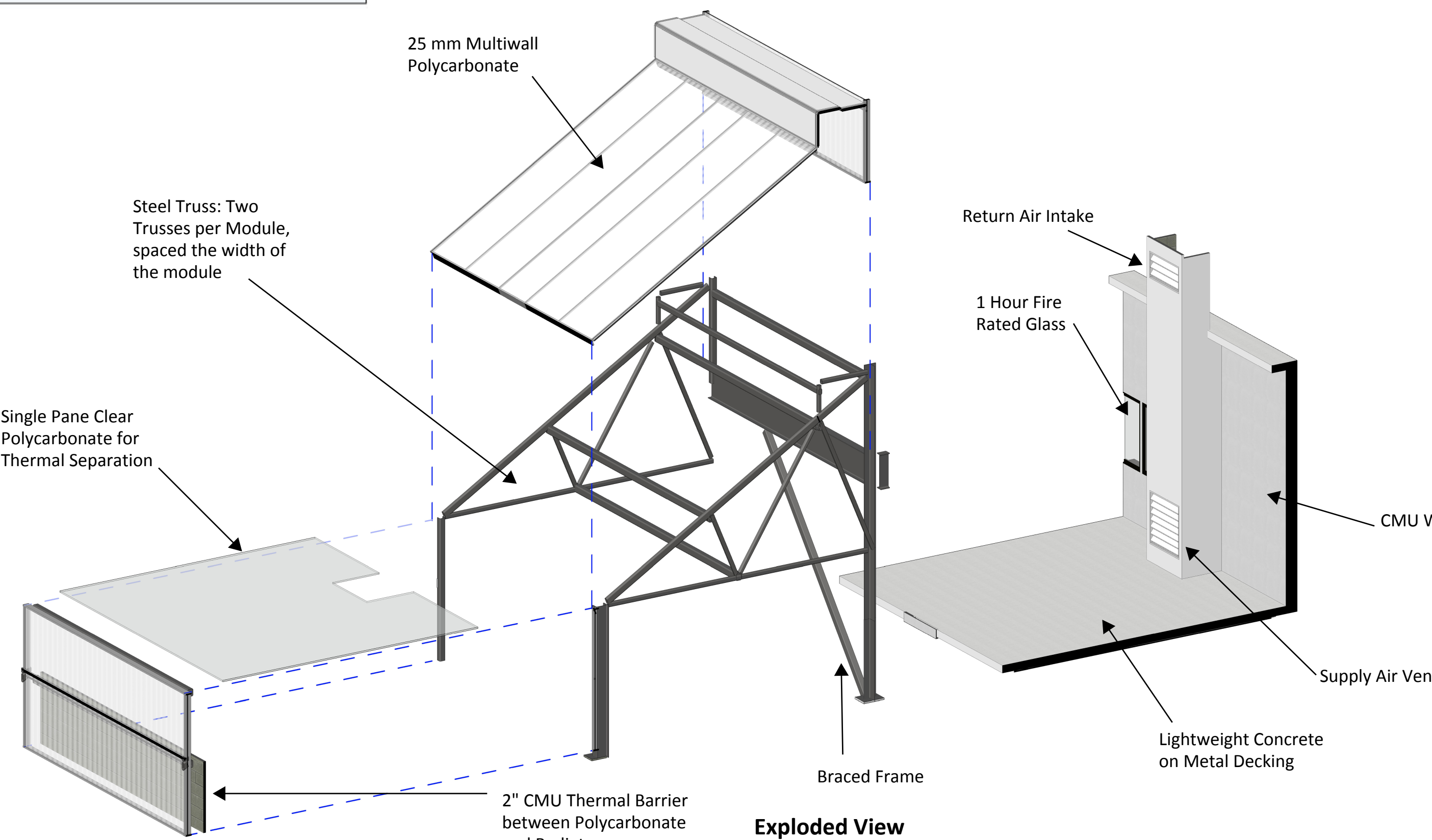
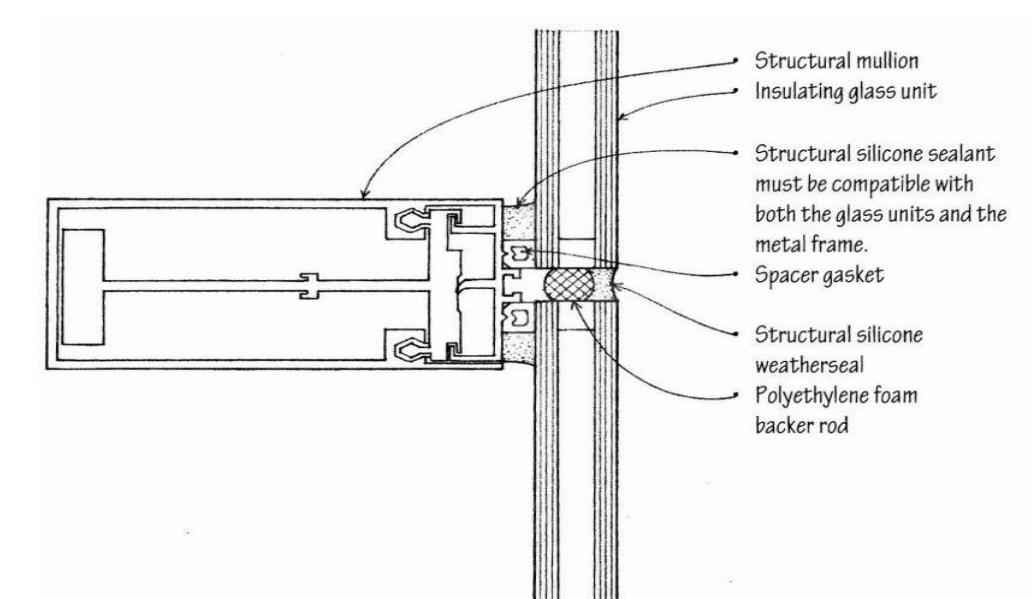
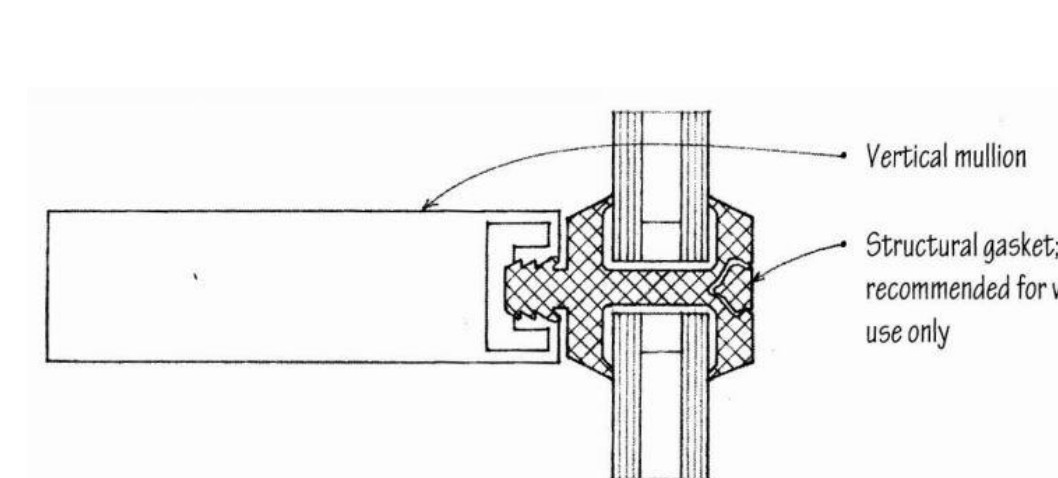
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- Construction Sequence:**
1. Steel Erection
 2. Metal Decking
 3. Concrete Floor Slab
 4. Polycarbonate and Mullion System
 5. CMU Back Wall
 6. CMU Heat Exchanger Shaft
 7. Shade System
 8. Horizontal Polycarbonate
 9. Lighting Fixtures



END CAPS
E – (4'-0" x 17'-3") Panels
F – See Above Dimensions
G – See Above Dimensions
H – (4'-0" x 15'-0") Panel



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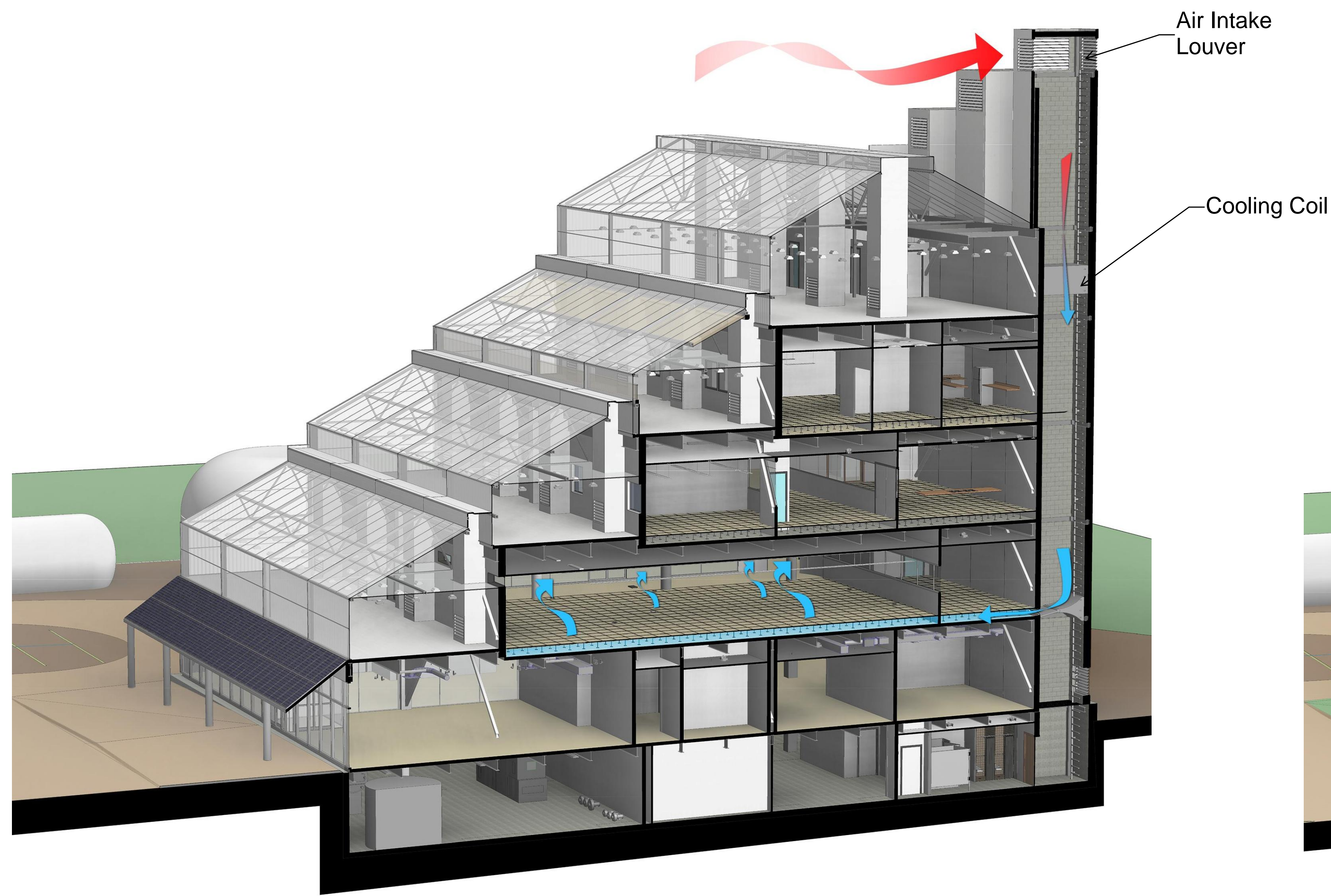
Greenhouse Module
6 Per Greenhouse

Team Number: AEI 09 - 2015
Date: 2/11/15
Drawn By: SYN

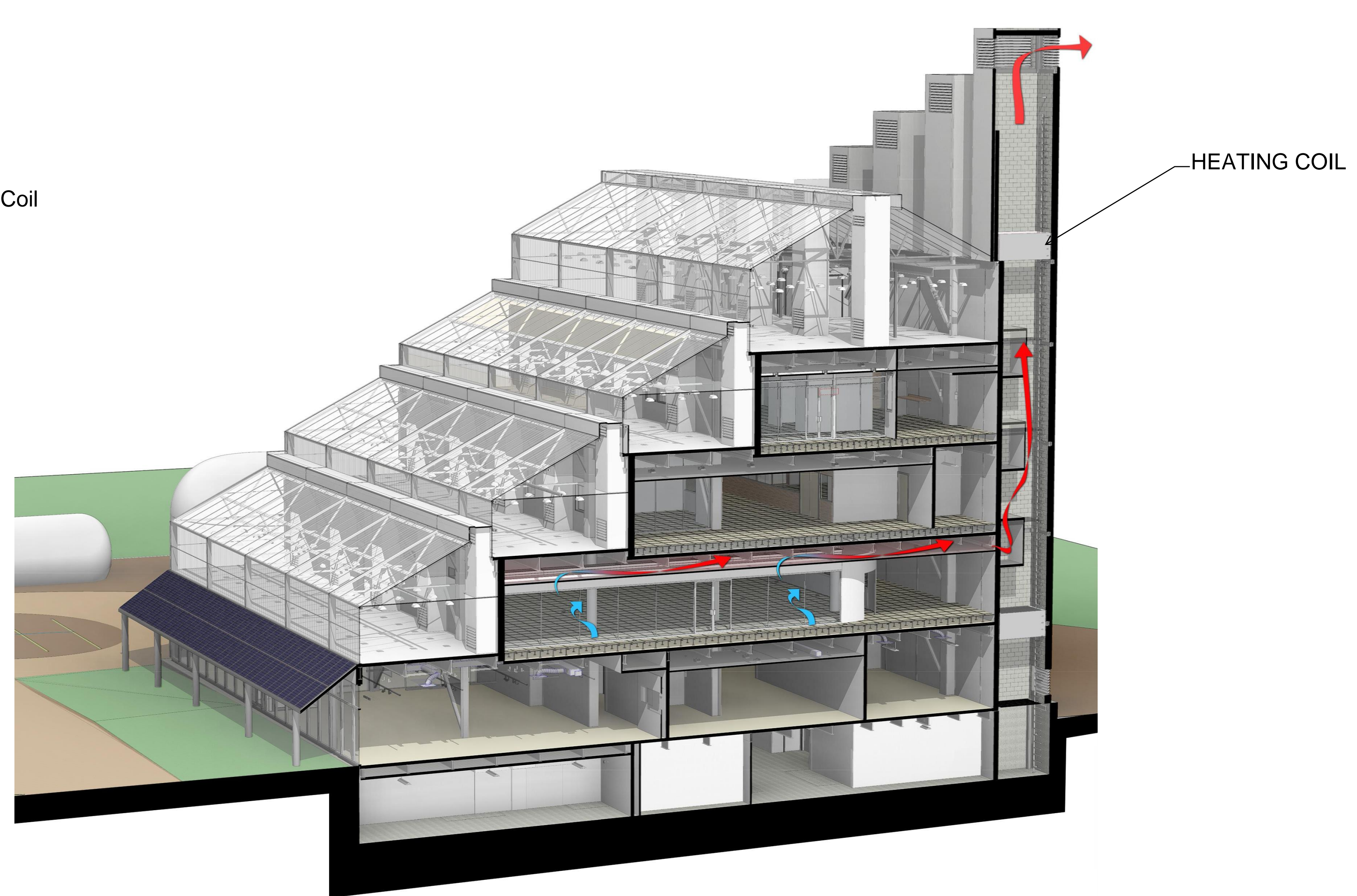
M105

Scale: 3/16" = 1'-0"

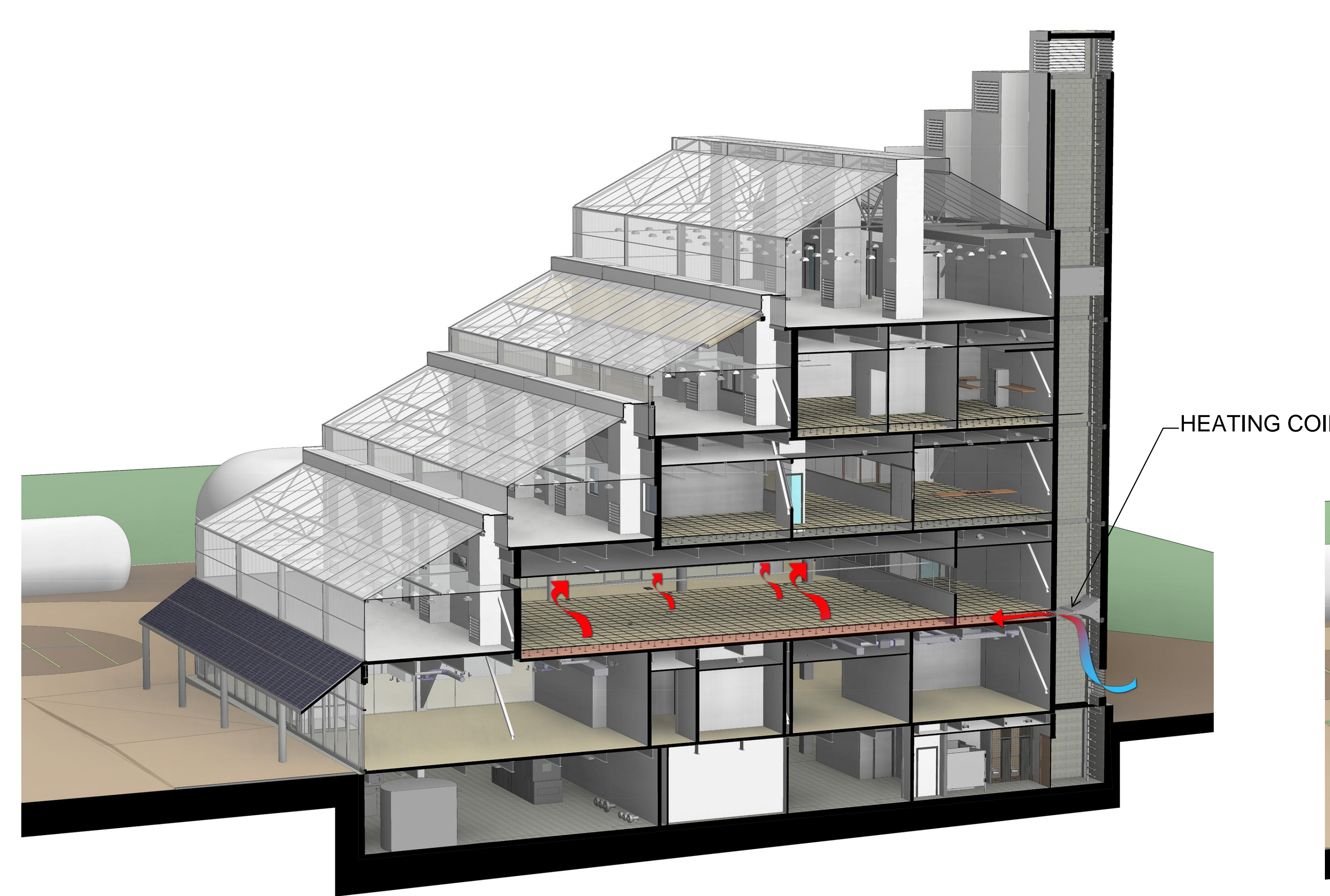
① Level 2 Copy 1
3/16" = 1'-0"



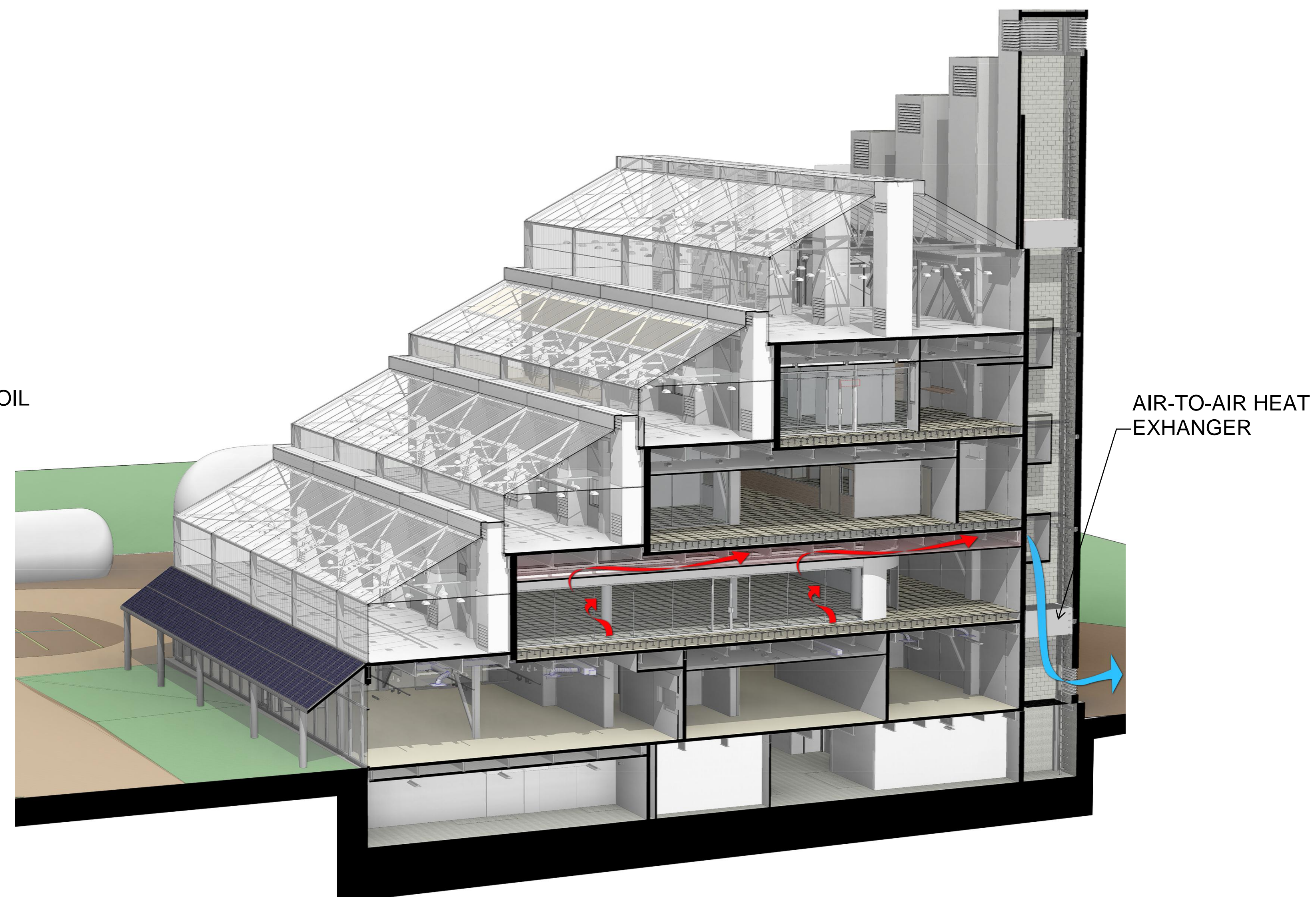
Downdraft Supply



Downdraft Return



Updraft Supply



Updraft Return

DRAWING NOTES:

1. IF OUTDOOR AIR IS ABOVE 55F, SYSTEM OPERATES IN DOWNDRAFT MODE
2. IF OUTDOOR AIR IS BELOW 55, DAMPERS AT BASE OF SUPPLY TOWERS OPEN, SYSTEM OPERATES IN UPDRAFT MODE
3. WASTE HEAT FROM MICROTURBINE IS PROVIDED TO THE SOLAR CHIMNEY WHEN AIR IS RELIEVED IN DOWNDRAFT MODE
4. AIR-TO-AIR HEAT EXCHANGER IS PROVIDED AT BOTTOM OF SOLAR CHIMNEY TO HELP RELIEVE AIR IN PASSIVE UPDRAFT MODE



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Natural HVAC Sections

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Date 02/11/15
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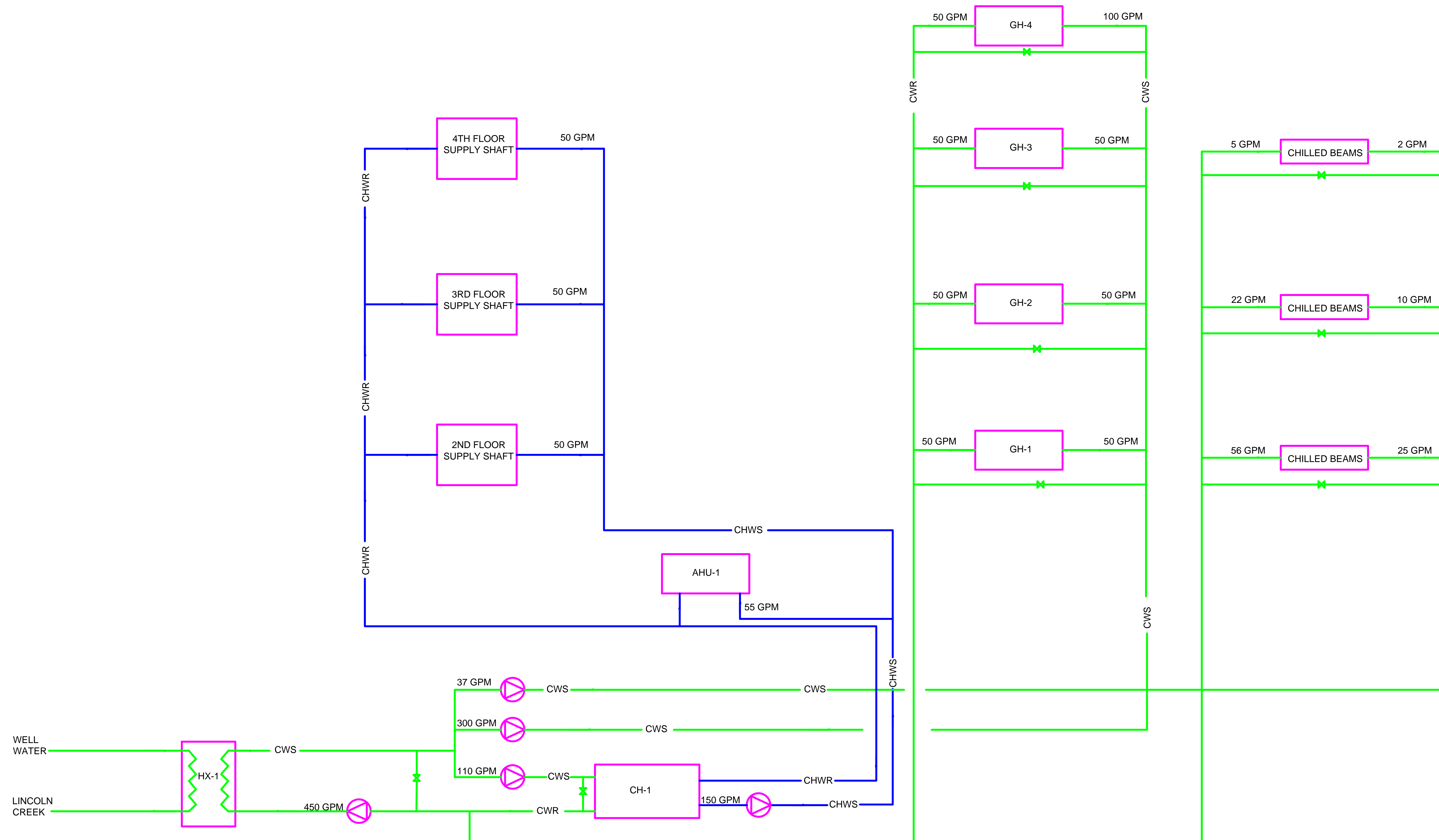
M106

Scale

DRAWING NOTES

1. PRIMARY/SECONDARY DISTRIBUTION PUMPING FOR CONDENSER WATER SUPPLY

2. BYPASS PROVIDED FOR ABSORPTION CHILLER AND CHILLED BEAMS TO INCREASE CONDENSER WATER TEMPERATURE



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Waterside Diagram

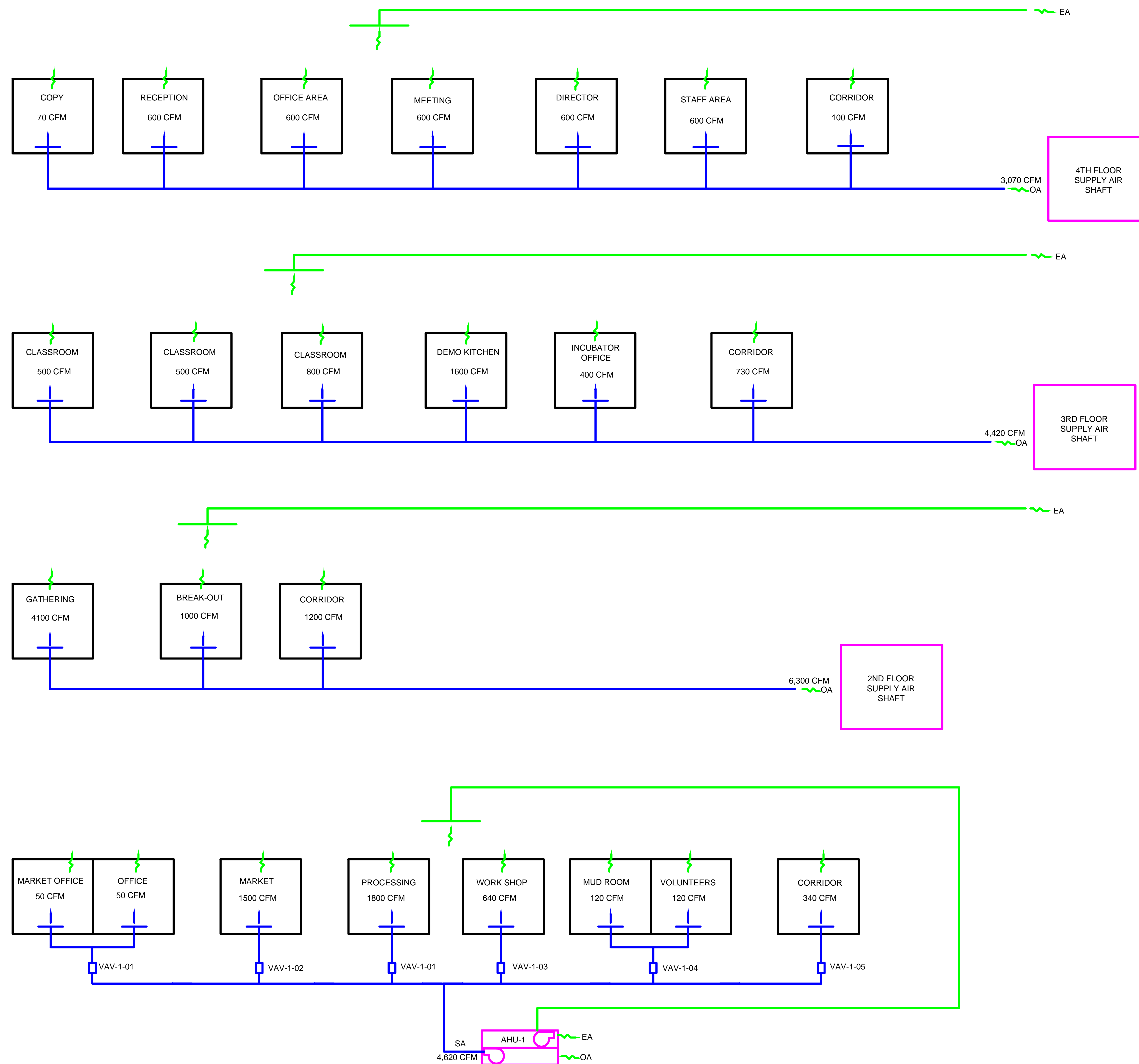
Team Number AEI 09-2015

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M107

Scale As indicated



AIRSIDE FLOW DIAGRAM

DRAWING NOTES:

1. AIRFLOWS CALCULATED FOR EACH SPACE
2. AHU-1 DESIGNED WITH ENERGY RECOVERY WHEEL
3. FLOORS 2-4 SUPPLIED VIA NATURAL HVAC SYSTEM



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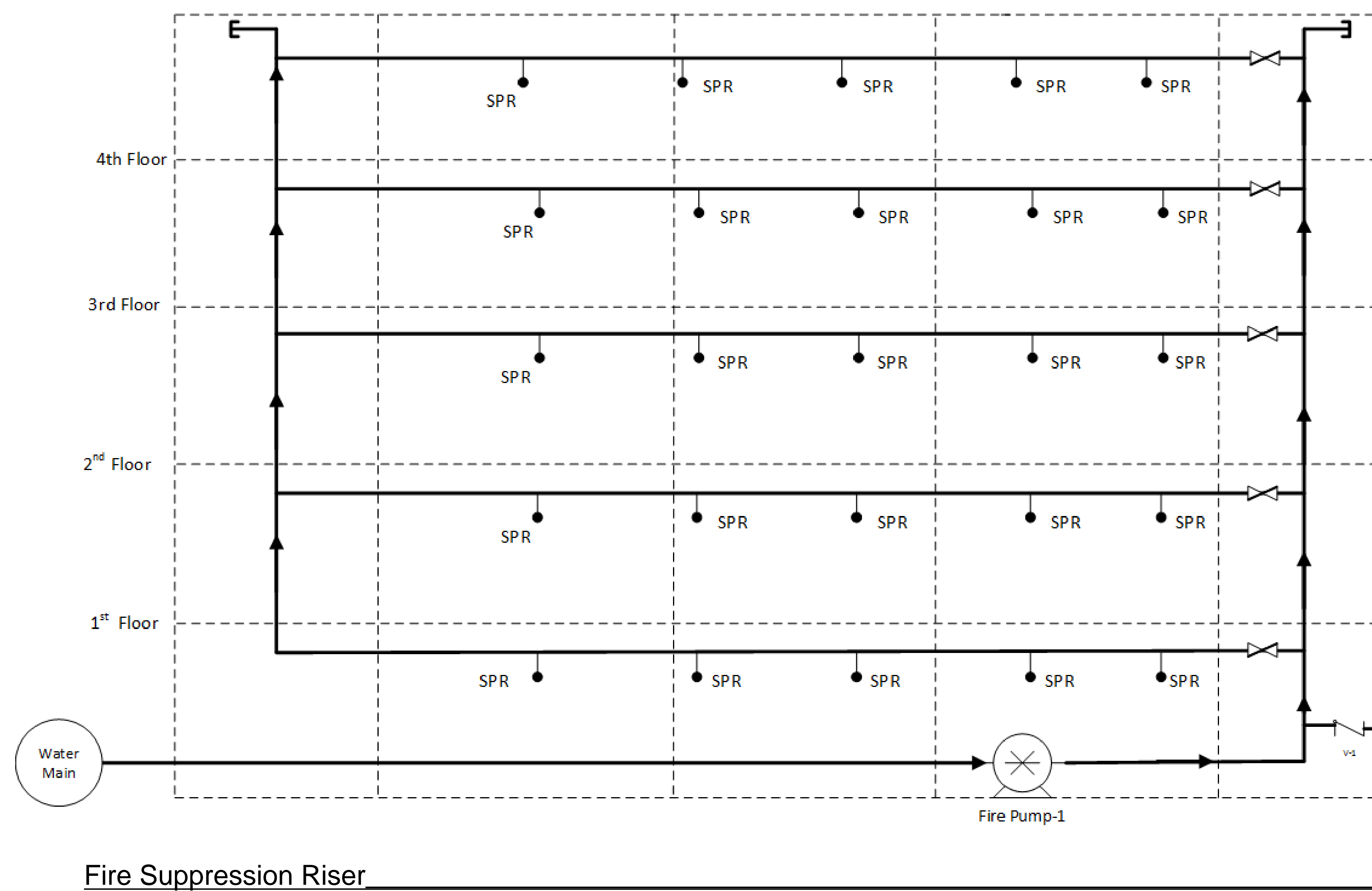
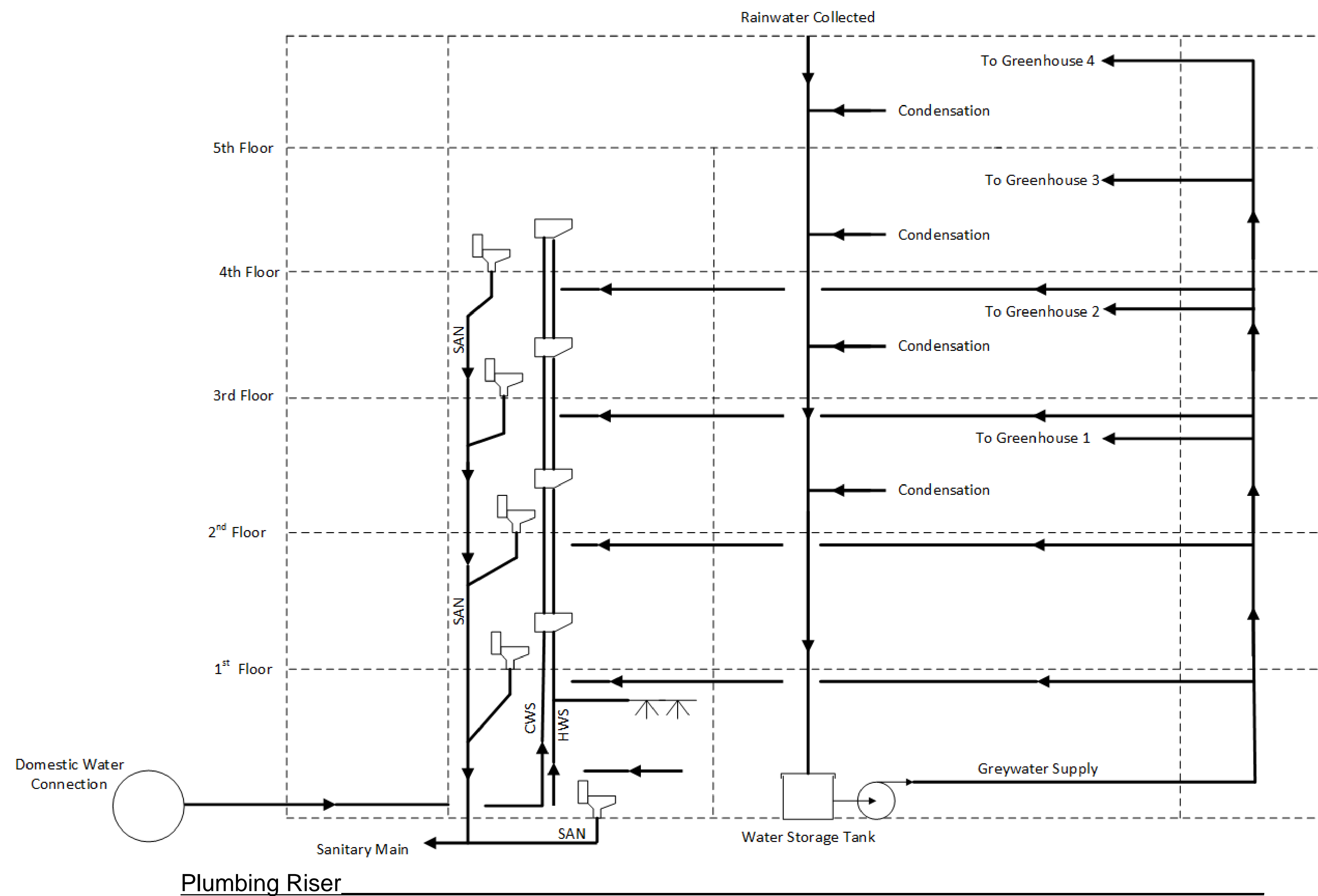
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Airside Flow Diagram

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Date: 2/11/15
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M108

Scale: As indicated



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**Plumbing & Fire
Suppression Riser**

Team Number AEI 09-2015

Date 2/11/15

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M109

Scale As indicated

Air Handling Unit Schedule																
Tag	Unit Type	Location	Area Serving	Max Supply Air [CFM]	Min Supply Air [CFM]	Min OA [%]	EAT [F]	LAT [F]	Cooling Coil		Heating Coil		Volts/Phase/Hz	Manufacturer	Model No.	Notes
									EWT [F]	LWT [F]	EWT (F)	LWT (F)				
AHU-1	VAV	Basement	1st Floor	4500	4500	100	89	55	40	50	180	160	480/3/60	Trane	CSAA008UA	1

Notes:
1. Variable Speed Drive Installed for Supply and Exhaust Fan

Absorption Chiller Schedule																			
Tag	Location	Type	Refrigerant Type	Capacity		Evapoarator			Condenser			Heating Water			Electrical		Manufacturer	Model No.	Notes
				Tons Cooling	MBH Heating	EWT [F]	LWT [F]	GPM	EWT [F]	LWT [F]	GPM	EWT [F]	LWT [F]	GPM	KVA	Volts/Phase/Hertz			
CH-1	Basement	Absorption	R-134a	60	994	40	50	40	72	82	345	180	160	102	5.7	460/3/60	Thermax	LT 6	1,2

Notes:
1. Selection valid for insulated chiller only
2. Room temperature should be from 41F to 113F

Pump Schedule													
Tag	Location	Service	Type	Flow Rate [GPM]	Head ft.	RPM	Efficiency [%]	HP	kVA	Volts/Phase/Hz	Manufacturer	Model No.	Notes
CHWP-1	Basement	Chilled	End Suction	150	10	1150	75.35	0.75	0.91	208/3/60	Bell & Gossett	3AD-e-1510	1
CHWP-2	Basement	Chilled	End Suction	150	36	1780	81	1.5	1.68	208/3/60	Bell & Gossett	2AD-es	1
CWP-1	Basement	Condenser	End Suction	450	20	1780	74	3.5	4.30	208/3/60	Bell & Gossett	4AD	1
CWP-2	Basement	Condenser	End Suction	345	44	1780	80.53	7.5	8.47	208/3/60	Bell & Gossett	3EB	1
CWP-3	Basement	Condenser	End Suction	300	62	1780	75	6.5	7.88	208/3/60	Bell & Gossett	3GB	1
CWP-4	Basement	Condenser	End Suction	85	27	1750	75.78	1	1.20	208/3/60	Bell & Gossett	2AD-es	1
CWP-5	Ground	Condenser	End Suction	450	250	3550	73.32	50	62.04	208/3/60	Bell & Gossett		1
SWP-1	Ground	Sump	End Suction	25	20	1150	59.2	0.5	0.77	208/3/60	Bell & Gossett	1.25AD-es	
GWP-1	Basement	Plumbing	End Suction	50	80	1750	52.6	3	5.19	208/3/60	Bell & Gossett	1.25BC	1
HWP-1	Basement	Heating	End Suction	120	45	1780	79	1.5	1.73	208/3/60	Bell & Gossett	1.5AD-es	1

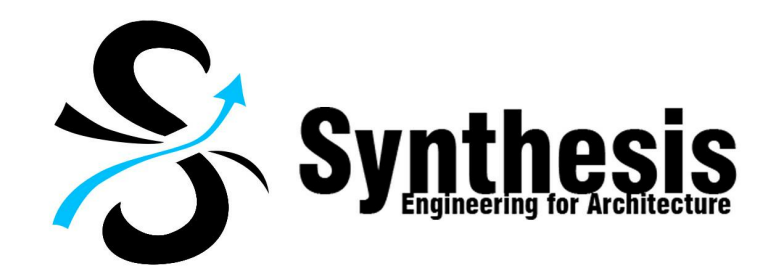
Notes:
1. Variable Speed Drive shall be installed

Exhaust Fan Schedule										
Tag	Location	CFM	RPM	Drive	Type	Electrical			Manufacturer	Model No.
						Amps	Watts	Volts/Phase/Hz		
EF-1	Locker Room	700	1100	Direct	Exhaust	3.2	350	120/3/60	Greenheck	SP-A700
EF-2	Locker Room	700	1100	Direct	Exhaust	3.2	350	120/3/60	Greenheck	SP-A700
EF-3	1st Mens	200	900	Direct	Exhaust	0.43	48.2	120/3/60	Greenheck	SP-A200
EF-4	1st Womens	200	900	Direct	Exhaust	0.43	48.2	120/3/60	Greenheck	SP-A200
EF-5	2nd Mens	300	1050	Direct	Exhaust	0.72	80.7	120/3/60	Greenheck	SP-A290
EF-6	2nd Womens	300	1050	Direct	Exhaust	0.72	80.7	120/3/60	Greenheck	SP-A290
EF-7	3rd Mens	300	1050	Direct	Exhaust	0.72	80.7	120/3/60	Greenheck	SP-A290
EF-8	3rd Womens	300	1050	Direct	Exhaust	0.72	80.7	120/3/60	Greenheck	SP-A290
EF-9	Kitchen	200	900	Direct	Exhaust	0.72	80.7	120/3/60	Greenheck	SP-A200
EF-10	4th Mens	200	900	Direct	Exhaust	0.43	48.2	120/3/60	Greenheck	SP-A200
EF-11	4th Womens	200	900	Direct	Exhaust	0.43	48.2	120/3/60	Greenheck	SP-A200
EF-12	Copy Room	70	850	Direct	Exhaust	0.43	48.2	120/3/60	Greenheck	SP-A70

Water to Water Heat Exchanger Schedule														
Tag	Location	Type	Capacity [MBH]	Cold Side				Hot Side				Manufacturer	Model No.	Notes
				Fluid	GPM	EWT [F]	LWT [F]	Fluid	GPM	EWT [F]	LWT [F]			
HX-1	Basement	Plate and Frame	675	Water	450	47	50	Water	450	63	66	Taco	PF19	1

Notes:
1. Standard & high temperature gaskets: Nitrile & EPDM

Hot Exhaust Gas Heat Exchanger Schedule												
Tag	Location	Type	Capacity [MBH]	Cold Side				Hot Side		Manufacturer	Model No.	Notes
				Fluid	GPM	EWT [F]	LWT [F]	Fluid	lb/hr			
HX-2	Basement	Shell and Tube	210	Water	120	160	180	Exhaust	10,440	Polar Power	20-29-0070	



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Equipment Schedules

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M110

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