

COVERS AND DRAWING LISTS

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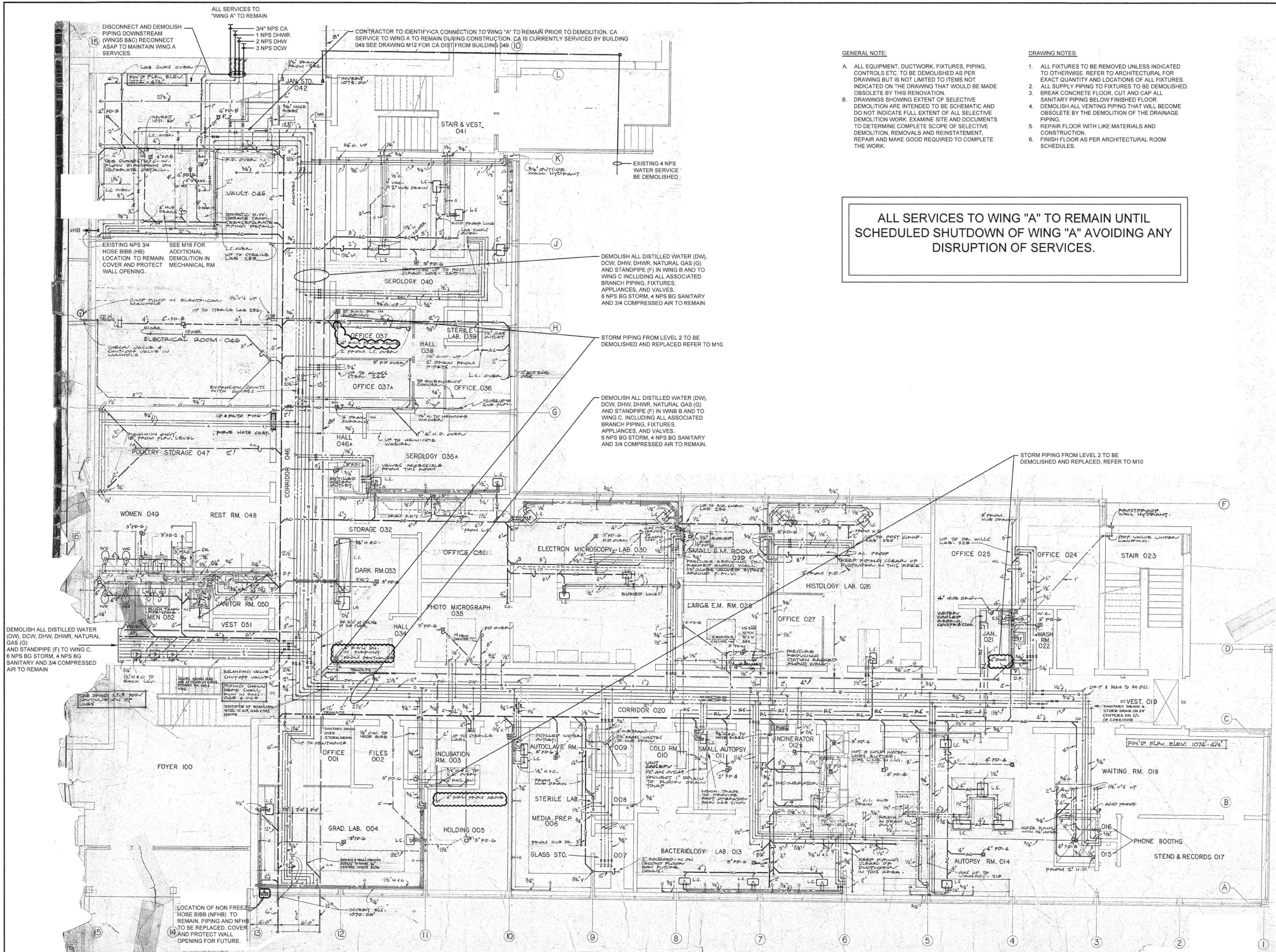
BUILDING #046 RENOVATIONS

JLR JOB NO. 27915
ISSUED FOR PERMIT & TENDER
NOVEMBER 2, 2018

MECHANICAL DRAWING SET



UNIVERSITY OF GUELPH - BUILDING #046 RENOVATIONS
JLR JOB NO. 27915



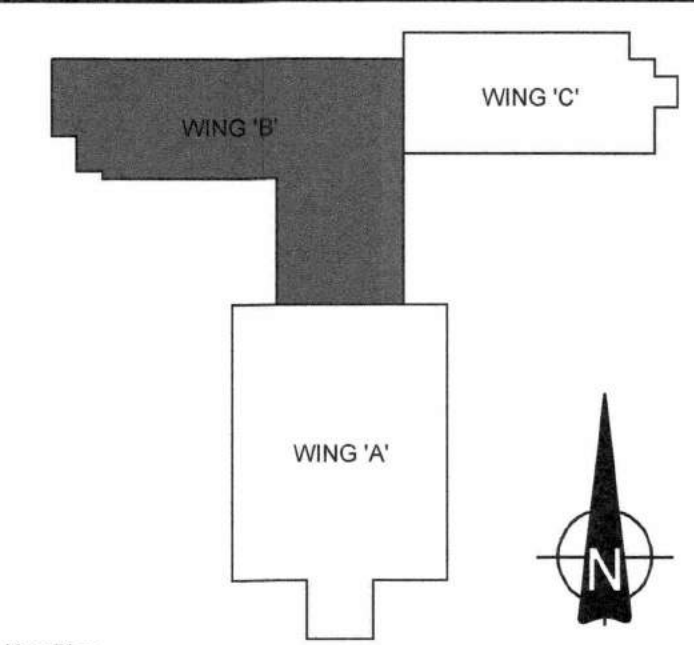
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6. FINISH FLOOR AS PER ARCHITECTURAL ROOM SCHEDULES.

ALL SERVICES TO WING "A" TO REMAIN UNTIL SCHEDULED SHUTDOWN OF WING "A" AVOIDING ANY DISRUPTION OF SERVICES.



Key Plan

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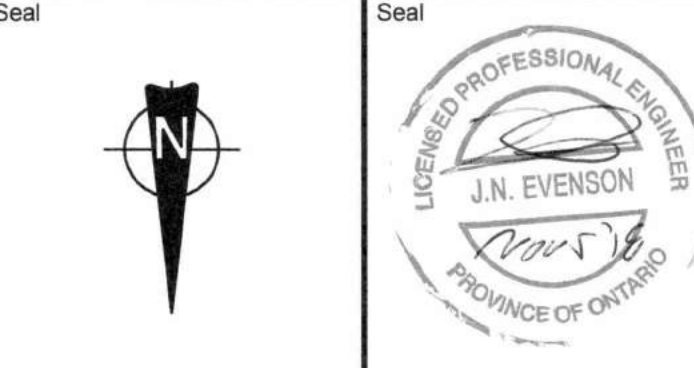
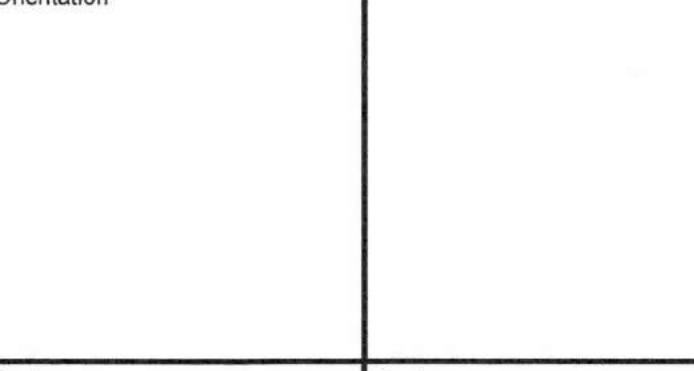
UNEXPECTED DISCOVERY OF ASBESTOS:

Where a friable material is discovered during construction, renovations and/or demolition, and it is suspected to contain asbestos, the Contractor must stop all work that may disturb the material. The Contractor shall advise the Owner of the discovery and await instructions from the owner.

A	A = Detail number
B	B = Drawing number where detailed

0	ISSUED FOR PERMIT & TENDER	TA	NOV 2, 2018
NO	ISSUED	BY	DATE

Orientation



UNIVERSITY OF GUELPH
Design, Engineering & Construction
Physical Resources
Guelph, Ontario. N1G 2W1

Consultant



Project
**BUILDING #046
RENOVATIONS**

Drawing Title
**MECHANICAL
DEMOLITION PLUMBING
WING B LEVEL 1**

Project No.
504034

Location
**UNIVERSITY OF GUELPH
BUILDING #046**

Scale
NTS

Date
NOV 2, 2018

Drawn by
HW

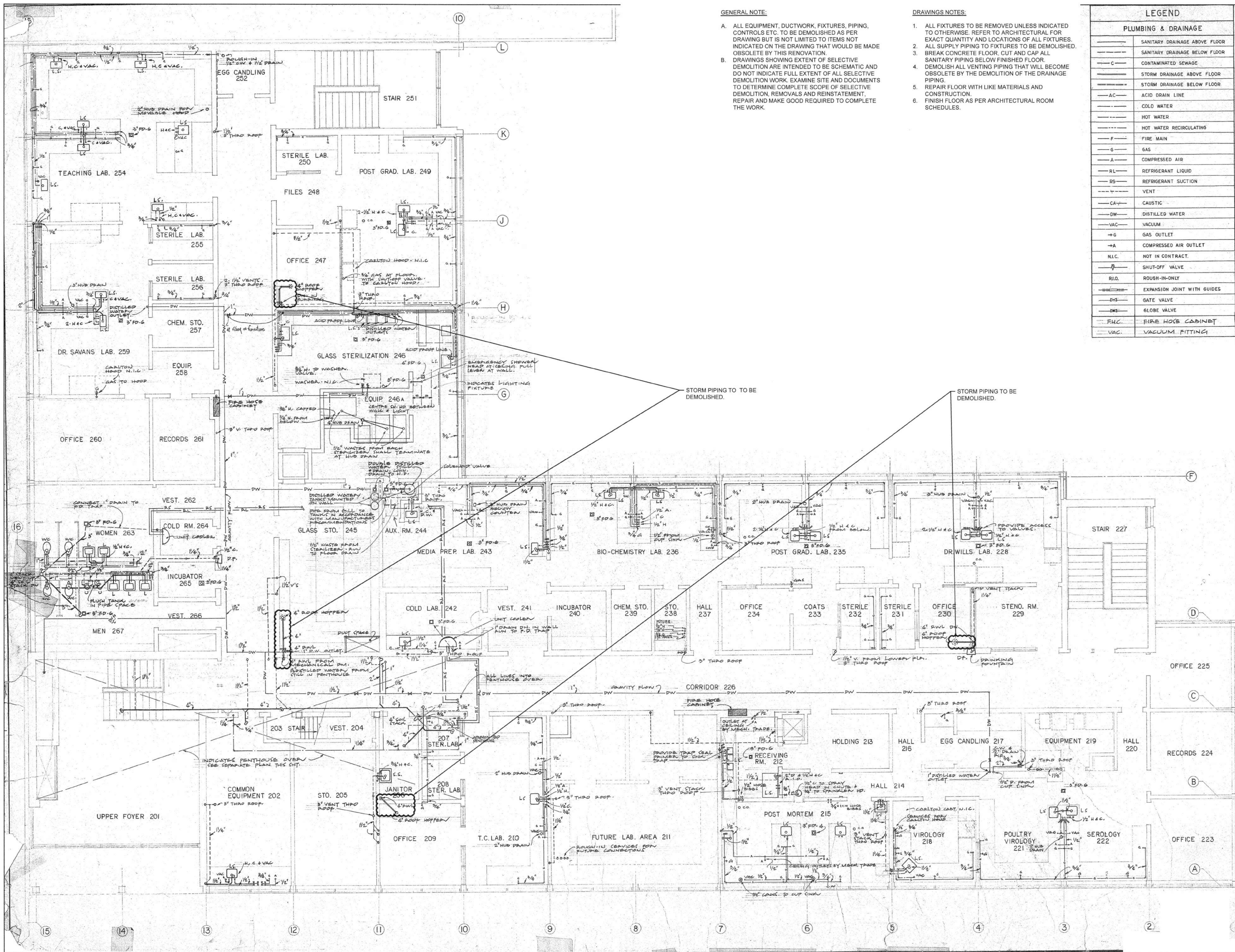
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KT

JLR #
27915

Cad File No. -----

DM10



GENERAL NOTE:

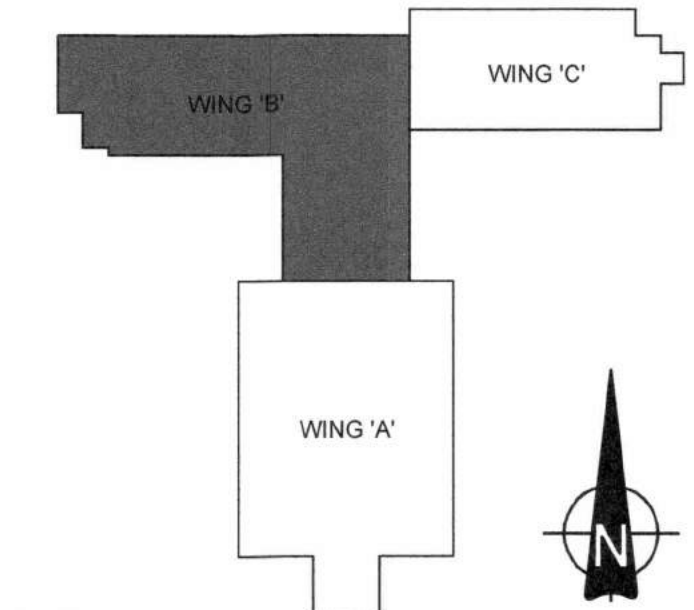
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6. FINISH FLOOR AS PER ARCHITECTURAL ROOM SCHEDULES.

LEGEND

PLUMBING & DRAINAGE	
---	SANITARY DRAINAGE ABOVE FLOOR
---	SANITARY DRAINAGE BELOW FLOOR
-C-	CONTAMINATED SEWAGE
---	STORM DRAINAGE ABOVE FLOOR
---	STORM DRAINAGE BELOW FLOOR
-AC-	ACID DRAIN LINE
---	COLD WATER
---	HOT WATER
---	HOT WATER RECIRCULATING
-F-	FIRE MAIN
-G-	GAS
-A-	COMPRESSED AIR
-RL-	REFRIGERANT LIQUID
-RS-	REFRIGERANT SUCTION
---	VENT
-CA-	CAUSTIC
-DW-	DISTILLED WATER
-VAC-	VACUUM
+G	GAS OUTLET
+A	COMPRESSED AIR OUTLET
NLC	NOT IN CONTRACT
-	SHUT-OFF VALVE
R/D	ROUGH-IN-ONLY
-EJ-	EXPANSION JOINT WITH GUIDES
-GV-	GATE VALVE
-GV-	GLOBE VALVE
-FHC-	FIRE HOSE CABINET
-VAC-	VACUUM FITTING



Key Plan

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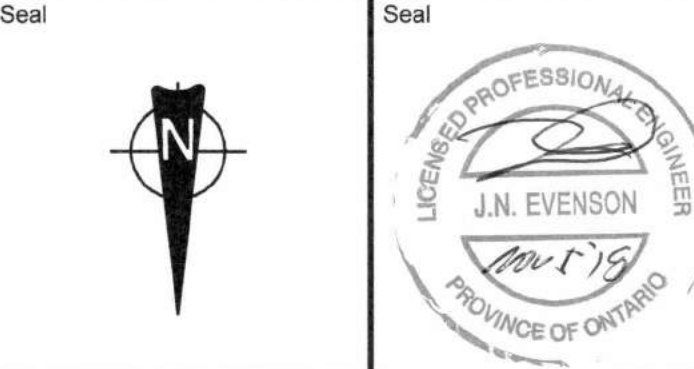
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NO.	ISSUED	BY	DATE
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Orientation



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Design, Engineering & Construction
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Guelph, Ontario. N1G 2W1

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Project
BUILDING #046 RENOVATIONS

Drawing Title
MECHANICAL DEMOLITION PLUMBING WING B LEVEL 2

Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

Scale
NTS

Date
NOV 2, 2018

Drawn by
HW

Checked by
NC

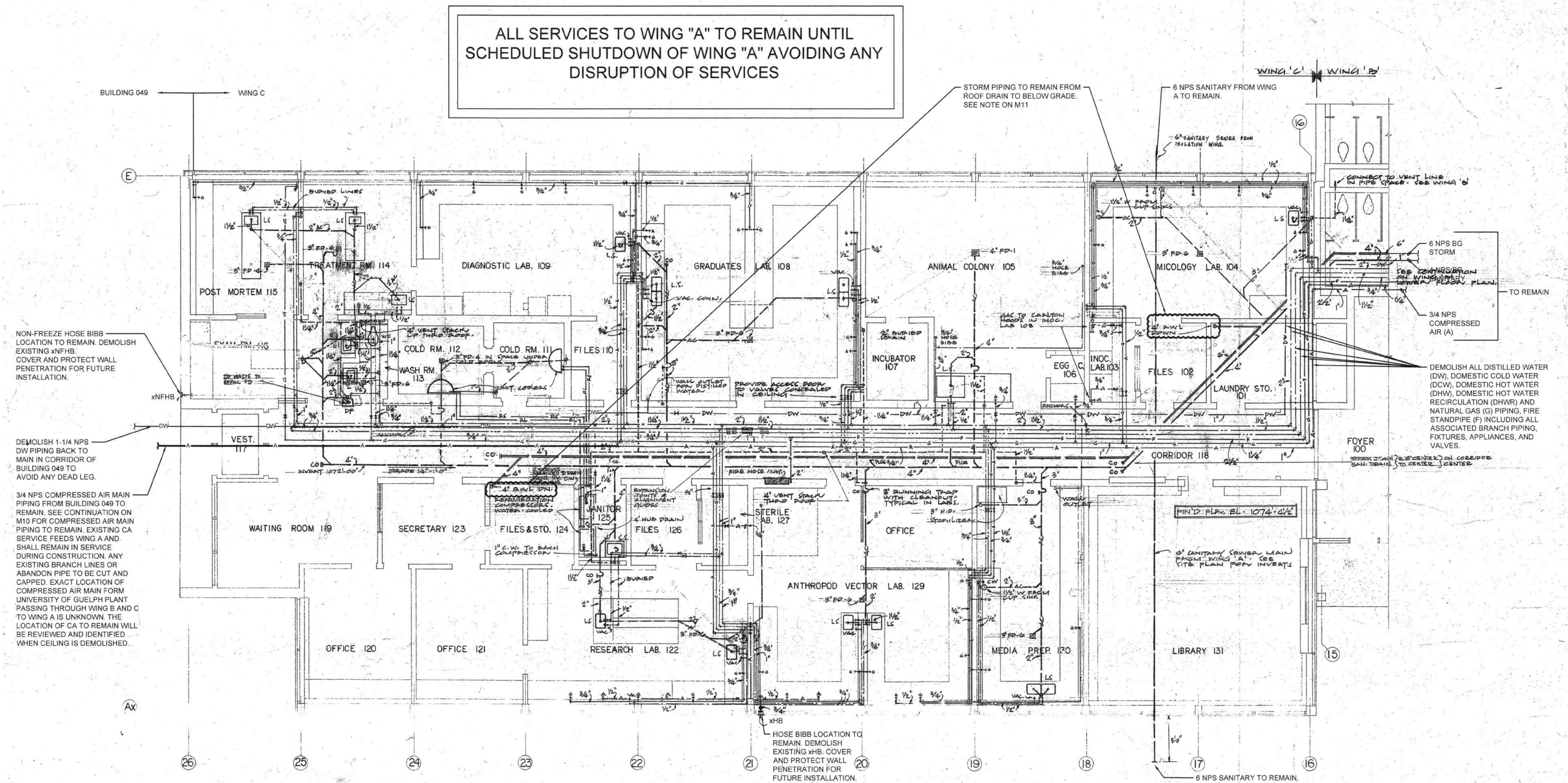
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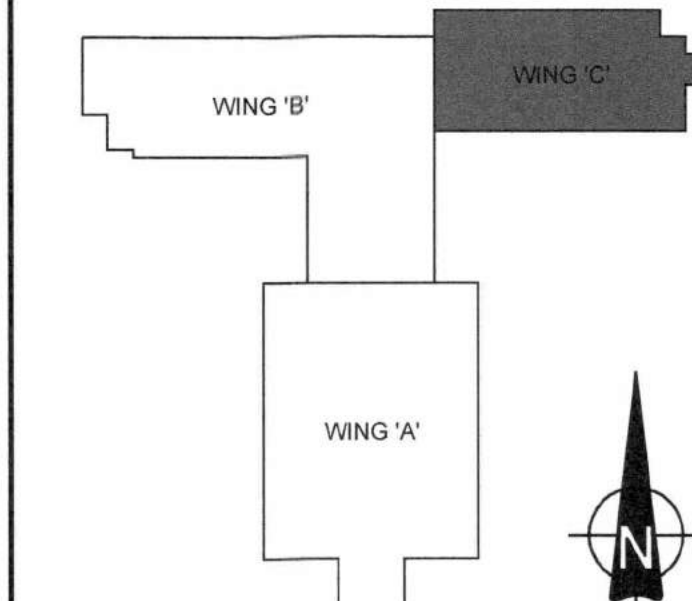
of 173



1
DM12

DEMOLITION PLUMBING WING C
SCALE: 1/75

- GENERAL NOTE:**
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Key Plan

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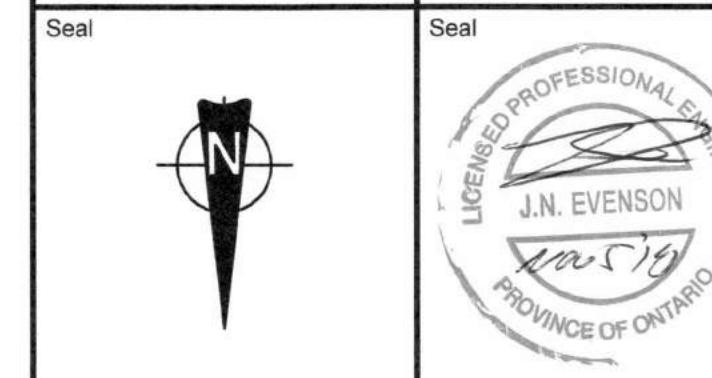
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Orientation	
Seal	Seal



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Project
BUILDING #046 RENOVATIONS

Drawing Title
MECHANICAL DEMOLITION PLUMBING WING C LEVEL 1

Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

Scale
NTS

Drawn by
HW

Checked By
NC

Approved By
KT

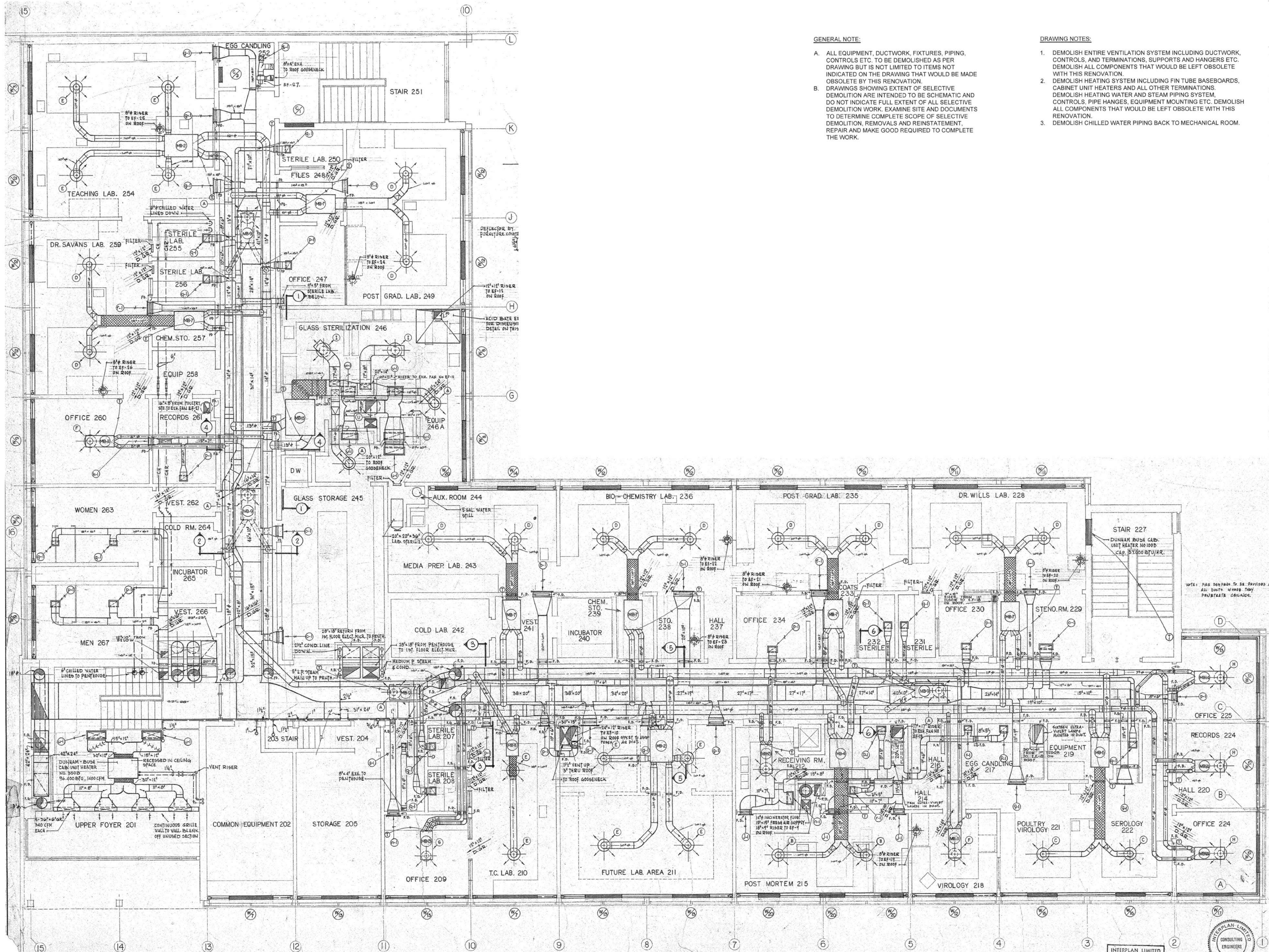
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JLR # 27915 of 173

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DM12



1 DEMOLITION VENTILATION B WING L2
SCALE: 1/8"

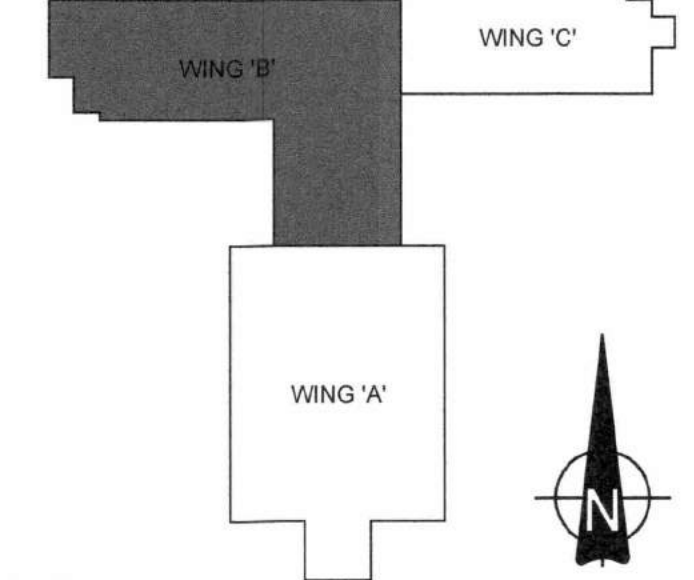
DM14

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- DEMOLISH CHILLED WATER PIPING BACK TO MECHANICAL ROOM.



Key Plan

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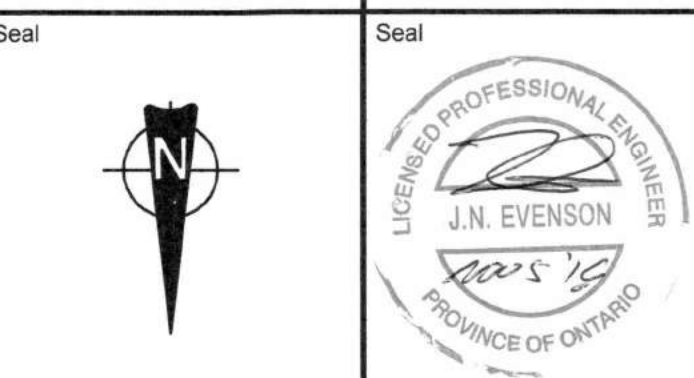
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Project
BUILDING #046
RENOVATIONS

Drawing Title

DEMOLITION HVAC WING B
LEVEL 2

Project No.
504034

Location
UNIVERSITY OF GUELPH
BUILDING #046

Scale

Date
NOV 2, 2018

Drawn by

Drawing No.

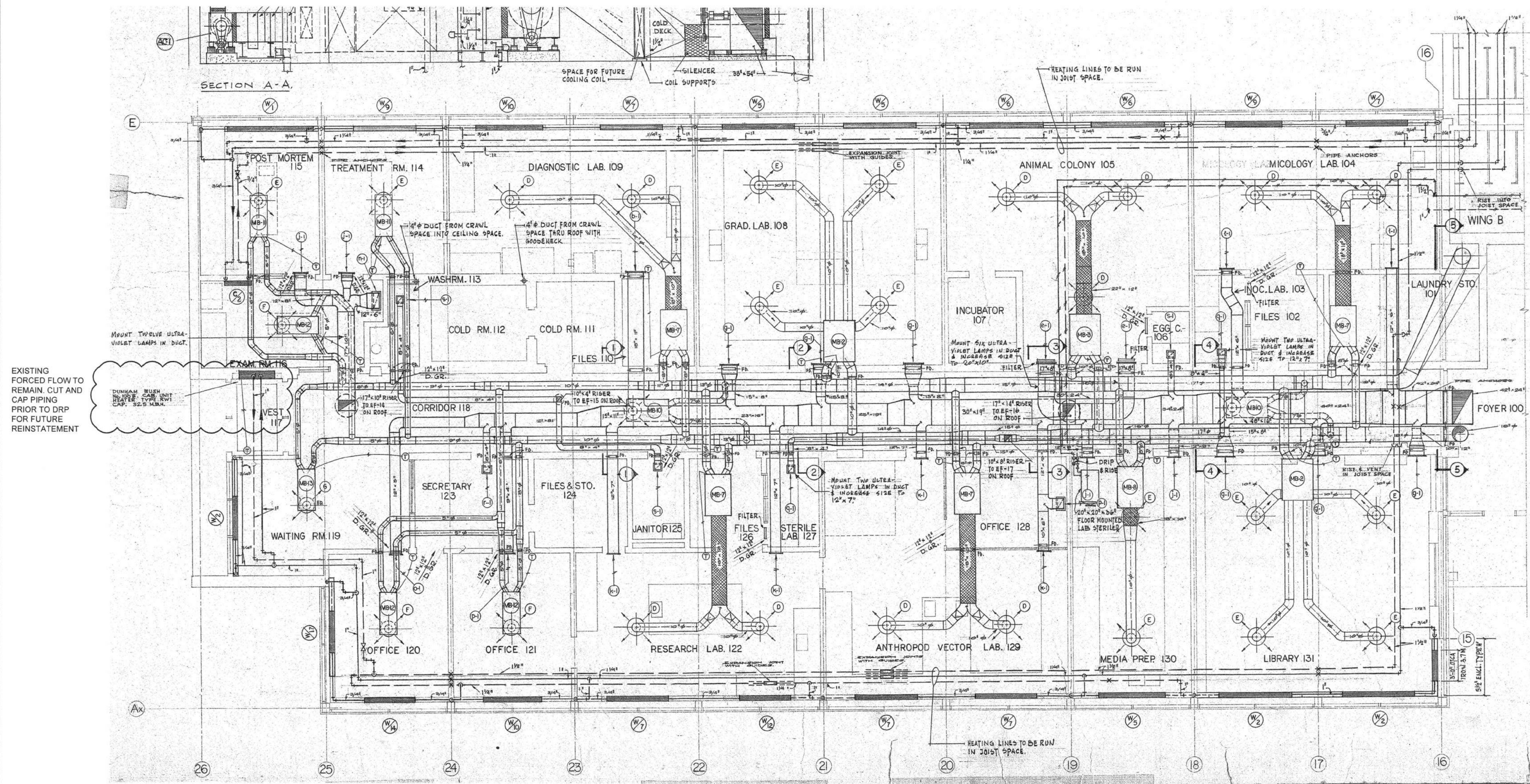
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DM14



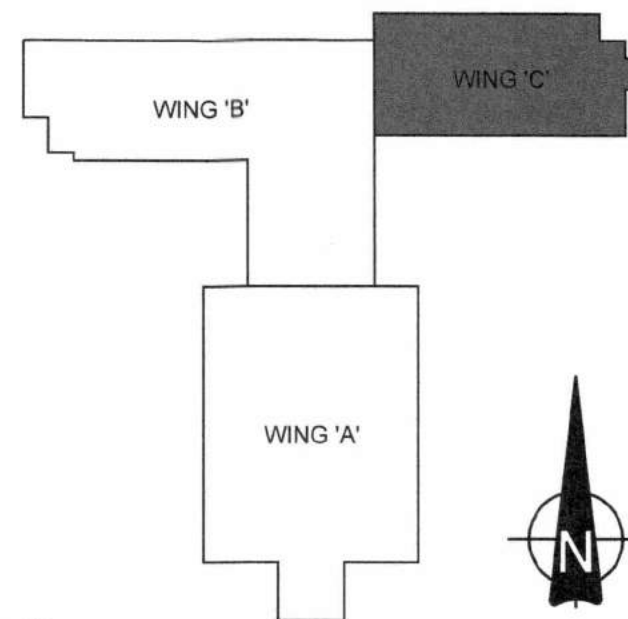
1 DEMOLITION VENTILATION C WING
DM15 SCALE: 1/75

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Seal



Seal



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Project
**BUILDING #046
RENOVATIONS**

Drawing Title

**DEMOLITION HVAC WING C
LEVEL 1**

Project No.
504034

Location
**UNIVERSITY OF GUELPH
BUILDING #046**

Scale Date
NOV 2, 2018

Drawn by Drawing No.

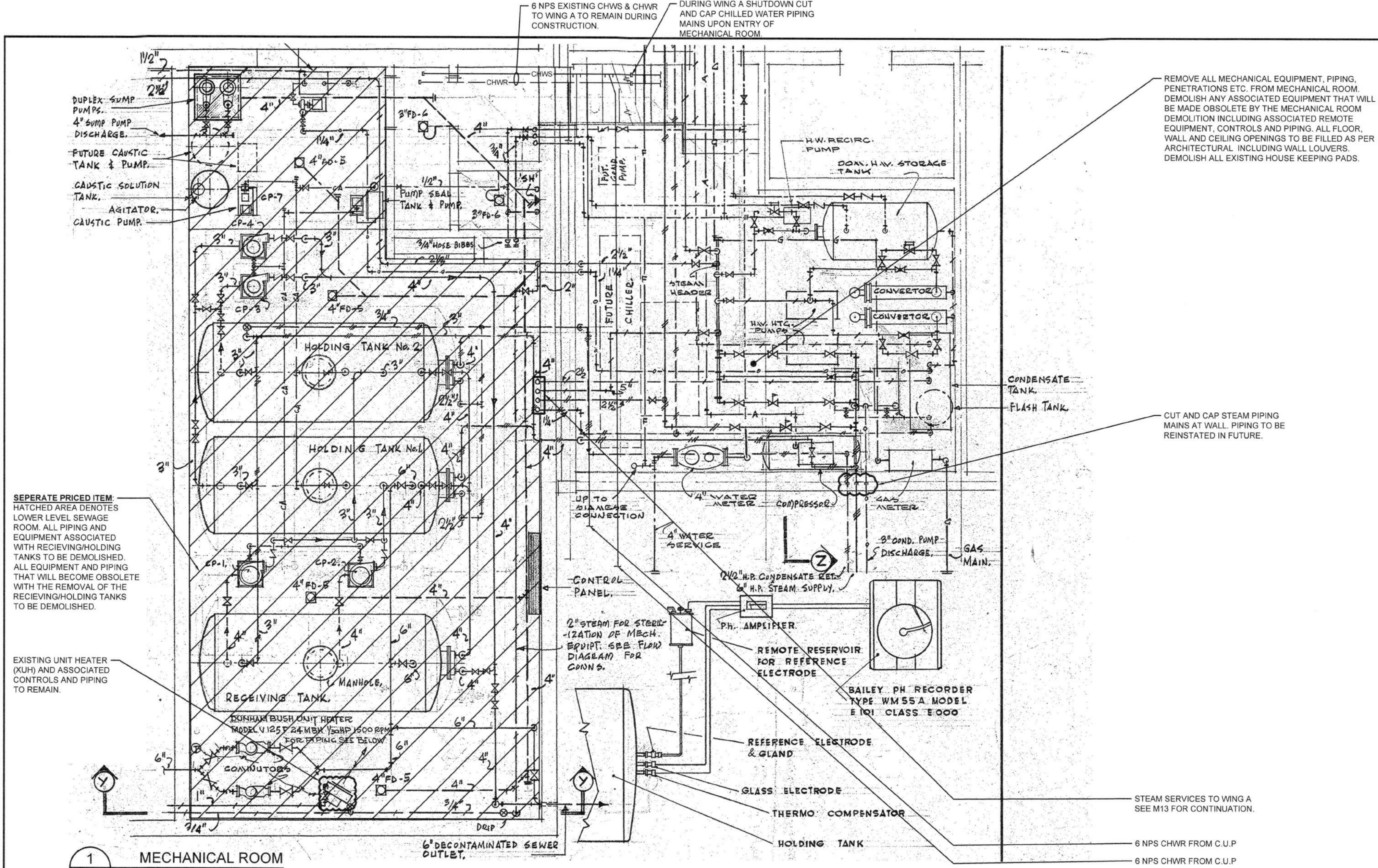
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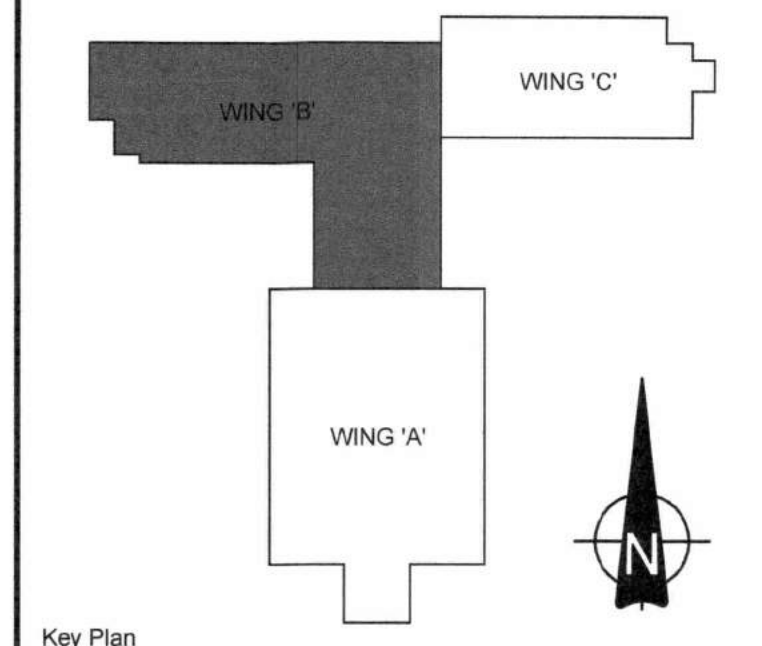
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DM15



ALL SERVICES TO WING "A" TO REMAIN CONNECTED UNTIL SCHEDULED SHUTDOWN OF WING "A".

- GENERAL NOTE:
- A. ALL EQUIPMENT, DUCTWORK, FIXTURES, PIPING, CONTROLS ETC. TO BE DEMOLISHED AS PER DRAWING BUT IS NOT LIMITED TO ITEMS NOT INDICATED ON THE DRAWING THAT WOULD BE MADE OBSOLETE BY THIS RENOVATION.
 - B. DRAWINGS SHOWING EXTENT OF SELECTIVE DEMOLITION ARE INTENDED TO BE SCHEMATIC AND DO NOT INDICATE FULL EXTENT OF ALL SELECTIVE DEMOLITION WORK. EXAMINE SITE AND DOCUMENTS TO DETERMINE COMPLETE SCOPE OF SELECTIVE DEMOLITION, REMOVALS AND REINSTATEMENT, REPAIR AND MAKE GOOD REQUIRED TO COMPLETE THE WORK.



DO NOT SCALE DRAWINGS:

Contractors must check and verify all site conditions. Notify the Owner's Representative in writing before proceeding with the work if discrepancies are evident between the drawings and the site condition. No extras to the contract will be allowed if discrepancies were evident prior to start of work.

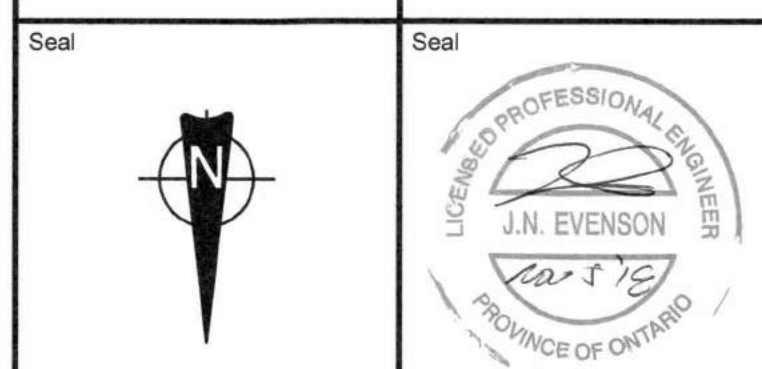
UNEXPECTED DISCOVERY OF ASBESTOS:

Where a friable material is discovered during construction, renovations and/or demolition, and it is suspected to contain asbestos, the Contractor must stop all work that may disturb the material. The Contractor shall advise the Owner of the discovery and await instructions from the owner.

A = Detail number
B = Drawing number where detailed

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NO	ISSUED	BY	DATE

Orientation



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Guelph, Ontario, N1G 2W1

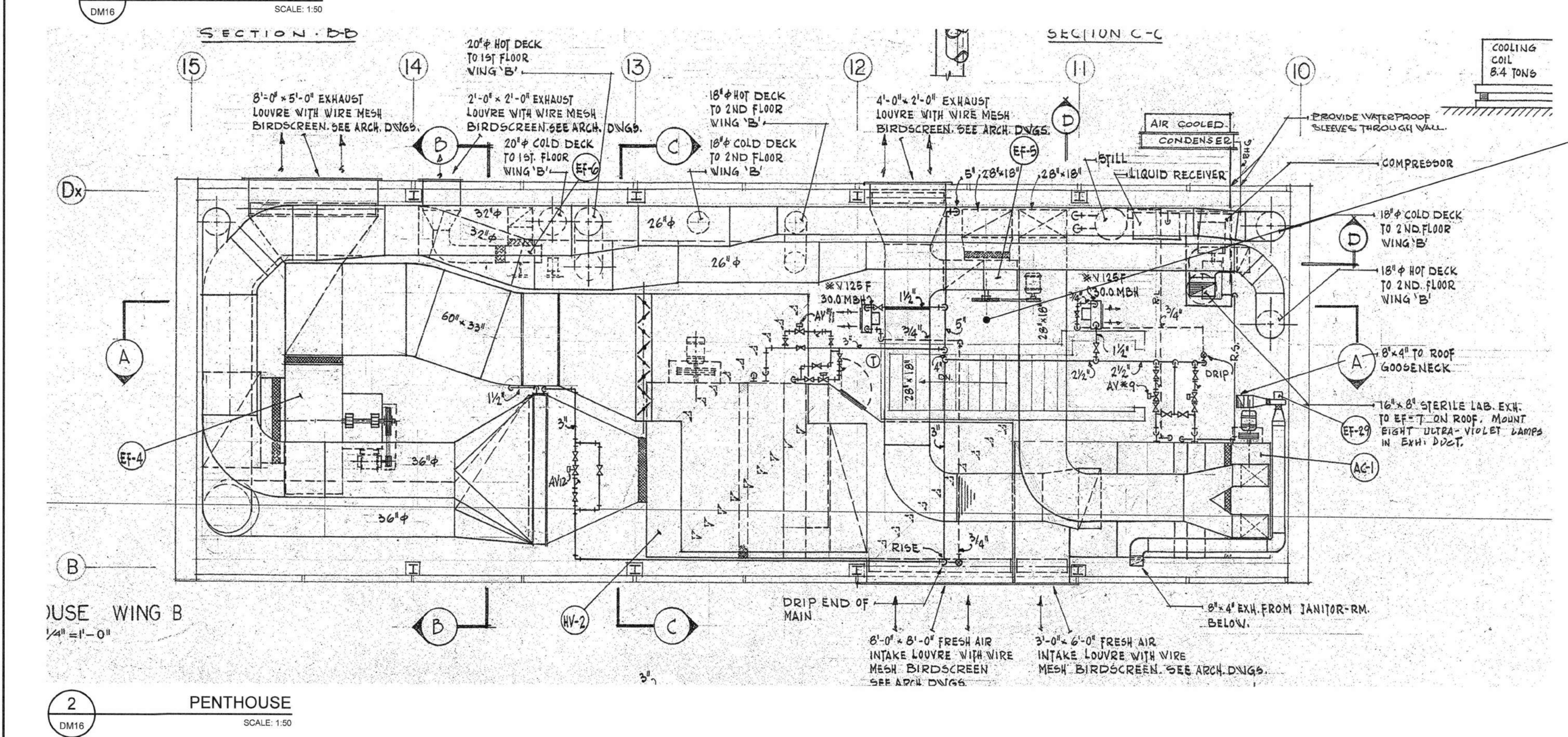
Consultant
www.jrichards.ca
J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS

Project
**BUILDING #046
RENOVATIONS**

Drawing Title
**DEMOLITION MECHANICAL
RM 120 AND PENTHOUSE**
302 No.
504034

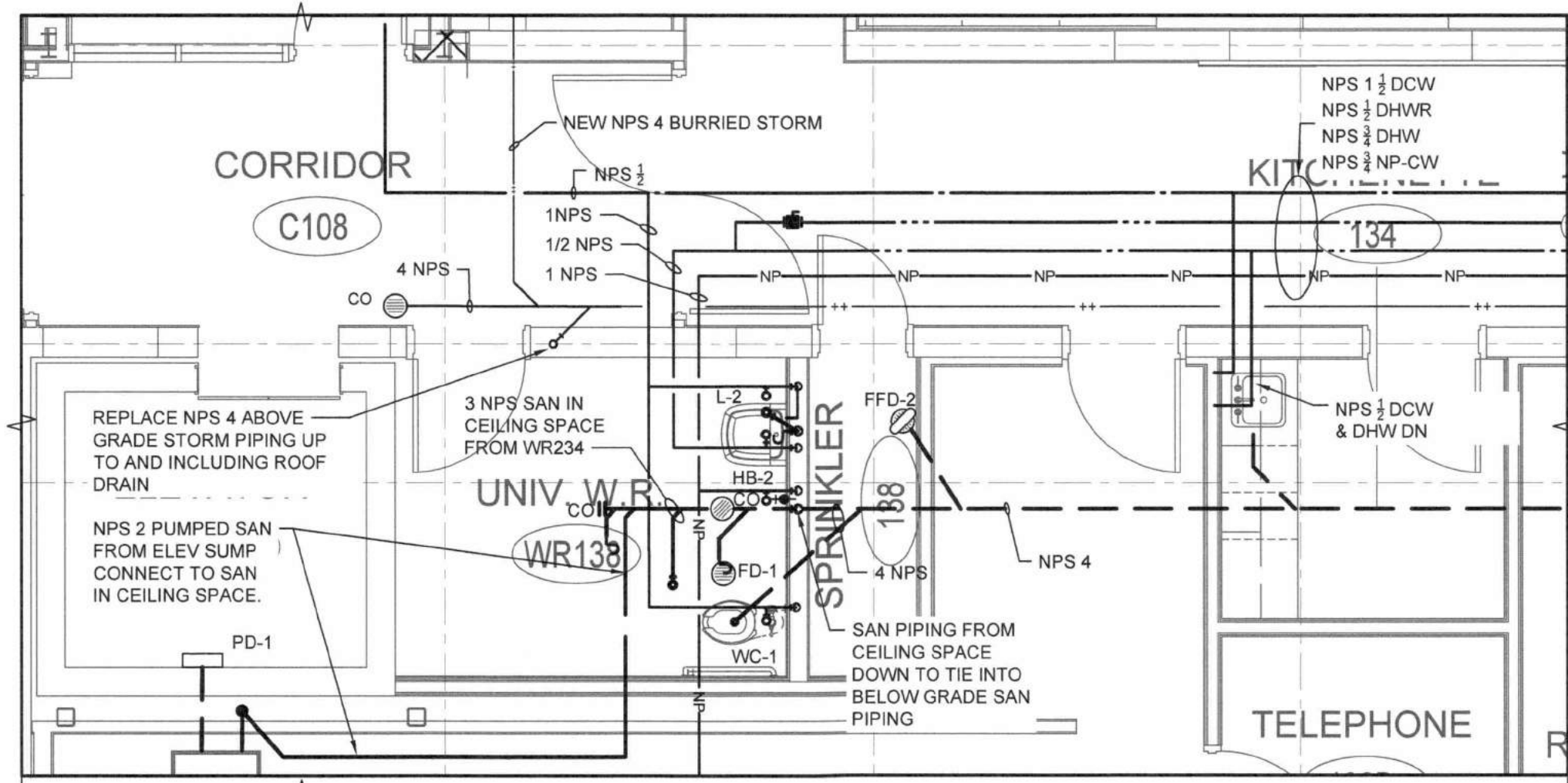
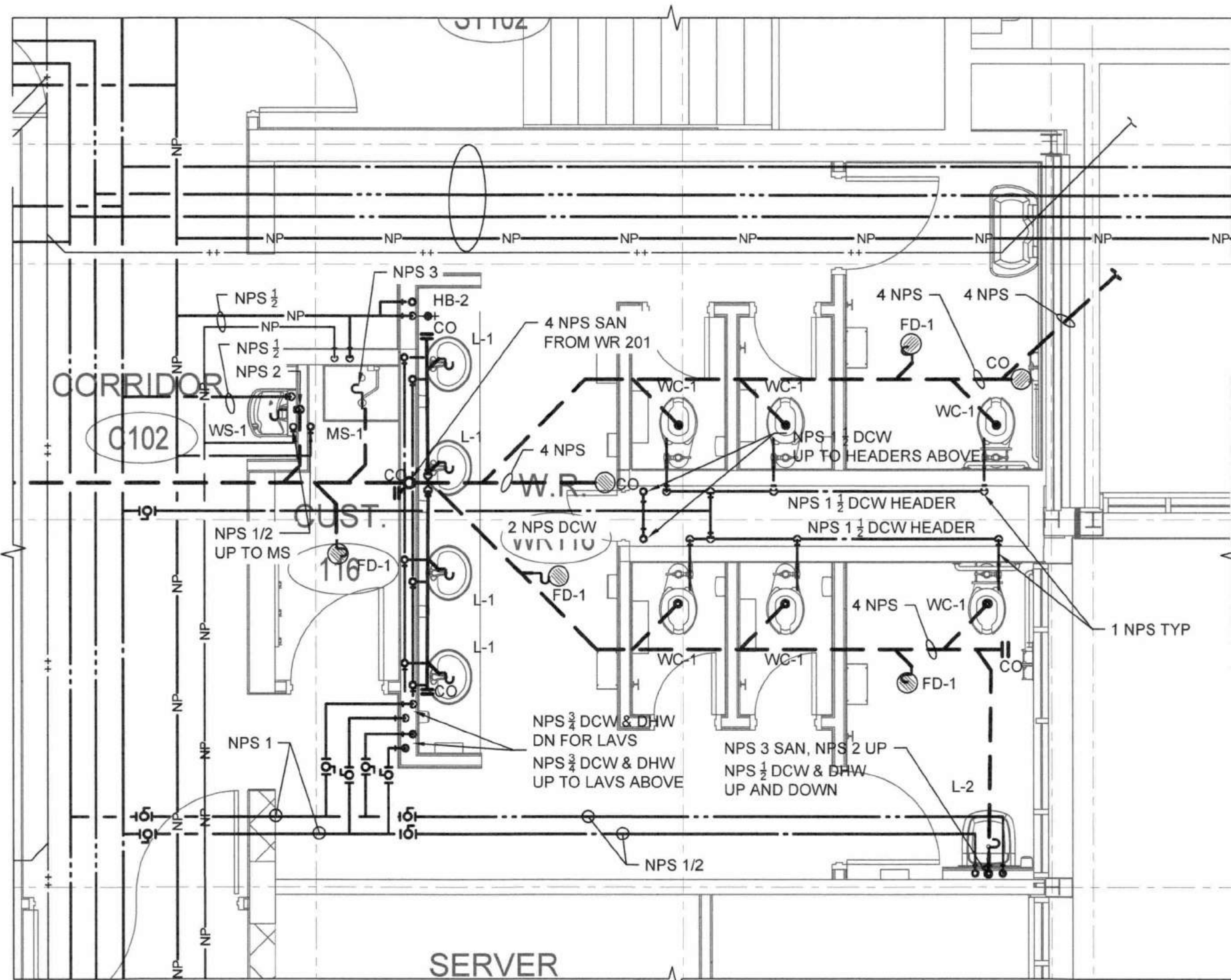
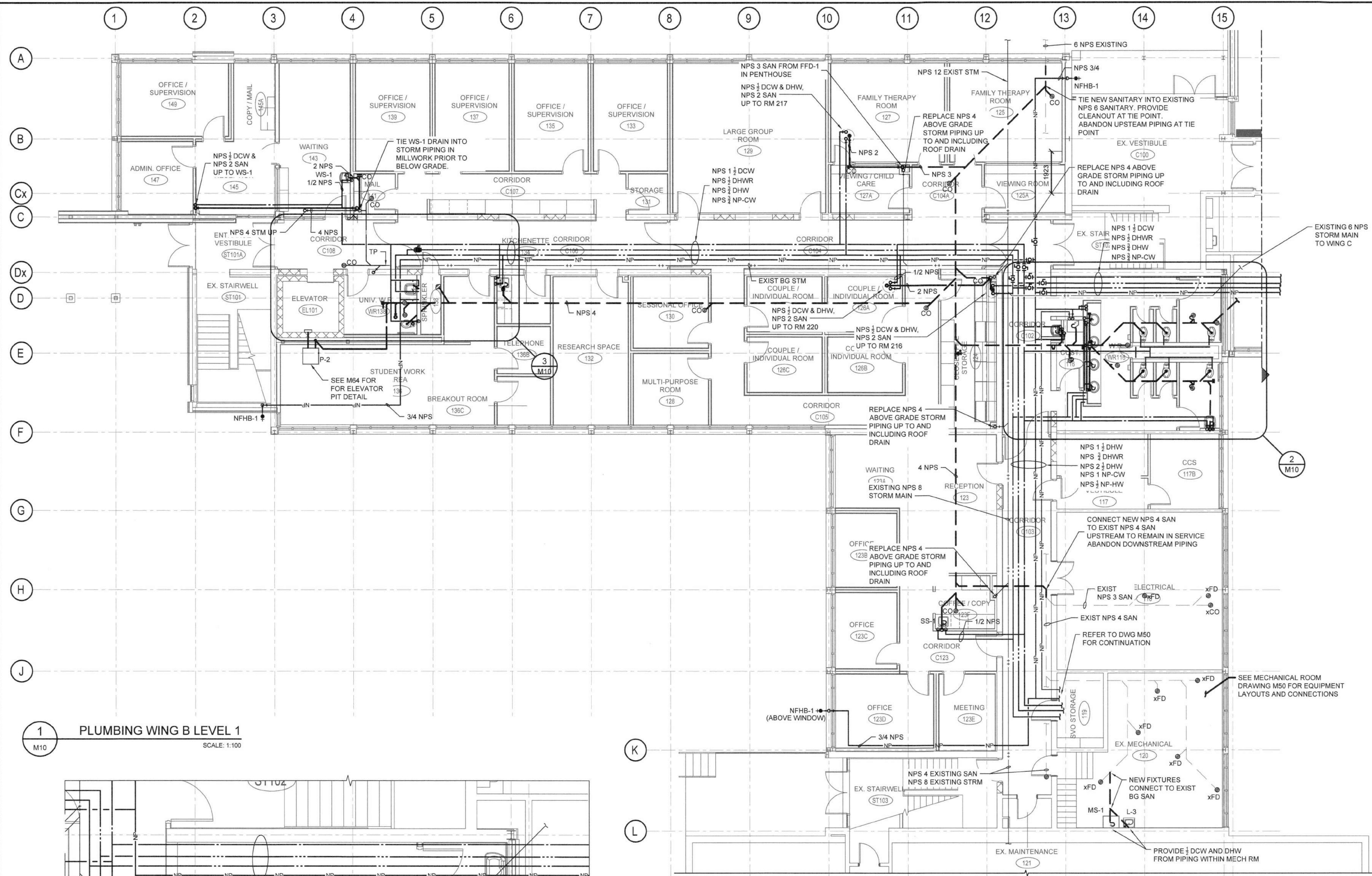
Location
**UNIVERSITY OF GUELPH
BUILDING #046**

Scale	Date NOV 2, 2018
Drawn by	Drawing No.
Checked By	
Approved By	
JLR # 27915	of 173
Cad File No. ----	



- REMOVE ALL MECHANICAL EQUIPMENT, PIPING, ROOF PENETRATIONS ETC. FROM PENTHOUSE. DEMOLISH ANY ASSOCIATED EQUIPMENT THAT WILL BE MADE OBSOLETE BY THE PENTHOUSE DEMOLITION INCLUDING ASSOCIATED REMOTE EQUIPMENT, CONTROLS AND PIPING. ALL FLOOR, WALL AND ROOF OPENINGS TO BE FILLED AS PER ARCHITECTURAL INCLUDING WALL LOUVERS. DEMOLISH ALL EXISTING HOUSE KEEPING PADS.

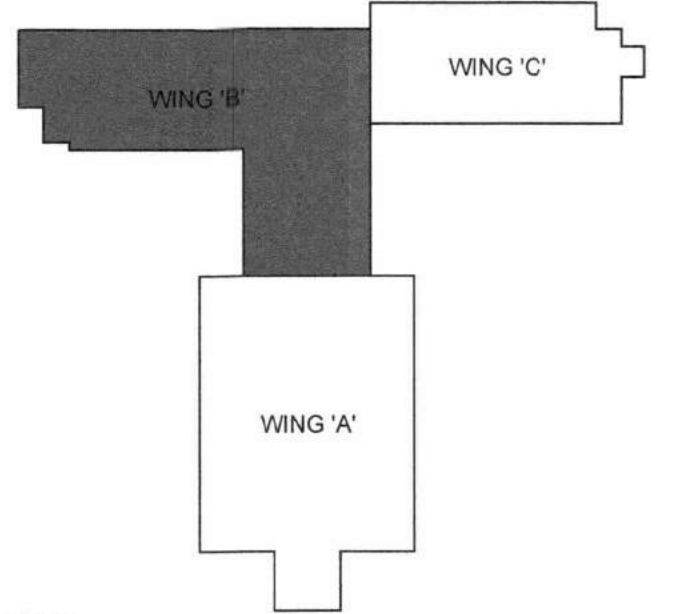
DM16



PLUMBING	
---	DCW
---	DHW
---	DHWR
---	NP
---	NON-POTABLE
---	SANITARY ABOVE GRADE/FLOOR
---	SANITARY BELOW GRADE/FLOOR
---	STORM ABOVE GRADE/FLOOR
---	STORM BELOW GRADE/FLOOR
---	SANITARY INDIRECT DRAIN
---	SANITARY VENT
---	TSP
---	TRAP SEAL PRIMER
---	CLEAN OUT IN CEILING SPACE
---	CLEAN OUT FINISHED FLOOR
---	FD
---	FLOOR DRAIN
---	FFD
---	FUNNEL FLOOR DRAIN
---	HD
---	HUB DRAIN
---	RD
---	ROOF DRAIN
---	HB
---	HOSE BIBB
---	METER (GENERIC)
---	DOUBLE CHECK BACKFLOW PREVENTOR
---	REDUCED PRESSURE BACKFLOW PREVENTOR

GENERAL NOTES:

- ALL EXISTING STORM PIPING ABOVE GRADE TO AND ROOF DRAINS TO BE REPLACED. STORM PIPING TO BELOW GRADE TO BE PROVIDED WITH A CLEANOUT. PROVIDE ACCESS DOORS WHERE REQUIRED.
- PROVIDE ALL FIRE RATED WALL PENETRATIONS WITH APPROPRIATE FIRE CAULK, OR COLLAR INSTALLATION TO MAINTAIN FIRE SEPARATIONS.
- PROVIDE ISOLATION FOR ALL MAIN TAKEOFFS ALL BRANCH PIPING AND AT EACH FIXTURE FOR MAINTENANCE PURPOSES IN AN ACCESSIBLE LOCATION. PROVIDE ACCESS DOORS, COORDINATE WITH ARCHITECTURAL.
- PROVIDE INSULATION ON ALL PIPING AS PER SPECIFICATIONS. STORM PIPING TO BE INSULATED 3000mm FROM ROOF DRAIN.
- PROVIDE TRAP SEAL PRIMER FOR ALL FLOOR DRAIN LOCATIONS.
- PROVIDE WATER HAMMER ARRESTORS AT ALL WASHROOM FEEDS AND AS REQUIRED.
- VENT PIPING NOT SHOWN. PROVIDE SANITARY VENT PIPING AS REQUIRED TO MEET O.B.C. AND TERMINATE ABOVE ROOF. LOCATE MINIMUM OF 3000 mm FROM MECHANICAL O/A INTAKES.
- TRAP SEAL PRIMERS NOT SHOWN. PROVIDE FOR ALL FLOOR DRAINS.
- UNLESS OTHERWISE INDICATED SLOPE ALL 4 NPS SANITARY DRAINAGE PIPING 1% MINIMUM AND SLOPE ALL 3 NPS SANITARY DRAINAGE PIPING 2% MINIMUM.
- COORDINATE WITH STRUCTURAL TO PROVIDE PIPE SLEEVE FOR ALL FLOOR PENETRATIONS.
- COORDINATE WITH ARCHITECTURAL TO PROVIDE FIRE STOPPING FOR ALL FLOOR PENETRATIONS.
- PROVIDE ALL REQUIRED ACCESS DOORS FOR SERVICE AND MAINTENANCE.



Key Plan

DO NOT SCALE DRAWINGS:

Contractors must check and verify all site conditions. Notify the Owner's Representative in writing before proceeding with the work if discrepancies are evident between the drawings and the site condition. No extras to the contract will be allowed if discrepancies were evident prior to start of work.

UNEXPECTED DISCOVERY OF ASBESTOS:

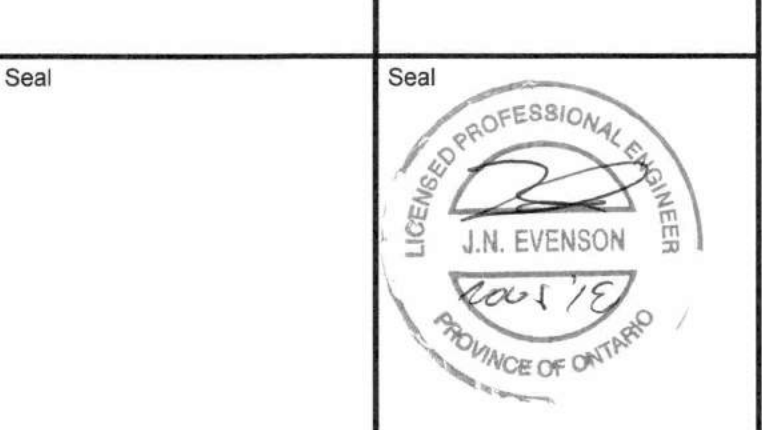
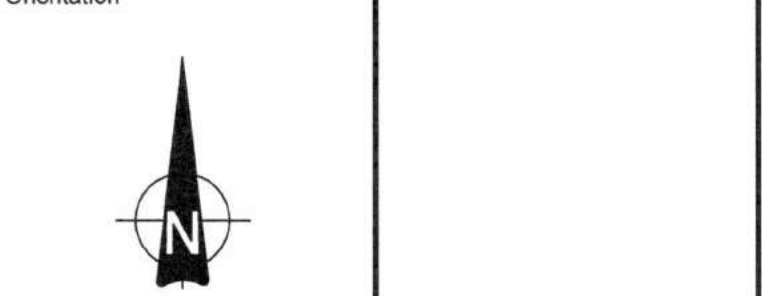
Where a friable material is discovered during construction, renovations and/or demolition, and it is suspected to contain asbestos, the Contractor must stop all work that may disturb the material. The Contractor shall advise the Owner of the discovery and await instructions from the owner.

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Project
BUILDING #046 RENOVATIONS

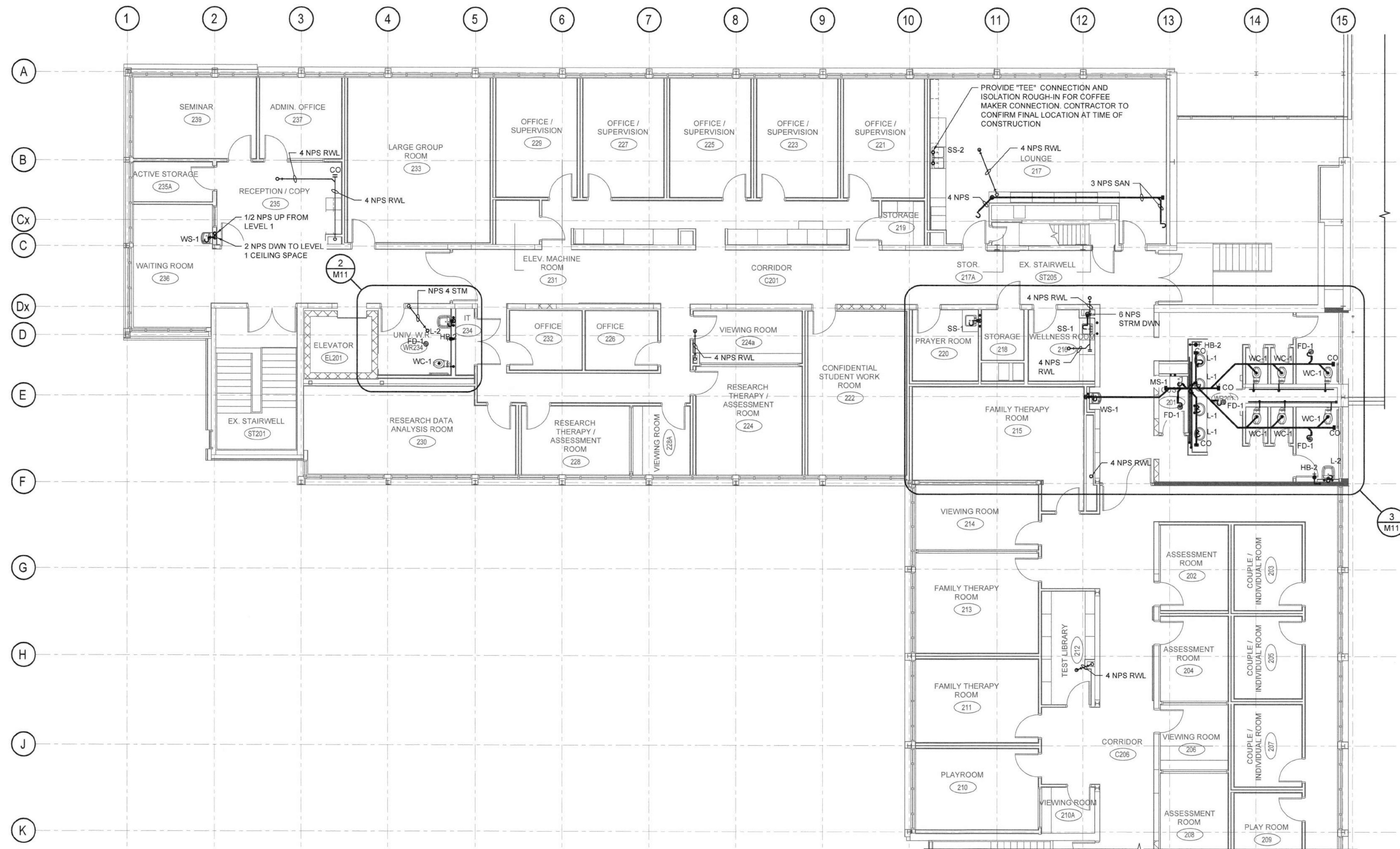
Drawing Title
PLUMBING WING B LEVEL 1

Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

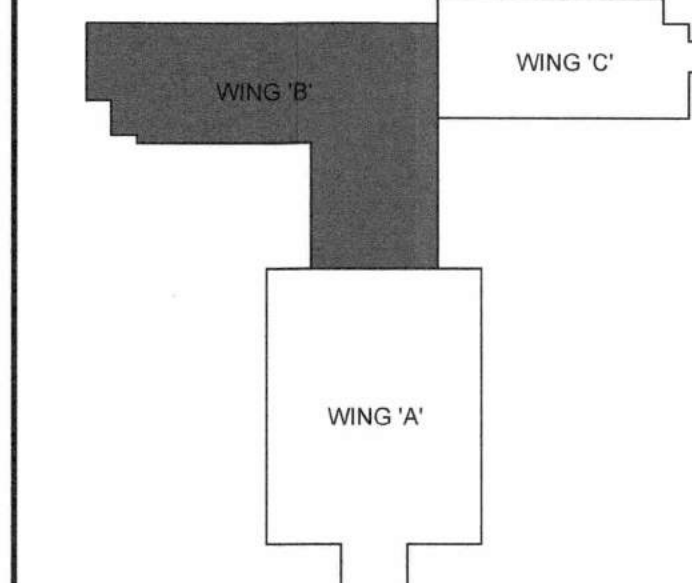
Scale AS NOTED	Date NOV 2, 2018
Drawn by HW	Drawing No.
Checked By NC	M10
Approved By KDT	
JLR # 27915	

Cad File No. ----- of 173



GENERAL NOTES:

- ALL EXISTING STORM PIPING ABOVE GRADE TO AND ROOF DRAINS TO BE REPLACED. STORM PIPING TO BELOW GRADE TO BE PROVIDED WITH A CLEANOUT. PROVIDE ACCESS DOORS WHERE REQUIRED.
- PROVIDE ALL FIRE RATED WALL PENETRATIONS WITH APPROPRIATE FIRE CAULK, OR COLLAR INSTALLATION TO MAINTAIN FIRE SEPARATIONS.
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- PROVIDE INSULATION ON ALL PIPING AS PER SPECIFICATIONS, STORM PIPING TO BE INSULATED 3000mm FROM ROOF DRAIN. MINIMUM OF 3000 mm FROM MECHANICAL O/A INTAKES.
- PROVIDE TRAP SEAL PRIMER FOR ALL FLOOR DRAIN LOCATIONS.
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Key Plan

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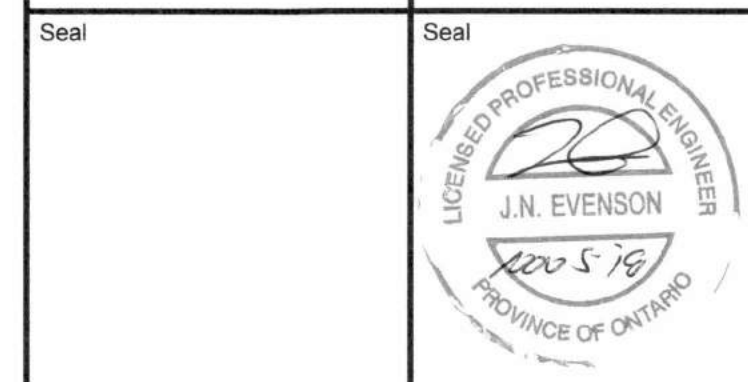
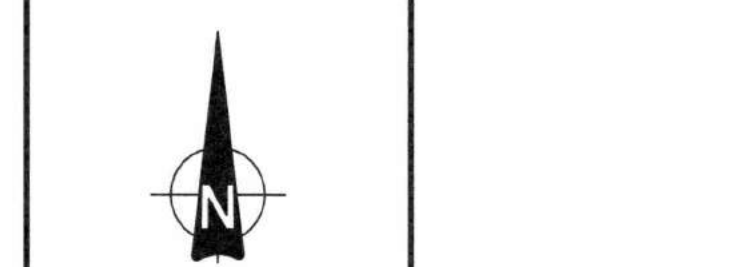
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Project
BUILDING #046 RENOVATIONS

Drawing Title
PLUMBING WING B LEVEL 2

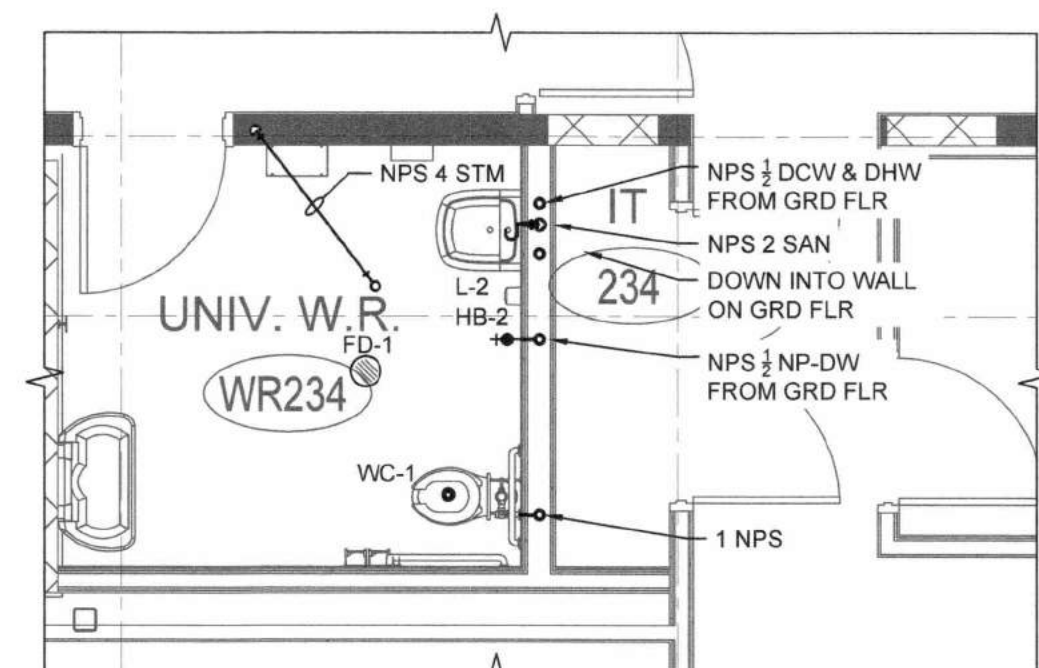
Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

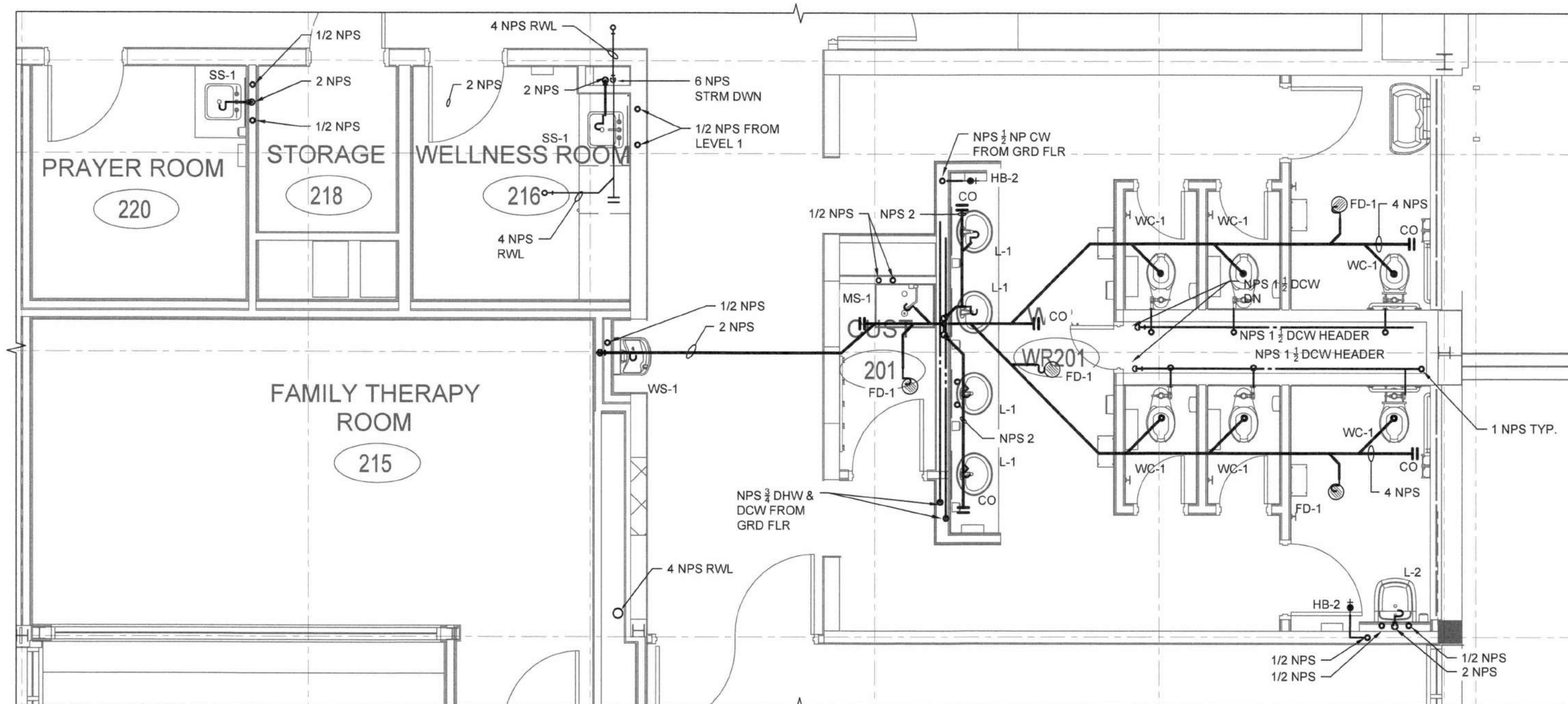
Scale AS NOTED	Date NOV 2, 2018
Drawn by HW	Drawing No. M11
Checked By NC	
Approved By KDT	
JLR # 27915	of 173

Cad File No. ----

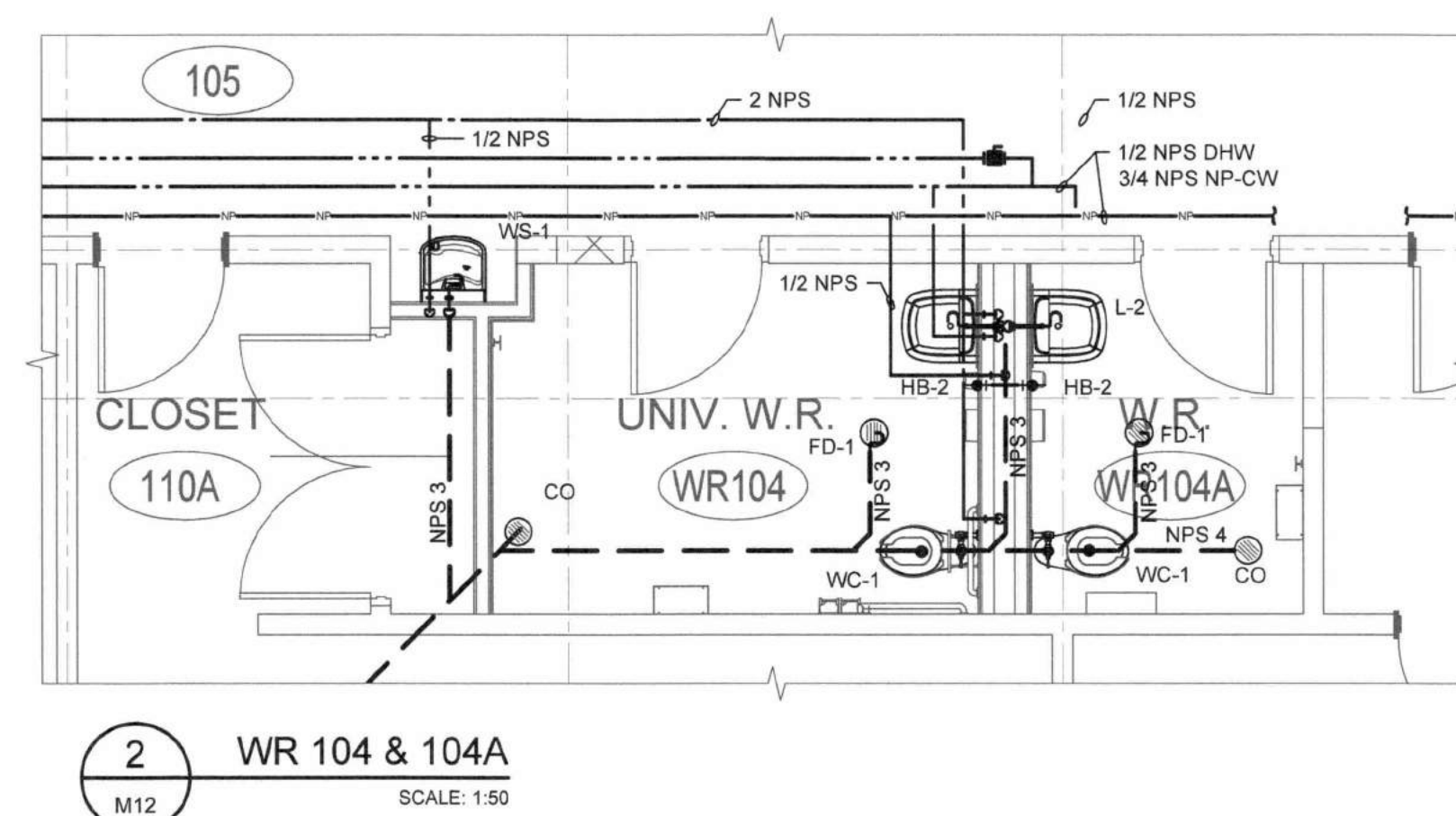
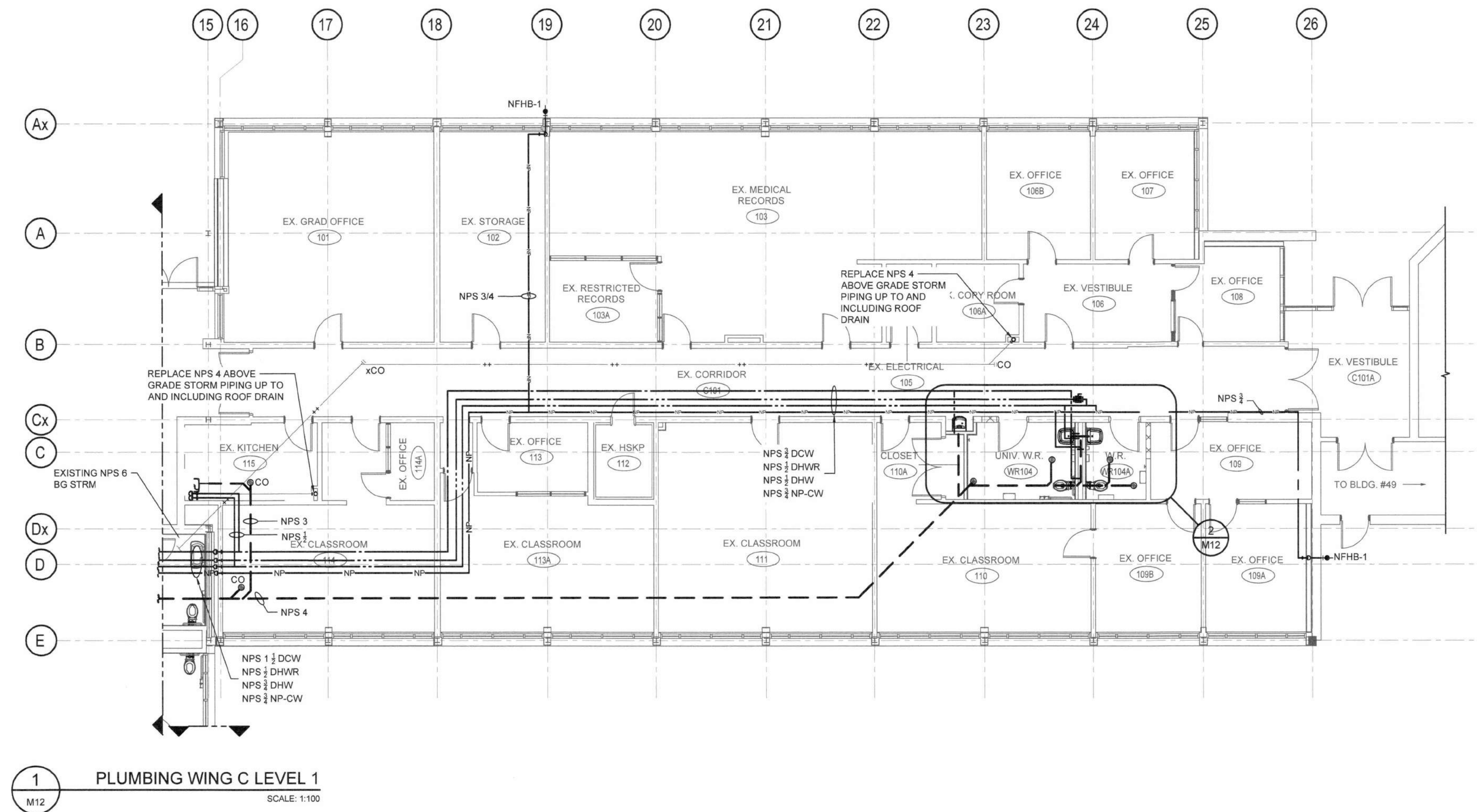
1 PLUMBING WING B LEVEL 2
SCALE: 1:100



2 PLUMBING UNIV. WR 234
SCALE: 1:50

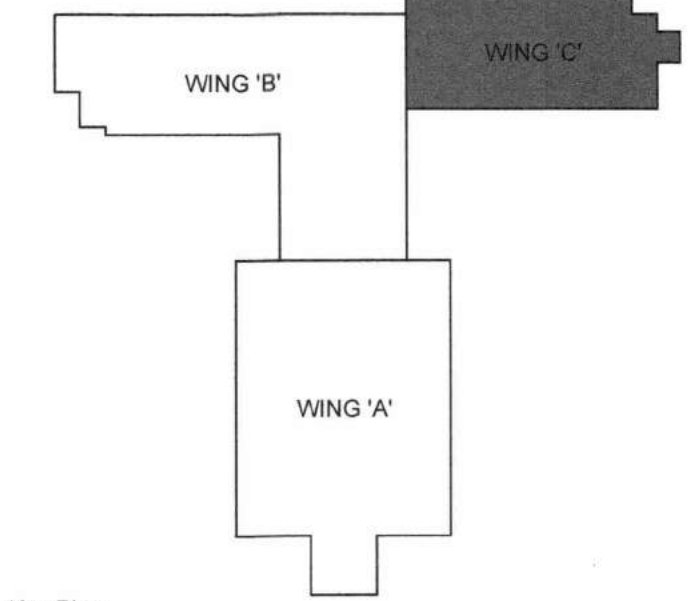


3 PLUMBING ENLARGED PARTIAL PLAN
SCALE: 1:50



GENERAL NOTES:

1. ALL EXISTING STORM PIPING ABOVE GRADE TO AND ROOF DRAINS TO BE REPLACED. STORM PIPING TO BELOW GRADE TO BE PROVIDED WITH A CLEANOUT. PROVIDE ACCESS DOORS WHERE REQUIRED.
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Key Plan

DO NOT SCALE DRAWINGS:

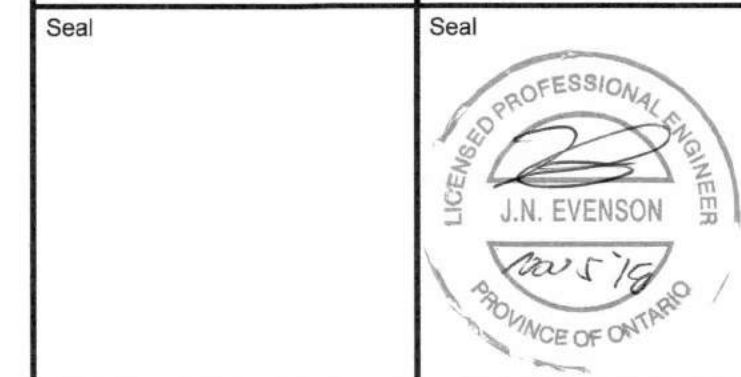
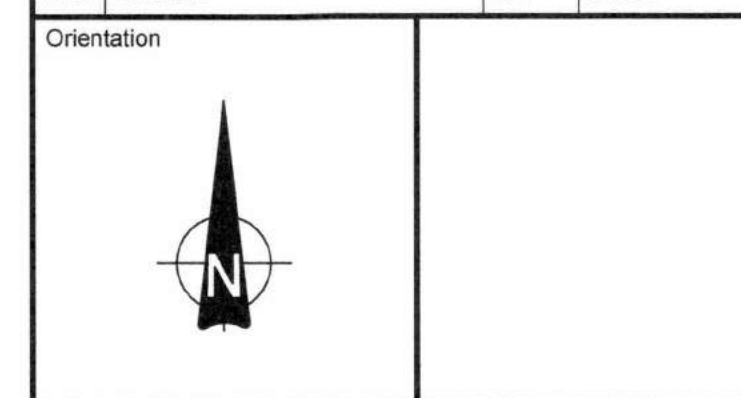
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Physical Resources
Guelph, Ontario. N1G 2W1

Consultant
J.L. Richards
ENGINEERS · ARCHITECTS · PLANNERS

Project
**BUILDING #046
RENOVATIONS**

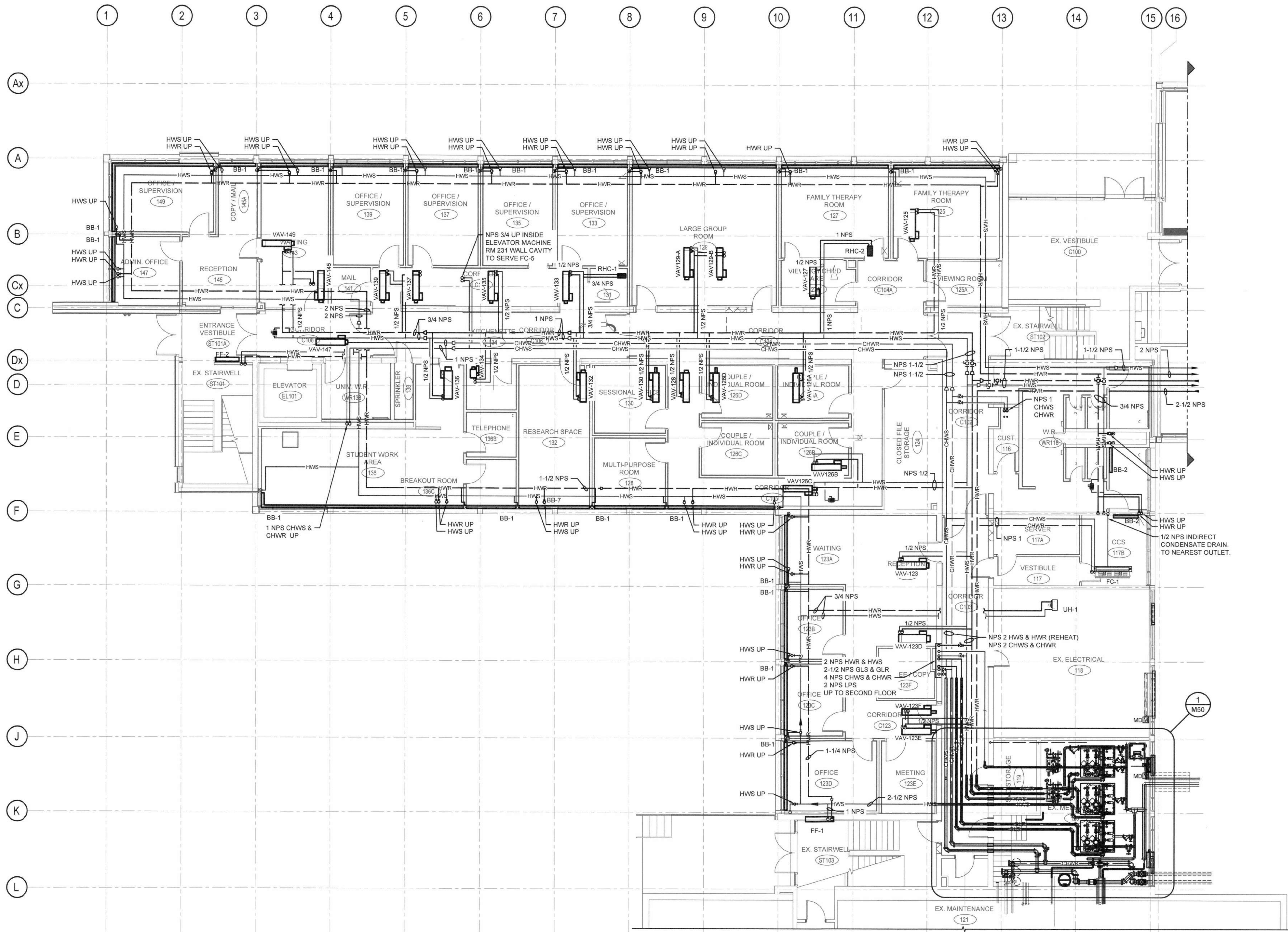
Drawing Title
PLUMBING WING C LEVEL 1

Project No.
504034

Location
**UNIVERSITY OF GUELPH
BUILDING #046**

Scale AS NOTED	Date NOV 2, 2018
Drawn by HW	Drawing No. M12
Checked By NC	
Approved By KDT	
JLR # 27915	of 173

Cad File No. ----

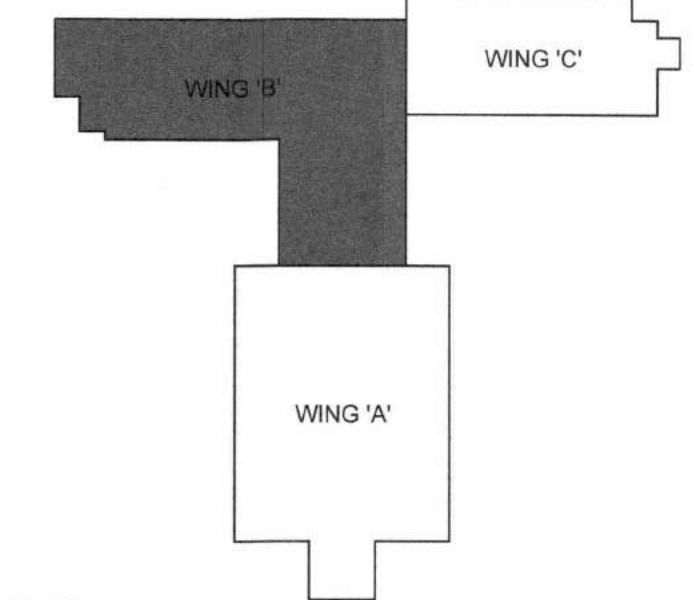


HEATING/COOLING

--HWS--	HEATING WATER SUPPLY
--HWR--	HEATING WATER RETURN
--TW--	TEMPERED WATER
--GLS--	GLYCOL SUPPLY
--GLR--	GLYCOL RETURN
--CHWS--	CHILLED WATER SUPPLY
--CHWR--	CHILLED WATER RETURN
--CWS--	CONDENSER WATER SUPPLY
--CWR--	CONDENSER WATER RETURN
--RL--	REFRIGERANT LIQUID
--RS--	REFRIGERANT SUCTION
--COND--	CONDENSATE
--HGB--	REFRIGERANT HOT GAS BYPASS
--HPS--	HIGH PRESSURE STEAM
--LPS--	LOW PRESSURE STEAM
--HPCD--	HIGH PRESSURE CONDENSATE
--LPCD--	LOW PRESSURE CONDENSATE
--ST--	STEAM TRAP

PIPING & VALVES

--PB--	PIPE BREAK
--FA--	FLOW ARROW
--TDD--	PIPE TEE DOWN
--TUU--	PIPE TEE UP
--ET--	PIPE ELBOW
--PA--	PIPE ANCHOR
--PC--	PIPE CAP
--PR--	PIPE RISE
--PD--	PIPE DROP
--RD--	PIPE REDUCER
--PU--	PIPE UNION
--FPC--	FLEXIBLE PIPE CONNECTION
--BV--	BALL VALVE
--BVV--	BUTTERFLY VALVE
--GV--	GATE VALVE
--GVV--	GLOBE VALVE
--PV--	PLUG VALVE
--CV--	CHECK VALVE
--TDV--	TRIPLE DUTY VALVE
--PRV--	PRESSURE REDUCING VALVE
--PRV--	PRESSURE RELIEF VALVE
--TWV--	THREE WAY VALVE
--CBV--	CIRCUIT BALANCING VALVE
--STR--	STRAINER
--VB--	VACUUM BREAKER
--AAV--	AUTOMATIC AIR VENT
--T--	THERMOMETER
--PG--	PRESSURE GAUGE
--P--	PUMP



Key Plan

DO NOT SCALE DRAWINGS:

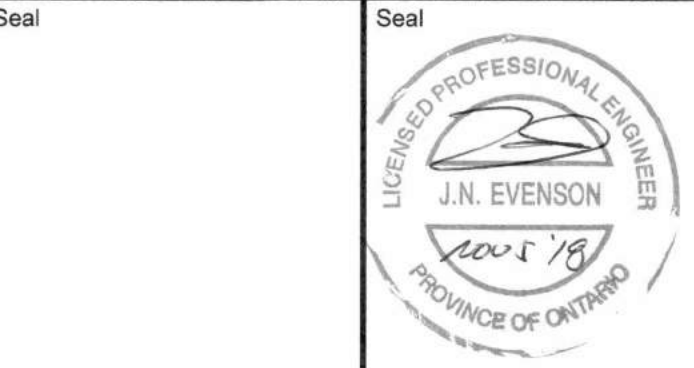
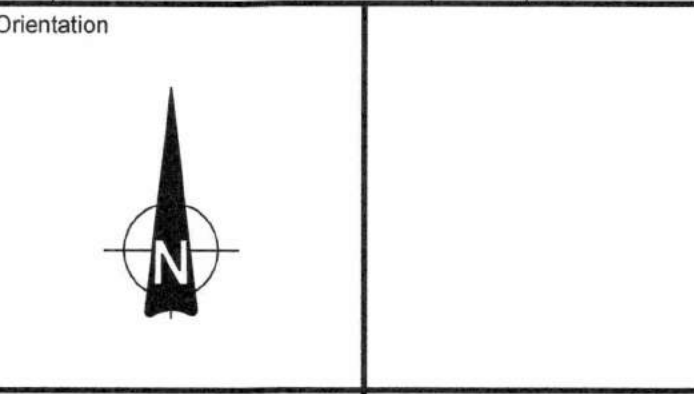
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Consultant
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Project
**BUILDING #046
RENOVATIONS**

Drawing Title
HEATING WING B LEVEL 1

Project No.
504034

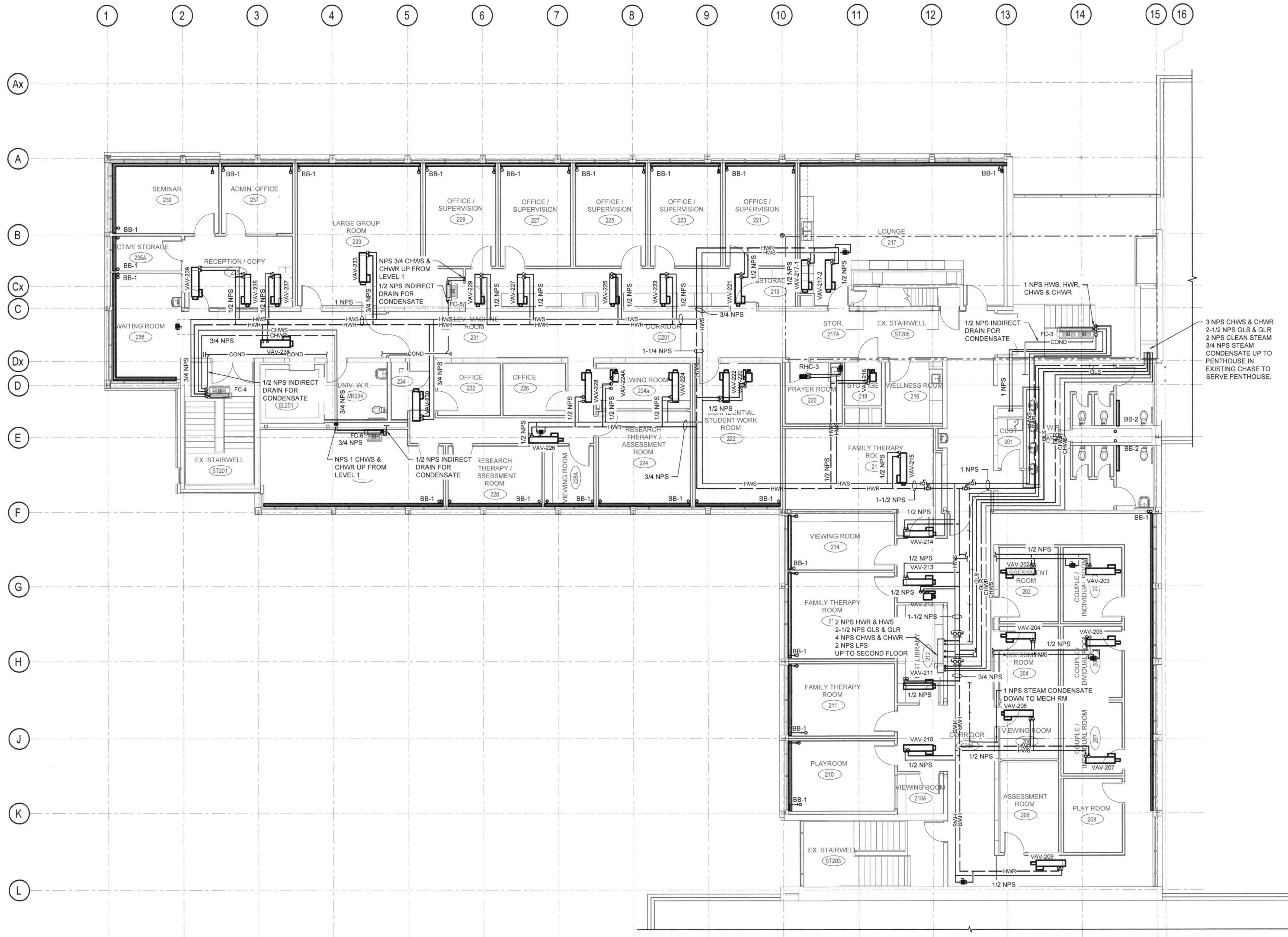
Location
**UNIVERSITY OF GUELPH
BUILDING #046**

Scale AS NOTED	Date NOV 2, 2018
Drawn by HW	Drawing No. M20
Checked By NC	
Approved By KT	
JLR # 27915	of 173

Cad File No. ----

1 HEATING WING B LEVEL 1
SCALE: 1/100

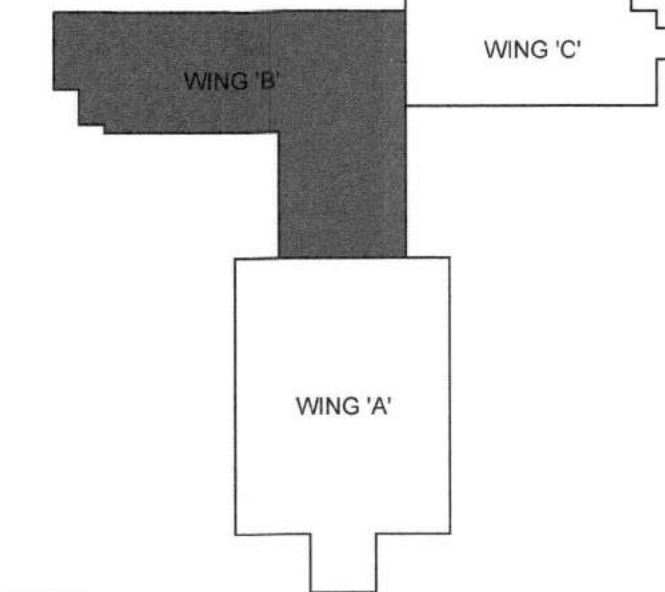
- GENERAL NOTES:
1. PROVIDE CONTINUOUS INSULATION FOR ALL HEATING AND CHILLER PIPING.
 2. ALL PIPING IN PUBLIC SPACES, AND OFFICES AND STUDENT AREAS TO BE RAN IN PIPE CHASE, BULKHEADS OR CEILING SPACES, NO EXPOSED PIPING IN THESE AREAS.
 3. ALL PIPING THAT IS IN AREAS SUCH AS IT ROOMS, CUSTODIAN CLOSETS, HOUSEKEEPING ETC. TO BE INSULATED AND PROVIDED WITH PCV JACKETING.
 4. PROVIDE INSULATED CONDENSATE DRAIN PIPING FOR ALL DRAIN PANS. CONDENSATE TO HAVE 25mm AIR GAP FOR INDIRECT DRAIN TO NEAREST DRAINAGE PIPING.
 5. PROVIDE DRAINS AT ALL LOW POINTS AND AIR VENTS AT ALL HIGH POINT IN THE SYSTEM.



1 HEATING WING B LEVEL 2
M21 SCALE: 1:100

GENERAL NOTES:

1. PROVIDE CONTINUOUS INSULATION FOR ALL HEATING AND CHILLER PIPING.
2. ALL PIPING IN PUBLIC SPACES, AND OFFICES AND STUDENT AREAS TO BE RAN IN PIPE CHASE, BULKHEADS OR CEILING SPACES, NO EXPOSED PIPING IN THESE AREAS.
3. ALL PIPING THAT IS IN AREAS SUCH AS IT ROOMS, CUSTODIAN CLOSETS, HOUSEKEEPING ETC. TO BE INSULATED AND PROVIDED WITH PCV JACKETING.
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Key Plan

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Seal



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Consultant www.jlrichards.ca

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ENGINEERS - ARCHITECTS - PLANNERS

Project
BUILDING #046
RENOVATIONS

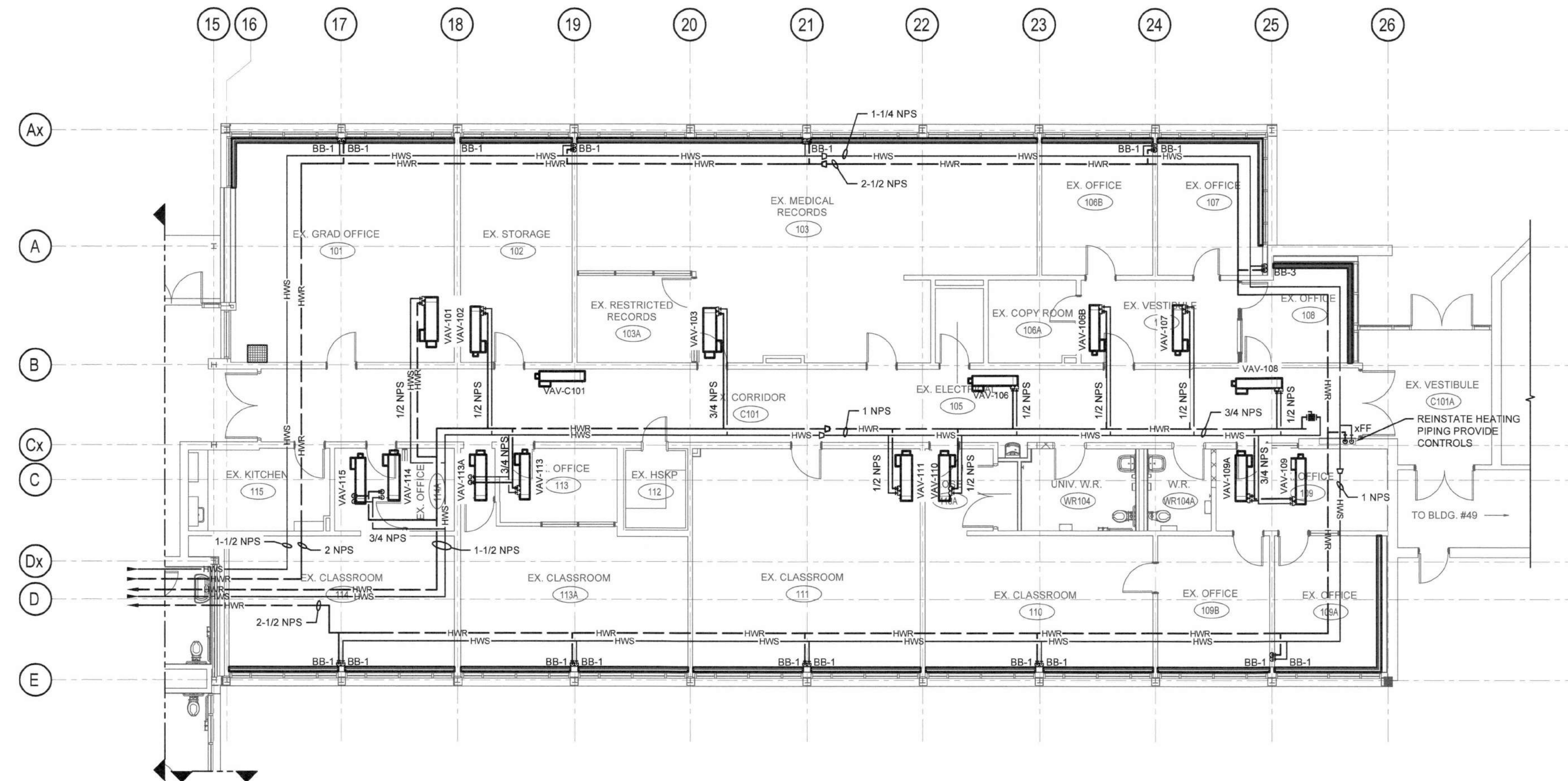
Drawing Title
HEATING WING B LEVEL 2

Project No.
504034

Location
UNIVERSITY OF GUELPH
BUILDING #046

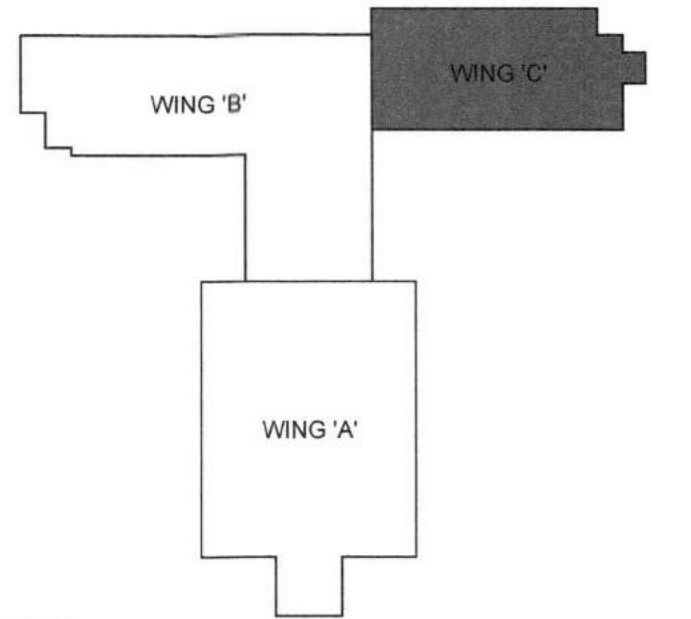
Scale AS NOTED	Date NOV 2, 2018
Drawn by HW	Drawn No.
Checked By NC	M21
Approved By KDT	
JLR # 27915	

Cad File No. -----



1 HEATING WING C
M22 SCALE: 1:100

- GENERAL NOTES:
1. PROVIDE CONTINUOUS INSULATION FOR ALL HEATING AND CHILLER PIPING.
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Key Plan

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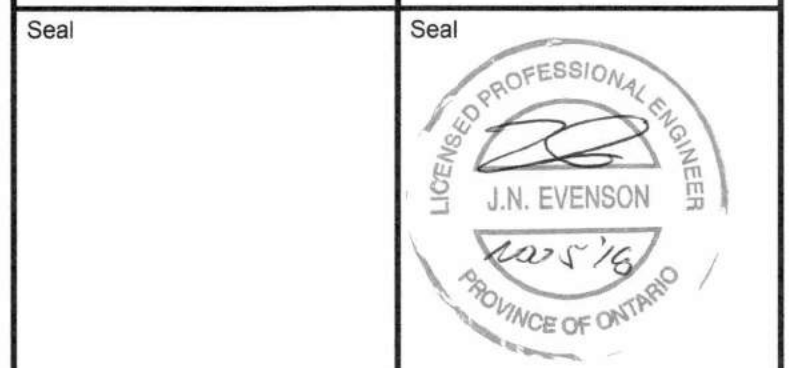
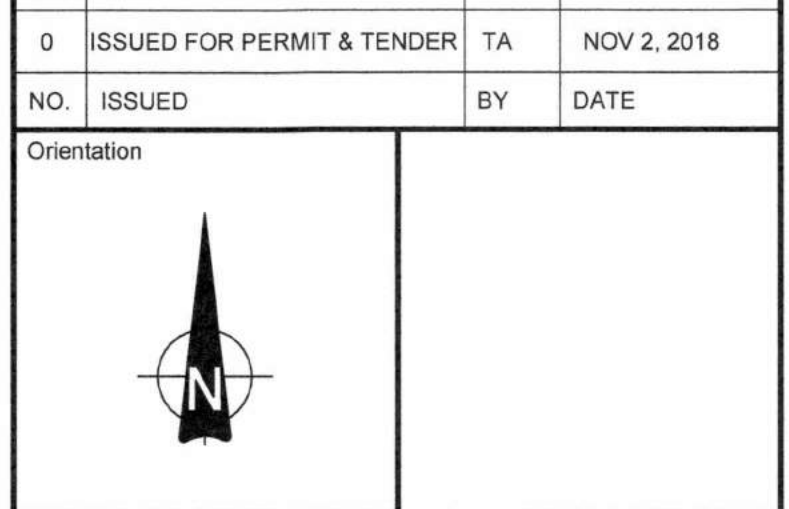
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A = Detail number
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0	ISSUED FOR PERMIT & TENDER	TA	NOV 2, 2018
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Project
**BUILDING #046
RENOVATIONS**

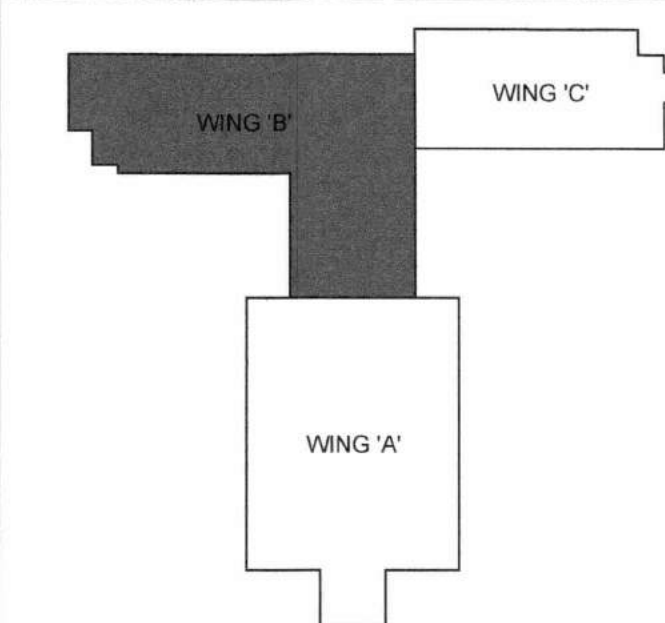
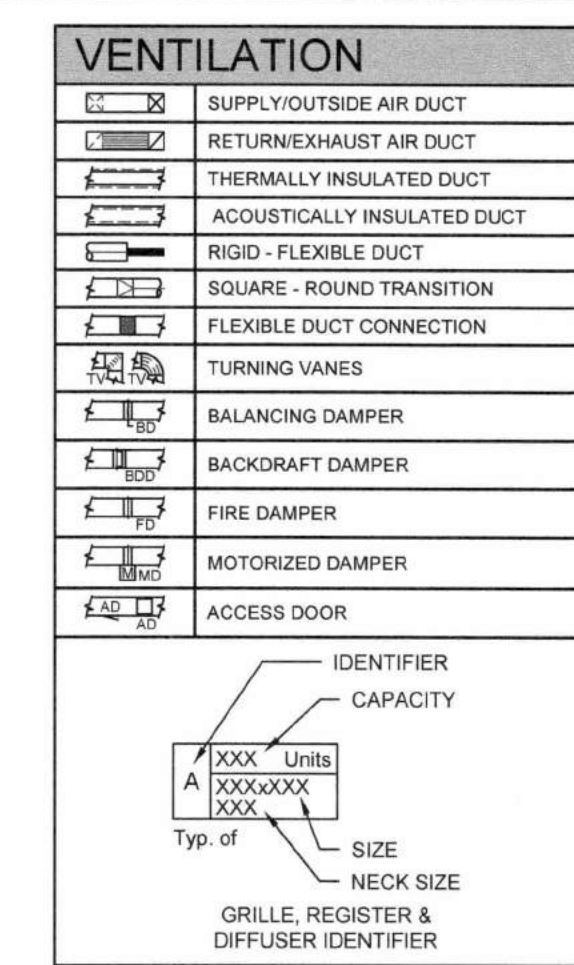
Drawing Title
HEATING WING C LEVEL 1

Project No.
504034

Location
**UNIVERSITY OF GUELPH
BUILDING #046**

Scale AS NOTED	Date NOV 2, 2018
Drawn by HW	Drawing No. M22
Checked By NC	
Approved By KDT	
JLR # 27815	of 173

Cad File No. ----



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1	RE-ISSUED FOR TENDER	TA	NOV 13, 2018
0	ISSUED FOR PERMIT & TENDER	TA	NOV 2, 2018
NO.	ISSUED	BY	DATE

Seal	Seal
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Project
BUILDING #046
RENOVATIONS

Drawing Title

VENTILATION WING B
LEVEL 1

Project No.
504034

Location
UNIVERSITY OF GUELPH
BUILDING #046

Scale	Date
AS NOTED	NOV 2 2018

AS NOTED	NOV 2, 2018
Drawn by HW	Drawing No.

Checked By	M30
NC	

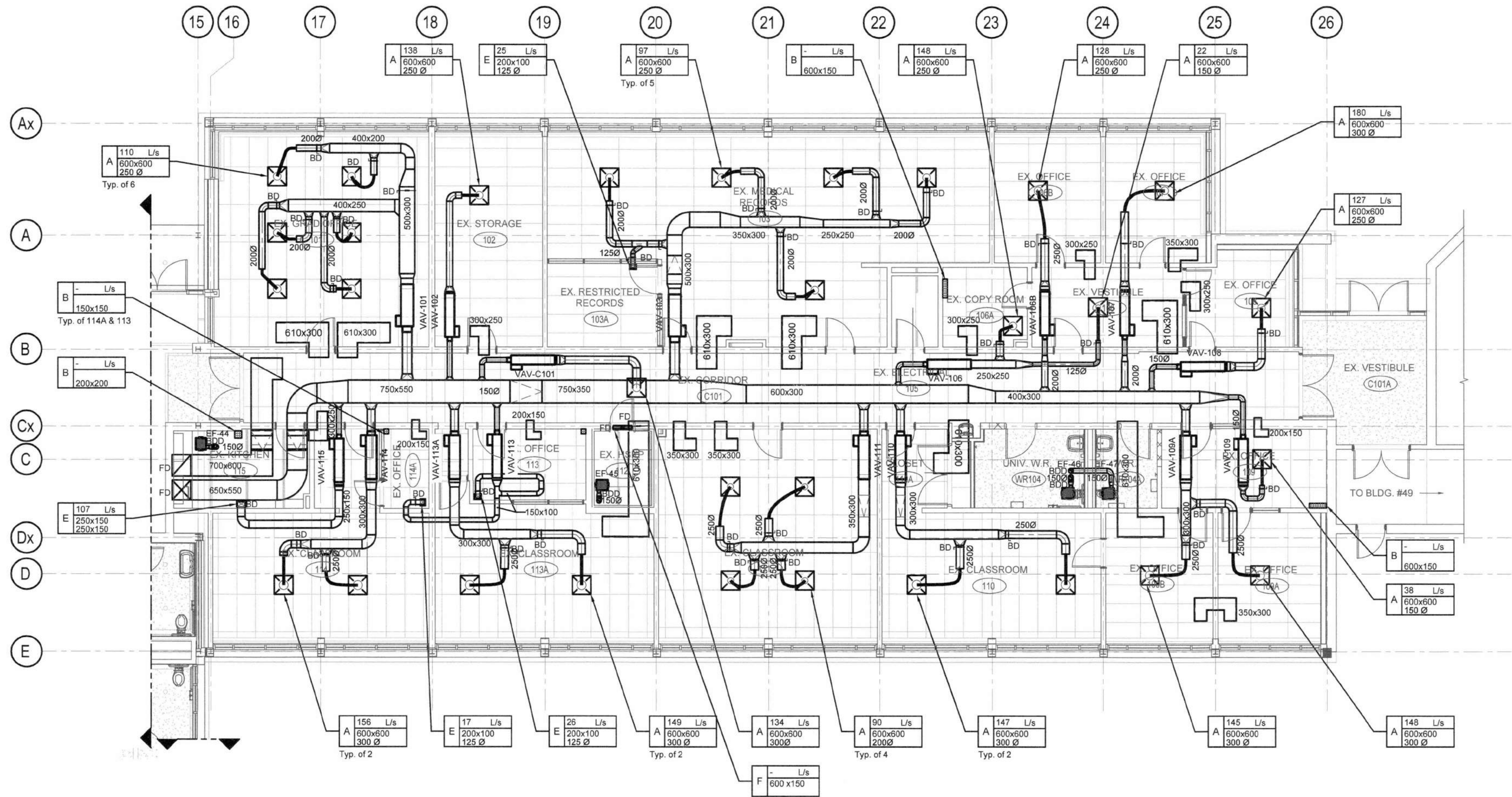
Approved By KDT	MISC
JLR #	

27915	of 1
Ord. File No. _____	

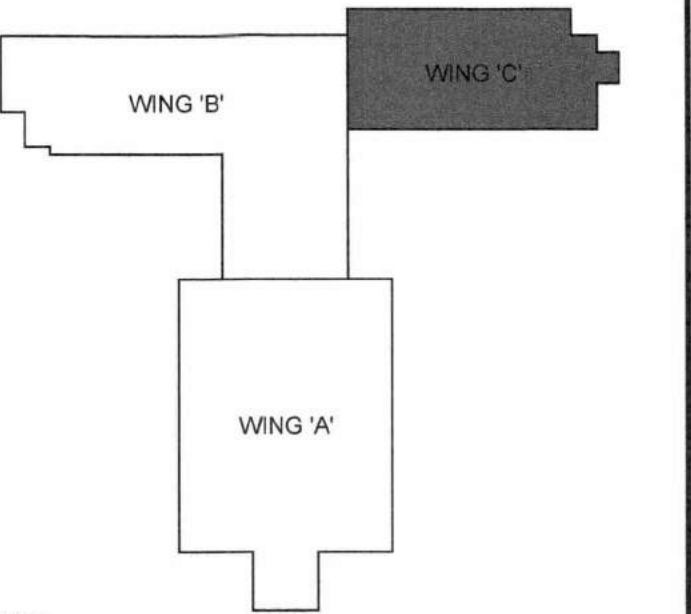
Cad File No. -----

M30

of 17



- GENERAL NOTES:
1. ALL DIMENSIONS SHOWN ON DRAWINGS ARE CLEAR INSIDE DUCT DIMENSIONS.
 2. ALL SUPPLY DUCT TO BE INSULATED.
 3. ALL FIRE DAMPERS TO BE DYNAMIC, "TYPE B" INSTALLATION WITH BLADE STACK OUTSIDE OF AIR STREAM.
 4. ALL EXHAUST DUCT TO BE INSULATED 3000 mm MINIMUM FROM TERMINATION POINT.
 5. BACK DRAFT DAMPERS TO BE INSTALLED FOR ALL EXHAUST WHERE MOTORIZED DAMPER IS NOT. INSTALL BACK DRAFT DAMPER AS NEAR TO TERMINATION POINT AS POSSIBLE.
 6. PROVIDE BALANCING DAMPERS ON ALL SUPPLY, RETURN AND EXHAUST DUCT BRANCHES.
 7. ALL TRANSFER DUCTS TO BE ACOUSTICALLY LINED.
 8. PROVIDE INDIRECT DRAIN FOR ALL FAN COIL UNITS, INSULATE MINIMUM OF 3000mm FROM UNIT WHERE APPLICABLE.
 9. VAV BOXES TO BE INSTALLED BETWEEN OHSJ WITH CLEARANCE ON THE CONTROLS AND HEATING COIL SIDE, COORDINATE CONTROLS AND COIL CONNECTIONS ON SIDE THAT BEST SUITS MAINTENANCE.



Key Plan

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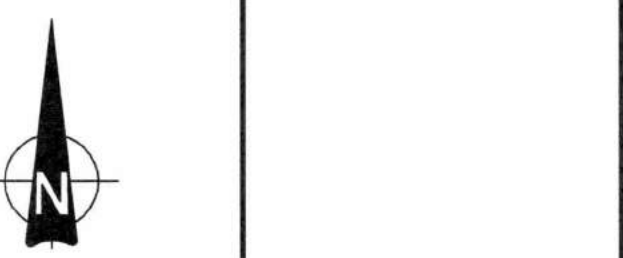
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Orientation



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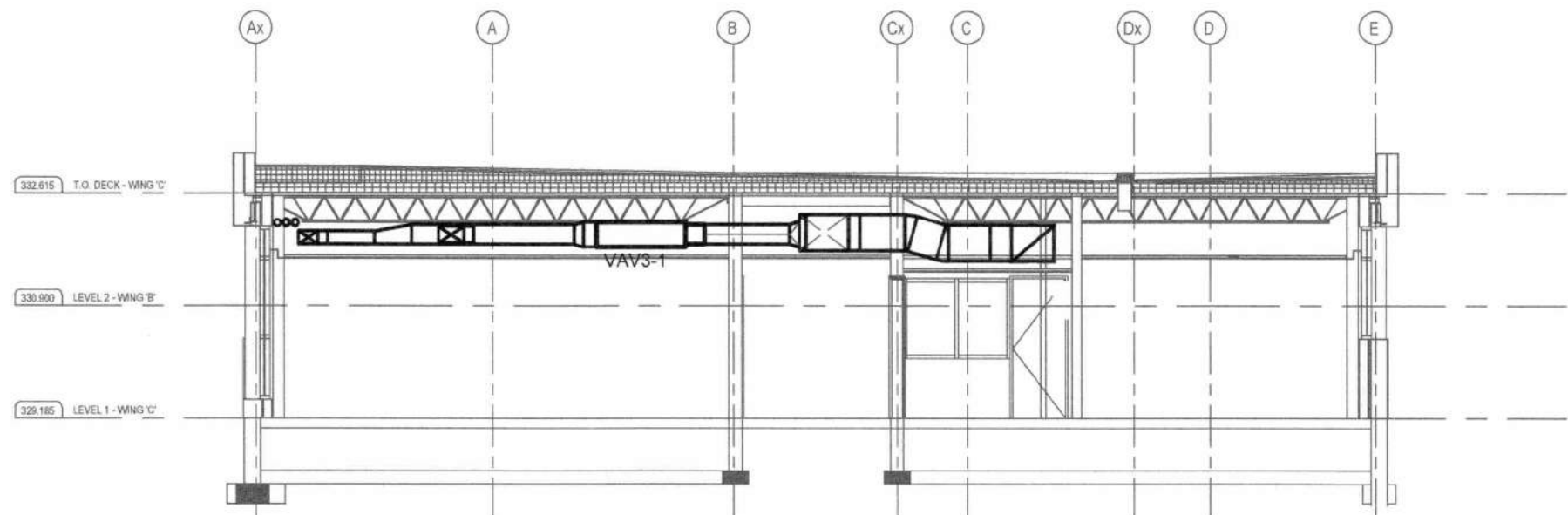
Project
**BUILDING #046
RENOVATIONS**

Drawing Title
**VENTILATION WING C
LEVEL 1**
Project No.
504034

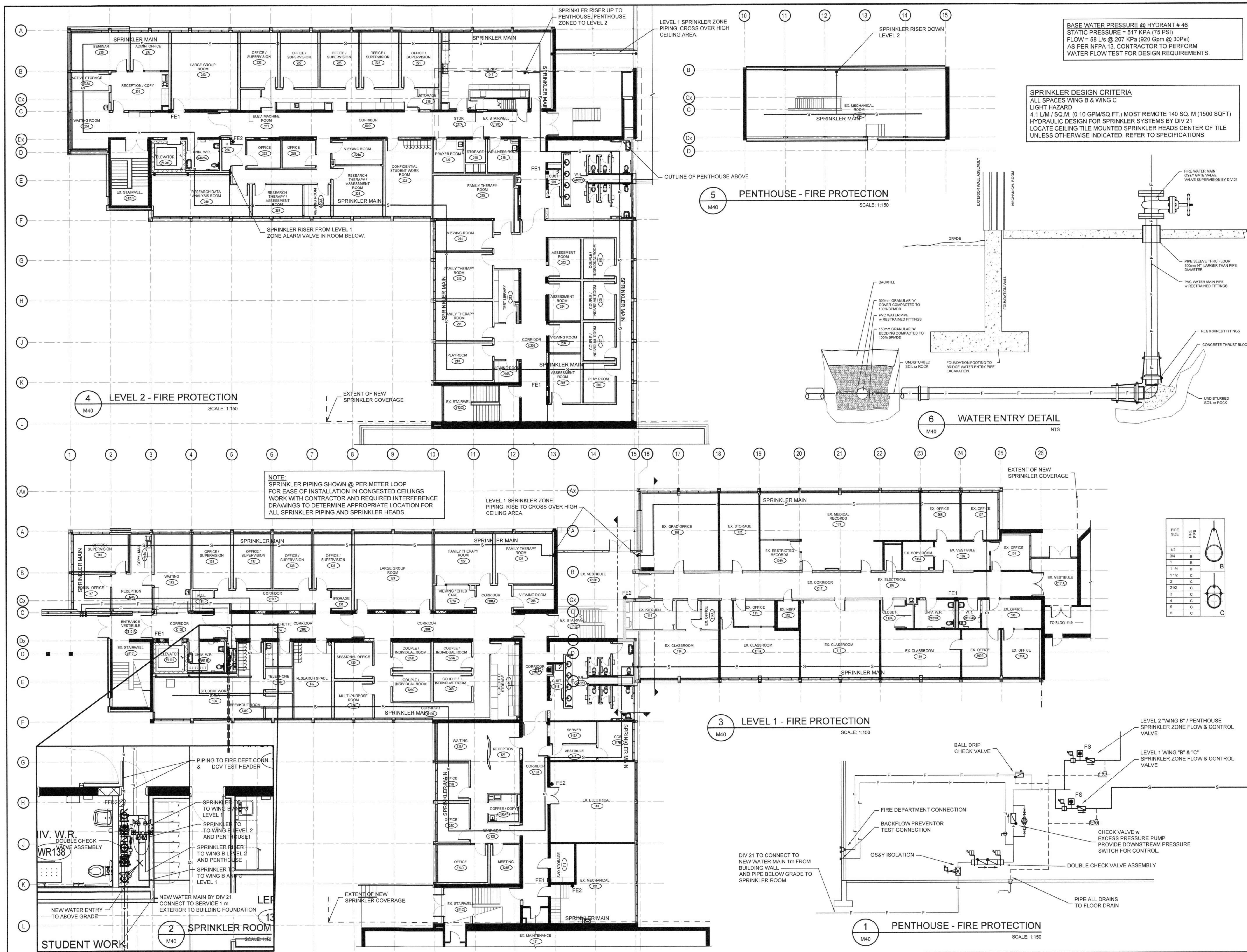
Location
**UNIVERSITY OF GUELPH
BUILDING #046**

Scale AS NOTED	Date NOV 2, 2018
Drawn by HW	Drawing No.
Checked By NC	M32
Approved By KDT	
JLR # 27915	
Cad File No. ----	of 173

1 VENTILATION WING C LEVEL 1
SCALE: 1:100



2 CORRIDOR SECTION
SCALE: 1:100



BASE WATER PRESSURE @ HYDRANT # 46
STATIC PRESSURE = 517 KPa (75 PSI)
FLOW = 58 L/s @ 207 KPa (30 PSI)
AS PER NFPA 13. CONTRACTOR TO PERFORM
WATER FLOW TEST FOR DESIGN REQUIREMENTS.

SPRINKLER DESIGN CRITERIA
ALL SPACES WING B & WING C
LIGHT HAZARD
4.1 L/M / SQ.M. (0.10 GPM/SQ.FT.) MOST REMOTE 140 SQ. M (1500 SQFT)
HYDRAULIC DESIGN FOR SPRINKLER SYSTEMS BY DIV 21
LOCATE CEILING TILE MOUNTED SPRINKLER HEADS CENTER OF TILE
UNLESS OTHERWISE INDICATED. REFER TO SPECIFICATIONS

WING 'B'

WING 'C'

WING 'A'

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BUILDING #046
RENOVATIONS

Drawing Title

FIRE SUPPRESSION WING B AND C

Project No.
504034

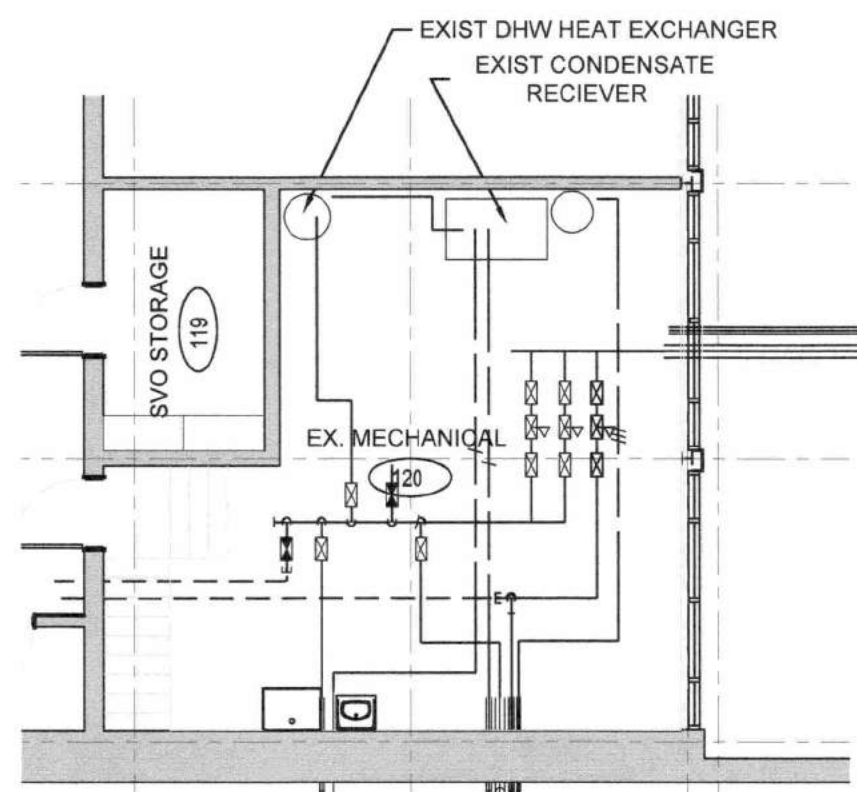
Location

UNIVERSITY OF GUELPH
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Scale	Date NOV 2, 2018
Drawn by	Drawing No.
Checked By	
Approved By	
JLR # 27915	
Cad File No. ----	

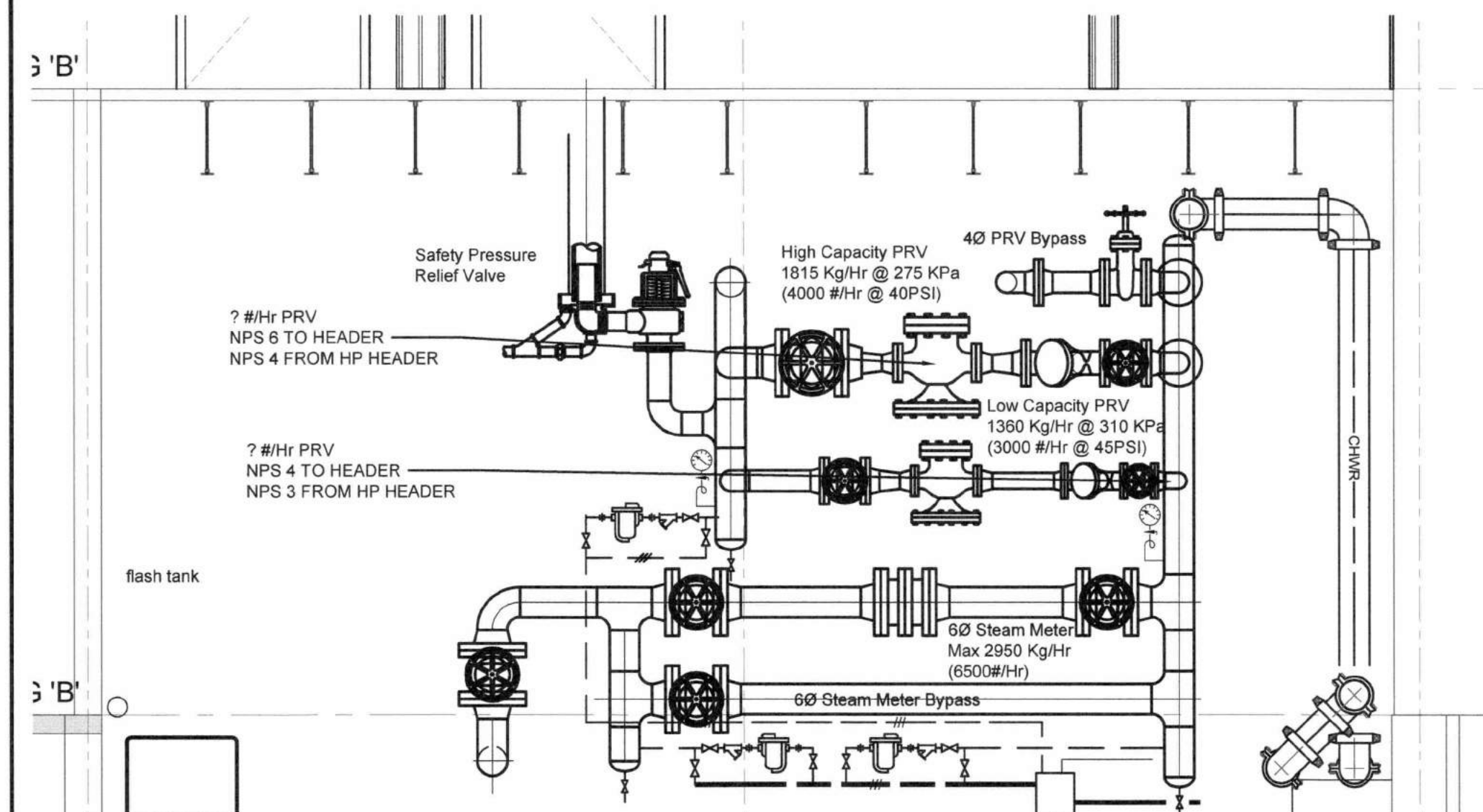
M40

of 173

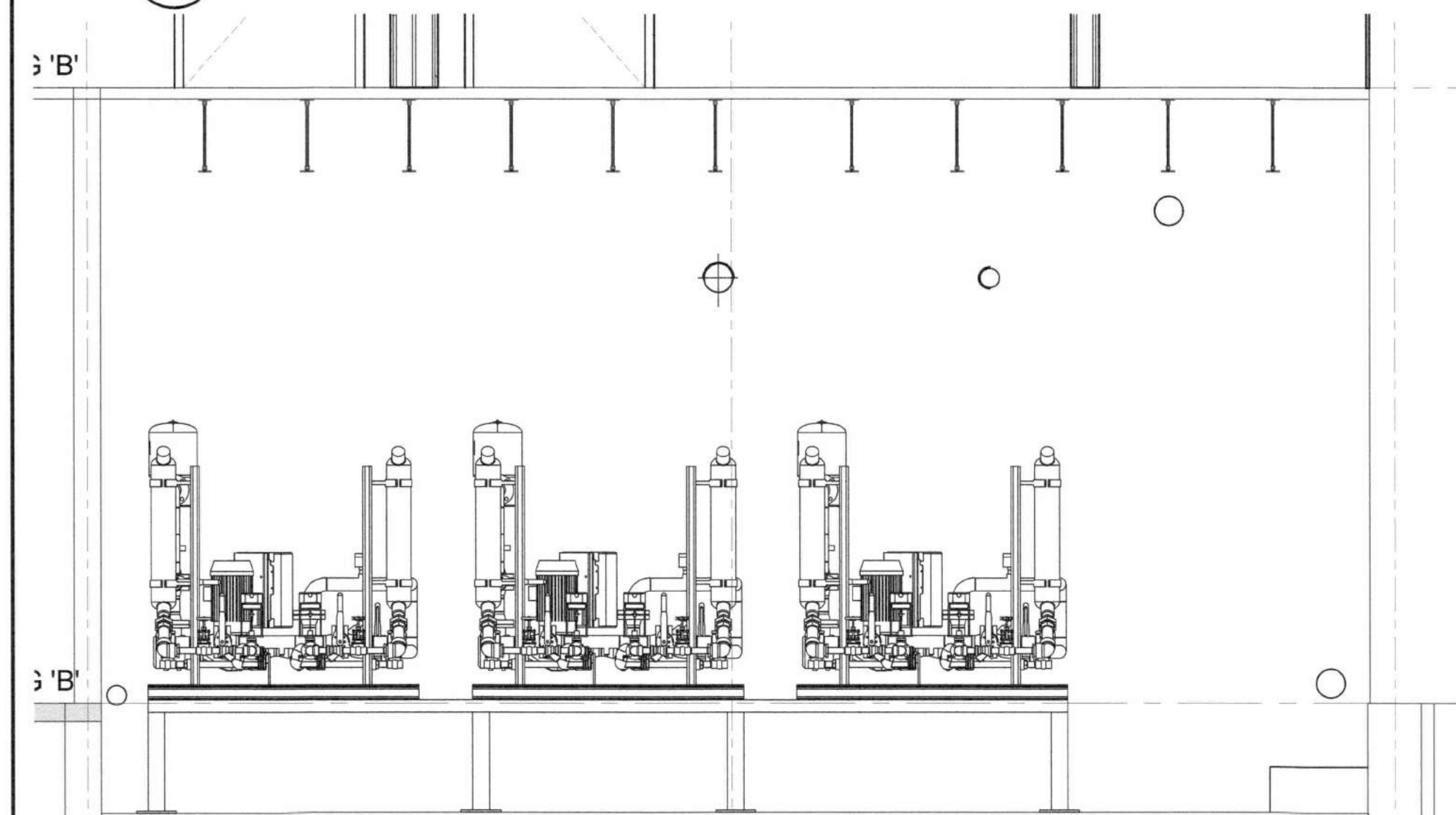


4 DEMOLITION MECHANICAL ROOM WING B
M50 SCALE: 1:100

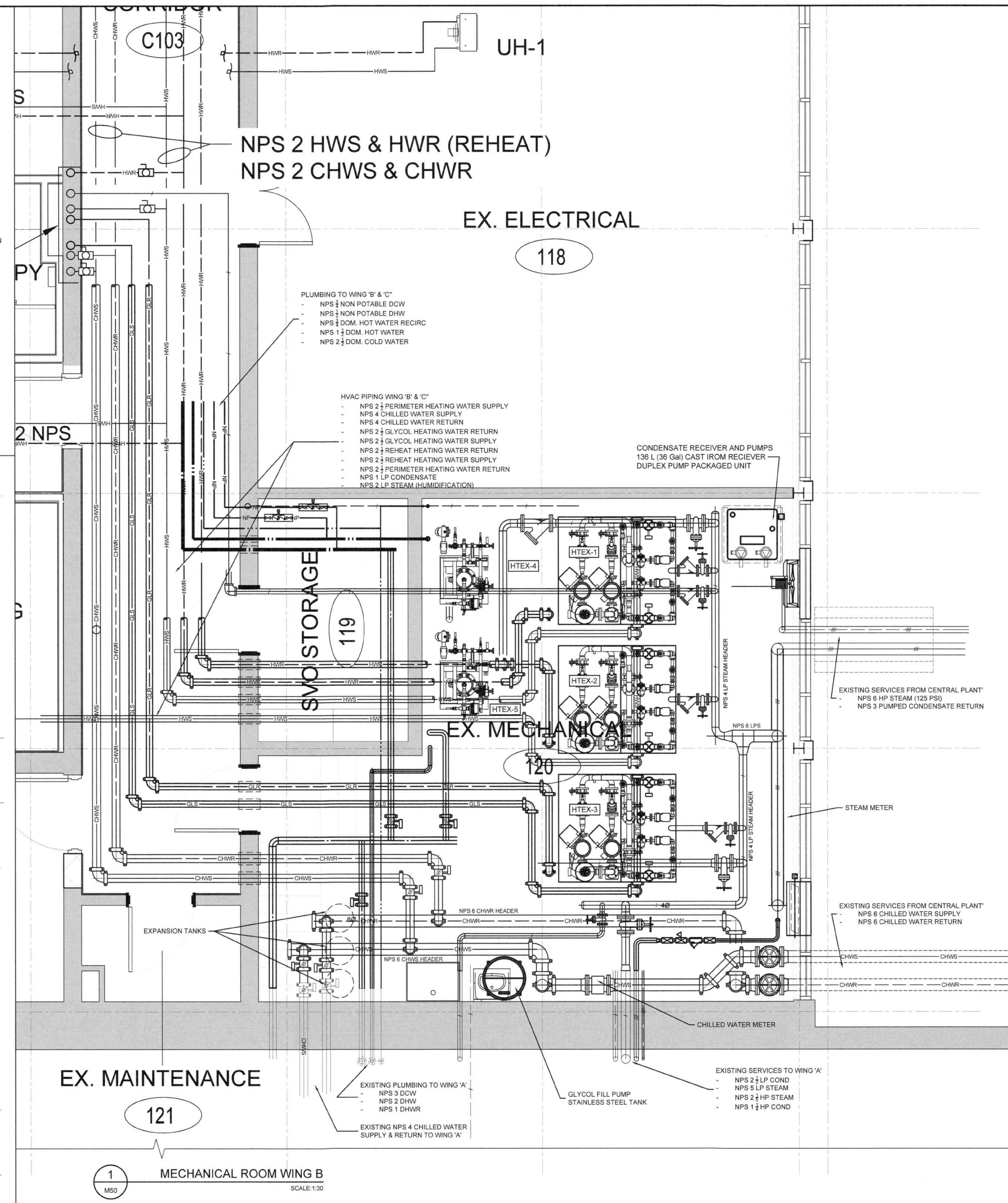
- DEMOLITION NOTES:
THIS DRAWING TO BE READ IN CONJUNCTION WITH THE DEMOLITION DRAWINGS.
ALL SERVICES TO WING "A" TO REMAIN OPERATIONAL FOR DURATION OF CONSTRUCTION
WITH LIMITED SHUT DOWN (WEEKENDS) FOR TRANSFER OF SERVICES.
1. DEMOLISH COMPRESSED AIR SERVICES, PLANT CA TO BE MAINTAINED TO WING "A" FOR CONTROLS SERVICES
 2. CHILLED WATER CAN BE DEMOLISHED AND REINSTATED AS PER NEW PLAN DURING THE WINTER MONTHS.
 3. DEMOLISH CONVECTORS AND PUMPS SERVING WINGS "B" & "C"
 4. MODIFY STEAM ENTRY TO PERMIT ISOLATION AND INSTALLATION OF NEW REGULATORS AND STEAM HEADERS
 5. INSTALL AND COMMISSION NEW CONDENSATE PUMP UNIT AND HEADER. DISCHARGE EXISTING CONDENSATE TO NEW PUMP UNIT TO PERMIT DEMOLITION OF EXISTING CONDENSATE RECEIVERS AND PUMPS
 6. INSTALL AND COMMISSION HTXS AND PROVIDE DHW FROM NEW HEAT EXCHANGER.
 7. DEMOLISH EXISTING DHW HEAT EXCHANGER.
 8. WITH NEW LP STEAM / HP STEAM / CONDENSATE HEADERS IN PLACE, REPIPE EXISTING WING "A" SERVICES TO NEW HEADERS.
 9. COMPLETE DEMOLITION AND CLEAN UP FOR INSTALLATION OF NEW EQUIPMENT AND PIPING FOR WINGS "B" & "C"
 10. CONTRACTOR TO REVIEW THE PROPOSED STRATEGIES AND IDENTIFY ITEMS OF CONCERN.



3 SECTION MECHANICAL ROOM WING B
M50 SCALE: 1:30



2 SECTION MECHANICAL ROOM WING B
M50 SCALE: 1:30



Key Plan

WING 'B' WING 'C'

WING 'A'

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Legend:

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BUILDING #046 RENOVATIONS

Drawing Title
MECHANICAL ROOM WING B

Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

Scale	Date
	NOV 2, 2018

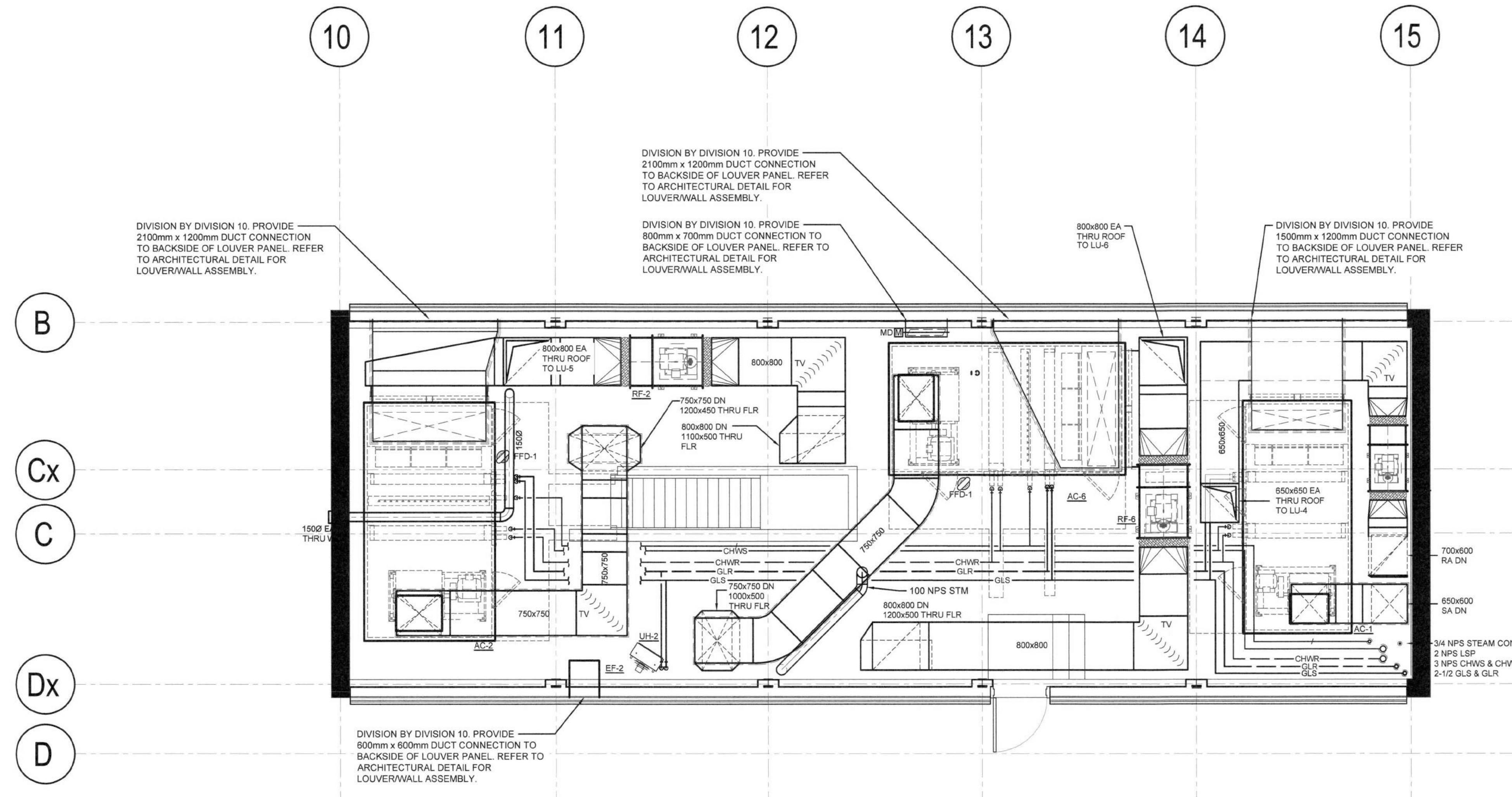
Drawn by	Drawing No.
	M50

Checked By

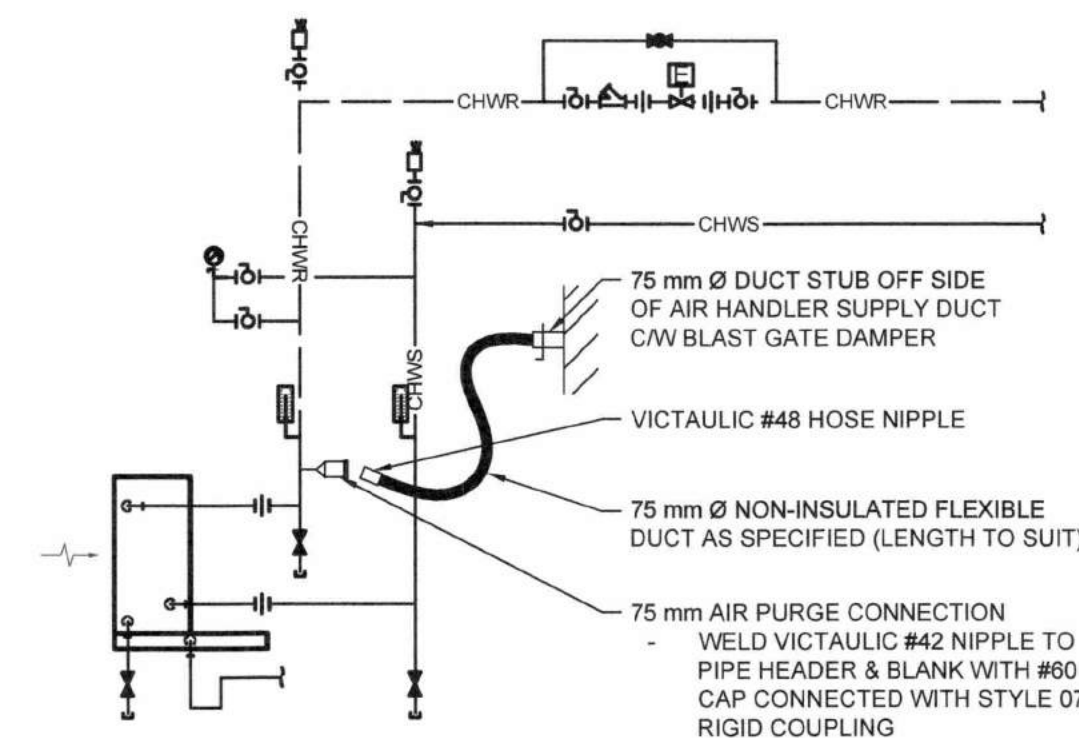
Approved By

JLR # 27815 of 173

Cad File No. ----

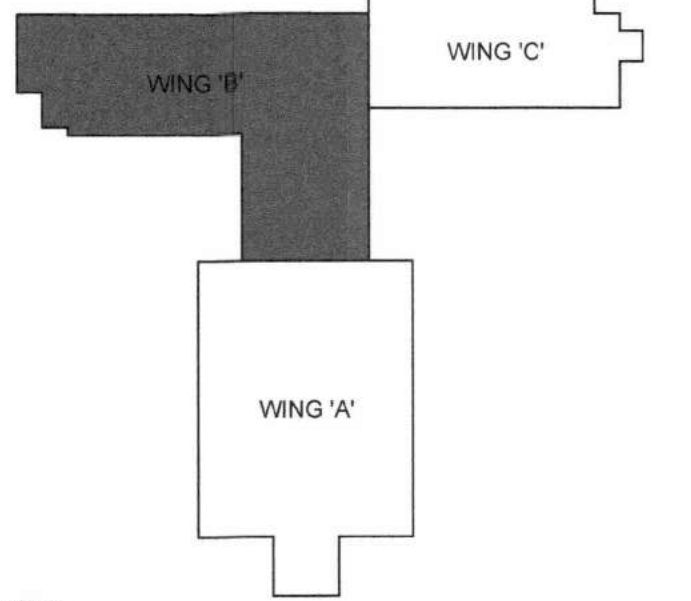


1 PENTHOUSE WING B
M51 SCALE: 1:50



- GENERAL NOTES:
1. INSTALLATION OF DUCT WORK TO BE TIGHT TO U/S OF OWSJ.
 2. INSTALLATION OF DUCTWORK TO BE AS TIGHT TO U/S OF DUCT WORK AS POSSIBLE.
 3. PROVIDE FREE STANDING EQUIPMENT CONTROLS STANDS FOR ALL CABINETS REQUIRED.

2 CHILLED WATER BLOW DOWN
M51 SCALE: NTS



Key Plan

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**BUILDING #046
RENOVATIONS**

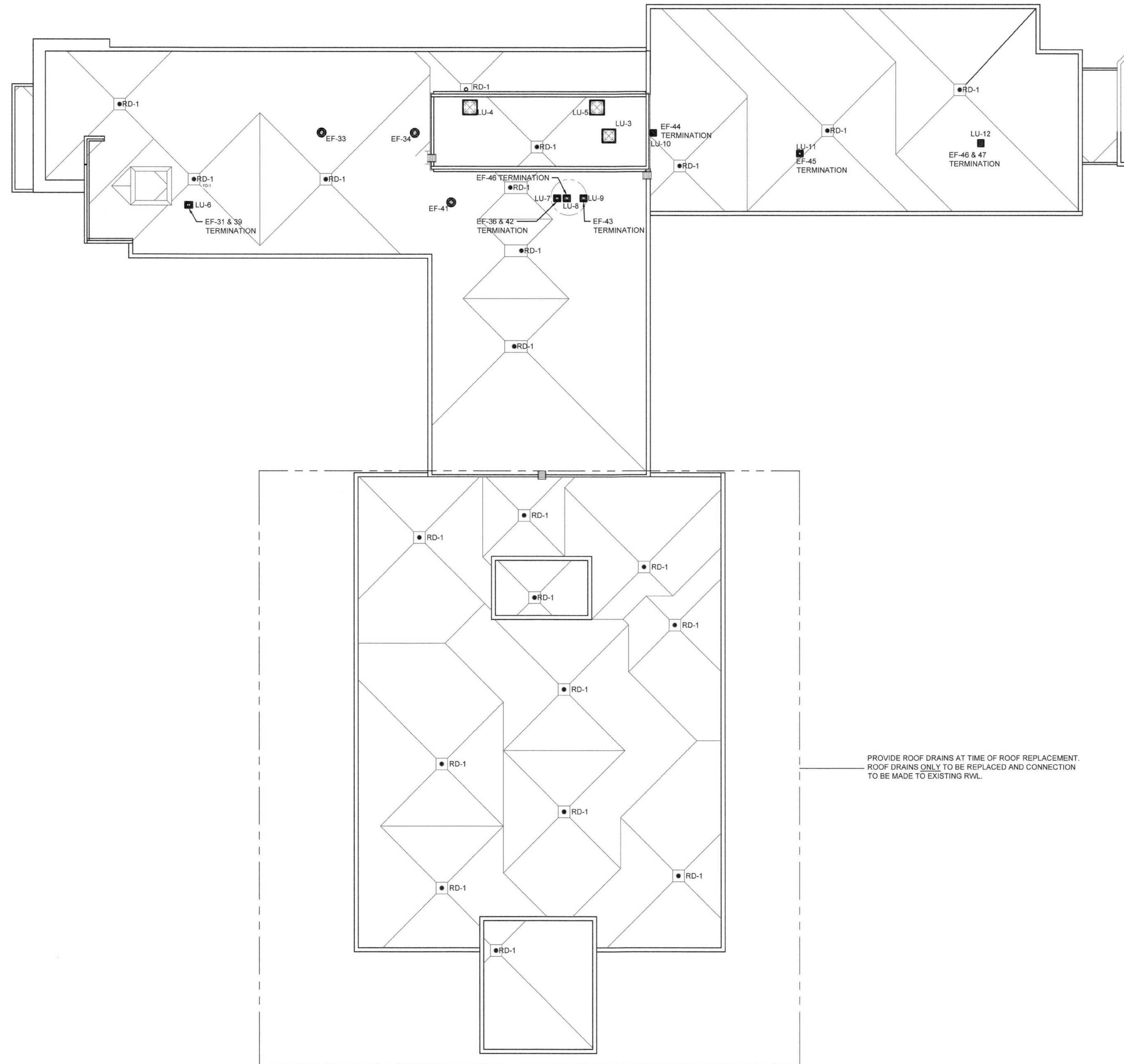
Drawing Title
PENTHOUSE WING B

Project No.
504034

Location
**UNIVERSITY OF GUELPH
BUILDING #046**

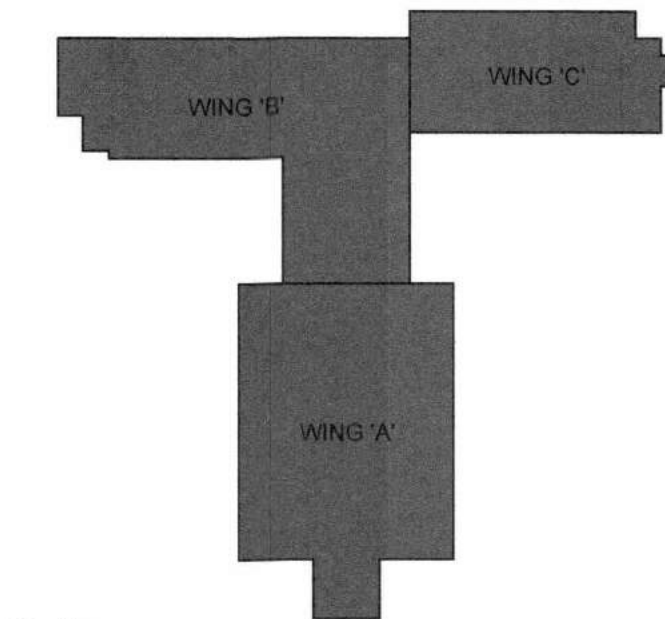
Scale AS NOTED	Date NOV 2, 2018
Drawn by HW	Drawing No. M51
Checked By NC	
Approved By KDT	
JLR # 27815	of 173

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1
M52

ROOF PLAN
SCALE: 1:200



Key Plan

DO NOT SCALE DRAWINGS:

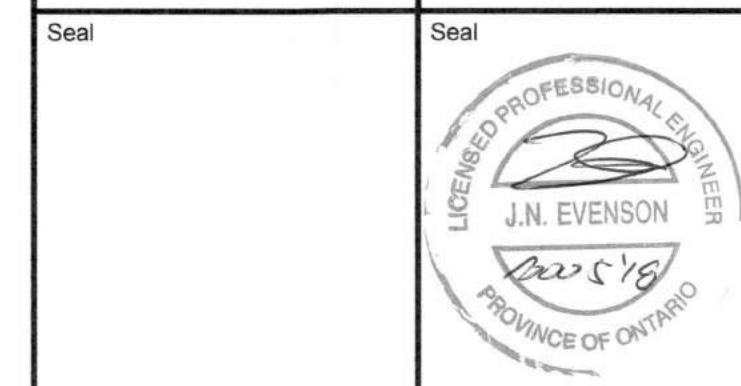
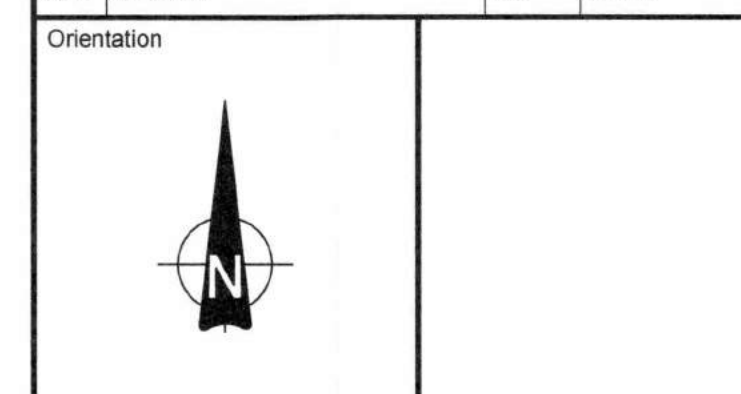
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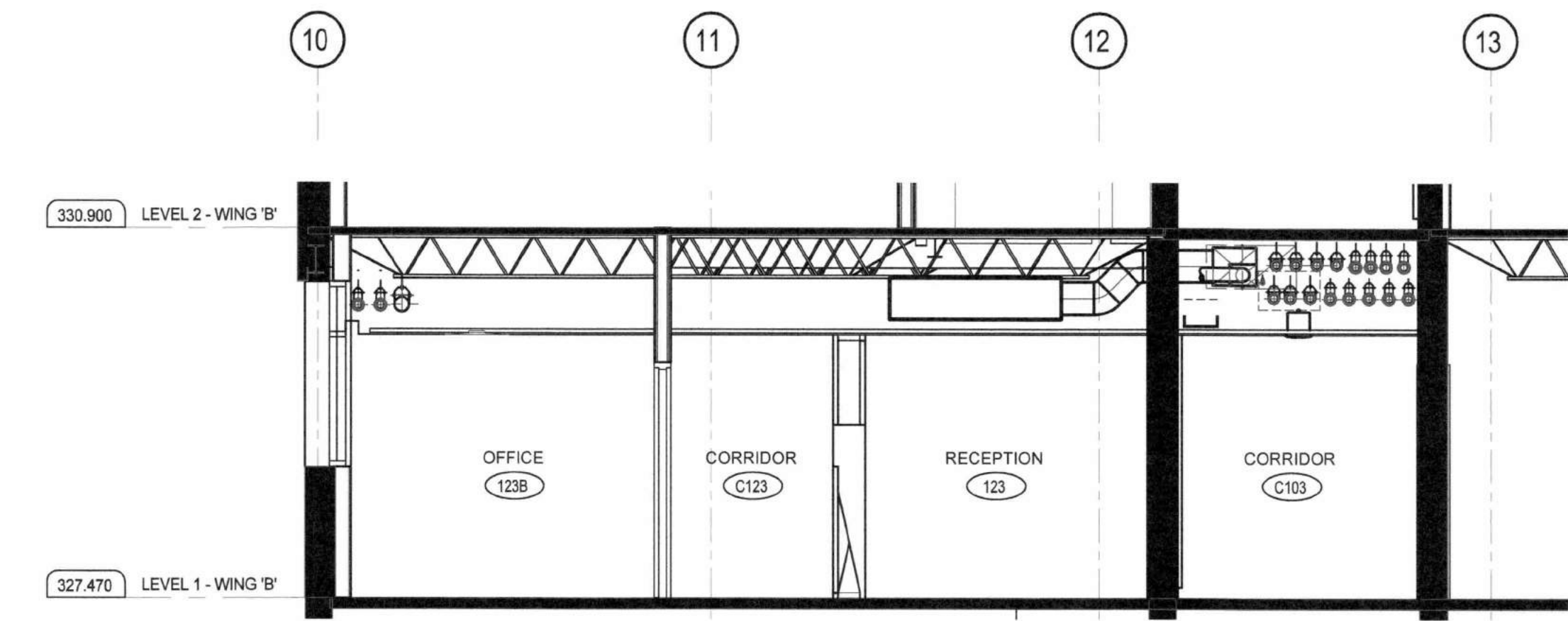
Project
**BUILDING #046
RENOVATIONS**

Drawing Title
ROOF PLAN

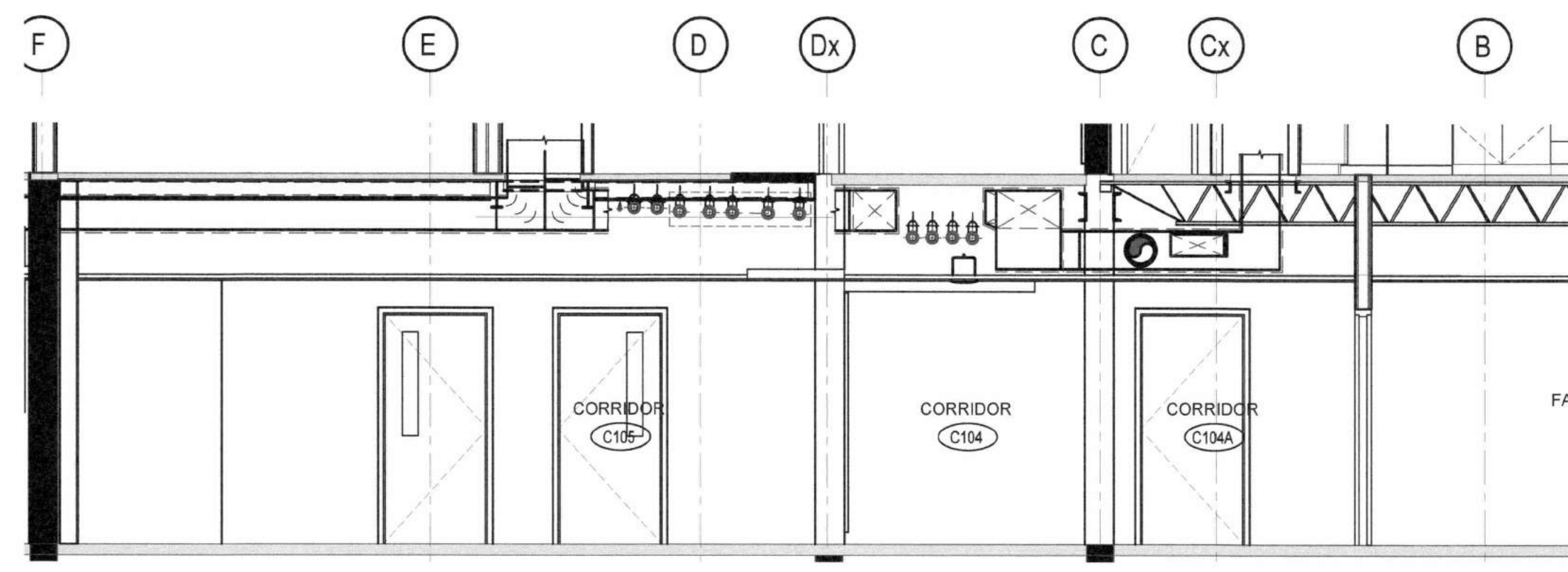
Project No.
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Location
**UNIVERSITY OF GUELPH
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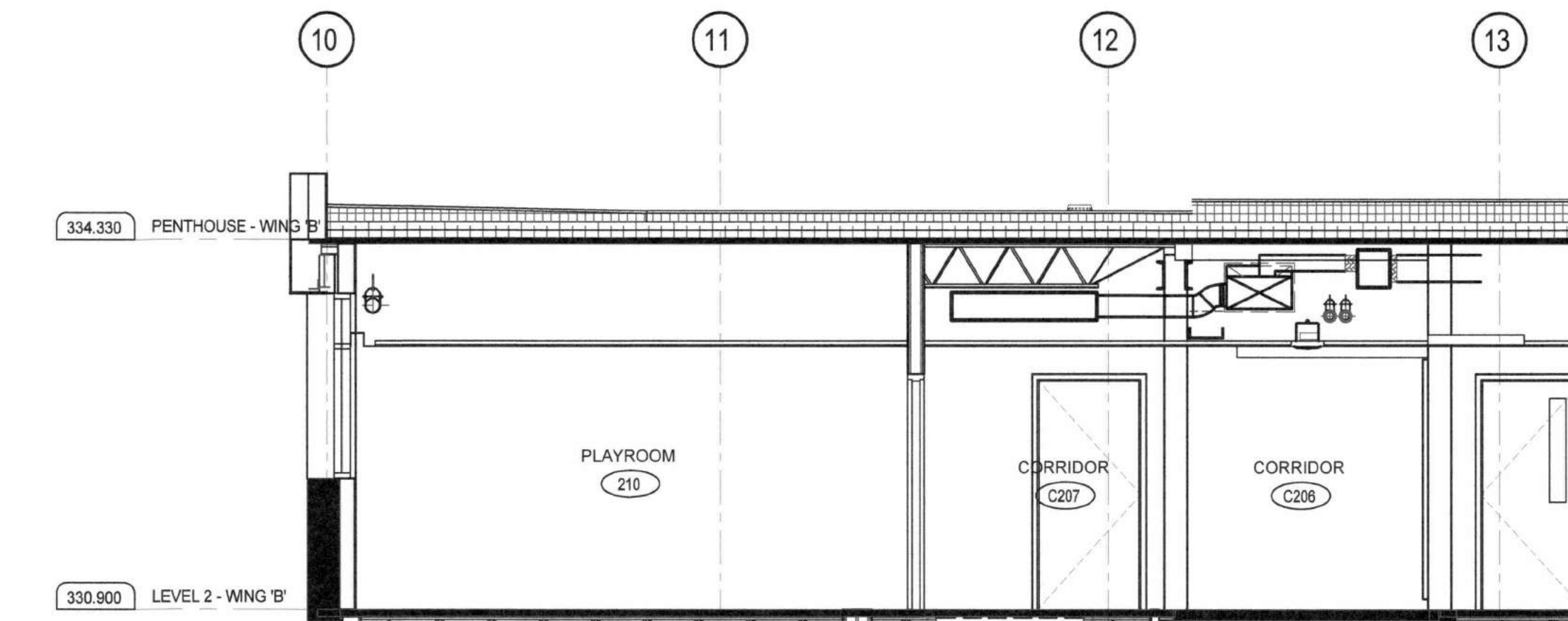
Scale	Date NOV 2, 2018
Drawn by	Drawing No. M52
Checked By	
Approved By	
JLR # 27915	of 173
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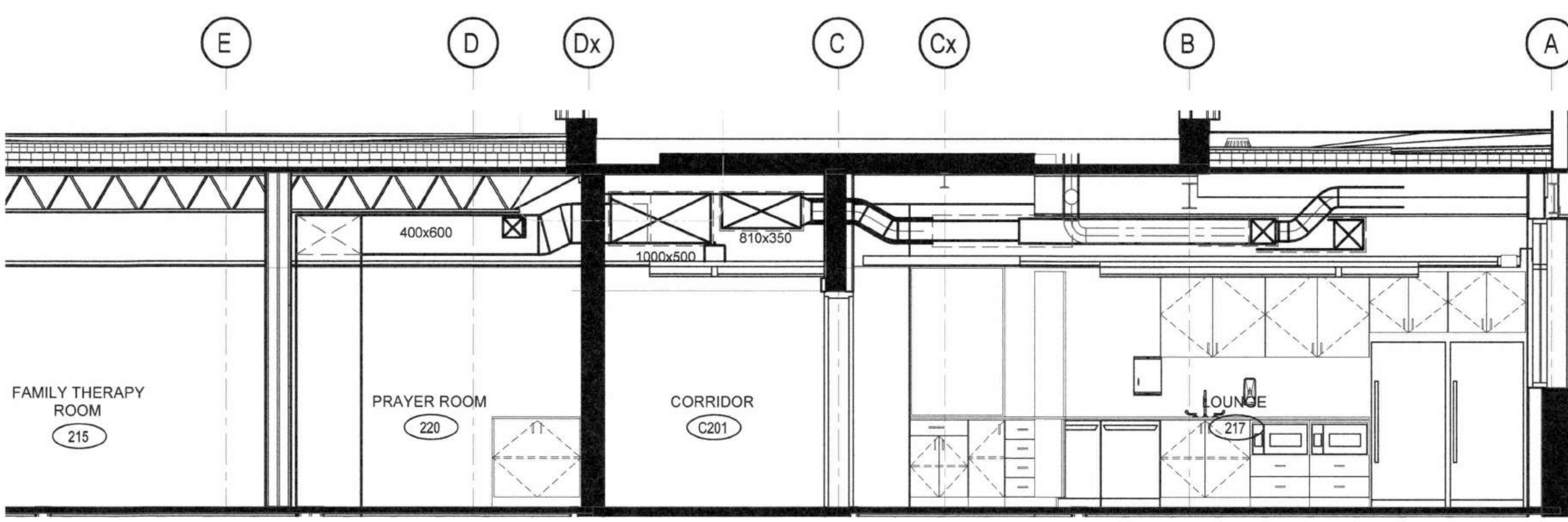
1 MECHANICAL SECTION 1
M53 SCALE: 1:50



3 MECHANICAL SECTION 3
M53 SCALE: 1:50



2 MECHANICAL SECTION 2
M53 SCALE: 1:50



4 MECHANICAL SECTION 4
M53 SCALE: 1:50

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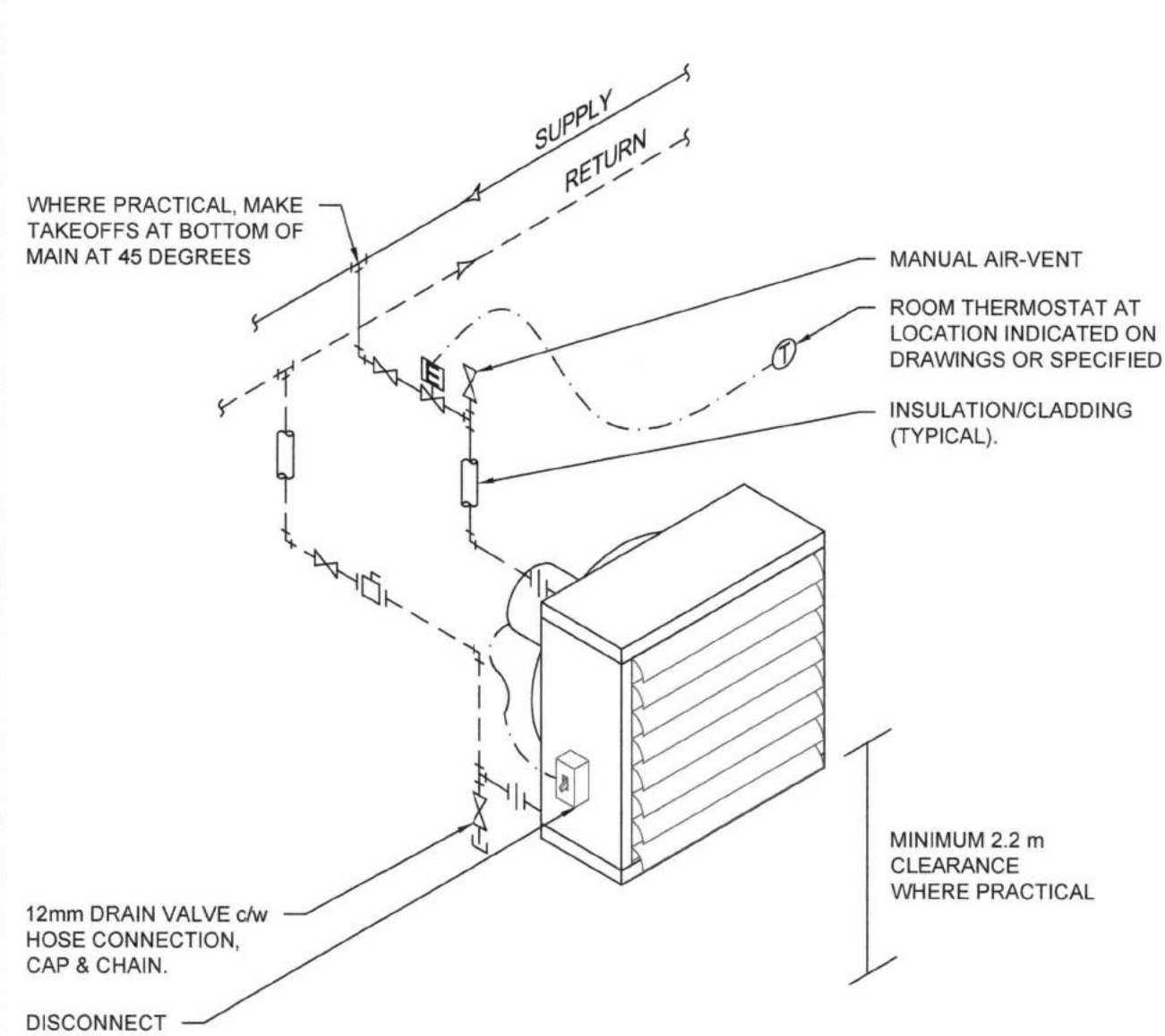
Project
**BUILDING #046
RENOVATIONS**

Drawing Title
MECHANICAL SECTIONS

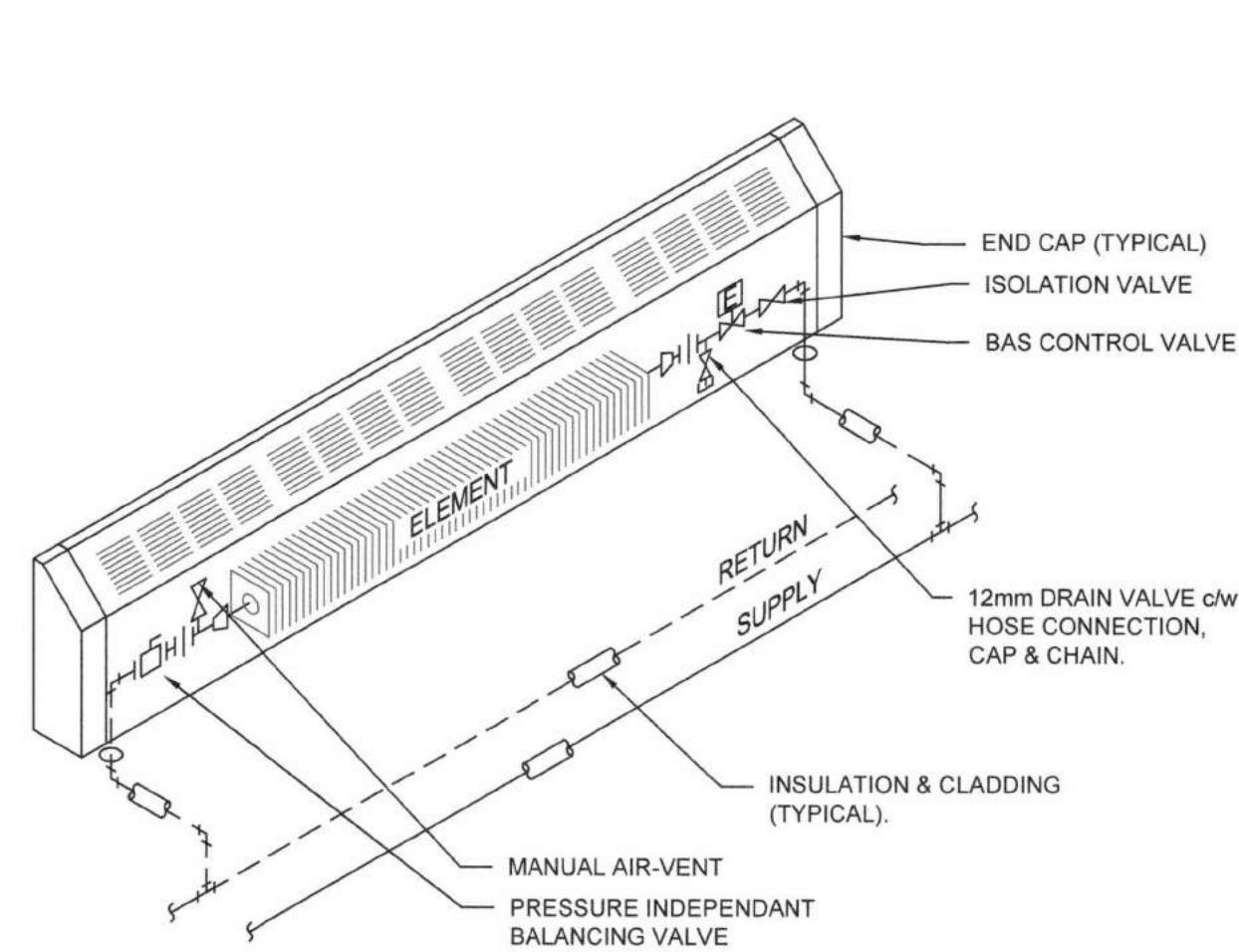
Project No.
504034

Location
**UNIVERSITY OF GUELPH
BUILDING #046**

Scale	Date NOV 2, 2018
Drawn by	Drawing No.
Checked By	M53
Approved By	
JLR # 27915	
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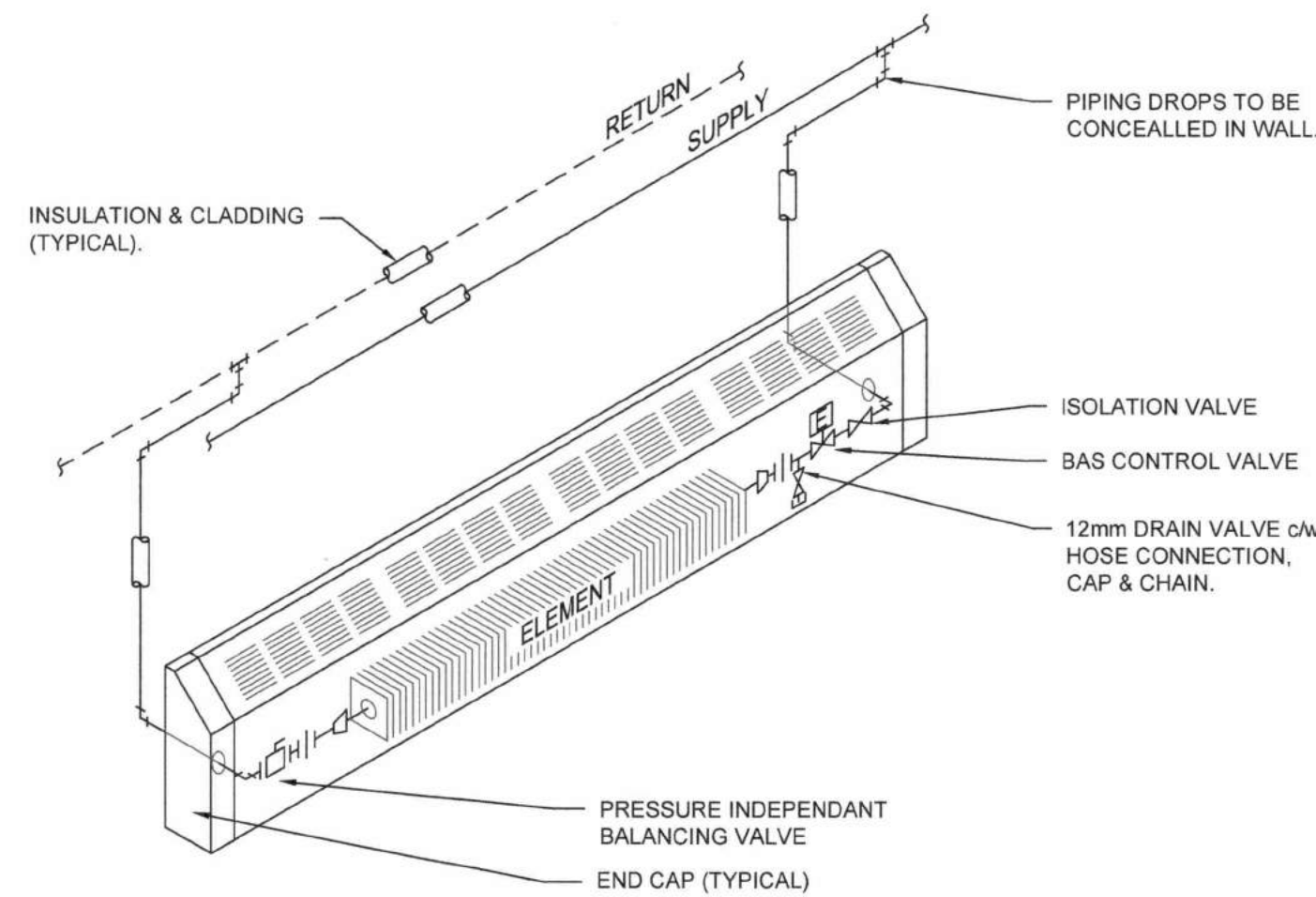


1 HYDRONIC UNIT HEATER - HOOKUP
SCALE: NTS



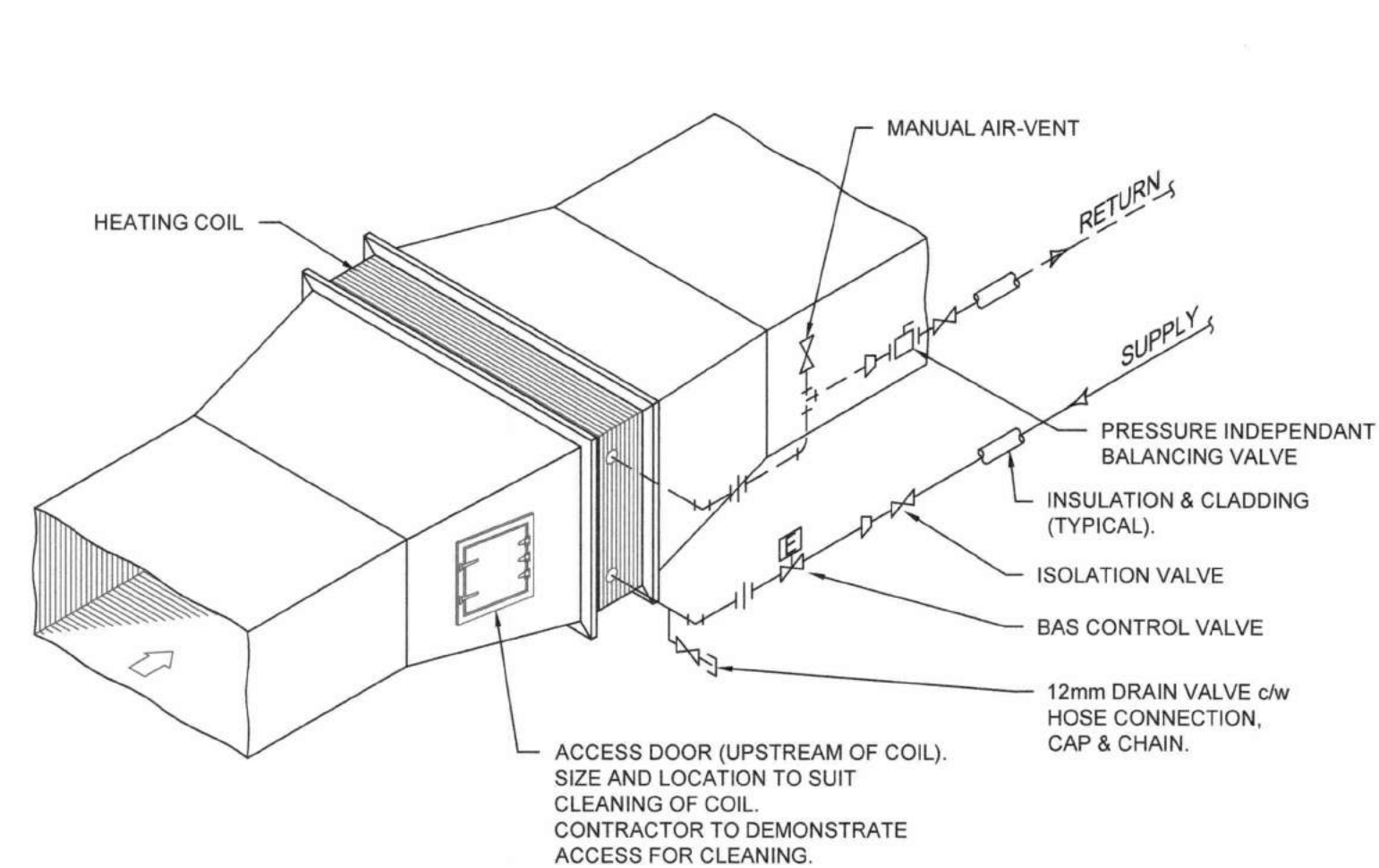
NOTE:
1. PIPING TO SLOPE UP IN DIRECTION OF AIR VENT.
2. PROVIDE DOOR AT EACH END OF ENCLOSURE FOR VALVE ACCESS.

2 HYDRONIC FINNED TUBE CONVECTOR HOOK-UP (FLOOR)
SCALE: NTS

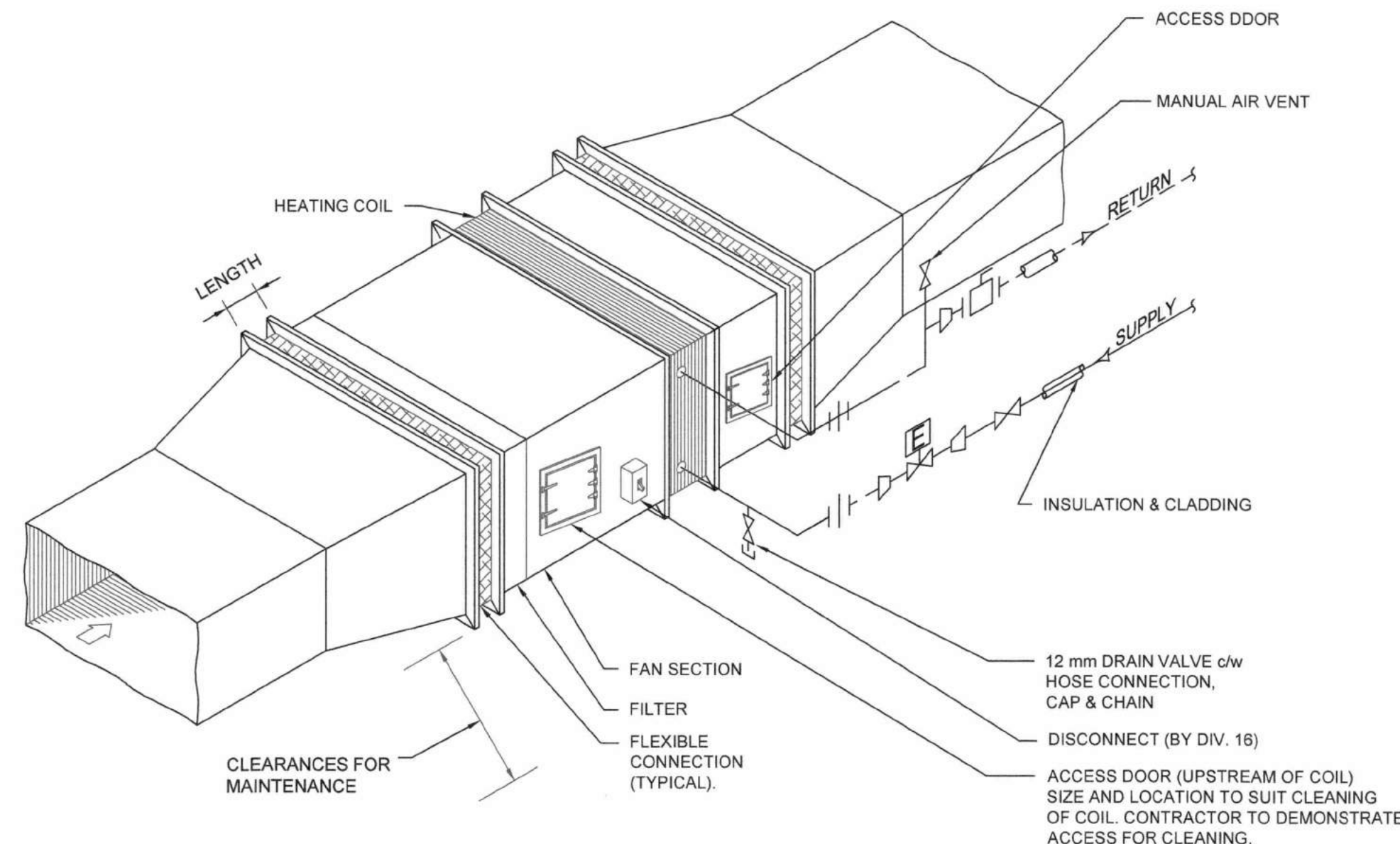


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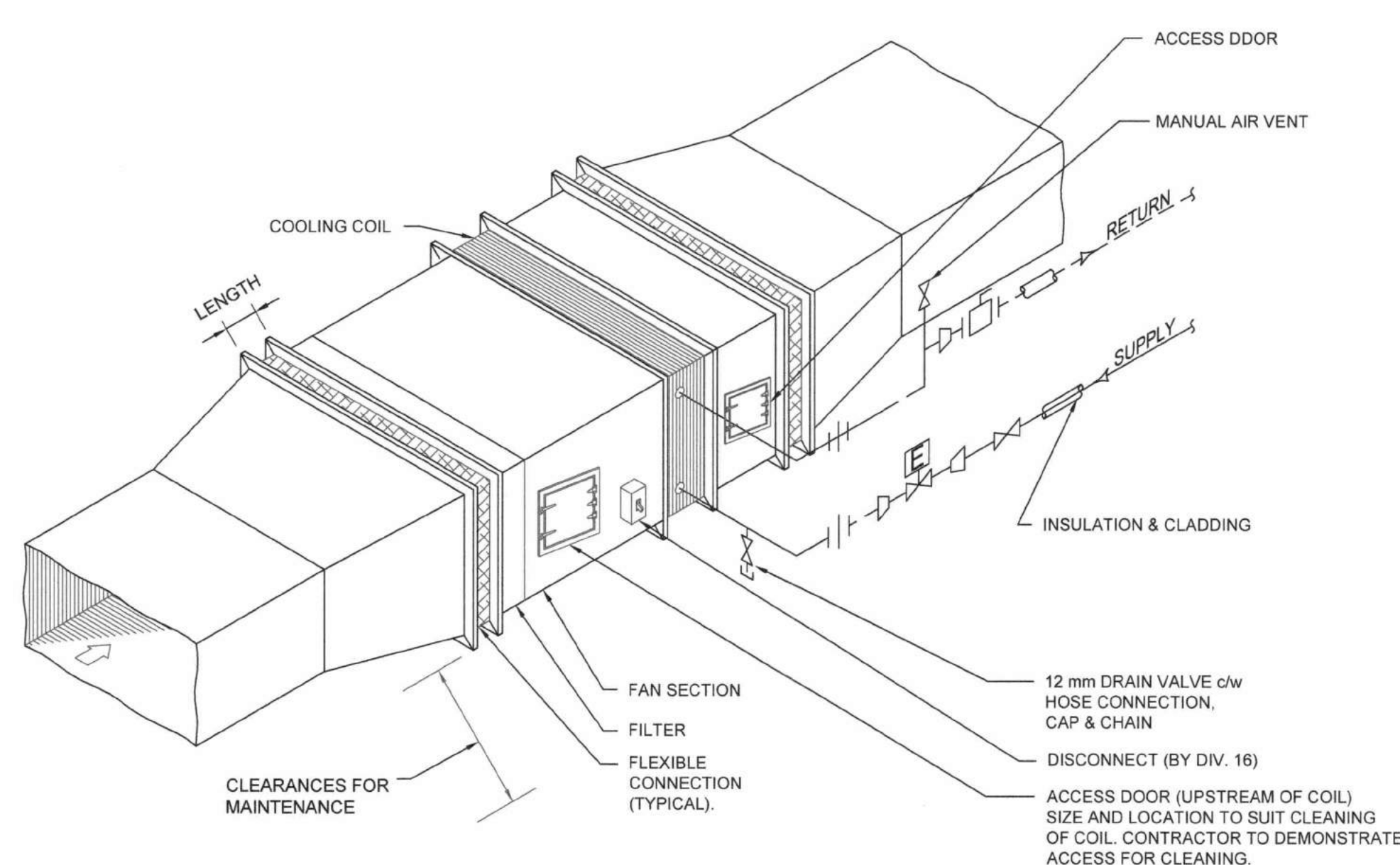
3 HYDRONIC FINNED TUBE CONVECTOR HOOK-UP (WALL)
SCALE: NTS



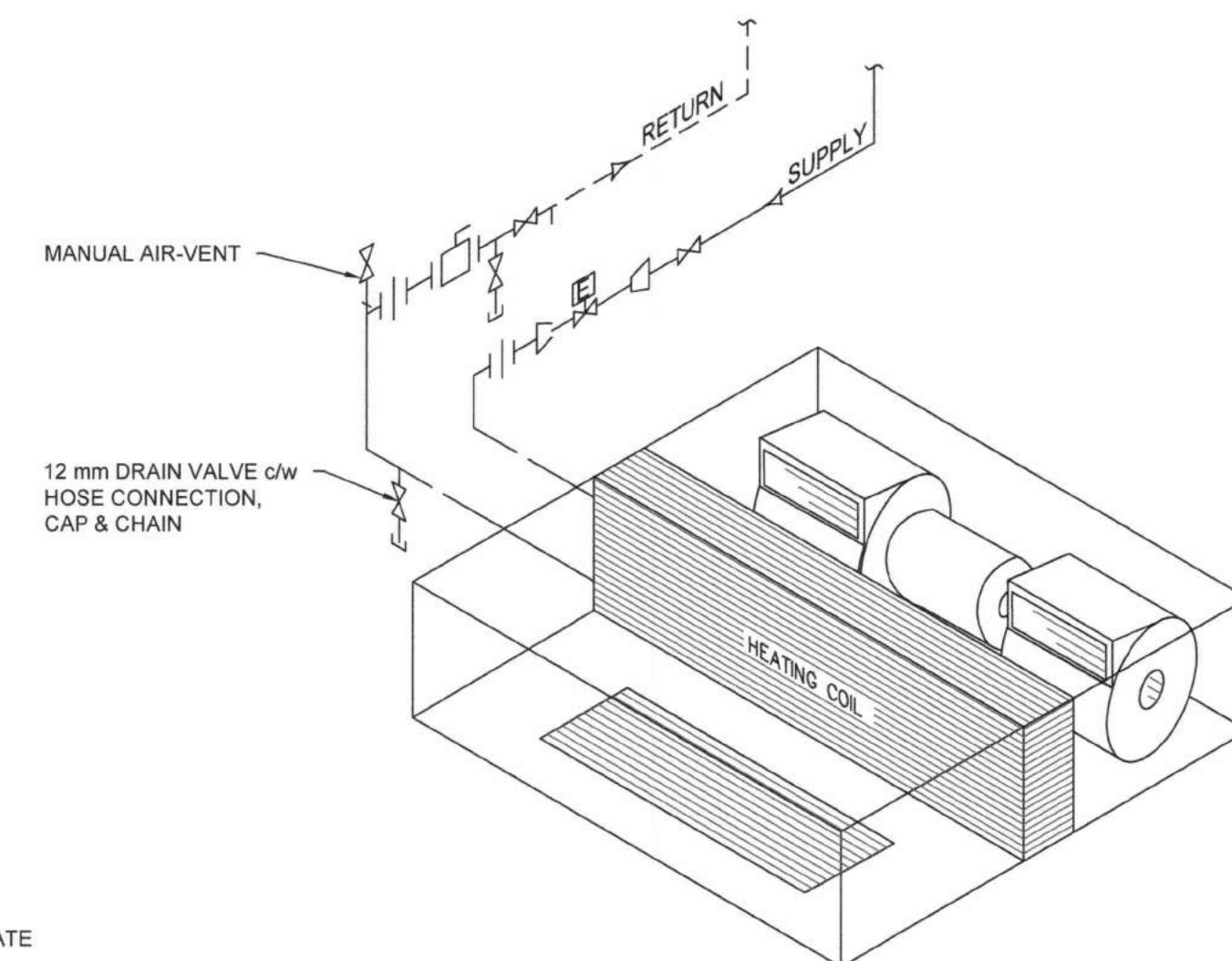
4 DUCT MOUNTED HYDRONIC HEATING COIL HOOK-UP (2-WAY CONTROL VALVE)
SCALE: NTS



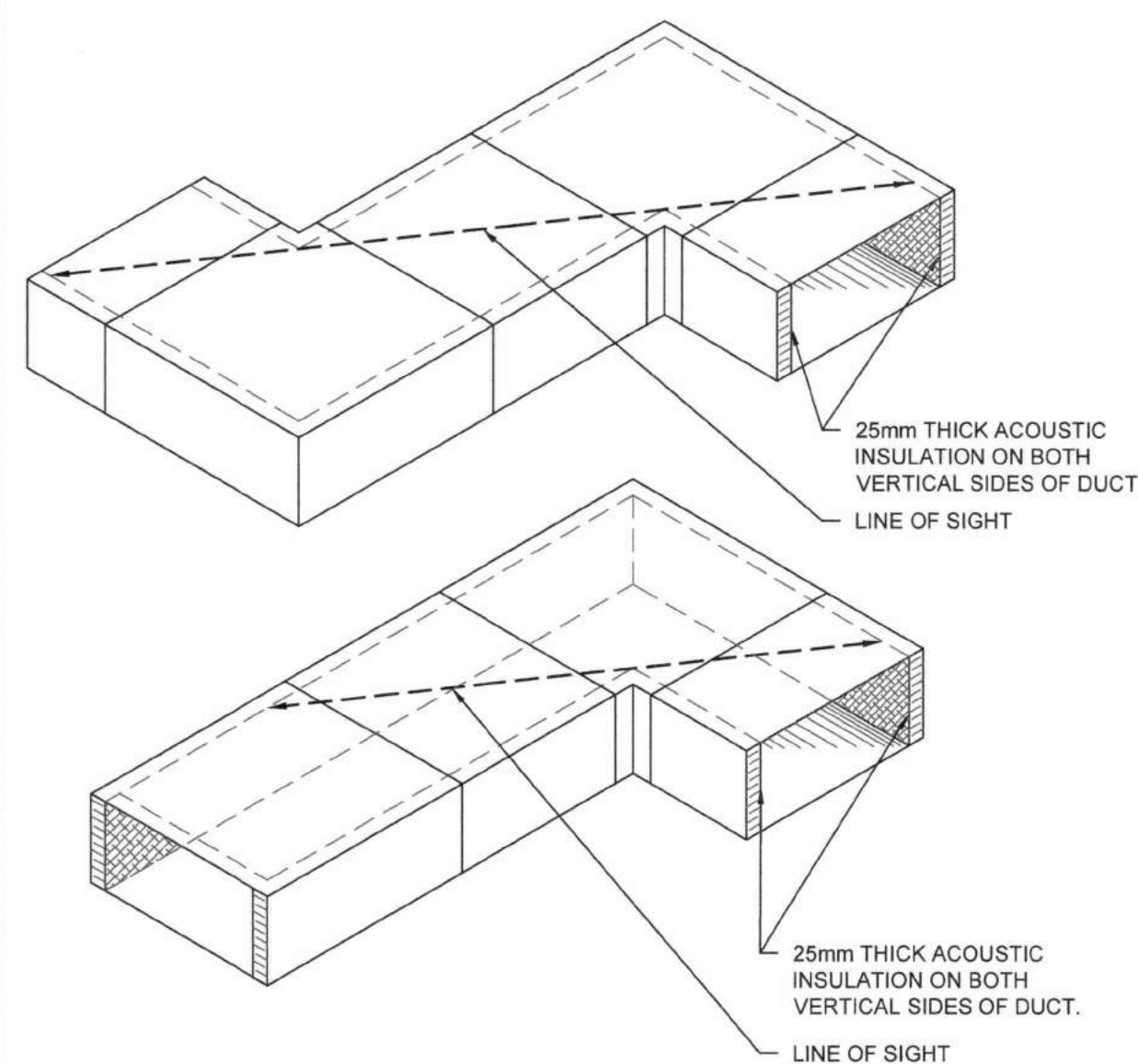
5 FAN COIL UNIT HYDRONIC HEATING HOOK-UP
SCALE: NTS



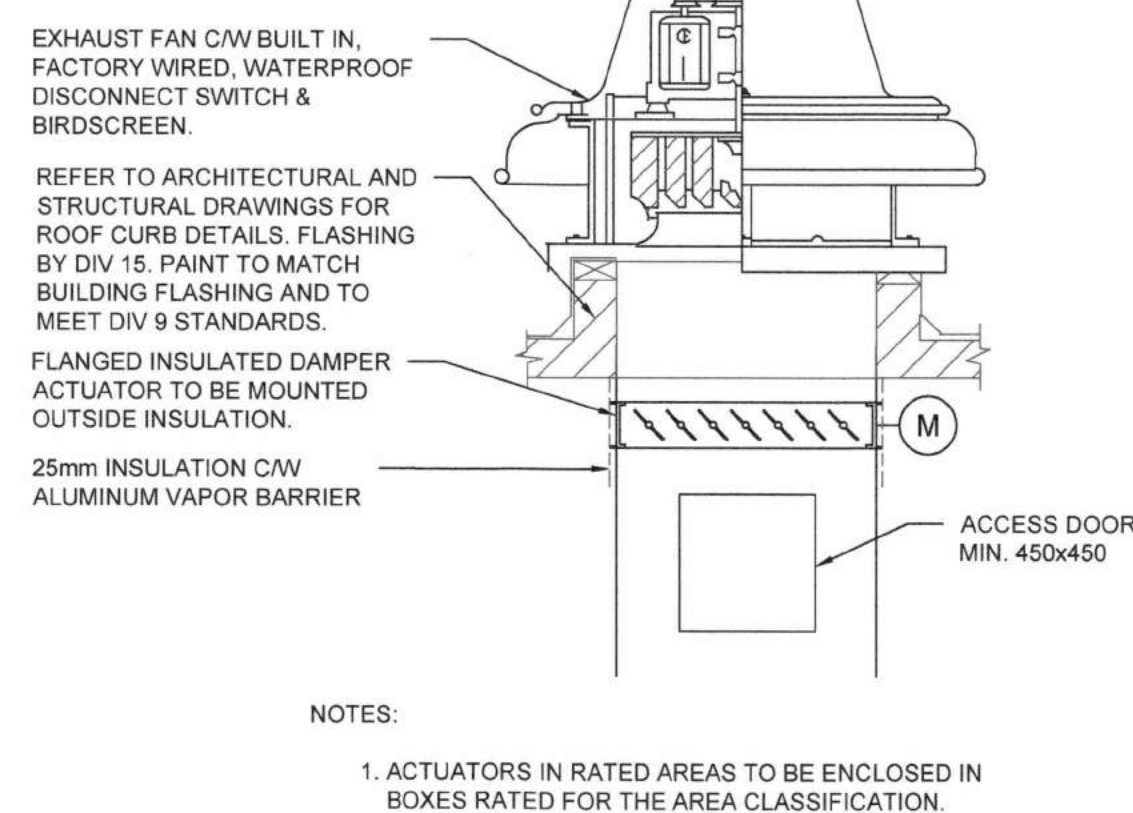
6 FAN COIL UNIT HOOK-UP (FOR COOLING OPTION)
SCALE: NTS



7 CABINET UNIT HEATER HYDRONIC HOOK-UP (CEILING)
SCALE: NTS

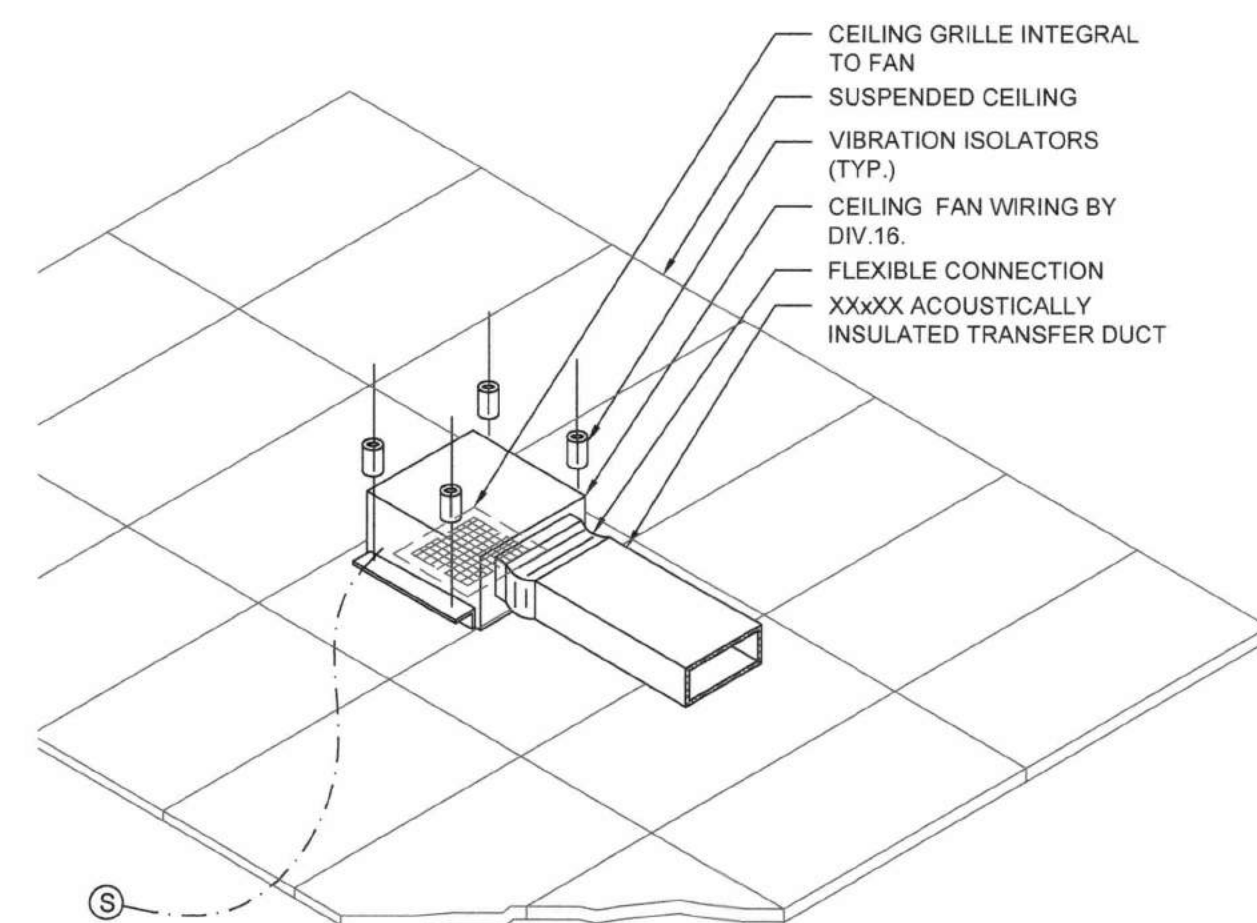


8 ACOUSTIC TRANSFER DUCT
SCALE: NTS

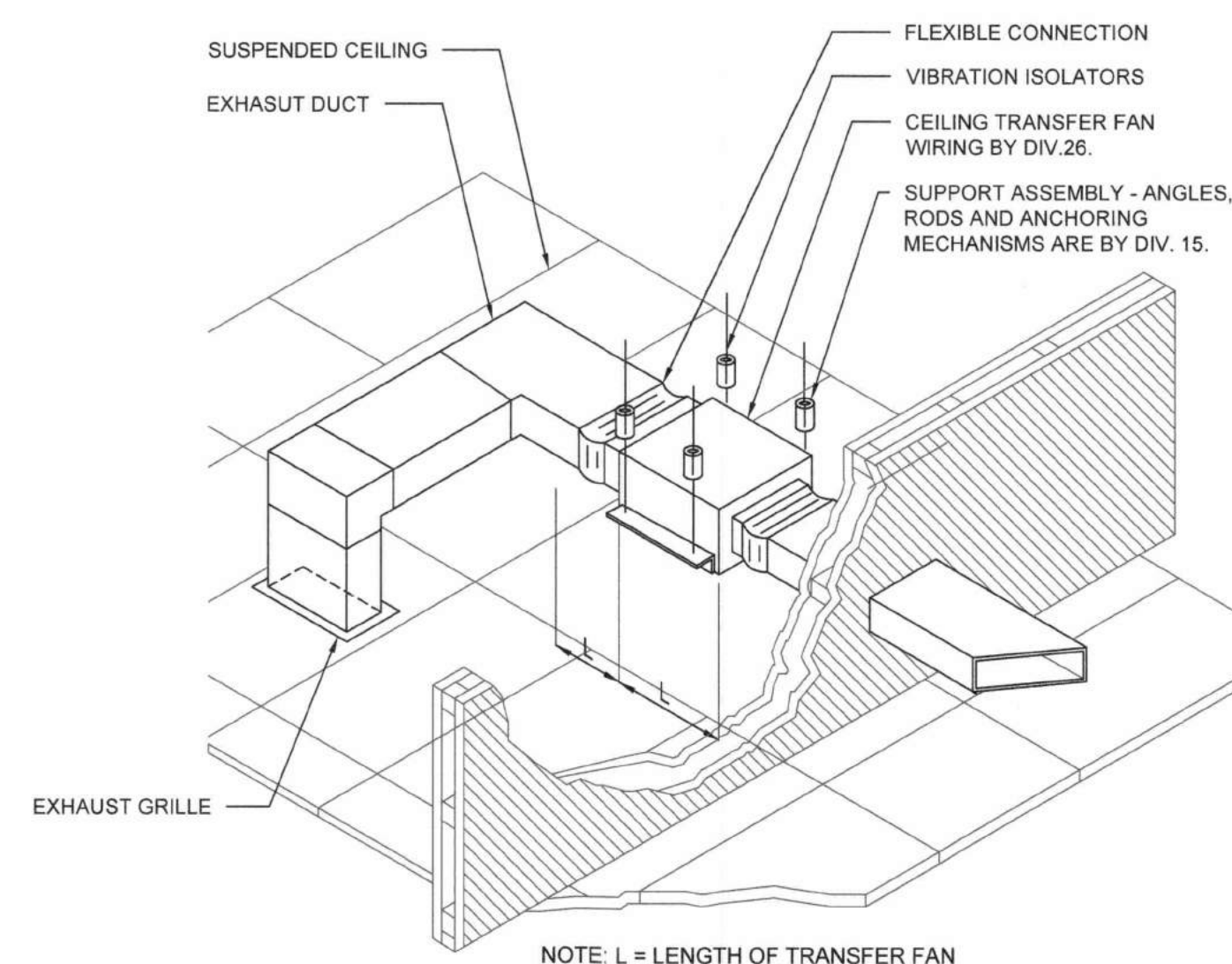


NOTES:
1. ACTUATORS IN RATED AREAS TO BE ENCLOSED IN BOXES RATED FOR THE AREA CLASSIFICATION.

9 ROOF EXHAUSTER DETAIL
SCALE: NTS

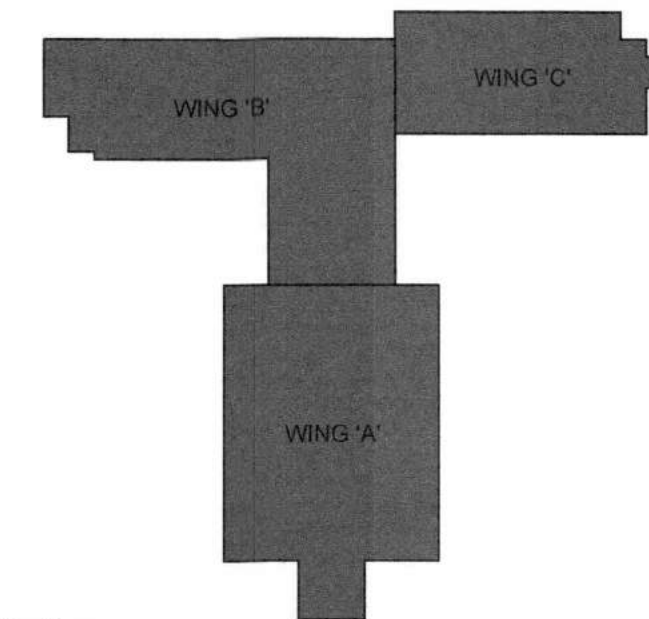


10 CEILING FAN MOUNTING DETAIL
SCALE: NTS



NOTE: L = LENGTH OF TRANSFER FAN

11 TRANSFER FAN MOUNTING DETAIL
SCALE: NTS



Key Plan

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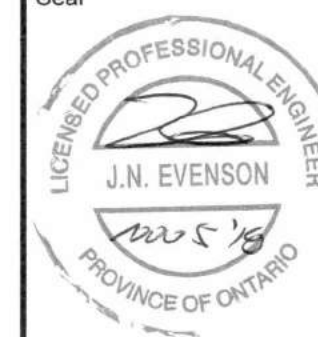
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Orientation



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Project

**BUILDING #046
RENOVATIONS**

Drawing Title

**MECHANICAL STANDARD
DETAILS**

Project No.
504034

Location

**UNIVERSITY OF GUELPH
BUILDING #046**

Scale

NTS

Date

NOV 2, 2018

Drawn by

HW

Drawing No.

Checked By

KT

Approved By

JE

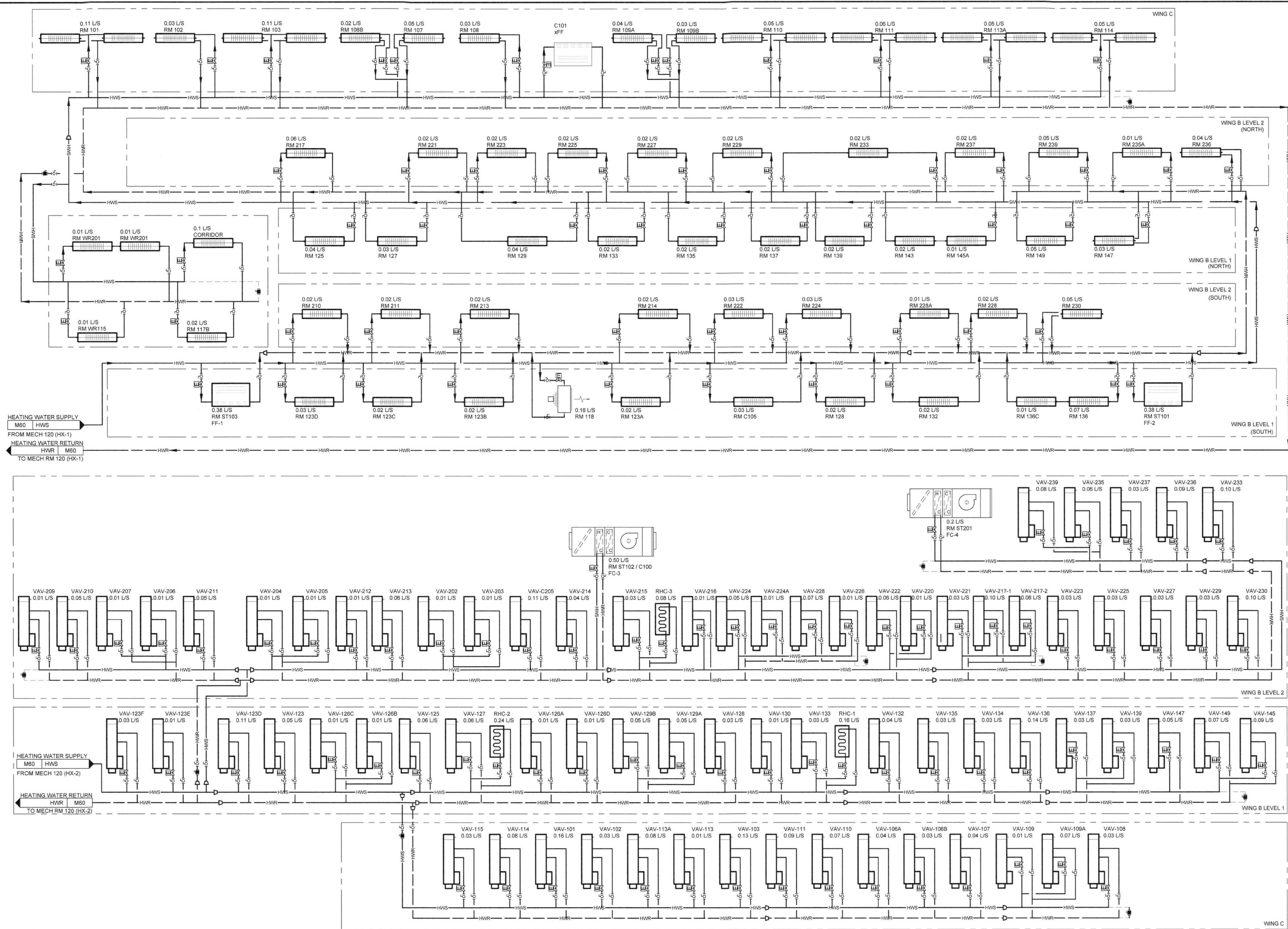
JLR #

27915

M54

of 173

Cad File No. ----



DO NOT SCALE DRAWINGS:
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NO.	ISSUED	BY	DATE

Orientation

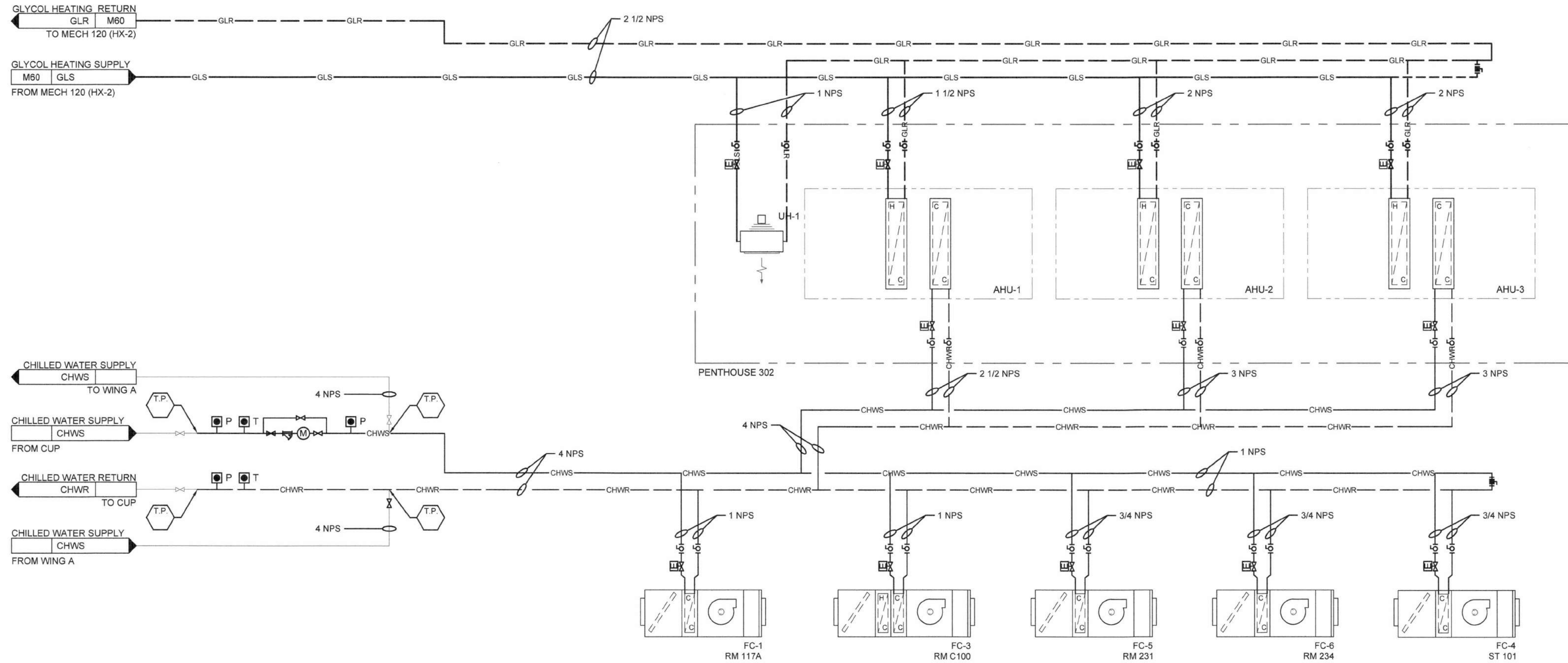
Seal
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Design, Engineering & Construction
Physical Resources
Guelph, Ontario. N1G 2W1

Consultant
J.L. Richards
ENGINEERS • ARCHITECTS • PLANNERS

Project
BUILDING #046
RENOVATIONS
Drawing Title
HOT WATER HEATING
SCHEMATICS
Project No.
504034
Location
UNIVERSITY OF GUELPH
BUILDING #046

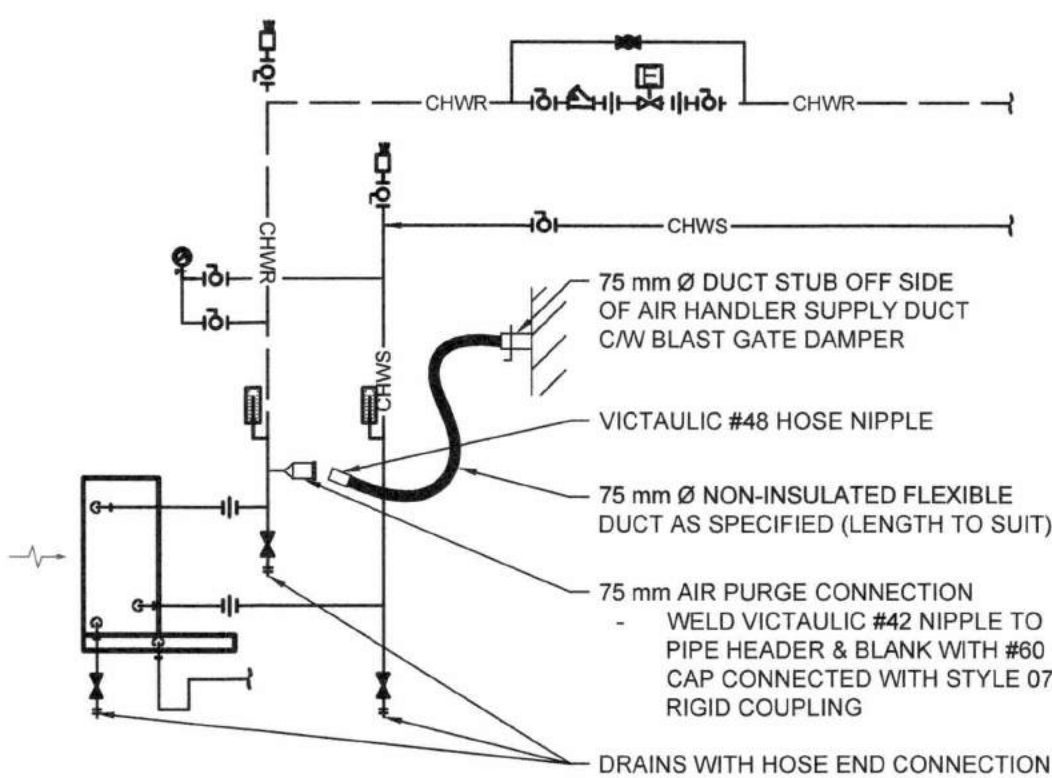
Scale NTS	Date NOV 2, 2018
Drawn by HW	Drawing No. M61
Checked By NC	
Approved By KDT	
JLR # 27915	of 173



1
M62

CHILLED WATER SCHEMATIC

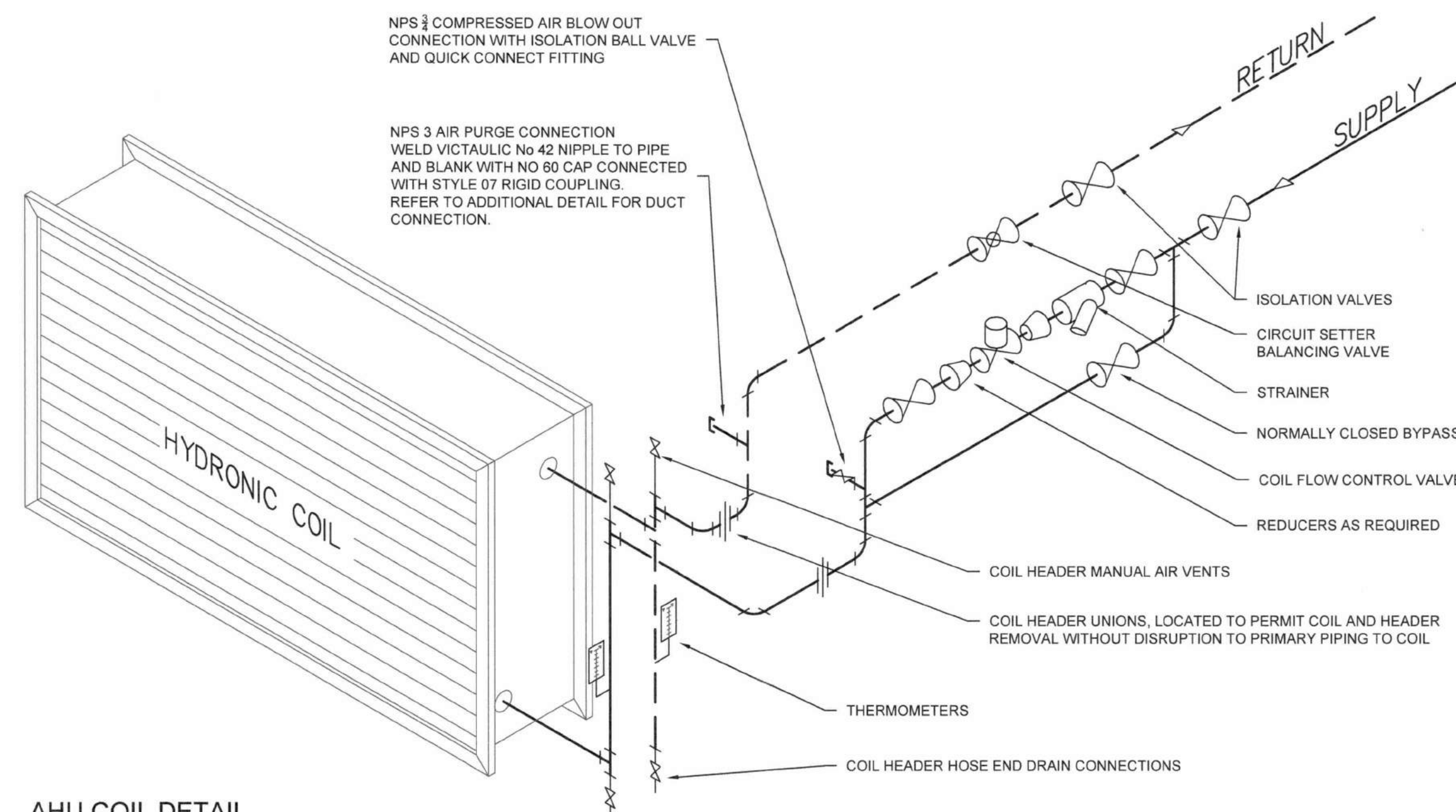
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2
M62

CHILLED WATER COIL PURGE BLOWDOWN DETAIL

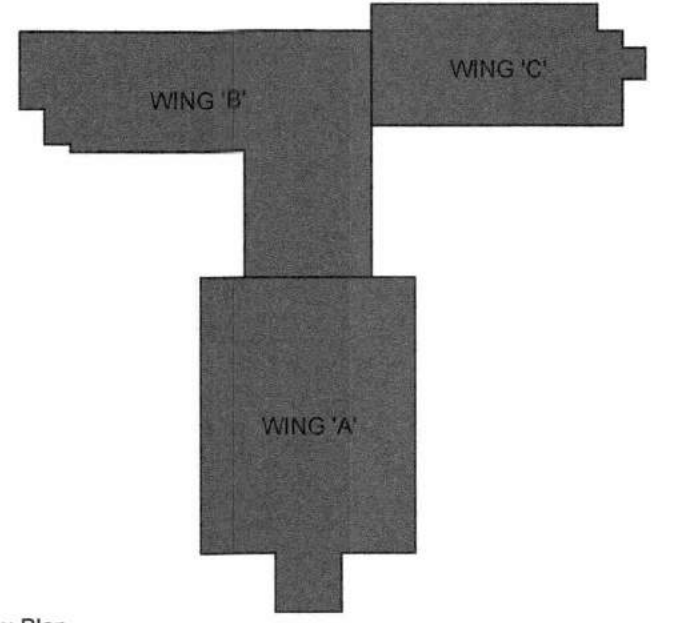
SCALE: NTS



3
M62

AHU COIL DETAIL

SCALE: NTS



Key Plan

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UNEXPECTED DISCOVERY OF ASBESTOS:

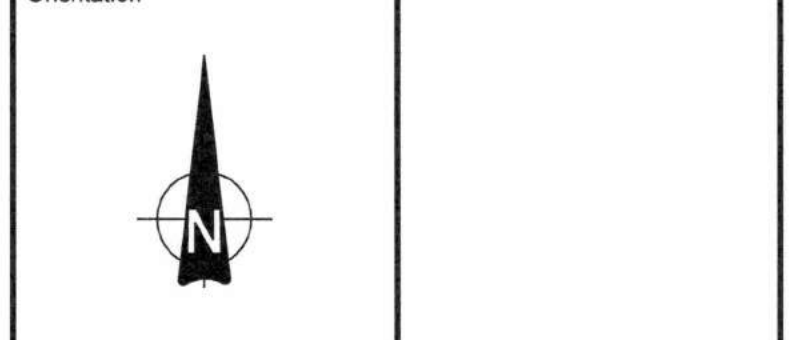
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Project
BUILDING #046 RENOVATIONS

Drawing Title

CHILLED WATER AND GLYCOL SCHEMATIC
Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

Scale
NTS

Date
NOV 2, 2018

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HW

Checked By
NC

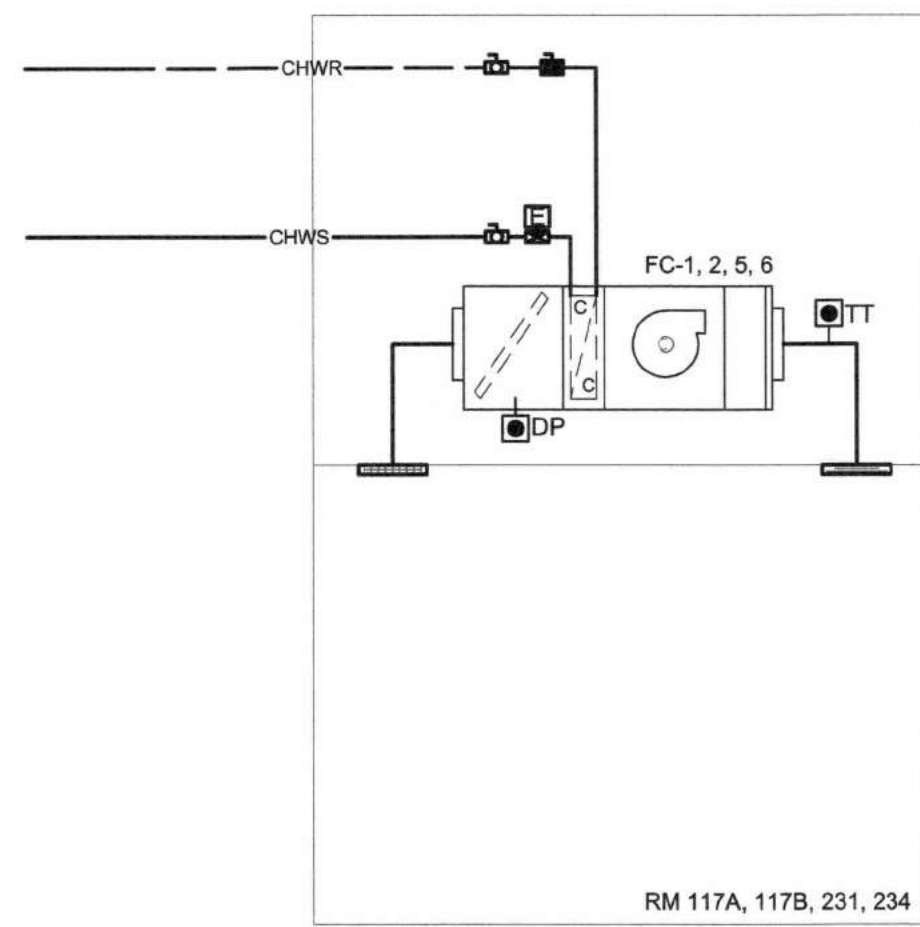
Approved By
KDT

JLR #
27915

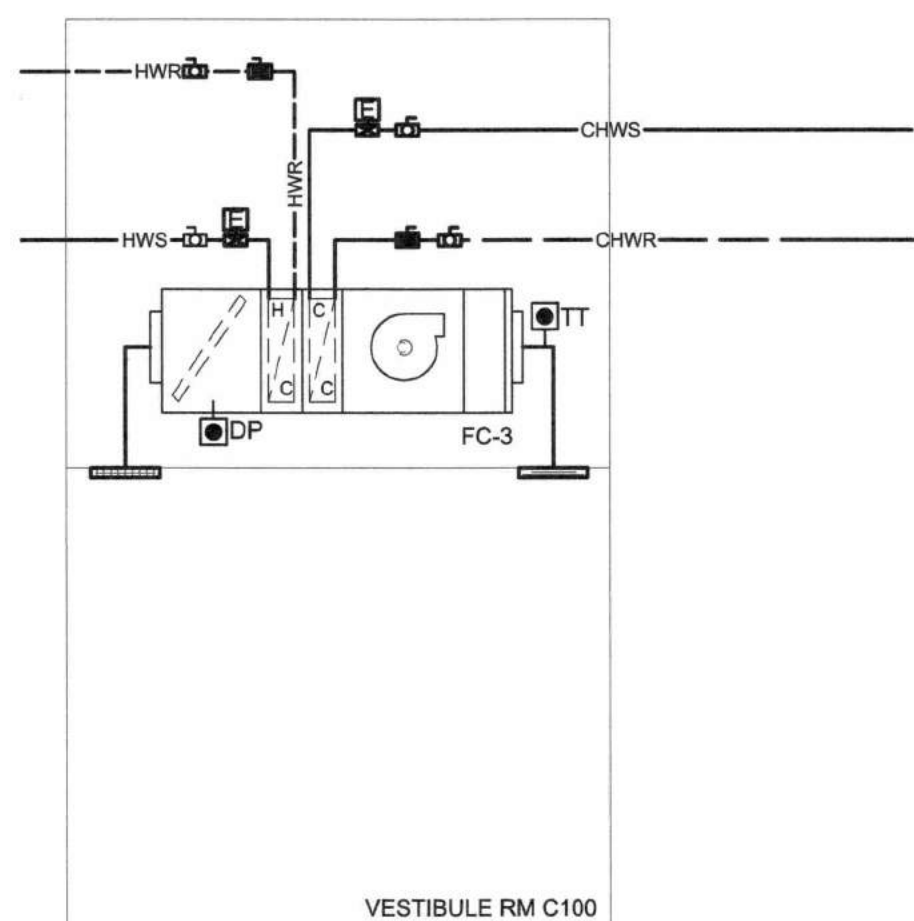
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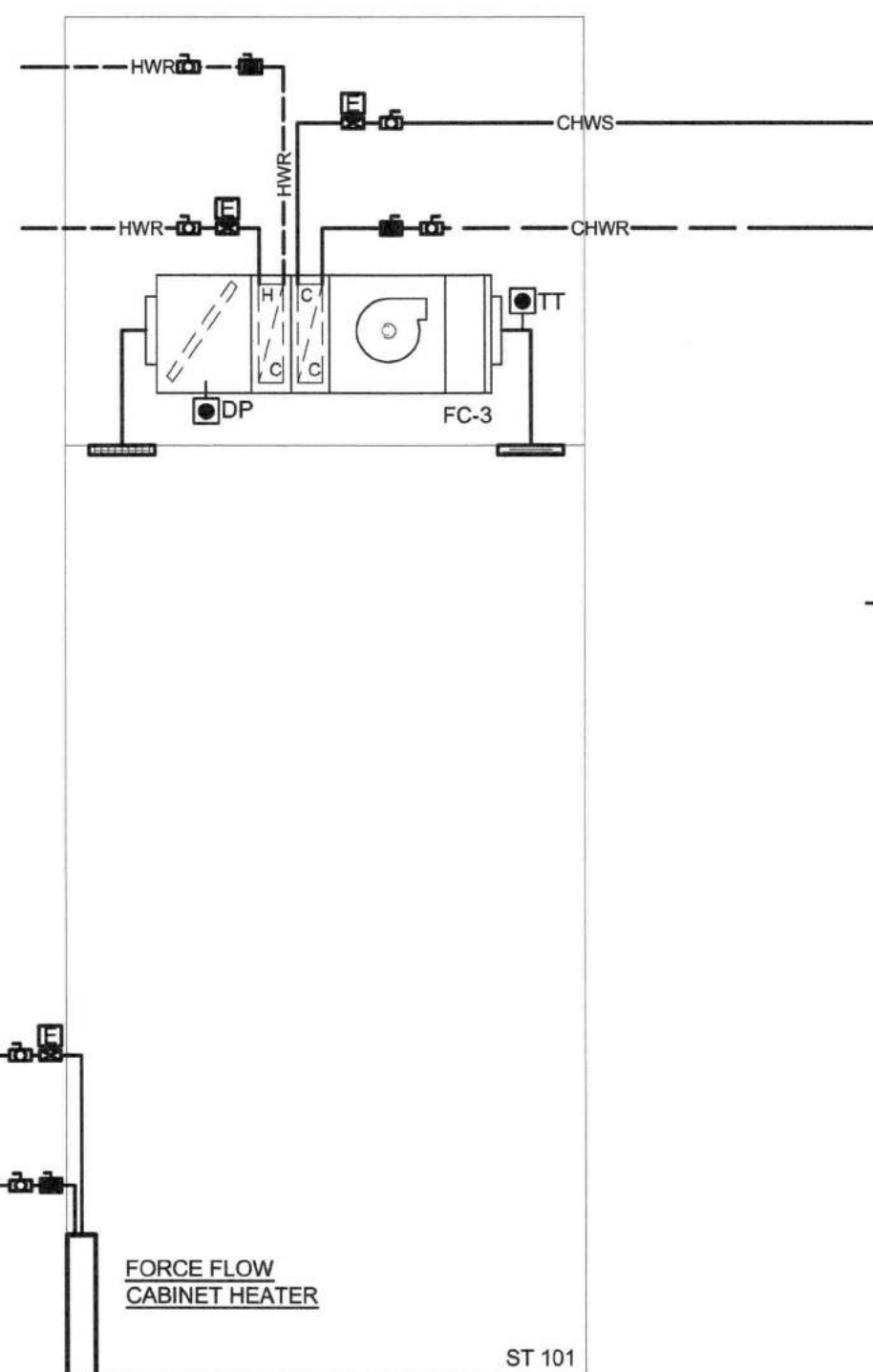
of 173



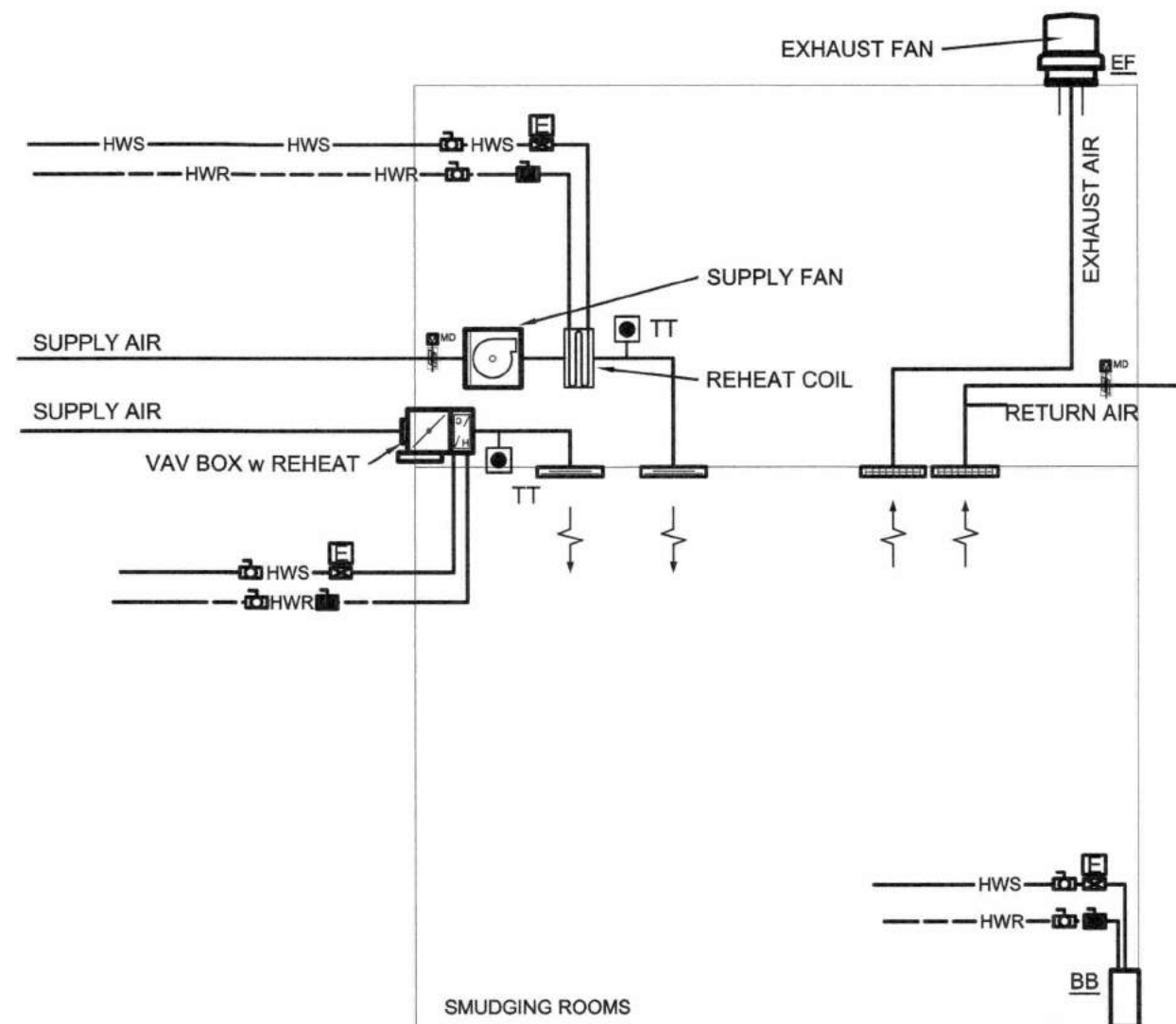
2 TYPICAL COOLING ONLY FAN COIL
SCALE: NTS



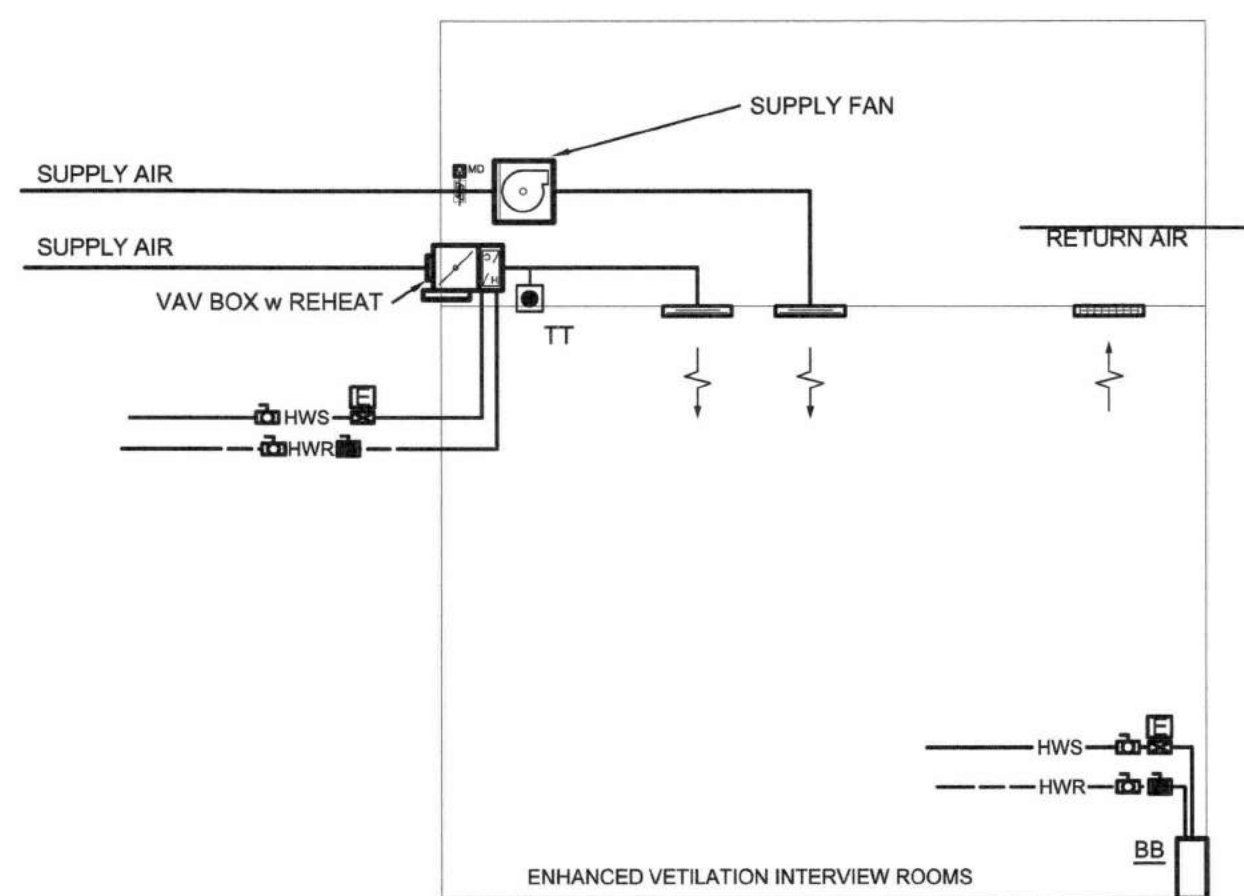
3 TYPICAL COOLING / HEATING FAN COIL
SCALE: NTS



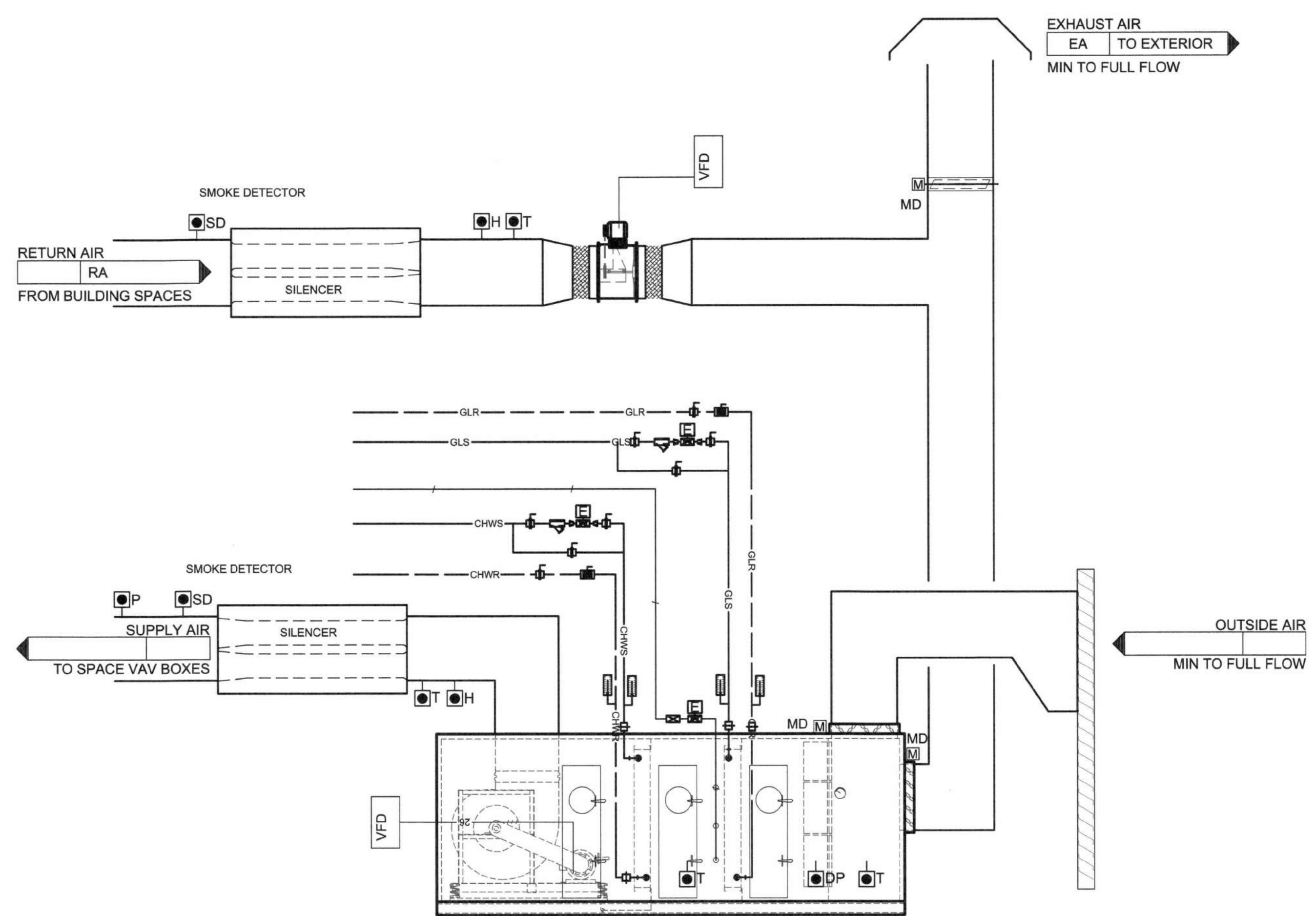
4 STAIR 101 COOLING / HEATING
SCALE: NTS



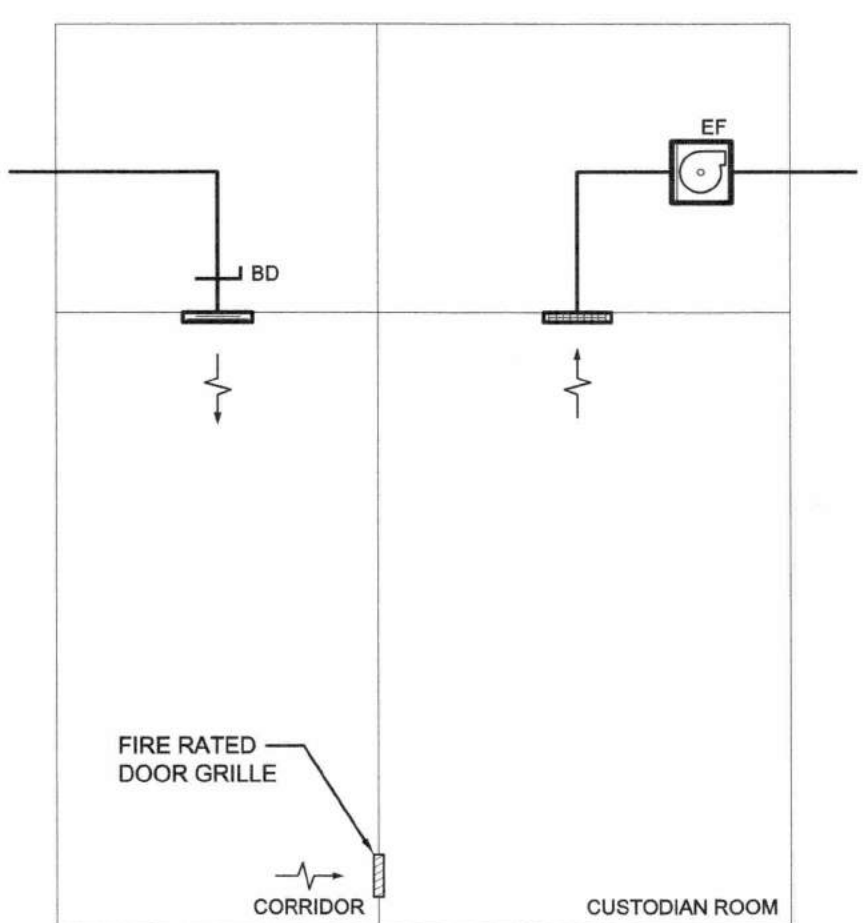
5 SMUDGING ROOM VENTILATION
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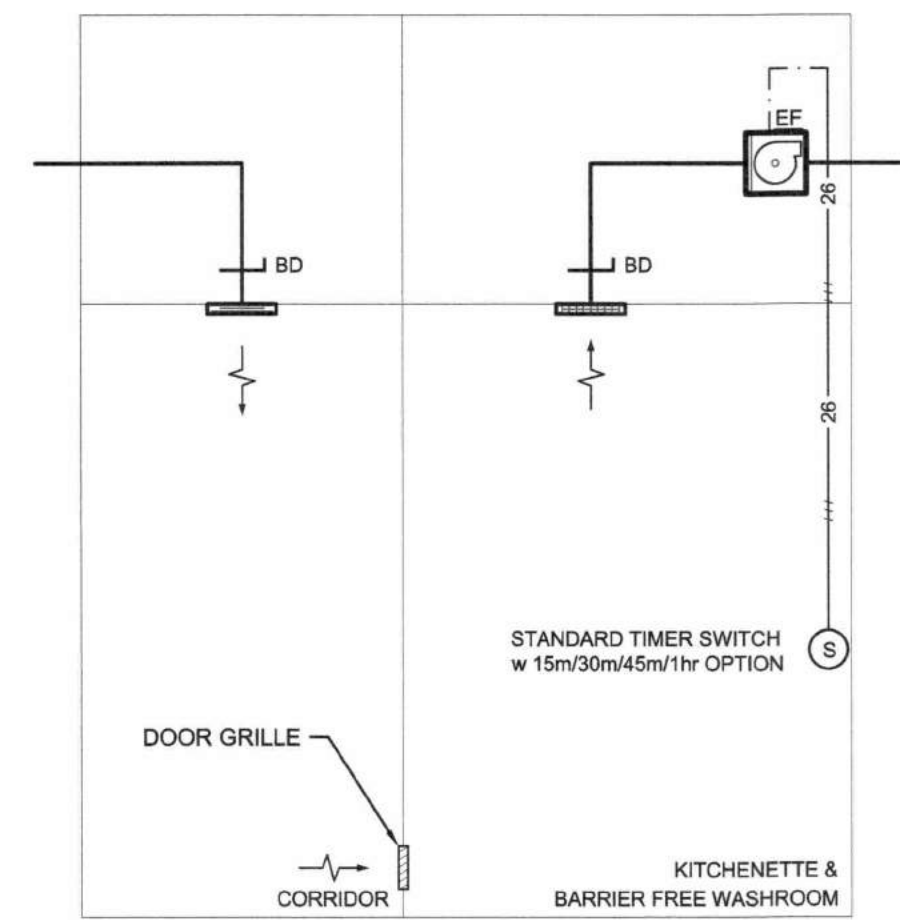
6 INTERVIEW ROOM VENTILATION
SCALE: NTS



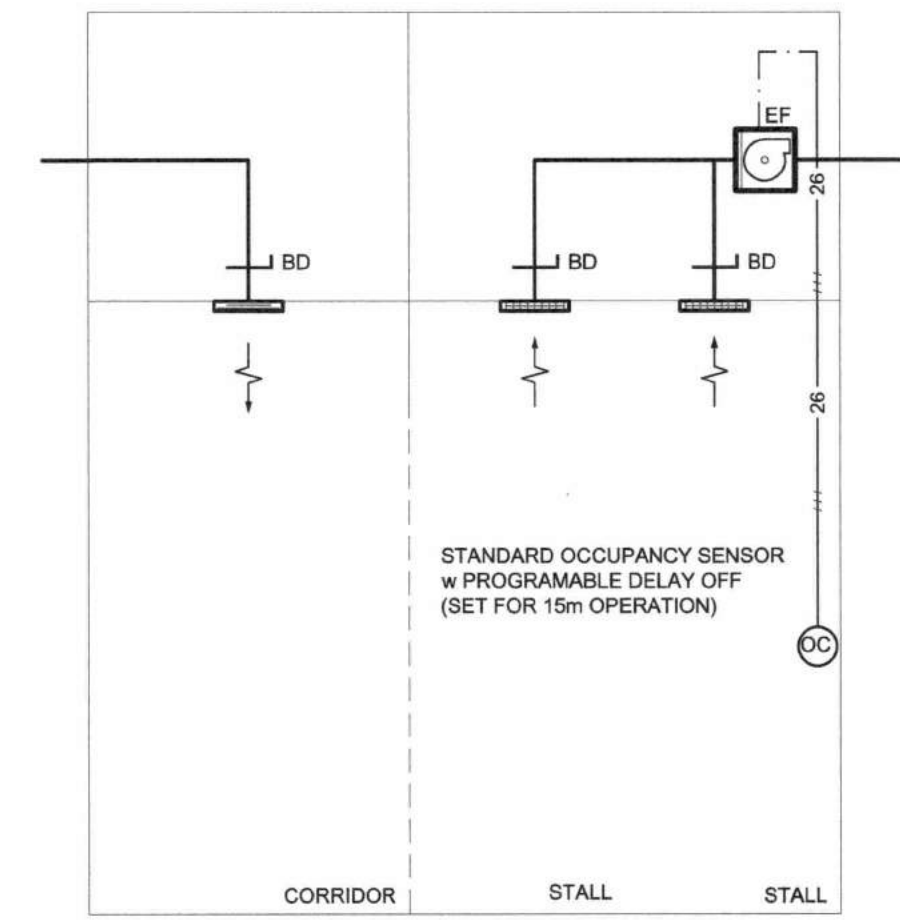
1 (X3) TYPICAL AIR HANDLING UNIT
SCALE: NTS



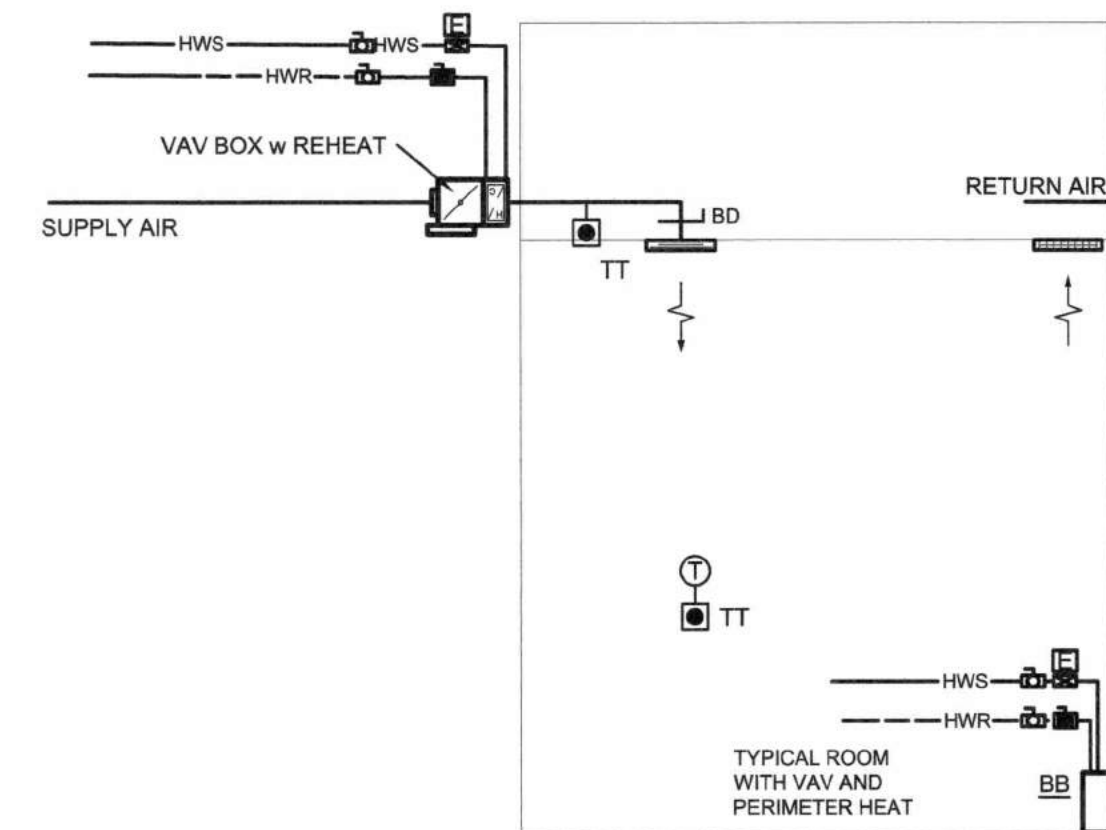
8 CUSTODIAN ROOM VENT
SCALE: NTS



9 KITCHENETTE VENTILATION
SCALE: NTS



10 WASHROOM VENTILATION
SCALE: NTS



7 TYPICAL VAV BOX CONTROL
SCALE: NTS

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Physical Resources
Guelph, Ontario. N1G 2W1

Consultant www.jrichards.ca

J.R. J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS

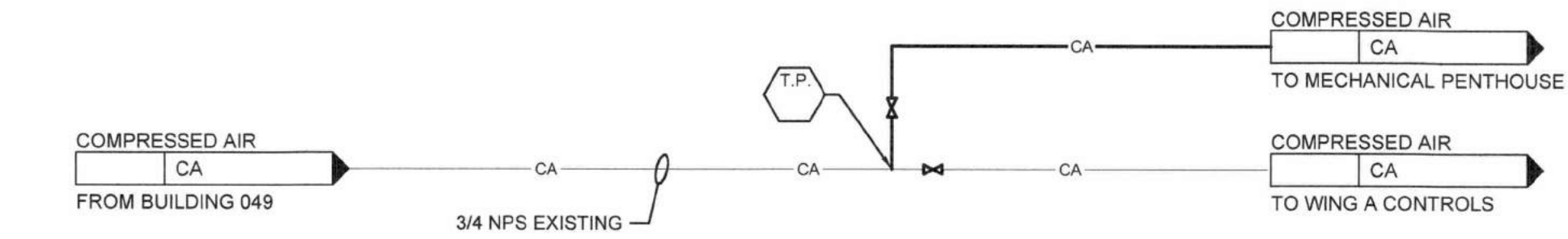
Project
BUILDING #046
RENOVATIONS

Drawing Title
VENTILATION SCHEMATICS

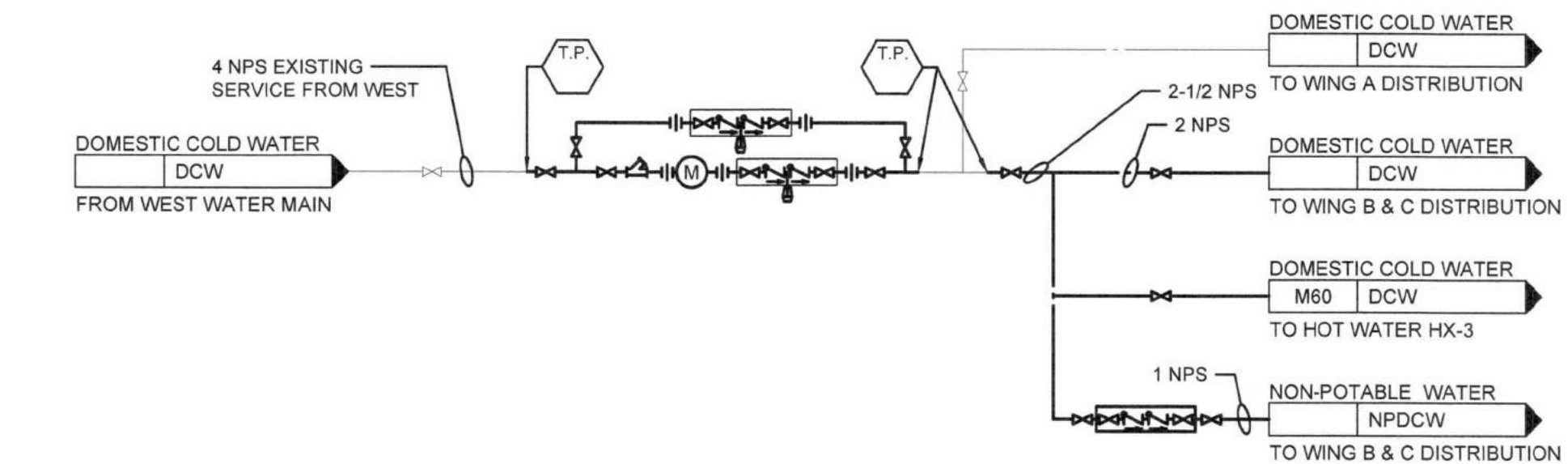
Project No.
504034

Location
UNIVERSITY OF GUELPH
BUILDING #046

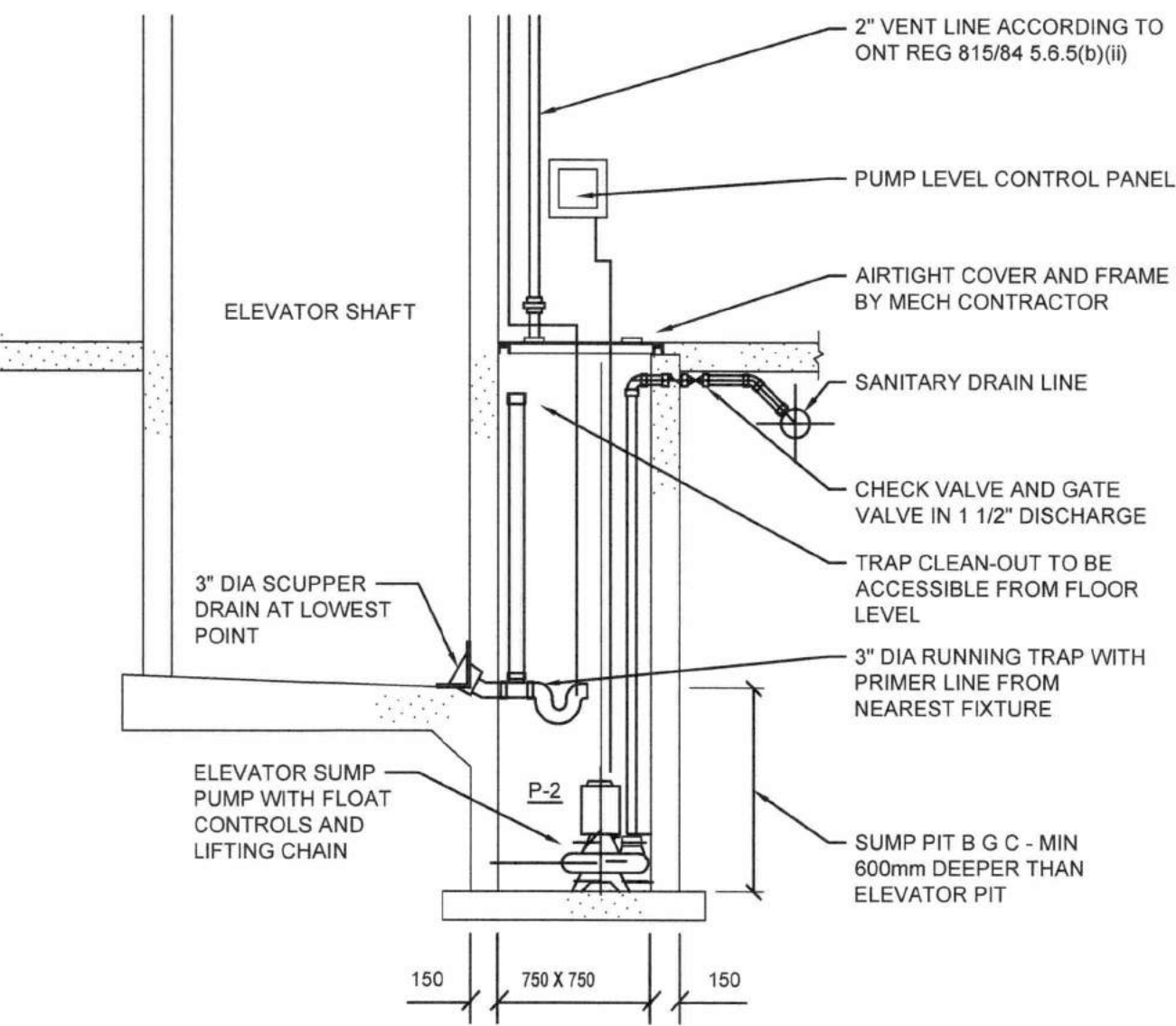
Scale
NTS
Date
NOV 2, 2018
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HW
Drawing No.
Checked By
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KDT
JLR #
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1 COMPRESSED AIR DISTRIBUTION
SCALE: NTS

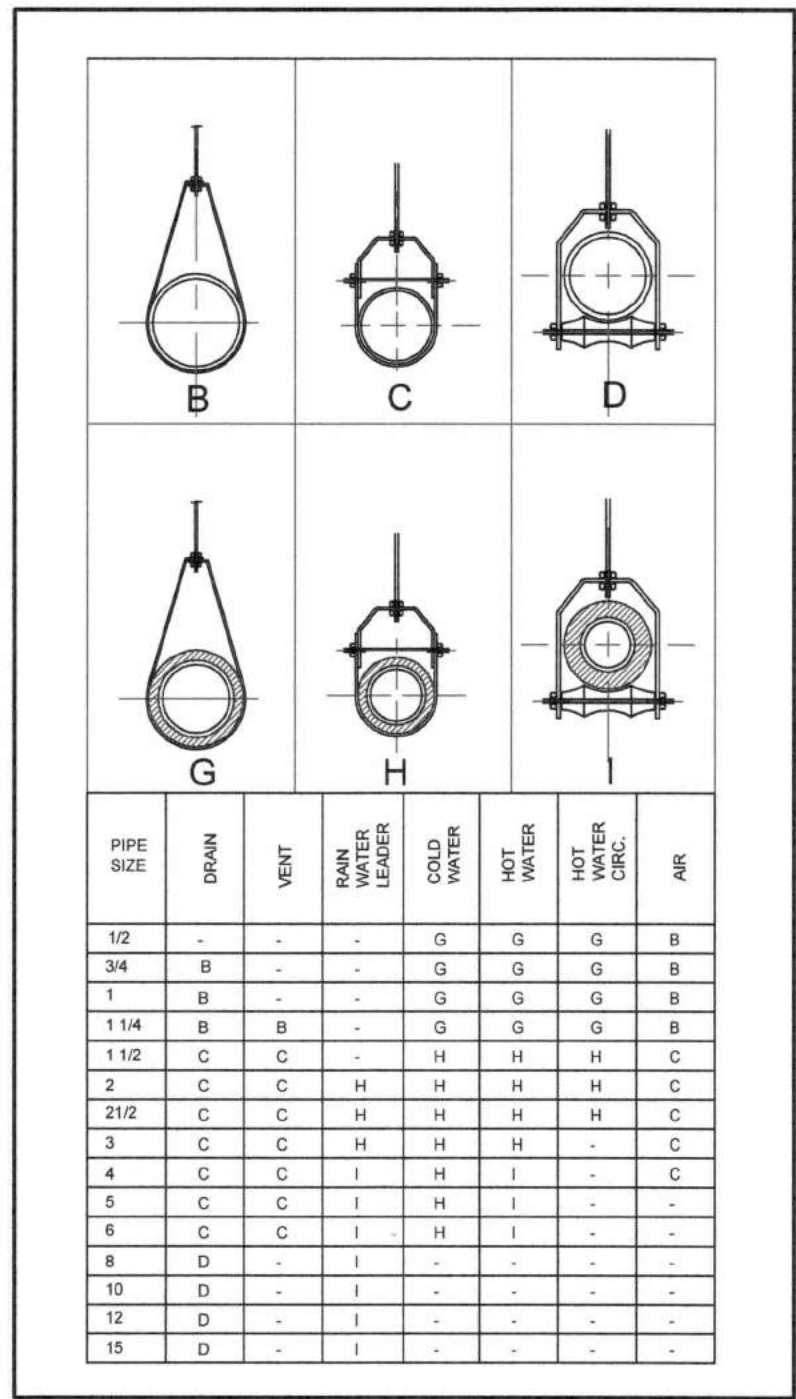


2 INCOMING WATER SCHEMATIC
NTS



3 ELEVATOR SUMP DETAIL
NTS

PLUMBING FIXTURE SCHEDULE											
I.D.	DESCRIPTION	MANUF./MODEL	CONNECTION SIZE					ACCESSORIES		COMMENTS	
			SAN	VENT	DCW	DHW	TEMP WATER	TRAP	TRIM		
			NPS	NPS	NPS	NPS	°C				
WC-1	FLOOR MOUNT BOTTOM OUT, ELONGATED, 1-1/2 NPS TOP SPUD MANUAL FLUSH VALVE, B.F. 419mm	AMERICAN STANDARD MACERA FLOWISE 34 61001	3	2-1/2	1	-	-	INTEGRAL	DELTA/81T201 MANJAL FV, B.F. 4.8 Lpf	C/W HEAVY DUTY ELONGATED SEAT OPEN FRONT - LESS COVER	
L-1	UNDERMOUNT, B.F. SINGLE HOLE, GLAZED UNDERSIDE W/ SENSOR TRIM	AMERICAN STANDARD/ OVALYN 0495.300	1-1/4	2	1/2	1/2		P-TRAP	DELTA/DEMD-111LF-NS W/ 060997A REMOTE CONTROL AND 1.9 Lpm	C/W MOUNTING KIT, TMV, BRADLEY NAVIGATOR S59-4016 AND SENSOR HARD WIRE CONVERSION KIT	
L-2	WALL HUNG, BARRIER FREE, SINGLE HOLE /KNEE SHROUD & SENSOR TRIM	AMERICAN STANDARD/ MURRO 0955 001EC & 0059 020EC	1-1/4	2	1/2	1/2		P-TRAP	DELTA / DECKMOUNT HI-RISE W/ SENSOR 590T0150 W/ 1.9 L/min LAMINAR OUTLET	C/W WALL CARRIER, KNEE SHROUD, TMV, BRADLEY NAVIGATOR S59-4016 & SENSOR HARDWIRE CONVERSION KIT	
L-3	WALL HUNG, 4°C/C, DECK MOUNT TRIM W/ VACUUM BREAKER	AMERICAN STANDARD/ LUCERNE 0355.027	1-1/4	2	1/2	1/2		P-TRAP	DELTA / W6720-9 WITH BLADE HANDLES	INSULATE AND COVER P-TRAP	
SS-1	SINGLE BOWL, UNDERMOUNT, SS (460x508x200DP)	FRANKE / UCS6808P-1	1-1/2	2	1/2	1/2	-	P-TRAP	DELTA / 101LF-HDF		
SS-2	DOUBLE BOWL, UNDERMOUNT, SS (460x794x200DP)	FRANKE / UCD6408P-1	1-1/2	2	1/2	1/2	-	P-TRAP	DELTA / 101LF-HDF		
WS-1	WATER STATION - REFRIGERATED WITH BOTTLE FILLER, SS FINISH, BF	ELKAY / EZS8WS/VR/SK	1-1/4	2	1/2	-	-	P-TRAP	-	BARRIER FREE INSTALLATION	
MS-1	SS MOP SINK WITH WALL GUARDS	FRANKE / FSS2222/0316-1	2	2	1/2	1/2	-	P-TRAP	DELTA / 28C9LH WALL MOUNT FAUCET W/ PAIL HOOK AND VACUUM BREAKER	SS WALL GAURDS TO EXTEND 600mm BEYOND MOP SINK EDGE AND 600mm ABOVE TOP EDGE	
HB-1	INTERIOR HOSE BIBB W/ VACUUM BREAKER	WATTS / SC8-5	-	-	1/2	-	-	-	-	-	
HB-2	INTERIOR HOSE BIBB W/ VACUUM BREAKER AND LOCKABLE COVER	WATTS / HY-330	-	-	3/4	-	-	-	-	-	
NFHB-1	NON-FREEZE HOSE BIBB W/ VACUUM BREAKER AND LOCKABLE COVER	WATTS / HY-725	-	-	3/4	-	-	-	-	-	
FD-1	FLOOR DRAIN	WATTS/ FD-100-C	3	2	-	-	-	P-TRAP	-	C/W TRAP SEAL PRIMER CONNECTION	
FFD-1	FUNNEL FLOOR DRAIN	WATTS/ FD-100C-EG	3	2	-	-	-	P-TRAP	-	C/W TRAP SEAL PRIMER CONNECTION	
FFD-2	FUNNEL FLOOR DRAIN	WATTS/ FD-100C-EG	4	-	-	-	-	P-TRAP	-	C/W TRAP SEAL PRIMER CONNECTION	
PD-1	PIT DRAIN - ELEVATOR	WATTS/ BV-600	3	2	-	-	-	P-TRAP	-	C/W BACK WATER VALVE	
TSP-1	ELECTRONIC TRAP SEAL PRIMER	PPP / MP-500-115V	-	-	1/2	-	-	-	-	PROVIDE 1-4 DISTRIBUTION AS NEEDED, C/W CABINET	
RD-1	ROOF DRAIN	WATTS / RD-100	-	-	-	-	-	-	-	SIZE AS INDICATED ON DRAWING, COORDINATE INSTALLATION AND REQUIREMENTS WITH THE ROOFING CONTRACTOR	
EW-1	SINK-MOUNT EYE / FACE WASH	HAWS/7610	-	-	1/2	1/2	-	-	-	C/W THERMOSTATIC MIXING VALVE AXION 9201EFE.	



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LICENSED PROFESSIONAL ENGINEER
J.N. EVENSON
2011/13
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UNIVERSITY OF GUELPH
Design, Engineering & Construction
Physical Resources
Guelph, Ontario. N1G 2W1

Consultant
J.L.Richards
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Project
BUILDING #046
RENOVATIONS

Drawing Title
PLUMBING SCHEDULE AND
SCHEMATICS
Project No.
504034

Location
UNIVERSITY OF GUELPH
BUILDING #046

Scale
AS NOTED
Date
NOV 2, 2018
Drawn by
HW
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KDT
JLR #
27915
of 173

M64

Cad File No. ----

PUMP SCHEDULE														
I.D.	DESCRIPTION	MANUF./MODEL	TYPE	OPERATING POINT 'A'			FLUID	MOTOR				MAX. WORKING PRESSURE	WEIGHT	COMMENTS
				FLOW	TDH	HYD EFF.		Kw	VOLT	PH	RPM			
				L/s (gpm)	M (ft)	%						kPa (PSI)	Kg (lbs)	
P-1	HOT WATER HEATING SUPPLY-PERIMETER HEAT	ARMSTRONG / TBD (OR APPROVED ALTERNATE)	VERTICAL IN-LINE	3.35 (53)	24.4 (80)	53.19%	WATER	2.3	575	3	3109	1207 (175)	117 (257)	VFD , C/W PACKAGED HEAT EXCHANGER SKID HX-1
P-1A	HOT WATER HEATING SUPPLY- PERIMETER HEAT	ARMSTRONG / TBD (OR APPROVED ALTERNATE)	VERTICAL IN-LINE	3.35 (53)	24.4 (80)	53.19%	WATER	2.3	575	3	3109	1207 (175)	117 (257)	VFD , C/W PACKAGED HEAT EXCHANGER SKID HX-1
P-2	HOT WATER HEATING SUPPLY - RE-HEAT COILS	ARMSTRONG / TBD (OR APPROVED ALTERNATE)	VERTICAL IN-LINE	4.04 (64)	27.9 (90)	55.51%	WATER	2.3	575	3	3182	1207 (175)	117 (257)	VFD , C/W PACKAGED HEAT EXCHANGER SKID HX-2
P-2A	HOT WATER HEATING SUPPLY - RE-HEAT COILS	ARMSTRONG / 4380 (OR APPROVED ALTERNATE)	VERTICAL IN-LINE	4.04 (64)	27.9 (90)	55.51%	WATER	2.3	575	3	3182	1207 (175)	117 (257)	VFD , C/W PACKAGED HEAT EXCHANGER SKID HX-2
P-3	DOMESTIC HOT WATER RECIRCULATION	ARMSTRONG / 250 SS (OR APPROVED ALTERNATE)	IN-LINE	0.33 (5.2)	4.25 (13.8)	-	POTABLE WATER	0.16	115	1	-	1035 (150)	4.54 (10)	C/W 3 SPEED MOTOR, ADJUSTABLE 24/7 TIMER & MANUAL OVERRIDE
P-4	ELEVATOR SUMP PUMP	MYERS / ME45MC-11 (OR APPROVED ALTERNATE)	SUBMERSIBLE	3.16 (50)	7.1 (23)	-	WATER/OIL	0.4	115	1	3450	1035 (150)	26.5 (58)	C/W PUMP CONTROL PACKAGE, PROBE/FLOAT HOUSING W/ PUMP OFF, PUMP START, HIGH LEVEL FLOATS AND HIGH-HIGH LEVEL PROBE. REMOTE ALARM & BACNET COMPATIBLE
P-5	GLYCOL HEATING SUPPLY	ARMSTRONG / 4380 (OR APPROVED ALTERNATE)	VERTICAL IN-LINE	3.67 (56.1)	25.9 (85)	53.89%	40% PPG	2.3	575	3	3235	1207 (175)	117 (257)	VFD, C/W PACKAGED HEAT EXCHANGER SKID HX-3
P-6	GLYCOL HEATING SUPPLY	ARMSTRONG / TBD (OR APPROVED ALTERNATE)	VERTICAL IN-LINE	3.67 (56.1)	25.9 (85)	53.89%	40% PPG	2.3	575	3	3235	1207 (175)	117 (257)	VFD, C/W PACKAGED HEAT EXCHANGER SKID HX-3
P-7	STEAM CONDENSATE PUMP	ARMSTRONG / AFH-42330-JDA	DUPLEX PUMP PACKAGE	2.84 (45)	21.4 (70)	-	STEAM CONDENSATE	6.6	575	3	-	1035 (150)	-	C/W 137L CAST IRON TANK AND DUPLEX PUMPS (1 DUTY, 1 STANDBY)

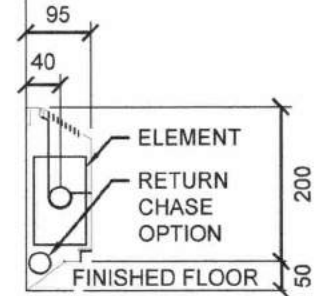
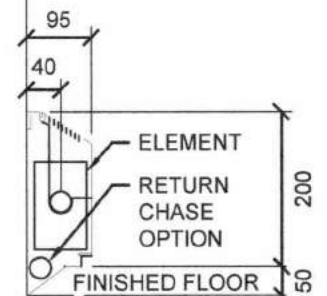
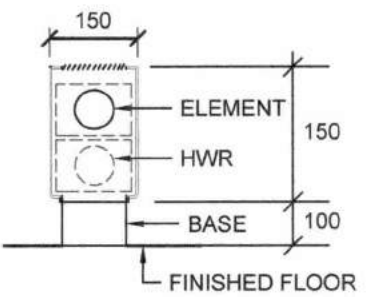
UNIT HEATER & FORCED FLOW CABINET HEATER SCHEDULE																			
I.D.	DESCRIPTION	MANUFACTURER/ MODEL	LOCATION	DEPTH	WIDTH	HEIGHT	CAPACITY	AIR		FLUID				MOTOR				COMMENTS	
								AIR FLOW	THROW	FLOW	Temp	T/sg	P.D.	FLUID	KW	VOLT	PH		RPM
				mm	mm	mm	kW (MBH)	L/s (cfm)	M	gpm	°C		KPa						
UH-1	HYDRONIC UNIT HEATER W/ FAN	SIGMA / 030H (OR APPROVED ALTERNATE)	ELECTRICAL ROOM (118)	394	559	343	7.4 (25)	246 (520)	5.5	0.16 (2.5)	82.2	71.1	3.98	WATER	0.04	120	1	1050	MOUNTING METHOD AND HEIGHT SHALL BE AS PER MANUFACTURERS INSTALLATION INSTRUCTIONS. BAS CONTROLLED
UH-2	HYDRONIC UNIT HEATER W/ FAN	SIGMA / 062H (OR APPROVED ALTERNATE)	MECHANICAL PENTHOUSE (302)	496	800	496	14.7 (50)	456 (970)	7.7	0.32 (5.0)	82.2	71.1	4.68	40% PPG	0.04	120	1	1050	MOUNTING METHOD AND HEIGHT SHALL BE AS PER MANUFACTURERS INSTALLATION INSTRUCTIONS. BAS CONTROLLED
FF-1	FORCED FLOW CABINET HEATER (WALL)	SIGMA (OR APPROVED ALTERNATE)	STRAIRWELL (ST103)	242	1030	660	17.6 (60)	284 (600)	-	0.32 (5.0)	82.2	71.1	8.53	WATER	0.08	120	1	-	FULLY RECESSED IN WALL CW/ COLLAR TRIM ALL SIDES, COLOUR TO BE SELECTED FROM MANUFACTURER'S STANDARD COLOUR CHART. BAS CONTROLLED
FF-2	FORCED FLOW CABINET HEATER (WALL)	SIGMA (OR APPROVED ALTERNATE)	STAIRWELL (ST101A)	242	1030	660	17.6 (60)	284 (600)	-	0.32 (5.0)	82.2	71.1	8.53	WATER	0.08	120	1	-	FULLY RECESSED IN WALL CW/ COLLAR TRIM ALL SIDES, COLOUR TO BE SELECTED FROM MANUFACTURER'S STANDARD COLOUR CHART. BAS CONTROLLED

PACKAGED HEAT EXCHANGER															
I.D.	DESCRIPTION	LOCATION	MANUFACTURER/ MODEL	COMPONENT	CAPACITY	SERVICE FLUID SIDE (HOT SIDE)			PROCESS FLUID SIDE (COLD SIDE)				PUMPS	NOTES	
						FLOW	Perit	FLUID	FLOW	Tent	Tlwg	P.D.			FLUID
					Kw (MBH)	Kg/h (lb/hr)	KPa (PSI)		L/s (gpm)	°C	°C	KPa			
												HX ONLY			
HX-1	STEAM TO HEATING HOT WATER (PERIMETER HEAT)	MECH RM 120	PRESTON PHIPPS/ COMPACKEAT (OR APPROVED ALTERNATE)	HEAT EXCHANGER	156 (530)	264 (581)	103.4 (15)	STEAM	3.35 (53)	71.1	82.2	30	WATER	-	REFER TO NOTES 1.3,4,5,6,7,8
				HEAT EXCHANGER	156 (530)	264 (581)	103.4 (15)	STEAM	3.35 (53)	71.1	82.2	30	WATER	-	
				HEATING PUMP	-	-	-	-	3.35 (53)	-	-	-	WATER	REFER TO P3	REFER TO NOTES 2,8
				HEATING PUMP	-	-	-	-	3.35	-	-	-	WATER	REFER TO P4	
HX-2	STEAM TO HEATING HOT WATER (RE-HEAT COILS)	MECH RM 120	PRESTON PHIPPS/ COMPACKEAT (OR APPROVED ALTERNATE)	HEAT EXCHANGER	94 (320)	160 (351)	103.4 (15)	STEAM	4.04 (64)	71.1	82.2	30	WATER	-	REFER TO NOTES 1.3,4,5,6,7,8
				HEAT EXCHANGER	94 (320)	160 (351)	103.4 (15)	STEAM	4.04 (64)	71.1	82.2	30	WATER	-	
				HEATING PUMP	-	-	-	-	3.29 (52)	-	-	-	WATER	REFER TO P5	REFER TO NOTES 2,8
				HEATING PUMP	-	-	-	-	3.29 (52)	-	-	-	WATER	REFER TO P6	
HX-3	STEAM TO GLYCOL	MECH RM 120	PRESTON PHIPPS/ COMPACKEAT (OR APPROVED ALTERNATE)	HEAT EXCHANGER	159 (540)	290 (638)	103.4 (15)	STEAM	3.67 (58.1)	71.1	82.2	30	40% PPG	-	REFER TO NOTES 1.3,4,5,6,7,8
				HEAT EXCHANGER	159 (540)	290 (638)	103.4 (15)	STEAM	3.67 (58.1)	71.1	82.2	30	40% PPG	-	
				HEATING PUMP	-	-	-	-	3.67 (58.1)	-	-	-	40% PPG	REFER TO P7	REFER TO NOTES 2,8
				HEATING PUMP	-	-	-	-	3.67 (58.1)	-	-	-	40% PPG	REFER TO P8	
HX-4	STEAM TO DOMESTIC HOT WATER	MECH RM 120	PRESTON PHIPPS/ DFS350W40 (OR APPROVED ALTERNATE)	SEMI- INSTANTANEOUS STEAM TO DHW	440 (1500)	702 (1547)	103.4 (15)	STEAM	1.90 (30)	4.4	60	6.9	DOMESTIC HOT WATER	-	REFER TO NOTES 8,9,10,11,12
				SEMI- INSTANTANEOUS STEAM TO DHW	-	702 (1547)	103.4 (15)	STEAM	1.90 (30)	4.4	60	6.9	DOMESTIC HOT WATER	-	

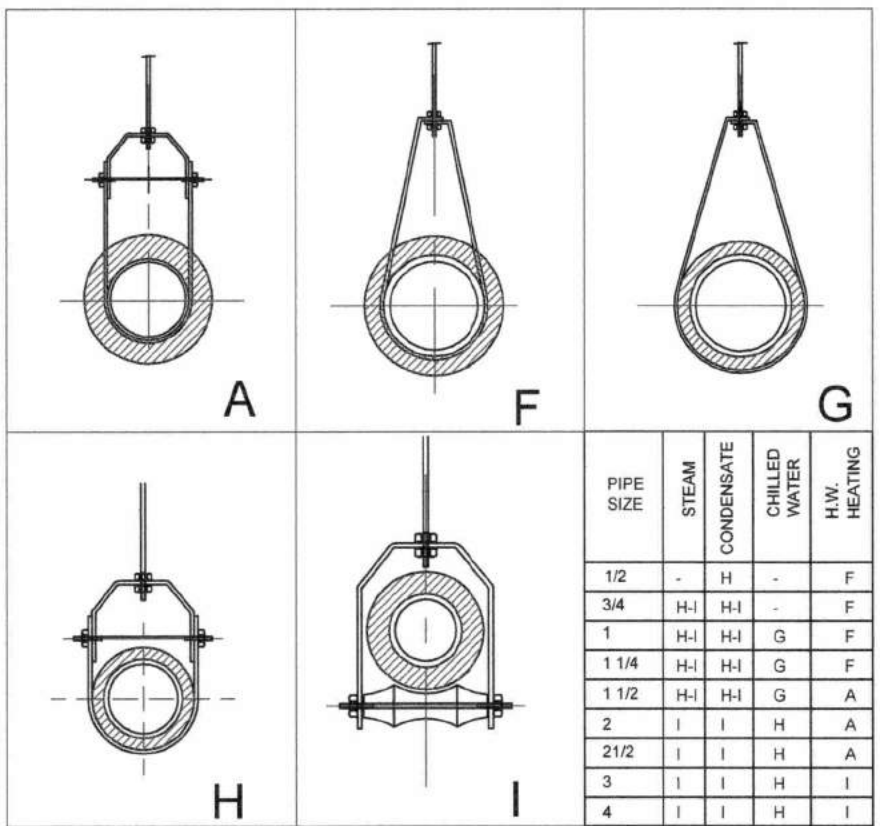
- NOTES:

1. PRE-PIPED SKID PACKAGES C/W DUPLEX STAINLESS STEEL SHELL & COIL HEAT EXCHANGER(S), ELECTRIC ACTUATED CONDENSATE CONTROL VALVES, STEAM CONTROL VALVES, STEAM TRAPS, CONDENSATE STRAINERS & CHECK VALVES, ANCILLARY ISOLATION VALVES, FITTINGS AND PIPING FOR CONDENSATE, INLET AND OUTLET HYDRONIC PIPE ASSEMBLIES WITH ISOLATION VALVES.
2. PRE-PIPED SKID PACKAGES C/W DUPLEX HEATING WATER VERTICAL IN-LINE CIRCULATING PUMPS WITH MOUNTED VFDs, VORTEX AIR SEPARATOR, SUCTION GUIDES, TRIPLE DUTY VALVES, ANCILLARY ISOLATION VALVES, FITTINGS AND PIPING FOR HEATING WATER AND PUMP PRESSURE GAUGE ASSEMBLIES.
3. DUPLEX HEAT EXCHANGERS SKID PACKAGE SECTIONS COMPLETE WITH INLET AND OUTLET HYDRONIC PIPE ASSEMBLIES WITH ISOLATION VALVES.
4. CONTROL BY BAS.
5. RTD, THERMOMETER & PRESSURE GAUGE SUPPLIED MOUNTED ON HYDRONIC OUTLET MANIFOLD ASSEMBLY
6. FLOW SWITCH, THERMOMETER & PRESSURE GAUGE SUPPLIED MOUNTED ON HYDRONIC INLET MANIFOLD ASSEMBLY.
7. OVERFLOW DRIP TRAP SHIPPED LOOSE.
8. SERVICE: 1 DUTY / 1 STANDBY
9. EACH PACKAGE COMPLETE WITH VERTICAL DOUBLE WALLED HEAT EXCHANGER WITH CARBON STEEL SHELL & COPPER-NICKEL TUBES, DIGITAL MIXING VALVE, SAFETY SHUT-OFF VALVE, INTERCONNECTING DOMESTIC WATER AND CONDENSATE PIPING, CHECK VALVES, STRAINERS AND FITTINGS.
10. SPCO RELAY OUTPUTS.
11. RS485 SERIAL PORT.
12. COMPLETE WITH MODULATING STEAM SUPPLY OPTION USING OB2000 TEMPERATURE REGULATOR.

HEATING COIL SCHEDULE													
I.D.	DESCRIPTION	LOCATION	HEATING COIL DATA									COMMENTS	
			TOTAL HEATING	AIR			FLUID				FLUID		DUCT SIZE
				EATdb	LAtdb	P.D. MAX	FLOW	Tent	Tlwg	MAX. HEAD			
			MBH	°C	°C	Pa	gpm	°C	°C	Kpa		mm x mm	
RHC-1	HYDRONIC DUCT REHEAT	OFFICE 133	3.7 (12.6)	13.7	23.9	25	0.16 (2.52)	60	55	15	WATER	TBD	8-10 FINS PER INCH PROVIDE DUCT MOUNTED TEMPERATURE SENSOR AS INDICATED. PROVIDE DUCT ACCESS DOORS BEFORE AND AFTER RHC.
RHC-2	HYDRONIC DUCT REHEAT	FAMILY THERAPY	5.5 (18.9)	13.7	23.9	25	0.24 (3.78)	60	55	15	WATER	TBD	
RHC-3	HYDRONIC DUCT REHEAT	PRAYER RM 220	1.8 (6.3)	13.7	23.9	25	0.08 (1.26)	60	55	15	WATER	TBD	

BASEBOARD SCHEDULE										
I.D.	MANUFACTURER/ MODEL	DESCRIPTION	ROWS	LENGTH	HEIGHT	OPERATING DATA			SECTION	COMMENTS
						CAPACITY KW/m (BTU/h/ft)	Tavg °C (°F)	FLUID		
			#	mm	mm					
BB-1	SIGMA / J59678 (SBBN-S)	WALL FIN SLOPED TOP WITH VALVE ACCESS DOOR AND BLANK SECTION(S) FOR WALL TO WALL INSTALLATION	1	AS REQ'D	200 (8)	0.586 (616)	76.6 (170)	WATER		ENCLOSURE TO BE WALL TO WALL WITH MAXIMUM LENGTH FIN. ENCLOSURE TO INCLUDE ACCESS DOOR. COLOUR TO BE SELECTED FROM MANUFACTURER'S STANDARD COLOUR CHART DURING SHOP DRAWING REVIEW PERIOD
BB-2	SIGMA / J59678 (SBBN-S)	WALL FIN SLOPED TOP WITH VALVE ACCESS DOOR AND BLANK SECTION(S) FOR WALL TO WALL INSTALLATION	1	1200	200 (8)	0.586 (616)	76.6 (170)	WATER		ENCLOSURE TO BE PROVIDED WITH END CAPS AND ACCESS DOOR. COLOUR TO BE SELECTED FROM MANUFACTURERS STANDARD COLOUR CHART DURING SHOP DRAWING REVIEW PERIOD
BB-3	SIGMA / J81012 (FST)	PEDESTAL TOP OUTLET FREE STANDING ENCLOSURE WITH ACCESS DOOR	1	AS REQ'D	250 (10)	0.586 (616)	76.6 (170)	WATER		ENCLOSURE TO BE WALL TO WALL WITH MAXIMUM LENGTH FIN. ENCLOSURE TO INCLUDE ACCESS DOOR. COLOUR TO BE SELECTED FROM MANUFACTURER'S STANDARD COLOUR CHART DURING SHOP DRAWING REVIEW PERIOD

EXPANSION TANK SCHEDULE									
I.D.	DESCRIPTION	MANUFACTURER / MODEL	TANK VOLUME	ACCEPT VOLUME	HORIZONTAL / VERTICAL	DIMENSIONS		OPERATING PRESSURE	COMMENTS
			L	L		DIA.	LENGTH		
						mm	mm		
ET-1	HOT WATER - PERIMETER HEAT SYSTEM	AMTROL / AX-120V (OR APPROVED ALTERNATE)	258	129	VERTICAL	610	1194	1207	
ET-2	HOT WATER - RE-HEAT SYSTEM	AMTROL / AX-60V (OR APPROVED ALTERNATE)	128	43	VERTICAL	407	1143	1207	
ET-3	GLYCOL HEATING SYSTEM	AMTROL / AX-120V (OR APPROVED ALTERNATE)	258	129	VERTICAL	610	1194	1207	
ET-4	DOMESTIC HOT WATER SYSTEM	AMTROL / ST-30V (OR APPROVED ALTERNATE)	53	35	VERTICAL	407	483	1035	




PIPE SIZE	STEAM	CONDENSATE	CHILLED WATER	H.W. HEATING
1/2	-	H	-	F
3/4	H-I	H-I	-	F
1	H-I	H-I	G	F
1 1/4	H-I	H-I	G	F
1 1/2	H-I	H-I	G	A
2	I	I	H	A
2 1/2	I	I	H	A
3	I	I	H	I
4	I	I	H	I

DO NOT SCALE DRAWINGS:

Contractors must check and verify all site conditions. Notify the Owner's Representative in writing before proceeding with the work if discrepancies are evident between the drawings and the site condition. No extras to the contract will be allowed if discrepancies were evident prior to start of work.

UNEXPECTED DISCOVERY OF ASBESTOS:

Where a friable material is discovered during construction, renovations and/or demolition, and it is suspected to contain asbestos, the Contractor must stop all work that may disturb the material. The Contractor shall advise the Owner of the discovery and await instructions from the owner.

 A = Detail number
B = Drawing number where detailed

0	ISSUED FOR PERMIT & TENDER	TA	NOV 2, 2018
NO.	ISSUED	BY	DATE

Orientation	
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[illegible]

Seal	Seal
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UNIVERSITY
of GUELPH
Design, Engineering & Construction
Physical Resources
Guelph, Ontario. N1G 2W1

Consultant www.jlrichards.ca

J.L. Richards
ENGINEERS • ARCHITECTS • PLANNERS

Project

**BUILDING #046
RENOVATIONS**

Drawing Title

HEATING SCHEDULES

Project No.
504034

Location
UNIVERSITY OF GUELPH
BUILDING #046

Scale AS NOTED	Date NOV 2, 2018
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Drawn by HW	Drawing No. <h1>M66</h1> of 173
Checked By NC	
Approved By KDT	
JLR # 27915	

AIR HANDLING UNIT SCHEDULE

I.D.	DESCRIPTION	LOCATION	MANUF. MODEL	MIN O/A	FAN DATA											COOLING COIL DATA										HEATING COIL DATA										FILTERS	SOUND POWER @ UNIT OUTLET (db)	UNIT PHYSICAL DIMENSIONS & WEIGHT					COMMENTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
					SUPPLY RETURN	AIR FLOW	EXT. S.P.	RPM	MOTOR				FAN TYPE	TOTAL COOLING	SENS/BL E COOLING	ENTERING AIR			FLOW	Tent.	Tlvg	P.D.	FLUID	TOTAL HEATING	AIR			FLUID																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
									DB	WB	P.D.	L/s				°C	°C	KPa							L/s	°C	°C	KPa	L/s	°C	°C	KPa	L/s	°C	°C			KPa	L/s	°C	°C	KPa																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
				L/s (cfm)		L/s (cfm)	Pa (in wg)		KW	VOLT	PH	RPM		KW	KW	°C	°C	Pa		L/s	°C	°C	KPa		KW	°C	°C	Pa		L/s	°C	°C	KPa																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				

FAN COIL UNITS

I.D.	DESCRIPTION	LOCATION	MANUF./MODEL											COOLING COIL DATA										HEATING COIL DATA										FILTERS	SOUND POWER @ UNIT OUTLET										WEIGHT	LENGTH	HEIGHT	WIDTH	COMMENTS
				AIR FLOW	EXT. S.P.	MOTOR			MCA	MOCP	TOTAL COOLING	SENSIBLE COOLING	ENTERING AIR		FLOW	Tent	Tlvg.	P.D	FLUID	TOTAL HEATING	AIR		FLUID																										
						DB	WB	°C					°C	L/s							°C	°C	KPa	°C	°C	L/s	°C	°C	KPa																				
				L/s	Pa	KW	VOLT	PH	A	A	KW	KW	°C	°C	L/s	°C	°C	KPa		KW	°C	°C	L/s	°C	°C	KPa		MERV	125	250	500	1K	2K	4K	LwA	KG	mm	mm	mm										
FC-1	COOLING UNIT	CCS (117 B)	DAIKIN FCHH212	567	125	0.79	115	1	8.5	15	6	8.2	23.9	17.3	0.5	7.3	12.8	50.81	WATER	-	-	-	-	-	-	-	-	8	59	61	62	61	57	50	-	43	514	252	1194	BAS CONTROLLED, & DISCONNECT SWITCH									
FC-2				REMOVED																																													
FC-3	COOLING/ HEATING UNIT	ENTRANCE (C100ST102)	DAIKIN FCHH212	567	125	0.79	115	1	8.5	15	6	8.2	23.9	17.3	0.5	7.3	12.8	50.81	WATER	24	2	32	0.5	82.3	71.8	18	WATER	8	68	67	67	66	63	57	-	71	514	252	1842	BAS CONTROLLED, & DISCONNECT SWITCH									
FC-4	COOLING UNIT	MAIN ENTRANCE (ST201)	DAIKIN FCHH206	285	125	0.44	115	1	4.7	15	5.3	4.5	23.9	17.3	0.26	7.3	12.8	20.50	WATER	5	2	32	0.2	82.3	71.8	23	WATER	8	59	61	62	61	57	50	-	43	514	252	1194	BAS CONTROLLED, & DISCONNECT SWITCH									
FC-5	COOLING UNIT	ELEVATOR CONTROL ROOM (231)	DAIKIN FCHH204	189	125	0.28	115	1	2.9	15	3.6	3.0	23.9	17.3	0.13	7.3	12.8	8.69	WATER	-	-	-	-	-	-	-	-	8	57	58	55	53	48	39	-	35	514	252	915	BAS CONTROLLED, & DISCONNECT SWITCH									
FC-6	COOLING UNIT	SERVER ROOM (234)	DAIKIN FCHH204	189	63	0.28	115	1	2.9	15	3.6	3.0	23.9	17.3	0.13	7.3	12.8	8.69	WATER	-	-	-	-	-	-	-	-	8	57	58	55	53	48	39	-	35	514	252	915	BAS CONTROLLED, & DISCONNECT SWITCH									

FAN SCHEDULE

I.D.	DESCRIPTION	LOCATION SERVED	MANUF./MODEL	TYPE	OPERATING POINT 'A'		SOUND	DRIVE	MOTOR				CONTROLS	COMMENTS
					AIR FLOW	S.P.			HP	VOLT	PH	RPM		
					L/s (cfm)	Pa (in. w.c.)	SONES							
EF-31	WASHROOM EXHAUST	UNIV. WR 138	COOK/ GC-146 (OR APPROVED ALTERNATE)	CABINET	43 (90)	63 (0.25)	1.3	DIRECT	1/20	115	1	900	REFER TO M80 MOTORS STARTER AND CONTROLS DRAWING	C/W SPEED CONTROLLER, BACKDRAFT DAMPER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH - PENTHOUSE LOUVER TERMINATION
EF-32	GENERAL EXHAUST	MECHANICAL PENTHOUSE	COOK/14XWH32D132 (OR APPROVED ALTERNATE)	WALL PROP	567 (1200)	63 (0.25)	8.9	DIRECT	1/4	115	1	1300		C/W SPEED CONTROLLER, WALL MOUNTING COLLAR, GUARD, MOTORIZED DAMPER, BIRD SCREEN, WEATHERPROOF LOUVER AND DISCONNECT SWITCH.
EF-33	PURGE EXHAUST	OFFICE 133	COOK/100R080 (OR APPROVED ALTERNATE)	ROOF MOUNTED UPBLAST	288 (610)	126 (0.5)	11.1	BELT	1/4	115	1	1725		C/W BACKDRAFT DAMPER, BIRD SCREEN, 24" ROOF CURB, AND DISCONNECT SWITCH
SBF-133	SUPPLY BOOST		COOK/ GN-842 (OR APPROVED ALTERNATE)	INLINE	260 (548)	63 (0.25)	4.5	DIRECT	1/4	115	1	1500		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
EF-34	PURGE EXHAUST	FAMILY 127	COOK/ 120R38 (OR APPROVED ALTERNATE)	ROOF MOUNTED UPBLAST	472 (1000)	126 (0.5)	10.2	BELT	1/4	115	1	1725		C/W BACKDRAFT DAMPER, BIRD SCREEN, 24" ROOF CURB, AND DISCONNECT SWITCH
SBF-127	SUPPLY BOOST		COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	427 (904)	63 (0.25)	4.0	DIRECT	1/2	115	1	910		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
EF-35	WASHROOM EXHAUST	WR116	COOK/ GN-622 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH - PENTHOUSE LOUVER TERMINATION
EF-36	CUSTODIAN EXHAUST	CUST. 116	COOK/ GC-128 (OR APPROVED ALTERNATE)	CABINET	30 (63)	63 (0.25)	1.1	DIRECT	1/20	115	1	750		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH - PENTHOUSE LOUVER TERMINATION
EF-37	GENERAL EXHAUST	ELECT. 118	COOK/24XWH28D102 (OR APPROVED ALTERNATE)	WALL PROP	1888 (4000)	63 (0.25)	15.4	DIRECT	1/4	115	1	1080		C/W SPEED CONTROLLER, WALL MOUNTING COLLAR, GUARD, MOTORIZED DAMPER, BIRD SCREEN, WEATHERPROOF LOUVER AND DISCONNECT SWITCH.
EF-38	GENERAL EXHAUST	MECH 120	COOK/14XWH32D132 (OR APPROVED ALTERNATE)	WALL PROP	567 (1200)	63 (0.25)	8.9	DIRECT	1/4	115	1	1300		C/W SPEED CONTROLLER, WALL MOUNTING COLLAR, GUARD, MOTORIZED DAMPER, BIRD SCREEN, WEATHERPROOF LOUVER AND DISCONNECT SWITCH.
EF-39	WASHROOM EXHAUST	UNIV. WR 234	COOK/ GC-146 (OR APPROVED ALTERNATE)	CABINET	43 (90)	63 (0.25)	1.3	DIRECT	1/20	115	1	900		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH - PENTHOUSE LOUVER TERMINATION
EF-40	GENERAL EXHAUST	LOUNGE 217	COOK/ GC-148 (OR APPROVED ALTERNATE)	CABINET	63 (132)	63 (0.25)	2.5	DIRECT	1/8	115	1	1075		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH - PENTHOUSE LOUVER TERMINATION
EF-41	PURGE EXHAUST	PRAYER 220	COOK/100R070 (OR APPROVED ALTERNATE)	ROOF MOUNTED UPBLAST	152 (320)	126 (0.5)	12.9	BELT	1/4	115	1	1725		C/W BACKDRAFT DAMPER, BIRD SCREEN, 24" ROOF CURB, AND DISCONNECT SWITCH
SF-220	SUPPLY BOOST		COOK/ GN-422 (OR APPROVED ALTERNATE)	INLINE	133 (282)	63 (0.25)	4.0	DIRECT	1/2	115	1	1500		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
EF-42	CUSTODIAN EXHAUST	CUST. 201	COOK/ GC-128 (OR APPROVED ALTERNATE)	CABINET	30 (63)	63 (0.25)	1.1	DIRECT	1/20	115	1	750		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, GOOSE NECK W BIRD SCREEN, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
EF-43	WASHROOM EXHAUST	WR 201	COOK/ GN-622 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, GOOSE NECK W BIRD SCREEN, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
EF-44	GENERAL EXHAUST	KITCHENETTE 115	COOK/ GC-148 (OR APPROVED ALTERNATE)	CABINET	63 (132)	63 (0.25)	2.5	DIRECT	1/8	115	1	1075		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, GOOSE NECK W BIRD SCREEN, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
EF-45	GENERAL EXHAUST	HSPK 112	COOK/ GC-128 (OR APPROVED ALTERNATE)	CABINET	30 (63)	63 (0.25)	1.1	DIRECT	1/20	115	1	750		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, GOOSE NECK W BIRD SCREEN, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
EF-46	WASHROOM EXHAUST	UNIV. WR 104	COOK/ GC-146 (OR APPROVED ALTERNATE)	CABINET	43 (90)	63 (0.25)	1.3	DIRECT	1/20	115	1	900		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, GOOSE NECK W BIRD SCREEN, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
EF-47	WASHROOM EXHAUST	WIC 104A	COOK/ GC-146 (OR APPROVED ALTERNATE)	CABINET	43 (90)	63 (0.25)	1.3	DIRECT	1/20	115	1	900		C/W SPEED CONTROLLER, BACKDRAFT DAMPER, GOOSE NECK W BIRD SCREEN, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-125	SUPPLY BOOST	FAMILY 125	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	429 (904)	63 (0.25)	4.0	DIRECT	1/2	115	1	910		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-126D	SUPPLY BOOST	CPL/IND 126D	COOK/ GN-422 (OR APPROVED ALTERNATE)	INLINE	133 (282)	63 (0.25)	4.0	DIRECT	1/2	115	1	1500		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-126A	SUPPLY BOOST	CPL/IND 126A	COOK/ GN-422 (OR APPROVED ALTERNATE)	INLINE	133 (282)	63 (0.25)	4.0	DIRECT	1/2	115	1	1500		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-126C	SUPPLY BOOST	CPL/IND 126C	COOK/ GN-422 (OR APPROVED ALTERNATE)	INLINE	133 (282)	63 (0.25)	4.0	DIRECT	1/2	115	1	1500		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-126B	SUPPLY BOOST	CPL/IND 126B	COOK/ GN-422 (OR APPROVED ALTERNATE)	INLINE	133 (282)	63 (0.25)	4.0	DIRECT	1/2	115	1	1500		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-228	SUPPLY BOOST	ASSESS 228	COOK/ GN-622 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-224	SUPPLY BOOST	ASSESS 224	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	427 (904)	63 (0.25)	4.0	DIRECT	1/2	115	1	910		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-216	SUPPLY BOOST	WELLNESS 216	COOK/ GN-422 (OR APPROVED ALTERNATE)	INLINE	133 (282)	63 (0.25)	4.0	DIRECT	1/2	115	1	1500		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-215	SUPPLY BOOST	FAMILY 215	COOK/ GN-842 (OR APPROVED ALTERNATE)	INLINE	522 (1105)	63 (0.25)	5.0	DIRECT	1/2	115	1	974		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-213	SUPPLY BOOST	FAMILY 213	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	427 (904)	63 (0.25)	4.0	DIRECT	1/2	115	1	910		C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH
SBF-211	SUPPLY BOOST	FAMILY 211	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	427 (904)	63 (0.25)	4.0	DIRECT	1/2	115	1	910	C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH	
SBF-210	SUPPLY BOOST	PLAY 210	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	427 (904)	63 (0.25)	4.0	DIRECT	1/2	115	1	910	C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH	
SBF-202	SUPPLY BOOST	ASSESS 202	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400	C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH	
SBF-203	SUPPLY BOOST	CP/IND 203	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400	C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH	
SBF-204	SUPPLY BOOST	ASSESS 204	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400	C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH	
SBF-205	SUPPLY BOOST	ASSESS 205	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400	C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH	
SBF-207	SUPPLY BOOST	CP/IND 207	COOK/ GN-622 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400	C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH	
SBF-208	SUPPLY BOOST	ASSESS 208	COOK/ GN-622 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400	C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH	
SBF-209	SUPPLY BOOST	PLAY 209	COOK/ GN-822 (OR APPROVED ALTERNATE)	INLINE	218 (461)	63 (0.25)	3.0	DIRECT	1/2	115	1	1400	C/W SPEED CONTROLLER, HANGING ISOLATOR KIT AND DISCONNECT SWITCH	

SINGLE DUCT VARIABLE A VOLUME TERMINAL UNIT SCHEDULE											
I.D.	MANUF./MODEL	DESCRIPTION	SERVING ROOM(S)	MAXIMUM AIR FLOW L/s (cfm)	MINIMUM AIR FLOW L/s (cfm)	INLET DUCT SIZE mm (inches) Ø	MAX S.P. Pa	NC	CONTROL	HEATING COIL KW (MBH)	COMMENTS
AC-1 WING 'C'	VAV-101	METALAIRE / TH512 (OR APPROVED ALTERNATE)	101	660 (1397)	198 (419)	300 (12)	63	<17	BAS	3.8 (13.0)	
	VAV-102	METALAIRE / TH506 (OR APPROVED ALTERNATE)	102	138 (292)	42 (88)	150 (6)	63	<17	BAS	0.8 (2.7)	
	VAV-103	METALAIRE / TH512 (OR APPROVED ALTERNATE)	103 & 103A	510 (1080)	153 (324)	300 (12)	63	<17	BAS	3.0 (10.1)	
	VAV-106	METALAIRE / TH506 (OR APPROVED ALTERNATE)	106, 106A	170 (360)	51 (108)	150 (6)	63	<20	BAS	1.0 (3.4)	
	VAV106B	METALAIRE / TH506 (OR APPROVED ALTERNATE)	106B	128 (270)	39 (81)	150 (6)	63	<17	BAS	0.7 (2.5)	
	VAV-107	METALAIRE / TH508 (OR APPROVED ALTERNATE)	107	180 (380)	54 (114)	200 (8)	63	<20	BAS	1.0 (3.4)	
	VAV-108	METALAIRE / TH508 (OR APPROVED ALTERNATE)	108	127 (267)	38 (80)	150 (6)	63	<17	BAS	0.7 (2.5)	
	VAV-109A	METALAIRE / TH510 (OR APPROVED ALTERNATE)	109A & 109B	293 (620)	88 (186)	250 (10)	63	15	BAS	1.7 (5.8)	
	VAV-109	METALAIRE / TH506 (OR APPROVED ALTERNATE)	109	38 (80)	12 (24)	150 (6)	63	<15	BAS	0.2 (0.7)	
	VAV-110	METALAIRE / TH510 (OR APPROVED ALTERNATE)	110	294 (622)	89 (187)	250 (10)	63	15	BAS	1.7 (5.8)	
	VAV-111	METALAIRE / TH510 (OR APPROVED ALTERNATE)	111	361 (764)	109 (229)	250 (10)	63	15	BAS	2.1 (7.1)	
	VAV-113	METALAIRE / TH510 (OR APPROVED ALTERNATE)	113 & 114A	43 (90)	13 (27)	250 (10)	63	<15	BAS	0.2 (0.8)	
	VAV-113A	METALAIRE / TH510 (OR APPROVED ALTERNATE)	113A	319 (675)	96 (203)	250 (10)	63	15	BAS	1.8 (6.3)	
	VAV-114	METALAIRE / TH510 (OR APPROVED ALTERNATE)	114	312 (660)	94 (198)	250 (10)	63	15	BAS	1.8 (6.2)	
AC-2 WING 'B' (NORTH)	VAV-115	METALAIRE / TH508 (OR APPROVED ALTERNATE)	115	107 (225)	32 (68)	150 (6)	63	<17	BAS	0.6 (2.1)	
	VAV-C101	METALAIRE/ TH506 (OR APPROVED ALTERNATE)	C101	134 (282)	40 (85)	150 (6)	63	17	BAS	0.8 (2.6)	
	VAV-147	METALAIRE / TH508 (OR APPROVED ALTERNATE)	147	212 (448)	64 (134)	200 (8)	63	<15	BAS	1.2 (4.2)	
	VAV-149	METALAIRE / TH508 (OR APPROVED ALTERNATE)	149	279 (590)	84 (177)	200 (8)	63	<15	BAS	1.6 (5.5)	
	VAV-145	METALAIRE / TH508 (OR APPROVED ALTERNATE)	143,145,145A	376 (795)	113 (239)	200 (8)	63	19	BAS	2.2 (7.4)	
	VAV-139	METALAIRE / TH506 (OR APPROVED ALTERNATE)	139	132 (278)	40 (83)	150 (6)	63	<17	BAS	0.8 (2.6)	
	VAV-137	METALAIRE / TH506 (OR APPROVED ALTERNATE)	137	132 (278)	40 (83)	150 (6)	63	<17	BAS	0.8 (2.6)	
	VAV-135	METALAIRE / TH506 (OR APPROVED ALTERNATE)	135	132 (278)	40 (83)	150 (6)	63	<17	BAS	0.8 (2.6)	
	VAV-133	METALAIRE / TH506 (OR APPROVED ALTERNATE)	133	132 (278)	40 (83)	150 (6)	63	<17	BAS	0.8 (2.6)	
	VAV-129A	METALAIRE / TH508 (OR APPROVED ALTERNATE)	129	204 (432)	62 (130)	200 (8)	63	<15	BAS	1.2 (4.0)	
	VAV-129B	METALAIRE / TH508 (OR APPROVED ALTERNATE)		204 (432)	62 (130)	200 (8)	63	<15	BAS	1.2 (4.0)	
	VAV-127	METALAIRE / TH508 (OR APPROVED ALTERNATE)	127 & 127A	238 (503)	72 (151)	200 (8)	63	<15	BAS	1.4 (4.7)	
	VAV-125	METALAIRE / TH508 (OR APPROVED ALTERNATE)	125 & 125A	232 (490)	70 (147)	200 (8)	63	<15	BAS	1.3 (4.6)	
	VAV-C106	METALAIRE / TH506 (OR APPROVED ALTERNATE)	C106	73 (155)	21 (47)	150 (6)	63	<15	BAS	NONE	
	VAV-C107	METALAIRE / TH505 (OR APPROVED ALTERNATE)	C107	40 (85)	40 (85)	125 (5)	63	<15	BAS	NONE	
	VAV-236	METALAIRE / TH510 (OR APPROVED ALTERNATE)	236 & 235A	344 (728)	104 (218)	250 (10)	63	15	BAS	2.0 (6.8)	
	VAV-239	METALAIRE / TH510 (OR APPROVED ALTERNATE)	239	327 (692)	96 (206)	250 (10)	63	15	BAS	1.9 (6.5)	
	VAV-237	METALAIRE / TH506 (OR APPROVED ALTERNATE)	237	130 (275)	39 (83)	150 (6)	63	17	BAS	0.8 (2.6)	
	VAV-235	METALAIRE / TH508 (OR APPROVED ALTERNATE)	235	227 (480)	68 (144)	200 (8)	63	<15	BAS	1.3 (4.5)	
	VAV-233	METALAIRE / TH510 (OR APPROVED ALTERNATE)	233	392 (830)	118 (249)	250 (10)	63	16	BAS	2.3 (7.7)	
	VAV-229	METALAIRE / TH506 (OR APPROVED ALTERNATE)	229	140 (296)	42 (89)	150 (6)	63	17	BAS	0.8 (2.8)	
	VAV-227	METALAIRE / TH506 OR APPROVED ALTERNATE)	227	140 (296)	42 (89)	150 (6)	63	17	BAS	0.8 (2.8)	
	VAV-225	METALAIRE / TH506 (OR APPROVED ALTERNATE)	225	140 (296)	42 (89)	150 (6)	63	17	BAS	0.8 (2.8)	
	VAV-223	METALAIRE / TH506 (OR APPROVED ALTERNATE)	223	140 (296)	42 (89)	150 (6)	63	17	BAS	0.8 (2.8)	
	VAV-221	METALAIRE / TH506 (OR APPROVED ALTERNATE)	221	140 (296)	42 (89)	150 (6)	63	17	BAS	0.8 (2.8)	
	VAV-217-1	METALAIRE / TH510 (OR APPROVED ALTERNATE)	217	390 (825)	117 (248)	250 (10)	63	16	BAS	2.3 (7.7)	
	VAV-217-2	METALAIRE / TH508 (OR APPROVED ALTERNATE)	217	280 (550)	78 (165)	200 (8)	63	<15	BAS	1.5 (5.1)	

SINGLE DUCT VARIABLE A VOLUME TERMINAL UNIT SCHEDULE											
I.D.	MANUF./MODEL	DESCRIPTION	SERVING ROOM(S)	MAXIMUM AIR FLOW L/s (cfm)	MINIMUM AIR FLOW L/s (cfm)	INLET DUCT SIZE mm (inches) Ø	MAX S.P. Pa	NC	CONTROL	HEATING COIL KW (MBH)	COMMENTS
VAV-136	METALAIRE / TH512 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	136 & 136C	581 (1230)	175 (369)	300 (12)	63	17	BAS	3.4 (11.5)	
VAV-134	METALAIRE / TH506 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	134 & 136B	107 (225)	32 (68)	150 (6)	63	17	BAS	0.8 (2.1)	
VAV-132	METALAIRE/ TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	132	178 (377)	54 (113)	200 (8)	63	<15	BAS	1.0 (3.5)	
VAV-130	METALAIRE / TH505 OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	130	30 (62)	9 (19)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-128	METALAIRE / TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	128	138 (292)	42 (88)	200 (8)	63	<15	BAS	0.8 (2.7)	
VAV-126D	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	126D	30 (62)	9 (19)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-126A	METALAIRE / TH505 (OR APPROVED ALTERNATE)	METALAIRE / TH505 (OR APPROVED ALTERNATE)	126A	30 (62)	9 (19)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-126C	METALAIRE / TH505 (OR APPROVED ALTERNATE)	METALAIRE / TH505 (OR APPROVED ALTERNATE)	126C	30 (62)	9 (19)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-126B	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	126B	30 (62)	9 (19)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-123	METALAIRE / TH510 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	123 & 123A	192 (405)	58 (122)	250 (10)	63	<15	BAS	1.1 (3.7)	
VAV-123D	METALAIRE / TH512 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	123C, 123D, 123B	448 (949)	135 (285)	300 (12)	63	17	BAS	2.6 (8.9)	
VAV-123F	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	C123 & 123F	121 (256)	37 (77)	125 (5)	63	<15	BAS	0.7 (2.4)	
VAV-123E	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	123E	44 (93)	14 (28)	125 (5)	63	<15	BAS	0.3 (0.9)	
VAV-C102	METALAIRE / TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	C102	235 (500)	235 (500)	200 (8)	63	<15	BAS	NONE	
VAV-C201	METALAIRE / TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	C201	230 (490)	230 (490)	200 (8)	63	<15	BAS	NONE	
VAV-230	METALAIRE / TH510 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	230	384 (813)	116 (244)	250 (10)	63	16	BAS	2.2 (7.6)	
VAV-226	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	226 & 232	48 (100)	15 (30)	124 (5)	63	<15	BAS	0.3 (0.9)	
VAV-228	METALAIRE / TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	228 & 228A	284 (600)	85 (180)	200 (8)	63	<15	BAS	1.6 (5.6)	
VAV-224A	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	224A	44 (92)	14 (28)	124 (5)	63	<15	BAS	0.3 (0.9)	
VAV-224	METALAIRE / TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	224	208 (439)	63 (132)	200 (8)	63	<15	BAS	1.2 (4.1)	
VAV-222	METALAIRE / TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	222	258 (545)	78 (164)	200 (8)	63	<15	BAS	1.5 (5.1)	
VAV-220	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	220	46 (97)	14 (29)	150 (6)	63	<15	BAS	0.3 (0.9)	
VAV-216	METALAIRE / TH506 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	216 & 218	45 (94)	14 (28)	150 (6)	63	<15	BAS	0.3 (0.9)	
VAV-215	METALAIRE / TH506 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	215	117 (246)	35 (74)	150 (6)	63	<15	BAS	0.7 (2.3)	
VAV-214	METALAIRE / TH506 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	214	144 (304)	44 (91)	150 (6)	63	<15	BAS	0.8 (2.8)	
VAV-213	METALAIRE / TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	213	226 (477)	68 (143)	200 (8)	63	<15	BAS	1.3 (4.5)	
VAV-212	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	212	33 (69)	10 (21)	124 (5)	63	<15	BAS	0.2 (0.6)	
VAV-211	METALAIRE / TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	211	196 (415)	59 (125)	200 (8)	63	<15	BAS	1.1 (3.9)	
VAV-210	METALAIRE / TH508 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	210 & 210A	194 (411)	59 (123)	200 (8)	63	<15	BAS	1.1 (3.8)	
VAV-202	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	202	38 (80)	12 (24)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-203	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	203	38 (80)	12 (24)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-204	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	204	38 (80)	12 (24)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-205	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	205	38 (80)	12 (24)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-206	METALAIRE / TH506 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	206 & 208	82 (172)	24 (52)	150 (6)	63	<15	BAS	0.2 (0.6)	
VAV-207	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	207	38 (80)	12 (24)	125 (5)	63	<15	BAS	0.2 (0.6)	
VAV-209	METALAIRE / TH505 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	209	44 (93)	14 (28)	125 (5)	63	<15	BAS	0.3 (0.9)	
VAV-C205	METALAIRE / TH510 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	C205	444 (940)	134 (282)	250 (10)	63	16	BAS	NONE	
VAV-C206	METALAIRE / TH506 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	C206 & C204	107 (225)	32 (68)	150 (6)	64	<15	BAS	NONE	
VAV-C25I	METALAIRE / TH506 (OR APPROVED ALTERNATE)	SINGLE DUCT TERMINAL UNIT	CORR. SOUTH INTERIOR	38 (80)	12 (24)	125 (5)	63	<15	BAS	NONE	

CONTRACTOR TO COORDINATE VAV BOX CONTROLS AND COIL ACCESS PRIOR TO ORDERING FOR EASE OF CONNECTION AND MAINTENANCE PUPROSES.

DO NOT SCALE DRAWINGS:

Contractors must check and verify all site conditions. Notify the Owner's Representative in writing before proceeding with the work if discrepancies are evident between the drawings and the site condition. No extras to the contract will be allowed if discrepancies were evident prior to start of work.

UNEXPECTED DISCOVERY OF ASBESTOS:

Where a friable material is discovered during construction, renovations and/or demolition, and it is suspected to contain asbestos, the Contractor must stop all work that may disturb the material. The Contractor shall advise the Owner of the discovery and await instructions from the owner.

A = Detail number
B = Drawing number where detailed

1	RE-ISSUED FOR TENDER	TA	NOV 13, 2018
0	ISSUED FOR PERMIT & TENDER	TA	NOV 2, 2018

NO. ISSUED BY DATE

Orientation	
Seal	Seal



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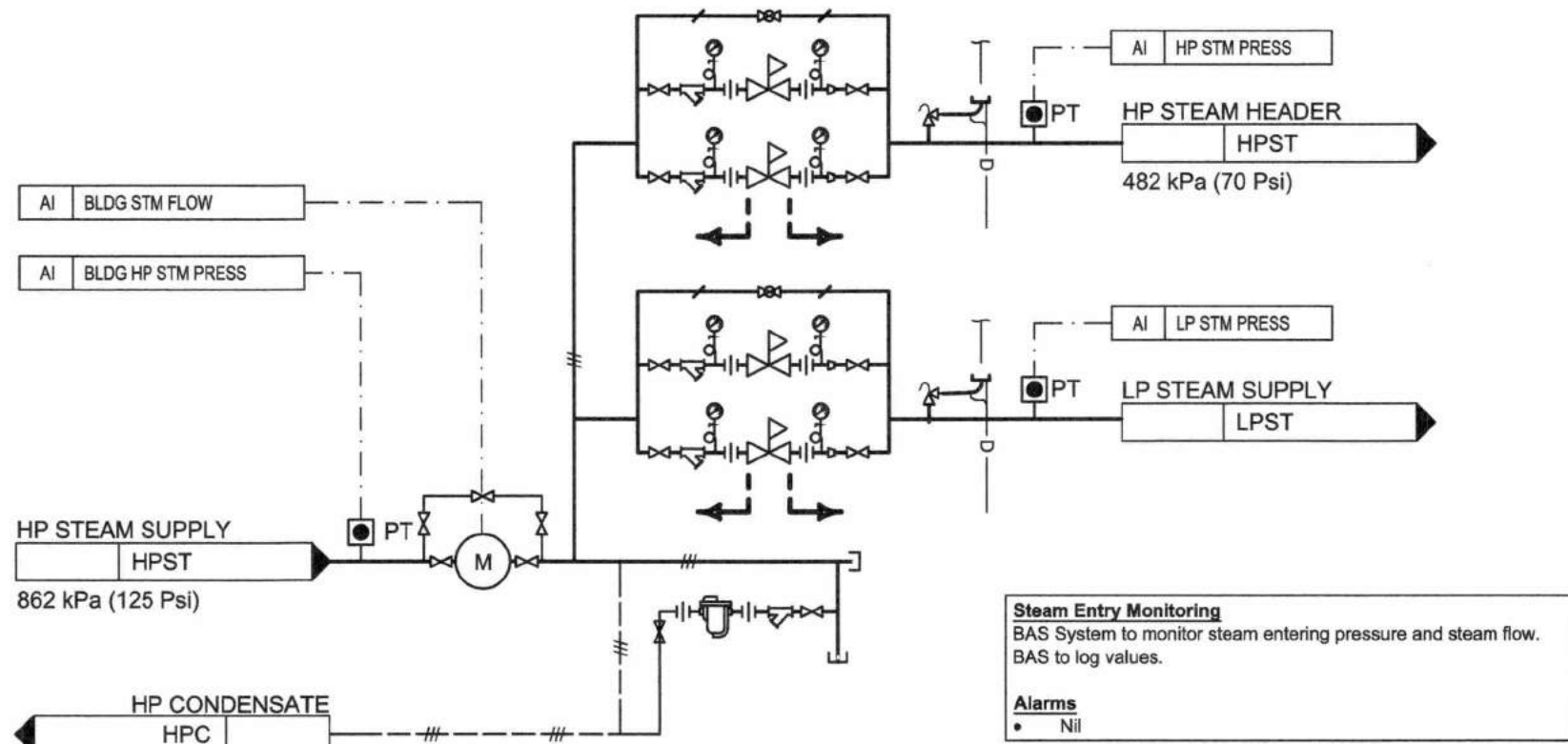
Project
BUILDING #046
RENOVATIONS

Drawing Title

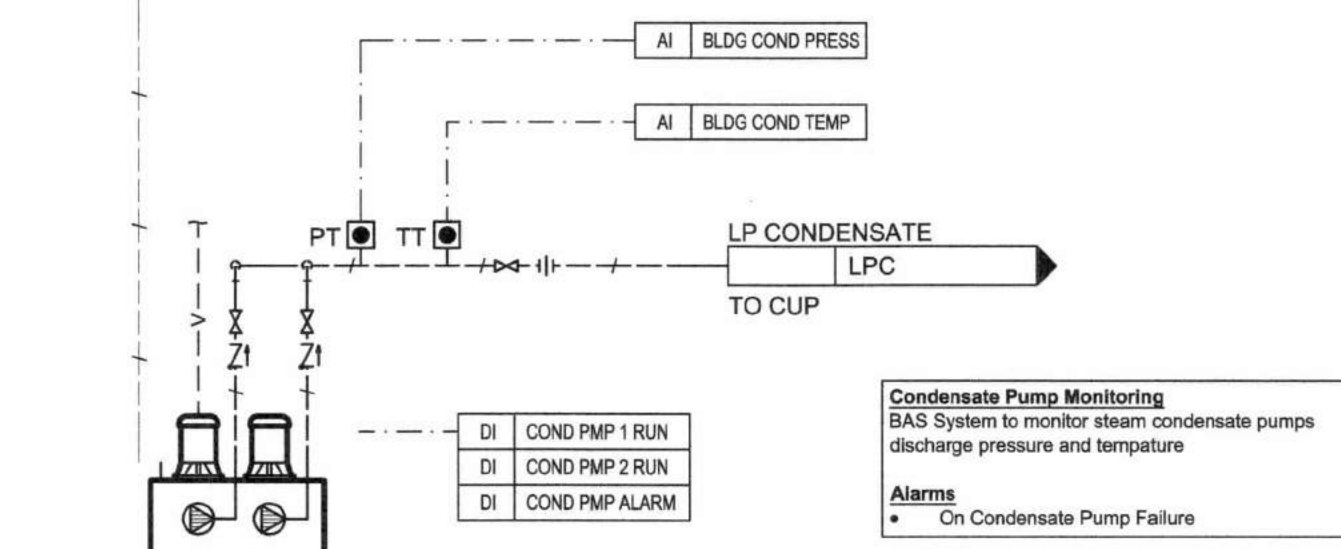
VENTILATION SCHEDULES
2 OF 2
Project No.
504034

Location
UNIVERSITY OF GUELPH
BUILDING #046

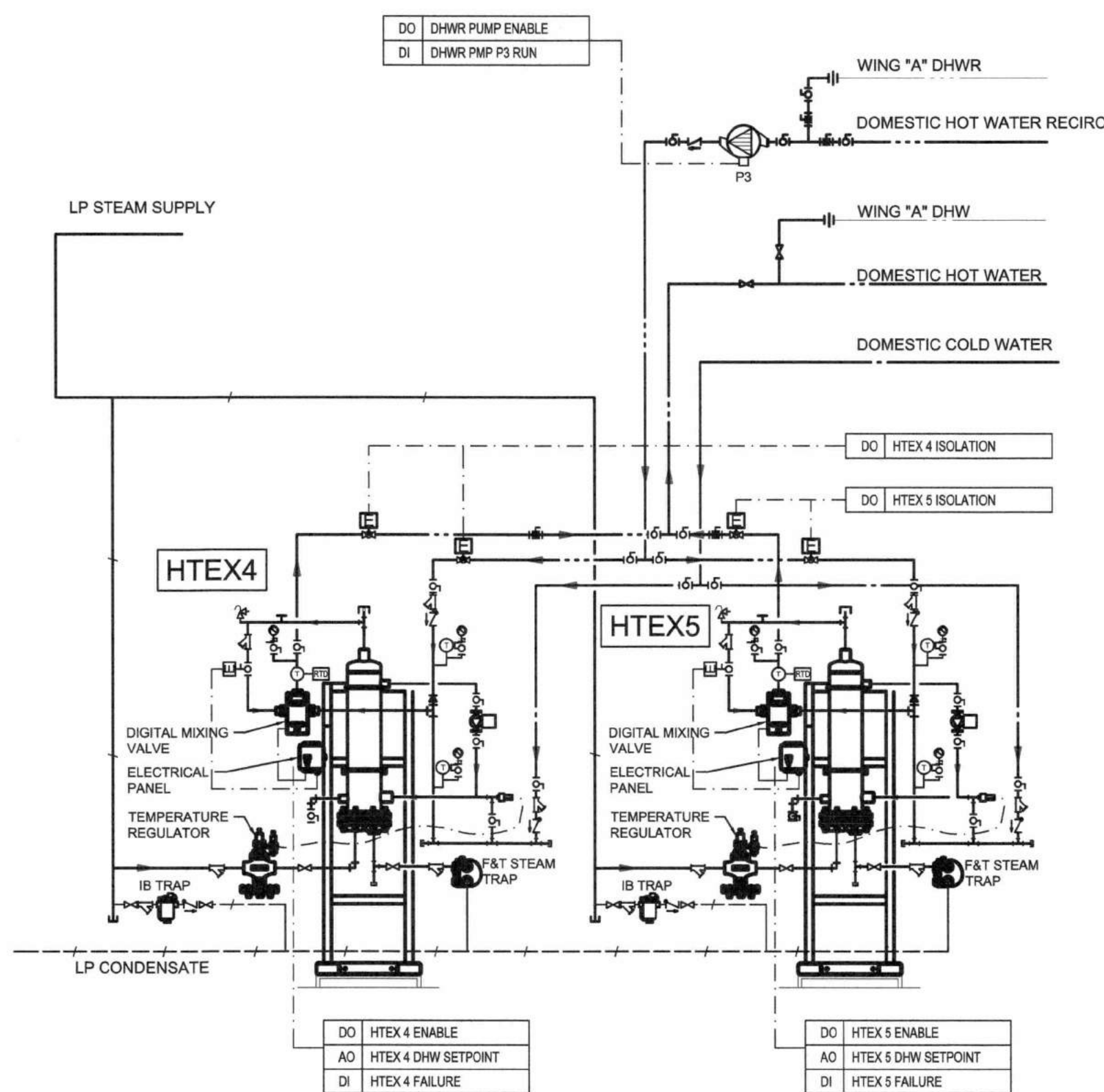
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Drawn by HW	Drawing No.
Checked By NC	M68
Approved By KDT	
JLR # 27915	
Cad File No. ----	of 173



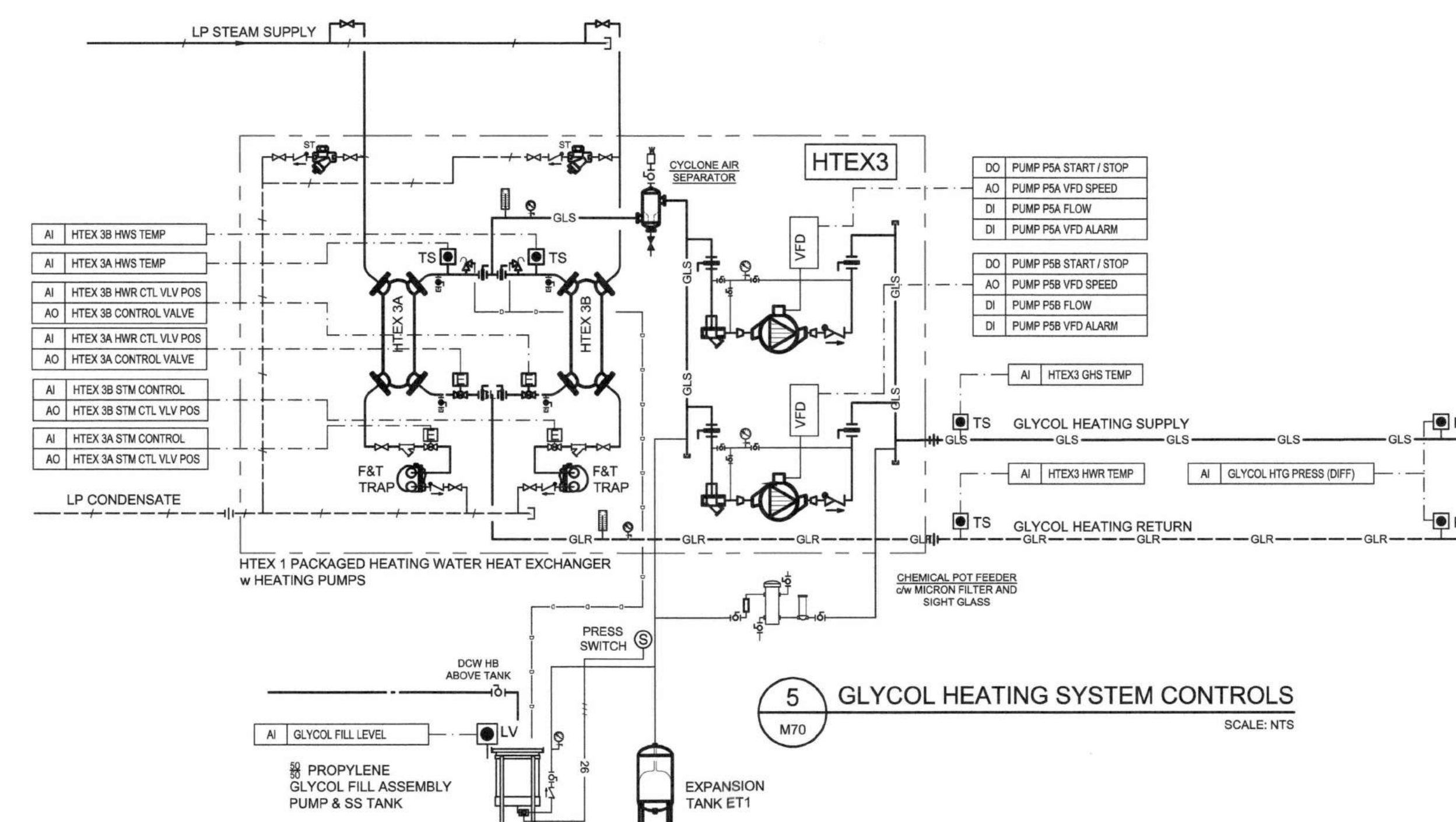
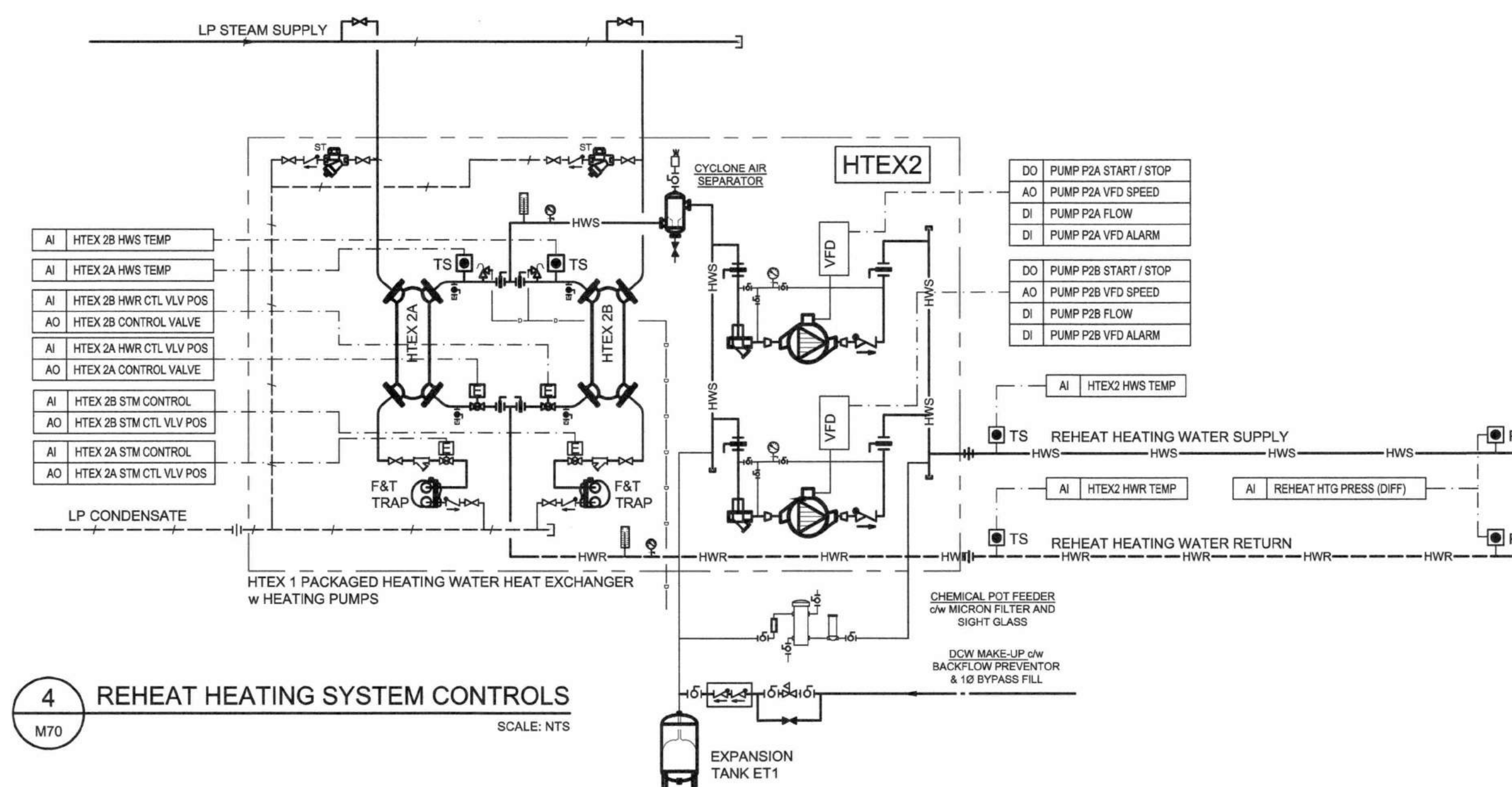
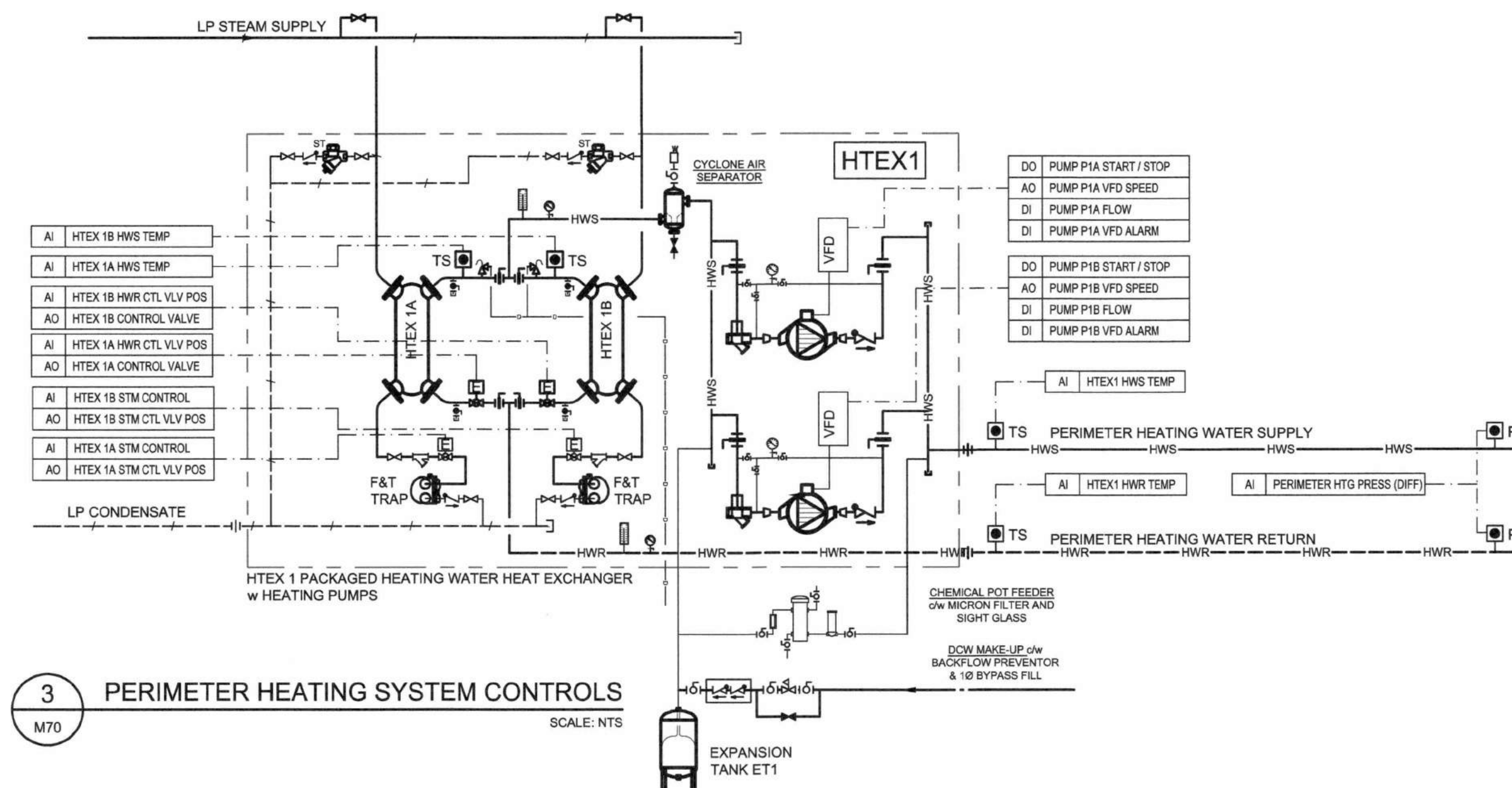
1 STEAM ENTRY MONITORING CONTROLS
SCALE: NTS



2 CONDENSATE PUMPS MONITORING CONTROLS
SCALE: NTS



6 DHW HEATING SYSTEM CONTROLS
SCALE: NTS



5 GLYCOL HEATING SYSTEM CONTROLS
SCALE: NTS

Perimeter Heating Water Loop Control
The system consists of two STEAM to HEATING WATER heat exchangers and two circulation pumps. Pumps are each sized for 100% flow and will not operate together. Heat exchangers are each sized for 100% load and will not operate together.

System Start
• The lead heat exchanger isolation valve shall open when one of the hot water pumps is running.

Normal Operation
• The lead Heating Pump shall run continuously when the outside air temperature is below system enable set-point and the hot water heating plant is enabled.
• Pump speed shall be modulated via variable frequency drive to maintain the System Differential Pressure at setpoint. If the System Differential Pressure exceeds the setpoint at minimum pump VFD speed (30%), the Heating By-Pass Control Valve shall modulate to maintain setpoint.
• The lag pump shall be enabled and the lead pump disabled if the lead pump goes into alarm.
• The lead heat exchanger control valve shall modulate to maintain Heating Supply Temperature at set-point based on Outside Air Temperature as per following:

OAT	GLS
12.8°C	43.3°C
-18°C	54.4°C

• If the lead heat exchanger has not been able to achieve the Heating Supply Temperature set point after 30 minutes, the hot water heat exchanger control valve and heat exchanger isolation valve shall close and alarm and the lag heat exchanger shall be enabled. The lag heat exchanger isolation valve shall be confirmed open prior to the lead heat exchanger isolation valve closing.
• Rotate pump lead and lag on a weekly basis. On pump switchover, the lag pump will start and ramp up to speed. Once run status is confirmed, the lead pump will ramp down and be disabled.
• Rotate heat exchanger lead and lag on a weekly basis. On switchover, the lag heat exchanger's HW isolation valve will open. Once valve is confirmed open, the hot water valve will open and begin to control.
• The hot water valve on the lead heat exchanger will be slowly closed and then its isolation valve will close.

System Stop
• The system shall be disabled when Outside Air Temperature rises above 18.3°C or the hot water heating system is disabled.

Alarms
• Heating Glycol Pump Feedback from variable speed drive.
• Heating Glycol Supply Temperature out of range.
• High Heating Glycol Differential Pressure.
• Glycol Makeup Package General Alarm.

Perimeter Heating Water Loop Control
The system consists of two STEAM to HEATING WATER heat exchangers and two circulation pumps. Pumps are each sized for 100% flow and will not operate together. Heat exchangers are each sized for 100% load and will not operate together.

System Start
• The lead heat exchanger isolation valve shall open when one of the hot water pumps is running.

Normal Operation
• The lead Heating Pump shall run continuously when the outside air temperature is below system enable set-point and the hot water heating plant is enabled.
• Pump speed shall be modulated via variable frequency drive to maintain the System Differential Pressure at setpoint. If the System Differential Pressure exceeds the setpoint at minimum pump VFD speed (30%), the Heating By-Pass Control Valve shall modulate to maintain setpoint.
• The lag pump shall be enabled and the lead pump disabled if the lead pump goes into alarm.
• The lead heat exchanger control valve shall modulate to maintain Heating Supply Temperature at set-point based on Outside Air Temperature as per following:

OAT	GLS
12.8°C	43.3°C
-15°C	54.4°C

• If the lead heat exchanger has not been able to achieve the Heating Supply Temperature set point after 30 minutes, the hot water heat exchanger control valve and heat exchanger isolation valve shall close and alarm and the lag heat exchanger shall be enabled. The lag heat exchanger isolation valve shall be confirmed open prior to the lead heat exchanger isolation valve closing.
• Rotate pump lead and lag on a weekly basis. On pump switchover, the lag pump will start and ramp up to speed. Once run status is confirmed, the lead pump will ramp down and be disabled.
• Rotate heat exchanger lead and lag on a weekly basis. On switchover, the lag heat exchanger's HW isolation valve will open. Once valve is confirmed open, the hot water valve will open and begin to control.
• The hot water valve on the lead heat exchanger will be slowly closed and then its isolation valve will close.

System Stop
• The system shall be disabled when Outside Air Temperature rises above 18.3°C or the hot water heating system is disabled.

Alarms
• Heating Glycol Pump Feedback from variable speed drive.
• Heating Glycol Supply Temperature out of range.
• High Heating Glycol Differential Pressure.
• Glycol Makeup Package General Alarm.

Heating Glycol Loop Control
The system consists of two STEAM to GLYCOL heat exchangers and two circulation pumps. Pumps are each sized for 100% flow and will not operate together. Heat exchangers are each sized for 100% load and will not operate together.

System Start
• The lead heat exchanger isolation valve shall open when one of the hot water pumps is running.

Normal Operation
• The lead Heating Glycol Pump shall run continuously when the outside air temperature is below system enable set-point and the hot water heating plant is enabled.
• Pump speed shall be modulated via variable frequency drive to maintain the Heating Glycol Differential Pressure at setpoint. If the Heating Glycol Differential Pressure exceeds the setpoint at minimum pump VFD speed (30%), the Heating Glycol By-Pass Control Valve shall modulate to maintain setpoint.
• The lag pump shall be enabled and the lead pump disabled if the lead pump goes into alarm.
• The lead hot water heat exchanger control valve shall modulate to maintain Heating Glycol Supply Temperature at set-point based on Outside Air Temperature as per following:

OAT	GLS
12.8°C	43.3°C
-15°C	54.4°C

• If the lead heat exchanger has not been able to achieve the Heating Glycol Supply Temperature set point after 30 minutes, the hot water heat exchanger control valve and heat exchanger isolation valve shall close and alarm and the lag heat exchanger shall be enabled. The lag heat exchanger isolation valve shall be confirmed open prior to the lead heat exchanger isolation valve closing.
• Rotate pump lead and lag on a weekly basis. On pump switchover, the lag pump will start and ramp up to speed. Once run status is confirmed, the lead pump will ramp down and be disabled.
• Rotate heat exchanger lead and lag on a weekly basis. On switchover, the lag heat exchanger's glycol isolation valve will open. Once valve is confirmed open, the hot water valve will open and begin to control.
• The hot water valve on the lead heat exchanger will be slowly closed and then its glycol isolation valve will close.

System Stop
• The system shall be disabled when Outside Air Temperature rises above 18.3°C or the hot water heating system is disabled.

Alarms
• Heating Glycol Pump Feedback from variable speed drive.
• Heating Glycol Supply Temperature out of range.
• High Heating Glycol Differential Pressure.
• Glycol Makeup Package General Alarm.

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B = Drawing number where detailed

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Orientation

Seal
J.N. EVENSON
PROVIDENCE OF ONTARIO

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Consultant: www.jlrchards.ca

J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS

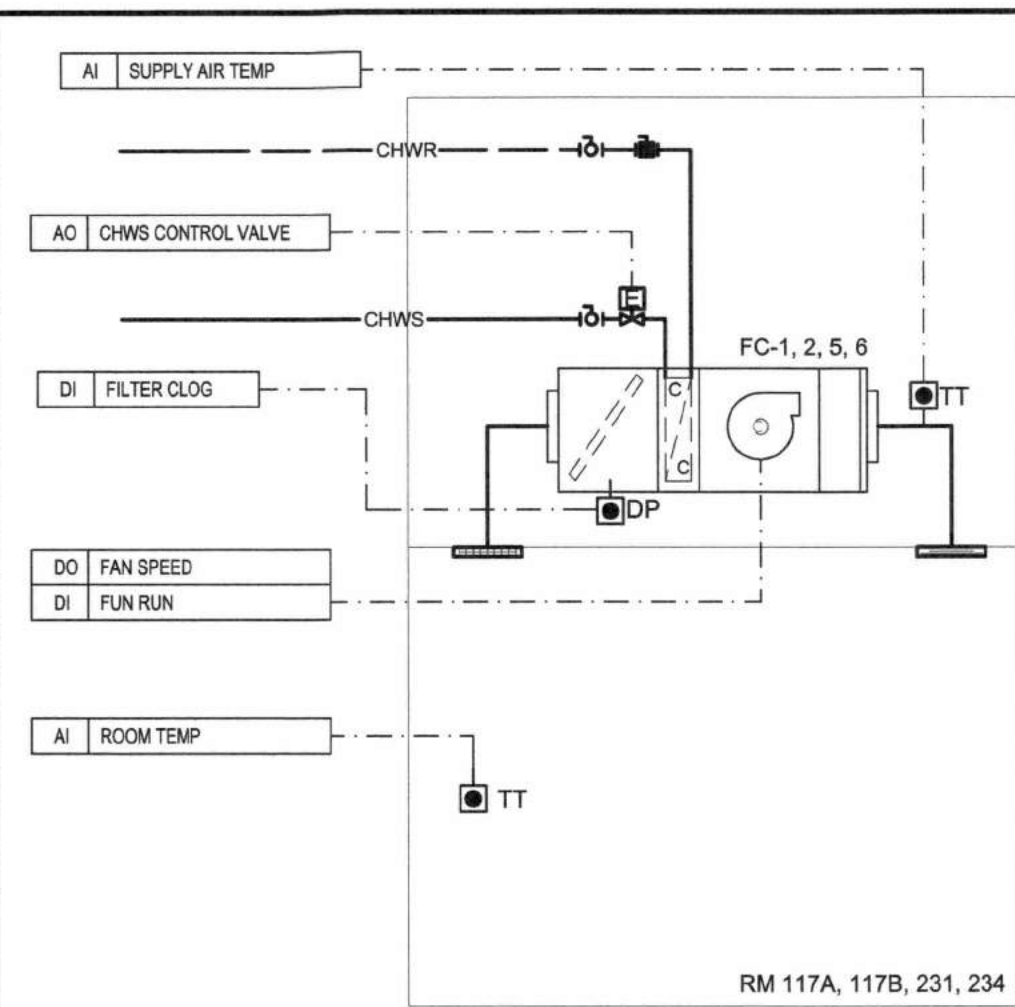
Project
BUILDING #046 RENOVATIONS

Drawing Title

CONTROLS SCHEMATIC 1 OF 3
Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

Scale NTS	Date NOV 2, 2018
Drawn by TJ	Drawing No.
Checked By NC	M70 of 173
Approved By KT	
JLR # 27915	
Cad File No. ----	



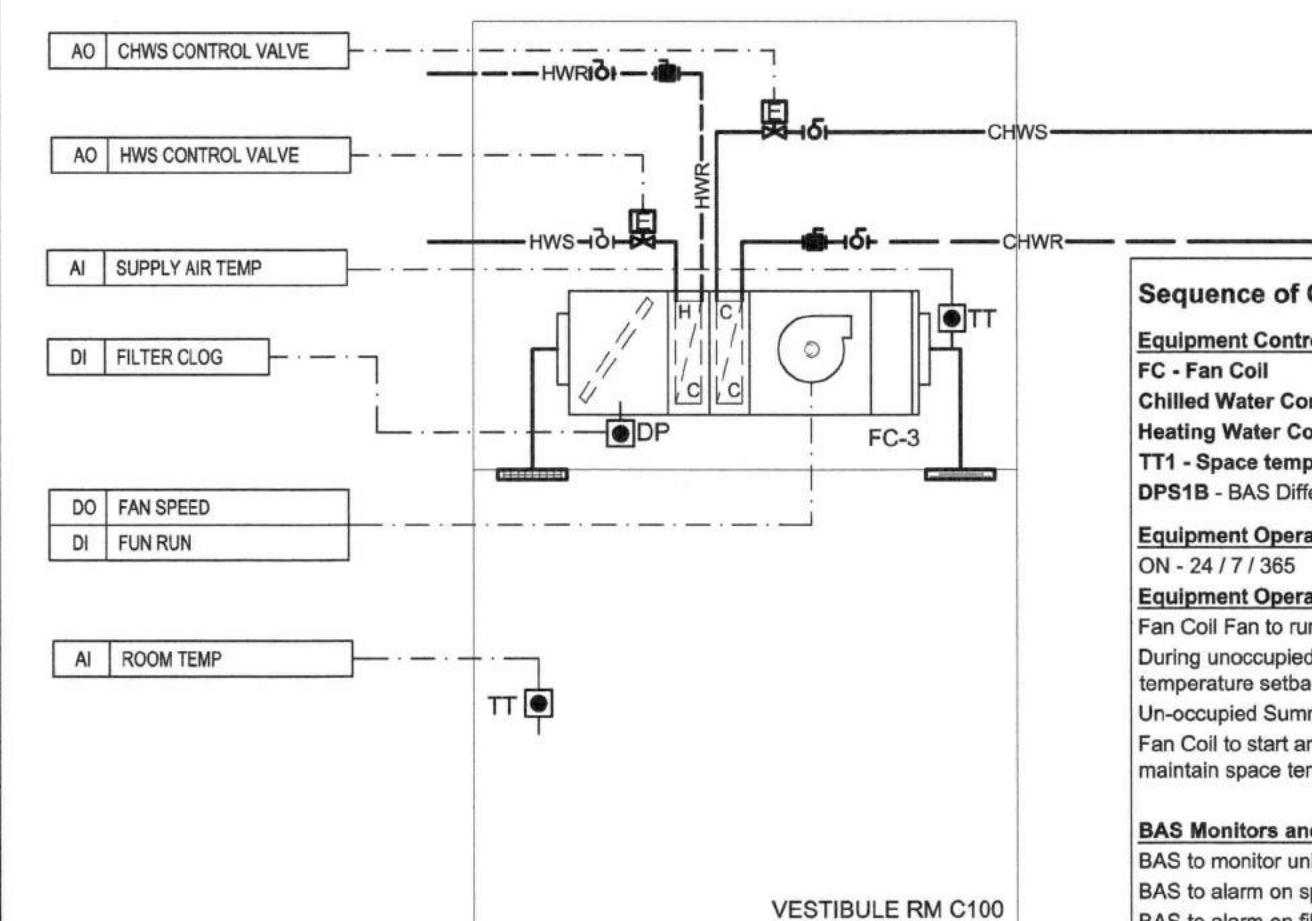
Sequence of Operation - Cooling Only Fan Coil

Equipment Controlled / Definitions
 FC - Fan Coil
 Chilled Water Control Valve
 TT1 - Space temperature Transmitter
 Note: For rooms 117A and 117B a single fan coil serves both spaces, provide 2 temperature sensors in each room, either sensor to initial cooling as required.
 DPS1B - BAS Differential Pressure Sensor

Equipment Operation
 ON - 24 / 7 / 365
Equipment Operation
 Fan Coil to start and unit to modulate Chilled Water Valve to maintain space temperature.
 Fan to de-energize if no call for cooling.

BAS Monitors and Alarms
 BAS to monitor unit discharge air temperature.
 BAS to alarm on space temperature rise 2 ° C over setpoint
 BAS to alarm on filter clog

2 TYPICAL COOLING ONLY FAN COIL CONTROL
M71 SCALE: NTS



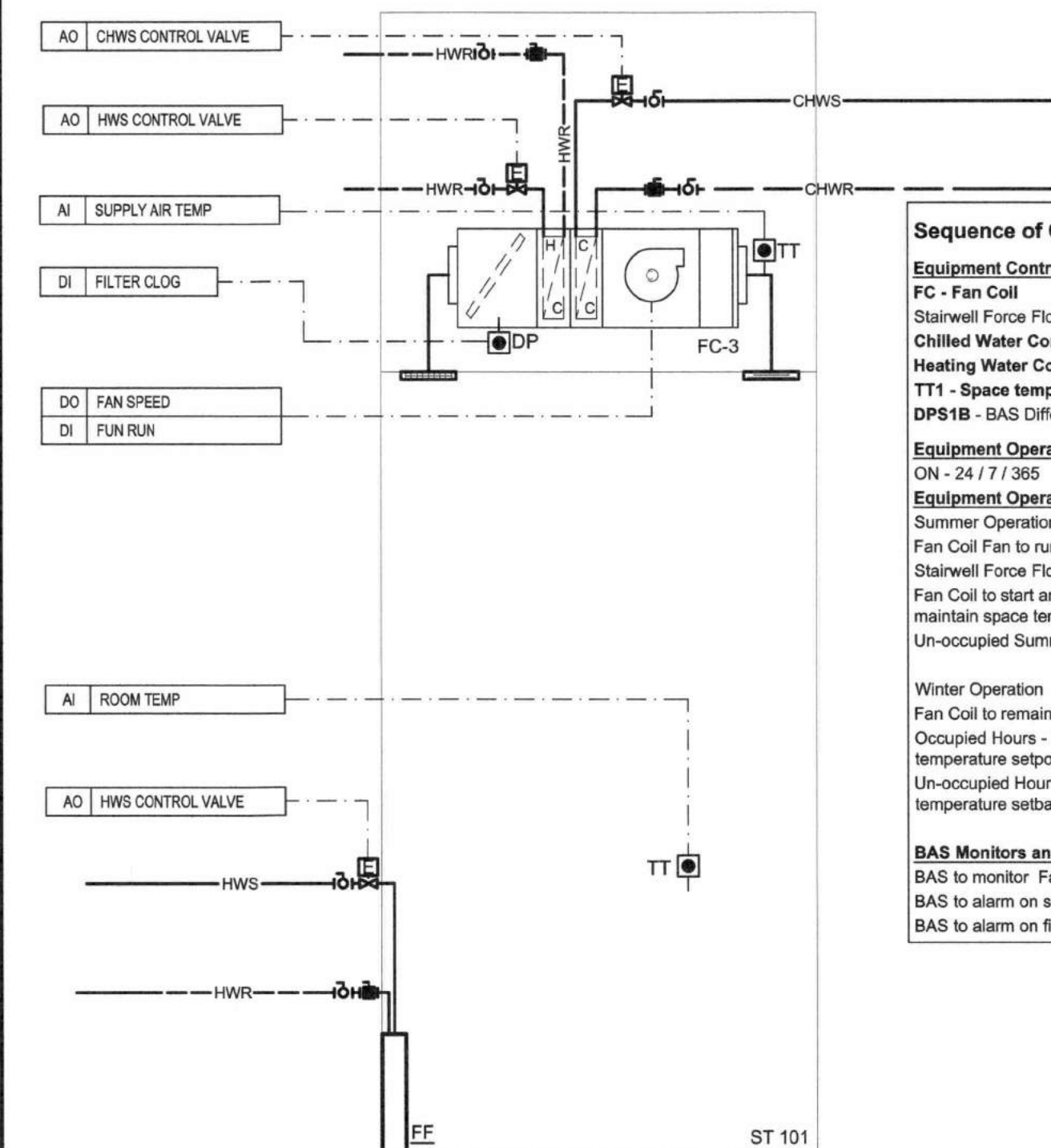
Sequence of Operation - Cooling / Heating Fan Coil

Equipment Controlled / Definitions
 FC - Fan Coil
 Chilled Water Control Valve
 Heating Water Control Valve
 TT1 - Space temperature Transmitter
 DPS1B - BAS Differential Pressure Sensor

Equipment Operation
 ON - 24 / 7 / 365
Equipment Operation
 Fan Coil Fan to run continuously during occupied hours
 During unoccupied hours / Winter Mode Fan Coil to run as required to satisfy space temperature setback setpoint.
 Un-occupied Summer Hours, Fan Coil to remain off.
 Fan Coil to start and unit to modulate Chilled Water Valve and Heating Water Valve to maintain space temperature.

BAS Monitors and Alarms
 BAS to monitor unit discharge air temperature.
 BAS to alarm on space temperature rise 2 ° C over setpoint
 BAS to alarm on filter clog

3 TYPICAL COOLING / HEATING FAN COIL CONTROL
M71 SCALE: NTS



Sequence of Operation - Cooling / Heating Fan Coil

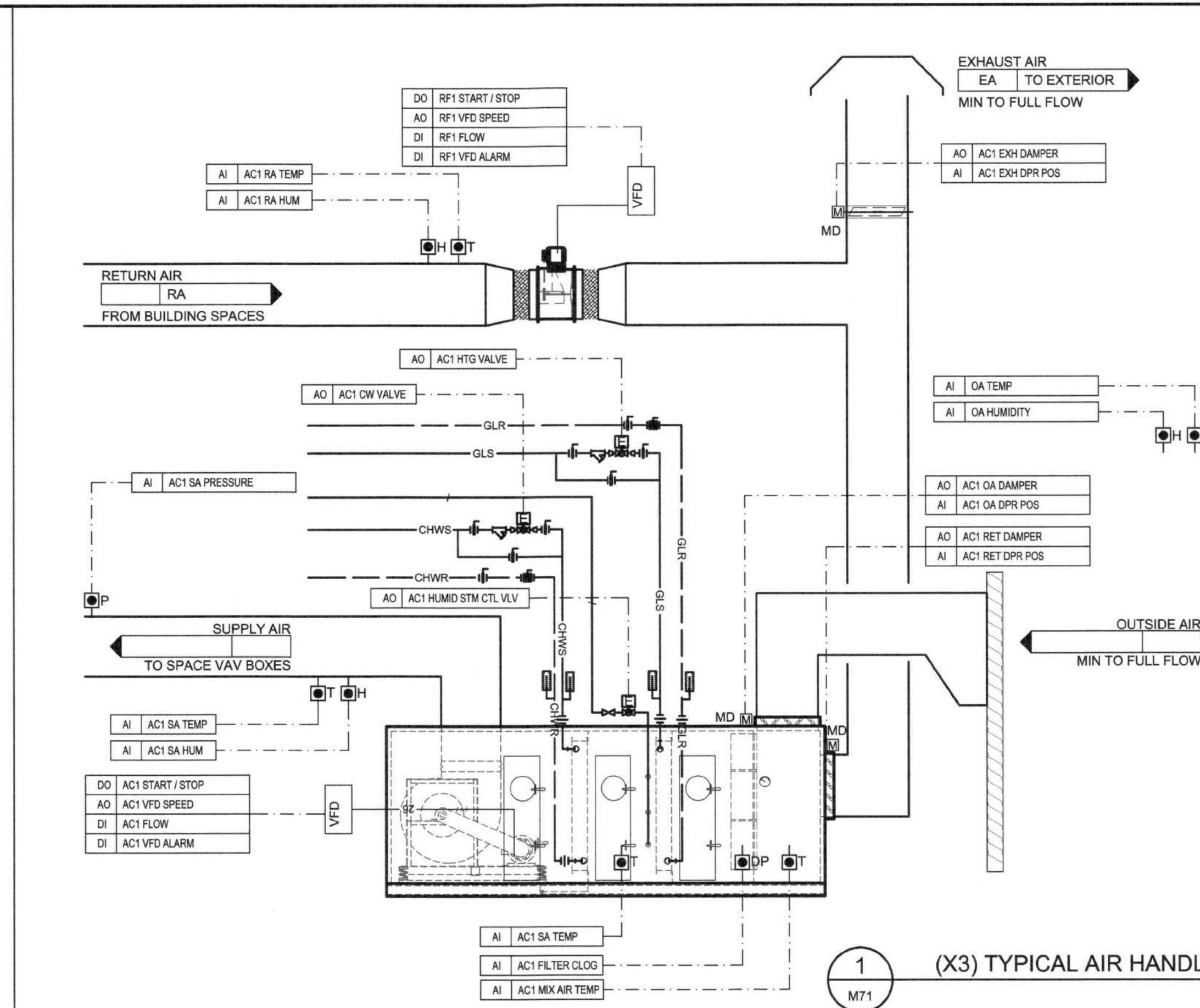
Equipment Controlled / Definitions
 FC - Fan Coil
 Stairwell Force Flow Heating Unit
 Chilled Water Control Valve
 Heating Water Control Valve
 TT1 - Space temperature Transmitter
 DPS1B - BAS Differential Pressure Sensor

Equipment Operation
 ON - 24 / 7 / 365
Equipment Operation
 Summer Operation
 Fan Coil Fan to run continuously during occupied hours.
 Stairwell Force Flow Unit to remain off.
 Fan Coil to start and unit to modulate Chilled Water Valve and Heating Water Valve to maintain space temperature.
 Un-occupied Summer Hours, Fan Coil to remain off.

Winter Operation
 Fan Coil to remain off
 Occupied Hours - Stairwell Force Flow Unit to run on call for heating to satisfy space temperature setpoint.
 Un-occupied Hours - Stairwell Force Flow Unit to run on call for heating to satisfy space temperature setback setpoint.

BAS Monitors and Alarms
 BAS to monitor Fan Coil unit discharge air temperature.
 BAS to alarm on space temperature rise 2 ° C over setpoint
 BAS to alarm on filter clog

4 STAIR 101 COOLING / HEATING CONTROL
M71 SCALE: NTS



Sequence of Operation - Exist Perimeter Supply Ventilation System

Equipment Controlled / Definitions
 AC1 w VFD - AHU Supply Fan / Location Penthouse
 RF1 w VFD - Return Fan / Location Penthouse
 Chilled Water Control Valve
 Heating Water Control Valve
 Humidification Steam Control Valve
 OA Damper / Exhaust Damper / Return Damper
 DPS1 - Duct Pressure Sensor (located ½ way down duct)
 TT1 - Outside Air Temp Sensor
 TT2 - Supply Air Temp Sensor
 TT3 - Return Air Temp Sensor
 HS1 - Outside Air Humidity Sensor
 HS2 - Supply Air Humidity Sensor
 HS3 - Return Air Humidity Sensor
 DPS1B - New Main Filter Pressure Gauge and BAS Differential Pressure Sensor

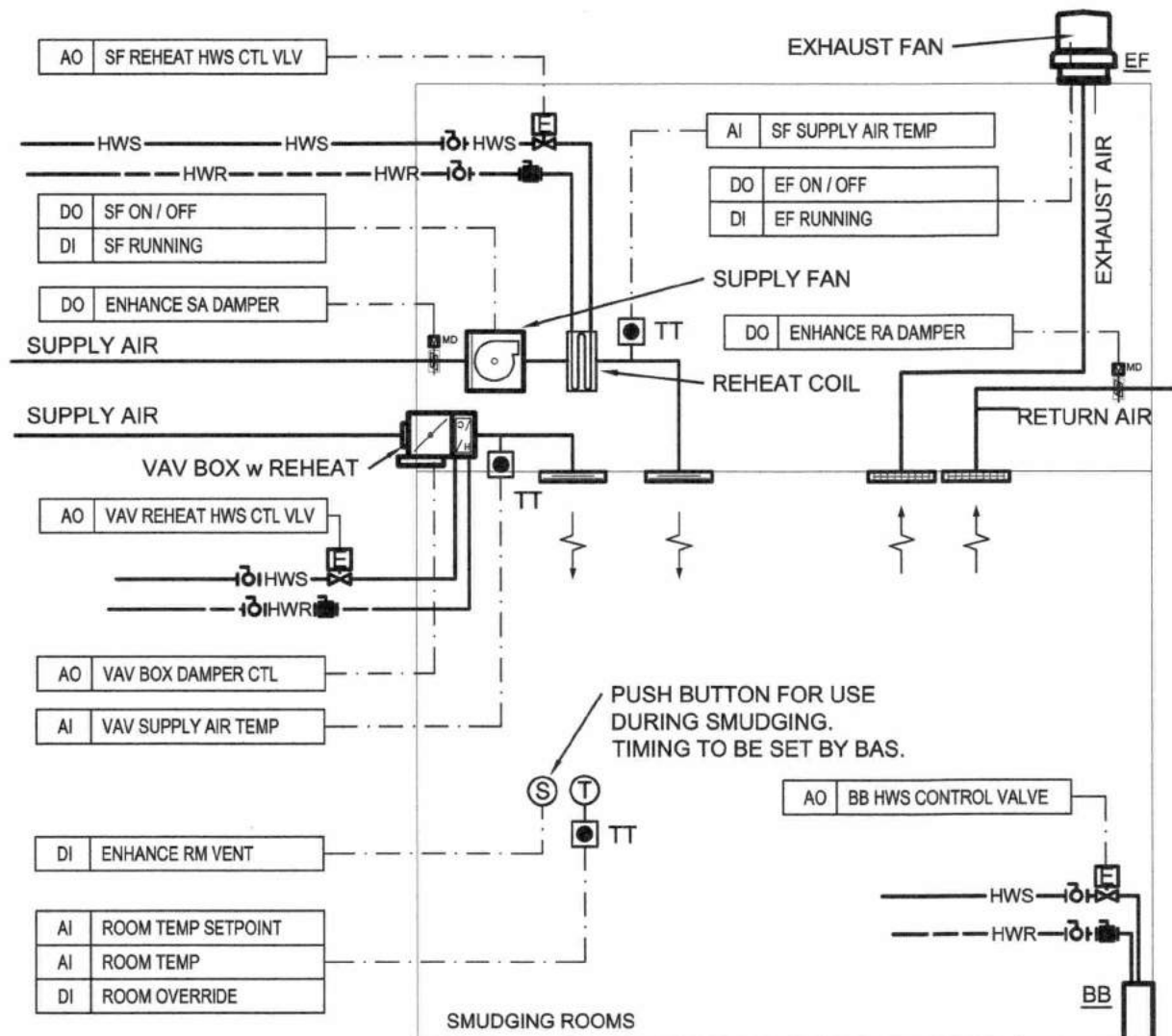
Equipment Operation
 ON - Occupied Periods as Scheduled, or when space override is active
 Fans are Variable Volume VFD

Equipment Operation
 Upon call for scheduled operation (or space occupied override);
 Unit conditions: Valves Closed, OA and EA Damper Closed, RA Damper Open
 Upon call for Unit Start
 Start AC1 and RF1 at low flow, Wait 10 Min, Open OA Damper to min position. Maintain Discharge Air Temp via modulation of Heating and Chilled Water Valves. If exterior conditions permit modulate OA / RA / EA Dampers for economizer operation and free cooling.
 Utilize Duct Pressure setpoint and modulate Supply and Return Fan Speed to maintain Duct Pressure setpoint.
 Return fan VFD to track with supply fan speed setpoint
 Note: TAB contractor to provide volume setpoints for various AC1 Fan and RF1 Fan operations (40%, 50%, 60%, 70%, 80%, 90%) for proper tracking of RF and SF speeds to maintain OA volume control.
 BAS to monitor return air humidity and provide humidifier with signal to control discharge humidity capacity, to maintain return air humidity setpoint.
 Setpoint to be variable based upon outside air temperature. (-25°C = 25%RH, 10°C = 50% RH)

Economizer Operation:
 If OA Temperature permits Economizer Operation; Modulate OA / RA / EA Dampers to maintain discharge air temperature.
 If Economizer Damper operation cannot maintain duct supply air temperature return unit to coil control. Return OA Damper to min position.

BAS Monitors and Alarms
 BAS to monitor AC1 / RF1 fan status and alarm on failure.
 BAS to monitor freeze stat temperature monitor on heating coil discharge and shut down SF1 unit if temperature > 4 ° C (40°F), P3 to continue to run, initiate alarm to Monitor.
 BAS to monitor Supply and Return Air Temperatures
 BAS to monitor Supply and Return Air Humidity

1 (X3) TYPICAL AIR HANDLING UNIT CONTROL
M71 SCALE: NTS



Sequence of Operation - Smudging Room Ventilation

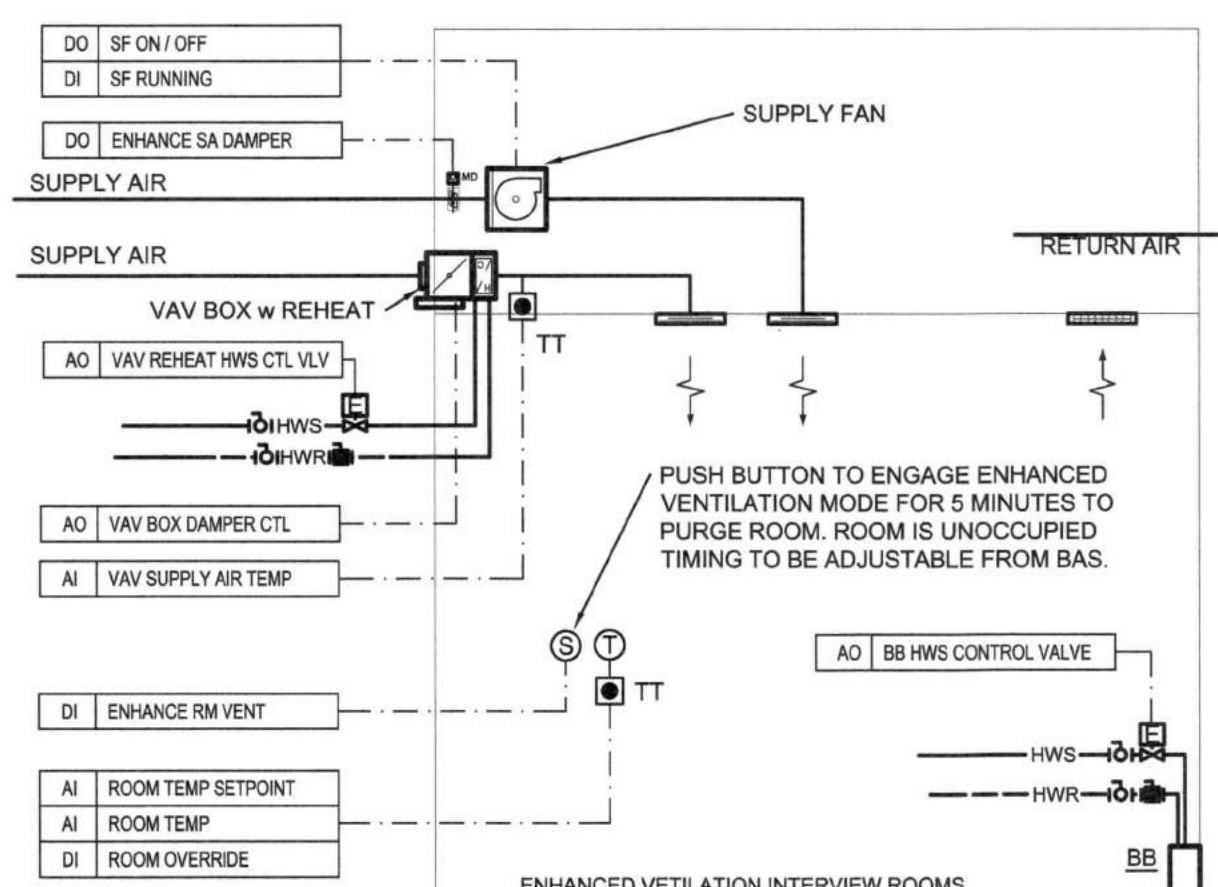
Controlled / Definitions
 VAV Box
 VAV Box Reheat Coil Valve
 Enhanced Vent Supply Fan (Normally Off)
 Supply Fan Reheat Coil Control Valve (Normally Closed)
 Supply Fan Damper (Normally Closed)
 Return Air Damper (Normally Open)
 Exhaust Fan (Normally Off)
 Space Base board Heating Water Control Valve
 TT1 - Space Thermostat
 (+/- 2° setpoint adjustment + override button)

Equipment Operation
 Occupied Hours - Space Thermostat to modulate VAV Box Damper, Reheat coil HTG control valve, and baseboard HTG control valve to maintain space temperature.
 Unoccupied Hours - Modulate baseboard HTG control valve to maintain space temperature. Unless Space override is engaged.

Enhanced Ventilation Mode
 Upon engagement of the Smudging Ventilation control switch
 Set enhanced ventilation mode run time for xx Hours
 Open Supply Fan Damper, Close Return Fan Damper
 Run Supply Fan and Exhaust Fan and prove operation.
 Modulate Supply Fan Reheat Control Valve to maintain discharge air temp equal to room setpoint temperature.
 Upon end of Enhanced Ventilation Mode Return system to normal operation.

BAS Monitors and Alarms
 BAS to monitor Supply Fan discharge air temperature.
 BAS to monitor VAV Box discharge air temperature.
 BAS to alarm on space temperature rise 2 ° C off setpoint
 BAS to alarm on supply or exhaust fan failure

5 SMUDGING ROOM VENTILATION CONTROL
M71 SCALE: NTS



Sequence of Operation - Interview Room Enhanced Ventilation Room Control

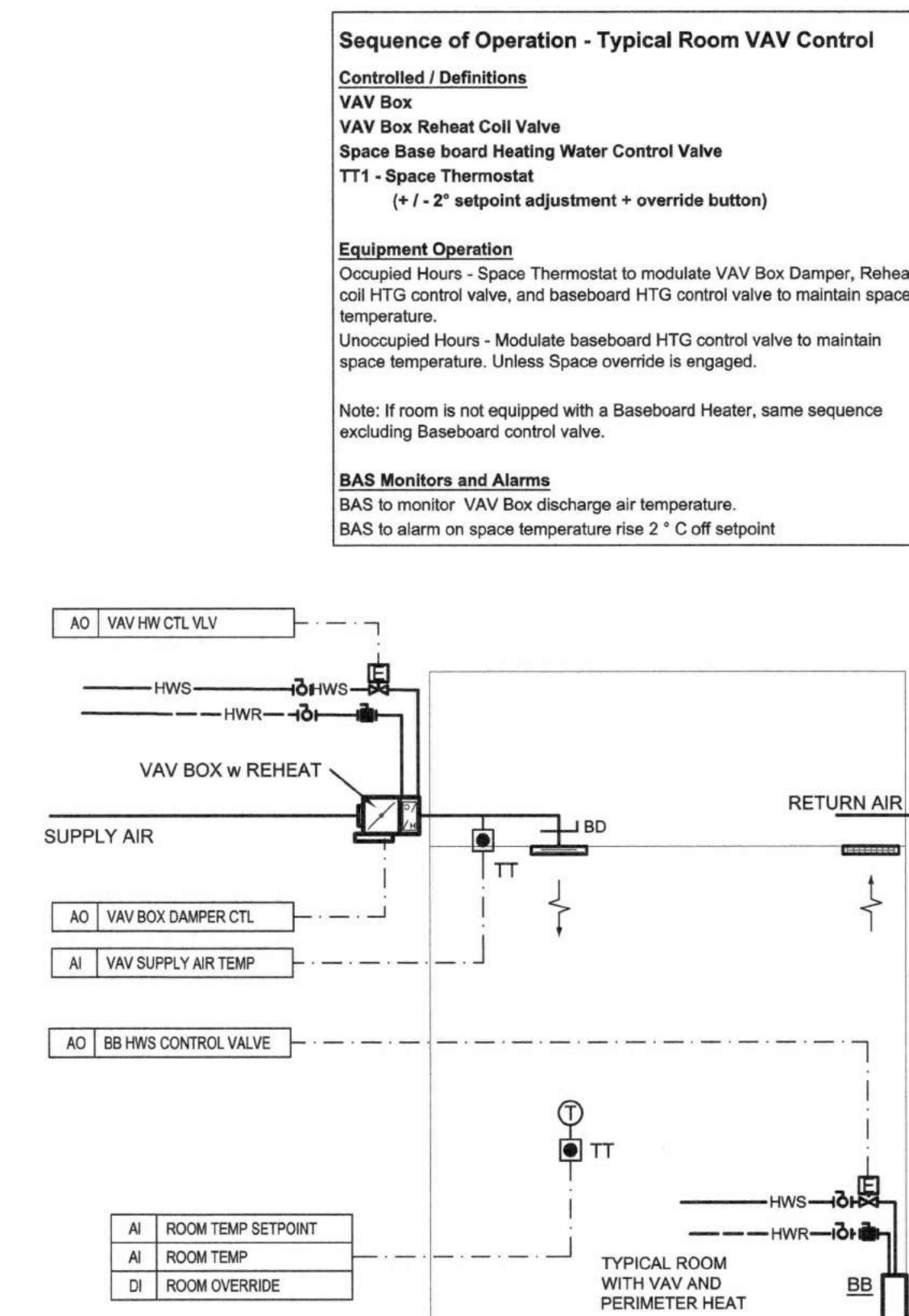
Controlled / Definitions
 VAV Box
 VAV Box Reheat Coil Valve
 Enhanced Vent Supply Fan (Normally Off)
 Supply Fan Damper (Normally Closed)
 Space Base board Heating Water Control Valve
 TT1 - Space Thermostat
 (+/- 2° setpoint adjustment + override button)

Equipment Operation
 Occupied Hours - Space Thermostat to modulate VAV Box Damper, Reheat coil HTG control valve, and baseboard HTG control valve to maintain space temperature.
 Unoccupied Hours - Modulate baseboard HTG control valve to maintain space temperature. Unless Space override is engaged.

Enhanced Ventilation Mode
 Upon engagement of the Enhanced Ventilation control switch
 Set enhanced ventilation mode run time for 5 Minutes (Adjustable)
 Open Supply Fan Damper, Run Supply Fan and prove operation.
 Modulate VAV Box / Baseboard Heating Control Valve to maintain space temperature setpoint.
 Upon end of Enhanced Ventilation Mode Return system to normal operation.

BAS Monitors and Alarms
 BAS to monitor VAV Box discharge air temperature.
 BAS to alarm on space temperature rise 2 ° C off setpoint
 BAS to alarm on supply fan failure

6 INTERVIEW ROOM VENTILATION CONTROL
M71 SCALE: NTS



7 TYPICAL VAV BOX CONTROL
M71 SCALE: NTS

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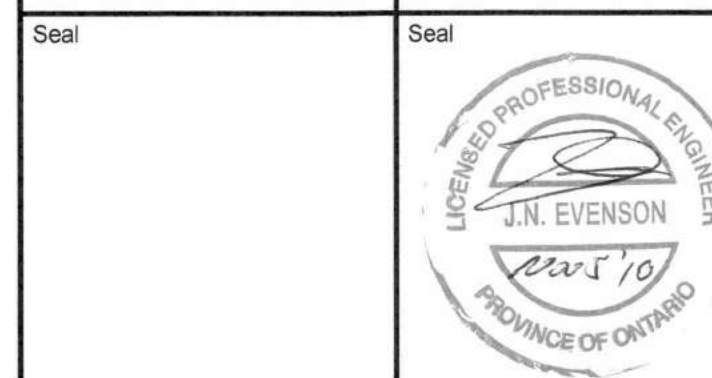
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Orientation



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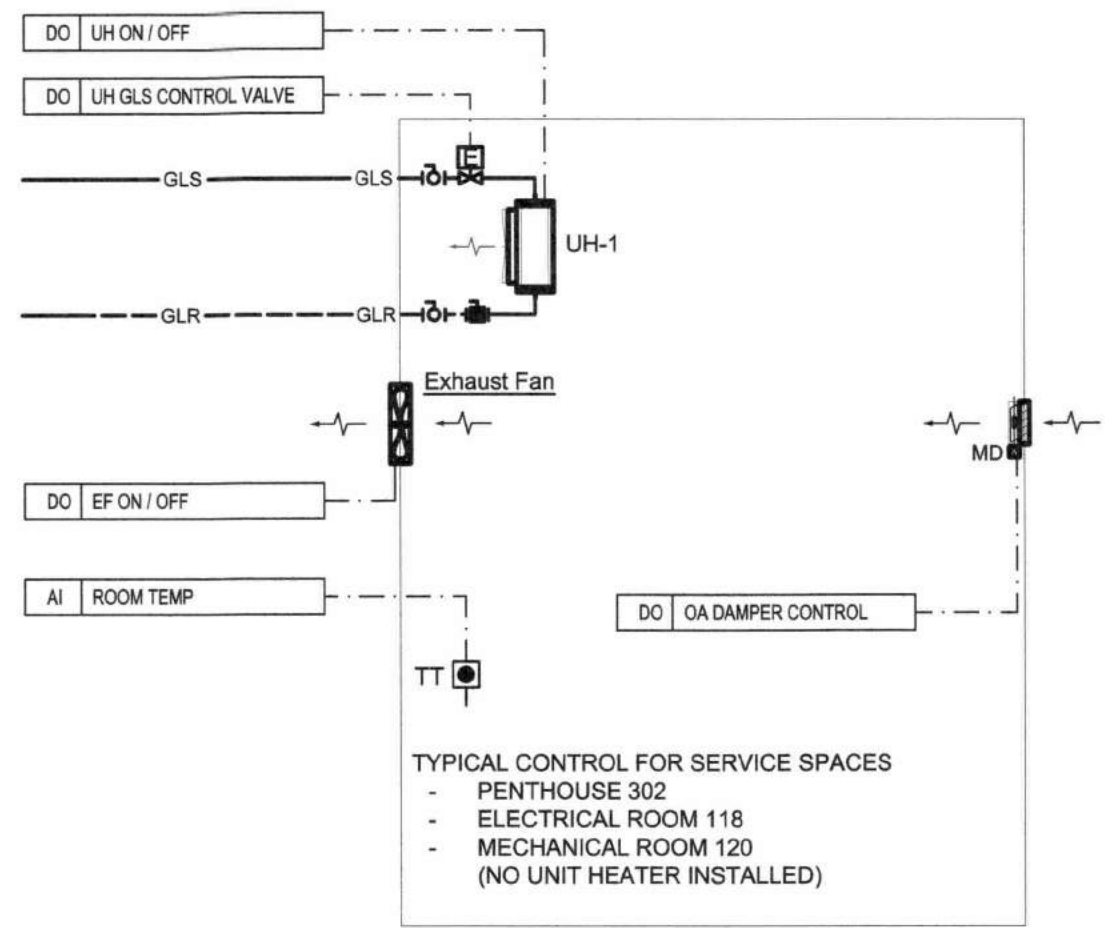
Project
BUILDING #046 RENOVATIONS

Drawing Title

CONTROLS SCHEMATIC 2 OF 3
 Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

Scale NTS	Date NOV 2, 2018
Drawn by TJ	Drawing No.
Checked By NC	M71
Approved By KT	
JLR # 27915	
Cad File No. ----	of 173



Sequence of Operation - Penthouse Space Temp

Equipment Controlled / Definitions
 UH - Unit Heater Fan
 UH Heating Water Control Valve (Normally Open)
 Space Exhaust Fan w Backdraft Damper (Normally Off)
 Outside Air Intake Damper (Normally Closed)
 TT - Space temperature Transmitter

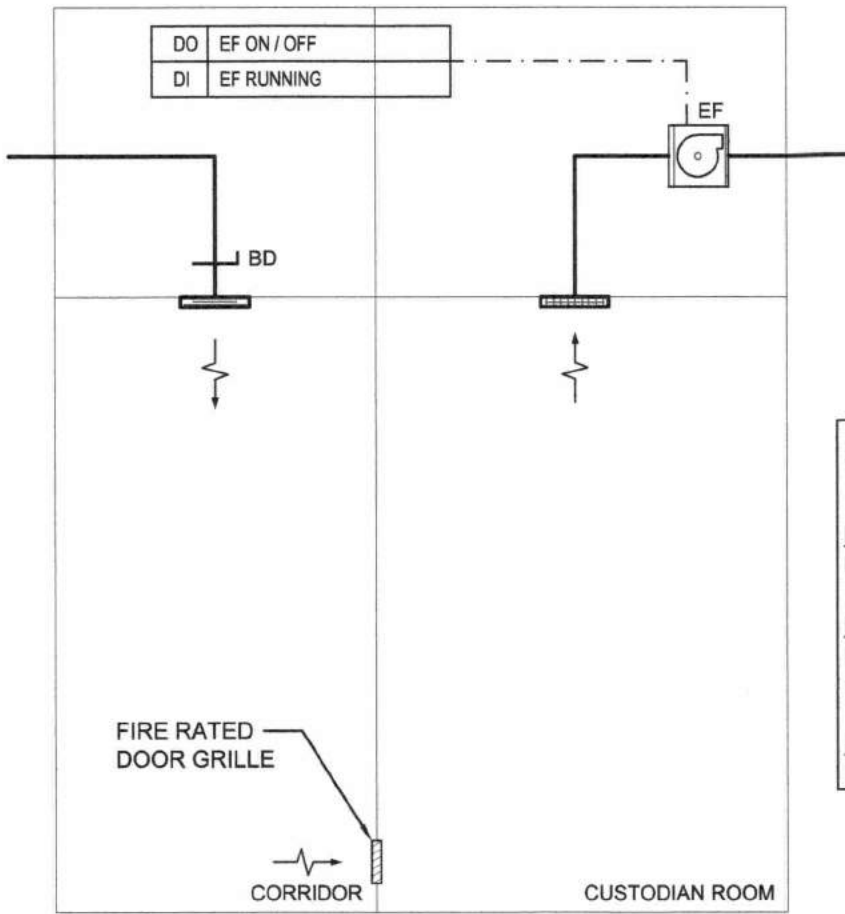
Equipment Operation
 ON - 24 / 7 / 365

Equipment Operation
 BAS to maintain space temperature control.
 Upon drop in space temperature start Unit Heater and Open Htg Control Valve to meet setpoint.
 Upon rise in temperature open outside air damper, to meet setpoint.
 Upon further rise in temperature (+ 2°C from setpoint) start exhaust fan to meet setpoint.

BAS Monitors and Alarms
 BAS to alarm on space temperature below 10 ° C.

TYPICAL CONTROL FOR SERVICE SPACES
 - PENTHOUSE 302
 - ELECTRICAL ROOM 118
 - MECHANICAL ROOM 120
 (NO UNIT HEATER INSTALLED)

1 SERVICE SPACE TEMPERATURE CONTROL
 SCALE: NTS



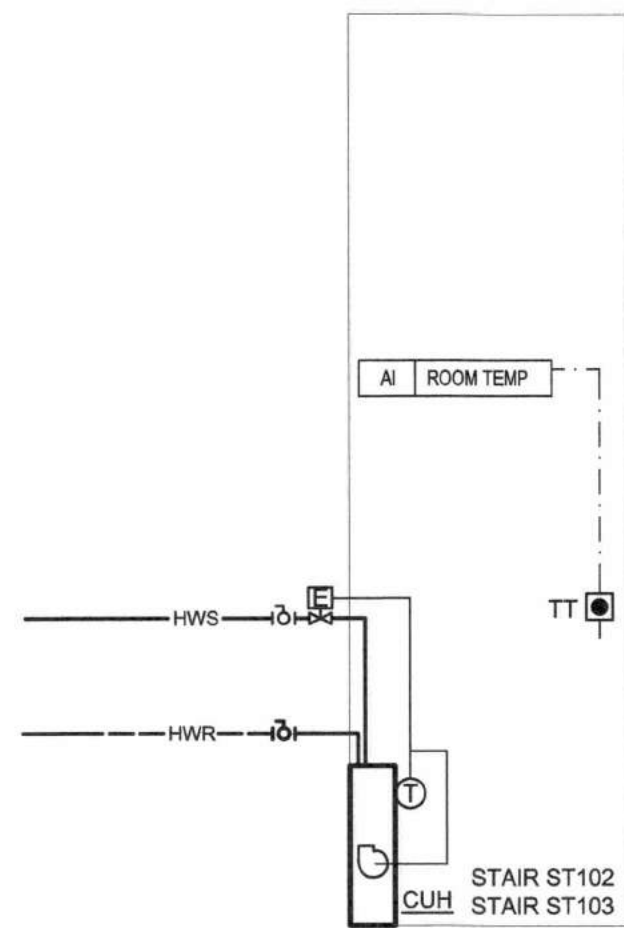
Sequence of Operation - Janitor / Custodian Room Vent

Equipment Controlled / Definitions
 EF - Exhaust Fan

Equipment Operation
 BAS run fan on U of G independent run schedule for custodian rooms.

BAS Monitors and Alarms
 BAS to alarm on fan failure.

2 CUSTODIAN ROOM VENT CONTROL
 SCALE: NTS



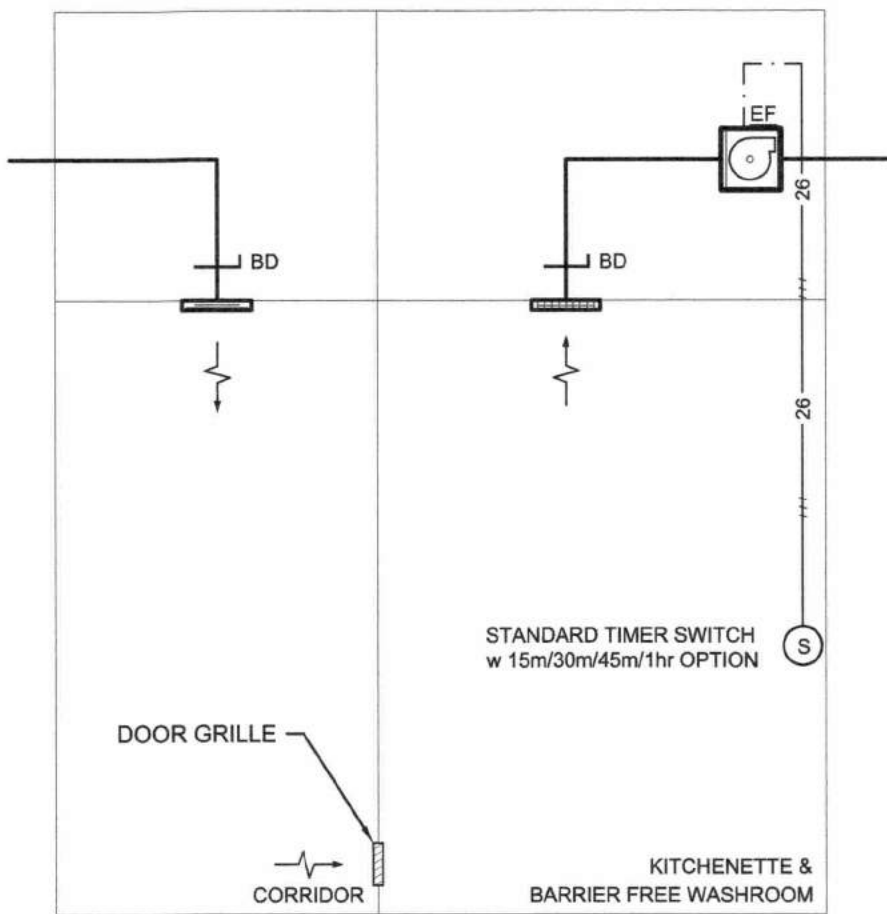
Sequence of Operation - Stairwell Heating

Equipment Controlled / Definitions
 CUH - Cabinet Unit Heater

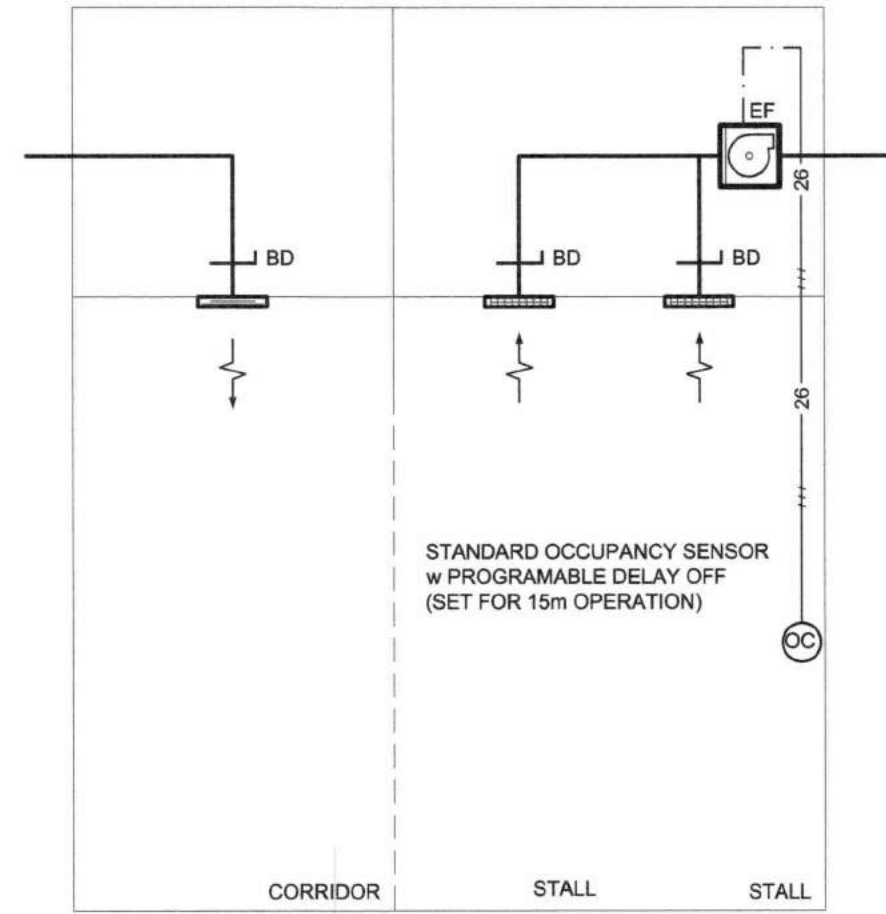
Equipment Operation
 Equipment integral 120V thermostat to open heating valve and run cabinet fan to maintain space temperature.

BAS Monitors and Alarms
 BAS to monitor stairwell space temperature and alarm if temperature is < 10°.

3 STAIRWELL TEMPERATURE CONTROL
 SCALE: NTS



4 INDEPENDANT CONTROL ROOMS
 SCALE: NTS



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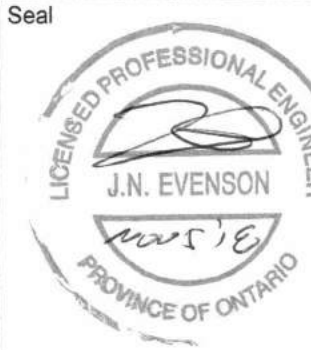
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Orientation	
Seal	Seal



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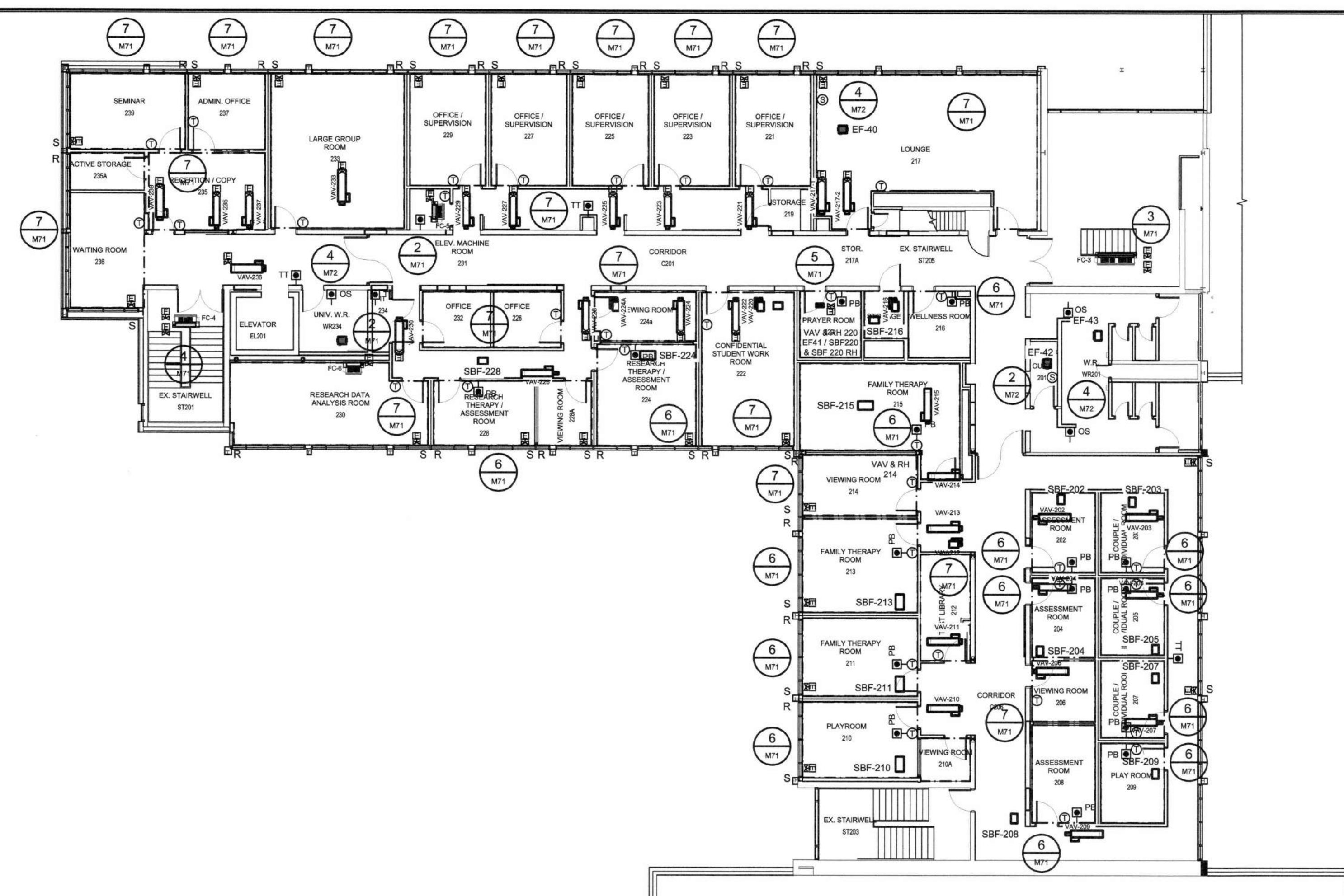


Project
BUILDING #046 RENOVATIONS

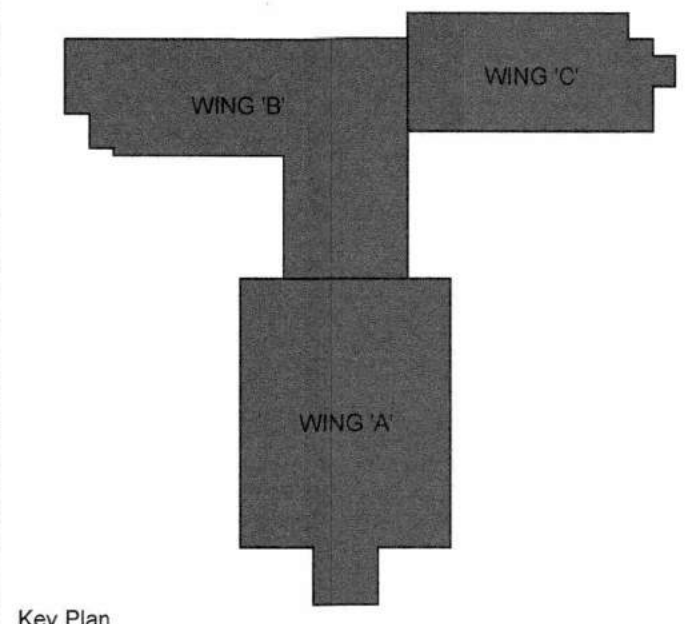
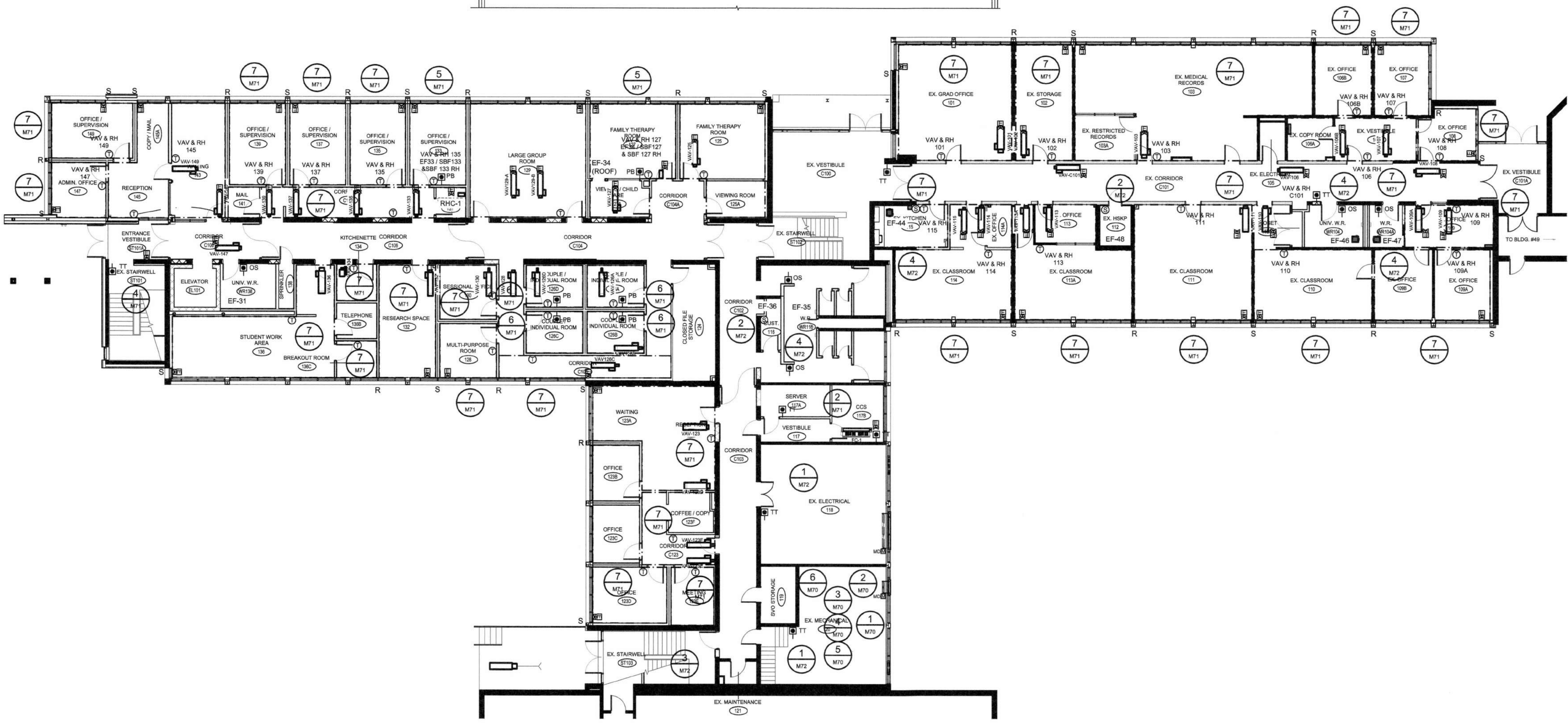
Drawing Title
CONTROLS SCHEMATICS 3 OF 3
 Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

Scale NTS	Date NOV 2, 2018
Drawn by JT	Drawing No. M72
Checked By NC	
Approved By NC	
JLR # 27915	of 173
Cad File No. ----	



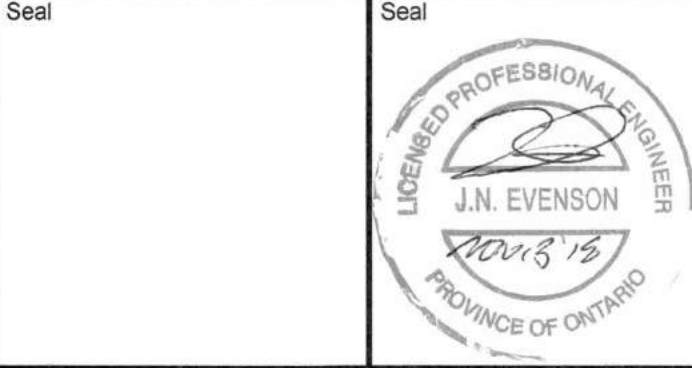
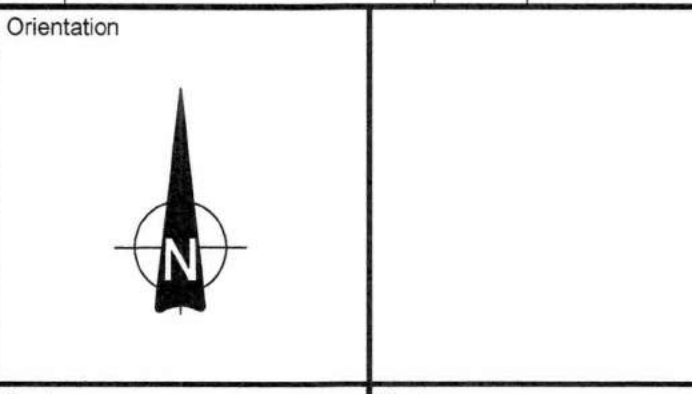
Note:
1. Not all control elements are shown, refer to Schematic Drawings for System requirements
2.



Key Plan
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1	RE-ISSUED FOR TENDER	TA	NOV 13, 2018
0	ISSUED FOR PERMIT & TENDER	TA	NOV 2, 2018
NO.	ISSUED	BY	DATE



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Project
BUILDING #046 RENOVATIONS

Drawing Title
CONTROLS PLAN

Project No.
504034

Location
UNIVERSITY OF GUELPH BUILDING #046

Scale	Date NOV 2, 2018
Drawn by	Drawing No.
Checked By	M73
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JLR # 27915	of 173
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