

1 SITE PLAN  
M0.01 N.T.S.

AREA OF WORK

GENERAL NOTES

GENERAL NOTES:

- ALL DRAWINGS ARE DIAGRAMMATIC ONLY. THE ARRANGEMENTS OF EQUIPMENT SHOWN ARE APPROXIMATIONS ONLY AND MAY BE ALTERED BY THE ENGINEERS TO MEET THE REQUIREMENTS OF THE PROJECT. ALL ROUTING OF SERVICES ARE APPROXIMATE, AND CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH OTHER DISCIPLINES AND PERFORMING SITE SURVEY FOR EXACT ROUTING OF SERVICES PRIOR TO SUBMITTING BID.
- PRIOR TO SUBMITTING THE BID, CONTRACTOR SHALL CAREFULLY REVIEW THE EXISTING SITE CONDITIONS AND THE SCOPE OF WORK. THE CONTRACTOR MUST PERFORM A SITE INSPECTION DURING THE TENDER PERIOD AND ENSURE THAT ALL WORK THAT IS VISIBLE IS INCLUDED AND CONSIDERED UNDER SCOPE OF WORK OF THIS PROJECT. ALL EXISTING DEVICES AND SERVICES THAT PASS THROUGH THE AREAS OF WORK ARE TO BE MAINTAINED WITHOUT INTERRUPTION. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL WORK WITH OTHER TRADES, CONSULTANT, AND THE OWNER. CONTRACTOR SHALL PROVIDE TEMPORARY COOLING OR HEATING TO THE AFFECTED AREA DURING THE CONSTRUCTION.
- WHERE WORK INVOLVES INTERRUPTION TO EXISTING SERVICES, TEMPORARILY OR PERMANENTLY RELOCATE/RE-ROUTE (AS REQUIRED) EXISTING SERVICES AND RE-INSTALLATION SHALL BE IN ACCORDANCE WITH THE EXISTING STANDARDS. COORDINATE WORK WITH OTHER TRADES. PRIOR TO START OF ANY RELOCATION WORK, IDENTIFY TO OWNER/CONSULTANT AND OBTAIN APPROVAL.
- AS A RESULT OF NEW WORK IN EXISTING AREA, REMOVE ALL ABANDONED SERVICES, DEVICES, AND EQUIPMENT, CUT BACK SERVICES TO SOURCE & MAKE SAFE. INCLUDE FOR REMOVAL AND RE-INSTALLATION OF EXISTING DEVICES & EQUIPMENT AS REQUIRED. INCLUDE FOR ANY CUTTING & PATCHING OF EXISTING SERVICES AS REQUIRED TO REMOVE ABANDONED SERVICES.
- FOR ALL REMOVED EXISTING EQUIPMENT AND MATERIALS, COORDINATE WITH OWNER IF THEY WISH TO KEEP SOME FOR SPARE PARTS. AND DISPOSE ANY UNWANTED ITEMS.
- DEMOLITION DRAWINGS INDICATE VISIBLE/KNOWN DEVICES AND/OR SERVICES ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR DETAILED SITE SURVEY PRIOR TO SUBMITTING THE BID, AND SHALL INCLUDE FOR ALL COSTS ASSOCIATED WITH DEMOLITION SCOPE OF WORK IN THE BID PRICE. MANDATORY SITE WALKTHROUGH SHALL BE ARRANGED PER THE RFT TO ALLOW CONTRACTORS TO INVESTIGATE AND RECORD EXISTING CONDITIONS PRIOR TO SUBMITTING THE BID. CONTRACTOR SHALL BE RESPONSIBLE FOR:
  - REVIEW OF EXISTING MECHANICAL SERVICES PRESENTLY SERVING EXISTING AREAS AS AFFECTED BY THE PROPOSED SCOPE OF WORK. IT SHALL BE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO IDENTIFY ALL EXISTING EQUIPMENT, DEVICES, AND SERVICES WHICH ARE TO REMAIN AND WHICH ARE PRESENTLY FED FROM THE AREAS WHICH ARE DESIGNATED TO BE DELETED. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR REINSTALLATION AND RECONNECTION OF ALL SUCH SERVICES TO MATCH EXISTING STANDARDS. CONTRACTOR SHALL INCLUDE ALL COSTS FOR SITE INVESTIGATION TO SOURCE DELETE SERVICES REQUIRED FOR RE-CONNECTION OF EXISTING SERVICES THAT MUST REMAIN. INCLUDE IN YOUR BID ALL COSTS ASSOCIATED WITH SITE INVESTIGATION, ETC, AND ALL REQUIRED COSTS FOR THIS WORK. REVIEW AND NOTE EXISTING CONDITIONS AND CONFIRM EXACT SITE CONDITIONS.
  - RECORDING OF ANY EXISTING SERVICES, DEVICES, ETC, WHICH MAY BE REQUIRED TO BE RETAINED AND/OR RELOCATED TO SUIT NEW WORK;
  - ENSURING THAT ALL TRADES BEARING UPON THE SCOPE OF WORK OF THIS PROJECT PERFORM DETAILED SITE INVESTIGATIONS REGARDING DEMOLITION AND NEW SCOPE OF WORK PRIOR TO SUBMISSION OF THE BID.
- ALL 90° MITERED DUCT ELBOW SHOWING IN PLAN DWGS SHALL BE C/W TURNING VANE.
- CONTRACTOR SHALL PROVIDE THE HYDRAULIC CALCULATION C/W FIRE PROTECTION PERMIT.
- CONTRACTOR SHALL PROVIDE INTERFERENCE DRAWING PRIOR TO CONSTRUCTION AND COORDINATE THE EXISTING CONDITION WITH NEW DESIGN
- CONTRACTOR SHALL ENSURE:
  - ALL PRESSURE RELIEF DEVICES SHALL BE PIPED TO FLOOR DRAINS
  - CHECKERED ALUMINUM COVER SHALL BE PROVIDED WHERE PIPING ON THE FLOOR REPRESENTS A TRIPPING HAZARD
  - ALL ISOLATION AND CONTROL VALVES AND STRAINERS SHALL BE ACCESSIBLE FOR MAINTENANCE
  - ALL ANALOGUE GAUGES SHALL BE ACCESSIBLE AND BE SEEN FROM THE FLOOR
  - ALL GAS ISOLATION VALVES SHALL BE ACCESSIBLE

ABBREVIATIONS

S/A	SUPPLY AIR
E/A	EXHAUST AIR
O/A	OUTDOOR AIR
R/A	RETURN AIR
F/A	FROM ABOVE
T/A	TO ABOVE
F/B	FROM BELOW
T/B	TO BELOW
C/W	COMPLETE WITH
FD	FIRE DAMPER
BD	BALANCE DAMPER
CTE	CONNECT TO EXISTING

MECHANICAL SCOPE OF WORK FOR SEPARATE PRICE

PROVIDE SEPARATE PRICE FOR THE FOLLOWING :-

DEMOLITION:

DEMOLISH AND REMOVE:

- EXISTING SUPPLY AIR DUCT CONNECTING FROM EXISTING SUPPLY FAN (SF-2) ON LEVEL 1 AS SHOWN ON DWG. M1.01.
- THE EXISTING UNIT VENTILATOR C/W ALL THE ASSOCIATED PIPING, VALVES, AND AIR GRILLE AS SHOWN ON DWG. M1.01.
- EXISTING EXHAUST AIR DUCTWORK AND GRILLES IN ROOM 131 AS SHOWN ON DWG. M1.01.

NEW CONSTRUCTION:

SUPPLY AND INSTALL:

- NEW VAV BOXES C/W 3-WAY VALVE, SILENCER, REHEAT COILS, AND ASSOCIATED PIPING AND CONTROLS WITH NEW THERMOSTATS. FOR DETAILED PIPING SCHEMATIC SEE DETAILS DRAWINGS . REFER TO DETAIL DRAWINGS FOR PIPING SCHEMATICS.
- NEW DUCTWORK C/W NEW BALANCE DAMPERS , DIFFUSERS, GRILLES, AND OTHER ACCESSORIES. PROVIDE NEW INSULATION ON SUPPLY DUCT.
- NEW HEATING CIRCULATION PUMP C/W NEW PIPING, AND SUPPORT. REFER TO DETAIL DRAWINGS FOR PIPING SCHEMATICS.
- NEW CONTROL VALVES WITH NEW SUPPLY AND RETURN ISOLATION VALVES ON EXISTING WALL FIN RADIATORS AND INTEGRATE TO THE BAS SYSTEM. PROVIDE ACCESS PANEL ON COAT RACK FOR SERVICE AND MAINTENANCE. CLOSE OFF THE UNIT VENTILATOR FRESH AIR DAMPER AND SEAL THE OPENING.
- NEW WALL FIN RADIATOR WF-131 C/W NEW ISOLATION AND CONTROL VALVE IN CLASSROOM 131.

CREDIT :

- SUPPLY AND INSTALL NEW INSULATION ON EXISTING SUPPLY AIR DUCT ON LEVEL 1 AS SHOWN ON M1.01.

MECHANICAL SYMBOLS

	PIPE UP
	PIPE DOWN
	ISOLATING/GATE VALVE
	CHECK VALVE
	STRAINER
	PRESSURE REDUCING VALVE
	PUMP
	THERMOMETER
	PRESSURE RELIEF VALVE
	PRESSURE GAUGE
	RECTANGULAR DUCT UP
	RECTANGULAR DUCT DOWN
	ROUND DUCT UP
	ROUND DUCT DOWN
	EXHAUST AIR GRILLE
	SUPPLY AIR DIFFUSER
	FIRE DAMPER (VERTICAL)
	FIRE DAMPER (HORIZONTAL)
	AIRFLOW ARROW
	AIR DIFFUSER/GRILLE DATA
	HEATING WATER SUPPLY
	HEATING WATER RETURN
	DOMESTIC COLD WATER
	DOMESTIC HOT WATER
	DOMESTIC HOT WATER RECIRCULATION
	CONDENSATE DRAIN
	NATURAL GAS
	STORM DRAIN
	SANITARY
	PARAMETER DRAIN
	FIRE LINE
	SPRINKLER LINE

DRAWINGS LIST

DWG NO.	DRAWING NAME
M0.01	COVER PAGE
M1.01	LEVEL 1 - HVAC DEMOLITION
M1.02	LEVEL 1 - HVAC NEW CONSTRUCTION
M1.03	LEVEL 2 / LOWER ROOF - HVAC DEMOLITION
M1.04	LEVEL 2 / LOWER ROOF - HVAC NEW CONSTRUCTION
M6.01	GAS PIPING SCHEMATIC
M7.01	RTU-5 CONTROL SCHEMATIC
M7.02	RTU-6 CONTROL SCHEMATIC
M7.03	TERMINAL UNITS VAVS CONTROL SCHEMATIC
M8.01	MECHANICAL SCHEDULES
M9.01	MECHANICAL DETAILS

SCOPE OF WORK

MECHANICAL SCOPE OF WORK

THE FOLLOWING PROVIDES A SUMMARY OF SCOPE OF WORK. REFER TO THE DRAWINGS AND SPECIFICATIONS FOR FULL SCOPE OF WORK.

DEMOLITION:

DEMOLISH AND REMOVE:

- SUPPLY AND RETURN FANS LOCATED IN MECHANICAL ROOM ON 2ND FLOOR (SF-1, SF-2 AND RF-2) COMPLETED WITH THE AIR DUCT CONNECTED TO THE UNITS WITHIN THE MECHANICAL ROOM.
- ALL HYDRONIC PUMP, PIPING AND ASSOCIATED ACCESSORIES SERVING THE EXISTING SUPPLY FANS (SF-1 AND SF-2) INSIDE THE SECOND FLOOR MECHANICAL ROOM. CAP THE HYDRAULIC PIPES AT THE MECH ROOM BOUNDARY .
- EXHAUST FAN SERVING THE GYM LOCATED ON ROOF.
- STORAGE ROOM EXHAUST FAN .

NEW CONSTRUCTION:

SUPPLY AND INSTALL:

- NEW ROOFTOP UNITS (RTU-5 AND RTU-6) LOCATED ON ROOF C/W AIR DUCTS WITH EXTERNAL INSULATION AND SUPPORTS AND CONNECTED BACK TO THE EXISTING AIR DISTRIBUTION SYSTEM AS SHOWN ON THE DRAWING. MODIFY EXISTING LOUVER OPENINGS AND PROVIDE NEW OPENINGS ON THE EXTERNAL WALL OF MECH ROOM FOR AIR DUCT PENETRATIONS.
- NEW RETURN AIR DUCT CONNECTING FROM THE OPENING OF REMOVED EXISTING GYM RETURN FAN AND NEW RTU-5 C/W AIR DUCTS WITH EXTERNAL INSULATION AND SUPPORTS.
- INSTALL NEW GAS PIPING TO NEW RTUs WITH ALL NEW ASSOCIATED PIPING ACCESSORIES AND SUPPORTS.
- PROVIDE NEW INSULATION ON EXISTING SUPPLY AIR DUCT ON LEVEL 1 AS SHOWN ON M1.01.
- NEW WALL MOUNTED FRESH AIR FAN (MINI MAKE UP AIR UNIT) C/W DUCTWORK, INSULATION FOR INLET CONNECTION, INLET DIFFUSER, AND INTAKE LOUVER WITH BIRD SCREEN, AND LOCAL& REMOTE CONTROL ON BAS.
- HIRE A HWDSB APPROVED ROOFING COMPANY TO PROVIDE/REPAIR ROOFING OVER THE NEW RTU CURB, WALL AND ROOF OPENINGS.
- SUBMIT AN APPLICATION TO UPGRADE THE MAIN INCOMING GAS LINE TO THE UTILITY COMPANY ON BEHALF OF THE OWNER. OWNER WILL PAY FOR THE UTILITY GAS APPLICATION AND THEIR UPGRADE FEE AS PART OF CASH ALLOWANCE. CARRY ALL THE OTHER ASSOCIATED COSTS, AS PART OF THE ORIGINAL CONTRACT, INCLUDING BUT NOT LIMITED TO THE APPLICATION FORMS, COORDINATION, AND FOLLOW UP WITH THE UTILITY COMPANY, IN ADDITION TO THE MATERIAL AND LABOR REQUIRED FOR THE MAIN INCOMING GAS UPGRADE.

TESTING AND BALANCING:

- PROVIDE WATER AND AIR BALANCING UPON COMPLETION OF THE WORK.

CONTROL SCOPE OF WORK

THE FOLLOWING PROVIDES A SUMMARY OF SCOPE OF WORK. REFER TO THE DRAWINGS AND SPECIFICATIONS FOR FULL SCOPE OF WORK.

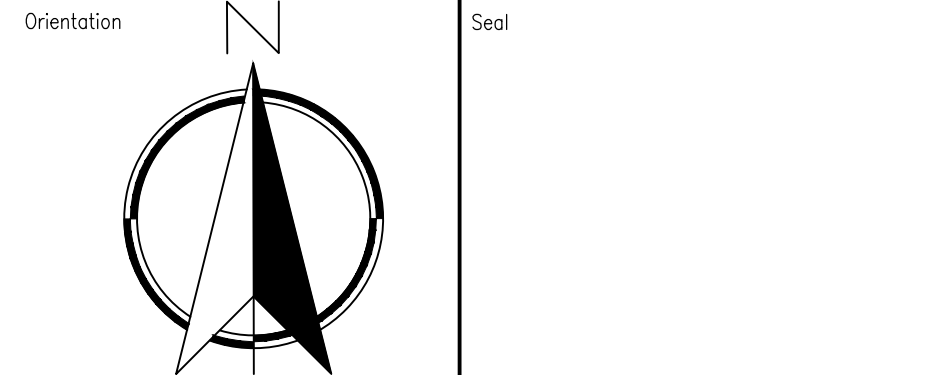
CONTRACTOR SHALL HIRE THE HWDSB APPROVED CONTROL CONTRACTOR, JCI OR CONVERGINT TO COMPLETE THE CONTROL SCOPE OF THIS PROJECT.

- REMOVE THE EXISTING BAS CONTROL WITH ALL WIRING C/W CONDUITS ASSOCIATED WITH THE NEW EQUIPMENT THAT ARE TO BE REPLACED AS PART OF THIS PROJECT.
- SUPPLY AND INSTALL NEW CONTROL PANELS AND DEVICES AS SHOWN ON THE NEW BAS DRAWINGS.
- CONNECT THE NEW EQUIPMENT TO BAS, UPDATE THE SYSTEM GRAPHIC AND PROVIDE THE SEQUENCE OF OPERATION AS NOTED.

CLOSEOUT

- TEST AND COMMISSION THE NEW BAS SYSTEMS AND CONTROL DEVICES INSTALLED AS PART OF THIS PROJECT.
- PROVIDE TRAINING TO THE FACILITY ON THE NEW SYSTEMS AND CONTROL DEVICES INSTALLED AS PART OF THIS PROJECT.
- PROVIDE O&M MANUALS WITH WARRANTY LETTER AS PER THE SPECIFICATIONS.

2	REISSUED FOR PERMIT	2025-01-10
1	ISSUED FOR TENDER	2025-01-10
0	ISSUED FOR PERMIT	2024-12-02
A	ISSUED FOR 33%	2024-08-16
No	Revisions	Date



The Contractor shall check and verify all dimensions and report all errors and omissions to the IO-Owner's/MBS Designee (as applicable) for his/her written direction before proceeding with the Work.

A	A Detail No
B	B Sheet No where detailed



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Ministry PSIF Number

Project  
HOLBROOK ELEMENTARY SCHOOL  
GYM RENOVATION

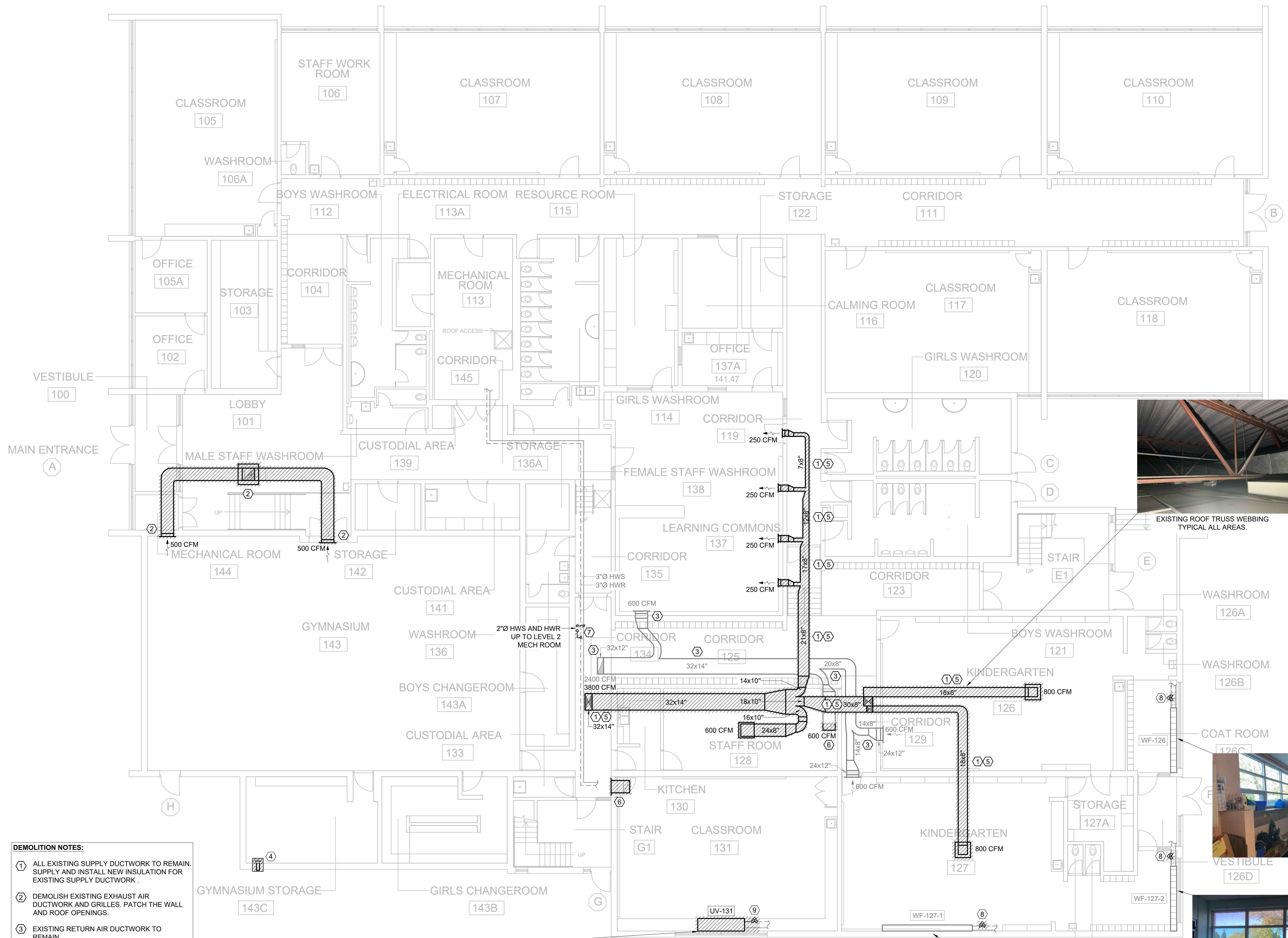
Location  
450 SANITORIUM ROAD  
HAMILTON, ONTARIO  
IO Project No Site No Building No  
P2024-2081

Client  
HAMILTON-WENWORTH DISTRICT S.B.

Drawing Title  
COVER PAGE

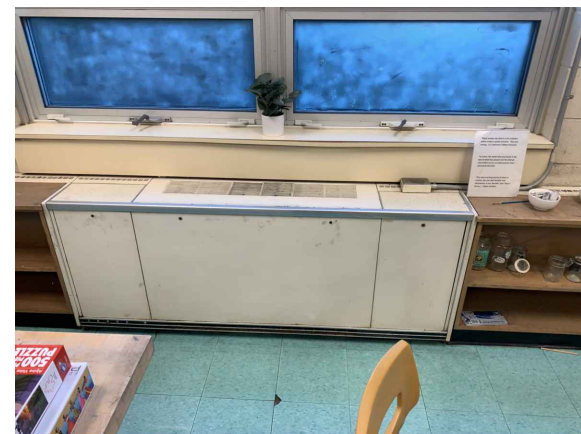
Scale N.T.S.	Project Start Date
Drawn by TS	Substantial Performance Date
Designed by MS	Drawing No M0.01
Approved by BR	CAD File NAME



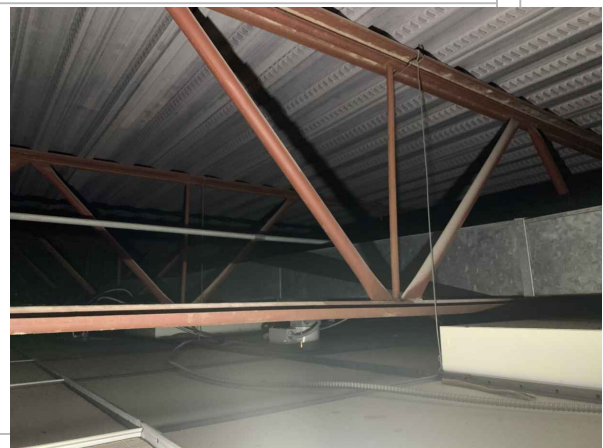
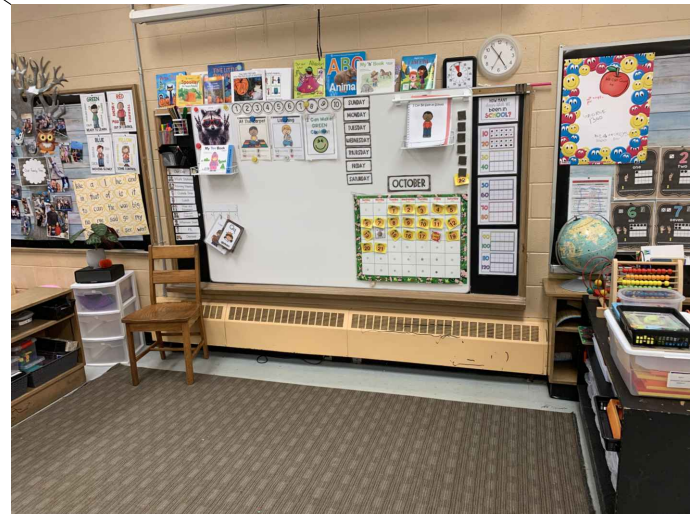


- DEMOLITION NOTES:**
- ① ALL EXISTING SUPPLY DUCTWORK TO REMAIN. SUPPLY AND INSTALL NEW INSULATION FOR EXISTING SUPPLY DUCTWORK.
  - ② DEMOLISH EXISTING EXHAUST AIR DUCTWORK AND GRILLES. PATCH THE WALL AND ROOF OPENINGS.
  - ③ EXISTING RETURN AIR DUCTWORK TO REMAIN.
  - ④ DEMOLISH THE EXISTING WALL MOUNTED EXHAUST FAN AND AIR LOUVER.

- DEMOLITION NOTES FOR SEPARATE PRICING**
- ⑤ DEMOLISH ALL EXISTING SUPPLY AND RETURN DUCTWORK C/W SUPPORT AS SHOWN. PATCH ANY WALL OPENINGS IF LEFT OPEN/UNUSED.
  - ⑥ DEMOLISH EXISTING EXHAUST AIR DUCTWORK AND GRILLES. PATCH THE WALL AND ROOF OPENINGS.
  - ⑦ DEMOLISH THE HYDRONIC SUPPLY AND RETURN RISERS GOING UP TO LEVEL 2 MECH ROOM. CAP THE PIPE BRANCH-OFFS ON THIS LEVEL AND PATCH THE CEILING SLAB OPENINGS.
  - ⑧ DEMOLISH WALL FIN CONTROL VALVES AND ISOLATION VALVES. CARRY COST TO MAKE OPENING ON WALL TO ACCESS THE RADIATOR BEHIND THE COAT RACK.
  - ⑨ DEMOLISH THE EXISTING UNIT VENTILATOR C/W ALL THE ASSOCIATED PIPING, VALVES, AND AIR GRILLE. PATCH THE AIR OPENING MATCH WITH EXISTING.



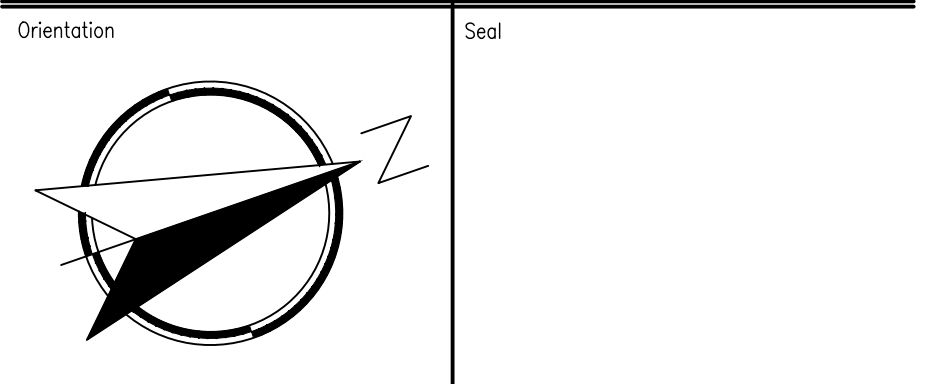
- GENERAL NOTES:**
- CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH EXISTING SITE CONDITION. THIS SHALL INCLUDE INVESTIGATION OF ALL EXISTING DUCTWORK, PIPING, LIGHTING, CONDUITS, PUBLIC ADDRESS AND LIFE SAFETY DEVICES LOCATIONS IN THE RENOVATED AREA
  - CONTRACTOR TO VERIFY EXACT LOCATIONS OF EXISTING DUCTWORK. COORDINATE WITH ELECTRICAL AND ALLOW ALL COSTS TO REMOVE AND RE-INSTALL ON LIGHT FIXTURES, PUBLIC ADDRESS AND LIFE SAFETY AND CONDUITS IF NECESSARY TO ACCOMMODATE INSTALLATION OF NEW SUPPLY AND RETURN AIR DUCTWORK.
  - ALL DUCTWORK INSTALLED OUTSIDE TO BE INSULATED WITH EXTERNAL WEATHER-PROOF INSULATION C/W ALUMINUM JACKET.
  - ALL PIPING AND DUCT PENETRATION THROUGH FIRE RATED WALLS AND FLOOR SLABS TO BE FIRE STOPPED.



EXISTING ROOF TRUSS WEBBING  
TYPICAL ALL AREAS.



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A Detail No  
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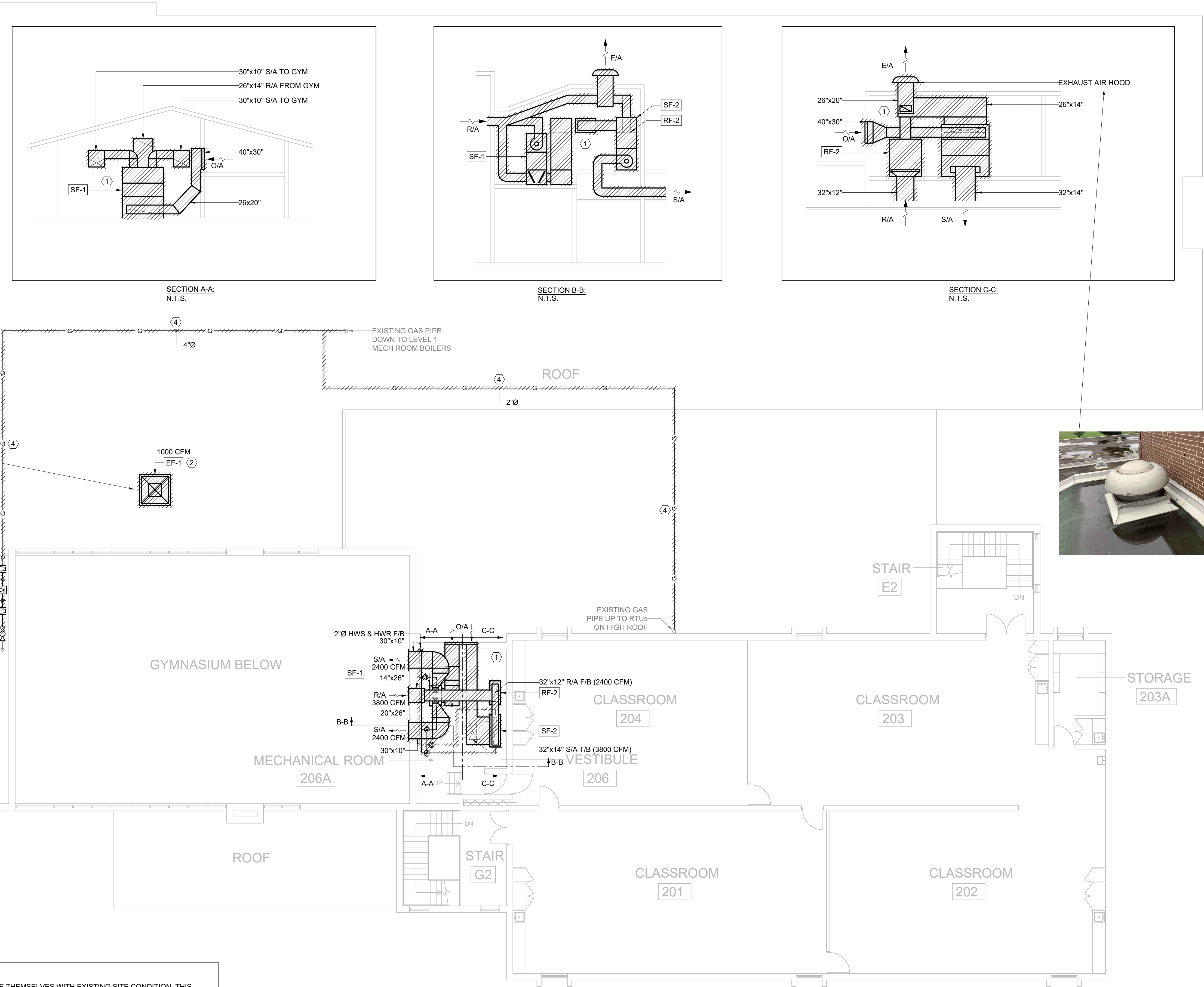
Ministry PSIF Number  
Project  
**HOLBROOK ELEMENTARY SCHOOL GYM RENOVATION**  
Location  
450 SANITORIUM ROAD  
HAMILTON, ONTARIO  
IO Project No  
P2024-2081  
Site No  
Building No  
Client  
**HAMILTON-WENTWORTH DISTRICT S.B.**

Drawing Title  
**LEVEL 1 HVAC DEMOLITION**  
Scale  
1/8" = 1'-0"  
Drawn by  
TS  
Designed by  
MS  
Approved by  
BR  
Project Start Date  
Substantial Performance Date  
Drawing No  
**M1.01**  
Floor No  
CAD File NAME





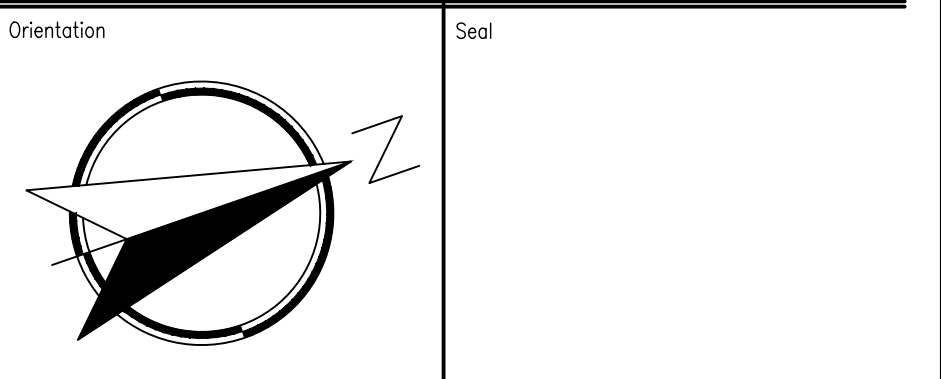




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  - CONTRACTOR TO VERIFY EXACT LOCATIONS OF EXISTING DUCTWORK. COORDINATE WITH ELECTRICAL AND ALLOW ALL COSTS TO REMOVE AND RE-INSTALL ON LIGHT FIXTURES, PUBLIC ADDRESS AND LIFE SAFETY AND CONDUITS IF NECESSARY TO ACCOMMODATE INSTALLATION OF NEW SUPPLY AND RETURN AIR DUCTWORK.
  - CARRY ALLOWANCE FOR DUCTWORK ROUTE AND ARRANGEMENT CHANGES BASED ON SITE CONDITIONS AND CLASH DRAWINGS.
  - ALL DUCTWORK INSTALLED OUTSIDE TO BE INSULATED WITH EXTERNAL WEATHER-PROOF INSULATION C/W ALUMINUM JACKET.
  - ALL PIPING AND DUCT PENETRATION THROUGH FIRE RATED WALLS AND FLOOR SLABS TO BE FIRE STOPPED.

- DEMOLITION NOTES:**
- DEMOLISH ALL EQUIPMENT INSIDE THE MECH ROOM INCLUDING SF-1, SF-2 AND RF-2 C/W ALL THEIR ASSOCIATED DUCTWORK, EXHAUST HOOD, CIRCULATION PUMP, PIPING AND ACCESSORIES. CAP AND PATCH THE OPENING AND REPAIR ROOFING AFTER DEMOLITION.
  - DEMOLISH EXISTING ROOFTOP EXHAUST FAN EF-1. CAP AND PATCH THE OPENING AND REPAIR ROOFING AFTER DEMOLITION.
  - DEMOLISH AND REMOVE THE EXISTING INCOMING GAS STATION (MAIN PRV, METER, VALVES, ETC.) IN COORDINATION WITH UTILITY COMPANY.
  - DEMOLISH ALL GAS PIPING AND OTHER ASSOCIATED VALVES AND PIPING ACCESSORIES AS SHOWN ON THE ROOF AS SHOWN.

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Ministry PSIF Number

Project  
HOLBROOK ELEMENTARY SCHOOL  
GYM RENOVATION

Location  
450 SANITORIUM ROAD  
HAMILTON, ONTARIO  
IO Project No Site No Building No  
P2024-2081

Client  
HAMILTON-WENWORTH DISTRICT S.B.

Drawing Title  
LEVEL 2 / LOWER ROOF  
HVAC DEMOLITION

Scale 1/8" = 1'-0"	Project Start Date
Drawn by TS	Substantial Performance Date
Designed by MS	Drawing No M1.0.3
Approved by BR	Floor No
CAD File NAME	



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Orientation

Seal

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A  
B

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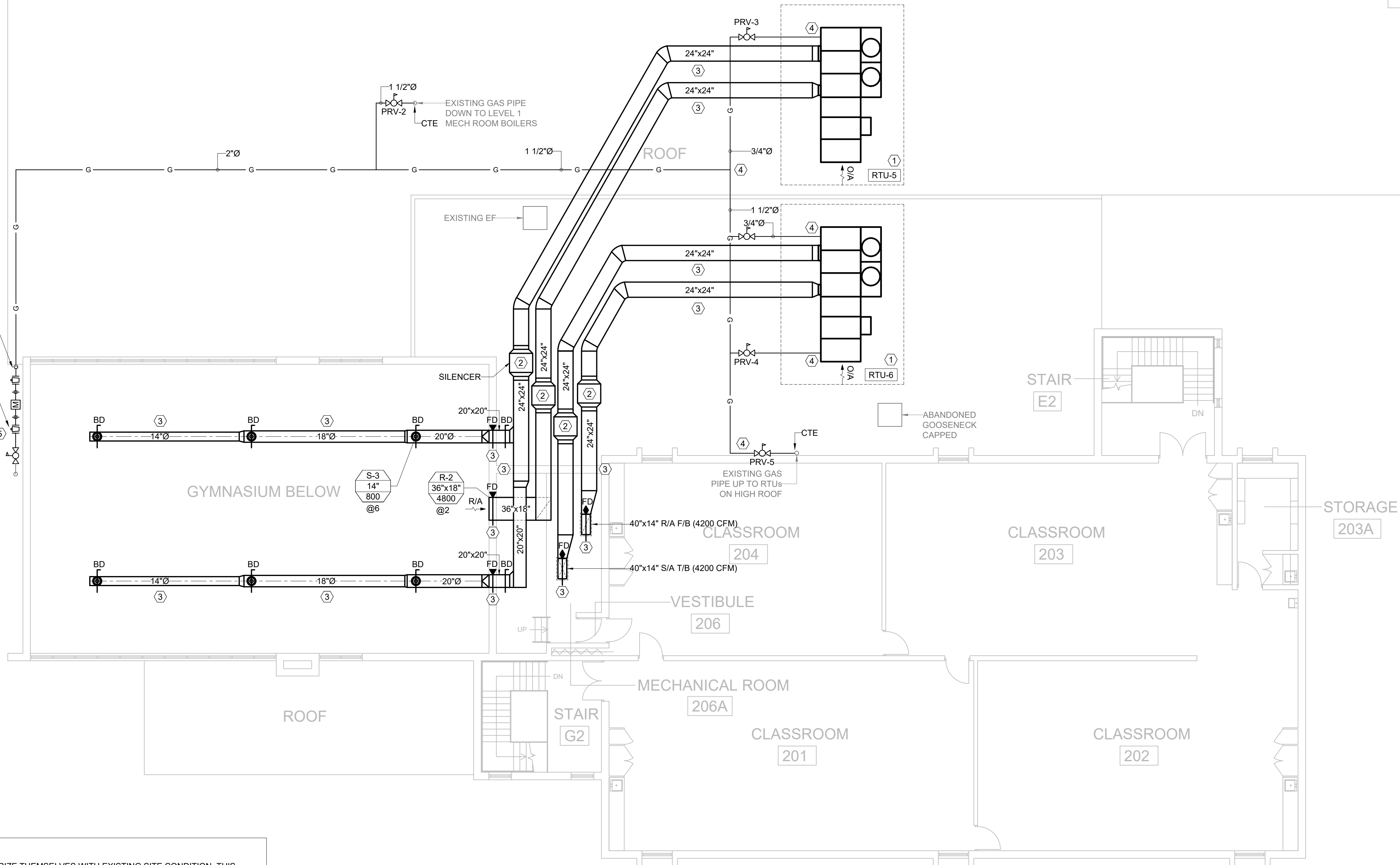
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Drawing Title  
LEVEL 2 / LOWER ROOF  
HVAC NEW CONSTRUCTION

Scale 1/8" = 1'-0"	Project Start Date
Drawn by TS	Substantial Performance Date
Designed by MS	Drawing No M1.04
Approved by BR	Floor No CAD File NAME

NEW GAS PIPE UP FROM  
NEW GAS METER ON  
GROUND LEVEL  
EXTERIOR WALL

NEW MAIN INCOMING  
GAS STATION ON  
GROUND LEVEL  
OUTSIDE THE  
BUILDING

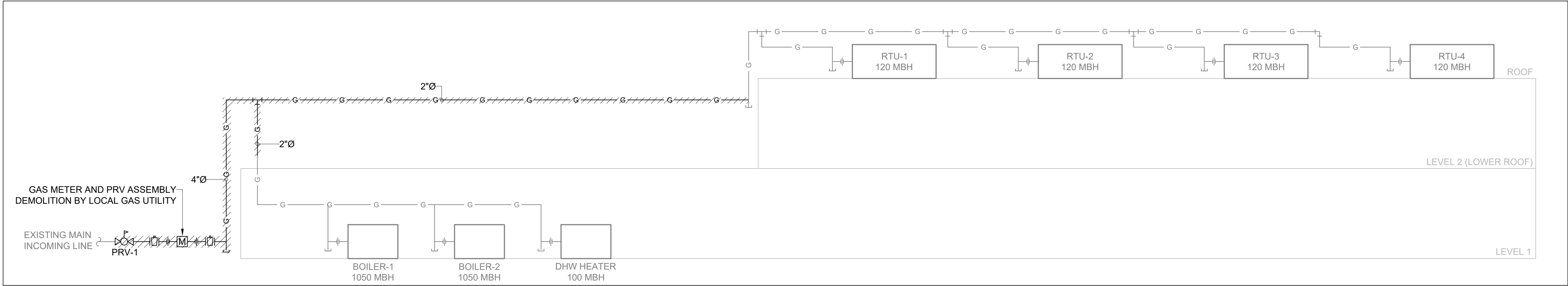


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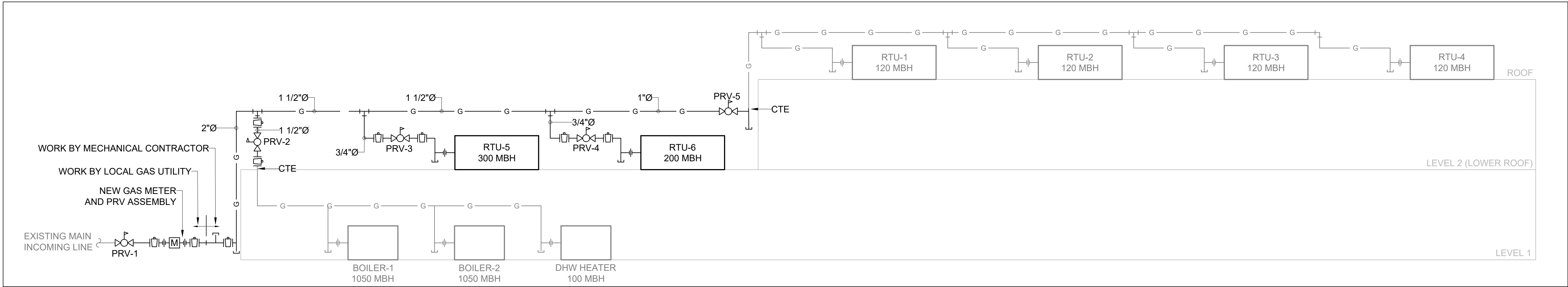
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- ALL DUCTWORK INSTALLED OUTSIDE TO BE INSULATED WITH EXTERNAL WEATHER-PROOF INSULATION C/W ALUMINUM JACKET.
- ALL PIPING AND DUCT PENETRATION THROUGH FIRE RATED WALLS AND FLOOR SLABS TO BE FIRE STOPPED.

NEW CONSTRUCTION NOTES:

- SUPPLY AND INSTALL NEW ROOFTOP UNITS RTU-5 AND RTU-6 WITH ROOF CURB. FOR EXACT UNITS LOCATION REFER TO STRUCTURAL DRAWINGS. PROVIDE 4" FLEXIBLE DUCT CONNECTION AT UNIT SUPPLY AND RETURN CONNECTION
- SUPPLY AND INSTALL SILENCER. CONTRACTOR TO VERIFY AND CONFIRM THE INSTALL LOCATIONS AND DIMENSIONS ON SITE TO SUIT THE SITE CONDITION.
- SUPPLY AND INSTALL NEW S/A AND R/A DUCTS AND DIFFUSERS AND AIR GRILLES AS SHOWN. EXTERIOR DUCTWORK SHALL BE C/W 2" INSULATION AND ALUMINUM JACKET. MODIFY THE MECHANICAL ROOM EXTERIOR WALL AND FLOOR SLABS OPENINGS FOR NEW RTU-5 AND RTU-6 SUPPLY AND RETURN DUCTS PENETRATIONS AND HORIZONTAL FIRE DAMPERS FOR FLOOR SLAB PENETRATIONS. COORDINATE WITH STRUCTURAL FOR EXACT LOCATIONS OF OPENINGS. ALLOW FOR RAISING AND DROPPING THE DUCTWORK ELEVATION AS REQUIRED WITHIN THE MECHANICAL ROOM TO ALIGN WITH OPENINGS LOCATIONS WITH SMOOTH TRANSITION MAXIMUM 45 DEGREES. THE EXPOSED DUCTWORK INSIDE THE GYM AREA ALONG WITH ITS SUPPORT ASSEMBLIES AND DIFFUSERS SHALL BE FACTORY FACTORY FINISHED WHITE ROUND
- SUPPLY AND INSTALL NEW NATURAL GAS PIPING FOR NEW RTUs AND CONNECT TO EXISTING GAS PIPING. MODIFY THE EXISTING GAS PIPING GOING UP TO EXISTING RTUs AROUND THE NEW RTUs C/W FLOOR ANCHORED PIPE SUPPORT. ALL GAS PIPING EXPOSED TO BE EPOXY PAINTED. FIELD ROUTE GAS PIPING ON ROOF AND PROVIDE GAS PIPE SUPPORTS REQUIRED PER CAS B149.1 AND NFPA STANDARD. C/W HEAVY DUTY POLYPROPYLENE UV RESISTANT BLOCK STAND AND ROOFING PAD ATTACHED TO ROOF MEMBRANE WITH HOT ROOF TAR.
- UPGRADE THE EXISTING INCOMING GAS STATION IN COORDINATION WITH UTILITY SERVICE PROVIDER. APPLY FOR THE REQUIRED PERMIT IMMEDIATELY AFTER CONTRACT AWARD TO CONTRACTOR TO AVOID ANY DISRUPTION TO THE SCHOOL OPERATION. REFER TO DWG M6.01 FOR FURTHER DETAILS.



1 GAS PIPING SCHEMATIC - DEMOLITION  
M6.01 N.T.S.



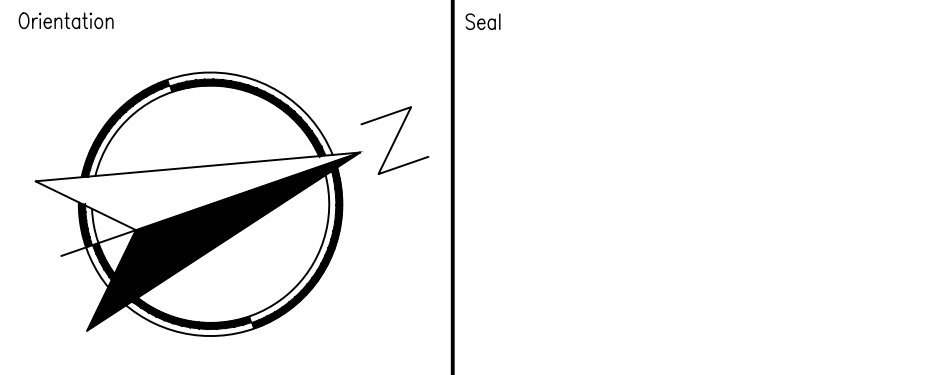
2 GAS PIPING SCHEMATIC - NEW CONSTRUCTION  
M6.01 N.T.S.

GAS LOAD		
LOCATION	TAG	CAPACITY (MBH)
LEVEL 1 BOILER ROOM	B-1	1050
	B-2	1050
	DHW HEATER	100
LEVEL 3 ROOF	RTU-1	120
	RTU-2	120
	RTU-3	120
	RTU-4	120
EXISTING TOTAL		2680
LEVEL 2 LOWER ROOF	RTU-5	300
	RTU-6	200
SUB-TOTAL		3,180
SPARE (25%)		795
TOTAL LOAD		3,975

GENERAL NOTES:

- SUPPLY AND INSTALL ALL THE NECESSARY PIPING C/W PIPE SUPPORTS PER THE LATEST GAS CODE AND EQUIPMENT MANUFACTURER RECOMMENDATIONS.
- GAS PIPING PENETRATING ANY TYPE OF CONSTRUCTION MATERIAL SHALL BE STEEL SLEEVED OR DOUBLE WRAPPED, AND SEALED BY A FIRESTOP SYSTEM HAVING A FIRE RATING NOT LESS THAN THE FIRE PROTECTION RATING REQUIRED FOR CLOSURES IN THE FIRE SEPARATION.
- ALLOW FOR ALL THE WORK REQUIRED FOR SHUT DOWN AND REINSTATEMENT OF THE EXISTING EQUIPMENT AS THE RESULT OF THE NEW GAS PIPING TO ENSURE THE EXISTING EQUIPMENT ARE OPERATIONAL UPON COMPLETION OF WORK.

2	REISSUED FOR PERMIT	2025-01-10
1	ISSUED FOR TENDER	2025-01-10
0	ISSUED FOR PERMIT	2024-12-02
A	ISSUED FOR 33%	2024-08-16
No	Revisions	Date



The Contractor shall check and verify all dimensions and report all errors and omissions to the IO-Owner's/MBS Designee (as applicable) for his/her written direction before proceeding with the Work.

A	A Detail No
B	B Sheet No where detailed



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Ministry PSIF Number

Project  
HOLBROOK ELEMENTARY SCHOOL  
GYM RENOVATION

Location  
450 SANITORIUM ROAD  
HAMILTON, ONTARIO  
IO Project No Site No Building No  
P2024-2081

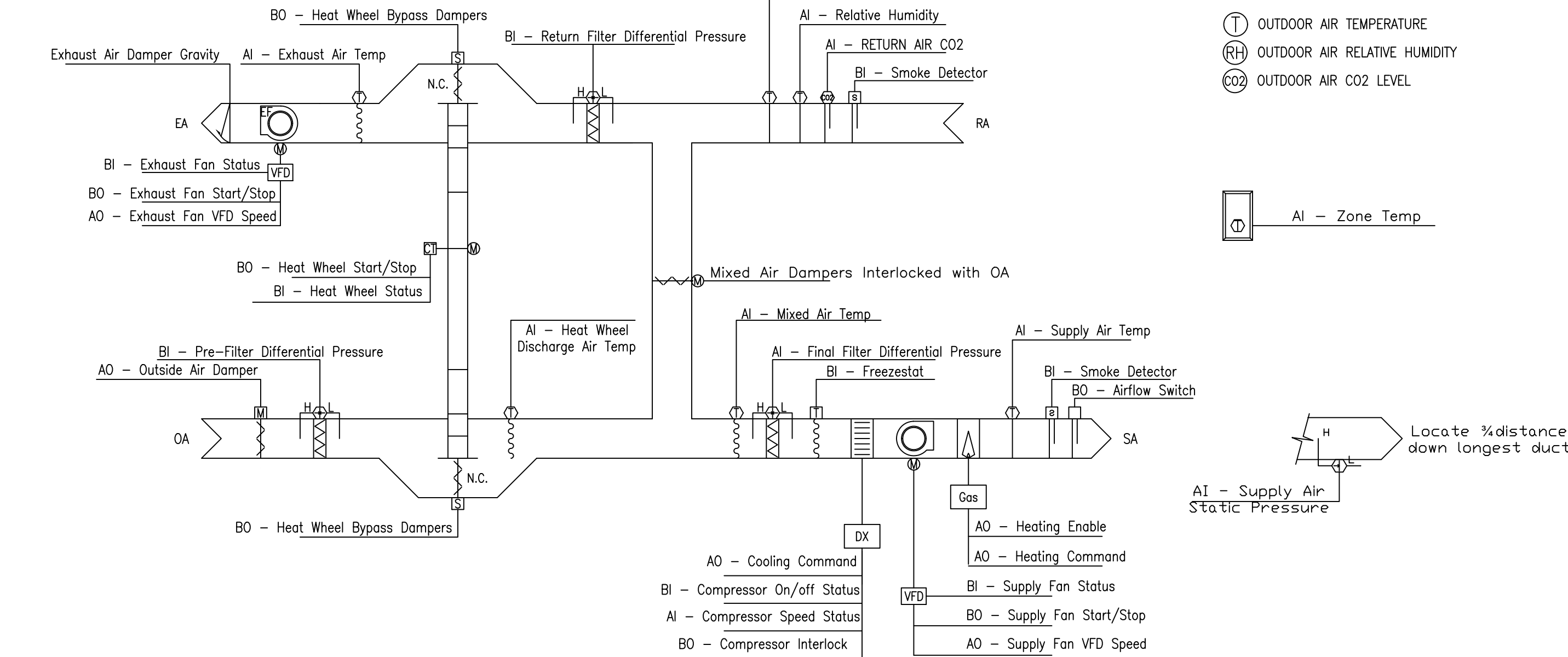
Client  
HAMILTON-WENWORTH DISTRICT S.B.

Drawing Title  
GAS PIPING SCHEMATIC AND  
RTU ROOF CURBS

Scale N.T.S.	Project Start Date
Drawn by TS	Substantial Performance Date
Designed by MS	Drawn No M6.01
Approved by BR	Floor No

CAD File NAME





#### RUN CONDITIONS – SCHEDULED:

THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

- OCCUPIED MODE: THE UNIT SHALL MAINTAIN
- A 75°F (ADJ.) COOLING SETPOINT
- A 70°F (ADJ.) HEATING SETPOINT.

UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN

- A 83°F (ADJ.) COOLING SETPOINT.
- A 65°F (ADJ.) HEATING SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).
- LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

#### ZONE SETPOINT ADJUST:

THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR. ZONE TEMPERATURE SENSOR LOCATION TO BE COORDINATED WITH BUILDING OPERATION TEAM.

#### ZONE OPTIMAL START:

THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

#### FREEZE PROTECTION:

THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A FREEZESTAT STATUS.

#### RETURN AIR SMOKE DETECTION:

THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A RETURN AIR SMOKE DETECTOR STATUS.

#### SUPPLY AIR SMOKE DETECTION:

THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SUPPLY AIR SMOKE DETECTOR STATUS.

#### PROOF OF AIRFLOW DETECTION:

THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON LACK OF AIRFLOW AS DETERMINED BY AIRFLOW DETECTION SENSOR.

#### SUPPLY FAN:

THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

BAS SHALL MEASURE THE DIFFERENTIAL PRESSURE AT SUPPLY DUCT FOR MONITORING AND BALANCING PURPOSES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

#### EXHAUST FAN:

THE EXHAUST FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

#### ENERGY WHEEL CONTROL:

THE ENERGY WHEEL IS THE FIRST FORM OF HEATING OR COOLING WHEN ACTIVE. COMPRESSORS OR HEAT SHOULD ONLY BE ACTIVATED AND CONTROLLED BY THE BAS WHEN THE ENERGY RECOVERY

WHEEL CANNOT SATISFY THE SUPPLY AIR TEMPERATURE SETPOINT BY THE BAS AFTER A USER DEFINABLE RUNTIME OF HEAT WHEEL.

UPON THE OPERATION OF THE EXHAUST FAN BY THE BAS THE ENERGY RECOVERY WHEEL IS OPERATIONAL AND CONTROLLED BY THE BAS.

THE BAS SHALL PROVIDE A MODULATING SIGNAL TO THE FACTORY SUPPLIED WHEEL MOTOR VFD TO MODULATE THE SPEED OF THE ENERGY RECOVERY WHEEL TO MEET THE DISCHARGE AIR TEMPERATURE SET POINT USING FIELD MOUNTED TEMPERATURE SENSORS.

#### FROST PREVENTION CONTROL:

ASSUMING AN OUTDOOR AIR RELATIVE HUMIDITY OF 95% THE BAS SHALL CALCULATE THE POINT AT WHICH CONDENSATE WILL DEVELOP IN THE EXHAUST AIR (SEE THE INTERSECTION POINT IN FIGURE 1). WHEN THE EXHAUST AIR REACHES THIS TEMPERATURE THE ENERGY RECOVERY WHEEL MOTOR SHALL BE MODULATED BY THE BAS TO REDUCE THE EFFECTIVENESS OF THE WHEEL AND AVOID FROST BUILDUP. THIS ALLOWS THE WHEEL TO REMAIN ON AT THESE FROST PREVENTION TIMES AND STILL RECOVER SOME ENERGY.

THE BYPASS DAMPERS WILL OPEN WHENEVER THE HEAT WHEEL IS DISABLED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HEAT WHEEL ROTATION FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- HEAT WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

#### COOLING STAGE:

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE COOLING TO MAINTAIN ITS COOLING SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE COOLING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.).
- AND THE ECONOMIZER (IF PRESENT) IS DISABLED OR FULLY OPEN.
- AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT.
- AND THE SUPPLY FAN STATUS IS ON.
- AND THE HEATING IS NOT ACTIVE.

#### GAS HEATING:

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING TO MAINTAIN ITS HEATING SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.
- AND THE SUPPLY FAN STATUS IS ON.
- AND THE COOLING IS NOT ACTIVE.

#### ECONOMIZER:

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2°F LESS THAN THE ZONE COOLING SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20% (ADJ.) OPEN WHENEVER OCCUPIED.

THE ECONOMIZER SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY.
- AND THE SUPPLY FAN STATUS IS ON.
- MIXED AIR TEMPERATURE DROPS BELOW 50°F (ADJ.).
- OR ON LOSS OF SUPPLY FAN STATUS.

THE ECONOMIZER SHALL CLOSE WHENEVER:

- MIXED AIR TEMPERATURE DROPS BELOW 50°F (ADJ.).
- OR ON LOSS OF SUPPLY FAN STATUS.

- OR FREEZESTAT IS ON.

THE OUTSIDE AIR DAMPER SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START UP IS AVAILABLE, THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

#### DEMAND CONTROL VENTILATION

BAS SHALL MEASURE THE RETURN AIR AND OUTDOOR CO2 LEVEL AND MODULATE MODULATE THE OUTSIDE AIR DAMPERS TO MAINTAIN 700 PPM (ADJ) DIFFERENCE BETWEEN INDOOR AND OUTDOOR AIR CO2 LEVEL. THE OUTDOOR AIR DAMPER SHALL HAVE A MINIMUM DAMPER POSITION (ADJ) TO BE DETERMINED DURING BALANCING.

#### MIXED AIR TEMPERATURE:

THE CONTROLLER SHALL MONITOR THE MIXED AIR TEMPERATURE AND USE AS REQUIRED FOR ECONOMIZER CONTROL.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

#### RETURN AIR CARBON DIOXIDE (CO2) CONCENTRATION MONITORING:

THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 CONCENTRATION.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION: IF THE RETURN AIR CO2 CONCENTRATION IS GREATER THAN 1000PPM (ADJ.) WHEN IN THE OCCUPIED MODE.

#### RETURN AIR HUMIDITY:

THE CONTROLLER SHALL MONITOR THE RETURN AIR HUMIDITY AND USE AS REQUIRED FOR ECONOMIZER CONTROL.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR HUMIDITY: IF THE RETURN AIR HUMIDITY IS GREATER THAN 70% (ADJ.).
- LOW RETURN AIR HUMIDITY: IF THE RETURN AIR HUMIDITY IS LESS THAN 30% (ADJ.).

#### RETURN AIR TEMPERATURE:

THE CONTROLLER SHALL MONITOR THE RETURN AIR TEMPERATURE AND USE AS REQUIRED FOR ECONOMIZER CONTROL (IF PRESENT)

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

#### FILTER DIFFERENTIAL PRESSURE MONITOR:

THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE SWITCH ACROSS THE FILTERS AND GENERATE AN ALARM. PRE-FILTER AND FINAL FILTER STATUS ARE PROVIDED WITH ONE COMMON SIGNAL AT THE RTU.

## GENERAL NOTES

1. REFER TO DRAWINGS M-1 FOR GENERAL NOTES THAT APPLY TO THIS DRAWINGS.
2. CONTROL CONTRACTOR SHALL PROVIDE ALL THE NECESSARY EQUIPMENT, CONTROLLERS, AND FIELD DEVICES TO ACHIEVE THE CONTROL DIAGRAM AND SEQUENCE OF OPERATION, AS SPECIFIED HERE.
4. IN ADDITION TO THE CONTROL POINT LIST PROVIDED HERE INCLUDE ALL THE CONTROL POINTS REQUIRED TO FULLY IMPLEMENT THE SEQUENCE OF OPERATION AS PART OF THE SCOPE OF WORK.
5. CONTROL CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR FOR THE ASSOCIATED MECHANICAL WORK (INSTALLATION OF WELLS FOR SENSORS, CONTROL VALVE INSTALLATION, COORDINATION WITH MECHANICAL EQUIPMENT MANUFACTURER FOR THE CONTROL WORK, ETC) AND WITH ELECTRICAL CONTRACTOR FOR ELECTRICAL WORK (POWERING THE EQUIPMENT).
6. CONTROL CONTRACTOR TO PROVIDE ALARM FOR EQUIPMENT FAILURES/COMMAND MISMATCH AND PRIORITIZE THEM THEM INTO APPROPRIATE CATEGORIES AS SPECIFIED.
7. ALL THE EQUIPMENT AND ASSOCIATED CONTROL POINTS SHOWN ON THESE DRAWING ARE NEW AND ARE TO BE PROVIDED AS PART OF THIS PROJECT.

## DRAWING NOTES

#### RTU OPERATION:

1. ALL THE CONTROL POINTS SHOWN HERE ARE HARDWIRED. THE UNIT MANUFACTURER SHALL PROVIDE STRIP TERMINALS FOR ALL THE CONTROL POINTS AS SHOWN ON THE CONTROL POINTS LIST.
2. THE BAS CONTRACTOR SHALL SUPPLY, INSTALL, AND ALL THE SENSORS ON SITE, NOT PROVIDED BY THE FACTORY AS SHOWN ON THE CONTROL POINT LISTS, TO FULLY CONTROL AND MONITOR THE UNIT ON THE BAS.
3. THE BAS CONTRACTOR SHALL COMMISSION ALL THE CONTROL POINTS (BY BAS/BY MANUFACTURER) ON SITE AND ENSURE FULL FUNCTIONALITY OF THE UNIT BASED ON THE SEQUENCE OF OPERATION.
4. THE UNIT MANUFACTURER/REPRESENTATIVE SHALL SUPPLY AND INSTALL A RELAY AT THE UNIT TO DISRUPT POWER TO THE CONTROL INTERFACE CIRCUIT FOR FULL UNIT SHUTDOWN UPON SMOKE DETECTOR ACTIVATION WITHOUT ANY INVOLVEMENT WHATSOEVER FROM THE BAS.
5. SUPPLY AND INSTALL A S/S ROOM TEMPERATURE SENSOR TO MONITOR THE ROOM TEMPERATURE AND CONTROL THE RTU.

2	REISSUED FOR PERMIT	2025-01-10
1	ISSUED FOR TENDER	2025-01-10
0	ISSUED FOR PERMIT	2024-12-02
A	ISSUED FOR 33%	2024-08-16
No	Revisions	Date

Orientation	Seal
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The Contractor shall check and verify all dimensions and report all errors and omissions to the IO-Owner's/MBS Designee (as applicable) for his/her written direction before proceeding with the Work.

A	A Detail No
B	B Sheet No where detailed



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Ministry PSIF Number

Project  
HOLBROOK ELEMENTARY SCHOOL  
GYM RENOVATION

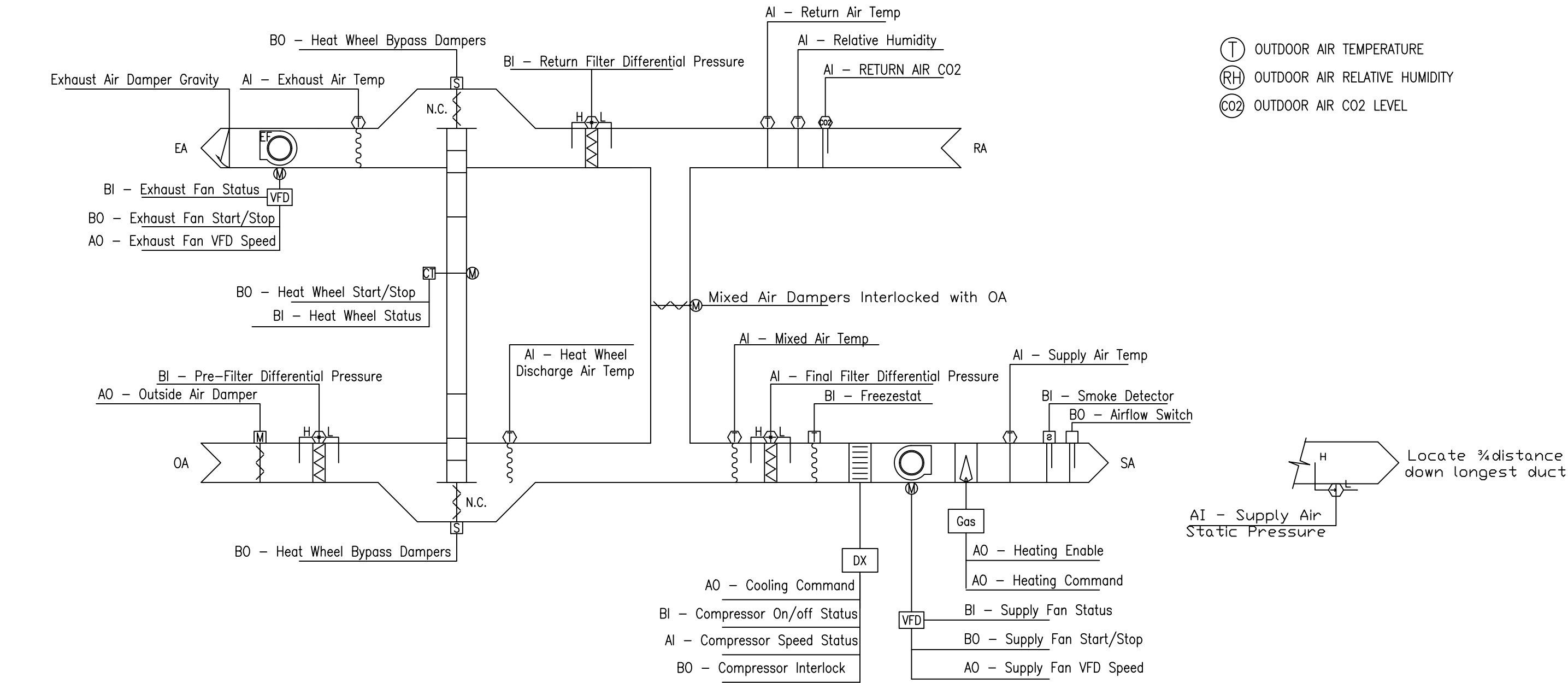
Location  
450 SANATORIUM ROAD  
HAMILTON, ONTARIO  
IO Project No Site No Building No  
P2024-2081

Client  
HAMILTON-WENWORTH DISTRICT S.B.

Drawing Title  
RTU-5  
CONTROL SCHEMATIC

Scale N.T.S.	Project Start Date
Drawn by TS	Substantial Performance Date
Designed by MS	Drawing No M7.01
Approved by BR	Floor No CAD File NAME





RUN CONDITIONS – SCHEDULED:  
THE UNIT SHALL RUN WHENEVER:

- ANY ZONE IS OCCUPIED
- OR A DEFINABLE NUMBER OF UNOCCUPIED ZONES NEED HEATING OR COOLING..

ZONE OPTIMAL START:  
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START–UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM–UP OR COOL–DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

FREEZE PROTECTION:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A FREEZESTAT STATUS.

SUPPLY AIR SMOKE DETECTION:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SUPPLY AIR SMOKE DETECTOR STATUS.

PROOF OF AIRFLOW DETECTION:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON LACK OF AIRFLOW AS DETERMINED BY AIRFLOW DETECTION SENSOR.

SUPPLY FAN:  
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

SUPPLY AIR DUCT STATIC PRESSURE CONTROL:  
THE CONTROLLER SHALL MEASURE DUCT STATIC PRESSURE AND MODULATE THE SUPPLY FAN VFD SPEED TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT. THE SPEED SHALL NOT DROP BELOW 30% (ADJ.). THE STATIC PRESSURE SETPOINT SHALL BE RESET BASED UPON THE POSITION OF THE ZONE DAMPERS, WITH A GOAL OF REDUCING THE STATIC PRESSURE UNTIL AT LEAST ONE ZONE DAMPER IS NEARLY WIDE OPEN.

- THE INITIAL DUCT STATIC PRESSURE SETPOINT SHALL BE AS DETERMINED BY THE BALANCER.
- IF NO ZONE DAMPER IS NEARLY WIDE OPEN, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 30% BELOW INITIAL SETPOINT.
- AS ONE OR MORE DAMPERS NEARS THE WIDE OPEN POSITION, THE SETPOINT SHALL INCREMENTALLY RESET UP TO 30% ABOVE THE INITIAL SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT.
- LOW SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT.
- SUPPLY FAN VFD FAULT.

EXHAUST FAN:  
THE EXHAUST FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS. MODULATE THE FAN SPEED AS REQUIRED FOR ECONOMIZER OPERATION.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- EXHAUST FAN VFD FAULT.

ENERGY WHEEL CONTROL:  
THE ENERGY WHEEL IS THE FIRST FORM OF HEATING OR COOLING WHEN ACTIVE. COMPRESSORS OR HEAT SHOULD ONLY BE ACTIVATED AND CONTROLLED BY THE BAS WHEN THE ENERGY RECOVERY WHEEL CANNOT SATISFY THE SUPPLY AIR TEMPERATURE SETPOINT BY THE BAS AFTER A USER DEFINABLE RUNTIME OF HEAT WHEEL.

UPON THE OPERATION OF THE EXHAUST FAN BY THE BAS THE ENERGY RECOVERY WHEEL IS OPERATIONAL AND CONTROLLED BY THE BAS.  
THE BAS SHALL PROVIDE A MODULATING SIGNAL TO THE FACTORY SUPPLIED WHEEL MOTOR VFD TO MODULATE THE SPEED OF THE ENERGY RECOVERY WHEEL TO MEET THE DISCHARGE AIR TEMPERATURE SET POINT USING FIELD MOUNTED TEMPERATURE SENSORS.

FROST PREVENTION CONTROL:  
ASSUMING AN OUTDOOR AIR RELATIVE HUMIDITY OF 95% THE BAS SHALL CALCULATE THE POINT AT WHICH CONDENSATE WILL DEVELOP IN THE EXHAUST AIR (SEE THE INTERSECTION POINT IN FIGURE 1). WHEN THE EXHAUST AIR REACHES THIS TEMPERATURE THE ENERGY RECOVERY WHEEL MOTOR SHALL BE MODULATED BY THE BAS TO REDUCE THE EFFECTIVENESS OF THE WHEEL AND AVOID FROST BUILDUP. THIS ALLOWS THE WHEEL TO REMAIN ON AT THESE FROST PREVENTION TIMES AND STILL RECOVER SOME ENERGY.

THE BYPASS DAMPERS WILL OPEN WHENEVER THE HEAT WHEEL IS DISABLED.  
ALARMS SHALL BE PROVIDED AS FOLLOWS:  
HEAT WHEEL ROTATION FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.  
HEAT WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

SUPPLY AIR TEMPERATURE SETPOINT – OPTIMIZED:  
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A SUPPLY AIR TEMPERATURE SETPOINT RESET BASED ON ZONE COOLING AND HEATING REQUIREMENTS

THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET FOR COOLING BASED ON ZONE COOLING REQUIREMENTS AS FOLLOWS:

- THE INITIAL SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 55°F (ADJ.).
- AS COOLING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 53°F (ADJ.).
- AS COOLING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 72°F (ADJ.).
- IN WINTERTIME, PROVIDED THAT ALL VAV BOXES WERE IN HEATING MODE, RESET THE SUPPLY AIR TEMPERATURE SETPOINT UP TO A MAXIMUM OF 90°F (ADJ.).

IF MORE ZONES NEED HEATING THAN COOLING, THEN THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET FOR HEATING AS FOLLOWS:

- THE INITIAL SUPPLY AIR TEMPERATURE SETPOINT SHALL BE 82°F (ADJ.).
- AS HEATING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 85°F (ADJ.).

AS HEATING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 72°F (ADJ.).

COOLING STAGE:  
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE COOLING TO MAINTAIN ITS COOLING SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE COOLING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.).
- AND THE ECONOMIZER (IF PRESENT) IS DISABLED OR FULLY OPEN.
- AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT.
- AND THE SUPPLY FAN STATUS IS ON.
- AND THE HEATING IS NOT ACTIVE.

GAS HEATING:  
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING TO MAINTAIN ITS HEATING SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.
- AND THE SUPPLY FAN STATUS IS ON.
- AND THE COOLING IS NOT ACTIVE.

ECONOMIZER:  
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2°F LESS THAN THE ZONE COOLING SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20% (ADJ.) OPEN

WHENEVER OCCUPIED.

THE ECONOMIZER SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY.
- AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL CLOSE WHENEVER:

- MIXED AIR TEMPERATURE DROPS BELOW 50°F (ADJ.).
- OR ON LOSS OF SUPPLY FAN STATUS.
- OR FREEZESTAT IS ON.

THE OUTSIDE AIR DAMPER SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START UP IS AVAILABLE, THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

DEMAND CONTROL VENTILATION  
BAS SHALL MEASURE THE RETURN AIR AND OUTDOOR CO2 LEVEL AND MODULATE MODULATE THE OUTSIDE AIR DAMPERS TO MAINTAIN 700 PPM (ADJ.) DIFFERENCE BETWEEN INDOOR AND OUTDOOR AIR CO2 LEVEL. THE OUTDOOR AIR DAMPER SHALL HAVE A MINIMUM DAMPER POSITION (ADJ.) TO BE DETERMINED DURING BALANCING.

MIXED AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE MIXED AIR TEMPERATURE AND USE AS REQUIRED FOR ECONOMIZER CONTROL.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

RETURN AIR CARBON DIOXIDE (CO2) CONCENTRATION MONITORING:  
THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 CONCENTRATION.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION: IF THE RETURN AIR CO2 CONCENTRATION IS GREATER THAN 1000PPM (ADJ.) WHEN IN THE OCCUPIED MODE.

RETURN AIR HUMIDITY:  
THE CONTROLLER SHALL MONITOR THE RETURN AIR HUMIDITY AND USE AS REQUIRED FOR ECONOMIZER CONTROL.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR HUMIDITY: IF THE RETURN AIR HUMIDITY IS GREATER THAN 70% (ADJ.).
- LOW RETURN AIR HUMIDITY: IF THE RETURN AIR HUMIDITY IS LESS THAN 30% (ADJ.).

RETURN AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE RETURN AIR TEMPERATURE AND USE AS REQUIRED FOR ECONOMIZER CONTROL (IF PRESENT)

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

FILTER DIFFERENTIAL PRESSURE MONITOR:  
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE SWITCH ACROSS THE FILTERS AND GENERATE AN ALARM. PRE–FILTER AND FINAL FILTER STATUS ARE PROVIDED WITH ONE COMMON SIGNAL AT THE RTU.

## GENERAL NOTES

1. REFER TO DRAWINGS M–1 FOR GENERAL NOTES THAT APPLY TO THIS DRAWINGS.
2. CONTROL CONTRACTOR SHALL PROVIDE ALL THE NECESSARY EQUIPMENT, CONTROLLERS, AND FIELD DEVICES TO ACHIEVE THE CONTROL DIAGRAM AND SEQUENCE OF OPERATION, AS SPECIFIED HERE.
4. IN ADDITION TO THE CONTROL POINT LIST PROVIDED HERE INCLUDE ALL THE CONTROL POINTS REQUIRED TO FULLY IMPLEMENT THE SEQUENCE OF OPERATION AS PART OF THE SCOPE OF WORK.
5. CONTROL CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR FOR THE ASSOCIATED MECHANICAL WORK (INSTALLATION OF WELLS FOR SENSORS, CONTROL VALVE INSTALLATION, COORDINATION WITH MECHANICAL EQUIPMENT MANUFACTURER FOR THE CONTROL WORK, ETC) AND WITH ELECTRICAL CONTRACTOR FOR ELECTRICAL WORK (POWERING THE EQUIPMENT).
6. CONTROL CONTRACTOR TO PROVIDE ALARM FOR EQUIPMENT FAILURES/COMMAND MISMATCH AND PRIORITIZE THEM THEM INTO APPROPRIATE CATEGORIES AS SPECIFIED.
7. ALL THE EQUIPMENT AND ASSOCIATED CONTROL POINTS SHOWN ON THESE DRAWING ARE NEW AND ARE TO BE PROVIDED AS PART OF THIS PROJECT.

## DRAWING NOTES

- RTU OPERATION.
1. ALL THE CONTROL POINTS SHOWN HERE ARE HARDWIRED. THE UNIT MANUFACTURER SHALL PROVIDE STRIP TERMINALS FOR ALL THE CONTROL POINTS AS SHOWN ON THE CONTROL POINTS LIST.
  2. THE BAS CONTRACTOR SHALL SUPPLY, INSTALL, AND ALL THE SENSORS ON SITE, NOT PROVIDED BY THE FACTORY AS SHOWN ON THE CONTROL POINT LISTS, TO FULLY CONTROL AND MONITOR THE UNIT ON THE BAS.
  3. THE BAS CONTRACTOR SHALL COMMISSION ALL THE CONTROL POINTS (BY BAS/BY MANUFACTURER) ON SITE AND ENSURE FULL FUNCTIONALITY OF THE UNIT BASED ON THE SEQUENCE OF OPERATION.
  4. THE UNIT MANUFACTURER/REPRESENTATIVE SHALL SUPPLY AND INSTALL A RELAY AT THE UNIT TO DISRUPT POWER TO THE CONTROL INTERFACE CIRCUIT FOR FULL UNIT SHUTDOWN UPON SMOKE DETECTOR ACTIVATION WITHOUT ANY INVOLVEMENT WHATSOEVER FROM THE BAS.

2	REISSUED FOR PERMIT	2025–01–10
1	ISSUED FOR TENDER	2025–01–10
0	ISSUED FOR PERMIT	2024–12–02
A	ISSUED FOR 33%	2024–08–16
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Orientation	Seal
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Ministry PSIF Number

Project  
HOLBROOK ELEMENTARY SCHOOL  
GYM RENOVATION

Location  
450 SANATORIUM ROAD  
HAMILTON, ONTARIO  
10 Project No Site No Building No  
P2024–2081

Client

HAMILTON–WENWORTH DISTRICT S.B.

Drawing Title  
RTU–6  
CONTROL SCHEMATIC

Scale N.T.S.	Project Start Date
Drawn by TS	Substantial Performance Date
Designed by MS	Drawing No M7.02
Approved by BR	Floor No CAD File NAME







ROOF TOP UNIT SCHEDULE																											
UNIT DATA				SUPPLY FAN							COOLING							GAS HEATING					ELECTRICAL			SIZE	
TAG	SERVICE	MANUFACTURER	MODEL	AIRFLOW (CFM)	OUTDOOR AIR (CFM)	FAN BHP	MOTOR HP	FAN RPM	ESP (in H2O)	TSP (in H2O)	AIR PD (in H2O)	COIL EAT DB/WB (F)	COIL LAT DB/WB (F)	LAT DB UNIT (F)	EER	TOTAL CAPACITY (MBH)	REFRIGERANT	COMPRESSOR QTY	EAT DB (F)	LAT DB (F)	AIR PD (in H2O)	INPUT CAPACITY (MBH)	OUTPUT CAPACITY (MBH)	AMPS (A)	MCA (A)	MOP (A)	WEIGHT (LBS)
RTU-5	GYM	TRANE OR EQUIVALENT	OAD	4823	2047	3.11	5	1610	1	2.9	0.31	76.3/64.2	50.8/50.7	74.2	14.3	183.1	R-454B	2	63	109.4	0.32	300	243	75.1	80.9	100	4278
RTU-6	LIBRARY	TRANE OR EQUIVALENT	OAD	4131	1875	3.01	5	1881	1.5	3.3	0.26	76.3/64.2	48.3/48.3	74.8	14	181.5	R-454B	2	62.8	98.5	0.44	200	160	75.1	80.9	100	4254
NOTES:																											
1. UNITS TO BE SUPPLIED WITH INTEGRAL ERV, BOLT ON ERV IS NOT ACCEPTABLE																											
2. ERV CONDITIONS BASED ON: SUMMER OUTDOOR AIR DB (F) = 88F / WINTER OUTDOOR AIR DB (F) = -4F / SUMMER LEAVING AIR DB (F) = 78F / WINTER LEAVING AIR DB (F) = 54F																											
3. UNITS TO BE SUPPLIED WITH TERMINAL BLOCK, ALL CONTROLS, BAS INTEGRATION AND ANY ANCILLARY SENSORS TO BE PROVIDED BY CONTROLS PROVIDER.																											
4. PROVIDE MODULATING HOT GAS REHEAT																											
5. UNITS TO BE SUPPLIED WITH MERV 13 FILTER, MODULATING O/AIRA DAMPERS W/ ECONOMIZER, BAROMETRIC RELIEF, HAILGUARDS, NON-FUSED DISCONNET, CONVIENIENCE OUTLET, SS DRAIN PAN																											
6. SUPPLY, EXHUAST FANS, AND ERV TO BE PROVIDED WITH VFD																											
7. UNIT SHALL BE CONFIGURED FOR HORIZONTAL SUPPLY AND HORIZONTAL RETURN																											
8. GAS BURNERS SHALL BE 10:1 FULLY MODULATING																											
9. FACTORY SUPPLIED SERVICE RECEPTACLE DISCONNECT SHALL BE INSTALLED.																											
10. UNITS SHALL INCLUDED FACTORY SUPPLIED 14" (H) GALVANIZED ROOF CURB.																											

AIR TERMINAL UNIT VAV SCHEDULE (TO BE INCLUDED SEPARATE PRICING)																	
TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	UNIT SIZE	ROWS	MIN AIRFLOW (CFM)	MAX AIRFLOW (CFM)	REHEAT AIR VOLUME (CFM)	WC CAPACITY (MBH)	EAT (°F)	LAT (°F)	FLUID FLOW (GPM)	MIN OPERATING PD (in H2O)	MAX COIL APD (in H2O)	FPD (ft H2O)	MAX DIS NC
VAV-1	PRICE OR EQUIVALENT	SDV	STAFF ROOM 128	STAFF ROOM 128	8	1	125	608	304	5.5	55	71.5	0.3	0.17	0.16	0.12	--
VAV-2	PRICE OR EQUIVALENT	SDV	CORRIDOR 125	LEARNING COMMONS 137	10	1	457	864	457	8	55	71.1	0.42	0.16	0.15	0.04	--
VAV-3	PRICE OR EQUIVALENT	SDV	CLASSROOM 131	CLASSROOM 131	10	1	431	818	431	8	55	71.8	0.42	0.15	0.14	0.04	--
VAV-4	PRICE OR EQUIVALENT	SDV	KINDERGARTEN 127	KINDERGARTEN 127	10	1	476	845	476	8.5	55	71.4	0.46	0.16	0.15	0.04	--
VAV-5	PRICE OR EQUIVALENT	SDV	KINDERGARTEN 126	KINDERGARTEN 126	10	1	437	1008	504	9	55	71.4	0.49	0.21	0.2	0.05	--
NOTES:																	
1. DASHES (--) INDICATE SOUND POWER LEVELS BELOW 36-29-26-22-19-17 FOR EACH OCTAVE BAND; THE VALUES OF THESE SOUND POWER LEVELS ARE CONSIDERED BELOW SIGNIFICANCE PER AHRI 880																	
2. NC VALUES ARE CALCULATED BASED ON PROCEDURES OUTLINED IN AHRI STANDARD 885-2008 "A" PROCEDURE FOR ESTIMATING OCCUPIED SPACE SOUND LEVELS IN THE APPLICATION OF AIR TERMINALS AND AIR OUTLETS"																	
3. SOUND POWER LEVELS ARE GIVEN IN DECIBELS (dB)																	
4. MINIMUM OPERATING PRESSURE IS THE MINIMUM STATIC PRESSURE REQUIRED TO OPERATE THE TERMINAL ITEM ASSEMBLY AT MAXIMUM PRIMARY FLOW WITH A WIDE OPEN DAMPER																	
5. AIRFLOW IS GIVEN IN CUBIC FEET PER MINUTE (CFM)																	
6. AIR PRESSURE DROP (APD) IS GIVEN IN INCHES OF WATER GAUGE (in H2O) AND WATER PRESSURE DROP IS GIVEN IN FEET OF WATER GAUGE (ft H2O)																	
7. NC VALUES ARE DERIVED FROM SOUND POWER LEVELS OBTAINED IN ACCORDANCE WITH ASHRAE STANDARD 130-2016 AND AHRI STANDARD 880-2017 WHICH INCLUDE DUCT END REFLECTION CORRECTIONS																	
8. WATER COIL PERFORMANCE IS RATED AND CERTIFIED IN ACCORDANCE WITH THE LATEST EDITION OF AHRI STANDARD 410																	

HYDRONIC RECIRCULATION PUMP SCHEDULE (TO BE INCLUDED IN SEPARATE PRICING)											
TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	FLUID TYPE	TOTAL CAPACITY (GPM)	HEAD (ft H2O)	PRESSURE RATING (PSI)	OPERATION	ELECTRICAL (V / Ph / Hz)	COMMENTS
P-1	BELL & GOSSETT OR EQUIVALENT	ECOCIRC 20-18	CORRIDOR 134	VAV REHEAT COILS	WATER	5	6.75	145	DUTY	115 / 1 / 60	HIGH EFFICIENCY WET ROTOR CIRCULATOR C/W ECM & ONBOARD CONTROLS FOR VARIABLE SPEED APPLICATIONS

WALL FIN SCHEDULE (TO BE INCLUDED IN SEPARATE PRICING)																
TAG	MANUFACTURER	LEVEL	ROOM	HEATING CAPACITY (BTU/HR)	AWT (°F)	EAT (°F)	FINS/FT	FIN SIZE (IN)	TUBE SIZE (IN)	ROWS	HEIGHT (IN)	WIDTH (IN)	BTUhr / ft	REQUIRED ELEMENT LENGTH (FT)	REQUIRED ENCLOSURE (ASSUMED ENCLOSURE 2FT LONGER THAN ELEMENT)	WATER FLOW (GPM)
WF-131	TRANE OR EQUIVALENT	LEVEL 1	ROOM 131	18,720	170	65	50	4.25x4.25	3/4"	3	24	5	2.26	8.3	10.3	2.06

SILENCER SCHEDULE																	
TAG	MANUFACTURER	MODEL	LOCATION	DIMENSIONS			AIRFLOW (CFM)	VELOCITY (FPM)	PRESSURE DROP (INCH.W.G.)	MINIMUM DYNAMIC INSERTION LOSS, dB							
				DUCT WIDTH (INCH)	DUCT HEIGHT (INCH)	DUCT LENGTH (INCH)				63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz
SL-RTU-5S	PRICE OR EQUIVALENT	RM36/6C	RTU-5 SUPPLY	24	24	36	4823	1206	0.12	4	6	10	20	16	13	10	8
SL-RTU-5R	PRICE OR EQUIVALENT	RM36/6F	RTU-5 RETURN	24	24	36	2187	547	0.1	6	10	19	31	27	21	16	12
SL-RTU-6S	PRICE OR EQUIVALENT	RM60/1B	RTU-6 SUPPLY	24	24	60	4131	1033	0.08	4	6	13	31	33	29	20	17
SL-RTU-6R	PRICE OR EQUIVALENT	RM60/6E	RTU-6 RETURN	24	24	60	2050	513	0.06	7	15	26	42	38	27	16	12
NOTES:																	
1. SILENCER MATERIAL SHALL BE FLAME SPREAD CLASSIFICATION < 25 AND SMOKE DEVELOPMENT RATING <50 WHEN TESTED IN ACCORDANCE WITH ASTM E84, UL723 AND NFPA255.																	
2. SILENCERS SHALL BE OF ASTM A653 ( M ) STEEL CASINGS AND LINERS.																	
3. SILENCERS SHALL BE TESTED IN NVLAP-ACCREDITED SOUND LAB.																	
4. PERFORMANCE DATA SHALL BE DERIVED FROM TEST DATA IN CONFORMANCE WITH ASTM-E477-20.																	
5. IDEAL INLET AND OUTLET CONDITIONS ARE ASSUMED.																	
6. CONTRACTOR TO VERIFY AND CONFIRM ALL DIMENSIONS ON SITE.																	
7. INSTALLED SILENCER MAY HAVE INCREASED PRESSURE DROP RESULTING FROM SYSTEM EFFECT CAUSED BY DUCT ELEMENTS LOCATED UPSTREAM OR DOWNSTREAM OF THE SILENCER.																	

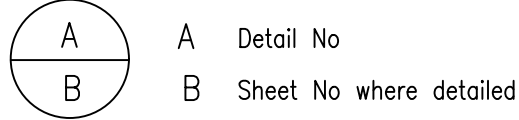
REGISTER, GRILLE & DIFFUSER SCHEDULE (TO BE INCLUDED IN SEPARATE PRICING)							
TAG	MANUFACTURER	MODEL	QTY	TYPE	SIZE	CFM (MAX)	REMARKS
S-1	PRICE OR EQUIVALENT	SCD	SEE PLAN	SQUARE CONE SUPPLY AIR DIFFUSER	24"x24"	VARIES	ADJUSTABLE DOUBLE DEFLECTION
S-2	PRICE OR EQUIVALENT	520 SERIES	SEE PLAN	LOUVERED FACE SUPPLY AIR GRILLE	SEE PLAN	VARIES	WITH OPPOSED BLADE DAMPER
S-3	PRICE OR EQUIVALENT	RCD4	SEE PLAN	ROUND CONE SUPPLY AIR DIFFUSER	SEE PLAN	VARIES	FULLY ADJUSTABLE WITH WIRE GUARDS
R-1	PRICE OR EQUIVALENT	530 SERIES	SEE PLAN	LOUVERED FACE R AIR GRILLE	SEE PLAN	VARIES	45 DEFLECTION 3/4 IN BLADE SPACING
R-2	PRICE OR EQUIVALENT	90 SERIES	SEE PLAN	HEAVY DUTY RETURN GYM GRILLE	SEE PLAN	VARIES	3/8 IN. BLADE SPACING, 0' DEFLECTION STEEL
NOTES: ALL TO BE EQUIPPED WITH MOUNTING FRAME. PROVIDE FULL PERIMETER GASKET WITH PLASTER FRAMES CONCEALED FASTENERS AND CONCEALED OPERATOR. FINISH: BAKED ENAMEL TO MATCH THE CEILING, COMPLETE WITH BLANK OFF BAFFLES. SPIRAL DUCT GRILLES TO BE EQUIPPED WITH ANODIZED FINISH WITH CURVED FRAME TO MATCH DUCT RADIUS.							

MINI FRESH AIR MAKE-UP UNIT SCHEDULE									
TAG	MANUFACTURER	MODEL	LOCATION	AIR FLOW (CFM)	COLLAR DIA (INCH)	POWER (KW)	AMPS	FUSES	ELECTRICAL (V / Ph / Hz)
FA	THERMOLEC OR EQUIVALENT	FER-6-1.5-120	GYM STORAGE	45	6	1.5	12.5	15	120 / 1 / 60

2	REISSUED FOR PERMIT	2025-01-10
1	ISSUED FOR TENDER	2025-01-10
0	ISSUED FOR PERMIT	2024-12-02
A	ISSUED FOR 33%	2024-08-16
No	Revisions	Date

Orientation	Seal

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Ministry PSIF Number

Project  
HOLBROOK ELEMENTARY SCHOOL  
GYM RENOVATION

Location  
450 SANITORIUM ROAD  
HAMILTON, ONTARIO

IO Project No P2024-2081 Site No Building No

Client

HAMILTON-WENWORTH DISTRICT S.B.

Drawing Title  
MECHANICAL SCHEDULES

Scale N.T.S.	Project Start Date
Drawn by TS	Substantial Performance Date
Designed by MS	Drawng No
Approved by BR	Floor No
M8.01	
CAD File NAME	



REQUIREMENT/SCOPE:

NEW DUCT SMOKE DETECTORS SHALL BE INSTALLED IN ALL AIR MOVING FAN SYTEMS THAT ARE SUPPLYING AND RETURNING AIRFLOW IN EXCESS OF 2,000 CFM AS REQUIRED BY THE 2012 IMC SECTION 606. NEW DUCT SMOKE DETECTORS SHALL BE INSTALLED IN ACCORDANCE WITH SECTION FUNCTIONALITY/TESTING/INSPECTION/MAINTENANCE.

NEW DUCT SMOKE DETECTOR DEVICE SHALL BE UL-268A LISTED. WHEN DUCT SMOKE DETECTORS ARE REQUIRED A REMOTE VISUAL/AUDIBLE TEST STATION PER NFPA 72 FOR EACH DUCT SMOKE DETECTOR WILL BE REQUIRED. ACCESS DOORS /PANELS SHALL BE PROVIDED IN ACCORDANCE WITH NFPA 90A, STANDARDS FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS.

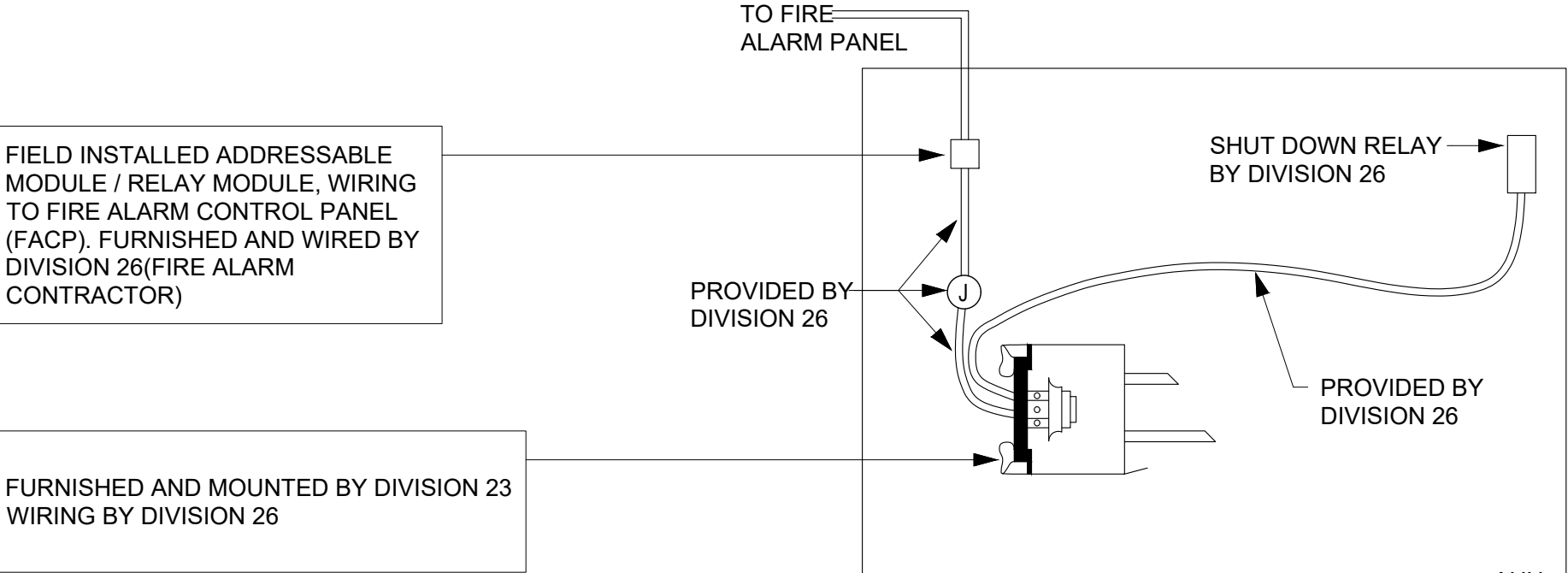
INSTALLATION/ACCESSIBILITY:

DUCT SMOKE DETECTORS SHALL BE FACTORY INSTALLED AND ACCESSIBLE FROM THE EQUIPMENT ACCESS PANELS

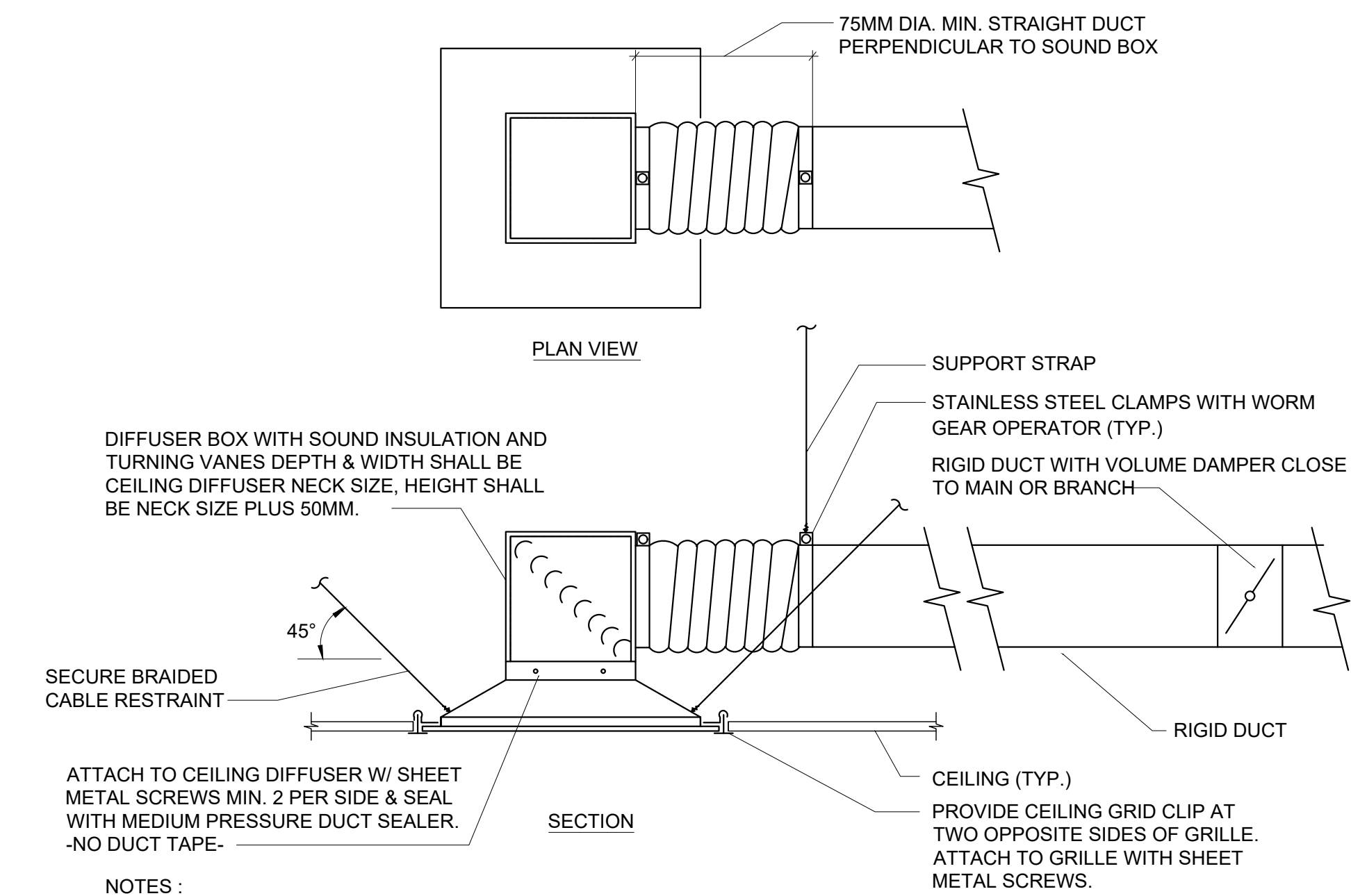
TESTING/OPERATION:

SEE ELECTRICAL DRAWINGS FOR MORE INFORMATION.  
DUCT SMOKE DETECTORS SHALL BE TESTED/CERTIFIED BY THE FIRE ALARM  
DUCT SMOKE DETECTORS SHALL ACTIVATE A VISIBLE AND AUDIBLE SIGNAL AT A NORMALLY OCCUPIED LOCATION AND SHALL BE MONITORED BY THE FACP AND REPORT AS A SUPERVISORY SIGNAL PER NFPA 72 AND THE IMC.  
DUCT SMOKE DETECTORS TO PROVIDE SHUTDOWN OF DETECTORS SHALL BE CONTROLLED PER SECTION 606.4

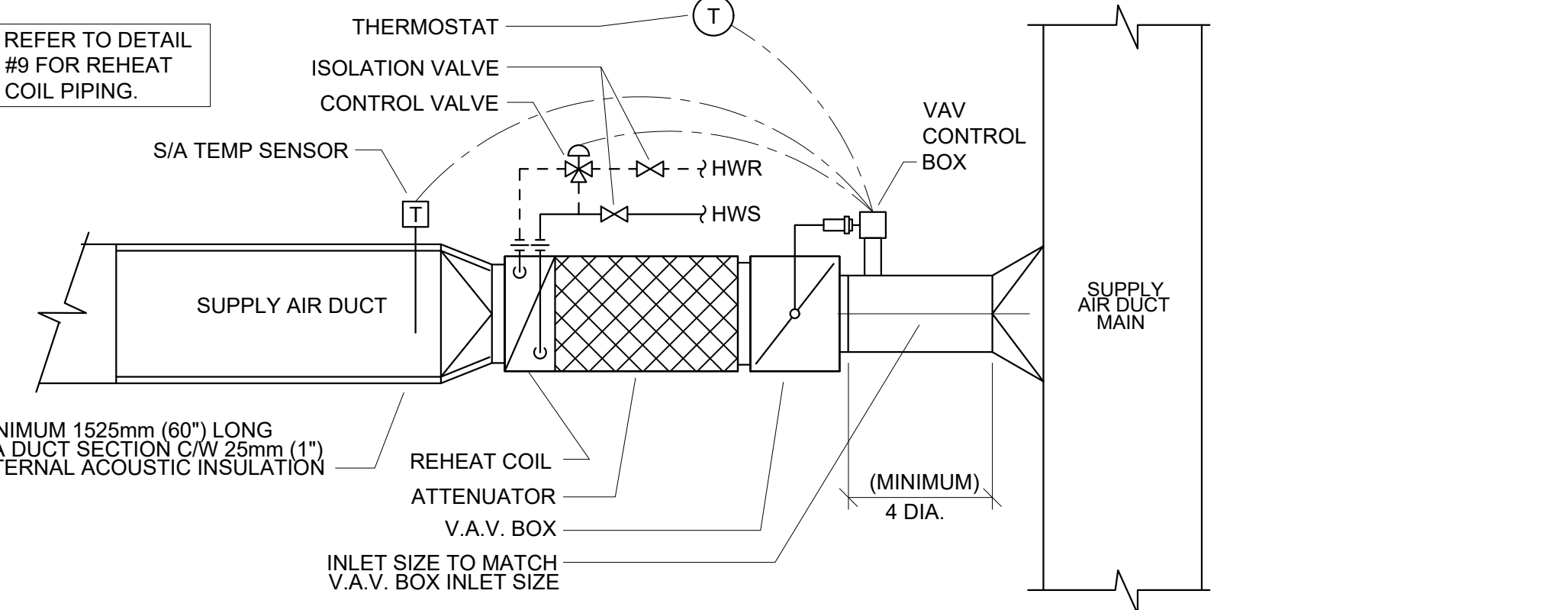
CONTRACTOR RESPONSIBILITIES:



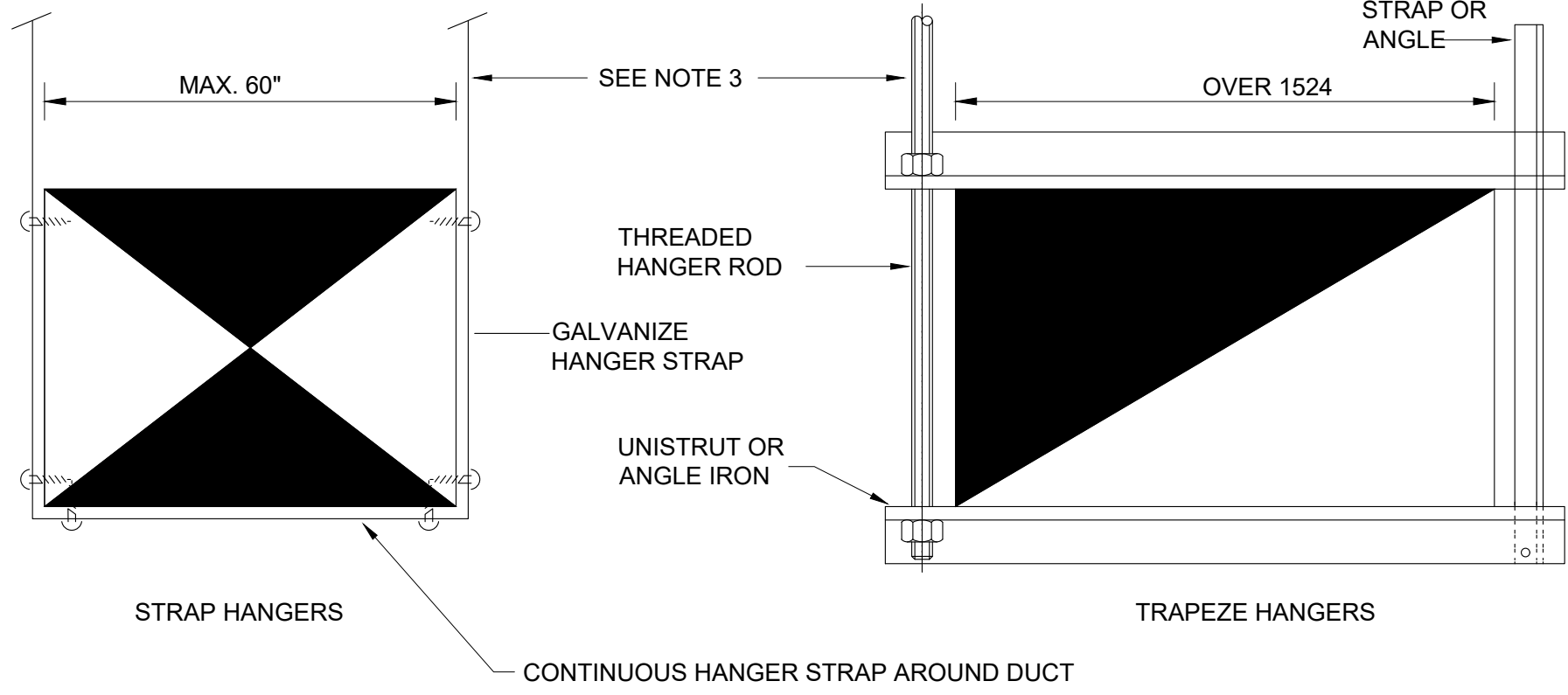
1 DUCT SMOKE DETECTOR DETAIL  
M9.01 N.T.S.



3 LOW CLEARANCE CEILING DIFFUSER  
M9.01 N.T.S.



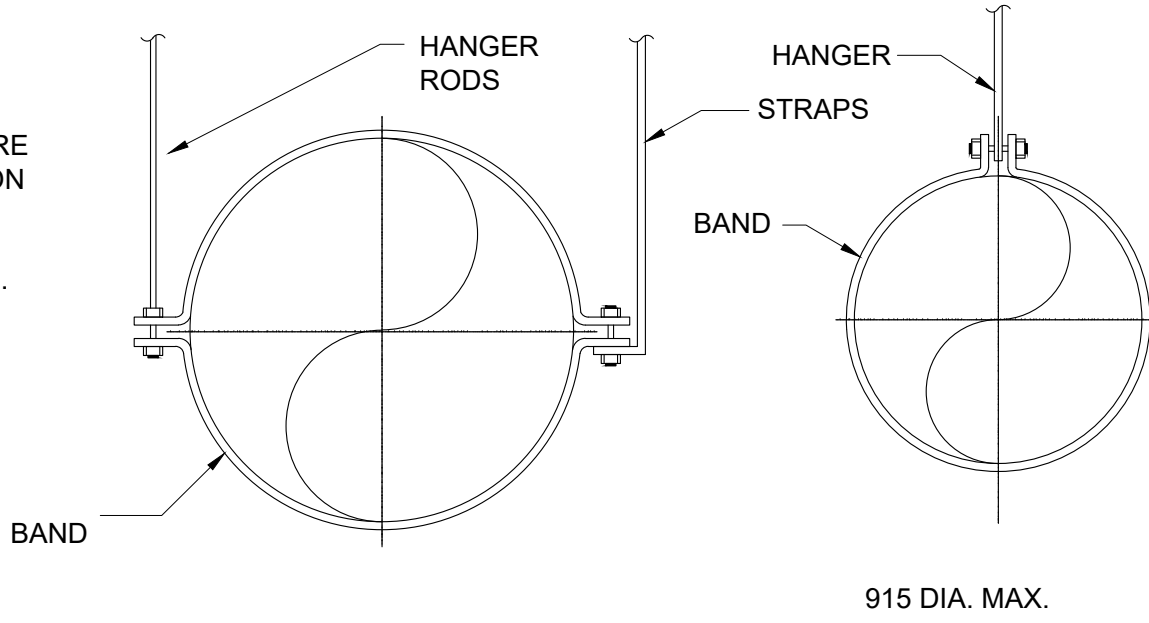
5 V.A.V. BOX WITH ATTENUATOR DETAIL  
M9.01 N.T.S.



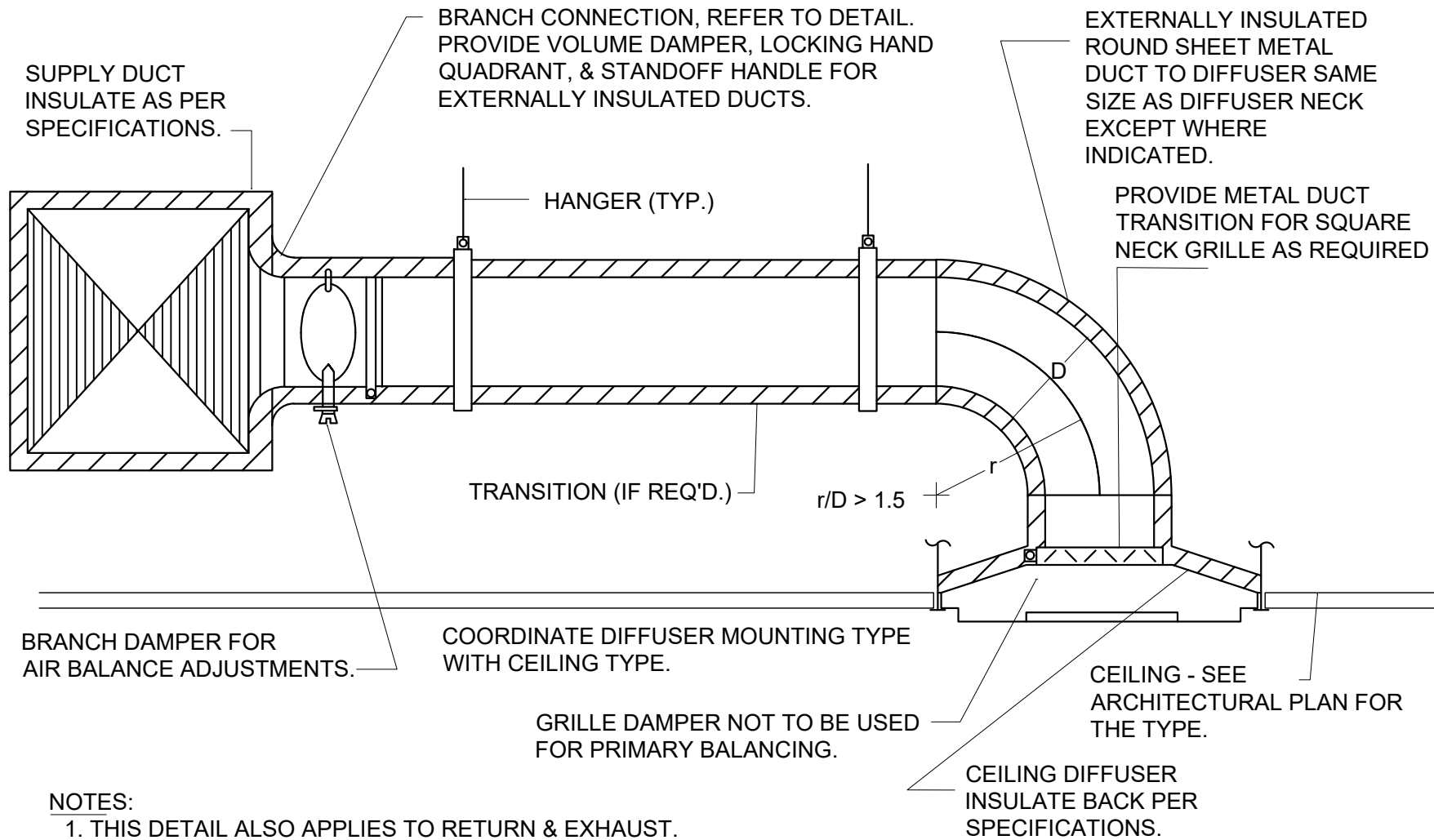
NOTES:

- ON DUCTS OVER 1200 WIDE, BOTTOM SHALL BE BRACED BY ANGLE. FOR CROSS SECTION AREA MORE THAN 0.75M<sup>2</sup>, DUCT SHALL BE BRACED BY ANGLES ON ALL FOUR SIDES.
- CUTTING AND PATCHING SHALL BE LIMITED TO A MINIMUM AS REQUIRED FOR PROPER INSTALLATION.
- SUPPORTS SHALL BE SPACED AND SIZED AS PER SMACNA.
- REFER TO SMACNA FOR SPECIFIC RECOMMENDED HANGER TYPES NOTED ABOVE.

SHEETMETAL AND SPECIALTIES



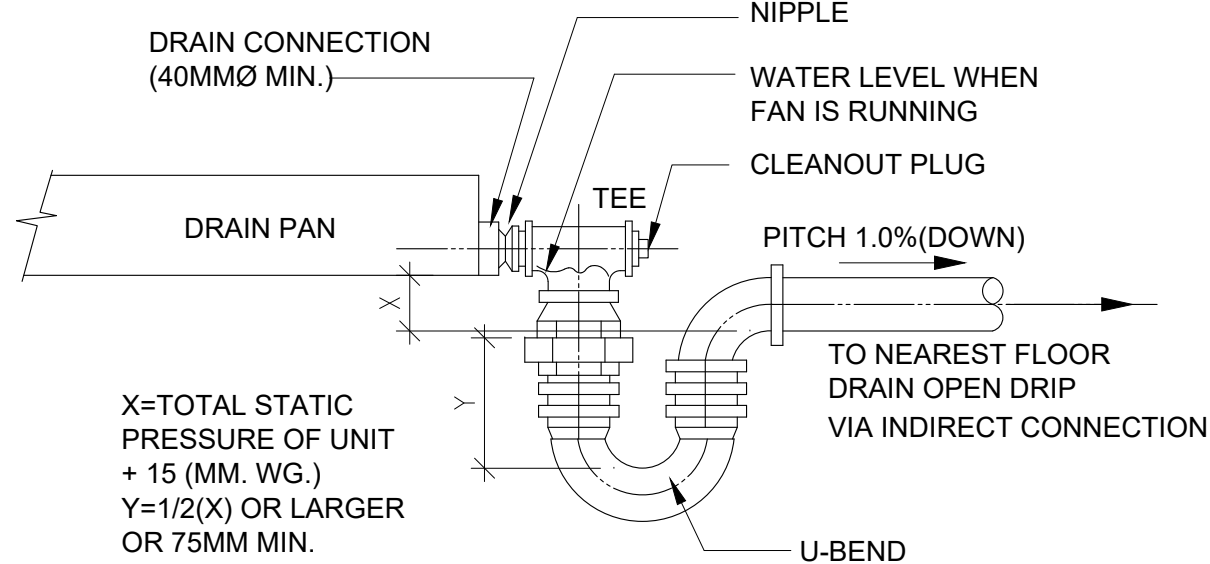
2 DUCT HANGER SUPPORT  
M9.01 N.T.S.



NOTES:

- THIS DETAIL ALSO APPLIES TO RETURN & EXHAUST.
- VISIBLE INSIDES OF DUCT SHALL BE PAINTED FLAT BLACK.
- FOR BRANCHES OFF ROUND OR FLAT DUCT, USE SADDLE TYPE CONNECTION.
- IF r/D > 1.5 CAN NOT FIT, THEN r/D > 1.0 IS FIRST ALTERNATE AND ALTERNATE 2 IS MITERED WITH TURNING VANES.
- PROVIDE RIGID DUCT FOR CRITICAL CARE AREAS - OPERATING ROOMS, DELIVERY ROOMS, LDR ROOMS, NURSERIES, PROTECTIVE ENVIRONMENT ROOMS, & CRITICAL CARE UNITS.
- PROVIDE CEILING GRID CLIPS AT TWO DIAGONALLY OPPOSITE CORNERS OF GRILLE.

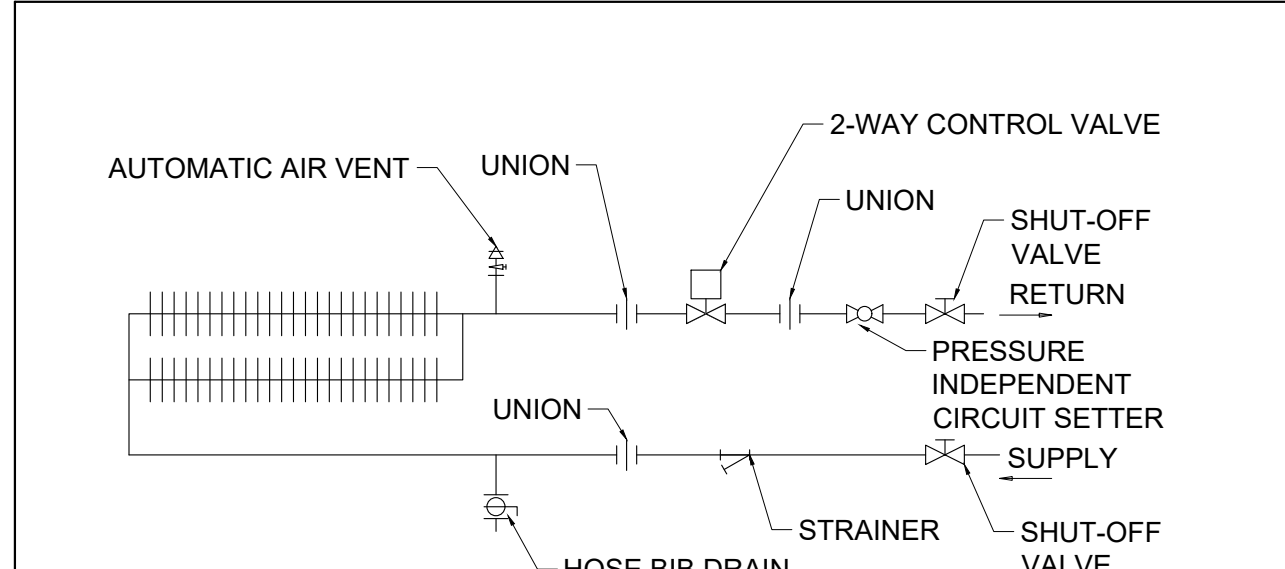
4 CEILING DIFFUSER - RIGID DUCT  
M9.01 N.T.S.



NOTES:

- ALLOW SUFFICIENT SPACE BELOW DRAIN PAN FOR TRAP
- PITCH DOWN DRAIN FOR PROPER RUN OFF
- MANUALLY PRIME FILL TRAP BEFORE START UP TO FORM INITIAL DRAIN SEAL
- TERMINATE THE DRAIN CONNECTION TO A NEARBY HUB DRAINS

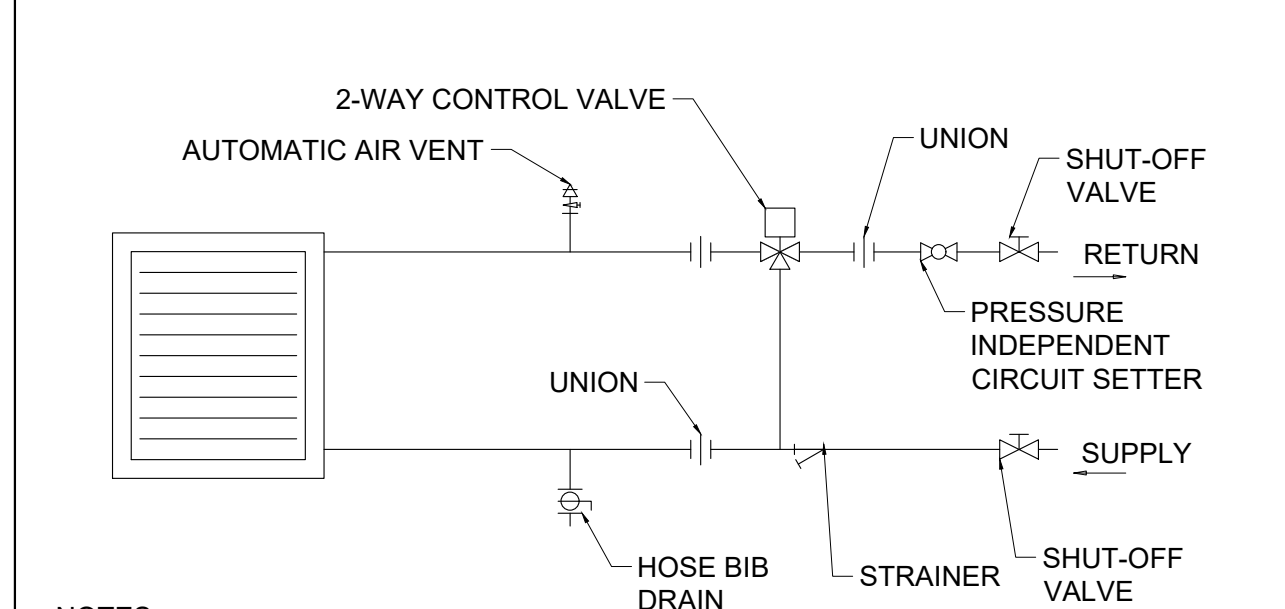
6 AHU CONDENSATE DRAIN PIPING AND P TRAP  
M9.01 N.T.S.



NOTES:

- ALL PIPE, VALVES, & FITTINGS SHALL BE ARRANGED SO AS NOT TO INTERFERE WITH COIL ACCESS OR REMOVAL.

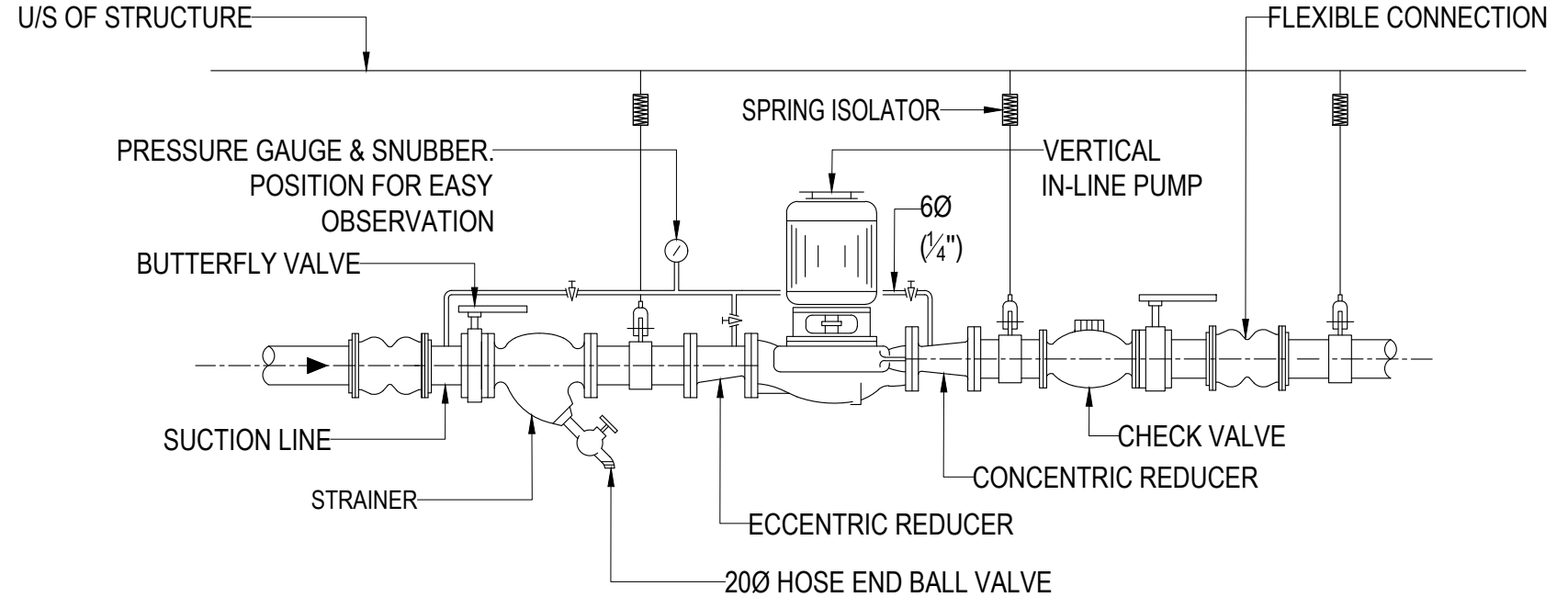
8 WALL FIN HEATER WITH 2-WAY CONTROL VALVE  
M9.01 N.T.S.



NOTES:

- ALL PIPE, VALVES, & FITTINGS SHALL BE ARRANGED SO AS NOT TO INTERFERE WITH COIL ACCESS OR REMOVAL.

9 VAV REHEAT COIL WITH 2-WAY CONTROL VALVE  
M9.02 N.T.S.



NOTES:

- VALVES AND STRAINER TO BE PIPE LINE SIZE AS INDICATED ON SCHEMATIC.
- 1 1/2" CONNECTIONS AND LESS UNLESS INDICATED OTHERWISE ON DWGS.

7 TYPICAL VERTICAL IN-LINE PUMP (N.T.S.)  
M9.01 N.T.S.

No	Revisions	Date
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Drawing Title  
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Drawn by TS	Substantial Performance Date
Designed by MS	Drawing No M9.01
Approved by BR	Floor No CAD File NAME