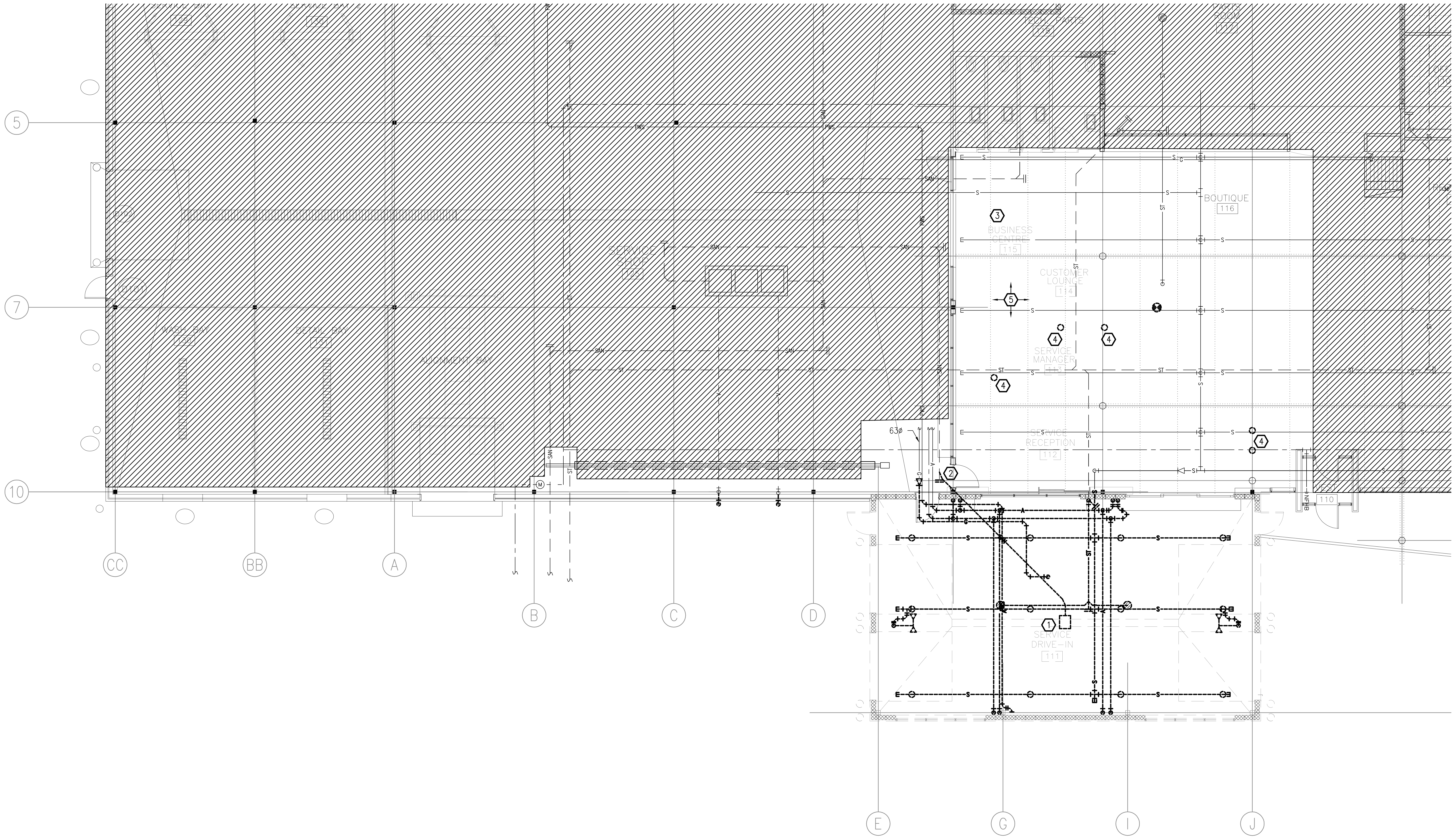

GENERAL NOTES

1. ALL PIPING AND REDUNDANT SYSTEMS WITHIN THE AREA OF DEMOLITION SHALL BE REMOVED AND CUT BACK AS REQUIRED.

DRAWING NOTES

1. REMOVE CATCH BASIN AND ASSOCIATED SANITARY PIPING.
2. CONFIRM THAT THE ELEVATION OF THE EXISTING SANITARY PIPE IS ADEQUATE FOR THE NEW CONSTRUCTION AND ADVISE ENGINEER IF NOT SUITABLE.
3. REMOVE COFFEE STATION, DISHWASHER, DISCONNECT AND CUT BACK DOMESTIC WATER PIPE TO SOURCE AND SANITARY PIPING TO BELOW GRADE AND CAP SERVICE.
4. SPRINKLER PIPING DROPS TO OFFICES TO BE CUT BACK AND CAPPED AT HIGH LEVEL.
5. REMOVE HIGH LEVEL SPRINKLER HEADS ABOVE NEW SUSPENDED T-BAR CEILING WITHIN OFFICES. REFER TO NEW FLOOR PLAN FOR EXTEND OF NEW CEILING.

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REVISION No.	DESCRIPTION	DATE
3.	ISSUED FOR TENDER	JUN 3/25
2.	ISSUED FOR BUILDING PERMIT	APR 21/25
1.	ISSUED FOR 66% REVIEW	MAR 28/25

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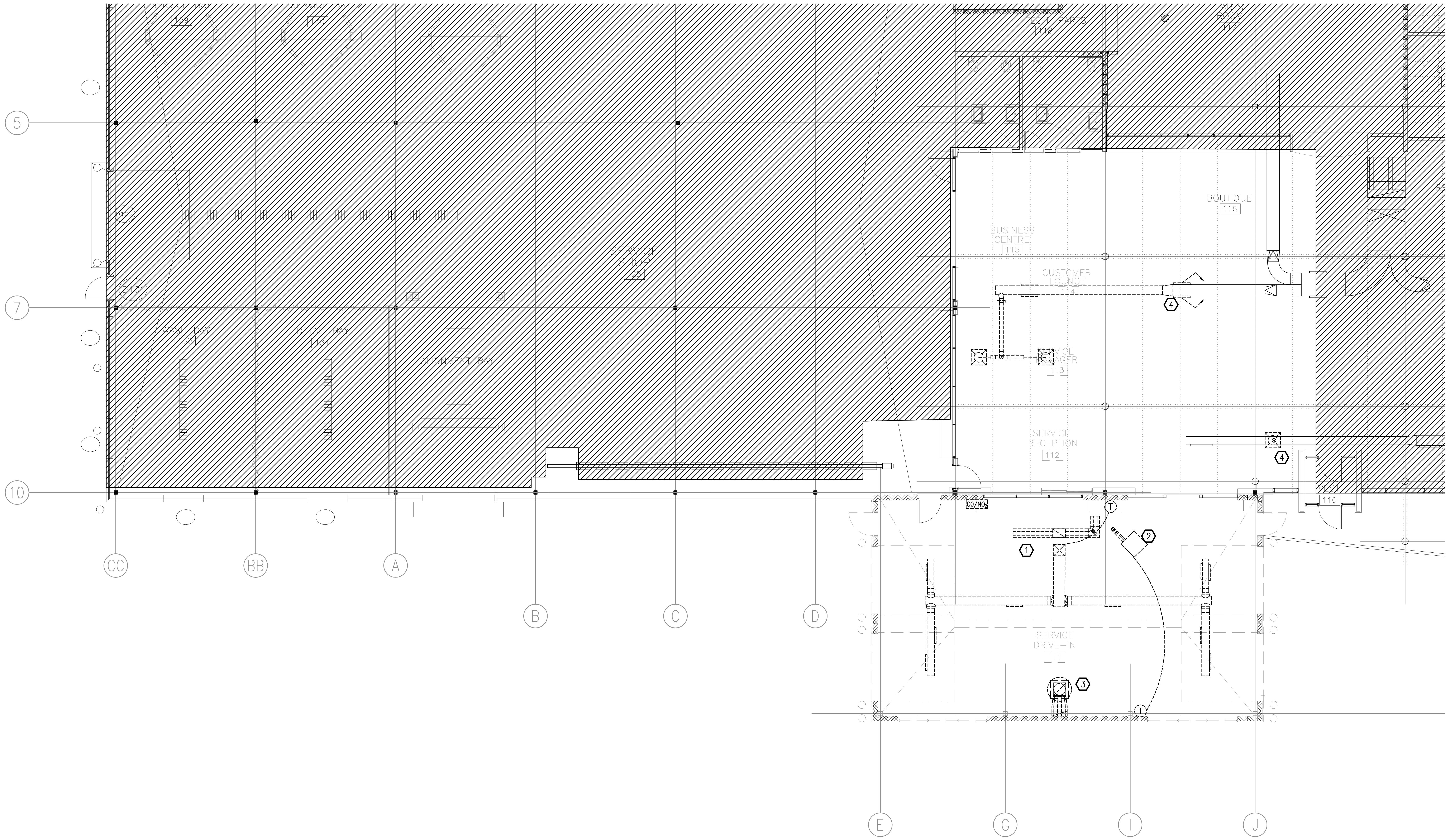
www.mckeeottawa.ca

PROJECT:
MERCEDEZ-BENZ
STAR MOTORS OF OTTAWA
400 WEST HUNT CLUB RD,
OTTAWA, ONTARIO

DRAWING:
MECAHNICAL:
PLUMBING AND
FIRE PROTECTION
DEMOLITION

DATE: MARCH 2025
DESIGNED BY: J.W.S.
DRAWN BY: J.W.S.
CHECKED BY: S.C.
SCALE: 1:100
No. DWGS. 9
DRAWING No.
PROJECT No.
24094
MD-1



GENERAL NOTES

1. ALL INDOOR AND OUTDOOR EQUIPMENT, DUCTWORK, CONTROLS AND REDUNDANT SYSTEMS WITHIN THE AREA OF DEMOLITIONS SHALL BE REMOVED AND CUT BACK AS REQUIRED.

DRAWING NOTES

1. REMOVE ROOFTOP UNIT RTU-1 FROM DRIVE THROUGH AND KEEP ON SITE TO BE REUSED FOR NEW DRIVE THROUGH.
2. REMOVE UNIT HEATER.
3. REMOVE EXHAUST FAN.
4. CUT BACK EXISTING DUCTWORK AND CAP. RELOCATE THE TWO GRILLES TO ALLOW THE CONSTRUCTION OF THE NEW WALL.

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2.	ISSUED FOR BUILDING PERMIT	APR 21/25
1.	ISSUED FOR 66% REVIEW	MAR 28/25
REVISION No.	DESCRIPTION	DATE

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PROJECT:
MERCEDEZ-BENZ
STAR MOTORS OF OTTAWA
400 WEST HUNT CLUB RD,
OTTAWA, ONTARIO

DRAWING:
MECAHNICAL:
HVAC DEMOLITION

DATE: MARCH 2025
DESIGNED BY: J.W.S.
DRAWN BY: J.W.S.
CHECKED BY: S.C.
SCALE: 1:100
No. DWGS. 9
DRAWING No.
PROJECT No.
24094
MD-2

FAN SCHEDULE

REF.	FUNCTION	LOCATION	CAPACITY		RPM	ELECTRICAL			REMARKS
			FLOW L/S	SP Pa		MAX POWER	VOLTS	PH.	
F-1	EXHAUST	ROOF	1887	189	1288	1-1/2HP	600	3	EQUAL TO COOK MODEL ACE-B 180C8B
F-2	DE-STRATIFICATION	NEW ADDITION	4563	–	310	97 W	120	1	EQUAL TO CANARM MODEL CP56 F&R WITH WALL MOUNTED SPEED CONTROLLER FOR FAN F-2, 3 AND 4.
F-3	DE-STRATIFICATION	NEW ADDITION	4563	–	310	97 W	120	1	EQUAL TO CANARM MODEL CP56 F&R
F-4	DE-STRATIFICATION	NEW ADDITION	4563	–	310	97 W	120	1	EQUAL TO CANARM MODEL CP56 F&R
AB-1	O/H DOOR AIR BARRIER	NEW ADDITION	7995	–	1500	1HP	600	1	EQUAL TO ENERSHIELD AIR BARRIER MODEL CLIMATE CONTROL DS-144, C/W PHOTO CELL
AB-2	O/H DOOR AIR BARRIER	NEW ADDITION	7995	–	1500	1HP	600	1	EQUAL TO ENERSHIELD AIR BARRIER MODEL CLIMATE CONTROL DS-144, C/W PHOTO CELL

ROOF TOP UNIT SCHEDULE

(BASED ON 35°C AIR ON CONDENSER)

REF.	COOLING CAP.		E.A.T.		HEATING		SUPPLY FAN			ELEC.			REMARKS
	SENSIBLE KW	TOTAL KW	DB °C	WB °C	TYPE	INPUT CAP. KW	FLOW L/S	ESP. PA	HP	VOLT	PH.	MOCP	
RTU-1	--	34.6	26.6	19.4	GAS	70.3	1887	198.4	3	575	3ø	25	EXISTING UNIT TO BE RELOCATED YORK MODEL ZH120N24Z5B1BAA1A1 PROVIDE NEW 600MM HIGH SEISMIC ROOF CURB.
RTU-2	10.5	14.8	26.6	19.4	GAS	19.0	755	198.4	1	575	3ø	15	EQUAL TO LENNOX MODEL LGT048H5E,

GAS FIRED RADIANT HEATER SCHEDULE

REF.	CAPACITY	DEFLECTOR		ELECTRICAL		REMARKS
	INPUT BTU/H	MOUNTING ANGLE DEG.	LENGTH FT	VOLTS	PHASE	
RH-1	130,000	30	40	120	1	EQUAL TO SCHWANK SST-TB13-40
RH-2	130,000	30	40	120	1	EQUAL TO SCHWANK SST-TB13-40
RH-3	130,000	0	40	120	1	EQUAL TO SCHWANK SST-TB13-40
RH-4	130,000	0	40	120	1	EQUAL TO SCHWANK SST-TB13-40

GRAVITY INTAKE HOOD SCHEDULE

REF.	FUNCTION	LOCATION	CAPACITY	REMARKS
			FLOW L/S	
GI-1	DRIVE THROUGH SUPPLY	ROOF	1768	EQUAL TO COOK GRAVITY INTAKE VENTILATOR MODEL TR-20

GRILLE & DIFFUSER SCHEDULE

REF.	FUNCTION	THROW DIRECTION	FRAME OR BORDER TYPE	NECK SIZE	COLOR	BALANCING DAMPER	REMARKS
A	RETURN	--	DUCTED	--	WHITE	--	EQUAL TO NAILOR MODEL 51EC – TO MATCH RETURN AIR DUCTWORK
B	SUPPLY	2-WAY	DUCTED	400X150	WHITE	BUILT IN	EQUAL TO NAILOR MODEL SERIES 51DCV-DEXAL C/W DAMPER/EXTRACTOR
C	SUPPLY	4-WAY	T-BAR	200ø	WHITE	BUILT IN	EQUAL TO NAILOR MODEL UNI – 610X610
D	RETURN	--	T-BAR	610X305	WHITE	--	EQUAL TO NAILOR MODEL 51EC
E	SUPPLY	2-WAY	DRYWALL	400X250	WHITE	BUILT IN	EQUAL TO NAILOR MODEL SERIES 51DV

BYPASS TERMINAL UNIT SCHEDULE

REF.	SIZE	AIR FLOW		REMARKS
		MAX. L/S	MIN. L/S	
BP-1	10	195	18	EQUAL TO NAILOR MODEL 3400
BP-2	10	130	18	EQUAL TO NAILOR MODEL 3400
BP-3	10	130	18	EQUAL TO NAILOR MODEL 3400

HVAC LEGEND

REMOVED AND/OR RELOCATED	EXISTING TO REMAIN	NEW	HVAC LEGEND
			VERTICAL SUPPLY AIR DUCT
			VERTICAL RETURN OR EXHAUST AIR DUCT
			SUPPLY AIR DUCT
			RETURN OR EXHAUST DUCT
			INTERNAL ACOUSTIC DUCT LINING
			FIRE DAMPER
M	M	M	MOTOR OPERATED DAMPER
			BALANCING DAMPER
			TURNING VANES
			SQUARE TO ROUND TRANSITION
AD AD	AD AD	AD AD	ACCESS DOOR
			FLEXIBLE DUCT (MAX. 6' LENGTH)
			BYPASS TERMINAL UNIT
			SQUARE DIFFUSER
			DUCTED RETURN/EXHAUST GRILLE
			EGGCRATE RETURN/EXHAUST GRILLE
			FLEXIBLE CONNECTION
	A #	A #	A = DIFFUSER TYPE (SEE SCHEDULE) # = CAPACITY FOR EACH (L/S)

CONTROLS LEGEND

REMOVED AND/OR RELOCATED	EXISTING TO REMAIN	NEW	CONTROLS LEGEND
(T)	(T)	(T)	ROOM THERMOSTAT
			CONTROL WIRING
		SC	SPEED CONTROLLER
		CO/NO$_2$	COMBINATION CARBON MONOXIDE/NITROGEN DIOXIDE SENSOR
		CONT	COMBINATION CARBON MONOXIDE/NITROGEN DIOXIDE SENSOR CONTROLLER

PLUMBING LEGEND

REMOVED AND/OR RELOCATED	EXISTING TO REMAIN	NEW	PLUMBING LEGEND
SAN	SAN	SAN	SANITARY PIPING ABOVE GRADE/FLOOR
SAN	SAN	SAN	SANITARY PIPING BELOW GRADE/FLOOR
V	V	V	SANITARY VENT PIPING
ST	ST	ST	STORM PIPING ABOVE GRADE/FLOOR
ST	ST	ST	STORM PIPING BELOW GRADE/FLOOR
			DOMESTIC COLD WATER PIPING
			DOMESTIC HOT WATER PIPING
PWS	PWS	PWS	PRESSURE WASHER SUPPLY PIPING
G	G	G	NATURAL GAS PIPING
A	A	A	COMPRESSED AIR PIPING
			CLEAN OUT
			DRAIN/DRAIN BODY
			HUB DRAIN
A	A	A	COMPRESSED AIR OUTLET WITH QUICK CONNECT
HB	HB	HB	HOSE BIBB
NFHB	NFHB	NFHB	NON-FREEZE HOSE BIBB
WH	WH	WH	WALL HYDRANT
M	M	M	METER
R	R	R	REGULATOR

VALVES & FITTINGS LEGEND

REMOVED AND/OR RELOCATED	EXISTING TO REMAIN	NEW	VALVES & FITTINGS LEGEND
			GATE VALVE
			BALL VALVE
			STRAINER
			CHECK VALVE
			DOUBLE CHECK VALVE BACKFLOW PREVENTER
			THERMOMETER
P	P	P	PRESSURE GAUGE & COCK
			PUMP
			ELBOW UP OR DOWN
			BRANCH CONNECTION BOTTOM OR TOP
			CAP
			DRIP LEG
			REDUCER
			UNION OR FLANGE

FIRE PROTECTION LEGEND

REMOVED AND/OR RELOCATED	TO BE REMOVED	EXISTING TO REMAIN	NEW	FIRE PROTECTION LEGEND
S		S	S	SPRINKLER PIPING
F		F	F	FIRE STANDPIPE PIPING
	○	○	●	PENDANT SPRINKLER HEAD
				UPRIGHT SPRINKLER HEAD
	◁	◁	◀	SIDE WALL SPRINKLER HEAD
	◎	◎	◉	FLUSH SPRINKLER HEAD
DE DE		DE DE	DE DE	DRY EXTENSION SPRINKLER
				SUPERVISED VALVE
FS		FS	FS	FLOW SWITCH
PS		PS	PS	PRESSURE SWITCH
				FIRE DEPARTMENT CONNECTION
				FIRE EXTINGUISHER

MECHANICAL DRAWING LIST

DRAWING No.	DESCRIPTION
MD-1	MECHANICAL : PLUMBING AND FIRE PROTECTION DEMOLITION
MD-2	MECHANICAL : HVAC DEMOLITION
M-1	MECHANICAL : SCHEDULES, LEGEND AND DRAWING LIST
M-2	MECHANICAL : PLUMBING AND FIRE PROTECTION
M-3	MECHANICAL : HVAC
M-4	MECHANICAL : ROOF PLAN
M-5	MECHANICAL : DETAILS
M-6	MECHANICAL : SPECIFICATIONS
M-7	MECHANICAL : SPECIFICATIONS

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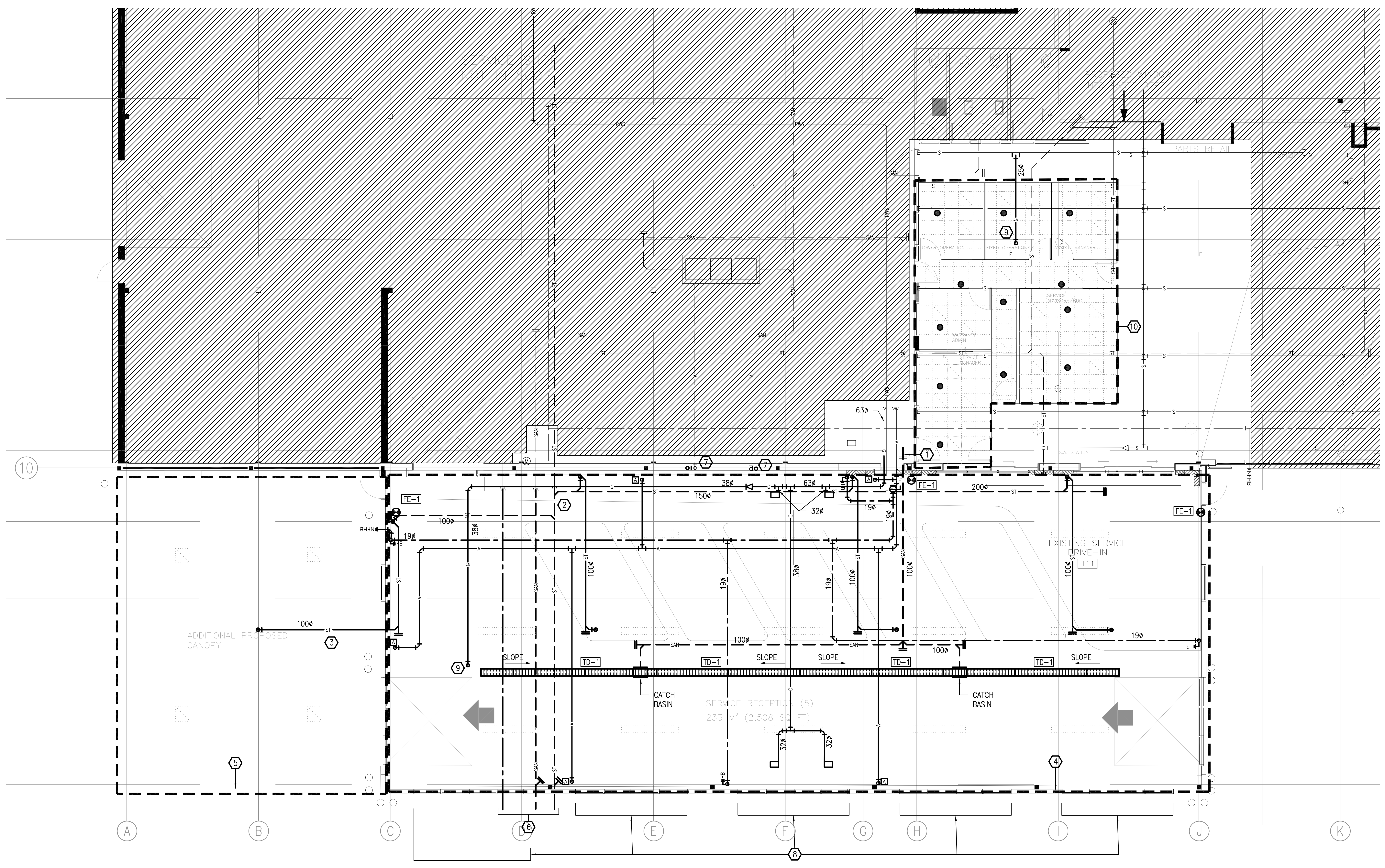
PROJECT:
MERCEDEZ-BENZ
STAR MOTORS OF OTTAWA
400 WEST HUNT CLUB RD,
OTTAWA, ONTARIO

DRAWING:
MECAHNICAL:
SCHEDULES, LEGEND
AND DRAWING LIST

DATE: MARCH 2025
DESIGNED BY: J.W.S.
DRAWN BY: J.W.S.
CHECKED BY: S.C.
SCALE: AS NOTED
No. DWGS. 9
PROJECT No. 24094
DRAWING No. M-1



GENERAL NOTES

1. COMPRESSED AIR PIPING MATERIAL AND SIZE TO BE COORDINATED WITH CLIENT TO MATCH EXISTING SYSTEMS. OUTLET CONNECTIONS TO MATCH EXISTING.
2. INCLUDE 4 NEW HOSE BIBBS. EXACT LOCATIONS TO BE COORDINATED ON SITE WITH CLIENT. GENERAL LOCATIONS INDICATED.
3. PRESSURE WASHER WAND LOCATION TO BE COORDINATED WITH CLIENT. PIPING MATERIAL TO MACH EXISTING OR AS INDICATED BY CLIENT. INCLUDE FOR 40 METERS OF PIPING.

DRAWING NOTES

1 CONNECT NEW SANITARY TO EXISTING. PERFORM CAMERA INSPECTION TO CONFIRM THAT THE PIPE DISCHARGES INTO OIL & GRIT INTERCEPTOR.

2 STORM WATER PIPING TO CONNECT TO MAIN BELOW NEW ADDITION.

3 HEAT TRACING ON CANOPY DRAIN PIPING, BY ELECTRICAL CONTRACTOR. THERMAL INSULATION AND PVC JACKETING BY MECHANICAL CONTRACTOR.

4 EXTEND EXISTING WET PIPE SPRINKLER SYSTEM TO LARGER DRIVE THROUGH.

5 PROVIDE NEW DRY TYPE SPRINKLER ZONE FOR COVERAGE BELOW CANOPY ROOF. HEADS SHALL BE UPRIGHT ONLY WITHOUT ANY LOW POINTS WITHIN OUTDOOR PIPING DISTRIBUTION.

6 EXTEND DOMESTIC WATER, SANITARY AND STORM WATER BUILDING SERVICES. EXTEND 1 METER OUTSIDE NEW ADDITION. COORDINATE LOCATION AND CONNECTION WITH CIVIL CONTRACTOR.

7 EXISTING OIL & GRIT INTERCEPTOR VENTS TO BE MODIFIED SO THAT THEY EXTEND UP WITHIN EXISTING BUILDING, AND WITH NEW PENETRATIONS THROUGH ROOF. COORDINATE ON SITE.

8 PROVIDE INDOOR WINDOW SPRINKLERS WITH SEPARATE ZONE FOR FIRE RATED WALL. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR SIZE AND MULLION PLACEMENT.

9 UP TO ROOF THROUGH SIDE OF ROOF CURB, AS HIGH AS POSSIBLE. SEAL WEATHER TIGHT.

10 HIGH LEVEL SPRINKLERS HEADS LOCATED ABOVE NEW T-BAR CEILING AND ENCLOSED BY FULL HEIGHT WALLS TO BE REMOVED. INCLUDE 4 NEW HIGH LEVEL SPRINKLERS OUTSIDE OF OFFICE AREA TO SUIT NEW WALL LOCATION.

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PROJECT:
MERCEDEZ-BENZ
STAR MOTORS OF OTTAWA
400 WEST HUNT CLUB RD,
OTTAWA, ONTARIO

DRAWING:
MECAHNICAL:
PLUMBING AND
FIRE PROTECTION

DATE: MARCH 2025
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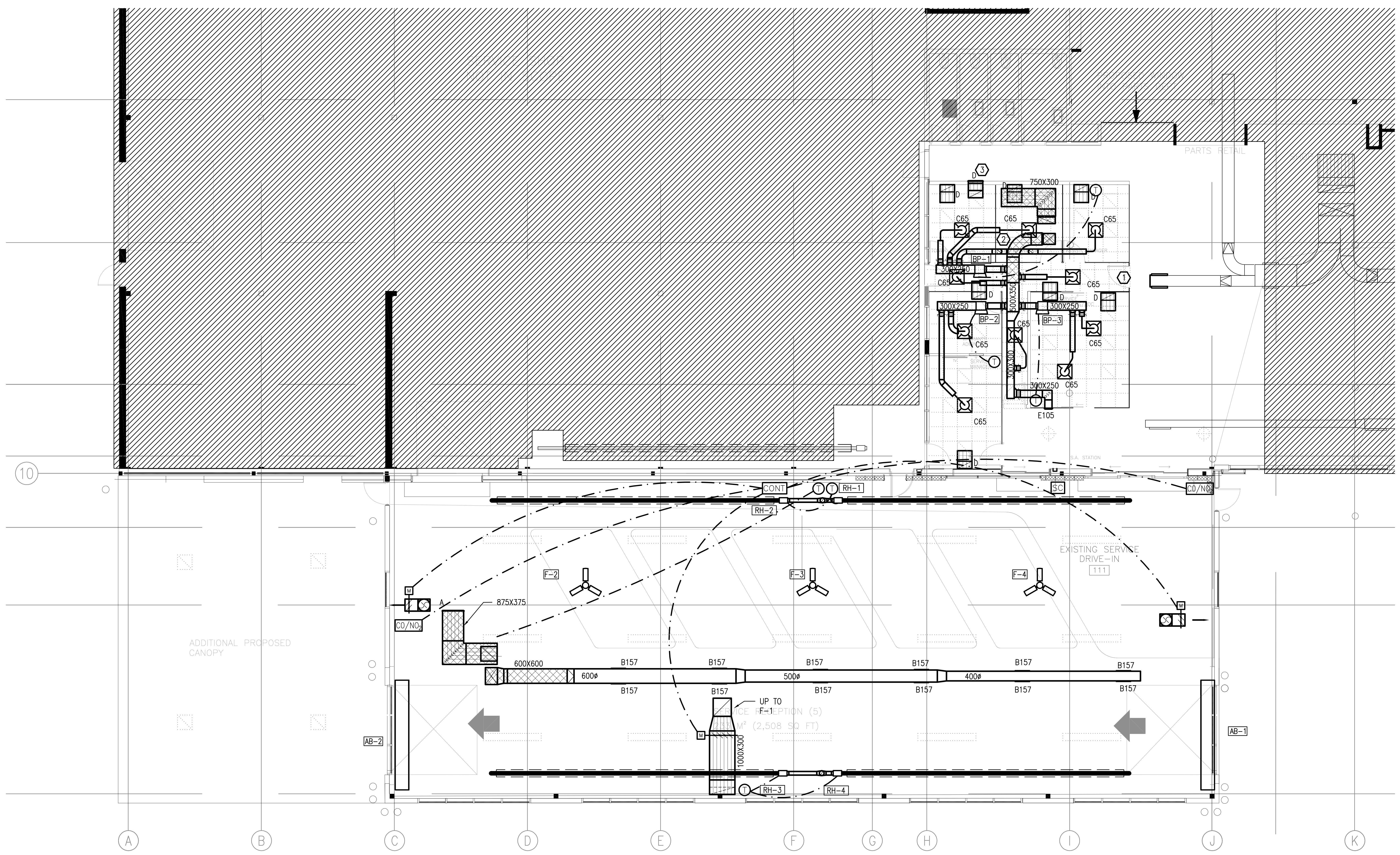
CHECKED BY: S.C.
SCALE: 1:100
No. DWGS. 9
DRAWING No.
M-2
PROJECT No.
24094



GENERAL NOTES

1. PROVIDE ACOUSTICALLY LINED TRANSFER DUCT ON ALL TYPE D RETURN AIR GRILLES WITHIN NEW OFFICES. REFER TO DETAIL 7/M-5.

DRAWING NOTES

① CAP SUPPLY DUCTWORK. REINSTALL TWO SUPPLY AIR GRILLES.

② INSTALL SUPPLY AIR DUCTWORK 300MM ABOVE SUSPENDED T-BAR CEILING.

③ TRANSFER DUCT INSTALLED ABOVE HIGHT OF T-BAR CEILING, THROUGH WALL AND ANGLE UP.

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PROJECT:
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STAR MOTORS OF OTTAWA
400 WEST HUNT CLUB RD,
OTTAWA, ONTARIO

DRAWING:
MECAHNICAL:
HVAC

DATE: MARCH 2025
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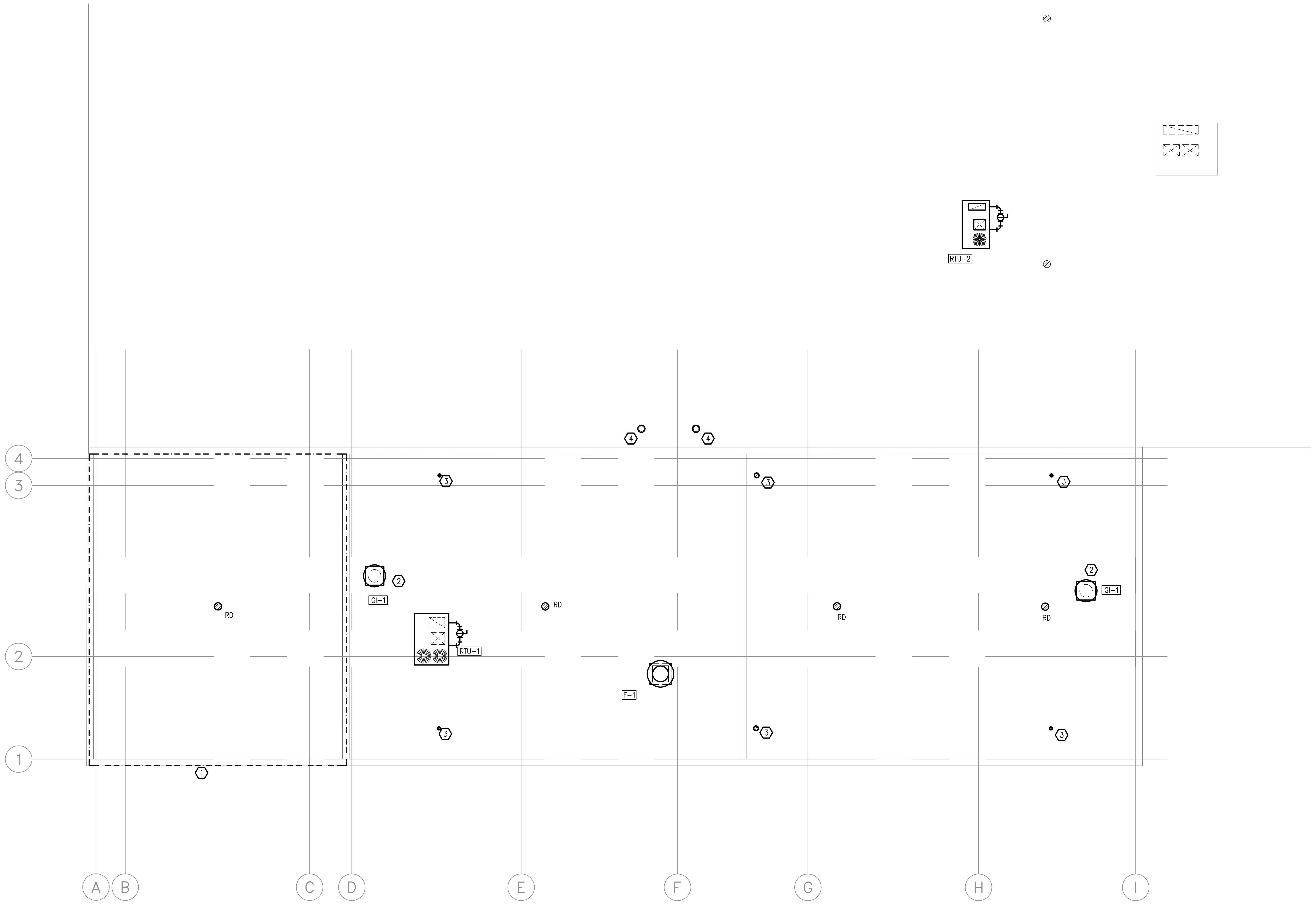
SCALE: 1:100
No. DWGS. 9
DRAWING No. M-3
PROJECT No. 24094



DRAWING NOTES

- ⟨1⟩ NEW ROOF CANOPY OPEN BELOW.
- ⟨2⟩ INTAKE AIR VENTILATOR
- ⟨3⟩ RADIANT TUB HEATER INTAKE OR EXHAUST.
- ⟨4⟩ OIL/GRIT SEPARATOR VENT THROUGH ROOF.

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MERCEDEZ–BENZ
STAR MOTORS OF OTTAWA
400 WEST HUNT CLUB RD,
OTTAWA, ONTARIO

DRAWING:
MECAHNICAL:
ROOF PLAN

DATE: MARCH 2025
DESIGNED BY: J.W.S.
DRAWN BY: J.W.S.
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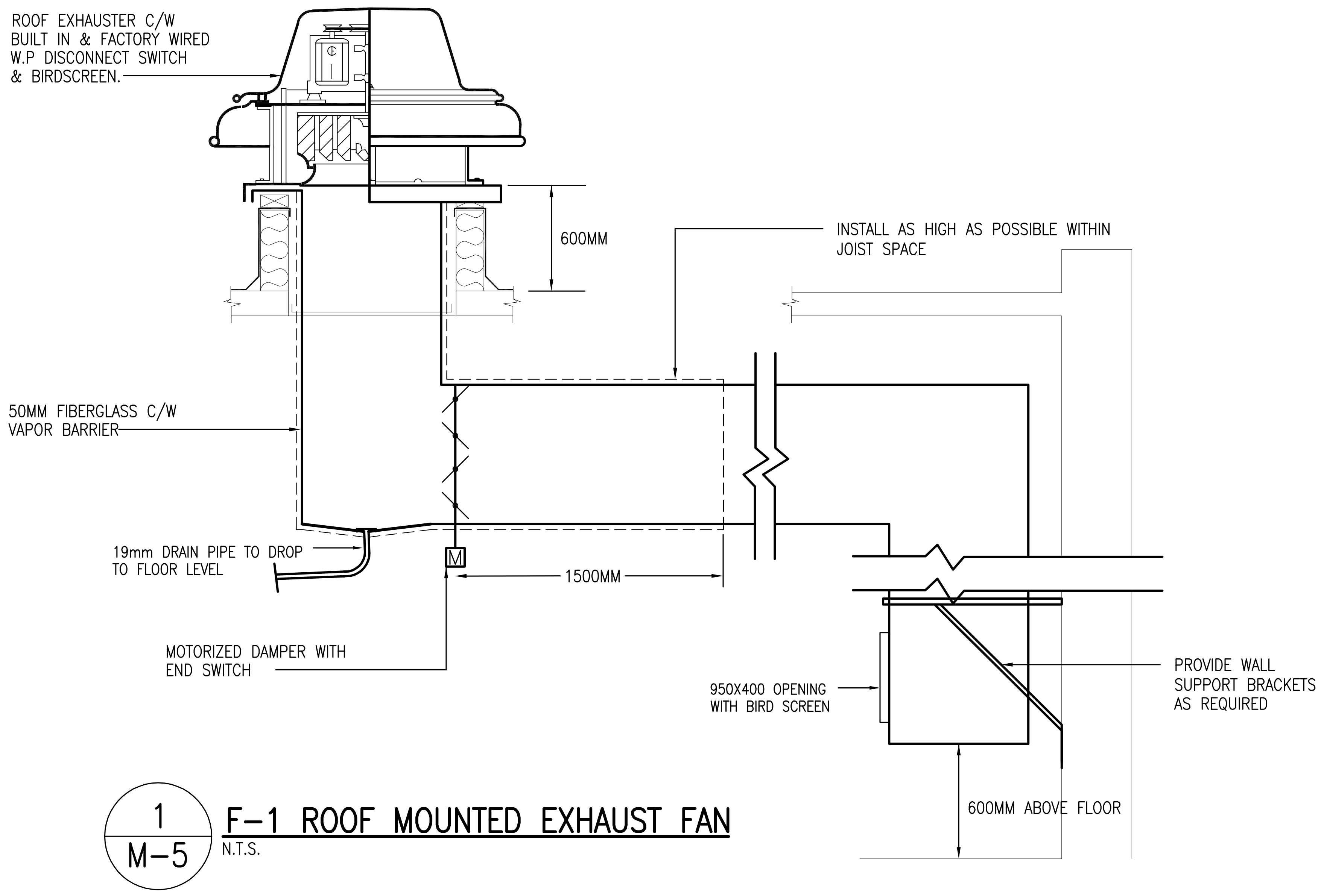
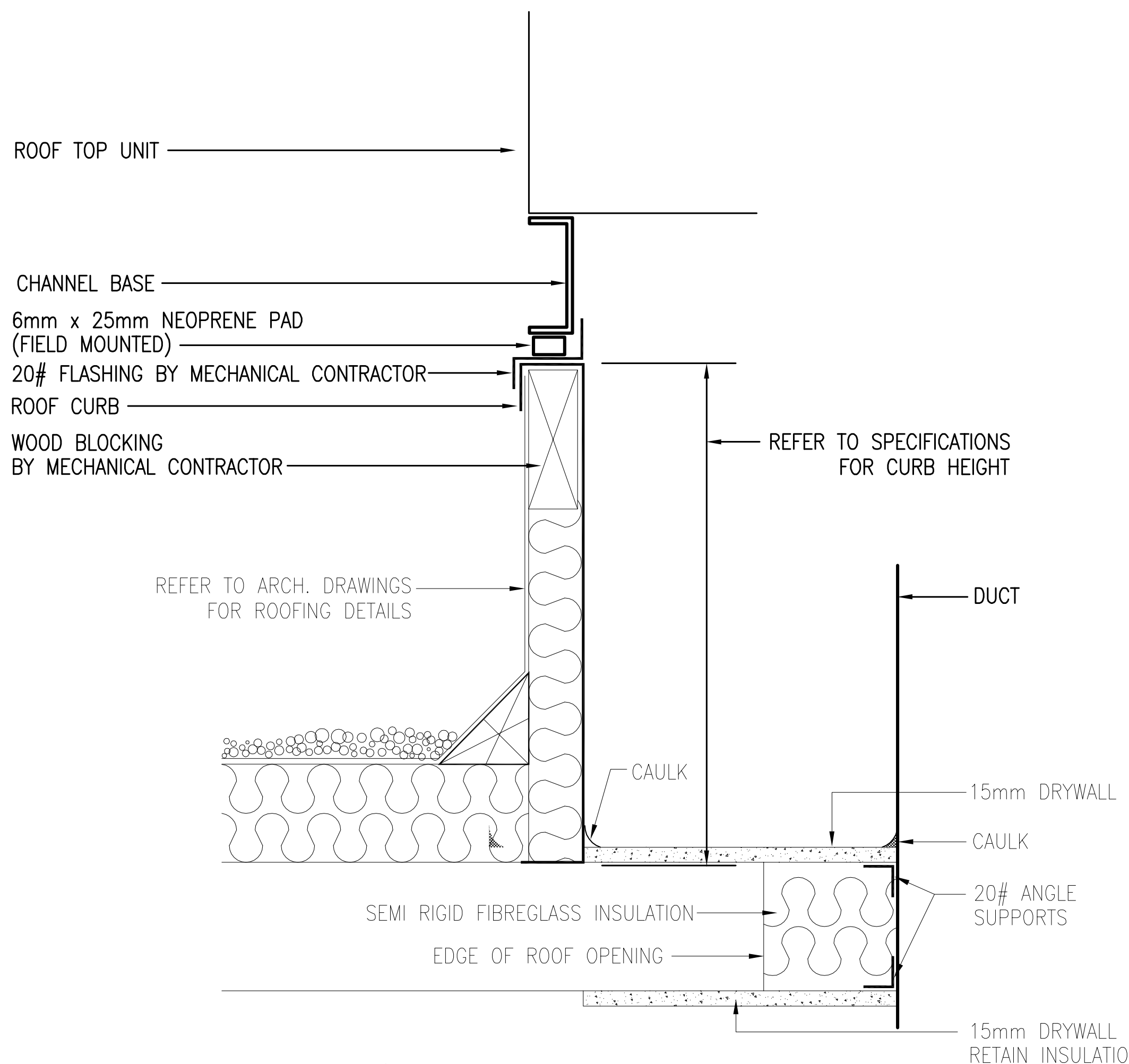
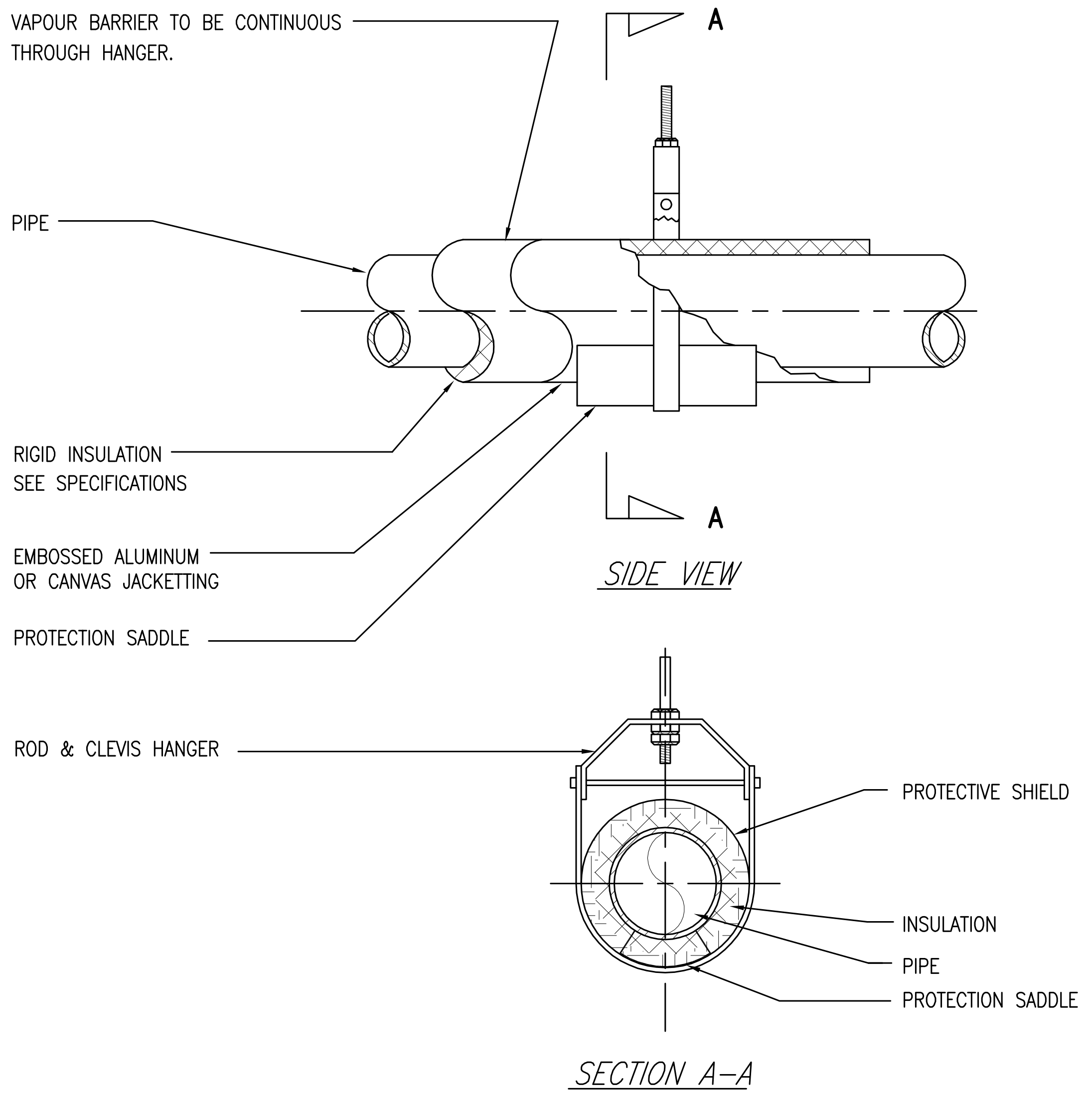
SCALE: 1:100
No. DWGS. 9
DRAWING No. M-4
PROJECT No. 24094



1
M–5
F–1 ROOF MOUNTED EXHAUST FAN
N.T.S.



2
M–5
ROOF CURB DETAIL
N.T.S.



3
M–5
TYPICAL PIPE HANGER

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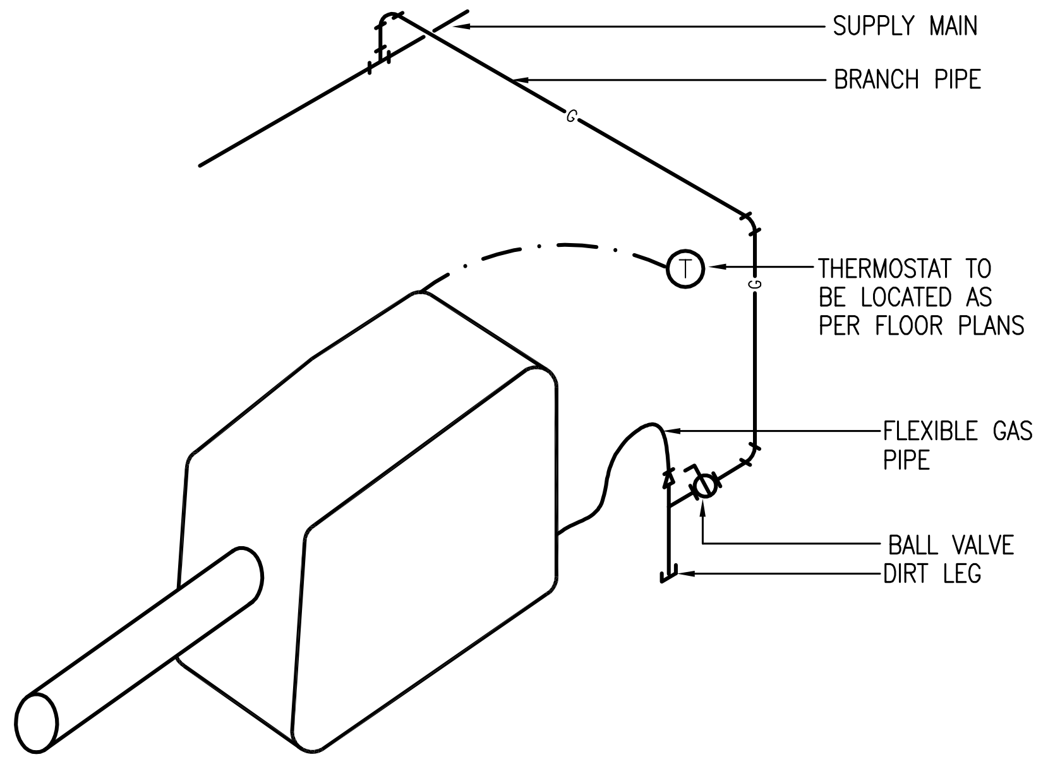
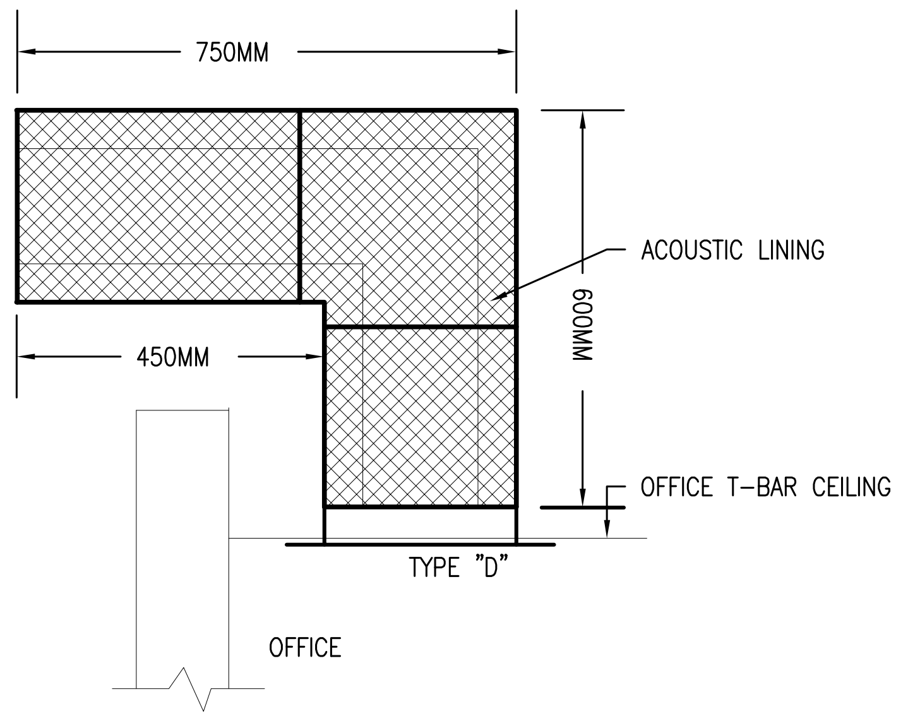
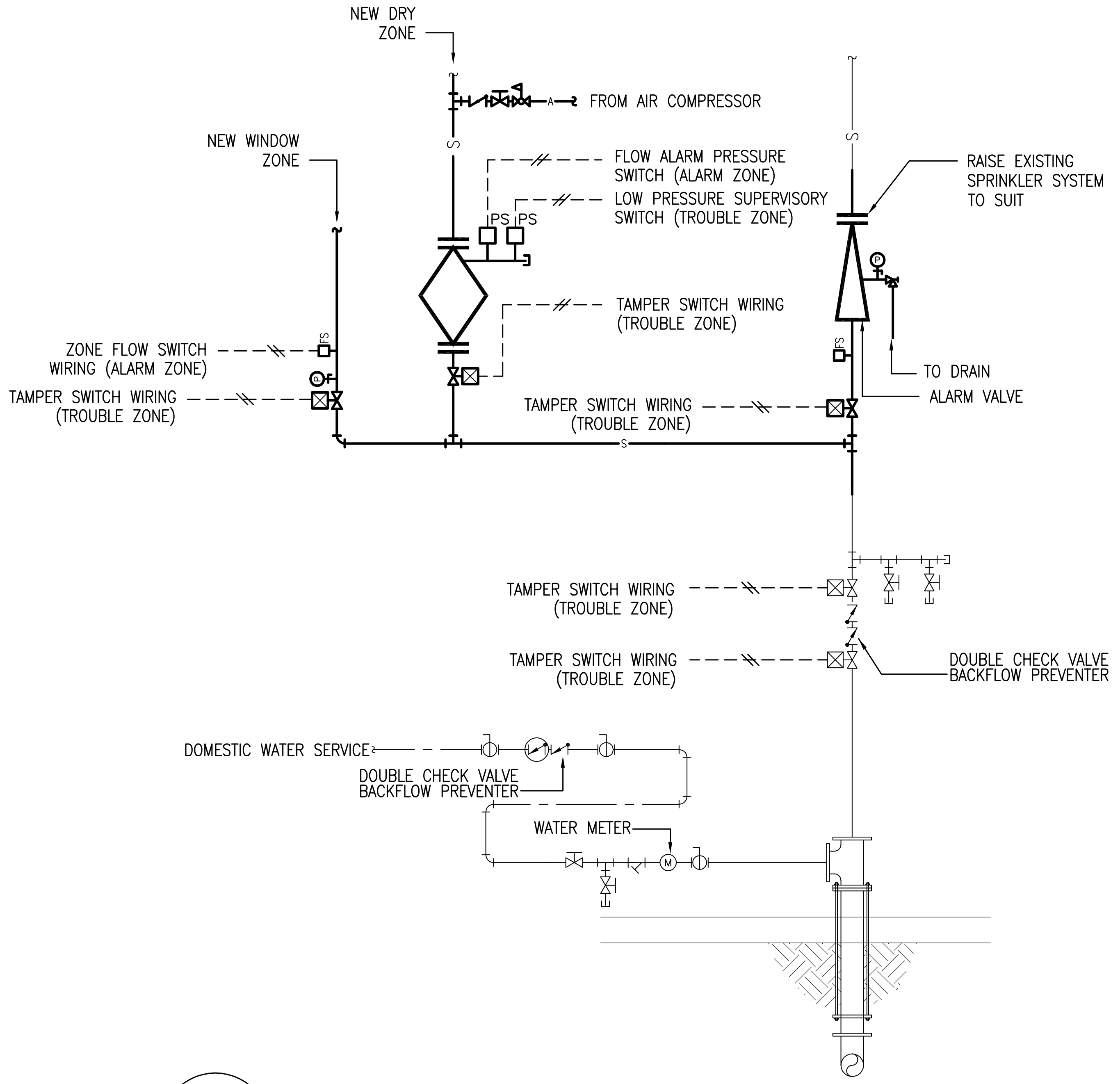


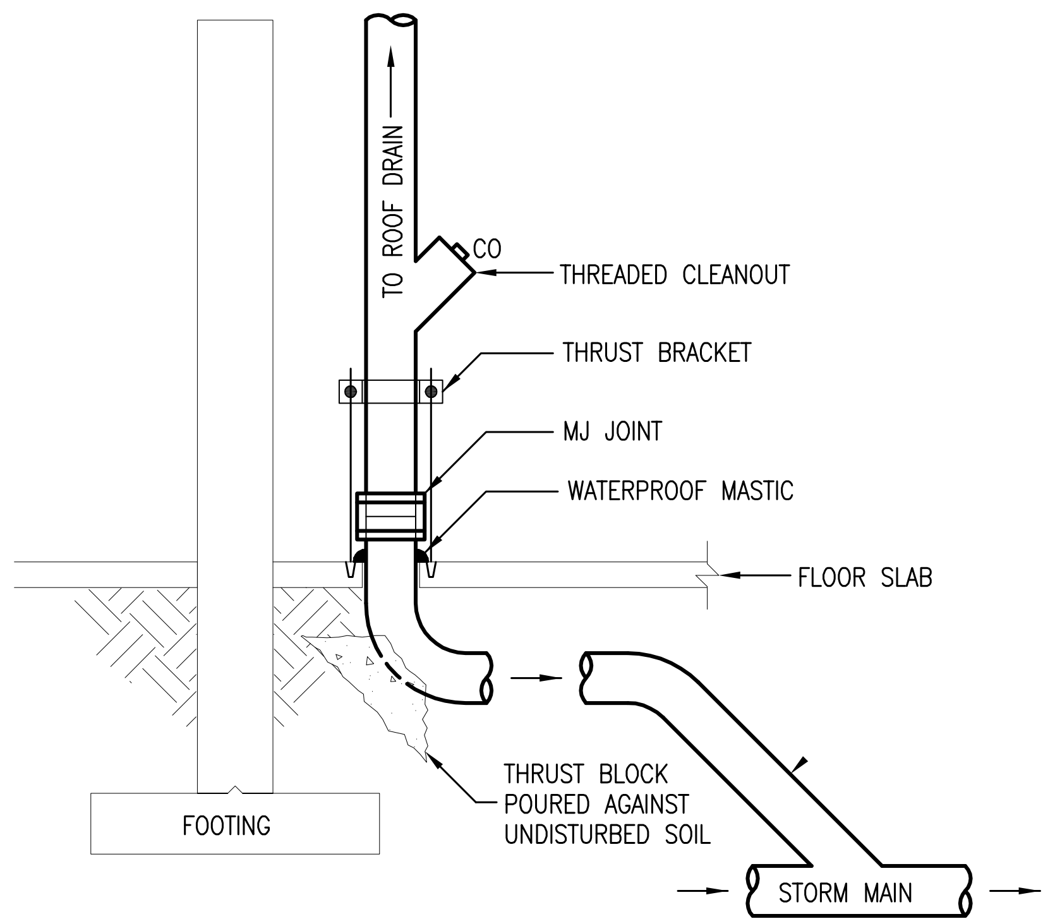
4
M–5
RADIANT HEATER GAS PIPING
N.T.S.



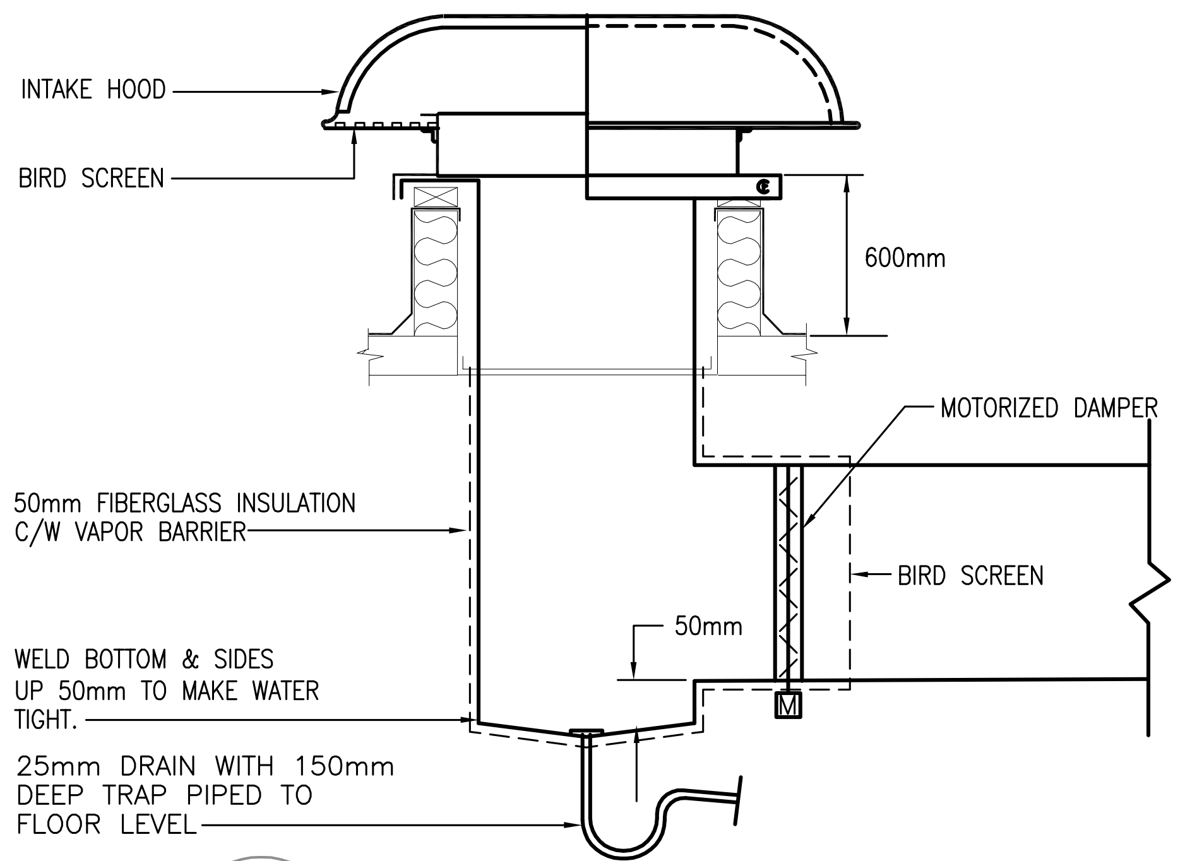
5
M–5
OFFICE TRANSFER AIR DETAIL
N.T.S.



8
M–5
DRY ALARM VALVE INSTALLATION ON EXISTING SYSTEM
N.T.S.



6
M–5
RAINWATER LEADER CONNECTION DETAIL
N.T.S.



7
M–5
ROOF MOUNTED AIR INTAKE
N.T.S.

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400 WEST HUNT CLUB RD,
OTTAWA, ONTARIO

DRAWING:
MECAHNICAL:
DETAILS

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CHECKED BY: S.C.
SCALE: AS NOTED
No. DWGS. 9
PROJECT No. 24094
DRAWING No. M-5

GENERAL

CONDITIONS OF CONTRACT

ALL CONDITIONS OF CCDC2–2020 (STIPULATED PRICE CONTRACT) SHALL APPLY TO THIS PROJECT.

EXAMINATION OF WORK

THIS PROJECT INVOLVES RENOVATIONS TO THE EXISTING BUILDING, THEREFORE EXAMINE THE SITE AND LOCAL CONDITIONS INCLUDING REVIEW OF CEILING INTERFERENCES TO DETERMINE THE DIFFICULTIES IN CARRYING OUT THE WORK INDICATED AND SPECIFIED PRIOR TO SUBMITTING FINAL PRICE. ALLOW FOR ALL DUCT AND PIPE ELBOWS AND OFFSETS AS REQUIRED TO COORDINATE WITH ALL OTHER SERVICES IN CEILING SPACE. THESE REQUIRED OFFSETS ARE NOT SHOWN ON THE DRAWINGS.

INTENT

ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH STANDARDS OF GOOD PRACTICE SUCH AS SMACNA AND ASHRAE.

TESTING

TEST ALL EQUIPMENT AND MATERIAL WHERE REQUIRED BY THE SPECIFICATIONS OR AUTHORITIES HAVING JURISDICTION TO DEMONSTRATE IT'S PROPER OPERATION TO THE OWNER'S REPRESENTATIVE. TEST PROCEDURES SHALL BE IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF THE ASME, ASHRAE, AND OTHER RECOGNIZED STANDARDS.

PERFORM THE FOLLOWING TESTS AND UPON COMPLETION OF THE MECHANICAL INSTALLATION, TURN OVER TO THE OWNER CERTIFICATION OF THE TESTS WITH DETAILED DATA AS REQUIRED BY EACH. EACH TEST SHALL BE ITEMIZED AS TO THE TIME PERFORMED AND PERSONNEL RESPONSIBLE FOR THE TEST. WHERE LEAKAGE OCCURS, REPAIRS SHALL BE MADE AND THE ENTIRE SYSTEM RE–TESTED. ALL TESTS TO BE MADE BEFORE BACKFILLING OR FURRING IN.

TEST COMPRESSED AIR PIPING SYSTEM TO 1–1/2 TIMES WORKING PRESSURE. ISOLATE ANY EQUIPMENT NOT CAPABLE OF WITHSTANDING TEST PRESSURE. MAINTAIN TEST PRESSURE FOR 4 HOURS WITHOUT DROP IN PRESSURE.

SANITARY, VENT, AND DOMESTIC WATER PIPING SHALL BE TESTED AS PER THE REQUIREMENTS OF THE ONTARIO BUILDING CODE.

ALL DUCT SYSTEMS, INCLUDING SUPPLY, RETURN AND EXHAUST SHALL BE CHECKED FOR TIGHTNESS. ALL LEAKS SHALL BE REPAIRED BEFORE DUCTS ARE FURRED IN TO ENSURE TOTAL OUTLET CAPACITY IS WITHIN 5% OF THE QUANTITY BEING SUPPLIED BY THE AIR SYSTEM.

ALL GAS PIPING SHALL BE TESTED AS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION.

TESTING AND BALANCING

BALANCE ALL SYSTEMS WHERE AIRFLOW IS GIVEN FOR RATED AIR FLOW, ROOM TEMPERATURE CONTROL AND CHECK CURRENT DRAW AFTER INSTALLATION IS COMPLETE AND IN FULL WORKING ORDER. ADJUST CONTROLS DAMPERS, AND DIFFUSERS FOR PROPER AIR CIRCULATION AND MINIMUM ENERGY CONSUMPTION. ADJUST FAN SPEEDS AS REQUIRED TO OBTAIN SPECIFIC PERFORMANCE. CHANGE PULLEYS/BELTS WITHIN AIR HANDLING EQUIPMENT AS REQUIRED TO ACHIEVE DESIGN AIRFLOW. BALANCE VAV BOXES TO THEIR MAXIMUM AND MINIMUM POSITIONS.

RECORD AIR HANDLING UNIT PERFORMANCE.

MECHANICAL SYSTEMS SHALL NOT BE CONSIDERED READY FOR FINAL INSPECTION UNTIL BALANCING RESULTS ACCEPTABLE TO THE ENGINEER ARE OBTAINED. IF IT IS FOUND THAT THE SPECIFIED AIR FLOWS CANNOT BE ACHIEVED ON PORTIONS OF THE SYSTEM, THE ACTUAL CONDITIONS SHALL BE REPORTED TO THE ENGINEER FOR CONSIDERATION OF CORRECTIVE ACTION BEFORE CONTINUING THE BALANCING PROCEDURE. PROVIDE INSTRUMENTS AND MANPOWER TO VERIFY RESULTS OF UP TO 30% OF ALL REPORTED MEASUREMENTS. IF MEASURED FLOW AT FINAL INSPECTION SHOWS DEVIATION OF 10% OR MORE OF SELECTED AREAS, THE REPORT SHALL BE REJECTED. IF REPORT IS REJECTED, SYSTEMS SHALL BE REBALANCED AND A NEW CERTIFIED REPORT SUBMITTED AT NO EXTRA COST, FOLLOWING WHICH THE ENGINEER RESERVES THE RIGHT TO REQUEST ADDITIONAL VERIFICATION.

SUBMIT WRITTEN BALANCING REPORT CONFORMING TO AABC AND ASHRAE STANDARDS FOR ENGINEER'S APPROVAL. ONCE REVIEWED AND DEEMED SATISFACTORY BY THE ENGINEER, THE BALANCING CONTRACTOR SHALL SUBMIT 3 COPIES OF THE BALANCING REPORT FOR SUBMISSION TO THE OWNER.

ELECTRIC MOTORS AND WIRING

SUPPLY ALL MECHANICAL EQUIPMENT COMPLETE WITH ELECTRIC MOTORS AS REQUIRED. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO SUPPLY ALL MOTOR STARTERS, EXCEPT ON PRE–WIRED PACKAGED EQUIPMENT, DISCONNECT SWITCHES FOR ALL MOTORS FOR THE PROJECT, AND ALL WIRING TO STARTERS EXCEPT WHERE SHOWN OTHERWISE. EQUIPMENT REQUIRING CONNECTION TO AN ELECTRICAL POWER SOURCE SHALL BE CSA OR ULC APPROVED FOR USE AT LOCATION OF INSTALLATION. THE MECHANICAL CONTRACTOR SHALL SUPPLY AND INSTALL ALL LOW VOLTAGE CONTROL WIRING WITHIN EMT CONDUIT FOR A COMPLETE AND OPERATIVE INSTALLATION UNLESS OTHERWISE SPECIFIED. ALL MOTOR EFFICIENCIES SHALL BE IN ACCORDANCE WITH THE ONTARIO BUILDING CODE.

"AS–BUILT" DRAWINGS

KEEP IN THE JOB OFFICE AN EXTRA SET OF WHITE PRINTS AND SPECIFICATIONS ON WHICH ALL CHANGES AND DEVIATIONS SHALL BE RECORDED DAILY. AT COMPLETION OF THE PROJECT TURN THESE OVER TO THE ENGINEER.

SHOP DRAWINGS

BEFORE FABRICATION OR DELIVERY OF ANY MATERIALS OR EQUIPMENT, SUBMIT A MINIMUM OF SIX (6) COMPLETE SETS OF SHOP DRAWINGS AND DATA SHEETS COVERING EQUIPMENT TO BE FURNISHED AND INTENDED FOR INSTALLATION UNDER THE CONTRACT FOR REVIEW BY THE ENGINEER.

SUBMIT AT LEAST FIFTEEN (15) WORKING DAYS BEFORE THE DATE REVIEWED SUBMISSIONS ARE REQUIRED.

ELECTRONIC SHOP DRAWING SUBMISSIONS ARE ACCEPTABLE WITH THE FOLLOWING CONDITIONS: THE SHOP DRAWINGS SHALL BE IN PDF FORMAT WITH A TRANSMITTAL AND INCLUDE THE TRADE CONTRACTOR'S REVIEW STAMP. THE PAGE SIZE SHALL NOT EXCEED 8.5"x11" AND MUST BE FULLY LEGIBLE. IF LARGER SHEET SIZE IS REQUIRED, THE SUBMISSION SHALL BE IN HARD COPY FORMAT RATHER THAN ELECTRONIC.

COORDINATE EACH SUBMISSION WITH REQUIREMENTS OF THE WORK AND CONTRACT. INDIVIDUAL SHOP DRAWINGS WILL NOT BE REVIEWED UNTIL ALL RELATED DRAWINGS ARE AVAILABLE. THE CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS SPECIFIED IN A SECTION IN ONE SUBMISSION. MULTIPLE SHOP DRAWING SUBMISSIONS FOR A SPECIFICATION SECTION SHALL NOT BE ACCEPTABLE. IN THE EVENT THAT SHOP DRAWINGS ARE SUBMITTED PIECE MEAL (MULTIPLE SUBMISSIONS) WITHIN A SPECIFICATION SECTION, THE SHOP DRAWINGS SHALL BE REJECTED BY THE CONSULTANT UNTIL ALL SHOP DRAWINGS FROM THAT SECTION HAVE BEEN RECEIVED IN ONE PACKAGE FOR REVIEW.

TEMPORARY AND TRIAL USAGE

TEMPORARY OR TRIAL USAGE BY THE OWNER OF ANY MECHANICAL MACHINERY, APPARATUS, EQUIPMENT OR ANY OTHER WORK OR MATERIALS SUPPLIED UNDER THE CONTRACT BEFORE FINAL WRITTEN ACCEPTANCE BY THE ENGINEER IS NOT TO BE CONSTRUED AS EVIDENCE OF THE ACCEPTANCE OF SAME BY THE OWNER. THE OWNER SHALL HAVE THE PRIVILEGE OF SUCH TEMPORARY AND TRIAL USAGE AS SOON AS THIS CONTRACTOR CLAIMS THAT SAID WORK IS COMPLETED. ANY DAMAGE CAUSED BY DEFECTIVE MATERIAL OR WORKMANSHIP THROUGH TEMPORARY OR TRIAL USAGE BY THE OWNER SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR.

OPERATING AND MAINTENANCE DATA

FURNISH THREE (3) SETS OF OPERATING AND MAINTENANCE DATA FOR ALL NEW EQUIPMENT AND SYSTEMS. DATA SHALL BE ASSEMBLED IN BOOKLET FORM WITH HARD COVER AND INDEX. IDENTIFY FRONT COVER WITH NAME AND LOCATION OF THE PROJECT, CONSULTING ENGINEER AND CONTRACTOR. SUBMIT ONE COPY TO THE ENGINEER FOR REVIEW PRIOR TO FINAL SET OF THREE (3) PRINTED MANUALS AND ONE (1) PDF COPY.

NOTICE TO ENGINEER

PROVIDE ENGINEER WITH MINIMUM FIVE (5) DAYS NOTICE PRIOR TO INSTALLATION OF CEILING AND PARTITIONS SO THAT A FIELD REVIEW OF THE COMPLETED ROUGH IN WORK MAY OCCUR PRIOR TO THESE SYSTEMS BEING CONCEALED.

ACCESS DOORS

SUPPLY TO THE INSTALLING TRADES, ACCESS DOORS FOR VALVES, CLEANOUTS, AIR VENTS, BALANCING DAMPERS, FIRE DAMPERS, EXPANSION JOINTS AND FOR ALL ANCILLARY EQUIPMENT. MATERIAL SHALL BE OF 3 mm ($\frac{1}{8}$") CORE THICKNESS BONDERIZED STEEL COMPLETE WITH HEAVY DUTY RUST RESISTANT CONCEALED HINGES, POSITIVE LOCKING AND SELF–OPENING SCREW DRIVER LOCK. FRAME SHALL BE 300x300 mm (12"x12") MINIMUM AND 600x600 mm (24"x24") MAXIMUM AS REQUIRED AND SUITABLE FOR THE TYPE OF ASSOCIATED WALL OR CEILING CONSTRUCTION. PROVIDE SUITABLY RATED FIRE RATED ACCESS DOORS FOR INSTALLATION IN FIRE RATED ASSEMBLIES. THIS TRADE SHALL BE RESPONSIBLE FOR ACCURATELY LOCATING THE ACCESS DOORS.

APPROVALS

THE PRICE SUBMITTED FOR THIS CONTRACT SHALL BE BASED ON THE USE OF MATERIALS AND EQUIPMENT AS SPECIFIED. IF THIS CONTRACTOR WISHES TO QUOTE ON EQUIVALENT MATERIALS AND EQUIPMENT HE MUST QUOTE ON PRODUCTS APPROVED BY THE ENGINEER, IN WRITING, AS AN EQUIVALENT TO THE PRODUCT SPECIFIED. THIS CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY ADDITIONAL WORK OR MATERIALS REQUIRED BY THE MECHANICAL TRADE OR OTHER CONTRACTORS TO ACCOMMODATE APPROVED EQUIVALENT MATERIALS OR EQUIPMENT. EXTRAS WILL NOT BE APPROVED TO COVER SUCH WORK.

CUTTING AND PATCHING

THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR THIS WORK AND SHALL COORDINATE LOCATIONS FOR ALL HOLES FOR PIPES, DUCTS THROUGH FLOORS AND ROOF ETC., AND PROVIDE SLEEVES REQUIRED TO EXECUTE THE MECHANICAL INSTALLATION. SCAN FLOORS AND STRUCTURAL WALLS BEFORE CUTTING TO LOCATE EXISTING REBAR AND CONDUITS, AND OBTAIN OWNER'S APPROVAL FOR PROPOSED CUTTING. PROVIDE ULC APPROVED FIRESTOPPING SYSTEM FOR ALL PENETRATIONS THROUGH RATED ASSEMBLIES. REPAIR ALL EXISTING WORK DAMAGED BY CUTTING AT NO EXTRA COST TO THE CONTRACT.

IDENTIFICATION

INSTALL SELF ADHESIVE PIPE IDENTIFICATION LABELS TO IDENTIFY FLUID MEDIUM AND DIRECTION ON PIPE EITHER SIDE OF WALLS OR FLOORS, AND SO THAT A LABEL IS CLEARLY VISIBLE FROM ANY LOCATION, INCLUDING IN CEILING SPACES.

USE PAINTED LETTERS TO IDENTIFY DUCTWORK SYSTEMS.

EXCAVATION AND BACKFILLING

CAREFULLY READ THE SECTION OF THE ARCHITECTURAL SPECIFICATIONS COVERING EXCAVATION, TRENCHING AND BACKFILLING.

DO ALL NECESSARY CUTTING AND EXCAVATION INSIDE THE LIMITS OF THE BUILDING AND BACKFILL WITH SAND OR OTHER APPROVED MATERIAL TO A MINIMUM OF 305 mm OVER PIPES OR AS NECESSARY TO PROTECT THE MECHANICAL WORK. BACKFILL THE REMAINDER OF THE EXCAVATION TO MATCH EXISTING, OR AS DESCRIBED IN THE ARCHITECTURAL SPECIFICATIONS OR GEO–TECHNICAL REPORT. ALL EXCAVATION AND BACKFILLING OUTSIDE THE BUILDING SHALL BE CARRIED OUT BY OTHERS.

EXCAVATE BOTTOM OF TRENCHES SO THAT PIPES ARE SUPPORTED ON A SOLID BED OF UNDISTURBED EARTH. DO ALL PUMPING REQUIRED TO KEEP EXCAVATION FREE OF WATER. IF THE TRENCH IS EXCAVATED BEYOND THE PROPER DEPTH, IT SHALL BE FILLED WITH GRAVEL AND COMPACTED TO 95% PROCTOR DENSITY TO BRING THE BOTTOM OF THE TRENCH TO THE PROPER ELEVATION OR AS INDICATED IN THE GEO–TECHNICAL REPORT. NO LOOSE SOIL WILL BE PERMITTED UNDER THE PIPES.

FLASHING

DO ALL FLASHING AND COUNTERFLASHING UNLESS OTHERWISE INDICATED IN THE ARCHITECTURAL SPECIFICATIONS AND DRAWINGS WHERE DUCTS AND OTHER MECHANICAL PARTS ARE PASSING THROUGH WEATHER AND/OR WATERPROOFED WALLS, FLOORS, ROOFS; ALL TO THE SATISFACTION OF THE ENGINEER AND ARCHITECT.

SEISMIC RESTRAINT

PROVIDE SEISMIC RESTRAINT OF MECHANICAL SYSTEMS IN ACCORDANCE WITH SECTION 4.1.8 OF THE ONTARIO BUILDING CODE. SUBMIT RESTRAINT DETAILS IN FORM OF SHOP DRAWINGS, STAMPED AND SIGNED BY A SEISMIC ENGINEER LICENSED IN THE PROVINCE OF ONTARIO. HAVE SAME SEISMIC ENGINEER PROVIDE CONFIRMATION IN WRITING AT COMPLETION OF PROJECT THAT THE MECHANICAL INSTALLATION IS IN GENERAL COMPLIANCE WITH THE SHOP DRAWINGS. INCLUDE ALL COSTS FOR SEISMIC DESIGN, MATERIALS AND SITE REVIEW IN TENDER PRICE.

HOURS OF WORK

ANY AUDIBLE TESTING, CORE DRILLING OR ANY OTHER NOISY WORK TO BE PERFORMED AFTER REGULAR WORKING HOURS. MAKE ARRANGEMENTS WITH BUILDING PERSONNEL TO CONFIRM TIMES FOR SUCH WORK.

SHUT–DOWNS OF SERVICES AND SYSTEMS

CONTRACTOR TO COORDINATE ALL DOWN TIME AND SYSTEM SHUTDOWNS WITH BUILDING OWNER OR USER GROUP PRIOR TO PERFORMING WORK. CONTRACTOR TO VERIFY WITH OWNER BEFORE MAKING ANY CONNECTION TO ANY EXISTING SYSTEMS. THIS WILL ENSURE THAT (1) THE OWNER IS AWARE THAT WORK WILL BE DONE ON A SYSTEM AND (2) THAT THE CONTRACTOR IS WORKING ON A SYSTEM THAT IS FUNCTIONING NORMALLY WHEN HE STARTS HIS WORK.

DEMOLITION

FULL EXTENT OF DEMOLITION MAY NOT BE ILLUSTRATED ON DRAWINGS. DEVICES SHOWN ARE BASED ON VISUAL INSPECTION PERFORMED DURING NORMAL WORKING HOURS, SOME EXISTING DEVICES MIGHT NOT BE SHOWN ON DRAWINGS DUE TO THE PRESENCE OF VARIOUS OBSTRUCTIONS. DISCONNECT AND REMOVE ALL EQUIPMENT LOCATED ON EXISTING CEILINGS AND WALLS TO BE DEMOLISHED. REMOVE ALL SERVICES FOR EQUIPMENT WHICH HAVE BECOME REDUNDANT UNDER THE CONTRACT COMPLETE WITH ALL REDUNDANT WIRING, PIPING, DUCTWORK, AND SYSTEMS. ALL ITEMS REMOVED DURING DEMOLITION AND WHICH ARE NOT TO BE REUSED SHALL BE REMOVED FROM SITE.

CONTRACTOR IS RESPONSIBLE FOR THE RECONNECTION OF ANY SERVICES WHICH ARE TO REMAIN AND WHICH HAVE BEEN DISCONNECTED DURING THE COURSE OF DEMOLITION OR CONSTRUCTION. MAINTAIN SERVICES AND SYSTEMS AT ALL TIMES TO AREAS BEYOND THE CONSTRUCTION AREA. REINSTATE IMMEDIATELY ANY EXISTING SERVICES DISRUPTED DURING DEMOLITION NOT INTENDED TO BE REMOVED AS PART OF THIS CONTRACT. RETAIN CONTINUITY OF SAFETY SYSTEMS TO ALL OCCUPIED AREAS OF THE BUILDING THROUGHOUT CONSTRUCTION PERIOD. WHERE SOME EXISTING MATERIALS OR EQUIPMENT ARE TO BE RETAINED IN PLACE OR RECONNECTED, IDENTIFY AND PROTECT THE MATERIALS OR EQUIPMENT PRIOR TO THE COMMENCEMENT OF DEMOLITION. MAINTAIN ADEQUATE STRUCTURAL SUPPORT FOR EQUIPMENT AND MATERIAL DURING DEMOLITION PROCESS.

WHERE EXISTING MATERIALS ARE TO BE RE–USED, THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR REMOVAL, STORAGE, CLEANING AND REINSTALLATION.

TURN OVER TO THE OWNER IN CLEAN AND SOUND CONDITION ANY REDUNDANT EXISTING MATERIAL OR EQUIPMENT DESIGNATED BY THE OWNER OR SPECIFIED ON DRAWINGS.

CHANGES IN THE WORK

- .1 CHANGES IN THE WORK MAY BE REQUESTED FROM TIME TO TIME BY THE ISSUANCE OF A CONTEMPLATED CHANGE NOTICE (CCN) AND/OR PROPOSED CHANGE (PC). REFER TO GENERAL CONDITIONS OF THE CONTRACT OR THE FRONT END SPECIFICATIONS FOR REQUIREMENTS ON HOW TO QUOTE CHANGES IN THE WORK. THOSE REQUIREMENTS TAKE PRECEDENCE OVER THE REQUIREMENTS FOLLOWING IN THIS SECTION.
- .2 SHOULD THE BID FORM, GENERAL CONDITIONS OF THE CONTRACT OR FRONT END SPECIFICATIONS NOT ADDRESS HOW TO QUOTE CHANGES IN THE WORK, THE REQUIREMENTS FOLLOWING IN THIS SECTION SHALL APPLY.
- .3 PROVIDE DETAILED BREAKDOWNS OF MATERIAL AND LABOUR WITH UNIT PRICES AND EXTENSIONS REQUIRED FOR REVIEW OF CONTEMPLATED CHANGE NOTICES (CCN'S) OR PROPOSED CHANGES (PC'S).
- .4 IN ADDITION TO THE NET COST OF THE CHANGE, THE CONTRACTOR SHALL BE ENTITLED TO A 15% FEE TO COVER OVERHEADS AND PROFIT ON THEIR WORK AND A 10% FEE TO COVER OVERHEADS AND PROFIT ON SUB–TRADES.
- .5 PLUMBING AND PIPING LABOUR SHALL BE EVALUATED USING "MCAA" LABOUR UNITS. SHEET METAL FIELD LABOUR SHALL BE EVALUATED USING "SMACNA" LABOUR UNITS. JOB FACTORS SHALL NOT BE CONSIDERED APPLICABLE UNLESS CONSTRUCTION WORK IS BEING DONE IN OCCUPIED AREAS OF THE BUILDING.
- .6 THE OVERHEAD PERCENTAGE AND USE OF MCAA AND SMACNA LABOUR UNITS INDICATED ABOVE INCLUDES THE FOLLOWING:
  - .1 INSURANCE
  - .2 BONDING
  - .3 FINANCING AND INTEREST
  - .4 COORDINATION WITH OTHER TRADES
  - .5 SALARIES OF ANY STAFF ABOVE THAT OF THE WORKING FOREMEN EMPLOYED DIRECTLY ON THE WORK.
  - .6 LICENSES AND PERMITS
  - .7 ONSITE TIMEKEEPING AND SCHEDULING
  - .8 REST PERIODS
  - .9 CLEANUP BEYOND MCAA RECOMMENDED PRACTICE
  - .10 MATERIAL HANDLING
  - .11 PERSONAL HYGIENE
  - .12 SAFETY TRAINING
  - .13 JOB SITE SAFETY TALKS
  - .14 WHMIS INFORMATION
  - .15 HEALTH AND SAFETY COMMITTEE
  - .16 ESCALATING SITE AND SAFETY PROCEDURES
  - .17 GARBAGE BINS
  - .18 SHIPPING AND DELIVERIES
  - .19 PROJECT MANAGEMENT
  - .20 ESTIMATING
  - .21 SPECIAL CLEANING
  - .22 SPECIAL HANDLING/STORAGE
  - .23 EQUIPMENT RENTALS FOR SMALL TOOLS
  - .24 EQUIPMENT START–UP
  - .25 ANY OTHER NON–PRODUCTIVE TIME
  - .26 COVID–19 MEASURES
- .7 A SINGLE BLENDED LABOUR RATE BASED ON A CREW OF 1 WORKING FOREMAN AND 4 JOURNEYMEN SHALL BE USED FOR NORMAL WORKING HOURS FOR THE DURATION OF THE PROJECT AND SHALL INCLUDE THE FOLLOWING:
  - .1 BASE RATE, VACATION PAY, AND STATUARY HOLIDAYS AS PER THE CURRENT COLLECTIVE AGREEMENT FOR UNIONIZED CONTRACTORS.
  - .2 UNION DEDUCTIONS FOR BENEFITS (HEALTH AND WELFARE), PENSION, UNION DUES, PROVINCIAL TRAINING FOR EMPLOYEE AND EMPLOYER, LOCAL TRAINING, INDUSTRY FUND, AND STABILIZATION FUND.
  - .3 LEGISLATED PAYROLL BURDENS FOR:
    - .1 CANADA PENSION PLAN
    - .2 EMPLOYMENT INSURANCE
    - .3 WORKPLACE SAFETY AND INSURANCE BOARD
    - .4 EMPLOYER HEALTH TAX
    - .5 HST ON INSURANCE PREMIUMS
    - .6 INSURANCE (PL AND PD)
  - .4 MCAO GUIDELINES ADDERS FOR:
    - .1 SMALL TOOLS
    - .2 SITE FACILITIES
    - .3 PERSONAL PROTECTION EQUIPMENT
    - .4 PARKING AS PER COLLECTIVE AGREEMENT
    - .5 CLEAN–UP AS PER OCA RECOMMENDED PRACTICE
- .8 FOR PREMIUM NIGHT SHIFT (MINIMUM THREE (3) CONSECUTIVE NIGHT SHIFTS), USE THE NORMAL RATE CALCULATION WITH A 20% ADDER TO BASE RATE, VACATION PAY, PENSION, AND HEALTH BENEFITS.
- .9 FOR OVERTIME, USE THE NORMAL RATE CALCULATION WITH A 100% ADDER TO BASE RATE, VACATION PAY, PENSION, AND HEALTH AND WELFARE BENEFITS.
- .10 PLUMBING AND PIPING MATERIAL SHALL BE BASED ON "ALL–PRICER" LIST PRICING WITH A 30% DISCOUNT APPLIED. SHEET METAL MATERIAL SHALL BE BASED ON CURRENT MARKET PRICING. SUBMIT SUPPLIER INVOICES FOR ALL MATERIALS NOT INCLUDED IN "ALL–PRICER".
- .11 THE FOLLOWING JOB EXPENSES SHALL BE CONSIDERED TO BE ACCEPTABLE:
  - .1 BONDING COSTS
  - .2 WARRANTY COSTS SHALL BE BASED ON 2% OF THE MATERIAL AND LABOUR COST FOR THE CHANGE.
  - .3 DRAFTING COSTS SHALL BE CONSIDERED BASED ON 2% OF THE LABOUR COST FOR THE CHANGE.
  - .4 HOISTING SHALL BE CHARGED BASED ON THE CURRENT CRANING COSTS.
  - .5 EQUIPMENT RENTALS FOR LARGE EQUIPMENT.
  - .6 CORE DRILLING.
  - .7 TRAVEL IN ACCORDANCE WITH THE APPLICABLE UNION AGREEMENT.
  - .8 SHEET METAL DELIVERIES SHALL BE CHARGED PER THE ONTARIO SHEET METAL ASSOCIATION.
- .12 THE MECHANICAL CONTRACTOR SHALL SUBMIT A TEMPLATE PROPOSED TO BE USED FOR ANY CCN'S/PC'S AS A FORMAL SHOP DRAWING SUBMISSION FOR REVIEW AND ACCEPTANCE PRIOR TO ANY CCN'S/PC'S BEING ISSUED.

GENERAL REVIEW DECLARATION

PRIOR TO TIME OF OCCUPANCY PERMIT APPLICATION, THE FOLLOWING WORK SHALL BE COMPLETE:

1. DOMESTIC HOT AND COLD WATER TO PLUMBING FIXTURES
2. ABOVEGROUND AND UNDERGROUND PLUMBING DRAINAGE.
3. FIRE PROTECTION WORK (SPRINKLERS).
4. FIRE EXTINGUISHERS.
5. HVAC SYSTEMS.
6. AIR SYSTEM BALANCING.
7. SEISMIC RESTRAINT SYSTEMS

PRIOR TO TIME OF OCCUPANCY PERMIT APPLICATION, SUBMIT THE FOLLOWING ITEMS FOR REVIEW:

1. MUNICIPAL PLUMBING INSPECTION REPORT.
2. FIRE PROTECTION (SPRINKLERS) LETTER FROM PROFESSIONAL ENGINEER LICENSED IN ONTARIO, INDICATING CONFORMANCE WITH THE OBC/NFPA OR APPLICABLE STANDARDS REFERENCED IN THE SPECIFICATIONS.
3. NEW HVAC SYSTEMS STARTUP REPORTS.
4. COMPLETE BALANCING REPORT WITH NO OUTSTANDING ISSUES.
5. LETTERS FROM ALL RESPECTIVE MECHANICAL SUB–TRADES INDICATING SYSTEMS HAVE BEEN SEISMICALLY RESTRAINED IN ACCORDANCE WITH THE OBC. LETTERS SHALL BE AUTHORED, SIGNED, AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.

SUBMISSIONS SHALL BE COMPLETE WITH TRANSMITTALS OR COVER LETTERS SIGNED BY AN APPROPRIATE SKILLED TRADE. THE SIGNATORY SHALL BE REGISTERED WITH SKILLED TRADES ONTARIO.

THE PROJECT MUST BE SUBSTANTIALLY COMPLETE AND READY FOR ITS INTENDED USE. START UP, BALANCE AND COMMISSION ALL SYSTEMS. ENSURE SYSTEMS HAVE BEEN INSTALLED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, MANUFACTURER'S RECOMMENDATIONS, AND INDUSTRY STANDARDS AS THE CASE MAY BE.

PLUMBING AND FIRE PROTECTION

PIPE AND PIPE FITTINGS

SANITARY DRAINAGE, STORM AND VENT PIPING ABOVE GRADE SHALL BE "DWV" COPPER WITH 50:50 TIN LEAD SOLDER JOINTS, OR DWV CAST IRON WITH MJ TYPE JOINTS. PROVIDE THRUST RESTRAINTS AT ALL ABOVE GRADE STORM WATER PIPING JOINTS, EQUAL TO HOLDRITE.

SANITARY DRAINAGE, STORM, AND VENT PIPING BELOW GRADE SHALL BE PVC DWV PIPE WITH SOLVENT WELDED JOINTS, OR DWV CAST IRON WITH MJ TYPE JOINTS.

DOMESTIC WATER AND CONDENSATE PIPING ABOVE GRADE SHALL BE TYPE M COPPER WITH WROUGHT OR CAST COPPER OR BRASS FITTINGS, AND 95:5 SOLDER JOINTS.

DOMESTIC WATER PIPE BELOW GRADE SHALL BE TYPE K SOFT COPPER WITH 95:5 SOLDER JOINTS UP TO 50 mm ø. OVER 50 mm ø PIPE SHALL BE CEMENT LINED DUCTILE IRON WITH BELL AND SPIGOT JOINTS.

NATURAL GAS PIPE SHALL BE SCHEDULE 40 BLACK STEEL WITH SCREWED JOINTS IN EXPOSED LOCATIONS, AND WELDED IN CONCEALED LOCATIONS. ALL PIPING 64 mm ø AND LARGER SHALL BE WELDED.

FIRE PROTECTION PIPING UP TO NPS 2 SHALL BE SCHEDULE 40 BLACK STEEL TO ASTM A53 WITH THREADED JOINTS. NPS 2–1/2 TO NPS 6 SHALL BE SCHEDULE 40 BLACK STEEL TO ASTM A53 WITH FLANGED JOINTS OR WITH MECHANICAL GROOVED COUPLINGS, OR SCHEDULE 10 TO ASTM A53 WITH WELDED JOINTS OR ROLL GROOVED COUPLINGS.

WHEREVER DISSIMILAR METALS ARE JOINED OR SUPPORTED, THE PIPING SHALL HAVE NON–CONDUCTING TYPE CONNECTIONS OR HANGERS TO PREVENT GALVANIC CORROSION.

PROVIDE VACUUM BREAKERS OR BACKFLOW PREVENTERS ON LINES SERVING EQUIPMENT OR FIXTURES WHERE CONTAMINATION OF DOMESTIC WATER CAN OCCUR, IN ACCORDANCE WITH CSA B64.

PROVIDE ALL VALVES AS SHOWN ON THE DRAWINGS OR REQUIRED BY AUTHORITIES HAVING JURISDICTION.

PROVIDE ALL VENTING IN ACCORDANCE WITH LATEST ONTARIO BUILDING CODE.

PAINT ALL GAS LINES WHETHER EXPOSED OR CONCEALED WITH A MINIMUM OF TWO FULL COATS TO GIVE COMPLETE COVERAGE. COLOUR SHALL BE YELLOW EXCEPT WHERE EXPOSED ON EXTERIOR WALLS WHERE THE COLOUR SHALL MATCH THE WALL COLOUR.

PIPE INSULATION

DOMESTIC COLD WATER AND CONDENSATE PIPING: FIBREGLASS INSULATION WITH FACTORY APPLIED VAPOUR BARRIER JACKET, MOULDED TO CONFORM TO PIPING, "K" VALUE AT 24 °C SHALL BE 0.26 W/m °C MAXIMUM.

DOMESTIC HOT WATER PIPING: FINE FIBROUS GLASS INSULATION WITH FACTORY APPLIED GENERAL PURPOSE JACKET, MOULDED TO CONFORM TO PIPING, "K" VALUE AT 24 °C SHALL BE 0.26 W/m °C MAXIMUM.

VAPOUR BARRIERS AND INSULATION TO BE COMPLETE OVER FULL LENGTH OF PIPE, WITHOUT PENETRATION FOR HANGERS, AND WITHOUT INTERRUPTION AT SLEEVES AND PIPE FITTINGS. PROVIDE FOR ALL PIPE INSULATION WITH A VAPOUR BARRIER CRUSH RESISTANT MANUFACTURED INSULATED CLAMPS EQUAL TO CRUSH–A–THERM TO SUPPORT PIPING WITHOUT PENETRATING THE VAPOUR BARRIER. INSULATED CLAMP SHALL BE SEALED TO THE ADJACENT INSULATION SYSTEM TO MAINTAIN THE CONTINUITY OF THE VAPOUR BARRIER.

PIPING	PIPE DIAMETER (mm)	INSULATION THICKNESS (mm)
DOMESTIC COLD WATER	ALL SIZES	12
DOMESTIC HOT WATER & CIRCULATION	ALL SIZES UP TO 51	25
	OVER 51	40
CONDENSATE	ALL SIZES	12
HORIZONTAL STORM DRAINAGE AND THE FIRST 1.5M OF VERTICAL STACK OF THE RAINWATER LEADER	ALL SIZES	25

ALL EXPOSED INSULATION TO BE COVERED IN A CANVAS JACKET. CANVAS JACKET SHALL BE ULC LISTED PLAIN WEAVE COTTON FABRIC AT 0.75 OZ./SQ.FT.

INSULATION ASSEMBLIES SHALL COMPLY WITH ONTARIO BUILDING REGULATIONS WITH FLAME SPREAD AND SMOKE DEVELOPED RATINGS NOT EXCEEDING 25 AND 50 RESPECTIVELY.

WORK SHALL BE PERFORMED BY AN INSULATION JOURNEYPERSON AND A RATIO OF SUPERVISED APPRENTICES IN ACCORDANCE WITH SKILLED TRADES ONTARIO.

ACCEPTABLE INSULATION CONTRACTORS: THERMEC INSULATION SERVICES LTD., ALPINE INSULATION LTD., B.L. THERMAL INSULATION INC, ST. LAWRENCE INSULATION CO LTD.

ROOF DRAINS

CAST IRON WITH VANDAL PROOF SECURED CAST ALUMINUM OR CAST IRON DOME, UNDERDECK CLAMP, FLASHING CLAMP RING WITH INTEGRAL GRAVEL STOP, ADJUSTABLE EXTENSION AND BEARING PAN, SUMP RECEIVER FLANGE, COMPLETE WITH SINGLE SLOT CONTROL FLOW WEIR EQUAL TO WATTS ACCUTROL, FLOWING 5 GPM PER INCH OF HEAD. ACCEPTABLE MATERIAL: WATTS RD–100, ZURN Z–105–5CEA, ANCON RD–100BEDK, ENPOCO RD10DEPW, SMITH 1085.

COMPRESSED AIR PIPING

SHALL BE SEAMLESS BLACK STEEL, SCHEDULE 40 TO ASTM A53 CLASS 150 WITH REGISTERED FITTINGS TO ANSI/ASME B16.11. COUPLINGS SHALL BE SOCKET WELDED OR THREADED HALF COUPLING TYPE TO ANSI/ASME B16.11. UNIONS SHALL BE MALLEABLE IRON WITH BRASS TO IRON GROUND SEAT. INSTALL AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.

TRENCH DRAIN (TD–1)

SHALL BE MODULAR, PRECAST POLYMER CONCRETE DRAINAGE SYSTEM WITH BUILT IN SLOPE, 100MM WIDE, REMOVABLE LOAD CLASS E DUCTILE IRON GRATE WITH ANCHOR FRAME AND OUTLET SECTIONS/CATCH BASINS. PROVIDE DRAIN SECTIONS AND SLOPES AS REQUIRED TO SUIT THE LAYOUT AND PIPE CONNECTIONS INDICATED ON THE DRAWINGS. ACCEPTABLE MATERIALS: ABT POLYDRAIN, SMITH ACO.

CLEANOUTS

PROVIDE AND SET CLEANOUTS AT ALL POINTS REQUIRED BY THE CODE AND WHERE INDICATED ON THE DRAWINGS. ALL CLEANOUTS SHALL BE MADE ACCESSIBLE BY EXTENDING BRANCH CONNECTIONS TO FINISHED SURFACES AND FITTING THEM WITH A SUITABLE ACCESS COVER IN KEEPING WITH THE FINISH OF THE WALL OR FLOOR WHERE INSTALLED.

FLOOR AND WALL PLATES

PROVIDE CHROMIUM PLATED SOLID BRASS, PLATES WITH SET SCREWS WHERE ALL PIPES PASS THROUGH THE FINISHED FLOORS WALLS AND CEILINGS.

HANGERS

SUPPORT ALL PIPING WITH APPROVED ADJUSTABLE CADMIUM OR GALVANIZED STEEL HANGERS, ARRANGED TO SUIT EXPANSION AND CONTRACTION. SUPPORT COPPER PIPING USING INSULATING TAPE BETWEEN COPPER PIPE AND FERROUS HANGERS. USE PROTECTION SADDLE OR SHIELD WITH OVERSIZED HANGERS FOR COLD INSULATED PIPE TO PREVENT PENETRATION OF THE INSULATION VAPOUR BARRIER. SUPPORT SPACING SHALL BE IN ACCORDANCE WITH APPLICABLE STANDARDS.

FIRE PROTECTION

PROVIDE PORTABLE FIRE EXTINGUISHERS OF THE TYPE SHOWN ON THE DRAWINGS.

FE–1: SHALL BE 10 LB MULTIPURPOSE DRY CHEMICAL EXTINGUISHER EQUAL TO BADGER MODEL ADV–10, RATED 4A:60–B:C, COMPLETE WITH HEAVY DUTY WALL MOUNTING BRACKET.

MODIFY EXISTING SPRINKLER SYSTEM AND PROVIDE NEW ZONES AS SHOWN ON DRAWING TO ORDINARY HAZARD GROUP 2 AS PER NFPA–13. NEW SPRINKLER HEADS SHALL BE SAME BRAND AND STYLE AS EXISTING UNLESS STATED OTHERWISE ON THE DRAWINGS. PROVIDE AIR COMPRESSOR FOR NEW DRY ZONE SPRINKLER SYSTEM.

IT IS THE RESPONSIBILITY OF THE FIRE PROTECTION CONTRACTOR TO OBTAIN AND REVIEW ALL ARCHITECTURAL DRAWINGS OF THE BUILDING PRIOR TO SUBMITTING HIS BID AS WELL AS REVIEW THE SITE CONDITIONS AND EXISTING SYSTEM INSTALLATION, AND TO IDENTIFY AND ALLOW FOR ALL SPRINKLER SYSTEM REQUIREMENTS TO PROVIDE A FULL FIRE PROTECTION SYSTEM AS PER NFPA.

SPRINKLERS ARE TO BE HYDRAULICALLY DESIGNED FOR THE COVERAGE AND OCCUPANCY AS INDICATED, WITH STANDARD COVERAGE SPRINKLER HEADS. CARRY OUT FLOW TEST OF WATER MAIN AND SUBMIT RESULTS FOR CONSULTANT'S REVIEW PRIOR TO SUBMITTING HYDRAULIC CALCULATIONS.

DRAWINGS AND HYDRAULIC CALCULATIONS SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO. SUBMIT SHOP DRAWINGS AND TECHNICAL INFORMATION FOR THE REVIEW BY THE CONSULTANT.

THE ENGINEER PROVIDING THE CERTIFIED DESIGN FOR THE SPRINKLER LAYOUT DRAWINGS AND CALCULATIONS SHALL VISIT THE SITE, AS REQUIRED, TO PROVIDE A LETTER AT THE END OF CONSTRUCTION, INDICATING THE INSTALLATION IS IN ACCORDANCE WITH THE CERTIFIED SHOP DRAWING SUBMISSION AND ONTARIO BUILDING CODE. THE LETTER SHALL BE STAMPED AND SIGNED WITH THE PROFESSIONAL ENGINEER'S SEAL, LICENSED IN THE PROVINCE OF ONTARIO.

DRAIN AND REFILL SPRINKLER SYSTEM AS REQUIRED.

COORDINATE SHUTDOWN AND START–UP OF FIRE ALARM SYSTEM WITH ELECTRICAL CONTRACTOR AS REQUIRED.

PROVIDE FIRE WATCH AS REQUIRED.

THE PAPER COPY OF THE DRAWINGS ISSUED FOR BUILDING PERMIT AND/OR TENDER WILL TAKE PRECEDENCE OVER ELECTRONIC COPIES.

REVISION No.	DESCRIPTION	DATE
3.	ISSUED FOR TENDER	JUN 3/25
2.	ISSUED FOR BUILDING PERMIT	APR 21/25
1.	ISSUED FOR 66% REVIEW	MAR 28/25

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PROJECT:
MERCEDEZ–BENZ
STAR MOTORS OF OTTAWA
400 WEST HUNT CLUB RD,
OTTAWA, ONTARIO

DRAWING:
MECAHNICAL:
SPECIFICATIONS

DATE: MARCH 2025
DESIGNED BY: J.W.S.
DRAWN BY: J.W.S.
CHECKED BY: S.C.
SCALE: AS NOTED

No. DWGS. 9
PROJECT No. 24094
DRAWING No. M–6

VENTILATION AND AIR CONDITIONING

DUCTWORK

DUCTWORK SHALL BE OF GALVANIZED STEEL AND SHALL BE LOCK FORMING QUALITY. ALL DUCTWORK SHALL BE CONSTRUCTED, BRACED, CONNECTED AND JOINTED AS RECOMMENDED IN THE LATEST ISSUE OF THE DUCT CONSTRUCTION STANDARDS ISSUED BY THE SHEET METAL NATIONAL ASSOCIATION INC. (SMACNA). ALL DUCTWORK SHALL BE INSTALLED TO CONFORM TO THE ONTARIO BUILDING CODE, NFPA 90A AND 91 AND IN ACCORDANCE WITH OTHER APPLICABLE CODES.

DUCTWORK GAUGES, REINFORCING AND SEALING TECHNIQUES SHALL BE IN ACCORDANCE WITH LATEST EDITION OF SMACNA, FOR THE FOLLOWING CLASSIFICATION.

SYSTEM	PRESSURE CLASS	SEAL CLASS
EXHAUST	–250 Pa	C
RETURN AIR	–250 Pa	C
CONSTANT VOLUME SUPPLY	+500 Pa	C

JOINTS SHALL BE PITTSBURGH SEAM, LONGITUDINALLY, DRIVE SLIP (450 mm AND UNDER) AND BAR SLIP (ABOVE 450 mm) TRANSVERSELY, AND SHALL BE AIR TIGHT.

RECTANGULAR DUCTWORK IN EXPOSED OR CONCEALED AREAS, INSULATED OR NON–INSULATED, SHALL BE SUPPORTED ON BLACK ROLLED STEEL ANGLES WITH BLACK STEEL THREADED RODS.

ROUND DUCTWORK UP TO 1270MM (50") DIAMETER IN EXPOSED OR CONCEALED AREAS, INSULATED OR NON–INSULATED, SHALL BE SUPPORTED WITH GALVANIZED STEEL STRAPS WITH BLACK STEEL THREADED RODS, EQUAL TO DUCTMATE ROUND DUCT STRAP BRACKET. A GALVANIZED STEEL SUSPENSION RING BAND WITH A THREADED SUPPORT ROD IS ACCEPTABLE UP TO 300MM (12") DIAMETER DUCTWORK, EQUAL TO DUCTMATE ROUND DUCT HANGER. FOR DUCTWORK LARGER THAN 1270MM (50") DIAMETER, SUBMIT SMACNA SUPPORT DETAIL FOR REVIEW.

TURNS IN DUCTWORK SHALL HAVE CENTRE LINE RADIUS NOT LESS THAN 1–1/4 TIMES DUCT WIDTH, OR SHALL HAVE MITRE BENDS WITH HOLLOW TURNING VANES.

RIGID ROUND DUCTWORK SHALL BE SPIRAL GALVANIZED STEEL CONSTRUCTION WITH SLIP JOINT, MADE AIR TIGHT USING HIGH PRESSURE SEALANT AND REINFORCING TAPE.

FLEXIBLE ROUND DUCTWORK SHALL BE CORRUGATED ALUMINIUM CONSTRUCTION, .170 mm THICK, TO CAN/ULC–S110, CLASS 1. WHERE DUCTING IS SPECIFIED TO BE INSULATED, PROVIDE FLEXIBLE DUCT COMPLETE WITH 25 mm THICK FIBREGLASS BLANKET INSULATION AND PLASTIC VAPOUR BARRIER. MAXIMUM LENGTH NOT TO EXCEED 3 m.

DIFFUSER TAKEOFFS SHALL BE CONICAL COMPLETE WITH BUTTERFLY DAMPERS. VAV BOX TAKEOFFS FROM DUCT MAIN SHALL BE CONICAL, WITH RIGID DUCTWORK TO THE VAV BOX. SPIN–ONS SHALL NOT BE USED AT ANY LOCATION. SHOULD HEIGHT OF DUCT BE INSUFFICIENT TO ACCOMMODATE A CONICAL TAKE–OFF FITTING, PROVIDE RECTANGULAR SIDE TAKE–OFF FITTING WITH 45 DEGREE TAPERED ENTRY WITH TRANSITION TO CIRCULAR DUCT.

BALANCING DAMPERS SHALL BE SINGLE BLADE, GALVANIZED STEEL CONSTRUCTION WITH INDICATING TYPE LOCKING REGULATOR ON 50mm STAND OFF BRACKET. FOR DUCTWORK DEEPER THAN 300mm CLEAR, BALANCING DAMPERS SHALL BE MULTIBLADE TYPE COMPLETE WITH CHANNEL FRAME, LINKAGES, AND SHAFT EXTENSION WITH HANDLE FOR MANUAL ADJUSTMENT.

FLEXIBLE CONNECTIONS

SHALL BE EQUAL TO DURO–DYNE METAL FAB WITH DUROLON FABRIC, 75 mm WIDE HEAVY WEIGHT COATED FIBREGLASS FABRIC SECURELY FASTENED TO DUCTWORK AND EQUIPMENT BY GALVANIZED STEEL CONNECTORS. FLEXIBLE CONNECTION SHALL BE AIR–TIGHT AND SUITED FOR OPERATION UP TO 120 °C.

DIFFUSERS

SIZES INDICATED ON THE DRAWINGS ARE NOMINAL. PROVIDE CORRECT STANDARD PRODUCT NEAREST TO NOMINAL FOR CAPACITY THROW, NOISE LEVEL, THROAT AND OUTLET VELOCITY. CONTRACTOR SHALL BE RESPONSIBLE TO CONFIRM THE EXACT DIFFUSER MODULE DIMENSION FOR COMPATIBILITY WITH THE EXISTING OR NEW SUSPENDED CEILING GRID SYSTEM PRIOR TO SUBMITTING SHOP DRAWINGS. PERFORM NECESSARY MEASUREMENTS ON SITE FOR EXISTING CEILING INSTALLATIONS AND COORDINATE WITH ARCHITECTURAL TRADES AND CEILING SYSTEM SHOP DRAWINGS FOR NEW CEILING CONSTRUCTIONS

STEEL SHALL BE PRIME COATED STAMPED OR COLD ROLLED STEEL WITH EXPOSED JOINTS WELDED AND GROUND FLUSH AND COMPLETELY CLOSED. ALUMINUM SHALL BE EXTRUDED WITH MECHANICAL FASTENERS AND COMPLETELY CLOSED CORNERS. PROVIDE PLASTER FRAMES AS PLASTER STOPS WHERE SET INTO PLASTER OR GYPSUM BOARD. PROVIDE CONCEALED FASTENERS AND OPERATORS. UNLESS STATED OTHERWISE, COLOUR SHALL BE OFF–WHITE. LINEAR DIFFUSERS SHALL INCLUDE FULLY ACOUSTICALLY INSULATED PLENUMS, EVEN IF NOT SPECIFICALLY LISTED IN THE GRILLES AND DIFFUSER SCHEDULES.

ACCEPTABLE MATERIALS: E. H. PRICE, NAILOR INDUSTRIES, KRUEGER, TITUS, METAL–AIRE.

ROOF EXHAUST FANS

SHALL BE CENTRIFUGAL FAN UNITS, V–BELT DRIVEN WITH SPUN ALUMINIUM HOUSING, COMPLETE WITH RESILIENT MOUNTED MOTOR AND FAN, 12 X 12 mm MESH (2 mm ø) ALUMINIUM BIRDSCREEN, WATERPROOF DISCONNECT SWITCH WITHIN FAN HOUSING, CONTINUOUS SPONGE RUBBER CURB GASKETS, STAINLESS STEEL SECURING BOLTS AND SCREWS AND INSULATED ROOF CURB (MINIMUM 600 mm HIGH). HINGED CURB PLATES FOR ACCESS TO INTERNALS FOR FAN, BELT AND GREASING SERVICE, AND BACKDRAFT DAMPER. FANS SHALL BE AMCA LISTED AND LABELLED, AND CSA APPROVED.

DUCT INSULATION

ALL COVERING SHALL BE APPLIED IN A WORKMANLIKE MANNER TO PRESENT A NEAT AND CLEAN APPEARANCE AT COMPLETION OF THE WORK TO THE APPROVAL OF THE ENGINEER AND OWNER. INSULATION ASSEMBLIES SHALL COMPLY WITH ONTARIO BUILDING REGULATIONS WITH FLAME SPREAD AND SMOKE DEVELOPED RATINGS NOT EXCEEDING 25 AND 50 RESPECTIVELY. UTILIZE PINS ON RECTANGULAR DUCTWORK & WIRE ON ROUND DUCTWORK TO SECURE THERMAL INSULATION.

APPLY 25 mm THICK ACOUSTIC INSULATION ON DUCTWORK WHERE SHOWN ON THE DRAWINGS UNLESS NOTED OTHERWISE. ACOUSTIC INSULATION TO BE 25 mm THICK HIGH DENSITY FLEXIBLE FIBREGLASS DUCT LINER, WITH NEOPRENE COATING, EQUAL TO CERTAIN TEED 200, FLAME SPREAD RATING OF 25 OR LESS, FASTENED TO INTERIOR SHEET METAL SURFACES WITH 100% COVERAGE OF AN APPROVED FIRE RESISTANT BONDING ADHESIVE AND METAL PINS AND WASHERS, SPACED ON NOT MORE THAN 300 mm CENTRES. SEAL EDGES, PIN PENETRATIONS AND JOINTS WITH AN APPROVED FIRE RESISTANT MASTIC. PROTECT LEADING EDGES WITH SHEET METAL EDGING. ALL DUCT SIZES SHOWN ON THE DRAWINGS ARE FREE AREA SIZES AND DO NOT INCLUDE FOR ACOUSTIC INSULATION, THEREFORE, THE CONTRACTOR SHALL MAKE PROPER ALLOWANCE FOR INCREASING THE DUCT SIZE TO ACCOMMODATE ACOUSTIC INSULATION WHERE INDICATED.

INSULATE EXHAUST DUCTS AND PLENUMS STARTING 1.5m UPSTREAM OF EXHAUST DAMPER AND CARRY THE INSULATION TO THE EXTERIOR WALL LOUVER. IN THE ABSENCE OF A DUCT MOUNTED DAMPER, WHERE APPLICABLE, CARRY THE INSULATION FROM THE LOUVER TO THE AIR HANDLING UNIT DAMPER. IN THE ABSENCE OF ANY DAMPER, THE INSULATION SHALL EXTEND A MINIMUM OF 1.5m FROM THE OUTDOOR LOUVER. FIBERGLASS INSULATION SHALL BE 50mm WITH FACTORY APPLIED VAPOR BARRIER.

ALL DUCTWORK CARRYING UNHEATED OUTSIDE AIR SHALL BE INSULATED WITH 50 mm THICK RIGID 4.5# DENSITY INSULATION WITH FACTORY APPLIED ALUMINIUM FOIL VAPOUR BARRIER.

APPLY 25 mm THICK FLEXIBLE FIBROUS GLASS INSULATION WITH FACTORY APPLIED REINFORCED ALUMINIUM FOIL VAPOUR BARRIER ON SUPPLY AIR DUCTWORK IN ALL AREAS UP TO THE DIFFUSERS, EXCEPT WHERE INTERNAL ACOUSTIC INSULATION IS PROVIDED, THERMAL SHALL BE ADDED TO MAKE UP THE DIFFERENCE.

ALL EXPOSED INSULATION TO BE RIGID AND COVERED IN A CANVAS JACKET. CANVAS JACKET SHALL BE ULC LISTED PLAIN WEAVE COTTON FABRIC AT 0.75 OZ./SQ.FT.

WORK SHALL BE PERFORMED BY AN INSULATION JOURNEYPERSON AND A RATIO OF SUPERVISED APPRENTICES IN ACCORDANCE WITH SKILLED TRADES ONTARIO.

ACCEPTABLE INSULATION CONTRACTORS: THERMEC INSULATION SERVICES LTD., ALPINE INSULATION LTD., B.L. THERMAL INSULATION INC, ST. LAWRENCE INSULATION CO LTD.

CO/NO_2 HAZARDOUS GAS DETECTION SYSTEM

PROVIDE COMPLETE GAS DETECTION SYSTEM FOR THE DRIVE THROUGH AREA.

SYSTEM SHALL PROVIDE CONTINUOUS MONITORING OF CARBON MONOXIDE (CO) AND NITROGEN DIOXIDE (NO_2) LEVELS IN PARTS PER MILLION (PPM). A SIGNAL FROM GAS DETECTION UNIT SHALL BE USED TO OPEN THE EXHAUST FAN DAMPER AND OUTDOOR AIR INTAKE DAMPER. EXHAUST FAN SHALL BE STARTED THROUGH END SWITCH ON DAMPER, AND ASSOCIATED WIRING BY ELECTRICAL CONTRACTOR.

ALL SENSORS SHALL BE FACTORY CALIBRATED BEFORE ON–SITE INSTALLATION. PROVIDE ALL WIRING AS REQUIRED BETWEEN THE CONTROLLER AND THE SENSORS, TO BE INSTALLED WITHIN CONDUITS.

MANUFACTURER'S TECHNICIAN SHALL BE ON SITE DURING SYSTEM STARTUP. SYSTEM SHALL BE SUITABLE FOR OPERATION AT TEMPERATURE OF –10°C TO +40°C AND RELATIVE HUMIDITY TO 100%. LOCATE SENSOR AS SHOWN ON DRAWINGS.

UNIT CONTROL PANEL TO INCLUDE THE FOLLOWING FEATURES:
.1 LED INDICATION FOR POWER, CHANNEL, LOW ALARM, HIGH ALARM, AND SENSOR FAIL. BUILT–IN TEST TO MONITOR SENSOR INPUTS CONTINUOUSLY.
.2 CONTROL PANEL TO BE FIELD CONFIGURABLE FOR SENSOR TYPE INPUT, COMMON OR INDEPENDENT RELAY OPERATION. TIME DELAYS FOR MAKE OR BRAKE, AND AUDIBLE DISABLE THROUGH DIPS SWITCHES INSIDE PANEL.
.3 CONTROL PANEL ENCLOSURE TO BE A NEMA 4 RATING AND ACCEPT EITHER A SOLID STATE SENSOR INPUT OR 4 TO 20 MA INPUT.
.4 TWO DPDT 5A RELAYS WITH 5, 10, OR 15 MIN DELAYS ON MAKE ON 10, 15, OR 25 MIN DELAYS ON BREAK TO PROVED OUTPUT SIGNAL TO EXHAUST FAN. ON START–UP OF EXHAUST FAN THERE SHALL BE A 5 MIN DELAY.
.5 CALIBRATION OF SETPOINTS TO BE DIGITALLY STORED TO EEPROM THROUGH DIP SWITCH SELECTION.
.6 HORN AND STROBE LIGHT TO SUIT THE SEQUENCE OF OPERATION. IF EXTERNALLY MOUNTED, PROVIDED INTERLOCKING WIRING AS REQUIRED.

ELECTROCHEMICAL SENSOR SHALL CARRY A ONE YEAR MANUFACTURER'S WARRANTY.

PROVIDE 120V/24V TRANSFORMER AS REQUIRED FOR SYSTEM OPERATION. WIRING FROM CONTROL PANEL AND SENSORS AND TO OTHER CONTROL DEVICES SHALL BE 24V, TO BE INSTALLED IN CONDUITS.

SEQUENCE OF OPERATION:
.1 LOW LEVEL ALARM CONDITION TO ACTIVATE EXHAUST SYSTEM AT 25 PPM CO AND/OR 3 PPM NO_2 WITH VISUAL INDICATION ON UNIT. EXHAUST SYSTEM SHALL AUTOMATICALLY SHUT DOWN WHEN LOW LEVEL CONDITION IS SATISFIED.
.2 HIGH LEVEL ALARM CONDITION TO ACTIVATE VISUAL AND AUDIBLE ALARM AT 100 PPM CO AND/OR 5 PPM NO_2 SHOULD CONDITION REMAIN FOR MORE THAN TEN (10) MINUTES. HIGH ALARM SHALL AUTOMATICALLY RESET WHEN HIGH LEVEL CONDITION IS SATISFIED.
.3 SHOULD SYSTEM FAIL TO OPERATE PROPERLY, THE EXHAUST SYSTEM SHALL BE AUTOMATICALLY ACTIVATED UNTIL REPAIRS ARE MADE.

ACCEPTABLE MATERIALS: QUATROSENSE ENVIRONMENTAL LTD. MODEL M–CONTROLLER CONTROLLER AND SOLID STATE CO SENSOR AND NO_2 SENSOR, ARMSTRONG.

ROOFTOP AIR CONDITIONING UNIT (RTU–2)

SHALL BE SINGLE ZONE ROOF MOUNTED PACKAGE WITH DX COOLING, GAS HEAT EXCHANGER, 50 MM MERV 13 FILTERS, AIRSIDE ECONOMIZER CONTROLLED FROM DRY BULB WITH INTAKE AND EXHAUST AIR HOODS. THE UNIT SHALL BE CSA AND ULC APPROVED, AND SHALL BE RATED TO ARI 210 STANDARD FOR UNITARY AIR CONDITIONING EQUIPMENT. COOLING SYSTEM EFFICIENCY, AND FAN EFFICIENCY FOR MOTORS 5 HP AND LARGER SHALL COMPLY WITH ASHRAE 90.1–2013 EDITION. COMPRESSORS AND HEAT EXCHANGERS SHALL BE WARRANTED FOR 5 YEARS, PARTS ONLY, NON PRORATED. UNIT SHALL BE SUPPLIED WITH STAINLESS STEEL HEAT EXCHANGER.

UNIT SHALL BE COMPLETE WITH 600 MM HIGH INSULATED ROOF CURB SUITABLE FOR SEISMIC ANCHORING, OR HIGHER IF NOTED.

UNIT SHALL HAVE ECONOMIZER WITH BAROMETRIC DAMPER. ECONOMIZERS SHALL BE CONTROLLED FROM DRY BULB.

COMPRESSORS SHALL BE HERMETIC WITH CONDENSER FANS SHALL BE PERMANENTLY LUBRICATED AND HAVE BUILT IN THERMAL OVERLOADS.

SUPPLY FAN SHALL EITHER BE DIRECT DRIVE WITH ECM MOTOR, VARIABLE FREQUENCY DRIVE, OR MINIMUM TWO (2) SPEED DIRECT DRIVE FORWARD CURVE CENTRIFUGAL.

HEATING FOR UNIT SHALL BE TWO STAGES.

PROVIDE PROGRAMMABLE ELECTRONIC NIGHT SETBACK THERMOSTAT, ADJUSTABLE DEAD BAND CONTROL BETWEEN COOLING AND HEATING OF MINIMUM 2.9 DEG C (5 DEG F) FOR AUTOMATIC SWITCHOVER CONTROL, FAN ON–AUTO SWITCH, MANUAL CHANGEOVER CONTROL, ANTI–SHORT CYCLE TIMER, AND LCD DISPLAY. THERMOSTAT SHALL BE SUPPLIED BY ROOFTOP UNIT SUPPLIER. PROVIDE WIRING AS REQUIRED BETWEEN THERMOSTAT AND UNIT. EXPOSED WIRING TO BE INSTALLED IN CONDUITS.

UNIT SHALL BE SUPPLIED WITH A FACTORY INSTALLED AND WIRED MAIN ELECTRICAL WEATHERPROOF DISCONNECT SWITCH, AS WELL AS 120V/20A 5–20R WEATHERPROOF SERVICE RECEPTACLE FOR FIELD WIRING BY ELECTRICAL CONTRACTOR.

ACCEPTABLE MATERIALS: LENNOX, TRANE, CARRIER, DAIKIN, AAON, YORK

CONTROLS

PROVIDE ALL REQUIRED CONTROL HARDWARE, LOW VOLTAGE WIRING, AND OTHER DEVICES FOR PROPER CONTROL OPERATION. ALL EXPOSED WIRING TO BE IN CONDUITS. WIRING TO SENSORS INSTALLED ON EXPOSED BUILDING COLUMNS OR OTHER NON–FURRED OUT ASSEMBLIES SHALL BE IN WIREMOLD.

PROVIDE 120V POWER IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS FOR CONTROL SYSTEM AND ASSOCIATED COMPONENTS. EXTEND EXISTING CIRCUITS SERVING CONTROLS WHERE CIRCUIT CAPACITY IS SUFFICIENT. OBTAIN NEW CIRCUITS COMPLETE WITH NEW CIRCUIT BREAKERS AS REQUIRED FROM BASE BUILDING/LANDLORD PANEL BOARDS. AVOID TENANT PANEL BOARDS. CIRCUITS USED FOR CONTROLS SHALL NOT BE SHARED WITH OTHER SYSTEMS. MAKE FINAL CONNECTIONS. UPDATE PANEL SCHEDULE.

AFTER COMPLETION OF WORK, CONTRACTOR SHALL PERFORM A VERIFICATION OF ALL NEW AND EXISTING CONTROLS WITHIN THE SCOPE OF WORK, AND SUBMIT A WRITTEN REPORT TO THE BUILDING OWNER.

CONTROLS CONTRACTOR SHALL ASSIST THE BALANCING CONTRACTOR DURING THE EQUIPMENT AND SYSTEM BALANCING PROCEDURES.

EXHAUST/INTAKE DAMPERS

DAMPERS SHALL BE CONSTRUCTED OF 6" EXTRUDED ALUMINUM INSULATED BLADES, 12 GA. INSULATED EXTRUDED ALUMINUM FRAMES, DOUBLE SEALED BEARINGS, WITH SIDE AND BLADE SEALS, RATED AT LESS THAN 0.6% LEAKAGE AT 10" S.P.

EXHAUST FAN F–1 DAMPER SHALL BE SUPPLIED WITH END SWITCH FOR CONFIRMATION OF OPEN DAMPER POSITION.

ACCEPTABLE MANUFACTURERS: TAMCO SERIES 9000, RUSKIN CDTI–50, ALUMAVENT 3900 SERIES.

BY–PASS VAV BOXES

SHALL BE LOW PRESSURE TERMINAL UNIT, WITH CASING CONSTRUCTED OF 22 GAUGE ZINC COATED STEEL, ACOUSTICALLY AND THERMALLY LINED WITH MINIMUM 13MM THICK INTERNAL INSULATION MEETING NFPA 90A. UNITS SHALL BE SUITABLE FOR COOLING AND HEATING/COOLING SYSTEMS. UNIT SHALL BE SUPPLIED WITH 900MM LONG SOUND ATTENUATOR ON DISCHARGE OF VAV BOX WITH MINIMUM 13MM THICK INTERNAL ACOUSTIC LINING.

UNIT SHALL BE SUPPLIED WITH ROUND OR OVAL INLET DUCT CONNECTION WITH BALANCING DAMPER, INTERNAL DIVERTER DAMPER WITH ACTUATOR, BALANCING DAMPER AT BYPASS DISCHARGE OPENING, AND MINIMUM AIR VOLUME STOP ON ELECTRIC ACTUATOR FOR FIELD ADJUSTMENT. BY–PASS OPENING SHALL BE EITHER ON SIDE OR TOP OF CASING, TO BE CONFIRMED BY CONTRACTOR TO SATISFY SITE RESTRICTIONS AND INSTALLATION REQUIREMENTS. PERFORMANCE SHALL BE TESTED IN ACCORDANCE WITH ANSI/ASHRAE 130–1996 AND ARI 880–98.

CONTROLS SHALL BE PRESSURE DEPENDENT, ANALOG ELECTRONIC CONTROL WITH 120V/24V CONTROL TRANSFORMER, ELECTRIC DAMPER ACTUATOR, TOGGLE ELECTRICAL DISCONNECT SWITCH, AND WALL MOUNTED TEMPERATURE SENSOR. WIRING BETWEEN SENSOR AND VAV BOX SHALL BE 24V. CONTROLLERS SHALL BE FACTORY SUPPLIED AND INSTALLED ON VAV BOX. THE UNIT SHALL BE SUPPLIED WITH A HEATING/COOLING SWITCH–OVER CONTROLLER TO REVERSE THE OPERATION OF THE BY–PASS DAMPER WHENEVER THE SUPPLY AIR TEMPERATURE IS ABOVE THE ROOM TEMPERATURE SETPOINT.

ACCEPTABLE MATERIAL: NAILOR, E. H. PRICE, KRUEGER, METAL–AIRE, TITUS.

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