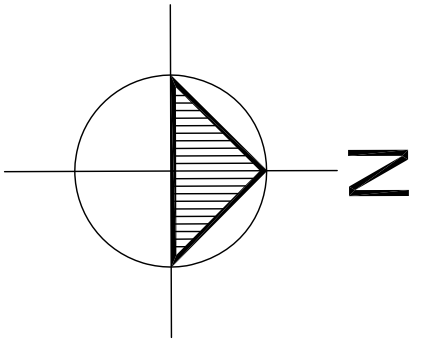


DESIGN & INSTALL ALL MECHANICAL SYSTEMS TO THE FOLLOWING CODES AND STANDARDS.

ALBERTA BUILDING CODE – LATEST EDITION
 ALBERTA FIRE CODE – LATEST EDITION
 NATIONAL BUILDING CODE – LATEST EDITION
 NATIONAL FIRE CODE – LATEST EDITION
 NFPA-13 & ALL OTHER APPLICABLE NFPA SECTIONS
 CANADIAN PLUMBING CODE – LATEST EDITION
 NATURAL GAS INSTALLATION CODE CGA-B149
 SMACNA



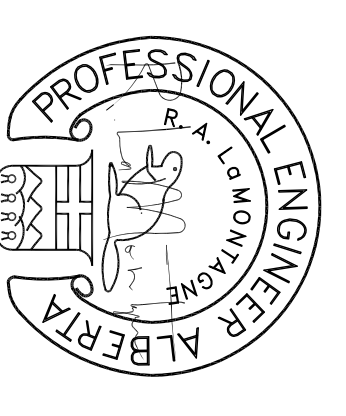
FIELD REVIEW:
 THE ENGINEER HAS BEEN REQUIRED ONLY FOR PERMITS, SITE INSPECTIONS TO THE CONTRACT DOCUMENTS.
 THE ENGINEER HAS NOT BEEN REQUIRED FOR THE CONTRACT DOCUMENTS.

SITE SAFETY:
 THE ENGINEER ASSUME NO RESPONSIBILITY FOR ON-SITE WORKER SAFETY FOR OTHER RESPONSIBILITY FOR THE SAFETY AS PER THE CONVENTIONAL HEALTH AND SAFETY ACT.

PLANS EXAMINATION:
 DRAWINGS ARE NOT TO BE USED FOR CONSTRUCTION UNTIL REVIEWED AND APPROVED BY THE AUTHORITY HAVING JURISDICTION. THIS AUTHORITY, BASED ON APPLICABLE CODES, THESE CODES MAKE UNDESIRABLE AND THEREFORE ARE THE RESPONSIBILITY OF THE OWNER AND/OR CONTRACTOR.

COPYRIGHTS:
 ALL DRAWINGS, NOTATIONS AND RELATED DOCUMENTS ARE THE PROPERTY OF THE ARCHITECTURAL FIRM. NO PART OF THIS DOCUMENT IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT THE WRITTEN PERMISSION OF THE ARCHITECTURAL FIRM.

DRAWING REVIEW:
 THE CONTRACTOR MUST OBTAIN APPROVAL FROM THE ARCHITECTURAL FIRM FOR ANY CHANGES TO THE DRAWINGS. ANY CHANGES MUST BE APPROVED BY THE ARCHITECTURAL FIRM AND THE ENGINEER. THE CONTRACTOR MUST OBTAIN APPROVAL FROM THE ARCHITECTURAL FIRM FOR ANY CHANGES TO THE DRAWINGS. ANY CHANGES MUST BE APPROVED BY THE ARCHITECTURAL FIRM AND THE ENGINEER.



03/10/12
 PERMIT TO PRACTICE P10904

REVISIONS		
NO.	DESCRIPTION	DATE
1	ISSUED FOR BP	24/08/12
2	ISSUED FOR TENDER	03/10/12

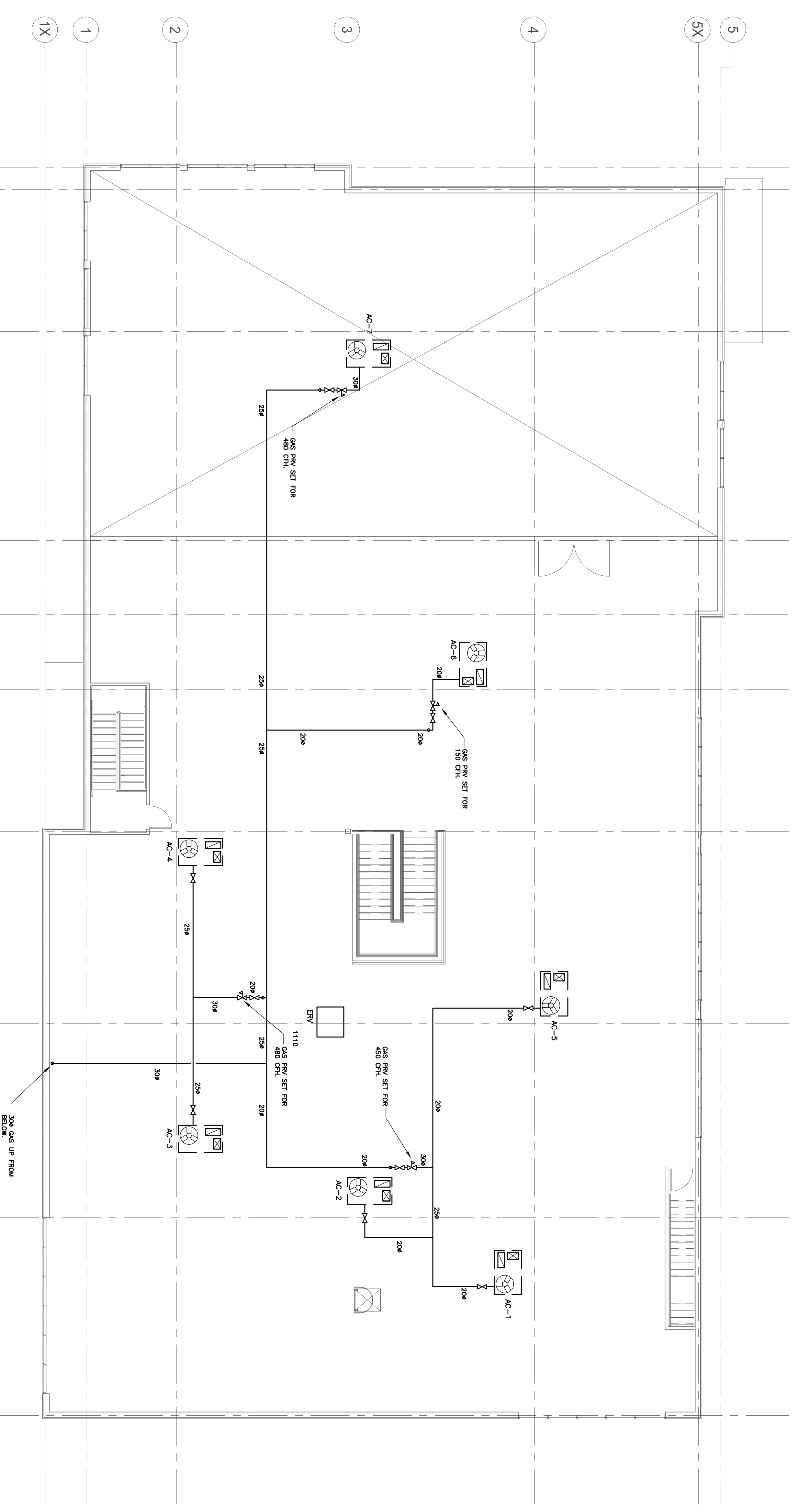
DMH Designs Ltd.
 117 Royal Oak Green NW
 Calgary, Alberta T3G 6A7
 Tel: (403) 620-3170
 Fax: (403) 208-4185

CLIENT:
 VISIONS
 CALGARY, ALBERTA

PROJECT:
 GOOD LIFE FITNESS BLDG
 ST ALBERT, ALBERTA

TITLE:
 HVAC UPPER FLOOR PLAN

SCALE	DATE	DRAWING NO.
AS NOTED	AUGUST /12	M2-2
DESIGN BY DP	CHECKED BY DP	REVISION: 1
JOB #: 12-756	DATE:	
PROJECT:	COORD:	



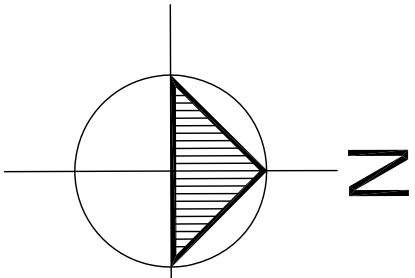
ROOF TOP UNIT SCHEDULE
 (LENNOX OR APPROVED EQUAL)

TAG	MODEL	HEATING CAPACITY INPUT	HEATING CAPACITY OUTPUT	COOLING CAPACITY (NET)	AIR VOL. (CFM)	POWER	REMARKS	APPROX UNIT WEIGHT
AC-1	LENNOX LGC060H-BH	240 MBH	192 MBH	63 MBH	2100	575V/3/60 1 HP BLOWER	EACH UNIT TO BE C/W - MERV 8 DISPOSABLE FILTER - 18" ROOF CURB - DIFFERENTIAL ENTHALPY - ECONOMIZER - CONDENSATE DRAIN TRAP - CONTROL TRANSFORMER - PROGRAMMABLE HEAT/COOL THERMOSTAT WITH LOCKING COVERS	11010 LBS
AC-2	LENNOX LGC060H-BH	240 MBH	192 MBH	63 MBH	2100	575V/3/60 2 HP BLOWER	- DIFFERENTIAL ENTHALPY - ECONOMIZER - CONDENSATE DRAIN TRAP - CONTROL TRANSFORMER - PROGRAMMABLE HEAT/COOL THERMOSTAT WITH LOCKING COVERS	11010 LBS
AC-3	LENNOX LGC0510H-BH	240 MBH	192 MBH	144.4 MBH	4000	575V/3/60 3 HP BLOWER	- DISCONNECT SWITCH - LIQUID & DISCHARGE SERVICE VALVES	11470 LBS
AC-4	LENNOX LGC1210H-BH	240 MBH	192 MBH	120 MBH	3800	575V/3/60 3 HP BLOWER	- DISCONNECT SWITCH - LIQUID & DISCHARGE SERVICE VALVES	11430 LBS
AC-5	LENNOX LCC0321H-BH	240 MBH	192 MBH	93 MBH	3000	575V/3/60 2 HP BLOWER	- BAROMETRIC RELIEF DAMPER - STAINLESS STEEL HEAT EXCHANGER	11010 LBS
AC-6	LENNOX LCC0321H-BH	240 MBH	192 MBH	93 MBH	3000	575V/3/60 2 HP BLOWER	- BAROMETRIC RELIEF DAMPER - STAINLESS STEEL HEAT EXCHANGER	11010 LBS
AC-7	LENNOX LCC0321H-BH	240 MBH	192 MBH	175.4 MBH	4000	575V/3/60 7.5 HP BLOWER	- R-410A REFRIGERANT	12870 LBS

HVAC NOTES:
 - ADDITIONAL OPTIONS AS FOLLOWS: HUMIDITY CONTROL, DEMINERALIZATION SYSTEM C/W HUMIDITY SENSOR KITS TO BE INSTALLED ON AC-1, AC-3 & AC-7
 - POWER EXHAUST TO BE INSTALLED ON AC-5, & AC-7. CO2 SENSOR KIT TO BE INSTALLED ON AC-1, AC-3 & AC-7.
 - BASE ROOF TOP UNITS ARE NOTED ABOVE. THE TENANT MECHANICAL CONSULTANT IS TO REVIEW THE INCLUDED ADDITIONAL OPTIONS REQUIRED BY THE TENANT.
 - ROOF TOP UNIT ELECTRICAL DATA IS AS FOLLOWS:
 MODEL LCC060 - (AT 575V/3/60) MINIMUM CIRCUIT AMPACITY=14, MAXIMUM OVERCURRENT PROTECTION=20AMPS
 MODEL LCC092 - (AT 575V/3/60) MINIMUM CIRCUIT AMPACITY=20, MAXIMUM OVERCURRENT PROTECTION=25AMPS
 MODEL LCC120 - (AT 575V/3/60) MINIMUM CIRCUIT AMPACITY=27, MAXIMUM OVERCURRENT PROTECTION=30AMPS
 MODEL LCC150 - (AT 575V/3/60) MINIMUM CIRCUIT AMPACITY=33, MAXIMUM OVERCURRENT PROTECTION=40AMPS
 MODEL LCC180 - (AT 575V/3/60) MINIMUM CIRCUIT AMPACITY=33, MAXIMUM OVERCURRENT PROTECTION=40AMPS

1 UPPER FLOOR HVAC
 M2-2 1:100

DESIGN & INSTALL ALL MECHANICAL SYSTEMS TO THE FOLLOWING CODES AND STANDARDS:
 ALBERTA BUILDING CODE – LATEST EDITION
 ALBERTA FIRE CODE – LATEST EDITION
 NATIONAL BUILDING CODE – LATEST EDITION
 NATIONAL FIRE CODE – LATEST EDITION
 NFPA-13 & ALL OTHER APPLICABLE NFPA SECTIONS
 CANADIAN PLUMBING CODE – LATEST EDITION
 NATURAL GAS INSTALLATION CODE CGA-B149
 SMOACNA

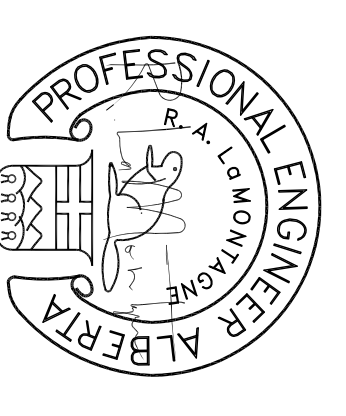


FIELD REVIEW:
 THE ENGINEER HAS BEEN REQUIRED ONLY FOR PERIODIC SITE INSPECTIONS TO VERIFY THE WORK IS BEING DONE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

SITE SAFETY:
 THE ENGINEER ASSUMES NO RESPONSIBILITY FOR ON-SITE WORKER SAFETY FOR OTHER THAN THE PROJECT WORKERS.
 THE ENGINEER HAS CONDUCTED A VISUAL GENERAL SAFETY AND HEALTH INSPECTION OF THE WORK AREA AND HAS FOUND NO OBVIOUS HAZARDS.
 THE ENGINEER HAS CONDUCTED A VISUAL GENERAL SAFETY AND HEALTH INSPECTION OF THE WORK AREA AND HAS FOUND NO OBVIOUS HAZARDS.
 THE ENGINEER HAS CONDUCTED A VISUAL GENERAL SAFETY AND HEALTH INSPECTION OF THE WORK AREA AND HAS FOUND NO OBVIOUS HAZARDS.

DEPARTMENTS:
 ALL DEPARTMENTS AND RELATED DOCUMENTS ARE THE PROPERTY OF THE ENGINEER. THE ENGINEER HAS CONDUCTED A VISUAL GENERAL SAFETY AND HEALTH INSPECTION OF THE WORK AREA AND HAS FOUND NO OBVIOUS HAZARDS.

IRREVOCABLE REVIEW:
 THE ENGINEER HAS CONDUCTED A VISUAL GENERAL SAFETY AND HEALTH INSPECTION OF THE WORK AREA AND HAS FOUND NO OBVIOUS HAZARDS.



03/10/12
 PERMIT TO PRACTICE P10904

NO.	DESCRIPTION	DATE	CK
1	ISSUED FOR BP	24/08/12	
2	ISSUED FOR TENDER	03/10/12	

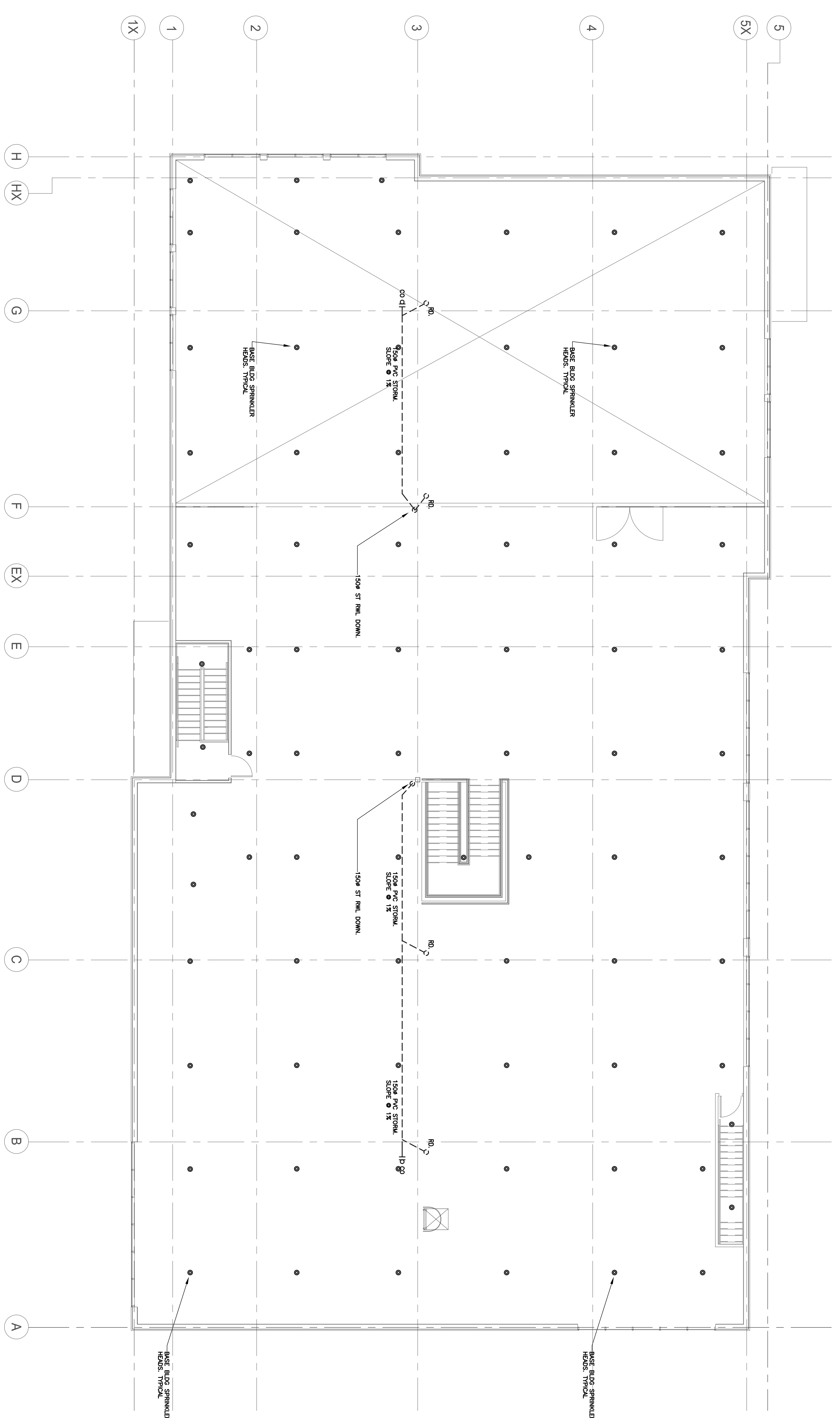
DMH Designs Ltd.
 117 Royal Oak Green NW
 Calgary, Alberta T3G 6A7
 Tel: (403) 620-3170
 Fax: (403) 208-4185

CLIENT
 VISIONS
 CALGARY, ALBERTA

PROJECT
 GOOD LIFE FITNESS BLDG
 ST ALBERT, ALBERTA

TITLE
 PLBG, DRAINAGE & SPRINKLER
 UPPER FLOOR PLAN

SCALE	DATE	DRAWING NO.
AS NOTED	AUGUST /12	M2-4
DRAWN BY DP	CHECKED BY DP	REVISION: 1
JOB #: 12-756	DWG:	
PLotted:	COPYED:	



1 UPPER FLOOR PLBG, DRAINAGE & SPRINKLER PLAN
 M2-4 1:100

MECHANICAL SPECIFICATIONS

GENERAL

- IT IS THE INTENTION OF THESE SPECIFICATIONS AND DRAWINGS TO PROVIDE FOR COMPLETE AND FULLY OPERATING SYSTEMS WITH FAULTS AND SERVICES TO MEET THE OWNER'S REQUIREMENTS AS SET FORTH IN THESE SPECIFICATIONS AND DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE SYSTEMS TO BE COMPLETED AND FOR THE PROVISION OF ALL MATERIALS, TOOLS AND EQUIPMENT AS WELL AS WHETHER OR NOT DIRECTLY SPECIFIED OR SHOWN ON THE PLANS, AS REQUIRED FOR THE INSTALLATION, TESTING AND PUTTING INTO OPERATION, THE COMPLETE SYSTEMS, AS SHOWN AND DESCRIBED HEREIN, WHERE IT IS SPECIFICALLY MENTIONED THAT SUCH MATERIAL OR WORK IS PART OF THE CONTRACT.
- THE DRAWINGS AND SPECIFICATIONS ARE NOT A DETAILED SET OF INSTALLATION INSTRUCTIONS, BUT A GUIDE TO ESTABLISHING QUALITY OF EQUIPMENT, MATERIAL, WORKMANSHIP, AND PERFORMANCE. REFER TO ARCHITECTURAL, STRUCTURAL, AND ELECTRICAL DRAWINGS, AS WELL AS MECHANICAL DRAWINGS, TO ONE ANOTHER AND THAT WHICH IS SHOWN ON ONE IS AS BINDING AS THAT WHICH IS SHOWN ON BOTH. THE TERM "PROVIDER" SHALL MEAN TO SUPPLY AND INSTALL.
- ANY DISCREPANCIES BETWEEN DRAWINGS OR SPECIFICATIONS, LEAVING IN DOUBT THE INTENT OF WORK, SHALL BE BROUGHT TO THE ATTENTION OF THE CONSULTANT, IN WRITING, PRIOR TO COMMENCING OF THE WORK.
- ALL WORK AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE CURRENT EDITION OF THE ALBERTA BUILDING CODE, REVISIONS THERETO, THE LOCAL BUILDING REGULATIONS, THE FIRE PROTECTION ACT, AND APPLICABLE MUNICIPAL JURISDICTION.
- AFTER THE WORK IS COMPLETE, BUT PRIOR TO FINAL PAYMENT, FINISH A WRITTEN GUARANTEE STATEMENT OF WORKMANSHIP AND PERFORMANCE, WHICH SHALL BE VALID FOR THE PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF THE PROJECT, AND FURTHER THAT ANY DEFECTIVE MATERIALS OR WORKMANSHIP THAT BECOME EVIDENT DURING THE GUARANTEE PERIOD WILL BE CORRECTED AT NO ADDITIONAL COST TO THE OWNER.
- ONLY FIRST CLASS WORKMANSHIP WILL BE ACCEPTED, NOT ONLY AS REGARDS TO THE NEATNESS OF THE WORK, BUT ALSO AS REGARDS TO THE QUALITY OF THE WORK. ALL WORK SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTION DIRECTIONS.
- MAKE ANY NECESSARY CHANGES OR ADDITIONS TO THE PLACEMENT OF EQUIPMENT AND ROUTING OF PIPING AND DUCTWORK TO ACCOMMODATE STRUCTURAL, ELECTRICAL AND ARCHITECTURAL CONDITIONS.
- ALL NECESSARY PIPE STEELERS, HANGER INSERTS, EQUIPMENT SUPPORTS, ETC., SHALL BE INSTALLED AT THE PROPER TIME AND PROVIDED WHERE NECESSARY TO CARRY OUT THE MECHANICAL WORK.
- FLASH, GUMMER FLASH, AND PROVIDE STEELS FOR ALL PIPING AND DUCTWORK THROUGH ROOF, AND SUPPLY AND SET STEELS FOR THE PROJECT. ALL CUTTING, PATCHING, ROOF REPAIR, CALCULATING, ETC., SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- SUBMIT FOR REVIEW, A MINIMUM OF EIGHT COPIES OF SHOP DRAWINGS OF ALL EQUIPMENT PRIOR TO ACCEPTANCE OF EQUIPMENT. EQUIPMENT THAT HAS NOT BEEN REVIEWED BY THE CONSULTANT WILL NOT BE USED.
- PROVIDE ISOLATION VALVES AND MAKE CONNECTIONS TO EQUIPMENT, FITTINGS, ETC., PROVIDED AS PART OF THIS CONTRACT AND SUPPLIED BY OTHERS AND LEAVE IT IN FULL OPERATING CONDITION.
- FOLLOW THE RECOMMENDED INSTALLATION DETAILS AND PROCEDURES FOR EQUIPMENT AS FOUND IN SUPPLIERS' TECHNICAL DATA SUPPLEMENTED BY DETAILS GIVEN HEREIN AND ON PLANS, WHICH IN TURN SHALL BE SUBJECT TO THE APPROVAL OF THE CONSULTANT.
- PROVIDE ADDITIONAL MATERIAL FOR MODIFICATIONS THAT MAY BE REQUIRED TO CORRECT MINOR JOB CONDITIONS, FOR NONNOMALLY ACCEPTED PROCEDURES IN THE RESPECTIVE TRADE.
- ON COMPLETION OF THE PROJECT SUPPLY TO THE CONSULTANT ONE SET OF MARKED-UP RECORD DRAWINGS, AS WELL AS THREE SETS OF APPROVED SHOP DRAWINGS AND EQUIPMENT MAINTENANCE INSTRUCTIONS, IN THREE-RING BINDERS NEATLY BOUND AND LABELED. OPERATING AND MAINTENANCE INSTRUCTIONS SHALL INCLUDE: MANUFACTURER'S NAME, MODEL NUMBER, SERIAL NUMBER, DATE OF INSTALLATION, NUMBERED PARTS, HANGER DIMENSIONS AND TREATMENT INFORMATION. MANUALS SHALL INCLUDE THE FOLLOWING INFORMATION: INDEX, LIST OF CONTRACTORS AND EQUIPMENT SUPPLIERS, SYSTEMS TESTING INFORMATION, TESTS, PERFORMANCE RECORDS, SHOP DRAWINGS, AND MAINTENANCE DATA. INSTALLATION AND MAINTENANCE DATA SHEETS.
- INSTALL ALL PIPING, DUCTWORK, ETC., GENERALLY IN LOCATIONS AND ROUTES SHOWN ON THE DRAWINGS, CLOSE TO THE BUILDING STRUCTURE TO MINIMIZE FLOORING (WHERE NECESSARY) AND INSTALLED WILL BE REQUIRED AND PROVIDED TO THE SATISFACTION OF THE CONSULTANT.
- THE DETAILED LAYOUT OF WORK WITH RESPECT TO OTHER WORK IS THE RESPONSIBILITY OF THE WORK OF OTHER TRADES, UNLESS SUCH INTERFERENCES HAVE BEEN BROUGHT TO THE ATTENTION OF THE CONSULTANT IN WRITING, FOR CORRECTION.
- ONE ALL NECESSARY NOTICES, ORDINANCE, ALL NECESSARY PERMITS AND APPROVALS FROM AUTHORITIES HAVING JURISDICTION, AND PAY ALL FEES, IN ORDER THAT THE WORK HEREIN SPECIFIED AND SHOWN ON THE DRAWINGS, MAY BE CARRIED OUT. FURNISH ANY CERTIFICATES NECESSARY AS EVIDENCE THAT THE CONTRACTOR IS A REGISTERED PROFESSIONAL ENGINEER, ARCHITECT, OR MECHANICAL ENGINEER. ALL CHANGES AND ALTERATIONS REQUIRED BY AN AUTHORIZED INSPECTOR OR ANY AUTHORITY, SHALL BE CARRIED OUT WITHOUT CHARGE OR EXPENSE TO THE OWNER. UPON COMPLETION OF THE WORK, PROVIDE A CERTIFICATE OF FINAL APPROVAL FROM THE INSPECTOR AUTHORITY.
- PROVIDE ALL NECESSARY INFORMATION TO THE RESPECTIVE SUPERINTENDERS, SO THAT ORDINANCES AND CHARGES MAY BE PREPARED FOR INSTALLATION OF WORK, INCLUDING INFORMATION FOR EXPANSION SHEETS, HANGER ROOS, BRACKETS, OR STEELS SHALL BE BY THE CONTRACTOR.
- THE USE OF AN EQUIPMENT MANUFACTURER SHALL, IN NO WAY RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY OF FURNISHING ANY WORK THAT MAY BE REQUIRED BY REASON OF DEFERENT SPACE, WEIGHT, ELECTRICAL REQUIREMENTS, ETC., FROM THAT OF THE SPECIFIED MANUFACTURER. IF, IN THE COURSE OF THE WORK, THE CONTRACTOR DETERMINES THAT THE EQUIPMENT SPECIFIED IN THESE DRAWINGS WILL ENSURE SATISFACTORY OPERATION AND PERFORMANCE OF THE PRODUCT, THEN THE CONTRACTOR SHALL BE REQUIRED TO USE THE SPECIFIED MANUFACTURER.
- BE RESPONSIBLE FOR THE PROTECTION AND MAINTENANCE OF WORK OF THIS PROJECT UNTIL, THE BUILDING HAS BEEN COMPLETED AND ACCEPTED BY THE OWNER, AND FOR THE STORING OF MATERIALS ON SITE AND ALL PARTS OF THE BUILDING ALL DAMAGE CAUSED BY THE WORK.
- PROTECT ALL PARTS OF THE BUILDING FROM DAMAGE DUE TO THE CARRYING OUT OF THE WORK AND MAKE GOOD, OR PAY FOR, ANY DAMAGES SUSTAINED.
- THOROUGHLY CLEAN WALLS, CEILINGS, FLOORS, PIPING, DUCTS, CONDENSERS AND EQUIPMENT OF DIRT, CUTTINGS AND OTHER FOREIGN SUBSTANCES. DISCONNECT, CLEAN AND RECONNECT WHEREVER DAMAGED IN THE COURSE OF REMOVING OBSTRUCTIONS. REPAIR WORK DAMAGED IN THE COURSE OF REMOVING OBSTRUCTIONS.
- NO ALTERATION BY MEANS OF CUTTING, BELLING OR OTHERWISE TO CEILING, FLOORS, ROOF OR WALLS OF THIS STRUCTURE WITHOUT THE PRIOR WRITTEN APPROVAL OF THE STRUCTURAL CONSULTANT.
- REMOVE ALL TOOLS, SUPPLIES AND WASTE MATERIAL FROM THE BUILDING UPON COMPLETION, CLEAN ALL GROUND, DIRT AND EXCESS MATERIAL FROM WALLS, FLOORS, CEILINGS AND FIXTURES FOR WHICH THE CONTRACTOR WAS RESPONSIBLE, AND LEAVE THE PREMISES SUITABLE FOR IMMEDIATE USE.
- BE RESPONSIBLE FOR TRANSPORTATION, STORAGE AND PROTECTION OF ALL MATERIAL AND EQUIPMENT SUPPLIED UNDER THIS CONTRACT, UP TO THE TIME THE PROJECT IS COMPLETE AND ACCEPTED BY THE OWNER.
- PROVIDE ALL REQUIRED SCAFFOLDING, HOISTS, AND RIGGING NECESSARY FOR THE ERECTION AND DELIVERY OF THE MECHANICAL WORK.
- EQUIPMENT SPECIFIED BY MAKE, MODEL AND SIZE FOR TYPE OF MATERIAL TO BE USED, SERIES TO SET A STANDARD OF QUALITY AND SHALL BE USED AS A STANDARD FOR THE CONTRACTOR'S PROPOSAL. WHERE EQUIPMENT IS NOT SPECIFICALLY IDENTIFIED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SELECTION OF EQUIPMENT WITH COMPLETE DETAILED TECHNICAL SUBMISSION TO HAVE HIS EQUIPMENT APPROVED. FAXED SUBMISSIONS AND INFORMATION OF A GENERAL NATURE WILL NOT BE ACCEPTED. RESULTS FOR DRY RUNS SHALL BE PROVIDED TO THE OWNER PRIOR TO THE TESTING PERIOD AND THE WORKING DAYS PRIOR TO CLOSING OF SUPERINTENDERS TENDERS.
- SUPPLY REPAIRS, EQUIPMENT WITH MOTORS OPERATING AT 1800 RPM, UNLESS OTHERWISE SPECIFIED. REFER TO ELECTRICAL DRAWING 161 DRAWINGS AND SPECIFICATIONS FOR VOLTAGE, AMPERES AND CIRCLES. WHERE VOLTAGES ARE INDICATED IN DIVISION 15, CONFIRMATION SHALL BE MADE BY REFERENCE TO DIVISION 16 DOCUMENTS, PRIOR TO ORDERING MOTORS.
- BE RESPONSIBLE FOR ALL EXAMINATION AND BACKFILL ALL SUPERTEST REPORT TO OWNER.
- PIPING TO COMMENCEMENT WORK, CHECK LOCATIONS AND INVERTS OF SERVICE LINES ENTERING OR LEAVING A BUILDING, AND THROUGH THE BUILDING AND SITE TO ENSURE THEIR PROPER FUNCTION AND THAT NO CONFLICT OCCURS.
- PROVIDE ALL SERVICES WITHIN THE BOUNDS OF THE SITE PROPERTY LINES. ARRANGE FOR AND PAY COST OF THE INSTALLATION OF ALL SERVICES AND SERVICE LINES OUTSIDE THE PROPERTY LINES AND IN ALL RESIDUALS AND RIGHTS OF-WAY.

29. DO NOT USE THE PERMANENT HEATING SYSTEM FOR TEMPORARY HEATING PURPOSES WITHOUT WRITTEN PERMISSION FROM THE CONSULTANT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE HEATING SYSTEM. THIS CONTRACT SHALL BE PROVIDED WITH NEW FILTERS PRIOR TO TAKEOVER OF THE PROJECT. WELL AS THE AUTHORIZED REPRESENTATIVE OF THE OWNER.

- BE RESPONSIBLE FOR THE EXCAVATING TO FACILITATE THE INSTALLATION OF SITE SERVICES.
- BE RESPONSIBLE FOR ADDITIONAL BEDDING MATERIAL, BACKFILLING AND TAMPING WHERE OVER-EVALUATION HAS BEEN PERFORMED.
- THE WORK SHALL NOT UNDERMINE BUILDING FOUNDATIONS.
- FROST REMOVAL DONE BY BURNING SHALL BE DONE IN ACCORDANCE WITH LOCAL BYLAWS AND REGULATIONS.
- TRENCHES SHALL NOT BE OPEN FOR MORE THAN 30 M IN ADVANCE OF PIPE LAYING NOR 30 M BEHIND PIPE LAYING.
- COMMENCE CONSTRUCTION OF MANHOLES AND CATCH BASINS WITH ONE DAY OF LAYING PIPE UP TO SAME.
- BACKFILL TRENCHES WITHOUT DELAY, SO THAT USE OF THE SITE IS AVAILABLE AS QUICKLY AS POSSIBLE.
- BRACE AND SHORE EXCAVATIONS IN ACCORDANCE WITH GOVERNING LAWS.
- REMOVE AND DISPOSE OF WATER IN EXCAVATIONS WITHOUT DAMAGE TO CONSTRUCTION WORK.
- PERSONS OR PROPERTY, IN ACCORDANCE WITH ANY LOCAL BYLAWS OR REGULATIONS.
- BE RESPONSIBLE FOR ANY DAMAGE WHICH MAY OCCUR DUE TO STORM WATER ENTERING EXCAVATIONS.
- CHECK AND ASSESSMENT SATISFACTORY INERT ELEVATIONS FOR SERVICE CONNECTIONS BEFORE INSTALLING THE DRAINAGE SYSTEMS.
- PROVIDE DISINFECTION OF WATER MAINS, WHERE REQUIRED.
- PROVIDE BARRETTED, GUARDS, CONSTRUCTION SIGNS, TORCHES AND LANTERNS IN ACCORDANCE WITH THE LOCAL AUTHORITIES, TO PROTECT PERSONS FROM INJURY AND VOID PROPERTY DAMAGE.
- EXCAVATE TO GROUND THE LEAST INTERUPTION TO TRAFFIC. PROVIDE SUITABLE BRIDGES WHERE TRAFFIC MUST CROSS OPEN EXCAVATIONS.
- CATCH BASIN AND MANHOLE BARRELS, FRAMES AND COVERS SHALL CONFORM TO LOCAL MUNICIPALITY STANDARDS.
- BURRED PIPING SHALL BE BEDDED ON A MINIMUM 150 MM THICKNESS, APPROVED FINE GRANULAR MATERIAL, CONTROLLED TO FIT 60 PERCENT OF THE PIPE DIAMETER.
- USE FINE GRAVEL OR SAND WHERE THE EXISTING MATERIAL IS NOT SUITABLE FOR BEDDING.
- UNSATURABLE SOIL SHALL BE REMOVED AND SHALL BE REPLACED WITH THOROUGHLY COMPACTED GRAVEL OR APPROVED ACCEPTABLE BEDDING.
- BRIDGE BRIDGERS AND STONES ENCOUNTERED IN THE EXCAVATION TO PROVIDE A MINIMUM CLEARANCE OF 160 MM BELOW AND ON EACH SIDE OF THE PIPE.
- USE LOGS OR PLY BOARD SAND OR GRAVEL, NOT EXCEEDING 25 MM IN SIZE FOR BEDDING THOROUGHLY COMPACT AND FIRM TO ONE THE SPECIFIED BEDDING CONDITIONS.
- USE SUITABLE EXCAVATION MATERIAL, OR PROVIDE GRANULAR MATERIAL FOR BACKFILL, WHERE EXCAVATED MATERIAL IS UNSUITABLE.

30. PLACE BACKFILLING BY HAND IN 150 MM LAYERS TO 300 MM ABOVE THE PIPE MAKING SURE NOT TO DROP MATERIAL ONTO THE EXCAVATED PIPE. MANHOLES AND BASINS MAY BE USED TO DISPERSE LOADS THIS POINT.

- GRAVEL SOILS TO WITHIN 1 M OF FINISHED SURFACES SHALL BE COMPACTED TO NOT LESS THAN 95 PERCENT OF THE SOILS MAXIMUM DENSITY, WITH THE MOISTURE CONTENT WITHIN 3 PERCENT OF THE AVERAGE DENSITY OF NOT LESS THAN 95 PERCENT.
- TRENCHES OR CUTS IN ROADWAYS OR PROPOSED ROADWAYS SHALL BE BACKFILLED IN LIFTS TO SURFACE. EACH LIFT SHALL BE MECHANICALLY COMPACTED.
- INSTALL SEWERS WITH THE USE OF SUPERVISOR'S GRADE SHEETS AND BATTER BOARDS. GRADE SHEETS SHALL NOTE ACTUAL INSTALLATION AND SHALL BE SIGNED BY AN INDEPENDENT SURVEYOR.
- PROVIDE REINFORCED CONCRETE OR WOODEN BRIDGES WHERE SERVICE LINES MUST CROSS PIPING AND PIPE FITTINGS.
- DOMESTIC WATER PIPING ABOVE GRADE SHALL BE TYPE L HANG COPPER WITH WROUGHT COPPER BELLOW GRADE SHALL BE PVC (PVC EX BLUE BRUTE OR EQUAL) WITH PVC FITTINGS, AND HUB AND SPOUT RUBBER GASKET JOINTS. ALL PIPING SHALL MEET THE APPROVAL OF LOCAL CODES AND AUTHORITIES. REFER TO THE SPECIFICATIONS FOR THE APPROVAL OF LOCAL CODES AND AUTHORITIES AND REFER TO THE SPECIFICATIONS FOR THE APPROVAL OF LOCAL CODES AND AUTHORITIES.
- STORM DRAINAGE, SANITARY DRAINAGE, AND VENT PIPING BELOW GRADE SHALL BE PVC - SDR35 (PVC OR SANITARY DRAINAGE AND VENT PIPING ABOVE GRADE SHALL BE DWV COPPER WITH WROUGHT COPPER SANITARY DRAINAGE AND VENT PIPING ABOVE GRADE SHALL BE DWV COPPER WITH WROUGHT COPPER USED ABOVE GRADE IF APPROVED BY THE LOCAL AUTHORITIES. ALL EXPOSED DRAINAGE PIPING CONNECTED TO PLUMBING FIXTURES IN FINISHED AREAS SHALL BE CHROME PLATED.
- NATURAL GAS PIPING SHALL BE STEEL SCHEDULE 40 BLACK. FITTINGS SHALL BE WELDABLE IRON 1035 KPA, WITH SCHEDULED JOINTS, OR WELDED JOINTS, AS REQUIRED BY CODE. PROVIDE YELLOW PAINT FOR PIPE COVERS ON ALL BURRED GAS PIPING.
- HANGERS AND HANGER ROOFS SHALL BE SUPPLIED AND INSTALLED BY THIS CONTRACTOR. USE OF PREPARED STRAP, WIRE OR CHAIN HANGERS IS NOT PERMITTED.
- CAST IRON AND STEEL PIPES, USE CLEANS TYPE HANGERS.
- COPPER PIPES, USE HANGERS IN COPPER PLATE FINISH.
- SUPPORT PIPES IN ACCORDANCE WITH ASHRAE STANDARDS AND/OR APPLICABLE CODES.
- PROVIDE CLEARANCES FOR PROPER INSTALLATION OF INSULATION, AND FOR ACCESS TO VALVES, DRAINS, ETC.
- PROVIDE HANGERS AND SUPPORTS FOR ALL DUCTWORK, IN ACCORDANCE WITH SHAWMA - HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, LATEST EDITION.
- PIPE IDENTIFICATION
- ALL INTERIOR GAS PIPING IS TO BE BANNED AS CALLED FOR IN GAS CODE.
- ALL EXTERIOR GAS PIPING IS TO BE PROPERLY PRIMED AND PAINTED YELLOW USING RUST RESISTANT PAINT.
- VALVES SHALL BE INSTALLED AS INDICATED ON THE DRAWINGS, AND AS REQUIRED TO ISOLATE ALL FIXTURES, EQUIPMENT, ETC..
- PROVIDE CHROME PLATED ROOF FLEXIBLE SUPPLIES TO ALL PLUMBING FIXTURES WITH STOPS, REDUCERS, AND EXHAUSTORS SECURELY ATTACHED TO WALL OR FLOOR SURFACE.
- ALL PLUMBING FIXTURES SHALL BE PROVIDED WITH AN APPROVED CLEAR SILICONE SEALANT AROUND PERIMETER WHERE FIXTURES ATTACH TO WALLS OR FLOORS.
- FOR SHUTOFF SERVICE ON PIPING AND BRANCH LINES, USE RED & WHITE BALL VALVES, UNLESS OTHERWISE SPECIFIED.
- VALVES ON NATURAL GAS SERVICE, WRENCH OPERATED PLUG TYPE, CLASS 125, NEMAW-MILKLEN OR THERMADUQUE INSTALLATIONS.
- PRESSURE REDUCING VALVES FOR GAS SERVICE: FISHER OR EQUAL, SIZED FOR MAXIMUM OF 75 PERCENT OF FULL RATED CAPACITY C/M PRESSURE RELIEF.

31. INSULATION

- INSULATE ALL DOMESTIC HOT AND COLD WATER LINES AND HEATING HEATING LINES, WITH 25 MM THICK FIBREGLOSS HEAVY DENSITY PIPING INSULATION, WITH ALL SERVICE JACKETS.
- INSULATE THE FIRST 3 M OF STORM AND VENT PIPING FROM THE ROOF TERMINAL, AND ALL HORIZONTAL HEAVY DENSITY INSULATION WITH ALL SERVICE JACKETS BELOW ROOF DECK, WITH 25 MM THICK FIBREGLOSS HEAVY DENSITY INSULATION WITH ALL SERVICE JACKETS.
- INSULATE THE FIRST 3 M OF EXHAUST SUPPLY DUCTWORK FROM ROOF OR WALL TERMINAL, LOCATED INDOORS, WITH 25 MM FLEXIBLE FOL FACED FIBREGLOSS EXTERIOR DUCT INSULATION.
- INSULATE ALL DUCTWORK LOCATED OUTDOORS OR SUBJECT TO OUTDOOR TEMPERATURES WITH 50 MM THICK ROOF FIBREGLOSS INTERIOR DUCT INSULATION.
- INSULATE VENTILATION EQUIPMENT AND CABINET EXHAUST FAN CASINGS WITH 25 MM THICK RIGID FIBREGLOSS INTERIOR DUCT INSULATION.
- WHERE FIBREGLOSS PIPE INSULATION IS USED, INSULATE ALL PIPE FITTINGS, ELBOWS, ETC., WITH FIBREGLOSS INTERIOR DUCT INSULATION.
- ADJACENT INSULATION OF PIPE ELBOWS AND PIPE FITTINGS ON ALL EXPOSED INSULATION SHALL BE COVERED WITH PVC FITTING COVERS OR APPROVED EQUAL.
- ALL EXTERIOR SERVICE SHALL HAVE A MINIMUM SLOPE OF 1 PERCENT FOR LINES 100 MM AND OVER FOR LINES 75 MM AND UNDER, SEE MINIMUM 2 PERCENT SLOPE.
- PROVIDE BARRETT THE CLEANOUTS OF MATERIALS COMPATIBLE TO PIPING MATERIALS AT BIRDS OF SPOCS.
- PLUMBING INSTALLATION SHALL COMPLY WITH LOCAL BUILDING REGULATIONS. SUCH REQUIREMENTS SHALL TAKE PRECEDENCE OVER THE DRAWINGS AND SPECIFICATIONS.
- ALL CLEANOUTS SHALL BE ACCESSIBLE.
- ALL PIPES SHALL BE LOCATED AWAY FROM LOAD BEARING FOOTINGS.
- PROVIDE EPoxy COATED CAST IRON BORED CLEANOUTS C/M CLAMPING DEVICE ON PIPING BELOW GRADE AND ABOVE GRADE. PROVIDE CAST IRON BORED CLEANOUTS C/M CLAMPING DEVICE ON PIPING SCOURATED CAST IRON IN UNFINISHED AREAS, EXTRA HEAVY DUTY IN WAREHOUSE AREAS, NICKEL BRONZE SHEET PILE AND SEAMLESS TUBING (ASTM A213-90-10-40).
- PROVIDE CAST IRON ROOF DRAINS, WITH INTEGRAL COLLARS AND GRAVEL GUARD, POLY-DOME, SWAMP RECEIVER AND UNDERDRAIN CLAMP (ZURN 7-10-OR, UNLESS OTHERWISE SPECIFIED).
- FR-1 PROVIDE EPoxy COATED CAST IRON ROOF DRAINS, C/M REVERSIBLE CLAMPING COLLAR AND 165 MM ROUND, EXTRA HEAVY DUTY, NICKEL BRONZE STRAINER (ZURN NZ-210-8), UNLESS OTHERWISE NOTED.
- NON-FREEZE HOSE BIBBS SHALL BE ZURN MODEL NZ-1315-1/4, 20 MM, OR APPROVED EQUAL.
- FIT WATER SUPPLY PIPING TO EACH FIXTURE OR GROUP OF FIXTURES WITH AN AIR CHAMBER. PROVIDE AIR CHAMBERS TWO PIPE SIZES LARGER THAN INSTALLED ON AND MINIMUM 600 MM LONG, OR PROVIDE MANUFACTURER'S PUBLISHED RECOMMENDATIONS.
- WHERE STEEL PIPE IS USED, EXPOSED PIPE SHALL BE EXPRESSED TO INSULATE BETWEEN STEEL PIPING AND COPPER PIPING OR VESSELS BY THE USE OF DIELECTRIC JOINTS.
- PROVIDE APPROPRIATE PORTABLE WATER PROTECTION DEVICES ON PLUMBING LINES, WHERE CONTAMINATION OF PORTABLE DOMESTIC WATER FROM LEAKS, HOSE BIBBS, FLUSH VALVES, FIRE PROTECTION SYSTEMS, IRRIGATION SYSTEMS AND OTHERS REQUIRED BY CODE. PROTECTION DEVICES SHALL COMPLY WITH CSA B64.
- PLUMBING CONTRACTORS IS TO HAVE ALL BELOW GRADE PIPING INSPECTED BY MECHANICAL CONSULTANT PRIOR TO BACKFILLING. ADVISE CONSULTANT IN WRITING WITH 24 HOURS NOTICE OF BACKFILLING.
- H.V.A.C. DUCTWORK, EQUIPMENT & ACCESSORIES
- DUCTWORK SHALL BE CONSTRUCTED AND SEALED IN CONFORMANCE WITH SHAWMA - HVAC DUCT SIZES SHOWN, AND SHEET METAL SIZES, WHERE INTERNAL INSULATION IS SPECIFIED. MAKE AN ALLOWANCE FOR INSULATION THICKNESS, MAINTAIN INTERNAL DUCT SIZES SHOWN. PRIOR TO FABRICATION, CHECK CEILING SPACES, HEIGHTS AND CONDITIONS, WITH OTHER TRADES AT THE SITE AND ON DRAWINGS.
- RECTANGULAR DUCTS SHALL HAVE OPPOSED DUCT VOLUME DAMPERS.
- ROUND DUCTS SHALL HAVE BUTTERFLY DAMPERS.
- HAND BALANCING DAMPERS SHALL BE PROVIDED OF CALIBRATED IRON, TWO GAUGES HEAVIER THAN THAT OF THE DUCT IN WHICH THE DAMPER IS TO BE INSTALLED.
- FIRE DAMPER BLADE THICKNESS AND CONSTRUCTION SHALL COMPLY WITH THE CANADIAN BOARD OF INSURANCE UNDERWRITERS' REQUIREMENTS. THESE SHALL BE INSTALLED WHERE DUCTS AND GRILLS PASS THROUGH FIRE RATED ASSEMBLIES. PROVIDE APPROVED ACCESS PANELS AT EACH FIRE DAMPER CONTROLLING THE DAMPER REQUIREMENTS.
- DUCTS SHALL NOT UNDER ANY CIRCUMSTANCES, BE SUPPORTED BY MEANS OF OTHER TRADES, WIRE OR CHAIN. DUCTS SHALL NOT BE SUPPORTED FROM HANGERS SUPPLIED BY OTHER TRADES.
- THE CONNECTIONS BETWEEN DUCTS AND AIR HANDLING UNIT FANS SHALL BE MADE WITH 150 MM LONG FLEXIBLE NEOPRENE, TO PREVENT TRANSMISSION OF VIBRATION. THE CONTRACTOR SHALL ENSURE THAT ALL CONNECTIONS ARE LEAKPROOF.
- THE CONTRACTOR SHALL SUPPLY AND INSTALL FOR EACH ROOFTOP HVAC UNIT AND EACH MAKE-UP AIR UNIT (MAKEUP) THREE (3) GPM GAS FOR SERVICE CONNECTIONS TO THE UNIT. EACH SERVICE TO THE UNIT (GAS, WATER AND CONDENSATE) SHALL BE RUN THROUGH A SEPARATE GAIN COIL.
- THE HANG UNIT SUPPLIER AND THE MAKE-UP AIR UNIT SUPPLIER SHALL VISIT THE SITE AND INSPECT THE SERVICE CONNECTIONS TO THE SUPPLIER SHALL CONFORM WITH THE REQUIREMENTS OF THE MANUFACTURER'S INSTALLATION AND OPERATION OF THIS EQUIPMENT METS SPECIFIED CONDITIONS, AND AUTOMATIC CONTROLS.
- ALL AUTOMATIC CONTROLS FOR MECHANICAL EQUIPMENT SHALL BE PROVIDED BY THE CONTRACTOR.
- PROVIDE ALL NECESSARY WIRING DIAGRAMS AND INSTRUCTIONS IN ORDER THAT THE ELECTRICAL WORK CAN BE SUPERVISORALLY COMPLETED.
- INSTALLATION OF CONTROL WORK BY THE ELECTRICAL TRADE SHALL BE DONE UNDER THE SUPERVISION OF THE MECHANICAL TRADE.
- CONTROL WIRING AND ELECTRICAL DEVICES SHALL COMPLY WITH THE REQUIREMENTS OF DIVISION 16 - ELECTRICAL.
- THERMOSTATS SHALL BE MOUNTED 1.5 M ABOVE THE FLOOR LEVEL AND ON LOOK SIDE OF DOORS (IF APPLICABLE). THERMOSTATS SHALL BE MOUNTED ON INSULATED WALLS OR CEILING. THERMOSTATS SHALL BE MOUNTED ON OUTSIDE WALLS SHALL BE STOOD OFF FROM THE WALL BY INSULATED BLOCKS OR BRACKETS WHICH ALLOW FREE AIR MOVEMENT BEHIND THE THERMOSTAT. THERMOSTATS IN PUBLIC SPACES SHALL BE PROVIDED WITH CLEAR PLASTIC LOOKING COVERS.
- IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO ENSURE THAT, ALL CONTROL DEVICES SERVING MECHANICAL EQUIPMENT ARE INSTALLED CORRECTLY AND IN ACCORDANCE WITH THE MANUFACTURER'S OPERATING INSTRUCTIONS AS FURNISHED AND SPECIFIED IN CONNECTION WITH THE CONTROLS.
- MAKE CHANGES IMMEDIATELY TO CORRECT DEFECTS SHOULD TESTS INDICATE DEFECTIVE WORK. CORRECT LEAKS BY REPAIRING JOINTS AND RELETS.
- CONDUCT PERFORMANCE TESTS TO DEMONSTRATE EQUIPMENT AND SYSTEMS MEET SPECIFIED REQUIREMENTS AS SOON AS CONDITIONS PERMIT. MAKE CHANGES, REPAIRS, ADJUSTMENTS AND REPLACEMENTS REQUIRED AS TESTS MAY INDICATE, PRIOR TO OPERATING.
- PRESSURE TEST SHALL BE AS FOLLOWS:
 - CARRY OUT PNEUMATIC TESTS FOR 8 HOUR PERIOD AND MAINTAIN PRESSURE WITHIN NOT APPROPRIATE PRESSURE DROP, WHERE LEAKAGE OCCURS, REPAIR AND RETEST.
 - DOMESTIC WATER PIPING, TEST TO 1035 KPA, WATER PRESSURE MEASURED AT SYSTEM LOW POINT.
 - CHECK FOR PROPER GRADE AND OBSTRUCTION BY BALL TEST.
 - STORM DRAINAGE SYSTEMS, TEST BY FILLING WITH WATER TO PRODUCE WATER PRESSURE OF 5 M, CHECK FOR PROPER GRADE AND OBSTRUCTION BY BALL TEST.
 - GAS PIPING, TEST AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.
 - LOW VELOCITY DUCTS, TEST FOR TIGHTNESS SUCH THAT LEAKAGE IS MEASURABLE AND NOT DETECTABLE BY FEEL.

32. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO BALANCE ALL AIR SYSTEMS TO WITHIN +10 PERCENT OF DESIGN FLOW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE BALANCING SYSTEMS. THIS CONTRACT SHALL BE PROVIDED WITH NEW FILTERS PRIOR TO TAKEOVER OF THE PROJECT. WELL AS THE AUTHORIZED REPRESENTATIVE OF THE OWNER.

- THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO BALANCE ALL AIR SYSTEMS TO WITHIN +10 PERCENT OF DESIGN FLOW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE BALANCING SYSTEMS. THIS CONTRACT SHALL BE PROVIDED WITH NEW FILTERS PRIOR TO TAKEOVER OF THE PROJECT. WELL AS THE AUTHORIZED REPRESENTATIVE OF THE OWNER.
- INSULATE ALL DOMESTIC HOT AND COLD WATER LINES AND HEATING HEATING LINES, WITH 25 MM THICK FIBREGLOSS HEAVY DENSITY PIPING INSULATION, WITH ALL SERVICE JACKETS.
- INSULATE THE FIRST 3 M OF STORM AND VENT PIPING FROM THE ROOF TERMINAL, AND ALL HORIZONTAL HEAVY DENSITY INSULATION WITH ALL SERVICE JACKETS BELOW ROOF DECK, WITH 25 MM THICK FIBREGLOSS HEAVY DENSITY INSULATION WITH ALL SERVICE JACKETS.
- INSULATE THE FIRST 3 M OF EXHAUST SUPPLY DUCTWORK FROM ROOF OR WALL TERMINAL, LOCATED INDOORS, WITH 25 MM FLEXIBLE FOL FACED FIBREGLOSS EXTERIOR DUCT INSULATION.
- INSULATE ALL DUCTWORK LOCATED OUTDOORS OR SUBJECT TO OUTDOOR TEMPERATURES WITH 50 MM THICK ROOF FIBREGLOSS INTERIOR DUCT INSULATION.
- INSULATE VENTILATION EQUIPMENT AND CABINET EXHAUST FAN CASINGS WITH 25 MM THICK RIGID FIBREGLOSS INTERIOR DUCT INSULATION.
- WHERE FIBREGLOSS PIPE INSULATION IS USED, INSULATE ALL PIPE FITTINGS, ELBOWS, ETC., WITH FIBREGLOSS INTERIOR DUCT INSULATION.
- ADJACENT INSULATION OF PIPE ELBOWS AND PIPE FITTINGS ON ALL EXPOSED INSULATION SHALL BE COVERED WITH PVC FITTING COVERS OR APPROVED EQUAL.
- ALL EXTERIOR SERVICE SHALL HAVE A MINIMUM SLOPE OF 1 PERCENT FOR LINES 100 MM AND OVER FOR LINES 75 MM AND UNDER, SEE MINIMUM 2 PERCENT SLOPE.
- PROVIDE BARRETT THE CLEANOUTS OF MATERIALS COMPATIBLE TO PIPING MATERIALS AT BIRDS OF SPOCS.
- PLUMBING INSTALLATION SHALL COMPLY WITH LOCAL BUILDING REGULATIONS. SUCH REQUIREMENTS SHALL TAKE PRECEDENCE OVER THE DRAWINGS AND SPECIFICATIONS.
- ALL CLEANOUTS SHALL BE ACCESSIBLE.
- ALL PIPES SHALL BE LOCATED AWAY FROM LOAD BEARING FOOTINGS.
- PROVIDE EPoxy COATED CAST IRON BORED CLEANOUTS C/M CLAMPING DEVICE ON PIPING BELOW GRADE AND ABOVE GRADE. PROVIDE CAST IRON BORED CLEANOUTS C/M CLAMPING DEVICE ON PIPING SCOURATED CAST IRON IN UNFINISHED AREAS, EXTRA HEAVY DUTY IN WAREHOUSE AREAS, NICKEL BRONZE SHEET PILE AND SEAMLESS TUBING (ASTM A213-90-10-40).
- PROVIDE CAST IRON ROOF DRAINS, WITH INTEGRAL COLLARS AND GRAVEL GUARD, POLY-DOME, SWAMP RECEIVER AND UNDERDRAIN CLAMP (ZURN 7-10-OR, UNLESS OTHERWISE SPECIFIED).
- FR-1 PROVIDE EPoxy COATED CAST IRON ROOF DRAINS, C/M REVERSIBLE CLAMPING COLLAR AND 165 MM ROUND, EXTRA HEAVY DUTY, NICKEL BRONZE STRAINER (ZURN NZ-210-8), UNLESS OTHERWISE NOTED.
- NON-FREEZE HOSE BIBBS SHALL BE ZURN MODEL NZ-1315-1/4, 20 MM, OR APPROVED EQUAL.
- FIT WATER SUPPLY PIPING TO EACH FIXTURE OR GROUP OF FIXTURES WITH AN AIR CHAMBER. PROVIDE AIR CHAMBERS TWO PIPE SIZES LARGER THAN INSTALLED ON AND MINIMUM 600 MM LONG, OR PROVIDE MANUFACTURER'S PUBLISHED RECOMMENDATIONS.
- WHERE STEEL PIPE IS USED, EXPOSED PIPE SHALL BE EXPRESSED TO INSULATE BETWEEN STEEL PIPING AND COPPER PIPING OR VESSELS BY THE USE OF DIELECTRIC JOINTS.
- PROVIDE APPROPRIATE PORTABLE WATER PROTECTION DEVICES ON PLUMBING LINES, WHERE CONTAMINATION OF PORTABLE DOMESTIC WATER FROM LEAKS, HOSE BIBBS, FLUSH VALVES, FIRE PROTECTION SYSTEMS, IRRIGATION SYSTEMS AND OTHERS REQUIRED BY CODE. PROTECTION DEVICES SHALL COMPLY WITH CSA B64.
- PLUMBING CONTRACTORS IS TO HAVE ALL BELOW GRADE PIPING INSPECTED BY MECHANICAL CONSULTANT PRIOR TO BACKFILLING. ADVISE CONSULTANT IN WRITING WITH 24 HOURS NOTICE OF BACKFILLING.
- H.V.A.C. DUCTWORK, EQUIPMENT & ACCESSORIES
- DUCTWORK SHALL BE CONSTRUCTED AND SEALED IN CONFORMANCE WITH SHAWMA - HVAC DUCT SIZES SHOWN, AND SHEET METAL SIZES, WHERE INTERNAL INSULATION IS SPECIFIED. MAKE AN ALLOWANCE FOR INSULATION THICKNESS, MAINTAIN INTERNAL DUCT SIZES SHOWN. PRIOR TO FABRICATION, CHECK CEILING SPACES, HEIGHTS AND CONDITIONS, WITH OTHER TRADES AT THE SITE AND ON DRAWINGS.
- RECTANGULAR DUCTS SHALL HAVE OPPOSED DUCT VOLUME DAMPERS.
- ROUND DUCTS SHALL HAVE BUTTERFLY DAMPERS.
- HAND BALANCING DAMPERS SHALL BE PROVIDED OF CALIBRATED IRON, TWO GAUGES HEAVIER THAN THAT OF THE DUCT IN WHICH THE DAMPER IS TO BE INSTALLED.
- FIRE DAMPER BLADE THICKNESS AND CONSTRUCTION SHALL COMPLY WITH THE CANADIAN BOARD OF INSURANCE UNDERWRITERS' REQUIREMENTS. THESE SHALL BE INSTALLED WHERE DUCTS AND GRILLS PASS THROUGH FIRE RATED ASSEMBLIES. PROVIDE APPROVED ACCESS PANELS AT EACH FIRE DAMPER CONTROLLING THE DAMPER REQUIREMENTS.
- DUCTS SHALL NOT UNDER ANY CIRCUMSTANCES, BE SUPPORTED BY MEANS OF OTHER TRADES, WIRE OR CHAIN. DUCTS SHALL NOT BE SUPPORTED FROM HANGERS SUPPLIED BY OTHER TRADES.
- THE CONNECTIONS BETWEEN DUCTS AND AIR HANDLING UNIT FANS SHALL BE MADE WITH 150 MM LONG FLEXIBLE NEOPRENE, TO PREVENT TRANSMISSION OF VIBRATION. THE CONTRACTOR SHALL ENSURE THAT ALL CONNECTIONS ARE LEAKPROOF.
- THE CONTRACTOR SHALL SUPPLY AND INSTALL FOR EACH ROOFTOP HVAC UNIT AND EACH MAKE-UP AIR UNIT (MAKEUP) THREE (3) GPM GAS FOR SERVICE CONNECTIONS TO THE UNIT. EACH SERVICE TO THE UNIT (GAS, WATER AND CONDENSATE) SHALL BE RUN THROUGH A SEPARATE GAIN COIL.
- THE HANG UNIT SUPPLIER AND THE MAKE-UP AIR UNIT SUPPLIER SHALL VISIT THE SITE AND INSPECT THE SERVICE CONNECTIONS TO THE SUPPLIER SHALL CONFORM WITH THE REQUIREMENTS OF THE MANUFACTURER'S INSTALLATION AND OPERATION OF THIS EQUIPMENT METS SPECIFIED CONDITIONS, AND AUTOMATIC CONTROLS.
- ALL AUTOMATIC CONTROLS FOR MECHANICAL EQUIPMENT SHALL BE PROVIDED BY THE CONTRACTOR.
- PROVIDE ALL NECESSARY WIRING DIAGRAMS AND INSTRUCTIONS IN ORDER THAT THE ELECTRICAL WORK CAN BE SUPERVISORALLY COMPLETED.
- INSTALLATION OF CONTROL WORK BY THE ELECTRICAL TRADE SHALL BE DONE UNDER THE SUPERVISION OF THE MECHANICAL TRADE.
- CONTROL WIRING AND ELECTRICAL DEVICES SHALL COMPLY WITH THE REQUIREMENTS OF DIVISION 16 - ELECTRICAL.
- THERMOSTATS SHALL BE MOUNTED 1.5 M ABOVE THE FLOOR LEVEL AND ON LOOK SIDE OF DOORS (IF APPLICABLE). THERMOSTATS SHALL BE MOUNTED ON INSULATED WALLS OR CEILING. THERMOSTATS SHALL BE MOUNTED ON OUTSIDE WALLS SHALL BE STOOD OFF FROM THE WALL BY INSULATED BLOCKS OR BRACKETS WHICH ALLOW FREE AIR MOVEMENT BEHIND THE THERMOSTAT. THERMOSTATS IN PUBLIC SPACES SHALL BE PROVIDED WITH CLEAR PLASTIC LOOKING COVERS.
- IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO ENSURE THAT, ALL CONTROL DEVICES SERVING MECHANICAL EQUIPMENT ARE INSTALLED CORRECTLY AND IN ACCORDANCE WITH THE MANUFACTURER'S OPERATING INSTRUCTIONS AS FURNISHED AND SPECIFIED IN CONNECTION WITH THE CONTROLS.
- MAKE CHANGES IMMEDIATELY TO CORRECT DEFECTS SHOULD TESTS INDICATE DEFECTIVE WORK. CORRECT LEAKS BY REPAIRING JOINTS AND RELETS.
- CONDUCT PERFORMANCE TESTS TO DEMONSTRATE EQUIPMENT AND SYSTEMS MEET SPECIFIED REQUIREMENTS AS SOON AS CONDITIONS PERMIT. MAKE CHANGES, REPAIRS, ADJUSTMENTS AND REPLACEMENTS REQUIRED AS TESTS MAY INDICATE, PRIOR TO OPERATING.
- PRESSURE TEST SHALL BE AS FOLLOWS:
 - CARRY OUT PNEUMATIC TESTS FOR 8 HOUR PERIOD AND MAINTAIN PRESSURE WITHIN NOT APPROPRIATE PRESSURE DROP, WHERE LEAKAGE OCCURS, REPAIR AND RETEST.
 - DOMESTIC WATER PIPING, TEST TO 1035 KPA, WATER PRESSURE MEASURED AT SYSTEM LOW POINT.
 - CHECK FOR PROPER GRADE AND OBSTRUCTION BY BALL TEST.
 - STORM DRAINAGE SYSTEMS, TEST BY FILLING WITH WATER TO PRODUCE WATER PRESSURE OF 5 M, CHECK FOR PROPER GRADE AND OBSTRUCTION BY BALL TEST.
 - GAS PIPING, TEST AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.
 - LOW VELOCITY DUCTS, TEST FOR TIGHTNESS SUCH THAT LEAKAGE IS MEASURABLE AND NOT DETECTABLE BY FEEL.

33. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO BALANCE ALL AIR SYSTEMS TO WITHIN +10 PERCENT OF DESIGN FLOW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE BALANCING SYSTEMS. THIS CONTRACT SHALL BE PROVIDED WITH NEW FILTERS PRIOR TO TAKEOVER OF THE PROJECT. WELL AS THE AUTHORIZED REPRESENTATIVE OF THE OWNER.

- THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO BALANCE ALL AIR SYSTEMS TO WITHIN +10 PERCENT OF DESIGN FLOW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE BALANCING SYSTEMS. THIS CONTRACT SHALL BE PROVIDED WITH NEW FILTERS PRIOR TO TAKEOVER OF THE PROJECT. WELL AS THE AUTHORIZED REPRESENTATIVE OF THE OWNER.
- INSULATE ALL DOMESTIC HOT AND COLD WATER LINES AND HEATING HEATING LINES, WITH 25 MM THICK FIBREGLOSS HEAVY DENSITY PIPING INSULATION, WITH ALL SERVICE JACKETS.
- INSULATE THE FIRST 3 M OF STORM AND VENT PIPING FROM THE ROOF TERMINAL, AND ALL HORIZONTAL HEAVY DENSITY INSULATION WITH ALL SERVICE JACKETS BELOW ROOF DECK, WITH 25 MM THICK FIBREGLOSS HEAVY DENSITY INSULATION WITH ALL SERVICE JACKETS.
- INSULATE THE FIRST 3 M OF EXHAUST SUPPLY DUCTWORK FROM ROOF OR WALL TERMINAL, LOCATED INDOORS, WITH 25 MM FLEXIBLE FOL FACED FIBREGLOSS EXTERIOR DUCT INSULATION.
- INSULATE ALL DUCTWORK LOCATED OUTDOORS OR SUBJECT TO OUTDOOR TEMPERATURES WITH 50 MM THICK ROOF FIBREGLOSS INTERIOR DUCT INSULATION.
- INSULATE VENTILATION EQUIPMENT AND CABINET EXHAUST FAN CASINGS WITH 25 MM THICK RIGID FIBREGLOSS INTERIOR DUCT INSULATION.
- WHERE FIBREGLOSS PIPE INSULATION IS USED, INSULATE ALL PIPE FITTINGS, ELBOWS, ETC., WITH FIBREGLOSS INTERIOR DUCT INSULATION.
- ADJACENT INSULATION OF PIPE ELBOWS AND PIPE FITTINGS ON ALL EXPOSED INSULATION SHALL BE COVERED WITH PVC FITTING COVERS OR APPROVED EQUAL.
- ALL EXTERIOR SERVICE SHALL HAVE A MINIMUM SLOPE OF 1 PERCENT FOR LINES 100 MM AND OVER FOR LINES 75 MM AND UNDER, SEE MINIMUM 2 PERCENT SLOPE.
- PROVIDE BARRETT THE CLEANOUTS OF MATERIALS COMPATIBLE TO PIPING MATERIALS AT BIRDS OF SPOCS.
- PLUMBING INSTALLATION SHALL COMPLY WITH LOCAL BUILDING REGULATIONS. SUCH REQUIREMENTS SHALL TAKE PRECEDENCE OVER THE DRAWINGS AND SPECIFICATIONS.
- ALL CLEANOUTS SHALL BE ACCESSIBLE.
- ALL PIPES SHALL BE LOCATED AWAY FROM LOAD BEARING FOOTINGS.
- PROVIDE EPoxy COATED CAST IRON BORED CLEANOUTS C/M CLAMPING DEVICE ON PIPING BELOW GRADE AND ABOVE GRADE. PROVIDE CAST IRON BORED CLEANOUTS C/M CLAMPING DEVICE ON PIPING SCOURATED CAST IRON IN UNFINISHED AREAS, EXTRA HEAVY DUTY IN WAREHOUSE AREAS, NICKEL BRONZE SHEET PILE AND SEAMLESS TUBING (ASTM A213-90-10-40).
- PROVIDE CAST IRON ROOF DRAINS, WITH INTEGRAL COLLARS AND GRAVEL GUARD, POLY-DOME, SWAMP RECEIVER AND UNDERDRAIN CLAMP (ZURN 7-10-OR, UNLESS OTHERWISE SPECIFIED).
- FR-1 PROVIDE EPoxy COATED CAST IRON ROOF DRAINS, C/M REVERSIBLE CLAMPING COLLAR AND 165 MM ROUND, EXTRA HEAVY DUTY, NICKEL BRONZE STRAINER (ZURN NZ-210-8), UNLESS OTHERWISE NOTED.
- NON-FREEZE HOSE BIBBS SHALL BE ZURN MODEL NZ-1315-1/4, 20 MM, OR APPROVED EQUAL.
- FIT WATER SUPPLY PIPING TO EACH FIXTURE OR GROUP OF FIXTURES WITH AN AIR CHAMBER. PROVIDE AIR CHAMBERS TWO PIPE SIZES LARGER THAN INSTALLED ON AND MINIMUM 600 MM LONG, OR PROVIDE MANUFACTURER'S PUBLISHED RECOMMENDATIONS.
- WHERE STEEL PIPE IS USED, EXPOSED PIPE SHALL BE EXPRESSED TO INSULATE BETWEEN STEEL PIPING AND COPPER PIPING OR VESSELS BY THE USE OF DIELECTRIC JOINTS.
- PROVIDE APPROPRIATE PORTABLE WATER PROTECTION DEVICES ON PLUMBING LINES, WHERE CONTAMINATION OF PORTABLE DOMESTIC WATER FROM LEAKS, HOSE BIBBS, FLUSH VALVES, FIRE PROTECTION SYSTEMS, IRRIGATION SYSTEMS AND OTHERS REQUIRED BY CODE. PROTECTION DEVICES SHALL COMPLY WITH CSA B64.
- PLUMBING CONTRACTORS IS TO HAVE ALL BELOW GRADE PIPING INSPECTED BY MECHANICAL CONSULTANT PRIOR TO BACKFILLING. ADVISE CONSULTANT IN WRITING WITH 24 HOURS NOTICE OF BACKFILLING.
- H.V.A.C. DUCTWORK, EQUIPMENT & ACCESSORIES
- DUCTWORK SHALL BE CONSTRUCTED AND SEALED IN CONFORMANCE WITH SHAWMA - HVAC DUCT SIZES SHOWN, AND SHEET METAL SIZES, WHERE INTERNAL INSULATION IS SPECIFIED. MAKE AN ALLOWANCE FOR INSULATION THICKNESS, MAINTAIN INTERNAL DUCT SIZES SHOWN. PRIOR TO FABRICATION, CHECK CEILING SPACES, HEIGHTS AND CONDITIONS, WITH OTHER TRADES AT THE SITE AND ON DRAWINGS.
- RECTANGULAR DUCTS SHALL HAVE OPPOSED DUCT VOLUME DAMPERS.
- ROUND DUCTS SHALL HAVE BUTTERFLY DAMPERS.
- HAND BALANCING DAMPERS SHALL BE PROVIDED OF CALIBRATED IRON, TWO GAUGES HEAVIER THAN THAT OF THE DUCT IN WHICH THE DAMPER IS TO BE INSTALLED.
- FIRE DAMPER BLADE THICKNESS AND CONSTRUCTION SHALL COMPLY WITH THE CANADIAN BOARD OF INSURANCE UNDERWRITERS' REQUIREMENTS. THESE SHALL BE INSTALLED WHERE DUCTS AND GRILLS PASS THROUGH FIRE RATED ASSEMBLIES. PROVIDE APPROVED ACCESS PANELS AT EACH FIRE DAMPER CONTROLLING THE DAMPER REQUIREMENTS.
- DUCTS SHALL NOT UNDER ANY CIRCUMSTANCES, BE SUPPORTED BY MEANS OF OTHER TRADES, WIRE OR CHAIN. DUCTS SHALL NOT BE SUPPORTED FROM HANGERS SUPPLIED BY OTHER TRADES.
- THE CONNECTIONS BETWEEN DUCTS AND AIR HANDLING UNIT FANS SHALL BE MADE WITH 150 MM LONG FLEXIBLE NEOPRENE, TO PREVENT TRANSMISSION OF VIBRATION. THE CONTRACTOR SHALL ENSURE THAT ALL CONNECTIONS ARE LEAKPROOF.
- THE CONTRACTOR SHALL SUPPLY AND INSTALL FOR EACH ROOFTOP HVAC UNIT AND EACH MAKE-UP AIR UNIT (MAKEUP) THREE (3) GPM GAS FOR SERVICE CONNECTIONS TO THE UNIT. EACH SERVICE TO THE UNIT (GAS, WATER AND CONDENSATE) SHALL BE RUN THROUGH A SEPARATE GAIN COIL.
- THE HANG UNIT SUPPLIER AND THE MAKE-UP AIR UNIT SUPPLIER SHALL VISIT THE SITE AND INSPECT THE SERVICE CONNECTIONS TO THE SUPPLIER SHALL CONFORM WITH THE REQUIREMENTS OF THE MANUFACTURER'S INSTALLATION AND OPERATION OF THIS EQUIPMENT METS SPECIFIED CONDITIONS, AND AUTOMATIC CONTROLS.
- ALL AUTOMATIC CONTROLS FOR MECHANICAL EQUIPMENT SHALL BE PROVIDED BY THE CONTRACTOR.
- PROVIDE ALL NECESSARY WIRING DIAGRAMS AND INSTRUCTIONS IN ORDER THAT THE ELECTRICAL WORK CAN BE SUPERVISORALLY COMPLETED.
- INSTALLATION OF CONTROL WORK BY THE ELECTRICAL TRADE SHALL BE DONE UNDER THE SUPERVISION OF THE MECHANICAL TRADE.
- CONTROL WIRING AND ELECTRICAL DEVICES SHALL COMPLY WITH THE REQUIREMENTS OF DIVISION 16 - ELECTRICAL.
- THERMOSTATS SHALL BE MOUNTED 1.5 M ABOVE THE FLOOR LEVEL AND ON LOOK SIDE OF DOORS (IF APPLICABLE). THERMOSTATS SHALL BE MOUNTED ON INSULATED WALLS OR CEILING. THERMOSTATS SHALL BE MOUNTED ON OUTSIDE WALLS SHALL BE STOOD OFF FROM THE WALL BY INSULATED BLOCKS OR BRACKETS WHICH ALLOW FREE AIR MOVEMENT BEHIND THE THERMOSTAT. THERMOSTATS IN PUBLIC SPACES SHALL BE PROVIDED WITH CLEAR PLASTIC LOOKING COVERS.
- IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO ENSURE THAT, ALL CONTROL DEVICES SERVING MECHANICAL EQUIPMENT ARE INSTALLED CORRECTLY AND IN ACCORDANCE WITH THE MANUFACTURER'S OPERATING INSTRUCTIONS AS FURNISHED AND SPECIFIED IN CONNECTION WITH THE CONTROLS.
- MAKE CHANGES IMMEDIATELY TO CORRECT DEFECTS SHOULD TESTS INDICATE DEFECTIVE WORK. CORRECT LEAKS BY REPAIRING JOINTS AND RELETS.
- CONDUCT PERFORMANCE TESTS TO DEMONSTRATE EQUIPMENT AND SYSTEMS MEET SPECIFIED REQUIREMENTS AS SOON AS CONDITIONS PERMIT. MAKE CHANGES, REPAIRS, ADJUSTMENTS AND REPLACEMENTS REQUIRED AS TESTS MAY INDICATE, PRIOR TO OPERATING.
- PRESSURE TEST SHALL BE AS FOLLOWS:
 - CARRY OUT PNEUMATIC TESTS FOR 8 HOUR PERIOD AND MAINTAIN PRESSURE WITHIN NOT APPROPRIATE PRESSURE DROP, WHERE LEAKAGE OCCURS, REPAIR AND RETEST.
 - DOMESTIC WATER PIPING, TEST TO 1035 KPA, WATER PRESSURE MEASURED AT SYSTEM LOW POINT.
 - CHECK FOR PROPER GRADE AND OBSTRUCTION BY BALL TEST.
 - STORM DRAINAGE SYSTEMS, TEST BY FILLING WITH WATER TO PRODUCE WATER PRESSURE OF 5 M, CHECK FOR PROPER GRADE AND OBSTRUCTION BY BALL TEST.
 - GAS PIPING, TEST AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.
 - LOW VELOCITY DUCTS, TEST FOR TIGHTNESS SUCH THAT LEAKAGE IS MEASURABLE AND NOT DETECTABLE BY FEEL.

34. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO BALANCE ALL AIR SYSTEMS TO WITHIN +10 PERCENT OF DESIGN FLOW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE BALANCING SYSTEMS. THIS CONTRACT SHALL BE PROVIDED WITH NEW FILTERS PRIOR TO TAKEOVER OF THE PROJECT. WELL AS THE AUTHORIZED REPRESENTATIVE OF THE OWNER.

- THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO BALANCE ALL AIR SYSTEMS TO WITHIN +10 PERCENT OF DESIGN FLOW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE BALANCING SYSTEMS. THIS CONTRACT SHALL BE PROVIDED WITH NEW FILTERS PRIOR TO TAKEOVER OF THE PROJECT. WELL AS THE AUTHORIZED REPRESENTATIVE OF THE OWNER.

35. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO BALANCE ALL AIR SYSTEMS TO WITHIN +10 PERCENT OF DESIGN FLOW