

ALL DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF THE CONSULTANT AND NO REPRODUCTIONS MAY BE MADE WITHOUT THE CONSENT OF THE CONSULTANT AND REPORTS MUST BEAR THE NAME OF THE CONSULTANT.  
 THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DATINGS AND LEVELS NOTED ON DRAWINGS WITH THE CONTRACTOR'S FIELD AND SURVEY DATA. THE CONTRACTOR SHALL REPORTING ANY ERRORS OR OMISSIONS TO THE ENGINEER FOR ADJUSTMENTS.  
 THIS DRAWING SHALL NOT BE SCALED

- HAZARD, DOUBLE CHECK VALVE BACKFLOW PREVENTER (DCVA) FOR MEDIUM HAZARD OR REDUCED PRESSURE BACKFLOW PREVENTER (RP) FOR HIGH HAZARD FIXTURES.
- 18.2. PROVIDE BACKFLOW PREVENTION FOR THE FLOWING FIXTURES (OR GROUP OF FIXTURES) AS DEFINED ABOVE.
- 18.2.1. BASIN DCVA
  - 18.2.2. FLUSH TANK DCVA
  - 18.2.3. FLUSHING EQUIPMENT DEVICE RP
  - 18.2.4. HOSE CONNECTION (NON-RESIDENTIAL) DCVA/RP
  - 18.2.5. HOT WATER SYSTEMS CONNECTION HCVB
  - 18.2.6. LAVATORY DCVA
  - 18.2.7. TRAP PRIMER RP

**PLUMBING FIXTURES AND EQUIPMENT:**

WC-1 WATER CLOSET – WALL HUNG – BARRIER FREE

ACORN DURA-WARE 2100-W-1-HPS-BCN, BLOWOUT JET TOILET – OFF FLOOR, WALL THICKNESS 190MM BLOCK, WALL (CONCEALED), OFF-FLOOR, WALL OUTLET, 1.6 GPF, HIGH POLISH INTEGRAL SEAT, BLIND CAP NUTS (3), SLOAN REGAL XL OPTIMA #153-1.6 ES-S, CONCEALED FLUSHOMETER FOR TOP SPUD TOILET, 6 L (1.6 US GAL) FACTORY SET FLOW, QUIET ACTION DIAPHRAGM TYPE, INFRARED SENSOR, SOLENOID OPERATED FLUSH CONTROLLER CIRCUITRY, COURTESY FLUSH ELECTRONIC OVER-RIDE BUTTON, BAK-CHEK ANGLE STATED (WHEEL HANDLE OPERATED), EXPOSED CP ELBOW FOR TOP SPUD CONNECTION, VACUUM BREAKER, SENSOR LOCATED ABOVE THE TOILET, 5 VA POWER REQUIRED PER UNIT. PROVIDE 4" (102 MM) SQUARE ELECTRICAL BOX FOR MOUNTING SENSOR PLATE. SLOAN #EL-342, BOX MOUNT HARD WIRED TRANSFORMER, 240 / 24 50 VA. WILL OPERATE UP TO 10 "OPTIMA" FLUSH VALVE UNITS. WATTS #SCA-101-M11 SINGLE HORIZONTAL ADJUSTABLE TOILET CARRIER, MOUNTED ON CONCRETE FLOOR, ALL EPOXY COATED CAST IRON FITTING, ADJUSTABLE ABS SLIDE NIPPLE WITH INTEGRAL TEST CAP AND NEOPRENE BOWL GASKET, WASTED PLATED HARDWARE, CHROME CAP NUTS, TILING FRAME, 102 MM (4") NO HUB WASTE, 51 MM (2") NO HUB VENT, 158.8 KG (350 LBS) STATIC LOAD, 305 MM (12") FINISHED METAL STUD WALL TO BACK OF PIPE SPACE. C.T.134m981294m MI-TR S34614234634 #M-HUB TR-440 DRAIN COUPLING, COUPLING, NO-HUB, TYPE 300 AISI STAINLESS STEEL BAND, TYPE 300 AISI STAINLESS STEEL EYELETS, ELASTOMERIC COMPOUND GASKET MEETING THE REQUIREMENTS OF ASTM C-564, TYPE 300 AISI STAINLESS STEEL SHIELD, TESTED TO MAINTAIN 4.3 PSI OF WATER PRESSURE AT 60 INCH LB MIN/MAX TORQUE BOLT TIGHTNESS, TESTED AND CERTIFIED TO ASTM STANDARD 1460-2012 AND CSA STANDARD B602-2010 AND LISTED WITH IAPMO. ALL MODELS ARE LISTED TO THE NATIONAL PLUMBING CODE OF CANADA AND RELEVANT CANADIAN STANDARD (S) AND BEAR THE CUPC MARK OF CONFORMITY. NON CONSTANT TEMPERATURE RATING IS 140F.

L-1 LAVATORY – WALL HUNG – BARRIER FREE

ACORN MERIDIAN 3701-1-SO-DMJ-PPM STAINLESS STEEL CURVED FRONT UNI-BASIN LAVATORY, OFF-FLOOR, WALL MOUNTED, TERRAZZO COMPOSED OF PEARL GRAY MARBLE CHIPS AND PORTLAND CEMENT GROUND SMOOTH, SEALED TO RESIST STAIN, CAST BRASS DRAIN WITH STAINLESS STEEL STRAINER, 3"(75MM) OUTLET, AMERICAN STANDARD #B350.243 WALL MOUNTED TWO HANDLE FAUCET, CHROME PLATED, 8" (203MM) CENTERSET, CAST BRASS BODY, SLOW COMPRESSION, UNRESTRICTED HOSE END OUTLET, SPOUT WITH ATMOSPHERIC VACUUM BREAKER AND BUCKET HOOK 173 MM (7-1/4") FROM WALL TO OUTLET REACH, LEVER HANDLES. STERN WILLIAMS T-35 HOSE AND WALL HOOK HOSE 36" (914MM) LONG WITH 3/4" (19MM) CHROME COUPLING, STAINLESS STEEL WALL BRACKET. STERN WILLIAMS T-40 MOP HANGER STAINLESS STEEL #4 FINISH, 24" (610MM) LONG WITH 3 RUBBER SPRING LOADED CLIPS. STERN WILLIAMS BP BACK SPLASH PANEL 20 GAUGE TYPE 304 STAINLESS STEEL. PROVIDE P-TRAP, SAME MATERIAL AS THE CONNECTING PIPE DRAIN.

MS-1 SERVICE / MOP SINK – TWO HANDLE FAUCET

STERN WILLIAMS #MTB-2424 SQUARE SERVICE / MOP SINK, 610 MM (24") X 610 MM (24") X 254 MM (10") DEEP, FLOOR MOUNTED, TERRAZZO COMPOSED OF PEARL GRAY MARBLE CHIPS AND PORTLAND CEMENT GROUND SMOOTH, SEALED TO RESIST STAIN, CAST BRASS DRAIN WITH STAINLESS STEEL STRAINER, 3"(75MM) OUTLET, AMERICAN STANDARD #B350.243 WALL MOUNTED TWO HANDLE FAUCET, CHROME PLATED, 8" (203MM) CENTERSET, CAST BRASS BODY, SLOW COMPRESSION, UNRESTRICTED HOSE END OUTLET, SPOUT WITH ATMOSPHERIC VACUUM BREAKER AND BUCKET HOOK 173 MM (7-1/4") FROM WALL TO OUTLET REACH, LEVER HANDLES. STERN WILLIAMS T-35 HOSE AND WALL HOOK HOSE 36" (914MM) LONG WITH 3/4" (19MM) CHROME COUPLING, STAINLESS STEEL WALL BRACKET. STERN WILLIAMS T-40 MOP HANGER STAINLESS STEEL #4 FINISH, 24" (610MM) LONG WITH 3 RUBBER SPRING LOADED CLIPS. STERN WILLIAMS BP BACK SPLASH PANEL 20 GAUGE TYPE 304 STAINLESS STEEL. PROVIDE P-TRAP, SAME MATERIAL AS THE CONNECTING PIPE DRAIN.

FD-1 FLOOR DRAINS – FIN. AREAS – MED. DUTY STRAINER

SMITH SERIES 2005A FLOOR DRAIN, ALL DUCCO COATED CAST IRON BODY, REVERSIBLE FLASHING CLAMP WITH SEEPAGE OPENINGS AND ADJUSTABLE 5" (127MM) DIAMETER NICKEL BRONZE 1/4" (6.35MM) THICK STRAINER, SECURED WITH S.S. SCREWS, 4" (100MM) THROAT ON STRAINER. (WHERE REQUIRED BY LOCAL CODE PROVIDE TRAP SEAL).

CO-1 FLOOR CLEANOUT (UNFINISHED AND OUTSIDE AREAS)

SMITH "TWS-TO-FLOOR" SERIES 4220 FLOOR CLEANOUT, DUCCO COATED CAST IRON BODY AND REMOVABLE POSITIVE GASKET SEAL CLOSURE PLUG AND HEAVY DUTY 6" (150MM) ROUND ADJUSTABLE SCORATED CAST IRON COVER SECURED WITH STAINLESS STEEL SCREWS, C.O. CAST IN COVER. (FOR WATER-PROOFED AREAS PROVIDE "C" FLANGE WITH FLASHING CLAMP).

CO-2 FLOOR CLEANOUT (TILED AREAS)

SMITH SERIES 4140 FLOOR CLEANOUT, DUCCO COATED CAST IRON BODY AND REMOVABLE POSITIVE GASKET SEAL CLOSURE PLUG AND HEAVY DUTY 6" (150MM) ROUND NICKEL BRONZE COVER AND FRAME WITH 1/8" (3MM) TILE RECESS. (FOR MEDIUM LOAD TRAFFIC) COVER CAN BE ADJUSTED TO SUIT FLOOR LINES WHEN INSTALLING FINISHED FLOOR. (MOSAIC TILE PROVIDE SERIES 4160 WITH SQUARE COVER.)

CO-3 FLOOR CLEANOUT (TERRAZZO AREAS)

SMITH SERIES 4180 FLOOR CLEANOUT, DUCCO COATED CAST IRON BODY AND REMOVABLE POSITIVE GASKET SEAL CLOSURE PLUG, HEAVY DUTY 6" (150MM) ROUND NICKEL BRONZE COVER AND FRAME WITH 1/2" (12MM) TERRAZZO RECESS (FOR MEDIUM LOAD TRAFFIC). COVER CAN BE ADJUSTED TO SUIT FLOOR LINES WHEN INSTALLING FINISHED FLOOR.

CO-4 STACK CLEANOUT

SMITH SERIES 4510 STACK CLEANOUT, IN BASE OF CAST IRON STACKS WITH NEOPRENE GASKETED PLUG. WHERE CLEANOUTS ARE CONCEALED BEHIND FINISHED WALLS ACCESS SHALL BE MADE BY SMITH 4530 ROUND STAINLESS STEEL PLATE AND SLOTTED FLAT HEAD STAINLESS STEEL SCREW.

TS-1 TRAP SEAL DEVICE

WADE MODEL #4405 TRAP SEAL DEVICE (OR EQUAL), REGULARLY FURNISHED: ELASTOMERIC TRAP SEAL DEVICE WITH FITTING.

WHA WATER HAMMER ARRESTORS

SMITH "HYDROTRLO" WATER HAMMER ARRESTORS SERIES #5000, STAINLESS STEEL, PRESSURIZED CHAMBERS, BELLOWS, SIZE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS CHART BELOW TO ELIMINATE WATER HAMMER AND SHOCK FROM PIPING SYSTEM. PROVIDE WATER HAMMER ARRESTORS ON HOT AND COLD WATER SUPPLIES TO ALL QUICK VALVES, SOLENOIDS, AND PLUMBING FIXTURES, AND LOCATE IN AN UPRIGHT POSITION BETWEEN THE LAST TWO FIXTURES ON A LINE, OR HORIZONTALLY AT THE END OF LINE CLOSEST TO SUPPLY SOURCE.

SIZE	FIXTURE UNITS	MODEL NO.	CONN. SIZE
A	1 – 11	5005	1/2" (12MM)
B	12 – 32	5010	3/4" (19MM)

C	33 – 60	5020	1" (25MM)
D	61 – 113	5030	1-1/4"(32MM)
E	114 – 154	5040	1-1/2"(38MM)
F	155 – 330	5050	2" (50MM)

P-1 POTABLE WATER PUMP

GRUNDFOS 'CR SERIES' VERTICAL MULTISTAGE CENTRIFUGAL PUMP, MODEL # CRIS-4, . CAST IRON SUCTION AND DISCHARGE, STAINLESS STEEL CASING, BOWLS, AND IMPELLERS, EPDM ELASTOMERS, CARTRIDGE MECHANICAL SEAL WITH SILICON CARBIDE VS SILICON CARBIDE FACES, 1/3 HP, TEFC ENCLOSURE, 115/1/60 ELECTRIC MOTOR, CONNECTIONS: 1 1/2" ANSI FLANGED, CAPACITY: 2 USGPM @ 40 PSI.

WP-1 WELL PUMP (FOR APPROXIMATE PRICING ONLY – TO BE DETERMINED BASED ON TEST DRILLS)

GRUNDFOS 'SP SERIES' SUBMERSIBLE PUMP, MODEL # 5505-13, C/W STAINLESS STEEL CONSTRUCTION, INTEGRAL DISCHARGE CHECK VALVE, 4" NOMINAL PUMP SIZE, 4" NOMINAL MOTOR SIZE, 1/4HP, 208/3/60 SUBMERSIBLE MOTOR, 2" NPT DISCHARGE, CAPACITY: 5 USGPM @ 200 FT TDH.

PT-1,2 PRESSURE TANKS

GOULDS V60 STAND MOUNTED PRESSURE TANK, 19.9 GAL CAPACITY.

ST-1 POTABLE WATER STORAGE TANK

EQUINOX E-250WS POLYETHYLENE INDOOR WATER AND STORAGE TANK, 250 GAL CAPACITY.

HT-1 SEWAGE HOLDING TANK

GUARDIAN HOLDING TANK G-1500-H7, 1500 GALLON CAPACITY, DEEP CONFIGURATION. PROVIDE COMPLETE WITH SLEEVE EXTENSION FOR DEEP CONFIGURATION.

HWT-1 DOMESTIC HOT WATER TANK

AO SMITH MODEL DEL-10 ELECTRIC DOMESTIC HOT WATER TANK, RATED AT 2 KW, VESSEL CONSTRUCTED FOR 150 PSI WORKING PRESSURE, GLASS LINED, INSULATED, MANUAL TEMPERATURE CONTROL, LOW WATER CUT OFF, 10 GALLON STORAGE CAPACITY, 208V.

**WATER SOFTENERS**

1. SUMMARY
  - 1.1. PROVIDE A \$5000.00 ALLOWANCE FOR FUTURE WATER SOFTENER.
  - 1.2. THIS SECTION PROVIDES GUIDANCE ON SELECTING AND INSTALLING A DOMESTIC WATER SOFTENER.
  - 1.3. SPECIFYING A SUITABLE WATER SOFTENER REQUIRES INPUT FROM A LOCAL WATER SAMPLE AND ESTIMATED WATER CONSUMPTION.
  - 1.4. THE CONTRACTOR SHALL COLLECT A LOCAL WATER SAMPLE AND HAVE IT ANALYZED FOR WATER HARDNESS. REPORT SHALL INDICATE MG/L OR GRAINS PER GALLON (GPG) OF CALCIUM AND MAGNESIUM, AND MG/L OR PARTS PER MILLION (PPM) OF IRON.
  - 1.5. THE CONTRACTOR SHALL INPUT THIS DATA INTO THE CALCULATIONS IN PART 2 AND APPLY THE RESULTANT INFORMATION TO THE REMAINDER OF THIS SECTION TO COMPLETE THE SPECIFICATION.
2. PRODUCTS
  - 2.1. SIZING CALCULATION:
    - 2.1.1. RECORD LEVELS OF CALCIUM AND MAGNESIUM. IF READING IN MG/L, DIVIDE THE READING BY 17.1 TO OBTAIN GRAINS PER GALLON (GPG).
    - 2.1.2. RECORD LEVEL OF IRON. MULTIPLY MG/L OR PARTS PER MILLION (PPM) X3 TO OBTAIN GRAINS PER GALLON (GPG).
    - 2.1.3. ADD: GPG CALCIUM AND MAGNESIUM + GPG IRON = TOTAL GPG.
    - 2.1.4. FOR THIS APPLICATION, IT IS ESTIMATED THAT THE VOLUME OF WATER USAGE PER DAY WILL BE 1000 GALLONS. IT IS ESTIMATED THE MAXIMUM FLOW RATE THROUGH THE SOFTENER WILL BE 20 GALLONS PER MINUTE (GPM).
    - 2.1.5. MULTIPLY: TOTAL GPG X 1000 GALLONS X 7 DAYS = THEORETICAL GRAINS REQUIRED
    - 2.1.6. DIVIDE: THEORETICAL GRAINS REQUIRED / 20,000 = CUBIC FEET OF RESIN BEADS REQUIRED.
    - 2.1.7. THE SPECIFIED WATER SOFTENER SHALL BE SIZED FOR:
      - 2.1.7.1. THE CUBIC FEET OF RESIN BEADS CALCULATED, AND
      - 2.1.7.2. THE ESTIMATED FLOW RATE (GPM).
  - 2.2. SYSTEM REQUIREMENTS
    - 2.2.1. THE WATER SOFTENING SYSTEM SHALL BE A TURN-KEY COMPLETE SYSTEM BY ONE SUPPLIER. SOFTENING SYSTEM COMPONENTS SHALL INCLUDE RESIN TANK(S), BRINE TANK(S), BRINE FORMING SYSTEM, BRINE DISTRIBUTION AND METERING SYSTEM, REGENERATING MANIFOLD, STANDALONE CONTROL SYSTEMS INCLUDING A 7 DAY TIME CLOCK, AND 99.7% PURE SALT IN FORMED SHAPE PELLETS.
3. INSTALLATION
  - 3.1. INSTALL AND SETUP AS PER MANUFACTURERS REQUIREMENTS.
  - 3.2. COMPONENTS SHALL BE PLACED AND SECURED TO AVOID FORCES ON CONNECTED PIPING.
  - 3.3. REGENERATION DISCHARGE PIPE SHALL TERMINATE ABOVE A FUNNEL FLOOR DRAIN VIA AN AIR GAP.
  - 3.4. INPUT INITIAL SYSTEM PARAMETERS INCLUDING WATER HARDNESS DATA.
  - 3.5. SET CORRECT TIME ON THE SYSTEM INTERNAL TIME CLOCK. SET REGENERATION TIME FOR SUNDAY 2:00 AM UNLESS OTHERWISE NOTED.
  - 3.6. FILL THE BRINE TANK WITH 99.7% PURE SALT IN FORMED SHAPE PELLETS. DO NOT USE ROCK SALT.
  - 3.7. PROVIDE ONE EXTRA BAG OF SALT AND LEAVE NEXT TO BRINE TANK.

**OUTSIDE SERVICES**

1. PROVIDE PIPING SYSTEMS INCLUDING ALL NECESSARY CONNECTIONS TO SANITARY SEWER AND DOMESTIC WATER SERVICE.
2. RESPONSIBILITY FOR RESTORATION OF PAVED PUBLIC STREETS TO ORIGINAL CONDITION IF THEY HAVE BEEN AFFECTED AS A RESULT OF THE WORK IN THIS SECTION.
3. CONFIRMATION OF EXACT LOCATION AND INVERT ELEVATIONS OF SERVICES PRIOR TO COMMENCING WORK. IF ANY DISCREPANCIES SHOULD BE DISCOVERED, THEN NOTIFY THE CONTRACT ADMINISTRATOR IMMEDIATELY.
4. CONFORM WITH THE REQUIREMENTS OF THE PLANS AND SPECIFICATION, THE LOCAL AUTHORITIES HAVING JURISDICTION AND THE CITY OF WINNIPEG CONSTRUCTION SPECIFICATIONS. IN THE CASE OF CONFLICTING REQUIREMENTS, BE GOVERNED BY THE MOST SEVERE REGULATIONS.
5. SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH SPECIFICATIONS.
6. EXAMINE AREA WHERE WORK IS TO BE PERFORMED FOR:
  - 6.1. ANYTHING THAT AFFECTS EXECUTION AND QUALITY OF WORK.
  - 6.2. PIPING CLEARANCES.
7. WHERE, UNDER THIS CONTRACT, IT IS NECESSARY TO CONNECT EXISTING WEAR MAINS TO THOSE WHICH ARE TO BE LAID, ALL PRECAUTIONARY MEASURES DEEMED NECESSARY BY THE CONTRACT ADMINISTRATOR TO PROTECT EXISTING MAINS, AND TO CAUSE THE LEAST INCONVENIENCE TO USERS OF EXISTING MAINS, SHALL BE CARRIED OUT BY THE OUTSIDE SERVICES CONTRACTOR AT NO ADDITIONAL CHARGE TO THE CITY. THIS CHARGE, IF ANY, TO BE INCLUDED. NO VALVE OR OTHER CONTROL ON THE SYSTEM SHALL BE OPERATED FOR ANY PURPOSE BY THE OUTSIDE SERVICES CONTRACTOR WITHOUT APPROVAL OF THE CONTRACT ADMINISTRATOR, AND ALL CONSUMERS AFFECTED BY SUCH OPERATIONS SHALL BE NOTIFIED BY THE OUTSIDE SERVICE CONTRACTOR, AT LEAST ONE HOUR BEFORE THE OPERATION AND ADVISED OF THE PROBABLE TIME WHEN SERVICE WILL BE RESTORED.
8. THE OUTSIDE SERVICE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES TO ANY UNDERGROUND OR SURFACE UTILITY STRUCTURES, DRAIN, SEWER, WATER SERVICE, VALVE, SERVICE BOX OR OTHER OBSTRUCTION ENCOUNTERED IN THE PROGRESS OF THE WORK. ANY SERVICE OR OTHER UTILITY DAMAGE, SHALL BE REPAIRED OR REPLACED AT THE OUTSIDE SERVICE CONTRACTOR'S EXPENSE TO THE ENTIRE SATISFACTION OF THE CONTRACT ADMINISTRATOR.
9. PROCURE ALL PERMITS FOR CROSSING STREETS AND SIDEWALKS AND PERFORM NO EXCAVATION WITHOUT APPROVAL BY CITY ENGINEERING DEPARTMENT AND CONTRACT ADMINISTRATOR.
10. WHERE THE SURFACE OF A STREET, DRIVEWAY, BOULEVARD, OR SIDEWALK HAS BEEN CUT TO INSTALL PIPE, THE CROSSING SHALL BE BACKFILLED WITH GRANULAR FILL, AND TAMPERED IN LIFTS AND RESURFACED TO THE ORIGINAL CONDITION, TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR AND AUTHORITIES HAVING

JURISDICTION.

11. THIS CONTRACTOR SHALL MAKE APPLICATION AND PAY FOR ALL PERMITS, ASSESSMENTS, INSPECTION FEES, CONNECTION CHARGES, STREET CUT PERMITS AND ALL OTHER CHARGES PERTAINING TO THE COMPLETION OF INSTALLATION, TO ALL APPROPRIATE GOVERNMENTAL AUTHORITIES.

12. SEWER PIPES SHALL BE LAID ACCORDING TO THE GRADE AND ALIGNMENT SHOWN ON THE PLANS, WITHIN A TOLERANCE OF 1 1/2" (38 MM) VERTICAL AND 12" (300 MM) HORIZONTAL. THE OUTSIDE SERVICE CONTRACTOR TO ESTABLISH OWN BATTER BOARDS FOR LINE AND GRADE.

13. ALL PIPES SHALL BE LEFT UNCOVERED FOR INSPECTION AND NO PIPES SHALL BE COVERED UNTIL PERMISSION HAS BEEN GIVEN BY THE CONTRACT ADMINISTRATOR. THE CONTRACTOR SHALL ALLOW 48 HRS. NOTIFICATION PRIOR TO COMMENCEMENT OF WORK. SHOULD ANY PIPE BE COVERED BY THE CONTRACTOR BEFORE THE PERMISSION OF THE CONTRACT ADMINISTRATOR HAS BEEN OBTAINED, THE TRENCH SHALL BE REOPENED AT THE OUTSIDE CONTRACTOR'S EXPENSE.

14. PIPE BEDDING SHALL CONSIST OF A MINIMUM OF 4" (100 MM) SAND SHALL BE SPREAD AND GRADED OVER THE BOTTOM OF THE TRENCH BEFORE PLACING ANY PIPE. AFTER THE PIPE IS PLACED, FREE RUNNING SAND SHALL BE PLACED TO THE TOP OF THE PIPE AND THEN COMPACTED. PARTICULAR CARE SHALL BE TAKEN IN COMPACTING THIS MATERIAL TO GIVE PROPER SUPPORT TO THE PIPE. MORE SAND SHALL THEN BE PLACED AND THOROUGHLY COMPACTED TO 24" (600 MM) ABOVE THE PIPE IN 6" (150 MM) LIFTS. THE REMAINDER OF THE TRENCH WHERE GOING UNDER SIDEWALK PAVING, FLOOR SLABS, ETC. SHALL BE BACKFILLED WITH GRANULAR MATERIAL COMPACTED IN 12" (300 MM) LIFTS TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR. WHERE THE TRENCHES RUN THROUGH GRASSED AREAS, OR NON-PAVED AREAS, THE REMAINDER OF THE TRENCH MAY THEN BE BACKFILLED WITH CLEAN EARTH MECHANICALLY COMPACTED IN 12" (300 MM) LIFTS. ALL EXCAVATION SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH ALL GOVERNING CODES AND PROVINCIAL DEPARTMENT OF LABOUR REGULATIONS. ALL EXCESS MATERIAL SHALL BE REMOVED FROM THE SITE OR BE PLACED AS DIRECTED BY THE ARCHITECT AFTER INSTALLATION OF THE BURIED SERVICE.

**HEATING, VENTILATION & AIR CONDITIONING**

1. PROVIDE SUPPLY, RETURN AND EXHAUST AIR DUCT SYSTEMS FROM AIR HANDLING EQUIPMENT AND FANS AS SHOWN.

2. ALL DUCTWORK INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH ASHRAE, SMACNA LATEST EDITION DUCT STANDARDS AND PART 9.36 OF THE NATIONAL BUILDING CODE.

3. THIS CONTRACTOR SHALL SUPPLY AND INSTALL ALL DUCTWORK INCLUDING APPURTENANCES, HANGERS, DAMPERS, ETC.

4. DUCT CONSTRUCTION:
 

- 4.1. RECTANGULAR DUCTWORK SHALL BE CONSTRUCTED FROM GALVANIZED SHEET METAL OF THE FOLLOWING U.S. STANDARD GAUGES:
 

DUCTS UP TO 12" ON LONGEST DIMENSION 26 GA.
DUCTS 13" TO 28" ON LONGEST DIMENSION 24 GA.
- 4.2. ROUND AND OVAL DUCTWORK SHALL BE SPIRAL CONDUIT CONSTRUCTION OF ZINC COATED STEEL OF THE FOLLOWING U.S. GAUGES:
 

CONDUIT SIZE	GAUGE OF METAL
8" AND SMALLER	26
9" TO 22"	24

ALL SEAMS AND JOINTS IN ROUND OR OVAL DUCT FITTINGS SHALL BE CONTIGUOUSLY WELDED. RE-COAT ZINC COATING DAMAGED BY WELDING PROCEDURE.

5. BACK-DRAFT DAMPERS SHALL BE PROVIDED WITH THE FOLLOWING MINIMUM REQUIREMENTS:
 

- 5.1. BALANCING DAMPERS SHALL BE CONSTRUCTED FROM GALVANIZED STEEL 2 GAUGES HEAVIER THAN THE DUCTWORK IN WHICH THEY ARE INSTALLED C/W LOCKING QUADRANT AND INDICATING DEVICE.
- 5.2. 16 GA. GALVANIZED STEEL OR ALUMINUM CHANNEL FRAME; 16 GA. GALVANIZED BLADES C/W STIFFENERS, FULL BLADE-LENGTH SHAFT; BRASS, BALL OR NYLON BUSHING; FELT OR NEOPRENE ANTI-CHATTER BLADE STRIPS; ADJUSTABLE COUNTER-BALANCE.
- 5.3. SHALL BE BY ONE MANUFACTURER. STANDARD OF ACCEPTANCE: VENTEX, PRICE, TITUS.

6. TURNING VANES SHALL BE CONSTRUCTED TO THE FOLLOWING REQUIREMENTS:
 

- 6.1. USE DUCT ELBOWS WHICH HAVE A THROAT RADIUS OF 1-1/2 TIMES THE DUCT DIAMETER.
- 6.2. WHERE SPACE IS LIMITED, USE DUCT ELBOWS FABRICATED WITH SPACE THROATS AND BACKS AND FITTED WITH ROVANE TURNING VANES.

7. THE FOLLOWING DUCT JOINING METHODS SHALL BE USED:
 

- 7.1. PITTSBURGH LOCK OR DOUBLE SLIDE LOCK HAMMERED FLAT FOR LONGITUDINAL JOINTS ON STRAIGHT DUCTWORK.
- 7.2. PITTSBURGH LOCK FOR CORNER LOCK OF FITTING.
- 7.3. FLAT DRIVE CLEAT JOINT ON ALL SIDE JOINTS 18" (450MM) AND UNDER IN LENGTH.
- 7.4. FLAT SLIP CLEAT JOINT ON ALL TRANSVERSE JOINTS 18" (450MM) AND UNDER IN LENGTH.
- 7.5. ANGLE "S" OR STANDING DRIVE CLEATS ON ALL SIDE JOINTS 19"(475MM) TO 30"(750MM) ON HEIGHT.
- 7.6. STANDING "S" OR STANDING DRIVE CLEATS ON ALL TRANSVERSE JOINTS 19"(475MM) TO 30"(750MM) IN LENGTH.
- 7.7. ANGLE "S" OR STANDING DRIVE CLEATS ON ALL TRANSVERSE AND SIDE JOINTS 31"(725MM) TO 72"(1800MM).
- 7.8. STANDING "S" OR STANDING DRIVE CLEATS REINFORCED WITH 1 1/2"(38MM) X 4.5MM MILD STEEL BAR ON ALL TRANSVERSE AND SIDE JOINTS 73"(1825MM) AND OVER.

8. PROVIDE FIRE DAMPERS WHICH CONFORM TO NFPA REGULATIONS, BEAR ULC LABEL, AND HAVE APPROVAL OF AUTHORITY HAVING JURISDICTION. DAMPERS TO BE TYPE 'B' AND 'C' (UNLESS OTHERWISE NOTED) AND INSTALLED IN DUCTWORK AT FIRE SEPARATIONS WHETHER SHOWN OR NOT. VERIFY LOCATIONS ON ARCHITECTURAL DRAWINGS. ALL FIRE DAMPERS SHALL BE BY ONE MANUFACTURER. STANDARD OF ACCEPTANCE: NAIOR, PRICE, TITUS.

9. ALL NEW DUCTWORK SHALL BE SEALED USING DUCT BOND II HIGH PRESSURE, NON-TOXIC, DUCT SEALER THROUGHOUT ALL SEAMS AND JOINTS.

10. SUPPORT HORIZONTAL DUCTS ON MAXIMUM 8'-0" (2.4 M) CENTERS BY PERFORATED GALV. STEEL RIVETTED STRAP FOR DUCTWORK 36" (915 MM) (EITHER DIMENSION) OR LESS, AND MINIMUM 1" X 1" X 1/8" (25 X 25 X 2 MM) GALV. IRON UNDER DUCTS OVER 36" (915 MM) (EITHER DIMENSION) WITH 3/8" (6 MM) DIAM. THREADED RODS SUSPENDING ANGLES FROM STRUCTURE.

11. PROVIDE ACCESS DOORS WHERE REQUIRED FOR SERVING OF EQUIPMENT AND FIRE DAMPERS.

12. PROVIDE 4" (100 MM) FLEXIBLE DUCT CONNECTIONS ON BOTH INLET AND OUTLET DISCHARGE SIDES OF EACH FAN.

13. PROVIDE ONE SPARE SET OF FILTERS FOR EACH AIR HANDLING UNIT.

14. DUCT MOUNTED MOTORIZED DAMPERS SHALL BE PROVIDED WITH THE FOLLOWING REQUIREMENTS:
 

- 14.1. ALL MOTORIZED DAMPERS SHALL BE INSULATED LOW LEAKAGE TYPE TO TAMCO 9000 OR EQUAL.
- 14.2. MOTORIZED DAMPERS SHALL BE LOCATED AS NEAR AS POSSIBLE TO THE PLANE OF THE BUILDING ENVELOPE FOR ALL AIR INTAKE AND OUTLET TYPES.
- 14.3. MOTORIZED DAMPERS SHALL CLOSE AUTOMATICALLY WHEN HVAC SYSTEM IS NOT IN OPERATION.
- 14.4. MOTORIZED DAMPERS SHALL BE PROVIDED ON ALL AIR INTAKES AND AIR OUTLET DUCTS EXCEEDING 12"ø OR 12"x12" IN SIZE.

15. PROVIDE VIBRATION ISOLATORS FOR ALL MECHANICAL EQUIPMENT, INCLUDING PUMPS, UTILITY FANS, AND VENT

**NOVA 3 ENGINEERING LTD.**  
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Revisions	
Date	Revision
May 31, 2017	Issued for Construction

Northern Sky Architecture Inc.

100-128 Irma Avenue  
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**APECM**  
 Certificate of Authorization  
 Nova 3 Engineering Ltd.  
 No.962 Date: 2017/05/31

Stamp:

Stamp: \_\_\_\_\_

Project: **La Barriere Park Washroom Replacement**  
 La Barriere Park, Manitoba

drawing title			
MECHANICAL – SPECIFICATION			
scale	as noted	designed by	kbb
date	May, 2017	drawn by	hc
project no.	337-2017	reviewed by	hc
reference no.	16.235	sheet	M.3.1 REV.

ISSUED FOR CONSTRUCTION