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APPENDIX A

APPROVED STANDARD MATERIALS

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All persons utilizing these documents are advised to visit the Capital Regional District website <http://www.crd.bc.ca/water/engineering/engineeringspecs.htm> to ensure that all specifications and drawings are the current version.

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Table 1: Revision Table

REVISION	DATE	UPDATES
v0	2024.02.16	Appendix re-released in new format. List of Approved Materials are based on previous Appendix A v09 (2023.08.28)
v1	2024.05.21	Sections 2.6, 3.1, 3.2, 7.3, 7.4
v2	2024.10.17	The following sections have been updated to provide clarity: 1.1.4, 2.1, 3.1, 4.1, 4.2, 4.3
v3	2025.01.06	Sections 1.1, 3.4, 3.5, 4.1, 6.1, and 6.2 have been updated.

1 GENERAL – APPROVED STANDARD MATERIALS

1.1 GENERAL REQUIREMENTS

- .1 This section covers the approved standard materials for use in the Juan de Fuca (JDF) Water Distribution System and any other water systems that require the use the Capital Regional District (CRD) Water Engineering Specifications. Requests for materials that are not already included in the Approved Standard Materials list must be submitted to the CRD for review and approval. Materials not appearing in this list, or not pre-approved, will not be accepted.
- .2 Where applicable, all materials shall conform to CSA Standards and meet NSF 61 (NSF/ANSI 61: Drinking Water System Components).
- .3 All bolts, nuts and hardware shall be stainless steel or high strength low alloy corrosion resistant steel.
- .4 Approved petrolatum corrosion protection coatings shall be applied, according to manufacturer's recommendation, to all bolts/nuts and unprotected metallic fittings.
- .5 Chipped or damaged coatings on all materials shall be repaired as per manufacturer's specifications.
- .6 All reference specifications listed such as ANSI/AWWA, ASTM, FM, UL, ULC, CSA, NSF shall be the latest version.

2 VALVES AND HYDRANTS

2.1 GATE VALVES (50MM TO 300MM)

- .1 Conform to ANSI/AWWA C509/C515 covering resilient seated gate valves with minimum rated working pressure of 1720kPa (250psi).
- .2 Valves shall be resilient wedge design: Hub x Hub, Hub x Flange, Flange x Flange, Mechanical Joint (MJ) x Flange, or MJ x MJ
- .3 Body and bonnet shall be coated with fusion bonded epoxy coating both internal and external meeting ANSI/AWWA C550.
- .4 50mm valves to be threaded National Pipe Taper (NPT).
- .5 Valves shall be right hand opening (RHO) or clockwise (CW) opening and have a 31mm (1¼") square operating nut for buried applications and rising stem (OS&Y) with hand wheels for vault installations.
- .6 Single rubber gasket for push-on bell and spigot type joint to ANSI/AWWA C111/21.11 (Tyton). All push-on joint hubs to be equipped with tie rod lugs.
- .7 Valves larger than 300mm shall be reviewed and approved on a case-by-case basis by the CRD.
- .8 Approved materials:

Manufacturer	Make/Model/Series
Mueller	A-2361 Series
Clow	Model 2639 (Full wall ductile iron)
American - AVK	45 Series
TCIW	3000 Series

2.2 BRONZE GATE VALVE

- .1 Rated 1380 kPa (200 psi) working pressure.
- .2 Valves shall be left hand opening (counterclockwise).
- .3 Conform to ANSI/AWWA C800, no lead (NL).
- .4 Approved materials:

Manufacturer	Make/Model/Series	Size	Comments
Red and White Toyo	206-A	12mm to 50mm.	NPT thread only. No Lead.

2.3 VALVE BOX

- .1 Valve boxes shall have square, flat top, with direction of flow clearly shown.
- .2 Approved materials:

Manufacturer	Make/Model/Series
TCIW	Robar Type

2.4 PRESSURE REDUCING VALVES

- .1 All pressure reducing valves shall have speed controls.

- .2 Ductile iron castings to ASTM A536.
- .3 Interior and exterior fusion bonded epoxy coating to ANSI/AWWA C116.
- .4 Braided, flexible stainless steel control lines, include dry stem position indicator, include ball valves on all ports. Include opening and closing speed control.
- .5 Nuts, bolts, and all hardware are to be stainless steel.
- .6 Approved materials:

Manufacturer	Make/Model/Series	Size	Comments
Cla-Val	90-01 Full Port 690-01 Reduced Port	Various	Subject to: 1. Design & pressure management requirements. 2. Approval by the CRD.
Singer	106 Full Port 206 Reduced Port	Various	

2.5 CHECK VALVES

- .1 Conform to ANSI/AWWA C508 with the following features:
 - Flange x Flange ends.
 - Swing check with resilient disc to meet NSF 61.
 - Stainless steel hinge pin with bronze bushings with “O” ring seal.
 - Must have outside lever and weight (non-direct bury).
 - Fusion bonded epoxy coating both internal and external meeting ANSI/AWWA C550.
- .2 Approved materials:

Manufacturer	Make/Model/Series	Size	Comments
Mueller	A-2602-6-01B1	50mm to 300mm	Resilient to bronze seat.
TCIW	5110 (rubber disk trim)	50mm to 300mm	
Clow	1106 LW	50mm to 300mm	

2.6 BUTTERFLY VALVES

- .1 Conform to ANSI/AWWA C504 with the following features:
 - Valves shall have mechanical joint connections.
 - Valves to have 1¼” operating nut – (2” to 1¼” adaptor is acceptable)
 - Valves intended for use in the CRD Water Services Distribution Systems shall be Right Hand opening (RHO)
 - Valves shall be rated for a working pressure of 250psi unless otherwise noted.
 - Valves to be seal-on-body
- .2 Approved materials:

Manufacturer	Make/Model/Series	Size
Mueller Pratt	Groundhog	100mm
GA Industries / VAG	Series 800, Model 804, Class 250B	100mm

2.7 COMBINATION AIR VALVES

- .1 Conform to ANSI/AWWA C512 with the following features:
- Stainless steel trim.
 - Fusion bonded epoxy interior and exterior coating, unless valve body is a composite material, and shall conform to ANSI/AWWA C550.
- .2 Approved materials:

Manufacturer	Make/Model/Series	Size
Apco	145C, 147C, 149C, 150C, 151C	50mm to 200mm
Valmatic	202C, 203C, 204C, 206C, 208C	50mm to 200mm
Golden-Anderson. (low profile)	945	25mm to 100mm
Crispin	UL30, UL41.1, C61, C81	75mm to 200mm
ARI	D040, D060	25mm to 200mm
Vent-O-Mat	RBX	25mm to 300mm

2.8 FIRE HYDRANTS

- .1 Conform to ANSI/AWWA C502 for dry barrel fire hydrants with the following features:
- Compression style shutoff.
 - Right hand opening (clockwise).
 - Two 63.5mm (2 x 2 ½") hose nozzles BC standard fire thread and one 100mm (4") Storz nozzle c/w thread-on cap.
 - Inlet shall be push on 150mm hub with lugs.
 - Self-Draining.
 - Operating nut shall be 41.28mm (1 9/16") pentagon.
 - Hydrants shall be rated for a minimum working pressure of 1380kPa (200psi).
- .2 Approved materials:

Manufacturer	Make/Model/Series
Mueller	Super Centurion 350™, Series A-423
TCIW	Model C-71P/LT or H105 Heritage
American - AVK	Model 2780
Clow	Model M93 Brigadier

3 PIPE FITTINGS

3.1 DUCTILE IRON FITTINGS

- .1 Fittings shall be ductile iron (DI) and includes all bends, tees, reducers, and caps. Cast iron is not acceptable.
- .2 DI fittings to ANSI/AWWA C110 & C153.
- .3 Cement mortar lined to ANSI/AWWA C104.
- .4 Fittings may be Hub, Flange, M.J. or combination thereof for pipe diameters up to and including 200mm.
- .5 Fitting must be MJ for pipe diameters of 250mm and larger.
- .6 Single rubber gasket for push-on bell and spigot type joint and/or mechanical pipe joints to ANSI/AWWA C111/21.11 (Tyton). All push-on joint hubs to be equipped with tie rod lugs.
- .7 Approved materials:

Manufacturer	Make/Model/Series
Sigma Corporation	DI - C110 / C153
TCIW	DI - C110 / C153
Tyler Union	DI - C110 / C153
Star Pipe	Ductile Iron Fittings

3.2 SLEEVE TYPE JOINT COUPLINGS FOR PLAIN END PIPE

- .1 Conform to ANSI/AWWA C219.
- .2 Interior and exterior fusion bonded epoxy coating to ANSI/AWWA C213, if applicable.
- .3 Clamping bolts and hardware as specified and provided by the manufacturer.
- .4 Approved materials:

Manufacturer	Make/Model/Series	Size
Romac	XR501	100mm to 300mm
Hymax	2	100mm to 300mm
Smith Blair	421	50mm to 300mm
Robar	1506	50mm to 600mm
Robar	1696	100mm to 300mm

3.3 SLEEVE TYPE RESTRAINED JOINT COUPLINGS FOR PLAIN END PIPE

- .1 Conform to ANSI/AWWA C219.
- .2 Interior and exterior fusion bonded epoxy coating to ANSI/AWWA C213.
- .3 Clamping bolts and hardware as specified and provided by the manufacturer.
- .4 Designers/installers shall follow manufacturer's specifications and ensure that they are using the correct restrained joint coupling for the water pressure and pipe material.
- .5 No derating of pipe.
- .6 Approved materials:

Manufacturer	Make/Model/Series	Size
Romac	Alpha	100mm to 300mm
Hymax	Grip	38mm to 300mm

3.4 MECHANICAL JOINT RESTRAINTS

- .1 Ductile iron castings to ASTM A536.
- .2 Conform to ANSI/AWWA C110 and C111.
- .3 Restraining rods, clamping bolts and hardware as specified and provided by the manufacturer.
- .4 Fusion bonded epoxy coating.
- .5 Designers/installers shall follow manufacturer's specifications and ensure that they are using the correct restrained joint coupling for the water pressure and pipe material. No derating of pipe.
- .6 Approved materials – Ductile Iron:

Manufacturer	Make/Model/Series	Size
Smith Blair	111	75mm to 400mm
EBAA Iron	1100	75mm to 400mm
Ford	UFR1400-DA	75mm to 400mm
Sigma	One Lok SLDE	75mm to 400mm
Star Pipe Products	Series 3000	75mm to 400mm

Note: Restraints 450mm and larger to be reviewed and approved on a case-by-case basis.

- .7 Approved materials – Universal (DI & PVC):

Manufacturer	Make/Model/Series	Size
Clow	TUFGrip Dual Wedge	75mm to 400mm

Note: Restraints 450mm and larger to be reviewed and approved on a case-by-case basis.

3.5 PIPE JOINT RESTRAINT

- .1 Ductile iron castings to ASTM A536.
- .2 Restraining rods, clamping bolts and hardware as specified and provided by the manufacturer.
- .3 Fusion bonded epoxy coating.

- .4 Designers/installers shall follow manufacturer’s specifications and ensure that they are using the correct restraint for the water pressure and pipe material. No derating of pipe.
- .5 Pressure rating
 - i. Restraints shall be rated to at least 235psi for 200mm diameter and smaller pipe.
 - ii. Restraints shall be rated to at least 350psi for 250mm diameter and larger pipe
- .6 Approved materials:

Manufacturer	Make/Model/Series	Size	Comments
Ford Meter Box	UFR1300 UFR1350 UFR1360 UFR1390	Various	
EBAA Iron	1500 1700	100mm to 200mm 75mm to 400mm	C900 PVC Pipe Ductile Iron Pipe
Sigma	PV Lok	100mm to 200mm	C900 PVC Pipe Only
Star Pipe Products	Series 1000-G2, 1100-G2, 4000	100mm to 200mm	

3.6 STAINLESS STEEL REPAIR CLAMPS

- .1 Shell, sidebars and armor shall be fully passivated Type 304 stainless steel.
- .2 Bolts and nuts shall be stainless steel with NC rolled thread and manufacturer applied anti galling coating.
- .3 Buna-N rubber pad gasket per ASTM D2000.
- .4 Approved materials:

Manufacturer	Make/Model/Series
Robar	5626
Canada Pipeline Accessories (1986) Corp.	CR2
Mueller	510
Ford Meter Box	FS2
Smith Blair	261, 262, 263
Romac	SS1, SS2, SS3

3.7 FLANGE ADAPTERS

- .1 All flange adapters shall be restrained flange adapters.
- .2 Conform to ANSI/AWWA C219.
- .3 Adapter flanges shall have UL and FM approval.
- .4 Fusion bonded epoxy coating.
- .5 Designers/installers shall follow manufacturer's specifications and ensure that they are using the correct restrained flange adapter for water pressure and pipe material. No derating of pipe.
- .6 Approved materials:

Manufacturer	Make/Model/Series	Size	Comments
EBAA Iron	2100	75mm to 1200mm	Ductile pipe only
Romac	Alpha FC RFCA	100mm to 300mm 75mm to 600mm	
Star Pipe Products	Series 7200	100mm to 300mm	
Hymax	Hymax 2.0 Hymax Grip	50mm to 300mm	

3.8 SERVICES SADDLES

- .1 All service saddles shall be Type 304 Stainless Steel with minimum rated working pressure of 1620 kPa (235 psi) and must be Female Iron Pipe Thread (FIPT).
- .2 Conform to ANSI/AWWA C800, no lead (NL).
- .3 Bolts and nuts shall be stainless steel with NC rolled thread and manufacturer applied anti galling coating.
- .4 Buna-N rubber pad gasket per ASTM D2000 with raised compression seal.
- .5 Designers/installers shall follow manufacturer's specifications and ensure that they are using the correct service saddle for water pressure and pipe material. No derating of pipe.
- .6 Approved materials:

Manufacturer	Make/Model/Series	Size	Comments
Robar	2616	50mm to 300mm	
Canada Pipeline Accessories (1986) Corp.	SC-2 SC-4	75mm to 300mm 100mm to 600mm	200mm and smaller, 20-gauge shell. 250mm and larger 18-gauge shell.
Ford Meter Box	FS313	50mm to 300mm	
Smith Blair	370	100mm to 600mm	
Cambridge Brass	403 TECK	150mm to 200mm	Stainless steel service saddle with integral corp stop.

4 WATER MAIN PIPE / SERVICE TUBE AND ACCESSORIES

4.1 PVC PIPE

- .1 PVC pipe shall be ULC listed, meet CSA B137, meet ANSI/AWWA C900, and cast-iron equivalent outside diameter (CIOD) and integral bell gasketed joint. The pipe shall be supplied in 6.1 m nominal lengths.
- .2 To be compatible with specified M.J. and push on joint fittings and valves without the use of special adapters.
- .3 Push on joints shall be integrally thickened bell and spigot type, conform to ASTM D3139 Clause 6.2 with single elastomeric gasket to ASTM F477.
- .4 Minimum pressure class 1620kPa (235psi), (DR18) or as otherwise approved by the CRD.
- .5 Approved materials:

Manufacturer	Make/Model/Series	Size
IPEX	Blue Brute CIOD Pressure Pipe, C900	100mm to 200mm
Westlake Pipe	AquaSpring™ C900 Certa-Lok® RJIB	100mm to 200mm

4.2 DUCTILE IRON PIPE

- .1 Ductile Iron Pressure Class 350 to ANSI/AWWA C151, cement mortared lining, to ANSI/AWWA C104/A21.4, and asphaltic shop applied coating outside.
- .2 Ductile Iron pipe 300mm and larger shall be a fully restrained system, the pressure rating of the joint shall equal the pressure rating of the pipe (Class 350) when deflected to its maximum joint deflection. Restrained push-on joints for in-line pipe joints shall utilize ductile iron locking segments or a mechanical joint (MJ) restraint harness consisting of multiple gripping wedges incorporated into follower glands to AWWA C110. All Ductile Iron bends, elbows, and valves etc. shall be restrained with a mechanical joint (MJ) consisting of multiple gripping wedges incorporated into follower glands to AWWA C110 unless otherwise approved by the CRD.
- .3 Joints shall be single rubber gasket for push on bell and spigot type joint and/or mechanical pipe joints. Joints to ANSI/AWWA C111/21.11 (Tyton).
- .4 Approved materials:

Manufacturer	Make/Model/Series	Size
Canada Pipe	Ductile Iron C151	100mm to 600mm
US Pipe	Ductile Iron C151	100mm to 600mm

4.3 HDPE PIPE

- .1 HDPE pipe may be allowed in limited circumstances for pipe diameters 100 mm through 1,575 mm. Pre-approval by the CRD is required.
- .2 HDPE pipe shall:
 - i. Be minimum DR11 and meet CSA B137.1. Pipe and fittings shall meet ASTM D3350.
 - ii. Meet ANSI/AWWA C906 for water distribution and transmission.
 - iii. Be compatible with specified mechanical joint fittings and valves without special adapters.
 - iv. Be clearly marked by the manufacturer with a permanent colour marking designation for the entire length of pipe (i.e. blue striping for potable water).
 - v. Electrofusion fittings and conventional (butt) fusion fittings may be considered. Joints shall be fused in strict accordance with manufacturer’s instructions meeting ASTM 2620.
 - vi. Allowance to be included for thermal expansion

4.4 DETECTABLE REINFORCED UNDERGROUND UTILITY MARKING TAPE

- .1 Approved reinforced detectable marking tape shall be installed at burial depth recommended by the utility marking tape manufacturer.
- .2 Must be detectable by conductive and inductive methods.
- .3 Approved materials:

Manufacturer	Make/Model/Series	Size	Comments
USC Utility Supply (West) Corp.	Detectable Underground Marking Tape	150mm wide x 5.0mil thick	Safety Precaution Blue, marked “Caution Buried Potable Water Line Below”.

4.5 PEX SERVICE TUBING

- .1 Conform to ANSI/AWWA C904 and CSA B137.5.
- .2 Supplied in copper tube size (CTS) so it is compatible with AWWA C800 valves and fittings, manufacturer recommended stainless steel insert required to stiffen pipe.
- .3 Approved materials:

Manufacturer	Make/Model/Series	Size
Rehau Industries Inc.	Municipex SDR 9	19mm to 50mm
AquaPure	PE-RT tubing	20mm to 50mm

4.6 TRACER WIRE

- .1 Tracer wire to be installed on all plastic service lines.
- .2 Insulated (White or Blue) solid strand copper.
- .3 Wire to be fastened to the service line at 800mm intervals using zip ties or 3M linerless rubber splicing tape.
- .4 Each bare end of wire to be terminated with underground/waterproof rated connectors.
- .5 Approved materials:

Manufacturer	Make/Model/Series	Size
Southwire / General Cable	TWU RW90 XLPE	#14 AGW
Deca Cables	20-705	#14 AGW

5 SERVICE BRASS

5.1 CORPORATION STOPS

- .1 Rated 2068 kPa (300 psi) working pressure.
- .2 Conform to ANSI/AWWA C800, no lead (NL).
- .3 Approved materials:

Size	Fitting Type	Mueller	Cambridge	Ford
19mm (3/4")	MIP X Comp	B-25028	201-M3H3	FB1100-3-Q
	MIP X FIP	B-20046	201-M3H3	FB1700-3
	MIP X MIP	Ball N/A	201-M3H3	FB500-3
25mm (1")	MIP X Comp	B-25028	201-M4H4	FB1100-4-Q
	MIP X FIP	B-20046	201-M4H4	FB1700-4
	MIP X MIP	Ball N/A	201-M4H4	FB500-4
38mm (1 1/2")	MIP X Comp	B-25028	201-M6H6	FB1100-6-Q
50mm (2")	MIP X Comp	B-25028	201-M7H7	FB1100-7-Q
	MIP X FIP	N/A	201-M7H7	FB1700-7
	MIP X MIP	N/A	201-M7H7	FB500-7

5.2 PIPE CONNECTORS AND TRANSITIONS

- .1 Rated 2068kPa (300psi) working pressure.
- .2 Conform to ANSI/AWWA C800, no lead (NL).
- .3 Approved materials:

Size	Fitting Type	Mueller	Cambridge	Ford
Couplings C X C	12x19mm (5/8x3/4")	H-15403	118-H3H2	C44-22-Q
	19mm (3/4")	H-15403	118-H3H3	C44-33-Q
	25mm (1")	H-15403	118-H4H4	C44-44-Q
	38mm (1 1/2")	H-15403	118-H6H6	C44-66-Q
	50mm (2")	H-15403	118-H7H7	C44-77-Q
Male Adapter C X MIP	19mm (3/4")	H-15428	117-H3M3	C84-12-Q
	25mm (1")	H-15428	117-H4M4	THRU
	38mm (1 1/2")	H-15428	117-H6M6	C84-77-Q
	50mm (2")	H-15428	117-H7M7	
Female Adapter C X FIP	19mm (3/4")	H-15451	117-H3F3	C14-33-Q
	25mm (1")	H-15451	117-H4M4	THRU
	38mm (1 1/2")	H-15451	117-H6M6	C14-77-Q
	50mm (2")	H-15451	117-H7F7	
Tee C X C CX IP	19x19mm (3/4")	H-12941	150-H3H3	T444-333
	25mm (1")	H-12941	150-H4H4	THRU
	38mm (1 1/2x1 1/2x3/4")	H-12941	N/A	T884-444
	50mm (2x2x3/4")	H-12941	N/A	
	50mm (2x2x1")	H-12941	N/A	

5.3 CURB STOPS

- .1 Curb stops shall be rated for 2068kPa (300psi) working pressure.
- .2 Conform to ANSI/AWWA C800, no lead (NL).
- .3 Ball valves only. Comp joints only. Stop only, absolutely no drain. Copper Tubing Size OD (CTS)
- .4 Approved materials:

Size	Mueller	Cambridge	Ford
19mm (3/4") C X C	H-15209	202-H3H3	B44-333-Q
25mm (1") C X C	H-15209	202-H4H4	B44-444-Q

5.4 ANGLE BALL METER VALVES WITH LOCKWING

- .1 Rated 2068kPa (300psi) working pressure.
- .2 Conform to ANSI/AWWA C800, no lead (NL).
- .3 Approved materials:

Size	Mueller	Cambridge	Ford
3/4" comp x 3/4" swivel	B-24258	210-H3T3	BA43-231W-Q
3/4" comp x 1" swivel	B-24258	210-H3T4	BA43-232W-Q
1" comp x 1" swivel	B-24258	210-H4T4	BA43-342W-Q
1" comp x 1 1/4:" swivel	B-24258	210-H4T5	BA43-444W-Q
1 1/2" comp x Mtr Flg	B-24276	N/A	BFA43-666W-Q
2" comp x Mtr Flg	B-24276	N/A	BFA13-777W-Q
1 1/2" FIPT x Mtr Flg	B-24286	N/A	BFA13-666W
2" FIPT x Mtr Flg	B-24286	N/A	BFA13-777W

5.5 WYE CONNECTORS

- .1 Rated 2068kPa (300psi) working pressure.
- .2 Conform to ANSI/AWWA C800, no lead (NL).
- .3 Comp x Comp x Comp only.
- .4 Copper Tubing Size OD (CTS)
- .5 Approved materials:

Size	Mueller	Cambridge	Ford
25mm X 19mm X 19mm	(Comp 110) - H15343 Series	152NL-H4H3	Y44-243-Q

5.6 50MM METER SETTER

- .1 50mm meter setter to be made of copper and brass. Have NPT threaded inlet and outlet. Be equipped with dual lockable ball valve shutoff, and lockable 25mm ball valve bypass.
- .2 Conform to ANSI/AWWA C800, no lead (NL).
- .3 Approved materials:

Size	Mueller	Cambridge	Ford
50mm	B-2423-2N 112	6020NL-715F7F7-UUB	VHH77-12B-11-77-NL

5.7 ANGLE DUAL CHECK VALVES

- .1 Rated 1206kPa (175psi) working pressure.
- .2 Conform to ANSI/AWWA C800, no lead (NL).
- .3 Approved materials:

Manufacturer	Make/Model/Series
Mueller	H-14244-N
Ford	HHA31 (313) (323) (344) HHFA31-777-NL

6 CHAMBERS AND VAULTS

6.1 PRECAST CHAMBERS AND VAULTS

- .1 Subject to approval by the CRD and as required by the CRD on a case-by-case basis.
- .2 Designed for roadway use (H-20 traffic loading) and manufactured in accordance with CSA A23.4.
- .3 Products certified to Canadian Precast Concrete Quality Assurance (CPCQA) certification program (group C1).
- .4 Manufacturer applied exterior damp proof coating.
- .5 No white paint on interior

6.2 VAULT HATCH

- .1 Subject to approval by the CRD and as required by the CRD on a case-by-case basis.
- .2 Low traffic areas (i.e. road, boulevard, and driveway areas)
 - i. Load rated for a minimum H20 loading.
 - ii. Hatch to be cast in place.
- .3 Landscape/Pedestrian access areas only.
 - i. Load rated for a minimum 150psf.
 - ii. Hatch to be bolt down surface mount (or cast in place), 6061 Aluminium.
 - iii. Approved materials:

Manufacturer	Make/Model/Series	Size	Comments
USF Fabrication.	SRR-I (security reservoir & roof door).	914mm by 914mm clear opening.	
MSU Mississauga LTD.	MSU CRD bolt down access hatch.	914mm x 914mm clear opening.	

6.3 VAULT LADDER

- .1 Subject to approval by the CRD and as required by the CRD on a case-by-case basis.
- .2 Ladder to be CSA Grade 1A, load rated for 300 lbs. and meet or exceed CSA/ANSI/OSHA.
- .3 Rungs to be 32mm in diameter with 305mm center to center spacing. Overall ladder width to be minimum 467mm.
- .4 Ladder to be anchored top and bottom and must have a mid-span brace if over 3.0m (10 feet) long. Brace ladder every 1.5m (5 feet).
- .5 Ladder must be min of 150mm offset from vault wall and maximum 200mm to allow for the installation of a safety post. Ladder must have extendable safety post installed.

6.4 LADDER SAFETY POST

- .1 Factory fabricated safety post completely pre-assembled and ready for attachment to fixed ladder rungs.
- .2 Manufactured from high strength mill finish aluminum round tubing.
- .3 Safety post shall:
 - be permanently mounted to the top two rungs of a fixed ladder;
 - be extendable (telescoping);
 - have adjustable stainless-steel mounting brackets to accommodate ladder rungs up to 356mm on center and ladder rungs 32mm diameter.
- .4 Approved materials:

Manufacturer	Make/Model/Series	Size
U.S.F Fabrication Inc.	Retrofit Safety Post	For 32mm dia. ladder rungs.

7 MISCELLANEOUS

7.1 GASKET MATERIAL

- .1 Gasket materials shall as per manufactures specifications for the application intended with no pressure derating.

7.2 THREAD SEALANT

- .1 Approved materials:

Manufacturer	Make/Model/Series
Various	Teflon Tape
Various	Blue Magic

7.3 PETROLATUM TAPE COATING SYSTEMS

- .1 Conform to ANSI/AWWA C217.
- .2 Installers must follow manufacturer's application/installation specifications and ensure that they are using the correct products for the application.
- .3 Install with associated paste as per manufacturers recommendations.
- .4 Approved materials:

Manufacturer	Make/Model/Series
DENSO	Denso petrolatum tape system.
Petro Wrap	Petro Wrap anti corrosion system.
Longwrap	Petroleum Tape

7.4 METER BOXES AND LIDS

- .1 Meter box and lid to be H2O load rated.
- .2 Approved materials:

Manufacturer	Make/Model/Series	Size
DWF Plastics Inc.	DFW486WBC4-12-AF4MF 63D	For 19mm - 26mm Water Meters
DWF Plastics Inc.	DFWA4WBC4-24-AF4MF 63D	For 50mm Water Meters
DWF Plastics Inc.	DFWA2CNP4-12-AF4M-Water	For off road flush (50mm -100mm)