

Static Hydrant: 13179 Flow Hydrant 1: 12160 Flow Hydrant 2: 3143	HT22-6 - April 26/22					HT22-6 - April 26/22					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	12:57	1:07	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No Flowed)	12:57				57			393	361		-3%	
Hydrant 1 Flowed	1:00		1500	16	50	341	110	345				
Hyd1 (Both Flowed)		1:05	1400	14	40	316	97	276	259		-6%	
Hyd 2 (Both Flowed)	1:03		1415	14.1	40	321	97	276	259		-6%	
Hydrant 2 Flowed		1:06	1550	17.3	55.0	352	119	379				
Stop static case (No flowed)		1:07			56			400	361		-5%	

Static Hydrant: 3641 Flow Hydrant 1: 3635 Flow Hydrant 2: 3631	HT22-7 - April 26/22					HT22-7 - April 26/22					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	1:36	1:45	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No Flowed)	1:36				55			379	362		1%	
Hydrant 1 Flowed	1:40		1550	17	55	352	117	379				
Hyd1 (Both Flowed)		1:44	1475	15	53	335	108	366	354		-3%	
Hyd 2 (Both Flowed)	1:42		1610	16.5	53	365	126	366	354		-3%	
Hydrant 2 Flowed		1:45	1700	20.5	55.0	366	141	379				
Stop static case (No flowed)		1:45			55			379	362		1%	

Static Hydrant: 3392 Flow Hydrant 1: 3339 Flow Hydrant 2: 3369	HT22-6 - May 19/22					HT22-6 - May 19/22					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	10:55	11:04	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No Flowed)	10:55				50			345	332		-4%	
Hydrant 1 Flowed	10:59		1560	16	36	354	124	262				
Hyd1 (Both Flowed)		11:02	1300	12	34	295	63	234	225		-4%	
Hyd 2 (Both Flowed)	11:01		1110	7.9	34	252	54	234	225		-4%	
Hydrant 2 Flowed		11:03	1350	12.9	40.0	306	69	276				
Stop static case (No flowed)		11:04			50			345	332		-4%	

Static Hydrant: 6556 Flow Hydrant 1: 6565 Flow Hydrant 2: 6566	HT22-9 - April 26/22					HT22-9 - April 26/22					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	2:30	2:41	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No Flowed)	2:30				60			552	546		-1%	
Hydrant 1 Flowed	2:33		1600	23	79	409	159	545				
Hyd1 (Both Flowed)		2:37	1650	19	70	375	131	463	440		-9%	
Hyd 2 (Both Flowed)	2:35		1662	20	70	362	136	463	440		-9%	
Hydrant 2 Flowed		2:39	1600	25	70.0	409	172	463				
Stop static case (No flowed)		2:41			79			545	546		0%	

Static Hydrant: 6764 Flow Hydrant 1: 6763 Flow Hydrant 2: 6762	HT22-10 - April 26/22					HT22-10 - April 26/22					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	3:02	3:12	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No Flowed)	3:02				65			566	565		0%	
Hydrant 1 Flowed	3:04		1775	22	75	403	152	517	505		-2%	
Hyd1 (Both Flowed)		3:10	1450	15	41	329	103	263	306		-6%	
Hyd 2 (Both Flowed)	3:07		1520	16.5	41	345	114	263	306		-6%	
Hydrant 2 Flowed		3:12	1900	25.5	51.0	431	176	352				
Stop static case (No flowed)		3:12			60			552	565		6%	

Static Hydrant: 9721 Flow Hydrant 1: 9722 Flow Hydrant 2: 9746	HT22-11 - Aug 17 2022					HT22-11 - Aug 17 2022					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	11:06	11:14	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No Flowed)	11:06				54			372	362		3%	
Hydrant 1 Flowed	11:10		1565	35	50	355	241	345				
Hyd1 (Both Flowed)		11:12	1400	26	46	316	199	331	313		-5%	
Hyd 2 (Both Flowed)	11:13		1300	20	46	295	136	331	313		-5%	
Hydrant 2 Flowed		11:13	1150	30	49	261	207	336				
Stop static case (No flowed)		11:14			54			372	362		3%	

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
677	917	916

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
661	920	920

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
666	921	920

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
664.5	940.7	940

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
664.5	934	929

static hyd g.e.	HGL (m)	Modeled HGL (m)
660.3	940	940

static hyd g.e.	HGL (m)	Modeled HGL (m)
660.3	909	911

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
900.0	936	939

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
900.0	934	932

pre flow	12:56:57				pre flow	1:03:04			
WTPPZ	Record value	modeled value	units	modeled to Record	WTPPZ	Record value	modeled value	units	modeled to Record
Boundary conditions					Boundary conditions				
WTP discQ	1501	1421	m3/hr	-5%	WTP discQ	2154	2060	m3/hr	-4%
GL discQ	0	0	m3/hr	#DIV/0!	GL discQ	0	0	m3/hr	#DIV/0!
QN InQ	0	0	m3/hr	QN InQ	0	0	m3/hr		
MV discQ	326.7	327	m3/hr	0%	MV discQ	322	327	m3/hr	2%
NRD discQ	467	467	m3/hr	0%	NRD discQ	459	467	m3/hr	2%
NRD upP	662.7	676	kPa	2%	NRD upP	656	677	kPa	3%
CLV disQ	223.7	223	m3/hr	0%	CLV disQ	249	223	m3/hr	-10%

pre flow	1:37:36				pre flow	1:43:44			
SHPZ	Record value	modeled value	units	modeled to Record	SHPZ	Record value	modeled value	units	modeled to Record
Boundary conditions					Boundary conditions				
WTP discQ	1703	1700	m3/hr	0%	WTP discQ	2312	2371	m3/hr	3%
GL discQ	0	0	m3/hr	#DIV/0!	GL discQ	0	0	m3/hr	#DIV/0!
QN InQ	0	0	m3/hr	QN InQ	0	0	m3/hr		
MV discQ	326	325	m3/hr	0%	MV discQ	363	353	m3/hr	-3%
NRD discQ	454	454	m3/hr	0%	NRD discQ	567	567	m3/hr	0%
NRD upP	651	677	kPa	4%	NRD upP	621	660	kPa	6%
CLV disQ	277	274	m3/hr	-1%	CLV disQ	603	612	m3/hr	1%

pre flow	10:55				pre flow	11:01			
SHPZ	Record value	modeled value	units	modeled to Record	SHPZ	Record value	modeled value	units	modeled to Record
Boundary conditions					Boundary conditions				
WTP discQ	1665	1506	m3/hr	-10%	WTP discQ	2094	2044	m3/hr	-2%
GL discQ	0	0	m3/hr	#DIV/0!	GL discQ	0	0	m3/hr	#DIV/0!
QN InQ	0	0	m3/hr	QN InQ	0	0	m3/hr		
MV discQ	0	0	m3/hr	#DIV/0!	MV discQ	0	0	m3/hr	#DIV/0!
NRD discQ	435	435	m3/hr	0%	NRD discQ	426	426	m3/hr	0%
NRD upP	657	661	kPa	4%	NRD upP	650	660	kPa	-100%
CLV disQ	340	340.5	m3/hr	0%	CLV disQ	791	667	m3/hr	12%

pre flow	2:29:30				2flow	2:37			
EHPZ	Record value	modeled value	units	modeled to Record	EHPZ	Record value	modeled value	units	modeled to Record
Boundary conditions					Boundary conditions				
WTP discQ	1529	1541	m3/hr	1%	WTP discQ	2302	2326	m3/hr	1%
GL discQ	0	0	m3/hr	#DIV/0!	GL discQ	0	0	m3/hr	#DIV/0!
LCST discQ	0	0	m3/hr	LCST discQ	160	167	m3/hr	4%	
MV discQ	316	309	m3/hr	-3%	MV discQ	350	342	m3/hr	-2%
NRD discQ	367	367	m3/hr	0%	NRD discQ	353	353	m3/hr	0%
NRD upP	671	664	kPa	2%	NRD upP	665	664	kPa	3%
CLV disQ	231	241	m3/hr	4%	CLV disQ	1059	1061	m3/hr	0%

pre flow	3:01:02				2flow	3:09:10			
EHPZ	Record value	modeled value	units	modeled to Record	EHPZ	Record value	modeled value	units	modeled to Record
Boundary conditions					Boundary conditions				
WTP discQ	1412	1317	m3/hr	-7%	WTP discQ	2172	2206	m3/hr	2%
GL discQ	0	0	m3/hr	#DIV/0!	GL discQ	0	0	m3/hr	#DIV/0!
LCST discQ	0	0	m3/hr	LCST discQ	0	0	m3/hr	#DIV/0!	
MV discQ	319	306	m3/hr	-4%	MV discQ	347	312	m3/hr	-10%
NRD discQ	370	370	m3/hr	0%	NRD discQ	272	272	m3/hr	0%
NRD upP	662	667	kPa	1%	NRD upP	676	690	kPa	2%
CLV disQ	203	216	m3/hr	6%	CLV disQ	946	961	m3/hr	4%

pre flow	11:06				2flow	11:12			
EHPZ	Record value	modeled value	units	modeled to Record	EHPZ	Record value	modeled value	units	modeled to Record
Boundary conditions					Boundary conditions				
WTP discQ	1911	1639	m3/hr	-4%	WTP discQ	2466	2345	m3/hr	-6%
QN InQ	100	100	m3/hr	0%	QN InQ	100	100	m3/hr	0%
LCST discQ	220	240	m3/hr	9%	LCST discQ	230	235	m3/hr	2%
MV discQ	0	0	m3/hr	#DIV/0!	MV discQ	0	0	m3/hr	#DIV/0!
NRD discQ	416	416	m3/hr	0%	NRD discQ	370	370	m3/hr	0%
NRD upP	667	662	kPa	2%	NRD upP	655	664	kPa	4%
CLV disQ	566	592	m3/hr						

Static Hydrant: 3740 Flow Hydrant 1: 3743 Flow Hydrant 2: 3736	HT22-12 - April 28/22					HT22-12 - April 28/22					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	9:14	9:23	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No flowed)	9:14				76			524	540		3%	
Hydrant 1 Flowed	9:16		1800	23	76	409	159	524				
Hyd1 (both Flowed)		9:20	1750	21	74	397	145	510	469		-4%	
Hyd 2 (both Flowed)		9:16	2025	29	74	460	200	510	469		-4%	
Hydrant 2 Flowed		9:22	2100	31.5	74.0	477	217	510				
Stop static case (No flowed)		9:23			77			531	540		2%	

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
664.0	937	939

664.0	936	934
664.0	936	934

Static Hydrant: 4079 Flow Hydrant 1: 4076 Flow Hydrant 2: 4066	HT22-13 - April 29/22					HT22-13 - April 29/22					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	10:17	10:24	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No flowed)	10:17				51			352	337		-4%	
Hydrant 1 Flowed	10:19		1550	17	46	352	117	317				
Hyd1 (both Flowed)		10:22	1430	14	39	325	97	269	269		7%	
Hyd 2 (both Flowed)		10:21	1490	16	39	336	110	269	269		7%	
Hydrant 2 Flowed		10:23	1600	18.5	47.0	363	134	324				
Stop static case (No flowed)		10:24			53			365	337		-6%	

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
905.1	941	939

905.1	933	935
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905.1	942	939
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Static Hydrant: 6574 Flow Hydrant 1: 6576 Flow Hydrant 2: 6577	HT22-14 - May 19/22					HT22-14 - May 19/22					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	9:50	9:56	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No flowed)	9:50				76			536	534		-1%	
Hydrant 1 Flowed	9:51		2127	32	70	463	221	463				
Hyd1 (both Flowed)		9:55	1950	26	66	443	190	455	439		-4%	
Hyd 2 (both Flowed)		9:54	1650	23	66	420	159	455	439		-4%	
Hydrant 2 Flowed		9:56	2010	29	76.0	456	200	524				
Stop static case (No flowed)		9:56			62			565	534		-6%	

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
665.3	940	940

Static Hydrant: 10970 Flow Hydrant 1: 10969 Flow Hydrant 2: 10966	HT22-15 - Aug 17/22					HT22-15 - Aug 17/22					Model Results	
	Time (start)	Time (stop)	Field Measurement			Field Measurement			Residual Pressure (kPa)	Model Result to field		
	6:56	9:06	Flow (GPM)	Flow Hydr. Pressure (PSI)	Static Pressure (PSI)	Flow (m3/hr)	Flow Hydr. Pressure (kPa)	Static Pressure (kPa)				
Starting Static case (No flowed)	6:56				76			536	576		7%	
Hydrant 1 Flowed	9:00		1900	50	65	431	345	446				
Hyd1 (both Flowed)		9:03	1600	45	46	363	310	331	310		-6%	
Hyd 2 (both Flowed)		9:04	1550	32	46	352	221	331	310		-6%	
Hydrant 2 Flowed		9:05	1917	50	60.0	435	345	414				
Stop static case (No flowed)		9:06			76			536	576		7%	

static hyd g.e.	Measured HGL (m)	Modeled HGL (m)
661.0	936	940

661.0	915	913
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pre flow	9:11				2flow	9:19-20			
EHPZ					EHPZ				
Boundary conditions	Record value	modeled value	units	modeled to Record	Boundary conditions	Record value	modeled value	units	modeled to Record
WTP discQ	1796	1613	m3/hr	-10%	WTP discQ	2496	2376	m3/hr	-5%
QN inQ	100	100	m3/hr	0%	QN inQ	100	100	m3/hr	0%
LCST discQ	146	146	m3/hr	0%	LCST discQ	232	241	m3/hr	4%
MV discQ	0	0	m3/hr	#DIV/0!	MV discQ	0	0	m3/hr	#DIV/0!
NRD discQ	240	240	m3/hr	0%	NRD discQ	216	240	m3/hr	11%
NRD upP	666	694	kPa	1%	NRD upP	675	692	kPa	3%
CLV disQ	541	542	m3/hr	0%	CLV disQ	1275	1305	m3/hr	2%

pre flow	10:16-17				2flow	10:22-23			
EHPZ					EHPZ				
Boundary conditions	Record value	modeled value	units	modeled to Record	Boundary conditions	Record value	modeled value	units	modeled to Record
WTP discQ	1996	1625	m3/hr	-9%	WTP discQ	2574	2466	m3/hr	-4%
QN inQ	100	100	m3/hr	0%	QN inQ	92	100	m3/hr	9%
LCST discQ	162	146	m3/hr	-9%	LCST discQ	216	206	m3/hr	-6%
MV discQ	0	0	m3/hr	#DIV/0!	MV discQ	0	0	m3/hr	#DIV/0!
NRD discQ	447	447	m3/hr	0%	NRD discQ	413	413	m3/hr	0%
NRD upP	656	676	kPa	3%	NRD upP	645	676	kPa	5%
CLV disQ	534	547	m3/hr	2%	CLV disQ	1211	1222	m3/hr	1%

pre flow	9:50				2flow	9:55			
EHPZ					EHPZ				
Boundary conditions	Record value	modeled value	units	modeled to Record	Boundary conditions	Record value	modeled value	units	modeled to Record
WTP discQ	1706	1562.5	m3/hr	-7%	WTP discQ	2627	2445	m3/hr	-7%
QN inQ	0	0	m3/hr	#DIV/0!	QN inQ	0	0	m3/hr	#DIV/0!
LCST discQ	0	0	m3/hr	#DIV/0!	LCST discQ	0	0	m3/hr	#DIV/0!
MV discQ	0	0	m3/hr	#DIV/0!	MV discQ	0	0	m3/hr	#DIV/0!
NRD discQ	365	365	m3/hr	0%	NRD discQ	376	365	m3/hr	2%
NRD upP	667.7	665.9	kPa	3%	NRD upP	637	662	kPa	7%
CLV disQ	466	466.7	m3/hr	0%	CLV disQ	1316	1329	m3/hr	1%

pre flow	1:00				2flow	1:05-06			
EHPZ					EHPZ				
Boundary conditions	Record value	modeled value	units	modeled to Record	Boundary conditions	Record value	modeled value	units	modeled to Record
WTP discQ	1676	1755	m3/hr	-6%	WTP discQ	2560	2373	m3/hr	-6%
QN inQ	100	100	m3/hr	0%	QN inQ	67	67	m3/hr	0%
LCST discQ	143	140	m3/hr	-2%	LCST discQ	166.7	156	m3/hr	-5%
MV discQ	0	0	m3/hr	#DIV/0!	MV discQ	0	0	m3/hr	#DIV/0!
NRD discQ	462	462	m3/hr	0%	NRD discQ	429	430	m3/hr	0%
NRD upP	660	677	kPa	3%	NRD upP			kPa	#DIV/0!
CLV disQ	460	462	m3/hr	0%	CLV disQ	1316	1125	m3/hr	-15%

**Appendix B Proposed Capital Upgrades in The Existing
Distribution System**

Appendix B Recommended Capital Improvement For Existing System

Note: This improvement list is adapted from City of Red Deer Water Distribution System Study with revisions based on the model results of this Master Plan Update. The completed improvement items are in presented in gray color.

Item No.	Description of Deficiency / Issue	Available Fire Flow - Existing System	Required Fire Flow	Location	Improvement	Pipe Size (mm)	Length (m)	Priority (A, B, C, or D)
1	Insufficient Fire Flows on 34th Street east of 49th Avenue. (Construction completed in 2016)	120 L/s	233 L/s (School Site) 180 L/s (Multifamily Site)	34th Street from Gaetz Avenue past school site and north to tie in	Looping for fire flows – crossing Gaetz at 34 th Street and looping back through school yard. Trenchless crossing Gaetz is approx 100 m.	250	710	A
2	Insufficient fire flow for commercial / industrial and R3 residential on 54th Avenue.	71 L/s	233 L/s (Commercial / Industrial)	54th Avenue from 58A Street	54th Avenue looping. Install 250 mm main on 54th Avenue from 58A Street to 59th Street (170 m). Replace existing 100 mm CI Pipe on 54th Avenue from 59th Street to 60th Street (155 m). Replace existing 150 mm pipe on 60th Street from 54th Avenue to 53rd Avenue (115 m).	250	440	B
3	Improve hydraulic performance on the east end of 55th Street. (Construction completed in 2015)	>233 L/s	75 to 150	55th Street from Gaetz Avenue to 45th Avenue	Upgrade existing 200 mm CI pipe to 300 mm pipe on 55th Street from Gaetz Avenue to 45th Avenue. Construction completed in 2015.	300	850	A
4	Insufficient fire flow to residential multifamily and commercial development on 47th Avenue.	99 L/s (Residential Multifamily) 98 L/s (Commercial)	180 L/s (Residential Multifamily) 233 L/s (Commercial)	47th Avenue from hydrant north of 53rd Street to 51st Street	47th Avenue. Tie into 400 mm pipe at 47th Avenue and 52nd Street. Replace existing 150 mm CI pipe with 200 mm PVC pipe on 47th Avenue from 52nd Street to hydrant in line with 54th Street. Replace existing 150 mm CI pipe with 250 mm PVC pipe on 47th Avenue from 52nd Street to 51st Street.	200	325	B
5	All hydrants on 50th Avenue north of 67th Street that are fed from 150 mm pipes are deficient in fire flows for commercial / industrial land use.	62 L/s - 120 L/s	233 L/s (Commercial / Industrial)	50th Avenue north of 67th Street.	Replace existing 150 mm pipes that supply hydrants to 350 mm pipes.	350	1200	B
6	Insufficient fire flow at Arena south of 43rd Street.	47 L/s	233 L/s (Arena)	South east of the intersection of 43rd Street and 48th Avenue.	Looping for arena at 43rd Street and 48th Avenue. Installation of 200 mm pipe to complete looping	200	430	B
7	Insufficient fire flow for multifamily site on 54th Avenue Cres. (Completed in 2021)	> 190 L/s	135 L/s (Townhouses)	35th Street from 57th Avenue east through 54th Avenue Crescent to 54th Avenue.	Tie into 400 mm at 35th Street and 57th Avenue. Install 250mm pipe on 35th Street continuing through along 54th Avenue Cres and tie into existing at 54th Avenue.	250	725	B
8	Insufficient fire flow to R1 residential development on 38th Street Close. The Close is fed by single 100 mm CI pipe.	14 L/s	75 L/s (R1 Residential)	38th Street Close	Replace existing 100 mm CI pipe on 38 th Street close with 200 mm pipe. Increase fire flow availability to over 75 L/s	200	110	B
9	Insufficient fire flow to R1 residential close fed by single 150 mm CI pipe. (Construction completed in 2021)	78 L/s	75 L/s (R1 Residential)	37th Street, west of 55th Avenue.	Replace existing 150mm CI main with 200mm PVC main on 37th Street west of 55th Avenue	200	185	B
10	Insufficient fire flow to R1 residential close fed by single 150 mm CI pipe on Piper Drive.	46 L/s	75 L/s (R1 Residential)	Piper Drive, Pardue Close north to end of Piper Drive.	Replace existing 150 mm CI main with 200mm PVC main on Piper Drive from Pardue Close to the end of Piper Drive.	200	190	B
11	Insufficient fire flow to hydrant in R1 residential area.	63 L/s	75 L/s (R1 Residential)	Phelan Close from Parke Avenue to Phelan Cres	Install 200 mm pipe on Phelan Close from Parke Avenue to Phelan Cres to establish looping and increase available fire flow.	200	65	B
12	Insufficient fire flow to R1 residential area north of 55th Street from 48A Avenue to 47A Avenue. Pipes in the area are all 150 mm CI pipes.	39 L/s - 63 L/s	75 L/s (R1 Residential)	Residential area north of 55th Street from 48A Avenue to 47A Avenue.	Upgrade Existing 150 mm CI pipes north of 55th Street on 48A Avenue, 47A Avenue, and 56th Street. Upgrade to 200 mm PVC to meet minimum fire flow requirement of 75 L/s.	200	830	B
13	Insufficient fire flow for R1 residential area on 43A Avenue.	51 L/s - 58 L/s	75 L/s (R1 Residential)	43A Avenue, north of 51st Street	Complete looping along 43A Avenue North of 51st Street and replace existing 100 mm CI pipe with 150 mm PVC pipe. (Loop completion 60m, 100 mm main replacement 85 m)	150	145	B
14	Insufficient fire flow for R1 residential area on 56th Avenue.	35 L/s	75 L/s (R1 Residential)	56th Avenue from 58A Street to 60th Street	Replace existing 100 mm CI pipe on 56th Avenue from 58A St to 60th Street. Replace with 200 mm PVC pipe.	200	290	B
15	Improve hydraulics for the supply of water to the Mountview Reservoir.	N/A	N/A	48th Avenue north of 37th Street.	Complete installation of 400 mm pipe to replace existing 350 mm CI pipe on 48th Avenue. The pipe section closest to the Mountview Reservoir is the most critical piece.	400	350	B
16	Insufficient fire flow to hydrant at 47A Avenue and 54th Street (Construction completed in 2017)	>233 L/s	180 L/s (Residential Multifamily)	47A Avenue from 53rd Street to 54th Street.	Install 200 mm PVC pipe tied into 400 mm main on 53rd Street. Replaces Existing 150 mm CI pipe from 53rd Street to 54th Street	200	100	B

Appendix B Recommended Capital Improvement For Existing System

Item No.	Description of Deficiency / Issue	Available Fire Flow - Existing System	Required Fire Flow	Location	Improvement	Pipe Size (mm)	Length (m)	Priority (A, B, C, or D)
17	Insufficient fire flow to Mountview School on 34th Street.	115 and 136 L/s	233 L/s (Institutional)	34th Street from 43rd Avenue to Hydrant 34th Street from Hydrant to 44a Avenue.	Install 250 mm pipe on 34th Street from 43rd Avenue to Hydrant. Install 200 mm pipe on 34th Street from Hydrant to 44a Avenue.	250	60	B
						200	215	B
18	Insufficient fire flow to Annie L Gaetz School on Mitchell Avenue.	126 L/s	233 L/s (Institutional)	Mitchell Avenue	Replace section of 150 mm CI Pipe with 300 mm PVC pipe from Munro Cres to the hydrant at the school on Mitchell Avenue. Tie into 300 mm main on Munro Cres.	200	80	B
19	Insufficient fire flow for hydrant of Eastview Middle School.	105 L/s	233 L/s (Institutional)	40th Avenue (Eastview Middle School)	Tie-in a 350 mm pipe to the 400 mm HDPE pipe installed. Loop the hydrant in front of the school to the hydrant extending from 40A Avenue to the north of the school using a 200 mm pipe.	350	75	B
						200	165	B
20	Insufficient fire flow available for R3 residential on 44th Ave.	95 L/s	180 L/s (Residential Multifamily)	44th Avenue, north of 55th Street	Replace the existing 150mm pipe with 300 mm diameter watermain on 44th Avenue from 55th Street to 58th Street.	300	310	B
21	Insufficient fire flow for hydrant located at River Glen School	130 L/s	233 L/s (Institutional)	River Glen School on 59th Street.	Replace the existing 150mm pipe with 300 mm main on 44 Avenue from 58th Street to 59th Street and extend on 59th Street to Hydrant. Extend 300 mm main north to hydrant on school parcel.	300	360	B
22	Insufficient fire flow along 42 A Avenue near to Lindsay Thurber Comprehensive High School	107 L/s	233 L/s (Commercial / Institutional)	42 A Avenue near to Lindsay Thurber Comprehensive High School	Complete 300 mm loop from 55th Street to 59th Street adjacent to 42a Avenue.	300	700	B
23	Insufficient fire flows in commercial / industrial area. (60th Street)	78 L/s	233 L/s (Commercial / Industrial)	60th Street From 48th Avenue to 47th Avenue.	Replace existing 200 mm Pipe with 300 mm pipe to meet minimum fire flow standards.	300	600	B
24	Insufficient fire flow for Hydrants on 47A Avenue for multifamily land use.	104 L/s	180 L/s (Multifamily Site)	47A Avenue from 48th Street to 45th Street	Establish looping on 48th Street from 47A Avenue to 47 Avenue. Replace existing 150 mm CI pipe with 200 mm PVC pipe on 47A Avenue from 48th Street to 45th Street. Replace existing 150 mm pipe on 45th Street from 48 Avenue to 47A Avenue. Establish looping with installation of 200 mm main on 46th Street from 48 Avenue to 47a Avenue.	200	700	B
25	Insufficient fire flow at 51st Avenue and 48th Street.	203 L/s	233 L/s (Commercial)	51st Avenue and 47th Street.	Install 200 mm main on 48th Street from 51st Avenue to 50th Avenue.	200	120	B
26	Insufficient fire flow at West Park Middle School on 55th Avenue. (partially completed in 2017 - 2020)	143 L/s	233 L/s (Institutional)	West Park Middle School on 55th Avenue.	Install 350 mm main to replace existing 200 mm AC pipe on 55th Avenue from 400 mm pipe in laneway north of Wells Street to Wallace Close.	350	250	B
27	Insufficient fire flow at West Park Elementary School on 55th Avenue. (construction completed in 2021)	140 L/s	233 L/s (Institutional)	West Park Elementary School on 55th Avenue.	Connect 250 mm loop from 57th Avenue through to intersection of 37th Street and 54th Avenue.	250	620	B
28	Insufficient fire flow at St. Martin de Porres School on 57A Avenue.	81 L/s	233 L/s (Institutional)	St. Martin de Porres School on 57A Avenue.	Replace the existing 150mm Cast Iron pipe with a 350 mm main from 500 mm main on 57th Avenue to Hydrant on 57A Avenue.	350	75	B
29	Insufficient fire flow to commercial development at the corner of 43rd Street and Taylor Drive.	131 L/s	233 L/s (Commercial)	43rd St and Taylor Drive.	Loop system across Taylor Drive at 43rd Street using a 300 mm from 54th Avenue to 52 Avenue.	300	270	B
30	Insufficient fire flow for commercial area at 32nd Street and 49th Avenue.	148 L/s	233 L/s (Commercial)	32nd Street and 49th Avenue.	Replace Existing 200 mm CI pipe with 250 mm PVC Pipe on 49th Avenue from 33rd St to 30 St.	250	530	B
31	Insufficient fire flow at Aspen Heights School on 69 Street Drive.	77 L/s	233 L/s (Institutional)	Aspen Heights School on 69 St Drive	Replace existing 150 mm CI pipe with 250 mm PVC pipe on 69 St Drive from 71st Street to 59th Avenue.	250	270	B
32	Insufficient fire flow for commercial / industrial area on 47th Avenue Close, north of 77th Street.	116 L/s - 124 L/s	233 L/s (Commercial / Industrial)	47th Avenue Close, north of 77th Street.	Replace existing 200 mm pipe with 350 mm pipe to supply single supply line feed to hydrants on 47th Avenue Close.	350	560	B

Appendix B Recommended Capital Improvement For Existing System

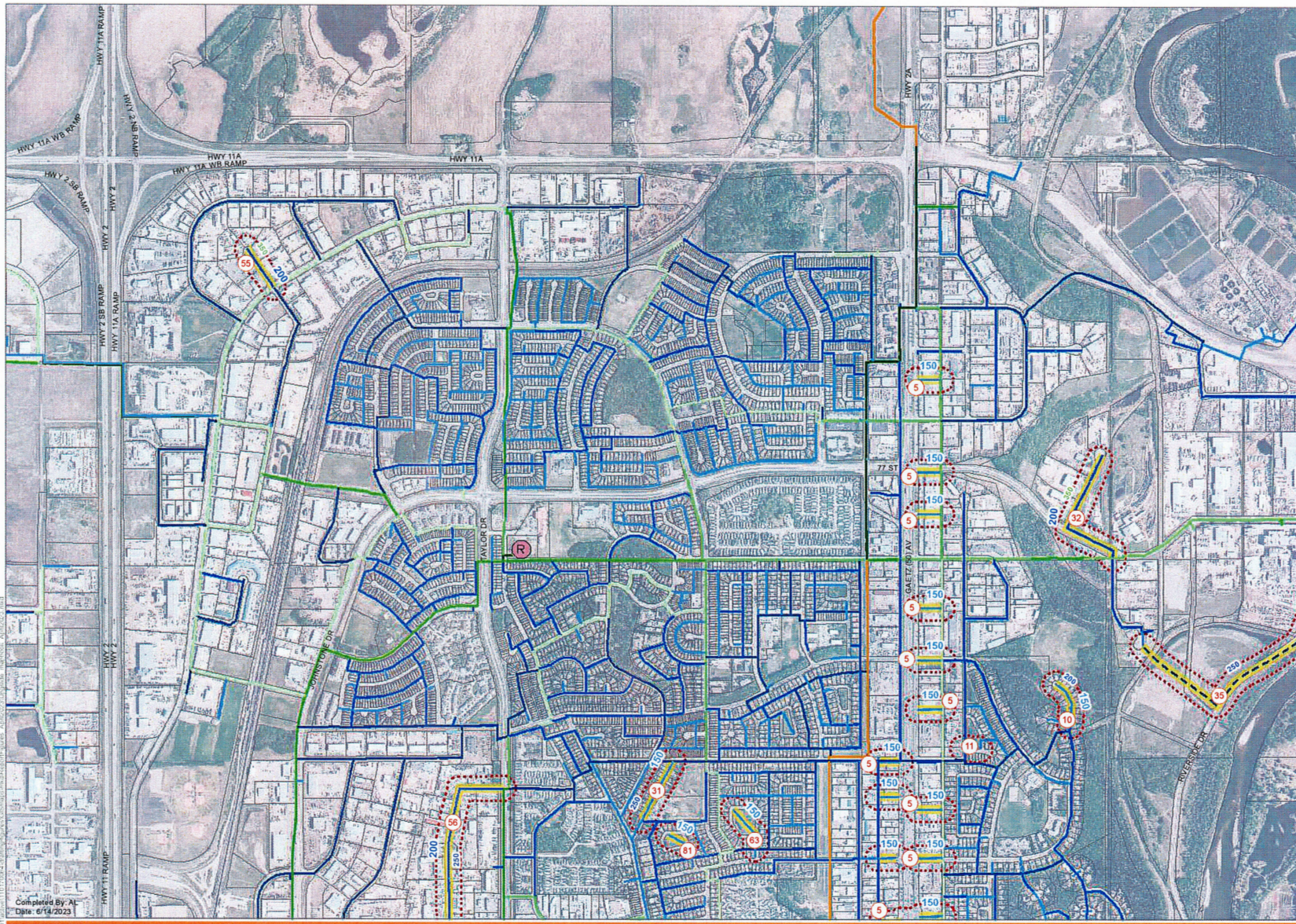
Item No.	Description of Deficiency / Issue	Available Fire Flow - Existing System	Required Fire Flow	Location	Improvement	Pipe Size (mm)	Length (m)	Priority (A, B, C, or D)
33	Insufficient fire flows in Rail Yards Development Area. (Construction completed in 2016-2018)	57 L/s - 192 L/s	233 L/s (Commercial / Industrial) 180 L/s (Multifamily Residential)	54th Avenue and 53rd Avenue, north of 50th Street. Proposed redevelopment of Rail Yards.	Replace existing 200 mm CI pipe with 300 mm PVC pipe on 53rd Avenue from 55th Street to 50th Street.	300	675	B
					Connect 300 mm pipe on 53rd Avenue with end of pipe on 52nd Avenue to establish looping. Replace existing 150 mm CI pipe with 250 mm PVC pipe on 52nd Street from 54th Avenue to 53rd Avenue. Replace existing 150 mm pipe on 54th Avenue from 55th Street to south end of pipe. Install new 250 mm PVC pipe to cross connect the distribution system on 52nd Street between 53rd Avenue and 51st Avenue.	250	620	B
34	Insufficient fire flow to R1 residential area (Oreston Close) (no longer needed using the newly calibration model)	76 L/s	75 L/s (R1 Residential)	Oreston Close	Replace existing 150 mm CI pipe with 200 mm PVC pipe on Oreston Close from Oberline Avenue to the end of the Oreston Close.	200	160	B
35	Insufficient fire flow to industrial development on 45th Avenue, south of 77th Street. Establish looping in industrial area.	125 and 158 L/s	233 L/s (Industrial)	Looping from south end of 45th Avenue (south of 77th Street) to Riverside Drive.	Install 250 mm pipe from south end of 45th Avenue (south of 77th Street) to Riverside Drive.	250	1050	B
36	Insufficient fire flow to 43rd Street, directly north of the Red Deer Regional Hospital. Complete the extension of the 250mm main along Gaelz Avenue to 43rd Street.	120 L/s - 132 L/s	233 L/s (Institutional)	Gaelz Avenue from 46th Street to 43rd Street. 43rd Street from Gaelz Avenue to 51A Avenue.	Replace existing 150/200 mm CI pipe with 250 mm PVC pipe.	250	550	B
37	Insufficient fire flow to multifamily area to the west and south of the Red Deer Regional Hospital. Establish looping through high density residential area.	86 L/s - 123 L/s	180 L/s (Multifamily Site)	52nd Avenue from 43rd Street to 39th Street. 39th Street from the corner of 52nd Avenue and 39th Street to 52nd Avenue. 52nd Avenue from 39th Street to lane south of 37th Street. Laneway on 52nd Avenue, south to 35th Street to connect to 400 mm pipe.	Replace existing 150 mm DI and CI pipes with 250 mm PVC pipe.	250	950	B
38	Insufficient fire flow to multifamily area on 44th Street between 51A Avenue and 51 Avenue. (Directly north of Red Deer Regional Hospital)	74 L/s	180 L/s (Multifamily Site)	51A Avenue, north of 43rd Street. 44th Street between 51A Avenue and 51 Avenue. 51A Avenue from 44th Street to 43rd Street.	Replace existing 150 mm CI pipe with 250 mm PVC pipe.	250	350	B
39	Insufficient fire flow to R1 residential area Deschner Close. Hydrant in NE portion of the close.	51 L/s	75 L/s (R1 Residential)	Deschner Close, hydrant in NE portion of the close.	Loop distribution piping to hydrant on NW portion of the close using a 150 mm PVC pipe.	150	140	C
40	Insufficient fire flow to R1 residential area on Orchard Green.	120 L/s	75 L/s (R1 Residential)	Orchard Green	Orchard Green from North Lane to Hydrant. Replace existing 150 CI pipe with 200 mm PVC pipe to achieve min 75 L/s fire flow.	150	210	C
41	Insufficient fire flow to R1 residential area on Odstone Green.	116-130 L/s	75 L/s (R1 Residential)	Odstone Green	Establish 150 mm looping on Odstone Green.	150	235	C
42	Insufficient fire flow for multifamily site on Lawford Avenue.	112 L/s	180 L/s (Residential Multifamily)	Lawford Avenue	Replace existing 150 mm single line feed to hydrant on west side of Lawford Avenue. Tie into 250 mm pipe on Leonard Cres. Fire flow is deficient for high demand area. Condo / apartment building	300	80	C
43	Insufficient fire flow for commercial development at the intersection of Dunlop Street and Dunning Crescent. (no longer needed)	310-358 L/s	233 L/s (Commercial)	Intersection of Dunlop Street and Dunning Crescent.	Increasing capacity of hydrant at Dunlop Street and Dunning Cres. Provide looping to hydrant from 30th Avenue to Dunning Cres with a 250 mm PVC pipe. Increase size of pipe from laneway to Dunlop Street from 150 mm to 300 mm. Increase pipe size in laneway north of Dunlop Street. (300 mm, and 250 mm)	250	230	C
						300	80	C
44	Insufficient fire flow at hydrant in at commercial development at 39th Street and 40th Avenue	169 L/s	233 L/s (Commercial)	40th Avenue and 39th Street	Connect hydrant to 400 mm HDPE pipe on 39th Street.	350	15	C
45	Insufficient fire flow at hydrant behind commercial development at 39th Street and 40th Avenue and adjacent to multifamily development.	159 L/s	180 L/s (Residential Multifamily)	41st Avenue and 39th Street, back lane behind commercial development.	Install 250 mm pipe to replace 200 mm CI pipe from 39th Street and 40th Avenue, around the commercial area to the hydrant.	250	230	C
46	Insufficient fire flow at hydrant at 50th Street and 38th Avenue	230 L/s	233 L/s (Commercial)	50th Street and 38th Avenue	Install 200 mm pipe from 47th Street to 50th Street on 38th Avenue	200	100	C
47	Insufficient fire flow available for commercial development at 50th Street and 41st Avenue. (Construction completed in 2017)	272 and 209 L/s	233 L/s (Commercial)	Intersection of 50th Street and 41 Avenue	Install 300 mm pipe on 47th Street from 40th Avenue to 41st Avenue. Install 300 mm pipe on 41st Avenue from 47th Street to 50th Street.	300	250	C
48	Insufficient fire flow for commercial area. Hydrants located at 52 Avenue and 58th St, and 52 Avenue and 59th St. (No need due to the improvement in 58 Street)	215-250 L/s L/s	233 L/s (Commercial)	Upgrades from 53 Avenue to 52 Avenue on 59th Street. Upgrades from 59th Street to 58th Street on 52nd Avenue.	Replace existing 150 mm pipe with 300 mm pipe on 59th Street from 53rd Avenue to 52nd Avenue. Replace existing 150 mm pipe with 300 mm pipe on 52nd Avenue from 59th Street to 58th Street.	300	280	C

Appendix B Recommended Capital Improvement For Existing System

Item No.	Description of Deficiency / Issue	Available Fire Flow - Existing System	Required Fire Flow	Location	Improvement	Pipe Size (mm)	Length (m)	Priority (A, B, C, or D)
49	Insufficient fire flow for Oilole Park School on Olabuey Street.	303 L/s	233 L/s (Institutional)	Oleander Drive from Olsen Street to hydrant near to Oberlin Avenue.	Replace existing 200 mm CI pipe with 250 mm PVC pipe.	250	260	C
50	Insufficient fire flow for multifamily development on Bennett St. (South of Bower Mall).	85 L/s - 118 L/s	180 L/s (Multifamily Site)	Bennett St. (South of Bower Mall).	Loop between hydrants using 150 mm pipe.	150	285	C
51	Insufficient fire flow for commercial development at 50th Avenue and Boyce Street.	611-638 L/s	233 L/s (Commercial)	50th Avenue and Boyce Street	Increase size of single supply line to hydrant from 200 mm to 350 mm	350	75	C
52	Insufficient fire flow to commercial lot at 49th Avenue and 18th Street (RV Sales Lot)	176 L/s	233 L/s (Commercial)	49th Avenue and 18th Street (RV Sales Lot)	Increase size of single supply line to hydrant from 150 mm to 350 mm	350	50	C
53	Insufficient fire flow to commercial developments on Taylor Drive between 22nd Street and 19th Street. Provide water supply to future development area south of Red Deer College. A portion of the loop has been constructed.	164 L/s - 203 L/s	233 L/s (Commercial)	Taylor Drive	Taylor Drive between 22nd Street and 19th Street.	300	620	C
54	Insufficient fire flow to commercial/industrial developments west of Westlerner Park on 49th Avenue.	104 L/s - 187 L/s	233 L/s (Commercial / Industrial)	west of Westlerner Park on 49th Avenue.	Increase pipe size from 200 mm to 250 mm along 49th Avenue from Westlerner Park Entrance to Spruce Street.	250	560	C
55	Insufficient fire flow to commercial / industrial development on Edgar Industrial Green.	155 L/s	233 L/s (Commercial / Industrial)	Edgar Industrial Green	Replace existing 200 mm single pipe feed to hydrant with a 350 mm pipe.	350	190	C
56	Insufficient fire flow along 65th Avenue north of 67th Street	173-189 L/s	233 L/s (Commercial / Industrial)	65th Avenue north of 67th Street	Replace existing 200 mm pipe with 250 mm PVC pipe.	250	890	C
57	Insufficient fire flow to hydrant on Ockley Close.	136 L/s	75 L/s (R1 Residential)	Ockley Close	Replace 150 mm feed with 200 mm PVC Pipe.	200	70	C
58	Insufficient fire flow for R1 residential area on Onslow Square.	122 L/s	75 L/s (R1 Residential)	Onslow Square.	Replace 150 mm feed with 200 mm PVC Pipe.	200	55	C
59	Insufficient fire flow on Orient Green for multifamily development	102 L/s	135 L/s (Residential Multifamily - Fourplex)	Orient Green	Establish looping by installing 200 mm pipe to the north of Orient Green and connecting to existing 200 mm pipe to the east. Replace 150 mm DI hydrant supply pipe with 200 mm PVC pipe.	200	315	C
60	Insufficient fire flows for multifamily development on Onaway Avenue and Oxford Avenue	124-141 L/s	135 L/s (Residential Multifamily - Fourplex)	Onaway Avenue and Oxford Avenue	Loop hydrant feeds with 150 mm PVC pipe between Onaway Avenue and Oxford Avenue to increase available fire flows.	150	200	C
61	Insufficient fire flow to R1 residential area (Olympic Green)	107 L/s - 111 L/s	75 L/s (R1 Residential)	Olympic Green	Loop hydrant feeds with 150 mm PVC pipe between to increase available fire flows.	150	120	C
62	Insufficient fire flow to R1 residential area (Oakville Crescent)	94 L/s	75 L/s (R1 Residential)	Oakville Crescent	Replace existing 150 mm DI pipe feed to hydrant on Oakville Crescent with 200 mm PVC pipe.	200	100	C
63	Insufficient fire flow to Norris Close	44 L/s	75 L/s (R1 Residential)	Norris Close	Replace existing 150 mm DI single supply line with 200 mm pipe.	200	200	C
64	Insufficient fire flow to R1 residential area on Overdown Drive.	138 L/s	75 L/s (R1 Residential)	Overdown Drive	Replace existing 150 mm CI single supply pipe to hydrant on Overdown Drive with 200 mm PVC	200	40	C
65	Insufficient fire flow to R1 residential area on 38th Street and 36th Street east of 42nd Ave.	59 L/s	75 L/s (R1 Residential)	38th Street, east of 42nd Avenue 36th Street, east of 42nd Avenue	Replace existing 150 mm CI pipes with 150 mm PVC pipes on 42nd Ave from: 36th Street to 38th Street 38th Street from 42nd Avenue to 41st Avenue 36th Street from 42nd Avenue to 41st Avenue	150	620	C
66	Insufficient fire flow to R1 residential area on 41st Avenue between 35th Street and 33rd Street. Insufficient fire flow to R1 residential area on 42nd Avenue, south of 35th Street.	54 L/s - 64 L/s	75 L/s (R1 Residential)	41st Avenue, south of 35th Street 42nd Avenue, south of 35th Street	Replace existing 150 mm CI pipe with 200 mm PVC pipe in the following locations: 35th Street from 41st Avenue to 43rd Avenue 42nd Avenue from 35th Street to 34 Street Close 41st Avenue from 35th Street, south to hydrant	200	550	C

Appendix B Recommended Capital Improvement For Existing System

Item No.	Description of Deficiency / Issue	Available Fire Flow - Existing System	Required Fire Flow	Location	Improvement	Pipe Size (mm)	Length (m)	Priority (A, B, C, or D)
67	Insufficient fire flow to R1 residential area on Anquetel Close	66 L/s	75 L/s (R1 Residential)	Anquetel Close	Replace existing 150 mm AC single pipe supply to hydrant with 200 mm PVC pipe.	200	95	C
68	Insufficient fire flow to R1 residential area on Allan Street	86 L/s	75 L/s (R1 Residential)	Allan Street	Replace existing 150 mm AC single pipe supply to hydrant with 200 mm PVC pipe.	200	60	C
69	Insufficient fire flow to R1 residential area on Akman Close	40 L/s	75 L/s (R1 Residential)	Akman Close	Replace existing 150 mm AC single pipe supply to hydrant with 200 mm PVC pipe.	200	110	C
70	Insufficient fire flow to R1 residential area on Ibbolton Close.	70 L/s	75 L/s (R1 Residential)	Ibbolton Close	Replace 150 mm PVC watermain with 200 mm PVC watermain on Ibbolton Close.	200	225	D
71	Replacement of aging 100 mm cast iron pipe on 60th Avenue.	N/A	75 L/s (R1 Residential)	60th Avenue from 64th Street to 61st Avenue.	Upgrade Existing 100 mm CI Pipe to 150 mm PVC pipe. 60th Avenue from 64th Street to 61st Avenue.	150	200	D
72	Insufficient fire flows in commercial / industrial area. (61st Street)	198 L/s	233 L/s (Commercial / Industrial)	61st Street From 48th Avenue to 46a Avenue.	Replace existing 200 mm Pipe with 300 mm pipe to meet minimum fire flow standards.	300	730	D
73	Insufficient fire flow for R1 residential development on Oates Green.	113-128 L/s	75 L/s (R1 Residential)	Oates Green.	Loop hydrant feeds on Oates Green	150	115	D
74	Insufficient fire flow for R1 residential development on Odell Green.	112 L/s	75 L/s (R1 Residential)	Odell Green	Loop hydrant feed for Odell Green.	150	250	D
75	Insufficient fire flow for hydrants on 48 Avenue, south of 48th Street.	215 L/s	233 L/s (Commercial)	48th Avenue from 49th Street to 46th Street.	Replace existing 200 CI Pipe with 300 mm PVC Pipe	300	315	D
76	Insufficient fire flow at 51st Avenue and 47th Street.	203 L/s	233 L/s (Commercial)	51st Avenue and 47th Street.	Install 300 mm main on 47th Street from 52nd Avenue to 50th Avenue. Replaces existing 150 mm pipe.	300	310	D
77	Insufficient fire flow to R1 on Broughton Cres.	63 L/s	75 L/s (R1 Residential)	Broughton Cres.	Replace single 150 mm feed to hydrant with 200 mm pipe.	200	120	D
78	Insufficient fire flow to R1 on Brookes Cres.	63 L/s	75 L/s (R1 Residential)	Brookes Cres.	Replace single 150 mm feed to hydrant with 200 mm pipe.	200	115	D
79	Insufficient fire flow to R1 on Best Cres.	62 L/s	75 L/s (R1 Residential)	Best Cres.	Replace single 150 mm feed to hydrant with 200 mm pipe.	200	110	D
80	Hydrant on Edgar Industrial Drive at midpoint of Edgar Industrial Court is deficient in fire flow for industrial land use.	230 L/s	233 L/s (Commercial / Industrial)	Edgar Industrial Drive at midpoint of Edgar Industrial Court	Replace existing 250 mm feed with 350 mm pipe from Edgar Industrial Link to hydrant.	350	290	D
81	Fire flow on Neville Close for R1 is insufficient.	63 L/s	75 L/s (R1 Residential)	Neville Close	Increase size of the feed to the hydrant from 150 mm to 200 mm	200	80	D
82	Insufficient fire flow to R1 residential area on Bunn Crescent	60 L/s	75 L/s (R1 Residential)	Bunn Crescent.	Replace existing 150 mm AC pipe with 200 mm pipe.	200	100	D



- Legend**
- (R) Existing Reservoir
 - (B) Booster Station
 - (T) Water Treatment Plant/Reservoir
 - ▲ Pressure Reducing Valve (Active)
 - ◻ Pressure Reducing Valve (Inactive)
- Proposed Pipes**
- 100
 - 150
 - 200
 - 250
 - 300
 - 350
 - 400
 - 450
 - 500
 - 600
 - 750
 - 900
 - 1050
 - 1200
 - 2000
- Existing Pipes**
- 100
 - 150
 - 200
 - 250
 - 300
 - 350
 - 400
 - 450
 - 500
 - 600
 - 750
 - 900
 - 1050
 - 1200
 - 2000
- Proposed Upgrades
- Upgrade Location

Completed By: AL
Date: 07/14/2023

Project No.: 110170064

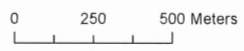


Figure B.1: Proposed Upgrades

City of Red Deer Water Model Update
City of Red Deer