City of Hamilton's
Drinking Water Systems

SUMMARY REPORT FOR MUNICIPALITIES (2015)

Safe Drinking Water Act, Ontario Regulation, 170/03, Schedule 22

HAMILTON WATER
WATER IS LIFE

Hamilton
Public Works

BCOS
BEYOND COMPLIANCE OPERATING SYSTEM

Summary Report for Municipalities
BCOS Record #: PW-WW-R-004-014
Issue #: 1

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1 INTRODUCTION

This summary report for municipalities has been prepared in accordance with the Safe Drinking Water Act, Ontario Regulation, 170/03, Schedule 22. The City of Hamilton is the Owner of the following five Drinking Water Systems (DWS):

Licence Number	Drinking Water System
005-101	Hamilton DWS
005-102	Freelton DWS
005-103	Greensville DWS
005-104	Carlisle DWS
005-105	Lynden DWS

For each of the City of Hamilton's five DWSs, the following information is provided for the 2015 reporting period:

- A summary of quantities and flow rate of the water supplied
- Monthly average and maximum daily flows (in comparison to approved flow rates)
- A summary of 2015 capital upgrades, as well as those to be initiated in 2016

There were no Provincial Officer's Orders issued. All confirmed Adverse Water Quality Incidents were reported to the Ontario Ministry of Environment and Climate Change's (MOECC) Spills Action Centre (SAC) and Public Health Services (PHS) and are provided in the report. All water taking quantities and flow rates were within approved rated capacities and provincial water taking limits.

2 HAMILTON DWS, WOODWARD SUB-SYSTEM

2.1 Capital Projects Update- 2015

2.1.1 Projects Completed 2015 - Woodward Water Treatment System and Water Outstations

- Ben Nevis and DeWitt Pumping Station (HD08A0) Pump Motor Replacement
- Glancaster Pumping Station (HD018) Pump #3 Refurbishment
- Greenhill Pumping Station (HD05A) Gas Chlorination System Refurbishment
- Highland Gardens Water Booster Pumping Station (HD03A) New Station
- Kenilworth Pumping Station (HD005) Emergency Repairs to the Transmission Main
- Old Ancaster Road Water Booster Pumping Station (HD012) Upgrade
- Select Pumping Stations Standby Power Diesel Fuel System Retrofits
- Woodard Avenue Water Treatment Plant SCADA Phase V Station Changeovers
- Woodley's Lane Reservoir (HDR11) Siding Replacement

- Woodward Avenue Water Treatment Plant Back Wash Valve (West) Repair
- Woodward Avenue Water Treatment Plant Rail Car Barrier New Wall
- Woodward Avenue Water Treatment Plant Sedimentary Basin Wash Line Repairs
- Water Distribution System Control Valves – Emergency repair of two Pressure Reducing valves (Design and Construction)

The above water treatment and water station upgrades and modifications were completed at a cost of approximately $10.9 million dollars.

2.1.2 Projects Initiated - Woodward Water Treatment System and Water Outstations

- Greenhill Avenue Reservoir (HDR1B) and Valvehouse Upgrades (Construction)
- Hillcrest Water Reservoir (HDR02) Upgrades Contract 3 - Access\Control, East Cell (Construction)
- Low Lift Pumping Station Improvements Phase 2 (Design)
- Osler Pumping Station (HD011) Immediate Process Upgrades (Design)

The above water treatment and water station upgrades and modifications are being undertaken at a cost of approximately $13.0 million dollars.

2.2 Distribution System - Pipes

As part of the City's Linear Asset Management Program, the following water upgrades and rehabilitations were completed:

- Approximately 13.7 km of watermain was replaced as a stand-alone project and\or in coordination with roadwork at a cost of $11.7 million dollars.
- Approximately 6.3 km of watermain was rehabilitated using structural and\or cement mortar lining at a cost of $5.9 million dollars.
- Approximately 3.7 km of new watermain was installed at a cost of 11.5 million dollars.

2.3 Capital Projects to be initiated in 2016

2.3.1 Woodward Water Treatment System and Water Outstations

- Ben Nevis & Dewitt Reservoir (HDR1C) Upgrades (Pre-design and Design)
- Ferguson Avenue Pumping Station (HD002) Phase III Upgrades - (Pre Design and Construction)
- Glancaster Road & Highway 53 Pumping Station (HD018) Upgrades (Design)
- Governors Road and Huntington (HD012A) Capacity Upgrade & Standby Power Installation (Design)
- Kenilworth Pumping Station (HD005) Upgrades – Phase II (Construction)
- Kenilworth Reservoir (HDR01) Upgrades (Design)
- Osler Pumping Station (HD011) Immediate Process Upgrades (Construction)

- Stoney Creek Water Outstations Fifty Road Pumping Station and Reservoir (HD009 and HDR10) and Ben Nevis Reservoir (HDR1C) Upgrades.
- Valve Chamber No. 3 (District 5) Upgrades (Construction)
- Water Distribution System Control Valves (Design and Construction)
- Woodward Avenue Water Treatment Plant – Corrosion Control (Pre-design and Design)
- Woodward Avenue Water Treatment Plant Surge Tower Upgrades (Design and Construction)
- Woodward Avenue Water Treatment Plant Upgrades Phase I (Pre-design and Detailed Design)
- York and Valley Pumping Station (HD016) Upgrades (Design)

The above upgrades and modifications will be undertaken at a cost of approximately $23.6 million dollars.

2.4 Corrosion Control Program

The City of Hamilton conducted its Legislated Community Lead Sampling Program for the Woodward DWS between 2008 and 2009. The results of the sampling program indicated that greater than 10 percent of tap water samples collected from residential and non-residential plumbing systems (“at the tap”) exceeded 10 micrograms per litre (µg/L) in all four sampling rounds and as such the MOECC required the City of Hamilton to prepare and submit a Corrosion Control Plan (CCP) for the Woodward DWS. A CCP was developed and accepted by the Ministry of the Environment (MOE) on June 7th, 2011.

Based on the recommendations of the CCP, a phosphate-based treatment approach was identified as the most optimal solution for corrosion control in the Woodward DWS. In 2012 and 2013, the Operating Authority conducted a Corrosion Control Pilot Study, which was subsequently peer reviewed, in to ensure that the most appropriate phosphate-based additive was chosen to address the corrosion issue in Hamilton. The results of this work recommended that the City proceed to full-scale implementation with orthophosphate for corrosion control, using phosphoric acid as the source additive.

At the November 25, 2015 Council meeting Report 15-015, Corrosion Control Program for the Woodward Drinking Water System, was adopted. The primary recommendation of the report was to gain authorization to implement corrosion control within the Woodward Drinking Water System (DWS) using a phosphate-based treatment approach with orthophosphate as the method for corrosion control, and phosphoric acid as the treatment additive.

The City of Hamilton updated the MOECC of Council’s approval in January 2016 and is moving forward with the implementation of the CCP as outlined in Report 15-015.

2.5 Adverse Water Quality Incidents (AWQI) - Hamilton DWS

The following AWQIs were reported to the MOECC SAC and PHS.

Notification Date (m-d-y)	Location of Adverse	AWQI	Resolution
07-25-2015	Lee Smith Booster Station Sulphur Springs Rd.	Total Coliforms = 1 CFU/100mL	Resampled adverse location, one upstream and one downstream hydrant. Results passed at all hydrants but failed at the adverse location resulting in another AWQI on July 26. The adverse was confirmed.
07-26-2015	Lee Smith Booster Station Sulphur Springs Rd.	Total Coliforms = 7 CFU/100mL	Two consecutive sets of samples taken 24 to 48 hours apart at the adverse location, one upstream and one downstream hydrant. Both sets of results passed.
09-22-2015	Water Pumping Station HD007, Highland Rd. W.	Total Coliforms = 2 CFU/100mL	Resampled adverse location, one upstream and one downstream hydrant. All results passed. The adverse was not confirmed.

2.6 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 2-1: Woodward Treatment Plant - 2015 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day
1	283	374	337	204	218	158	329	384	154	180	292	185
2	196	96	229	223	374	220	181	355	160	177	190	197
3	289	225	221	299	362	222	196	205	247	158	188	159
4	291	230	226	289	212	224	311	155	247	194	171	260
5	162	230	244	292	226	221	289	175	387	309	103	168
6	167	229	230	207	185	316	113	163	381	161	172	246
7	144	376	341	186	216	340	252	201	205	189	284	247
8	201	275	323	211	212	216	230	386	229	255	296	166
9	208	55	217	191	370	186	223	347	190	196	198	244
10	300	196	220	221	364	219	163	193	161	389	161	176
11	303	309	221	359	364	221	254	170	203	245	160	244
12	208	163	260	323	204	222	364	169	363	184	158	223
13	154	240	264	214	246	303	229	246	282	184	167	211
14	211	385	382	215	247	291	226	240	103	199	300	247
15	234	317	377	220	251	153	225	360	163	208	294	215
16	331	263	229	220	388	186	224	294	205	207	194	241
17	323	198	190	220	296	219	234	211	225	307	159	156
18	300	193	228	318	293	216	389	215	204	265	231	162
19	198	187	232	281	175	214	238	215	294	156	209	259
20	174	185	231	160	187	271	203	242	325	159	208	261
21	216	341	385	169	225	384	182	239	217	167	151	190
22	216	338	321	226	225	183	197	347	203	201	255	202
23	214	199	213	227	326	242	187	272	190	169	251	164
24	331	227	187	240	381	183	245	206	222	348	187	194
25	329	229	234	307	99	174	380	181	219	306	179	286
26	207	251	191	300	148	234	381	183	186	173	295	287
27	173	249	221	215	394	392	210	186	375	158	262	266
28	216	343	362	181	248	348	228	209	184	202	260	155
29	217		381	190	249	163	250	372	221	185	117	115
30	215		209	219	391	160	106	380	190	200	261	157
31	367		221		377		256	178		156		163
Total	7,378	6,903	8,127	7,129	8,454	7,082	7,492	7,679	6,934	6,587	6,354	6,446
Average	238	247	262	238	273	236	242	248	231	212	212	208
Min	144	55	187	160	99	153	106	155	103	156	103	115
Max	367	385	385	359	394	392	389	386	387	389	300	287
PTTW	909	909	909	909	909	909	909	909	909	909	909	909

Note: Municipal Drinking Water Licence (005-101) Rated Capacity 926,000 m^3/ day

Figure 2-1: Woodward Treatment Plant - 2015 Monthly Production (Summary)

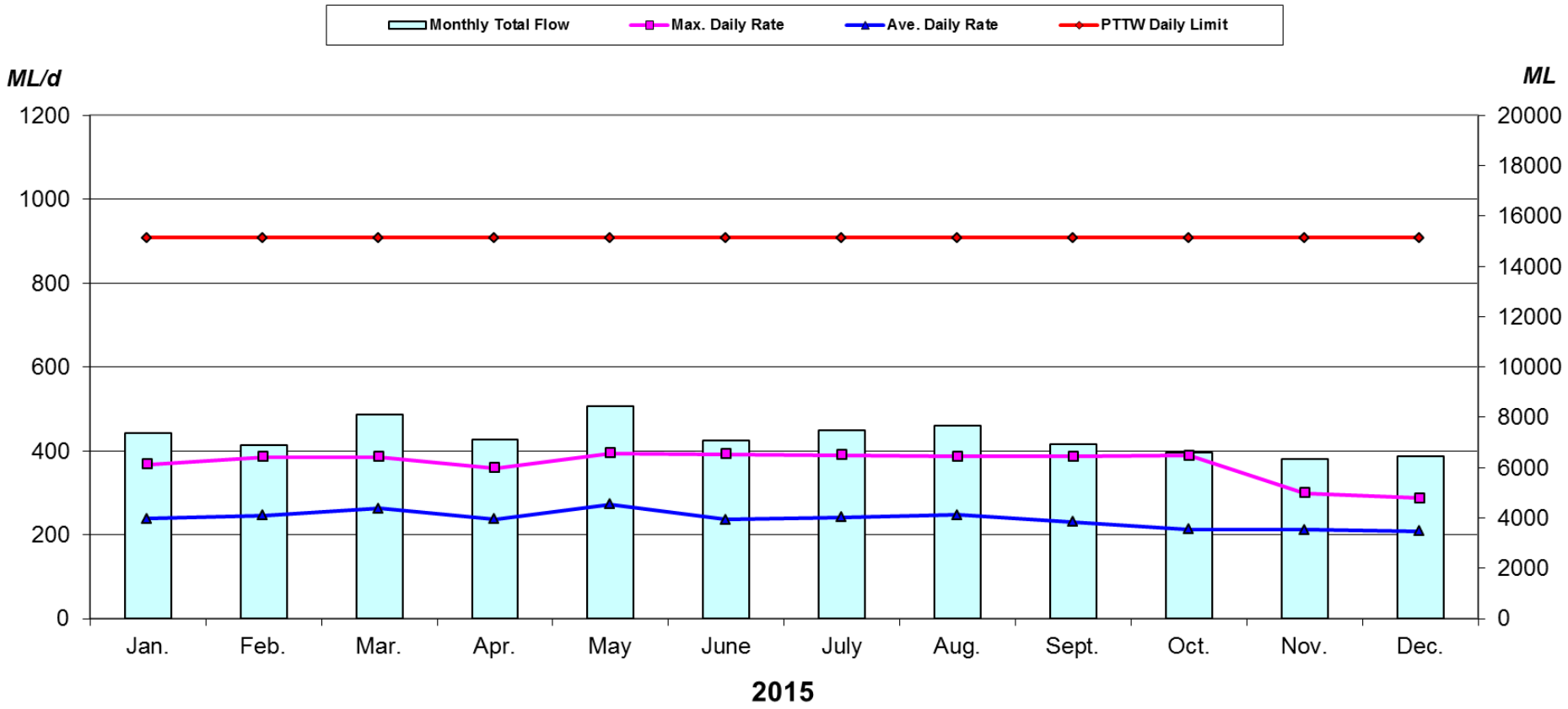

Table 2-2: Woodward Treatment Plant - 2015 Monthly Production (Summary)

Woodward	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total	ML	7,378	6,903	8,127	7,129	8,454	7,082	7,492	7,679	6,934	6,587	6,354	6,446
Average	ML/d	238	247	262	238	273	236	242	248	231	212	212	208
Maximum	ML/d	367	385	385	359	394	392	389	386	387	389	300	287
PTTW	ML/d	909	909	909	909	909	909	909	909	909	909	909	909

3 HAMILTON DWS, FIFTY ROAD SUB-SYSTEM

3.1 Operational Upgrades

See 2.3.1 for those capital projects planned for 2016.

3.2 Adverse Water Quality Incidents (AWQI) - Fifty Road DWS

No AWQI's in 2015.

3.3 Water Production Reports - Summary

The Fifty Road DWS receives treated water from the Town of Grimsby Water Distribution System.

4 CARLISLE DWS

4.1 Operational Upgrades

In 2015, pipe was added at the Carlisle Well Water Tower (FDC03R) to measure pressure at a new location. This work was completed at a cost of approximately $36,000.

Approximately 5.6 km of watermain pipe was installed on Centre Road at an approximate project cost $540,000.

The Class Environmental Assessment process, to identify potential locations for a new water tower was suspended in 2014 and the Carlisle Community Liaison Committee (CLC) was disbanded. In 2015, a new Community Conservation Committee (CCC) was formed. Hamilton Water, in partnership with the CCC, will work towards the development of a new Water Conservation Plan (WCP). The plan will continue to be developed and implemented over the next year (2016). The EA process will be revisited depending on the water conservation results achieved.

4.2 Adverse Water Quality Incidents (AWQI) - Carlisle DWS

The following AWQI was reported to MOECC SAC and PHS.

Notification Date (m-d-y)	Location of Adverse	AWQI	Resolution
01-26-2015	Carlisle DWS	Failure to obtain primary disinfection due to insufficient contact time.	Primary disinfection was restored. Samples were collected from the tower, FDC03R treated, FDC05 treated, sampling station A and sampling station B. All results passed.
04-21-2015	FDC01 (Treated) FDC02 (Treated) FDC03R (Treated) FDC05 (Treated)	Sodium = 21.5 mg/L Sodium = 20.1 mg/L Sodium = 46.5 mg/L Sodium = 46.2 mg/L	The adverse locations were resampled. Sodium adverse was confirmed at all wells except FDC02. Residents were mailed a letter, written by Public Health Services about sodium. Public Health was given a list of addresses to which the letters were mailed and a letter indicating that these addresses were believed to be connected to the Carlisle DWS. MOECC requires notification only once

			every 57 months.

4.3 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 4-1: Carlisle DWS (FDC01 & FDC02) - 2015 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day
1	191	493	369	248	168	0	0	0	255	0	162	15
2	366	156	200	428	592	105	0	0	283	0	207	0
3	502	297	207	734	742	0	0	0	0	0	313	0
4	738	343	310	31	423	0	0	0	81	0	327	0
5	176	372	185	482	518	0	0	30	414	0	206	0
6	523	372	282	220	742	0	0	182	643	473	0	0
7	470	372	530	181	740	0	17	164	638	658	0	0
8	324	537	168	420	741	0	0	0	629	112	0	13
9	395	375	274	675	654	96	0	0	648	0	0	0
10	740	428	369	72	0	162	0	0	649	0	110	0
11	232	345	433	365	3	0	0	191	118	0	0	0
12	372	461	740	275	16	0	0	296	0	0	0	34
13	546	370	123	203	15	0	0	199	0	24	0	0
14	607	510	518	369	0	0	23	0	0	0	107	0
15	0	740	740	466	0	0	0	0	60	0	213	47
16	277	183	32	741	0	16	214	0	0	402	176	0
17	524	505	435	103	240	0	295	386	0	280	114	0
18	740	465	612	543	139	0	295	330	0	658	206	0
19	143	175	98	741	407	0	187	0	0	156	304	0
20	376	626	378	283	321	0	0	2	0	286	135	0
21	485	639	740	531	160	0	14	0	118	241	194	0
22	100	137	264	313	0	0	0	0	648	651	305	9
23	179	372	312	345	55	88	0	0	660	167	226	0
24	372	551	336	547	37	0	0	0	655	196	222	0
25	456	415	619	630	0	0	0	12	656	651	30	0
26	365	201	350	621	210	0	0	0	658	329	0	0
27	49	372	294	284	373	0	29	7	654	243	0	0
28	290	349	370	479	51	0	248	0	218	651	0	0
29	429		564	743	96	22	29	0	15	460	0	15
30	532		327	719	69	71	2	127	0	244	0	0
31	372		664		0		0	54		603		0
Total	11,871	11,162	11,841	12,792	7,512	561	1,355	1,980	8,699	7,486	3,559	131
Average	383	399	382	426	242	19	44	64	290	241	119	4
Min	0	137	32	31	0	0	0	0	0	0	0	0
Max	740	740	740	743	742	162	295	386	660	658	327	47
PTTW	851	851	851	851	851	851	851	851	851	851	851	851

Note: Municipal Drinking Water Licence (005-104) FDC01 and FDC02 Rated Capacity 851 m^3/day

Figure 4-1: Carlisle DWS (FDC01 & FDC02) - 2015 Monthly Production (Summary)

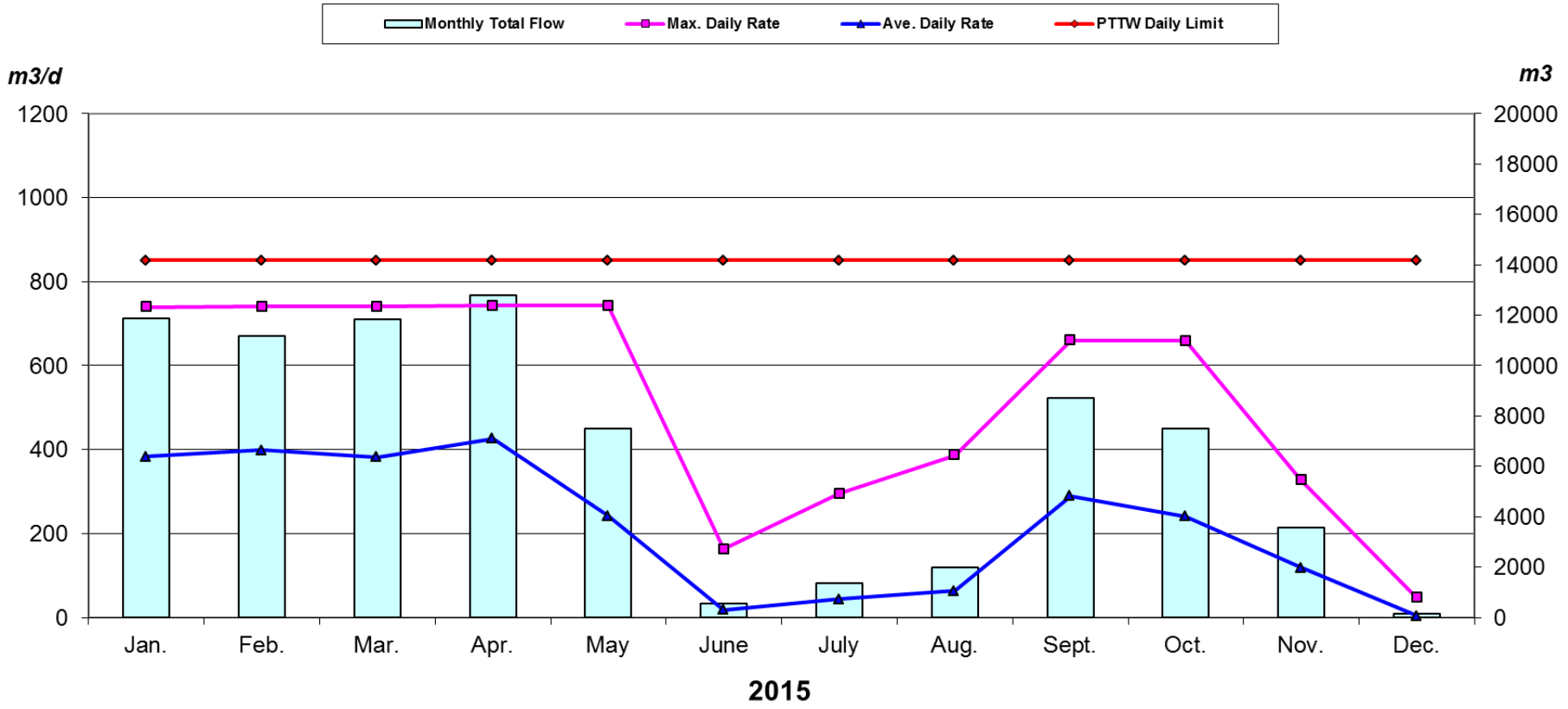

Table 4-2: Carlisle DWS (FDC01 & FDC02) - 2015 Monthly Production (Summary)

FDC01, FDC02	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total	m^3	11,871	11,162	11,841	12,792	7,512	561	1,355	1,980	8,699	7,486	3,559	131
Average	m^3/d	383	399	382	426	242	19	44	64	290	241	119	4
Maximum	m^3/d	740	740	740	743	742	162	295	386	660	658	327	47
PTTW	m3/d	851	851	851	851	851	851	851	851	851	851	851	851

Table 4-3: Carlisle DWS (FDC03R) - 2015 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day
1	0	0	0	0	0	378	783	1,319	1,147	0	0	98
2	0	77	197	0	0	426	871	1,541	1,111	0	0	415
3	0	0	0	0	0	1,136	908	603	1,216	0	0	479
4	0	0	0	0	26	1,173	1,164	1,048	1,116	0	0	513
5	18	0	0	0	0	1,556	1,538	1,086	0	0	0	0
6	81	0	1	209	0	1,217	840	780	0	0	0	946
7	0	0	0	0	0	1,328	1,071	1,174	668	0	0	240
8	0	0	0	0	0	300	488	1,540	603	0	0	256
9	0	34	129	0	45	303	1,030	1,533	385	0	0	520
10	0	0	0	0	167	848	1,054	618	129	0	0	381
11	0	0	0	0	360	739	610	661	976	0	0	160
12	29	0	0	0	105	789	353	733	656	0	0	607
13	0	0	0	74	0	842	1,064	1,070	757	0	0	496
14	0	0	0	0	134	561	782	962	684	0	0	384
15	0	0	0	0	0	772	999	804	624	0	0	0
16	0	47	25	0	82	833	958	1,129	0	0	0	800
17	0	0	0	0	640	762	710	543	0	0	0	0
18	0	0	0	0	858	954	467	770	0	0	29	826
19	21	0	0	0	313	949	647	1,127	0	0	1	440
20	0	0	0	18	0	1,232	588	761	0	0	0	390
21	0	0	0	0	198	1,160	1,133	1,028	25	0	0	179
22	0	0	0	15	1,282	913	1,170	1,044	0	0	0	339
23	0	33	39	0	1,121	593	1,551	1,328	0	0	0	294
24	0	0	0	0	1,226	927	1,561	742	0	0	0	522
25	0	0	0	0	1,124	1,035	1,562	961	0	0	62	474
26	31	0	0	0	845	1,055	1,549	879	0	0	53	452
27	407	0	0	60	779	768	1,225	1,176	0	0	435	436
28	0	0	0	0	1,143	491	1,128	1,121	0	0	544	473
29	0		0	0	1,210	702	1,315	1,533	0	0	442	53
30	0		20	0	1,373	403	1,350	936	0	0	295	492
31	0		0		541		1,306	990		0		642
Total	587	190	410	377	13,573	25,145	31,774	31,539	10,097	0	1,860	12,304
Average	19	7	13	13	438	838	1,025	1,017	337	0	62	397
Min	0	0	0	0	0	300	353	543	0	0	0	0
Max	407	77	197	209	1,373	1,556	1,562	1,541	1,216	0	544	946
PTTW	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160

Note: Municipal Drinking Water Licence (005-104) FDC03R and FDC05 Rated Capacity 3,456 m^3/day

Figure 4-2: Carlisle DWS (FDC03R) - 2015 Monthly Production (Summary)

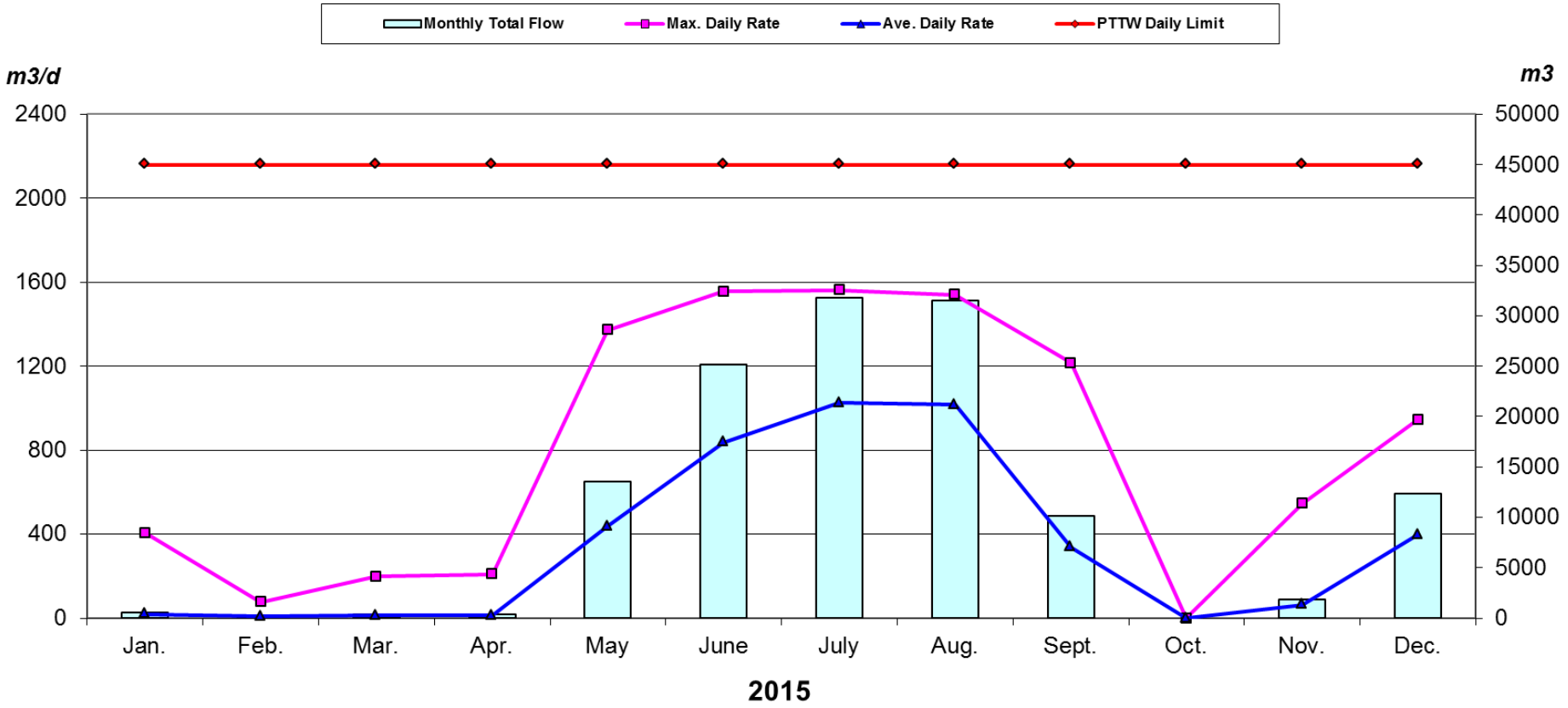

Table 4-4: Carlisle DWS (FDC03R) - 2015 Monthly Production (Summary)

FDC03R	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total	m3	587	190	410	377	13,573	25,145	31,774	31,539	10,097	0	1,860	12,304
Average	m3/d	19	7	13	13	438	838	1,025	1,017	337	0	62	397
Maximum	m3/d	407	77	197	209	1,373	1,556	1,562	1,541	1,216	0	544	946
PTTW	m3/d	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160

Table 4-5: Carlisle DWS (FDC05) - 2015 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day
1	0	0	0	0	0	604	0	388	0	636	0	0
2	0	350	38	0	384	461	0	0	0	618	556	0
3	0	0	176	0	0	0	0	231	325	617	0	0
4	0	171	289	0	22	0	0	0	293	578	0	0
5	35	0	0	0	363	0	0	0	771	448	0	0
6	0	38	356	48	0	0	302	0	1,051	209	613	0
7	0	0	0	295	0	0	165	144	649	0	258	28
8	0	0	0	0	58	625	0	0	0	195	376	0
9	0	44	62	0	529	75	0	0	0	346	390	0
10	0	0	0	0	468	0	0	474	0	677	499	0
11	0	0	0	263	493	0	1,051	0	0	718	170	0
12	17	0	0	22	588	0	1,075	0	0	513	257	0
13	0	0	0	108	727	0	372	0	0	382	686	0
14	0	0	0	0	1,070	0	40	0	60	412	0	0
15	224	0	0	0	1,070	22	0	0	124	567	448	0
16	0	24	36	0	54	0	0	0	1,055	0	334	0
17	0	0	0	0	625	0	0	88	1,043	200	178	0
18	0	0	0	0	472	0	0	518	664	0	87	54
19	24	0	0	0	107	0	0	0	918	71	187	0
20	116	0	0	34	1,045	0	250	0	656	369	153	0
21	0	0	0	0	1,017	0	0	0	480	0	457	0
22	312	0	0	29	0	114	0	0	511	0	0	81
23	56	35	48	0	203	0	0	0	0	228	214	3
24	0	0	0	0	638	138	0	73	318	0	203	0
25	0	0	0	0	283	0	0	0	261	0	98	0
26	130	144	0	0	442	0	620	0	153	84	494	0
27	77	81	0	64	754	0	384	0	394	0	0	10
28	0	77	0	0	649	0	699	0	448	0	0	29
29	0		0	0	707	31	808	0	899	0	0	15
30	0		9	0	251	0	875	296	550	0	33	0
31	0		18		0		186	0		0		0
Total	990	965	1,032	862	13,021	2,070	6,826	2,213	11,622	7,868	6,692	219
Average	32	34	33	29	420	69	220	71	387	254	223	7
Min	0	0	0	0	0	0	0	0	0	0	0	0
Max	312	350	356	295	1,070	625	1,075	518	1,055	718	686	81
PTTW	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296

Note: Municipal Drinking Water Licence (005-104) FDC03R and FDC05 Rated Capacity 3,456 m^3/day

Figure 4-3: Carlisle DWS (FDC05) - 2015 Monthly Production (Summary)

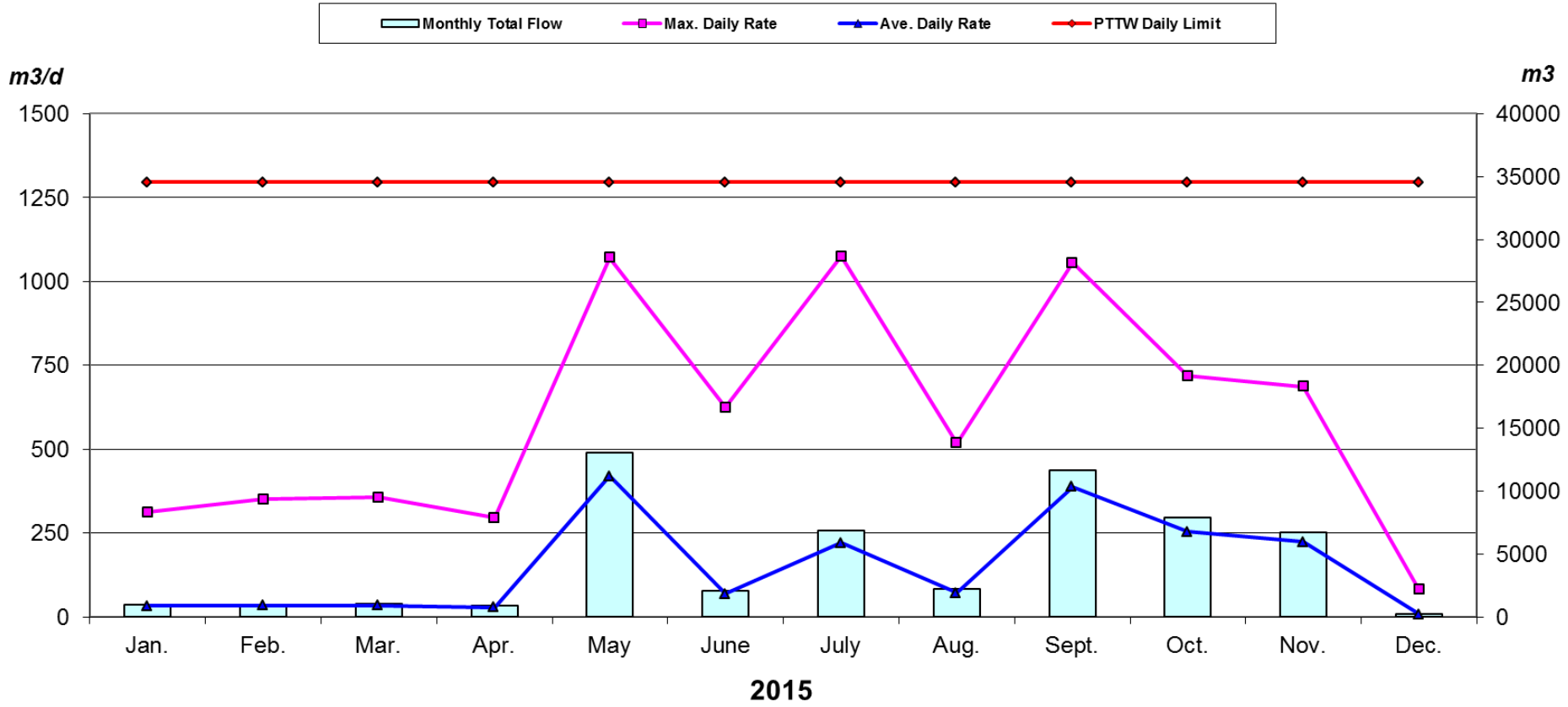

Table 4-6: Carlisle DWS (FDC05) - 2015 Monthly Production (Summary)

FDC05	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total	m3	990	965	1,032	862	13,021	2,070	6,826	2,213	11,622	7,868	6,692	219
Average	m3/d	32	34	33	29	420	69	220	71	387	254	223	7
Maximum	m3/d	312	350	356	295	1,070	625	1,075	518	1,055	718	686	81
PTTW	m3/d	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296

5 FREELTON DWS

5.1 Operational Upgrades

In 2016, the design for the Freelton Tower (HDT03) Upgrades will be complete at an approximate cost of $22,000.

5.2 Adverse Water Quality Incidents (AWQI) - Freelton DWS

The following AWQIs were reported to MOECC SAC and PHS.

Notification Date (m-d-y)	Location of Adverse	AWQI	Resolution
04-21-2015	FDF01 (Treated) FDF03 (Treated)	Sodium = 51.1 mg/L Sodium = 34.1 mg/L	The adverse locations were resampled. Sodium adverse was confirmed. Residents were mailed a letter, written by Public Health Services about sodium. Public Health was given a list of addresses to which the letters were mailed and a letter indicating that these addresses were believed to be connected to the Freelton DWS. MOECC requires notification only once every 57 months.
07-08-2015	Freelton Sampling Station B	Total Coliforms = 3 CFU/100mL	Resampled adverse location, one upstream and one downstream hydrant. All results passed. The adverse was not confirmed.

5.3 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 5-1: Freelton DWS (FDF01) - 2015 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
1	257	490	0	118	477	319	36	242	0	0	0	0
2	283	143	317	180	0	536	0	0	651	364	36	0
3	0	0	336	35	182	613	314	505	48	221	448	0
4	0	0	0	0	462	567	324	53	3	0	67	414
5	22	0	0	3	0	366	0	0	439	66	0	125
6	460	411	484	0	0	362	187	284	169	342	11	0
7	110	193	90	46	475	407	454	311	40	133	323	369
8	0	0	0	0	137	150	0	0	535	0	194	47
9	0	9	62	0	118	0	0	317	397	202	54	0
10	379	467	365	0	443	0	475	327	0	200	0	4
11	658	393	196	0	30	233	115	0	198	0	0	0
12	470	24	0	231	0	512	199	200	621	27	542	552
13	0	16	0	51	0	297	342	262	0	474	0	0
14	0	0	321	0	0	0	35	0	384	111	0	92
15	26	403	670	215	0	10	0	0	59	0	0	0
16	555	651	548	422	0	311	541	619	0	0	450	0
17	0	650	21	0	459	299	59	77	157	371	90	416
18	0	9	0	16	513	0	0	0	459	189	0	157
19	267	0	256	612	0	68	219	232	0	42	0	0
20	247	0	271	10	0	575	353	376	0	0	117	0
21	0	429	0	0	372	0	0	0	397	371	492	260
22	0	656	0	5	384	27	124	15	133	157	0	226
23	149	614	546	0	14	474	657	514	0	0	16	0
24	462	0	67	530	127	93	112	26	119	51	0	0
25	0	0	0	137	295	0	67	0	432	462	247	315
26	29	0	111	0	232	467	654	432	0	10	291	200
27	7	450	655	455	385	154	79	133	0	0	15	0
28	222	111	670	232	322	0	200	7	417	0	0	43
29	0		73	0	291	457	589	343	128	494	0	458
30	0		346	143	270	656	0	224	0	46	464	24
31	90		658		349		464	50		274		0
Total	4,692	6,118	7,067	3,440	6,339	7,953	6,603	5,549	5,786	4,608	3,855	3,702
Average	151	218	228	115	204	265	213	179	193	149	129	119
Min	0	0	0	0	0	0	0	0	0	0	0	0
Max	658	656	670	612	513	656	657	619	651	494	542	552
PTTW	878	878	878	878	878	878	878	878	878	878	878	878

Note: Municipal Drinking Water Licence (005-102) FDF01 Rated Capacity 878 m^3/ day

Figure 5-1: Freelton DWS (FDF01) - 2015 Monthly Production (Summary)

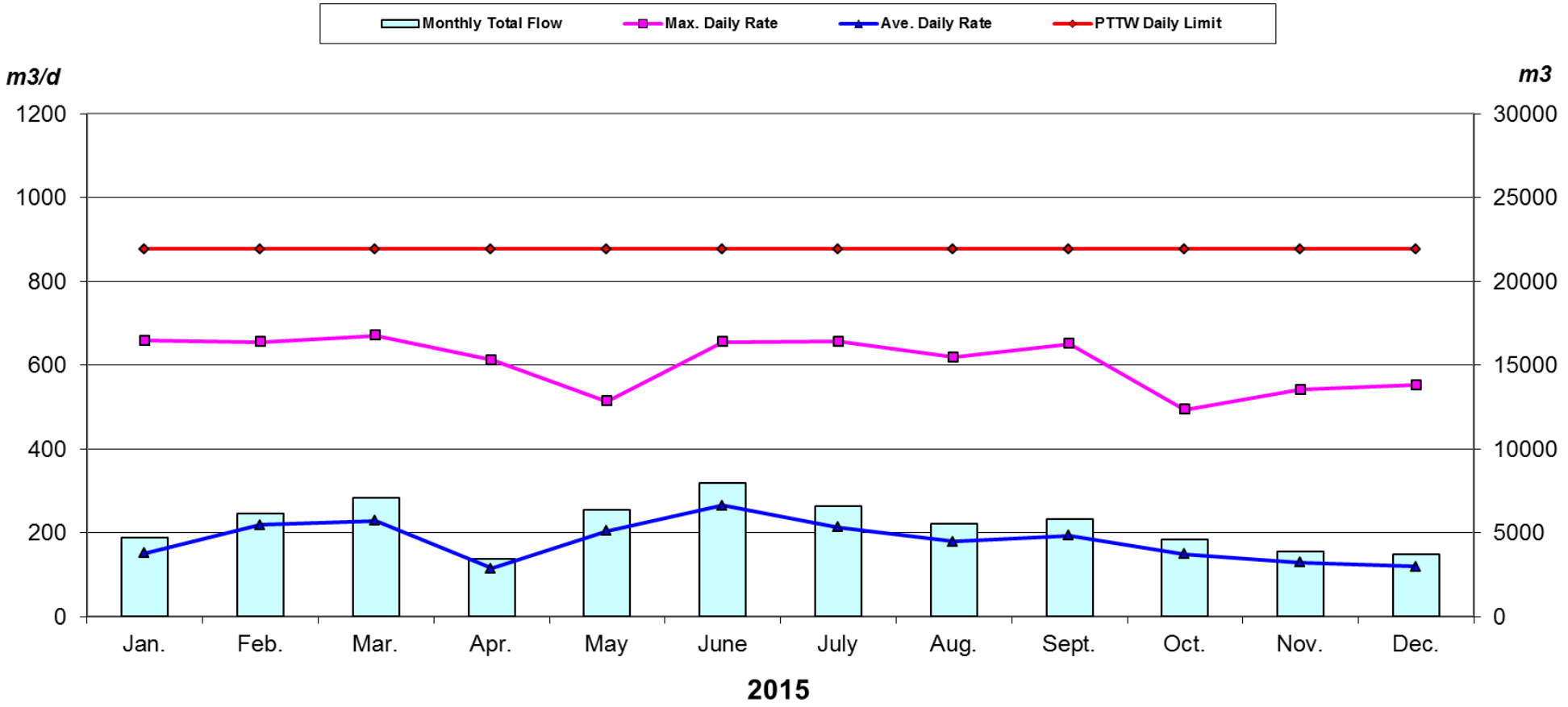

Table 5-2: Freelton DWS (FDF01) - 2015 Monthly Production (Summary)

FDF01	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total	m3	4,692	6,118	7,067	3,440	6,339	7,953	6,603	5,549	5,786	4,608	3,855	3,702
Average	m3/d	151	218	228	115	204	265	213	179	193	149	129	119
Maximum	m3/d	658	656	670	612	513	656	657	619	651	494	542	552
PTTW	m3/d	878	878	878	878	878	878	878	878	878	878	878	878

Table 5-3: Freelton DWS (FDF03) - 2015 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day
1	269	505	0	143	496	0	0	251	158	0	0	16
2	497	0	0	340	0	599	0	0	568	351	0	0
3	0	138	160	39	190	1,198	285	525	80	225	465	0
4	0	0	16	0	489	716	427	80	0	0	69	429
5	20	0	0	340	48	60	0	0	460	0	0	130
6	482	556	511	692	0	103	184	299	185	467	0	0
7	118	99	98	687	502	3	492	336	0	131	335	347
8	0	0	0	185	148	0	0	0	425	32	194	194
9	0	0	0	0	123	73	0	336	0	213	0	0
10	4	104	384	140	429	0	483	345	0	217	95	0
11	0	227	211	671	0	0	119	8	0	0	0	0
12	118	109	0	679	218	79	208	206	194	0	575	581
13	16	0	0	50	692	359	359	314	0	498	0	0
14	0	0	2	37	667	0	37	0	194	101	0	0
15	24	0	0	224	0	0	0	0	119	0	0	158
16	555	0	2	352	0	358	570	535	0	0	471	0
17	0	0	0	0	357	335	62	119	165	390	167	390
18	0	0	0	15	365	0	0	10	479	199	0	170
19	249	0	285	653	111	81	226	242	0	0	0	0
20	280	0	284	0	0	640	370	460	0	18	119	0
21	0	34	0	435	124	2	13	30	375	389	406	385
22	0	0	0	155	0	0	0	15	230	181	0	298
23	106	0	562	19	0	497	550	544	0	0	0	0
24	469	0	108	502	0	101	149	0	126	54	117	0
25	0	0	0	143	591	0	33	16	537	499	254	328
26	0	16	114	0	937	474	687	450	0	28	309	212
27	425	476	145	195	401	165	48	162	0	24	47	0
28	371	120	0	318	365	0	242	0	436	0	0	0
29	0		0	12	270	0	633	360	149	516	76	491
30	0		0	149	257	4	0	232	0	50	581	27
31	91		16		0		412	6		0		0
Total	4,094	2,385	2,898	7,174	7,778	5,848	6,591	5,880	4,879	4,580	4,279	4,158
Average	132	85	93	239	251	195	213	190	163	148	143	134
Min	0	0	0	0	0	0	0	0	0	0	0	0
Max	555	556	562	692	937	1,198	687	544	568	516	581	581
PTTW	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607

Note: Municipal Drinking Water Licence (005-102) FDF03 Rated Capacity 1,607 m^3/day

Figure 5-2: Freelton DWS (FDF03) - 2015 Monthly Production (Summary)

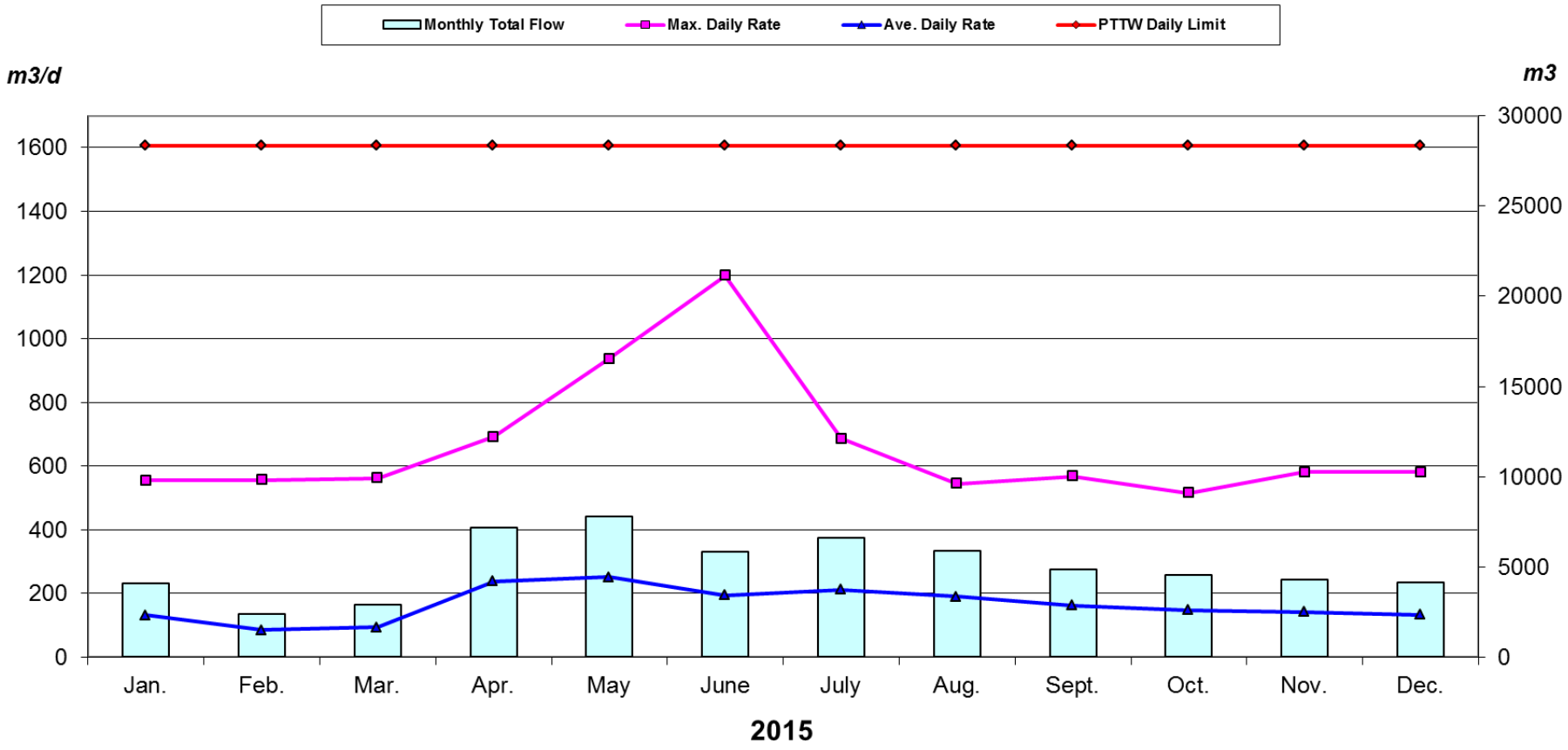

Table 5-4: Freelton DWS (FDF03) - 2015 Monthly Production (Summary)

FDF03	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total	m3	4,094	2,385	2,898	7,174	7,778	5,848	6,591	5,880	4,879	4,580	4,279	4,158
Average	m3/d	132	85	93	239	251	195	213	190	163	148	143	134
Maximum	m3/d	555	556	562	692	937	1,198	687	544	568	516	581	581
PTTW	m3/d	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607

6 GREENSVILLE DWS

6.1 Operational Upgrades

In 2016, the design for the New Greensville Well will be complete. This work is expected to cost $280,000.

The Mid-Spencer/Greensville Rural Settlement Area (RSA) Subwatershed Study reached substantial completion in 2015. One of the recommendations of the report is to create a backup well for FDG01. Hamilton Water staff is performing exploratory work to find a suitable location for the backup well.

6.2 Adverse Water Quality Incidents (AWQI) - Greensville DWS

The following AWQIs were reported to MOECC SAC and PHS.

Notification Date (m-d-y)	Location of Adverse	AWQI	Resolution
04-21-2015	FDG01 (Treated)	Sodium = 130 mg/L	The adverse location was resampled. Sodium adverse was confirmed. Residents were mailed a letter, written by Public Health Services, about sodium. Public Health was given a list of addresses to which the letters were mailed and a letter indicating that these addresses were believed to be connected to the Greensville DWS. MOECC requires notification only once every 57 months.
10-29-2015	Greensville Sampling Station B	Total Coliforms = 1 CFU/100mL	Resampled adverse location, one upstream and one downstream location. All results passed. The adverse was not confirmed.

6.3 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 6-1: Greensville DWS (FDG01) - 2015 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day
1	29	30	31	30	43	37	40	48	56	29	36	34
2	29	27	25	28	36	34	59	68	71	28	29	30
3	30	25	28	39	42	32	60	39	60	30	29	30
4	33	25	23	35	41	43	48	53	50	34	29	31
5	31	25	28	36	33	35	47	45	44	32	31	33
6	29	24	26	35	38	40	43	48	41	35	31	33
7	27	28	30	33	37	43	37	57	53	29	30	31
8	28	31	29	31	53	41	33	40	40	30	38	29
9	28	25	25	30	41	31	41	53	33	29	32	29
10	33	39	26	38	45	39	51	38	30	32	29	30
11	35	39	24	40	38	42	60	35	34	36	28	31
12	28	24	26	40	32	31	75	42	28	32	29	37
13	28	24	23	32	37	40	50	53	36	29	30	40
14	27	27	26	32	42	45	35	41	32	28	30	29
15	27	30	28	29	33	36	35	42	38	31	35	31
16	26	29	27	51	51	35	40	48	48	37	29	29
17	31	24	28	48	62	35	38	41	60	32	29	32
18	30	25	30	41	71	35	40	31	44	32	33	32
19	26	25	29	42	40	32	49	38	41	29	31	33
20	28	24	28	34	53	38	41	36	35	29	29	32
21	27	27	35	30	45	42	56	41	34	29	32	31
22	25	29	38	30	54	36	62	54	32	30	37	33
23	26	26	29	31	41	32	74	48	35	28	30	34
24	29	24	33	30	67	37	61	42	31	31	30	33
25	31	23	29	35	57	41	69	36	30	32	29	34
26	26	25	32	44	55	37	67	40	38	29	30	35
27	26	24	30	31	57	37	59	40	35	28	29	34
28	24	26	32	37	52	35	79	50	31	29	32	41
29	24		43	50	50	31	66	49	35	31	33	33
30	26		37	37	50	29	64	54	30	28	30	34
31	29		35		40		67	51		33		35
Total	874	756	913	1,079	1,436	1,102	1,645	1,399	1,205	949	933	1,011
Average	28	27	29	36	46	37	53	45	40	31	31	33
Min	24	23	23	28	32	29	33	31	28	28	28	29
Max	35	39	43	51	71	45	79	68	71	37	38	41
PTTW limit	197	197	197	197	197	197	197	197	197	197	197	197

Note: Municipal Drinking Water Licence (005-103) FDG01 Rated Capacity 199 m^3/ day

Figure 6-1: Greensville DWS (FDG01) - 2015 Monthly Production (Summary)

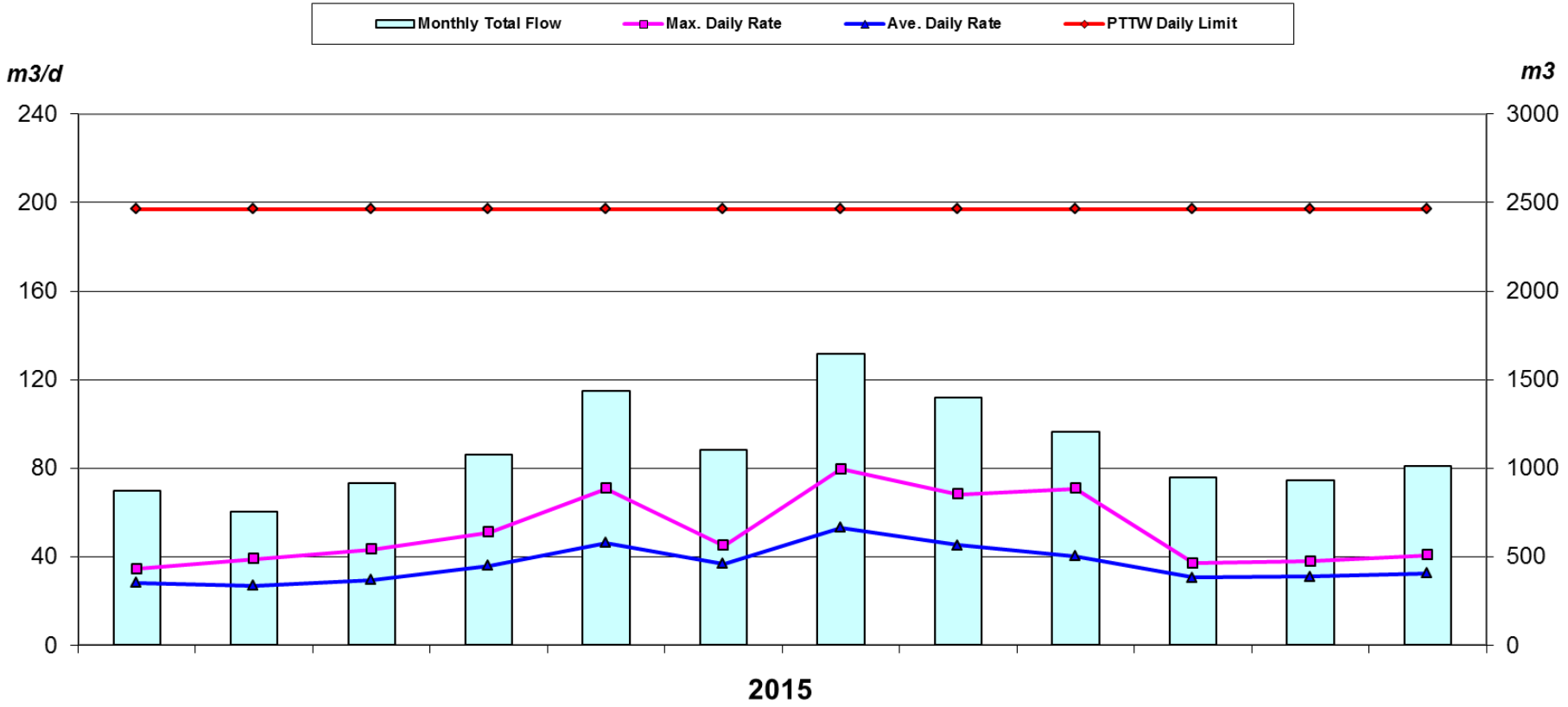

Table 6-2: Greensville DWS (FDG01) - 2015 Monthly Production (Summary)

FDG01	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total	m3	874	756	913	1,079	1,436	1,102	1,645	1,399	1,205	949	933	1,011
Average	m3/d	28	27	29	36	46	37	53	45	40	31	31	33
Maximum	m3/d	35	39	43	51	71	45	79	68	71	37	38	41
PTTW	m3/d	197	197	197	197	197	197	197	197	197	197	197	197

7 LYNDEN DWS

7.1 Operational Upgrades

In 2016, the electrical system at the Pumping Station (HD05B) will be upgraded and this work is expected to cost $300,000.

A new potential location for a municipal well has been identified on the same property where the existing production well and treatment building reside. Hamilton Water is finalizing the construction and testing of the new water well in 2016. It is expected that the Environmental Assessment (EA) will be completed late 2016. The schedule for capital work will be determined following the completion of the EA.

7.2 Adverse Water Quality Incidents (AWQI) - Lynden DWS

The following AWQIs were reported to MOECC SAC and PHS.

Notification Date (m-d-y)	Location of Adverse	AWQI	Resolution
04-21-2015	FDL01 (Treated)	Sodium = 58.1 mg/L	The adverse location was resampled. Sodium adverse was confirmed. Residents were mailed a letter, written by Public Health Services about sodium. Public Health was given a list of addresses to which the letters were mailed and a letter indicating that these addresses were believed to be connected to the Lynden DWS. MOECC requires notification only once every 57 months.

7.3 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 7-1: Lynden DWS (FDL01) - 2015 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day	m^3/day
1	94	93	96	87	73	79	83	105	83	70	77	65
2	61	84	67	67	108	73	93	105	65	69	70	77
3	91	67	87	98	118	101	69	80	86	75	70	77
4	73	87	67	80	73	82	103	67	66	90	73	67
5	83	85	72	97	69	83	95	89	75	72	70	76
6	67	68	86	92	98	122	92	88	92	66	57	98
7	86	96	86	70	92	105	79	81	90	70	101	69
8	77	73	98	67	80	73	73	86	69	72	80	88
9	67	83	71	86	130	68	71	89	48	71	67	70
10	102	86	73	65	100	92	96	68	92	96	66	71
11	83	68	82	96	77	73	98	93	71	74	72	71
12	69	68	71	86	73	66	103	77	79	92	69	96
13	86	86	86	89	92	105	93	78	78	69	69	77
14	68	83	81	73	69	98	65	89	71	70	77	73
15	86	83	97	86	75	67	76	86	76	66	278	74
16	67	101	71	68	109	75	86	106	74	76	81	81
17	105	69	88	66	75	94	63	92	73	86	70	77
18	93	83	67	100	137	78	95	71	68	85	71	69
19	73	71	72	80	64	72	90	82	77	68	77	100
20	74	86	92	85	102	95	82	73	80	71	67	79
21	87	78	98	67	69	100	72	65	76	70	77	74
22	72	103	88	77	97	71	96	107	69	66	98	84
23	87	73	71	69	117	82	73	95	91	83	73	75
24	77	73	92	91	111	73	93	76	86	80	80	76
25	81	72	77	89	107	87	116	87	78	75	62	90
26	91	89	76	81	105	94	97	66	95	86	72	80
27	69	71	82	82	83	64	102	78	76	67	82	76
28	81	97	90	70	127	107	87	87	75	68	77	81
29	65		100	86	105	67	98	99	71	73	84	86
30	85		70	69	124	87	91	84	72	68	77	73
31	97		69		82		98	97		89		73
Total	2,497	2,275	2,525	2,421	2,940	2,531	2,729	2,647	2,302	2,332	2,444	2,425
Average	81	81	81	81	95	84	88	85	77	75	81	78
Min	61	67	67	65	64	64	63	65	48	66	57	65
Max	105	103	100	100	137	122	116	107	95	96	278	100
PTTW	327	327	327	327	327	327	327	327	327	327	327	327

Note: Municipal Drinking Water Licence (005-105) FDL01 Rated Capacity 327 m3/ day

Figure 7-1: Lynden DWS (FDL01) - 2015 Monthly Production (Summary)

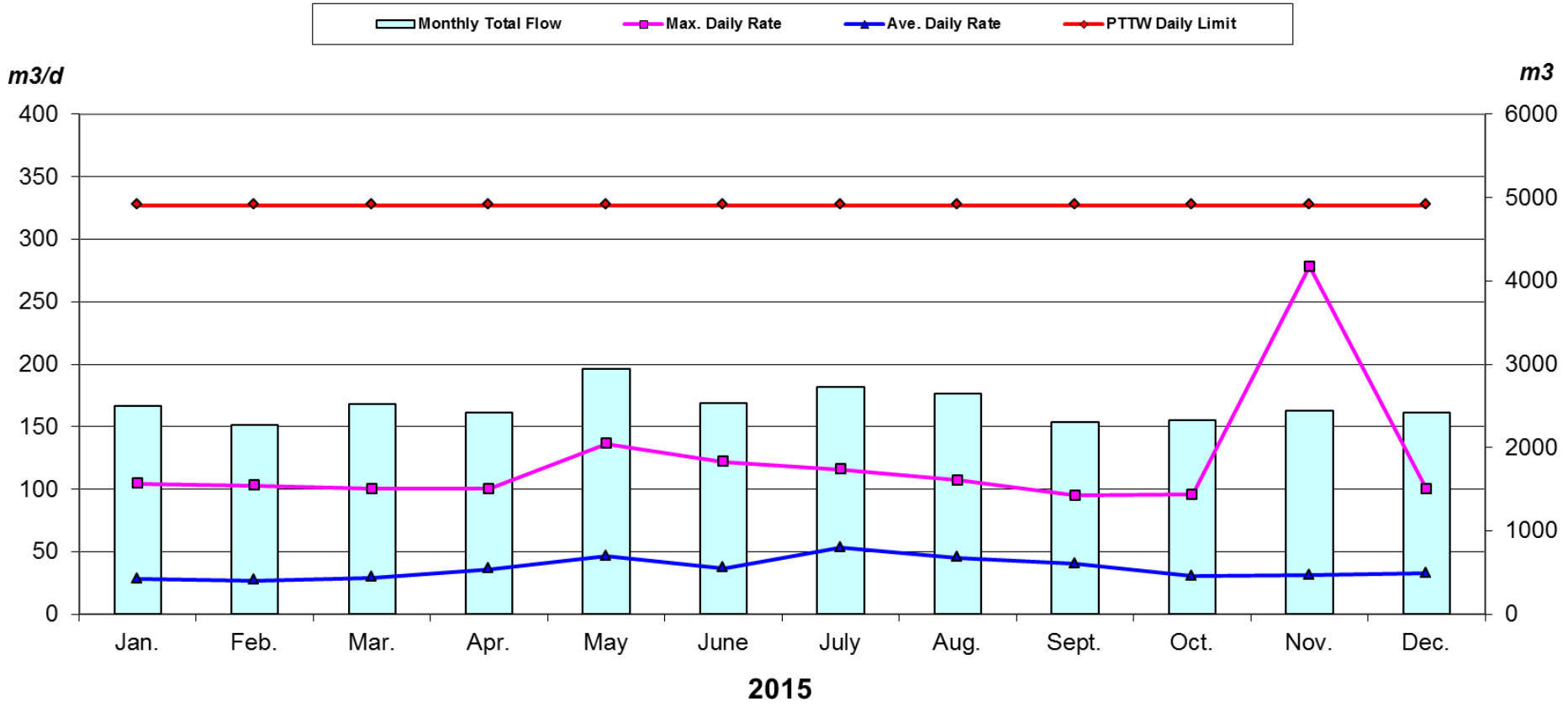

Table 7-2: Lynden DWS (FDL01) - 2015 Monthly Production (Summary)

FDL01	Units	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total	m3	2,497	2,275	2,525	2,421	2,940	2,531	2,729	2,647	2,302	2,332	2,444	2,425
Average	m3/d	81	81	81	81	95	84	88	85	77	75	81	78
Maximum	m3/d	105	103	100	100	137	122	116	107	95	96	278	100
PTTW	m3/d	327	327	327	327	327	327	327	327	327	327	327	327