



# 2016 ANNUAL WATER QUALITY REPORT

WESTHILLS WATER SYSTEM

Operated by SSL-Sustainable Services Ltd.



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SSL-Sustainable Services Ltd. (SSL) is a provider of infrastructure services for the Westhills community in Langford, British Columbia. In partnership with the City of Langford, SSL was created to deliver water and, through its Community Energy System, thermal energy.

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## Executive Summary

The purpose of this report is to fulfill the requirements set out in the British Columbia Drinking Water Protection Act (DWPA)<sup>1</sup> by publishing the results of water quality monitoring efforts, and also to provide a general overview of the Westhills Water System for the 2016 calendar year, including infrastructure upgrades, regular system operations, and maintenance programming.

The Westhills Water System was established in 2010, timed with the initial land development and construction of new homes in the Westhills community in Langford, B.C. Through efforts by both Westhills Land Corp and the City of Langford, the Capital Regional District (CRD) granted Langford the ability to provide water to Westhills residents. The system was operated on an interim basis by CRD Integrated Water Services until September 2010, at which point SSL took over as the operator of the water distribution system under contract with the City of Langford.

As the Westhills system does not maintain its own water source or undertake any water treatment, it was interpreted for several years as falling under the operating permit for the regional water system granted to the CRD by the Vancouver Island Health Authority (VIHA). Significant system expansion eventually led VIHA to issue a separate operating permit for the Westhills Water System (see Appendix 3). While the system was already in compliance with the base requirements set out in the BC Drinking Water Protection Act and Regulation, this permitting process formalizes our relationship with VIHA and provides an additional layer of important oversight for water quality matters.

This report will demonstrate that all water-related construction work, operating procedures, and water quality monitoring currently meet or exceed best practice, standards, and regulations set by the BC DWPA & DWPR, AWWA, VIHA, and the City of Langford.



### Highlights of the Westhills Water System for 2016:

- 203,353 m<sup>3</sup> of water delivered to the Westhills community;
- 108,679 m<sup>3</sup> of water delivered to residential customers;
- 94,674 m<sup>3</sup> of water delivered to public works, parks and commercial space;
- 67 microbiological tests, 12 turbidity tests and 12 heterotrophic plate count tests were completed, as well as 1 Full Spectrum Potability Analysis;
- Serviced 1 pressure relief valve (in-main);
- Maintained 54 fire hydrants to ensure reliable water is available during emergencies and for training purposes to Langford Fire Rescue;
- Zero leaks detected in water mains

<sup>1</sup> [http://www.bclaws.ca/Recon/document/ID/freeside/00\\_01009\\_01](http://www.bclaws.ca/Recon/document/ID/freeside/00_01009_01)

<sup>2</sup> <http://www.langford.ca/>

<sup>3</sup> <http://www.WesthillsBC.com/>

<sup>4</sup> <http://www.crd.bc.ca/>

## System Overview

The main water supply for the Westhills Water System is the Sooke Lake Reservoir, which also supplies water to the majority of the Capital Regional District (CRD)<sup>5</sup>. This water source is managed by CRD Integrated Water Services, including all disinfection and treatment processes – notably UV sterilization and chloramination.



Sooke Lake Reservoir

The treated supply water then enters the Humpback Pressure Reducing Station located approximately two kilometers upstream from the Westhills Water System’s Booster Pump Station (BPS). Bulk water is metered inside the Westhills BPS, representing the demarcation point between the regional water system operated by the CRD and the Westhills Water System operated by SSL–Sustainable Services Ltd.

Water is then pumped through 3 high-efficiency variable speed pumps into a distribution system servicing 421 single family homes, 50 town homes, a 68-unit condominium as well as park and public irrigation and commercial end uses. An automatic fire pump within the BPS provides fire flows when needed. The BPS also includes a standby diesel generator for emergency conditions. Fuel supply for this generator is fed from a day tank, which is in turn fed from a larger underground storage tank. An annual overview of significant water system assets can be seen in Table 1.



Booster Pump Station

<sup>5</sup> [https://www.crd.bc.ca/docs/default-source/Partnerships-PDF/gvdwsa-school-tours/2014\\_iws\\_highschooltour\\_factsandfigures.pdf?sfvrsn=2](https://www.crd.bc.ca/docs/default-source/Partnerships-PDF/gvdwsa-school-tours/2014_iws_highschooltour_factsandfigures.pdf?sfvrsn=2)

## Source Water Map, 2016

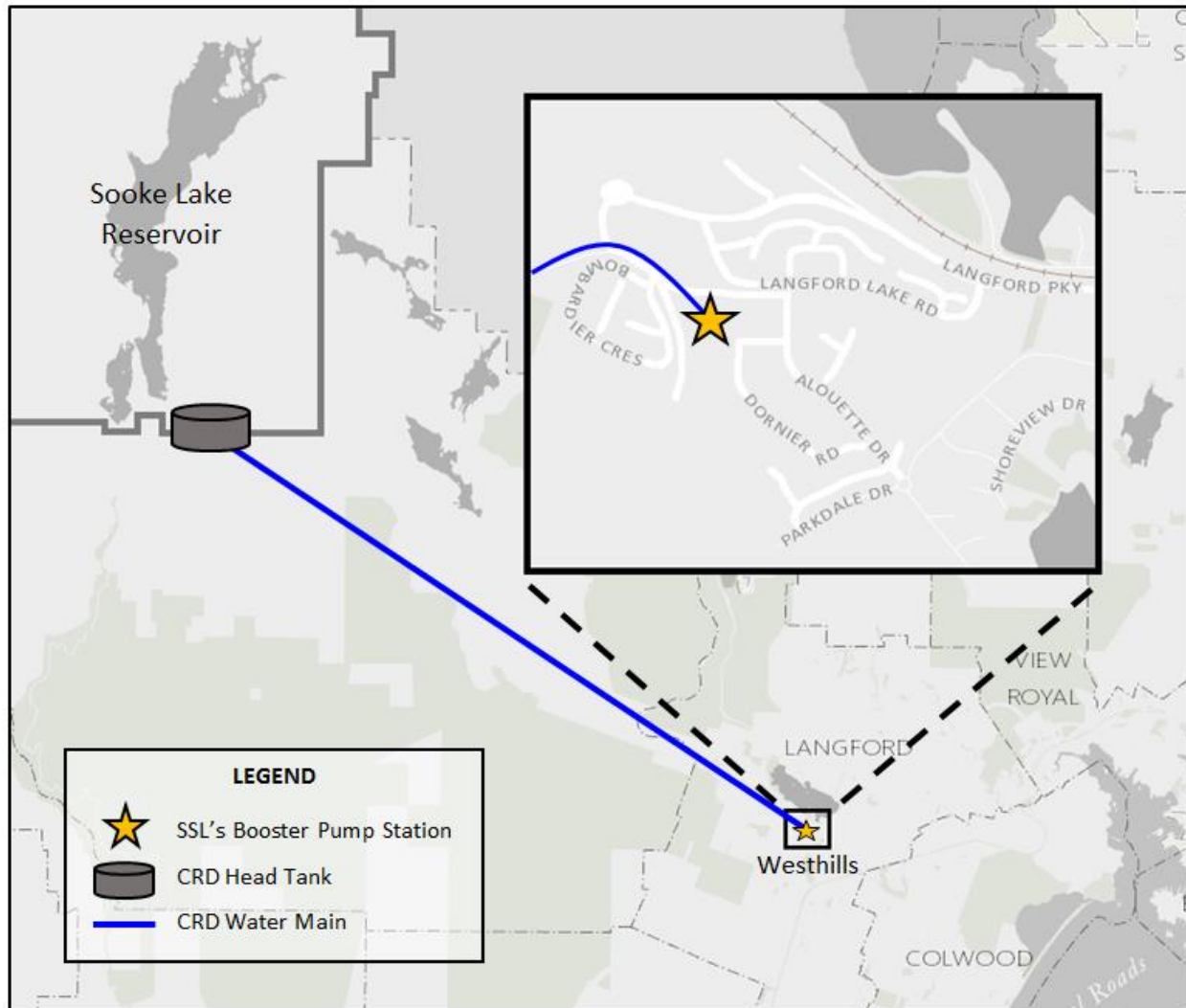
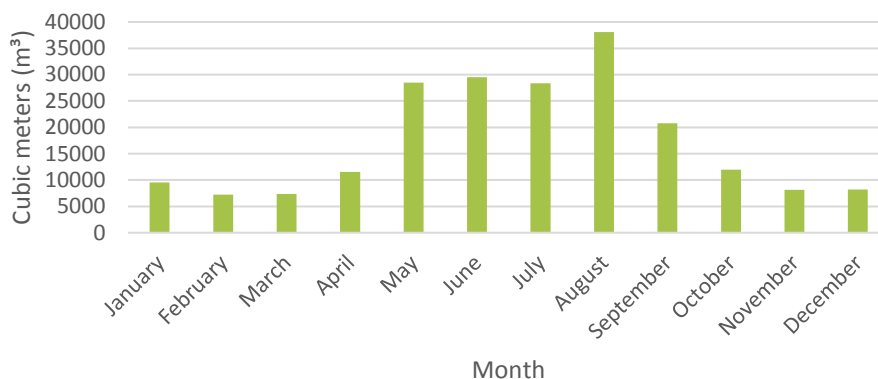


Table 1 – Overview of Westhills Water System

Water Assets	December 2014	December 2015	December 2016
Hydrants	38	51	54
Pressure Relief Valve Chamber	1	1	1
Water Mains	5.96 km	7.09 km	8.02 km
Gate Valves	147	182	195
Flush Valves	19	23	21
Air Valves	6	7	7
Commercial Service Connections	3	5	5
Residential Service Connections	378	422	471
Households Served	445	489	539
Population Served	1,800 (est.)	1,912 (est.)	2,115 (est.)

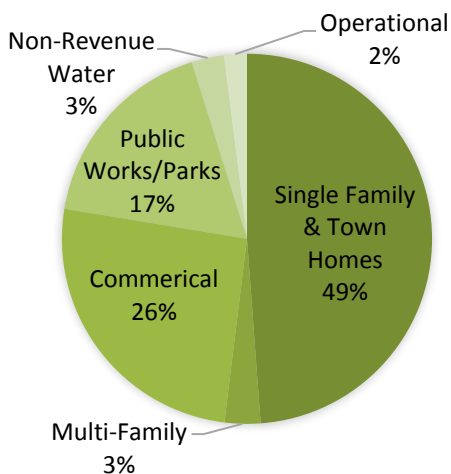
Like many systems, overall water usage more than triples during the summer compared to average winter levels, as seen in the graph below. Most of this increase is associated with the use of irrigation systems. As Westhills is also an ongoing land development site, large amounts of water are used during the dry summer months for construction and dust control purposes.

## 2016 Water Consumption



The graph below provides a breakdown by end use of all water provided in 2016. Through customer metering, SSL is able to track residential, commercial, parks and operational water usage, which accounts for most of the water which passes through the BPS. Any unidentified portion of the annual water total is classed as “non-revenue water,” including things like water leaks, error margins for estimated water billings, hydrant usage for fire department training and potentially water theft. In 2016, non-revenue water was 5,873 m<sup>3</sup>, or about 3% of total water usage in the system. While this amount is significantly better than industry standards, it is higher than the 2015 value of 1%. We believe part of this change is due to an increase of water main flushing in 2016, for which usage totals are estimated (i.e. unmetered).

## Annual Comparison



## Annual Water Usage Breakdown

	2014	2015	2016
Single Family & Townhomes	64 %	57 %	49%
Multi Family	5 %	4 %	3%
Commercial	5 %	13 %	26%
Public Works/Parks	18 %	22 %	18%
Non-Revenue	6 %	1 %	3%
Operational	2 %	2 %	2%

## System Upgrades

In 2016, the Westhills Water System was extended by adding 45 new residential water meters. Other new infrastructure included 13 gate valves, 3 fire hydrants and 0.93 km of new water mains.

## System Operation & Maintenance

The Westhills Water System is operated by SSL and its team of engineers, civil contractors and certified plant operators to implement the O&M program below.

### Monitoring: Booster Pump Station

- Weekly inspections of the BPS are carried out by a certified operator (EOCP Level III), with observations recorded in an on-site log book, including parameters like water temperature, total chlorine residual and pump run hours.
- SCADA/HMI System is remotely accessible from any computer connected to the internet and offers real time readings, trend logs and alarm tracking (authorized users only / protected by dual layer password protection).
- System Alarms are enunciated to a list of on-call personnel through an automated phone line system, which can operate without internet connectivity
- Live Video Cameras record any motion inside and outside the BPS, with both the live feed and recorded footage remotely accessible (authorized users only / protected by password and software registration)

### Monitoring: Distribution System

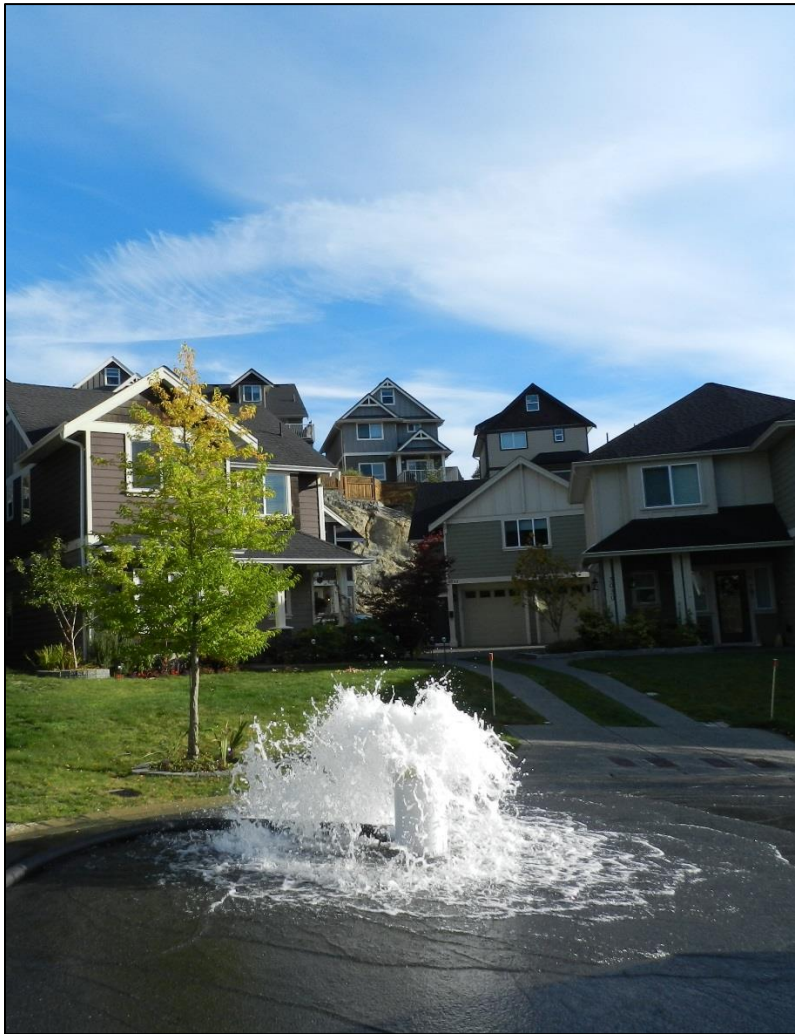
- Water quality samples were regularly collected at the following minimum intervals:
  - WEEKLY: one bacteriological test for Total Coliform and E. Coli (CFU/100ml), along with total chlorine residual (ppm)
  - MONTHLY: one Turbidity test and one Heterotrophic Plate Count (HPC)
  - ANNUAL: Full spectrum VIHA potability analysis (bacteriological, metals, organics, etc.)

### Maintenance: Booster Pump Station Equipment

- Fire pump: weekly inspection and 30-minute manual test run; annual inspection and cleaning of pump shaft cooling channels, packing glands and casing gaskets
- Booster pumps: weekly inspection and recording of run hours
- Diesel generator: weekly inspection and automated test run; annual full servicing which includes oil/filter change, readiness test and full load-banking (report filed on site and at SSL office)
- Pressure tank: annual inspection and servicing
- Backflow prevention devices: annual test by certified BFP tester (repair or replace as needed)
- Building electrical systems: annual inspection and report completed by FSR listed on Electrical Operating Permit
- Full hard copy sets of as-built and shop drawings are located at BPS, SSL head office, and with water system operator

### Maintenance: Distribution System

- Unidirectional flushing: Full system (annual); low-demand or dead-end sections (semi-annual / as needed)
- Fire hydrants: Pressure testing, painting, physical inspection and maintenance (annual); data reported to fire department, see Appendix 2.
- Valve exercising: Open/close all system valves to confirm operational; check all box covers and arrow painting (annual)
- Water meters: Physical inspection for leaks or bypasses; add mulch for frost protection (annual)



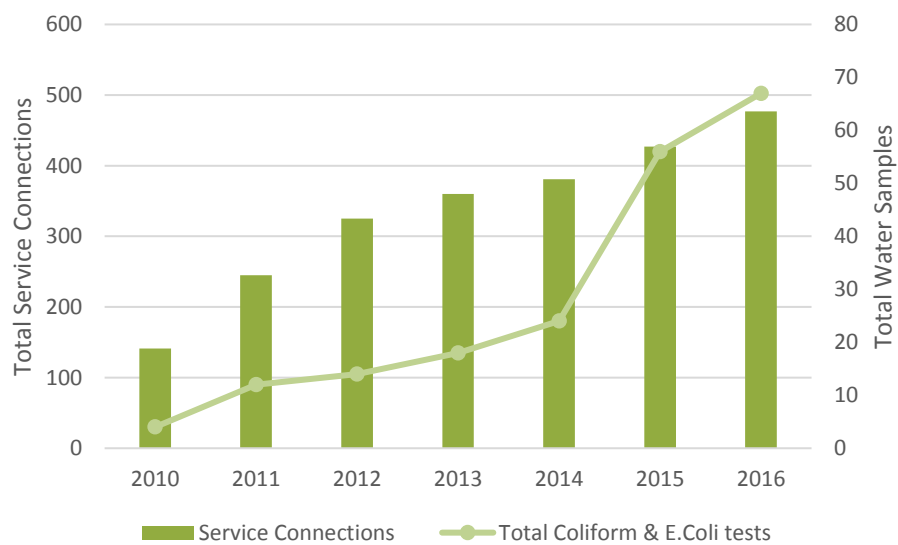
Unidirectional Flushing

## Water Quality Monitoring

In 2016, SSL collected samples on a weekly basis at 6 dedicated sampling sites. These sites are evenly distributed throughout the Westhills Water System to give a good representation of water quality across the entire distribution network. Due to inaccessibility, 1 of the sampling sites was decommissioned as of April 2016.

In 2016, 12 HPC, 12 Turbidity and 67 bacteriological samples for Total Coliform and E. Coli were collected. Sampling frequency has steadily increased over the years to keep up with the ongoing growth of the Westhills Water System and community, as seen in the graph below. All samples were sent for analysis at an accredited third-party laboratory, where tests were conducted in order to detect potentially harmful parameters in the water supply.

### Number of Bacteriological Samples vs Service Connections



**Total coliforms** are a group of bacteria that are usually found on or in plants, soils, water, and in the intestines of humans and warm-blooded animals. Total coliforms can be used to help determine the efficacy of a drinking water treatment system<sup>6</sup>.

If total coliforms are detected in a water sample, the positive site(s) should be immediately resampled, which also helps to rule out human sampling error. If total coliforms are detected in consecutive samples, or more than 10% of samples collected in a given sampling period, further investigation is required. This investigation will be coordinated by SSL, involving the water system operator and project engineer as required, and may include flushing or disinfection of the supply system and sampling of adjacent sites.

<sup>6</sup> Health Canada, Guidelines for Canadian Drinking Water Quality (2012)

CRD Integrated Water Services and VIHA may also be notified in order to confirm results against the upstream regional supply data and/or initiate further actions if necessary.

*Escherichia coli* (*E. coli*) is a member of the coliform group of bacteria that are usually found in the intestines of humans and warm-blooded animals. It is not naturally found on or in other environments such as plants, soils and water. The presence of *E. coli* in a water sample is a good indicator of recent faecal contamination and can suggest a possible danger to public health<sup>6</sup>.

If *E. coli* is detected in a water sample, SSL will immediately notify the water system operator, project engineer and VIHA. The positive site(s) and adjacent sites will be immediately resampled and a boil water advisory may be issued (subject to direction from VIHA). If a consecutive sample is positive for *E. coli*, a boil water advisory will be issued and corrective actions undertaken in consultation with VIHA (see Appendix 4). CRD Integrated Water Services will also be notified.

**Turbidity** is the overall transparency of water caused by the presence of organic and inorganic particles, such as: decomposed plant and animal debris, microorganisms, clays, silts and metal precipitates<sup>6</sup>.

The maximum acceptable concentration for Turbidity is less than or equal to 1.0 NTU in 95% of the measurement or 95% of the time each month<sup>6</sup>. Turbidity should never exceed 3.0 NTU, in which case, further investigation is required. This investigation will be coordinated by SSL, involving the water system operator and project engineer as required. CRD Integrated Water Services will also be notified in order to confirm results against water system supply quality.

**Heterotrophic Plate Count** is used to provide an overall baseline of bacteriological activity within the drinking water system.

## 2016 Test Results

In 2016, 55 of the 67 bacteriological test results met the drinking water quality requirements for *E. coli* and total coliforms. In 12 samples, very low levels (between 1 and 2 CFU/100 mL) of total coliforms were detected (no *E. coli* detected). In each case, the site was immediately re-sampled with results confirming bacteriological results within acceptable limits, apart from one instance. In this case, an investigation was initiated involving the water system operator and system engineer. The subject site was re-sampled for a third time along with two additional sites in the distribution system, all of which yielded acceptable bacteriological results. The water system was also flushed shortly thereafter and sampled again with acceptable results. We suspect the sampling site in question may have been the problem, as it had recently been covered in landscaping materials and was partially submerged in standing rainwater. This has been rectified. No samples in 2016 tested positive for *E. coli* bacteria and all 12 Turbidity samples were found to be within acceptable ranges and did not require further sampling or investigation. An overview of all water quality results from 2016 can be found in Table 2.

Table 2 – 2016 Water Quality Results

Sample Site	Sample Date	CL2 Res (ppm)	Total Coliforms (CFU/100mL)	<i>E. coli</i> (CFU/100mL)	Turbidity (NTU)	HPC	Temperature (°C)
Langford Parkway	5-Jan-16	0.25, 0.02	<1	<1	0.4	3	4, 4, 4
Artesian Crt	11-Jan-16	1.17, 1.31	<1	<1			2, 2, 2
Grob Crt	18-Jan-16	0.85, 0.74	<1	<1			5, 5, 4

2941 Dornier Rd	25-Jan-16	1.35, 1.34	<1	<1			5, 5, 5
Boeing & Bombardier	1-Feb-16	0.75, 0.78	<1	<1	0.3	<1	3, 4, 3
3088 Dornier Rd	9-Feb-16	1.10, 1.15	<1	<1			7, 7, 7
Langford Parkway	16-Feb-16	0.39, 0.36	<1	<1			5, 5, 5
Artesian Crt	22-Feb-16	1.02, 1.05	<1	<1			7, 7, 7
Grob Crt	1-Mar-16	0.76, 0.77	<1	<1	0.5	<1	10, 10, 11
2941 Dornier Rd	7-Mar-16	1.11, 1.14	1	<1			6, 6, 6
2941 Dornier Rd*	9-Mar-16	1.07, 1.20	<1	<1			7, 7, 7
Boeing & Bombardier	15-Mar-16	0.92, 0.93	1	<1			6, 6, 7
Boeing & Bombardier*	17-Mar-16	0.79, 0.80	<1	<1			8, 8, 8
3088 Dornier Rd	21-Mar-16	1.15, 1.14	<1	<1			6, 6, 6
Langford Parkway	28-Mar-16	1.14, 1.10	1	<1			7, 8, 8
Langford Parkway*	30-Mar-16	1.06, 1.10	1	<1			7, 7, 7
Langford Parkway*	1-Apr-16	1.13, 1.16	<1	<1			7, 10, 5
Artesian Crt	1-Apr-16	1.10, 1.14	<1	<1			7, 10, 5
Water Pump Station	1-Apr-16	1.34, 1.34	<1	<1			7, 10, 5
Grob Crt	11-Apr-16	0.80, 0.82	2	<1	0.3	1	9, 9, 9
Grob Crt*	13-Apr-16	0.80, 0.82	<1	<1			10, 9, 11
2941 Dornier Rd	18-Apr-16	1.36, 1.31	1	<1			10, 9, 10
2941 Dornier Rd*	20-Apr-16	1.29, 1.23	<1	<1			10, 10, 10
Boeing & Bombardier	25-Apr-16	0.91, 0.95	<1	<1			10, 10, 10
3088 Dornier Rd	2-May-16	0.91, 0.88	<1	<1	0.4	2	12, 12, 14
Artesian Crt	9-May-16	1.03, 1.00	<1	<1			10, 10, 10
Grob Crt	16-May-16	1.02, 1.13	1	<1			17, 17, 17
Grob Crt*	18-May-16	1.15, 1.13	<1	<1			12, 12, 12
2941 Dornier Rd	24-May-16	1.36, 1.39	<1	<1			10, 10, 10
Boeing & Bombardier	30-May-16	1.25, 1.22	<1	<1			10, 10, 11
3088 Dornier Rd	6-Jun-16	1.29, 1.36	<1	<1	<0.1	<1	10, 11, 10
Artesian Crt	13-Jun-16	1.24, 1.23	<1	<1			13, 14, 14
Grob Crt	20-Jun-16	0.83, 0.77	<1	<1			10, 9, 9
2941 Dornier Rd	27-Jun-16	1.43, 1.39	<1	<1			11, 11, 11
Boeing & Bombardier	4-Jul-16	0.98, 1.05	<1	<1	0.4	<1	12, 10, 13
3088 Dornier Rd	11-Jul-16	1.20, 1.19	<1	<1			13, 13, 13
Artesian Crt	18-Jul-16	1.36, 1.14	<1	<1			15, 15, 15
Grob Crt	25-Jul-16	0.78, 0.71	<1	<1			16, 16, 16
2941 Dornier Rd	2-Aug-16	1.29, 1.32	<1	<1			12, 12, 12
Boeing & Bombardier	8-Aug-16	0.89, 0.84	1	<1	0.3	<1	14, 14, 14
Boeing & Bombardier*	10-Aug-16	1.12, 1.10	<1	<1			14, 14, 14
3088 Dornier Rd	16-Aug-16	1.01, 1.01	<1	<1			16, 14, 14

Artesian Crt	22-Aug-16	1.06, 1.05	<1	<1			15, 15, 15
Grob Crt	29-Aug-16	0.54, 0.49	<1	<1			16, 15, 16
2941 Dornier Rd	6-Sep-16	1.23, 1.05	<1	<1	0.5	<1	19, 19, 19
Boeing & Bombardier	12-Sep-16	0.32, 0.33	<1	<1			17, 17, 17
3088 Dornier Rd	19-Sep-16	0.18, 0.07	<1	<1			14, 14, 15
Artesian Crt	26-Sep-16	0.12	<1	<1			14, 15, 15
Grob Crt	3-Oct-16	0.42, 0.06	<1	<1	0.4	<1	19, 18, 19
2941 Dornier Rd	11-Oct-16	0.13, 0.96	1	<1			11, 12, 11
2941 Dornier Rd*	13-Oct-16	0.27, 0.06, 0.04	<1	<1			10, 10, 10
Boeing & Bombardier	17-Oct-16	0.36	<1	<1			10, 10, 10
3088 Dornier Rd	24-Oct-16	N/A	<1	<1			14, 15, 15
Grob Crt	1-Nov-16	N/A	<1	<1	0.6	<1	16, 16, 17
Artesian Crt	7-Nov-16	N/A	<1	<1			14, 14, 14
2941 Dornier Rd	14-Nov-16	0.06	<1	<1			16, 17, 17
Boeing & Bombardier	21-Nov-16	0.27, 0.23	1	<1			8, 8, 8
Boeing & Bombardier*	23-Nov-16	N/A	<1	<1			7, 10, 8
3088 Dornier Rd	29-Nov-16	0.27, 0.15	<1	<1			13, 13, 13
Artesian Crt	5-Dec-16	0.40, 0.34	<1	<1	0.4	2	5, 7, 5
Grob Crt	13-Dec-16	0.72, 0.69	<1	<1			10, 11, 10
2941 Dornier Rd	19-Dec-16	0.76, 0.59	1	<1			7, 8, 7
2941 Dornier Rd*	21-Dec-16	1.29, 1.23	<1	<1			5, 5, 7
Boeing & Bombardier	28-Dec-16	1.03, 1.13	1	<1			6, 7, 6
Boeing & Bombardier*	30-Dec-16	1.07, 1.06	<1	<1			4, 2, 0
3088 Dornier Rd	30-Dec-16	1.12, 1.14	<1	<1			4, 2, 0
Water Pump Station	30-Dec-16	0.68, 1.08	<1	<1			4, 2, 0

\* Indicates a resample

## 2016 VIHA Potability Analysis

In addition to routine bacteriological testing, we also commission an annual “full spectrum” analysis of water in the Westhills distribution system. This analysis measures dozens of parameters which are impractical for routine testing, including metals, nutrients and various physical properties. While this is not required under the DWPA or our operating permit, we see value in the long-term maintenance of such records. The CRD also performs this analysis on the regional water source each year which allows us to make helpful comparisons between our distribution system and the primary water supply. The results of our 2016 analysis are included in Appendix 5.

## 2016 Water Quality Complaints

Two water quality complaints were received by SSL from homes within Westhills in 2016. Both complaints were investigated; one was found to be caused by sediment build up within the domestic hot water tank and was not related to the incoming water supply. The other was a complaint that the water had a stronger than normal chlorine taste. This complaint was received on July 30, 2016 and was attributed to an increase in source water chlorination initiated by the CRD at the regional treatment plant.

## Conclusion

In 2016, the Westhills Water System was operated and maintained in accordance with the requirements set out in the BC Drinking Water Protection Act. This would not be possible without the efforts of our core staff and an extended team of engineers, contractors, and operators. Their dedicated support is greatly appreciated by SSL and the wider public who enjoy daily access to reliable and safe drinking water.

For 2017, we are looking forward to continued development in the Westhills community, particularly the West Shore Parkway road extension project which has already begun and should be completed by late 2017. This project represents a significant expansion to the existing Westhills Water System, with plans encompassing large areas of previously underserved land to the south near Sooke Road. In addition to bringing substantially better fire protection services, properties around the Glenshire Business Park will soon have access to a reliable water system for the first time, supporting the potential for positive growth in this area.

*Southern Vancouver Island is extremely fortunate to enjoy high-quality drinking water resources. This has largely been made possible through efforts by the CRD and VIHA, who we acknowledge as invaluable partners in the ongoing delivery of safe, clean water to our customers. We are proud of our role in providing a critical utility to the vibrant and growing community of Westhills and look forward to many years of continued service.*



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# Appendices

**Appendix 1:** SSL Water Main Book

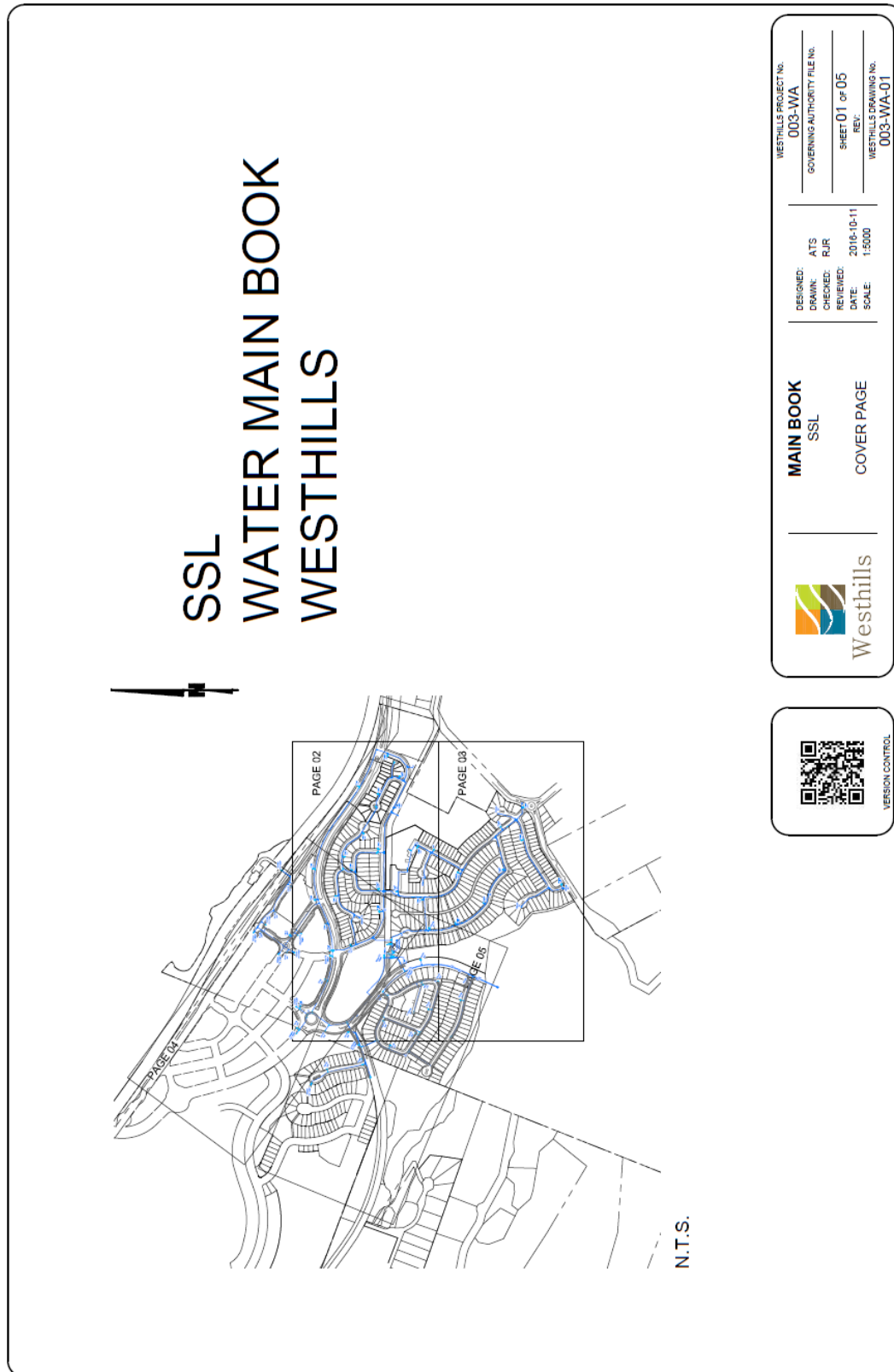
**Appendix 2:** Hydrant Maintenance Sheet

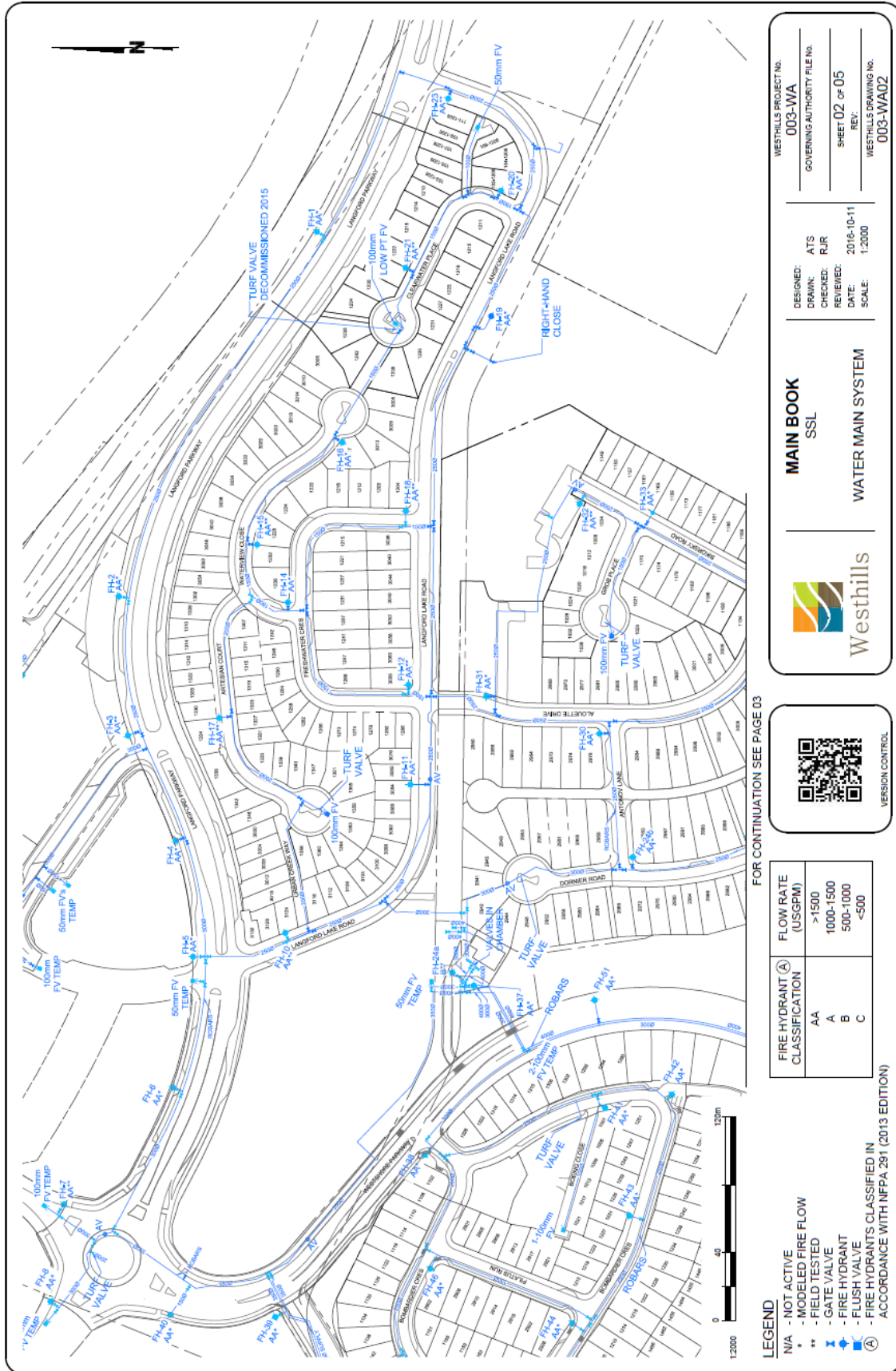
**Appendix 3:** VIHA Operating Permit

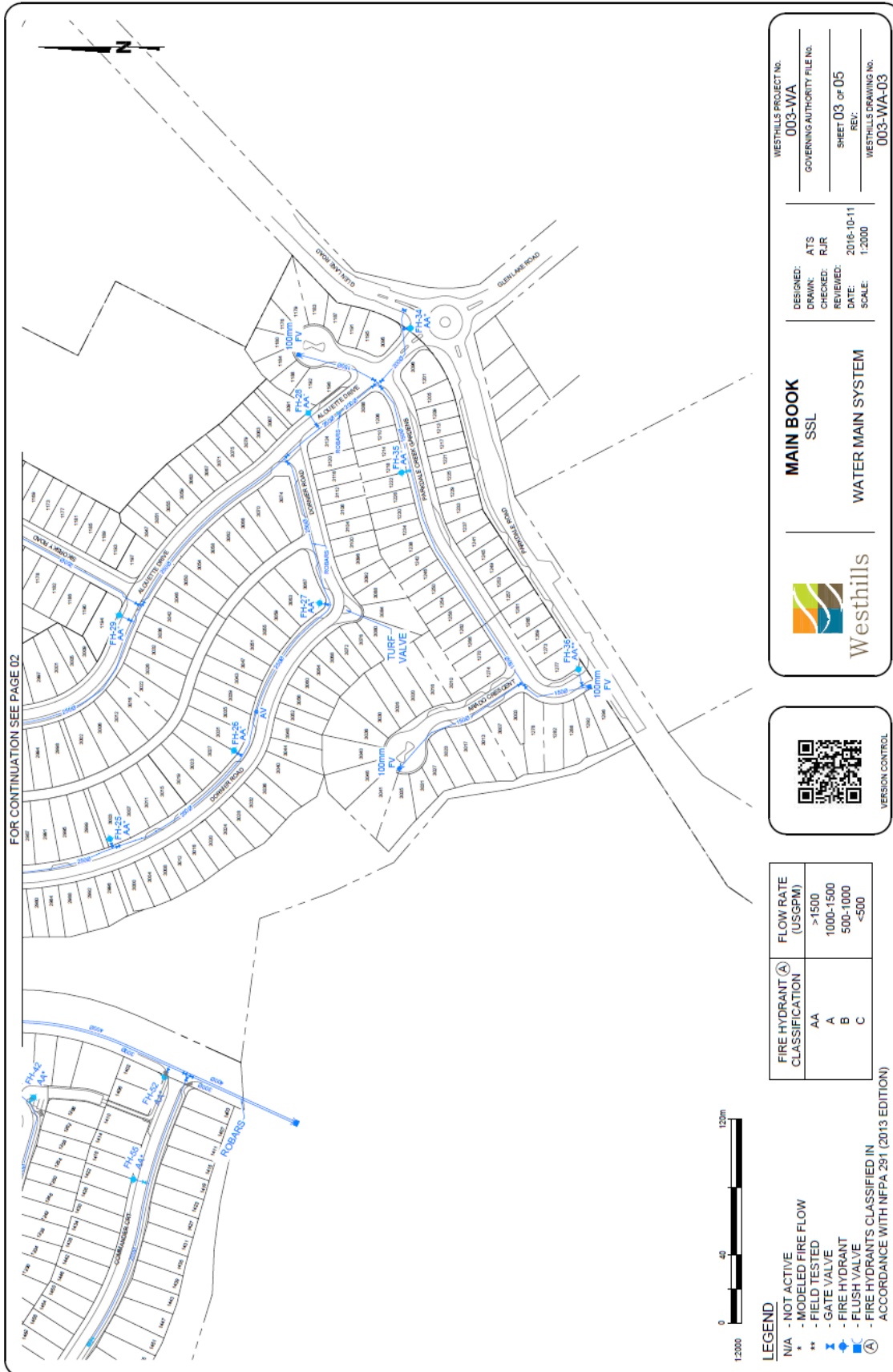
**Appendix 4:** Sample Drinking Water Quality Advisories

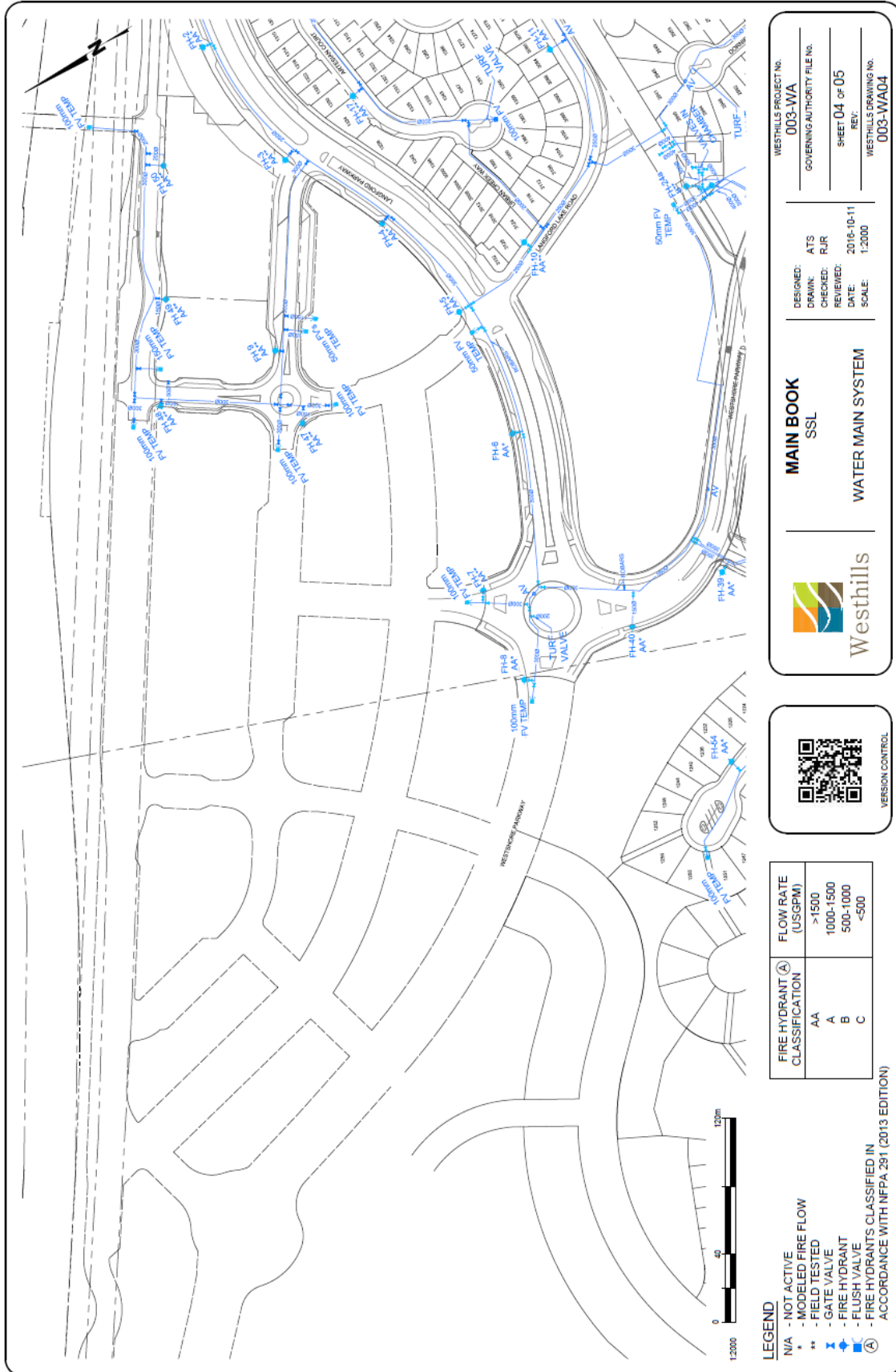
**Appendix 5:** Full Spectrum Potability Analysis

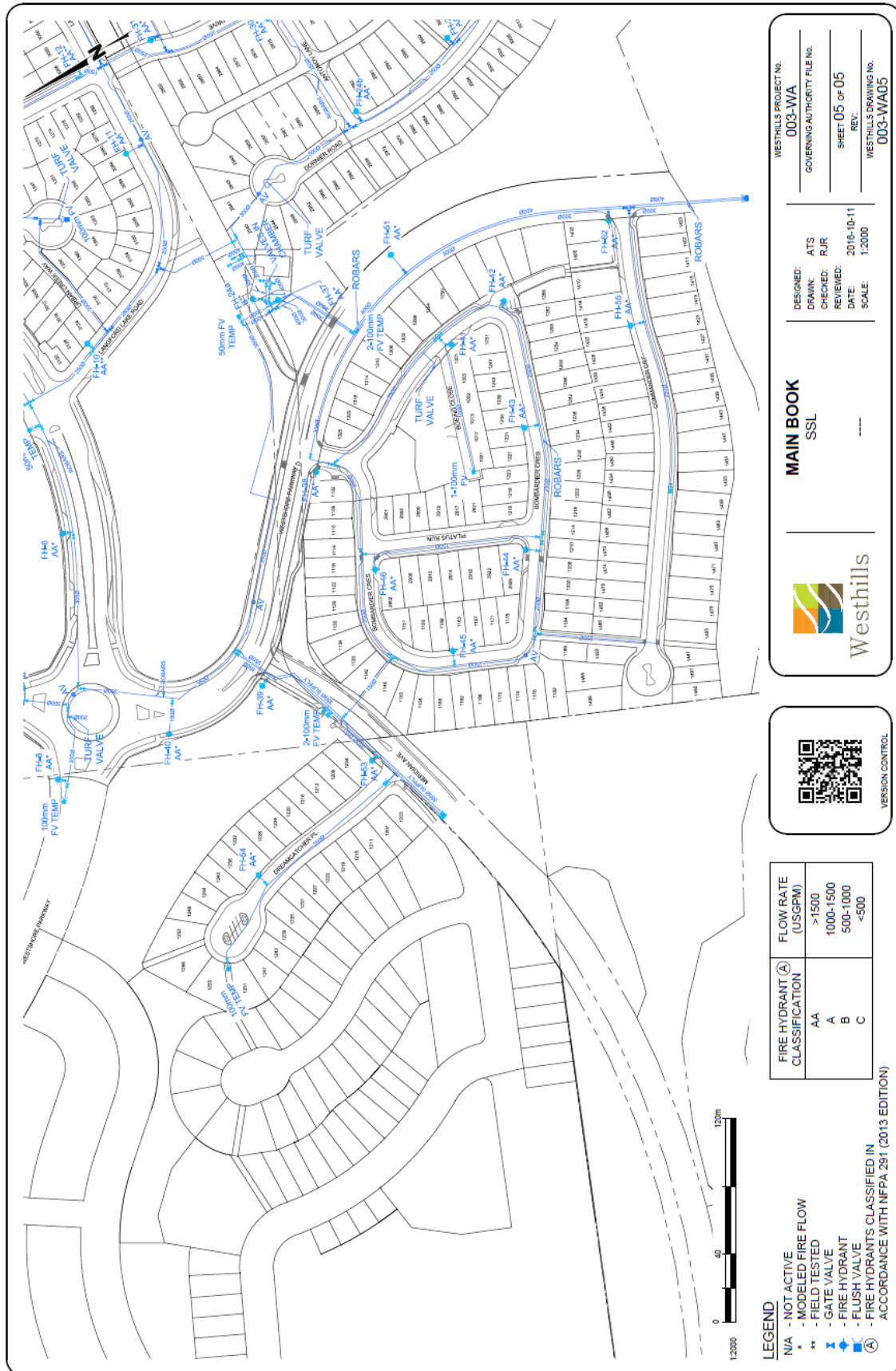
# Appendix 1: SSL Water Main Book











## Appendix 2: Hydrant Maintenance Sheet

Date	Hydrant #	Pressure (psi)	Requires Paint (Y-Yes or N-No)	Notes
26-Apr-16	FH #1	110	N	Pressure test -passed; in good shape.
26-Apr-16	FH #2	108	N	Pressure test -passed; in good shape.
26-Apr-16	FH #3	86	N	Pressure test -passed; in good shape.
26-Apr-16	FH #4	86	N	Pressure test -passed; in good shape.
26-Apr-16	FH #5	86	N	Pressure test -passed; in good shape.
26-Apr-16	FH #6	82	N	Pressure test -passed; in good shape. Replaced gasket on left side.
26-Apr-16	FH #7	80	Y	Pressure test -passed; in good shape. Replaced gasket left side.
26-Apr-16	FH #8	80	Y	Pressure test -passed; in good shape.
26-Apr-16	FH #10	82	N	Pressure test -passed; in good shape.
26-Apr-16	FH #11	70	N	Pressure test -passed; in good shape.
26-Apr-16	FH #12	70	Y	Pressure test -passed; in good shape.
26-Apr-16	FH #14	80	N	Pressure test -passed; in good shape.
26-Apr-16	FH #15	88	N	Pressure test -passed; in good shape.
26-Apr-16	FH #16	100	N	Pressure test -passed; in good shape.
26-Apr-16	FH #17	78	N	Pressure test -passed; in good shape.
26-Apr-16	FH #18	80	N	Pressure test -passed; in good shape.
26-Apr-16	FH #19	94	N	Pressure test -passed; in good shape.
26-Apr-16	FH #20	110	N	Pressure test -passed; in good shape.
26-Apr-16	FH #21	115	N	Pressure test -passed; in good shape.
26-Apr-16	FH #23	116	N	Pressure test -passed; in good shape.
26-Apr-16	FH #24A	32	N	Pressure test -passed; in good shape. Pressure dropped to 10 lbs due to irrigation for Park coming off the hydrant lead.
26-Apr-16	FH #24B	80	N	Pressure test -passed; in good shape.
26-Apr-16	FH #25	80	N	Pressure test -passed; in good shape.
26-Apr-16	FH #26	78	N	Pressure test -passed; in good shape.
26-Apr-16	FH #27	80	N	Pressure test -passed; in good shape.
26-Apr-16	FH #28	94	N	Pressure test -passed; in good shape.
26-Apr-16	FH #29	72	N	Pressure test -passed; in good shape.
26-Apr-16	FH #30	72	N	Pressure test -passed; in good shape.
26-Apr-16	FH #31	70	N	Pressure test -passed; in good shape.
26-Apr-16	FH #32	60	N	Pressure test -passed; in good shape.
26-Apr-16	FH #33	64	N	Pressure test -passed; in good shape.
26-Apr-16	FH #34	100	N	Pressure test -passed; in good shape.
26-Apr-16	FH #35	98	N	Pressure test -passed; in good shape.
26-Apr-16	FH #36	98	N	Pressure test -passed; in good shape.
26-Apr-16	FH #37	82	N	Pressure test -passed; in good shape.
26-Apr-16	FH #38	79	N	Pressure test -passed; in good shape.
26-Apr-16	FH #39	70	N	Pressure test -passed; in good shape.
26-Apr-16	FH #40	78	N	Pressure test -passed; in good shape.

26-Apr-16	FH #41	70	N	Pressure test -passed; in good shape.
26-Apr-16	FH #42	64	Y	Pressure test -passed; in good shape.
26-Apr-16	FH #43	60	Y	Pressure test -passed; in good shape.
26-Apr-16	FH #44	58	Y	Pressure test -passed; in good shape.
26-Apr-16	FH #45	55	N	Pressure test -passed; in good shape.
26-Apr-16	FH #46	70	N	Pressure test -passed; in good shape.
26-Apr-16	FH #47	98	N	Pressure test -passed; in good shape.
26-Apr-16	FH #48	100	N	Pressure test -passed; in good shape.
26-Apr-16	FH #49	112	N	Pressure test -passed; in good shape.
26-Apr-16	FH #50	115	N	Pressure test -passed; in good shape.
26-Apr-16	FH #51	80	N	Pressure test -passed; in good shape.
26-Apr-16	FH #52	85	Y	Pressure test -passed; in good shape.
26-Apr-16	FH #53	95	N	Pressure test -passed; in good shape.

## Appendix 3: VIHA Operating Permit



HEALTH PROTECTION

# PERMIT to OPERATE

## A WATER SUPPLY SYSTEM

Water System Name: **WESTHILLS WATER SYSTEM**  
Premises Number: **64010259**

Premises Address: **204 - 957 Langford Parkway  
Victoria, BC  
V9B 0A5**

Water System Owner: **SSL - Sustainable Services Ltd.**

SSL - Sustainable Services Ltd. is hereby permitted to operate the above potable water supply system and is required to operate this system in accordance with the Drinking Water Protection Act and in accordance with the conditions set out in this operating permit and conditions established as part of any construction permit.

The water supply system for which this operating permit applies is generally described as:

Service Delivery Area: **Westhills**  
Source Water: **CRD**  
Water Treatment methods are: **None**  
Water Disinfection methods are: **UV & Chloramination**

Number of Connections **301-10,000 Connections - DWT**

Date: **January 13, 2015**

Issued By:   
Environmental Health Officer

**This permit must be displayed  
in a conspicuous place and is not transferable**



## Appendix 4: Sample Drinking Water Quality Advisory

# BOIL WATER NOTICE

SSL-Sustainable Services Ltd. (SSL), in consultation with the Vancouver Island Health Authority (VIHA), has issued a BOIL WATER NOTICE for the Westhills Water Distribution System. This Notice is effective immediately and covers all residents of Westhills and those who obtain water from the Westhills Water Distribution System (Facility #1948)

Until further notice, water from the Westhills Water Distribution System should be held at a rolling boil for one (1) minute and cooled before it is consumed. For your safety, only boiled or bottled water should be used for drinking, making ice or fountain drinks, washing dishes, brushing teeth, or preparing foods that will not be cooked.

The following checked statement best describes the situation that triggered this notice:

- Recent water test show the presence of unacceptable levels of bacteria. Boiling the water will make it safe to drink.
- Turbidity in the water system has risen to unacceptable levels as a result of \_\_\_\_\_. High turbidity can interfere with disinfection and may signal the presence of disease causing organisms. Boiling the water will make it safe to drink.
- The water system recently experienced a \_\_\_\_\_, which may make the water unsafe to drink. Boiling the water will make it safe to drink.

SSL and VIHA are working together to resolve the situation. Once the water is safe to drink, this Boil Water Notice will be rescinded.

Updates will be provided regularly to Westhills residents' \_\_\_\_\_ as well as by postings in locations throughout the community and online at [www.SSL-BC.com](http://www.SSL-BC.com). Updates can also be obtained by contacting one of:

SSL-Sustainable Services Ltd. – 250-391-7260  
Island Flow Control Water Solutions Ltd. – 250-361-5503

The Vancouver Island Health Authority has additional information about boil water notices online at [http://www.viha.ca/mho/water/boil\\_water](http://www.viha.ca/mho/water/boil_water)

Thank you for your patience and cooperation. For further information, please contact:

**Name:**  
**Phone:**  
**Email:**  
**Date:**

# DO NOT USE WATER

SSL-Sustainable Services Ltd. (SSL), in consultation with the Vancouver Island Health Authority (VIHA), has issued a DO NOT USE WATER Notice for the Westhills Water Distribution System. This Notice is effective immediately and covers all residents of Westhills and those who obtain water from the Westhills Water Distribution System (Facility #1948)

*Until further notice, do not drink or use water from the Westhills Water Distribution System.  
Boiling the water will not make it safe to drink.*

The following statement best describes the situation that triggered this notice:

SSL and VIHA are working together to resolve the situation. Once the water is safe to drink, this DO NOT USE WATER Notice will be rescinded.

Updates will be provided regularly to Westhills residents \_\_\_\_\_ as well as by postings in locations throughout the community and online at [www.SSL-BC.com](http://www.SSL-BC.com). Updates can also be obtained by contacting one of:

SSL-Sustainable Services Ltd. – 250-391-7260  
Island Flow Control Water Solutions Ltd. – 250-361-5503

Thank you for your patience and cooperation. For further information, please contact:

**Name:**  
**Phone:**  
**Email:**  
**Date:**

## Appendix 5: Full Spectrum Potability Analysis

RDL = Reportable Detection Limit

N/A = Not Applicable

Criteria A = Maximum Acceptable Concentration (MAC)

Criteria B = Aesthetic Objectives (AO)

Criteria C = Operational Guidance Values (OG)

Maxxam ID					PK5190		
Sampling Date					2016/09/01 12:00		
COC Number					WI005207		
	<b>UNITS</b>	<b>MAC</b>	<b>AO</b>	<b>OG</b>	<b>BOMBARDIER + BOEING</b>	<b>RDL</b>	<b>QC Batch</b>
<b>ANIONS</b>							
Nitrite (N)	mg/L	1	-	-	<0.0050	0.0050	8387487
<b>Calculated Parameters</b>							
Total Hardness (CaCO <sub>3</sub> )	mg/L	-	-	-	17.8	0.50	8385063
Nitrate (N)	mg/L	10	-	-	<0.020	0.020	8384269
<b>Misc. Inorganics</b>							
Fluoride (F)	mg/L	1.5	-	-	0.020	0.010	8386917
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	-	-	-	14.3	0.5	8389527
Total Organic Carbon (C)	mg/L	-	-	-	2.81	0.50	8390303
Alkalinity (PP as CaCO <sub>3</sub> )	mg/L	-	-	-	<0.5	0.5	8389527
Bicarbonate (HCO <sub>3</sub> )	mg/L	-	-	-	17.4	0.5	8389527
Carbonate (CO <sub>3</sub> )	mg/L	-	-	-	<0.5	0.5	8389527
Hydroxide (OH)	mg/L	-	-	-	<0.5	0.5	8389527
<b>Anions</b>							
Dissolved Sulphate (SO <sub>4</sub> )	mg/L	-	500	-	1.5	1.0	8393558
Dissolved Chloride (Cl)	mg/L	-	250	-	4.4	1.0	8393557
<b>MISCELLANEOUS</b>							
True Colour	Col. Unit	-	15	-	<5	5	8386576
<b>Nutrients</b>							
Total Organic Nitrogen (N)	mg/L	-	-	-	0.158	0.020	8385282
Total Ammonia (N)	mg/L	-	-	-	0.092	0.0050	8387836
Nitrate plus Nitrite (N)	mg/L	-	-	-	<0.020	0.020	8387486
Total Nitrogen (N)	mg/L	-	-	-	0.250	0.020	8391578
<b>Physical Properties</b>							
Conductivity	uS/cm	-	-	-	48	1	8389535

pH	pH	-	6.5:8.5	-	7.0		8389536
<b>Physical Properties</b>							
Total Dissolved Solids	mg/L	-	500	-	20	10	8388774
Turbidity	NTU	see remark	see remark	see remark	0.4	0.1	8389215
<b>Total Metals by ICPMS</b>							
Total Aluminum (Al)	ug/L	-	-	100	9.8	3.0	8391021
Total Antimony (Sb)	ug/L	6	-	-	<0.50	0.50	8391021
Total Arsenic (As)	ug/L	10	-	-	<0.10	0.10	8391021
Total Barium (Ba)	ug/L	1000	-	-	3.9	1.0	8391021
Total Beryllium (Be)	ug/L	-	-	-	<0.10	0.10	8391021
Total Bismuth (Bi)	ug/L	-	-	-	<1.0	1.0	8391021
Total Boron (B)	ug/L	5000	-	-	<50	50	8391021
Total Cadmium (Cd)	ug/L	5	-	-	<0.010	0.010	8391021
Total Chromium (Cr)	ug/L	50	-	-	<1.0	1.0	8391021
Total Cobalt (Co)	ug/L	-	-	-	<0.50	0.50	8391021
Total Copper (Cu)	ug/L	-	1000	-	3.37	0.20	8391021
Total Iron (Fe)	ug/L	-	300	-	55.2	5.0	8391021
Total Lead (Pb)	ug/L	10	-	-	1.15	0.20	8391021
Total Manganese (Mn)	ug/L	-	50	-	12.0	1.0	8391021
Total Molybdenum (Mo)	ug/L	-	-	-	<1.0	1.0	8391021
Total Nickel (Ni)	ug/L	-	-	-	<1.0	1.0	8391021
Total Selenium (Se)	ug/L	50	-	-	<0.10	0.10	8391021
Total Silicon (Si)	ug/L	-	-	-	1800	100	8391021
Total Silver (Ag)	ug/L	-	-	-	<0.020	0.020	8391021
Total Strontium (Sr)	ug/L	-	-	-	16.1	1.0	8391021
Total Thallium (Tl)	ug/L	-	-	-	<0.050	0.050	8391021
Total Tin (Sn)	ug/L	-	-	-	<5.0	5.0	8391021
Total Titanium (Ti)	ug/L	-	-	-	<5.0	5.0	8391021
Total Uranium (U)	ug/L	20	-	-	<0.10	0.10	8391021
Total Vanadium (V)	ug/L	-	-	-	<5.0	5.0	8391021
Total Zinc (Zn)	ug/L	-	5000	-	<5.0	5.0	8391021
Total Zirconium (Zr)	ug/L	-	-	-	<0.50	0.50	8391021
Total Calcium (Ca)	mg/L	-	-	-	5.19	0.050	8385281
Total Magnesium (Mg)	mg/L	-	-	-	1.17	0.050	8385281
Total Potassium (K)	mg/L	-	-	-	0.134	0.050	8385281

Total Sodium (Na)	mg/L	-	200	-	1.60	0.050	8385281
Total Sulphur (S)	mg/L	-	-	-	<3.0	3.0	8385281
<b>MISCELLANEOUS</b>							
Total Sulphide	mg/L		0.05		0.0081	0.0050	8389605
Total Mercury (Hg)	ug/L	1			<0.010	0.010	8389686
Iron Bacteria	CFU/mL	-			150	25	8394694
Sulphate reducing bacteria	CFU/mL	-			<75	75	8394681
Langelier Index (@ 4.4C)	N/A				-2.95		8385283
Langelier Index (@ 60C)	N/A				-1.91		8385284
Saturation pH (@ 4.4C)	N/A				9.96		8385283
Saturation pH (@ 60C)	N/A				8.92		8385284
<b>Microbiological Param.</b>							
Heterotrophic Plate Count	CFU/mL	-			<1	1	8388975
Total Coliforms	CFU/100mL	<1			<1	1	8389205
E. coli	CFU/100mL	<1			<1	1	8389205