



NORTH VANCOUVER
DISTRICT

DRINKING WATER QUALITY ANNUAL REPORT 2015

May 2015. District of North Vancouver Utilities Department

Table of Content

EXECUTIVE SUMMARY..... 1

1 SOURCE WATER..... 2

2 DNV DISTRIBUTION SYSTEM..... 2

 2.1 General..... 2

 2.2 Sampling and Testing..... 2

3 RESULTS..... 4

 3.1 Weekly Bacteriological Parameters..... 4

 3.2 Weekly Chemical Parameter..... 5

 3.3 Weekly Physical Parameters..... 5

 3.4 Quarterly Disinfection By-products..... 6

 3.5 Semi-Annual Metals..... 7

 3.6 Special Samples..... 7

OPERATIONS & CAIPTAL PROGRAMS..... 8

 3.7 Water System Maintenance..... 8

 3.8 Water System Capital Improvements..... 8

 3.9 Operator Training & Qualification..... 9

4 ISSUES, INCIDENTS & RESPONSE PLANS..... 9

APPENDIX A: Water System, Sample Sites and Sample Schedule..... 14

APPENDIX B: Analysis Results by Sample Site 2011 - 2015..... 18

Figure 1. HPC Annual Avergaes..... 4

Figure 2. Free Cl2 Annual Averages..... 5

Figure 3. Turbidity Annual Avergaes..... 5

Figure 4. Loss of System Integrity Responce..... 11

[Table 1. Quarterly Disinfection By-products Results](#)..... 6

Table 2. Semi Annual Metal Results..... 7

Table 3. Water Main Replaced in 2015..... 8

Table 4. Proposed Water Main Replacement 2016..... 9

Table 5. Water Quality Notification..... 10

EXECUTIVE SUMMARY

In 2015, 99.6% of the District of North Vancouver (DNV) water samples met or exceeded regulatory requirements. The combined efforts of the Greater Vancouver Water District (GVWD or Metro) and the DNV resulted in excellent water quality for our customers. Metro and the DNV employ a multi-barrier science based approach that encompasses water from the source to the point of delivery to consistently deliver clean, safe, reliable water.

This year marks a significant milestone in that it is the first year in which 100% of all water supplied to DNV was treated through Metro's Seymour Capilano Filtration Plant. Metro's achievement of bringing this improved supply system into full operation results in improvements in water supply reliability and quality.

This report is the fifteenth Drinking Water Quality Annual Report prepared by the DNV and provides DNV water consumers with information about the quality of their potable water for 2015. Submission of this report to the Office of the Medical Health Officer for North Shore Vancouver Coastal Health fulfills a regulatory obligation under the Drinking Water Protection Regulation and supports our application to the Medical Health Officer for our annual Drinking Water System Permit to operate a potable water system. It adheres to Metro's "Water Quality Monitoring And Reporting Plan For The GVRD and Member Municipalities – 2006" , a template for all municipalities within Metro Vancouver to report annually on water quality results and issues.

1 SOURCE WATER

Metro supplies the DNV with 100% of its potable water from their Capilano and Seymour surface water reservoir sources. Metro's uses multiple barriers to protect safe drinking water including watershed protection, water treatment, sampling and testing and ongoing operation of the water transmission system. This year, 2015, was significant in that it is the first year in which 100% of all water supplied to DNV was treated through Metro's Seymour Capilano Filtration Plant (SCFP).

Until December 2009 Metro's only form of treatment for both the Capilano and Seymour sources was primary disinfection using chlorine. In 2010 all Seymour water was treated at the SCFP. In 2015 the twin tunnel delivery system was brought into full operation linking the Capilano water source to the SCFP. This milestone significantly reduces the historic issue of source water turbidity. In November and October of 2015 significant storm events caused spikes in the turbidity in the source reservoirs that historically may have resulted in taking a reservoir out of service, however, the SCFP was capable of maintaining consistent discharge turbidity values that exceeded water quality standards.

Metro tests source water for bacteriological, chemical and physical parameters according to the "BC Safe Drinking Water Regulation" (the regulation) and the "Water Quality Monitoring And Reporting Plan For The GVRD and Member Municipalities – 2006" (the plan). The "2015 - GVWD Quality Control Annual Report" summarises water quality for all of the Metro Vancouver service area and is made available on their website www.metrovancouver.org. The report demonstrates that drinking water supplied by Metro to DNV met or exceeded all water quality standards and guidelines in 2015.

Metro's peak demand day for 2015 occurred on July 1, when 1.65 BL of water was delivered through the Metro system. Both Metro's and the DNV's water supply and delivery systems performed well, with no problems encountered. This was similar to the previous year's 1.63 BL peak day on July 16, 2014

2 DNV DISTRIBUTION SYSTEM

2.1 General

The DNV water distribution system delivers potable water to its customers via a waterworks system incorporating approximately 364 km of water mains, 7 water pumping stations, 11 water storage reservoirs, and 36 pressure reducing stations. A population of approximately 88,000 is served through approximately 21,000 water service connections.

In 2015, Metro delivered 19.2 million cubic metres of water to the DNV distribution system. A map of the overall water system, showing pressure zones is included in Appendix A.

2.2 Sampling and Testing

Sampling is performed in three categories

1. **Weekly:** Bacteriological, Chemical and Physical Parameters.
2. **Quarterly:** Disinfection by-products
3. **Semi Annually:** Metals.

All samples are collected by trained DNV staff and transported to the certified Metro lab for analysis and reporting with the exception of temperature and free chlorine residual, which are analysed and recorded by trained DNV staff at the time of sampling. Appendix A includes a map of the overall water system with sampling site labeled, a list of the sample site locations and the annual sampling schedule.

Weekly Samples

In 2015 DNV staff collected a total of 1344 regular scheduled samples from 39 sample sites or approximately 112 samples per month. This exceeds the regulatory population based sample requirement for DNV of 34 sites and 86 samples per month. Sample collection is scheduled weekly on a rotating basis using strategic grouping of sample sites distributed across the district. Typically 13 samples are collected twice each week for a total of 26 samples per week.

Locations of weekly sample points are distributed according to the regulation recommendations as follows;

- 10% of sampling points at “source” (supply points off Metro transmission mains)
- 40% of sampling points at locations with medium flow
- 40% of sampling points at locations with low flow
- 10% of sampling points at system dead-ends (very low flow)

Weekly Samples are analysed in three categories bacteriological, chemical and physical parameters.

- Bacteriological parameters tested include Escherichia coli or E coli, total coliform and heliotrophic plate count (HPC).
- Chemical parameter is free chlorine residual.
- Physical parameters tested were turbidity and temperature.

Quarterly Disinfection By-Product Samples

In 2015 DNV staff collected 16 samples for Disinfection By-Product testing of Haloacetic acids (HAA's) and Trihalomethanes (THM's) in conformance with the regulation. In addition to the disinfection by-products pH is measures for these 16 samples.

HAA and THM are by products of the water treatment with chlorine and maximum targets levels are set at 0.08 and 0.1 mg/L respectively. pH influences HAA and THM formation during treatment and may contribute to the corrosion of ferrous pipe material. Target pH in distribution systems is 7.0.

Semi-Annual Metal Samples

In 2015 DNV staff collected 8 samples for analysis at 4 locations for metal testing in conformance with regulatory requirements.

Special Samples

In addition to the scheduled weekly, quarterly and semi-annual samples special samples are collected and analysed when warranted for water quality complaint or operational concern or maintenance activity. The majority of complaints are for turbid water and are found to be a direct and unintentional consequence of approved DNV activities such as water main flushing or hydrant flow testing. In 2015 a total of 75 special samples were collected and analysed.

3 RESULTS

The DNV water sampling program meets the regulatory requirements for sample location, testing frequency and sample quantity. Samples results are provided by Metro to DNV on a weekly basis and reviewed internally upon receipt. The weekly sample results (free chlorine residual, total Coliform, E-coli, HPC, turbidity and temperature) for each sample site are presented Appendix B. A summary of the results on a parameter by parameter basis is provided below.

3.1 Weekly Bacteriological Parameters

Bacteriological standards for water distribution systems are dictated by the requirements of the regulation and the Guideline for Canadian Drinking Water Quality (the guideline), which provide the following criteria:

- **E. coli:** Zero detectable E. coli per 100 mL sample.
- **Total Coliform:** 10 or less total coliform per 100 mL sample and 90% or more of the samples for a given month must have zero detectable total coliform per 100 mL sample.
- **HPC:** No maximum acceptable concentration limit provided. Increases in HPC concentrations above baseline level of 500 CFU/mL s are undesirable.

All samples collected in 2015 satisfied bacteriological requirements. There were zero occurrences of detectable E-coli or Total Coliform. All samples collected in 2015 were below the baseline HPC. The annual DNV average HPC for the last 5 years is presented below.

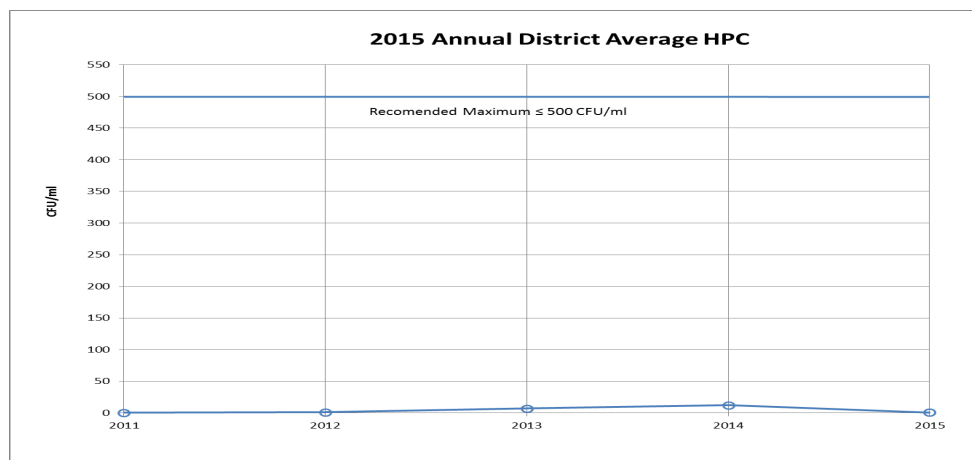


Figure 1. HPC Annual Averages

3.2 Weekly Chemical Parameter

In 2015 there were zero samples that had less free chlorine than the recommended minimum of 0.20 mg/L. The annual DNV average free chlorine for the past 5 years is presented below.

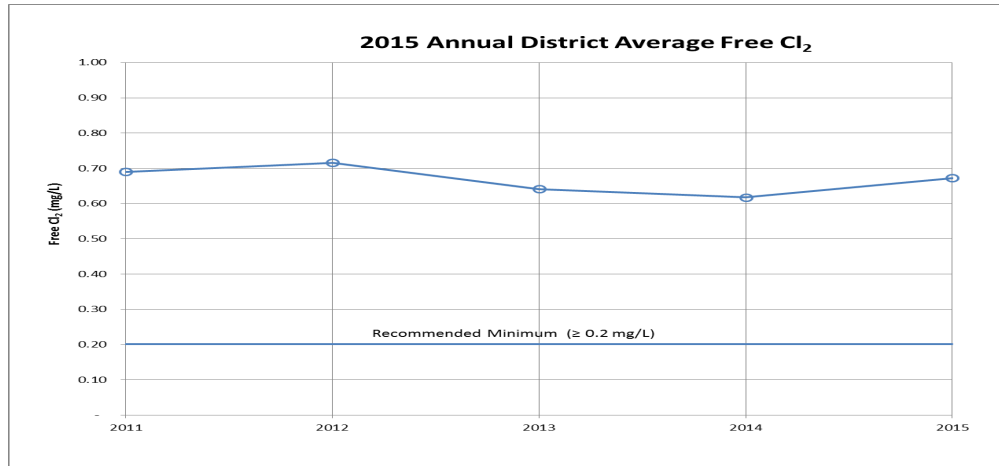


Figure 2. Free Cl₂ Annual Averages

3.3 Weekly Physical Parameters

Turbidity.

The Nephelometric Turbidity Unit (NTU) is used to test and record the turbidity in water. The target NTU is < 1 or “best possible” and should not exceed 5.0 in distribution systems according to the guideline. In 2015 five (5) samples, or 0.4% of the samples, from five (5) different sites tested above 1 NTU with maximum value of 3.5 NTU. The next scheduled sample for all five locations tested below the target NTU.

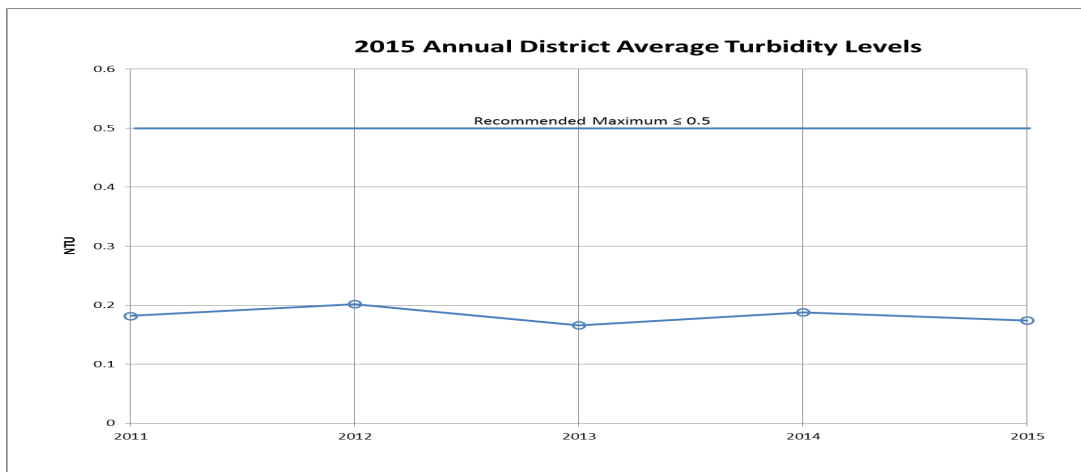


Figure 3. Turbidity Annual Averages.

Temperature.

The guidelines provide an aesthetic objective for water temperature at less than or equal to 15°C. In 2015, 18 % of the samples were above 15°C with the majority during the summer season.

3.4 Quarterly Disinfection By-products

Quarterly disinfection by-products tested were well below guideline limits and are presented below in Table 1.

Sample	Date Sampled	THM (ppb)		HAA (ppb)	
		Total Trihalomethanes	Total THM Quarterly Average (Guileline Limit 100ppb/mL)	Total Haloacetic Acid	Total HAA Quarterly Average (Guileline Limit 80ppb/mL)
DNV-727	2/16/2015	19.5	20	17.4	17
DNV-727	5/20/2015	17.2	18	14.1	16
DNV-727	8/18/2015	21.5	19	20.3	17
DNV-727	11/24/2015	18.8	19	26.4	20
DNV-733	2/16/2015	23.2	23	22.3	22
DNV-733	5/20/2015	21.3	22	13.2	18
DNV-733	8/18/2015	25.2	23	19.3	18
DNV-733	11/24/2015	29.4	25	27.4	21
DNV-734	2/16/2015	21	21	20.8	21
DNV-734	5/20/2015	17.7	19	17.6	19
DNV-734	8/18/2015	24.7	21	20.6	20
DNV-734	11/24/2015	21	21	25.8	21
DNV-736	2/16/2015	23.9	24	27.2	27
DNV-736	5/20/2015	22	23	21.4	24
DNV-736	8/18/2015	29.9	25	22.9	24
DNV-736	11/24/2015	22.7	25	26.5	25

Table 1. Quarterly Disinfection By-products Results

3.5 Semi-Annual Metals.

A total of eight samples for metals, including copper, lead and zinc, were collected from four locations in 2015. Sample locations, results, and maximum limits are given in Table 2 below. All samples tested for metals were under the recommended maximum concentrations.

Parameter : Guideline Limit (µg/L)	Site ID	DNV-721		DNV-730		DNV-734		DNV-747	
	Site Description	2838 Panorama Dr.		Braemar Reservoir		1181 West 22nd		1231 Lennox St. PRV	
	Sample Date	5/5/2015 7:55	10/20/2015 7:45	5/5/2015 12:50	10/20/2015 8:55	5/5/2015 14:05	10/20/2015 9:20	5/5/2015 10:25	10/20/2015 8:15
Sample Type	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB	GRAB
Aluminum Total 200 µg/L *		21	21	25	22	28	23	27	25
Antimony Total 6 µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic Total 10 µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium Total 1000 µg/L		3.5	4.6	2.9	4.0	3.0	4.0	2.9	3.8
Boron Total 5000 µg/L		<10	<10	<10	<10	<10	<10	<10	<10
Cadmium Total 5 µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Calcium Total none		3590	4660	3380	4260	3520	4270	3470	4140
Chromium Total 50 µg/L		<0.05	0.18	<0.05	0.14	<0.05	0.16	<0.05	0.15
Cobalt Total none		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Copper Total 1000 µg/L		3.9	3.5	1.0	1.1	11.9	8.3	<0.5	<0.5
Iron Total ≤ 300 µg/L		12	11	11	<5	5	8	<5	<5
Lead Total 10 µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium Total none		157	198	161	204	165	210	169	212
Manganese Total ≤ 50 µg/L		1.4	3.9	1.5	3.5	1.8	3.2	4.0	6.2
Mercury Total 1.0 µg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Molybdenum Total none		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel Total none		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium Total none		162	244	163	243	167	245	167	242
Selenium Total 50 µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver Total none		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sodium Total ≤ 200,000 µg/L		1480	1840	1500	1880	1500	1890	1520	1880
Zinc Total ≤ 5000 µg/L		<3	<3	<3	<3	<3	<3	<3	<3

*No health-based guideline for aluminium has been established in Canada, however where aluminum based coagulants are used in water treatment this operating guideline has been set.

Table 2. Semi Annual Metal Results

3.6 Special Samples

In 2015 75 special samples were collected. 32 were in response to customer complaints or staff concerns and 43 were for operational incidents or construction such as water main breaks or water main construction. None of samples tested positive for E.coli or Total Coliform. When free chlorine or elevated turbidity was identified operational activities were performed until acceptable levels were achieved.

OPERATIONS & CAIPTAL PROGRAMS

3.7 Water System Maintenance

Scheduled system maintenance that supports water quality includes water main flushing program and reservoir cleaning programs. In 2015 cleaning efforts focused on 4 of our largest reservoirs, two each at Mountain Highway (Reservoir #50) and Prospect Avenue (Reservoir #51). These reservoirs supply water to a balancing reservoir (Braemar Reservoir #43) and to pressure zones P 3 and P4. In 2015 the water main flushing program underwent a review and revision to align more closely with the AWWA standards to optimise flushing velocities and reduce the undesirable impacts such as turbidity outside of flushing areas.

There were 27 water main breaks in 2015. The majority of our breaks (52%) were on asbestos cement pipes. We continue to weigh pipe material heavily in the prioritisation for replacement.

3.8 Water System Capital Improvements

The DNV's water main replacement program takes into consideration multiple parameters in the prioritisation of the replacement schedule. Pipes with higher potential of failure or increased flushing requirements are given priority. The 2015 DNV construction crews completed the replacement of 3,100 metres of pipe. In addition Metro Vancouver began the replacement of Metro Main #4 that runs near and along Capilano Road from the Cleveland Dam to Edgemont Boulevard, referred to the 'Metro Cap9' project. As part of Metro's contract 2,480 m of DNV main will be replaced and brought into service in 2016.

The following two tables list the water main replaced in 2015 and the replacement plan for 2016 respectively.

Street	From	To	Length (m)
Ranger Avenue	Tudor Avenue	Handsworth Road	320
Phillip Avenue	Paisley Rd	Woods Dr	188
Lions Avenue	Tudor Avenue	Arundel Road	171
Edgewood Road	Capilano Road	Sycamore	292
Essex Road	Lions Avenue	4271 Essex Road	122
Lions Avenue	Devon Road	Tudor Avenue	161
Donegal Place	Delbrooke Avenue	Delbrooke Avenue	398
Forest Hills Drive	Glenview Crescent	Fairmont Road	147
Beaconsfield Road	Highland Boulevard	Skyline Drive	197
Norwood Avenue	West Braemar Road	West Rockland Road	208
Norwood Avenue	West Rockland Road	4066 Norwood Avenue	148
Madeley Road	Norwood Avenue	Cartelier Road	108
Woods Drive	Elizabeth Way	Woods Drive	139
Redwood Street	McBride Street	Pinewood Crescent	67
Pinewood Crescent	Redwood Street	1176 Pinewood Crescent	134
Frederick Road	Sykes Road	Fromme Road	337

Table 3. Water Main Replaced in 2015

Street	From	To
Quinton Place	Carolyn Dr	Quinton PL
W Queens Rd	Delbrook Ave	Mahon Ave
Dempsey Rd	Lynn Valley Rd	Underwood Ave
W15th	McQuire Ave	Pemberton Ave
McGuire Ave	W 15th St	Marine Drive
E Braemar Rd	191 E Braemar	189 E Bramar
Cortell St	W 21st St	W 22nd St
W 22nd St	Cortell St	Mackay Ave
Fernwood Cr	Sowden St	Sowden St
Verona Pl	Delbrook Ave	End of CDS
Norwood Ave	Madeley Rd	End of CDS
St Andrews Ave	E St James Rd	E Windsor Rd
Appin Way	ALDERLYNN DR	E 15th St
Starlight Way	Newdale Cr	4369 STARLIGHT WAY
Newdale Cr - Starlight to end of CuldSac	Starlight Way	End of CDS
Swinburne - Berkley east CDS	Berkley Rd	End of CDS
Adderly St. - Between Gladstone & Broosbank	Gladstone Ave	Brooksbank Ave
Selby Rd - Kilmer north to end of CDS	Kilmer Rd	End of CDS
W 20th St - Phillips and Pemberton	Bridgeman Ave	Pemberton Ave
Lytton St - Lytton Place to Violet Place	1079 LYTTON ST	1099 LYTTON ST
Brookridge - 3090 Brookridge south to end of CDS	2901 BROOKRIDGE DR	3010 BROOKRIDGE DR
Fromme Rd - South of E 27th	2500 FROMME RD	2638 FROMME RD
Wendel Place - Fromme Rd East to end of CDS	1179 WENDEL PL	3394 FROMME RD
W 23rd Ave. Philips & Bridgeman	2298 PHILIP AVE	2299 PHILIP AVE
Harbour Rd - Allied Ship Yard	1800 HARBOUR RD	1858 HARBOUR RD
St Andrews Ave. - E Breamar - Wellington Dr	431 BRAEMAR RD	3740 ST ANDREWS AVE

Table 4. Proposed Water Main Replacement 2016

3.9 Operator Training & Qualification

The DNV's distribution system is EOCP classified as a Level 3 system. The DNV currently has distribution system operators with Level 3 operator's certification from the EOCP, keeping the DNV in full compliance with the Regulation.

4 ISSUES, INCIDENTS & RESPONSE PLANS

Issues & Challenges

No significant water quality issues experienced in 2015.

Challenges facing the DNV in 2015 for maintaining good water quality in the distribution system were ensuring that water system maintenance and replacement programs have the greatest possible positive effect on maintaining good water quality, while at the same time achieving target levels for

infrastructure repair and replacement. The capital, operating and maintenance budgets along with the staffing and management of related programs continue to be a high priority for the DNV.

Security

There were no security threats to the DNV system in 2015. All DNV water storage reservoirs and pumping facilities have secured access, intrusion detection linked to the automated SCADA alarm system and designed fail safe valve operation to inhibit or reduce the impact of security threats. Assessments of new technology and improved systems to protect DNV water supply facilities are ongoing.

Notification & Emergency Response

The table below outlines the notification process for unusual situations that could potentially affect water quality

NOTIFICATION FOR UNUSUAL SITUATIONS POTENTIALLY AFFECTING WATER QUALITY			
Situation	Notifying Agency	Agency Notified	Time Frame For Notification
<i>E. coli</i> -positive sample	M.V. Laboratory or BC Centre for Disease Control	DNV and Vancouver Coastal Health (North Shore)	Immediate
Total coliform over 10 mg/L and no free chlorine residual	DNV	Vancouver Coastal Health (North Shore)	Immediately upon receipt of sample test results
Chemical Contamination	DNV	Vancouver Coastal Health (North Shore)	Immediate
Turbidity > 5 NTU	M.V. Laboratory or GVWD Operations	DNV and Vancouver Coastal Health (North Shore)	Immediate
GVRD Disinfection failure	GVWD Operations	DNV and Vancouver Coastal Health (North Shore)	Immediate in any situation in which the BCSDWR or the GCDWQ may not be met
Loss of pressure due to high demand	DNV	GVWD Operations and Vancouver Coastal Health (North Shore)	Immediate
Watermain break where contamination is suspected	DNV	Vancouver Coastal Health (North Shore)	Immediate

Table 5. Water Quality Notification

Response Plans

The flow diagram below illustrates the process that has been put in place for response to incidents that could potentially affect water quality during a loss of system integrity. Additional or cascading response protocols are outlined after the chart.

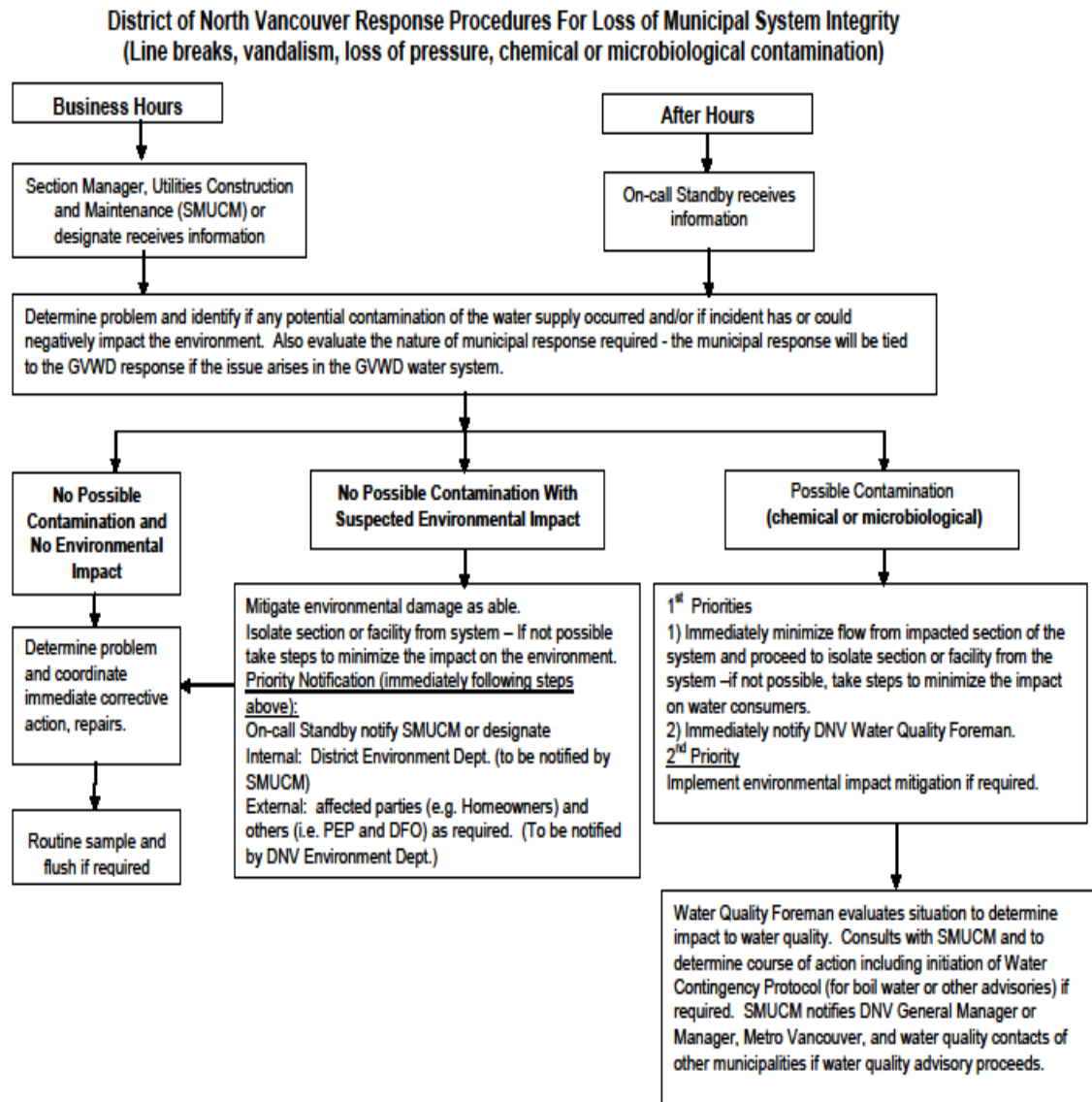


Figure 4. Loss of System Integrity Response

- ***Watermain Breaks***

Water main breaks pose an increased risk for potential contamination. Reposes procedure's and repair practices are in place to reduce the risk of contamination. In instances where chemical or microbiological contamination of the system is suspected, DNV Utilities crews will make adjustments to isolate the section or facility from the system. The DNV will immediately consult with Vancouver Coastal Health (North Shore) regarding further actions, and all water quality complaints from the public will be immediately and thoroughly investigated for potential contamination.

For all watermain breaks, water samples will be taken from the vicinity of the break and tested for bacteriological, chemical and physical parameters.

- ***Turbidity Events***

Turbidity in the DNV water distribution system is monitored on a regular basis through the water sampling program. Water sampling results yielding readings greater than 1 NTU are scrutinized, along with corresponding free chlorine. Any areas from which high turbidity results originate will be flushed and re-sampled for free chlorine and turbidity.

- ***Loss of Pressure Due to High Demand***

In the event of adverse pressure loss due to high demand, DNV Utilities crews will make adjustments to the system to isolate the section or facility from the system and then take measures to supplement pressure in the affected area. The DNV will immediately consult with GVWD and Vancouver Coastal Health (North Shore) regarding further actions, and all water quality complaints from the public will be immediately and thoroughly investigated for potential contamination.

- ***Positive E-coli Results***

If a sample submitted from DNV and analysed by the Metro Vancouver laboratory or the BC Centre for Disease Control tests positive for E. coli, the following response plan will be put into action.

- i) Results of interim samples, if any, from the site will be examined by the lab. Interim samples are any samples that may have been taken from the site in the period between when the E. coli -positive sample was taken and when it was determined to be positive.
- ii) The chlorine residual noted on the sampler's field sheet will be reviewed by the lab and compared to previous readings to determine if there had been a localized loss of disinfectant residual.
- iii) The DNV Section Manager of Utilities Construction and Maintenance (SMUCM) or designate and Vancouver Coastal Health (North Shore) will be notified immediately by the laboratory.

- iv) Arrangements will be made for the immediate collection of a repeat sample (including, where possible, samples from upstream and downstream of the positive sample location).
- v) Vancouver Coastal Health (North Shore) will be contacted and the need for a “boil water” advisory will be evaluated.
- vi) If a “boil water” advisory is warranted, the public notification process as outlined in the Water Quality Monitoring And Reporting Plan For The GVRD and Member Municipalities will be followed.
- vii) The lab will contact the DNV with repeat sample results and the results of the species identification tests. The DNV will contact Vancouver Coastal Health (North Shore) to evaluate these results and to determine whether or not the advisory can be lifted.

- ***Chemical Contamination***

In the event of chemical contamination in the DNV water distribution system, Vancouver Coastal Health (North Shore) will be immediately notified. Immediate steps will be taken to isolate the contaminated area and the level of contamination will be determined through water sampling and testing. The chemical will be identified and any public health risk factors associated with the chemical presence will be determined. Through consultation with Vancouver Coastal Health (North Shore), a public advisory will be carried out.

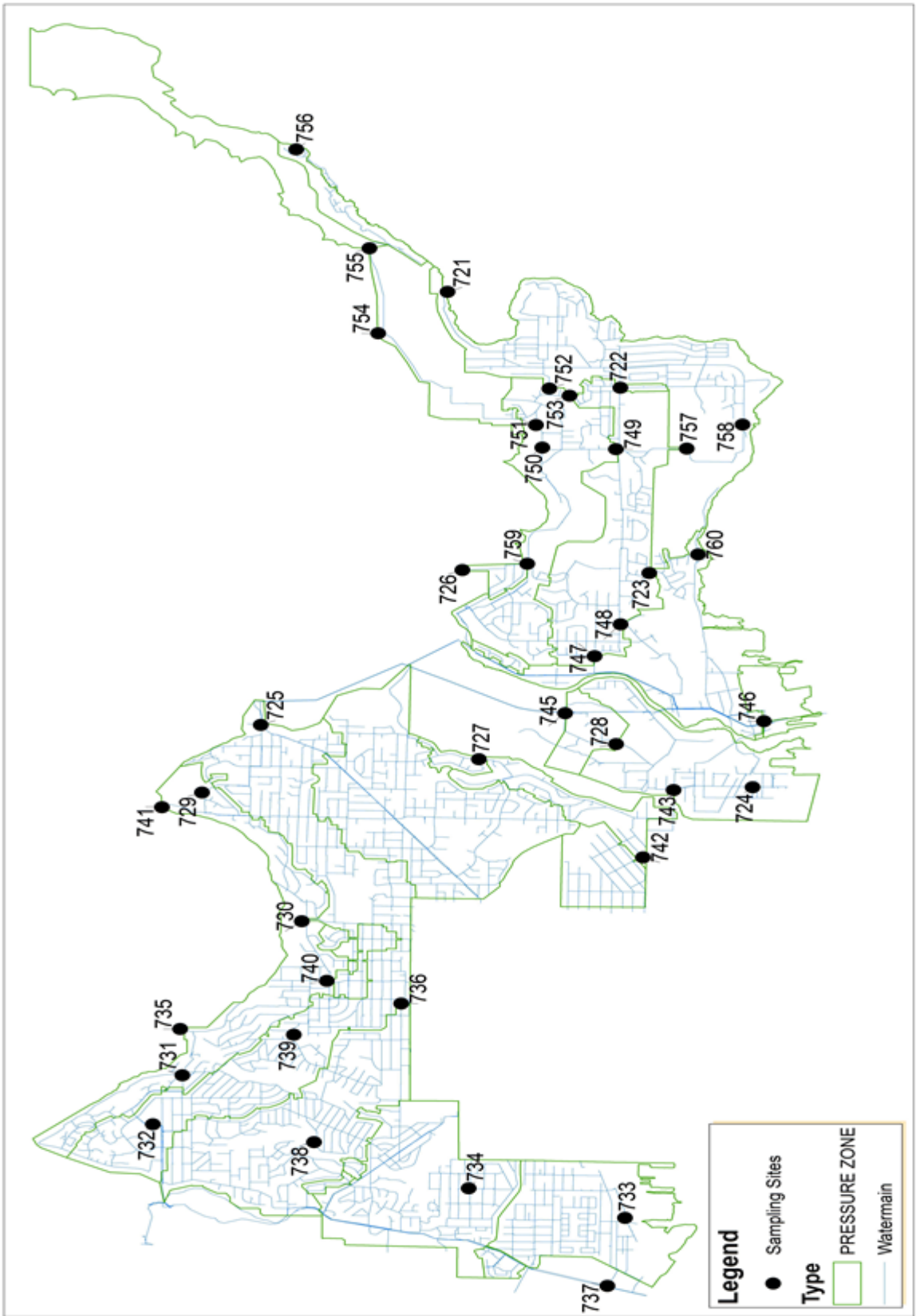
- ***Source Water Event***

In 2007 a task force comprised of Metro Vancouver, Vancouver Coastal Health, Fraser Health and member municipalities developed a communications template for source water major turbidity events. The template outlines the responsibilities of Metro Vancouver, the Health Authorities, and municipalities for notification and communications to each other and the public.

- ***GVRD Disinfection Failure***

Upon notification by GVWD Operations that an interruption in disinfection has occurred, DNV Water Quality personnel will immediately commence monitoring free chlorine residual levels at strategic locations and will contact the Vancouver Coastal Health (North Shore) if continued loss of residual is observed.

APPENDIX A: Water System, Sample Sites and Sample Schedule.



District of North Vancouver Water Quality Sampling Sites

Site I.D.	Lab No.	Sample Site Location	Flow Rate
1	721	2838 Panorama Dr.	Low
2	722	Fairway & Mt Seymour Pkwy.	Medium
3	723	Plymouth Dr & Fairfield Dr.	Low
4	724	LS #13 Dominion & Mountain Hwy.	Low
5	725	Marion Pump Station	Source
6	726	Hyannis Reservoir	Low
7	727	Hoskins Rd & Kilmarnock Cres.	Medium
8	728	Lillooet Road	Low
9	729	Ramsay Pump Station	Medium
10	730	Braemar Reservoir	Low
11	731	Skyline Pump Station	Medium
12	732	Sarita Pump Station	Source
13	733	McKeen Ave & Phillip Ave.	Medium
14	734	Pemberton Heights	Low
15	735	Prospect Reservoir	Medium
16	736	PRV #4 (W Queens Rd. & Lonsdale Ave.)	Dead End
17	737	N. of BC Rail Tracks just East of Lower Cap. Rd.	Source
18	738	3906 Sunnycrest Dr.	Medium
19	739	376 Cartelier Rd.	Medium
20	740	PRV #5 (190 E. Braemar Rd.)	Medium
21	741	Mountain Hwy Reservoir (North up access Rd., N. of Mountain Hwy.)	Low
22	742	PRV # 11 (Across from 1086 Cloverly St.)	Source
23	743	PRV #7 (N across from 481 Mountain Highway)	Dead End
24	744	Not in use	
25	745	PRV # 13 (N. of 1388 Monashee Drive (Capilano College))	Source
26	746	PRV #17 (60 Riverside Dr.)	Medium
27	747	PRV # 19 (1231 Lennox St.)	Dead End
28	748	PRV # 16 (2592 Bendale Rd.)	Dead End
29	749	PRV # 18 (3728 Mt. Seymour Parkway)	Low
30	750	up path behind 1610 Mt. Seymour Rd.	Medium
31	751	Access Rd, N. end of Cascade Ct.	Low
32	752	PRV # 25 (4068 Deane Pl.)	Medium
33	753	PRV # 20 (1501 Theta Ct.)	Low
34	754	Woodlands reservoir (2.1 km N. of Hixon Rd. on Indian River Dr.)	Low
35	755	PRV # 26 3.7 km NE of Hixon Rd. on Indian River Dr.	Low
36	756	End of Fire Lane # 7 (Firelane #7 is 3.6 km from Hixon Rd.)	Dead End
37	757	PRV 200 m south of 879 Roche Point Dr.	Medium
38	758	3860 Dollarton Hwy.	Medium
39	759	Hyannis Pump Station (1919 Hyannis drive)	Low
40	760	3000 Block Dollarton Hwy.	Low

**DISTRICT OF NORTH VANCOUVER
WATER QUALITY SAMPLING AND REPORTING
CALENDAR - 2015**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<u>DISTRIBUTION SYSTEM SAMPLING</u>												
bacteria, turbidity, chlorine, temperature (twice weekly)	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
HAA's, THM's, pH (quarterly)		x			x				x		x	
metals - copper, lead, zinc (semi-annually)					x						x	
<u>NOTIFICATION</u>												
Annual Report:												
Annual report sent to MHO					x							
MHO sends Council his response						x						
Staff report to Council							x					
Posted on Web								x				

APPENDIX B: Analysis Results by Sample Site 2011 - 2015

