Water and Waste
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Manitoba Conservation and Climate
Environmental Compliance and Enforcement Branch
1007 Century Street
Winnipeg, MB R3H 04W

April 15, 2021

Attention: Ms. Kristal Harman, Director

RE: 2020 ANNUAL REPORT - BRADY ROAD RESOURCE MANAGEMENT FACILITY

Please find enclosed the 2020 Annual Report for the City of Winnipeg Brady Road Resource Management Facility and the associated lab reports, in accordance with Environment Act Licence No. 3081 R.

This Annual Report covers the requirements described in clause 127 regarding activities conducted at the Brady Road Resource Management Facility in 2019.

Please let me know of any concerns or questions respecting this submission. I may be reached by telephone at 204-986-8359 or by e-mail at rgrosselle@winnipeg.ca.

Yours sincerely,

Original signed by R. Grosselle
(Signed original available upon request)

R. Grosselle
Manager of Environmental Standards

Enclosures
cc: M.L. Geer, CPA, CA (email)
M. Gordichuk (email)
C. Kozak, C.E.T. (email)

ENVIRONMENTAL STANDARDS DIVISION
2230 Main Street, Winnipeg, Manitoba R2V 4T8
DIVISION DES NORMES ENVIRONNEMENTALES
2230, rue Main, Winnipeg (Manitoba) R2V 4T8

T. | Tél. : 204-986-4684
F. | Fax : 204-339-2147
winnipeg.ca/waterandwaste

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Environmental Standards Division

Brady Road Resource Management Facility
Annual Report - 2020

Heather Demchenko B.Sc.
Compliance Reporting Technician

Chris Kozak C.E.T.
Supervisor of Environmental Monitoring and Reporting

Nancy Crawford B.Sc.
Compliance Reporting Branch Head

Renée Grosselle B.Sc.
Manager of Environmental Standards

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BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT

EXECUTIVE SUMMARY

The Brady Road Resource Management Facility BRRMF is the City of Winnipeg s only active landfill The site is bordered by the Perimeter Highway on the North Waverley Street on the East Brady Road and the R M of Macdonald on the West and Rue des Trappistes on the South The landfill has been in operation since and is estimated to have sufficient capacity for over years assuming current waste diversion practices are continued

Environment Act Licence No R issued on April requires the City of Winnipeg to submit an annual report on or before April th detailing activities conducted at BRRMF in the previous year This report provides a summary of major expenditures and construction major incidents waste diversion operations ground water management surface water management leachate management landfill gas management and nuisance management for

Major construction in included expansion of the landfill gas collection system and improvements to the landfill gas and leachate collection systems In there were no disruptions or failures of waste management practices due to equipment breakdown no major spills occurred and no alarms were activated

In approximately of the metric tonnes of material received at the BRRMF were beneficially re used composted or removed from the site for further processing or beneficial re use In addition kL of leachate was hauled to the North End Sewage Treatment Plant for treatment

Monitoring programs for leachate ground water surface water and subsurface gas migration followed the sampling and analysis plans in and contingency plans were not activated

Statistical analyses of analytical results obtained for leachate ground water and surface water indicate that the BRRMF has not had a negative impact on the ground water and surface water downstream of the site

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BRADY ROAD RESOURCE MANAGEMENT FACILITY ANNUAL REPORT

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TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

The Brady Road Resource Management Facility (BRRMF) is located south of the Perimeter Highway, between Brady Road and Waverley Street. Residential land use is present within 500 m of the site to the east and within 120 m north of the site (Waverly West development), other surrounding land use is agricultural. Opened in 1973, the 790-hectare, Class 1 Solid Waste Disposal facility currently holds approximately 12 million metric tonnes of waste, with over 300,000 metric tonnes of waste materials landfilled on an annual basis. The site has capacity for over 100 additional years of waste disposal, assuming current waste diversion practices are continued.

The BRRMF operates in accordance with Environment Act Licence No. 3081 R, which was issued on April 23, 2014. Clause 127 of the license requires the City of Winnipeg to prepare and submit an Annual Report on the activities undertaken at the site during the previous year on or before April 15th of each year. This report contains results and/or comments for each of the clauses of Licence No. 3081 R under which the BRRMF has generated pertinent information during 2020. The report also provides information on the BRRMF proposed activities for 2021.

The layouts of the primary components of the BRRMF are shown on Figure 1. Surface water flows are managed by perimeter ditching and retention ponds. The ground water monitoring system consists of wells in the bedrock, till, and clay layers. The leachate collection system is a network of manholes/risers, drains, and sumps around the perimeter of the landfill cells, which feed into a centralized collection tank/truck fill station. The landfill gas (LFG) management system includes extraction wells, collection piping, and a blower/enclosed flare station.

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2230 Main Street, Winnipeg, Manitoba R2V 4T8
DIVISION DES NORMES ENVIRONNEMENTALES
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T. | Tél. : 204-986-4684
F. | Fax : 204-339-2147
winnipeg.ca/waterandwaste

2.0 MAJOR ACTIVITIES AND CONSTRUCTION

Major activities and construction undertaken in 2020 included:

- installation of four horizontal gas collectors in Cell 32 under newly deposited waste
- installation of a second sub-lateral pipe to the eastern limit of Cell 33 for connection to future horizontal gas collectors
- addition of 18 wells to the LFG collection system, the new wells are equipped with pneumatic pumps for leachate extraction
- retrofit of 57 existing gas wells with pneumatic pumps for leachate extraction
- retrofit of three existing leachate manholes for LFG collection
- installation of gas tight lids at 24 leachate manholes and sumps to reduce odors
- Installation of compressed air and force main piping to all vertical extraction wells

Major activities and construction planned for 2021 include:

- installation of an air compressor system in the LFG flaring compound to power the pneumatic pumps in the wells
- construction and commissioning of a new waste cell (Cell 33)

3.0 MAJOR INCIDENTS

In 2020, there were no disruptions or failures of waste management practices due to equipment breakdown, no major spills occurred, and no alarms were activated.

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4.0 WASTE DIVERSION OPERATIONS

In 2020, the BRRMF received 552,543 metric tonnes of material: 202,299 metric tonnes were composted or re-used on-site, 3,962 metric tonnes were removed from the BRRMF for further processing or beneficial re-use, and 346,282 metric tonnes were landfilled. This translates to a diversion rate of 37%, which is a decrease from the 2019 diversion rate of 50%.

The amount of biosolids landfilled continued to decrease from previous years because they continue to be diverted to the soil fabrication pilot project at the Summit Landfill and the land application project. The BRRMF accepted significantly lower amounts of clean fill in 2020 because there is already a surplus stockpiled for use as final cover. In 2020, there was an increase in the amount of residential waste received, this is likely a result of the COVID-19 pandemic. In October 2020, the two-year Residential Food Waste Collection Pilot Project began. The feasibility of a city-wide program will be determined by the pilot project, which involves weekly curbside collection of residential food waste from approximately 4,000 households. In 2020, the pilot project diverted a total of 115 metric tonnes of organics from the landfill and into the leaf and yard waste composting operation, the resulting compost will be beneficially used onsite at the BRRMF. In 2021, we will continue to compost biosolids, divert wood waste, and continue the Residential Food Waste Collection Pilot Program.

A summary of the BRRMF Waste Diversion Operations is provided in Table 1, the 2020 BRRMF Tonnage Spreadsheet is provided in Appendix A.

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Wastes from Other Municipalities						
Miscellaneous Wastes dead animals asbestos hospital waste costruction demolition waste etc						
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Materials removed from site are stockpiled until sufficient quantities are collected

5.0 GROUND WATER, SURFACE WATER, LEACHATE, AND LANDFILL GAS MONITORING

5.1 GROUND WATER

The land beneath the BRRMF consists of three layers: the uppermost layer is clay (averaging 12 m in thickness), the second layer is till (averaging 6 m in thickness), and the lowest layer is bedrock. Ground water flows downwards through the clay and till layers into the bedrock aquifer, which flows in a north-east direction. The ground water in all three layers is saline and non-potable. The major ions in the ground water from the clay layer are calcium, magnesium, sulfate and bicarbonate. Sodium and chloride are the major ions in the bedrock aquifer. Ground water in the till layer is generally intermediate in brackishness and shows a gradual change with depth. The ground water monitoring system includes 34 nested wells: 13 bedrock wells, 13 till wells, and 8 clay wells. The locations of the ground water monitoring wells are shown on Figure 2.

As per the BRRMF Operating Plan, ground water is monitored in accordance with the Ground Water Sampling and Analysis Plan (SAP), as specified under Clause 123. Sampling frequency is twice per year for bedrock wells and downgradient till wells, and once per year for clay wells and other till wells distant from the waste areas. As neither Federal nor Manitoba Provincial Governments regulate non-potable ground water quality, the Ontario Ministry of Environment (MOE) guidelines for non-potable groundwater quality are used as the regulatory guideline (MOE, 2011).

In 2020, a total of 53 ground water samples were analyzed – 5 samples from wells upgradient of the site (background water quality), and 48 samples from wells cross gradient and downgradient of the site. There were no deviations from the Ground Water SAP or from normal sample collection and preservation practices. Well GWQ25-W10 was decommissioned and redrilled approximately 10 metres to the South to accommodate a new service road. The majority of results met the guidelines with the exception of chloride in some till and bedrock wells, and hydrocarbons in one of the till wells. The 2020 ground water results are provided in Tables 2.1-2.3.

The 2014-2020 average values are provided in Tables 3.1-3.3. Some variability from historical data was observed in some of the samples, this may be a statistical anomaly; we will continue to monitor these parameters to better evaluate trends. The Piper diagrams provided in Appendix B display tight groupings of ground water sampling data, which is indicative of no significant ground water chemical changes.

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Time versus concentration graphs provided in Appendix C show the historical relationship of the analytical parameters at each monitoring location. In general, the analytical results for ground water obtained in 2020 were found to be similar to those obtained in 2014-2019, and are consistent with background levels.

The Contingency Action Plan identified under Clause 125 was not implemented in 2020.

At this time, we have no recommendations for changes to the ground water monitoring program.

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			GWQ N DR	GWQ N D	GWQ N E	GWQ N DR	GWQ N E	GWQ N B	GWQ N C	GWQ N DR
	Units	Criteria	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring
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Alkalinity Bicarbonate	mg L									
Alkalinity Carbonate	mg L									
Alkalinity Hydroxide	mg L									
Alkalinity Total	mg L									
Dissolved Hardness CaCO	mg L									
pH	units									
Specific Conductivity	µS cm									
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Total Dissolved Solids	mg L									
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Carbonaceous Oxygen Demand	mg L									
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Bacvetia														
Total Coliforms MTF	MPN mL													
Fecal Coliforms MTF	MPN mL													
E coli MTF	MPN mL													
Fiemd Patan evetu														
pH	units													
Specific Conductivity	µS cm													
Ppnécécnc Atpn avic Hédtpcatbpou														
Naphthalene	mg L													
Benzo a pyrene	mg L													
Anthracene	mg L													
Pevtpmwn Hédtpcatbpou														
F C C Hydrocarbons	mg L													
F C C Hydrocarbons	mg L													
F C C Hydrocarbons	mg L													
F C C Hydrocarbons	mg L													
Benzene	mg L													
EthylBenzene	mg L													
Toluene	mg L													
Xylene Total	mg L													
Vpnavima Otgaoic Catbpou														
Vinyl chloride	mg L													
Peuvicideu														
Diazinon	g L													
Hetbicideu														
D	mg L													

Note Criteria from Ontario Ministry of the Environment July Soil Ground Water and Sediment Standards for Use Under Part XV I of the Environmental Protection Act Table Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition
Note Criteria exceedences are highlighted in red
Criteria for total chloride and total metals

Winnipeg | Water and Waste Eaux et déchets

Tabma Gtpwod Wavet Qwamvé Cpn r atiupo Cmaé Wemm

Ioptgaoic Patan evetu	Units	Criteria	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov
Alkalinity Bicarbonate	mg L															
Alkalinity Carbonate	mg L															
Alkalinity Hydroxide	mg L															
Alkalinity Total	mg L															
Dissolved Hardness CaCO	mg L															
pH	units															
Specific Conductivity	µS cm															
Turbidity	ntu															
Total Dissolved Solids	mg L															
Total Suspended Solids	mg L															
Total Solids	mg L															
Dissolved Chloride Cl	mg L															
Dissolved Sulphate SO	mg L															
Nwtieow																
Ammonia Dissolved	mg L N															
Nitrate Dissolved	mg L N															
Total Kjeldahl Nitrogen	mg L N															
Phosphorus Dissolved	mg L P															
Ovhet																
Cyanide Total CN	mg L		NA	NA		NR	NR	NR	NR	NR	NR	NR				
Otgaoic Iodicavptu																
Chemical Oxygen Demand	mg L		NA	NA												
Total Organic Carbon	mg L															
Mewam																
Arsenic As Dissolved	mg L															
Barium Ba Dissolved	mg L															
Beryllium Be Dissolved	mg L															
Cadmium Cd Dissolved	mg L															
Calcium Ca Dissolved	mg L															
Chromium Cr Dissolved	mg L															
Copper Cu Dissolved	mg L															
Iron Fe Dissolved	mg L															
Lead Pb Dissolved	mg L															
Magnesium Mg Dissolved	mg L															
Manganese Mn Dissolved	mg L															
Mercury Hg Total	mg L		NA	NA												
Nickel Ni Dissolved	mg L															
Potassium K Dissolved	mg L															
Selenium Se Dissolved	mg L															
Silver Ag Dissolved	mg L															
Sodium na Dissolved	mg L															
Zinc Zn Dissolved	mg L															
Fiend Patan evetu																
pH	units		NA	NA												
Specific Conductivity	µS cm		NA	NA												
Ppnócécric Atpn avic Hédtpcatbpou																
Naphthalene	mg L		NA		NR			NR	NR	NR						
Benzo a pyrene	mg L		NA		NR			NR	NR	NR						
Anthracene	mg L		NA		NR			NR	NR	NR						
Pevtpmwn Hédtpcatbpou																
F C C Hydrocarbons	mg L				NR	NR		NR		NR						
F C C Hydrocarbons	mg L				NR	NR		NR		NR						
F C C Hydrocarbons	mg L				NR	NR		NR		NR						
F C C Hydrocarbons	mg L				NR	NR		NR		NR						
Benzene	mg L				NR	NR		NR		NR						
EthylBenzene	mg L				NR	NR		NR		NR						
Toluene	mg L				NR	NR		NR		NR						
Xylene Total	mg L				NR	NR		NR		NR						
Vpmvim Otgaoic Catbpou																
Vinyl chloride	mg L				NR	NR		NR		NR						
Pewicideu																
Diazinon	g L		NA	NA	NR	NR		NR		NR						
Hetbicideu																
D	mg L		NA	NA	NR	NR		NR		NR						

Note Criteria from Ontario Ministry of the Environment July Soil Ground Water and Sediment Standards for Use Under Part XV I of the Environmental Protection Act Table Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition

Note Where value is expressed as less than the value is halved and used in the calculations where value is expressed as the value is used in the calculations
Criteria for total chloride total metals and xylene mixture
Total phosphorus results dissolved phosphorus not analysed
NR No result due to lab error

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Tabma Gtpwod Wavet Qwamvé Cpn r atiupo TimWemn

Ioptgaoic Patan evetu	Units	Criteria	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov	Axetage Ur gtadieov	Axetage Dpy ogtadieov
Alkalinity Bicarbonate	mg L															
Alkalinity Carbonate	mg L															
Alkalinity Hydroxide	mg L															
Alkalinity Total	mg L															
Dissolved Hardness CaCO	mg L															
pH	units															
Specific Conductivity	µS cm															
Turbidity	ntu															
Total Dissolved Solids	mg L															
Total Suspended Solids	mg L															
Total Solids	mg L															
Dissolved Chloride Cl	mg L															
Dissolved Sulphate SO	mg L															
Nwtieowu																
Ammonia Dissolved	mg L N															
Nitrate Dissolved	mg L N															
Total Kjeldahl Nitrogen	mg L N															
Phosphorus Dissolved	mg L P															
Ovhet																
Cyanide Total CN	mg L		NA	NA												
Otgaoic Iodicavptu																
Chemical Oxygen Demand	mg L		NA	NA												
Total Organic Carbon	mg L															
Mevwm																
Arsenic As Dissolved	mg L															
Barium Ba Dissolved	mg L															
Beryllium Be Dissolved	mg L															
Cadmium Cd Dissolved	mg L															
Calcium Ca Dissolved	mg L															
Chromium Cr Dissolved	mg L															
Copper Cu Dissolved	mg L															
Iron Fe Dissolved	mg L															
Lead Pb Dissolved	mg L															
Magnesium Mg Dissolved	mg L															
Manganese Mn Dissolved	mg L															
Mercury Hg Total	mg L		NA	NA												
Nickel Ni Dissolved	mg L															
Potassium K Dissolved	mg L															
Selenium Se Dissolved	mg L															
Silver Ag Dissolved	mg L															
Sodium na Dissolved	mg L															
Zinc Zn Dissolved	mg L															
Fierd Patan evetu																
pH	units		NA	NA												
Specific Conductivity	µS cm		NA	NA												
Ppnocécric Atpn avic Hédtpcatbpou																
Naphthalene	mg L		NA						NR	NR						
Benzo a pyrene	mg L		NA						NR	NR						
Anthracene	mg L		NA						NR	NR						
Pevtpmwn Hédtpcatbpou																
F C C Hydrocarbons	mg L		NA													
F C C Hydrocarbons	mg L		NA													
F C C Hydrocarbons	mg L		NA													
F C C Hydrocarbons	mg L		NA													
Benzene	mg L		NA													
EthylBenzene	mg L		NA													
Toluene	mg L		NA													
Xylene Total	mg L		NA													
Vpmvim Otgaoic Catbpou																
Vinyl chloride	mg L		NA													
Pesticideu																
Diazinon	g L		NA	NA												
Hetbicideu																
D	mg L		NA	NA												

Note Criteria from Ontario Ministry of the Environment July Soil Ground Water and Sediment Standards for Use Under Part XV I of the Environmental Protection Act Table Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition

Note Where value is expressed as less than the value is halved and used in the calculations where value is expressed as the value is used in the calculations
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Total phosphorus results dissolved phosphorus not analysed
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Tabma Gtpwod Wavet Qwamvé Cpn r atiupo Bedtpcl Wemm

	Units	Criteria	Axetage		Axetage		Axetage		Axetage		Axetage		Axetage		Axetage	
Ioptgaoic Patan evetu			**Ur gtadieov**	**Dpy ogtadieov**	**Ur gtadieov**	**Dpy ogtadieov**	**Ur gtadieov**	**Dpy ogtadieov**	**Ur gtadieov**	**Dpy ogtadieov**	**Ur gtadieov**	**Dpy ogtadieov**	**Ur gtadieov**	**Dpy ogtadieov**	**Ur gtadieov**	**Dpy ogtadieov**
Alkalinity Bicarbonate	mg L															
Alkalinity Carbonate	mg L															
Alkalinity Hydroxide	mg L															
Alkalinity Total	mg L															
Dissolved Hardness CaCO	mg L															
pH	units															
Specific Conductivity	µS cm															
Turbidity	ntu															
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Total Suspended Solids	mg L															
Total Solids	mg L															
Dissolved Chloride Cl	mg L															
Dissolved Sulphate SO	mg L															
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Nitrate Dissolved	mg L N															
Total Kjeldahl Nitrogen	mg L N															
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Ovhet																
Cyanide Total CN	mg L															
Otgaoic Iodicavptu																
Chemical Oxygen Demand	mg L		NA	NA												
Total Organic Carbon	mg L															
Mevavm																
Arsenic As Dissolved	mg L															
Barium Ba Dissolved	mg L															
Beryllium Be Dissolved	mg L															
Cadmium Cd Dissolved	mg L															
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Chromium Cr Dissolved	mg L															
Copper Cu Dissolved	mg L															
Iron Fe Dissolved	mg L															
Lead Pb Dissolved	mg L															
Magnesium Mg Dissolved	mg L															
Manganese Mn Dissolved	mg L															
Mercury Hg Total	mg L		NA	NA												
Nickel Ni Dissolved	mg L															
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Selenium Se Dissolved	mg L															
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Ppnscécric Atpn avic Hédtpcatbpou																
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F C C Hydrocarbons	mg L															
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F C C Hydrocarbons	mg L															
Benzene	mg L															
EthylBenzene	mg L															
Toluene	mg L															
Xylene Total	mg L															
Vpmvim Otgaoic Catbpou																
Vinyl chloride	mg L															
Peuvicideu																
Diazinon	g L															
Hetbicideu																
D	mg L															

Note Criteria from Ontario Ministry of the Environment July Soil Ground Water and Sediment Standards for Use Under Part XV I of the Environmental Protection Act Table Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition

Note Where value is expressed as less than the value is halved and used in the calculations where value is expressed as the value is used in the calculations
Criteria for total chloride total metals and xylene mixture
Total phosphorus results dissolved phosphorus not analysed

5.2 SURFACE WATER

Surface water flows at the BRRMF are managed by perimeter ditching and the central access road, which creates a barrier between the impacted water ditches on the North and the clean water ditches on the South; there are also 8 surface water retention ponds. The system is designed to run dry for most of the year, as such, grab sampling is performed three times per year: spring run-off, summer run-off, and fall run-off. The surface water sampling points are shown in Figure 3.

As per the BRRMF Operating Plan, surface water is managed in accordance with the Surface Water Sampling and Analysis Plan (SAP), as specified under Clause 115. Compliance parameters are applied to the upstream and downstream sampling points, with modifications at other locations interior to the site. Sampling for the clean water ponds (SWQ-25-9a and b) is similar to sampling for perimeter ditching. Sampling for impacted water ponds: Active Area Collection Pond (SWQ-25-6), Biosolids Storm Water Pond (SWQ-25-7), Leaf and Yard Waste Storm Water Pond (SWQ-25-8) and dry ponds (SWQ-25-11 a, b, and c) is performed only prior to discharge events. The Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Freshwater Aquatic Life are used as the regulatory guideline (CCME, 2019). Weekly field monitoring is performed at the weir from spring thaw to freeze-up.

In 2020, a total of 27 surface water samples were analyzed – one upstream sample, two downstream samples, eight interior samples, and 16 pond samples. There were no deviations from the Surface Water SAP or from normal sample collection and preservation practices, although we were unable to obtain any fall samples from the ditches as the site was completely dry. Weekly weir data is provided in Table 4 and the 2020 surface water results are provided in Tables 5.1 and 5.2.

The analytical results for some of the pond samples exceeded the guidelines for pH, chloride, cyanide, copper, iron, nickel, and selenium; the water was retained in the ponds or hauled for treatment as required. Many of the analytical results for perimeter ditching were highly variable between sample points. The iron concentration exceeded the guideline at the one interior and one downstream location, and the cadmium concentration exceeded the limit at one downstream location. Samples collected from the ponds and the perimeter ditching frequently contain elevated levels of arsenic, which is due to its natural occurrence in Manitoba soils.

ENVIRONMENTAL STANDARDS DIVISION
2230 Main Street, Winnipeg, Manitoba R2V 4T8
DIVISION DES NORMES ENVIRONNEMENTALES
2230, rue Main, Winnipeg (Manitoba) R2V 4T8

T. | Tél. : 204-986-4684
F. | Fax : 204-339-2147
winnipeg.ca/waterandwaste

The 2014-2020 averages for upstream and downstream locations are provided in Table 6 and time versus concentration graphs showing the historical relationship of the analytical parameters at each monitoring location are provided in Appendix C. In general, the analytical results for surface water obtained in 2020 were found to be similar to those obtained in 2014-2019, with similar results for upstream and downstream locations. The year 2020 was one of the driest on record and as such there was no surface water to sample in the fall.

The Contingency Action Plan identified under Clause 125 was not implemented in 2020.

At this time, we have no recommendations for changes to the surface water monitoring program.

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Table 4. 2020 Weekly Weir Data

Date	Flow (m/s)	pH (units)	Conductivity (m/s)	DO (mg/L)	Temp (°C)
9-Apr-20	0.0	8.81	4.34	*na	0.4
17-Apr-20	0.0	7.95	5.93	3.9	1.9
24-Apr-20	0.1	9.47	6.52	7.0	14.6
1-May-20	0.0	8.74	8.35	8.2	11.5
8-May-20	0.0	9.55	8.09	13.5	11.9
15-May-20	0.0	9.23	1.09	11.9	15.6
22-May-20	0.1	8.82	1.28	6.7	20.2
29-May-20	0.0	8.84	1.53	10.0	16.6
5-Jun-20	0.0	9.00	1.79	10.8	16.8
12-Jun-20	0.0	8.86	1.68	18.9	25.5
19-Jun-20	0.0	9.33	1.83	18.4	24.9
3-Jul-20	0.0	9.63	1.86	17.9	28.8
10-Jul-20	0.0	9.64	2.11	17.0	28.1
17-Jul-20	0.0	8.92	2.45	8.2	26.2
24-Jul-20	0.0	8.48	2.62	13.1	29.2
31-Jul-20	0.0	8.79	2.43	1.0	23.9
7-Aug-20	0.0	8.54	3.50	6.2	24.2
14-Aug-20	**ns	**ns	**ns	**ns	**ns
21-Aug-20	0.0	8.58	3.45	16.4	31.1
28-Aug-20	**ns	**ns	**ns	**ns	**ns
4-Sep-20	0.0	9.04	3.14	8.7	21.5
11-Sep-20	0.0	8.66	2.75	15.4	16.2
18-Sep-20	**ns	**ns	**ns	**ns	**ns
25-Sep-20	**ns	**ns	**ns	**ns	**ns

*na - not analysed due to equipment malfunction
**ns - no sample because weir was completely dry and/or frozen

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Tabma Swtface Wavet Mpoivptiog Ppodu

Ppodu

Sampling date	Units	Criteria	SW Apr	SW Aug	SW Apr	SW Aug	SW Apr	SW Aug	SW A Apr	SW A Aug	SW B Apr	SW B Aug	SW A Apr	SW A Aug	SW B Apr	SW B Aug	SW C Apr	SW C Aug
Ioptgaoic Patan evetu																		
Alkalinity Bicarbonate	mg L																	
Alkalinity Carbonate	mg L																	
Alkalinity Hydroxide	mg L																	
Alkalinity Total	mg L																	
Dissolved Hardness CaCO	mg L																	
pH	units																	
Specific Conductivity	µS cm																	
Turbidity	ntu																	
Total Dissolved Solids	mg L																	
Total Suspended Solids	mg L																	
Total Solids	mg L																	
Dissolved Chloride Cl	mg L																	
Dissolved Sulphate SO	mg L																	
Nwtieovu																		
Ammonia Dissolved	mg L N																	
Nitrate Dissolved	mg L N																	
Total Kjeldahl Nitrogen	mg L N																	
Phosphorus Dissolved	mg L P																	
Ovhet																		
Cyanide Total CN	mg L																	
Otgaoic Iodicavptu																		
Carbonaceous Oxygen Demand	mg L																	
Biochemical Oxygen Demand	mg L																	
Mevama																		
Arsenic As Dissolved	mg L																	
Barium Ba Dissolved	mg L																	
Beryllium Be Dissolved	mg L																	
Cadmium Cd Dissolved	mg L																	
Calcium Ca Dissolved	mg L																	
Chromium Cr Dissolved	mg L																	
Copper Cu Dissolved	mg L																	
Iron Fe Dissolved	mg L																	
Lead Pb Dissolved	mg L																	
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Manganese Mn Dissolved	mg L																	
Mercury Hg Dissolved	mg L																	
Nickel Ni Dissolved	mg L																	
Potassium K Dissolved	mg L																	
Selenium Se Dissolved	mg L																	
Sodium Na Dissolved	mg L																	
Zinc Zn Dissolved	mg L																	
Bacvetia																		
Total Coliforms MTF	MPN mL																	
Fecal Coliforms MTF	MPN mL																	
E coli MTF	MPN mL																	
Fierd Patan evetu																		
pH	units																	
Specific Conductivity	µS cm																	
Temperature																		

Note Criteria from Canadian Council of Ministers of the Environment Canadian Environmental Quality Guidelines Summary Table Water Quality Guidelines for the Protection of Freshwater Aquatic Life CCME
Criteria for total chloride and total metals
NA Not analysed

Winnipeg Water and Waste Eaux et déchets

Tabma Swtface Wavet Mpoivptiog Petin evet Divch

			Ur uvtean		Dpy ouvtean			Iovetipt														
			SW		SW		SW	SW			SW A		SW B		SW A		SW B		SW A		SW B	
Sampling date	Units	Criteria	Apr		Apr		Apr	Apr	Aug		Apr		Apr		Apr		Apr		Apr		Apr	
Ioptgaoic Patan evetu																						
Alkalinity Bicarbonate	mg L																					
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Dissolved Hardness CaCO	mg L																					
pH	units																					
Specific Conductivity	µS cm																					
Turbidity	ntu																					
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Total Solids	mg L																					
Dissolved Chloride Cl	mg L																					
Dissolved Sulphate SO	mg L																					
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pH	units																					
Specific Conductivity	µS cm																					
Temperature																						

Note Criteria from Canadian Council of Ministers of the Environment Canadian Environmental Quality Guidelines Summary Table Water Quality Guidelines for the Protection of Freshwater Aquatic Life CCME
Criteria for total chloride and total metals
No fall samples taken due to no flow

Water and Waste
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Tabma Swtface Wavet Mpoivptiog Petin evet Divch Cpn r atiupo

	Units	Criteria	Axetage		Axetage		Axetage		Axetage		Axetage		Axetage		Axetage	
Ioptgaoic Patan evetu			**Ur uvtean**	**Dpy ouvtean**	**Ur uvtean**	**Dpy ouvtean**	**Ur uvtean**	**Dpy ouvtean**	**Ur uvtean**	**Dpy ouvtean**	**Ur uvtean**	**Dpy ouvtean**	**Ur uvtean**	**Dpy ouvtean**	**Ur uvtean**	**Dpy ouvtean**
Alkalinity Bicarbonate	mg L															
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Alkalinity Total	mg L															
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Fecal Coliforms MTF	MPN mL															
E coli MTF	MPN mL															
Fierd Patan evetu																
pH	units		NA	NA												
Specific Conductivity	µS cm		NA	NA												
Temperature	°C		NA	NA	NA	NA	NA	NA	NA	NA						

Note Criteria from Canadian Council of Ministers of the Environment Canadian Environmental Quality Guidelines Summary Table Water Quality Guidelines for the Protection of Freshwater Aquatic Life CCME
Criteria for total chloride and total metals
SW is not used in the calculation for the downstream average because it is not affected by Brady runoff
NA not analyzed

5.3 LEACHATE

The leachate management system is a network of manholes/risers, drains, and sumps around the perimeter of the landfill cells, which feed into a header pipe. The leachate flows via gravity and lift stations into a 300,000L storage tank located at the intersection of Charette Road and the access road, which acts as a truck fill station for hauling to the North End Sewage Treatment Plant for treatment. Leachate can also be pumped from eleven collection manholes and one riser if needed; these sites also serve as sampling points. The locations of the manholes and riser are shown on Figure 3.

As per the BRRMF Operating Plan, leachate is managed in accordance with the Leachate Sampling and Analysis Plan (SAP), as specified under Clause 100. The MOE guidelines for non-potable groundwater quality are used as the regulatory guideline (MOE, 2011).

The total volume of leachate removed from the BRRMF in 2020 was 46,374 kL. There were no occurrences of leachate breakout from the development in 2020. The Contingency Action Plan identified under Clause 125 was not implemented in 2020.

In 2020, twelve leachate samples were analyzed; there were no deviations from the Leachate SAP or from normal sample collection and preservation practices. Monthly leachate elevations are provided in Table 7, and the 2020 leachate results are provided in Table 8. The majority of parameters were found to be highly variable between manholes; some of the samples exceeded the guidelines for chloride, nickel, extractables, hydrocarbons and vinyl chloride. Leachate is highly variable due to waste composition, amount of precipitation, site hydrology, waste compaction, cover, and interaction of leachate with the environment.

The 2014-2020 average results are provided in Table 9, and Piper diagrams showing the historical relationship of cations and anions at each monitoring location are provided in Appendix B. Many of the other parameters measured vary significantly from year to year. The average alkalinity, hardness, and conductivity have been increasing yearly since 2015 because improved landfill cover allows less water infiltration, which aids the biological breakdown of inorganic compounds – this was especially true for 2020, which was one of the driest years on record.

We have no recommendations for changes to the leachate monitoring program at this time.

ENVIRONMENTAL STANDARDS DIVISION
2230 Main Street, Winnipeg, Manitoba R2V 4T8
DIVISION DES NORMES ENVIRONNEMENTALES
2230, rue Main, Winnipeg (Manitoba) R2V 4T8

T. | Tél. : 204-986-4684
F. | Fax : 204-339-2147
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Tabra Leachave Lexera

	Dave	Jao	Feb	Mat	Art	Maé	Jwo	Jwn	Awg	Ser	Ocv	Npx	Dec
	Tpr pf Maohpra Eraxavipo n												
Maohpra	Der vh vp Leachave n												
	Maohpra Leachave Eraxavipo n												
	Tpr pf Maohpra Eraxavipo n												
Maohpra	Der vh vp Leachave n												
	Maohpra Leachave Eraxavipo n												
	Tpr pf Maohpra Eraxavipo n												
Maohpra	Der vh vp Leachave n												
	Maohpra Leachave Eraxavipo n												
	Tpr pf Maohpra Eraxavipo n												
Maohpra	Der vh vp Leachave n												
	Maohpra Leachave Eraxavipo n												
	Tpr pf Maohpra Eraxavipo n												
Maohpra	Der vh vp Leachave n												
	Maohpra Leachave Eraxavipo n												
	Tpr pf Maohpra Eraxavipo n												
Maohpra	Der vh vp Leachave n												
	Maohpra Leachave Eraxavipo n												
	Tpr pf Maohpra Eraxavipo n												
Maohpra	Der vh vp Leachave n												
	Maohpra Leachave Eraxavipo n												
	Tpr pf Maohpra Eraxavipo n												
Maohpra	Der vh vp Leachave n												na
	Maohpra Leachave Eraxavipo n												
	Tpr pf Riuet Eraxavipo n												
Riuet	Der vh vp Leachave n												
	Riuet Leachave Eraxavipo n												

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Tabra Leachave Mpoivptiog

			LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	Leachave Taol	BIO	RISER	Cpn r puive
Sampling Date	Units	Criteria	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep
Fiend Patan evetu															
pH	units														
Turbidity	ntu					nr									
Specific Conductivity	uS cm														
Temperature	C														
Ioptgaoic Patan evetu															
Alkalinity Bicarbonate	mg L														
Alkalinity Carbonate	mg L														
Alkalinity Hydroxide	mg L														
Alkalinity Total	mg L														
Hardness as CaCO	mg L														
pH	units														
Specific Conductivity	uS cm														
Turbidity	ntu														
Total Dissolved Solids	mg L														
Total Suspended Solids	mg L														
Total Solids	mg L														
Chloride dissolved	mg L														
Sulphate dissolved	mg L														
Ovhet															
Cyanide CN	mg L														
Nwutieovu															
Dissolved Ammonia	mg L														
Nitrate Nitrite Nitrogen	mg L														
Total Kjeldhal Nitrogen	mg L														
Phosphorus Total	mg L														
Otgaoic Iodicavptu															
Biological Oxygen Demand	mg L														
Chemical Oxygen Demand	mg L														
Mevamu															
Total Arsenic As	mg L														
Total Barium Ba	mg L														
Total Beryllium Be	mg L														
Total Cadmium Cd	mg L														
Total Calcium Ca	mg L														
Total Chromium Cr	mg L														
Total Chromium Hexavalent	mg L														
Total Copper Cu	mg L														
Total Iron Fe	mg L														
Total Lead Pb	mg L														
Total Magnesium Mg	mg L														
Total Manganese Mn	mg L														
Total Mercury Hg	mg L														
Total Nickel Ni	mg L														
Total Potassium K	mg L														
Dissolved Selenium Se	mg L														
Total Silver Ag	mg L														
Total Sodium Na	mg L														
Total Zinc Zn	mg L														
EEvtacvabmu															
Benzo a Pyrene PAH	mg L														
Anthracene	mg L														
Methylenebis Chloroaniline	ug L														
Benzo a anthracene PAH	mg L														
Benzo b j fluoroanthene PAH	mg L														
Benzo g h i Perylene PAH	mg L														
Hexachlorobenzene	ug L														
Phenanthrene	mg L														
Phenol	mg L														

Note Criteria from Ontario Ministry of the Environment July Soil Ground Water and Sediment Standards for Use Under Part XV I of the Environmental Protection Act Table Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition
Criteria for total chloride and total selenium

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Tabma Leachave Mpoivptiog

			LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	LQ MH	Leachave Taol	BIO	RISER	Cpn r puive
Sampling Date	Units	Criteria	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep	Sep
Pevtpmwn Hédtpcatbpou															
CCME Petroleum Hydrocarbon Fraction F	mg L														
CCME Petroleum Hydrocarbon Fraction F	mg L														
CCME Petroleum Hydrocarbon Fraction F	mg L														
CCME Petroleum Hydrocarbon Fraction F	mg L														
Vpmvinm Otgaoic Catbpou															
Vinyl Chloride	mg L														
Dichlorobenzene	mg L														
Chloroform	mg L														
Trichloroethene	mg L														
Tetrachloroethene	mg L														
DipÉiou aod Fwtaou															
TeCDD	pg L														
PeCDD	pg L														
HxCDD	pg L														
HxCDD	pg L														
HxCDD	pg L														
HpCDD	pg L														
OCDD	pg L														
Total TCDDs	pg L														
Total PeCDD	pg L														
Total HxCDD	pg L														
Total HpCDD	pg L														
TeCDF	pg L														
PeCDF	pg L														
PeCDF	pg L														
HxCDF	pg L														
HxCDF	pg L														
HxCDF	pg L														
HxCDF	pg L														
HpCDF	pg L														
HpCDF	pg L														
OCDF	pg L														
Total TCDF	pg L														
Total PeCDF	pg L														
Total HxCDF	pg L														
Total HpCDF	pg L														
Ppréchmptioaved Birheoém															
Aroclor	ug L														
Aroclor	ug L														
Aroclor	ug L														
Aroclor	ug L														
Aroclor	ug L														
Aroclor	ug L														
Aroclor	ug L														
Total PCBs	ug L														
Peuvicideu aod Hetbicideu															
Diazinon	ug L														
D	mg L														
Aldrin	ug L														
Hexachlorocyclohexane Lindane	ug L														
MCPA	mg L														
Mirex	ug L														
Methoxyclor	ug L														
Bacvetia															
Total Coliforms	MPN mL														
Fecal Coliforms	MPN mL														
E coli	MPN mL														

Note Criteria from Ontario Ministry of the Environment July Soil Ground Water and Sediment Standards for Use Under Part XV I of the Environmental Protection Act Table Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition

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Sampling Date	Units	Criteria	Axetage	Axetage	Axetage	Axetage	Axetage	Axetage	Axetage
Fiend Patan evetu									
pH	units		NA						
Turbidity NTU	ntu		NA						
Specific Conductivity	uS cm		NA						
Temperature	C		NA	NA	NA	NA			
Ioptgaoic Patan evetu									
Alkalinity Bicarbonate	mg L								
Alkalinity Carbonate	mg L								
Alkalinity Hydroxide	mg L								
Alkalinity Total	mg L								
Hardness as CaCO	mg L								
pH units	units								
Specific Conductivity	uS cm								
Turbidity NTU	ntu								
Total Dissolved Solids	mg L								
Total Suspended Solids	mg L								
Total Solids	mg L								
Chloride dissolved	mg L								
Sulphate dissolved	mg L								
Ovhet									
Cyanide CN	mg L								
Nwtieovu									
Dissolved Ammonia	mg L								
Nitrate Nitrogen	mg L								
Total Kjeldhal Nitrogen	mg L								
Phosphorus Total	mg L								
Otgaoic Iodicavptu									
Biological Oxygen Demand	mg L								
Chemical Oxygen Demand	mg L								
Mevam									
Total Arsenic As	mg L								
Total Barium Ba	mg L								
Total Beryllium Be	mg L								
Total Cadmium Cd	mg L								
Total Calcium Ca	mg L								
Total Chromium Cr	mg L								
Total Chromium Hexavalent	mg L								
Total Copper Cu	mg L								
Total Iron Fe	mg L								
Total Lead Pb	mg L								
Total Magnesium Mg	mg L								
Total Manganese Mn	mg L								
Total Mercury Hg	mg L								
Total Nickel Ni	mg L								
Total Potassium K	mg L								
Dissolved Selenium Se	mg L								
Total Silver Ag	mg L								
Total Sodium Na	mg L								
Total Zinc Zn	mg L								

Note Criteria from Ontario Ministry of the Environment July Soil Ground Water and Sediment Standards for Use Under Part XV I of the Environmental Protection Act Table Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition

Criteria for total chloride and total selenium
Correction results reported for were dissolved hardness

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Tabma Leachave Qwamvé Cpn r atiupo

Sampling Date	Units	Criteria	Axetage	Axetage	Axetage	Axetage	Axetage	Axetage	Axetage
EÉvtacvabmu									
Benzo a Pyrene PAH	mg L								
Anthracene	mg L								
Methylenebis Chloroaniline	ug L		NA	NA	NA				
Benzo a anthracene PAH	mg L								
Benzo b j fluoroanthene PAH	mg L								
Benzo g h i Perylene PAH	mg L								
Hexachlorobenzene	ug L								
Phenanthrene	mg L		NA						
Phenol	mg L								
Pevtpmwn Hédtpcatbpou									
CCME Petroleum Hydrocarbon Fraction F	mg L								
CCME Petroleum Hydrocarbon Fraction F	mg L								
CCME Petroleum Hydrocarbon Fraction F	mg L								
CCME Petroleum Hydrocarbon Fraction F	mg L								
Vpmvimo Otgaoic Catbpou									
Vinyl Chloride	mg L								
Dichlorobenzene	mg L								
Chloroform	mg L								
Trichloroethene	mg L								
Tetrachloroethene	mg L								
Ppmchmptioaved Bir heoému									
Aroclor	ug L								
Aroclor	ug L								
Aroclor	ug L								
Aroclor	ug L								
Aroclor	ug L								
Aroclor	ug L								
Aroclor	ug L								
Total PCBs	ug L								
Peuvicideu aod Hetbicideu									
Diazinon	ug L		NA						
D	mg L								
Aldrin	ug L								
gamma Hexachlorocyclohexane Lindane	ug L								
MCPA	mg L								
Mirex	ug L								
Methoxyclor	ug L								
Bacvetia									
Total Coliforms	MPN mL								
Fecal Coliforms	MPN mL								
E coli	MPN mL								

Note Criteria from Ontario Ministry of the Environment July Soil Ground Water and Sediment Standards for Use Under Part XV I of the Environmental Protection Act Table Full Depth Generic Site Condition Standards in a Non Potable Ground Water Condition

Note NA not analysed
Manhole results not included in average due to pump malfunction

5.4 LANDFILL GAS

5.4.1 COLLECTION AND FLARING SYSTEM

Landfill gas (LFG) produced at the BRRMF is comprised primarily of methane (CH_4) and carbon dioxide (CO_2) in approximately equal amounts. These greenhouse gases contribute to global warming, but CH_4 has a global warming potential 25 times that of CO_2. To reduce emissions, the LFG is collected via a series of pipes beneath the BRRMF, and sent to a flare where the CH_4 is reduced to CO_2 and water vapor. The landfill gas collection and flaring system (LFGCFS) is run by Integrated Gas Recovery Systems Inc. on behalf of the City of Winnipeg.

As per the BRRMF Operating Plan, LFG operations and monitoring are managed through the Landfill Gas Operating Plan, submitted October 23, 2014, as per Clause 110.

In 2020, the BRRMF LFGCFS operated as intended, although surface emission monitoring identified some areas where gas was escaping due to weak surface cap and/or manholes with improper seals.

The 2020 Landfill Gas Collection and Flaring Report, prepared by Integrated Gas Recovery Services Inc., is attached in Appendix D.

5.4.2 SUBSURFACE LANDFILL GAS MONITORING PROGRAM

LFG that is not collected or that cannot escape into the atmosphere may migrate into neighboring land below the ground surface. The purpose of LFG migration monitoring is to detect gas migration before it becomes a safety hazard to neighboring properties.

As per the BRRMF Operating Plan, subsurface LFG migration is managed in accordance with the Subsurface Landfill Gas Monitoring Program, submitted on October 23, 2014, as specified under Clause 111. Probes are monitored monthly for methane (CH_4), oxygen (O_2), carbon monoxide (CO), and hydrogen sulphide (H_2S).

In 2020, the maximum level of CH_4 measured was 0.6%. The Subsurface Landfill Gas Contingency Plan was not activated, indicating that the LFGCFS is operating effectively.

The 2020 subsurface gas migration probe data is provided in Table 10.

ENVIRONMENTAL STANDARDS DIVISION
2230 Main Street, Winnipeg, Manitoba R2V 4T8
DIVISION DES NORMES ENVIRONNEMENTALES
2230, rue Main, Winnipeg (Manitoba) R2V 4T8

T. | Tél. : 204-986-4684
F. | Fax : 204-339-2147
winnipeg.ca/waterandwaste

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Table 10. 2020 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
1	20-Jan-20	0.1	19.6	0.0	1.0
1	14-Feb-20	0.0	21.6	0.0	0.0
1	4-Mar-20	0.0	21.4	0.0	0.0
1	7-Apr-20	0.0	21.5	0.0	0.0
1	6-May-20	0.0	20.1	0.0	0.0
1	22-Jun-20	0.0	20.2	0.0	0.0
1	15-Jul-20	0.0	20.9	1.0	0.0
1	19-Aug-20	0.0	21.2	0.0	0.0
1	21-Sep-20	0.0	20.0	0.0	0.0
1	27-Oct-20	0.0	21.6	0.0	0.0
1	20-Nov-20	0.0	20.8	0.0	0.0
1	30-Dec-20	0.1	20.7	0.0	0.0
2	20-Jan-20	0.1	19.7	0.0	1.0
2	14-Feb-20	0.0	22.0	0.0	0.0
2	5-Mar-20	0.0	21.2	0.0	0.0
2	7-Apr-20	0.0	20.3	0.0	0.0
2	6-May-20	0.0	20.3	0.0	0.0
2	22-Jun-20	0.0	19.6	0.0	0.0
2	15-Jul-20	0.0	20.7	1.0	0.0
2	19-Aug-20	0.0	20.2	0.0	0.0
2	21-Sep-20	0.0	20.2	0.0	0.0
2	27-Oct-20	0.0	21.6	0.0	0.0
2	20-Nov-20	0.0	20.8	0.0	0.0
2	30-Dec-20	0.1	20.8	0.0	0.0
3	20-Jan-20	0.1	20.0	0.0	0.0
3	14-Feb-20	0.0	20.9	0.0	0.0
3	4-Mar-20	0.0	21.4	0.0	0.0
3	7-Apr-20	0.0	20.6	0.0	0.0
3	6-May-20	0.0	20.7	0.0	0.0
3	22-Jun-20	0.0	20.3	0.0	0.0
3	15-Jul-20	0.0	20.9	1.0	0.0
3	19-Aug-20	0.0	20.4	0.0	0.0
3	21-Sep-20	0.0	20.5	0.0	0.0
3	27-Oct-20	0.0	21.4	0.0	0.0
3	20-Nov-20	0.0	20.6	0.0	0.0
3	30-Dec-20	0.1	21.2	0.0	0.0

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Table 10. 2020 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
4	20-Jan-20	no access			
4	14-Feb-20	0.0	20.9	0.0	0.0
4	4-Mar-20	0.0	20.4	0.0	0.0
4	7-Apr-20	0.0	20.5	0.0	0.0
4	6-May-20	0.0	20.8	0.0	0.0
4	22-Jun-20	0.0	20.1	0.0	0.0
4	15-Jul-20	0.0	20.7	1.0	0.0
4	19-Aug-20	0.0	20.4	0.0	0.0
4	21-Sep-20	0.0	20.4	0.0	0.0
4	27-Oct-20	0.0	21.3	0.0	0.0
4	20-Nov-20	0.0	20.2	0.0	0.0
4	30-Dec-20	0.2	20.9	0.0	0.0
5	20-Jan-20	no access			
5	14-Feb-20	0.6	19.7	0.0	0.0
5	4-Mar-20	0.0	16.7	0.0	0.0
5	7-Apr-20	0.0	17.3	0.0	0.0
5	6-May-20	0.0	20.3	0.0	0.0
5	22-Jun-20	0.0	17.6	0.0	0.0
5	15-Jul-20	0.0	20.7	1.0	0.0
5	19-Aug-20	0.0	17.8	0.0	0.0
5	21-Sep-20	0.0	20.5	0.0	0.0
5	27-Oct-20	0.0	21.5	0.0	0.0
5	20-Nov-20	0.0	20.3	0.0	0.0
5	30-Dec-20	0.1	21.0	0.0	0.0
6	20-Jan-20	0.0	19.7	0.0	1.0
6	14-Feb-20	0.5	18.3	0.0	0.0
6	4-Mar-20	0.0	19.9	0.0	79.9
6	7-Apr-20	0.0	20.9	0.0	0.0
6	6-May-20	0.0	20.9	0.0	0.0
6	22-Jun-20	0.0	20.5	0.0	0.0
6	15-Jul-20	0.0	20.9	1.0	0.0
6	19-Aug-20	0.0	19.8	0.0	0.0
6	21-Sep-20	0.0	20.4	0.0	0.0
6	27-Oct-20	0.0	21.2	0.0	0.0
6	20-Nov-20	0.0	21.5	0.0	0.0
6	30-Dec-20	0.1	22.0	0.0	0.0

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Table 10. 2020 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
7	20-Jan-20	0.0	20.4	0.0	0.0
7	14-Feb-20	0.4	22.1	0.0	0.0
7	4-Mar-20	0.0	18.3	0.0	0.0
7	7-Apr-20	0.0	21.1	0.0	0.0
7	6-May-20	0.0	20.9	0.0	0.0
7	22-Jun-20	0.0	18.4	0.0	0.0
7	15-Jul-20	0.0	20.7	1.0	0.0
7	19-Aug-20	0.0	19.7	0.0	0.0
7	21-Sep-20	0.0	20.2	0.0	0.0
7	27-Oct-20	0.0	21.2	0.0	0.0
7	20-Nov-20	0.0	21.2	0.0	0.0
7	30-Dec-20	0.1	23.0	0.0	0.0
8	20-Jan-20	0.0	20.5	0.0	0.0
8	14-Feb-20	0.5	22.1	0.0	0.0
8	4-Mar-20	0.0	21.2	0.0	0.0
8	7-Apr-20	0.0	21.1	0.0	0.0
8	6-May-20	0.0	20.9	0.0	0.0
8	22-Jun-20	0.0	16.7	0.0	0.0
8	15-Jul-20	0.0	20.9	1.0	0.0
8	19-Aug-20	0.0	20.9	0.0	0.0
8	21-Sep-20	0.0	20.0	0.0	0.0
8	27-Oct-20	0.0	21.3	0.0	0.0
8	20-Nov-20	0.0	21.5	0.0	0.0
8	30-Dec-20	0.1	22.7	0.0	0.0
9	20-Jan-20	0.1	17.6	0.0	0.0
9	14-Feb-20	no access			
9	4-Mar-20	0.0	18.3	0.0	0.0
9	7-Apr-20	0.0	14.5	0.0	0.0
9	6-May-20	0.0	20.9	0.0	0.0
9	22-Jun-20	0.0	18.0	0.0	0.0
9	15-Jul-20	0.0	20.7	1.0	0.0
9	19-Aug-20	0.0	18.7	0.0	0.0
9	21-Sep-20	0.0	20.0	0.0	0.0
9	27-Oct-20	0.0	21.6	0.0	0.0
9	20-Nov-20	0.0	21.5	0.0	0.0
9	30-Dec-20	0.1	22.4	0.0	0.0

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Table 10. 2020 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
10	20-Jan-20	0.1	20.4	0.0	0.0
10	14-Feb-20	0.4	21.4	0.0	0.0
10	4-Mar-20	0.0	20.9	0.0	0.0
10	7-Apr-20	no access			
10	6-May-20	0.0	20.9	0.0	0.0
10	22-Jun-20	0.0	20.9	0.0	0.0
10	15-Jul-20	0.0	20.9	1.0	0.0
10	19-Aug-20	0.0	20.9	0.0	0.0
10	21-Sep-20	0.0	20.4	0.0	0.0
10	27-Oct-20	0.0	20.1	0.0	0.0
10	20-Nov-20	0.0	21.1	0.0	0.0
10	30-Dec-20	0.1	22.2	0.0	0.0
P26E	20-Jan-20	no access			
P26E	14-Feb-20	0.0	22.0	0.0	0.0
P26E	4-Mar-20	0.0	17.6	0.0	0.0
P26E	7-Apr-20	0.0	16.8	0.0	0.0
P26E	6-May-20	0.0	20.4	0.0	0.0
P26E	22-Jun-20	0.0	17.2	0.0	0.0
P26E	15-Jul-20	0.0	17.7	1.0	0.0
P26E	19-Aug-20	0.0	17.2	0.0	0.0
P26E	21-Sep-20	0.0	20.4	0.0	0.0
P26E	27-Oct-20	0.0	20.7	0.0	0.0
P26E	20-Nov-20	0.0	21.3	0.0	0.0
P26E	30-Dec-20	0.1	22.5	0.0	0.0
P28E	20-Jan-20	0.1	20.6	0.0	0.0
P28E	14-Feb-20	0.0	16.1	0.0	0.0
P28E	4-Mar-20	0.0	14.9	0.0	0.0
P28E	7-Apr-20	0.0	13.8	0.0	0.0
P28E	6-May-20	0.0	20.0	0.0	0.0
P28E	22-Jun-20	0.0	19.3	0.0	0.0
P28E	15-Jul-20	0.0	20.9	1.0	0.0
P28E	19-Aug-20	0.0	17.1	0.0	0.0
P28E	21-Sep-20	0.0	20.0	0.0	0.0
P28E	27-Oct-20	0.0	20.0	0.0	0.0
P28E	20-Nov-20	0.0	21.3	0.0	0.0
P28E	30-Dec-20	0.1	23.1	0.0	0.0

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Table 10. 2020 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P30E	20-Jan-20	0.1	21.8	0.0	2.0
P30E	14-Feb-20	0.4	22.9	1.0	0.0
P30E	4-Mar-20	0.0	7.6	0.0	0.0
P30E	7-Apr-20	0.0	8.9	0.0	0.0
P30E	6-May-20	0.0	20.2	0.0	0.0
P30E	22-Jun-20	0.0	18.3	1.0	0.0
P30E	15-Jul-20	0.0	20.9	1.0	0.0
P30E	19-Aug-20	0.0	19.6	0.0	0.0
P30E	21-Sep-20	0.0	20.2	0.0	0.0
P30E	27-Oct-20	0.0	21.0	0.0	0.0
P30E	20-Nov-20	0.0	21.5	0.0	0.0
P30E	30-Dec-20	0.1	20.9	0.0	0.0
P34E	20-Jan-20	0.4	21.7	0.0	2.0
P34E	14-Feb-20	0.0	22.1	0.0	0.0
P34E	5-Mar-20	0.0	22.3	0.0	0.0
P34E	7-Apr-20	0.1	20.4	0.0	0.0
P34E	6-May-20	0.0	19.6	0.0	0.0
P34E	22-Jun-20	0.0	20.9	0.0	0.0
P34E	15-Jul-20	0.0	20.9	1.0	0.0
P34E	19-Aug-20	0.0	20.4	0.0	0.0
P34E	21-Sep-20	0.0	19.6	0.0	0.0
P34E	27-Oct-20	0.0	20.8	0.0	0.0
P34E	20-Nov-20	0.0	21.6	0.0	0.0
P34E	30-Dec-20	0.1	20.4	0.0	0.0
P106E	20-Jan-20	0.0	21.9	0.0	0.0
P106E	14-Feb-20	0.4	20.3	0.0	0.0
P106E	4-Mar-20	0.0	20.9	0.0	0.0
P106E	7-Apr-20	0.0	20.9	1.0	0.0
P106E	6-May-20	0.0	20.9	0.0	0.0
P106E	22-Jun-20	0.0	20.9	0.0	0.0
P106E	15-Jul-20	0.0	20.9	1.0	0.0
P106E	17-Aug-20	0.0	16.2	0.0	1.0
P106E	21-Sep-20	0.0	19.9	0.0	0.0
P106E	27-Oct-20	0.0	20.4	0.0	0.0
P106E	20-Nov-20	0.0	20.9	0.0	0.0
P106E	30-Dec-20	0.1	20.9	0.0	0.0

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Table 10. 2020 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P107E	20-Jan-20	0.0	21.8	0.0	0.0
P107E	14-Feb-20	0.4	21.2	0.0	0.0
P107E	4-Mar-20	0.0	19.9	0.0	0.0
P107E	7-Apr-20	0.0	19.3	1.0	0.0
P107E	6-May-20	0.0	20.7	0.0	0.0
P107E	22-Jun-20	0.0	20.3	0.0	0.0
P107E	15-Jul-20	0.0	20.7	1.0	0.0
P107E	17-Aug-20	0.0	19.9	0.0	0.0
P107E	21-Sep-20	0.0	20.3	0.0	0.0
P107E	27-Oct-20	0.0	20.7	0.0	0.0
P107E	20-Nov-20	0.0	20.7	0.0	0.0
P107E	30-Dec-20	0.0	21.2	0.0	0.0
P108E	20-Jan-20	0.0	21.8	0.0	0.0
P108E	14-Feb-20	0.4	22.2	0.0	0.0
P108E	4-Mar-20	0.0	21.3	0.0	0.0
P108E	7-Apr-20	0.0	21.1	1.0	0.0
P108E	6-May-20	0.0	20.6	0.0	0.0
P108E	22-Jun-20	0.0	20.3	0.0	0.0
P108E	15-Jul-20	0.0	20.9	1.0	0.0
P108E	17-Aug-20	0.0	19.3	0.0	0.0
P108E	21-Sep-20	0.0	20.3	0.0	0.0
P108E	27-Oct-20	0.0	20.9	0.0	0.0
P108E	20-Nov-20	0.0	21.3	0.0	0.0
P108E	30-Dec-20	0.1	21.3	0.0	0.0
P109E	20-Jan-20	0.0	21.7	0.0	0.0
P109E	14-Feb-20	0.5	22.0	0.0	0.0
P109E	4-Mar-20	0.0	21.2	0.0	0.0
P109E	7-Apr-20	0.0	19.9	0.0	0.0
P109E	6-May-20	0.0	20.6	0.0	0.0
P109E	22-Jun-20	0.0	20.3	0.0	0.0
P109E	15-Jul-20	0.0	20.7	1.0	0.0
P109E	17-Aug-20	0.0	19.2	0.0	0.0
P109E	21-Sep-20	0.0	19.4	0.0	0.0
P109E	27-Oct-20	0.0	20.0	0.0	0.0
P109E	20-Nov-20	0.0	21.4	0.0	0.0
P109E	30-Dec-20	0.1	21.5	0.0	0.0

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Table 10. 2020 External Gas Probe Monitoring

Well No.	Date	CH4	O2	CO	H2S
		% LEL	(%)	PPM	PPM
P110E	20-Jan-20	0.0	21.5	0.0	0.0
P110E	14-Feb-20	0.5	4.5	0.0	0.0
P110E	4-Mar-20	0.0	4.1	0.0	0.0
P110E	7-Apr-20	0.0	4.4	2.0	0.0
P110E	6-May-20	0.0	20.7	0.0	0.0
P110E	22-Jun-20	0.0	1.8	1.0	0.0
P110E	15-Jul-20	0.0	20.9	1.0	0.0
P110E	17-Aug-20	0.0	6.8	0.0	1.0
P110E	21-Sep-20	0.0	6.9	0.0	0.0
P110E	27-Oct-20	0.0	6.6	0.0	0.0
P110E	20-Nov-20	0.0	6.5	0.0	0.0
P110E	30-Dec-20	0.1	1.5	0.0	0.0
P111E	20-Jan-20	0.0	20.8	0.0	0.0
P111E	14-Feb-20	0.2	20.4	0.0	0.0
P111E	4-Mar-20	0.0	20.7	0.0	0.0
P111E	7-Apr-20	0.0	21.2	0.0	0.0
P111E	6-May-20	0.0	20.6	0.0	0.0
P111E	22-Jun-20	0.0	20.9	0.0	0.0
P111E	15-Jul-20	0.0	20.7	1.0	0.0
P111E	17-Aug-20	0.0	19.8	0.0	0.0
P111E	21-Sep-20	0.0	20.7	0.0	0.0
P111E	27-Oct-20	0.0	21.3	0.0	0.0
P111E	20-Nov-20	0.0	20.9	0.0	0.0
P111E	30-Dec-20	0.1	20.7	0.0	0.0
P112E	20-Jan-20	0.0	20.6	0.0	0.0
P112E	14-Feb-20	0.4	20.2	0.0	0.0
P112E	4-Mar-20	0.0	21.3	0.0	0.0
P112E	7-Apr-20	0.0	21.3	0.0	0.0
P112E	6-May-20	0.0	20.7	0.0	0.0
P112E	22-Jun-20	0.0	20.9	0.0	0.0
P112E	15-Jul-20	0.0	20.7	1.0	0.0
P112E	17-Aug-20	0.0	19.7	0.0	0.0
P112E	21-Sep-20	0.0	20.7	0.0	0.0
P112E	27-Oct-20	0.0	21.6	0.0	0.0
P112E	20-Nov-20	no access			
P112E	30-Dec-20	no access			

6.0 NUISANCE MANAGEMENT

In order to reduce odour, litter, and vector nuisances at the landfill, several best practices and operating procedures are used, such as placement of screens, minimizing the working face of each cell, application of appropriate cover material (daily, intermediate, or final), site landscaping, weekly litter control patrols, and odour monitoring. If necessary, a licensed professional will apply vector control products to ensure that proper chemicals are used and properly handled. Noise is not a significant issue due to the separation from surrounding homes. Fugitive dust emissions are minimized by spraying site roads with uncontaminated surface water.

In 2020, there were 21 odour complaints from 15 customers; in all cases the source of the odour was investigated. If the source of the odour could be located within the BRRMF, we immediately covered the odour causing material, moved the tipping face to a more favorable area if available, and used compost or wood chips to reduce the odour and prevent further occurrence. Table 11 provides a summary of nuisance complaints received in 2020.

ENVIRONMENTAL STANDARDS DIVISION
2230 Main Street, Winnipeg, Manitoba R2V 4T8
DIVISION DES NORMES ENVIRONNEMENTALES
2230, rue Main, Winnipeg (Manitoba) R2V 4T8

T. | Tél. : 204-986-4684
F. | Fax : 204-339-2147
winnipeg.ca/waterandwaste

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Table 11. 2020 Nuisance Complaint Monitoring

Date Created	Complaint	Response
	Odours	
1/3/2020	Citizen emailed in to report that the Brady Landfill smells very rancid at the moment and that the smell needs to be addressed. Please attend.	Responded to the resident stating that there have been some complications with operations in the past week, and with the warmer weather and atmospheric conditions, it is possible the odour was from Brady Landfill. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis.
1/13/2020	Citizen reported on Jan 13 'The odour issues have been continuing in a moderate though still noticeable way. This evening it is substantially higher with a phosphorus type smell.	Responded to the resident stating that Brady did have an odour the previous day and with the atmospheric conditions the odour is likely to have travelled in that direction. Explained to the resident that the current garbage cell is getting close to the end of its capacity which would also contribute to the odour. Stated that the new cell will be opening and accepting waste; so the existing hill will provide some protection and relief from the odour. Also mentioned that Brady has been handling the biosolids on site for the last month, but the soil fabrication project was starting back up Monday, and this should also help lessen the odour.
2/16/2020	Citizen reported on Jan 13 'The odour issues have been continuing in a moderate though still noticeable way. This evening it is substantially higher with a phosphorus type smell.	Responded to the resident stating that the atmospheric conditions on Sunday suggest that the odour may have originated at Brady landfill. Unfortunately, with the right wind conditions it is very difficult to contain the odour, given our current operating location. Explained that we are working to close the current garbage cell and open a new cell further south, this will hopefully help to control some of the odour. Also mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
3/13/2020	Citizen states that there is a substantial odour around brady landfill. Please inspect. Thank you.	Responded to the resident stating that the atmospheric conditions today suggest that the odour could not have originated at Brady landfill. The wind for the last 24 hours has been coming from a strong WNW direction, thus the odour would be pushed away from that residence. Explained that we continue to monitor the odour in an around the landfill and will continue to monitor your area for the foreseeable future. Added that we are working to try to reduce odour and have started a project to improve our landfill gas system. Hopefully this will result in a reduction in odour issues.
6/21/2020	Citizen states; "There is a very bad smell outside which I believe is coming from Brady landfill. During winter, smell is pretty frequent which is very unfortunate and during summer, it is a bit better. But this is an on and off unpredictable scenario. It's embarrassing when visitors are over and they question the smell. I hope city will do something about the smell."	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
6/27/2020	Citizen states that the odour from Brady landfill has become very strong in the last 3 days	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
7/4/2020	Citizen emailed 311 wanting to file a complaint regarding the odour coming from the landfill. They state that they noticed an extreme odour on July 1st around 9:45pm. They live on Lake Bend Road, and they could not sit outside for Canada Day due to the odour. They also requested information on how they control odours if possible.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
7/7/2020	Citizen emailed 311 stating that the odour from the landfill was extremely bad on Canada Day, and was very bad this past Wednesday as well.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.

Date Created	Complaint	Response
	Odours	
7/11/2020	Citizen reported substantial odour that smells like garbage on Wednesday, July 8th. Citizen states they are no longer experiencing it now but would still want to have this issue investigated.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
7/13/2020	Resident states they live in Bridgewater Trails. Resident states that since the weather became hot they can smell a heavy odour everyday. Resident states the smell in the air made the family confused and their son has recently developed a cough. Resident would like to know if it is normal to smell this every day, if the odour is dangerous, if there are any solutions to control the odour, and if they will have to smell the odour the whole year.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
7/15/2020	Resident would like further actions taken by the COW to resolve this ongoing odor issue. She would also like to know why this is happening so consistently. Ther resident previously logged a complaint regarding the Brady landfill smell. "It is a beautiful summer day today, but unfortunately there is no way to enjoy the weather outside due to the smell. This is the third time in a week I'm experiencing a strong smell and I didn't even bother logging a complaint for the second incident. Is there any particular reason to get the smell consistently? It is so unfortunate to spend so much money on a house and not having the ability to enjoy the time outside. I got a response from the city regarding the initiatives they have taken to address this. But I I really hope city will do something about this sooner than later as this is unhealthy, annoying as well as embarrassing to have friends over when your area smells like a dump."	Responded to the resident stating that recently there have been unfavorable atmospheric conditions and landfill operations that have contributed to an increase in odour coming from the landfill. On days that there is a South wind it is more likely that the odour will be noticed. As well, the landfill is still working to expand their gas collection system which will continue into September. They are doing as much as they can to mitigate odour from this project. Also explained that three times a week our team conducts an odour round at Brady as well as the in the surrounding communities to test for Hydrogen Sulfide. So far we have not detected any harmful levels around your residence. We will continue to monitor levels around the neighborhood on a weekly basis.
7/15/2020	Citizen said the odor coming from the dump tonight is really, really bad. Please look into. Thank you.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
7/16/2020	Email in: "We can smell the landfill again this evening (July 16th). It's been very disappointing how frequently we can smell the dump this summer.'	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
7/20/2020	Resident states that for the last couple of months there has been a strong odour in the air in the South Pointe neighbourhood, which they attribute to the Brady Landfill. Resident would like action taken to prevent this, because they say that "it is becoming unbearable to either open the windows or step out of the home" and they fear that there could be health consequences.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
7/24/2020	Caller reports an intense odour coming from the Brady Landfill tonight.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.

Date Created	Complaint	Response
Odours		
8/5/2020	Resident reports a high concentration of what she believes to be hydrogen sulfide coming from the landfill on Wednesday, 24 June and again on Tuesday, 4 August, 2020.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
8/5/2020	Citizen reports that the odour coming from Brady today is unhealthy and intolerable. This has been a concern for the past 3 years that he has lived at his address. He cannot sit outside and there are children that he is concerned may become ill due to the odour. Citizen reports that the smell is very strong early today	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
8/6/2020	Councillor's office is following up on behalf of the constituent. The resident states other neighbours have also noticed the strong smell coming from the landfill. Councillor office is requesting further information on the issue, including if anything has been done about the odour.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
8/6/2020	Citizen is complaining about the odours coming from Brady Land fill. He said that he can't even go outside this summer because the smell is so bad. Citizen would like someone to contact him either by phone or by e-mail.	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
8/25/2020	Citizen stated that she has been smelling a nasty odour/smoke from the Brady landfill and this is the fourth night that this is happening. It smells like manure and it is really bad that she cannot sit outside. She stated that this had happened in the past	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.
9/25/2020	Received at councillor office yesterday: "Today is Sept 24 and a beautiful day. WHAT IS THAT HORRIBLE SMELL WAFTING THROUGH WAVERLEY HEIGHTS, BRIDGEWATER SOUTH POINT ETC. This is not a 'garbage dump' smell but more like pig or fertilizer. We thought somethig was being done about the Samborski fertilizer operation. What is this and everyone around here is noticing it, but I am probably the only one complaining. Are there plans to alleviate this stench?"	Responded to the resident stating that the atmospheric conditions and current landfill operations suggest that it would be likely the odour originated from Brady Landfill. Currently Brady is working on expanding the landfill gas collection system which has caused an increase in the hydrogen sulfide "garbage" odour that is emitted from Brady. Stated that we continuously work to reduce the impact of the landfill on our community and listed the measures that we take to control odours in and around our landfill on a day to day basis. Mentioned that we have also started up our soil fabrication project that is diverting all biosolids from Brady, this should greatly reduce the odour for the foreseeable future.

7.0 CONCLUSION

The diversion operations taking place at the BRRMF have been effective in diverting tens of thousands of metric tonnes of material from the landfill.

Leachate management was successful in 2020 as there were no breakouts of leachate.

The quality of the ground water beneath the site has not been negatively impacted, as demonstrated by the comparison of upstream to downstream ground water quality.

The quality of the surface water measured at the Weir is statistically similar to the quality of the surface water upstream of the BRRMF.

The areas where landfill gas is escaping will be repaired by upgrading the cap in those areas potentially using biosolid fabricated soil.

The BRRMF will continue to operate so as to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

8.0 REFERENCES

1. Brady Road Resource Management Facility – Manitoba Environment Act Licence No. 3081 R

https://www.winnipeg.ca/waterandwaste/pdfs/garbage/bradylicence.pdf

2. Ontario Ministry of the Environment. (2011, July 1). Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition.

https://www.ontario.ca/page/soil-ground-water-and-sediment-standards-use-under-part-xv1-environmental-protection-act

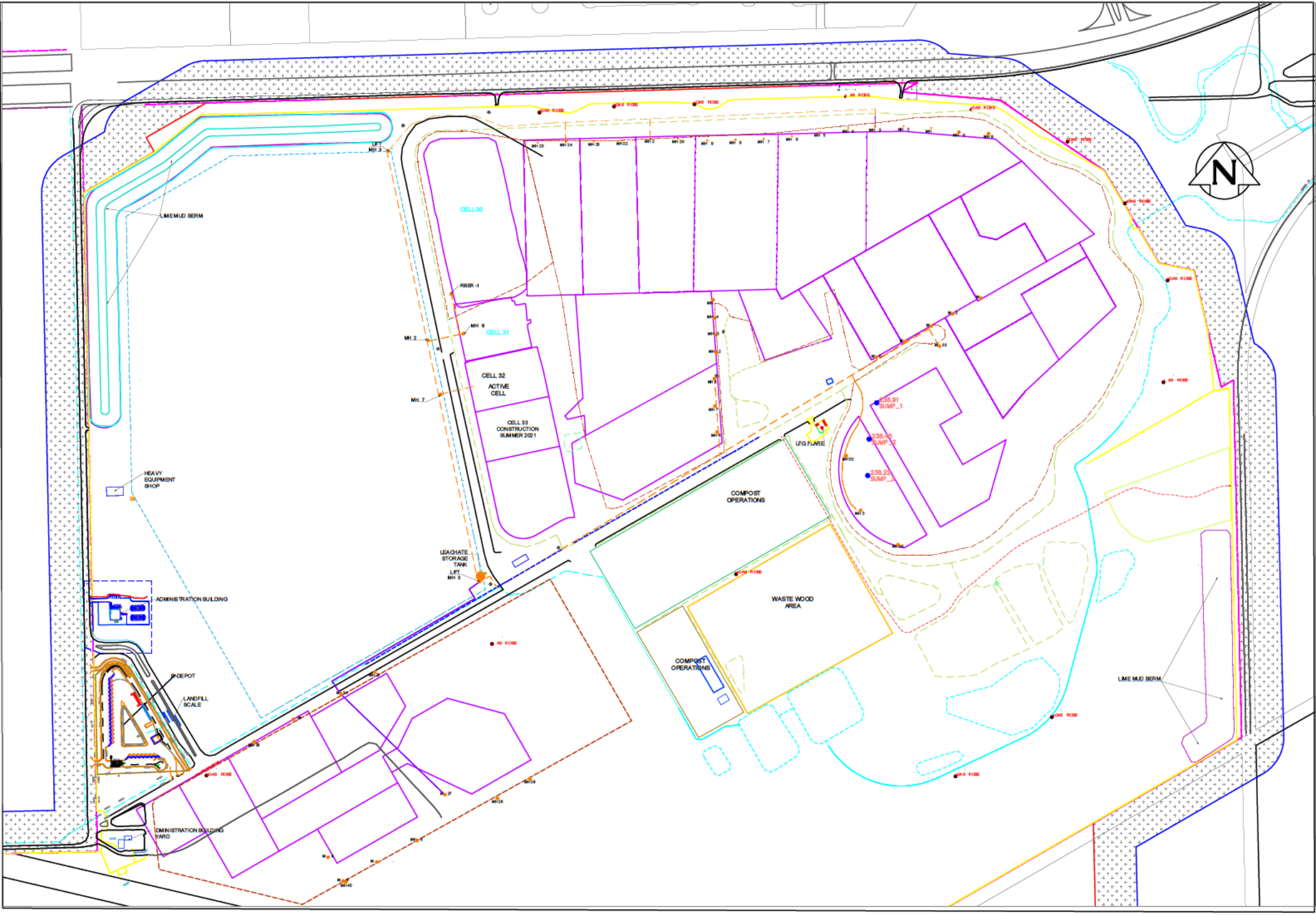
3. Canadian Council of Ministers of the Environment. Canadian Environmental Quality Guidelines Summary Table. Water Quality Guidelines for the Protection of Freshwater Aquatic Life. (CCME, 2019).

http://ceqg-rcqe.ccme.ca/download/en/221

ENVIRONMENTAL STANDARDS DIVISION
2230 Main Street, Winnipeg, Manitoba R2V 4T8
DIVISION DES NORMES ENVIRONNEMENTALES
2230, rue Main, Winnipeg (Manitoba) R2V 4T8

T. | Tél. : 204-986-4684
F. | Fax : 204-339-2147
winnipeg.ca/waterandwaste

FIGURE
BRRMF LAYOUT LEACHATE COLLECTION SYSTEM



La Ville de Winnipeg
City of Winnipeg

Brady Rd.

LEGEND/LÉGENDE

- CONTROL ZONE/ Zone de contrôle
- LANDFILL SITE/ Site d'enfouissement
- GW Flow Direction
- MANHOLE
- GAS PROBE
- LEACHATE PROBE
- HYDRANT
- THERMOCOUPLE
- GW Well
- CL
- CB
- GW Well/Lysimeter
- Wastewater System
- Storm Drain System
- Water Main
- Railway
- ADMIN. BUILDING
- CONTOURS LINES @ 0.05m.

Scale in metres / Échelle en mètres

METRIC / MÉTRIQUE

ORTHOPHOTO Date: December 23, 2019	FIELD BOOK #:		
UPDATED FEATURES			
WELLS FEATURES SURVEYED	2017	SWMN	
UPDATED FOR CK	2005	BM	
NO. REVISIONS	DATE	BY	

BRRMF
ADMINISTRATIVE BUILDING
Bâtiment Administratif

SURVEY BY: KB/BM | VALIDATED BY: GR
DRAWN BY: MO | APPROVED BY:
HOR. SCALE 1:10 | PRINTED
VERTICAL
DATE: May 15, 2020 | DATE: Apr 12,2021

THE CITY OF WINNIPEG / LA VILLE DE WINNIPEG
WATER AND WASTE DEPARTMENT
SOLID WASTE DIVISION

"WARNING"
THIS DRAWING IS THE PROPERTY OF THE CITY OF WINNIPEG. IT IS NOT TO BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS PREPARED WITHOUT THE WRITTEN CONSENT OF THE CITY OF WINNIPEG.
"ATTENTION"
CE DESSIN EST LA PROPRIÉTÉ DE LA VILLE DE WINNIPEG. IL NE DOIT PAS ÊTRE UTILISÉ À DES FINS AUTRES QUE CELLES POUR LESQUELLES IL A ÉTÉ PRÉPARÉ SANS LE CONSENTEMENT ÉCRIT DE LA VILLE DE WINNIPEG.

Site No. 25
Brady Rd.
DUMP SITE & DETAIL

SHEET 1 OF 2
CITY DRAWING NUMBER
BRRMF_Waste Plan_NAD_83.DWG

FIGURE
GROUND WATER SAMPLING LOCATIONS


BRADY ROAD LANDFILL
N
PERIMETER HWY
6N63
W9
W10
6N57
W3
MANITOBA HYDRO STATION
W11
5N62
W13
W13A
W14
W14A
W8
W15
W15A
W16
W16A
BRADY RD
6N60
W6
CHARETTE RD
W12
6N67
WAVERLEY ST
4N34
6N59
W5
CBC TOWERS
W7
RUE DES TRAPPISTES
W4
6N58
LEGEND
▲ OVERBURDEN PIEZOMETER NEST
⬢ GROUNDWATER WELL
0.0 0.05 0.1 0.2 0.3 0.4 0.5
DISTANCES IN KM
B.M. ELEV.
FIELD BOOK #
POSTED TO LBIS
1
11/11/25
KB
NO.
REVISIONS
DATE
BY
Winnipeg
THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT
BRADY ROAD LANDFILL
SHEET 1 OF 1
WELL LOCATIONS
FIGURE 1_R1

FIGURE
SURFACE WATER SAMPLING LOCATIONS

LEGEND:

- IMPACTED WATER POND
- DRY POND
- CLEAN WATER POND
- SWQ-25-16 SURFACE WATER SAMPLING LOCATION
- SURFACE WATER FLOW DIRECTION
- CLOSED LANDFILL BOUNDARY
- LAND DRAINAGE DITCH

NOTES:

1. TOPOGRAPHY SOURCES ARE CITY OF WINNIPEG, KGS GROUP 2013 TOPOGRAPHY OF ACTIVE LANDFILL OPERATING AREA AND ADDITIONAL LANDFILL PERIMETER SURVEY BY KGS GROUP 2013.
2. EXACT SURFACE WATER SAMPLING LOCATION TO BE DETERMINDED IN FIELD.

100 0 100 200 300 400m

SCALE: 1:10000 METRIC

NO.	YY/MM/DD	DESCRIPTION	BY
A	14/05/30	ISSUED WITH DRAFT REPORT	MFH

REVISIONS / ISSUE

KGS GROUP CONSULTING ENGINEERS

THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

BRADY ROAD RESOURCE MANAGEMENT FACILITY SURFACE WATER MANAGEMENT PLAN

PROPOSED SURFACE WATER MONITORING LOCATIONS

MAY 2014 | FIGURE 10 | REV: A

APPENDIX A
BRRMF TONNAGE SPREADSHEET

CITY OF WINNIPEG Brady Road Resource Management Facility Tonnage (metric tonnes) 2020

Material Type	WW Material	Item/Acct	January	February	March	April	May	June	July	August	September	October	November	December	Total
Domestic Collection - AREA 1-M LLER	DOM REF CT	2400	5004.00	4068.16	5030.83	6922.44	7164.11	7413.39	7391.57	6499.82	6706 25	6078 04	5365.54	5320 84	72,964 99
Domestic Collection - AREA 2-GFL	DOM REF CT	2500	4461.42	3613.30	4507.27	6124 65	6081 67	6338.75	6320.95	5719.25	5827.12	5439.75	4868.64	4807.48	64,110 25
Domestic Collection - BULKY PU-WASTE CONNECTION	DOM REF CT	3500	47.65	40.00	41.36	101 35	189 52	187.93	168.53	171.35	154 65	97.10	67.49	77.70	1,344 63
Other	DOM REF CT	*		0.00	0.00	2.99	0 00	0.00	9.85	-9.85			-2.99	0 00	0 00
Subtotal Single Family Collection	**DOM REF CT**		**9,513.07**	**7,721.46**	**9,579.46**	**13,151.43**	**13,435.30**	**13,940.07**	**13,890.90**	**12,380.57**	**12,688.02**	**11,614.89**	**10,298.68**	**10,206.02**	**138,419.87**
Multi-Family NW Area - Miller Waste Systems	APT WT	1093	1766.75	1487.88	1806.70	2144 25	2235.19	2431.68	2428.51	2220.96	2209 28	2012 37	1830.98	1895 85	24,470.40
Multi-Family SW Area - Waste Connections	APT WT	1504	1206.30	1044.55	1371.30	1585 28	1583.48	1721.29	1808.87	1550.99	1512 02	1393 88	1126.78	1137.15	17,041 89
Multi-Family E Area - Waste Connections	APT WT	1519	1103.06	859.60	1000.09	1104 99	1231 91	1341.60	1142.94	1187.52	1175 31	1150 00	9.26	0 00	11,306 28
Multi-Family E Area - GFL (Rolloff)	APT WT	1520		38.81	43.60	85 03	107 87	87.17	95.85	88.00	80.17	85 28	63.20	52 99	827 97
Multi-Family E Area - GFL (Front End)	APT WT	1553											1237.18	1258 67	2,495 85
Other	APT WT	*	1.52		3.53	-2 21	1.41	0.00	0.00	0.00	4 26	-4 26	-4.25	7 57	7 57
Subtotal Apt Collection	**APT WT**		**4,077.63**	**3,430.84**	**4,225.22**	**4,917.34**	**5,159.86**	**5,581.74**	**5,476.17**	**5,047.47**	**4,981.04**	**4,637.27**	**4,263.15**	**4,352.23**	**56,149.96**
Total Residential Collection			**13,590.70**	**11,152.30**	**13,804.68**	**18,068.77**	**18,595.16**	**19,521.81**	**19,367.07**	**17,428.04**	**17,669.06**	**16,252.16**	**14,561.83**	**14,558.25**	**194,569.83**
City Refuse - eg. Street Cleaning	CITY REFUS	4	141.37	162.75	478.40	700.79	1696 86	1033.64	3678.02	1726.81	862 31	2432 93	707.08	699 93	14,320 89
Construction / Demolition Waste - City	CITY CNDEM	5	1379.14	114.17	8.51	157.18	490.77	369.16	99.77	81.26	26.79	4 00	0.00	0 00	2,730.75
Landscaping - City - trees, etc., & (DE)	TREELFCITY	6													
	TREES CITY														
	TREES DE 1		479 93	474.74	669.00	309.10	231.14	272.08	162.36	118.51	64 52	274 94	444.97	397.77	3,899 06
Grit	GRIT	7	244.38	207.97	275.40	215 27	214 97	255.56	247.84	137.22	169 21	112.42	111.78	155.76	2,347.78
Bio solids landfilled	SLUDGE		2833.02	0.00	0.00	2382.73	3286 84	4859.29	3362.93	0.00	0 00	0 00	0.00	0 00	16,724 81
Waste Diversion Residue	RECYC-REFU						0 25		0.00	2.01	0 00	0 00	0.00	0 00	2 26
Residue from MRF (EMTERRA)	RES DUE		0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
Sweepings	SWEEP		0 21	0.00	0.00	-0 21	104 52	394.46	451.01	13.28	0 00	8300.45	0.00	5 23	9,268 95
Total City Depts - Charged			**5,078.05**	**959.63**	**1,431.31**	**3,764.86**	**6,025.35**	**7,184.19**	**8,001.93**	**2,079.09**	**1,122.83**	**11,124.74**	**1,263.83**	**1,258.69**	**49,294.50**
Total Residential + City Depts			**18,668.75**	**12,111.93**	**15,235.99**	**21,833.63**	**24,620.51**	**26,706.00**	**27,369.00**	**19,507.13**	**18,791.89**	**27,376.90**	**15,825.66**	**15,816.94**	**243,864.33**
	ANIMAL WAS	8													
	ANIMLS-CHG														
Dead Animals-Charge	SRM		618.11	843.29	729.19	859 35	650 99	797.33	896.41	867.55	995 52	1213.15	1333.01	878.48	10,682 38
Asbestos	ASBESTOS	9	20.68	28.00	31.65	165 88	45 04	51.33	17.22	51.74	57 20	5.47	23.81	10.18	508 20
Charitable Organization - C / special rate	C-CHARITY	18	141.85	115.68	102.04	123.76	109 58	165.70	194.32	196.00	172.16	190.47	132.33	118 87	1,762.76
Commercial / Industrial - all sources	COMM/INDUS	10	4544.83	3675.56	4562.83	5322 36	6958.72	6969.91	7332.29	6613.56	7193 96	5837 21	5010.58	4004 88	68,026 69
Commercial Flat Fee	COMM FF		17 32	276.80	263.87	11.17	21 56	23.15	18.80	13.52	29.78	185.18	33.36	68.70	963 21
Construction / Demolition Waste	CONST/DEM	11	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
Concrete - charged	CONC - CHG	12	0 64	0.00	0.00	1 61	0 00	4.83	0.00	0.00	0 00	1 25	3.75	0 00	12 08
Hospital Waste	HOSP WASTE	13	0.34	0.50	0.81	0 54	0 96	0.51	0.76	0.83	0 53	0 37	0.55	1 01	7.71
	LANDSCAPE														
	TREELFCOMM														
	TREES COMM														
Landscaping - Com. - trees, etc., & (DE)	TREES DE 2	14	2.23	7.36	11.93	8 06	52 26	62.77	24.79	16.05	50 87	52 31	15.40	6 00	310 03
Residue - Canada Fiber	RES DUE-CF		711.19	444.60	545.41	648 69	775.49	766.39	723.49	698.62	720 84	662 80	626.17	652 00	7,975 69
Sawdust - Charged	SAWDUST CH	15	0 00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
	HYDRO POLE														
	RES/OVER														
	SANDBAG														
	TIRES														
	TOILETS_$5														
	TOILETS_CH														
Special Waste	WEEDS	17	0 00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
Sewer Grit	SEWER-GRIT		0 00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
Manure	MANURE-P	16	0 00	0.00	0.00	0 00	121 92	0.00	0.00	0.00	0 00	0 00	0.00	0 00	121 92
Total Non City Depts - Charged			**6,057.19**	**5,391.79**	**6,247.73**	**7,141.42**	**8,736.52**	**8,841.92**	**9,208.08**	**8,457.87**	**9,220.86**	**8,148.21**	**7,178.96**	**5,740.12**	**90,370.67**
Dead Animals - TFW	ANIMLS-N/C	20	0.80	0.24	0.70	1 38	1 07	0.55	1.34	0.81	1 35	0 92	2.95	0 88	12 99
Brady Admin Building Construction Material	1777 BRADY		0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
Charitable Organization - TFW	CHARITY	19	76.78	47.05	25.13	99 84	31.12	28.99	65.60	66.19	61 66	69.42	41.56	50 35	663 69
October Fall Storm Wood Waste- NC (City and Private)	C-TREE-EMG		0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
Neighbourhood clean ups	CLEAN-UP		0.00	0.00		0 00	6 02	0.00	2.43	0.00	9 35	0 00	0.00	0 00	17 80
Total Non City Depts - Not Charged			**77.58**	**47.29**	**25.83**	**101.22**	**38.21**	**29.54**	**69.37**	**67.00**	**72.36**	**70.34**	**44.51**	**51.23**	694.48
Total Non City Depts			**6,134.77**	**5,439.08**	**6,273.56**	**7,242.64**	**8,774.73**	**8,871.46**	**9,277.45**	**8,524.87**	**9,293.22**	**8,218.55**	**7,223.47**	**5,791.35**	**91,065.15**

Material Type	WW Material	Item/Acct	January	February	March	April	May	June	July	August	September	October	November	December	Total
Other Municipalities															
Manitoba Conservation (Falcon Lake/Hecla)	DOM REF RM	*772*	0 00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
R. M. of Springfield / Emterra	DOM REF RM	*1212*	0 00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
R. M. of West St Paul / Emterra	DOM REF RM	*1263*	0 00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
Total Municipalities 445-454084-201904	DOM REF RM		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
4R Depots															
4R Contaminated Bins (Garbage)	4RDCONTGRB		3.89	2.66	7.46	3.42	25 57	25.02	20.57	9.34	5 26	5 08	1.82	3.18	113 27
4R Flat fee garbage	4RDEPTFF		2.78	3.57	52.87	10 00	13 87	12.20	28.62	32.86	149 52	154 90	157.34	128 66	747.19
4R Weighed garbage	4RDEPTREG		424.42	467.47	729.33	1311.76	2184 96	1769.58	1703.90	1575.78	1530 05	1458 06	1005.07	540 29	14,700 67
Total Garbage from 4R Depots 445-454570-201910			**431.09**	**473.70**	**789.66**	**1,325.18**	**2,224.40**	**1,806.80**	**1,753.09**	**1,617.98**	**1,684.83**	**1,618.04**	**1,164.23**	**672.13**	**15,561.13**
														Trees are chipped and not landfilled	(4,209 09)
														Adjustment for Flat Fee Tonnage	(1,335 27)
Total Landfilled			**25,234.61**	**18,024.71**	**22,299.21**	**30,401.45**	**35,619.64**	**37,384.26**	**38,399.54**	**29,649.98**	**29,769.94**	**37,213.49**	**24,213.36**	**22,280.42**	**344,946.25**
Organics - Area 1- Miller	ORGANICS	*2800*										27.70	30.04	26.42	84.16
Organics - Area 2 - GFL	ORGANICS	*2900*										8 08	11.04	11.92	31 04
Glass delivered to site	GLASS	*33*	794.40	614.13	648.62	707 27	799.43	792.10	766.37	706.17	747 37	748 64	782.41	756 34	8,863 25
Sweepings N/C	SWEEP N/C	*24*	0 00	0.00	0.00	0 00	0 00	5.29	0.00	0.00	0 00	989 90	0.00	0 00	995.19
Compostable -Yard waste/Ponds/Street Leaves/Cattails	PONDS	*26*													
	ST LEAVES														
	YARD WASTE														
	SAWDUST NC														
	CATTA LS		30.98	18.06	31.94	406.13	1,155.11	673.49	791.79	526.72	684.12	808 04	368.69	28.12	5,523.19
AREA 1 YARDWASTE-M LLER	LEAFIT-CUR	*2600*	0 00	0.00	0.00	184.74	3,855 82	2339.69	1515.77	947.39	1535 29	2738.49	495.33	0 00	13,612 52
AREA 2 YARDWASTE-GFL	LEAFIT-CUR	*2700*	0 00	0.00	0.00	0 00	3,807.10	2436.22	1778.75	1031.10	1713 82	2646.11	519.29	0 00	13,932 39
Leaf & Yard Waste self-hauled (per Foreman)			0 00	0.00	0.00	0.00	0 00	0 00	0.00						0 00
	AGGREGATE														
	CLEAN F LL														
Clean Fill - TFW (Tipping Fee Waived)	SHREDDED	*30*	2,109 99	2,370.64	2,026.96	2,609.19	11,546.13	21,121.43	27,886.32	10,380.35	14,628.34	9,783 28	13,576.02	13,256.91	131,295 56
Concrete No Charge - TFW	CONC - N/C	*31*	466.34	642.75	311.24	244 38	888 23	1071.74	845.96	645.18	1001 96	433.15	333.85	169 85	7,054 63
Tires N/C	TIRES N/C	*49*				441 54	835 81	859.14	513.47	626.41	0 00	0 00	0.00	0 00	3,276 37
	WOOD N/C														
	WC NC LF														
Wood Chips	WOOD CHIPS	*32*	72.97	100.96	164.66	363.41	232.12	247.07	281.37	300.19	281 21	168 04	100.36	61 33	2,373 69
Bio solids composted	BIO SLUDGE		0 00	0.00	0.00	1193 81	25.16	0.00	0.00	0.00	0 00	0 00	0.00	0 00	1,218 97
Wood Chips composted	BIOWOODCHI		0 00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0 00	0 00
Total compostable material			**3,474.68**	**3,746.54**	**3,183.42**	**6,150.47**	**23,144.91**	**29,546.17**	**34,379.80**	**15,163.51**	**20,592.11**	**18,351.43**	**16,217.03**	**14,310.89**	**188,260.96**
4R Battery	**4R Battery**		**3.09**	**0.00**	**3.61**	**2.84**	**8.33**	**6.40**	**6.59**	**5.32**	**8.46**	**7.93**	**6.27**	**2.63**	**61.48**
4R Battery - Small (Call2 Recycle)	**N/A**		**0.00**	**0.79**	**1.56**	**0.78**	**2.27**	**0.00**	**0.00**	**2.23**	**2.41**	**3.46**	**2.21**	**2.03**	**17.74**
4R Bicycles	**4R Bicycl**		**0.44**	**0.86**	**0.94**	**0.57**	**2.54**	**2.25**	**2.34**	**1.18**	**0.35**	**1.72**	**0.37**	**0.53**	**14.10**
4R Ceramic	**4RCERAMIC**		**8.76**	**20.11**	**15.04**	**23.83**	**49.96**	**30.47**	**34.25**	**35.06**	**18.67**	**23.78**	**5.67**	**15.72**	**281.32**
4R Clean Fill	**4RDCLEANFL**		**0.00**	**4.19**	**0.00**	**57.12**	**1,093.79**	**1,467.47**	**885.04**	**856.94**	**521.74**	**403.22**	**86.19**	**3.60**	**5,379.30**
4R Concrete	**4RCONCRETE**		**14.24**	**33.90**	**23.19**	**164.74**	**538.18**	**511.76**	**486.86**	**467.35**	**411.77**	**277.86**	**124.86**	**35.35**	**3,090.06**
4R Electronics	**4RELECTRO**		**46.15**	**12.20**	**47.12**	**61.65**	**48.78**	**88.46**	**92.62**	**74.92**	**74.10**	**35.10**	**72.44**	**59.76**	**713.30**
4R HHW	**4RDSOLVENT**		**28.94**	**26.87**	**32.62**	**55.65**	**98.61**	**92.94**	**87.62**	**79.67**	**105.85**	**109.65**	**70.61**	**36.47**	**825.50**
4R Oil	**4RDOIL**		**2.19**	**1.79**	**3.26**	**8.34**	**15.91**	**13.08**	**14.40**	**11.48**	**15.08**	**21.10**	**12.43**	**5.17**	**124.22**
4R Glass	**4RDGLASS**		**0.00**	**10.19**	**0.00**	**10.02**	**8.21**	**4.20**	**8.77**	**11.32**	**11.85**	**3.11**	**8.11**	**3.18**	**78.96**
4R Lumber	**4RDLUMBER**		**0.00**	**0.00**	**2.26**	**3.45**	**0.00**	**0.00**	**2.40**	**0.00**	**0.00**	**2.02**	**0.00**	**81.19**	**91.32**
4R Leaf and Yard Waste	**4RD LYW**														
	4RDLYWLG		**18.93**	**10.58**	**19.93**	**381.78**	**615.63**	**417.23**	**348.62**	**306.53**	**410.24**	**404.21**	**162.08**	**1,088.70**	**4,184.46**
4R Mattresses	**NOT IN WW**		**11.88**	**10.48**	**19.91**	**27.87**	**35.15**	**36.82**	**38.38**	**32.98**	**32.93**	**34.85**	**27.02**	**8.03**	**316.29**
4R ODS	**4RDODS**		**7.95**	**5.71**	**6.92**	**12.61**	**23.20**	**23.15**	**19.93**	**20.30**	**19.68**	**25.41**	**16.31**	**9.28**	**190.42**
4R Oversized Plastics	**4RDOSPLAST**		**0.00**	**0.00**	**1.31**	**0.65**	**3.66**	**2.28**	**2.40**	**2.66**	**2.84**	**2.64**	**1.60**	**1.73**	**21.77**
4R Recyclables	**4RDRECYCL**		**19.68**	**15.73**	**24.66**	**21.43**	**34.99**	**32.14**	**22.70**	**20.68**	**13.74**	**25.00**	**24.15**	**27.90**	**282.80**
4R Scrap Metal	**4RDSCRAPMT**		**23.24**	**35.54**	**20.74**	**23.68**	**82.67**	**107.76**	**95.01**	**79.42**	**80.38**	**89.39**	**55.11**	**33.36**	**726.28**
4R Tires	**4RDTIRES**		**1.80**	**2.27**	**4.43**	**4.32**	**51.11**	**38.87**	**34.78**	**30.43**	**34.46**	**34.98**	**33.97**	**5.51**	**276.93**
Total 4R Depot			**187.28**	**191.20**	**227.48**	**861.32**	**2,712.99**	**2,875.27**	**2,182.71**	**2,038.46**	**1,764.56**	**1,505.42**	**709.41**	**1,420.14**	**16,676.24**
Battery Removal	(BATTERYRMV)		0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
City Compost Removal	(COMPOSTREM)		0 00	0.00	0.00	0.00	(61 67)	(0 53)	0.00	0.00	(264.24)	0 00	0.00	(65.01)	(391.45)
Glass Removal	(GLASS REMV)		0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
Leachate Removed	(LEACH REMV)		(2,629.40)	(2,146.14)	(2,051.54)	(4,144.37)	(4,222 07)	(4,250 54)	(3,610.66)	(3,131.80)	(3,778.37)	(3,432 89)	(3,683.88)	(2,810.97)	(39,892 63)
ODS Removal	(ODS REMOVA)	*25*	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
Scrap Metal Removed	(SCRAP REMV)	*22*	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
Dutch Elm Removal (Wood Anchor)	(TREESDE-WA)		0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
Tires Removed	(T RES REMV)	*23*	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
Total material removed from site			**(2,629.40)**	**(2,146.14)**	**(2,051.54)**	**(4,144.37)**	**(4,283.74)**	**(4,251.07)**	**(3,610.66)**	**(3,131.80)**	**(4,042.61)**	**(3,432.89)**	**(3,683.88)**	**(2,875.98)**	**(40,284.08)**
Total Net All Items			**26,267.17**	**19,816.31**	**23,658.57**	**33,268.87**	**57,193.80**	**65,554.63**	**71,351.39**	**43,720.15**	**48,084.00**	**53,637.45**	**37,455.92**	**35,135.47**	**492,923.13**

Material Type	WW Material	Item/Acct	January	February	March	April	May	June	July	August	September	October	November	December	Total
NUMBER OF VEHICLES / LOADS															
Description		**Item/Acct**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	Total
BRADY ROAD LANDFILL - VEHICLES / LOADS															
Vehicles - Domestic Refuse - City		*1*	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicles - Domestic Refuse - Contract	DOM REF CT	*2*	1414	1201	1348	1496	1527	1542	1552	1412	1459	1457	1355	1493	17,256
Vehicles - 4R Depot (Brady) - Garbage Area	DATA L NK V by T		2375	2448	3914	6766	11003	8879	8379	8278	8098	7985	5918	3671	77,714
Vechiles - 4R Depot (Brady) - Total			3280	3249	5009	10521	17596	15108	13416	12316	12948	12335	8669	5070	119,517
Vehicles - 4R Depot (Pacific)			1628	1492	1696	3589	7087	5983	5812	5385	5488	5897	3766	2239	50,062
Vehicles - 4R Depot (Panet)			3074	2639	2873	5865	10747	10479	9322	7985	8678	9573	6206	4143	81,584
Vehicles - Commercial / Industrial	COMM/INDUS	*10*	2995	2754	3418	3717	5367	5203	5349	5098	5390	4952	4256	3239	51,738
Vehicles - Special Waste		*17*	0	0	0	0		0	0	0	0	0	0	0	0
Vehicles - Mud Trucks - Tandems			52	153	52	95	13	0	0	0	0	0	0	0	365
Vehicles - Mud Trucks - Semi-Trailers			0	3	7	42	3	0	0	0	0	0	0	0	55
OTHER MUNICIPALITIES - VEHICLES / LOADS															
Manitoba Conservation (Falcon Lake)		*772*	0	0	0	0	0	0	0	0	0	0	0	0	0
RM of Tache		*886*	0	0	0	0	0	0	0	0	0	0	0	0	0
R.M. of MacDonald / Blackhawk Enterprises		*1127*	0	0	0	0	0	0	0	0	0	0	0	0	0
R. M. of Springfield / Emterra		*1212*	0	0	0	0	0	0	0	0	0	0	0	0	0
R. M. of West St Paul / Emterra		*1263*	0	0	0	0	0	0	0	0	0	0	0	0	0
															0
TOTAL VEHICLES - ALL PAYING CUSTOMERS			**14,818**	**13,939**	**18,317**	**32,091**	**53,343**	**47,194**	**43,830**	**40,474**	**42,061**	**42,199**	**30,170**	**19,855**	**320,577**

Blue font = formula = don't type in

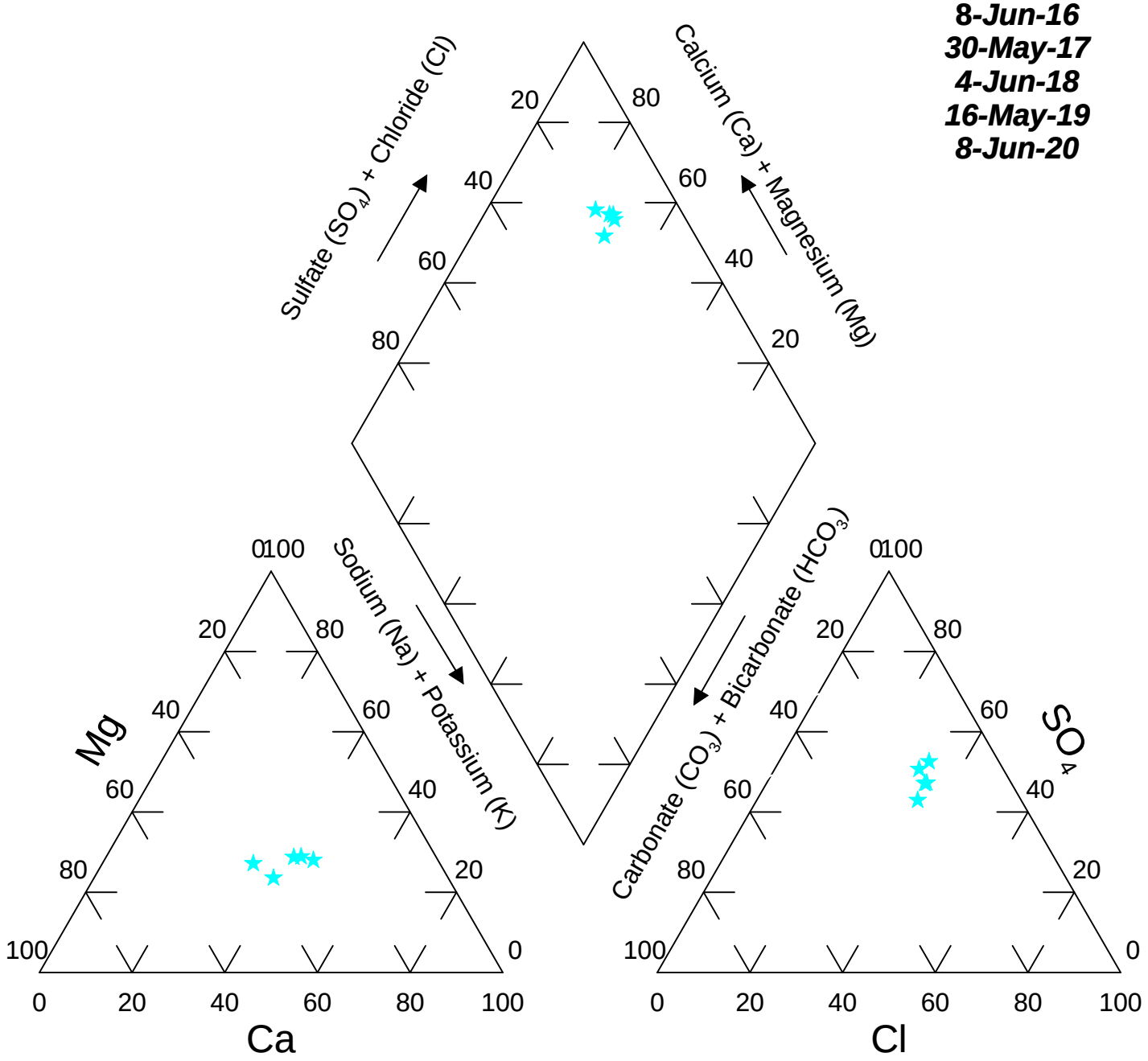
Reconcile Monthly Tonnage to WasteWorks Material Analysis report		**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	Total
Total Actual Weight per WW		31,062 30	23,030.03	27,131.40	39,838.25	65,241 82	73,645 53	78,408.06	49,648.21	55,792.85	60,171 68	44,528.97	39,592.50	588,091 60
														0.00
Less: Removals X 2 (negative here but positive in WW)	(BATTERYRMV)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0 00
	(COMPOSTREM)	**0.00**	**0.00**	**0.00**	**0.00**	**(123.34)**	**(1.06)**	**0.00**	**0.00**	**(528.48)**	**0.00**	**0.00**	**(130.02)**	(782 90)
	(GLASS REMV)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0 00
	(LEACH REMV)	**(5,258.80)**	**(4,292.28)**	**(4,103.08)**	**(8,288.74)**	**(8,444.14)**	**(8,501.08)**	**(7,221.32)**	**(6,263.60)**	**(7,556.74)**	**(6,865.78)**	**(7,367.76)**	**(5,621.94)**	(79,785 26)
	(ODS REMOVA)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0 00
	(SCRAP REMV)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0 00
	(TREESDE-WA)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0 00
	(T RES REMV)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0 00
	MUD TRUCKS MANULLY TRAC	338 00	1,059.00	488.50	1,520.50	149 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	3,555 00
Less: Items not on tonnage report	RES/REFUSE	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
	WEIGH ONLY		(76.32)					(228.49)	(4.69)		(33 04)			(342 54)
	TEST			(0.65)		(0.12)				(0.01)	(1.12)	(3.53)		(5.43)
	4RDEPTFF WASTEWORKS RE													0 00
	4RDEPTFF WRARS LEVY REP													0 00
	4R MATERIALS	**125.67**	**95.88**	**142.40**	**198.95**	**370.58**	**411.24**	**393.14**	**340.23**	**376.38**	**365.71**	**298.24**	**1,294.93**	4,413 35
	COMM_FF WASTEWORKS RE													0 00
	COMM_FF WRARS LEVY REP													0 00
	ZRATE ADJ	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
	CASH CUSTOMER	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
	OTHER ADJUSTMENTS				**(0.09)**									(0 09)
	ACCT 472 ARSON P LOT ZONE	0 00	0.00	0.00	0.00	0 00	0 00	0.00	0.00	0.00	0 00	0.00	0.00	0 00
Net		**26,267.17**	**19,816.31**	**23,658.57**	**33,268.87**	**57,193.80**	**65,554.63**	**71,351.39**	**43,720.15**	**48,084.00**	**53,637.45**	**37,455.92**	**35,135.47**	**515,143.73**
Total per Tonnage Report		26,267.17	19,816.31	23,658.57	33,268.87	57,193 80	65,554 63	71,351.39	43,720.15	48,084.00	53,637.45	37,455.92	35,135.47	515,143.73
Difference should be zero		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

APPENDIX B
PIPER DIAGRAMS

Groundwater
Piper Diagrams

Site: Brady
Location : GWQ25-4N34-CR

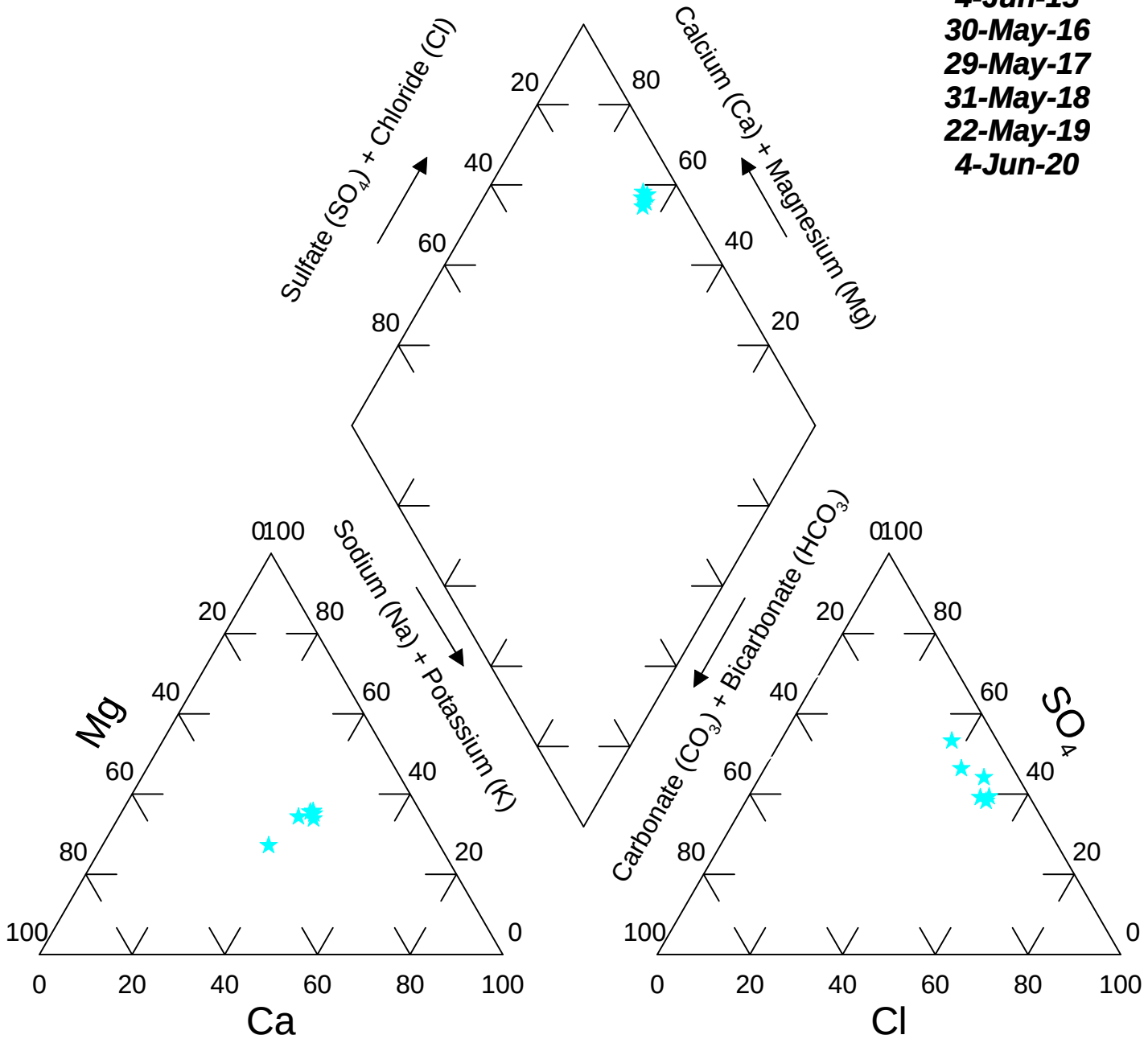
Dates:
8-Jun-16
30-May-17
4-Jun-18
16-May-19
8-Jun-20



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-5N62-D

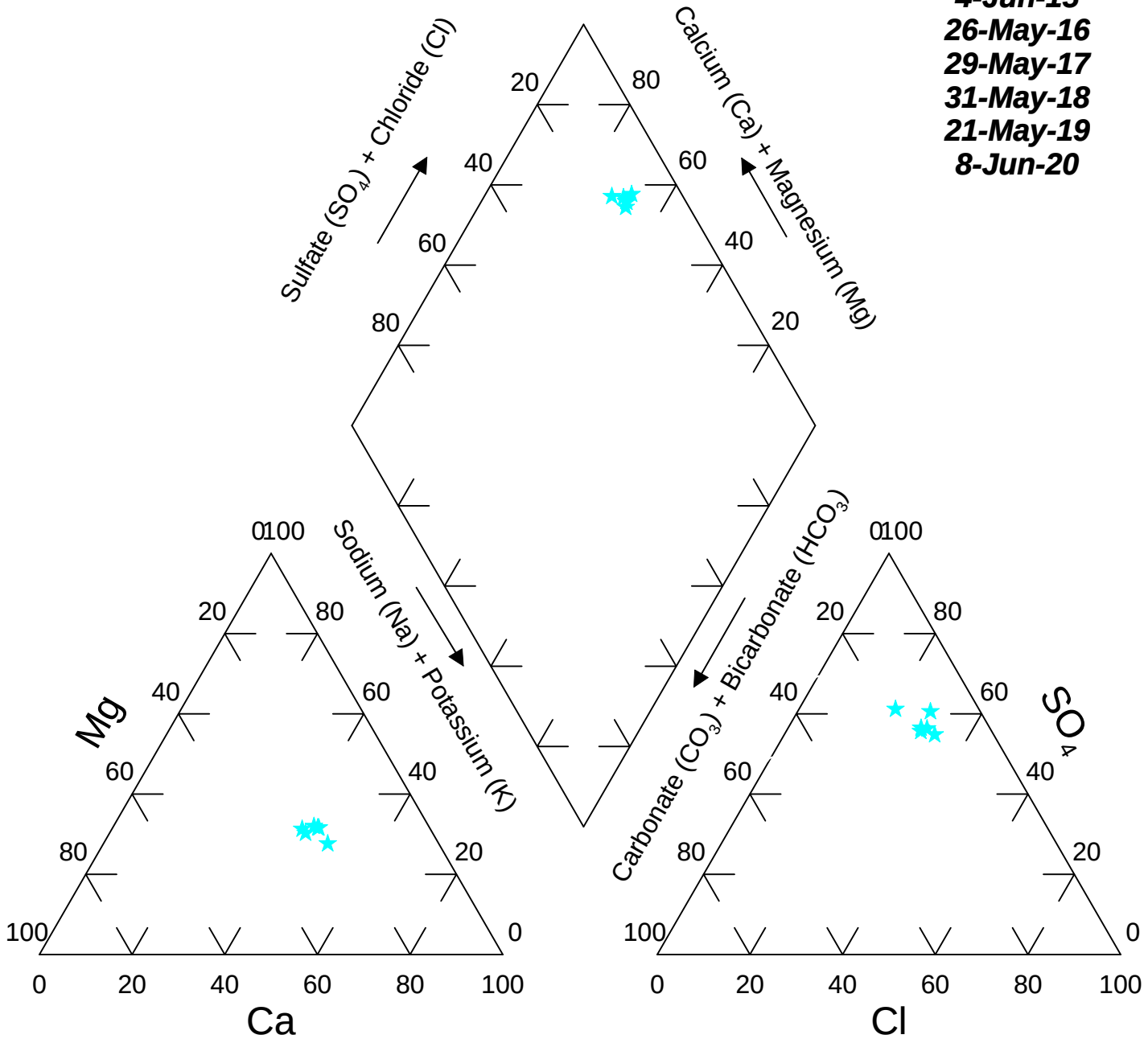
Dates:
4-Jun-15
30-May-16
29-May-17
31-May-18
22-May-19
4-Jun-20



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N57-DR

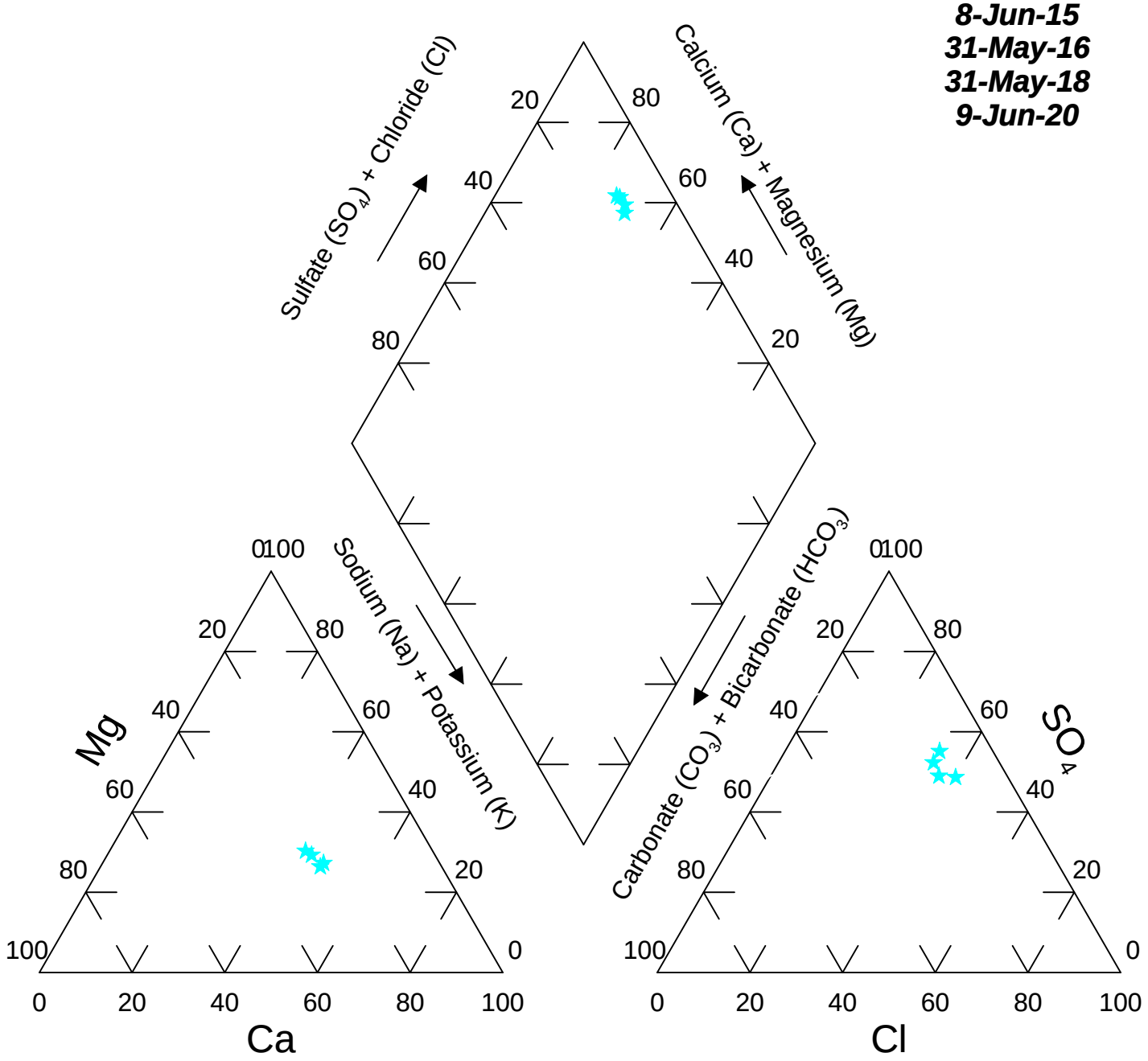
Dates:
4-Jun-15
26-May-16
29-May-17
31-May-18
21-May-19
8-Jun-20



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N58-DR

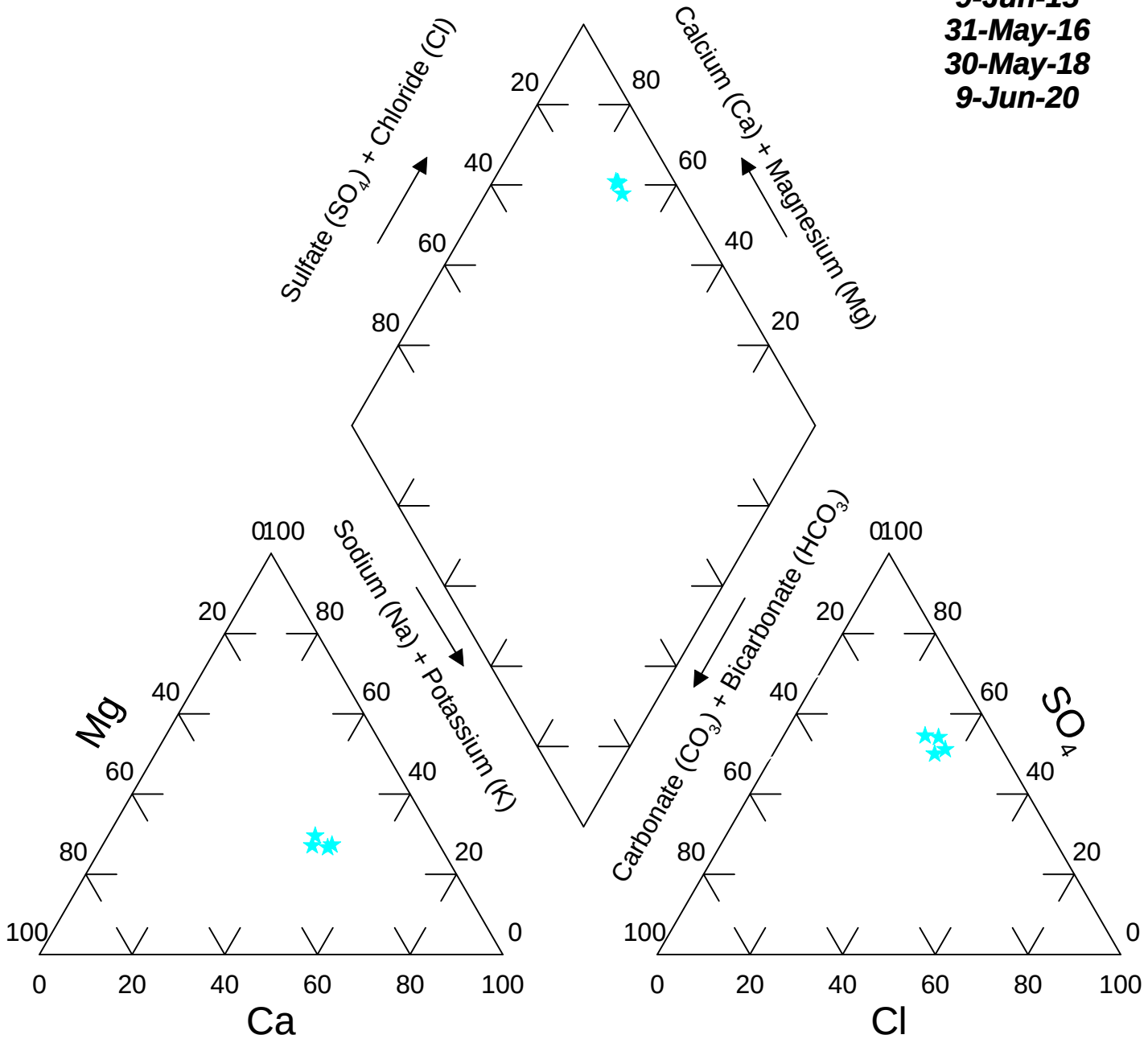
Dates:
8-Jun-15
31-May-16
31-May-18
9-Jun-20



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N59-DR

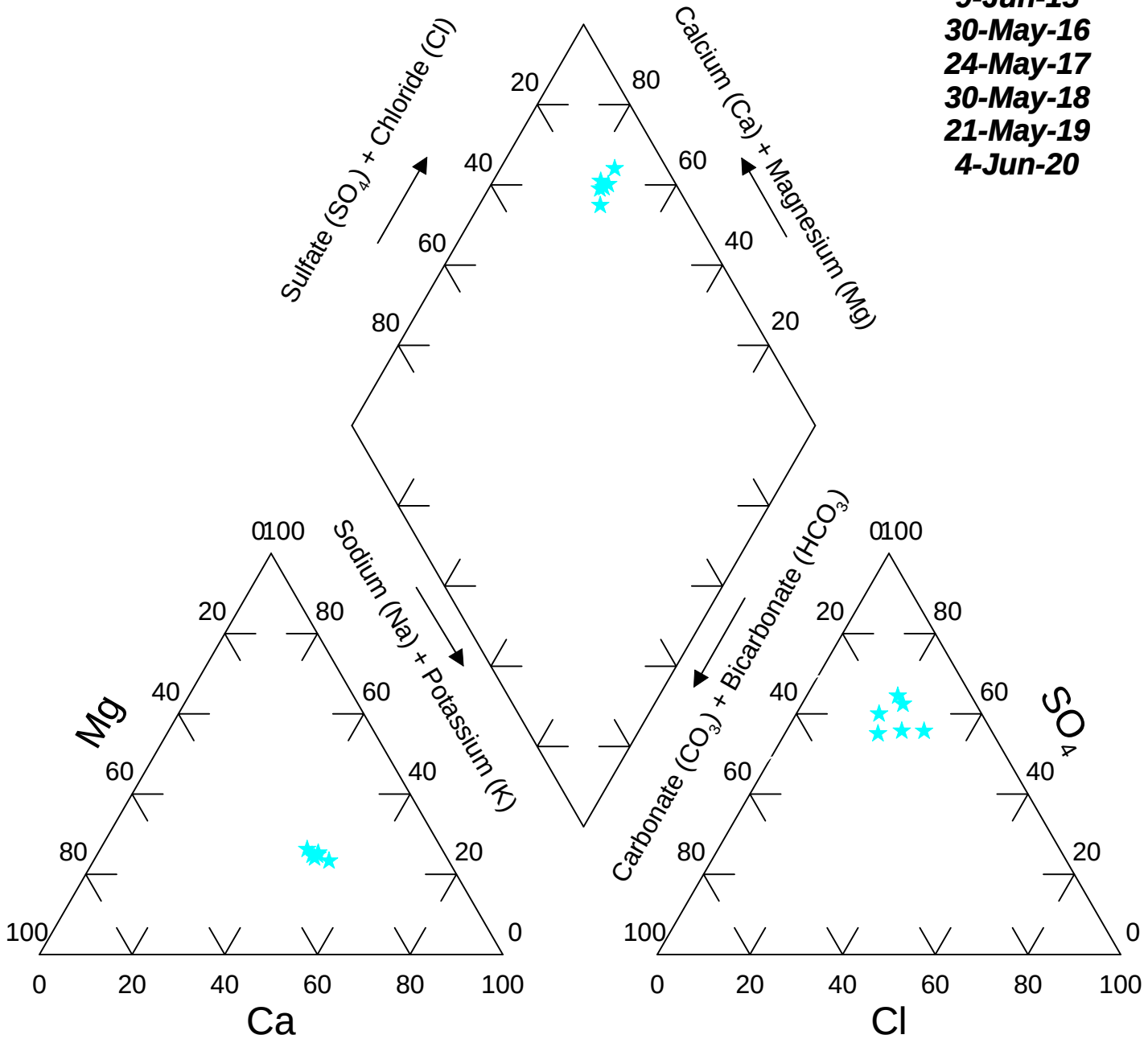
Dates:
9-Jun-15
31-May-16
30-May-18
9-Jun-20



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N60-DR

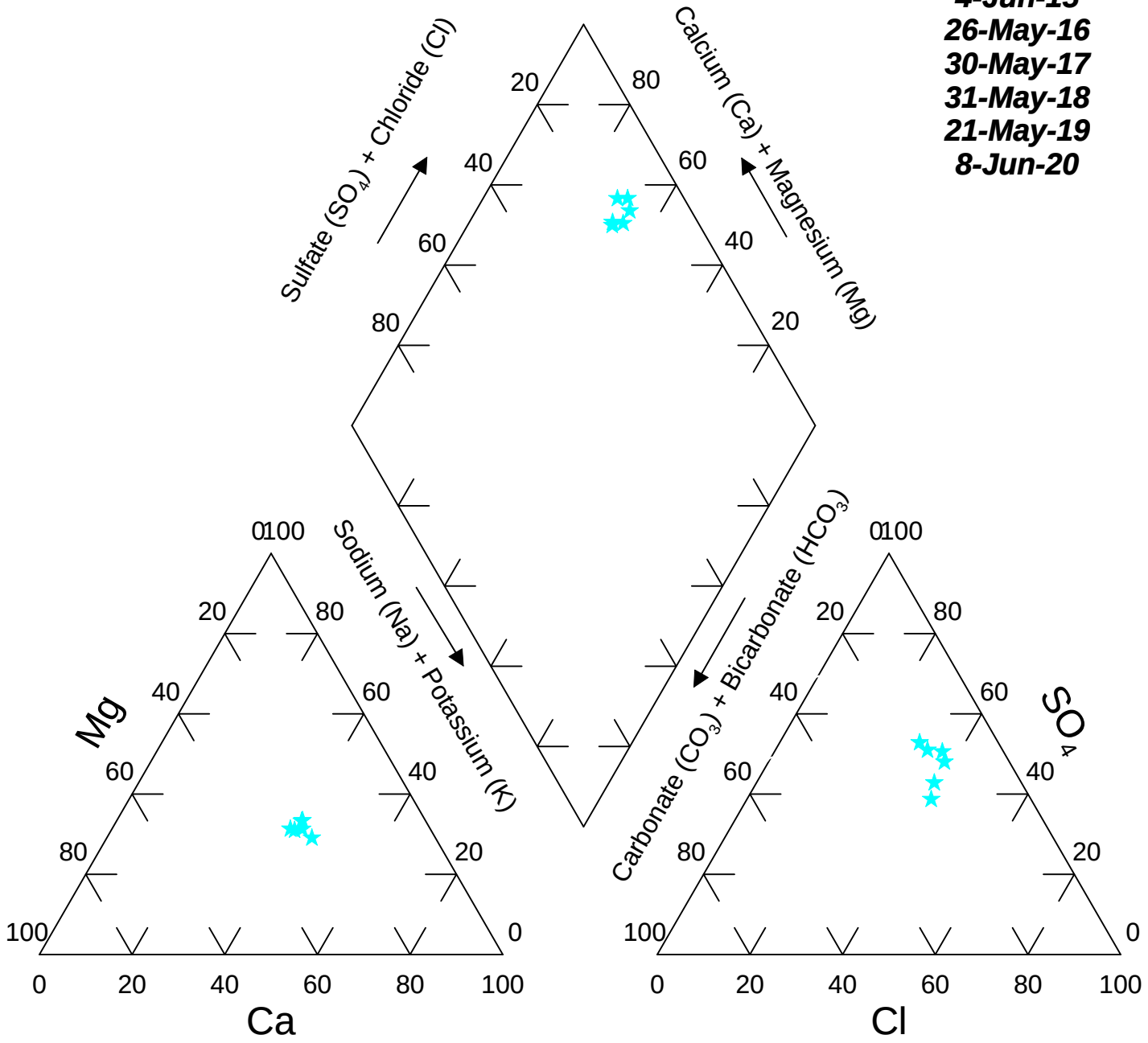
Dates:
9-Jun-15
30-May-16
24-May-17
30-May-18
21-May-19
4-Jun-20



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N63-E

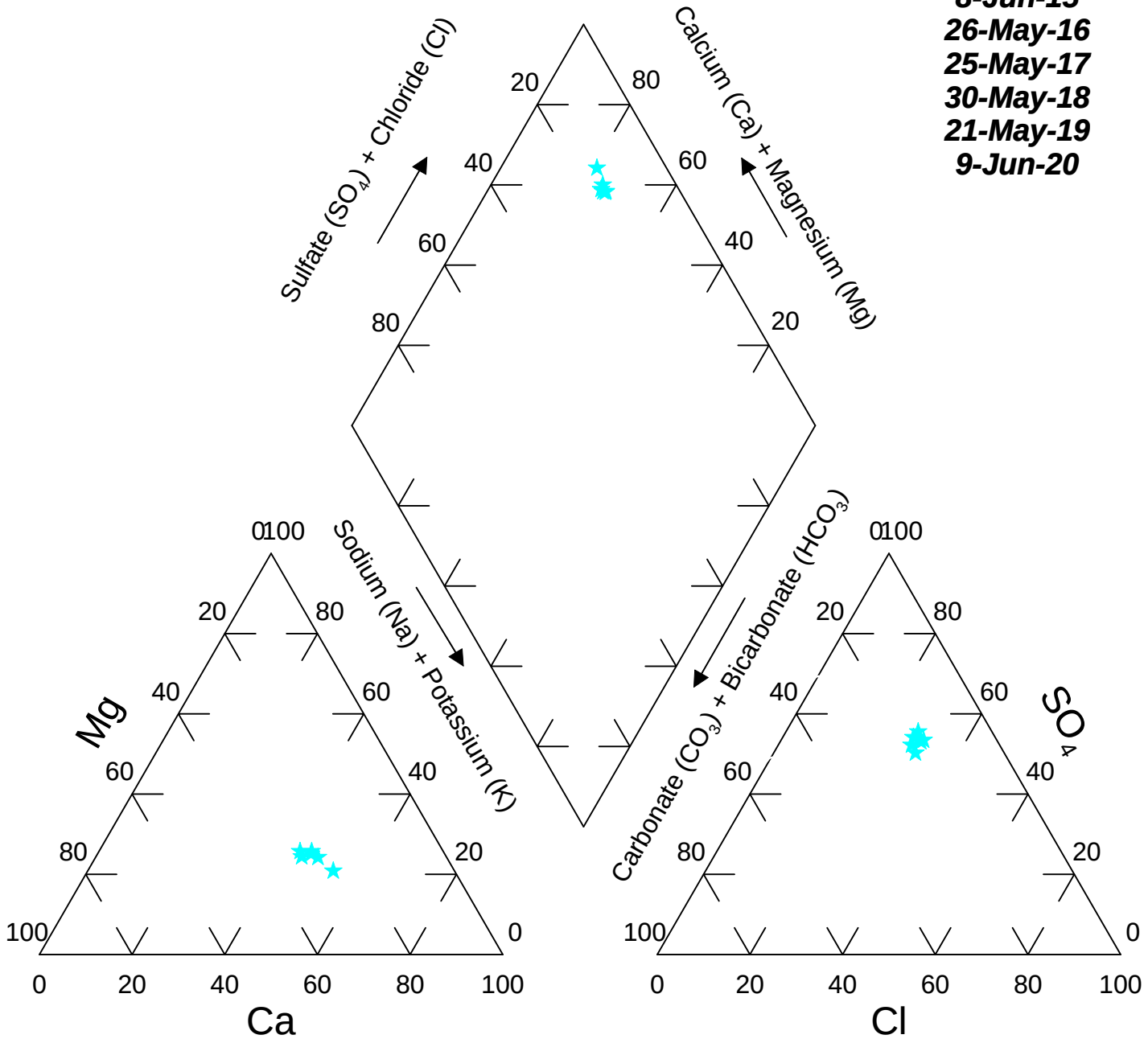
Dates:
4-Jun-15
26-May-16
30-May-17
31-May-18
21-May-19
8-Jun-20



Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-6N67-E

Dates:
8-Jun-15
26-May-16
25-May-17
30-May-18
21-May-19
9-Jun-20



Winnipeg
Water and Waste Department

Site: Brady
Well #: 4N34-D/DR

Dates:
8-Jun-15
7-Jun-16
25-May-17
4-May-18
16-May-19
8-Jun-20

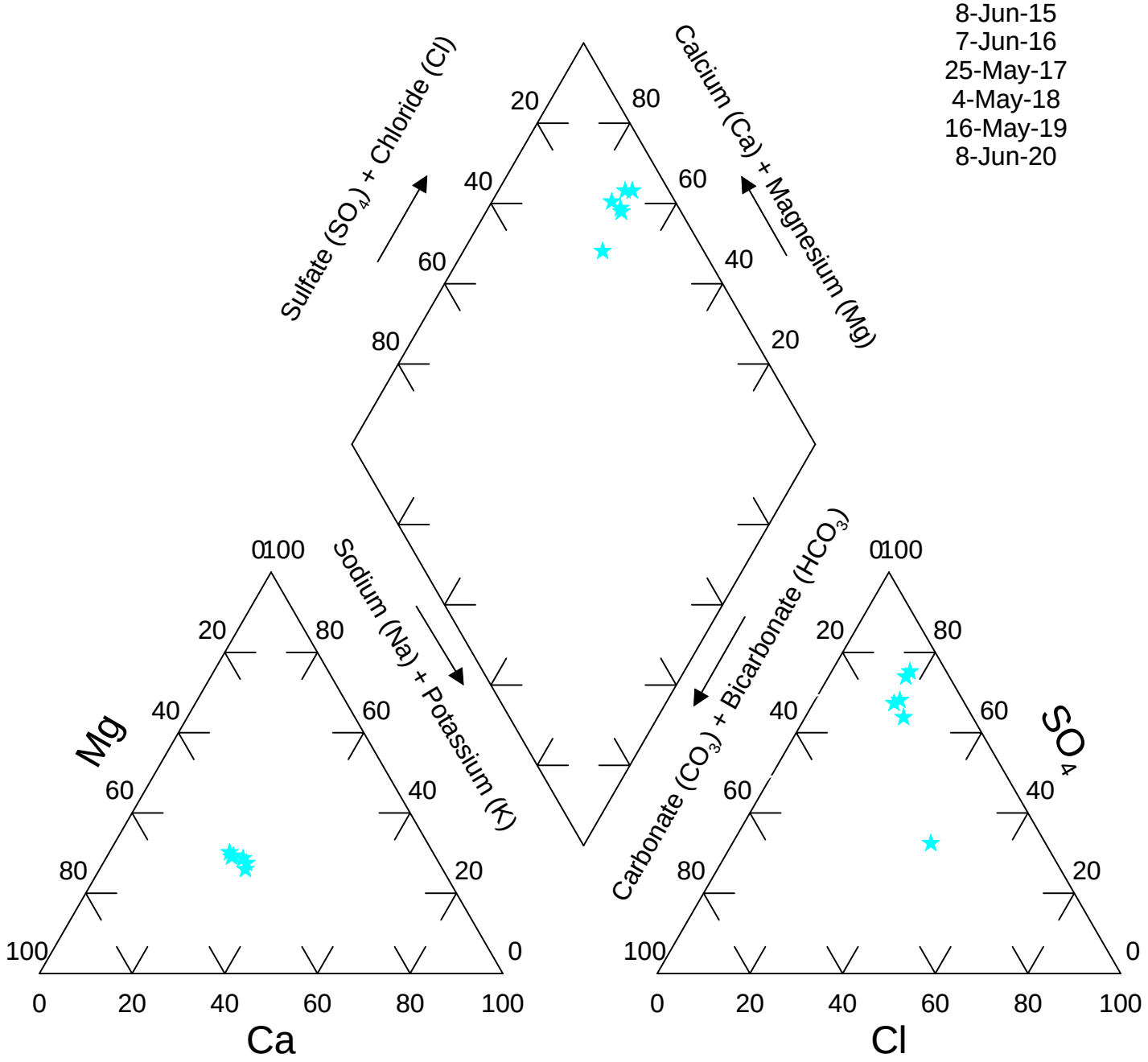
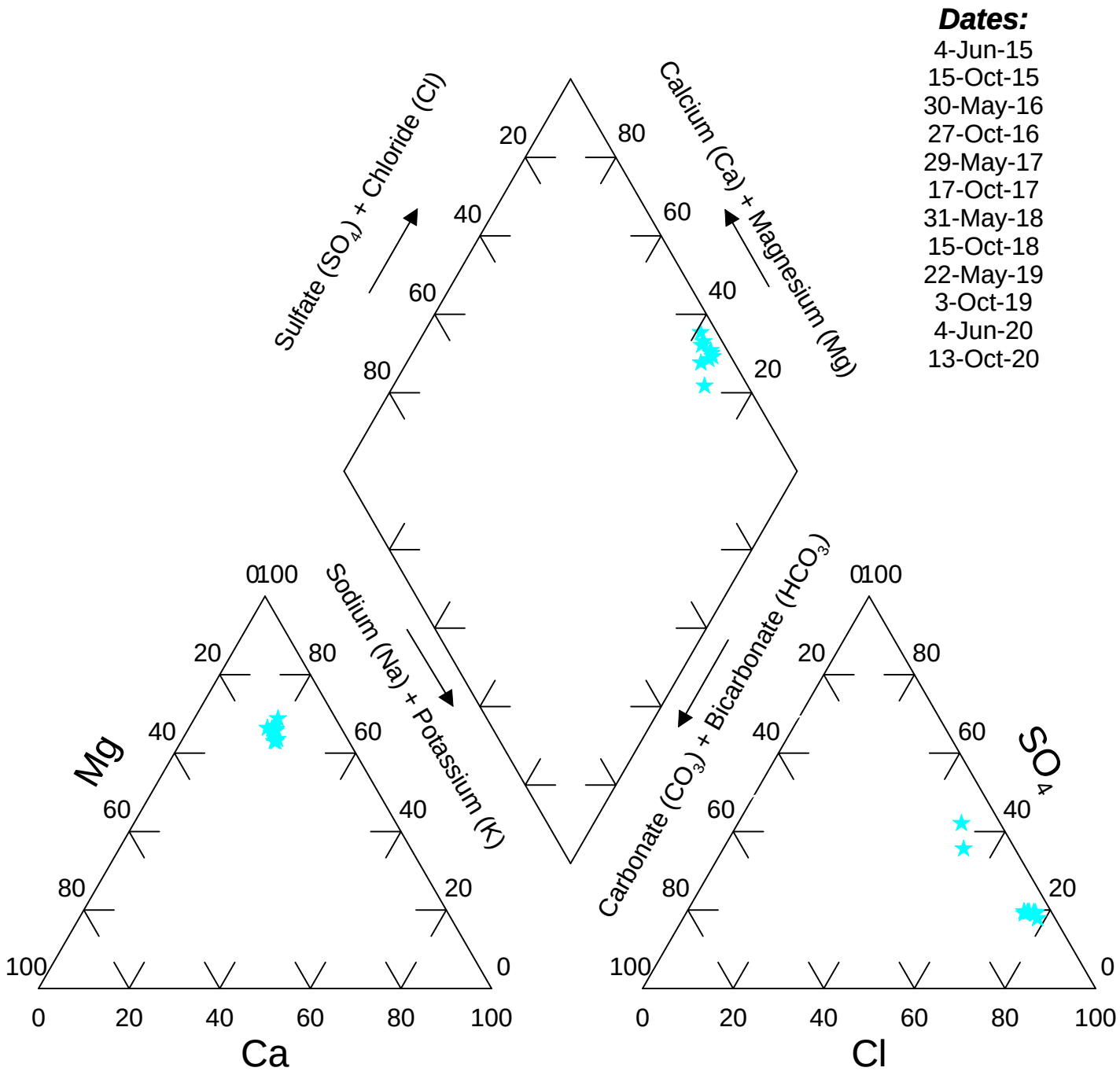


FIGURE: 10P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 5N62-E



Dates:

4-Jun-15
15-Oct-15
30-May-16
27-Oct-16
29-May-17
17-Oct-17
31-May-18
15-Oct-18
22-May-19
3-Oct-19
4-Jun-20
13-Oct-20

FIGURE: 11P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N57-F/FR

Dates:
10-Jun-15
26-May-16
24-May-17
30-May-18
21-May-19
8-Jun-20

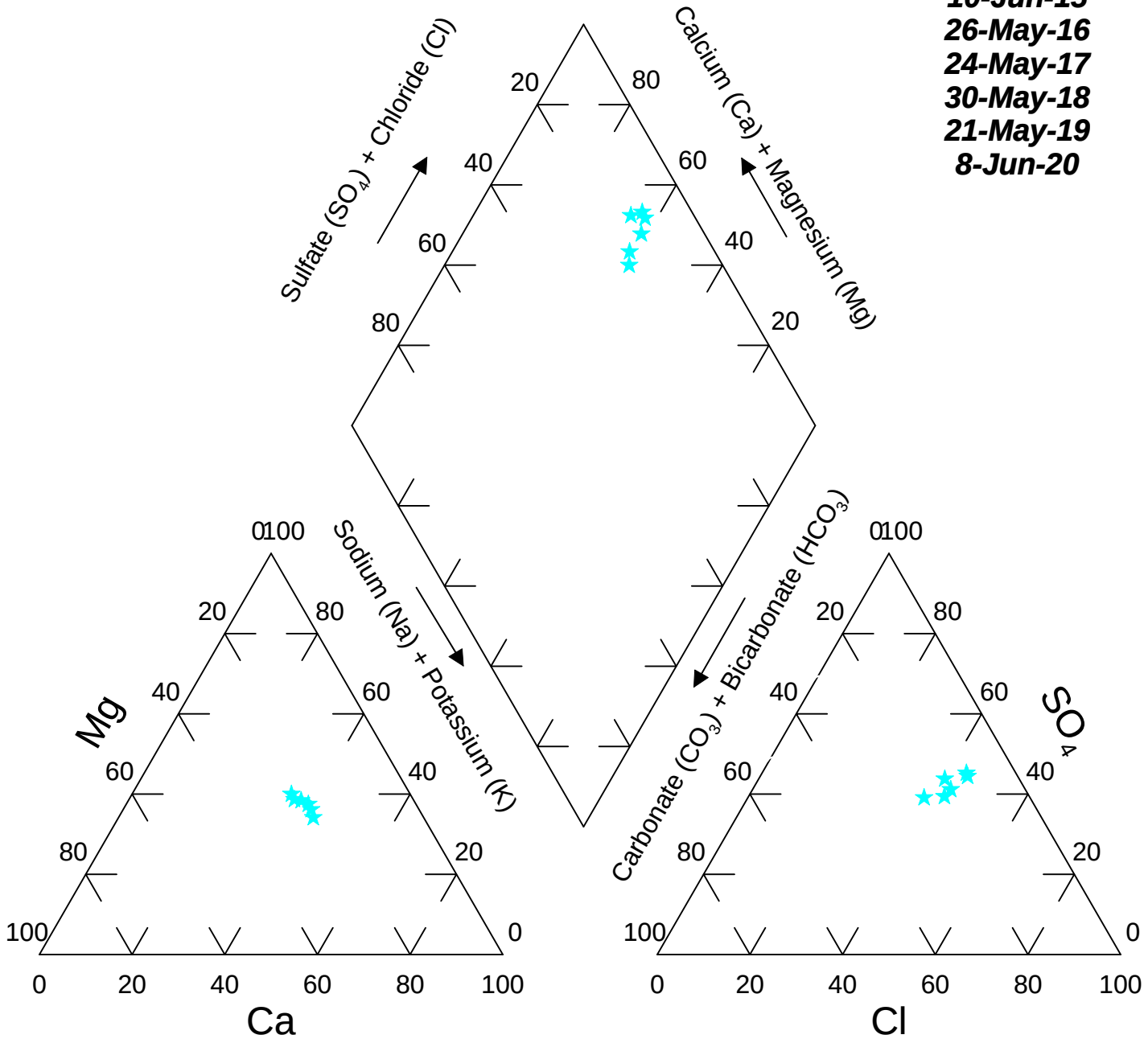
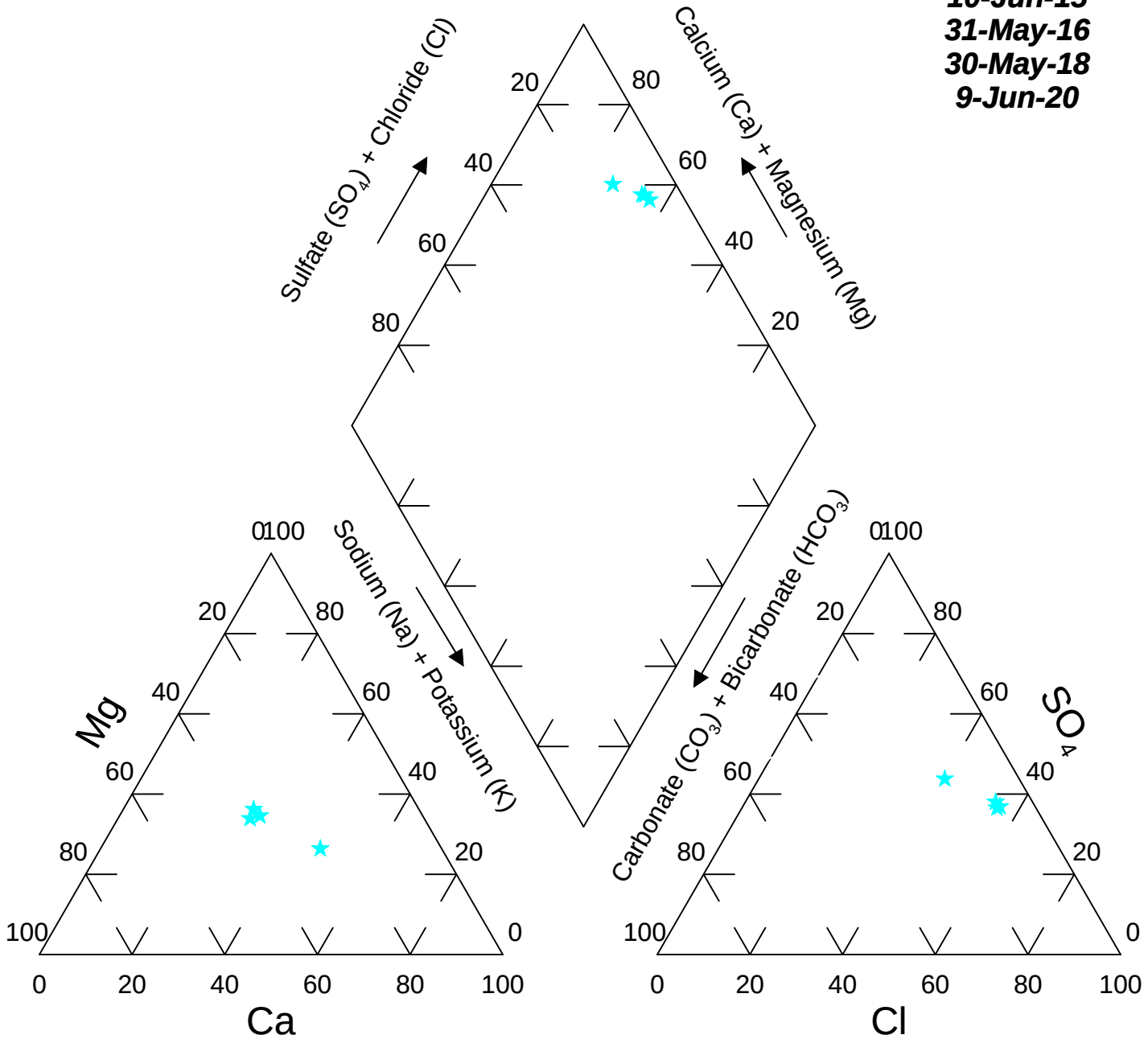


FIGURE: 12P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N58FR

Dates:
10-Jun-15
31-May-16
30-May-18
9-Jun-20



Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N59-F/FR

Dates:
11-Jun-15
30-May-16
30-May-18
9-Jun-20

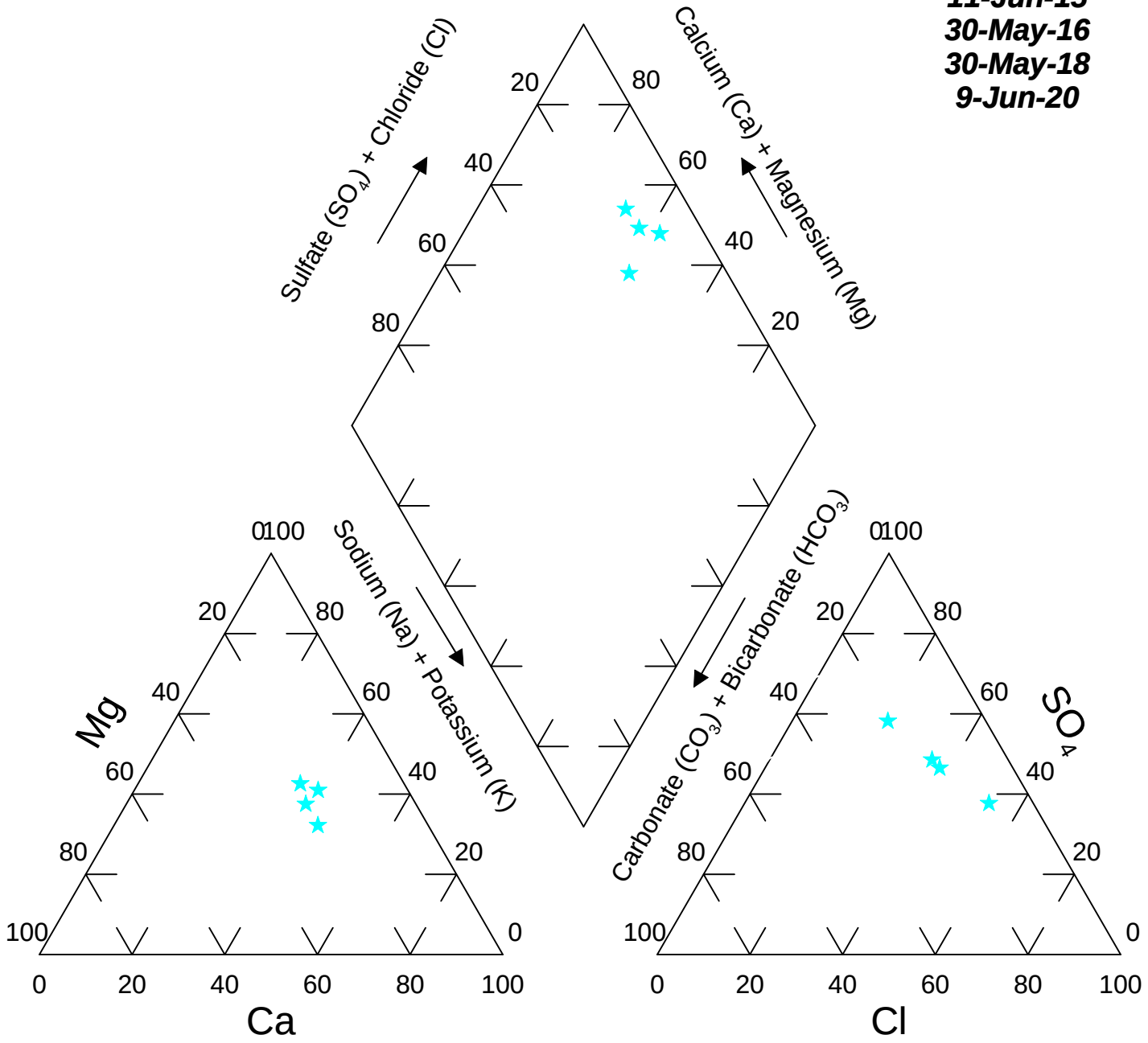


FIGURE: 14P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N60-E/ER

Dates:
8-Jun-15
15-Oct-15
30-May-16
27-Oct-16
24-May-17
17-Oct-17
30-May-18
15-Oct-18
21-May-19
3-Oct-19
4-Jun-20
15-Oct-20

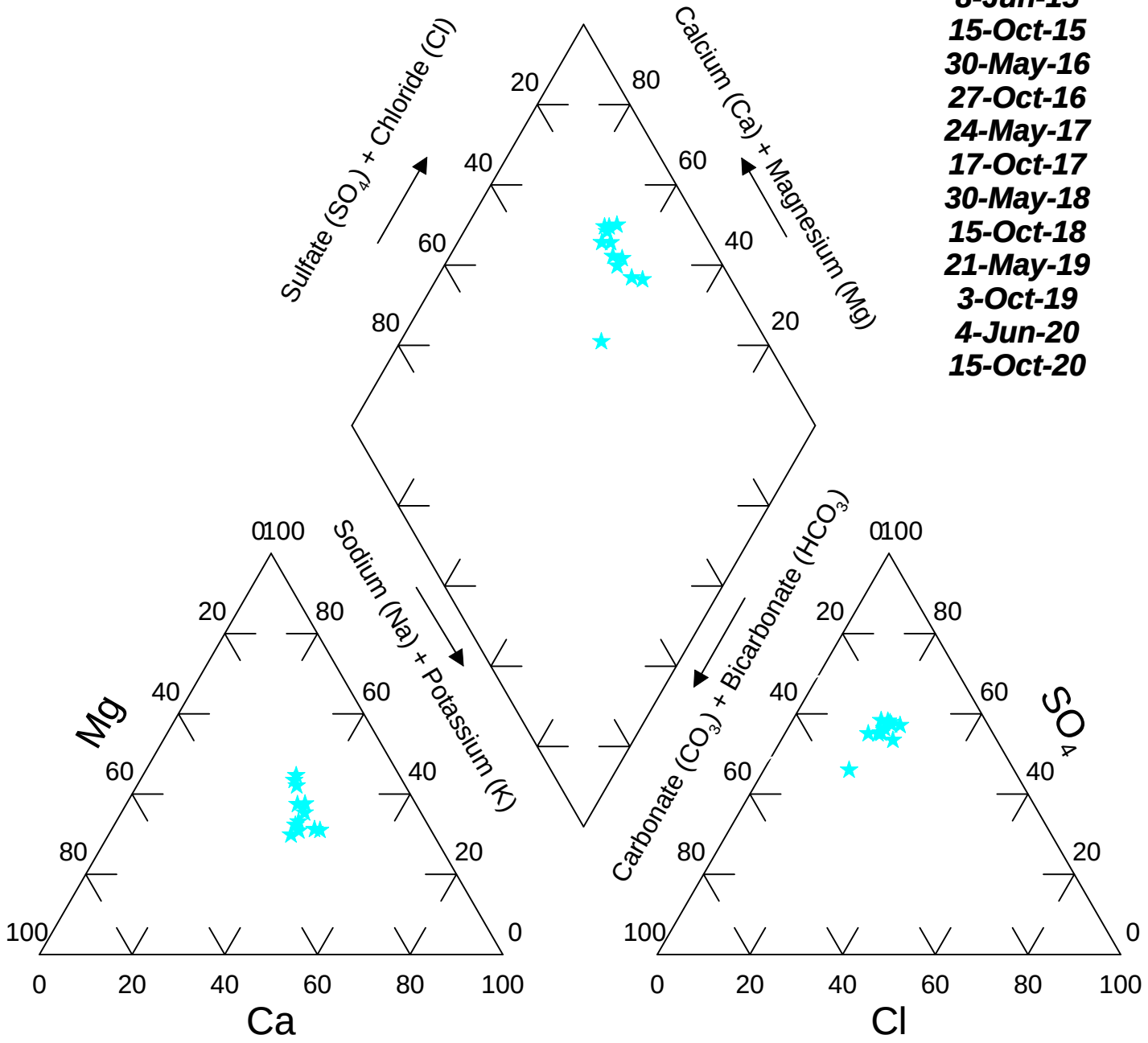


FIGURE: 15P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N63-F

Dates:
4-Jun-15
26-May-16
29-May-17
31-May-18
21-May-19
10-Jun-20

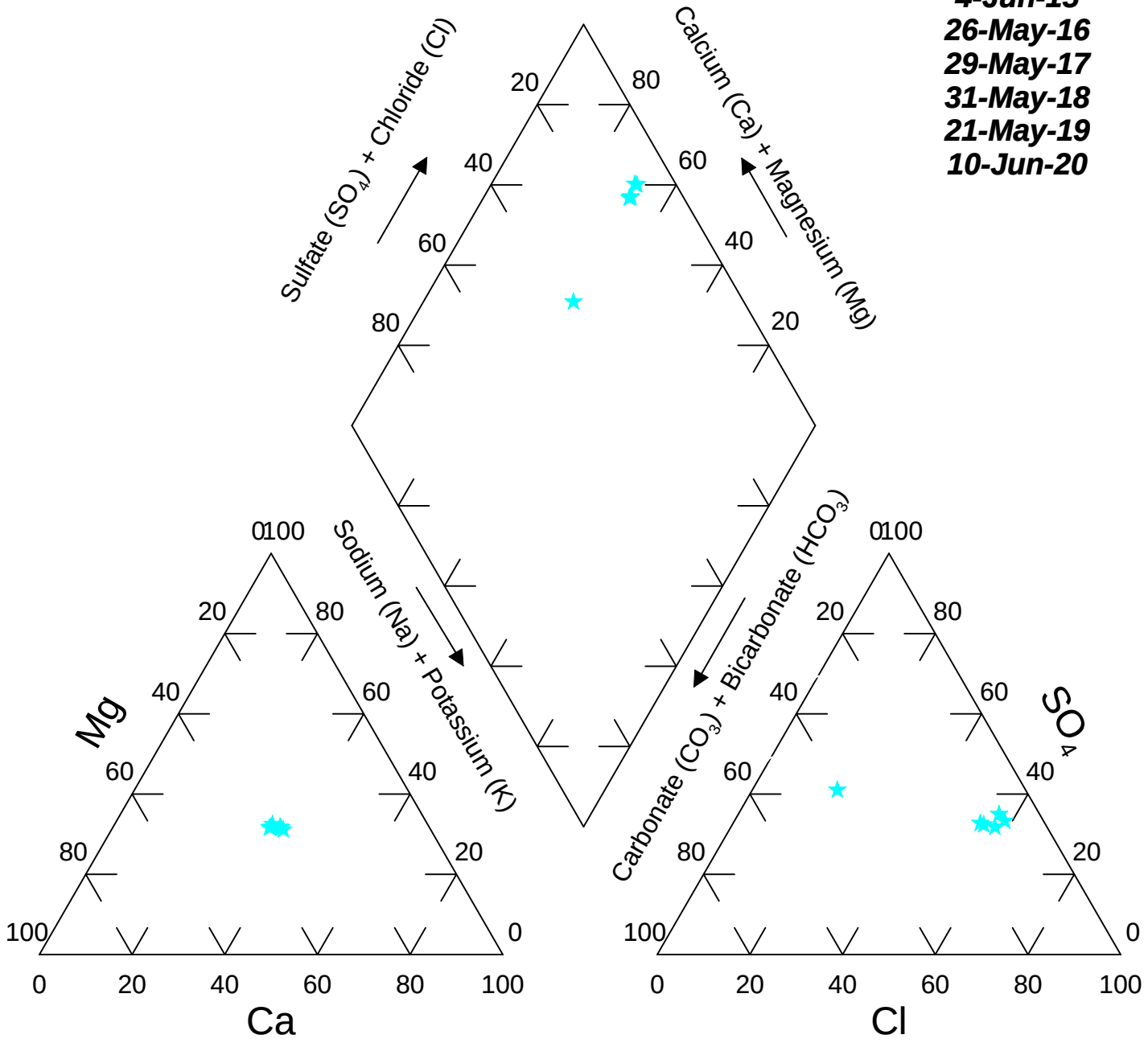


FIGURE: 16P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 6N67-F

Dates:
8-Jun-15
26-May-16
25-May-17
30-May-18
21-May-19
9-Jun-20

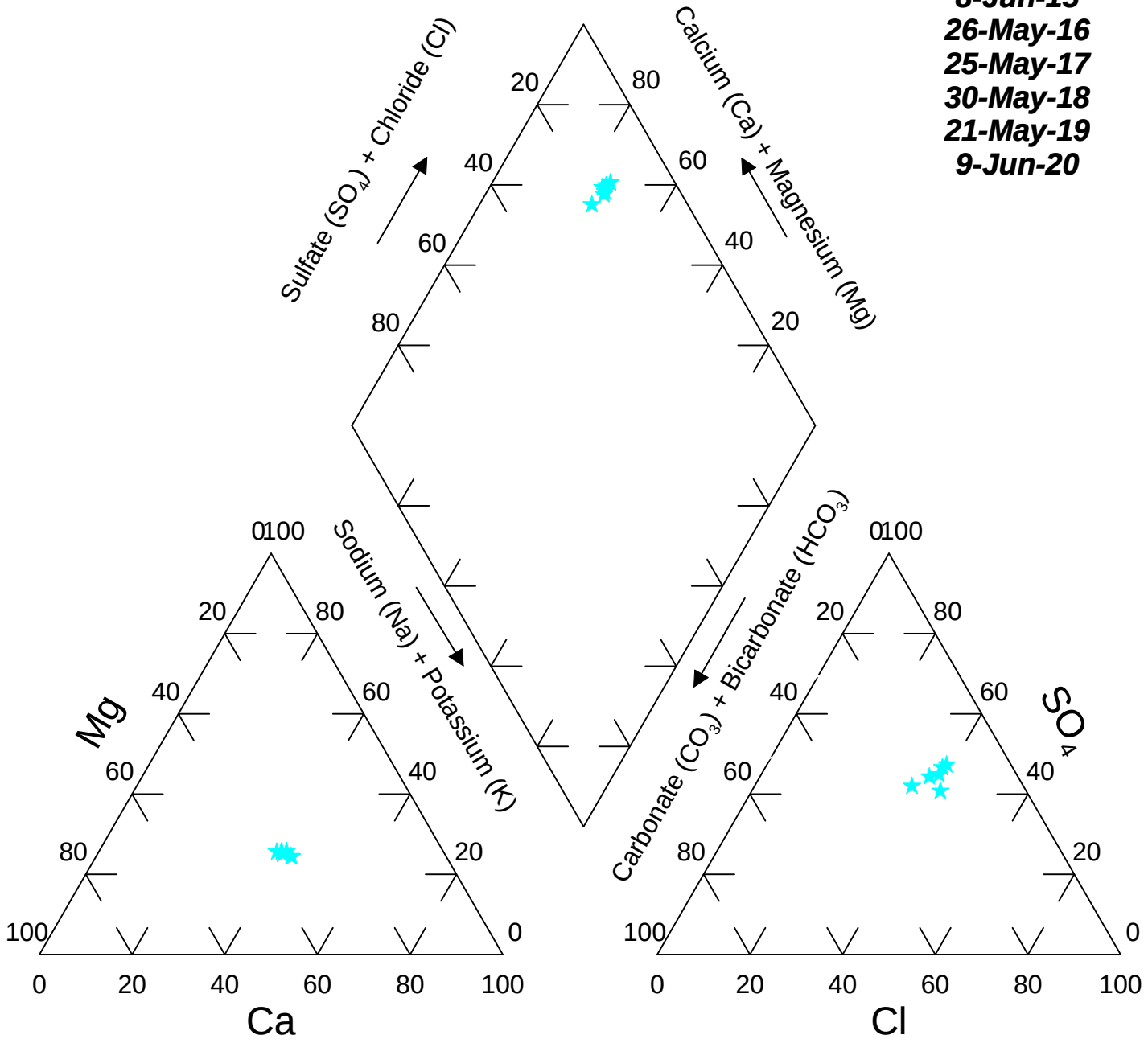
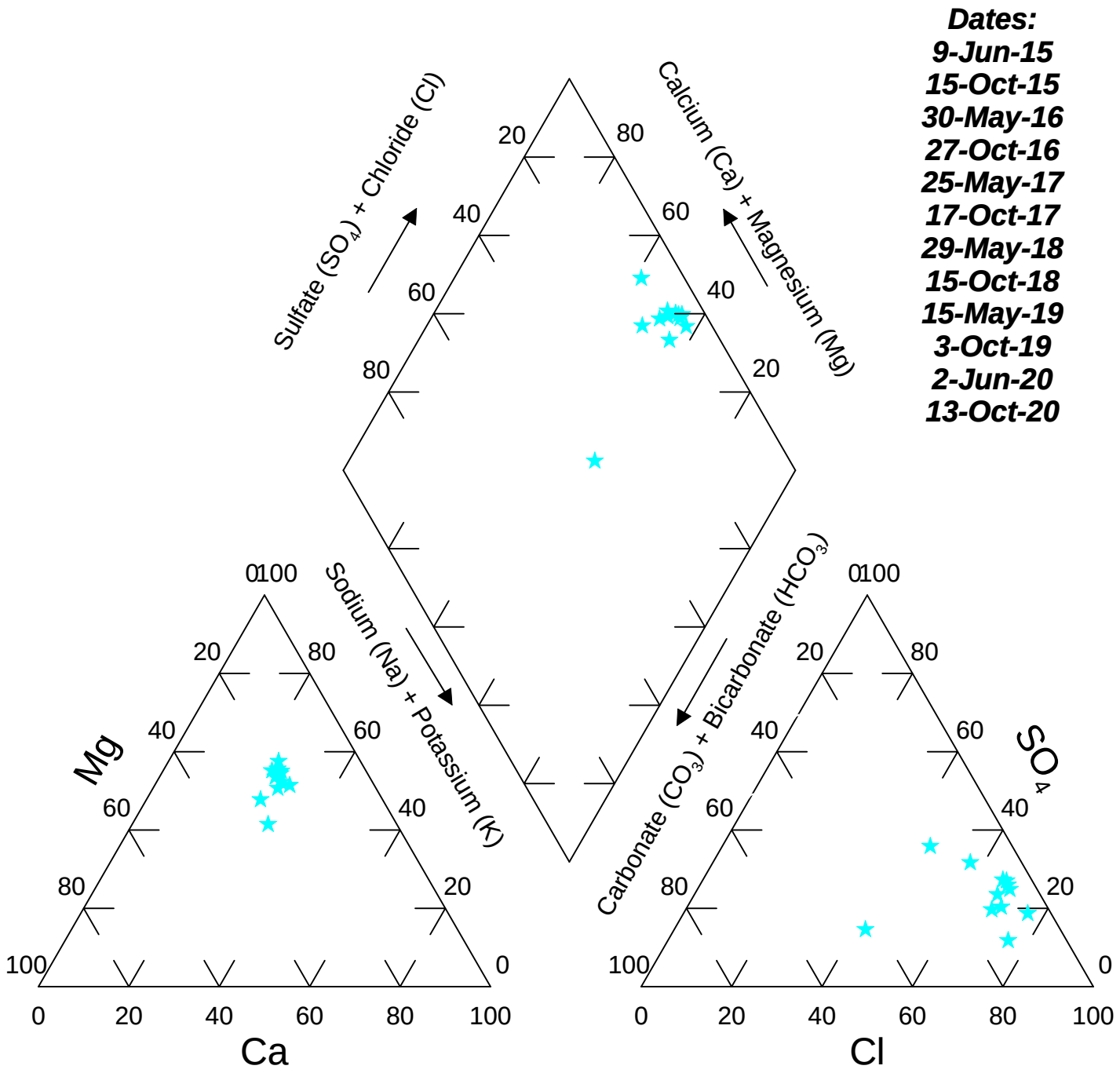


FIGURE: 17P

Winnipeg
Water and Waste Department

Site: Brady
Well #: 13A



Dates:
9-Jun-15
15-Oct-15
30-May-16
27-Oct-16
25-May-17
17-Oct-17
29-May-18
15-Oct-18
15-May-19
3-Oct-19
2-Jun-20
13-Oct-20

Winnipeg
Water and Waste Department

Site: Brady
Well #: 14A

Dates:
4-Jun-15
15-Oct-15
30-May-16
28-Oct-16
25-May-17
17-Oct-17
29-May-18
16-Oct-18
15-May-19
3-Oct-19
3-Jun-20
15-Oct-20

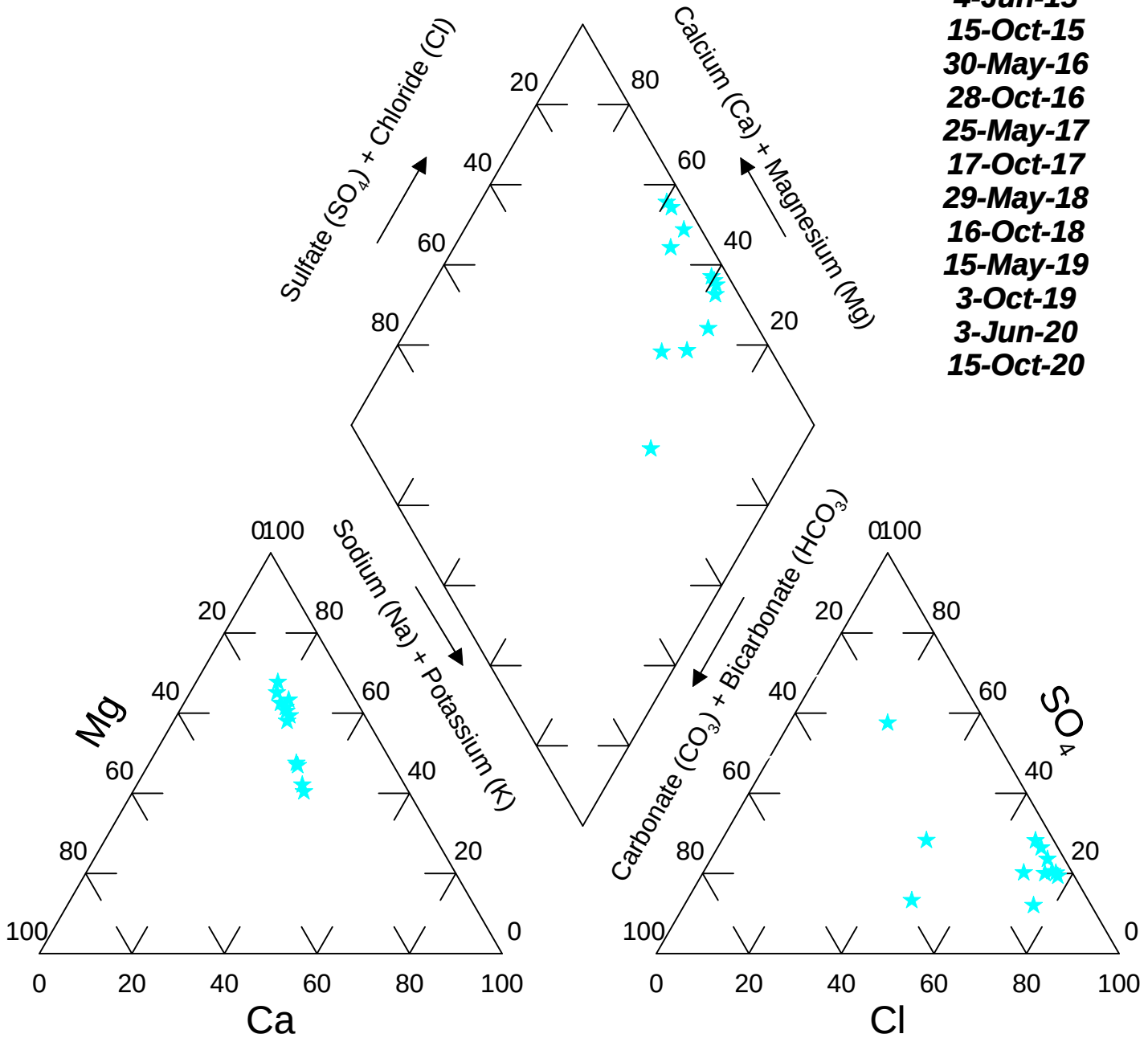
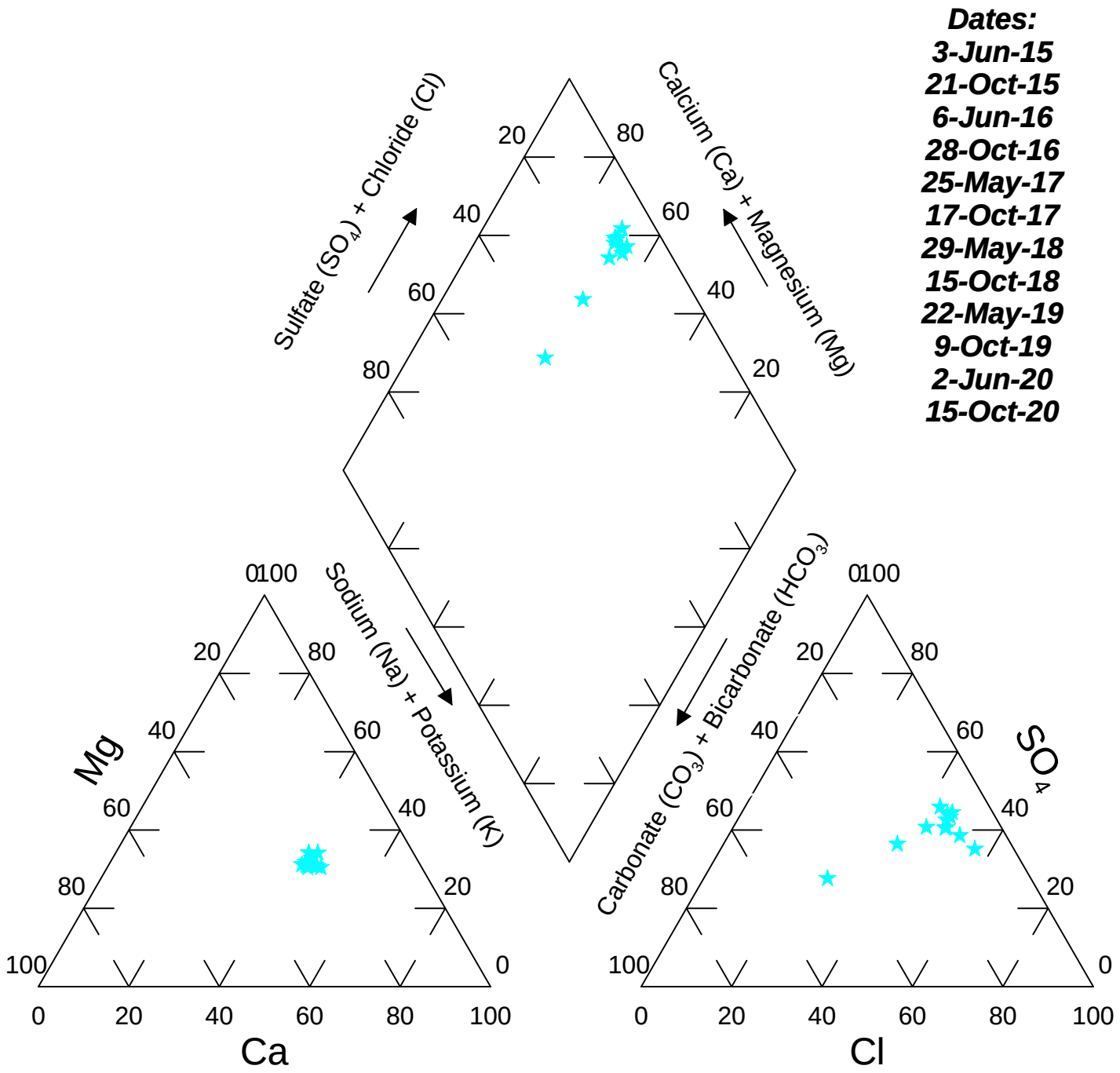


FIGURE: 13P

Winnipeg
Water and Waste Department

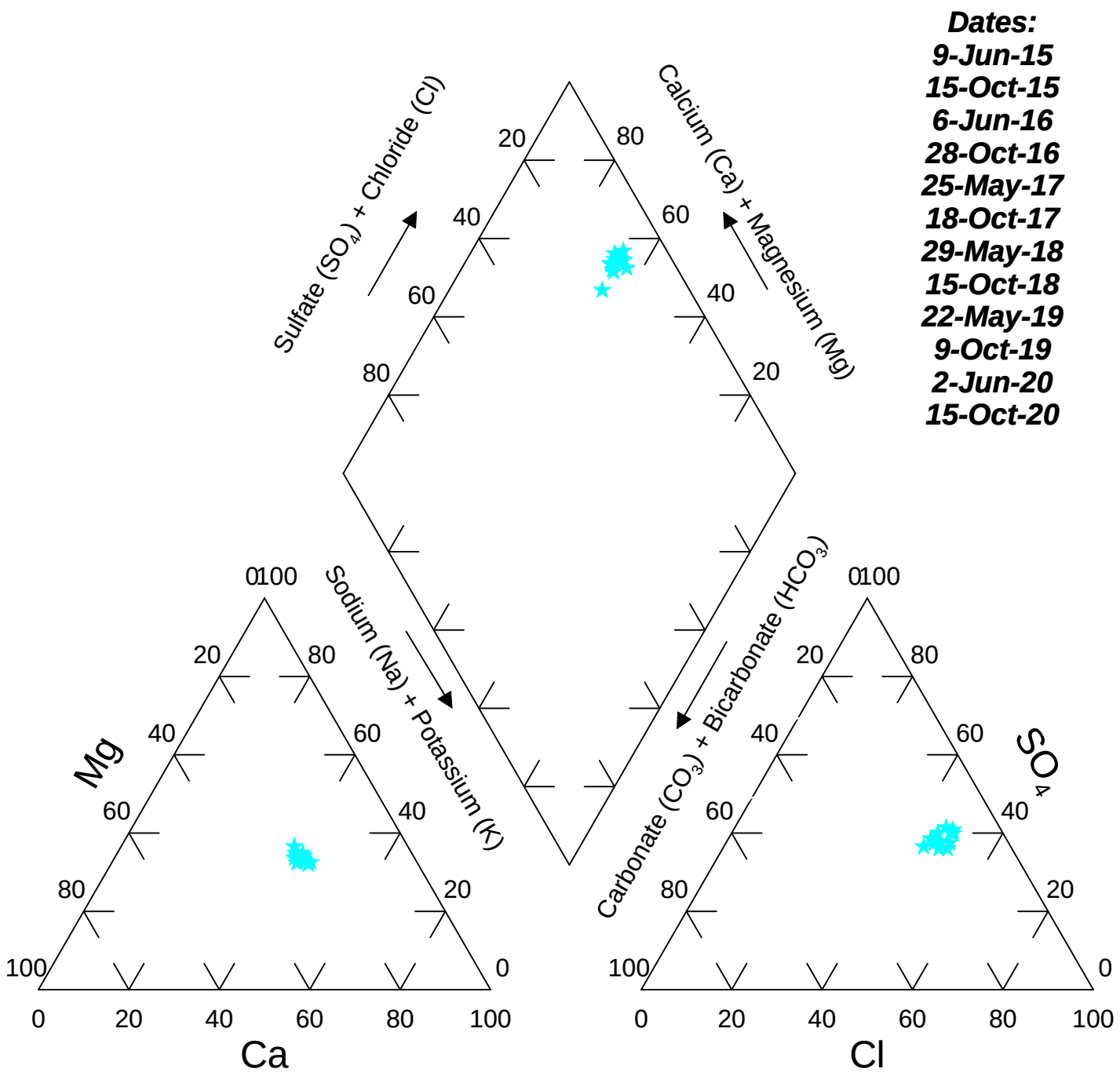
Site: Brady
Well #: 15A



Dates:
3-Jun-15
21-Oct-15
6-Jun-16
28-Oct-16
25-May-17
17-Oct-17
29-May-18
15-Oct-18
22-May-19
9-Oct-19
2-Jun-20
15-Oct-20

Winnipeg
Water and Waste Department

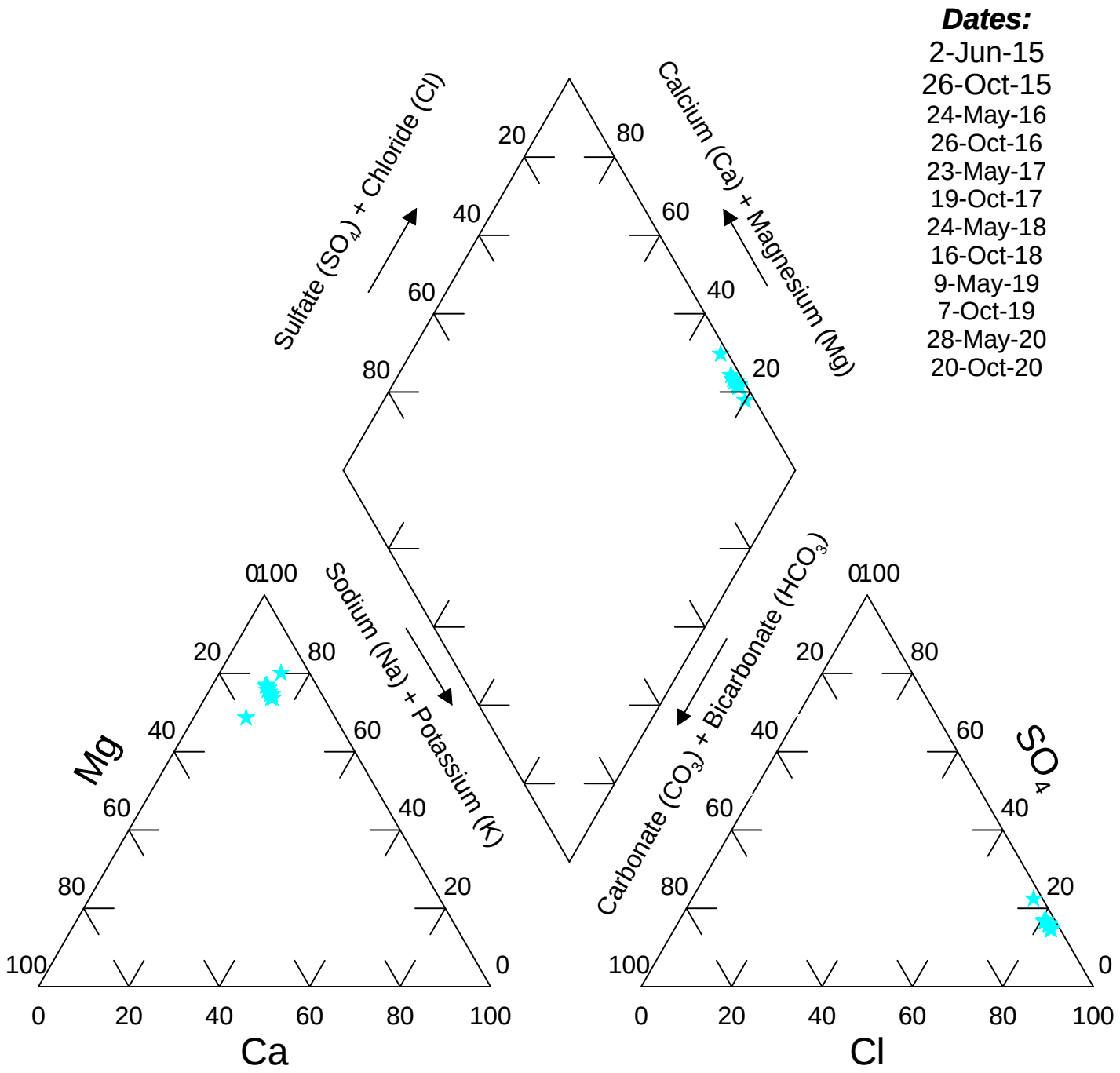
Site: Brady
Well #: 16A



Dates:
9-Jun-15
15-Oct-15
6-Jun-16
28-Oct-16
25-May-17
18-Oct-17
29-May-18
15-Oct-18
22-May-19
9-Oct-19
2-Jun-20
15-Oct-20

Winnipeg
Water and Waste Department

Site: Brady
Well #: W4



Dates:

2-Jun-15
26-Oct-15
24-May-16
26-Oct-16
23-May-17
19-Oct-17
24-May-18
16-Oct-18
9-May-19
7-Oct-19
28-May-20
20-Oct-20

FIGURE: 1P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W5

Dates:
2-Jun-15
26-Oct-15
24-May-16
26-Oct-16
23-May-17
19-Oct-17
24-May-18
18-Oct-18
9-May-19
7-Oct-19
28-May-20
15-Oct-20

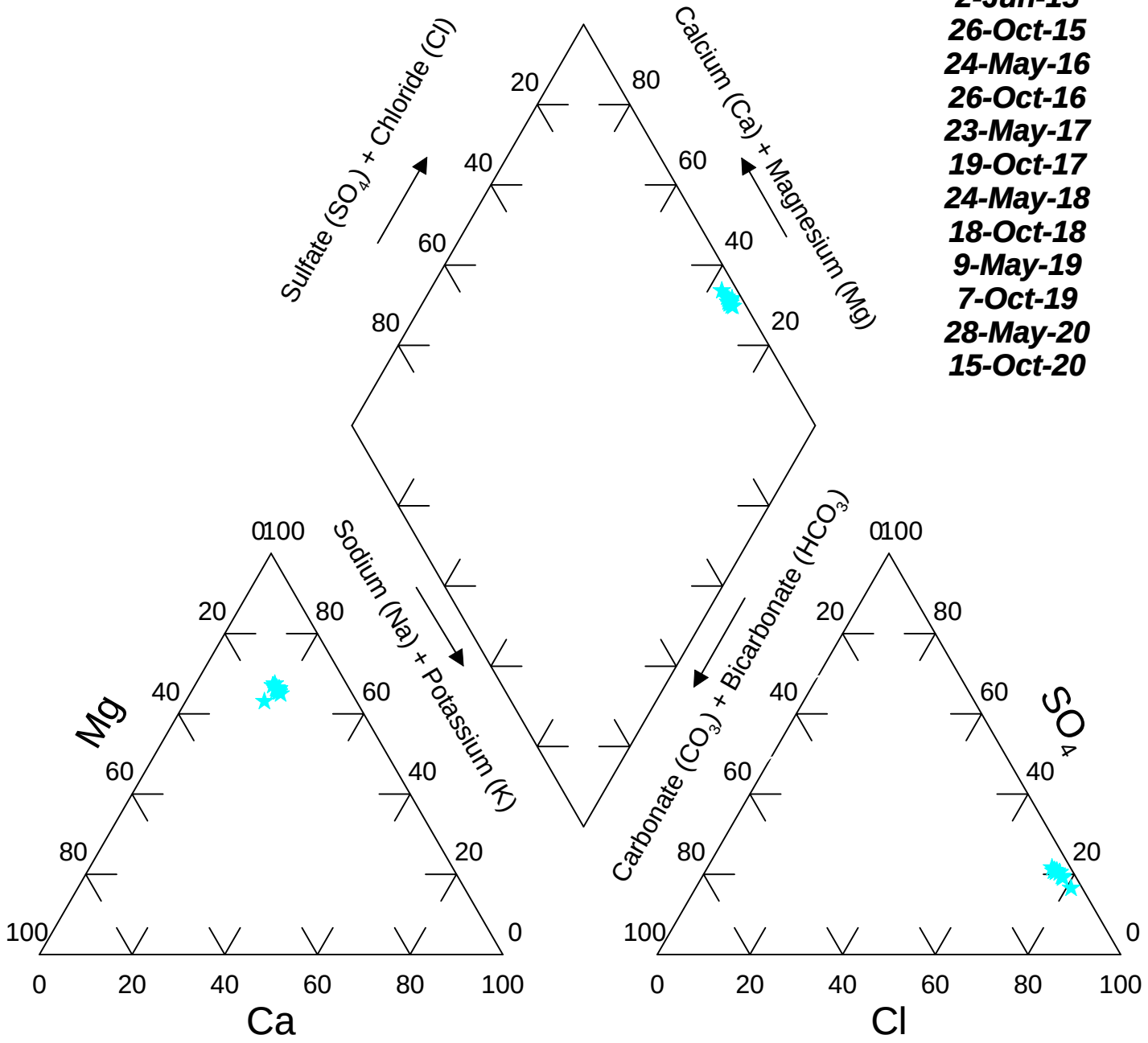
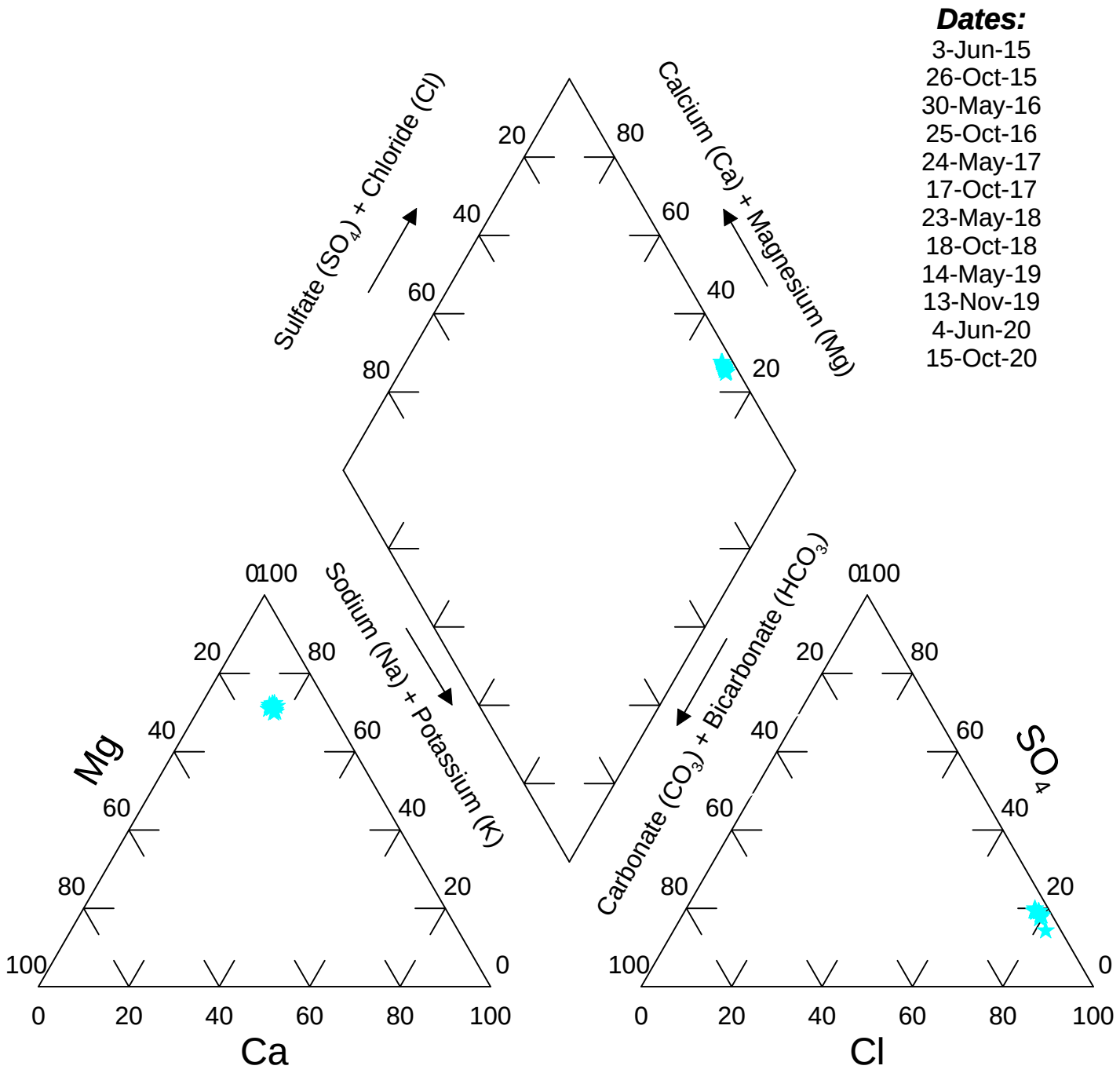


FIGURE: 2P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W6



Dates:

3-Jun-15
26-Oct-15
30-May-16
25-Oct-16
24-May-17
17-Oct-17
23-May-18
18-Oct-18
14-May-19
13-Nov-19
4-Jun-20
15-Oct-20

FIGURE: 3P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W7

Dates:
2-Jun-15
26-Oct-15
24-May-16
24-Oct-16
24-May-17
17-Oct-17
23-May-18
17-Oct-18
14-May-19
13-Nov-19
4-Jun-20
20-Oct-20

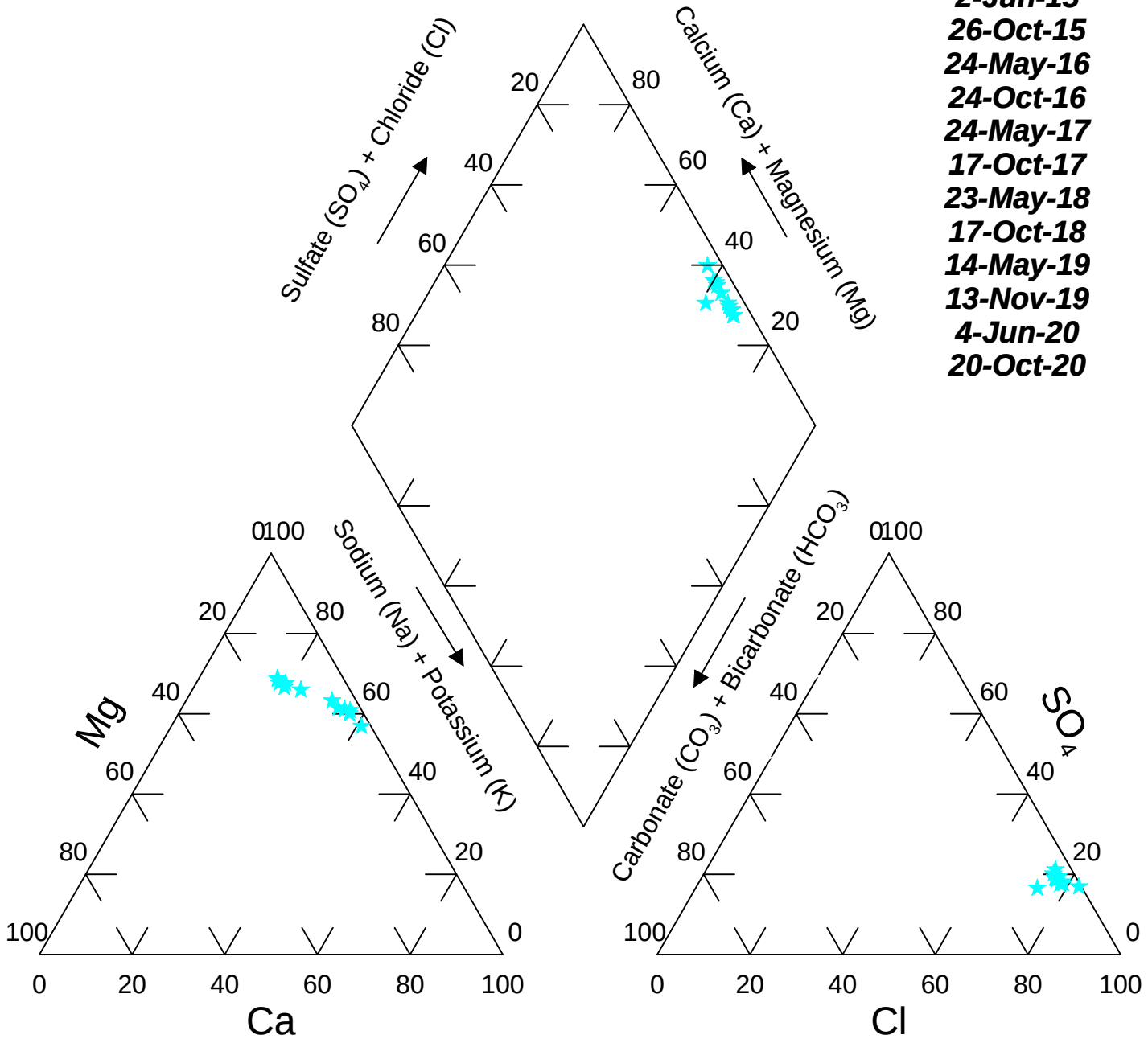


FIGURE: 4P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W8

Dates:
3-Jun-15
26-Oct-15
25-May-16
24-Oct-16
24-May-17
17-Oct-17
29-May-18
18-Oct-18
13-May-19
13-Nov-19
4-Jun-20
20-Oct-20

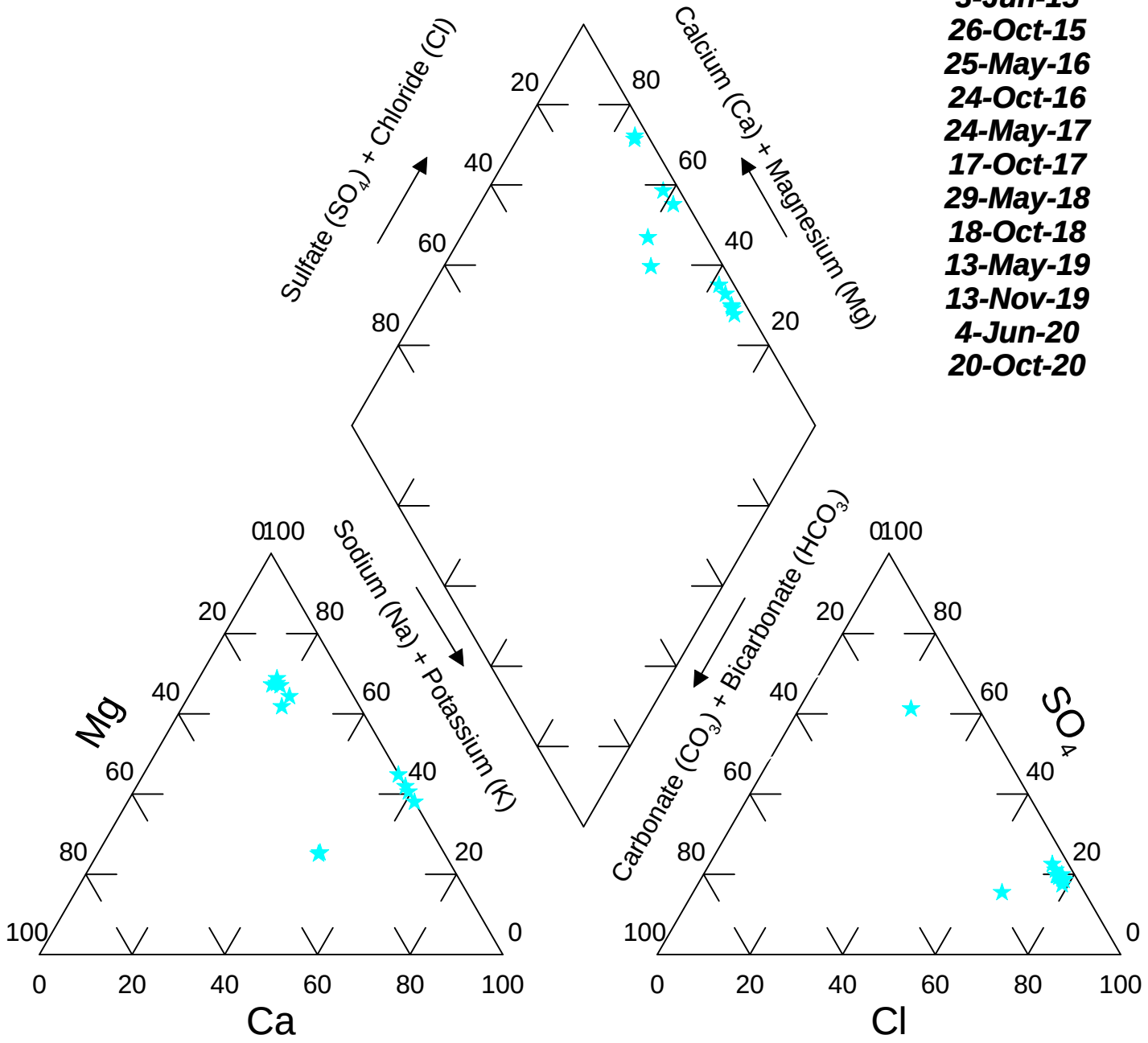


FIGURE: 5P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W9

Dates:
3-Jun-15
22-Oct-15
24-May-16
26-Oct-16
23-May-17
18-Oct-17
24-May-18
18-Oct-18
15-May-19
8-Oct-19
4-Jun-20
20-Oct-20

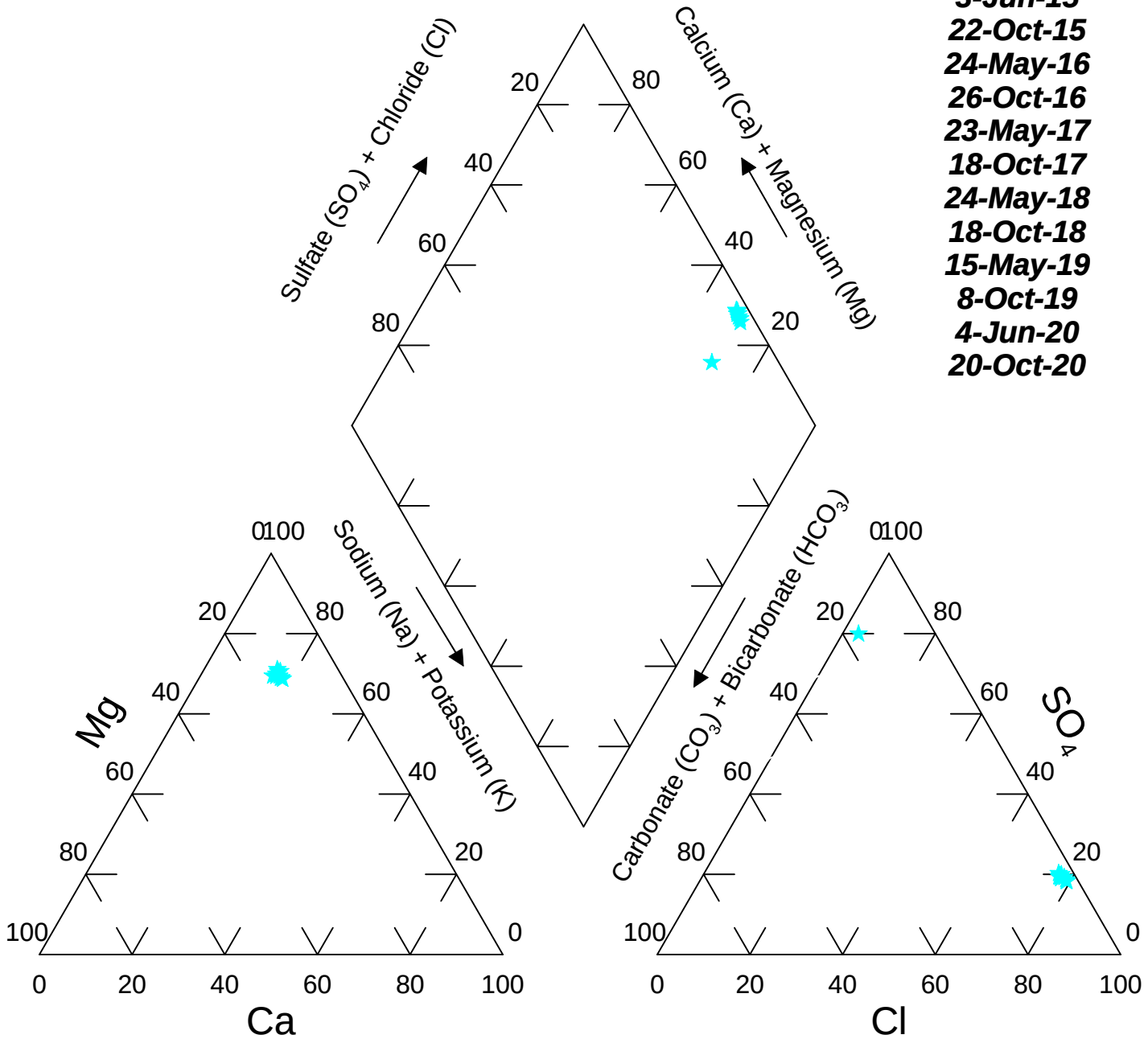
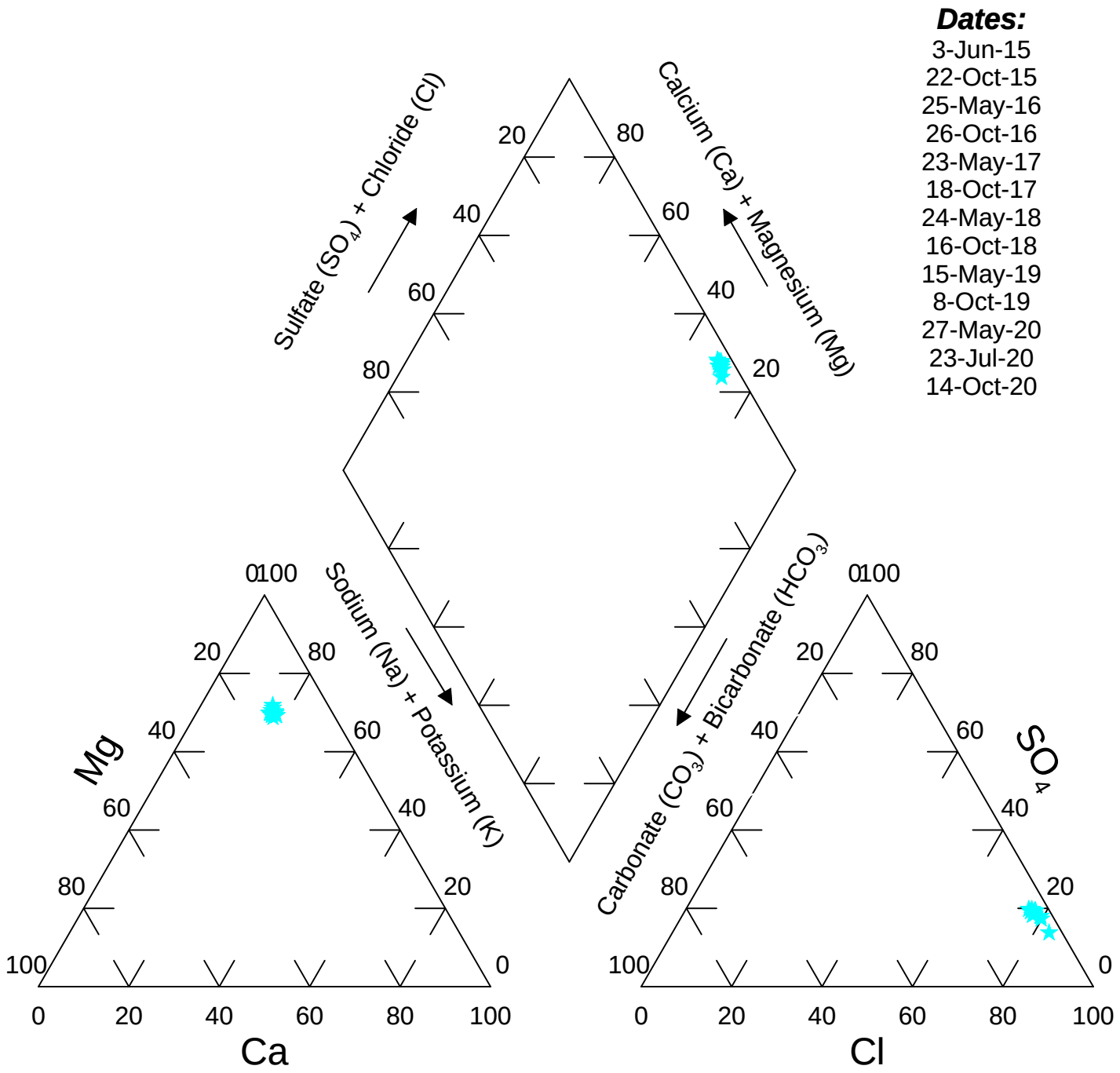


FIGURE: 6P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W10/W10R



Dates:

3-Jun-15
22-Oct-15
25-May-16
26-Oct-16
23-May-17
18-Oct-17
24-May-18
16-Oct-18
15-May-19
8-Oct-19
27-May-20
23-Jul-20
14-Oct-20

FIGURE: 7P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W11

Dates:
10-Jun-14
23-Oct-14
2-Jun-15
22-Oct-15
25-May-16
26-Oct-16
23-May-17
18-Oct-17
24-May-18
17-Oct-18
15-May-19
8-Oct-19

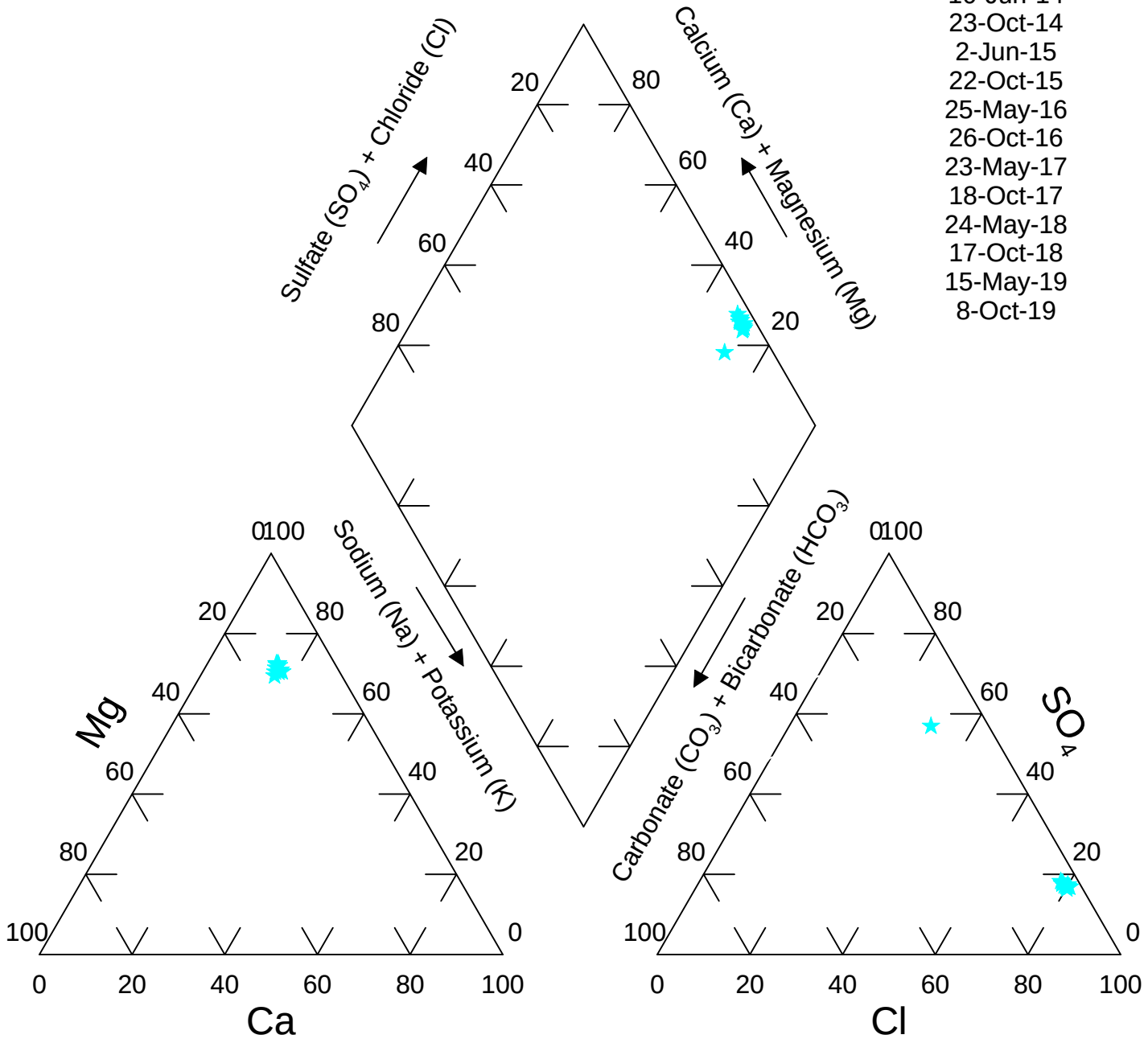
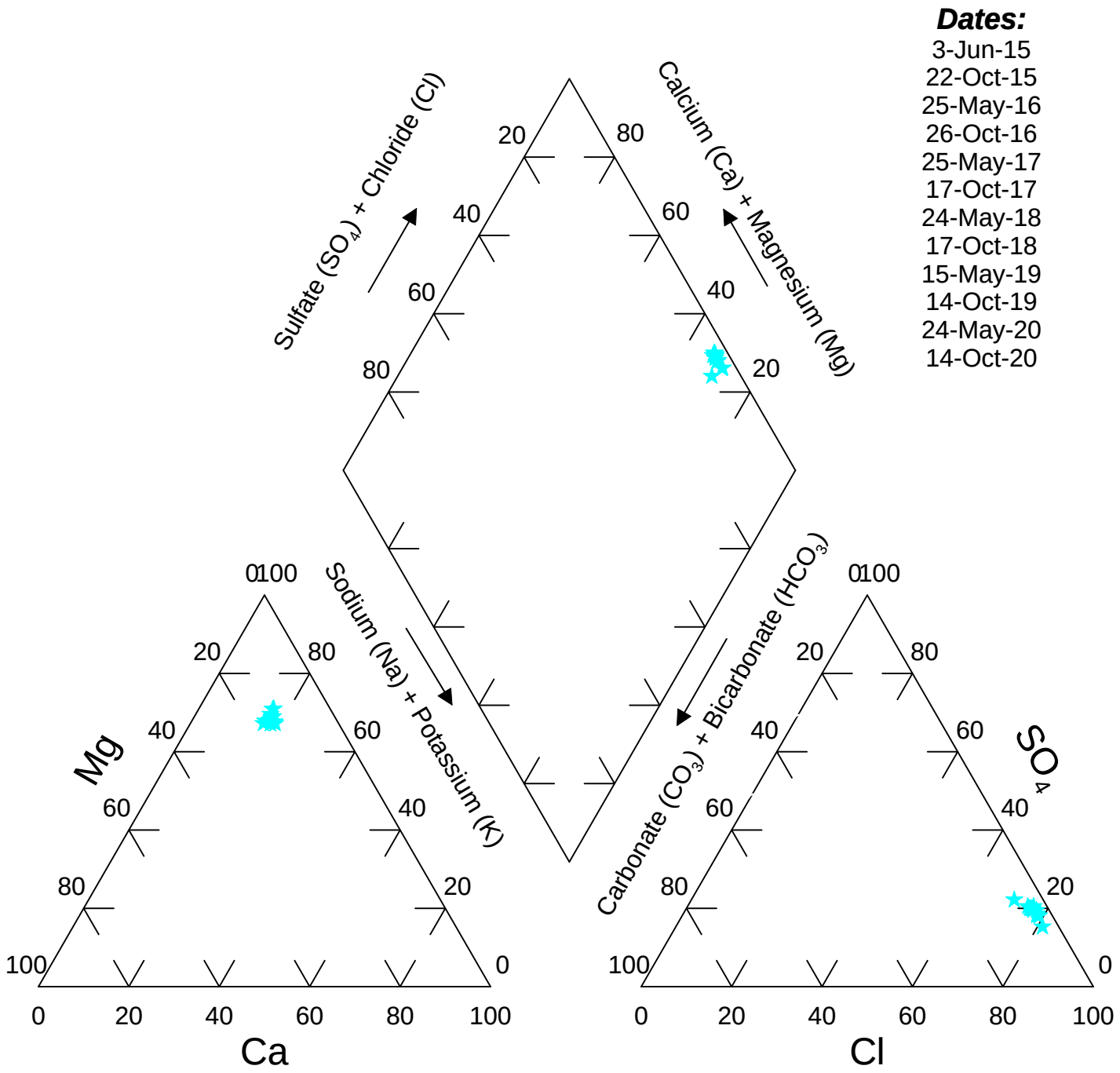


FIGURE: 8P

Winnipeg
Water and Waste Department

Site: Brady
Well #: W12



Dates:

3-Jun-15
22-Oct-15
25-May-16
26-Oct-16
25-May-17
17-Oct-17
24-May-18
17-Oct-18
15-May-19
14-Oct-19
24-May-20
14-Oct-20

FIGURE: 9P

Winnipeg
Water and Waste Department

Site: Brady
Location : W13

Dates:
1-Jun-15
21-Oct-15
27-May-16
24-Oct-16
24-May-17
16-Oct-17
28-May-18
17-Oct-18
13-May-19
8-Oct-19
2-Jun-20
20-Oct-20

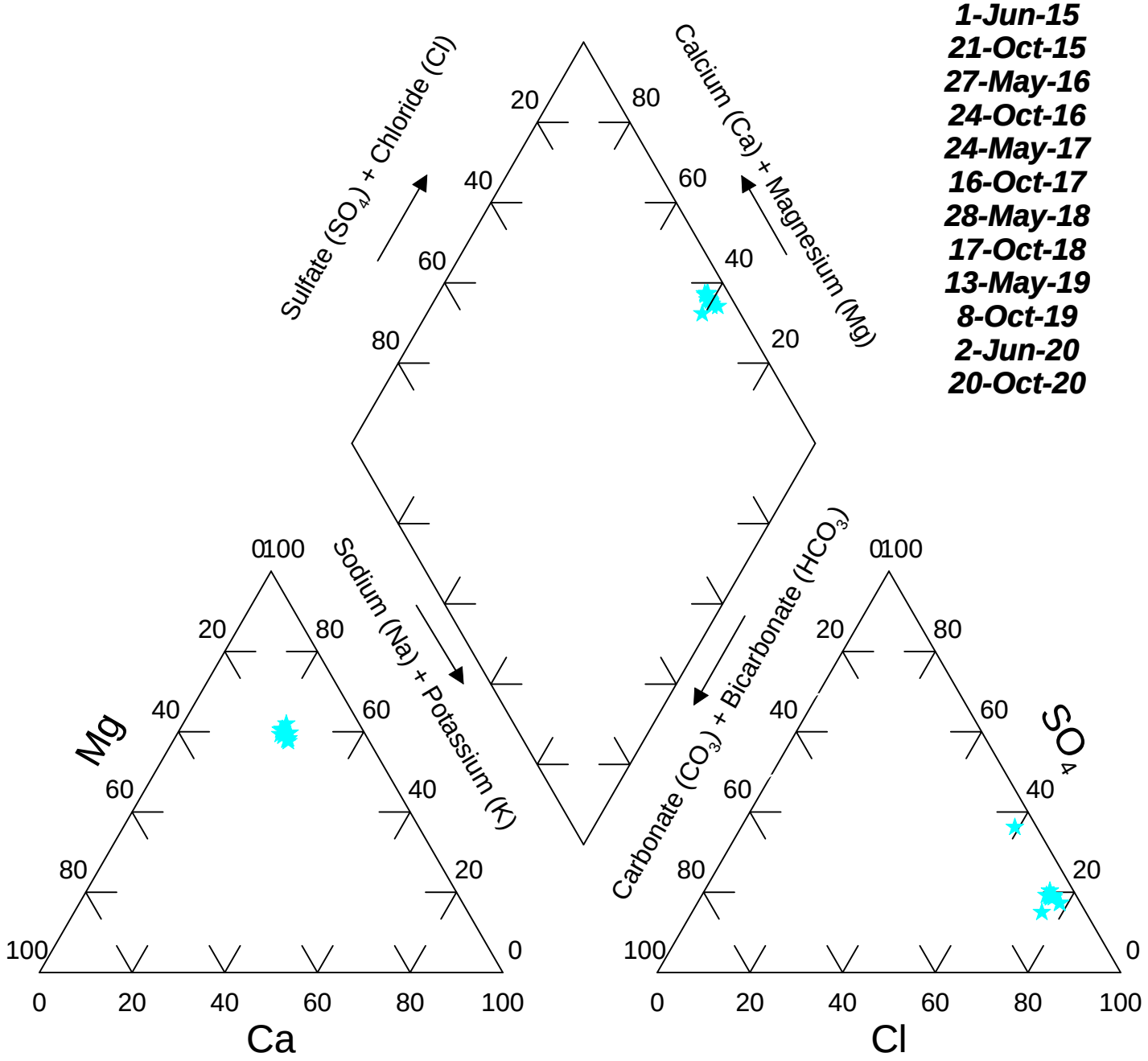


FIGURE: 1z

Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-W14

Dates:
3-Jun-15
21-Oct-15
25-May-16
26-Oct-16
25-May-17
16-Oct-17
28-May-18
18-Oct-18
15-May-19
13-Nov-19
3-Jun-20
15-Oct-20

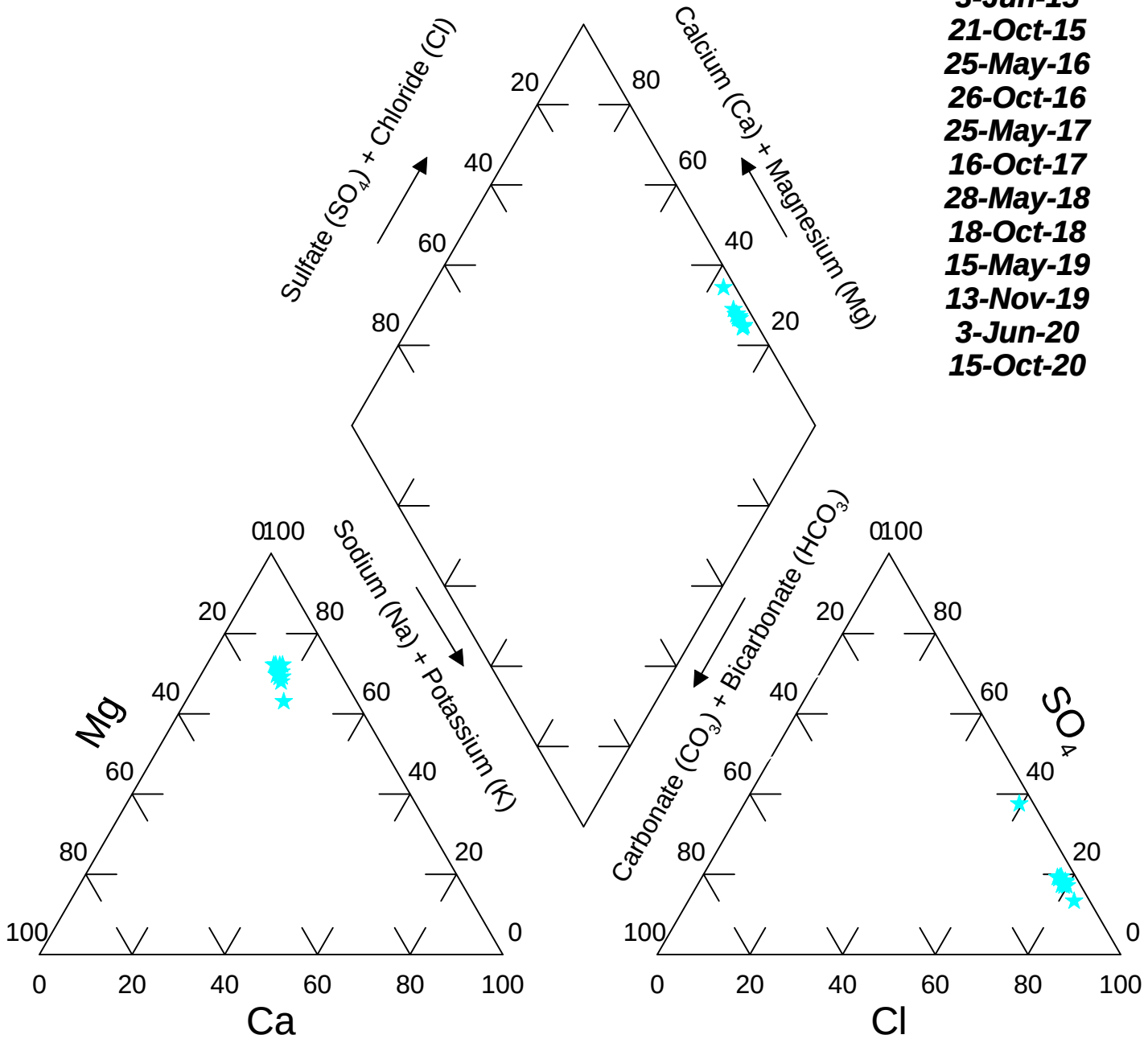


FIGURE: 2z

Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-W15

Dates:
3-Jun-15
21-Oct-15
30-May-16
25-Oct-16
25-May-17
16-Oct-17
28-May-18
22-Oct-18
15-May-19
13-Oct-19
2-Jun-20
20-Oct-20

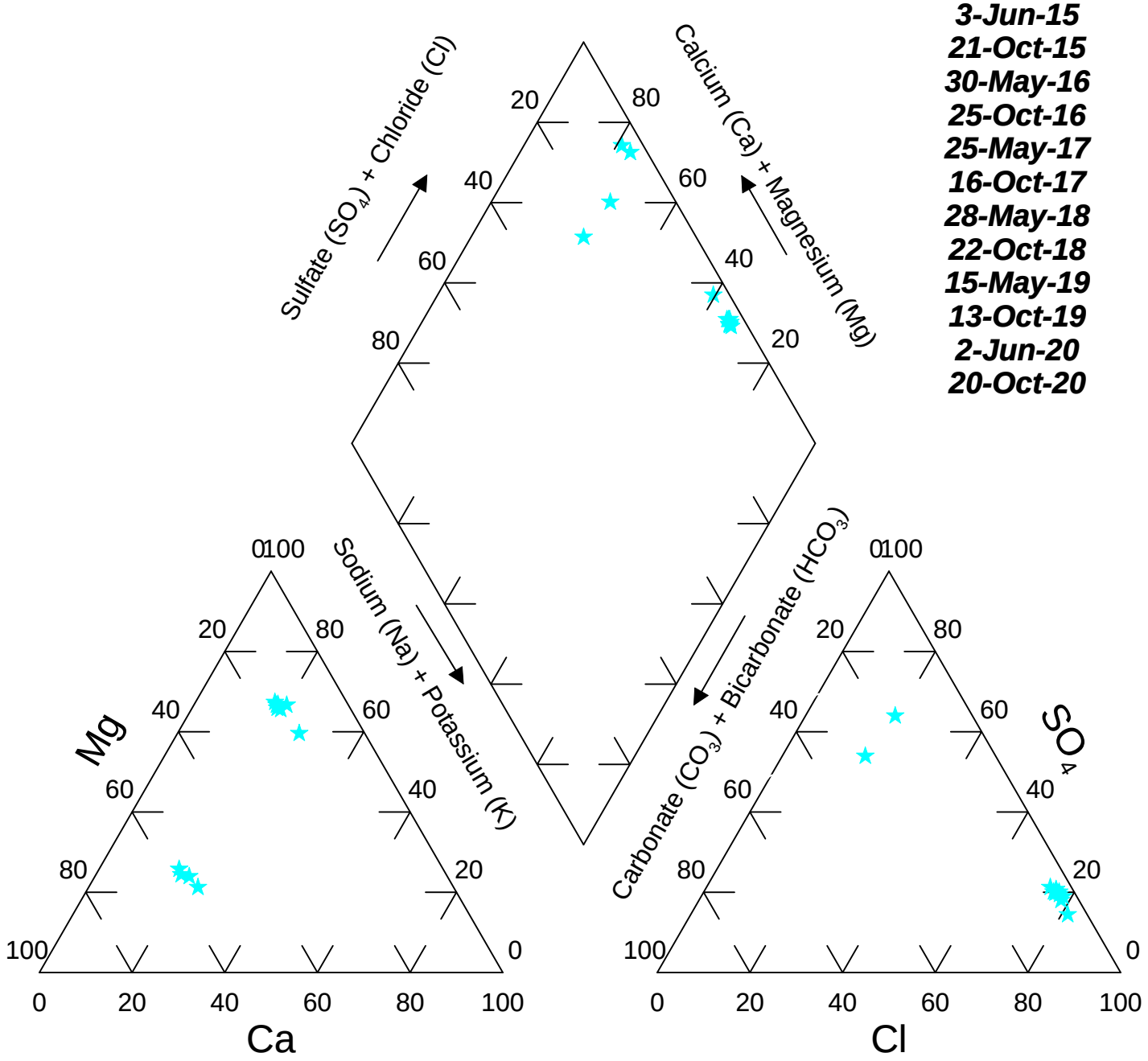


FIGURE: 3z

Winnipeg
Water and Waste Department

Site: Brady
Location : GWQ25-W16

Dates:
4-Jun-15
21-Oct-15
30-May-16
25-Oct-16
25-May-17
16-Oct-17
28-May-18
22-Oct-18
15-May-19
8-Dec-19
2-Jun-20
21-Oct-20

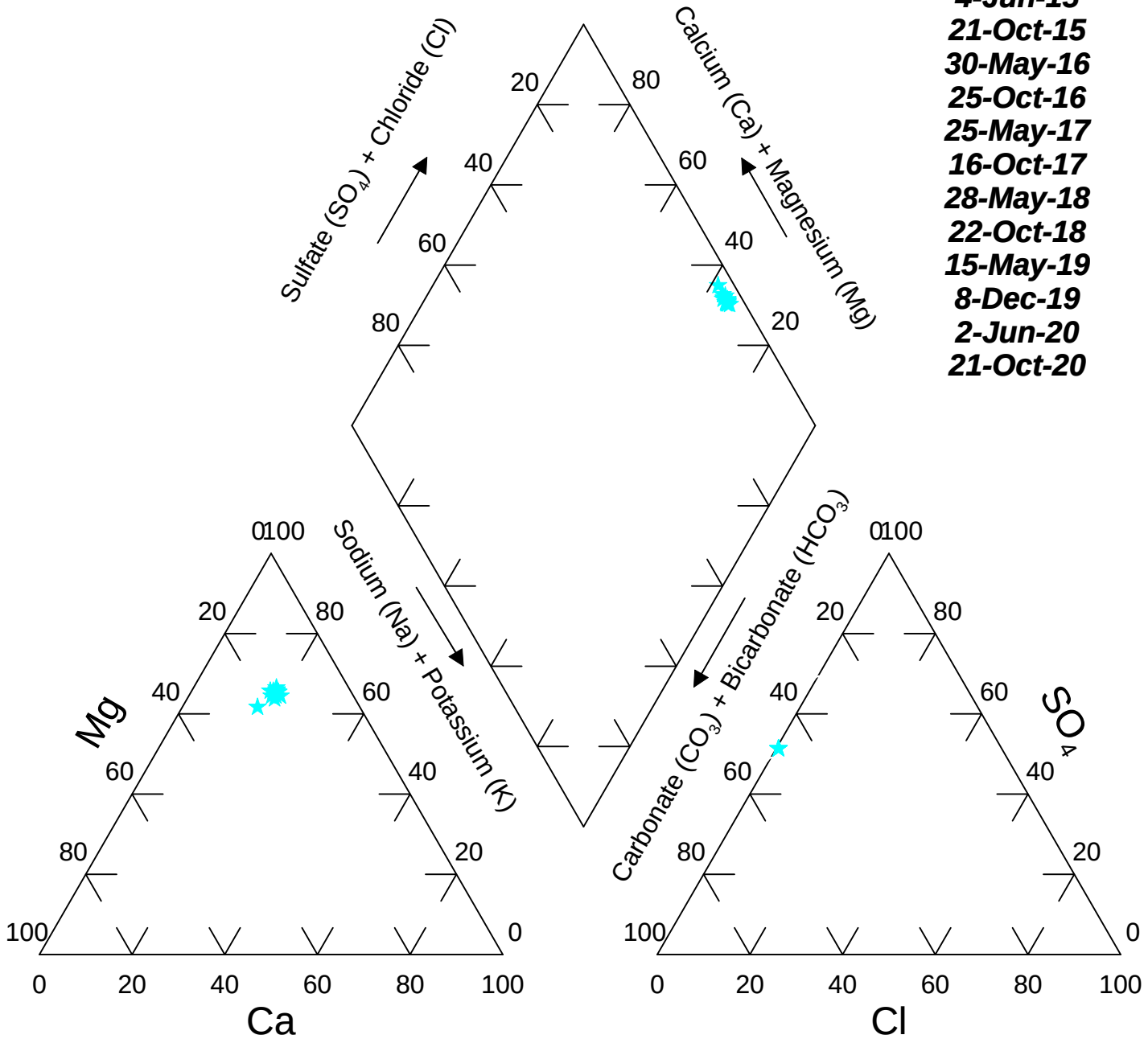


FIGURE: 4z

Winnipeg
Water and Waste Department

Leachate
Piper Diagrams

Site: Brady
Location: *MH3*

Dates:
2-Sep-15
8-Sep-16
26-Sep-17
31-Jul-18
11-Sep-19
8-Sep-20

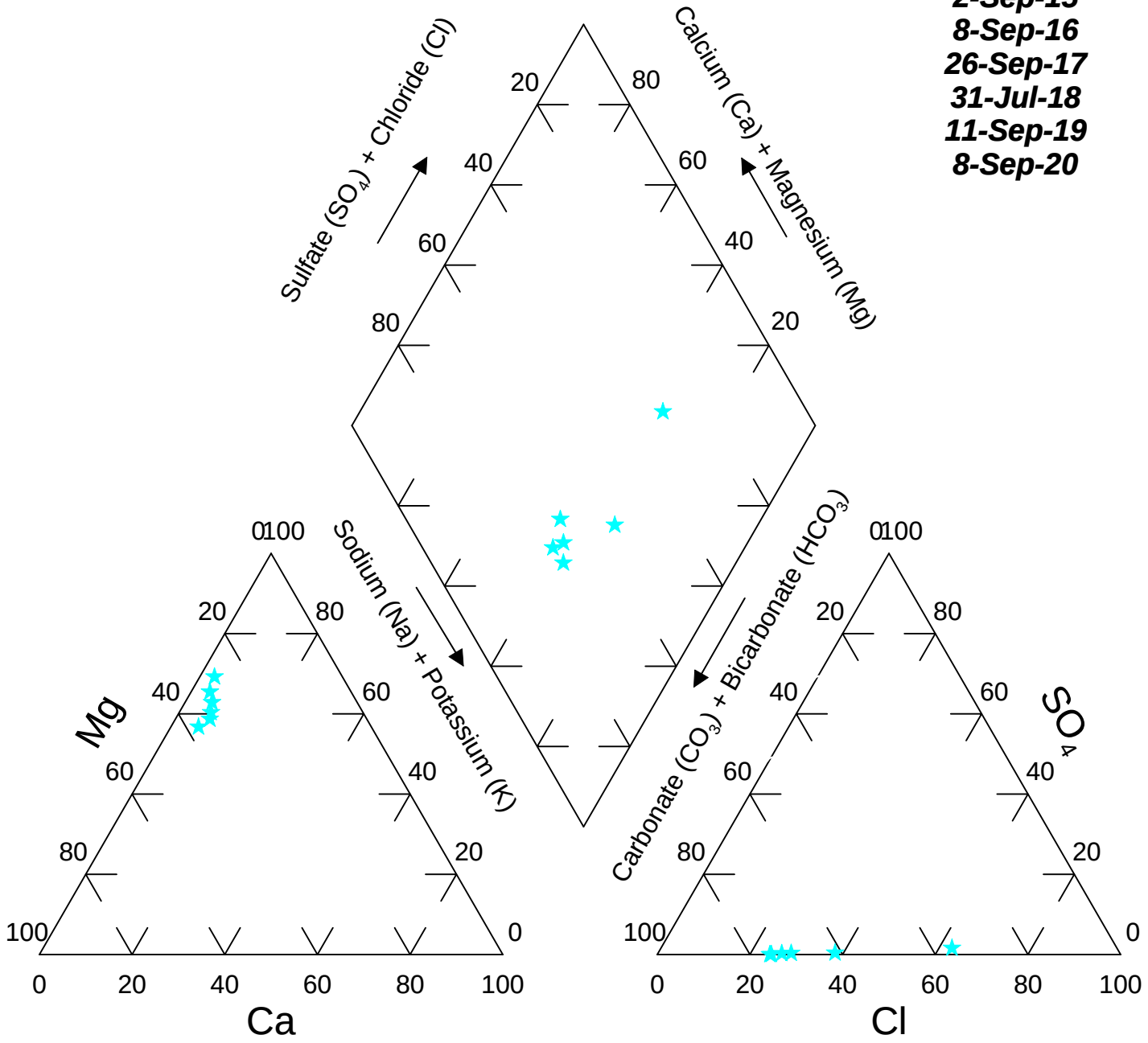


FIGURE: 18P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH8

Dates:
2-Sep-15
7-Sep-16
26-Sep-17
31-Jul-18
11-Sep-19
9-Sep-20

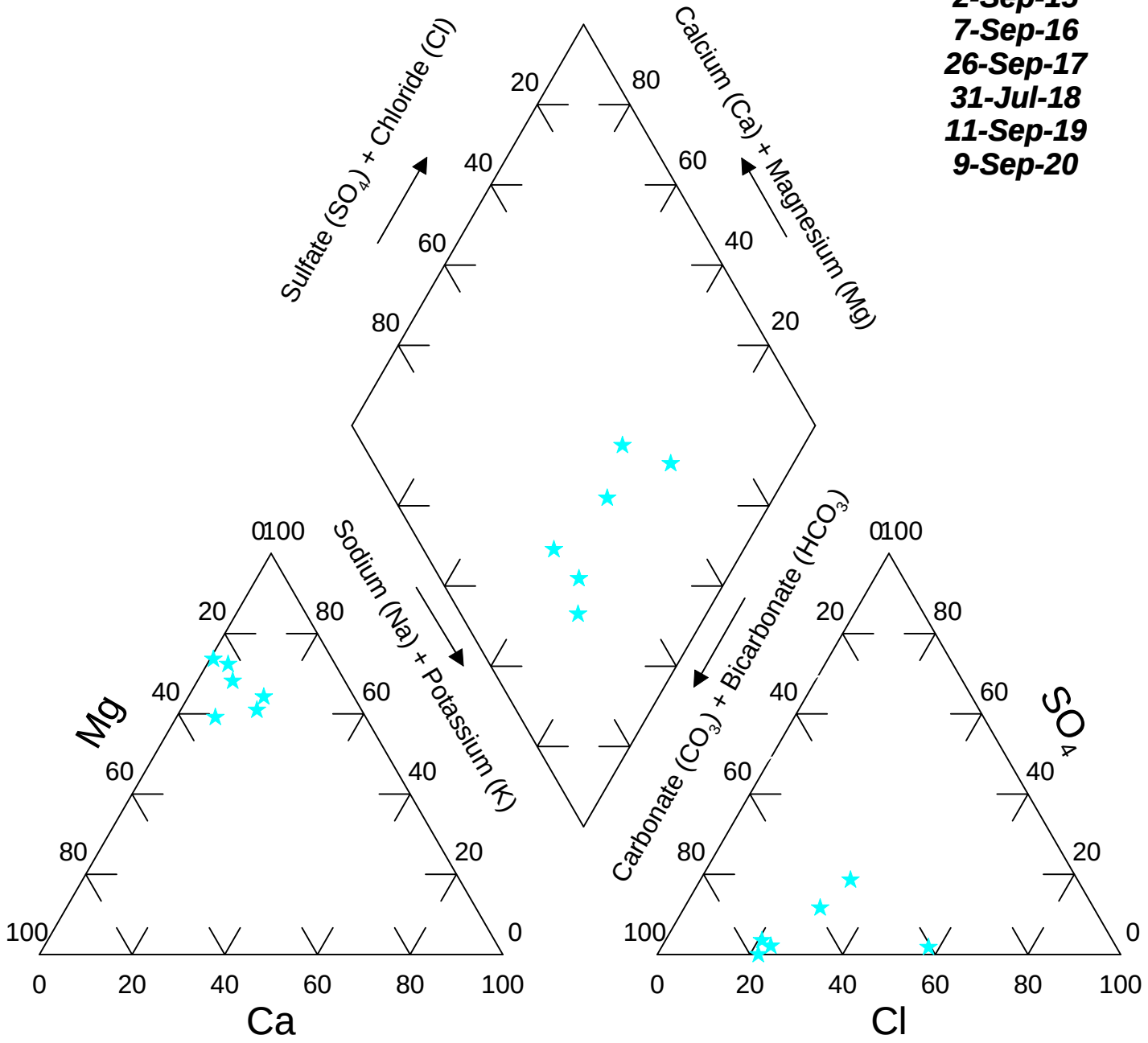


FIGURE: 19P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH13

Dates:
2-Sep-15
9-Sep-16
26-Sep-17
31-Jul-18
12-Sep-19
8-Sep-20

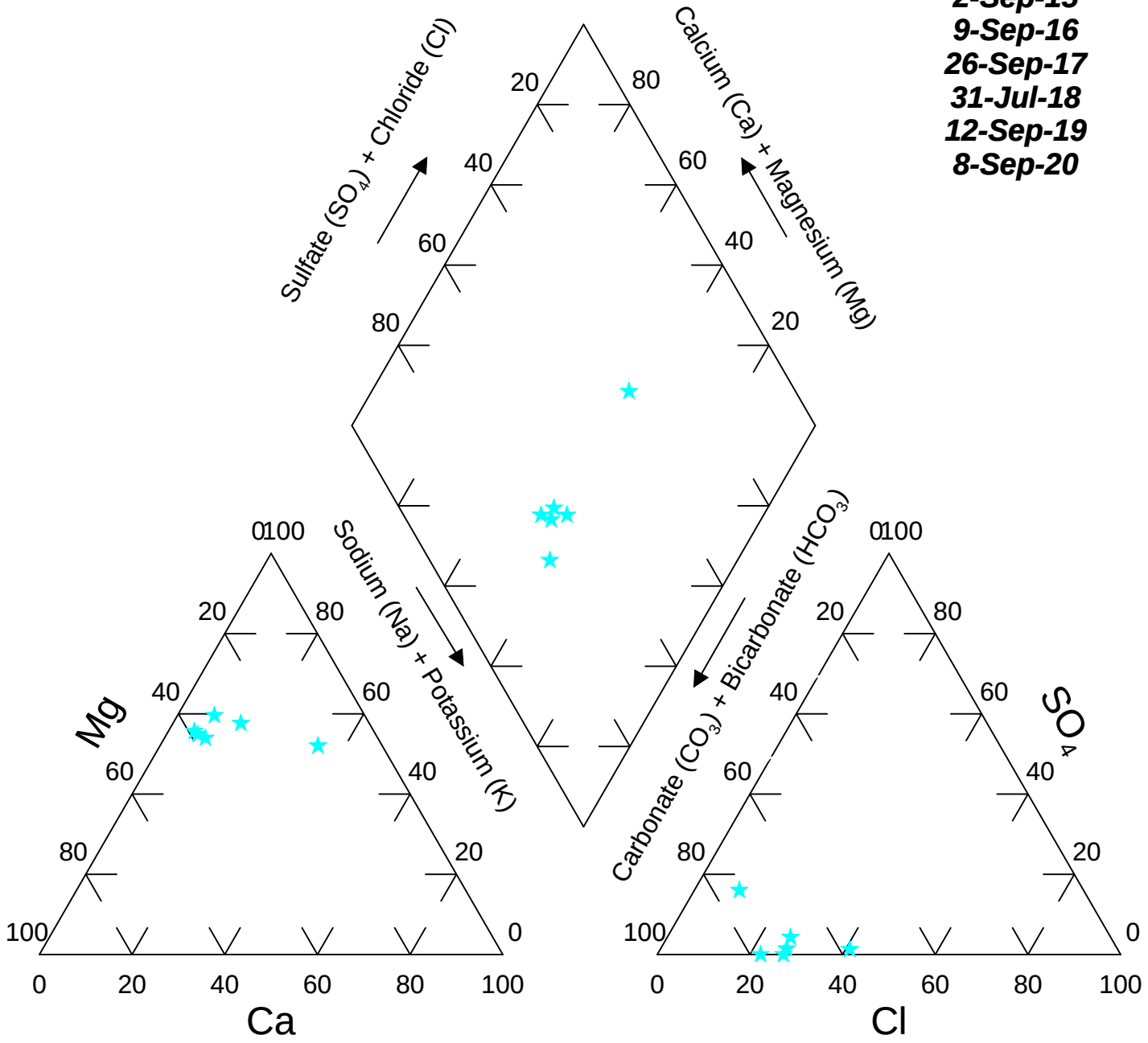


FIGURE: 20P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH24

Dates:
2-Sep-15
7-Sep-16
26-Sep-17
31-Jul-18
11-Sep-19
8-Sep-20

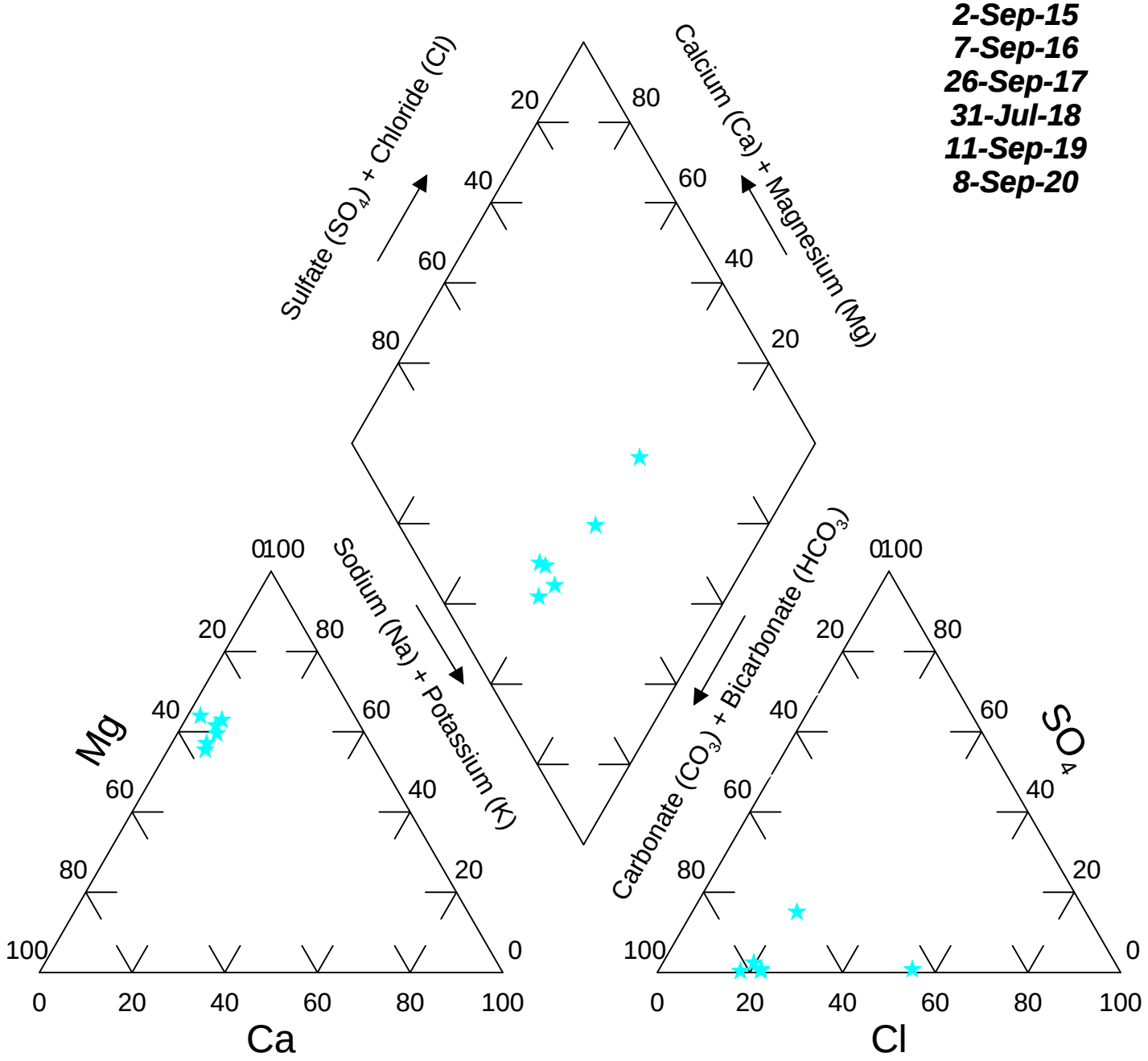


FIGURE: 21P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH27

Dates:
2-Sep-15
7-Sep-16
26-Sep-17
31-Jul-18
11-Sep-19
8-Sep-20

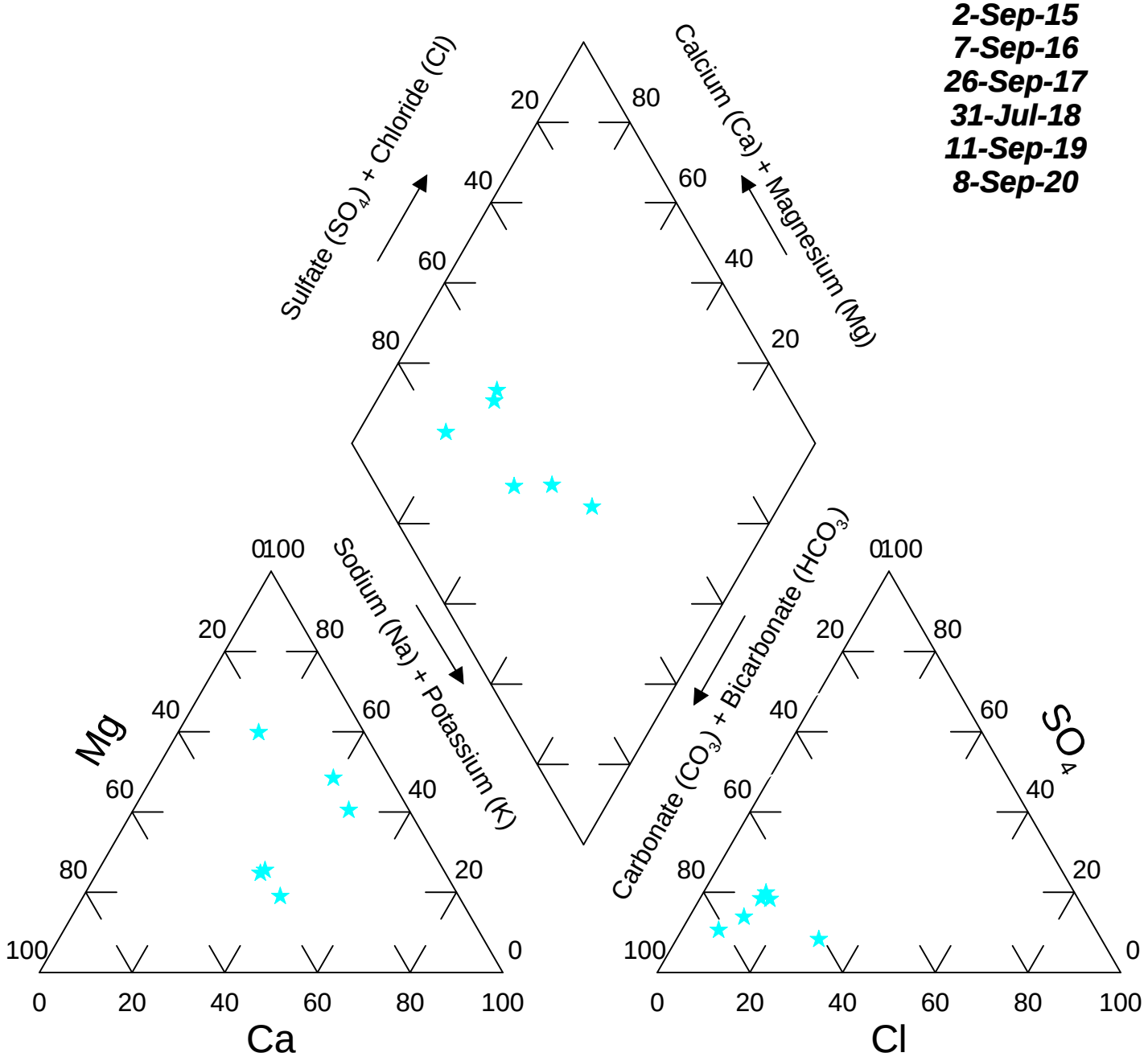


FIGURE: 22P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH31

Dates:
2-Sep-15
7-Sep-16
26-Sep-17
31-Jul-18
11-Sep-19
8-Sep-20

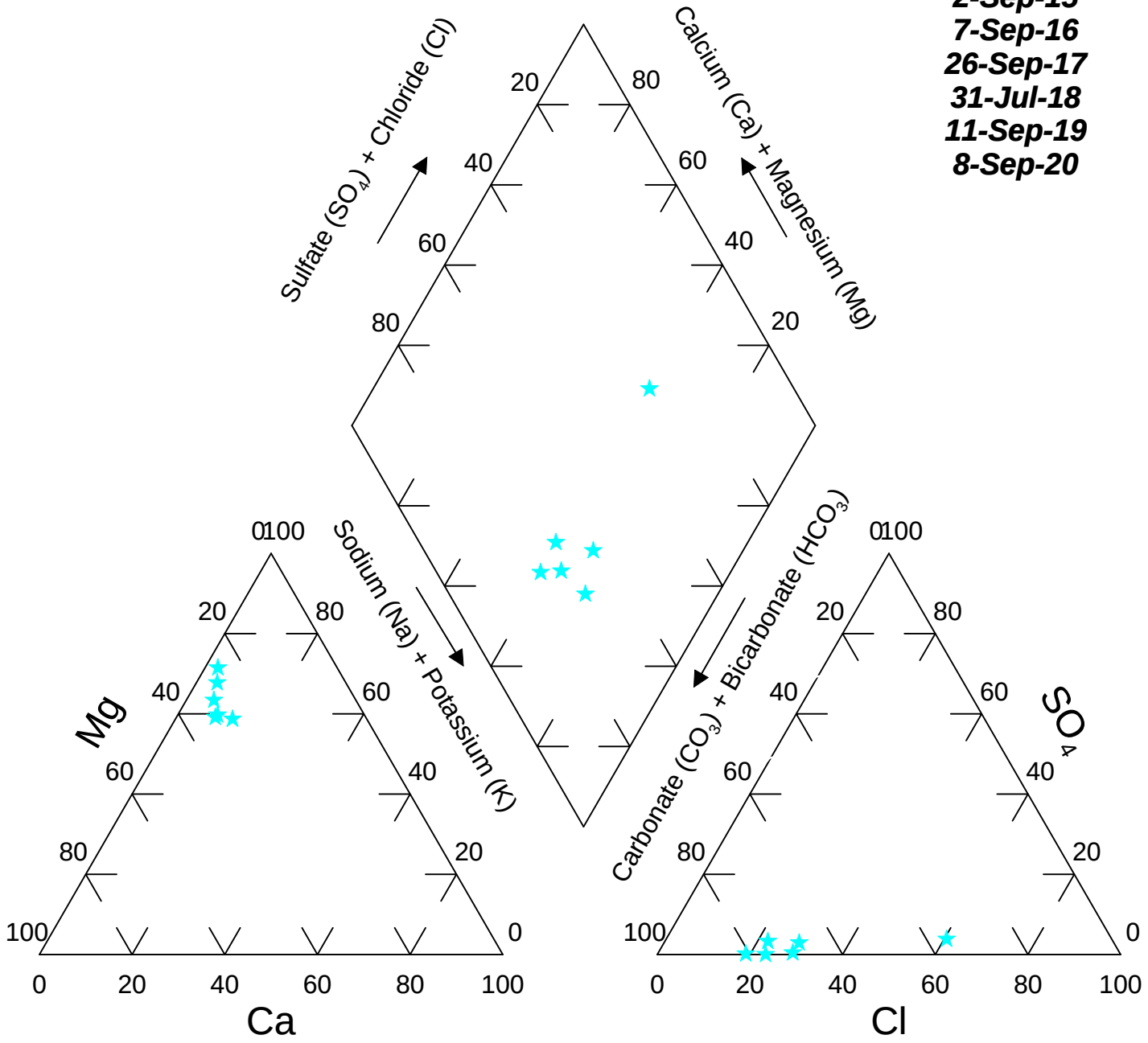


FIGURE: 23P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH34

Dates:
2-Sep-15
8-Sep-16
26-Sep-17
31-Jul-18
11-Sep-19
8-Sep-20

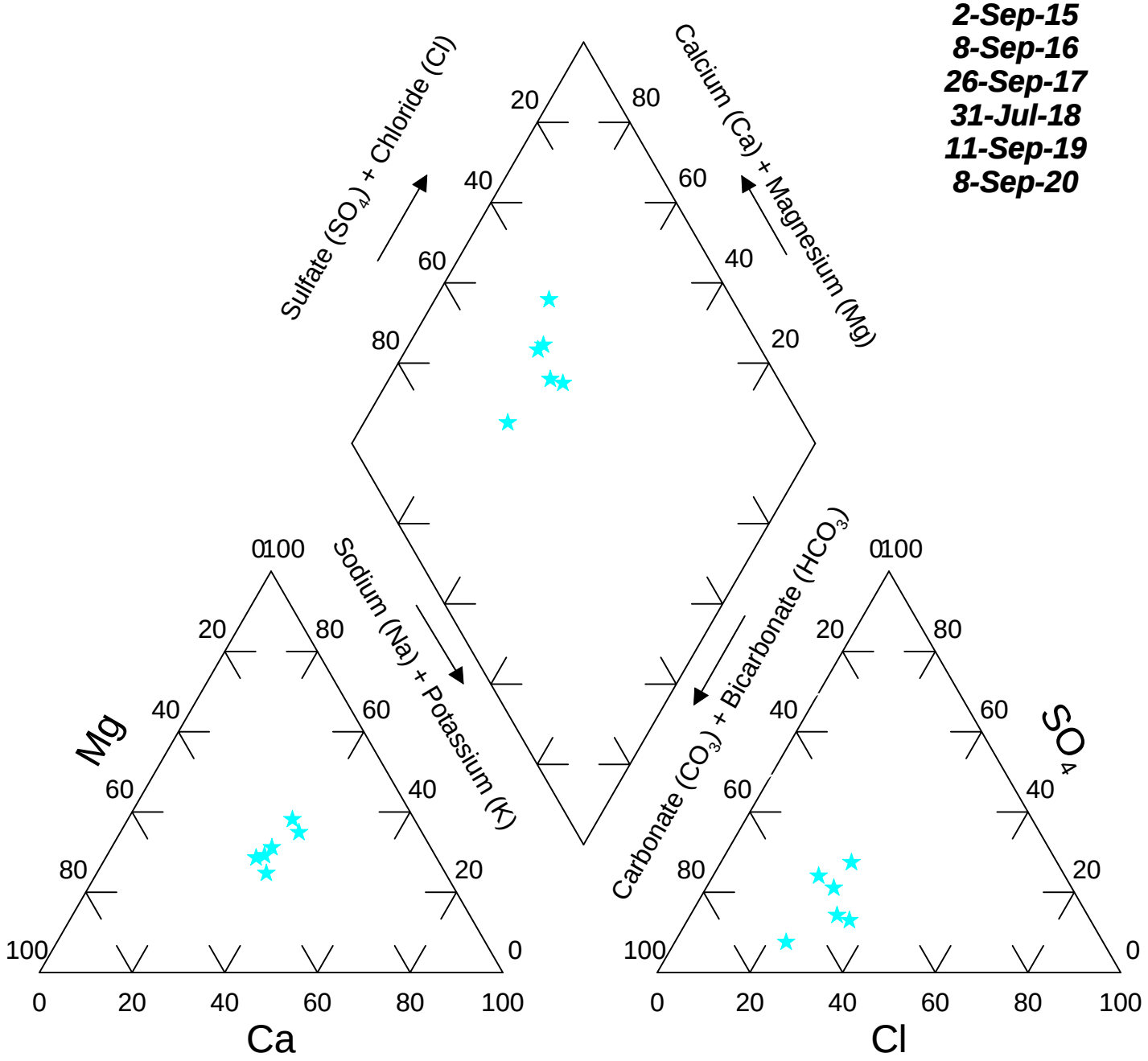


FIGURE: 24P

Winnipeg
Water and Waste Department

Site: Brady
Location: MH46

Date:
31-Jul-18
11-Sep-19

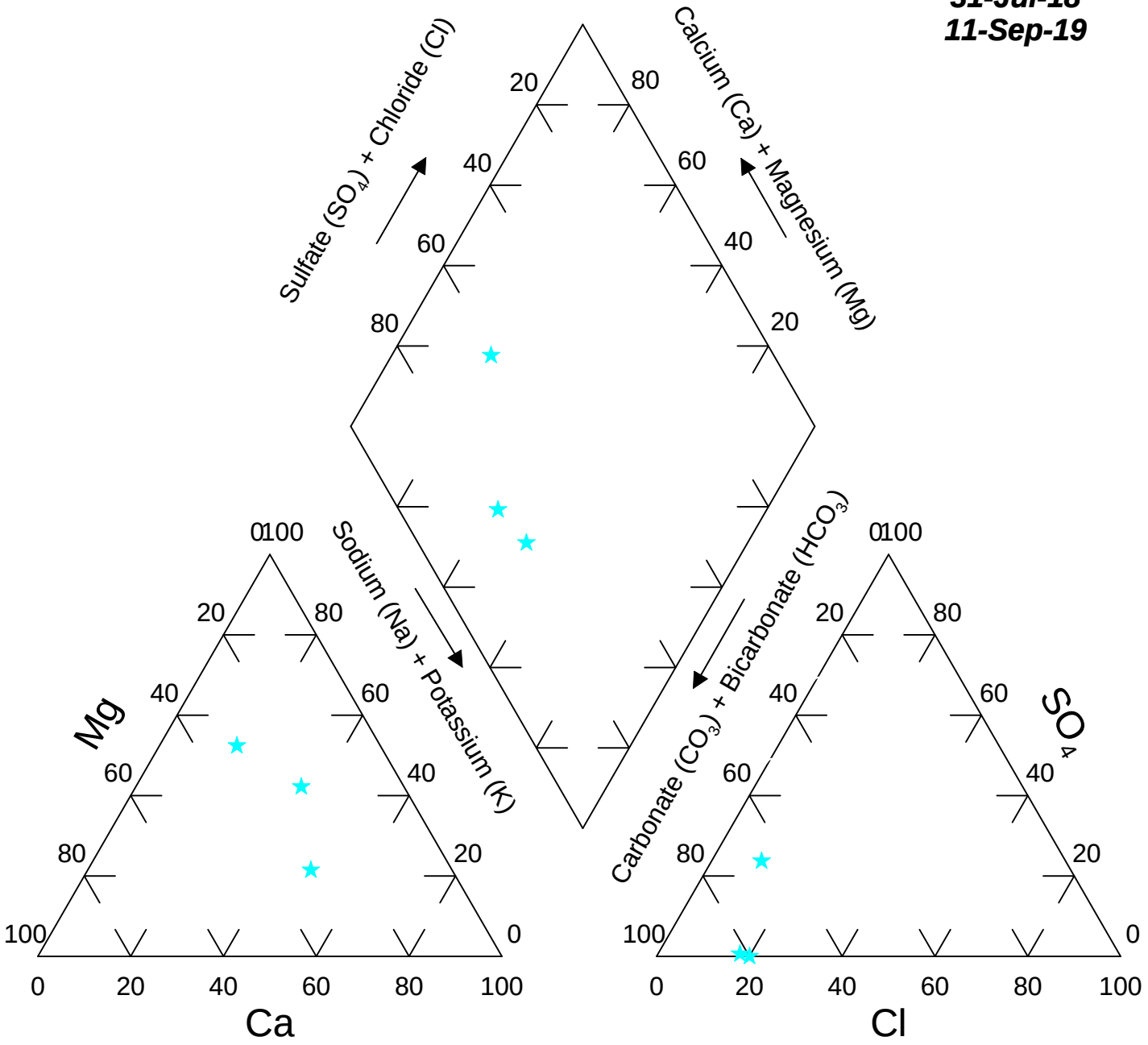


FIGURE: 21P

Winnipeg
Water and Waste Department

Site: Brady
Location: *Riser 1*

Dates:
29-Oct-15
8-Sep-16
26-Sep-17
31-Jul-18
10-Sep-19
8-Sep-20

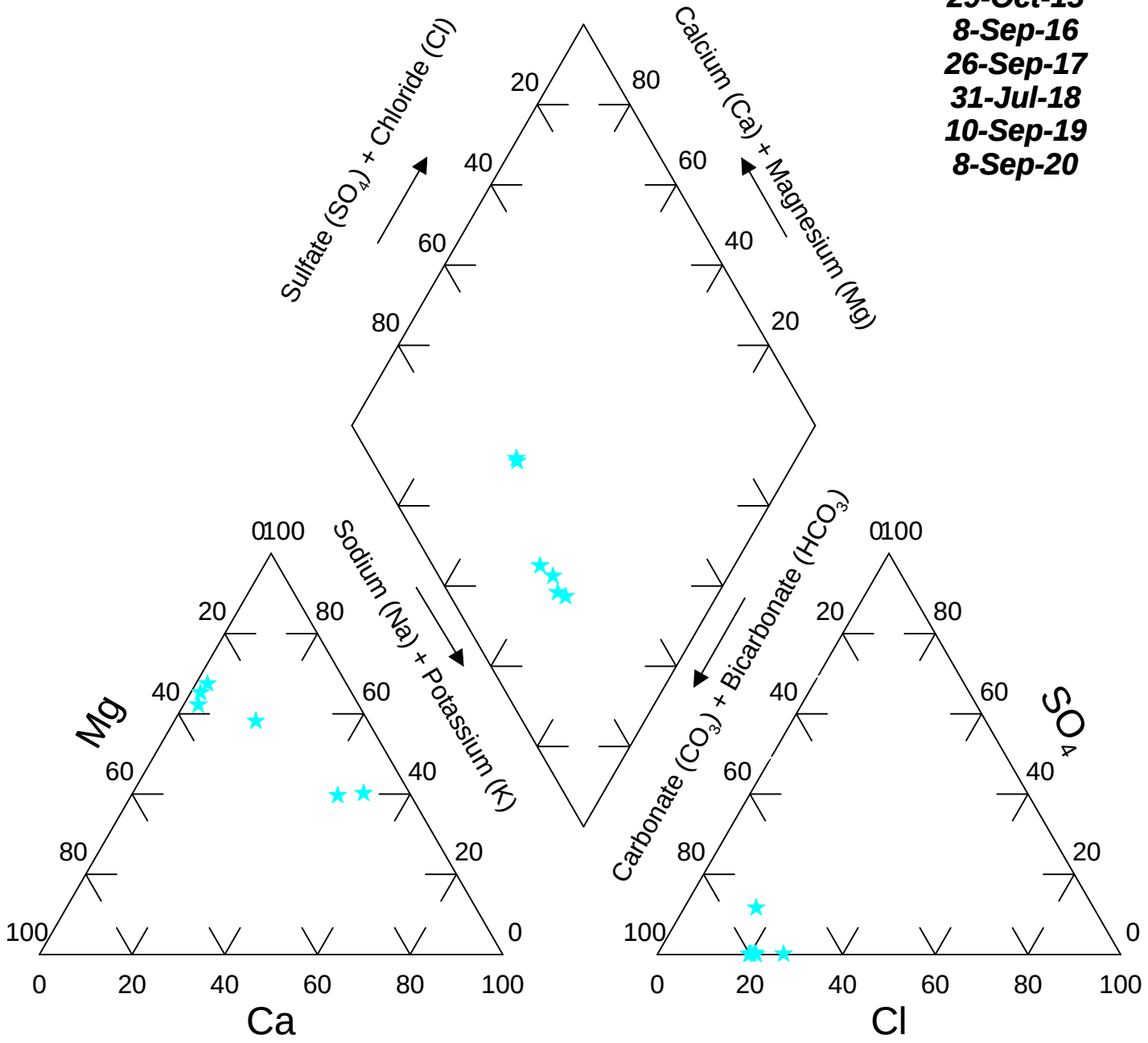


FIGURE: 18P

Winnipeg
Water and Waste Department

Site: Brady
Location: *MH BIO*

Dates:
2-Sep-15
8-Sep-16
26-Sep-17
31-Jul-18
10-Sep-19
8-Sep-20

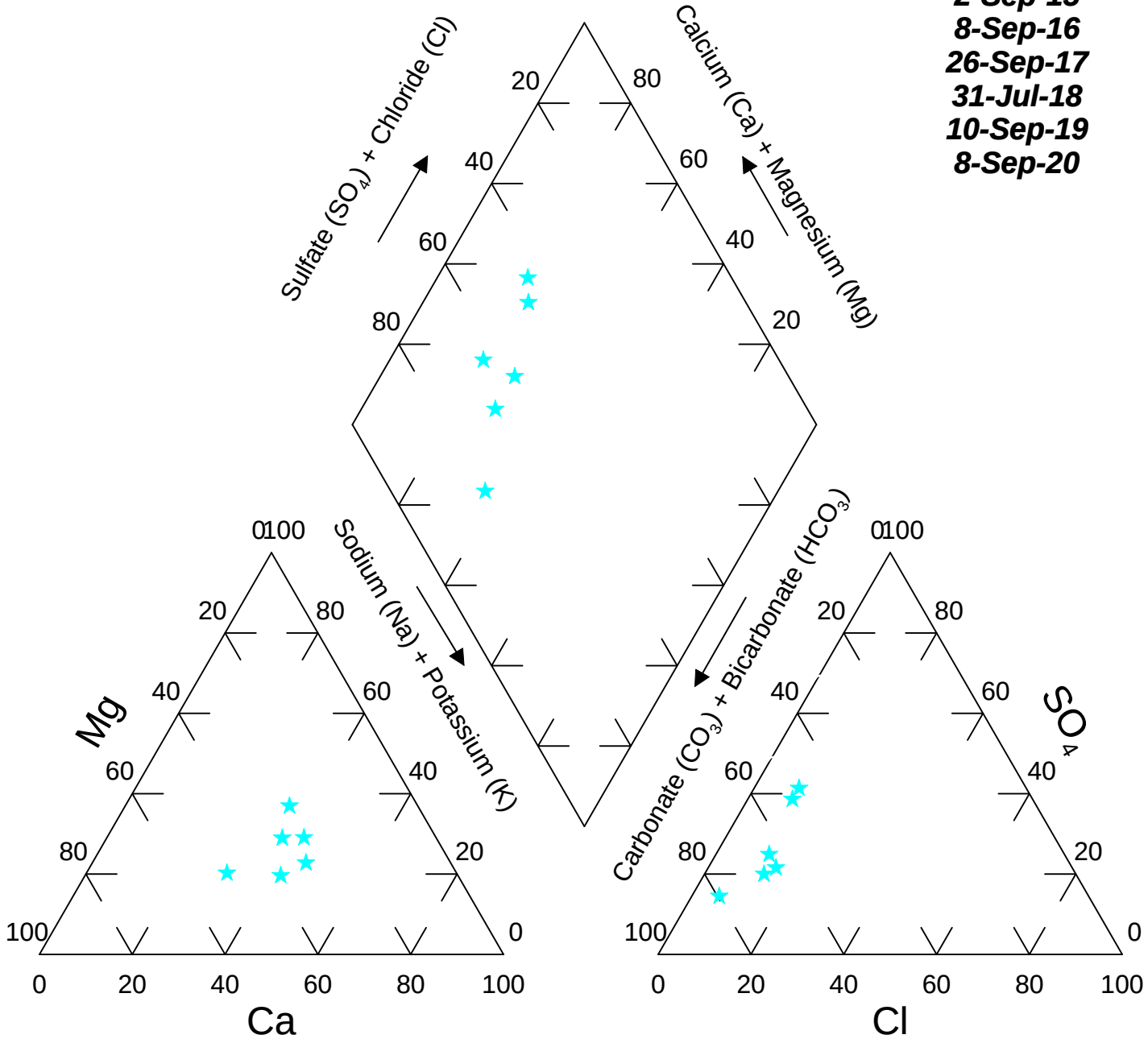
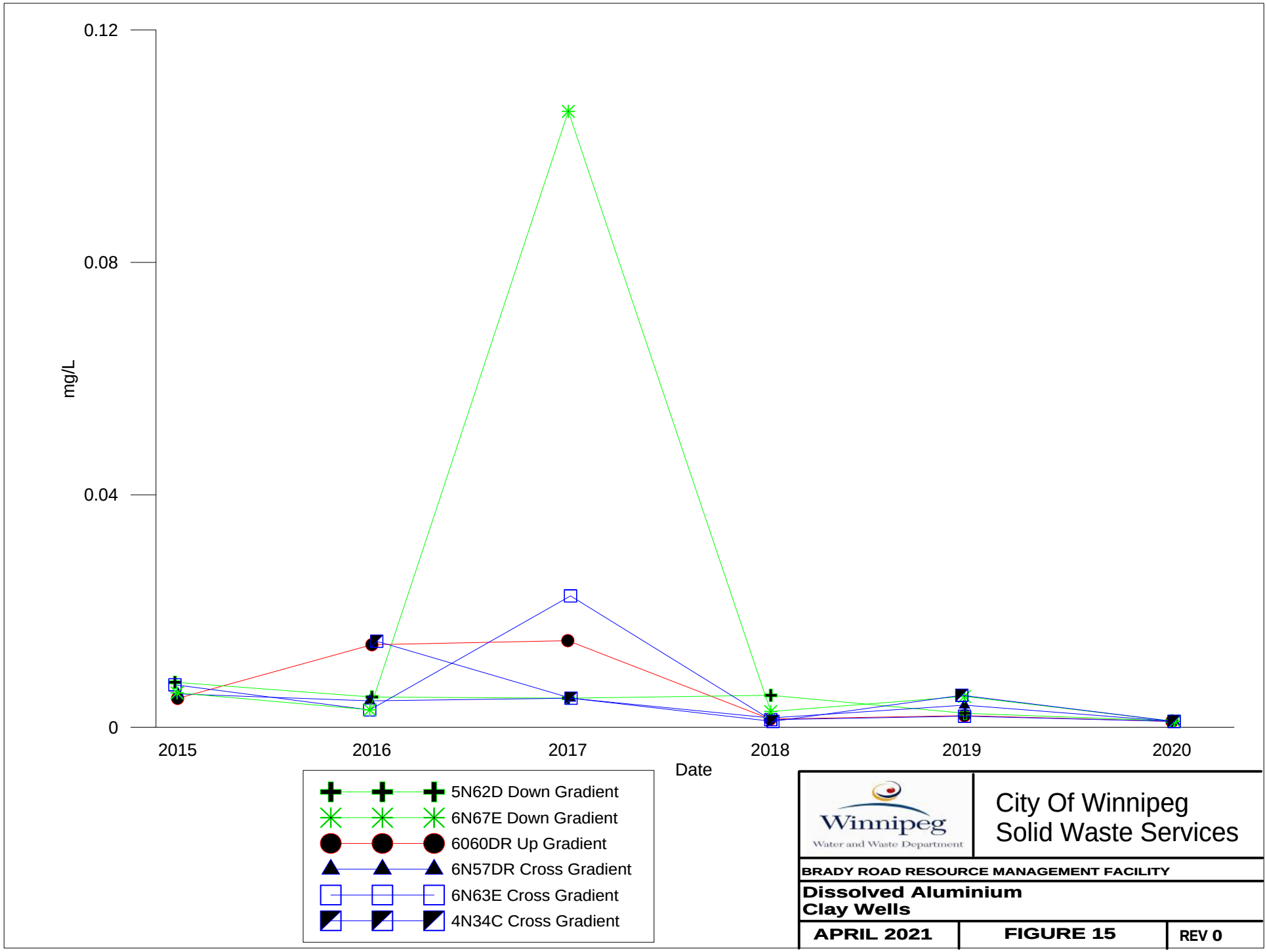


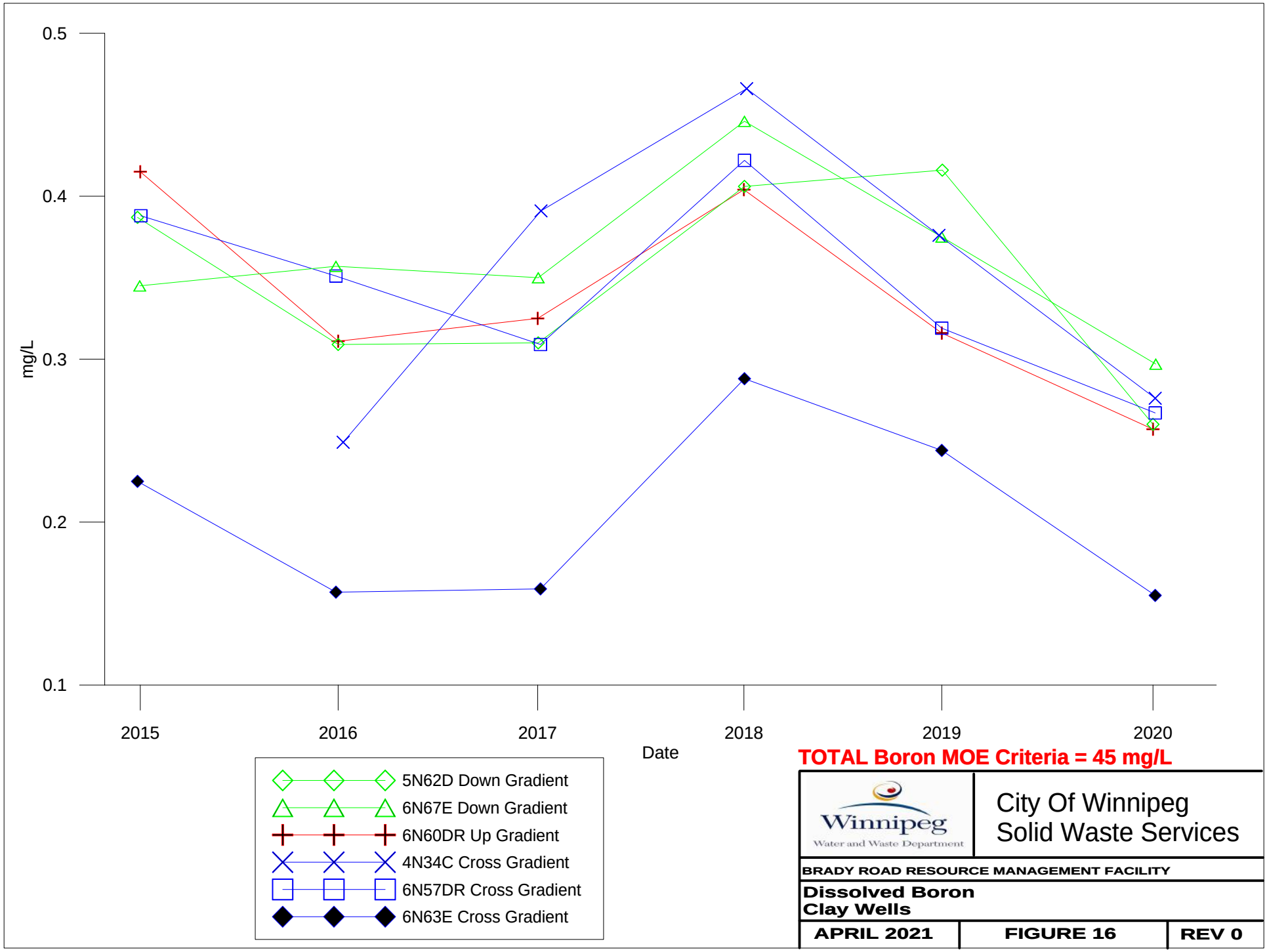
FIGURE: 18P

Winnipeg
Water and Waste Department

APPENDIX C
TIME VS CONCENTRATION GRAPHS

Groundwater
Time vs Concentration Graphs


0.12
0.08
0.04
0
mg/L
2015
2016
2017
2018
2019
2020
Date
5N62D Down Gradient
6N67E Down Gradient
6060DR Up Gradient
6N57DR Cross Gradient
6N63E Cross Gradient
4N34C Cross Gradient
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Aluminium
Clay Wells
APRIL 2021
FIGURE 15
REV 0



TOTAL Boron MOE Criteria = 45 mg/L

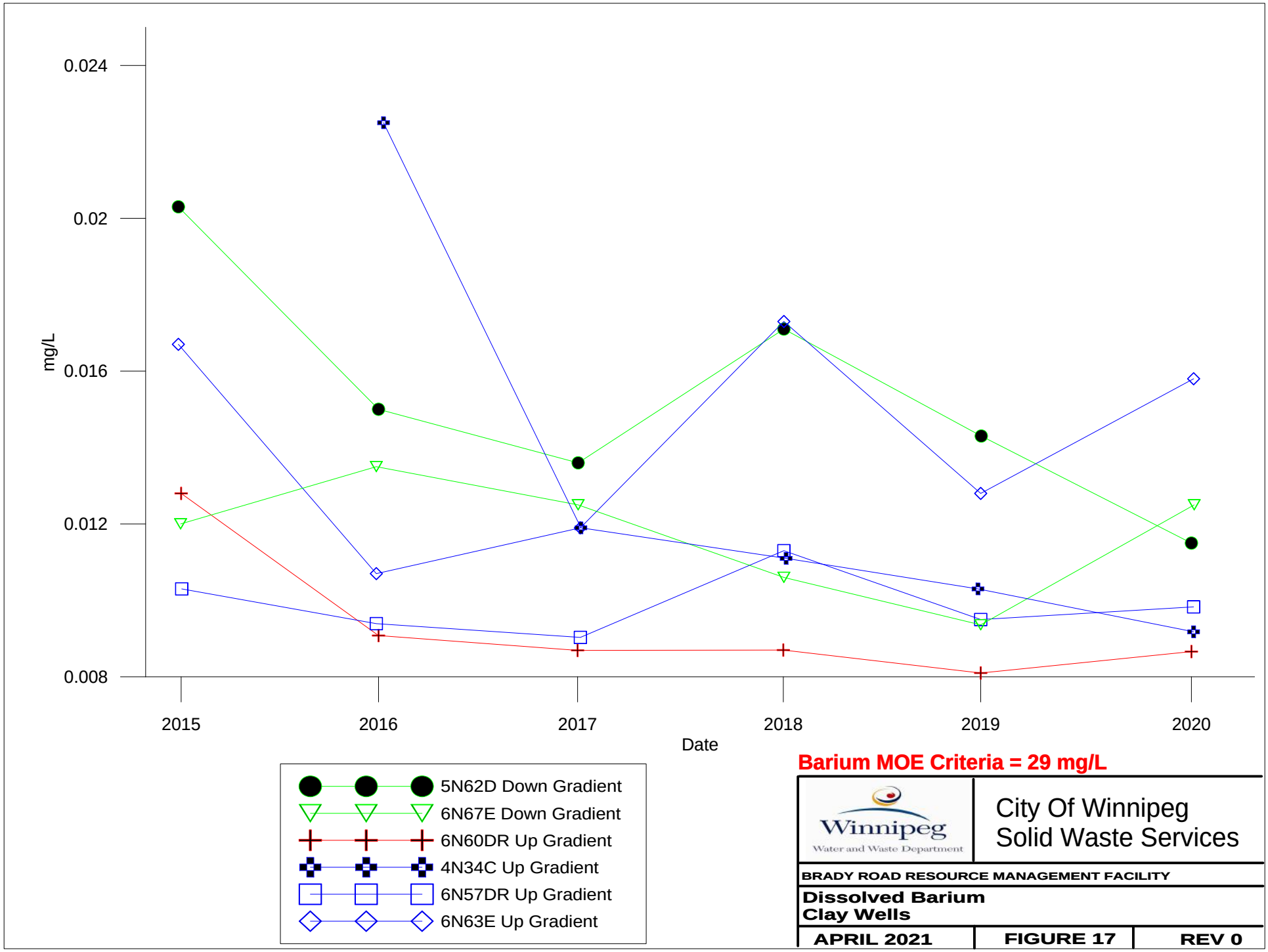
Winnipeg
Water and Waste Department

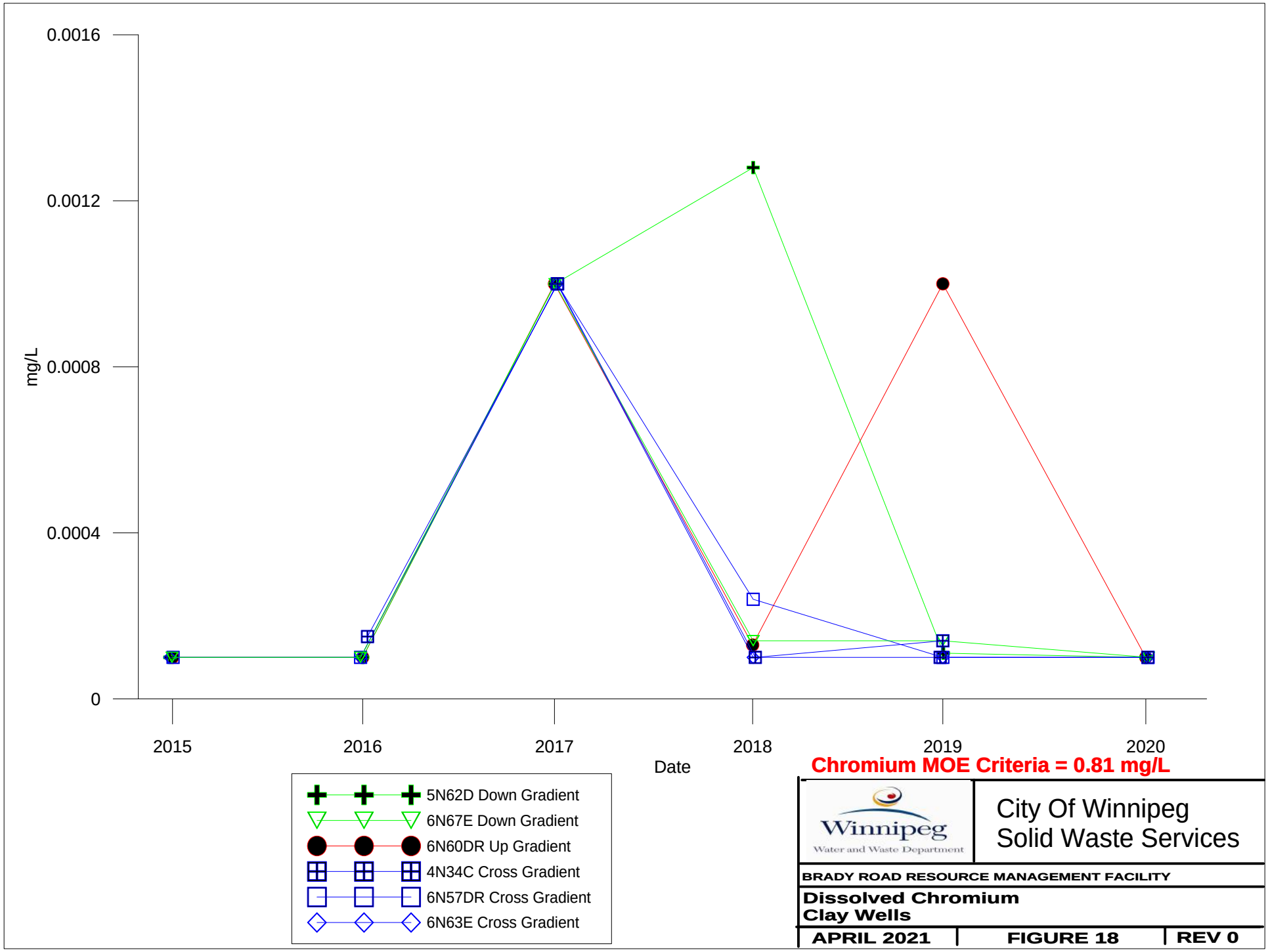
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Boron
Clay Wells

APRIL 2021	FIGURE 16	REV 0


0.024
0.02
0.016
0.012
0.008
mg/L
2015
2016
2017
2018
2019
2020
Date
5N62D Down Gradient
6N67E Down Gradient
6N60DR Up Gradient
4N34C Up Gradient
6N57DR Up Gradient
6N63E Up Gradient
Barium MOE Criteria = 29 mg/L
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Barium
Clay Wells
APRIL 2021
FIGURE 17
REV 0



Chromium MOE Criteria = 0.81 mg/L

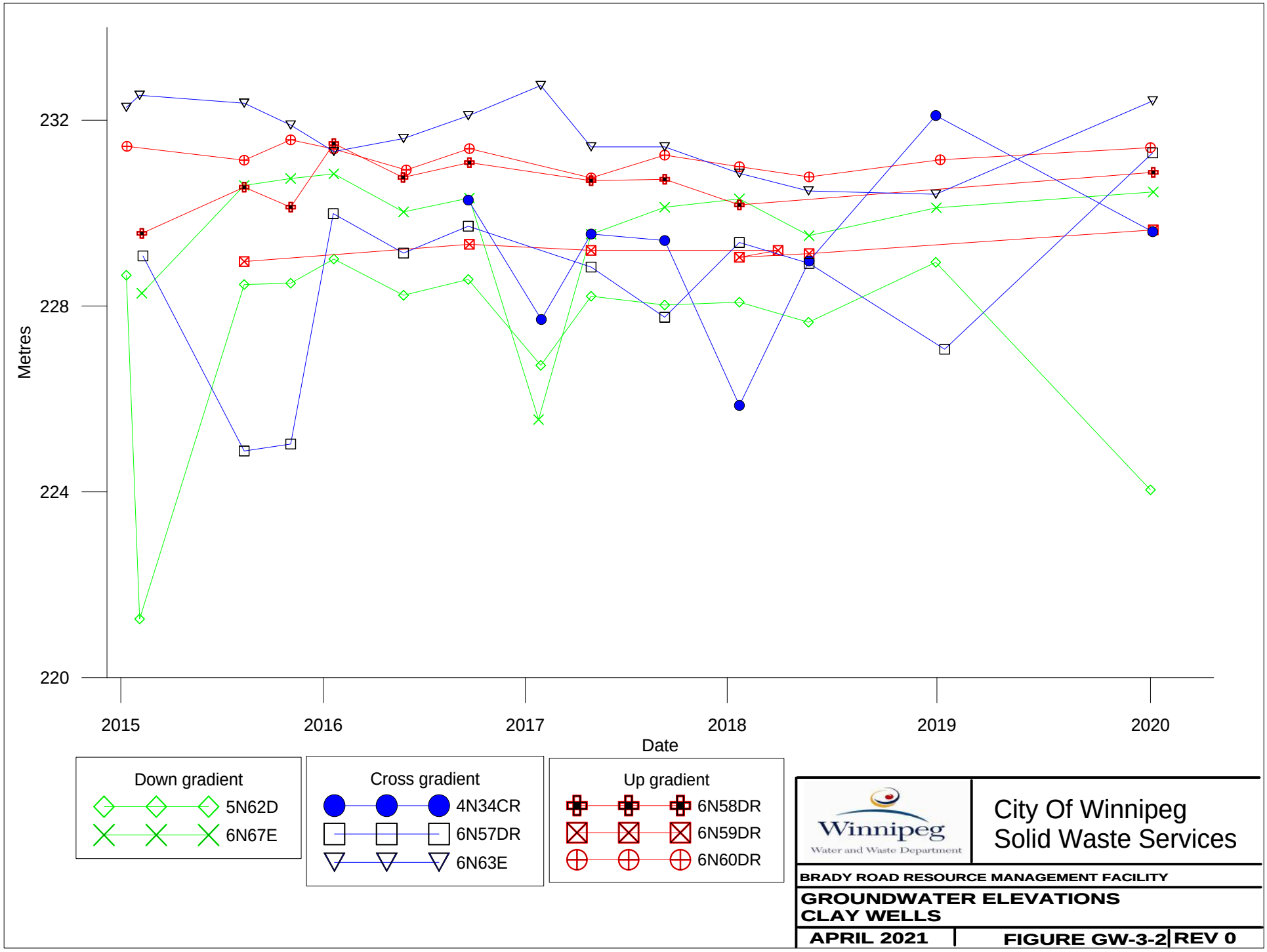
Winnipeg Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Chromium
Clay Wells

APRIL 2021	FIGURE 18	REV 0



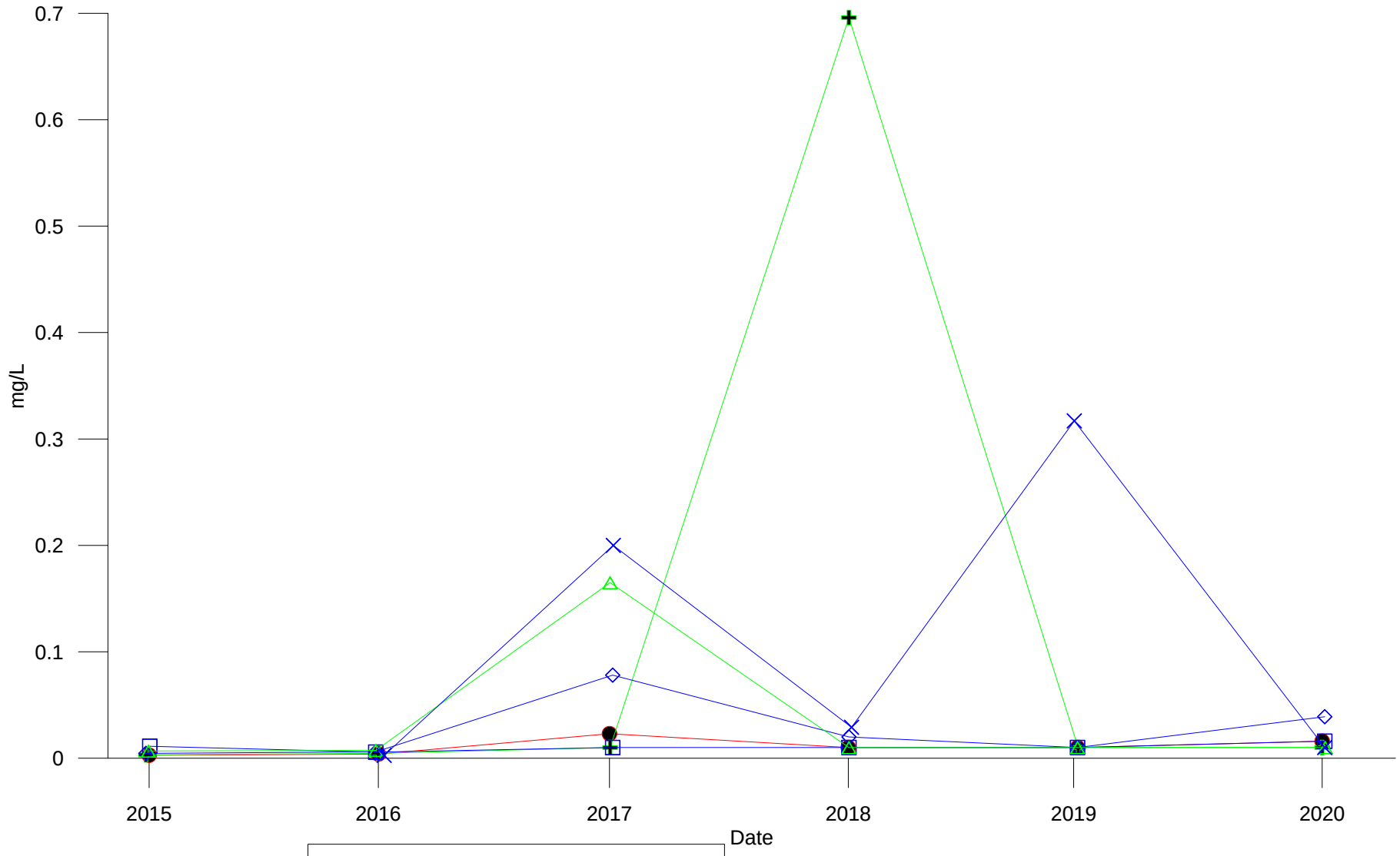
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

GROUNDWATER ELEVATIONS
CLAY WELLS

APRIL 2021 | FIGURE GW-3-2 | REV 0



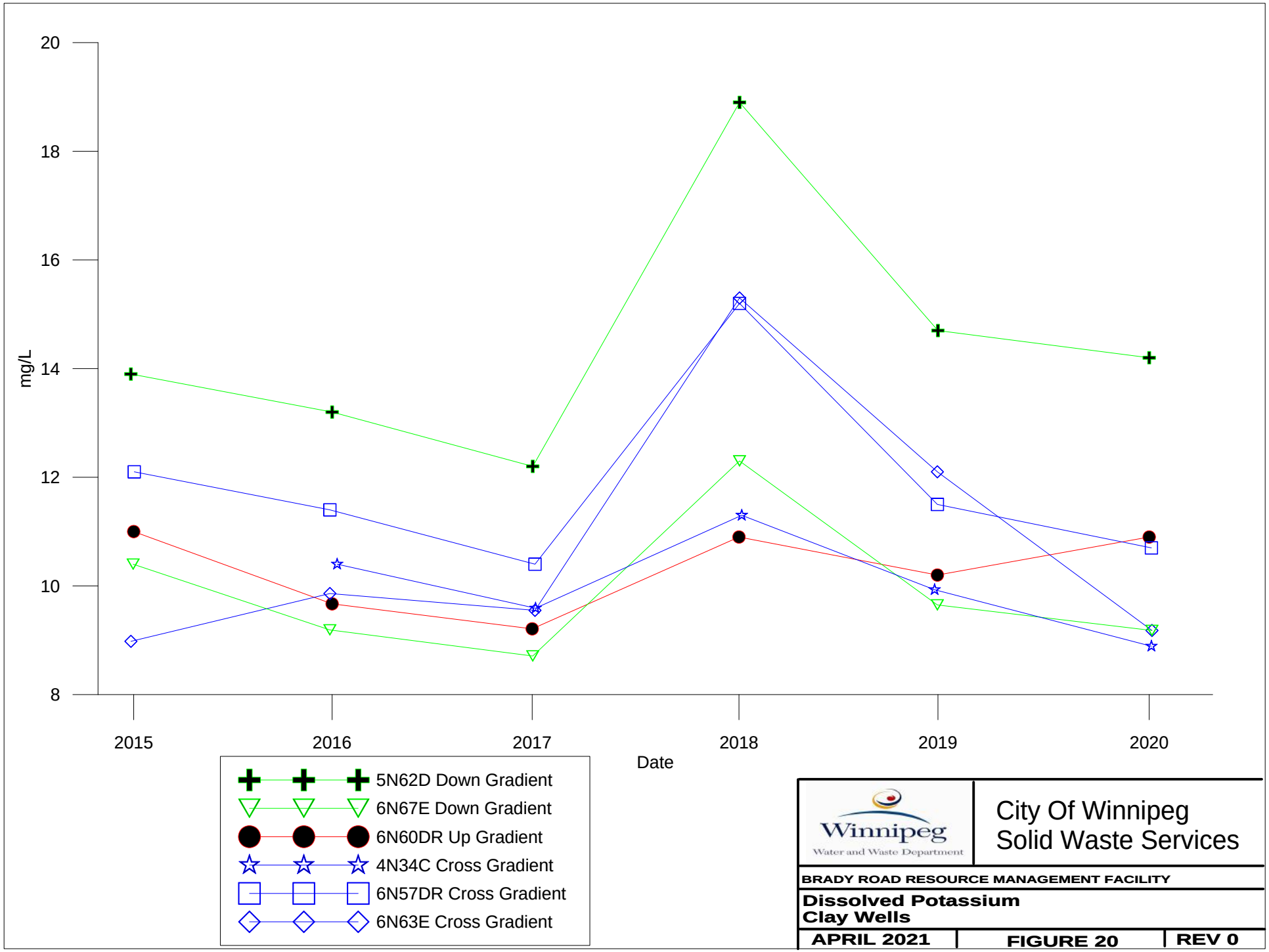
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Iron
Clay Wells

APRIL 2021	FIGURE 19	REV 0



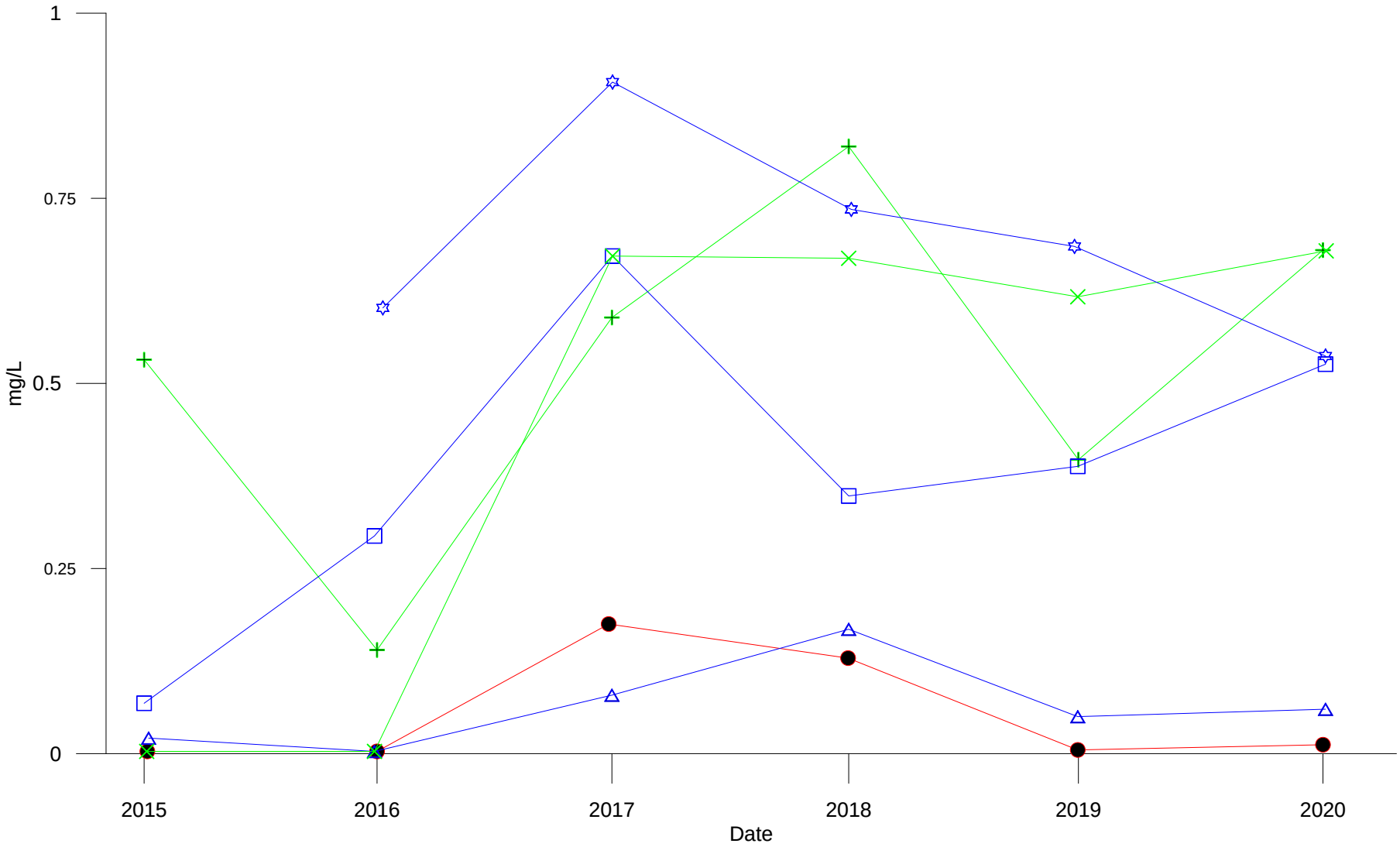
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Potassium
Clay Wells

APRIL 2021	FIGURE 20	REV 0



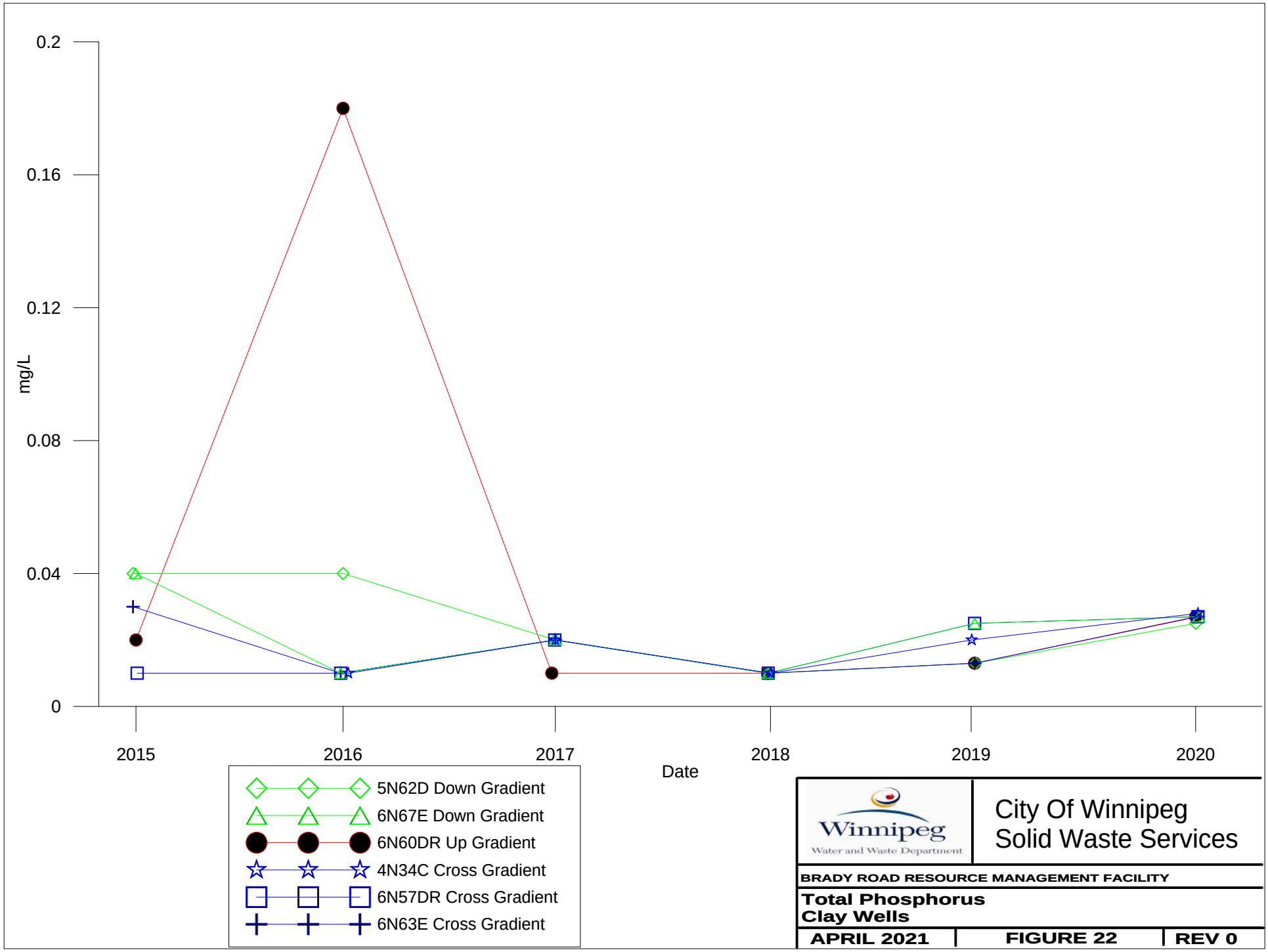
Winnipeg
Water and Waste Department

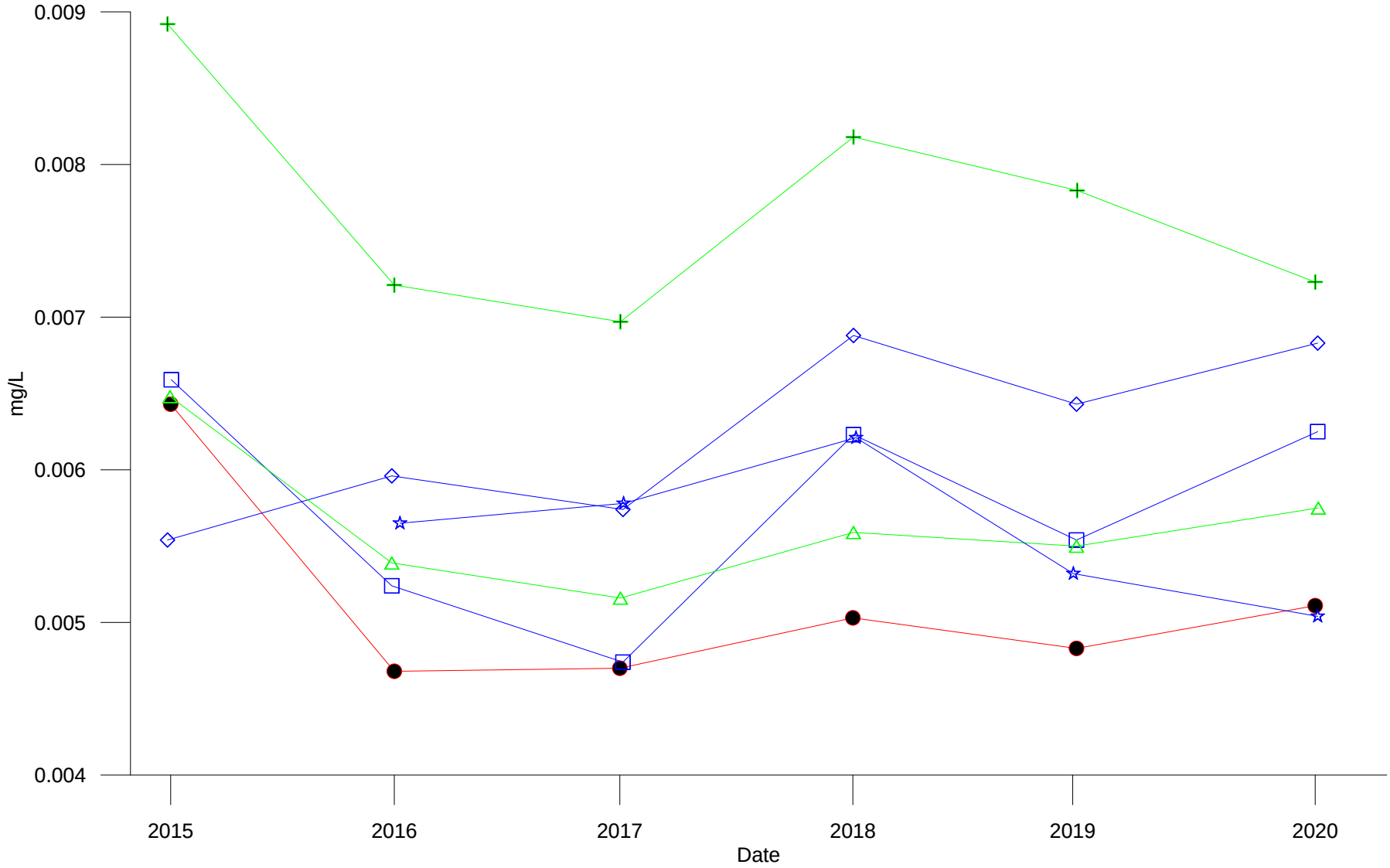
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Ammonia
Clay Wells

APRIL 2021	FIGURE 21	REV 0


0.2
0.16
0.12
0.08
0.04
0
mg/L
2015
2016
2017
2018
2019
2020
Date
5N62D Down Gradient
6N67E Down Gradient
6N60DR Up Gradient
4N34C Cross Gradient
6N57DR Cross Gradient
6N63E Cross Gradient
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Total Phosphorus
Clay Wells
APRIL 2021
FIGURE 22
REV 0



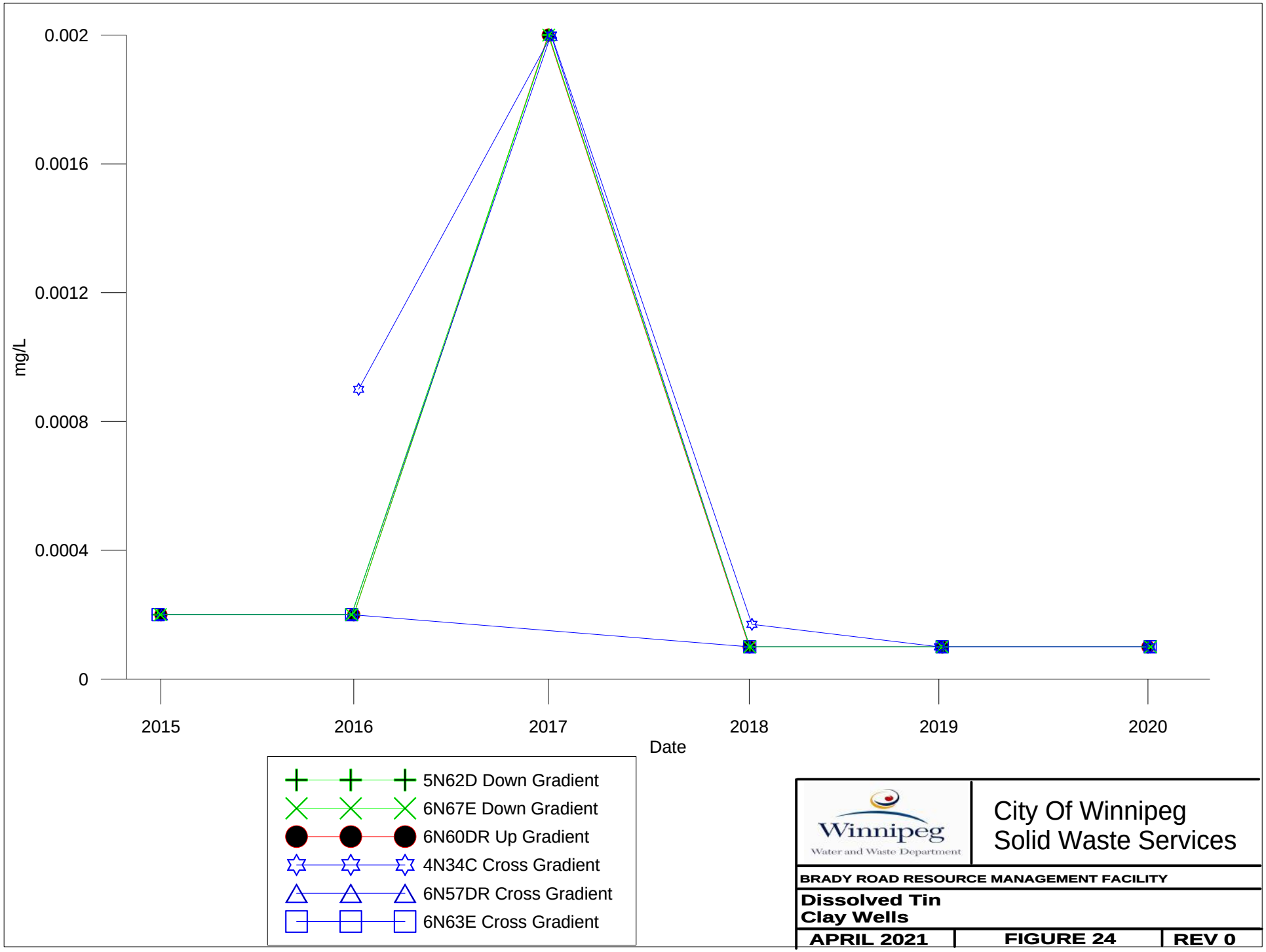
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Rubidium
Clay Wells

APRIL 2021	FIGURE 23	REV 0



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City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Tin
Clay Wells

APRIL 2021	FIGURE 24	REV 0

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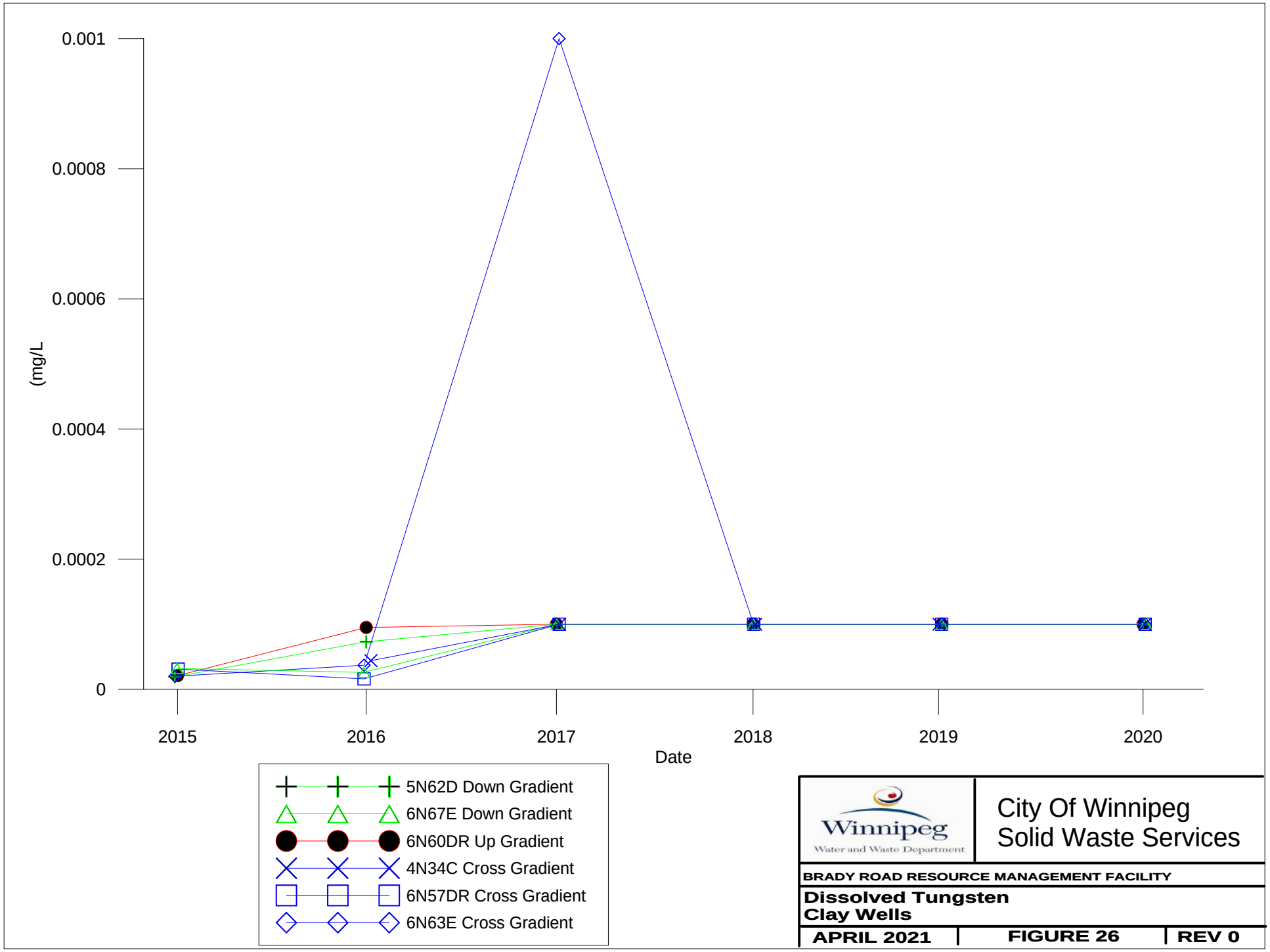
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Kjeldahl Nitrogen
Clay Wells

APRIL 2021	FIGURE 25	REV 0



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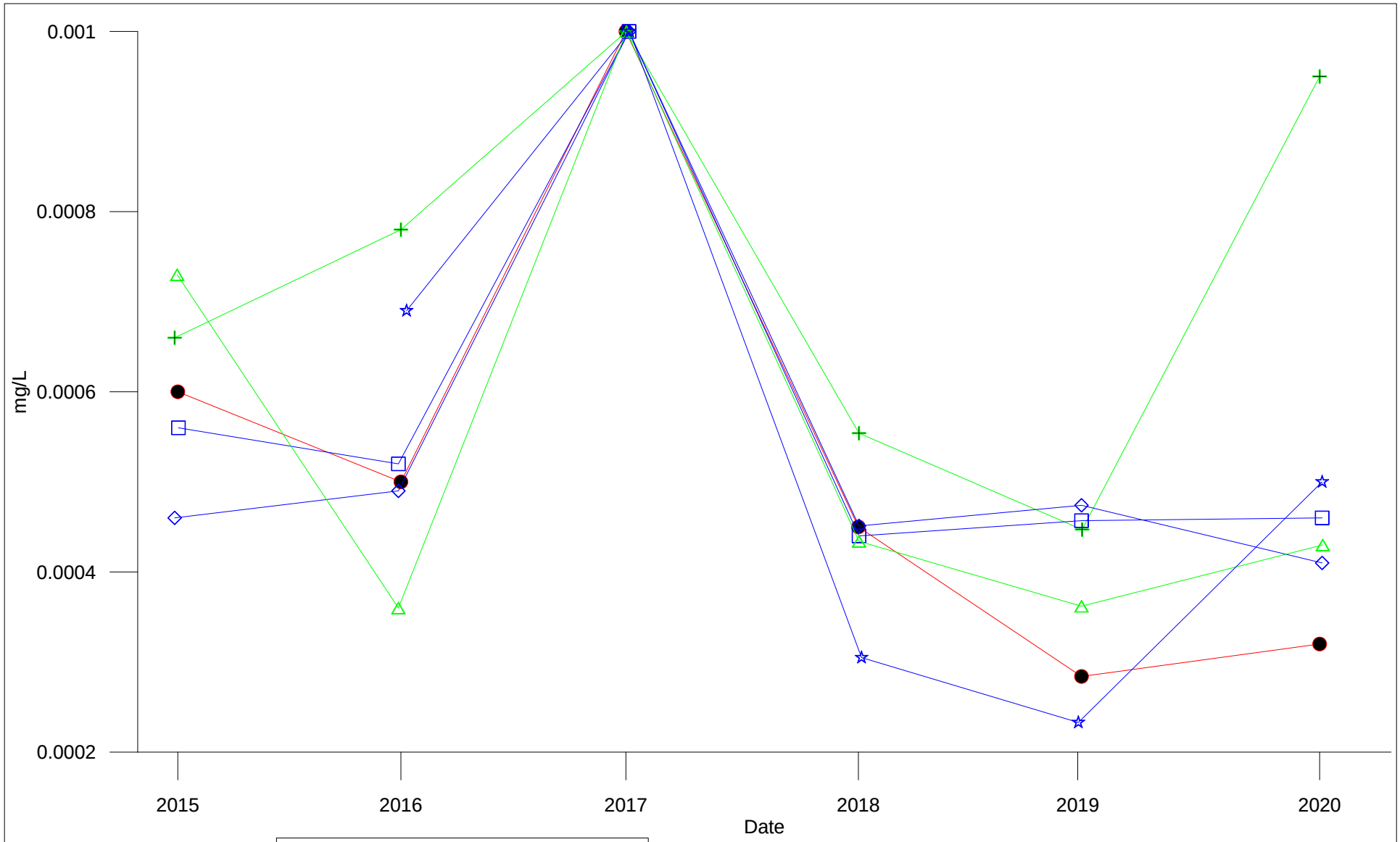
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Tungsten
Clay Wells

APRIL 2021	FIGURE 26	REV 0



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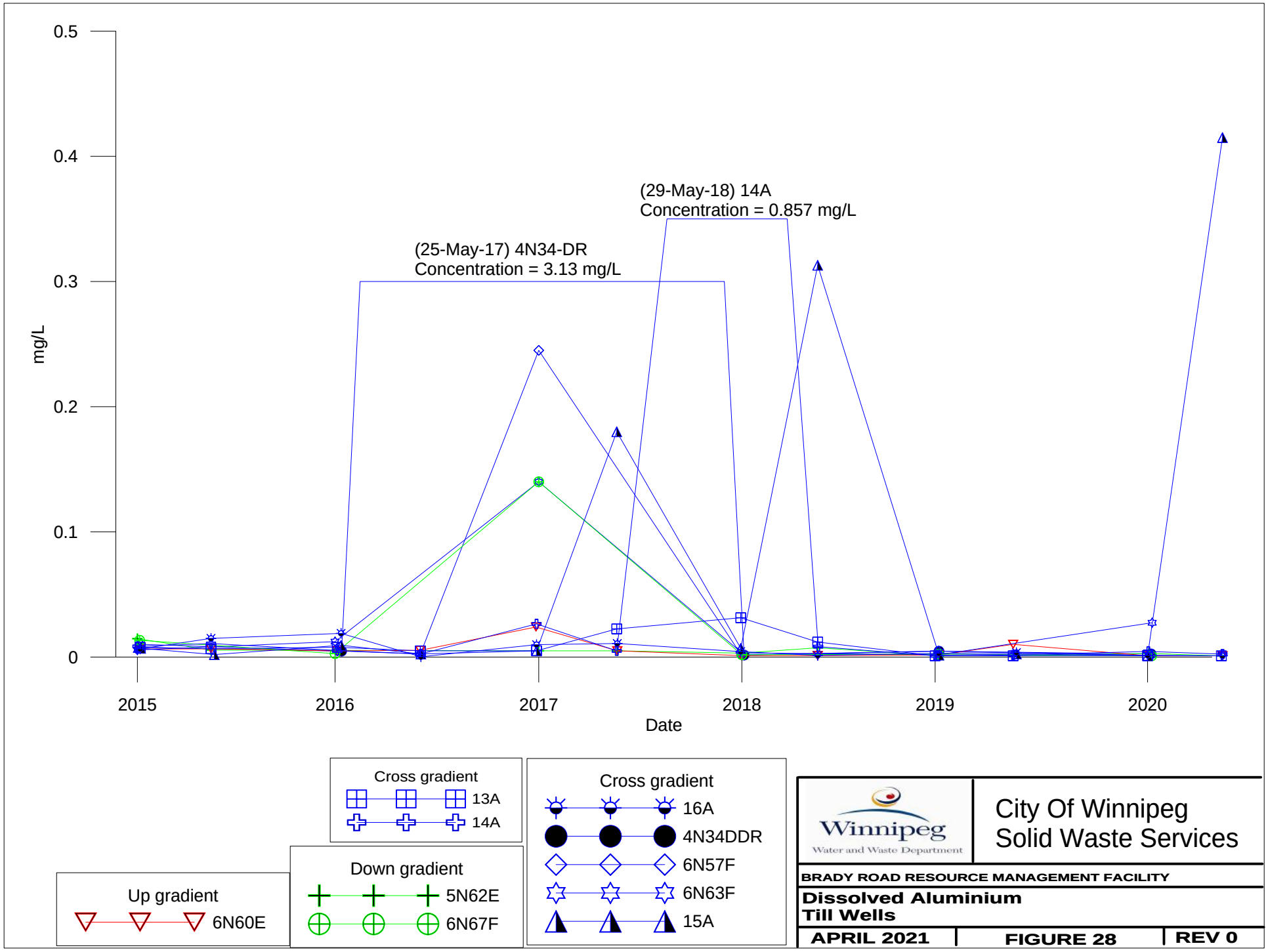
Water and Waste Department

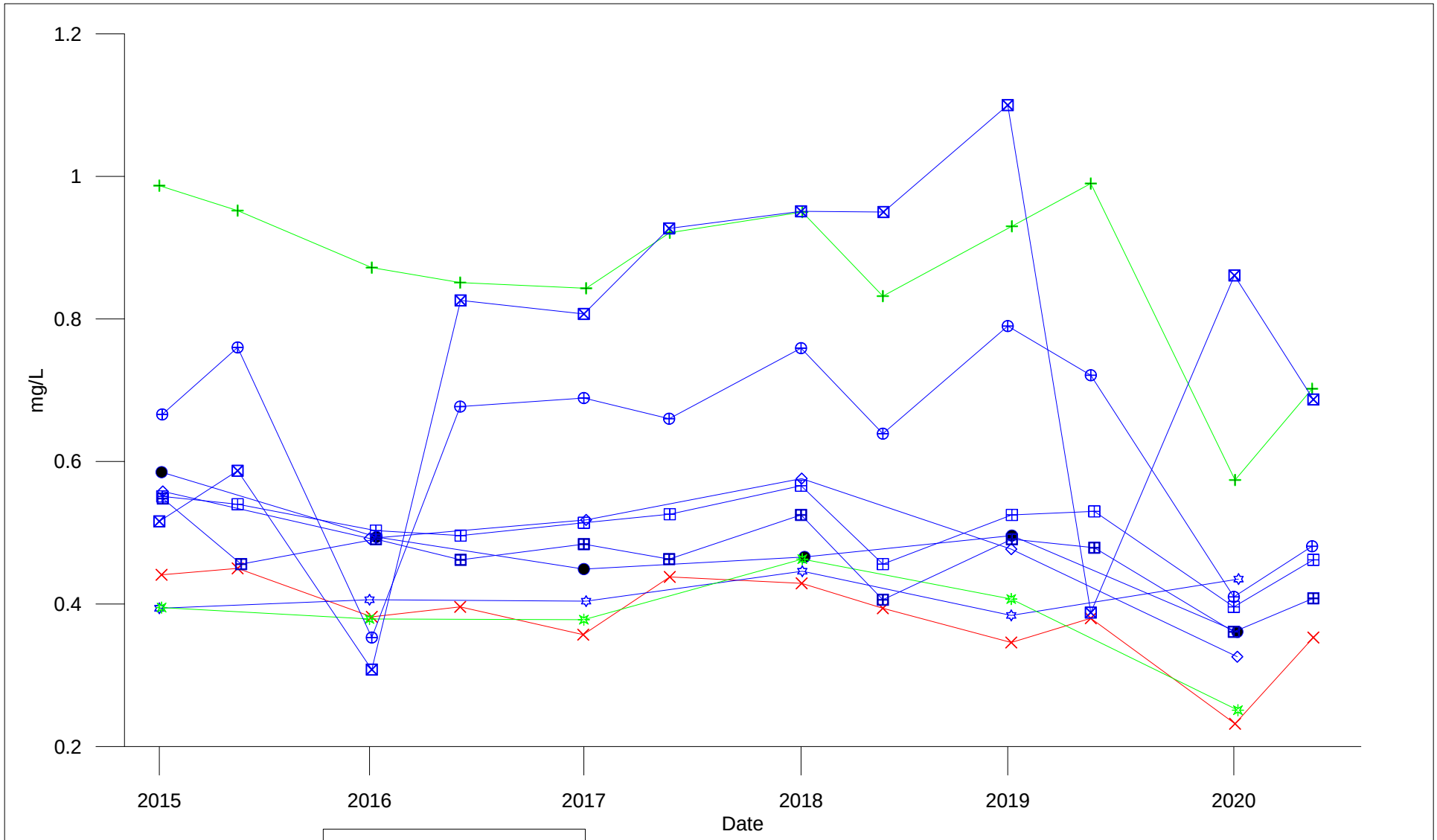
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Zirconium
Clay Wells

APRIL 2021	FIGURE 27	REV 0


0.5
0.4
0.3
0.2
0.1
0
mg/L
(29-May-18) 14A
Concentration = 0.857 mg/L
(25-May-17) 4N34-DR
Concentration = 3.13 mg/L
2015
2016
2017
2018
2019
2020
Date
Cross gradient
13A
14A
Cross gradient
16A
4N34DDR
6N57F
6N63F
15A
Up gradient
6N60E
Down gradient
5N62E
6N67F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Aluminium
Till Wells
APRIL 2021
FIGURE 28
REV 0



Up gradient
6N60EER

Down gradient
5N62E
6N67F

Cross gradient
13A
14A

Cross gradient
15A
16A
4N34DDR
6N57F
6N63F

Boron MOE Criteria = 45 mg/L

Winnipeg
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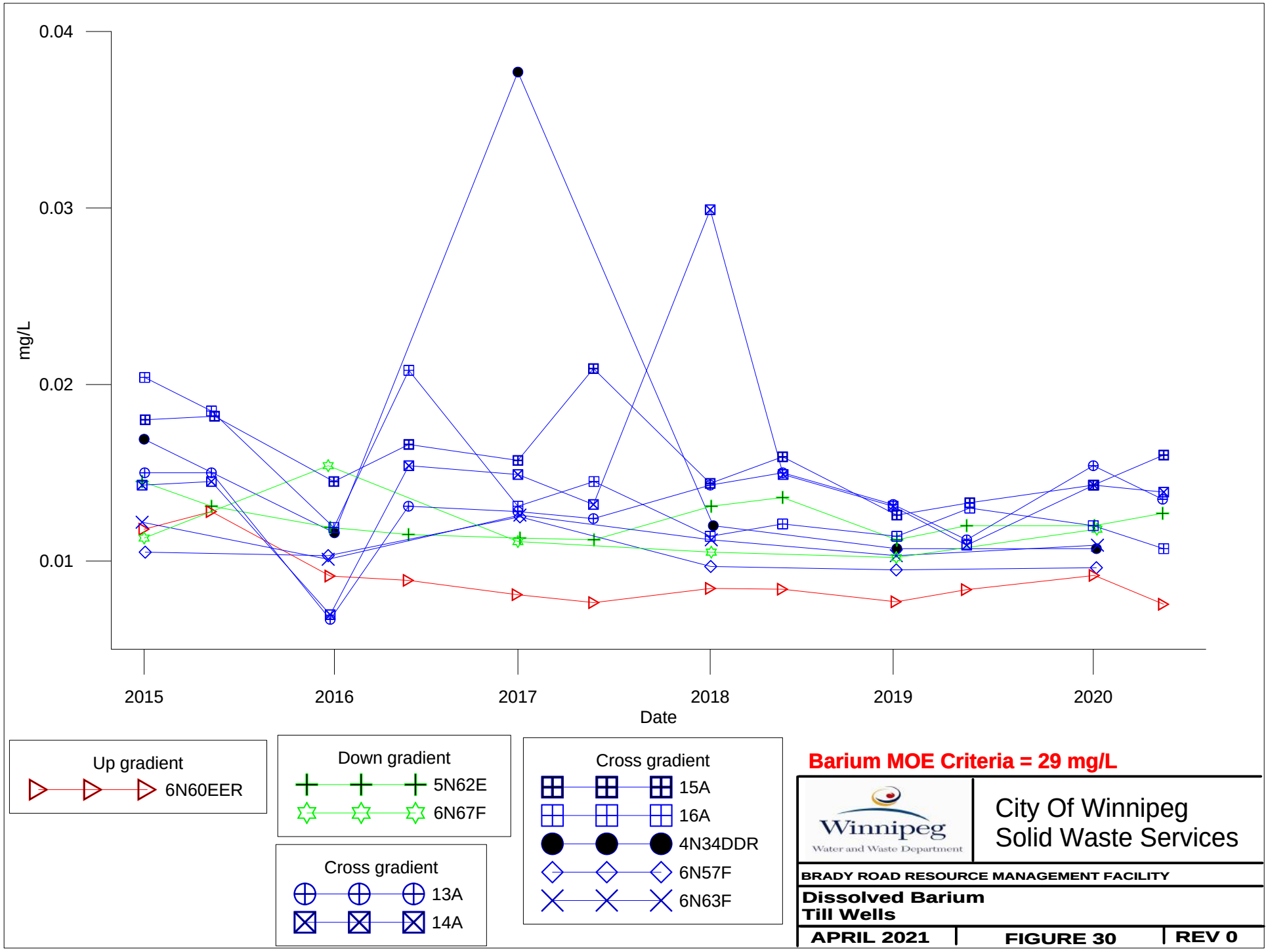
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Boron
Till Wells

APRIL 2021	FIGURE 29	REV 0



Barium MOE Criteria = 29 mg/L

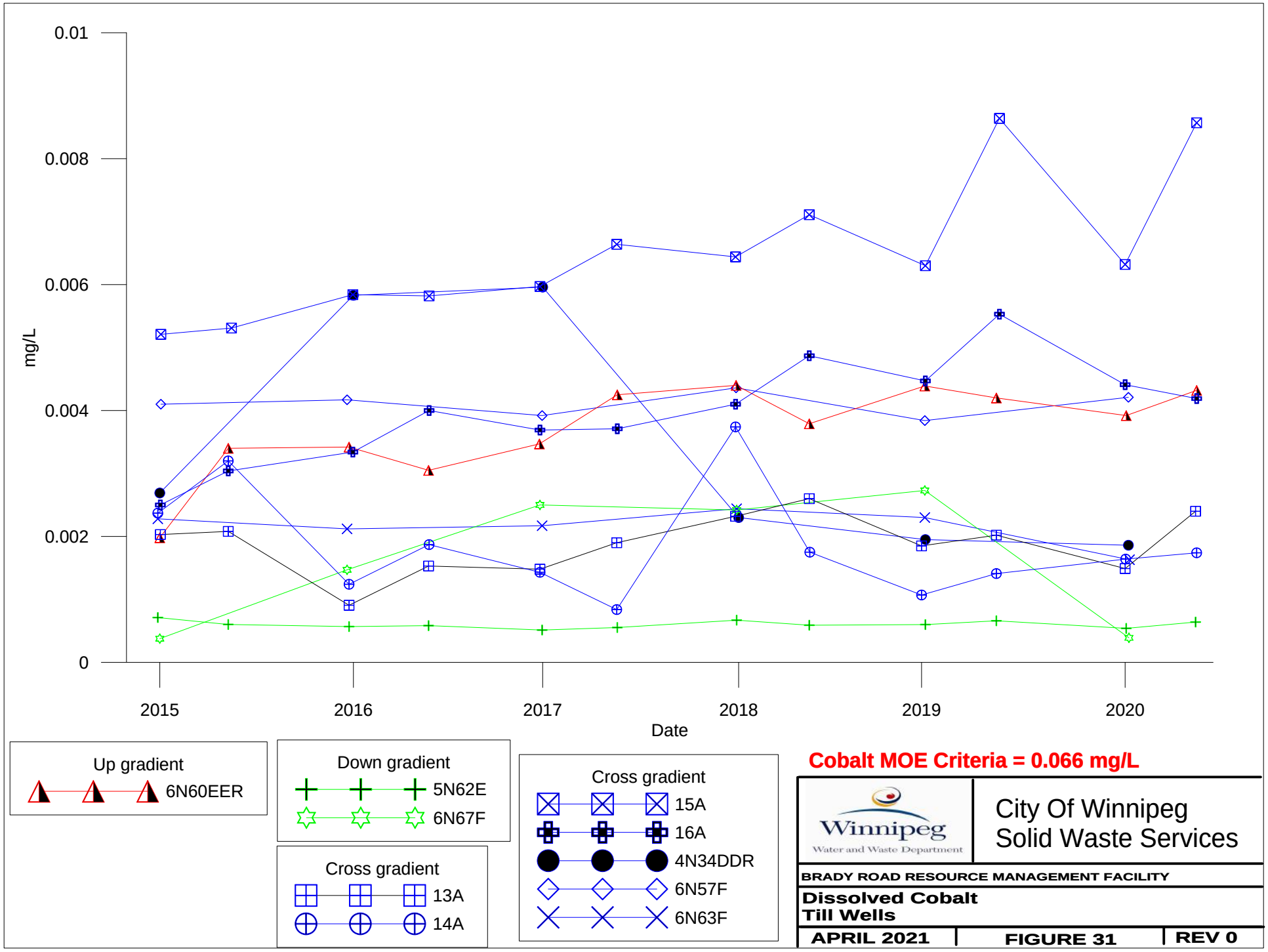
Winnipeg
Water and Waste Department

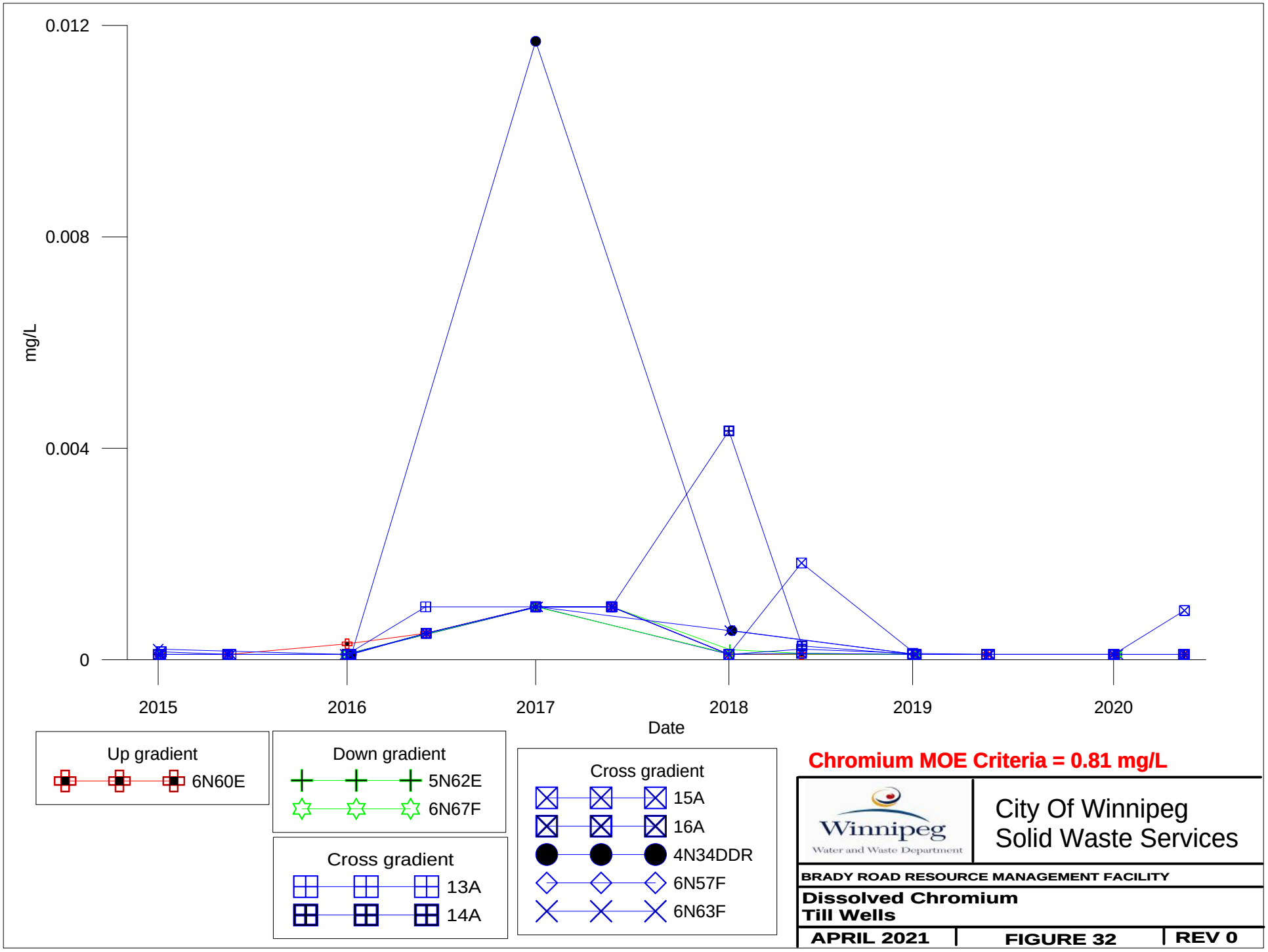
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Barium
Till Wells

APRIL 2021	FIGURE 30	REV 0


0.01
0.008
0.006
0.004
0.002
0
mg/L
2015
2016
2017
2018
2019
2020
Date
Up gradient
6N60EER
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
Cobalt MOE Criteria = 0.066 mg/L
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Cobalt
Till Wells
APRIL 2021
FIGURE 31
REV 0



Chromium MOE Criteria = 0.81 mg/L

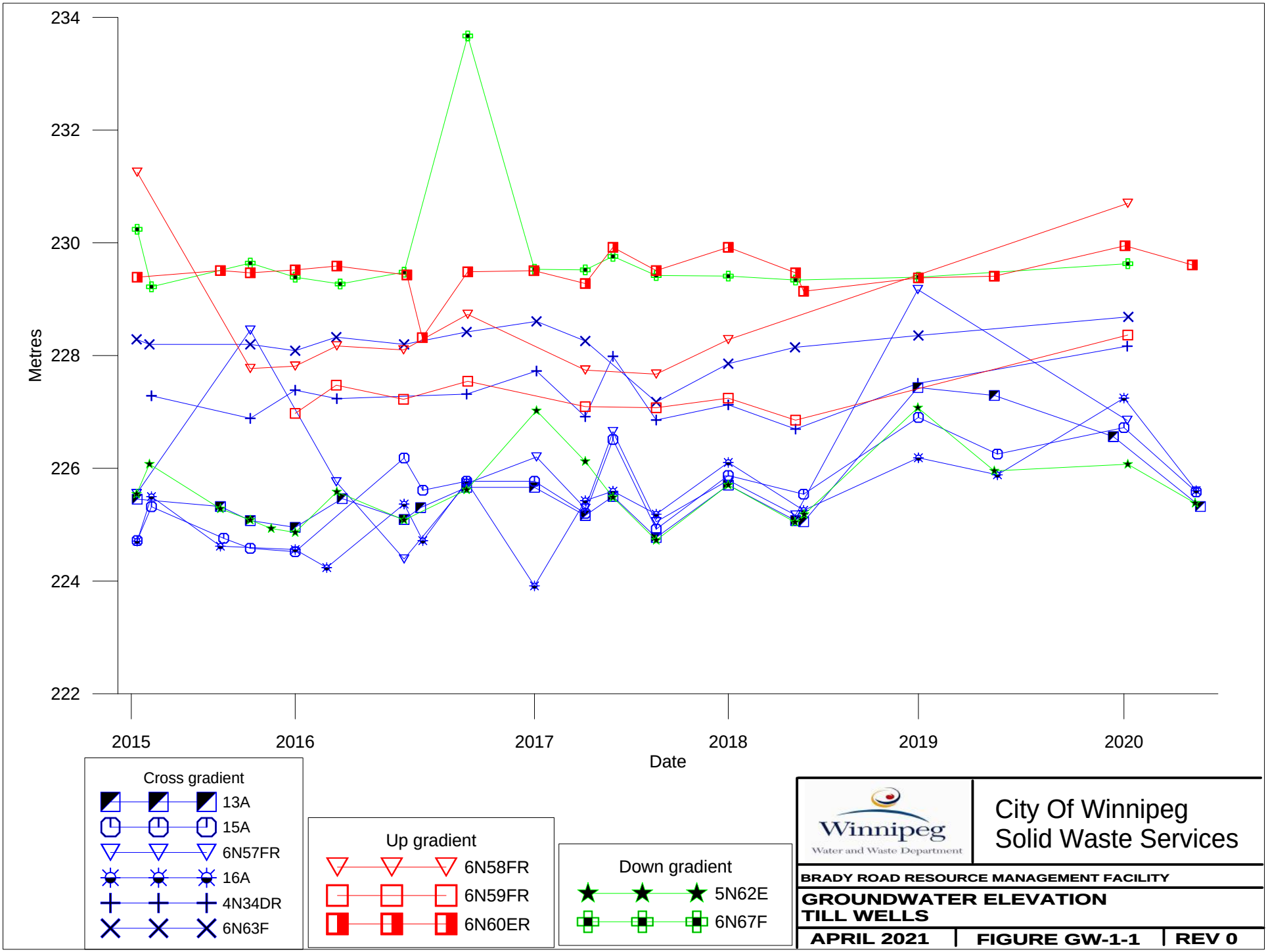
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Chromium
Till Wells

APRIL 2021	FIGURE 32	REV 0



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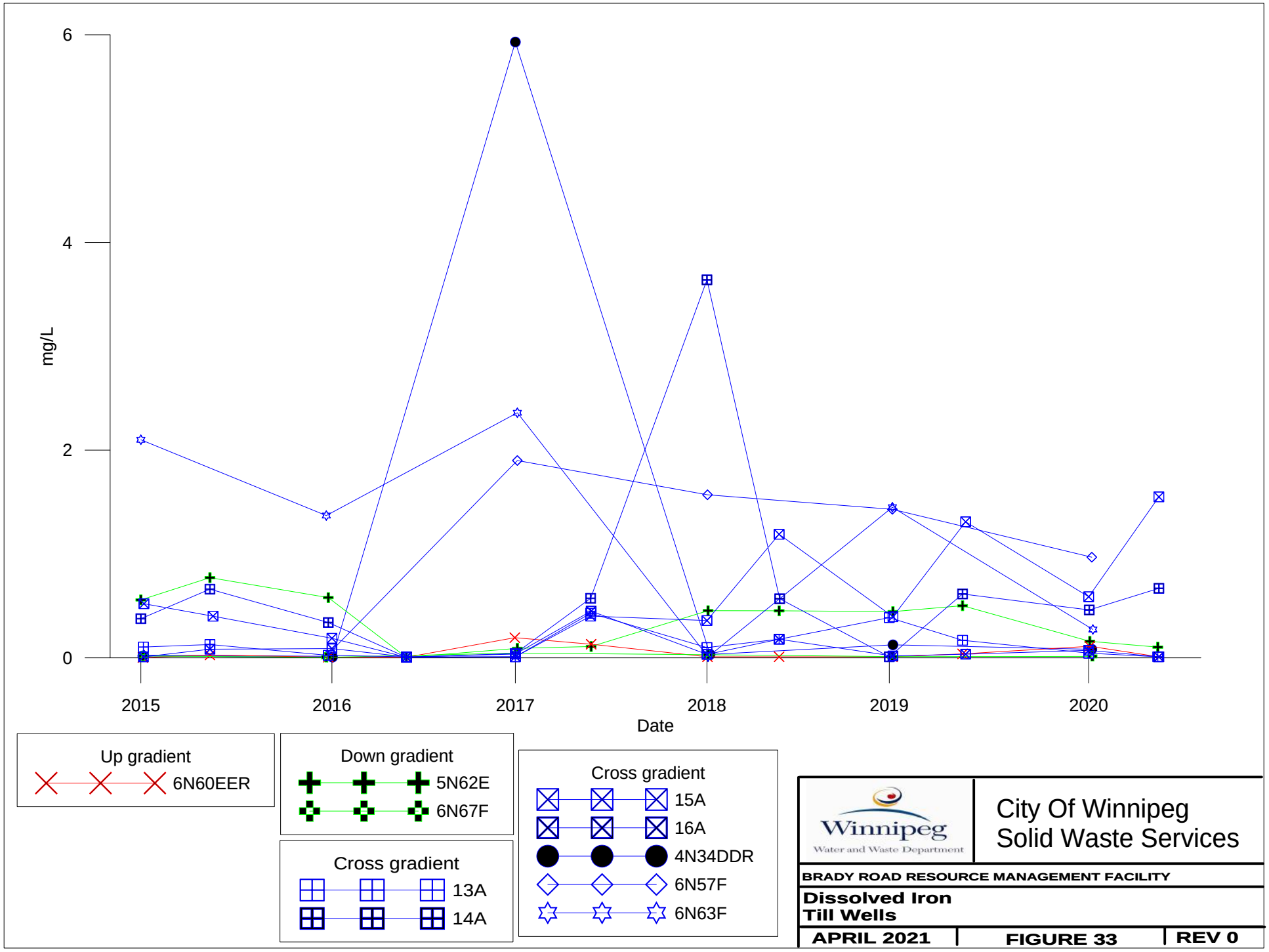
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

GROUNDWATER ELEVATION
TILL WELLS

APRIL 2021 | **FIGURE GW-1-1** | **REV 0**



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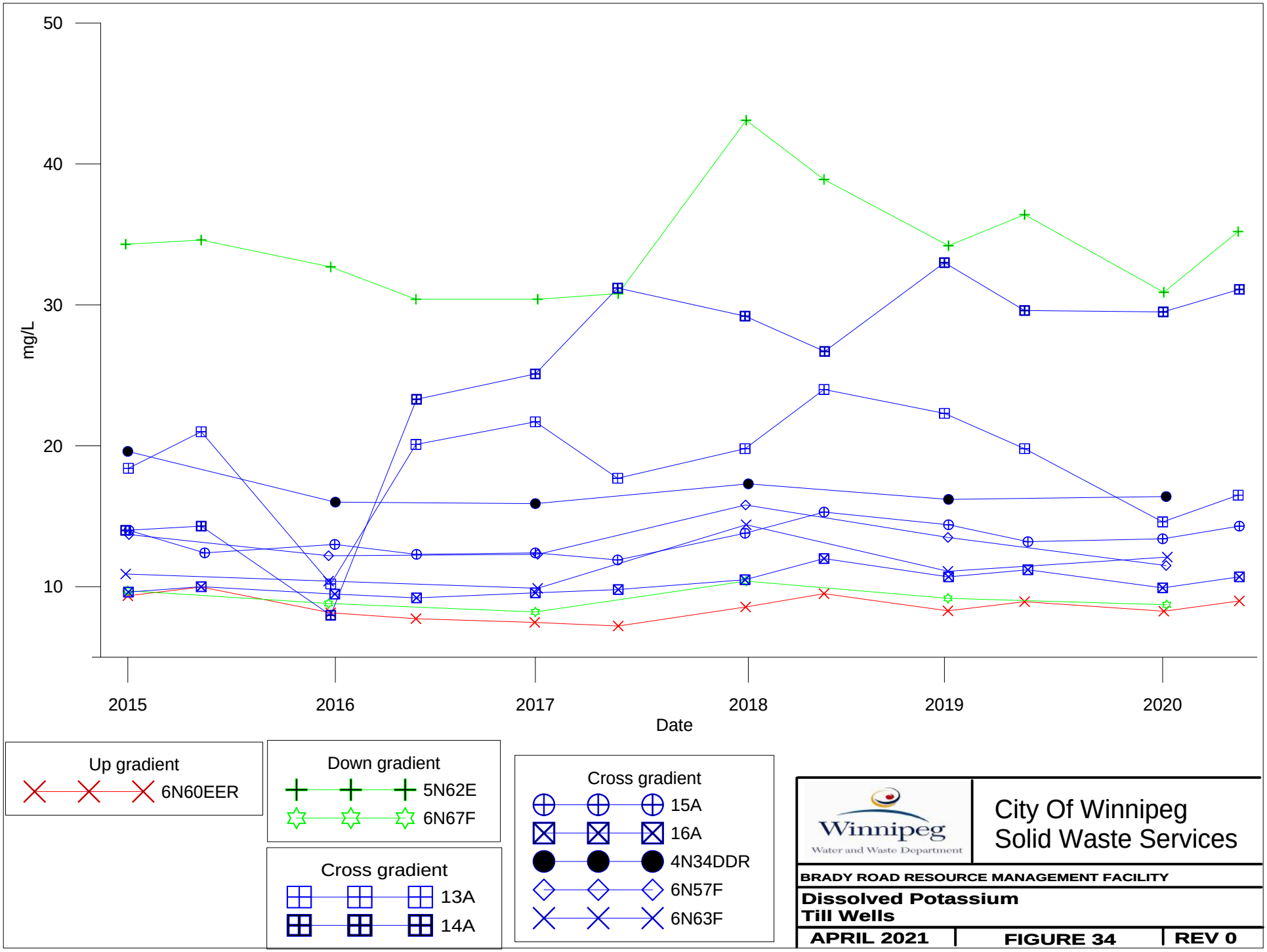
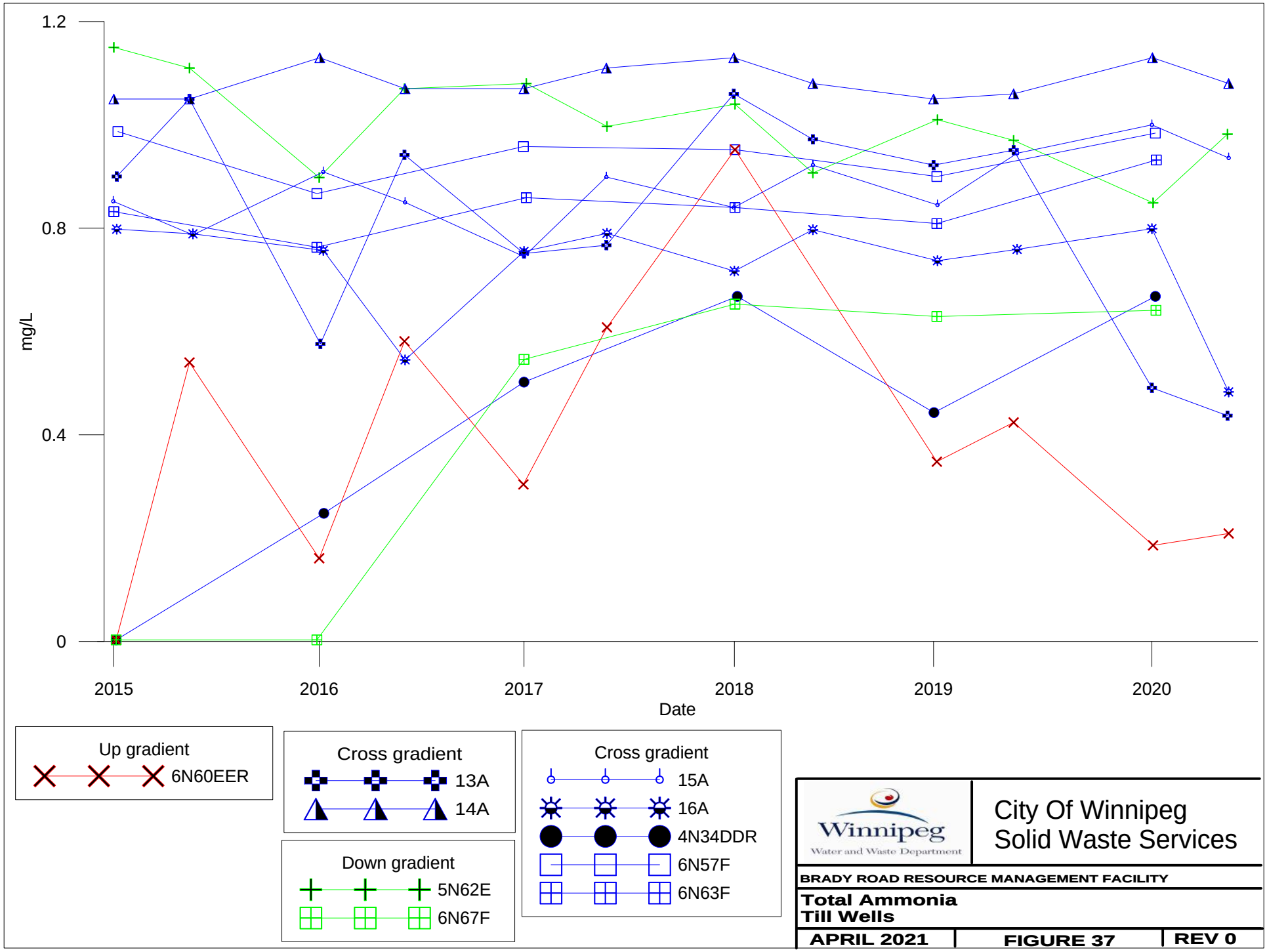
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Iron
Till Wells

APRIL 2021	FIGURE 33	REV 0


50
40
30
20
10
mg/L
2015
2016
2017
2018
2019
2020
Date
Up gradient
6N60EER
Down gradient
5N62E
6N67F
Cross gradient
13A
14A
Cross gradient
15A
16A
4N34DDR
6N57F
6N63F
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Potassium
Till Wells
APRIL 2021
FIGURE 34
REV 0



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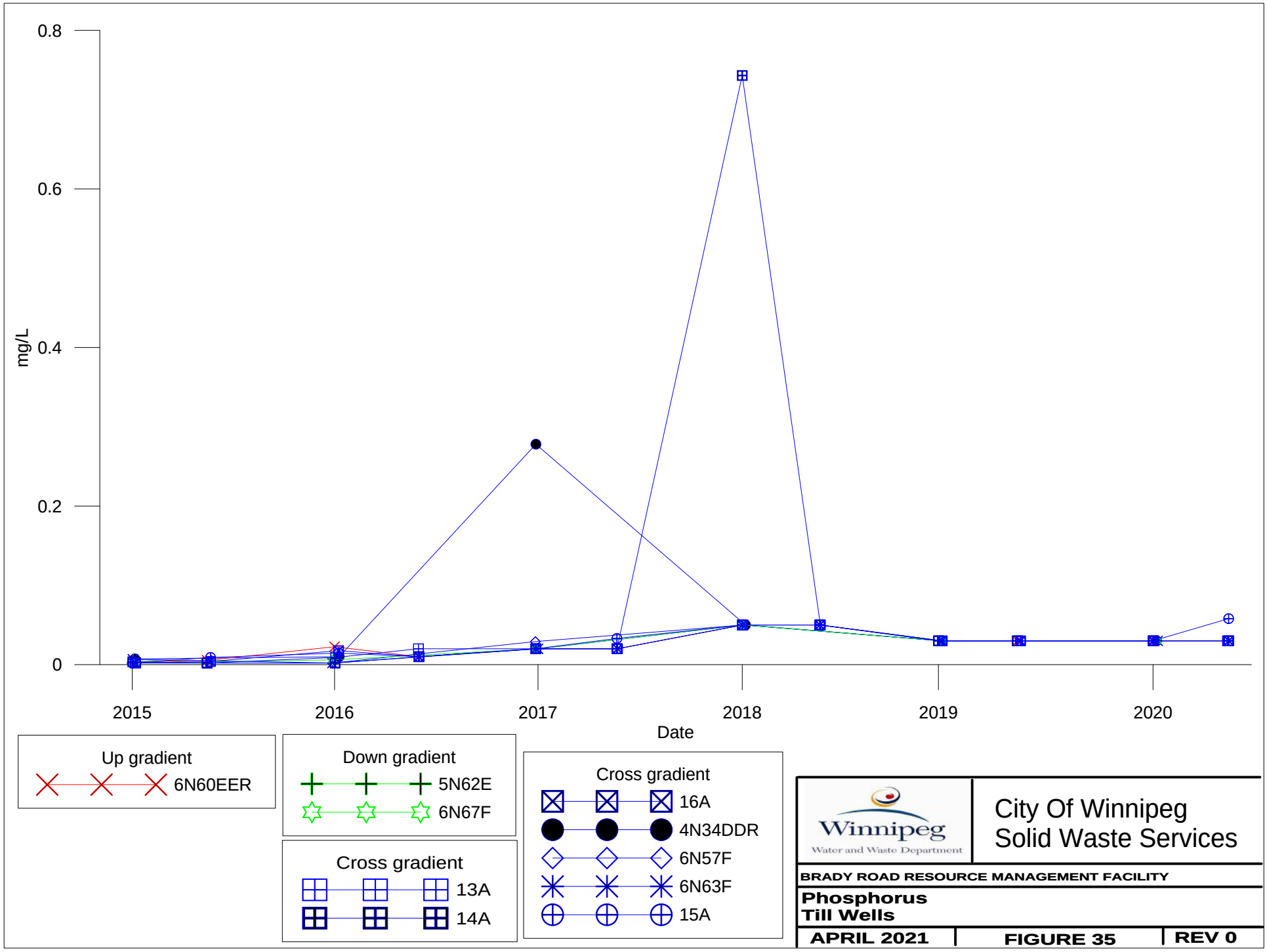
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Ammonia
Till Wells

APRIL 2021	FIGURE 37	REV 0



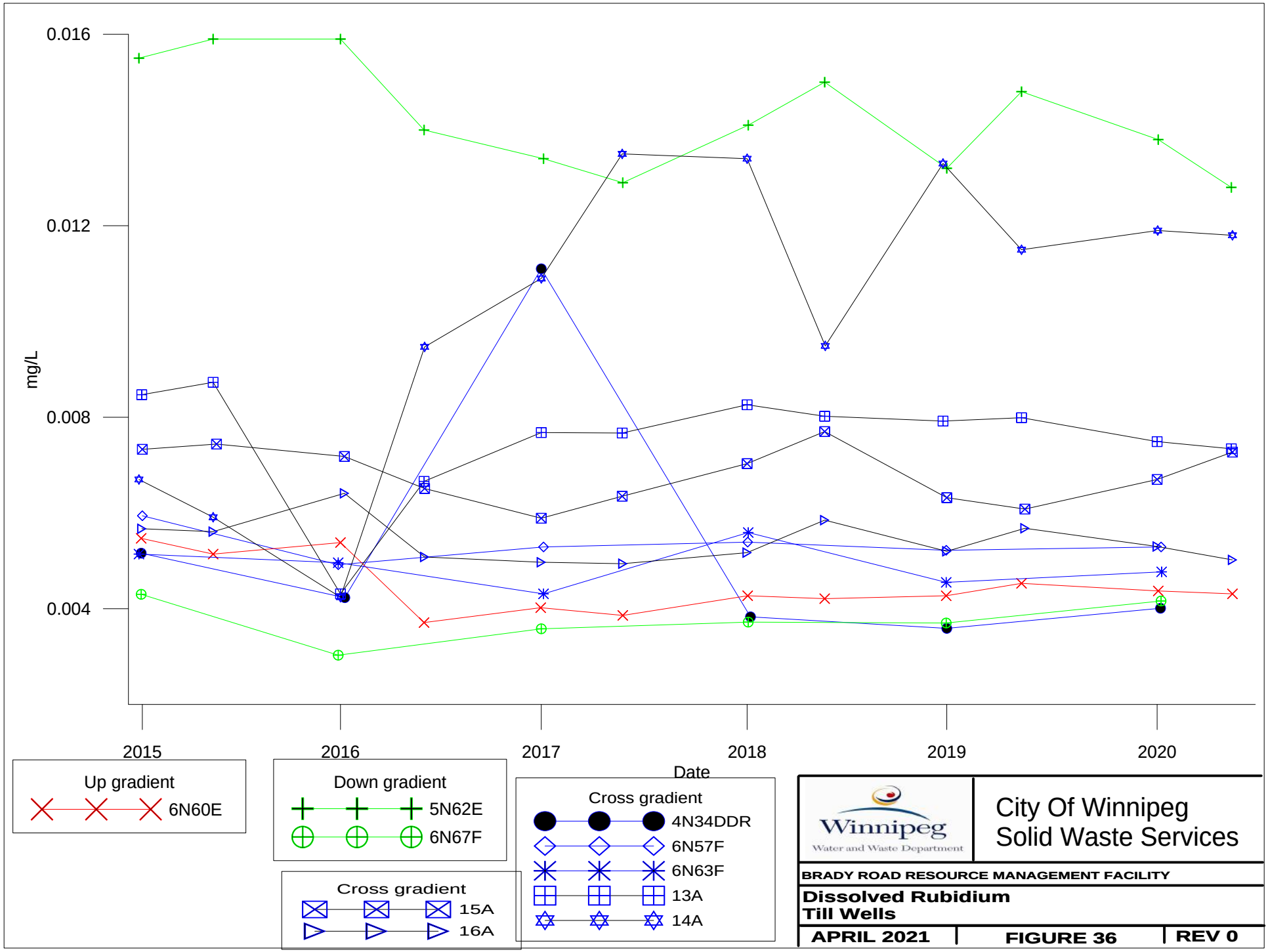
Winnipeg
Water and Waste Department

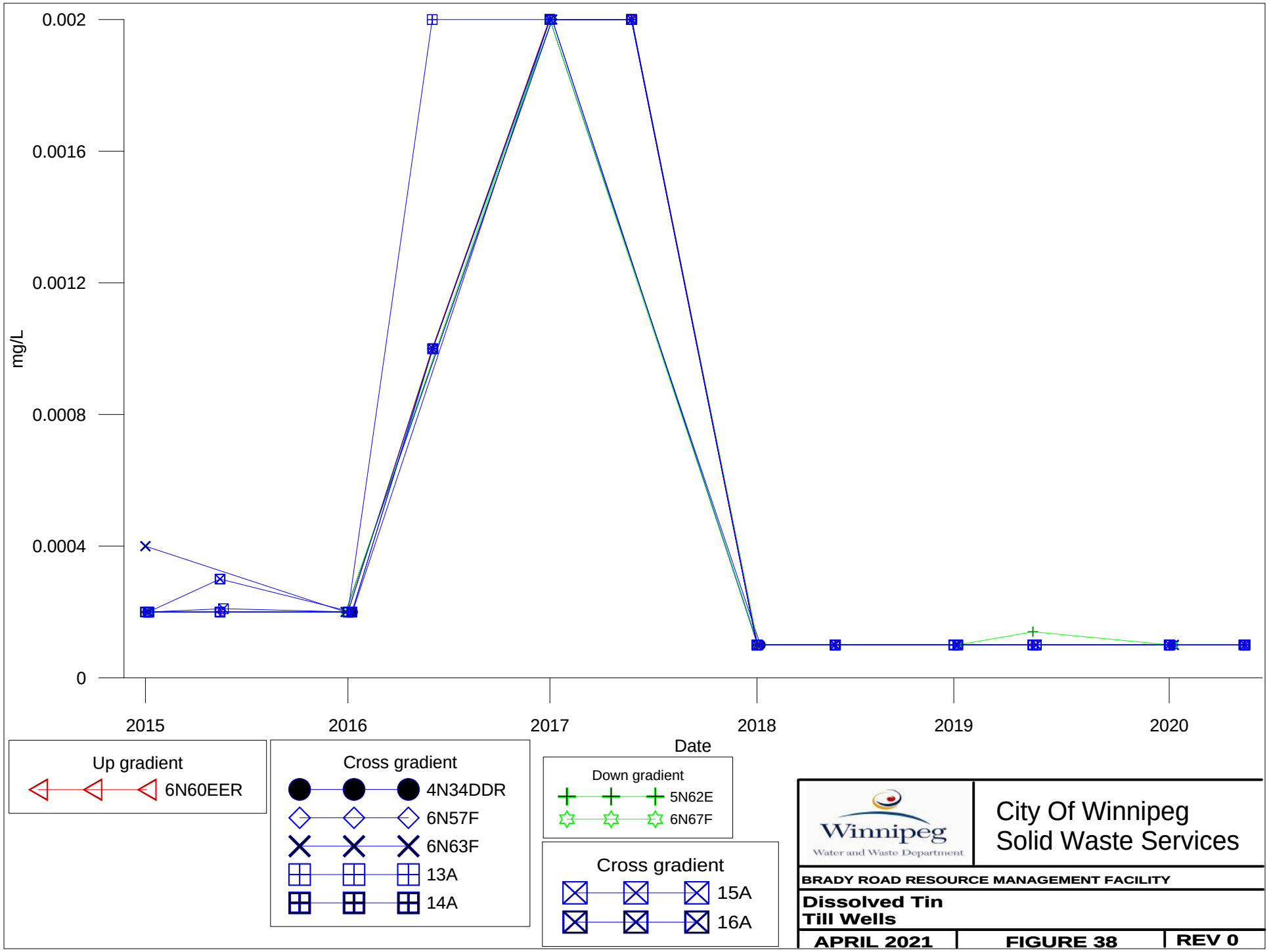
City Of Winnipeg
Solid Waste Services

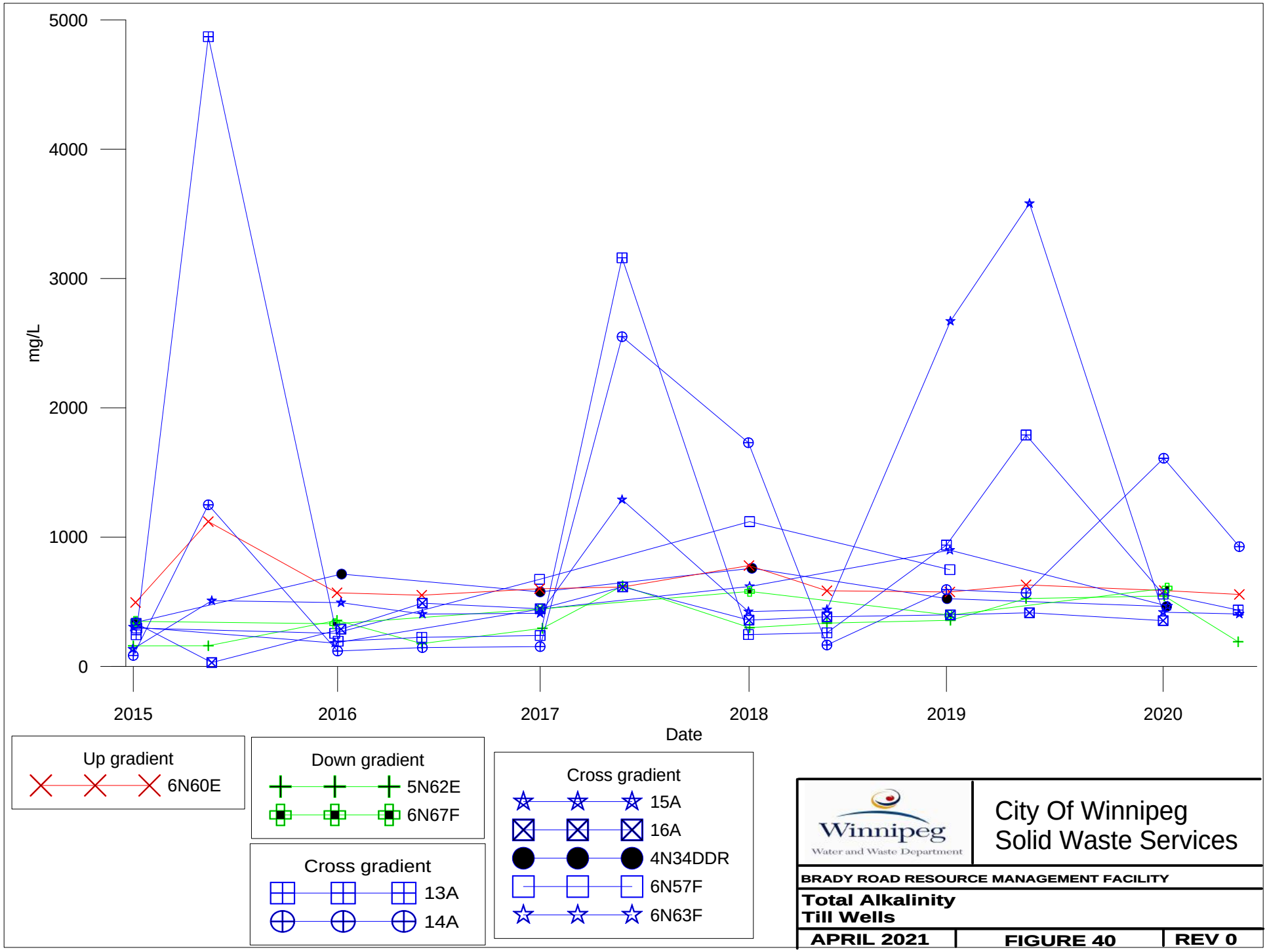
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Phosphorus
Till Wells

APRIL 2021	FIGURE 35	REV 0


0.016
0.012
0.008
0.004
mg/L
2015
2016
2017
2018
2019
2020
Date
Up gradient
6N60E
Down gradient
5N62E
6N67F
Cross gradient
15A
16A
Cross gradient
4N34DDR
6N57F
6N63F
13A
14A
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Rubidium
Till Wells
APRIL 2021
FIGURE 36
REV 0


0.002
0.0016
0.0012
0.0008
0.0004
0
mg/L
2015
2016
2017
2018
2019
2020
Date
Up gradient
6N60EER
Cross gradient
4N34DDR
6N57F
6N63F
13A
14A
Down gradient
5N62E
6N67F
Cross gradient
15A
16A
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Tin
Till Wells
APRIL 2021
FIGURE 38
REV 0



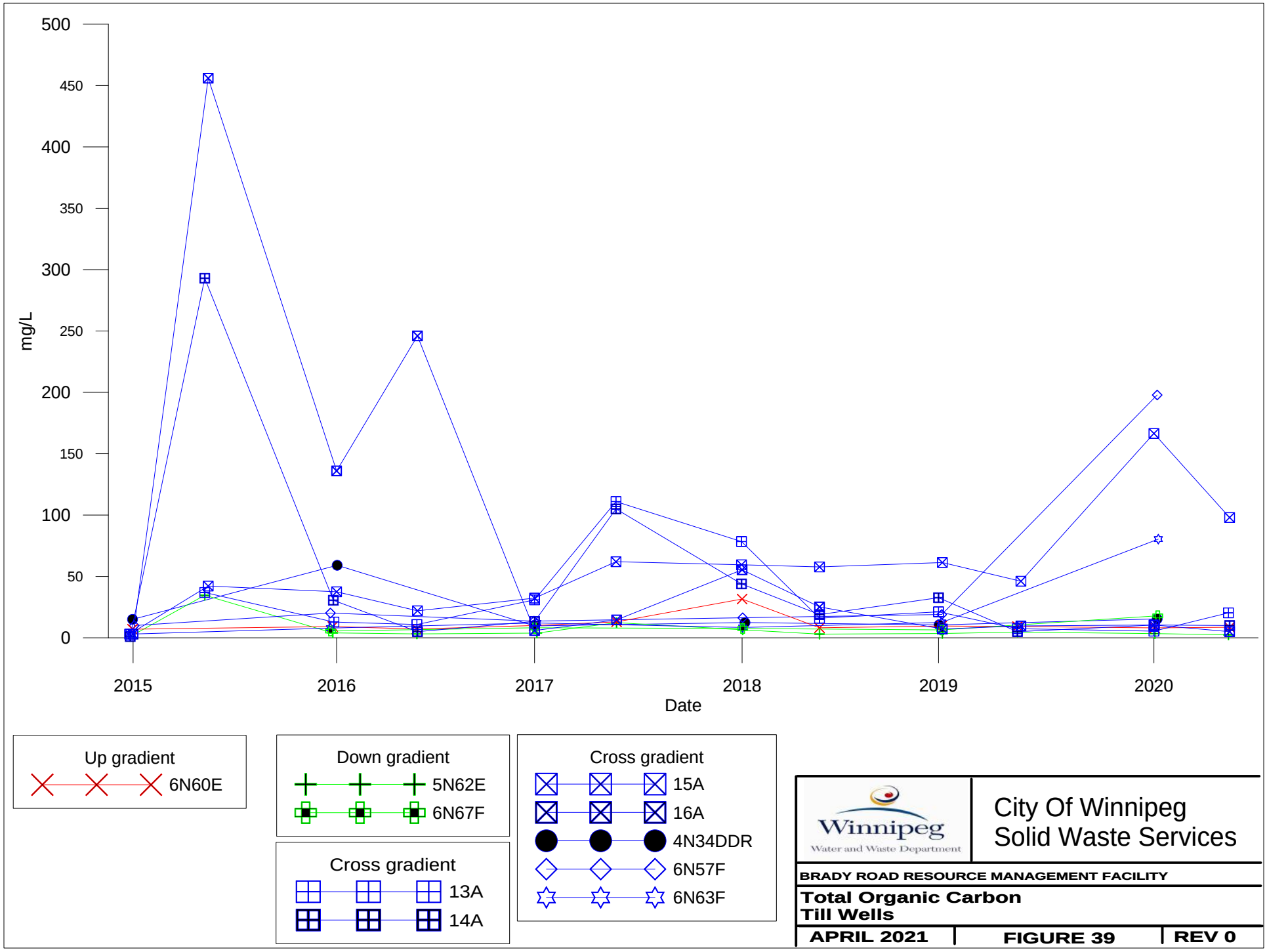
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Alkalinity
Till Wells

APRIL 2021	FIGURE 40	REV 0



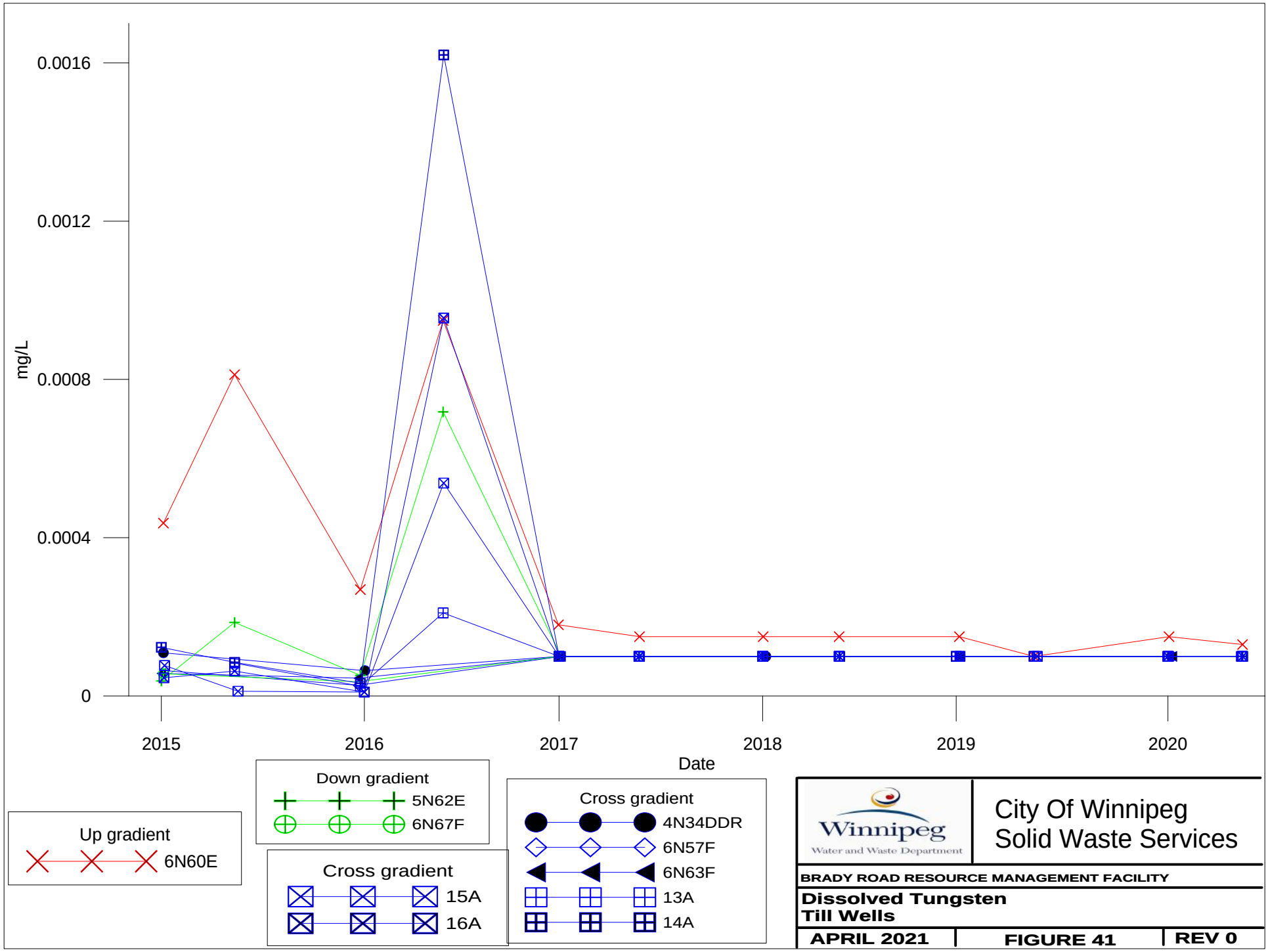
Winnipeg
Water and Waste Department

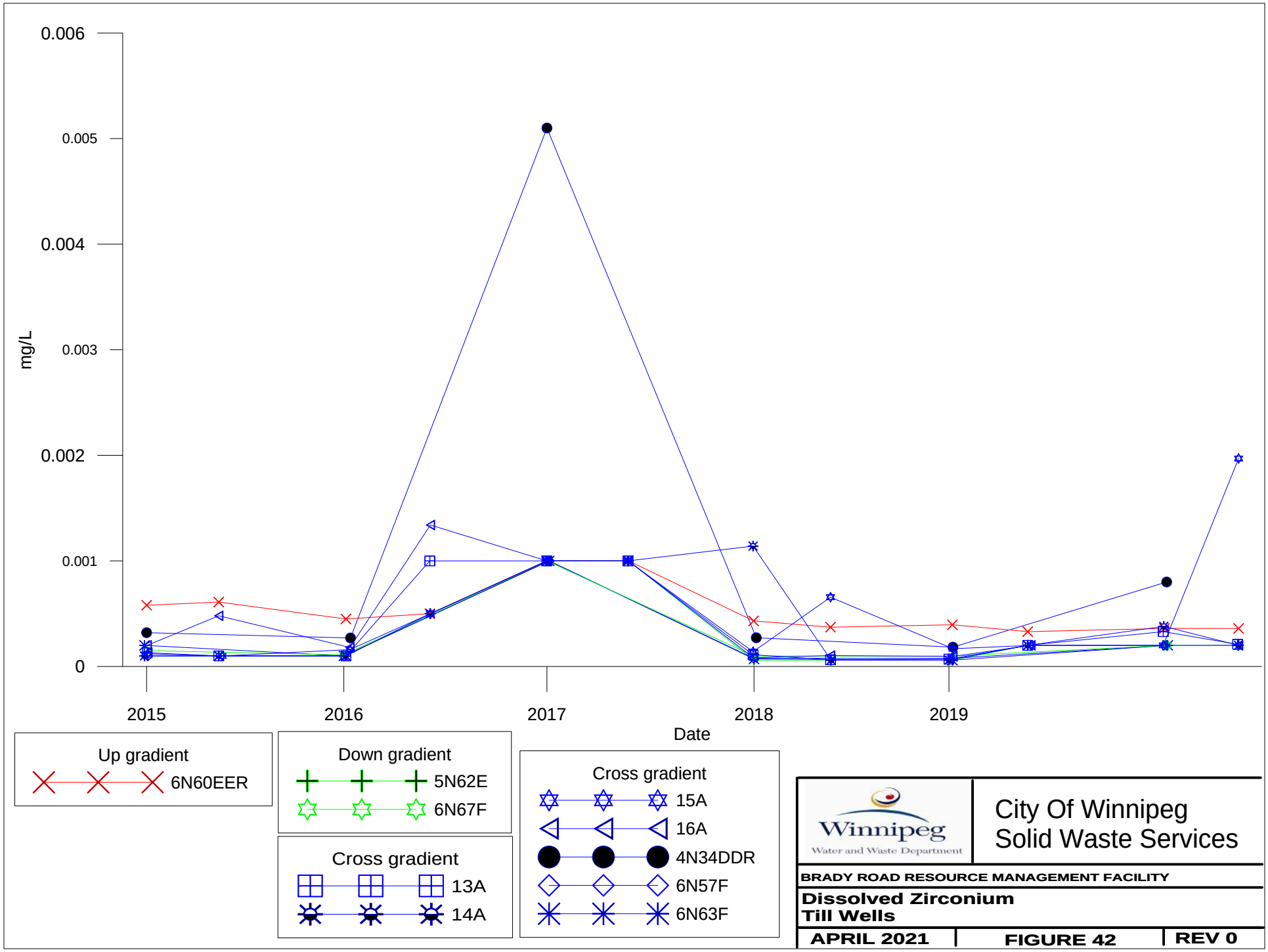
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Organic Carbon
Till Wells

APRIL 2021	FIGURE 39	REV 0


0.0016
0.0012
0.0008
0.0004
0
mg/L
2015
2016
2017
2018
2019
2020
Date
Up gradient
6N60E
Down gradient
5N62E
6N67F
Cross gradient
15A
16A
Cross gradient
4N34DDR
6N57F
6N63F
13A
14A
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Tungsten
Till Wells
APRIL 2021
FIGURE 41
REV 0



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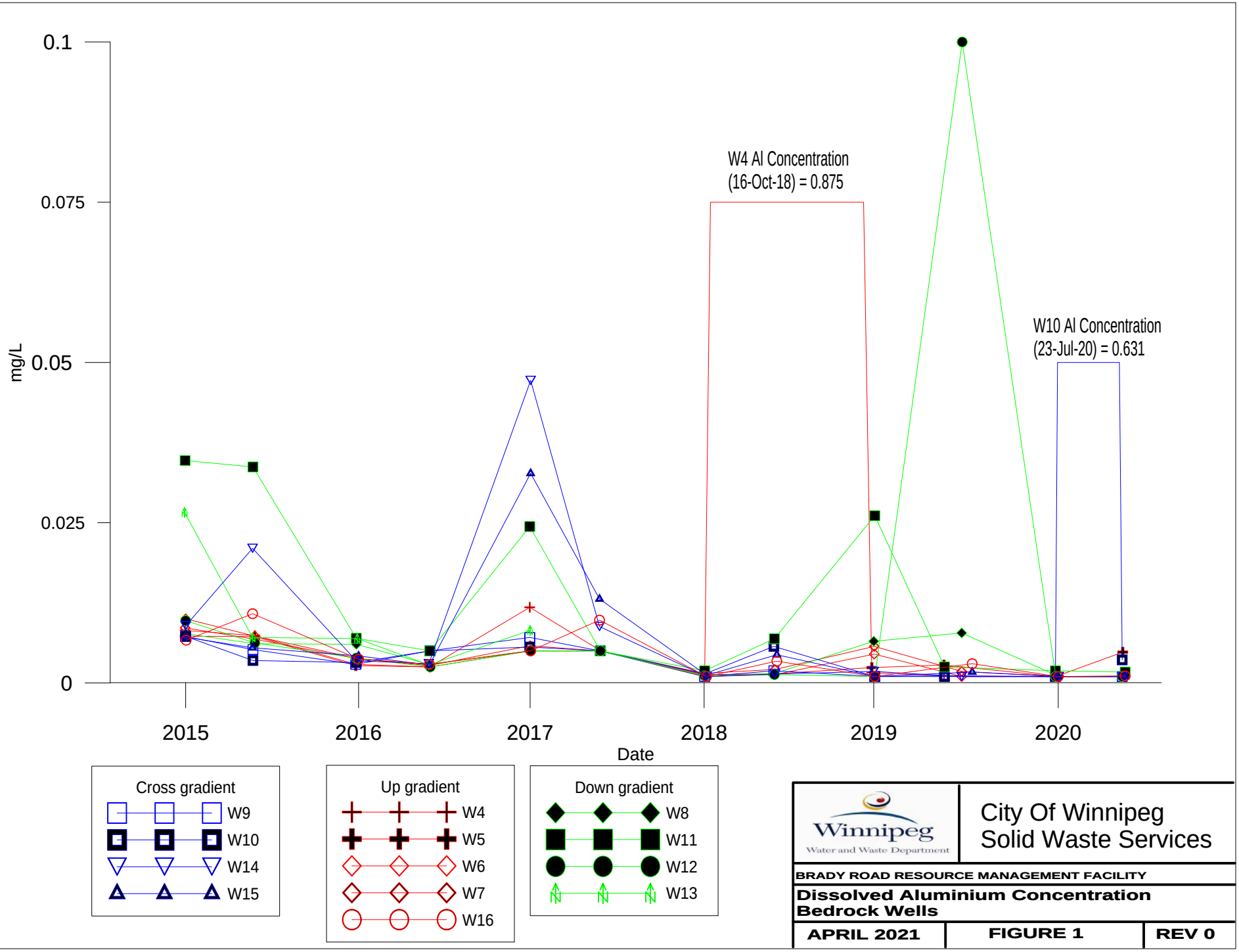
Water and Waste Department

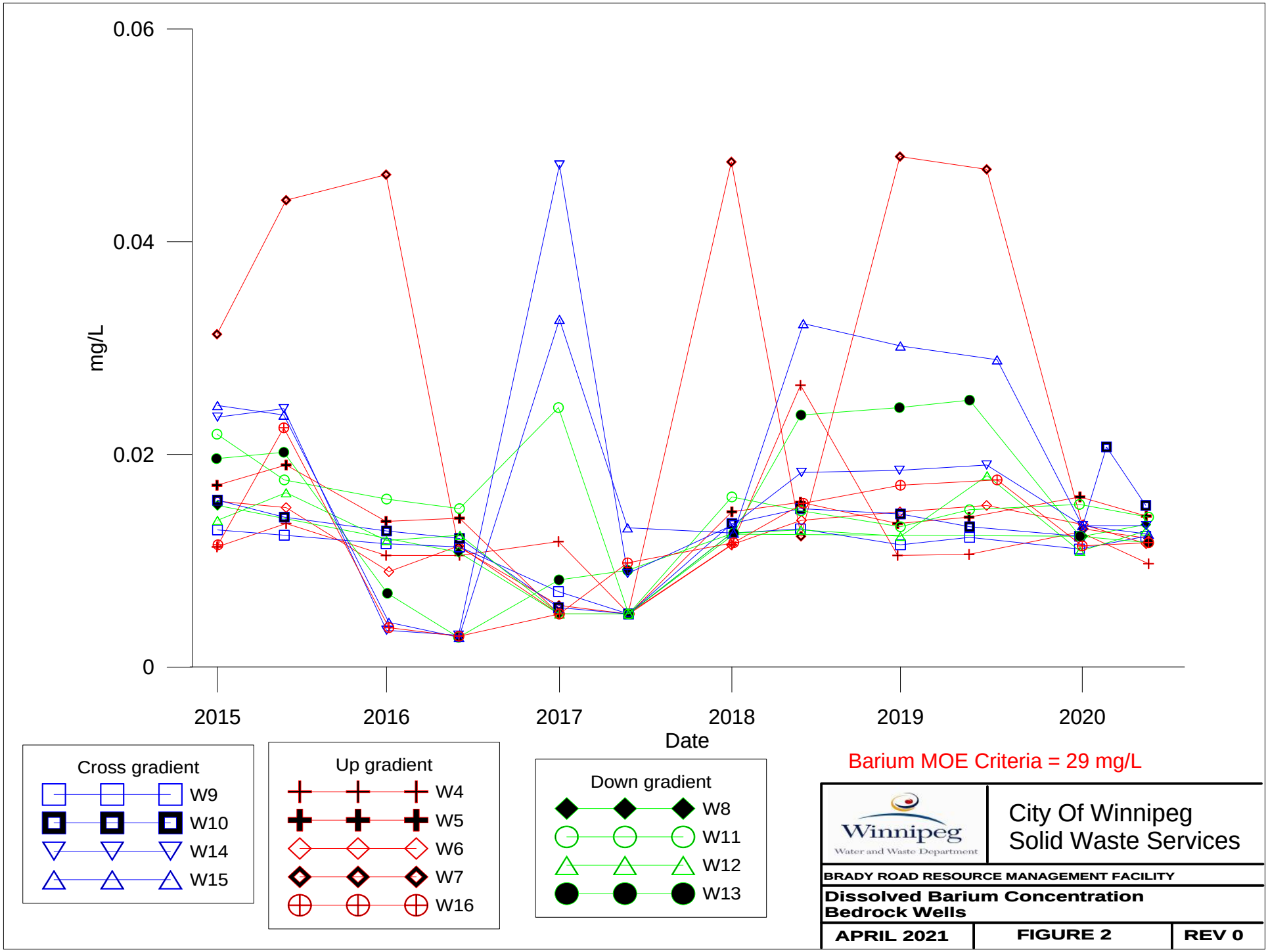
City Of Winnipeg
Solid Waste Services

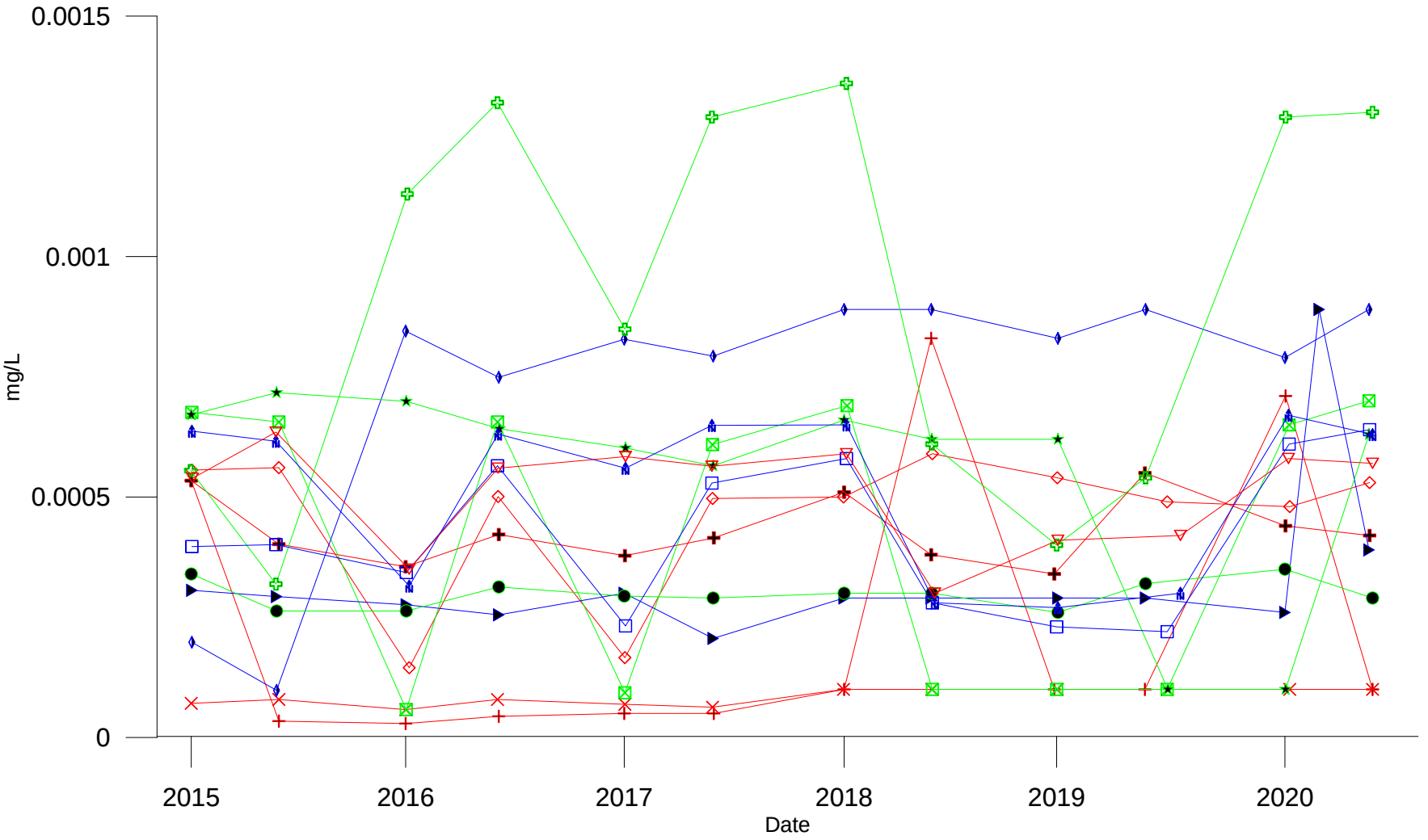
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Zirconium
Till Wells

APRIL 2021 | FIGURE 42 | REV 0


0.1
0.075
0.05
0.025
0
mg/L
W4 Al Concentration
(16-Oct-18) = 0.875
W10 Al Concentration
(23-Jul-20) = 0.631
2015
2016
2017
2018
2019
2020
Date
Cross gradient
W9
W10
W14
W15
Up gradient
W4
W5
W6
W7
W16
Down gradient
W8
W11
W12
W13
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Aluminium Concentration
Bedrock Wells
APRIL 2021
FIGURE 1
REV 0


0.06
0.04
0.02
0
mg/L
2015
2016
2017
2018
2019
2020
Date
Cross gradient
W9
W10
W14
W15
Up gradient
W4
W5
W6
W7
W16
Down gradient
W8
W11
W12
W13
Barium MOE Criteria = 29 mg/L
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Dissolved Barium Concentration
Bedrock Wells
APRIL 2021
FIGURE 2
REV 0



Cross gradient
W9
W10
W14
W15

Up gradient
W4
W5
W6
W7
W16

Down gradient
W8
W11
W12
W13

MOE Cobalt Criteria = 0.066 mg/L

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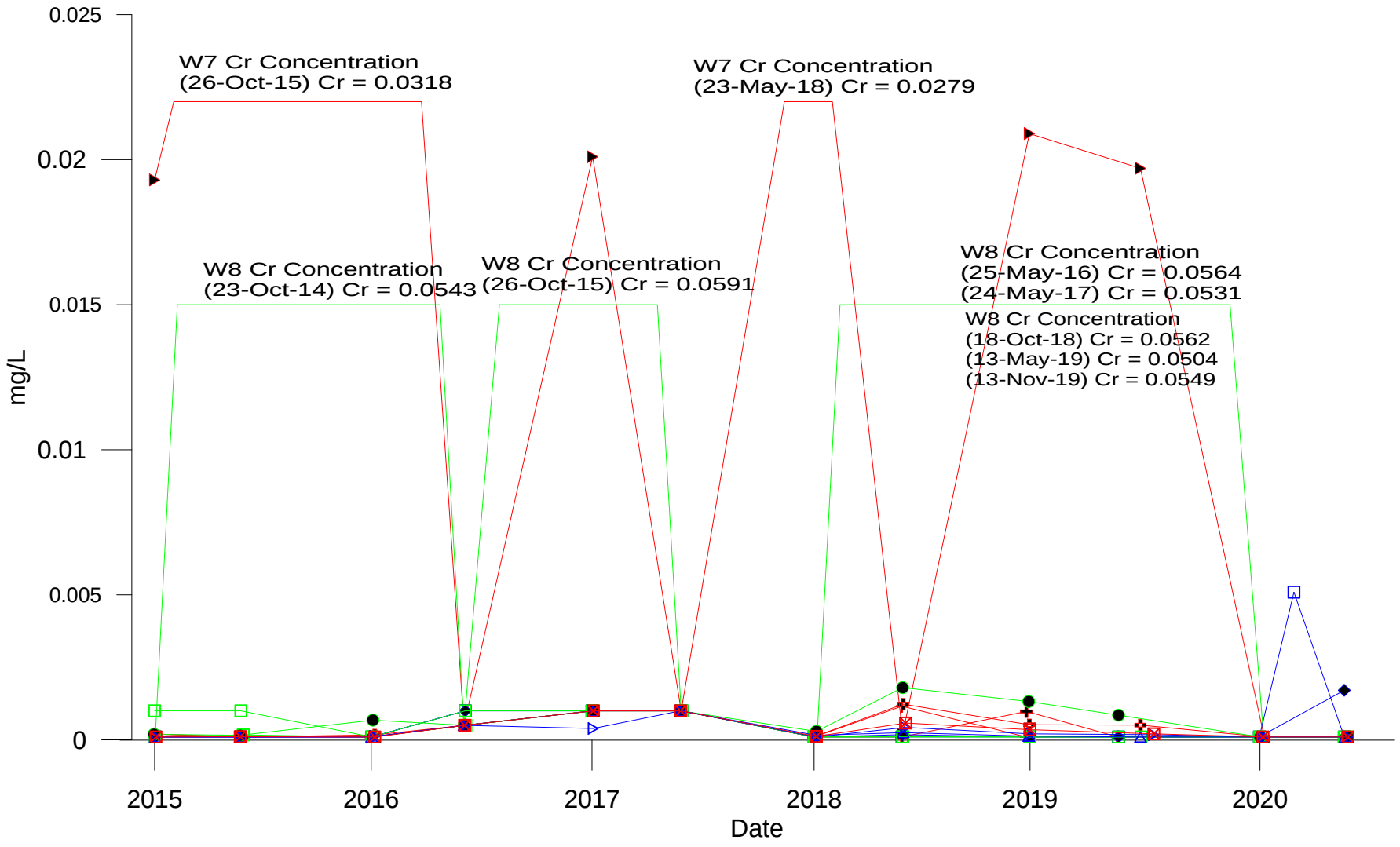
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Cobalt Concentration
Bedrock Wells

APRIL 2021	FIGURE 3	REV 0



Chromium MOE Criteria = 0.81 mg/L

Cross gradient
- W9
- W10
- W14
- W15

Up gradient
- W4
- W5
- W6
- W7
- W16

Down gradient
- W8
- W11
- W12
- W13

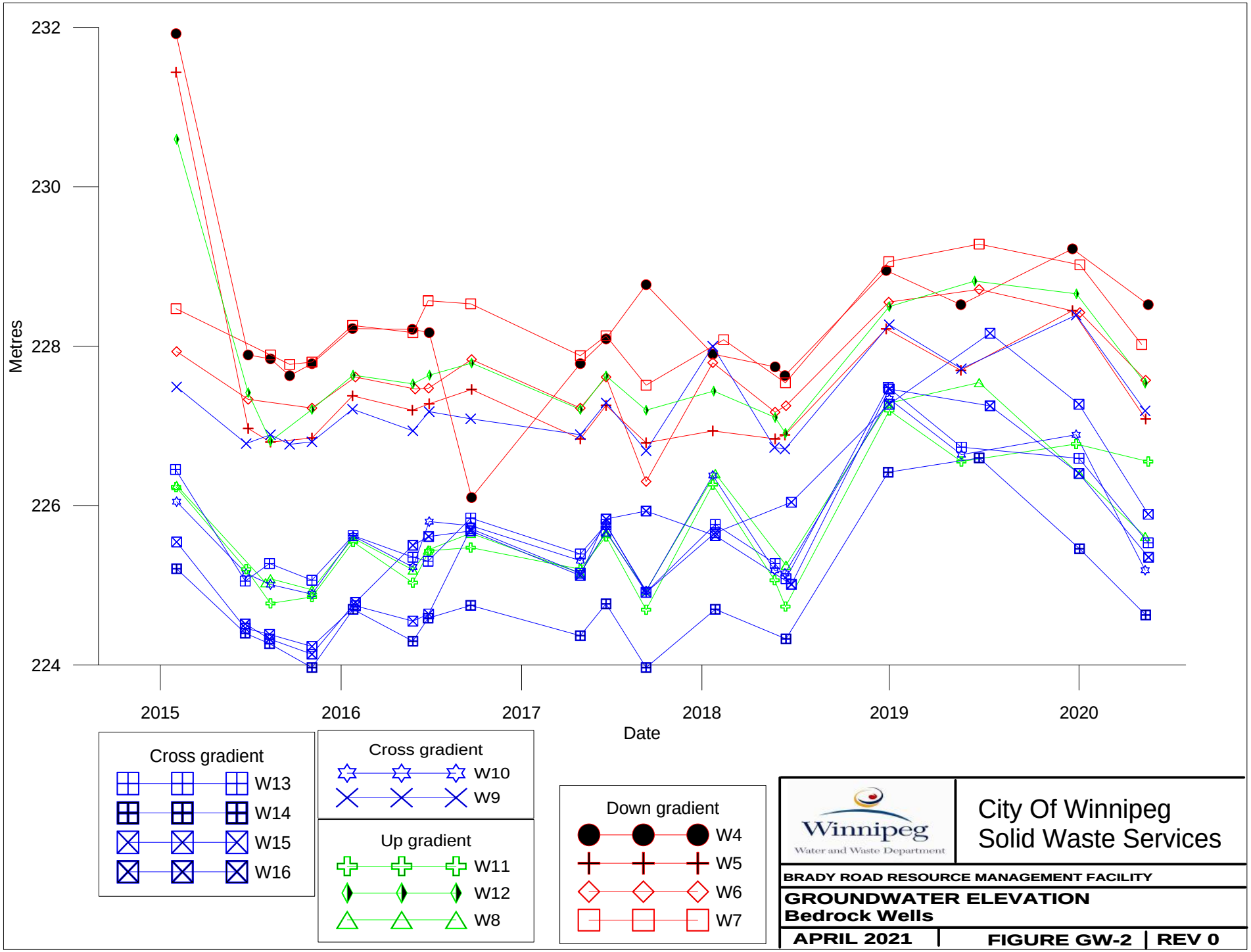
Winnipeg Water and Waste Department

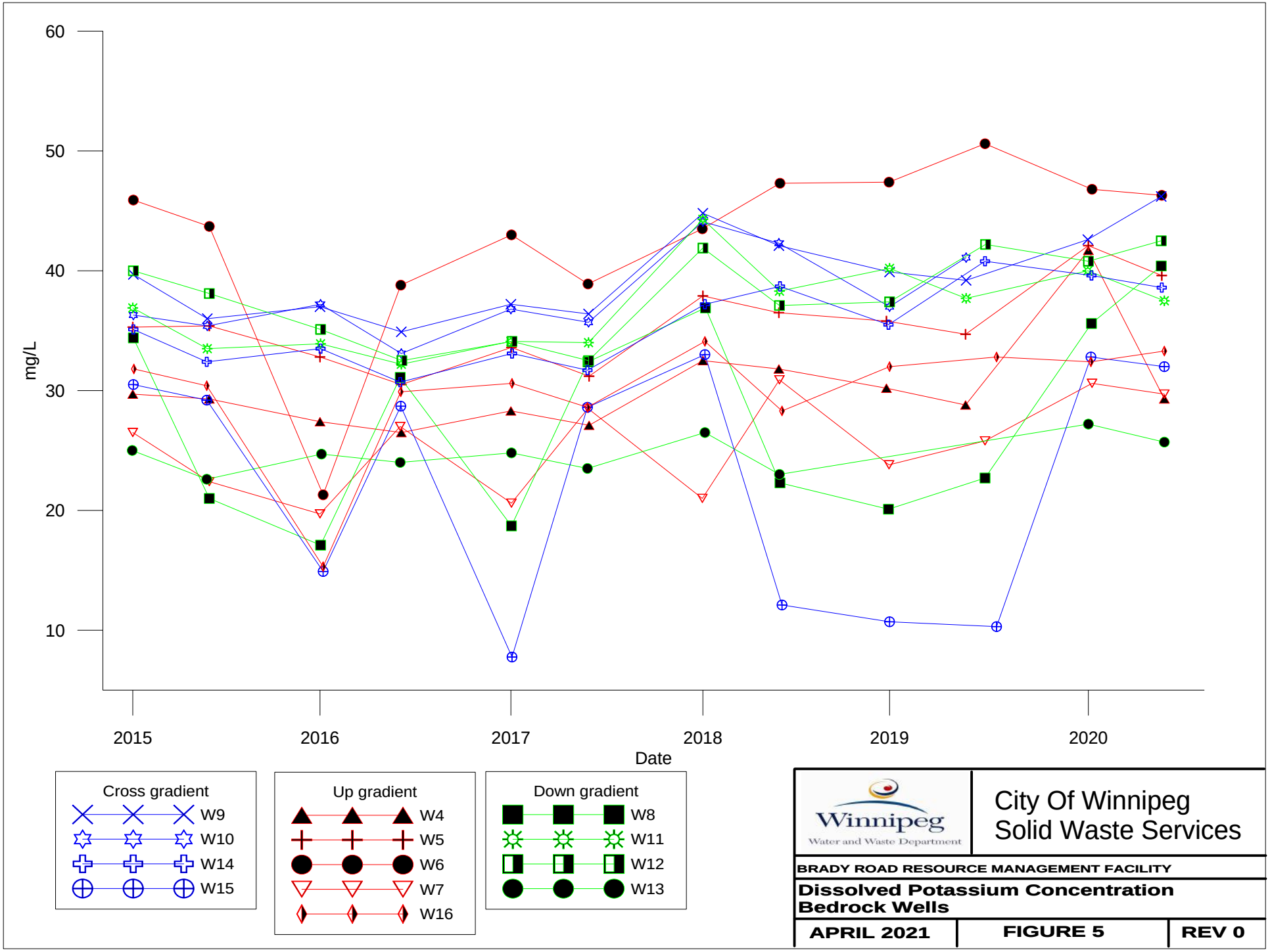
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Chromium Concentration
Bedrock Wells

APRIL 2021	FIGURE 4	REV 0


232
230
228
226
224
Metres
2015
2016
2017
2018
2019
2020
Date
Cross gradient
W13
W14
W15
W16
Cross gradient
W10
W9
Up gradient
W11
W12
W8
Down gradient
W4
W5
W6
W7
Winnipeg
Water and Waste Department
City Of Winnipeg
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
GROUNDWATER ELEVATION
Bedrock Wells
APRIL 2021
FIGURE GW-2 | REV 0



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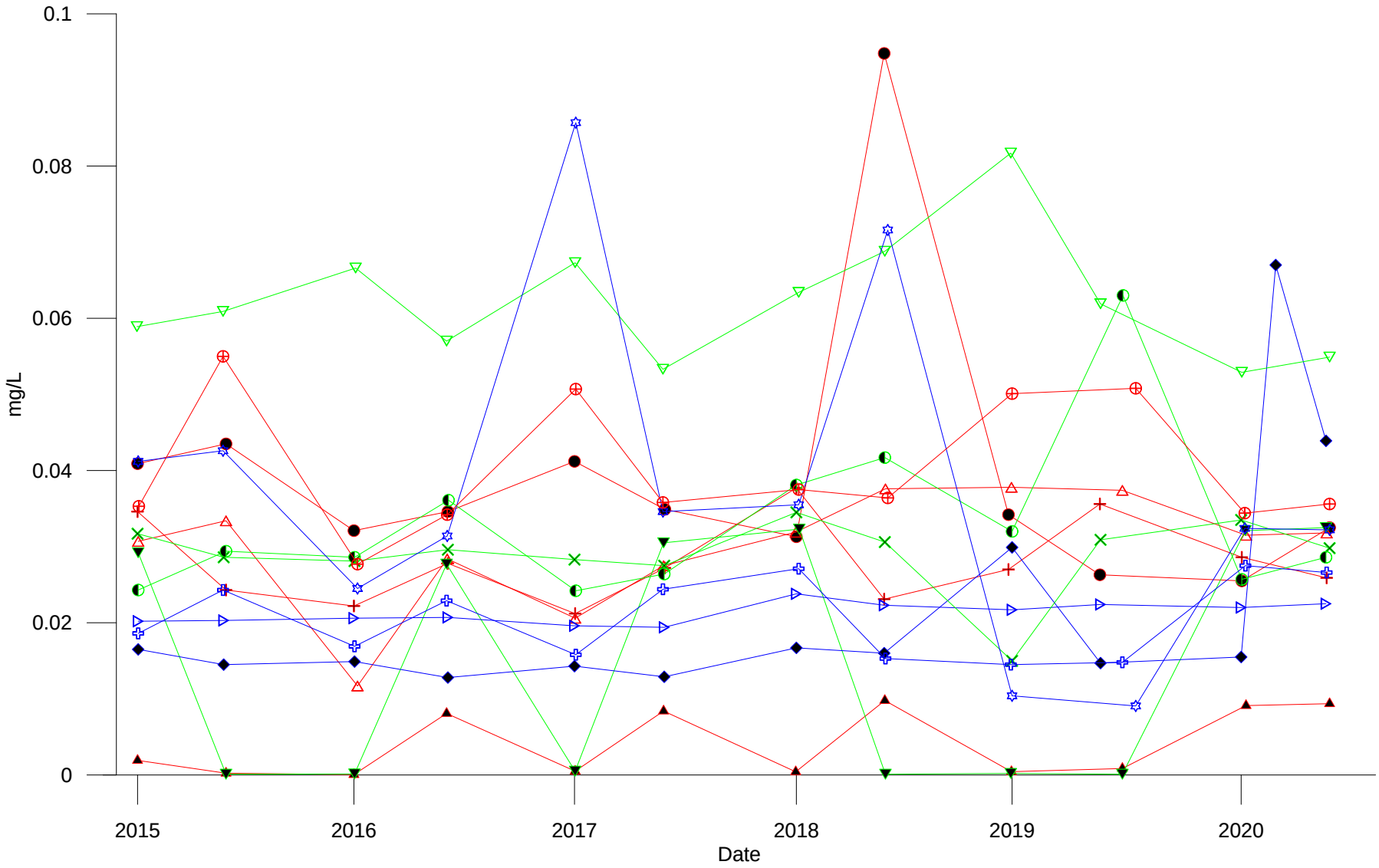
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Potassium Concentration
Bedrock Wells

APRIL 2021	FIGURE 5	REV 0



Cross gradient
W9
W10
W14
W15

Up gradient
W4
W5
W6
W7
W16

Down gradient
W8
W11
W12
W13

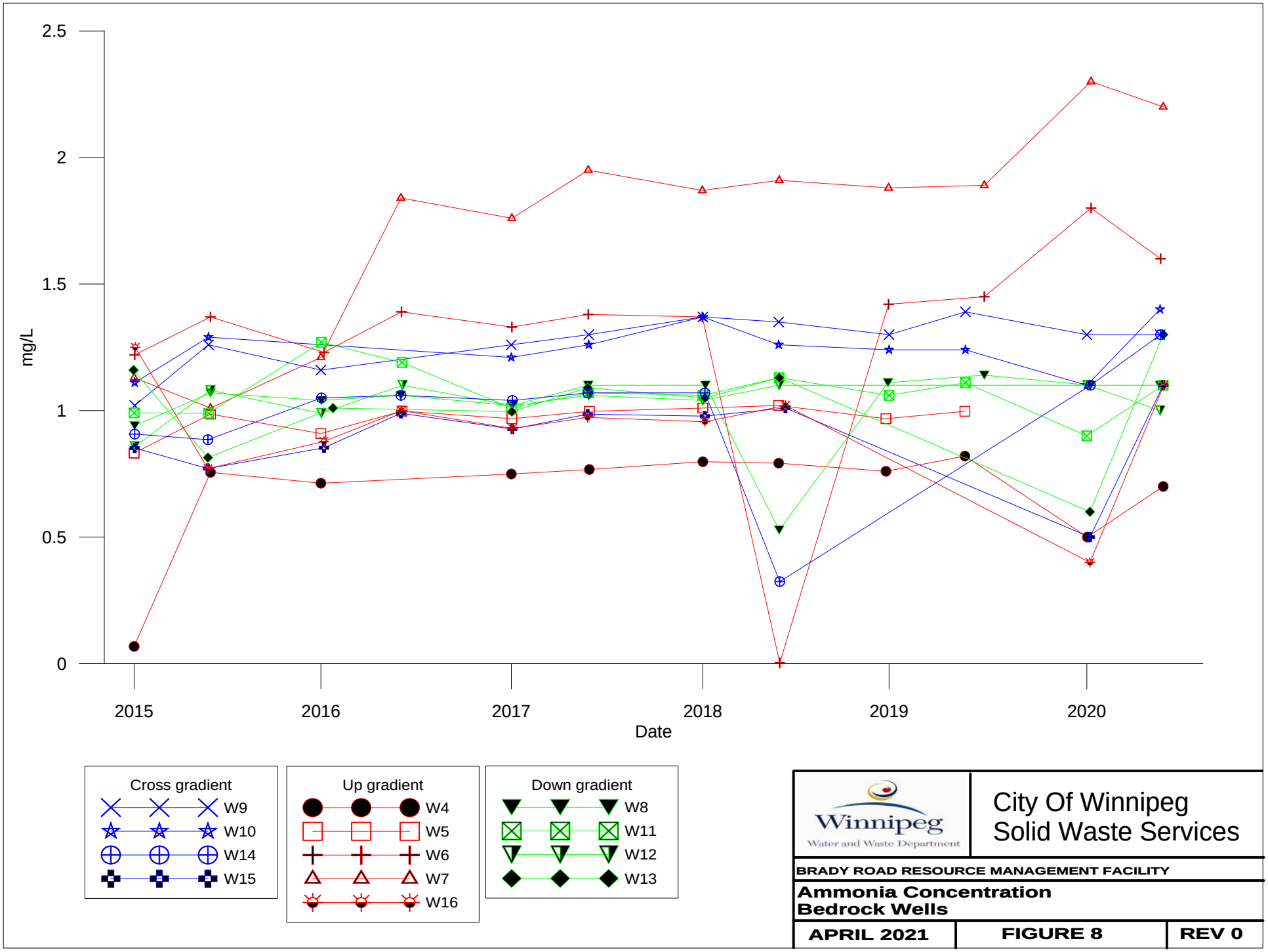
Winnipeg
Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Manganese Concentration
Bedrock Wells

APRIL 2021	FIGURE 7	REV 0



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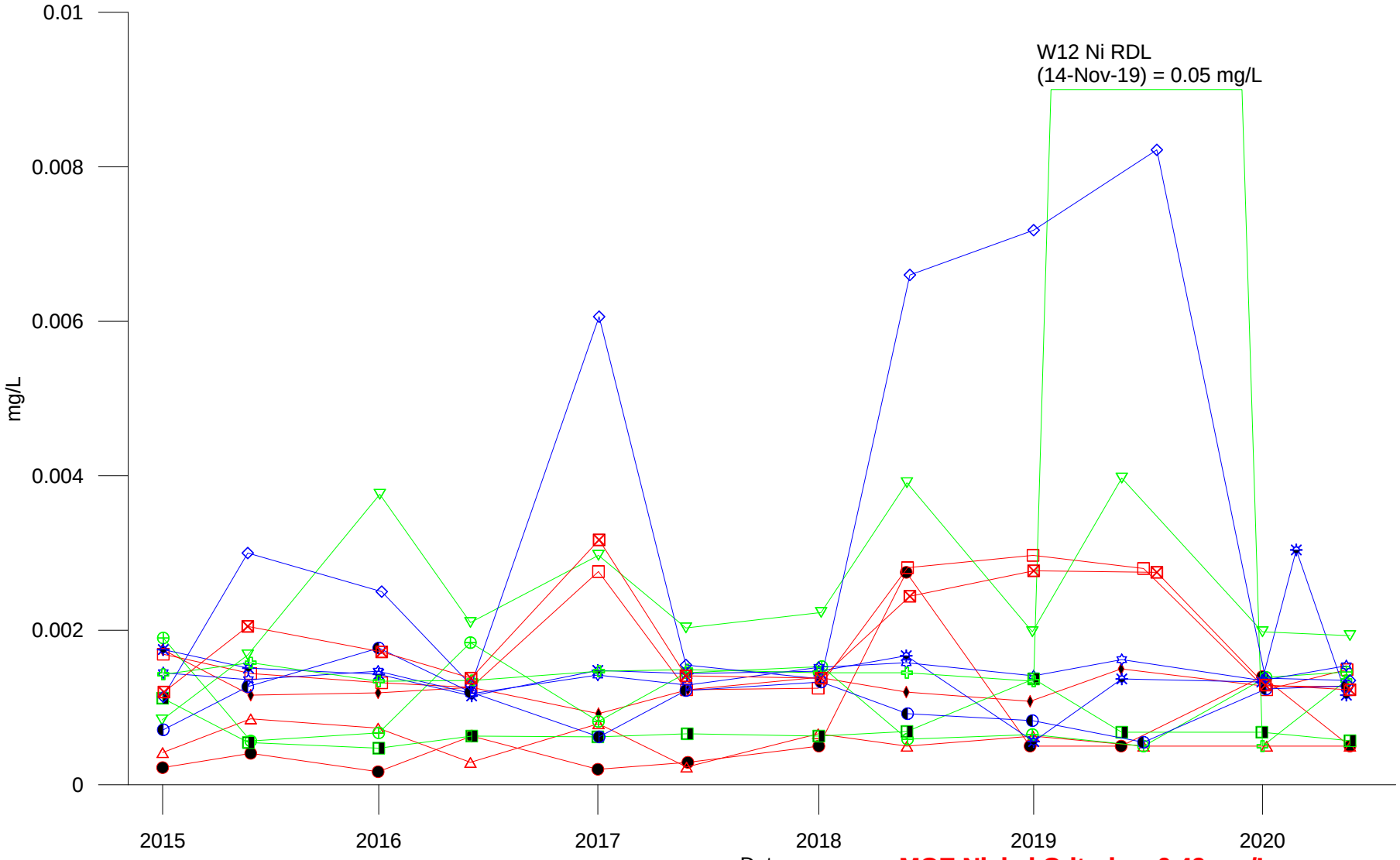
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Ammonia Concentration
Bedrock Wells

APRIL 2021	FIGURE 8	REV 0



MOE Nickel Criteria = 0.49 mg/L

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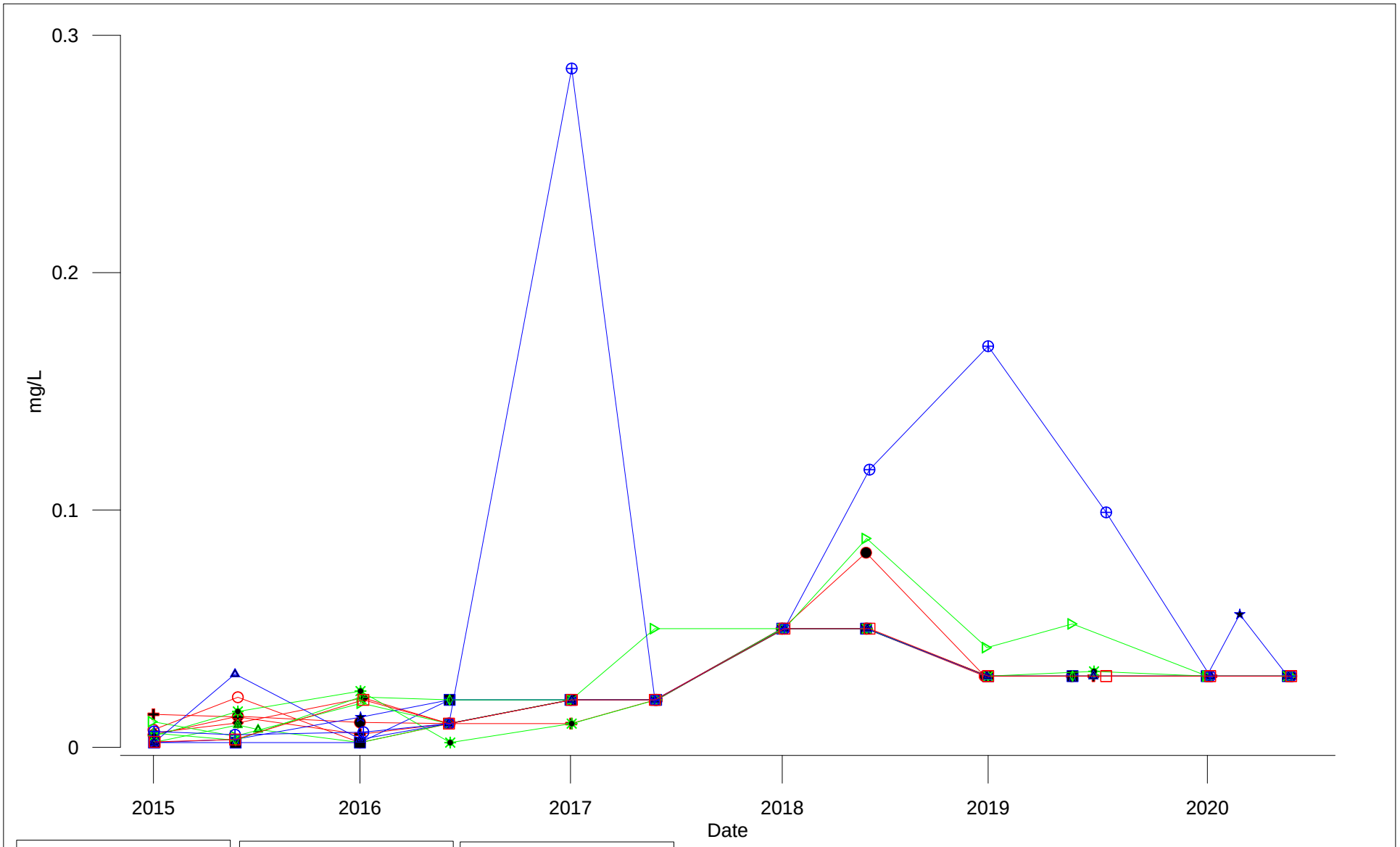
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Nickel Concentration
Bedrock Wells

APRIL 2021	FIGURE 9	REV 0



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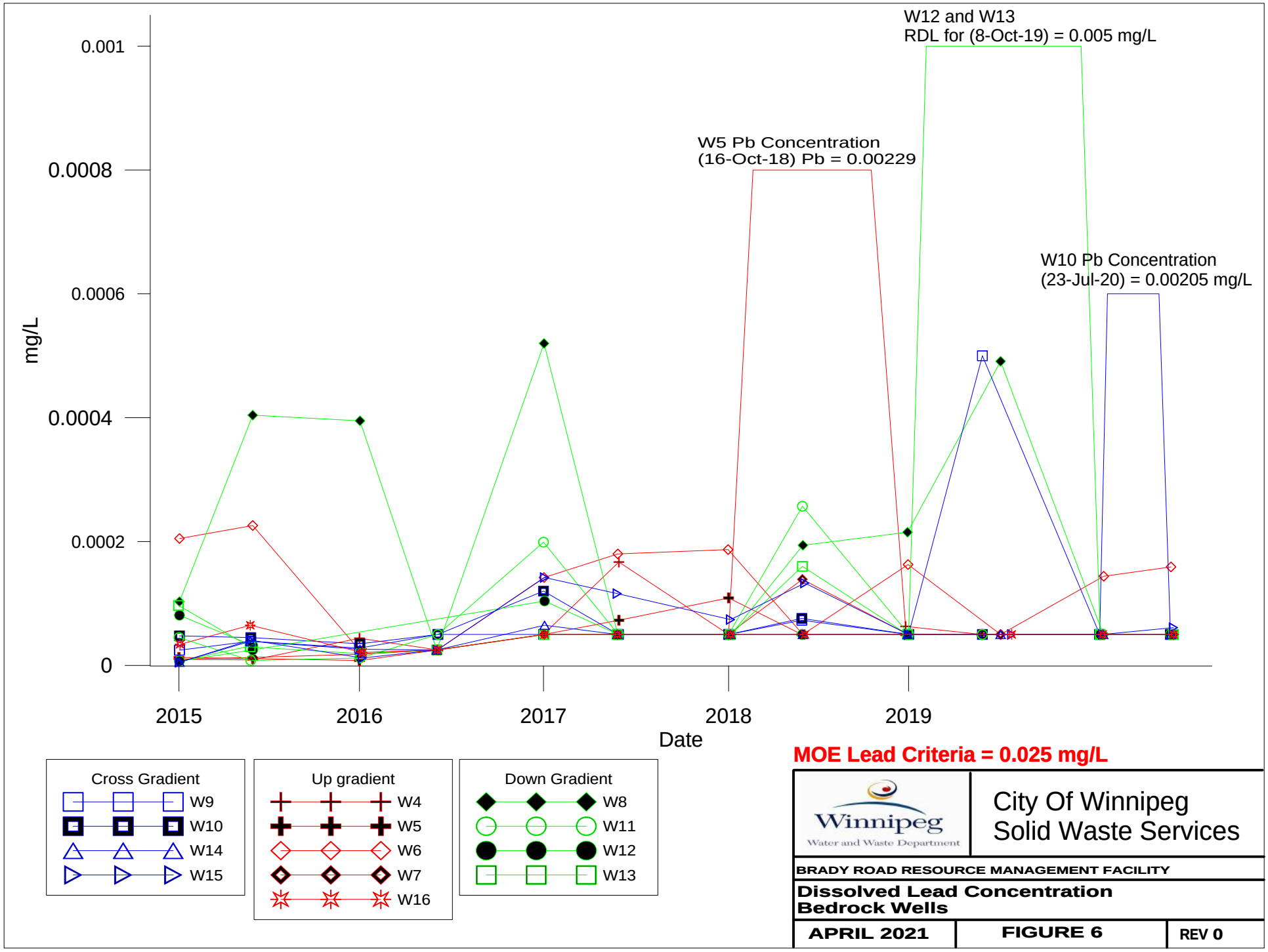
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Phosphorus Concentration
Bedrock Wells

APRIL 2021	FIGURE 10	REV 0



MOE Lead Criteria = 0.025 mg/L

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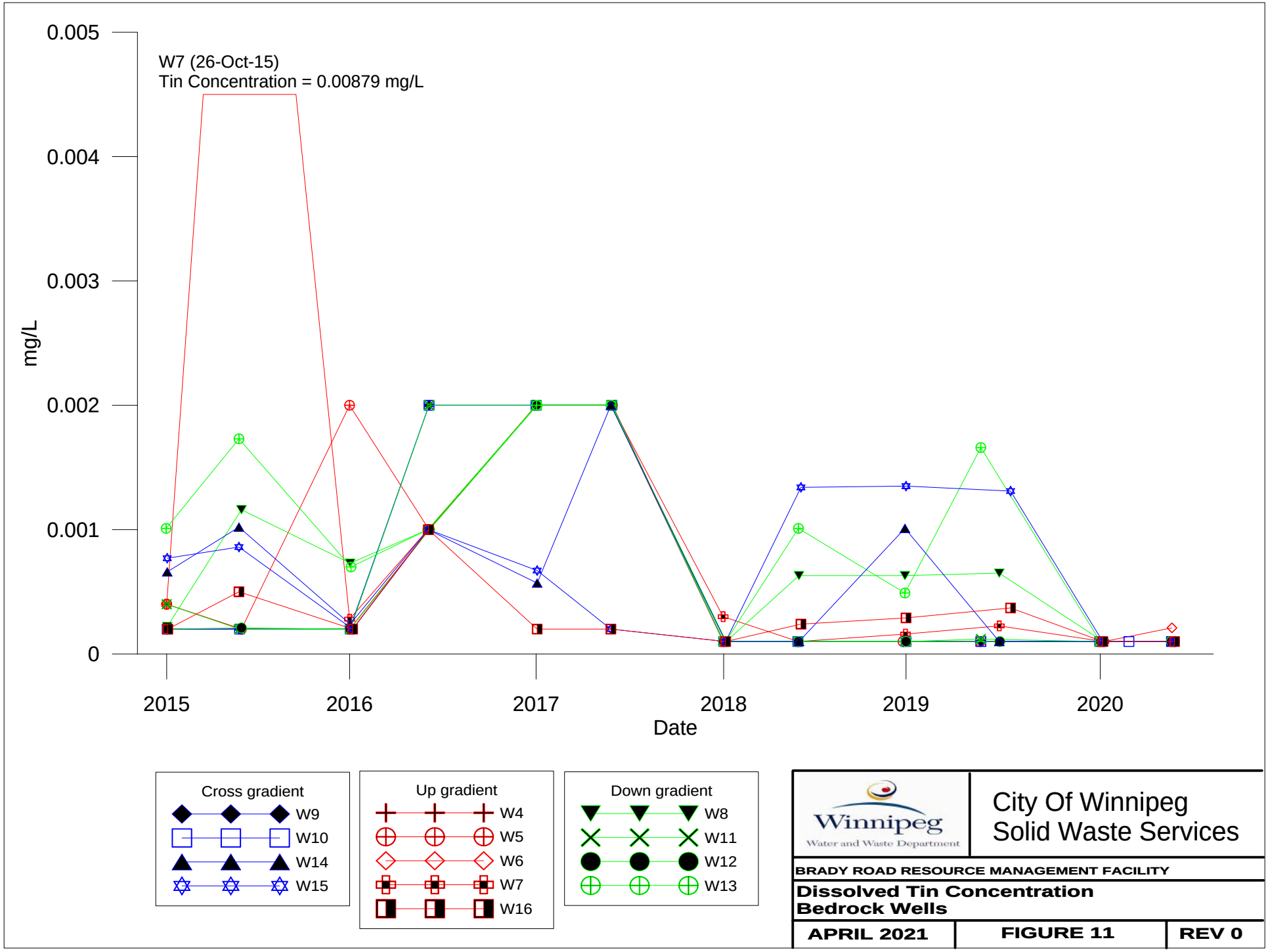
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Lead Concentration
Bedrock Wells

APRIL 2021	FIGURE 6	REV 0



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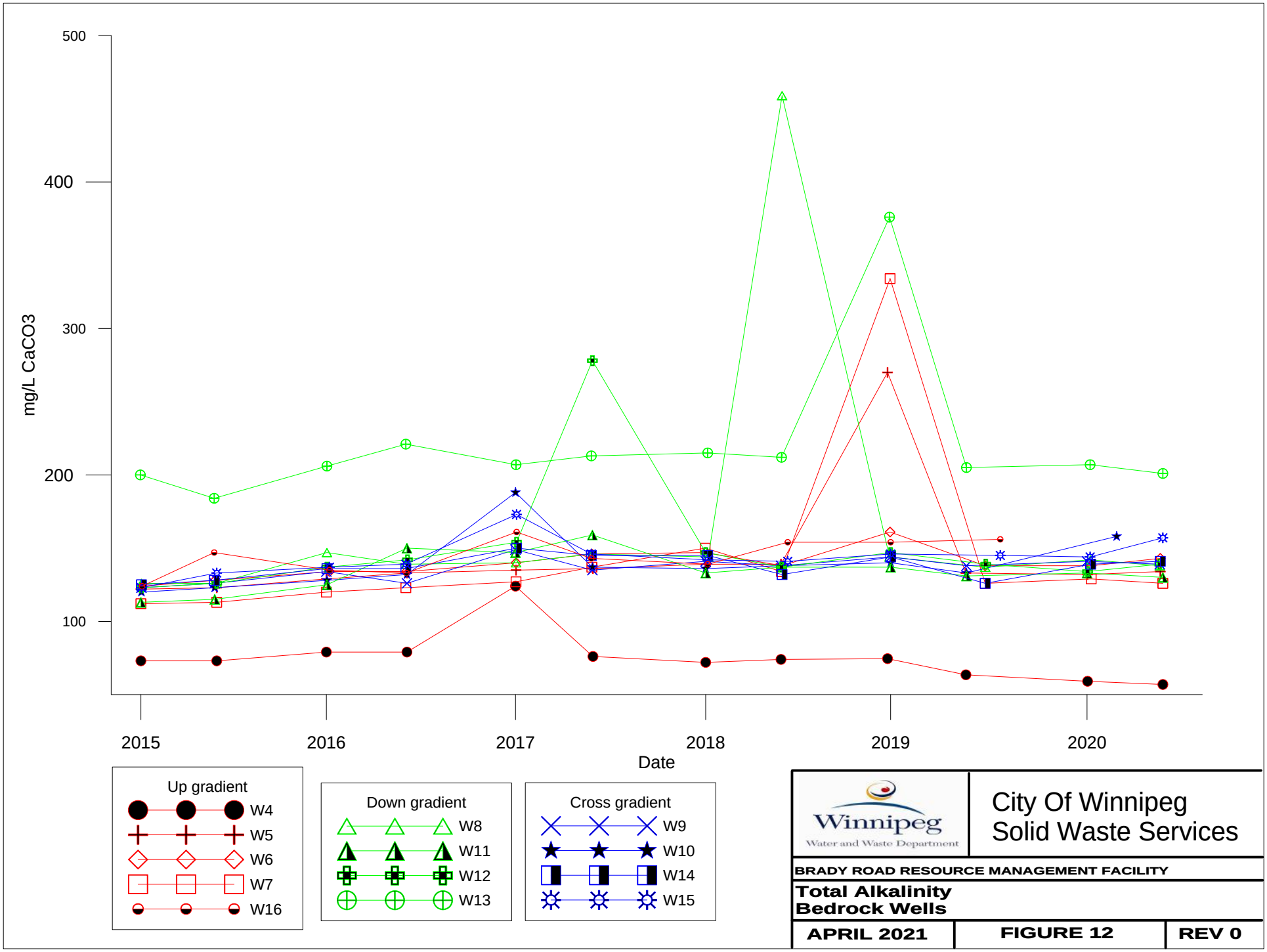
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Tin Concentration
Bedrock Wells

APRIL 2021	FIGURE 11	REV 0



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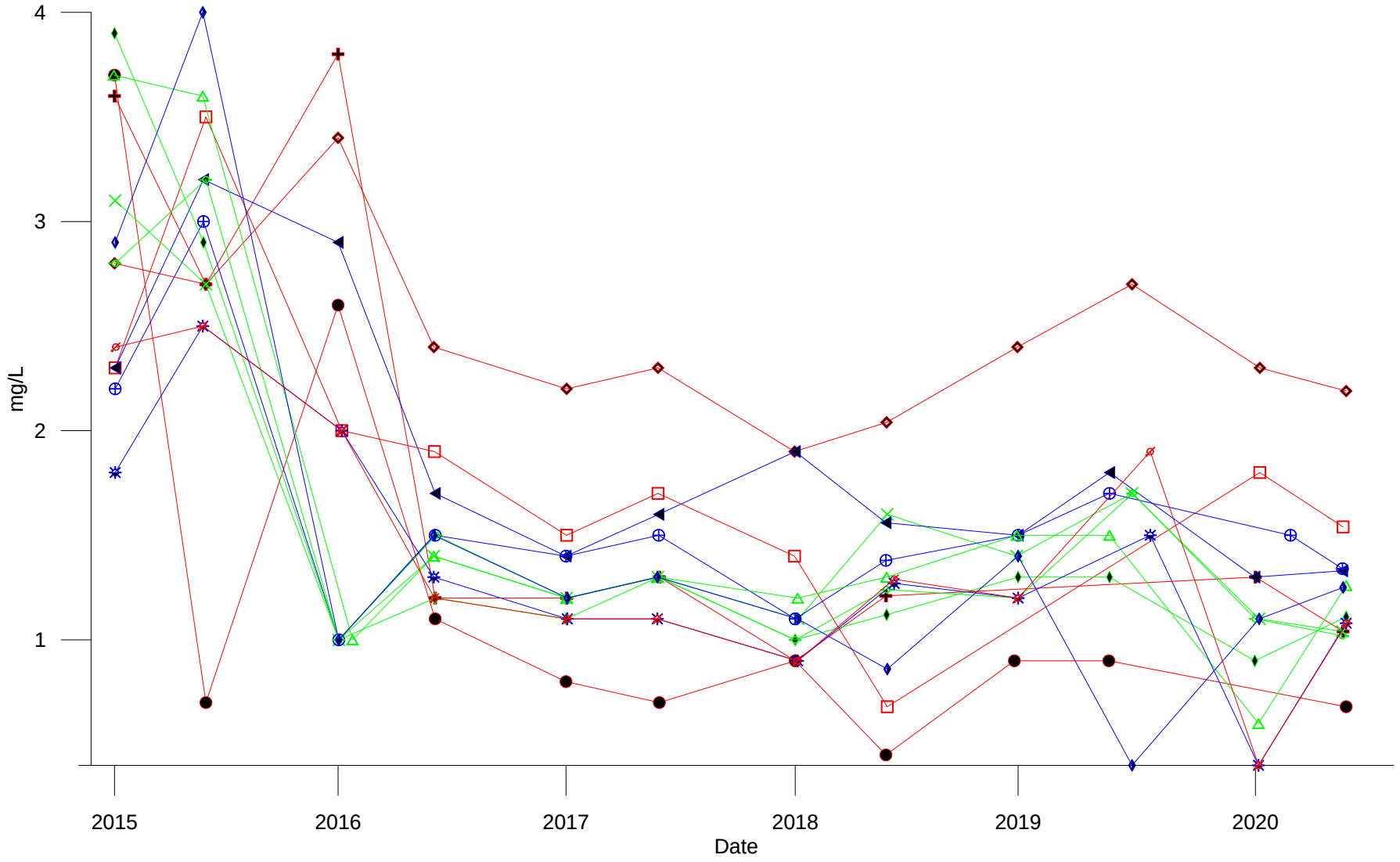
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Alkalinity
Bedrock Wells

APRIL 2021	FIGURE 12	REV 0



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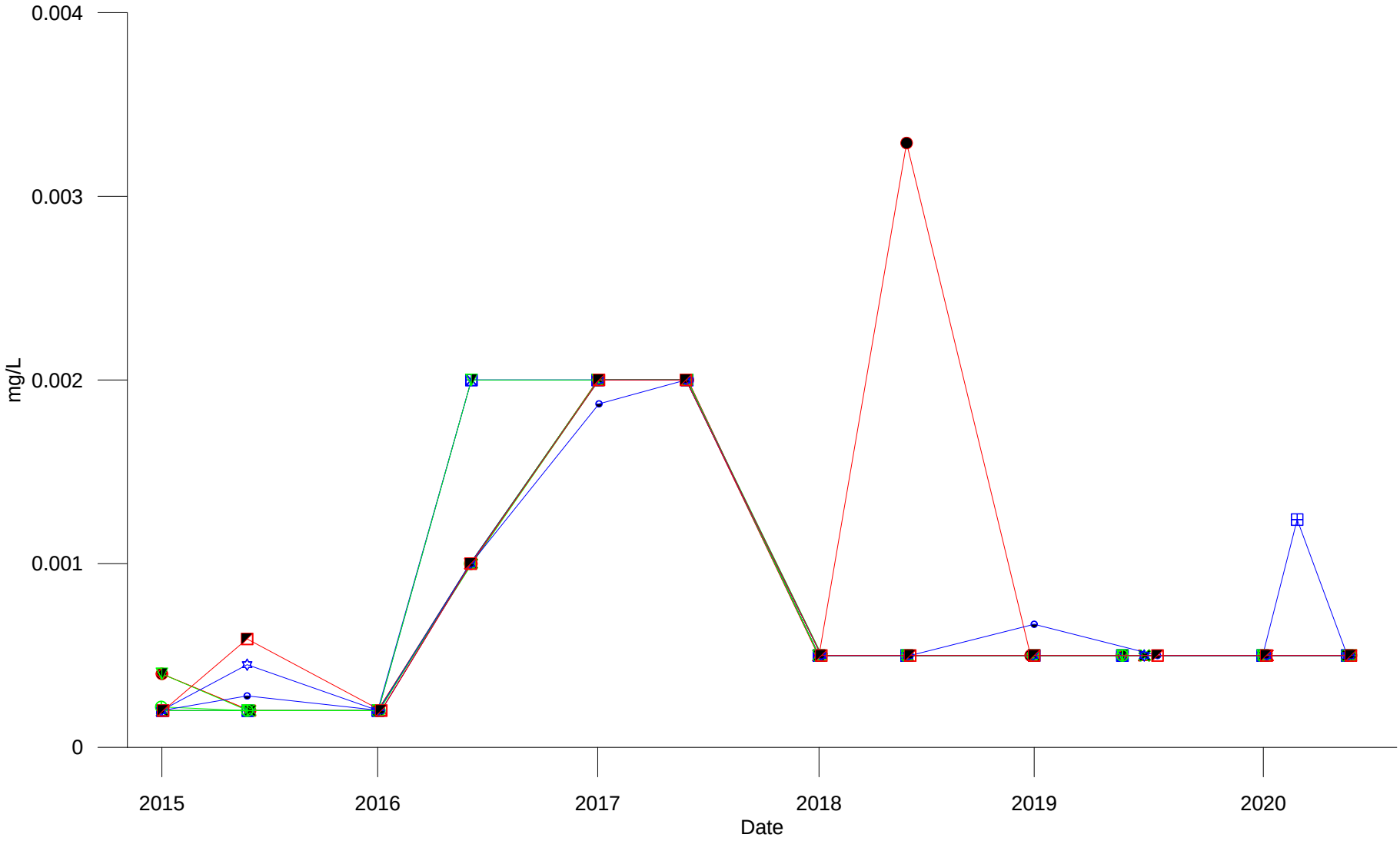
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

TKN Concentration
Bedrock Wells

APRIL 2021	FIGURE 12	REV 0



Cross gradient
W9
W10
W14
W15

Up gradient
W4
W5
W6
W7
W16

Down gradient
W8
W11
W12
W13

Vanadium MOE Criteria = 0.25 mg/L

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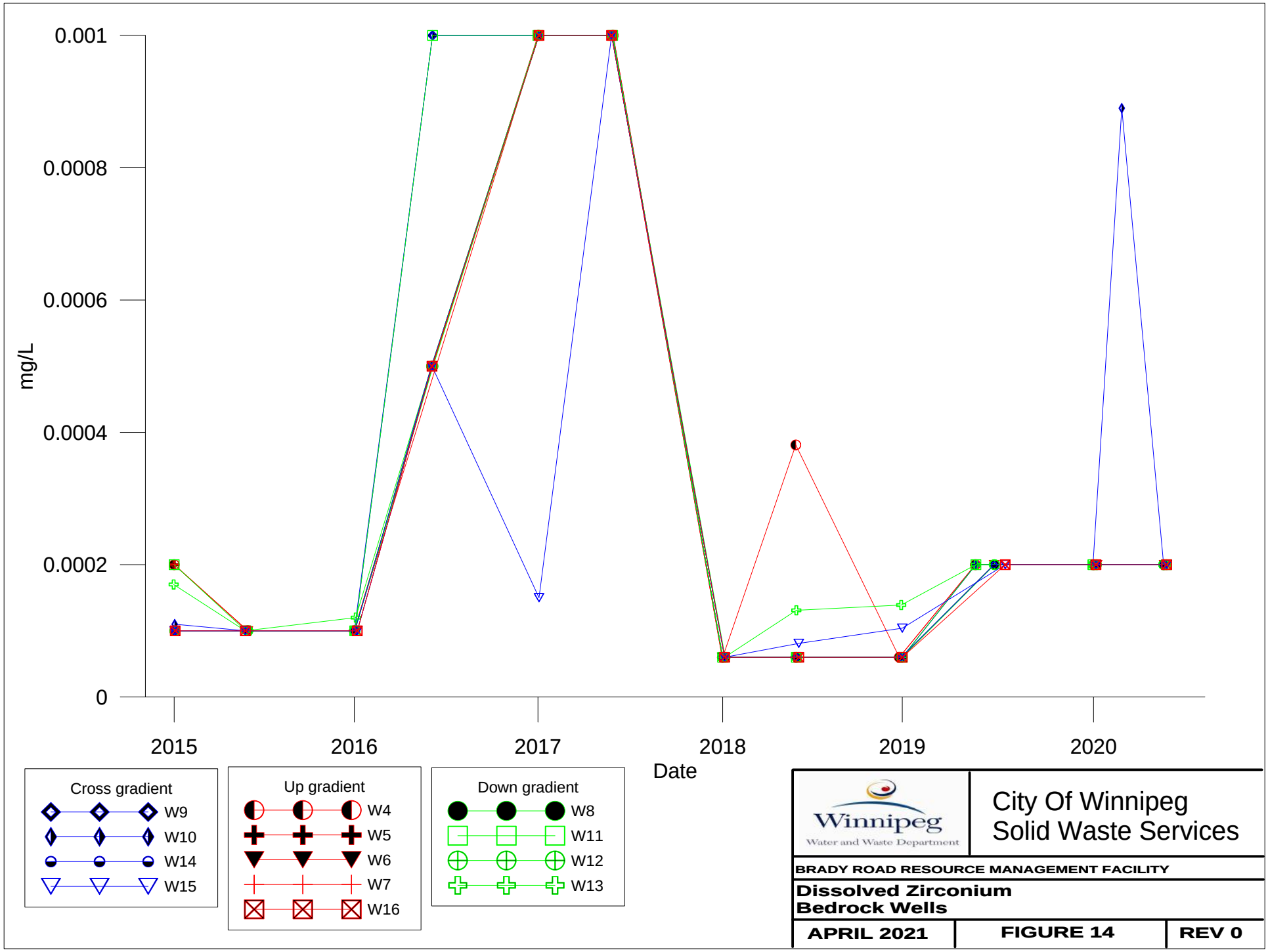
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Vanadium
Bedrock Wells

APRIL 2021	FIGURE 13	REV 0



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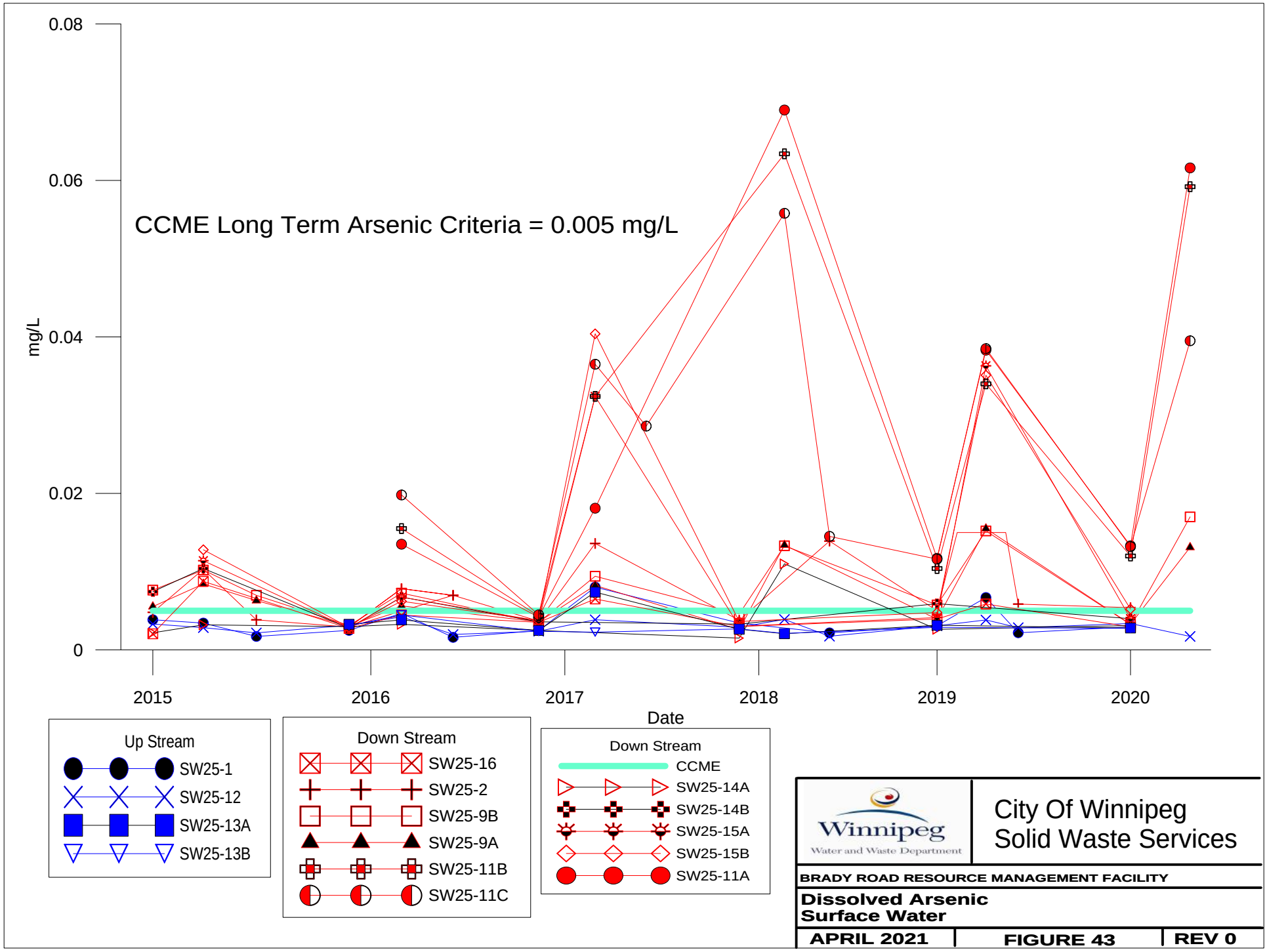
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Zirconium
Bedrock Wells

APRIL 2021	FIGURE 14	REV 0

Surface Water
Time vs Concentration Graphs



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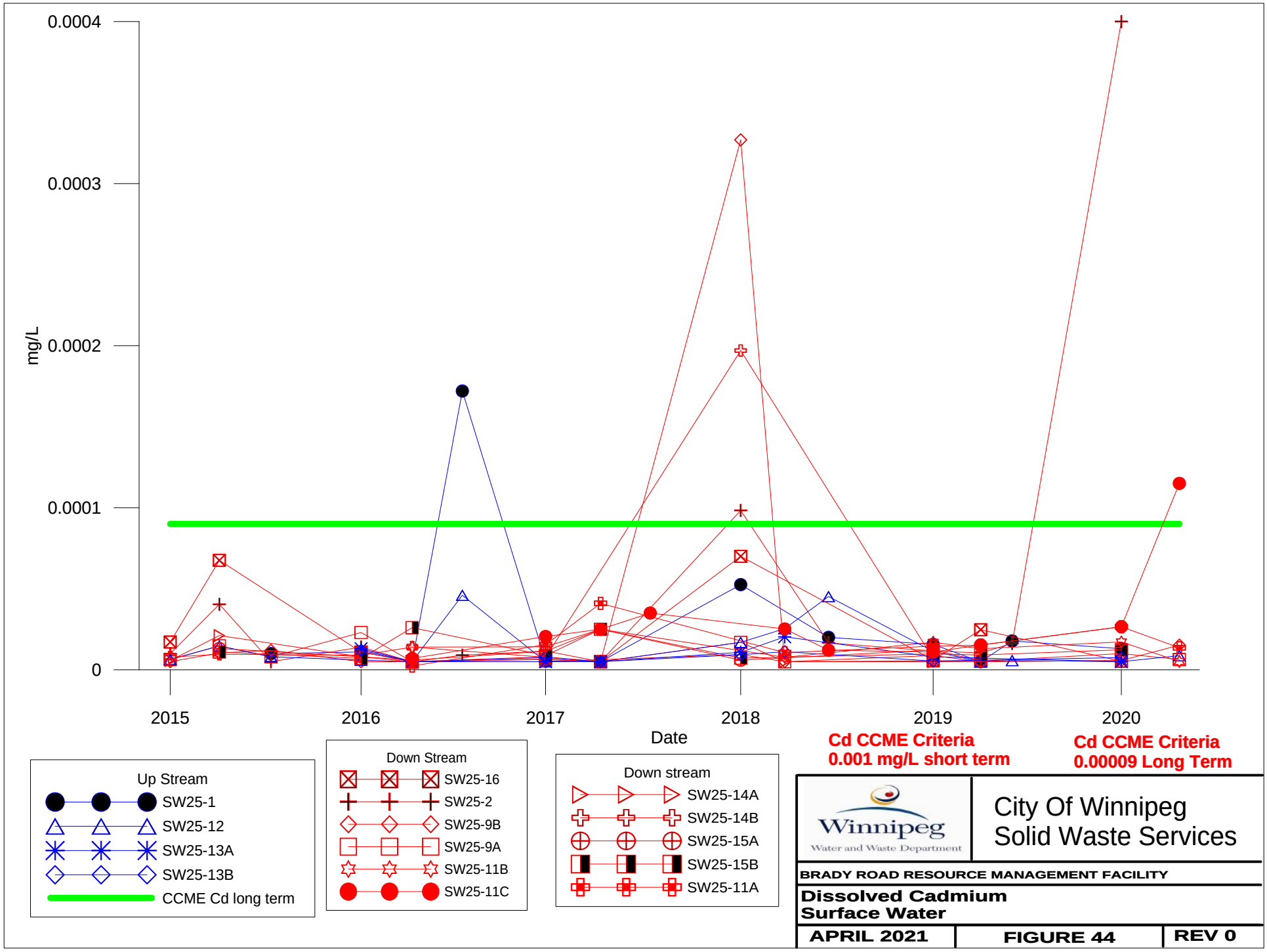
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Arsenic
Surface Water

APRIL 2021	FIGURE 43	REV 0



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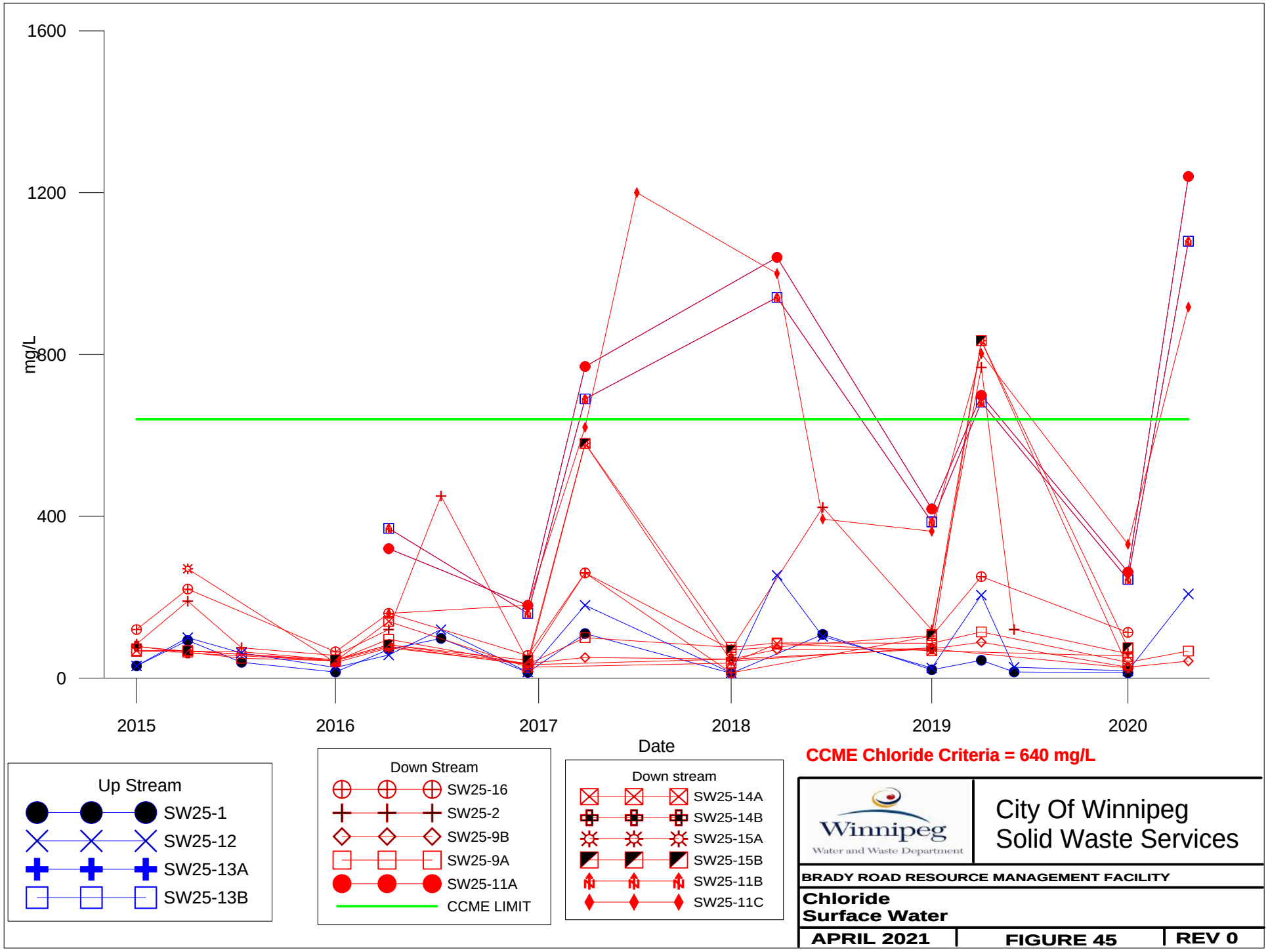
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Cadmium
Surface Water

APRIL 2021	FIGURE 44	REV 0


1600
1200
800
400
0
mg/L
2015
2016
2017
2018
2019
2020
Date
Up Stream
SW25-1
SW25-12
SW25-13A
SW25-13B
Down Stream
SW25-16
SW25-2
SW25-9B
SW25-9A
SW25-11A
CCME LIMIT
Down stream
SW25-14A
SW25-14B
SW25-15A
SW25-15B
SW25-11B
SW25-11C
CCME Chloride Criteria = 640 mg/L
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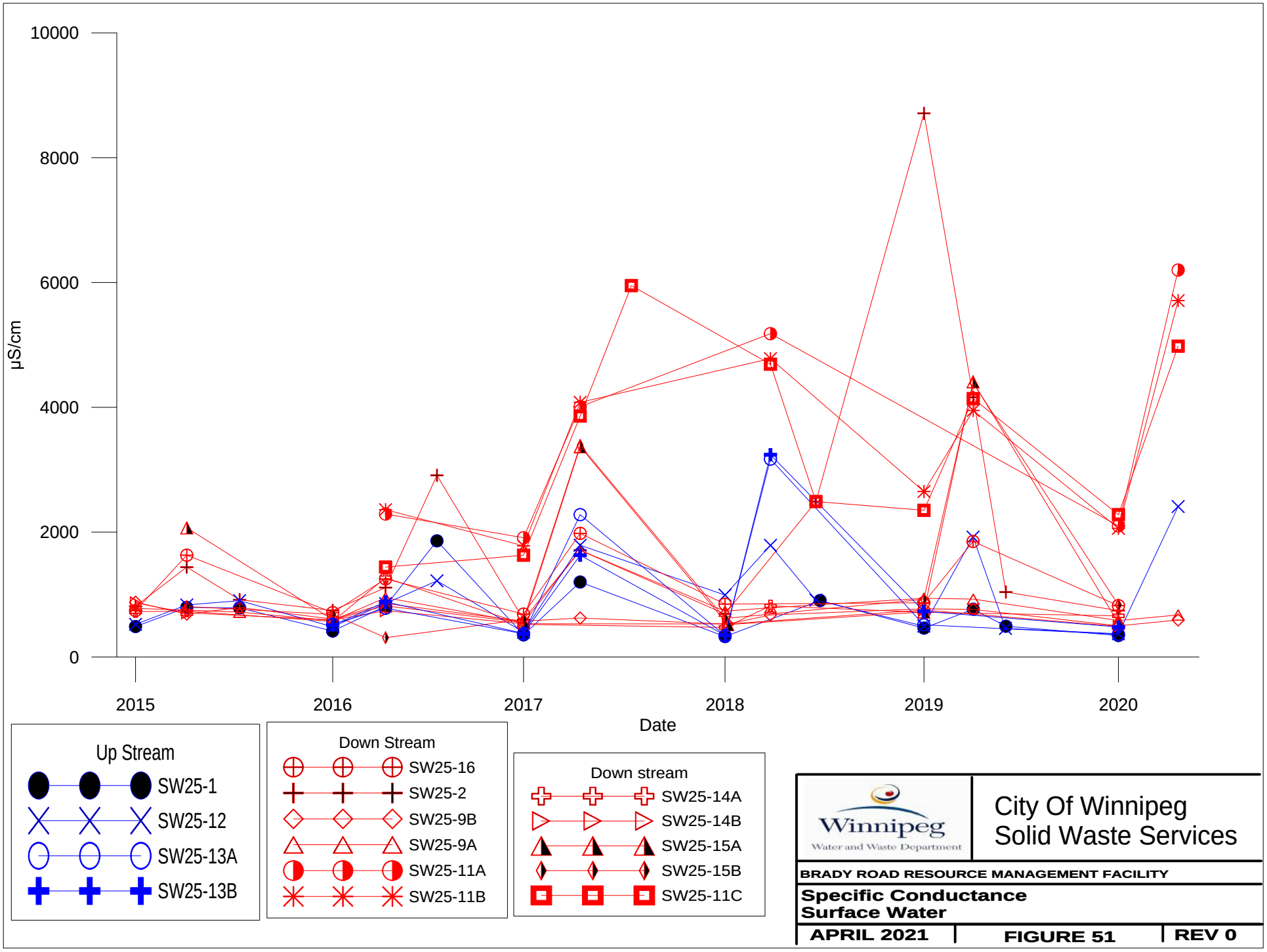
Solid Waste Services
BRADY ROAD RESOURCE MANAGEMENT FACILITY
Chloride
Surface Water
APRIL 2021
FIGURE 45
REV 0



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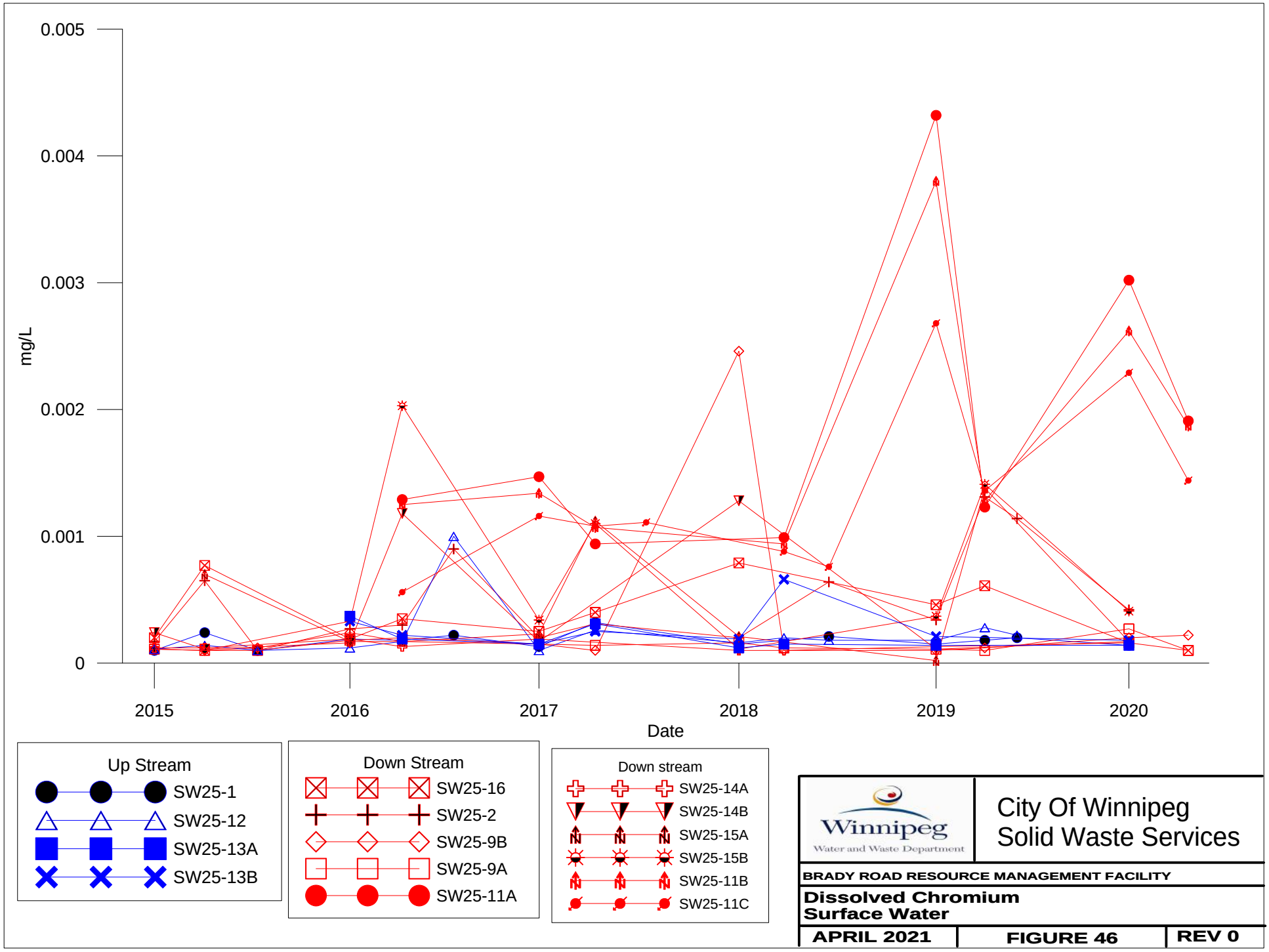
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Specific Conductance
Surface Water

APRIL 2021	FIGURE 51	REV 0



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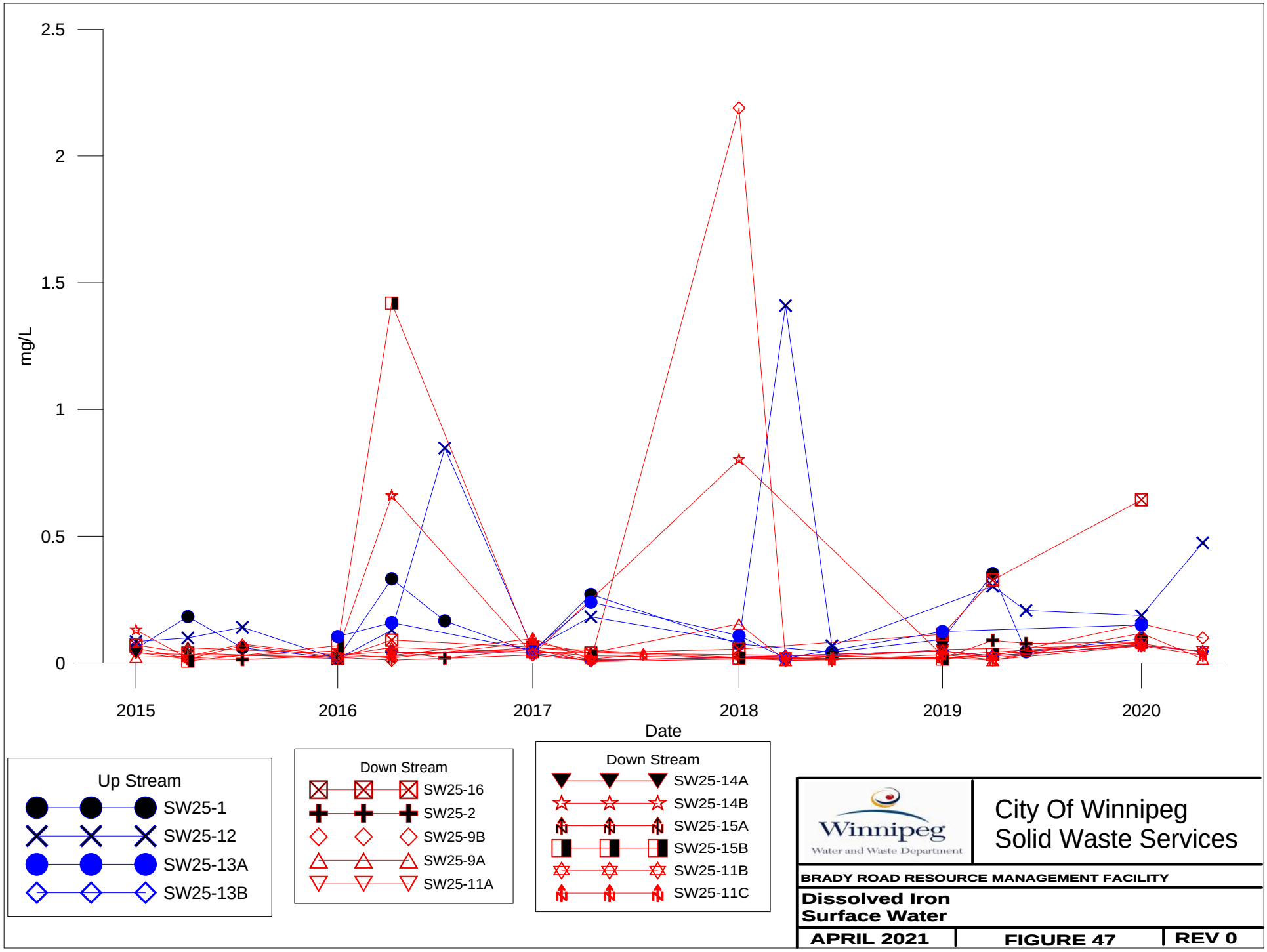
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Chromium
Surface Water

APRIL 2021	FIGURE 46	REV 0



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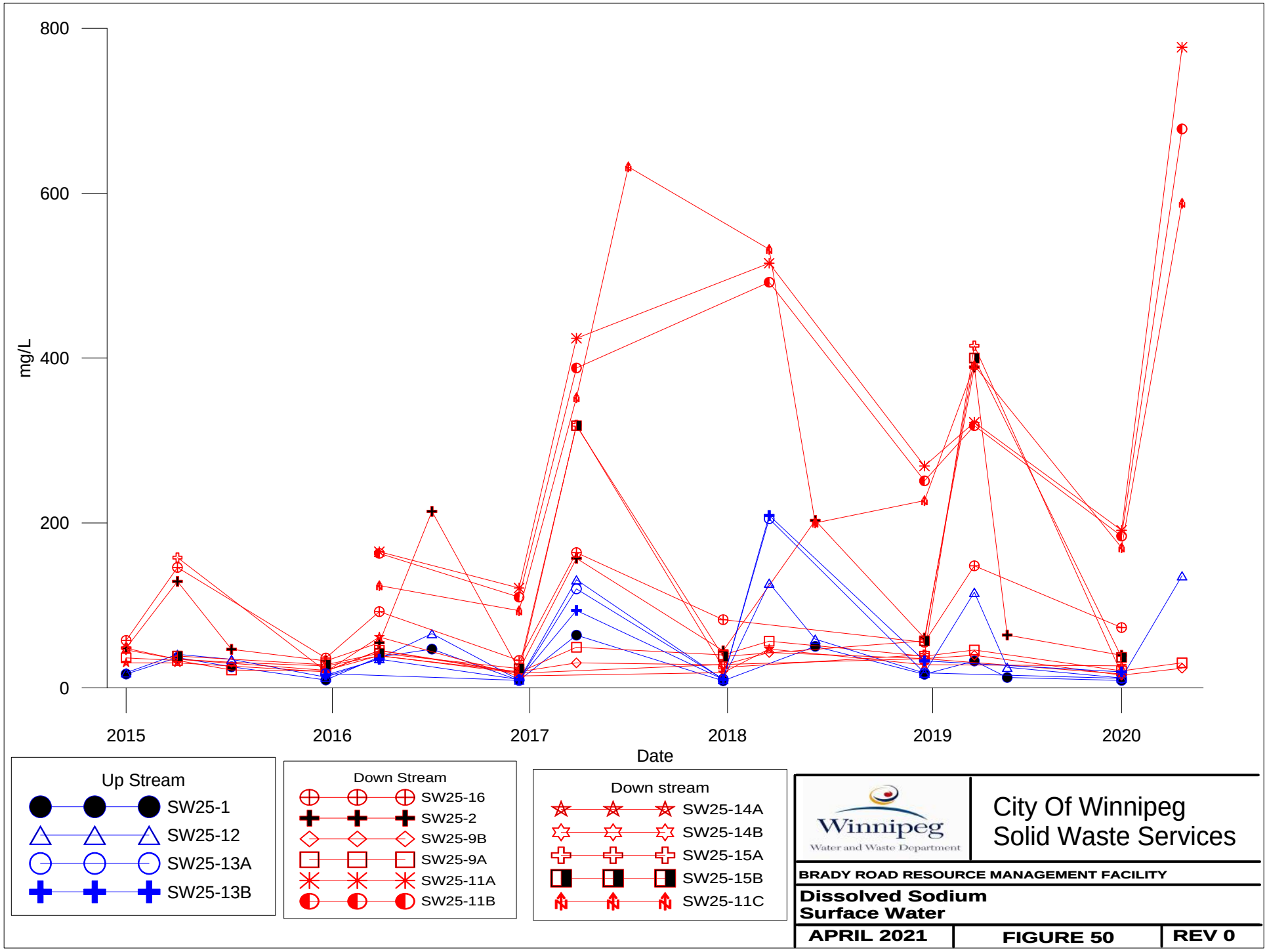
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Iron
Surface Water

APRIL 2021	FIGURE 47	REV 0



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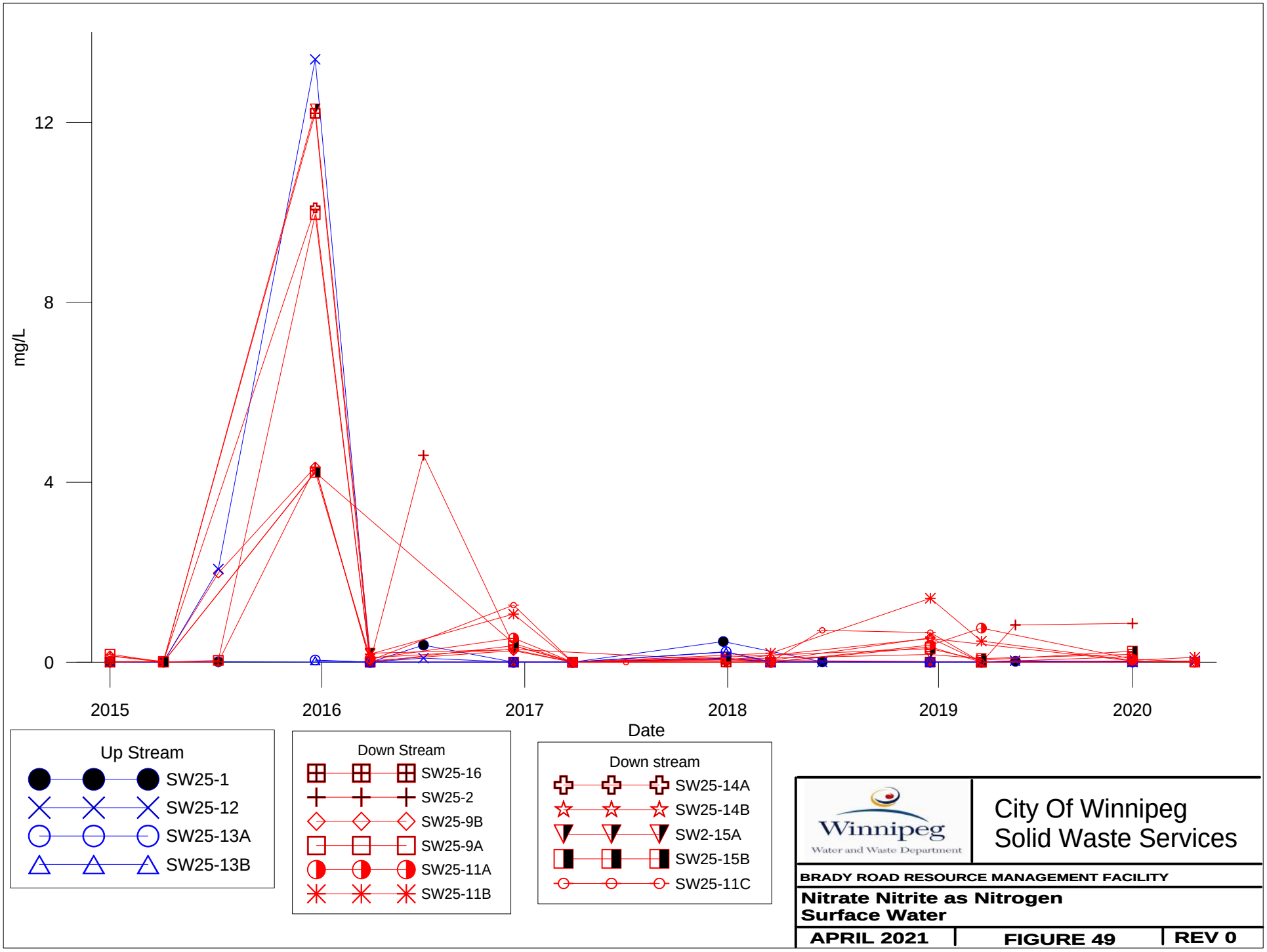
BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Sodium
Surface Water

APRIL 2021	FIGURE 50	REV 0



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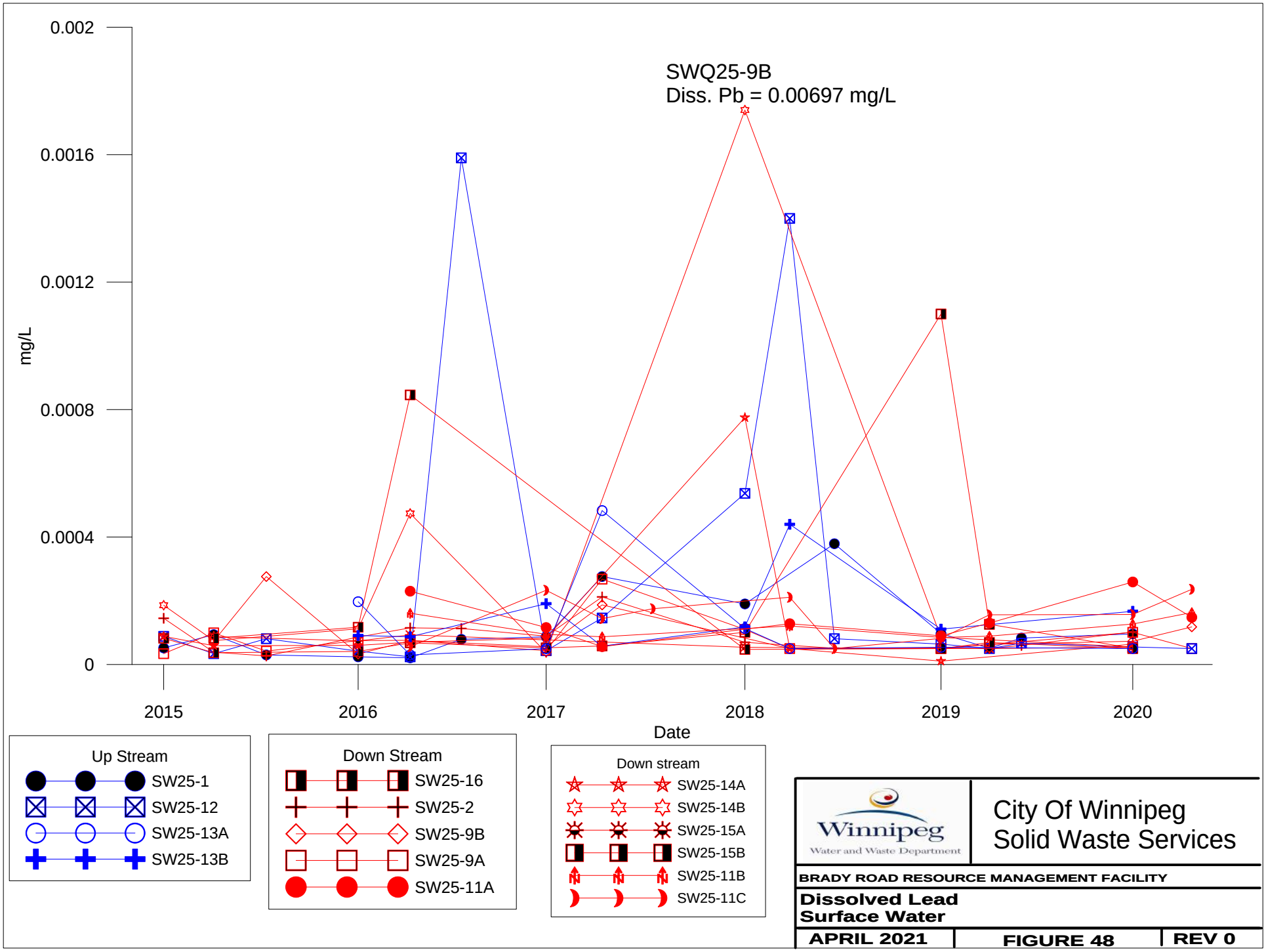
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Nitrate Nitrite as Nitrogen
Surface Water

APRIL 2021	FIGURE 49	REV 0



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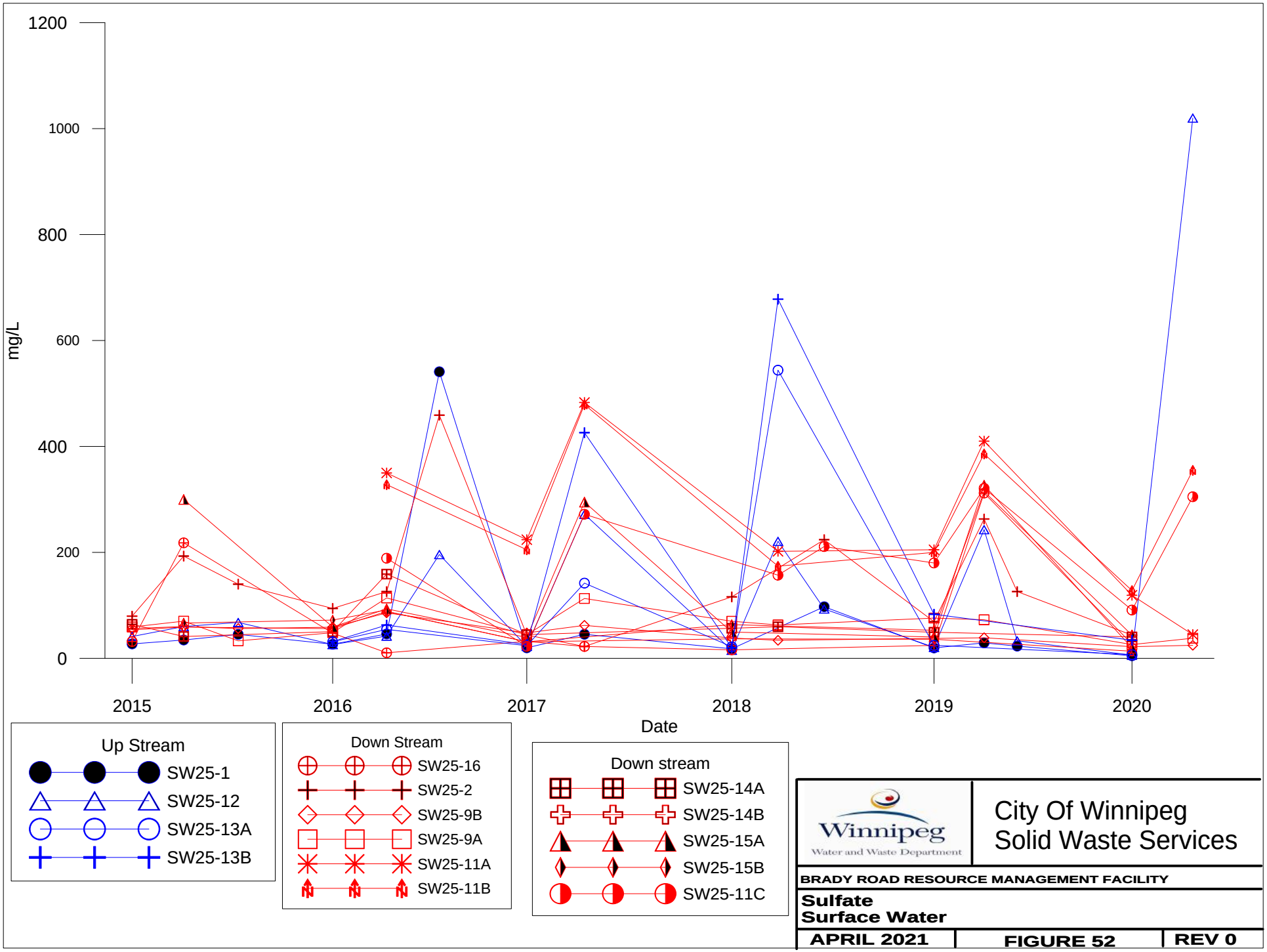
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Dissolved Lead
Surface Water

APRIL 2021	FIGURE 48	REV 0



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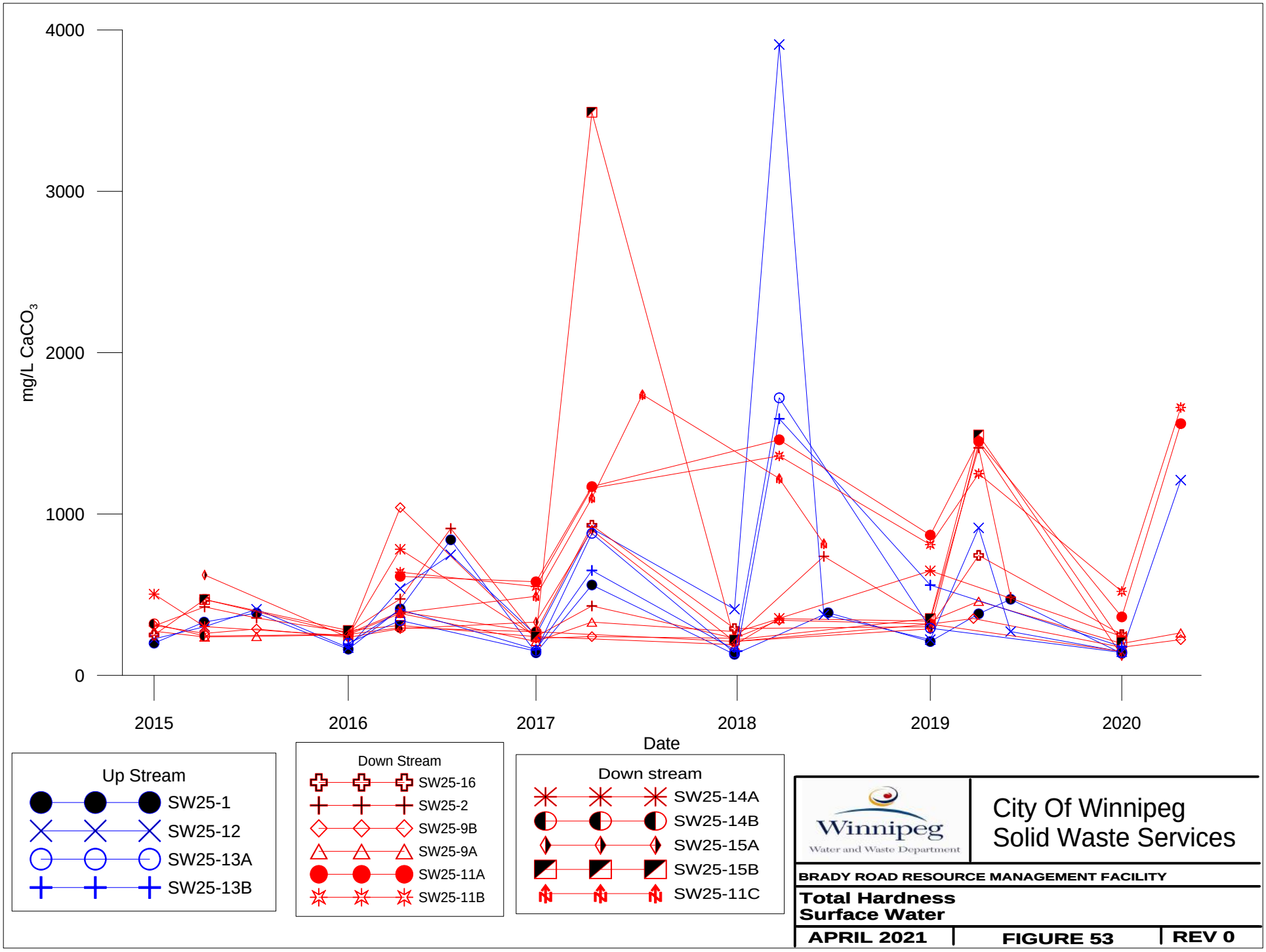
City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Sulfate
Surface Water

APRIL 2021	FIGURE 52	REV 0



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Water and Waste Department

City Of Winnipeg
Solid Waste Services

BRADY ROAD RESOURCE MANAGEMENT FACILITY

Total Hardness
Surface Water

APRIL 2021	FIGURE 53	REV 0

APPENDIX D
LANDFILL GAS COLLECTION AND FLARING REPORT

2020 ANNUAL MONITORING REPORT
CITY OF WINNIPEG

BRADY ROAD RESOURCE MANAGEMENT FACILITY
LANDFILL GAS COLLECTION AND FLARING SYSTEM

Prepared for

THE CITY OF WINNIPEG

Prepared by

INTEGRATED GAS RECOVERY SERVICES INC.

March 25, 2021

2020 ANNUAL MONITORING REPORT
CITY OF WINNIPEG

BRADY ROAD RESOURCE MANAGEMENT FACILITY
LANDFILL GAS COLLECTION AND FLARING SYSTEM

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1.0 INTRODUCTION

The City of Winnipeg operates the Landfill Gas Collection and Flaring System at the Brady Road Resource Management Facility in Winnipeg, Manitoba, which operates under Manitoba Conservation Licence 3081. After a short commissioning phase, the system became operational full time in August 2013 after approval to operate was received by the Office of the Fire Commissioner.

Operation of the system including maintenance and monitoring was completed by Comcor Environmental Limited (Comcor) on behalf of its partner Integrated Gas Recovery Services (IGRS).

This report outlines work performed and data collected during the operation of the Landfill Gas Collection and Flaring System during 2020.

2.0 LANDFILL GAS COLLECTION SYSTEM

There are two main components of the LGCFS that require monitoring. These include:

- Landfill Gas Collection Wellfield
- Mechanical System

The purpose and procedures associated with the monitoring of each of these components are discussed separately below. The recommended monitoring frequency is presented in Table 1.

Table 1: Summary of Monitoring Frequency

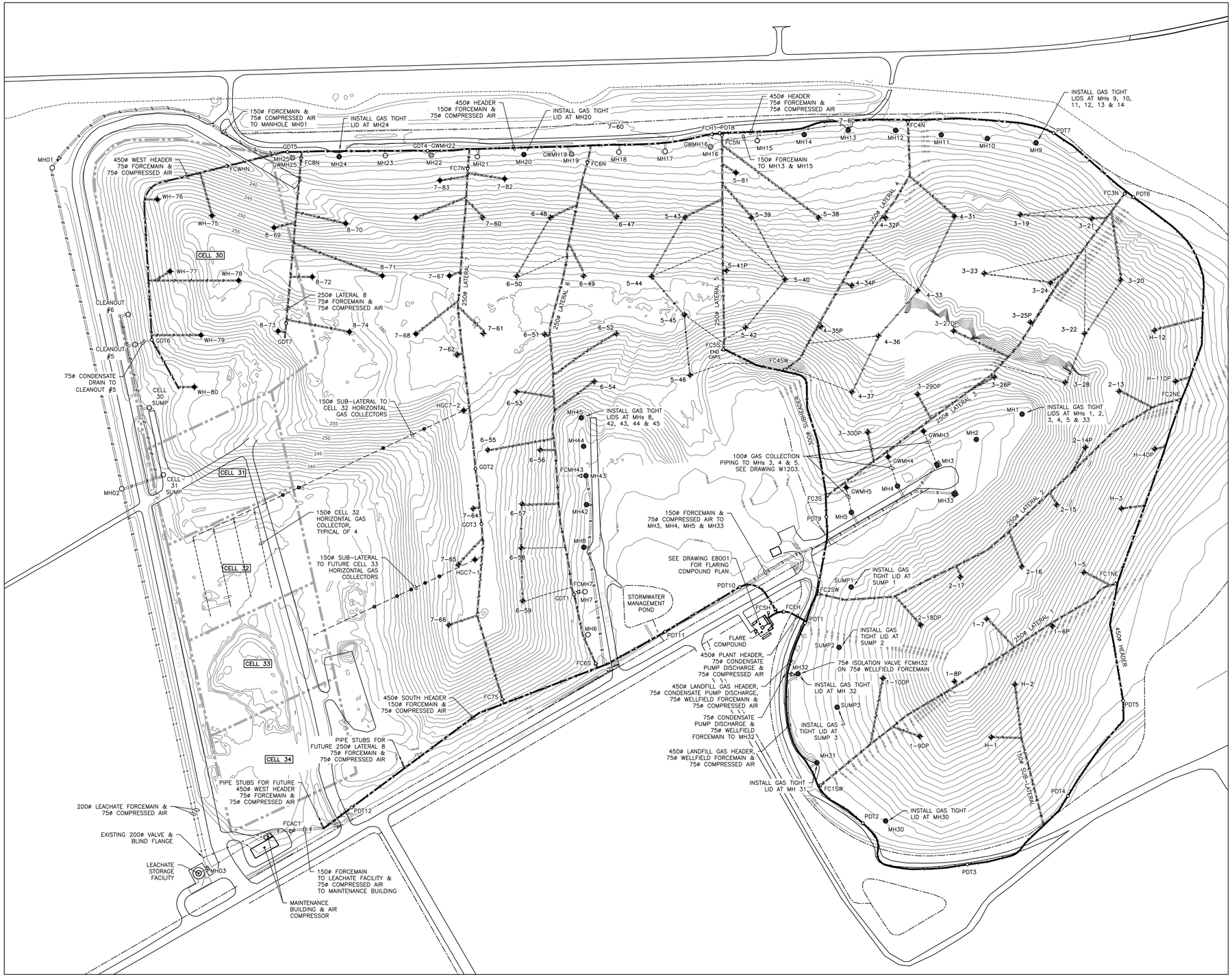
System Component	Monitoring Frequency
Wellfield Monitoring	Monthly
Remote Mechanical System Monitoring	Weekly
Mechanical System Monitoring	Weekly

2.1 Wellfield System Expansions

In April 2020, a tender was issued by the City of Winnipeg for an expansion of the landfill gas collection system. Figure 1 presents the approximate existing wellfield conditions at the site as as-builts including the 2020 expansion have yet to be finalized.

The 2020 expansion included a landfill gas collection system expansion in the northwest corner of the site, consisting of 18 new dual purpose wells, each equipped with a QED AP3 pneumatic pump for leachate extraction. Four perforated horizontal gas collectors were also installed in Cell 32 under newly deposited waste, and connected via 150 mm sub-lateral piping to Lateral 7. A second 150 mm sub-lateral was also installed to the eastern limit of Cell 33 for the installation of future horizontal gas collectors. Gas collection was also added to three leachate manholes at the end of Charette Road (MH3, 4 and 5), and gas tight HDPE lids were installed at a total of 21 leachate manholes and three leachate sumps to further reduce odours.

In addition to the new collection system infrastructure, the 2020 expansion also included the retrofitting of 57 existing gas wells to dual purpose to allow for leachate extraction. Compressed air and forcemain piping are now installed to all vertical extraction wells on site, along with QED AP3 pneumatic pumps. Powering the pumps will be a container-mounted 60 HP Atlas Copco air compressor system installed in the flaring compound. At the time of writing this report, the air compressor container had yet to be delivered. Delivery and commissioning of the air compressor container is expected to occur by the end of March 2021.



NOTES:
1. DRAWING SHOWS INFRASTRUCTURE ASSOCIATED WITH 2020 WELLFIELD AND DUAL-PURPOSE EXPANSION AS PER THE "FOR CONSTRUCTION" LAYOUT. AS-BUILT CONDITIONS FROM THIS EXPANSION HAVE NOT BEEN INCORPORATED INTO DRAWING.

COMCOR
ENVIRONMENTAL LIMITED
Consulting Engineers and Landfill Gas Specialists
320 Pinebush Road, Suite 12, Cambridge, Ontario N1T 1Z6
tel (519) 621-6669 • fax (519) 621-9944

INTEGRATED GAS RECOVERY SERVICES
A Landfill Gas Utilization Company

Winnipeg

City of Winnipeg
Brady Road
Resource Management
Facility

FIGURE 1

EXISTING SITE CONDITIONS
MARCH 2021

Previous to the expansion, Comcor identified that a number of the existing flow control assemblies were malfunctioning, primarily due to broken shear pins in the valves' gearboxes. These issues were remediated and included as a change order to the 2020 expansion contract.

2.2 Wellfield System Monitoring

The wellfield system monitoring consists of measuring vacuum/pressure in each well and lateral pipe, as well as the percentage of methane, oxygen and carbon dioxide in the landfill gas, and parts per million of carbon monoxide and hydrogen sulphide at each location. These measurements were taken using a proper gas meter/analyzer such as a Landtec GEM-5000, or equivalent. Vacuum fluctuations were noted, as it can be an indication of water within the piping system.

Each wellhead was monitored for the velocity of gas using an anemometer. The measured velocities were used to calculate landfill gas flow rates by multiplying the velocity by the pipe cross-sectional area.

The monitoring data collected during the monthly round is beneficial to determine if the wellfield is operating as intended. Changes to the wellhead valve position were made to ensure maximum gas collection from the landfill. The system was monitored and field balanced by a technician experienced in the operation of this type of system.

The new wells installed in 2020 were not monitored as the wells were not opened until December 2020. The pump counters at the new/retrofitted wells were also not monitored in 2020 since the new air compressor has not been commissioned.

During 2020, there were no elevated levels of Carbon Monoxide (CO) (>500 ppm). Previous elevated levels occasionally found at GW 2-13 and GW 1-7 as noted in the 2018 Annual Report were remediated. The highest CO levels at GW 1-7 and 2-13 during the 2020 monitoring period were both recorded in the June monitoring round and were 268 ppm and 188 ppm, respectively. From mid 2016 to October 2017, GW1-7 was closed due to low methane levels and high CO. The CO levels dropped in late 2017 and the temperature readings were within a more typical range, and thus the well was cracked for gas collection. The highest CO levels at 1-7 tends to occur during spring and summer. Elevated carbon monoxide within landfill gas can be an indicator of a subsurface fire within the waste. There was no indication of a subsurface fire in 2020.

The wellfield monitoring data and valve positions can be found in Table 2.

Pump counter measurements were recorded on a monthly basis at all active dual purpose gas/leachate collection wells. During the monthly pump counter measurements, the following items were noted:

- The pump counter at PDT1 was replaced in June 2020.
- The regulators were being repaired in July and August of 2020 at I-9, I-10, 2-18, and 3-30. Values were not recorded during these months.

- The pump counters at PDT4, PDT5, and PDT7 were not functioning throughout the 2020 reporting year due to flooding, thus readings were not recorded. The pumps however are working and are monitored to ensure that they are still operational.
- The pump counters at I-9, I-10, and 3-29 were not functioning during various months in the 2020 reporting year due to issues with the compressed air lines, thus readings were not recorded in some months.
- The pump at 3-27 was not operating properly and as a result was pulled for most of the 2020 reporting year, thus readings were not recorded.
- The pump counter at 3-30 was not functioning properly during various months in the 2020 reporting year, thus readings were not recorded in some months.
- The pump counter at 2-18 was removed for the month of May 2020. The pump counter was replaced in June, August, and November of 2020.

In instances when there was a lack of a functioning pump counter, the pumps were checked on a monthly basis to confirm operation, and were found to be functioning as intended at all inspections. Table 3 presents the pump counter measurements recorded at both the pump drain traps and active dual purpose wells in 2020. Once Covid restrictions are lifted, many pump counter confined space repairs can be completed to have all counters working again.

Water level monitoring requirements are for water levels to be measured on a semi-annual basis. Table 4 presents the water levels measured in 2020. The percent of open screen available for gas collection at each well is estimated based on water levels.

Based on pump counters and water levels recorded throughout 2020, dual purpose well pumps continue to remove leachate consistently. In 2020, the majority of the monitored dual-purpose wells have open screen percentages above 40%.

In August and June 2018, pumps at wells 3-27 and 3-30 respectively, were reinstalled due to suspicion that they may not be functioning as designed as a result of leachate and siltation residue making the pump inoperable. Although the pump at well 3-30 operated as intended throughout 2020 with the exception of months with a malfunctioning pump counter, the pump at well 3-27 did not operate as intended and was pulled out of the well for most of the year. The well should be monitored for residue build up and if it continues a vacuum truck could be considered to extract the silt/residue from the well to allow for operation of the pump

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
Weather Conditions			cloudy	cloudy	Cloudy	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Ambient Temperature		^{o}C	-24	-22	-15	15	22	28	25	23	23	10	-12	-16
Control Panel	*Flow Rate*	*CFM*	800	800	800	800	800	800	800	800	800	900	800	800
	CH_4	%	39.9	48.4	50.4	50.3	51.1	50.9	46.6	45.8	42.5	40.1	39.8	47.0
	O_2	%	5.5	3.2	1.5	1.7	0.9	1.2	1.8	2.6	3.0	3.7	3.9	2.9
	Wellfield Vac	*"H_2O*	8.9	9.2	10.3	10.6	-9.3	-10.1	-9.4	-9.9	-10.5	-12.4	-14.3	-13.3
	Outlet Press.	*"H_2O*	4.1	3.8	4.3	4.1	4.4	4.2	4.2	4.1	4.1	4.1	4.2	3.7
LOCATIONS														
H-1	*Well*	*"H_2O*	-1.04	-1.05	-1.02	-2.69	-7.28	-6.01	-4.98	-5.84	-6.75	-3.66	-0.16	-1.56
well bore seal	*Lateral*	*"H_2O*	-1.72	-4.94	-4.23	-6.32	-8.37	-8.44	-8.12	-7.50	-11.10	-9.27	-13.39	-11.58
	CH_4	%	49.1	51.6	52.9	51.6	32.5	33.6	31.8	26.6	38.0	40.9	44.2	39.2
	CO_2	%	32.0	38.6	39.6	37.1	27.0	28.5	25.9	23.9	32.0	32.8	33.1	31.4
	O_2	%	1.9	1.4	0.0	1.0	3.3	1.8	2.6	4.4	0.9	0.7	4.9	1.2
	BAL (N_2)	%	17.0	8.4	7.5	10.3	37.2	36.2	39.7	45.0	29.1	25.5	17.7	28.2
	CO	*PPM*	9	10	9	8	9	11	11	10	11	13	9	12
	H_2S	*PPM*	17	19	22	18	10	17	11	4	7	5	7	8
	Vel Max	*m/s*	Frozen	-	-	-	0.86	0.75	0.00	0.57	0.00	1.14	0.00	0.00
	Vel Min	*m/s*	Frozen	-	-	-	1.11	0.87	0.00	0.92	0.00	1.28	0.00	0.00
	Flow	*CFM*	-	-	-	-	9.307695938	7.654044375	0	7.039830938	0	11.43381938	0	0
	Temp	^{o}C	Surging	-	-	-	21.7	36.4	31.5	32.7	20.4	21.0	14.9	5.6
	Comments		1/2->1T	1T	1T	1T	1T-> 1/2	1/2->cracked	cracked	1/2T	Cracked	Cracked	Cracked	Cracked
H-2	*Well*	*"H_2O*	-0.86	0.09	0.92	-3.14	-6.50	-5.30	-5.38	-5.54	-3.78	-3.82	-0.43	-0.12
	Lateral	*"H_2O*	-1.63	-5.23	-4.96	-5.98	-7.90	-8.62	-6.54	-5.75	-10.56	-9.27	-12.58	-12.57
	CH_4	%	58.0	54.9	55.9	54.5	47.3	52.0	44.9	45.0	46.3	37.4	34.9	43.1
	CO_2	%	39.2	32.4	37.4	35.1	35.8	38.1	24.8	35.7	36.3	29.6	25.7	34.6
	O_2	%	0.0	3.4	2.4	1.6	1.7	0.1	1.4	0.0	0.2	36.0	3.3	0.5
	BAL (N_2)	%	2.7	9.3	4.3	8.8	15.1	9.8	28.9	19.2	17.2	29.3	36.0	21.8
	CO	*PPM*	8	6	4	2	9	12	15	13	11	11	6	10
	H_2S	*PPM*	12	12	13	15	8	13	10	15	9	14	4	5
	Vel Max	*m/s*	3.25	-	-	-	2.94	3.58	1.56	1.41	5.81	1.11	-	-
	Vel Min	*m/s*	3.64	-	-	-	3.70	3.98	1.87	1.63	6.24	1.44	-	-
	Flow	*CFM*	32.55331219	-	-	-	31.3721325	35.71887375	16.20578531	14.363145	56.93286094	12.04803281	-	-
	Temp	^{o}C	11.6	-	-	-	24.5	32.2	34.5	33.3	25.2	22.6	-	-
	Comments		1->2T	2T	2T	2T	2T -> 1T	1T	1/2T	1/2T	1	1 -> cracked	closed	closed
H-3	*Well*	*"H_2O*	5.04	-2.34	-1.85	-3.02	-6.04	-8.23	-5.96	-6.83	-7.95	-6.41	-0.76	-0.12
	Lateral	*"H_2O*	-9.07	-6.12	-5.14	-5.04	-7.27	-8.44	-6.98	-6.90	-9.77	-8.72	-11.91	-9.77
	CH_4	%	57.3	56.6	50.6	51.2	57.2	54.4	46.2	45.5	44.4	31.2	44.8	45.1
	CO_2	%	42.7	39.6	40.2	39.9	40.5	40.4	33.6	34.8	34.4	24.8	41.4	33.9
	O_2	%	0.0	2.8	3.6	2.5	0.4	0.4	2.4	2.9	3.1	6.7	13.7	2.1
	BAL (N_2)	%	0.0	1.0	5.6	6.4	1.8	4.8	17.8	16.8	18.1	37.3	0.1	18.9
	CO	*PPM*	10	14	13	12	20	33	30	26	30	16	7	9
	H_2S	*PPM*	9	15	16	15	15	7	10	8	6	4	14	10
	Vel Max	*m/s*	-	-	-	-	0.87	1.08	1.02	0.91	1.14	-	-	-
	Vel Min	*m/s*	-	-	-	-	2.46	1.37	1.65	1.32	1.30	-	-	-
	Flow	*CFM*	-	-	-	-	15.73331344	11.57556094	12.61499906	10.53612281	11.52831375	-	-	-
	Temp	^{o}C	-	-	-	-	18.2	35.3	31.9	30.0	20.4	-	-	-
	Comments		Frozen	1T	1T	1T	1T -> 2T	2T	1T	1T	1T	1T -> closed	closed	closed
H-4 DP	*Well*	*"H_2O*	3.52	0.02	0.09	-1.59	-6.29	-5.34	-3.42	-4.83	-8.70	-8.22	-8.43	-0.15
	Lateral	*"H_2O*	-8.23	-5.65	-5.94	-5.87	-7.13	-8.17	-6.87	-7.03	-9.14	-8.55	-12.00	-11.97
	CH_4	%	57.5	58.8	57.9	56.9	47.7	53.0	51.5	52.7	52.3	50.2	41.6	42.3
	CO_2	%	42.4	20.1	42.1	41.5	34.6	38.7	34.9	35.5	38.8	37.3	30.8	35.1
	O_2	%	0.0	4.6	0.0	1.0	2.8	0.7	1.5	1.1	1.1	1.7	4.8	2.3
	BAL (N_2)	%	0.0	16.5	0.0	0.6	14.9	7.5	12.1	7.5	7.8	10.8	22.8	20.3
	CO	*PPM*	7	5	5	3	3	13	10	11	15	13	6	9
	H_2S	*PPM*	25	24	20	25	11	28	36	46	27	22	7	14
	Vel Max	*m/s*	-	-	-	-	1.38	1.32	1.24	1.00	1.51	2.40	0.00	0.00
	Vel Min	*m/s*	-	-	-	-	1.46	1.44	1.69	1.21	1.52	2.90	0.00	0.00
	Flow	*CFM*	-	-	-	-	13.41820125	13.04022375	13.84342594	10.44162844	14.31589781	25.04100938	0	0
	Temp	^{o}C	-	-	-	-	18.4	28.4	30.9	32.5	22.3	25.2	13.4	5.9
	Comments		Frozen	2T	2T	2T	2T -> 1T	1T	1T	2T	2T	2T	cracked	cracked

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
1-5	*Well*	"H_2O	2.94	0.21	-1.38	-1.84	-1.53	-5.96	-3.65	-3.31	0.22	-0.06	-0.11	-0.07
well bore seal	*Lateral*	"H_2O	-8.68	-4.62	-4.62	-5.14	-7.24	-8.57	-6.56	-6.90	-11.56	-8.14	-14.65	-12.39
	CH_4	%	59.1	47.6	44.2	51.3	57.6	49.3	24.8	22.0	58.3	50.9	22.2	28.9
	CO_2	%	40.6	22.6	39.3	44.1	39.5	38.7	18.2	17.9	41.0	39.1	19.0	36.0
	O_2	%	0.2	9.8	9.9	0.5	0.6	0.7	8.6	9.5	0.0	0.5	10.6	1.0
	BAL (N_2)	%	0.0	20.0	6.6	4.1	2.2	12.0	48.4	50.6	0.7	9.5	48.2	34.1
	CO	*PPM*	3	2	3	3	6	10	11	13	8	14	9	11
	H_2S	*PPM*	24	12	14	15	30	11	5	3	73	6	2	8
	Vel Max	*m/s*	-	-	-	-	4.35	3.14	-	-	1.24	-	-	-
	Vel Min	*m/s*	-	-	-	-	4.54	3.85	-	-	1.57	-	-	-
	Flow	*CFM*	-	-	-	-	42.00274969	33.02578406	-	-	13.27645969	-	-	-
	Temp	°*C*	-	-	-	-	19.9	34.6	-	-	25.3	-	-	-
	Comments		Frozen	1/2T	1/2T	1/2T	1/2T -> 1T	1T	Closed	Closed	cracked	cracked	closed	closed
1-6 DP	*Well*	"H_2O	-2.92	1.98	2.04	1.34	0.69	-1.28	0.24	0.11	-1.21	-0.97	0.20	0.34
	Lateral	"H_2O	-8.84	-5.34	-5.22	-6.21	-7.31	-8.57	-6.41	-7.11	-10.78	-10.66	-15.26	-12.54
	CH_4	%	33.1	32.4	38.2	39.5	59.9	32.1	40.1	57.1	36.1	22.3	40.3	42.9
	CO_2	%	22.5	36.8	32.4	35.1	38.8	26.8	31.8	39.0	28.5	15.3	27.1	25.1
	O_2	%	8.8	16.0	14.3	15.9	0.1	3.7	1.5	0.7	4.0	9.1	6.0	3.8
	BAL (N_2)	%	35.6	14.8	15.1	9.5	0.2	37.4	26.6	3.2	31.4	53.3	26.6	28.2
	CO	*PPM*	4	5	6	8	5	8	5	7	7	7	2	6
	H_2S	*PPM*	16	92	95	100	100	2	102	246	41	12	45	44
	Vel Max	*m/s*	-	-	-	-	0.84	-	-	1.04	1.53	-	-	-
	Vel Min	*m/s*	-	-	-	-	0.88	-	-	1.39	1.62	-	-	-
	Flow	*CFM*	-	-	-	-	8.12651625	-	-	11.48106656	14.88286406	-	-	-
	Temp	°*C*	-	-	-	-	22.7	-	-	36.3	27.3	-	-	-
	Comments		1->closed	closed	closed	closed	closed -> cracked	cracked->closed	closed	cracked	cracked	closed	closed	closed
1-7	*Well*	"H_2O	0.43	-3.02	-1.46	-0.94	0.03	-1.76	-0.74	-0.08	-1.09	-0.23	-1.64	0.06
	Lateral	"H_2O	-8.51	-5.93	-6.47	-6.21	-6.76	-8.39	-6.74	-7.07	-9.42	-7.78	-14.09	-12.98
	CH_4	%	55.4	46.2	46.9	51.1	56.0	31.9	48.7	51.2	33.9	45.0	31.9	33.3
	CO_2	%	44.6	31.4	23.9	30.5	43.6	33.4	36.8	40.2	33.9	38.0	28.8	31.6
	O_2	%	0.0	4.8	3.2	5.1	0.1	0.6	0.7	1.2	0.6	0.7	5.9	0.7
	BAL (N_2)	%	0.0	17.6	26.0	13.3	0.2	34.0	13.8	7.4	31.6	16.3	33.4	34.4
	CO	*PPM*	93	42	40	55	91	268	105	78	69	55	47	75
	H_2S	*PPM*	7	16	16	21	19	20	25	29	28	14	32	30
	Vel Max	*m/s*	-	-	-	-	6.94	1.05	1.89	2.30	5.91	3.44	-	-
	Vel Min	*m/s*	-	-	-	-	7.24	1.11	2.24	2.40	6.02	3.71	-	-
	Flow	*CFM*	-	-	-	-	66.99651188	10.2053925	19.51308844	22.20617813	56.36589469	33.78173906	-	-
	Temp	°*C*	-	-	-	-	25.0	35.7	26.9	25.4	26.0	23.7	-	-
	Comments		Frozen	1/2T	1/2T	1/2T	1/2T -> 1T	1->cracked	1T	1T	1/2T	1/2T	closed	closed
1-8	*Well*	"H_2O	-1.77	-3.41	-3.93	-4.28	-0.01	-1.78	-1.63	-1.54	-3.40	-0.66	-0.02	0.14
	Lateral	"H_2O	-8.68	-5.56	-5.36	-6.17	-7.47	-8.34	-7.15	-7.23	-9.28	-8.73	-15.84	-11.59
	CH_4	%	56.4	51.3	48.9	51.2	52.0	42.1	52.6	54.0	32.3	20.5	40.9	41.2
	CO_2	%	41.5	29.6	26.4	30.4	38.1	36.9	40.5	41.4	27.0	16.4	30.6	27.0
	O_2	%	0.3	2.9	1.9	3.8	2.6	1.2	3.4	2.8	6.0	11.1	5.7	6.5
	BAL (N_2)	%	1.7	16.2	22.8	14.6	7.4	19.9	3.5	1.9	34.7	52.0	22.8	25.3
	CO	*PPM*	9	10	11	12	26	14	15	18	12	0	12	13
	H_2S	*PPM*	22	40	42	45	33	76	80	73	46	16	60	55
	Vel Max	*m/s*	6.86	-	-	-	1.00	1.03	1.14	1.16	1.60	-	-	-
	Vel Min	*m/s*	7.28	-	-	-	1.09	1.04	1.59	1.24	2.01	-	-	-
	Flow	*CFM*	66.80752313	-	-	-	9.874662188	9.780167813	12.89848219	11.339325	17.05623469	-	-	-
	Temp	°*C*	1.5	-	-	-	31.8	36.7	28.6	24.5	29.7	-	-	-
	Comments		1T	1T	1T	1T	1T -> cracked	cracked	1T	1T	1/2T	closed	closed	closed
1-9 DP	*Well*	"H_2O	-5.49	-2.24	-2.02	-3.75	-6.09	-6.31	-3.69	-4.16	-5.25	-0.94	-0.31	-0.11
	Lateral	"H_2O	-9.05	-5.92	-5.10	-6.15	-7.61	-8.45	-7.14	-7.88	-11.31	-10.55	-15.53	-11.37
	CH_4	%	52.6	52.5	46.1	48.2	40.8	46.3	36.4	33.5	27.5	39.9	46.2	44.2
	CO_2	%	36.7	28.6	28.6	30.6	28.9	33.9	31.7	28.7	25.9	29.6	29.2	25.3
	O_2	%	0.2	9.2	7.6	9.8	4.4	1.4	1.9	2.5	4.0	2.4	4.0	3.6
	BAL (N_2)	%	10.6	9.7	17.7	11.4	26.0	18.3	30.0	35.4	42.6	28.1	3.0	26.9
	CO	*PPM*	8	6	7	5	6	10	25	35	45	19	12	15
	H_2S	*PPM*	16	15	16	14	11	21	10	4	3	7	18	9
	Vel Max	*m/s*	4.25	-	-	-	1.02	1.15	0.84	0.61	0.00	-	-	-
	Vel Min	*m/s*	5.17	-	-	-	1.09	1.27	0.95	0.83	0.00	-	-	-
	Flow	*CFM*	44.50685063	-	-	-	9.969156563	11.43381938	8.457246563	6.803595	0	-	-	-
	Temp	°*C*	26.5	-	-	-	28.7	35.5	31.0	33.4	0.0	-	-	-
	Comments		1T	1T	1T	1T	1T -> 1/2T	1/2T	cracked	cracked	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
1-10 DP	*Well*	*"H_2O*	0.15	0.06	-2.43	-5.21	-7.78	-7.28	-3.50	-5.13	-3.21	0.01	-0.10	0.31
	Lateral	*"H_2O*	Frozen	-6.01	-4.74	-6.43	-7.96	-8.17	-7.20	-7.61	-11.15	-10.03	-16.14	-12.43
	CH_4	*%*	63.9	58.6	56.9	54.8	36.1	29.5	35.2	36.4	17.6	65.2	2.1	8.7
	CO_2	*%*	30.4	35.9	32.8	31.9	29.2	26.2	28.3	29.2	12.9	31.0	1.8	13.6
	O_2	*%*	0.3	5.5	0.0	2.6	3.5	2.7	1.3	1.0	11.1	0.0	19.3	8.2
	BAL (N_2)	*%*	5.4	0.0	0.0	10.7	31.2	41.6	35.2	33.4	58.4	3.8	76.8	69.5
	CO	*PPM*	3	12	13	10	9	14	18	15	5	11	3	3
	H_2S	*PPM*	2	14	14	15	2	4	5	7	1	6	0	3
	Vel Max	*m/s*	-	-	-	-	1.06	1.13	0.69	0.85	0.00	0.00	-	-
	Vel Min	*m/s*	-	-	-	-	1.37	1.22	0.85	1.06	0.00	0.00	-	-
	Flow	*CFM*	-	-	-	-	11.48106656	11.10308906	7.276066875	9.024212813	0	0	-	-
	Temp	*°C*	-	-	-	-	22.1	31.4	30.8	31.1	0.0	28.6	-	-
	Comments		Frozen	2T	2T	2T	2T -> 1T	1->1/2T	cracked	cracked	closed	cracked	closed	closed
H-11 DP	*Well*	*"H_2O*	-8.33	-2.12	-3.25	-2.96	-5.95	-6.56	-5.24	-5.76	-9.40	0.80	-0.02	-9.40
	Lateral	*"H_2O*	-8.81	-4.92	-4.93	-6.84	-7.01	-8.36	-6.74	-6.98	-9.46	-8.57	-12.00	-11.58
	CH_4	*%*	52.0	57.2	49.5	50.2	51.1	52.2	49.2	49.5	51.1	53.7	35.3	36.9
	CO_2	*%*	35.8	38.9	28.6	31.6	37.3	39.2	38.6	36.9	36.7	40.1	32.7	35.4
	O_2	*%*	2.5	3.9	4.6	5.0	1.9	0.8	1.4	2.2	1.7	1.1	2.7	1.0
	BAL (N_2)	*%*	9.7	0.0	17.3	13.2	9.7	7.7	10.8	11.5	10.5	5.1	29.3	26.7
	CO	*PPM*	1	2	4	2	1	5	5	6	9	10	5	10
	H_2S	*PPM*	29	67	65	69	78	110	127	131	78	44	67	63
	Vel Max	*m/s*	1.81	-	-	-	1.00	1.11	1.24	0.97	0.78	1.24	-	-
	Vel Min	*m/s*	1.97	-	-	-	1.14	1.29	1.98	1.07	0.89	1.31	-	-
	Flow	*CFM*	17.85943688	-	-	-	10.11089813	11.339325	15.21359438	9.63842625	7.890280313	12.04803281	-	-
	Temp	*°C*	-0.6	-	-	-	23.7	28.1	29.5	26.4	23.3	19.4	-	-
	Comments		1T	1T	1T	1T	1T	1T	1T	1T	1T	1T	closed	closed
H-12	*Well*	*"H_2O*	Frozen	?	-3.19	-3.69	-	-8.34	-5.89	-5.11	-0.38	0.98	-0.59	-1.20
well bore seal	*Lateral*	*"H_2O*	-8.11	-6.10	-6.12	-6.22	-6.81	-9.16	-6.52	-6.87	-9.32	-8.36	-10.87	-11.67
	CH_4	*%*	22.7	43.8	47.3	48.6	36.1	55.6	48.6	45.7	46.9	43.8	48.7	47.0
	CO_2	*%*	13.6	28.0	32.5	30.5	24.2	35.6	33.2	31.8	35.7	33.3	32.5	33.3
	O_2	*%*	14.4	6.4	8.3	9.7	7.0	1.0	2.7	3.3	1.3	0.9	0.6	1.5
	BAL (N_2)	*%*	49.2	21.7	11.9	11.2	32.6	7.8	15.5	19.3	16.1	22.0	18.2	18.2
	CO	*PPM*	1	0	1	2	2	19	9	7	9	0	5	8
	H_2S	*PPM*	9	9	9	8	19	42	38	35	28	10	15	25
	Vel Max	*m/s*	-	-	-	-	0.74	3.56	0.98	0.70	0.79	0.00	0.44	0.55
	Vel Min	*m/s*	-	-	-	-	0.75	3.88	1.34	0.81	0.81	0.00	0.52	0.97
	Flow	*CFM*	-	-	-	-	7.039830938	35.1519075	10.9613475	7.134325313	7.55955	0	4.53573	7.1815725
	Temp	*°C*	-	-	-	-	25.4	32.1	26.7	30.1	23.5	19.9	12.1	10.6
	Comments		20%	20%	20%	20%	20% -> 10%	10->20%	20%	20%	20%	15%	15%	15%
2-13	*Well*	*"H_2O*	-6.56	-6.02	-3.24	-4.33	-5.63	-8.82	-3.97	1.83	-8.75	-7.23	-6.49	-7.40
	Lateral	*"H_2O*	-6.59	-6.40	-5.11	-6.10	-6.36	-9.18	-7.63	-7.83	-10.25	-8.31	-11.95	-12.37
	CH_4	*%*	58.6	57.6	59.8	58.2	57.4	55.9	55.1	58.4	55.9	55.7	55.1	53.2
	CO_2	*%*	41.0	42.3	29.9	35.1	39.5	38.6	36.4	41.4	40.7	39.7	38.6	39.6
	O_2	*%*	0.4	0.0	10.3	1.2	0.6	0.5	0.8	0.0	3.0	0.3	3.4	3.1
	BAL (N_2)	*%*	0.0	0.0	0.0	5.5	2.5	5.0	7.7	0.2	0.4	4.3	2.9	4.1
	CO	*PPM*	60	84	85	98	72	188	136	100	47	41	35	45
	H_2S	*PPM*	89	40	42	45	70	135	147	336	109	54	43	60
	Vel Max	*m/s*	-	-	-	-	2.22	2.51	3.68	5.12	3.75	2.84	3.84	3.64
	Vel Min	*m/s*	-	-	-	-	3.11	2.74	4.16	5.43	4.26	3.61	4.31	4.17
	Flow	*CFM*	-	-	-	-	25.18275094	24.80477344	37.041795	49.84578281	37.84499719	30.47443594	38.50645781	36.90005344
	Temp	*°C*	-	-	-	-	29.4	25.6	30.4	29.2	21.4	25.4	11.6	9.5
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
2-14	*Well*	*"H_2O*	-0.05	-1.23	-1.62	-1.45	0.63	-0.75	2.45	-1.32	-1.01	-0.14	-0.23	-0.11
well bore seal	*Lateral*	*"H_2O*	-7.06	-5.24	-5.69	-5.32	-5.33	-9.40	-6.87	-6.29	-10.44	-8.85	-10.48	-11.67
	CH_4	*%*	47.2	49.6	46.4	50.6	58.8	54.8	42.5	40.0	39.3	30.0	58.1	50.1
	CO_2	*%*	33.3	50.4	26.4	41.0	41.3	40.0	35.2	34.3	32.9	22.9	40.6	31.5
	O_2	*%*	4.4	0.0	9.4	5.1	0.0	0.0	0.9	0.6	2.4	8.2	1.3	1.4
	BAL (N_2)	*%*	15.1	0.0	17.8	3.3	0.0	5.2	21.4	25.2	25.4	38.9	0.0	17.0
	CO	*PPM*	5	6	5	5	6	24	28	30	17	10	10	12
	H_2S	*PPM*	34	40	41	39	38	48	36	27	20	16	25	19
	Vel Max	*m/s*	-	-	-	-	2.25	4.60	2.45	-	-	-	-	-
	Vel Min	*m/s*	-	-	-	-	2.54	5.11	3.58	-	-	-	-	-
	Flow	*CFM*	-	-	-	-	22.63140281	45.87701906	28.49005406	-	-	-	-	-
	Temp	*°C*	-	-	-	-	29.1	33.6	31.4	-	22.4	22.4	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2->1T	1/2T	1/2T	cracked	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
2-15	*Well*	"H_2O	-2.31	-2.02	-2.42	-1.68	-0.73	-3.39	-1.24	-0.98	-1.08	-2.67	-1.95	-1.08
	Lateral	"H_2O	-6.6	-6.0	-4.9	-5.1	-5.8	-9.2	-7.1	-6.8	-10.7	-9.0	-12.7	-11.0
	CH_4	%	49.2	50.1	44.2	48.6	58.3	46.5	47.5	47.7	50.4	37.1	44.6	43.2
	CO_2	%	36.5	49.9	32.7	35.9	40.1	37.2	36.0	37.0	37.8	30.6	33.3	35.3
	O_2	%	0.8	0.0	5.3	2.1	0.3	0.3	0.6	1.0	1.2	3.4	4.7	1.4
	BAL (N_2)	%	3.5	0.0	17.8	13.4	1.3	16.1	15.9	14.3	10.6	28.9	17.4	20.1
	CO	*PPM*	29.0	14.0	10.0	11.0	20.0	91.0	26.0	24.0	11.0	22.0	13.0	10.0
	H_2S	*PPM*	6.0	21.0	18.0	16.0	10.0	12.0	13.0	12.0	9.0	6.0	10.0	12.0
	Vel Max	*m/s*	-	-	-	-	3.9	2.9	1.2	-	5.6	0.0	0.6	0.4
	Vel Min	*m/s*	-	-	-	-	4.6	3.0	1.5	-	6.0	0.0	0.8	0.7
	Flow	*CFM*	-	-	-	-	40.16010938	28.11207656	12.94572938	-	54.99572625	0	6.850842188	5.149943438
	Temp	°*C*	-	-	-	-	23.4	25.3	26.1	-	21.4	21.8	9.6	6.3
	Comments		1->1/2T	1/2T	1/2T	1/2T	1/2->1T	1->1/2T	1/2T	1/2T	1	cracked	1/2T	1/2T
2-16	*Well*	"H_2O	-1.43	-1.64	-3.14	-2.46	0.07	-4.39	-2.69	-3.49	0.05	-0.08	-7.34	-3.65
	Lateral	"H_2O	-6.03	-5.19	-4.22	-5.87	-6.49	-8.18	-6.84	-5.10	-9.46	-8.50	-12.22	-11.76
	CH_4	%	34.2	51.2	42.9	48.3	56.2	39.2	25.6	26.2	58.0	52.9	57.3	54.1
	CO_2	%	26.2	48.8	38.5	40.3	41.4	33.1	25.3	22.8	41.8	39.0	41.6	39.0
	O_2	%	6.8	0.0	2.2	2.5	1.7	1.7	5.4	6.9	0.0	1.5	1.1	1.3
	BAL (N_2)	%	32.7	0.0	16.4	8.9	0.0	26.0	43.7	44.7	0.2	6.6	0.0	5.6
	CO	*PPM*	5	5	6	7	10	36	10	1	18	9	12	15
	H_2S	*PPM*	16	17	15	14	20	21	16	14	48	17	18	50
	Vel Max	*m/s*	-	-	-	-	3.90	8.13	0.00	-	4.51	6.39	0.00	2.65
	Vel Min	*m/s*	-	-	-	-	4.60	8.33	0.00	-	4.84	7.11	0.00	2.97
	Flow	*CFM*	-	-	-	-	40.16010938	77.76887063	0	-	44.17612031	63.78370313	0	26.55291938
	Temp	°*C*	-	-	-	-	23.4	31.5	30.6	-	24.7	24.1	4.9	2.5
	Comments		2->1/2T	1-2T	1/2T	1/2T	1/2->1T	1->1/2T	cracked	cracked	1/2T	1/2T	1/2T	1/2T
2-17	*Well*	"H_2O	-2.35	-1.29	-1.92	-2.10	-2.55	-7.13	-4.27	-2.93	-3.87	-2.84	-0.02	-0.67
	Lateral	"H_2O	-6.63	-4.63	-3.86	-5.68	-6.28	-9.44	-6.63	-7.41	-10.31	-9.69	-12.68	-10.58
	CH_4	%	55.5	55.4	43.2	50.3	59.5	46.1	48.6	49.8	50.8	40.5	49.0	44.8
	CO_2	%	36.5	30.2	36.1	41.5	40.3	37.0	35.2	37.9	38.4	30.6	34.6	36.2
	O_2	%	1.0	14.0	12.4	6.5	0.2	0.2	0.8	0.6	0.7	4.3	3.0	1.3
	BAL (N_2)	%	4.9	0.4	8.3	1.7	0.0	16.7	15.4	11.7	10.1	24.6	13.4	17.7
	CO	*PPM*	7	2	3	3	8	15	10	9	7	6	3	8
	H_2S	*PPM*	6	8	9	8	8	7	5	3	5	3	4	8
	Vel Max	*m/s*	-	-	-	-	4.04	3.94	1.39	-	5.31	0.00	0.00	0.00
	Vel Min	*m/s*	-	-	-	-	4.38	4.13	2.11	-	5.96	0.00	0.00	0.00
	Flow	*CFM*	-	-	-	-	39.78213188	38.12848031	16.53651563	-	53.24758031	0	0	0
	Temp	°*C*	-	-	-	-	22.5	26.2	29.3	-	19.5	28.4	14.3	3.6
	Comments		1T	1T	1T	1T	1->2T	2->1T	1T	1T	1T	cracked	cracked	cracked
2-18	*Well*	"H_2O	0.11	0.14	0.94	0.32	-0.52	-0.97	-0.87	-0.98	-0.41	-0.26	0.16	0.14
	Lateral	"H_2O	-6.50	-4.82	-4.20	-6.03	-8.36	-8.97	-7.20	-7.25	-11.34	-9.51	-15.62	-11.36
	CH_4	%	43.7	39.7	36.2	35.6	34.2	6.9	18.4	24.3	39.1	41.6	59.4	35.6
	CO_2	%	35.0	38.8	29.4	32.5	31.0	11.3	25.3	26.6	33.7	33.7	38.0	33.5
	O_2	%	0.6	20.5	23.4	6.5	2.1	9.6	2.4	1.7	0.2	0.1	2.6	0.6
	BAL (N_2)	%	20.6	1.0	11.0	25.4	32.7	72.2	53.9	47.4	27.0	24.6	0.0	30.3
	CO	*PPM*	6	5	5	4	14	18	15	20	7	13	9	8
	H_2S	*PPM*	10	12	13	14	0	1	14	11	39	26	29	25
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	-	0.00	-
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	0.00	-
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	-	0	-
	Temp	°*C*	-	-	-	-	-	-	-	-	-	-	10.4	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	cracked	closed
3-19	*Well*	"H_2O	-1.59	-3.14	0.23	-1.62	-4.74	-2.45	-3.58	-4.47	-0.07	0.08	-0.09	-0.07
	Lateral	"H_2O	-6.98	-4.31	-5.01	-5.24	-5.87	-6.12	-6.93	-6.65	-8.08	-10.39	-10.75	-12.09
	CH_4	%	57.4	52.7	56.7	52.6	44.6	53.9	35.2	30.8	40.1	58.6	24.5	32.9
	CO_2	%	39.5	37.1	20.2	26.3	32.3	38.4	26.7	22.7	30.1	41.3	18.4	33.6
	O_2	%	1.1	3.3	0.0	3.5	3.7	0.9	7.1	8.3	4.8	0.0	10.4	3.9
	BAL (N_2)	%	2.0	7.0	23.1	17.6	19.3	6.8	31.0	38.2	25.0	0.1	46.7	29.6
	CO	*PPM*	5	6	7	5	6	11	14	9	11	6	4	12
	H_2S	*PPM*	28	9	8	12	23	35	25	21	31	23	7	23
	Vel Max	*m/s*	5.45	-	-	-	4.11	5.78	2.54	2.93	2.94	6.78	-	-
	Vel Min	*m/s*	6.11	-	-	-	4.33	5.90	2.68	3.14	3.11	7.12	-	-
	Flow	*CFM*	54.61774875	-	-	-	39.87662625	55.184715	24.66303188	28.67904281	28.58454844	65.67359063	-	-
	Temp	°*C*	8.4	-	-	-	18.3	24.1	27.0	25.2	27.3	11.7	-	-
	Comments		2T	2T	2T	2T	2->1T	1.>2T	1/2T	1/2T	cracked	1T	closed	closed

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
3-20	*Well*	"H_2O	-1.20	-3.41	-3.21	-4.98	-5.37	-5.54	-6.13	-6.04	-7.93	-7.60	-9.43	-9.68
	Lateral	"H_2O	-6.84	-4.32	-5.85	-6.14	-6.30	-6.28	-6.93	-6.63	-8.90	-8.34	-11.36	-11.48
	CH_4	%	56.0	56.5	58.2	55.7	52.0	55.1	55.7	56.8	55.1	54.0	54.0	53.7
	CO_2	%	43.8	43.3	31.4	35.2	39.2	41.0	39.6	42.2	21.8	41.3	40.0	20.9
	O_2	%	0.2	0.1	0.0	2.6	1.2	0.6	1.2	0.5	0.1	0.5	2.4	0.8
	BAL (N_2)	%	0.0	0.0	10.4	6.5	7.6	3.3	3.5	0.6	23.0	4.2	3.6	24.6
	CO	PPM	17	19	21	20	17	23	25	27	29	17	16	15
	H_2S	PPM	15	3	4	5	8	6	9	6	8	5	5	9
	Vel Max	m/s	5.14	-	-	-	3.96	3.14	3.65	3.53	4.03	2.53	4.32	3.59
	Vel Min	m/s	5.24	-	-	-	5.11	3.21	3.81	3.67	4.78	3.42	4.96	4.06
	Flow	CFM	49.04258063	-	-	-	42.85319906	30.00196406	35.24640188	34.017975	41.62477219	28.11207656	43.84539	36.14409844
	Temp	°C	4.2	-	-	-	18.6	24.1	25.2	24.7	19.7	17.6	9.3	5.3
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
3-21	*Well*	"H_2O	-0.59	-2.15	1.20	1.65	-5.01	-4.00	-1.14	1.39	0.77	-1.36	0.02	0.77
	Lateral	"H_2O	-6.57	-5.03	-5.26	-6.58	-7.42	-6.37	-6.58	-7.39	-9.24	-8.12	-11.83	-9.24
	CH_4	%	51.6	5.2	8.7	23.6	55.6	25.8	34.2	37.1	54.0	19.0	35.6	37.5
	CO_2	%	45.8	3.7	6.3	5.6	41.8	20.9	24.3	28.8	43.8	16.4	28.6	30.6
	O_2	%	1.8	20.6	21.9	25.1	0.3	9.6	6.9	5.3	0.1	11.8	8.3	4.2
	BAL (N_2)	%	0.8	70.5	63.9	45.7	2.3	43.6	34.6	29.8	2.1	52.8	27.5	27.7
	CO	PPM	5	2	3	2	4	5	11	9	10	5	4	8
	H_2S	PPM	15	0	0	2	27	0	26	53	38	1	9	22
	Vel Max	m/s	-	-	-	-	0.47	-	-	-	0.00	-	-	-
	Vel Min	m/s	-	-	-	-	0.56	-	-	-	0.00	-	-	-
	Flow	CFM	-	-	-	-	4.866460313	-	-	-	0	-	-	-
	Temp	°C	-	-	-	-	28.7	-	-	-	22.5	-	-	-
	Comments		1T	1T-> closed	closed	closed	closed->cracked	cracked->closed	closed	closed	cracked	closed	closed	closed
3-22	*Well*	"H_2O	-5.40	-3.21	-2.95	-4.58	-3.34	-4.26	-1.60	3.19	-2.45	-3.66	-5.24	-6.31
well bore seal	*Lateral*	"H_2O	-6.47	-3.95	-5.23	-5.24	-4.89	-6.11	-6.75	-7.22	-9.78	-7.91	-11.24	-11.97
	CH_4	%	57.2	58.0	60.2	56.7	55.8	45.8	57.4	60.0	55.7	57.3	55.2	53.6
	CO_2	%	42.7	41.5	39.2	36.8	39.3	32.2	36.1	39.4	36.4	41.2	40.2	38.4
	O_2	%	0.0	0.4	0.6	1.4	0.9	3.8	1.3	0.0	0.4	0.8	2.3	1.8
	BAL (N_2)	%	0.0	0.0	0.0	5.1	4.1	18.3	5.2	0.6	7.5	0.7	2.3	6.2
	CO	PPM	24	31	32	25	36	48	15	12	10	20	18	15
	H_2S	PPM	25	26	26	36	48	50	254	500	480	29	19	33
	Vel Max	m/s	-	1.93	-	-	4.67	1.64	2.56	3.82	1.56	3.41	1.96	1.68
	Vel Min	m/s	-	1.53	-	-	5.05	1.69	2.71	4.14	2.14	3.86	2.23	2.06
	Flow	CFM	-	16.34752688	-	-	45.92426625	15.73331344	24.89926781	37.60876125	17.48145938	34.34870531	19.79657156	17.67044813
	Temp	°C	-	13.4	-	-	28.0	24.8	26.2	24.2	25.9	22.9	13.0	6.2
	Comments		2T	2T	2T	2T	2T	2->1/2T	1/2T	1/2T	1/2T	1T	1T	1T
3-23	*Well*	"H_2O	frozen	-3.16	1.59	-2.58	-3.16	-4.44	TOO	TOO	TOO	Too Tall	-9.68	-8.02
	Lateral	"H_2O	-6.45	-3.47	-3.49	-4.24	-4.37	-4.62	TALL	TALL	TALL	-9.32	-12.48	-11.03
	CH_4	%	58.7	59.0	57.4	56.4	58.0	51.8	-	-	-	58.0	52.3	51.7
	CO_2	%	41.3	40.8	37.6	38.5	39.2	35.4	-	-	-	39.3	36.1	35.7
	O_2	%	1.0	0.2	1.3	1.1	0.3	2.0	-	-	-	0.9	6.0	3.8
	BAL (N_2)	%	0.0	0.0	3.9	4.0	2.5	10.9	-	-	-	1.8	5.6	8.8
	CO	PPM	4	5	6	5	19	17	-	-	-	6	7	12
	H_2S	PPM	53	56	50	66	86	83	-	-	-	34	25	31
	Vel Max	m/s	-	0.00	-	-	0.72	0.61	-	-	-	0.89	1.15	1.06
	Vel Min	m/s	-	0.00	-	-	1.29	1.14	-	-	-	1.47	1.37	1.35
	Flow	CFM	-	0	-	-	9.496684688	8.268257813	-	-	-	11.15033625	11.90629125	11.38657219
	Temp	°C	-	6.2	-	-	26.7	30.5	-	-	-	11.6	12.9	3.0
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
3-24	*Well*	"H_2O	-0.96	-0.65	0.06	0.08	0.04	0.03	0.05	0.00	-0.54	-0.49	-0.02	0.12
	Lateral	"H_2O	-6.94	-4.22	-4.24	-4.52	-5.08	-6.39	-7.10	-7.75	-9.67	-7.40	-12.08	-12.97
	CH_4	%	57.1	19.8	17.6	26.3	58.4	58.2	55.2	57.2	56.1	20.6	46.0	45.9
	CO_2	%	42.9	14.1	36.2	35.1	41.5	40.8	39.8	41.6	40.8	16.0	35.9	36.5
	O_2	%	0.0	15.5	17.6	18.6	0.2	0.1	0.3	0.0	0.1	14.1	2.5	3.6
	BAL (N_2)	%	0.0	50.6	28.6	20.0	0.0	1.0	4.7	1.2	3.0	49.3	15.6	14.0
	CO	PPM	28	4	3	5	44	71	55	39	41	7	23	15
	H_2S	PPM	40	14	14	17	86	155	149	157	139	44	99	87
	Vel Max	m/s	-	-	-	-	1.36	1.69	2.56	5.82	3.47	-	-	-
	Vel Min	m/s	-	-	-	-	1.40	2.13	3.24	6.41	4.10	-	-	-
	Flow	CFM	-	-	-	-	13.04022375	18.04842563	27.40336875	57.78331031	35.76612094	-	-	-
	Temp	°C	-	-	-	-	32.0	35.6	28.4	27.1	29.4	-	-	-
	Comments		Frozen	2T->closed	closed	closed	closed->cracked	cracked->1/2T	1T	1T	1T	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
3-25	*Well*	"H_2O	-6.28	-4.43	-4.79	-4.87	-4.90	-6.11	-6.54	-6.72	-8.14	-7.78	-8.69	-9.60
	Lateral	"H_2O	-7.81	-4.58	-5.34	-5.14	-5.10	-6.37	6.75	-7.24	-8.65	-7.94	-12.12	-12.63
	CH_4	%	55.2	59.0	58.6	56.2	52.3	51.5	50.2	47.3	48.1	48.1	57.9	54.6
	CO_2	%	37.4	38.8	30.4	31.6	36.1	35.3	31.9	33.5	32.7	34.6	40.4	32.7
	O_2	%	2.0	1.1	0.0	1.0	1.9	2.2	2.6	3.2	1.9	4.2	1.7	1.4
	BAL (N_2)	%	5.4	1.1	11.0	11.2	9.6	11.0	15.3	16.0	17.3	13.1	0.0	11.3
	CO	PPM	5	4	5	10	15	23	20	14	12	3	6	11
	H_2S	PPM	16	22	25	24	25	35	64	58	75	20	33	60
	Vel Max	m/s	-	0.00	-	-	0.76	0.70	1.58	1.81	2.57	2.14	2.35	3.05
	Vel Min	m/s	-	0.00	-	-	1.09	0.93	2.69	2.43	2.69	2.26	2.79	4.24
	Flow	CFM	-	0	-	-	8.740729688	7.701291563	20.17454906	20.0328075	24.85202063	20.7887625	24.28505438	34.44319969
	Temp	°C	-	0.0	-	-	30.7	35.7	28.4	25.1	27.1	18.0	10.9	5.2
	Comments		Frozen	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
3-26	*Well*	"H_2O	1.45	-4.93	-4.01	-4.25	-4.53	-8.11	-6.74	-8.00	-10.36	-8.01	-9.94	-8.47
	Lateral	"H_2O	-6.69	-4.75	-4.96	-4.81	-4.73	-8.73	-7.14	-8.31	-10.74	-8.17	-12.30	-11.06
	CH_4	%	54.1	60.2	57.4	51.6	44.2	56.5	55.9	55.8	55.8	56.0	52.3	50.9
	CO_2	%	38.7	38.8	29.6	26.7	30.8	38.3	37.5	38.7	38.4	38.6	35.8	36.4
	O_2	%	2.5	0.9	2.6	3.9	4.4	0.4	0.5	0.8	2.6	0.7	2.3	3.5
	BAL (N_2)	%	4.7	0.0	10.4	17.8	20.6	4.7	6.1	4.7	3.2	4.7	9.6	9.2
	CO	PPM	12	4	2	4	5	10	8	9	9	12	11	11
	H_2S	PPM	41	16	18	20	22	43	42	38	31	19	13	14
	Vel Max	m/s	1.54	-	-	-	0.00	0.65	0.00	0.00	0.00	3.41	0.00	0.00
	Vel Min	m/s	1.96	-	-	-	0.00	0.77	0.00	0.00	0.00	3.57	0.00	0.00
	Flow	CFM	16.53651563	-	-	-	0	6.709100625	0	0	0	32.97853688	0	0
	Temp	°C	1.1	-	-	-	25.0	32.8	26.9	25.8	27.8	31.4	6.3	2.5
	Comments		2T	2T	2T	2T	2->1T	1->2T	2T	2T	2T	2T	2T	2T
3-27 DP	*Well*	"H_2O	8.22	-5.35	1.51	3.65	8.96	-4.97	-2.65	-7.01	-5.62	0.11	-0.02	-0.02
	Lateral	"H_2O	Buried	BURIED	BURIED	-4.13	-4.42	-6.41	-6.53	-7.16	-9.47	-8.95	-10.35	-11.02
	CH_4	%	57.5	35.2	40.6	42.5	57.9	51.8	50.6	49.9	48.2	38.2	44.2	43.8
	CO_2	%	42.5	25.3	33.4	40.5	40.9	39.1	38.3	38.7	39.6	29.6	32.6	38.4
	O_2	%	0.0	9.3	3.4	3.5	1.2	0.5	1.0	0.7	0.2	5.1	3.5	2.9
	BAL (N_2)	%	0.0	30.1	22.5	13.5	0.0	8.5	10.1	10.6	67.3	27.1	19.6	14.9
	CO	PPM	8	4	10	11	15	12	15	18	15	6	13	15
	H_2S	PPM	73	38	44	54	67	67	69	63	66	49	15	32
	Vel Max	m/s	-	-	-	-	0.56	0.00	1.98	2.43	1.47	-	-	-
	Vel Min	m/s	-	-	-	-	0.63	0.00	2.62	2.91	2.57	-	-	-
	Flow	CFM	-	-	-	-	5.622415313	0	21.73370625	25.22999813	19.08786375	-	-	-
	Temp	°C	-	-	-	-	30.5	36.5	27.1	28.3	25.3	-	-	-
	Comments		1/2T	1/2->closed	closed	closed	closed->cracked	cracked->1/2T	1/2T	1/2T	1/2T	closed	closed	closed
3-28	*Well*	"H_2O	-0.24	-1.82	-1.15	-1.97	-0.86	2.22	2.65	1.38	-3.38	-0.56	-0.13	-0.06
	Lateral	"H_2O	-6.46	-4.61	-5.03	-4.55	-3.86	-7.72	-7.35	-8.32	-8.49	-7.35	-12.32	-11.47
	CH_4	%	58.6	41.9	40.9	41.8	31.5	56.8	55.8	56.4	22.8	39.4	0.4	26.4
	CO_2	%	37.8	29.9	26.3	27.9	23.1	41.0	40.2	40.7	17.3	30.7	0.5	17.5
	O_2	%	1.2	6.4	9.9	8.0	8.3	0.0	0.1	0.2	11.0	4.7	0.9	6.5
	BAL (N_2)	%	2.4	21.8	22.9	22.3	37.1	2.2	3.9	2.6	48.9	25.2	98.2	49.6
	CO	PPM	13	5	8	5	4	13	15	11	3	7	10	5
	H_2S	PPM	98	25	20	30	36	119	86	91	34	25	29	33
	Vel Max	m/s	-	-	-	-	surging	1.13	2.87	3.82	Surging	-	-	-
	Vel Min	m/s	-	-	-	-	surging	1.16	3.64	5.19	-	-	-	-
	Flow	CFM	-	-	-	-	-	10.81960594	30.75791906	42.56971594	-	-	-	-
	Temp	°C	-	-	-	-	surging	36.8	25.2	24.4	-	-	-	-
	Comments		Frozen	1T -> 1/2T	1/2T	1/2T	1/2->closed	closed->cracked	1T	1T	cracked	cracked	closed	closed
3-29 DP	*Well*	"H_2O	1.02	-6.45	-5.82	-4.63	-4.40	-8.32	-3.54	-2.38	-0.05	0.00	-0.09	-0.05
	Lateral	"H_2O	-6.73	-6.61	-5.84	-5.10	-4.87	-8.91	-6.82	-6.28	-9.78	-7.41	-12.46	-12.57
	CH_4	%	56.9	60.4	59.6	58.6	56.4	56.5	10.9	6.5	31.2	36.1	18.9	22.8
	CO_2	%	43.1	38.4	36.9	35.2	36.8	37.2	6.9	4.5	22.0	25.7	13.3	22.8
	O_2	%	0.0	1.2	0.0	2.5	1.1	0.5	15.4	17.0	8.2	6.9	17.5	7.4
	BAL (N_2)	%	0.0	0.0	3.5	4.0	5.7	5.8	66.8	72.0	38.6	31.3	50.3	47.0
	CO	PPM	8	6	5	5	5	9	5	4	5	5	8	5
	H_2S	PPM	65	42	51	50	46	75	10	7	10	9	4	11
	Vel Max	m/s	-	-	-	-	0.92	3.11	-	-	-	-	-	-
	Vel Min	m/s	-	-	-	-	1.25	3.79	-	-	-	-	-	-
	Flow	CFM	-	-	-	-	10.25263969	32.60055938	-	-	-	-	-	-
	Temp	°C	-	-	-	-	25.3	35.4	-	-	-	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	closed	closed	closed	closed	closed	closed

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
3-30 DP	*Well*	*"H_2O*	0.25	-2.10	-3.43	-4.05	-1.90	-2.04	-1.65	-1.34	-0.37	-0.82	-0.26	-0.14
	Lateral	*"H_2O*	-6.82	-4.79	-4.82	-4.51	-4.11	-8.41	-6.96	-6.63	-10.20	-7.70	-11.21	-11.47
	CH_4	*%*	52.6	54.9	55.4	50.6	37.1	35.4	38.4	36.7	52.6	36.6	47.9	42.7
	CO_2	*%*	40.5	38.7	32.6	35.6	28.3	27.9	26.7	29.7	37.8	28.8	33.1	34.1
	O_2	*%*	0.4	1.3	1.4	2.5	5.3	3.6	3.6	3.5	0.7	5.0	10.8	4.8
	BAL (N_2)	*%*	6.5	5.1	10.6	11.3	29.2	33.2	31.3	30.1	8.9	29.6	8.2	18.4
	CO	*PPM*	5	6	6	5	5	8	10	9	8	6	10	5
	H_2S	*PPM*	26	5	6	7	10	18	16	20	42	12	13	24
	Vel Max	*m/s*	-	-	-	-	4.04	-	-	-	2.89	-	-	-
	Vel Min	*m/s*	-	-	-	-	5.67	-	-	-	3.03	-	-	-
	Flow	*CFM*	-	-	-	-	45.87701906	-	-	-	27.970335	-	-	-
	Temp	*°C*	-	-	-	-	38.7	-	-	-	33.4	-	-	-
	Comments		1T	1T	1T	1T	1->1/2T	1/2->closed	closed	closed	cracked	closed	closed	closed
4-31	*Well*	*"H_2O*	-3.80	-3.47	-4.11	-4.25	-3.62	-4.31	-2.47	-2.63	-4.87	-4.82	-3.49	-5.30
	Lateral	*"H_2O*	-4.92	-4.05	-4.92	-4.82	-3.67	-4.55	-6.69	-7.70	-9.66	-9.56	-11.48	-12.67
	CH_4	*%*	58.9	57.8	58.4	56.3	54.5	49.3	51.3	53.9	52.7	51.1	46.9	51.8
	CO_2	*%*	40.4	41.0	29.4	36.1	39.0	37.0	38.4	39.4	39.2	38.1	34.3	35.4
	O_2	*%*	0.7	1.1	0.0	1.3	0.8	1.3	0.9	0.6	1.4	1.3	4.8	2.5
	BAL (N_2)	*%*	0.0	0.0	12.2	6.3	5.7	12.1	9.4	6.1	6.7	9.5	14.0	10.3
	CO	*PPM*	3	5	7	5	5	10	12	13	15	5	12	14
	H_2S	*PPM*	47	16	20	26	62	87	85	87	95	37	16	84
	Vel Max	*m/s*	0.79	-	-	-	4.46	2.04	2.68	3.02	2.46	4.53	2.69	2.47
	Vel Min	*m/s*	1.09	-	-	-	5.80	2.31	3.20	3.32	3.12	5.12	2.83	3.28
	Flow	*CFM*	8.88247125	-	-	-	48.47561438	20.55252656	27.78134625	29.95471688	26.36393063	45.59353594	26.0804475	27.16713281
	Temp	*°C*	3.4	-	-	-	21.6	30.4	26.3	25.9	28.9	20.1	9.7	5.1
	Comments		2T	2T	2T	2T	2T	2T->1T	1T	1T	1T	1T	1T	1T
4-32	*Well*	*"H_2O*	81.48	-4.47	-3.40	-3.67	-3.66	-5.08	-6.14	-7.86	-8.74	-9.39	-11.32	-7.35
	Lateral	*"H_2O*	Frozen	-5.68	-5.04	-4.92	-4.25	-5.44	-6.94	-7.84	-9.57	-9.55	-12.02	-12.48
	CH_4	*%*	56.6	56.7	57.9	56.4	56.1	55.5	52.9	53.6	54.2	56.6	48.6	54.0
	CO_2	*%*	43.0	42.6	31.7	36.8	41.2	42.3	40.7	40.9	39.4	42.4	36.8	35.9
	O_2	*%*	0.4	0.7	3.2	2.6	0.7	0.0	0.2	0.5	0.6	0.1	3.9	1.2
	BAL (N_2)	*%*	0.0	0.0	7.2	4.2	2.1	2.1	6.2	5.0	5.8	0.9	10.7	8.9
	CO	*PPM*	2	5	7	5	5	8	6	24	14	5	11	12
	H_2S	*PPM*	54	22	21	25	85	159	135	113	124	53	43	39
	Vel Max	*m/s*	-	-	-	-	2.46	1.64	3.68	2.31	1.69	2.47	2.14	2.39
	Vel Min	*m/s*	-	-	-	-	2.69	1.67	4.12	2.51	2.47	2.73	2.65	3.01
	Flow	*CFM*	-	-	-	-	24.33230156	15.63881906	36.85280625	22.77314438	19.65483	24.5685375	22.63140281	25.51348125
	Temp	*°C*	-	-	-	-	26.5	30.2	26.3	25.4	27.4	13.1	12.6	5.2
	Comments		Frozen	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
4-33	*Well*	*"H_2O*	-6.07	-4.55	-4.88	-5.01	-5.85	-4.77	-6.32	-6.76	-7.45	-6.89	-7.44	-9.47
	Lateral	*"H_2O*	-7.81	-5.28	-5.69	-5.57	-5.95	-5.13	-6.97	-6.08	-9.82	-7.02	-9.67	-11.53
	CH_4	*%*	58.3	59.0	56.2	55.2	55.9	53.5	55.4	56.5	55.5	56.5	54.7	52.4
	CO_2	*%*	41.4	40.3	28.6	39.9	38.5	37.2	36.5	39.1	38.6	38.9	37.2	36.1
	O_2	*%*	0.2	0.7	4.7	1.3	0.9	1.4	0.6	0.4	1.3	0.8	1.8	1.2
	BAL (N_2)	*%*	0.0	0.0	10.5	3.6	4.6	7.8	7.5	4.0	4.6	3.8	6.4	10.3
	CO	*PPM*	6	5	5	5	5	11	12	15	16	6	11	11
	H_2S	*PPM*	408	245	255	262	269	>>>>	>>>>	>>>>	>>>>	261	461	>>>>
	Vel Max	*m/s*	-	0.00	-	-	1.18	1.01	1.68	1.50	0.78	1.63	5.20	1.59
	Vel Min	*m/s*	-	0.00	-	-	1.80	1.46	2.65	2.50	1.24	1.84	5.43	1.88
	Flow	*CFM*	-	0	-	-	14.07966188	11.67005531	20.45803219	18.898875	9.543931875	16.39477406	50.22376031	16.39477406
	Temp	*°C*	-	10.6	-	-	16.9	27.1	25.2	23.4	25.8	19.0	10.1	3.4
	Comments		1T-> 2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
4-34	*Well*	*"H_2O*	-5.54	-2.73	-3.39	-1.68	-1.52	-3.56	-1.25	0.13	0.55	1.53	-0.64	-0.05
	Lateral	*"H_2O*	-7.73	-5.46	-4.64	-4.51	-4.37	-5.52	-6.91	-7.43	-8.21	-7.82	-8.18	-11.03
	CH_4	*%*	43.4	45.4	52.2	51.8	44.2	37.0	37.2	38.4	35.4	59.1	7.0	13.7
	CO_2	*%*	30.9	32.7	30.9	35.6	31.2	26.8	27.1	25.8	28.1	40.4	5.2	31.4
	O_2	*%*	5.0	6.6	9.8	7.3	4.2	6.0	4.9	5.8	3.5	0.4	17.7	2.9
	BAL (N_2)	*%*	20.7	15.3	7.1	5.3	20.4	30.2	30.8	30.0	33.0	0.1	70.1	52.0
	CO	*PPM*	3	3	8	6	5	5	5	6	5	5	3	5
	H_2S	*PPM*	31	82	81	102	269	404	384	357	366	176	7	240
	Vel Max	*m/s*	-	-	-	-	1.49	-	-	-	-	0.00	-	-
	Vel Min	*m/s*	-	-	-	-	1.67	-	-	-	-	0.00	-	-
	Flow	*CFM*	-	-	-	-	14.93011125	-	-	-	-	0	-	-
	Temp	*°C*	-	-	-	-	27.3	-	-	-	-	14.2	-	-
	Comments		1->1/2T	1/2T	1/2T	1/2T	1/2T	1/2T->closed	closed	closed	closed	cracked	closed	closed

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
4-35	*Well*	"H_2O	-1.77	-1.10	-1.74	-1.54	-0.56	-1.12	-1.63	-1.11	7.20	-0.61	-1.36	-0.03
well bore seal	*Lateral*	"H_2O	-7.75	-4.89	-4.84	-4.98	-4.37	-5.64	-7.54	-7.89	-8.12	-9.98	-10.02	-10.69
	CH_4	%	47.0	50.5	50.4	50.0	50.8	44.8	45.9	44.8	43.8	49.3	29.3	33.2
	CO_2	%	33.7	36.2	27.8	40.6	37.0	32.6	31.6	33.5	37.4	35.6	21.4	35.1
	O_2	%	4.3	3.0	11.4	2.5	1.7	3.4	3.4	4.1	2.5	2.6	8.2	3.6
	BAL (N_2)	%	15.0	10.2	10.7	6.9	10.5	19.2	19.1	17.8	16.3	12.5	41.1	28.1
	CO	*PPM*	6	9	10	8	8	12	11	10	13	9	10	10
	H_2S	*PPM*	21	157	167	155	108	201	164	183	167	124	71	63
	Vel Max	*m/s*	-	0.00	-	-	0.90	0.81	0.97	0.45	0.88	0.92	-	-
	Vel Min	*m/s*	-	0.00	-	-	1.13	0.84	1.47	0.74	0.92	1.02	-	-
	Flow	*CFM*	-	0	-	-	9.591179063	7.795785938	11.52831375	5.622415313	8.50449375	9.165954375	-	-
	Temp	^oC	-	6.8	-	-	26.3	35.2	26.0	25.1	23.1	12.1	-	-
	Comments		1/2T	1/2T	1/2T	1/2T	1/2T	1/2T->cracked	cracked	cracked	cracked	cracked	closed	closed
4-36	*Well*	"H_2O	TOO TALL	TOO TALL	TOO TALL	TOO TALL	TOO TALL	TOO TALL	TOO TALL	TOO TALL	TOO TALL	TOO TALL	TOO TALL	TOO TALL
	Lateral	"H_2O	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV
	CH_4	%	-	-	-	-	-	-	-	-	-	-	-	-
	CO_2	%	-	-	-	-	-	-	-	-	-	-	-	-
	O_2	%	-	-	-	-	-	-	-	-	-	-	-	-
	BAL (N_2)	%	-	-	-	-	-	-	-	-	-	-	-	-
	CO	*PPM*	-	-	-	-	-	-	-	-	-	-	-	-
	H_2S	*PPM*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Flow	*CFM*	-	-	-	-	-	-	-	-	-	-	-	-
	Temp	^oC	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV
4-37	*Well*	"H_2O	-1.45	0.29	-0.11	-0.22	-0.11	0.01	0.02	-0.08	-0.05	0.00	-0.02	-0.05
	Lateral	"H_2O	-5.62	-6.58	-5.36	-4.97	-4.02	-8.72	-6.97	-6.47	-9.41	-7.26	-9.29	-10.34
	CH_4	%	29.6	57.7	46.3	47.5	32.2	57.6	18.4	15.6	31.4	33.4	41.4	36.1
	CO_2	%	29.7	42.0	24.4	39.7	23.3	40.5	15.3	12.9	24.6	25.6	31.0	25.7
	O_2	%	6.5	0.4	10.4	7.6	8.2	0.0	14.7	13.5	6.4	7.8	5.1	6.3
	BAL (N_2)	%	34.2	0.0	18.9	5.2	36.3	2.0	51.6	58.0	37.6	33.2	22.5	31.9
	CO	*PPM*	10	7	5	4	5	11	10	7	8	3	13	5
	H_2S	*PPM*	100	140	141	120	28	320	36	32	43	35	62	27
	Vel Max	*m/s*	-	-	-	-	-	0.00	-	-	-	-	-	-
	Vel Min	*m/s*	-	-	-	-	-	0.00	-	-	-	-	-	-
	Flow	*CFM*	-	-	-	-	-	0	-	-	-	-	-	-
	Temp	^oC	-	-	-	-	-	29.4	-	-	-	-	-	-
	Comments		closed	losed -> cracked	cracked	cracked	racked->closed	closed->cracked	closed	closed	closed	closed	closed	closed
5-38	*Well*	"H_2O	0.18	-4.93	0.47	0.98	-2.71	-5.32	-1.54	-0.06	-0.14	-9.01	-0.03	-0.04
	Lateral	"H_2O	-4.89	-5.36	-4.93	-4.21	-3.21	-7.08	-7.25	-7.97	-8.14	-10.21	-11.83	-11.63
	CH_4	%	54.8	1.6	2.4	20.6	56.3	4.0	36.4	42.4	41.7	19.7	50.1	45.2
	CO_2	%	39.0	1.2	9.4	5.6	42.5	3.0	31.0	32.3	33.9	16.8	37.7	31.0
	O_2	%	2.7	21.6	22.8	21.2	0.0	17.1	3.8	4.5	2.9	8.9	2.9	2.5
	BAL (N_2)	%	3.5	75.6	65.4	52.6	1.2	75.9	28.8	20.8	21.5	54.6	9.4	21.3
	CO	*PPM*	0	2	6	5	5	2	15	23	20	3	10	11
	H_2S	*PPM*	21	1	3	24	86	13	9	6	12	29	48	50
	Vel Max	*m/s*	0.00	-	-	-	0.64	-	0.00	0.00	0.00	-	-	-
	Vel Min	*m/s*	0.00	-	-	-	0.91	-	0.00	0.00	0.00	-	-	-
	Flow	*CFM*	0	-	-	-	7.323314063	-	0	0	0	-	-	-
	Temp	^oC	-5.6	-	-	-	31.9	-	21.4	26.9	22.3	-	-	-
	Comments		closed->cracked	cracked->closed	closed	closed	closed->cracked	cracked->closed	cracked	cracked	cracked	closed	racked -> closed	closed
5-39	*Well*	"H_2O	66.60	-4.71	-4.12	-4.71	-2.53	-5.51	-6.58	-7.76	-7.18	-9.90	-10.62	-8.09
well bore seal	*Lateral*	"H_2O	-5.14	-5.26	-5.32	-4.96	-2.57	-5.68	-7.94	-8.05	-8.13	-10.10	-11.98	-11.47
	CH_4	%	58.1	57.6	55.6	57.2	56.8	56.8	55.6	56.4	54.3	56.3	56.8	54.3
	CO_2	%	41.8	42.0	33.4	39.5	41.0	40.9	41.3	40.4	39.5	39.8	40.4	39.4
	O_2	%	0.0	0.3	4.9	1.2	0.1	0.5	0.4	0.6	0.5	3.0	2.6	1.3
	BAL (N_2)	%	0.0	0.0	6.1	2.1	2.1	1.8	2.7	2.7	5.7	0.9	0.1	5.0
	CO	*PPM*	13	15	20	21	22	23	28	25	21	16	23	20
	H_2S	*PPM*	35	12	15	26	41	60	55	49	52	19	11	23
	Vel Max	*m/s*	0.96	-	-	-	0.85	0.00	0.58	0.89	1.12	0.69	0.00	1.12
	Vel Min	*m/s*	1.05	-	-	-	1.19	0.00	1.64	0.91	1.44	0.87	0.00	1.69
	Flow	*CFM*	9.496684688	-	-	-	9.63842625	0	10.48887563	8.50449375	12.09528	7.37056125	0	13.27645969
	Temp	^oC	-7.6	-	-	-	25.5	31.6	26.4	25.0	22.7	6.4	10.9	5.1
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
5-40	*Well*	"H_2O	0.91	-5.56	-4.01	-3.68	-2.40	-5.40	-1.63	-1.14	-0.22	-8.09	-0.11	-0.15
	Lateral	"H_2O	-7.74	-5.95	-4.84	-4.62	-2.54	-6.09	-6.85	-7.84	-6.12	-9.76	-8.16	-11.04
	CH_4	%	58.8	47.0	49.2	50.1	40.7	41.3	44.2	45.2	40.3	40.6	48.1	44.9
	CO_2	%	41.1	34.5	28.4	31.9	31.2	33.2	33.9	34.6	35.8	33.0	33.5	31.6
	O_2	%	0.1	4.0	6.4	4.0	4.3	3.0	1.2	0.5	1.0	2.7	14.8	1.1
	BAL (N_2)	%	0.0	14.6	16.0	14.0	23.9	22.4	20.7	19.7	22.9	23.7	3.6	22.4
	CO	PPM	3	5	6	4	5	6	9	8	7	3	7	7
	H_2S	PPM	61	43	38	105	149	232	251	247	231	41	174	157
	Vel Max	m/s	-	-	-	-	0.71	0.64	0.00	0.00	0.12	-	-	-
	Vel Min	m/s	-	-	-	-	0.90	0.66	0.00	0.00	0.18	-	-	-
	Flow	CFM	-	-	-	-	7.606797188	6.142134375	0	0	1.417415625	-	-	-
	Temp	°C	-	-	-	-	28.8	36.4	24.2	23.4	20.3	-	-	-
	Comments		Frozen	closed->1T	1T	1T	1->1/2T	1/2->cracked	cracked	cracked	cracked	closed	closed	closed
5-41	*Well*	"H_2O	-6.38	-5.04	-4.57	-4.14	-2.17	-5.03	-6.20	-6.78	-7.14	-7.58	0.12	0.22
well bore seal	*Lateral*	"H_2O	-6.86	-5.94	-5.12	-4.25	-2.67	-5.41	-7.62	-8.13	-8.44	-8.34	-7.39	-10.24
	CH_4	%	60.4	59.7	56.2	55.9	58.3	57.3	53.7	51.3	56.2	23.3	40.5	41.2
	CO_2	%	39.4	39.7	34.4	41.3	38.2	38.0	35.8	37.2	31.5	16.1	28.3	31.5
	O_2	%	0.2	0.5	0.0	1.0	0.2	0.3	0.8	0.7	0.3	12.2	5.4	1.0
	BAL (N_2)	%	0.0	0.0	9.4	1.8	3.3	4.4	9.7	10.8	12.0	48.4	25.8	26.3
	CO	PPM	3	6	7	9	7	7	5	8	6	4	6	4
	H_2S	PPM	41	60	50	66	179	325	354	311	324	46	69	55
	Vel Max	m/s	-	-	-	-	1.65	1.78	4.98	3.16	3.01	-	-	-
	Vel Min	m/s	-	-	-	-	3.49	2.10	5.21	3.82	3.22	-	-	-
	Flow	CFM	-	-	-	-	24.28505438	18.33190875	48.14488406	32.97853688	29.43499781	-	-	-
	Temp	°C	-	-	-	-	29.3	33.0	28.9	24.4	22.4	-	-	-
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	closed	closed	closed
5-42	*Well*	"H_2O	-1.00	-0.55	-0.81	-1.64	0.14	-2.91	-2.89	-3.98	-2.12	-0.10	-3.84	-3.69
	Lateral	"H_2O	-7.76	-6.85	-5.35	-4.96	-4.40	-5.75	-6.57	-7.60	-8.30	-10.28	-9.47	-10.24
	CH_4	%	37.9	43.5	47.4	48.5	57.7	36.6	48.7	50.6	49.5	55.7	52.2	51.4
	CO_2	%	27.6	31.7	26.9	39.7	41.0	27.2	28.5	31.4	33.2	39.6	36.9	31.0
	O_2	%	7.4	5.6	7.5	1.5	0.0	6.0	4.6	3.4	5.4	0.6	3.5	3.9
	BAL (N_2)	%	27.2	19.2	18.2	10.3	1.2	30.2	18.2	14.6	11.9	4.1	7.4	13.7
	CO	PPM	5	11	7	10	16	16	14	21	20	12	16	11
	H_2S	PPM	12	93	87	71	189	121	161	185	174	188	221	150
	Vel Max	m/s	-	-	-	-	1.93	2.63	1.54	1.18	1.05	2.52	0.44	1.25
	Vel Min	m/s	-	-	-	-	2.07	2.79	2.35	1.97	1.22	2.74	0.81	1.67
	Flow	CFM	-	-	-	-	18.898875	25.60797563	18.37915594	14.88286406	10.72511156	24.85202063	5.905898438	13.79617875
	Temp	°C	-	-	-	-	28.5	25.1	23.4	27.6	23.4	27.0	13.3	6.3
	Comments		40->30%	30% -> 25%	25%	25%	25->30%	30->20%	20%	20%	20%	25%	20%	20%
5-43	*Well*	"H_2O	-4.65	-4.88	-5.24	-4.32	-3.59	-5.31	-5.77	-7.68	-8.14	-9.51	-7.45	-0.34
	Lateral	"H_2O	-5.26	-5.23	-5.72	-4.51	-4.00	-5.64	-6.91	-7.79	-8.24	10.06	-9.01	-10.27
	CH_4	%	59.9	58.3	60.2	59.6	58.0	58.2	57.8	56.5	58.2	51.6	21.0	33.6
	CO_2	%	40.0	40.0	39.8	38.2	38.4	39.4	38.4	38.1	25.6	35.2	14.8	34.2
	O_2	%	0.1	1.7	0.0	2.2	0.3	0.1	0.5	1.6	1.0	2.2	12.9	1.9
	BAL (N_2)	%	0.0	0.0	0.0	0.0	3.3	2.2	3.3	3.9	15.2	11.0	51.3	30.3
	CO	PPM	5	4	7	4	9	7	7	10	8	6	5	4
	H_2S	PPM	66	14	10	23	65	101	92	84	102	33	19	111
	Vel Max	m/s	3.30	-	-	-	2.40	2.21	3.14	2.54	3.05	2.78	-	-
	Vel Min	m/s	3.40	-	-	-	3.20	2.44	3.69	3.51	3.14	3.41	-	-
	Flow	CFM	31.65561563	-	-	-	26.458425	21.96994219	32.26982906	28.58454844	29.24600906	29.24600906	-	-
	Temp	°C	-2.6	-	-	-	23.0	26.3	28.6	25.1	24.8	11.4	-	-
	Comments		3T	3T	3T	3T	3T	3T	3T	3T	3T	3T	closed	closed
5-44	*Well*	"H_2O	0.47	-0.06	-2.79	-1.68	-0.08	-0.14	-2.35	-1.45	-2.44	-1.02	-0.75	-0.21
	Lateral	"H_2O	-7.22	-5.43	-4.92	-4.25	-5.88	-6.13	-7.61	-7.15	-6.84	-6.78	-8.48	-10.21
	CH_4	%	57.8	58.4	51.9	50.5	47.1	52.6	47.3	48.3	45.1	41.7	37.7	35.8
	CO_2	%	41.9	41.2	32.6	42.0	36.4	39.3	38.1	39.3	35.4	34.6	30.7	32.5
	O_2	%	0.3	0.3	3.9	1.2	0.5	0.3	0.2	0.0	0.9	4.3	2.5	1.8
	BAL (N_2)	%	0.0	0.0	11.6	6.3	16.0	7.7	14.4	12.4	18.6	19.4	29.1	29.9
	CO	PPM	4	5	8	7	6	11	10	13	14	8	10	11
	H_2S	PPM	207	>>>>	>>>>	>>>>>	186	>>>>	>>>>	>>>>	>>>>	191	226	>>>>
	Vel Max	m/s	-	0.00	-	-	2.00	1.00	1.02	1.64	1.44	0.00	-	-
	Vel Min	m/s	-	0.00	-	-	2.35	1.06	1.49	1.73	1.62	0.00	-	-
	Flow	CFM	-	0	-	-	20.55252656	9.732920625	11.85904406	15.92230219	14.45763938	0	-	-
	Temp	°C	-	6.1	-	-	20.2	35.7	24.7	29.4	28.5	10.4	-	-
	Comments		Frozen	cracked -> 1/2T	1/2T	1/2T	1/2->cracked	cracked->1/2T	1/2T	1/2T	1/2T	cracked	closed	closed

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
5-45	*Well*	*"H_2O*	-0.02	0.04	0.71	0.62	0.02	0.04	-0.97	-0.45	-0.22	0.03	-2.60	-1.69
	Lateral	*"H_2O*	-7.02	-4.51	-5.62	-5.24	-6.45	-	-6.49	-7.97	-7.64	-6.83	-9.88	-10.58
	CH_4	*%*	46.9	34.0	35.9	45.1	54.6	58.2	33.8	35.7	31.5	57.1	50.4	51.4
	CO_2	*%*	35.2	28.0	16.2	32.6	39.6	38.0	31.6	32.1	30.2	41.5	36.1	31.4
	O_2	*%*	3.9	5.6	19.6	4.5	0.1	0.0	2.4	3.3	2.8	1.2	2.5	1.7
	BAL (N_2)	*%*	14.0	32.4	28.3	17.8	5.8	3.8	32.2	28.9	35.5	0.2	11.0	15.5
	CO	*PPM*	3	3	5	1	5	9	11	14	9	7	9	10
	H_2S	*PPM*	24	25	20	69	107	260	97	72	81	145	143	77
	Vel Max	*m/s*	-	-	-	-	1.28	-	-	-	-	0.00	1.15	1.28
	Vel Min	*m/s*	-	-	-	-	1.38	-	-	-	-	0.00	1.73	1.99
	Flow	*CFM*	-	-	-	-	12.56775188	-	-	-	-	0	13.60719	15.44983031
	Temp	*°C*	-	-	-	-	17.8	-	-	-	-	17.7	11.2	5.3
	Comments		cracked	cracked->closed	closed	closed	closed->cracked	cracked->1/2T	closed	closed	closed	cracked	1/2T	1/2T
5-46	*Well*	*"H_2O*	0.15	-2.69	0.03	0.24	-0.23	-1.95	-0.14	0.18	-0.04	Under	0.14	-1.24
	Lateral	*"H_2O*	-7.92	-6.01	-5.24	-4.87	-4.76	-8.62	-6.84	-7.46	-7.95	Construction	-9.36	-11.47
	CH_4	*%*	58.8	29.8	32.6	43.3	58.5	33.0	35.3	37.4	32.8	-	59.7	48.7
	CO_2	*%*	41.2	24.7	19.4	24.5	40.1	26.8	30.9	31.6	35.9	-	40.3	33.9
	O_2	*%*	0.0	8.6	24.4	16.1	0.0	5.5	5.1	7.4	4.7	-	0.0	2.1
	BAL (N_2)	*%*	0.0	36.8	23.6	16.1	1.4	34.7	28.7	23.6	26.6	-	0.0	15.3
	CO	*PPM*	3	8	6	9	6	20	22	25	18	-	12	15
	H_2S	*PPM*	21	18	15	14	138	32	45	31	40	-	191	44
	Vel Max	*m/s*	-	-	-	-	0.00	-	-	-	-	-	0.00	0.00
	Vel Min	*m/s*	-	-	-	-	0.00	-	-	-	-	-	0.00	0.00
	Flow	*CFM*	-	-	-	-	0	-	-	-	-	-	0	0
	Temp	*°C*	-	-	-	-	25.8	-	-	-	-	-	10.3	5.7
	Comments		Frozen	1T-> closed	closed	closed	closed->cracked	cracked->closed	closed	closed	closed	closed	cracked	cracked
6-47	*Well*	*"H_2O*	4.16	-5.08	-4.90	-4.63	-3.24	-4.58	-5.14	-6.87	-7.81	-7.33	-7.51	-9.57
	Lateral	*"H_2O*	-5.04	-5.36	-5.15	-4.98	-3.58	-4.68	-5.39	-6.02	-7.99	-7.91	-9.14	-12.60
	CH_4	*%*	60.3	56.2	57.6	55.0	56.8	56.7	54.3	51.1	54.2	50.1	56.7	54.0
	CO_2	*%*	39.1	35.7	30.4	38.6	36.3	36.6	35.7	33.7	30.8	32.8	38.2	31.7
	O_2	*%*	0.6	2.3	0.6	1.5	0.9	0.8	1.4	2.2	1.8	3.5	1.5	1.5
	BAL (N_2)	*%*	0.0	5.8	11.4	4.9	6.1	6.0	8.6	13.0	13.2	13.6	3.6	12.8
	CO	*PPM*	3	4	7	8	8	6	9	9	7	4	6	5
	H_2S	*PPM*	20	6	7	10	18	31	25	24	32	13	26	22
	Vel Max	*m/s*	-	-	-	-	0.00	0.00	0.00	0.00	0.00	Surging	4.13	2.47
	Vel Min	*m/s*	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	4.99	3.11
	Flow	*CFM*	-	-	-	-	0	0	0	0	0	-	43.089435	26.36393063
	Temp	*°C*	-	-	-	-	31.0	34.5	21.3	26.5	23.8	-	10.1	5.4
	Comments		Frozen	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	2T
6-48	*Well*	*"H_2O*	1.30	-4.60	-4.11	-4.27	-4.05	-5.11	-5.64	-6.37	-6.02	-3.55	-2.63	-3.54
	Lateral	*"H_2O*	-5.18	-5.12	-4.94	-4.69	-3.86	-6.41	-7.98	-6.26	-7.40	-6.98	-10.15	-11.47
	CH_4	*%*	63.5	58.5	52.9	50.1	48.4	49.4	42.9	36.2	43.8	48.5	49.1	47.5
	CO_2	*%*	36.5	33.3	27.4	36.7	27.9	24.1	26.7	28.6	30.8	33.2	30.4	32.6
	O_2	*%*	0.0	1.7	2.4	2.6	3.7	4.1	2.5	1.4	2.1	0.5	1.9	3.0
	BAL (N_2)	*%*	0.0	6.6	17.3	10.6	19.9	22.4	27.9	33.7	23.3	17.8	18.6	16.9
	CO	*PPM*	4	3	7	10	7	8	10	11	9	5	7	10
	H_2S	*PPM*	18	2	4	5	7	7	11	24	11	11	13	11
	Vel Max	*m/s*	0.48	-	-	-	0.00	0.00	0.00	0.56	0.44	0.00	0.00	0.00
	Vel Min	*m/s*	0.77	-	-	-	0.00	0.00	0.98	0.64	0.66	0.00	0.00	0.00
	Flow	*CFM*	5.905898438	-	-	-	0	0	4.630224375	5.6696625	5.197190625	0	0	0
	Temp	*°C*	-7.4	-	-	-	29.3	32.4	21.4	25.4	20.1	10.3	12.4	6.9
	Comments		Frozen	2T	2T	2T	2T	2T	1/2T	1/2T	1/2T	1/2T	1/2T	1/2T
6-49	*Well*	*"H_2O*	-2.40	-2.23	-3.84	-4.31	-1.48	-1.09	-1.30	-1.28	-2.02	-0.21	-4.77	-3.56
	Lateral	*"H_2O*	-5.34	-5.02	-4.75	-4.62	-3.05	-3.72	-4.69	-5.64	-7.51	-4.78	-7.42	-10.33
	CH_4	*%*	54.0	55.4	55.2	54.7	39.7	50.8	47.3	45.8	47.5	57.0	48.7	49.1
	CO_2	*%*	38.0	37.3	29.4	31.5	36.1	37.5	36.7	37.0	39.0	40.1	36.2	35.3
	O_2	*%*	1.0	1.8	1.0	1.2	1.1	0.3	0.9	0.4	0.8	0.1	1.1	1.2
	BAL (N_2)	*%*	7.1	5.5	14.4	12.6	13.1	11.5	15.1	16.9	12.7	2.8	14.0	14.4
	CO	*PPM*	6	6	6	7	7	14	10	15	12	3	11	10
	H_2S	*PPM*	33	212	202	148	112	313	215	183	164	64	161	157
	Vel Max	*m/s*	6.56	2.34	-	-	4.59	4.63	2.97	5.59	4.54	5.10	3.34	2.47
	Vel Min	*m/s*	7.34	2.60	-	-	5.71	5.24	4.10	6.01	4.99	5.67	4.17	2.99
	Flow	*CFM*	65.67359063	23.34011063	-	-	48.66460313	46.63297406	33.40376156	54.8067375	45.02656969	50.88522094	35.48263781	25.79696438
	Temp	*°C*	21.7	13.7	-	-	22.6	35.0	24.3	28.3	26.8	19.2	14.6	10.7
	Comments		2T	2T	2T	2T	2->1T	1T	1/2T	1/2T	1/2T	1	1T	1T

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
6-50	*Well*	"H_2O	0.18	FROZEN	FROZEN	0.14	0.22	0.11	0.54	0.10	-0.20	0.14	-1.39	-0.11
	Lateral	"H_2O	-6.24	-4.76	-4.66	-4.75	-3.06	-4.69	-6.98	-6.23	-5.99	-4.35	-7.42	-9.63
	CH_4	%	57.2	19.8	17.6	22.9	60.0	23.0	41.0	59.6	56.1	57.3	14.5	22.5
	CO_2	%	42.7	16.1	16.2	17.2	40.0	15.7	16.2	39.0	34.0	42.7	12.1	30.6
	O_2	%	0.1	12.9	13.5	9.0	0.0	8.8	2.6	0.0	3.5	0.0	14.4	5.3
	BAL (N_2)	%	0.0	51.2	52.7	50.9	0.0	52.5	40.2	1.4	6.4	0.0	59.0	41.6
	CO	PPM	5	6	7	3	5	29	15	11	12	7	5	11
	H_2S	PPM	34	20	15	68	120	51	167	346	194	117	22	187
	Vel Max	m/s	-	-	-	-	0.00	0.00	-	0.00	0.00	0.45	-	-
	Vel Min	m/s	-	-	-	-	0.00	0.00	-	0.00	0.00	0.62	-	-
	Flow	CFM	-	-	-	-	0	0	-	0	0	5.055449063	-	-
	Temp	°C	-	-	-	-	12.8	0.0	-	28.7	24.5	6.2	-	-
	Comments		FROZEN	cracked->closed	closed	closed	closed->cracked	cracked->closed	closed	cracked	cracked	1/2T	closed	closed
6-51	*Well*	"H_2O	Frozen	-0.15	-1.91	-2.36	-1.09	-0.22	-0.48	-0.72	-2.44	-1.36	-1.11	-0.09
	Lateral	"H_2O	-6.19	-4.24	-4.10	-4.85	-3.05	-2.88	-6.94	-5.40	-7.41	-5.68	-10.59	-12.30
	CH_4	%	54.0	54.3	46.2	47.2	38.4	51.0	51.1	51.4	50.4	38.5	40.2	37.6
	CO_2	%	41.1	45.8	27.1	28.7	32.9	42.5	42.7	43.9	39.5	36.6	35.5	38.3
	O_2	%	1.9	0.0	0.0	1.2	3.3	0.2	0.4	0.3	1.5	1.2	1.3	2.0
	BAL (N_2)	%	2.9	0.0	26.7	22.9	25.4	6.3	5.8	4.3	8.6	23.7	23.0	22.1
	CO	PPM	6	9	6	5	7	12	10	15	13	10	10	11
	H_2S	PPM	46	48	46	49	48	124	25	31	40	53	43	41
	Vel Max	m/s	0.44	0.00	-	-	2.34	0.55	1.67	2.63	2.15	1.12	-	-
	Vel Min	m/s	0.61	0.00	-	-	2.80	0.74	2.47	3.04	2.19	1.27	-	-
	Flow	CFM	4.960954688	0	-	-	24.28505438	6.094887188	19.56033563	26.78915531	20.50527938	11.29207781	-	-
	Temp	°C	-0.6	9.3	-	-	18.5	32.1	35.1	33.5	29.4	12.9	-	-
	Comments		1/2T	1/2T->1T	1T	1T	1->1/2T	1/2T	1T	1T	1T	1/2T	closed	closed
6-52	*Well*	"H_2O	0.06	0.03	-0.11	TOO	Too	-0.01	-0.02	-0.07	-0.05	0.07	-0.04	-0.08
	Lateral	"H_2O	Surging	-3.65	-3.10	TALL	Tall	-4.06	-4.78	-4.19	-7.44	-6.28	-10.47	-10.88
	CH_4	%	38.3	16.9	18.2	-	-	29.6	16.4	13.9	14.8	56.8	36.4	30.2
	CO_2	%	37.5	21.0	12.2	-	-	27.6	24.6	23.3	28.9	42.7	29.3	25.1
	O_2	%	3.8	12.5	13.7	-	-	6.5	5.9	7.1	6.6	0.0	7.1	8.1
	BAL (N_2)	%	20.4	49.5	55.9	-	-	36.3	53.1	55.6	49.7	0.5	27.2	36.6
	CO	PPM	7	3	10	-	-	7	7	8	6	7	5	8
	H_2S	PPM	11	6	2	-	-	12	7	9	10	39	15	12
	Vel Max	m/s	Surging	-	-	-	-	-	-	-	-	-	-	-
	Vel Min	m/s	Surging	-	-	-	-	-	-	-	-	-	-	-
	Flow	CFM	-	-	-	-	-	-	-	-	-	-	-	-
	Temp	°C	Surging	-	-	-	-	-	-	-	-	-	-	-
	Comments		closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed	closed
6-53	*Well*	"H_2O	-0.79	-0.55	-1.32	-3.03	-0.52	-0.78	-2.78	-0.94	0.22	-1.51	-2.16	-1.82
	Lateral	"H_2O	-4.91	-3.32	-3.71	-3.62	-2.53	-2.72	-3.69	-4.65	-7.44	-5.21	-9.81	-11.21
	CH_4	%	59.4	55.7	51.2	55.6	59.1	56.0	54.7	53.3	55.7	38.8	46.8	44.9
	CO_2	%	37.4	36.8	26.9	30.8	37.4	36.8	36.1	36.5	33.1	32.1	30.3	29.8
	O_2	%	0.1	0.0	0.2	0.7	0.0	0.0	0.0	0.0	3.5	0.0	3.5	2.9
	BAL (N_2)	%	3.0	7.5	21.7	12.9	3.6	7.2	9.2	10.2	7.7	29.1	19.4	22.4
	CO	PPM	7	7	7	10	8	9	7	10	12	7	9	14
	H_2S	PPM	251	380	371	>>>>	413	>>>>	>>>>	494	>>>>	131	57	>>>>
	Vel Max	m/s	8.29	2.10	-	-	4.43	3.82	5.48	7.73	8.44	0.91	0.00	1.52
	Vel Min	m/s	8.80	2.30	-	-	5.13	4.79	6.31	8.64	8.64	1.03	0.00	1.36
	Flow	CFM	80.74544344	20.7887625	-	-	45.16831125	40.67982844	55.70443406	77.34364594	80.69819625	9.165954375	0	13.60719
	Temp	°C	29.9	32.8	-	-	31.9	37.5	35.9	33.8	32.4	26.6	9.3	6.1
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	1/2T	1/2T	1/2T
6-54	*Well*	"H_2O	-0.52	-0.27	-0.60	-1.52	-0.94	-1.03	-0.07	-0.11	0.41	-2.10	-0.59	-1.22
	Lateral	"H_2O	Surging	Surging	Surging	-2.68	-2.98	-2.67	Surging	Surging	-5.78	-5.70	-10.68	-10.27
	CH_4	%	55.9	59.5	54.5	52.6	46.1	45.3	55.3	57.8	55.1	35.5	45.9	43.1
	CO_2	%	37.1	39.2	31.4	30.9	32.1	31.3	31.5	39.2	36.4	25.3	39.4	33.6
	O_2	%	1.5	0.7	0.8	1.4	4.5	3.1	1.3	0.0	1.4	6.2	1.8	2.4
	BAL (N_2)	%	5.4	0.5	13.3	15.1	17.3	20.3	11.9	2.9	7.1	33.0	12.9	20.9
	CO	PPM	4	5	4	9	5	8	11	12	10	6	11	9
	H_2S	PPM	12	22	16	24	46	85	100	119	101	19	120	115
	Vel Max	m/s	Surging	Surging	-	Surging	Surging	2.01	Surging	Surging	0.00	0.00	0.00	0.00
	Vel Min	m/s	Surging	Surging	-	Surging	Surging	2.09	Surging	Surging	0.00	0.00	0.00	0.00
	Flow	CFM	-	-	-	-	-	19.37134688	-	-	0	0	0	0
	Temp	°C	Surging	Surging	-	Surging	Surging	36.2	Surging	Surging	21.5	12.9	8.2	5.4
	Comments		2T	2T	2T	2T	2T	2->1T	2T	2T	2T	1/2T	1/2T	1/2T

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
6-55	*Well*	"H_2O	-0.41	-0.15	-0.79	-3.41	-0.11	-0.13	-1.17	-0.48	-1.41	-0.56	-7.91	-4.12
	Lateral	"H_2O	-4.18	-3.23	-3.94	-4.01	Surging	-3.83	-4.68	-4.19	-6.85	-4.16	-8.48	-12.40
	CH_4	%	59.5	60.0	53.9	58.3	60.1	57.5	57.9	56.4	55.9	56.5	40.4	43.1
	CO_2	%	40.2	40.0	30.3	41.4	39.9	39.2	38.6	39.2	35.7	39.0	33.4	33.2
	O_2	%	0.2	0.0	0.1	0.3	0.0	0.1	0.1	0.0	3.1	0.0	0.0	4.8
	BAL (N_2)	%	0.0	0.0	15.7	0.0	0.0	3.2	3.4	4.4	5.3	4.5	26.2	18.9
	CO	PPM	8	9	5	2	9	11	10	12	8	11	11	7
	H_2S	PPM	480	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	97	>>>>
	Vel Max	m/s	6.56	2.06	-	-	Surging	Surging	5.14	6.92	7.54	8.84	3.38	6.84
	Vel Min	m/s	7.61	1.64	-	-	Surging	Surging	6.69	9.40	7.69	9.37	4.71	6.55
	Flow	CFM	66.94926469	17.48145938	-	-	-	-	55.89342281	77.10741	71.95746656	86.03712844	38.22297469	63.26398406
	Temp	°C	25.5	25.7	-	-	-	-	31.2	29.2	25.4	27.9	8.3	2.8
	Comments		2T	2T	2T	2T	2T	2T	2T	2T	2T	2T	1T	1T
6-56	*Well*	"H_2O	0.04	-0.61	0.02	0.14	0.12	0.00	0.01	0.02	-1.14	0.04	0.05	0.08
	Lateral	"H_2O	-9.41	-2.36	-3.14	-4.51	-4.63	-4.23	-5.14	Surging	-7.82	-7.82	-8.65	-12.30
	CH_4	%	54.7	16.4	17.3	54.3	61.3	33.8	39.6	60.3	58.9	25.6	33.9	30.5
	CO_2	%	35.5	18.6	6.9	42.3	36.5	27.2	29.5	36.0	35.6	24.3	24.2	29.5
	O_2	%	0.0	7.3	8.4	1.0	0.0	1.1	1.0	0.0	1.1	6.2	1.9	5.4
	BAL (N_2)	%	9.8	57.3	67.4	2.4	2.2	37.8	29.9	3.7	4.4	43.9	40.0	34.6
	CO	PPM	6	26	21	17	8	42	24	15	12	8	15	10
	H_2S	PPM	188	8	11	236	329	30	>>>>	>>>>	>>>>	19	>>>>	>>>>
	Vel Max	m/s	-	-	-	-	0.00	0.00	-	Surging	1.20	-	-	-
	Vel Min	m/s	-	-	-	-	0.00	0.00	-	Surging	1.25	-	-	-
	Flow	CFM	-	-	-	-	0	0	-	-	11.57556094	-	-	-
	Temp	°C	-	-	-	-	27.6	-	-	Surging	25.6	-	-	-
	Comments		Frozen	2->closed	closed	closed	closed->cracked	cracked->closed	closed	cracked	cracked	closed	closed	closed
6-57	*Well*	"H_2O	-0.09	0.03	-0.49	1.69	0.04	0.03	0.04	0.09	-0.65	0.04	0.15	0.02
	Lateral	"H_2O	-10.11	-7.12	-4.17	-4.63	-5.29	-6.65	-6.47	-7.35	-7.54	-7.28	-8.42	-10.80
	CH_4	%	42.1	52.3	48.6	47.5	50.5	49.0	25.7	21.2	32.5	6.5	39.8	29.8
	CO_2	%	32.5	36.6	25.2	36.3	36.5	34.1	20.9	21.2	29.5	10.9	31.6	25.1
	O_2	%	0.7	1.2	1.4	1.2	0.0	0.1	5.7	4.9	5.9	8.5	4.9	9.8
	BAL (N_2)	%	24.7	9.9	24.8	15.0	13.0	16.8	47.7	52.6	32.1	74.1	23.7	35.3
	CO	PPM	6	6	8	9	7	12	15	11	13	14	11	18
	H_2S	PPM	16	9	6	21	20	25	33	40	42	7	35	40
	Vel Max	m/s	3.82	-	-	-	1.81	2.04	0.00	0.00	0.20	0.20	-	-
	Vel Min	m/s	4.04	-	-	-	2.04	2.94	0.00	0.00	0.30	0.00	-	-
	Flow	CFM	37.13628938	-	-	-	18.19016719	23.52909938	0	0	2.362359375	0.94494375	-	-
	Temp	°C	23.2	-	-	-	34.6	29.4	26.3	24.8	22.1	0.0	-	-
	Comments		2->1T	1T	1T	1T	1T	1T	cracked	cracked	cracked	closed	closed	closed
6-58	*Well*	"H_2O	0.01	0.05	0.01	-0.68	0.02	0.11	-0.02	0.02	-0.55	0.06	0.09	-0.02
	Lateral	"H_2O	-9.55	-7.42	-4.38	-4.57	-5.05	-6.95	-6.58	-7.68	-6.95	-7.28	-8.71	-11.22
	CH_4	%	44.7	41.2	46.9	46.2	46.0	51.9	48.1	23.8	31.2	30.3	39.4	30.6
	CO_2	%	31.8	31.3	26.4	28.6	32.7	33.4	35.6	22.3	25.6	27.6	28.0	25.1
	O_2	%	1.3	1.9	2.2	1.3	0.8	0.0	0.0	3.2	5.4	0.0	3.1	3.1
	BAL (N_2)	%	22.2	25.5	24.5	23.9	20.5	14.7	16.3	50.8	37.8	42.1	29.5	41.2
	CO	PPM	10	7	9	11	7	8	24	33	20	19	20	17
	H_2S	PPM	58	26	21	54	74	163	78	58	70	41	68	84
	Vel Max	m/s	2.43	-	-	-	1.29	3.41	1.65	0.00	1.22	-	-	-
	Vel Min	m/s	2.78	-	-	-	1.45	3.70	2.97	0.00	1.33	-	-	-
	Flow	CFM	24.61578469	-	-	-	12.94572938	33.59275031	21.82820063	0	12.04803281	-	-	-
	Temp	°C	11.5	-	-	-	29.9	36.9	37.5	26.1	25.2	-	-	-
	Comments		2->1/2T	1/2T->1T	1/2T	1/2T	1/2->cracked	cracked->1/2T	1/2T	cracked	cracked	closed	closed	closed
6-59	*Well*	"H_2O	0.07	0.11	0.20	0.25	0.09	0.11	0.00	0.00	-0.05	0.04	-0.85	-0.41
	Lateral	"H_2O	-9.56	-7.77	-4.94	-5.16	-6.00	-6.59	-6.72	-7.19	-8.47	-8.65	-8.48	-11.41
	CH_4	%	45.9	22.2	19.7	36.2	60.4	59.4	44.9	42.3	34.5	49.3	47.0	40.1
	CO_2	%	32.3	18.5	9.4	20.1	38.5	37.4	32.8	31.4	33.5	35.8	32.3	30.2
	O_2	%	1.1	10.0	11.9	13.6	0.0	0.0	0.4	1.5	3.5	1.3	1.9	2.1
	BAL (N_2)	%	20.7	49.3	59.0	30.1	1.1	3.2	21.9	24.8	28.5	13.6	18.8	27.6
	CO	PPM	14	22	18	16	7	17	11	14	12	13	10	11
	H_2S	PPM	21	10	11	25	54	84	55	25	20	23	15	25
	Vel Max	m/s	3.58	-	-	-	0.00	3.35	0.00	0.00	1.20	0.97	1.56	1.21
	Vel Min	m/s	3.76	-	-	-	0.00	3.80	0.00	0.00	1.32	1.11	1.98	1.14
	Flow	CFM	34.67943563	-	-	-	0	33.78173906	0	0	11.90629125	9.827415	16.72550438	11.10308906
	Temp	°C	30.8	-	-	-	27.6	35.1	30.4	29.3	25.1	34.2	10.7	5.9
	Comments		1T	1->closed	closed	closed	closed->1/2T	1/2->1T	cracked	cracked	cracked	cracked	cracked	cracked

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
7-60	*Well*	*"H_2O*	-4.90	-5.26	0.02	0.10	5.02	-3.85	-0.27	-0.64	-1.12	-1.91	-7.48	-7.99
	Lateral	*"H_2O*	-5.44	-5.30	-5.02	-4.26	-3.41	-4.44	-6.93	-7.14	-7.95	-1.47	-8.57	-10.22
	CH_4	*%*	47.3	0.5	1.4	36.8	60.5	57.4	45.1	46.7	40.6	64.7	58.3	56.3
	CO_2	*%*	24.2	0.3	12.6	10.1	31.8	29.5	31.6	32.4	30.5	32.9	31.3	32.4
	O_2	*%*	4.8	17.1	18.4	18.6	0.7	1.8	1.1	1.5	2.3	1.0	1.8	1.2
	BAL (N_2)	*%*	23.7	82.1	67.6	34.5	6.9	11.3	22.2	18.5	26.6	1.4	8.6	10.1
	CO	*PPM*	4	2	10	11	9	10	12	14	15	7	7	9
	H_2S	*PPM*	43	0	2	12	29	46	39	25	30	22	55	32
	Vel Max	*m/s*	0.50	-	-	-	0.00	0.00	0.58	1.10	1.60	0.00	5.14	4.25
	Vel Min	*m/s*	0.66	-	-	-	0.44	0.00	0.96	1.73	1.65	0.00	6.32	4.96
	Flow	*CFM*	5.48067375	-	-	-	2.07887625	0	7.276066875	13.37095406	15.35533594	0	54.14527688	43.51465969
	Temp	*°C*	-5.8	-	-	-	30.9	38.0	29.1	28.4	25.9	19.4	15.1	8.4
	Comments		Frozen	2T -> closed	closed	closed	closed->cracked	cracked->1/2T	1/2T	1/2T	1/2T	2	2	2
7-61	*Well*	*"H_2O*	Frozen	0.24	-1.11	Too	Too	Too	Too	-3.41	-4.11	34.00	-3.55	-3.52
	Lateral	*"H_2O*	-5.87	-4.66	-4.74	Tall	Tall	Tall	Tall	-6.44	-7.54	NLV	-9.31	-12.50
	CH_4	*%*	57.3	51.7	48.6	-	-	-	-	48.1	47.9	55.8	54.5	46.1
	CO_2	*%*	42.4	48.6	27.5	-	-	-	-	33.2	35.1	44.2	40.9	32.1
	O_2	*%*	0.3	0.0	0.0	-	-	-	-	2.3	3.1	0.0	3.6	4.5
	BAL (N_2)	*%*	0.0	0.0	23.9	-	-	-	-	16.4	14.2	14.2	1.0	17.3
	CO	*PPM*	7	34	35	-	-	-	-	8	19	21	24	15
	H_2S	*PPM*	262	>>>>	>>>>	-	-	-	-	14	18	>>>>	229	230
	Vel Max	*m/s*	2.03	0.00	-	-	-	-	-	2.33	3.51	0.00	1.33	1.87
	Vel Min	*m/s*	2.85	0.00	-	-	-	-	-	3.18	3.62	0.00	1.70	1.55
	Flow	*CFM*	23.0566275	0	-	-	-	-	-	26.03320031	33.68724469	0	14.31589781	16.15853813
	Temp	*°C*	-1.6	5.4	-	-	-	-	-	26.2	25.4	0.0	12.0	10.2
	Comments		2->1T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T	1T
7-62	*Well*	*"H_2O*	-0.01	0.79	0.44	0.15	0.17	ACTIVE	-2.98	-3.65	-2.84	0.11	-4.91	-1.99
	Lateral	*"H_2O*	BURIED	BURIED	BURIED	-1.45	-2.75	WORK	-5.36	-6.93	-7.95	-3.78	-8.93	-10.51
	CH_4	*%*	60.0	59.2	47.4	62.4	57.7	AREA	48.2	49.5	46.8	60.5	48.4	45.2
	CO_2	*%*	40.0	40.8	24.1	37.3	41.4		35.4	37.4	36.5	39.2	35.4	32.1
	O_2	*%*	0.0	0.0	0.0	0.0	0.0		2.9	3.6	2.5	0.0	3.2	3.6
	BAL (N_2)	*%*	0.0	0.0	28.5	0.3	0.9		13.5	9.5	14.2	0.3	13.0	19.1
	CO	*PPM*	5	0	7	5	9		25	31	28	9	10	18
	H_2S	*PPM*	220	320	351	>>>>	>>>>		80	71	80	>>>>	134	155
	Vel Max	*m/s*	BURIED	BURIED	BURIED	BURIED	-		0.69	1.67	1.22	3.98	1.17	1.62
	Vel Min	*m/s*	BURIED	BURIED	BURIED	BURIED	-		1.47	2.01	1.36	4.11	1.02	1.32
	Flow	*CFM*	-	-	-	-	-	0	10.2053925	17.386965	12.18977438	38.22297469	10.34713406	13.89067313
	Temp	*°C*	BURIED	BURIED	BURIED	BURIED	-		22.3	25.3	22.3	28.4	9.8	2.7
	Comments		3T -> 1T	1T	1T	1T	1T	1T	1T	1T	1T	2	1T	1T
7-64	*Well*	*"H_2O*	-0.17	0.05	-1.38	-0.61	0.07	-0.04	-0.04	-0.01	-1.22	0.10	-9.48	-7.65
	Lateral	*"H_2O*	-7.12	-4.71	-4.39	-4.11	-3.41	-3.04	-2.63	-1.89	-6.58	-5.23	-14.00	-12.10
	CH_4	*%*	37.9	46.9	49.2	50.0	44.1	52.3	52.6	53.7	50.3	50.8	26.4	43.6
	CO_2	*%*	30.7	34.0	26.8	28.1	33.0	38.7	38.5	40.0	39.5	41.2	30.7	31.2
	O_2	*%*	0.4	0.0	0.2	0.3	0.0	0.0	0.4	1.0	2.5	2.5	0.4	3.6
	BAL (N_2)	*%*	31.0	19.0	23.8	21.6	22.9	8.9	8.5	5.4	7.7	0.0	42.5	21.6
	CO	*PPM*	7	6	6	2	6	9	8	10	7	10	10	8
	H_2S	*PPM*	57	118	108	136	104	14	95	113	105	142	24	137
	Vel Max	*m/s*	1.89	1.21	-	-	4.90	1.59	1.24	0.83	0.88	1.63	7.84	1.88
	Vel Min	*m/s*	2.55	1.10	-	-	7.72	1.82	1.57	1.82	0.95	5.35	9.11	1.59
	Flow	*CFM*	20.97775125	10.91410031	-	-	59.62595063	16.11129094	13.27645969	12.52050469	8.646235313	32.97853688	80.08398281	16.39477406
	Temp	*°C*	13.3	18.4	-	-	29.4	32.7	32.6	30.4	28.1	19.7	8.3	4.9
	Comments		2->1T	1T	1T	1T	1T	1T	1T	1T	1T	2	1T	1T
7-65	*Well*	*"H_2O*	0.04	0.02	0.03	0.09	0.10	0.04	0.00	0.13	-0.01	-0.07	-3.15	0.05
	Lateral	*"H_2O*	-7.71	SURGING	SURGING	Surging	Surging	NLV	NLV	-0.69	-5.99	-6.17	-14.04	-10.11
	CH_4	*%*	38.8	56.1	50.3	48.2	43.4	55.1	54.9	50.1	46.8	34.4	22.1	35.4
	CO_2	*%*	31.5	36.4	28.9	33.5	33.5	36.5	35.2	36.6	37.5	31.1	24.2	29.8
	O_2	*%*	1.1	0.0	0.2	0.0	0.0	0.0	0.0	2.4	3.3	0.4	2.9	6.9
	BAL (N_2)	*%*	28.6	7.5	20.6	18.3	23.0	8.4	9.9	11.0	12.4	34.1	50.8	27.9
	CO	*PPM*	9	7	5	3	7	9	15	12	10	12	8	8
	H_2S	*PPM*	42	249	220	196	137	250	214	207	209	163	18	189
	Vel Max	*m/s*	SURGING	SURGING	-	SURGING	SURGING	-	-	7.89	8.88	Surging	-	-
	Vel Min	*m/s*	SURGING	SURGING	-	SURGING	SURGING	-	-	11.14	8.89	-	-	-
	Flow	*CFM*	-	-	-	-	-	-	-	89.91139781	83.95825219	-	-	-
	Temp	*°C*	SURGING	SURGING	-	SURGING	SURGING	-	-	40.1	36.5	-	-	-
	Comments		1->Closed	closed->1T	1T	1T	1->1/2T	NLV	NLV	1/2T	1/2T	1/2T	closed	closed

Table 2: Wellfield Monitoring Data

		Units	13/Jan/20	20/Feb/20	22/Mar/20	25/Apr/20	20/May/20	20/Jun/20	20/Jul/20	24/Aug/20	27/Sep/20	28/Oct/20	28/Nov/20	16/Dec/20
7-66	*Well*	"H_2O	0.08	0.14	0.38	0.33	0.21	0.12	0.04	0.07	0.02	0.08	0.02	0.08
	Lateral	"H_2O	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	1.37	NLV	NLV
	CH_4	%	60.7	60.6	59.4	60.3	62	61.6	60.8	61	58.1	56.6	-	54.1
	CO_2	%	39.2	38.9	33.4	39.4	37.5	37.3	37.5	37.1	33.2	35.1	-	36.5
	O_2	%	0.1	0.3	0.3	0.3	0.5	0.3	0.6	1.3	2.2	0.6	-	3.1
	BAL (N_2)	%	0	0	6.9	0	0	0.7	1.1	0.6	6.5	7.7	-	6.3
	CO	*PPM*	9	10	11	15	9	11	10	12	10	9	-	8
	H_2S	*PPM*	295	181	167	174	190	249	234	206	220	364	-	215
	Vel Max	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Vel Min	*m/s*	-	-	-	-	-	-	-	-	-	-	-	-
	Flow	*CFM*												
	Temp	°*C*	-	-	-	-	-	-	-	-	-	-	-	-
	Comments		NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV
MH-16	*Well*	"H_2O	0.38	-0.01	0.01	0.02	0.00	-0.05						
	Lateral	"H_2O	-5.23	-4.20	NLV	-3.56	-4.18	-3.25				NLV		
	CH_4	%	55.1	48.8	47.3	33.6	27.4	25.1						
	CO_2	%	44.9	36.4	27.4	23.5	20.1	18.4						
	O_2	%	0.0	3.2	2.1	5.3	10.1	10.4						
	BAL (N_2)	%	0.0	11.6	23.2	37.6	42.4	46.4						
	CO	*PPM*	3	2	7	10	3	2						
	H_2S	*PPM*	40	10	7	5	4	17						
	Vel Max	*m/s*	-	-	-	-	-	-						
	Vel Min	*m/s*	-	-	-	-	-	-						
	Flow	*CFM*												
	Temp	°*C*	-	-	-	-	-	-	-					
	Comments		cracked	cracked	cracked	cracked	cracked	cracked->closed	cracked->closed	cracked->closed	cracked->closed	closed	cracked->closed	cracked->closed
MH-19	*Well*	"H_2O	0.05	0.14	0.12	0.03	0.02	0.01						
	Lateral	"H_2O	-5.43	-3.99	-3.99	-3.82	-3.94	-3.10				NLV		
	CH_4	%	56.2	54.0	50.2	47.1	36.7	48.7						
	CO_2	%	43.7	41.4	29.4	27.9	28.4	38.6						
	O_2	%	0.2	1.3	1.1	2.6	6.3	2.4						
	BAL (N_2)	%	0.0	3.2	19.3	22.4	28.5	10.4						
	CO	*PPM*	3	2	9	4	3	4						
	H_2S	*PPM*	30	9	6	21	39	85						
	Vel Max	*m/s*	-	-	-	-	-	-						
	Vel Min	*m/s*	-	-	-	-	-	-						
	Flow	*CFM*												
	Temp	°*C*	-	-	-	-	-	-						
	Comments		cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked	cracked
MH-22	*Well*	"H_2O	0.03	0.05	0.06	0.03	0.01	-0.01				0.02		
	Lateral	"H_2O	-4.96	SURGING	NLV	NLV	NLV	-3.25				-0.02		
	CH_4	%	57.8	57.3	51.4	46.1	14.4	43.4				55.2		
	CO_2	%	42.0	42.4	28.3	31.8	10.4	32.6				41.5		
	O_2	%	0.2	0.3	0.3	0.4	14.5	3.9				1.3		
	BAL (N_2)	%	0.0	0.0	20.0	21.7	60.7	20.0				2.0		
	CO	*PPM*	4	3	3	5	3	4				4		
	H_2S	*PPM*	89	13	18	23	34	203				35		
	Vel Max	*m/s*	-	-	-	-	-	-				-		
	Vel Min	*m/s*	-	-	-	-	-	-				-		
	Flow	*CFM*												
	Temp	°*C*	-	-	-	-	-	-	-			-		
	Comments		cracked	cracked	cracked	cracked	cracked->closed	closed	closed	closed	closed	cracked	closed	closed
MH-25	*Well*	"H_2O	1.41	0.05	0.03	0.02	0.02	0.02				0.06		
	Lateral	"H_2O	NLV	NLV	NLV	NLV	NLV	NLV				NLV		
	CH_4	%	62.2	60.5	58.7	43.6	39.7	55.0				62.1		
	CO_2	%	37.6	37.5	32.9	42.5	23.5	35.0				37.8		
	O_2	%	0.2	0.7	0.2	3.4	6.6	1.3				0.1		
	BAL (N_2)	%	0.0	1.2	8.2	10.5	30.1	8.6				0.0		
	CO	*PPM*	4	2	1	3	4	4				4		
	H_2S	*PPM*	248	20	10	16	79	203				79		
	Vel Max	*m/s*	-	-	-	-	-	-				-		
	Vel Min	*m/s*	-	-	-	-	-	-				-		
	Flow	*CFM*										-		
	Temp	°*C*	-	-	-	-	-	-				-		
	Comments		NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV	NLV

Table 3: Pump Counters

	December 2019	January 2020			February 2020			March 2020			April 2020			May 2020			June 2020		
Location	Counter	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
PDT 1	4931	4931	0	0	4931	0	0	4931	0	0	4932	1	2.6	4938	6	15.6	170	-	-
PDT 2	12192	12192	0	0	12192	0	0	12254	62	161.2	13402	1148	2984.8	15033	1631	4240.6	15837	804	2090.4
PDT 3	16268	16400	132	343.2	16493	93	241.8	16698	205	533	17321	623	1619.8	17743	422	1097.2	17743	0	0
PDT 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 5	-	-	-	-	-	-	-	58897	-	-	58897	0	0	58897	0	0	60910	2013	5233.8
PDT 6	136145	136145	0	0	136146	1	2.6	136211	65	169	140165	3954	10280.4	147460	7295	18967	149625	2165	5629
PDT 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 8	46173	46197	24	62.4	46238	41	106.6	46314	76	197.6	47012	698	1814.8	48036	1024	2662.4	48787	751	1952.6
PDT 9	1911	2225	314	816.4	2471	246	639.6	2471	0	0	4687	2216	5761.6	8922	4235	11011	12402	3480	9048
PDT 10	23	28	5	13	29	1	2.6	32	3	7.8	55	23	59.8	78	23	59.8	183	105	273
PDT 11	855	856	1	2.6	856	0	0	954	98	254.8	1368	414	1076.4	1884	516	1341.6	2604	720	1872
PDT 12	22	22	0	0	22	0	0	22	0	0	22	0	0	22	0	0	28	6	15.6
H-4	363145	365749	2604	6770.4	374910	9161	23818.6	377522	2612	6791.2	379165	1643	4271.8	384016	4851	12612.6	392357	8341	21686.6
1-9	765504	769568	4064	10566.4	776391	6823	17739.8	778456	2065	5369	782741	4285	11141	788644	5903	15347.8	796350	7706	20035.6
1-10	585541	587653	2112	5491.2	592874	5221	13574.6	593874	1000	2600	595675	1801	4682.6	599693	4018	10446.8	605344	5651	14692.6
H-11	498024	515235	17211	44748.6	567009	51774	134612.4	586845	19836	51573.6	610245	23400	60840	669647	59402	154445.2	743231	73584	191318.4
2-18	25	25	0	0	28	3	7.8	33	5	13	33	0	0	-	-	-	41536	-	-
3-27	-	-	-	-	-	-	-	-	-	-	-	-	-	238279	-	-	-	-	-
3-29	830071	830071	0	0	830073	2	5.2	830073	0	0	830073	0	0	-	-	-	-	-	-
3-30	69405	69405	0	0	69409	4	10.4	69409	0	0	69415	6	15.6	69430	15	39	69451	21	54.6

	July 2020			August 2020			September 2020			October 2020			November 2020			December 2020		
Location	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo	Counter	Counts / mo	Litres / mo
PDT 1	328	158	410.8	541	213	553.8	893	352	915.2	1267	374	972.4	1333	66	171.6	1402	69	179.4
PDT 2	16126	289	751.4	45712	29586	76923.6	107876	62164	161626.4	107878	2	5.2	107899	21	54.6	107974	75	195
PDT 3	18089	346	899.6	18092	3	7.8	18095	3	7.8	18098	3	7.8	18098	0	0	18098	0	0
PDT 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 5	60910	0	0	61647	737	1916.2	16090	-	-	60910	44820	116532	60910	0	0	60910	0	0
PDT 6	150230	605	1573	151347	1117	2904.2	152666	1319	3429.4	153328	662	1721.2	153746	418	1086.8	154003	257	668.2
PDT 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PDT 8	49406	619	1609.4	50014	608	1580.8	52747	2733	7105.8	52924	177	460.2	52924	0	0	52924	0	0
PDT 9	13797	1395	3627	13797	0	0	19974	6177	16060.2	21759	1785	4641	21759	0	0	21965	206	535.6
PDT 10	212	29	75.4	456	244	634.4	896	440	1144	947	51	132.6	1002	55	143	1124	122	317.2
PDT 11	2703	99	257.4	2978	275	715	3578	600	1560	3987	409	1063.4	4068	81	210.6	4132	64	166.4
PDT 12	31	3	7.8	31	0	0	31	0	0	31	0	0	31	0	0	31	0	0
H-4	399110	6753	17557.8	402369	3259	8473.4	420781	18412	47871.2	426380	5599	14557.4	426939	559	1453.4	426948	9	23.4
1-9		-	-		-	-	804126	-	-	810413	6287	16346.2	812047	1634	4248.4	812087	40	104
1-10		-	-		-	-	616275	-	-	620890	4615	11999	623044	2154	5600.4	623077	33	85.8
H-11	770553	27322	71037.2	770553	0	0	851504	80951	210472.6	917218	65714	170856.4	921679	4461	11598.6	927145	5466	14211.6
2-18		-	-		-	-	116549	-	-	161388	44839	116581.4	830087	-	-	830087	0	0
3-27	-	-	-	-	-	-	-	-	-	-	-	-	69456	-	-	-	-	-
3-29	-	-	-	-	-	-	830087	-	-	830087	0	0	830087	0	0	-	-	-
3-30		-	-		-	-	69457	-	-	69485	28	72.8	69486	1	2.6	69488	2	5.2

Table 4: Water Levels

			Mar 25/26,2020				July 22/23,2020				Oct 26/27,2020			
Units	**meters**	**meters**	**meters**	**meters**	**°C**	**%**	**meters**	**meters**	**°C**	**%**	**meters**	**meters**	**°C**	**%**
Locations	**Screen Length**	**Installed Well Depth**	**Depth to Water**	**Depth to Bottom**	**Temperature**	**Open Screen**	**Depth to Water**	**Depth to Bottom**	**Temperature**	**Open Screen**	**Depth to Water**	**Depth to Bottom**	**Temperature**	**Open Screen**
H-1	12	14.63	7.70	14.30	26 0	43.14	7 80	14.80	25 3	43 96	8.00	14.70	23.8	45.60
H-2	14	16.77	8 90	18.20	28.1	42.65	8.70	18.60	27.4	41.19	8.90	18.60	26.1	42.65
H-3	12	15.24	7.10	16.20	11 3	33 22	7 00	16.40	13.4	32.40	7.20	16.30	10.5	34.04
H-4	11	14.02	8 00	9.80	15.1	45.11	8 50	10.00	16 0	49.67	8.80	9 90	15.9	52.40
1-5	11	13.72	8 00	15.00	20 2	46.40	8.10	14.90	21 8	47 34	8.10	14.80	20.7	47.34
1-6	12	15.55	10.80	16.70	22 8	61 06	10.70	16.60	24 0	60 24	10.90	16.50	22.9	61.88
1-7	18	21.34	14.50	19.70	28.4	62.60	14.60	19.80	32 9	63.15	14.90	19.50	31.0	64.79
1-8	21	24.39	15.10	23.10	33.1	56.47	18.00	23.80	32 3	70 06	16.40	24.00	31.9	62.56
1-9	12	14.63	10.50	14.70	32 5	66.10	12.40	14.80	33.1	81.68	13.50	14.90	32.2	90.70
1-10	9	12.20	10.20	12.00	24 8	78.19	10.00	12.10	27 0	76 00	10.20	12.30	27.2	78.19
H-11	9	12.80	FOAM	12.00	21 5	-	FOAM	8.50	21.6	-	FOAM	9 80	20.7	-
H-12	13	16.16	no port			-	no port			-	no port			-
2-13	21	25.00	7.70	9.40	40.4	18 94	8 30	18.60	41 3	21.75	8.40	18.50	36.8	22.22
2-14	20	22.56	7 00	22.30	30.4	21.48	7 80	22.60	32 3	25 51	7.10	21.80	31.5	21.98
2-15	18	21.65	12.30	22.10	17.7	48 91	12.30	22.10	20 3	48 91	12.50	22.20	21.0	50.00
2-16	26	28.35	22.10	29.00	16.1	75 87	21.60	29.40	30 5	73 94	21.40	29.50	28.5	73.17
2-17	15	18.29	12.80	17.50	22 3	63 97	13.30	18.40	21 9	67 25	13.30	18.20	21.6	67.25
2-18	15	18.29	14.40	18.60	28.7	74.46	14.20	16.00	34 3	73.15	14.10	16.80	33.9	72.50
3-19	12	14.94	9 00	14.30	15 8	51 30	7 80	14.40	18.4	41.46	8.20	14.50	15.7	44.74
3-20	11	13.26	8 50	14.70	14 3	55 37	8.60	14.50	15 9	56 31	8.90	14.80	16.0	59.12
3-21	5	7.62	4.40	8.00	9.8	29 55	4 50	7.90	19.1	31.73	4.20	8.10	18.9	25.17
3-22	24	26.68	13.00	18.40	34 3	43 22	6 80	18.00	35 0	17.47	9.60	17.80	33.8	29.10
3-23	23	25.91	10.00	16.20	30 3	30.40	TOO TALL			-	TOO TALL			-
3-24	21	23.48	6 50	18.30	34 3	20.46	7.40	19.50	36 0	24.67	8.30	19.70	36.1	28.89
3-25	18	21.34	8 80	25.30	34 3	31.44	5.60	18.40	35 5	13 95	6.90	18.10	33.8	21.05
3-26	9	12.20	4 30	13.90	20 5	13.68	4 50	14.20	28.6	15 87	5.30	14.50	36.5	24.61
3-27	21	24.09	6 80	18.40	39 3	19 01	7.40	19.50	40.7	21 82	7.50	19.90	39.1	22.29
3-28	12	15.24	3 00	15.90	14.4	0.00	3.60	15.80	18 5	4.52	3.30	15.50	15.0	2.06
3-29	12	14.63	7.70	15.00	33 3	43.14	8 50	14.90	36 2	49.70	9.00	14.40	37.0	53.80
3-30	7	9.76	5 00	8.70	39.7	35 00	5 80	8.80	40 3	45 93	5.60	9 00	38.9	43.20
4-31	16	18.75	8 30	18.20	24.1	35 33	8.60	18.30	24 8	37.18	8.80	18.10	22.5	38.42
4-32	10	12.50	5 00	11.00	30 5	23.13	6 30	11.40	31 9	36.45	6.90	11.40	30.9	42.60
4-33	24	26.68	7 30	22.30	23 3	20 56	5 80	20.70	32 3	14.41	6.30	21.60	29.1	16.46
4-34	20	22.56	4 50	20.90	33.7	8.86	5 90	20.40	34 9	15 93	6.20	20.10	33.6	17.44
4-35	15	17.38	7.60	18.80	24.1	35 86	7.40	18.50	22 5	34 54	7.90	17.40	21.8	37.82
4-36	15	18.29	too tall			-	3.60	18.70	38.60	3.62	3.70	18.20	36.20	4.27
4-37	12	14.94	9 50	14.90	36.1	55.40	9 50	14.80	37.6	55.40	9.30	15.70	35.6	53.76
5-38	8	10.67	4 20	12.00	11 8	15.10	4.40	12.00	14 8	17.73	4.50	12.50	12.1	19.04
5-39	8	10.67	4 50	12.40	14 2	19 04	4 50	12.40	16.7	19 04	4.30	12.60	15.6	16.42
5-40	18	21.95	5 20	12.40	34.7	8.43	5.70	14.70	35.7	11.16	6.10	15.40	33.6	13.35
5-41	17	18.90	9 00	15.70	30 8	40 95	10.50	15.80	31 0	49 89	10.80	16.10	30.4	51.68
5-42	12	16.16	9 80	13.60	31.4	47 86	10.30	14.60	39.7	51 96	9.80	15.30	40.2	47.86
5-43	14	16.16	5.5	12.4	19 3	22 31	5.6	12 2	22.2	23 04	5.8	12.3	21.9	24.50
5-44	19	21.95	11.7	16.2	34.1	45.77	12	12.4	34 8	47 35	13 2	14.9	33.2	53.70
5-45	15	16.77	5.3	15.5	30.1	24.77	6.6	16.6	35.6	33 30	7.2	15.7	34	37.23
5-46	16	18.90	7.9	17.2	-	30.60	8.1	17.1	22.4	31 86	7.6	16.3	31.1	28.71
6-47	14	15.85	5	13.9	24 2	20 89	5.4	13 9	22 3	23 80	5.3	13.9	21.4	23.08
6-48	15	17.68	4.7	15.6	21 9	11 28	5	15 5	29 3	13 33	5.1	15.3	28.5	14.02
6-49	20	23.48	14	23.5	37 8	53.61	15.6	23 2	32 8	61.44	14.4	23.8	31.7	55.57
6-50	14	17.38	13.6	17	34 2	73.63	13.1	16.6	39 2	70.14	13 5	16.5	39	72.94
6-51	12	14.94	5	6.4	23.7	18 50	5.2	5.5	27.4	20.14	5.7	5.4	26.9	24.24
6-52	6	9.15	too tall			-	5.2	7.5	26.5	35 28	4.7	7.7	25.1	27.08
6-53	22	23.63	14.2	21.9	35 3	57 35	13.5	22	36 9	54.18	14 3	22.1	35.8	57.80
6-54	13	15.85	6.8	15.3	27 8	30 94	7	15 2	27.6	32.47	7.1	15.5	26.2	33.23
6-55	18	21.34	16	21	38.7	70 80	15.8	22	33.4	69.71	14 8	21.4	31.7	64.24
6-56	10	12.80	5	13.4	35.6	22.42	4.2	13 2	37 9	14.47	4.9	12.9	36.4	21.43
6-57	0	0.00	10.7	14.7	36	-	11.5	14 3	36.8	-	11.6	14.5	35.6	-
6-58	0	0.00	10	21.7	26 9	-	9.7	21 2	28.1	-	8.9	21.6	29.5	-
6-59	17	20.12	16.4	21.3	22 5	78 20	16.2	21 3	38.4	77 03	16 3	21	37.5	77.61
7-60	13	15.55	5.2	14	25 5	17 21	5.6	14.1	27.4	20.41	5.5	14.5	27.3	19.61
7-61	13	15.24	too tall			-	too tall			-	too tall			-
7-62	17	18.29	16.6	17.6	23 9	89 91	16.9	17.4	26.1	91.69	16 8	16.9	24.6	91.10
7-64	22	24.09	17.1	26.7	32.1	68.18	17	26 2	35.4	67.72	17 5	26.3	33.9	70.00
7-65	24	26.22	17	27.6	34 5	61 23	17	28 2	35.6	61 23	17.6	28.1	34.2	63.75
7-66	19	21.95	16	24.3	30.7	-	16	23	30.1	-	16 2	22.8	29.6	-

2.3 Surface Emission Monitoring

As required by the City, surface emission monitoring is requested to be carried out semi-annually, weather conditions permitting, by Comcor. This monitoring is performed using a portable flame ionization detector (FID) and a GPS, marking locations where concentrations of hydrocarbons were greater than 500 ppm. The surface emission monitoring was completed in May and October for the 2020 reporting year. Several areas were noted where there were significant volumes of gas detected, including areas where cap was weak, pipe emanated from the landfill surface, uncovered manholes and/or manholes lacking proper sealing.

2.4 Mechanical System Monitoring

The main operational control of the mechanical system is carried out by the Programmable Logic Controller (PLC). The PLC also provides information on the operating status of the system, and records all data electronically which can be downloaded when required. Specific details on these items are included in the Flare Operation and Maintenance Manual. At a minimum the PLC records:

- Landfill gas composition and temperature
- Flare operating times
- Blower operating times
- Landfill gas flow rate
- Volume of landfill gas collected and flared
- Greenhouse Gas Emission Reduction in CO_2 equivalents.

These items were also monitored remotely and were reviewed at minimum on a weekly basis to ensure that all parameters outlined above are being recorded and that all system data indicates that the overall system is operating properly. The system review was carried out by a technician experienced in the operation of such systems. Notably, the internet at the Site was upgraded in November which prevented the system from recording of the aforementioned parameters until access was provided by the City. Upon providing the required information, the ability to communicate with the flare was restored and the previously unrecorded data was recovered.

Comcor staff also carried out the maintenance of the system as outlined by the Operations and Maintenance Manual. No other major repairs had to be made to the mechanical system during 2020.

Data for 2020 has been compiled, and is found in Appendix A.

2.4.1 System Pressure Measurements

Monitoring ports at the inlet and outlet to the blower were measured and recorded on a monthly frequency, using a suitably scaled pressure gauge. Gauge fluctuations were noted, as it can be an indication of water within the system.

Data for 2020 has been compiled, and is found in Table 2.

2.4.2 System Gas Measurements

The purpose of the main blower skid gas analyzer system is to monitor the oxygen and methane concentrations of the landfill gas being transferred by the LGFCS to the flare. As a safety precaution, if either the oxygen concentration gets too high, or the methane concentration gets too low, an alarm is sent to the main computer control panel PLC to shut the system down. Having records of the gas concentrations also allows for better analysis of the system and aids in troubleshooting when problems arise.

A pump, located within the gas analyzer system cabinet in the control room, is used to draw a continuous sample of process gas from the header pipe on the blower discharge side. After entering the analyzer, the sample is drawn through a de-mister and a series of filters to remove any particulate or moisture that may affect the monitoring equipment. The methane and oxygen concentrations of the sample are then measured by an infra-red methane analyzer and oxygen analyzer. The methane and oxygen concentrations are displayed on separate LED display screens mounted on the front face of the gas analyzer panel. The gas analyzer system will send signals to the PLC that will trigger a number of system alarms/warnings including low methane and high oxygen.

All system failures and/or alarms are displayed on the main control circuit panel. Any alarms that shut down the system are relayed by the auto messaging to the system operator.

During 2020, the system operated as intended with the analyzer data recorded at an interval of five minutes or better and any system alarms were sent to the operator. This data was recorded and summarized into a daily value and can be found in Appendix A.

In addition to the main system analyser, concentrations of methane (CH_4), carbon dioxide (CO_2) and oxygen (O_2) were measured manually, recorded monthly at the blower inlet and blower outlet, and compared to the insitu monitoring devices to ensure accuracy. These measurements were taken using a proper gas meter/analyzer such as a Landtec GEM-5000+, or equivalent.

2.4.3 System Flow Rate Measurements

Landfill gas velocities and temperatures at each landfill gas extraction well in the wellfield were measured and recorded on a monthly basis using an anemometer, if possible. These velocities were used to calculate landfill gas flow rates by multiplying by the pipe's cross sectional area.

A thermal mass flow meter continuously calculates flows to the flare and this data was recorded on an interval of 5 minutes or less.

The monitoring completed in 2020 is found in Table 2 and a summary of daily plant data can be found in Appendix A.

3.0 FLARE AND GREENHOUSE GAS EMISSIONS

3.1 Flare Emissions

The flare stack is equipped with four thermocouples that measure the temperature in the flare stack. These thermocouples are monitored by the system control panel PLC at intervals of 5 minutes or better. The control system is continuously monitoring the flame conditions and will shut down the LGCFS system immediately if flame is lost.

If the system shuts down for any reason, the fail safe valve will close and prevent any non-combusted landfill gas from being released to the atmosphere, thereby controlling the emissions from the flare.

3.2 Greenhouse Gas Emissions

The landfill gas is comprised of primarily methane and carbon dioxide in approximately equal amounts. In addition there are other trace amounts of a large number of compounds. Methane and carbon dioxide are greenhouse gases but methane has a global warming potential 25 times that of carbon dioxide. By combusting the methane in the flare the resultant products are carbon dioxide and water vapour which reduces its global warming potential by approximately 95 percent.

The control panel records both flow and methane gas concentration being collected from the system and sent to be combusted in the flare. These quantities are measured and recorded at intervals of 5 minutes or less. The data collected can be readily processed to calculate the greenhouse gas emission reduction expressed as carbon dioxide equivalents.

For the Brady Road Landfill, greenhouse gas emissions have been calculated based on operational data and can be found in Appendix A.

4.0 CONDENSATE COLLECTION SYSTEM

The purpose of the Condensate Collection System component of the LGCFS is to remove moisture from the landfill gas and to collect condensate from the collection laterals/header pipes. Collection and removal of the condensate increases the efficiency of the landfill gas collection in the wellfield and minimizes the moisture being passed through the mechanical system.

Condensate and moisture are removed from the system at three main locations. First, relative low points have been provided in the gas collection header to allow any free moisture to drain by gravity out of the underground gas collection system. In the wellfield, this moisture drains into condensate gravity style and pump style drain traps which have pneumatic pumps installed inside the sump. Next, prior to the gas entering the blowers, a condensate moisture separator removes most of the residual water droplets remaining in the gas. At this stage the residual water drains by gravity into the condensate chamber.

The condensate chamber stores the water until the pump at the bottom of the chamber is activated either manually or automatically through a series of floats. The water is then pumped through a 75 mm diameter HDPE forcemain and is discharged into the leachate collection system.

After completion of the landfill gas collection system 2019 southern header expansion, Viridian VP4 pneumatic pumps were installed in nine manholes (MH3, MH4, MH5, MH8, MH31, MH32, MH33, MH42 and MH43) to send leachate directly to the storage tank located in the southwest corner of the Site. Prior to the 2020 expansion, condensate/leachate from the existing dual purpose wells, pump drain traps, and the condensate chamber was discharged to manhole MH32, where a vacuum tanker would periodically pump down the manhole. With the installation of a pneumatic pump in manhole MH32, condensate/leachate from the landfill gas collection system is now pumped directly to the storage tank.

5.0 CONCLUSIONS AND RECOMMENDATIONS

1. During operation in 2020, the Brady Road Resource Management Facility Gas Collection and Flaring System operated as was intended.

2. During surface emission monitoring, some areas were noted where gas was escaping. These areas included open manholes and areas of weak surface cap. In order to get maximum efficiency from the LGCFS, these issues should be looked at in the future.

3. The system should continue to operate on a full-time basis and be monitored according to the Operation and Maintenance Manual for the site.

All of which is Respectfully Submitted,

INTEGRATED GAS RECOVERY SERVICES

[redacted]

Christine Grant, EIT
Engineering Project Coordination

[redacted]

Shannan McGarr, B.Sc.
Wellfield Operations Manager

APPENDIX A

PLANT AND FLARE DATA

Date	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
Jan 1 2020	285	285	285	1296173	1296173	1296173	36718	900	627	47.8	2.3	24	0	866	900	932	0	25753.6	24.2	26326
Jan 2 2020	550	550	265	2592391	2592391	1296218	36719	900	584	44.5	3.5	24	0	859	900	937	0	25753.6	24.2	26350.2
Jan 3 2020	808	808	258	3888719	3888719	1296328	36722	900	567	43.2	3.9	24	0	866	900	931	0	25753.6	23.1	26373.3
Jan 4 2020	1076	1076	268	5184998	5184998	1296279	36721	900	588	44.9	3.4	24	0	872	900	928	0	25753.6	24.2	26397.6
Jan 5 2020	1336	1336	260	6482020	6482020	1297022	36742	901	571	43.5	3.9	24	0	869	900	935	0	25753.6	24.2	26421.8
Jan 6 2020	1600	1600	264	7777776	7777776	1295756	36706	900	580	44.2	3.7	24	0	864	900	939	0	25753.6	24.1	26445.9
Jan 7 2020	1826	1826	226	8968409	8968409	1190633	33728	900	496	41.2	4.7	20.1	1	870	900	922	0	25753.6	23.5	26469.4
Jan 8 2020	2087	2087	261	10264442	10264442	1296033	36714	900	573	43.7	3.8	24	0	859	900	925	0	25753.6	24.1	26493.5
Jan 9 2020	2348	2348	261	11559730	11559730	1295288	36693	900	573	43.7	4	24	0	872	900	934	0	25753.6	24.1	26517.6
Jan 10 2020	2592	2592	244	12855494	12855494	1295764	36706	900	537	41	4.7	24	0	858	900	932	0	25753.6	23.1	26540.7
Jan 11 2020	2840	2840	248	14151886	14151886	1296392	36724	900	546	41.6	4.5	24	0	860	900	927	0	25753.6	24.1	26564.8
Jan 12 2020	3086	3086	246	15447216	15447216	1295330	36694	900	542	41.3	4.7	24	0	890	900	912	0	25753.6	24.2	26589
Jan 13 2020	3332	3332	246	16742639	16742639	1295423	36697	900	540	41.2	4.8	24	0	865	900	931	0	25753.6	24.1	26613.1
Jan 14 2020	3570	3570	238	18037845	18037845	1295206	36691	899	523	39.9	5.1	24	0	853	900	932	0	25753.6	24.1	26637.2
Jan 15 2020	3800	3800	230	19333627	19333627	1295782	36707	900	507	38.6	5.5	24	0	851	900	924	0	25753.6	23.1	26660.3
Jan 16 2020	4027	4027	227	20629556	20629556	1295929	36711	900	500	38.1	5.5	24	0	865	900	917	0	25753.6	24.1	26684.4
Jan 17 2020	4271	4271	244	21924428	21924428	1294872	36681	899	537	41	4.7	24	0	890	900	912	0	25753.6	24.2	26708.6
Jan 18 2020	4499	4499	228	23219377	23219377	1294949	36683	899	502	38.3	5.6	24	0	887	900	914	0	25753.6	24.1	26732.7
Jan 19 2020	4715	4715	216	24514824	24514824	1295447	36697	900	475	36.3	6.3	24	0	875	900	916	0	25753.6	24.1	26756.8
Jan 20 2020	4944	4944	229	25808911	25808911	1294087	36659	900	503	38.4	5.4	23.9	1	870	900	922	0	25753.6	23.9	26780.7
Jan 21 2020	5184	5184	240	27104216	27104216	1295305	36693	899	527	40.2	5.1	24	0	886	900	918	0	25753.6	23.1	26803.9
Jan 22 2020	5408	5408	224	28399831	28399831	1295615	36702	900	492	37.5	6	24	0	870	900	928	0	25753.6	24.1	26828
Jan 23 2020	5632	5632	224	29695952	29695952	1296121	36717	900	494	37.6	6	24	0	871	900	937	0	25753.6	24.1	26852.1
Jan 24 2020	5872	5872	240	30993229	30993229	1297277	36749	901	528	40.2	5.2	24	0	866	900	927	0	25753.6	24.1	26876.2
Jan 25 2020	6114	6114	242	32288810	32288810	1295581	36701	900	532	40.6	5.1	24	0	875	900	926	0	25753.6	23.1	26899.3
Jan 26 2020	6352	6352	238	33583782	33583782	1294972	36684	899	523	39.9	5.3	24	0	866	900	927	0	25753.6	24.2	26923.5
Jan 27 2020	6589	6589	237	34878406	34878406	1294624	36674	899	521	39.8	5.3	24	0	858	900	936	0	25753.6	24.1	26947.6
Jan 28 2020	6654	6654	65	35230943	35230943	352537	9987	900	143	40.1	5.2	6.5	0	872	900	916	0	25753.6	6	26953.6
Jan 29 2020	6654	6654	0	35230943	35230943	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0
Jan 30 2020	6790	6790	136	35844959	35844959	614016	17394	899	298	48	2.5	11.4	1	-1	890	959	0	25753.6	50.2	27003.8
Jan 31 2020	7067	7067	277	37141863	37141863	1296904	36739	901	608	46.4	2.7	24	0	880	900	918	0	25753.6	24.2	27028
Feb 1 2020	7335	268	268	38437271	1295408	1295408	36696	900	589	45	3.4	24	0	853	900	924	0	25753.6	23.1	27051.1
Feb 2 2020	7580	513	245	39734072	2592209	1296801	36736	901	539	41.1	5	24	0	872	900	938	0	25753.6	24.2	27075.3
Feb 3 2020	7829	762	249	41029365	3887502	1295293	36693	899	548	41.8	4.5	23.5	0	868	900	924	0	25753.6	23.1	27098.4
Feb 4 2020	7961	894	132	41698667	4556804	669302	18960	900	290	42.8	4.2	12.4	0	858	900	930	0	25753.6	13.1	27111.5
Feb 5 2020	7961	894	0	41698667	4556804	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0
Feb 6 2020	8084	1017	123	42316044	5174181	617377	17489	899	271	43.4	4.1	11	1	225	894	939	0	25753.6	59.5	27170.9
Feb 7 2020	8344	1277	260	43611574	6469711	1295530	36700	900	572	43.6	4	24	0	868	900	927	0	25753.6	24.1	27195
Feb 8 2020	8604	1537	260	44906800	7764937	1295226	36691	899	572	43.7	4.2	24	0	871	900	926	0	25753.6	23.1	27218.1
Feb 9 2020	8866	1799	262	46201526	9059663	1294726	36677	899	576	44	4	24	0	869	900	925	0	25753.6	24.2	27242.3
Feb 10 2020	9126	2059	260	47497785	10355922	1296259	36720	900	572	43.6	4.2	24	0	869	900	925	0	25753.6	24.2	27266.5
Feb 11 2020	9394	2327	268	48794144	11652281	1296359	36723	900	590	45	3.8	24	0	859	900	931	0	25753.6	24.1	27290.6
Feb 12 2020	9661	2594	267	50090033	12948170	1295889	36710	900	588	44.8	5.3	24	0	856	900	941	0	25753.6	23.2	27313.9
Feb 13 2020	9919	2852	258	51386185	14244322	1296152	36717	900	568	43.3	4.1	24	0	864	900	936	0	25753.6	24.2	27338.1
Feb 14 2020	10192	3125	273	52683010	15541147	1296825	36736	901	600	45.7	3.5	24	0	871	900	928	0	25753.6	24.1	27362.2
Feb 15 2020	10453	3386	261	53981580	16839717	1298570	36786	902	574	43.7	4	24	0	860	900	930	0	25753.6	24.2	27386.4
Feb 16 2020	10715	3648	262	55274647	18132784	1293067	36630	898	577	44.1	3.8	24	0	853	900	940	0	25753.6	23.1	27409.5
Feb 17 2020	10972	3905	257	56556903	19415040	1282256	36324	890	566	43.6	4	24	0	854	900	939	0	25753.6	24.2	27433.7
Feb 18 2020	11224	4157	252	57857138	20715275	1300235	36833	903	554	42.1	4.4	24	0	860	900	936	0	25753.6	24.2	27457.9
Feb 19 2020	11477	4410	253	59148514	22006651	1291376	36582	897	555	42.5	4.2	24	0	861	900	940	0	25753.6	24.1	27482
Feb 20 2020	11743	4676	266	60444938	23303075	1296424	36725	900	585	44.6	3.6	24	0	873	900	930	0	25753.6	23.2	27505.2
Feb 21 2020	12013	4946	270	61744238	24602375	1299300	36807	902	593	45.1	3.6	24	0	867	900	931	0	25753.6	24.1	27529.3
Feb 22 2020	12287	5220	274	63042540	25900677	1298302	36778	902	602	45.8	3.4	24	0	865	900	925	0	25753.6	24.1	27553.4
Feb 23 2020	12558	5491	271	64339207	27197344	1296667	36732	900	595	45.3	3.5	24	0	871	900	941	0	25753.6	24.2	27577.6
Feb 24 2020	12606	5539	48	64573286	27431423	234079	6631	901	106	44.8	3.6	4.3	0	868	899	939	0	25753.6	4.5	27582.1
Feb 25 2020	12606	5539	0	64573286	27431423	0	0	0	0	0	0	0.0	0	0	0	0	0	25753.6	0	27582.1
Feb 26 2020	12607	5540	1	64578480	27436617	5194	147	858	2	46.3	20.1	0.1	1	-14	170	482	0	25753.6	0.1	27582.2
Feb 27 2020	12607	5540	0	64578480	27436617	0	0	0	0	0	0	0.0	0	0	0	0	0	25753.6	0	27582.2
Feb 28 2020	12772	5705	165	65307624	28165761	729144	20655	899	362	49.1	2.7	13.5	1	-12	894	960	0	25753.6	13.1	27595.3
Feb 29 2020	12870	5803	98	65741528	28599665	433904	12292	900	216	49.1	2.5	8.0	0	887	900	913	0	25753.6	8.4	27603.6
Mar 1 2020	13017	147	147	66396931	655403	655403	18566	901	324	48.9	2.5	12.1	1	8	893	949	0	25753.6	11.3	27614.9
Mar 2 2020	13315	445	298	67692821	1951293	1295890	36710	900	655	49.9	2	24	0	862	900	943	0	25753.6	24.1	27639
Mar 3 2020	13601	731	286	68989419	3247891	1296598	36730	900	630	48	2.6	24	0	861	900	932	0	25753.6	24.2	27663.2
Mar 4 2020	13848	978	247	70078960	4337432	1089541	30865	900	543	49.3	2.2	20.1	0	869	900	914	0	25753.6	20.5	27683.7
Mar 5 2020	13988	1118	140	70688356	4946828	609396	17263	898	308	50	2.1	11.3	1	-6	891	946	0	25753.6	10.3	27694
Mar 6 2020	14174	1304	186	71499640	5758112	811284	22982	900	409	49.8	2	15	0	876	900	918	0	25753.6	15.9	27709.9
Mar 7 2020	14174	1304	0	71499640	5758112	0	0	0	0	0	0	0.0	0	0	0	0	0	25753.6	0	27709.9

Date	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
Mar 8 2020	14174	1304	0	71499640	5758112	0	0	0	0	0	0	0.0	0	0	0	0	0	25753.6	0	27709.9
Mar 9 2020	14174	1304	0	71499640	5758112	0	0	0	0	0	0	0.0	0	0	0	0	0	25753.6	0	27709.9
Mar 10 2020	14194	1324	20	71577396	5835868	77756	2203	896	43	54.9	0.6	1.4	1	-6	833	956	1.5	25755.1	0	27709.9
Mar 11 2020	14326	1456	132	72117952	6376424	540556	15313	899	291	53.2	1.2	10	1	-3	888	937	0	25755.1	9.9	27719.8
Mar 12 2020	14626	1756	300	73414392	7672864	1296440	36726	900	660	50.3	1.9	24	0	876	900	928	0	25755.1	23.1	27742.9
Mar 13 2020	14912	2042	286	74709620	8968092	1295228	36691	900	628	47.9	2.6	24	0	879	900	920	0	25755.1	24.1	27767
Mar 14 2020	15198	2328	286	76005669	10264141	1296049	36714	900	629	47.9	2.5	24	0	872	900	924	0	25755.1	24.1	27791.1
Mar 15 2020	15495	2625	297	77298981	11557453	1293312	36637	900	652	49.8	2	24	1	0	899	920	0	25755.1	24.3	27815.4
Mar 16 2020	15793	2923	298	78595878	12854350	1296897	36738	901	656	50	1.9	24	0	866	900	936	0	25755.1	23.2	27838.6
Mar 17 2020	16086	3216	293	79893092	14151564	1297214	36747	901	644	49	2.3	24	0	866	900	938	0	25755.1	24.2	27862.8
Mar 18 2020	16376	3506	290	81186328	15444800	1293236	36635	900	637	48.7	2.4	23.9	1	881	900	914	0	25755.1	23.2	27886
Mar 19 2020	16660	3790	284	82481232	16739704	1294904	36682	899	625	47.7	2.7	24	0	872	900	916	0	25755.1	24.6	27910.6
Mar 20 2020	16945	4075	285	83777611	18036083	1296379	36724	900	626	47.7	2.7	24	0	868	900	933	0	25755.1	24	27934.6
Mar 21 2020	17237	4367	292	85073261	19331733	1295650	36703	900	643	49	2.3	24	0	870	900	927	0	25755.1	24.1	27958.7
Mar 22 2020	17533	4663	296	86369732	20628204	1296471	36726	900	650	49.6	2.1	24	0	871	900	925	0	25755.1	23.1	27981.8
Mar 23 2020	17828	4958	295	87662763	21921235	1293031	36629	899	649	49.6	2.1	23.9	1	660	900	1034	0	25755.1	24.1	28005.9
Mar 24 2020	18130	5260	302	88958222	23216694	1295459	36698	900	664	50.7	1.8	24	0	875	900	923	0	25755.1	24.2	28030.1
Mar 25 2020	18317	5447	187	89777991	24036463	819769	23222	900	411	49.5	2.1	15.2	0	865	900	923	0	25755.1	15.2	28045.3
Mar 26 2020	18317	5447	0	89777991	24036463	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0
Mar 27 2020	18317	5447	0	89777991	24036463	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	47.2	28092.5
Mar 28 2020	18317	5447	0	89777991	24036463	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	0	28092.5
Mar 29 2020	18454	5584	137	90346149	24604621	568158	16095	899	302	52.5	1.5	10.5	1	-1	893	957	0	25755.1	10.5	28103
Mar 30 2020	18454	5584	0	90346149	24604621	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	0	28103
Mar 31 2020	18555	5685	101	90753887	25012359	407738	11550	899	222	53.8	1.1	7.6	1	12	888	935	0	25755.1	7.5	28110.4
Apr 1 2020	18864	309	309	92049676	1295789	1295789	36707	900	679	51.8	1.6	24	0	869	900	927	0	25755.1	23.1	28133.5
Apr 2 2020	19144	589	280	93227866	2473979	1178190	33376	899	616	51.7	1.6	21.8	1	-7	896	962	0	25755.1	22	28155.6
Apr 3 2020	19449	894	305	94523478	3769591	1295612	36702	900	670	51.1	1.7	24	0	862	900	930	0	25755.1	24.2	28179.8
Apr 4 2020	19753	1198	304	95818958	5065071	1295480	36698	900	668	51	1.7	24	0	868	900	927	0	25755.1	24.1	28203.9
Apr 5 2020	20059	1504	306	97115747	6361860	1296789	36735	901	672	51.2	1.6	24	0	868	900	931	0	25755.1	23.2	28227.1
Apr 6 2020	20369	1814	310	98411688	7657801	1295941	36711	900	681	52	1.4	24	0	881	900	917	0	25755.1	24.2	28251.3
Apr 7 2020	20677	2122	308	99707379	8953492	1295691	36704	900	678	51.7	1.5	24	0	870	900	939	0	25755.1	24.1	28275.4
Apr 8 2020	20982	2427	305	101004367	10250480	1296988	36741	901	671	51.1	1.6	24	0	858	900	941	0	25755.1	24.1	28299.5
Apr 9 2020	21276	2721	294	102268561	11514674	1264194	35812	899	647	50.6	1.7	23.4	1	73	897	967	0	25755.1	22.6	28322.1
Apr 10 2020	21584	3029	308	103565062	12811175	1296501	36727	900	676	51.6	1.4	24	0	869	900	952	0	25755.1	24.1	28346.2
Apr 11 2020	21885	3330	301	104861376	14107489	1296314	36722	900	662	50.5	1.7	24	0	872	900	931	0	25755.1	24.2	28370.4
Apr 12 2020	22184	3629	299	106156990	15403103	1295614	36702	900	657	50.1	1.8	24	0	867	900	943	0	25755.1	24.1	28394.5
Apr 13 2020	22482	3927	298	107452924	16699037	1295934	36711	900	656	50	1.8	24	0	873	900	925	0	25755.1	23.1	28417.6
Apr 14 2020	22779	4224	297	108745731	17991844	1292807	36623	900	653	49.9	1.8	23.9	1	0	899	935	0	25755.1	24.5	28442.1
Apr 15 2020	23076	4521	297	110041419	19287532	1295688	36704	900	652	49.8	1.8	24	0	864	900	933	0	25755.1	24.2	28466.3
Apr 16 2020	23371	4816	295	111337401	20583514	1295982	36713	900	650	49.5	1.8	24	0	865	900	947	0	25755.1	23.1	28489.4
Apr 17 2020	23674	5119	303	112633194	21879307	1295793	36707	900	665	50.7	1.6	24	0	850	900	943	0	25755.1	24.2	28513.7
Apr 18 2020	23970	5415	296	113930164	23176277	1296970	36741	901	650	49.6	1.9	24	0	870	900	927	0	25755.1	24.1	28537.8
Apr 19 2020	24267	5712	297	115226678	24472791	1296514	36728	900	653	49.8	1.8	24	0	842	900	936	0	25755.1	24.1	28561.9
Apr 20 2020	24560	6005	293	116522371	25768484	1295693	36704	900	645	49.2	2	24	0	874	900	928	0	25755.1	23.2	28585.1
Apr 21 2020	24853	6298	293	117818840	27064953	1296469	36726	900	645	49.2	1.9	24	0	865	900	938	0	25755.1	24.1	28609.2
Apr 22 2020	25148	6593	295	119104849	28350962	1286009	36430	899	649	49.9	1.8	23.8	1	290	897	939	0	25755.1	24	28633.2
Apr 23 2020	25445	6890	297	120400426	29646539	1295577	36701	900	654	49.9	1.8	24	0	870	900	948	0	25755.1	24.2	28657.4
Apr 24 2020	25738	7183	293	121696047	30942160	1295621	36702	900	645	49.2	1.9	24	0	872	900	932	0	25755.1	23.2	28680.6
Apr 25 2020	26032	7477	294	122993253	32239366	1297206	36747	901	647	49.3	1.9	24	0	880	900	927	0	25755.1	24.1	28704.7
Apr 26 2020	26332	7777	300	124289107	33535220	1295854	36709	900	660	50.3	1.6	24	0	841	900	955	0	25755.1	24.1	28728.8
Apr 27 2020	26631	8076	299	125584502	34830615	1295395	36696	900	657	50.2	1.7	24	0	868	900	945	0	25755.1	24.2	28753
Apr 28 2020	26928	8373	297	126879839	36125952	1295337	36694	900	652	49.8	1.8	24	0	868	900	932	0	25755.1	23	28776
Apr 29 2020	27222	8667	294	128175798	37421911	1295959	36712	900	647	49.4	1.9	24	0	870	900	930	0	25755.1	24.2	28800.2
Apr 30 2020	27524	8969	302	129471568	38717681	1295770	36707	900	665	50.7	1.6	24	0	873	900	935	0	25755.1	24.1	28824.3
May 1 2020	27829	305	305	130767354	1295786	1295786	36707	900	671	51.1	1.5	24	0	862	900	932	0	25755.1	24.2	28848.5
May 2 2020	28015	491	186	131554654	2083086	787300	22303	899	410	51.5	1.4	14.6	1	7	894	951	0	25755.1	13.7	28862.3
May 3 2020	28313	789	298	132850108	3378540	1295454	36698	900	656	50.1	1.8	24	0	876	900	925	0	25755.1	24.1	28886.4
May 4 2020	28614	1090	301	134146621	4675053	1296513	36728	900	662	50.4	1.6	24	0	870	900	927	0	25755.1	24.2	28910.6
May 5 2020	28707	1183	93	134547669	5076101	401048	11361	901	205	50.5	1.6	7.4	0	861	900	934	0	25755.1	7	28917.6
May 6 2020	28707	1183	0	134547669	5076101	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0
May 7 2020	28818	1294	111	135033126	5561558	485457	13752	900	243	49.5	1.9	9.0	1	0	897	920	0	25755.1	64.3	28981.8
May 8 2020	29114	1590	296	136329670	6858102	1296544	36729	900	652	49.7	1.8	24	0	870	900	925	0	25755.1	24.1	29005.9
May 9 2020	29409	1885	295	137625679	8154111	1296009	36713	900	650	49.5	1.8	24	0	875	900	924	0	25755.1	24.2	29030.1
May 10 2020	29702	2178	293	138921776	9450208	1296097	36716	900	645	49.1	1.9	24	0	877	900	919	0	25755.1	24.1	29054.2
May 11 2020	29997	2473	295	140218325	10746757	1296549	36729	900	648	49.4	1.7	24	0	872	900	934	0	25755.1	23.1	29077.3
May 12 2020	30293	2769	296	141511233	12039665	1292908	36626	900	650	49.7	1.7	23.9	1	868	900	945	0	25755.1	24.2	29101.5
May 13 2020	30349	2825	56	141752970	12281402	241737	6848	902	122	49.9	1.6	4.4	0	887	900	910	0	25755.1	5.2	29106.7

Date	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
May 14 2020	30484	2960	135	142315312	12843744	562342	15930	899	298	52.3	1.3	10.5	1	7	891	944	0	25755.1	10.3	29117
May 15 2020	30782	3258	298	143610971	14139403	1295659	36703	900	656	50	1.8	24	0	872	900	922	0	25755.1	23.2	29140.2
May 16 2020	31079	3555	297	144907016	15435448	1296045	36714	900	654	49.9	1.9	24	0	854	900	936	0	25755.1	24.1	29164.3
May 17 2020	31378	3854	299	146202590	16731022	1295574	36701	900	658	50.2	1.8	24	0	863	900	939	0	25755.1	24.1	29188.4
May 18 2020	31586	4062	208	147108975	17637407	906385	25676	900	457	49.9	1.8	16.7	0	855	900	944	0	25755.1	17.1	29205.5
May 19 2020	31729	4205	143	147691726	18220158	582751	16508	900	315	53.4	0.9	10.8	1	24	892	955	0	25755.1	10.5	29216
May 20 2020	32041	4517	312	148988545	19516977	1296819	36736	901	686	52.3	1.1	24	0	854	900	945	0	25755.1	24.1	29240.1
May 21 2020	32354	4830	313	150282590	20811022	1294045	36658	900	688	52.6	0.8	23.9	1	852	900	948	0	25755.1	23.5	29263.6
May 22 2020	32665	5141	311	151579146	22107578	1296556	36729	900	683	52.1	0.9	24	0	849	900	946	0	25755.1	24.1	29287.7
May 23 2020	32974	5450	309	152874409	23402841	1295263	36692	900	680	51.9	0.9	24	0	833	900	946	0	25755.1	24.2	29311.9
May 24 2020	33184	5660	210	154171215	24699647	1296806	36736	901	462	35.2	7.4	24	0	864	900	939	0	25755.1	23.2	29335.1
May 25 2020	33490	5966	306	155467567	25995999	1296352	36723	900	672	51.3	0.9	24	0	872	900	930	0	25755.1	24.1	29359.2
May 26 2020	33796	6272	306	156761218	27289650	1293651	36647	900	674	51.5	0.8	23.9	1	0	899	934	0	25755.1	24	29383.2
May 27 2020	34100	6576	304	158057186	28585618	1295968	36712	900	669	51.1	1	24	0	847	900	950	0	25755.1	24.2	29407.4
May 28 2020	34401	6877	301	159351577	29880009	1294391	36668	899	661	50.5	1.1	24	0	859	900	942	0	25755.1	23.1	29430.6
May 29 2020	34698	7174	297	160648205	31176637	1296628	36731	900	653	49.8	1.1	24	0	864	900	929	0	25755.1	24.2	29454.8
May 30 2020	34996	7472	298	161944289	32472721	1296084	36715	900	656	50	0.9	24	0	856	900	943	0	25755.1	24.1	29478.9
May 31 2020	35300	7776	304	163240072	33768504	1295783	36707	900	668	50.9	0.8	24	0	856	900	940	0	25755.1	24.1	29503
Jun 1 2020	35607	307	307	164534854	1294782	1294782	36679	899	675	51.5	0.6	24	0	853	900	967	0	25755.1	23.2	29526.2
Jun 2 2020	35908	608	301	165830603	2590531	1295749	36706	900	663	50.5	0.9	24	0	849	900	946	0	25755.1	24.1	29550.3
Jun 3 2020	36212	912	304	167126639	3886567	1296036	36714	900	669	51	0.7	24	0	836	900	958	0	25755.1	24.2	29574.5
Jun 4 2020	36514	1214	302	168422694	5182622	1296055	36715	900	665	50.7	0.8	24	0	847	900	963	0	25755.1	24.1	29598.6
Jun 5 2020	36808	1508	294	169717502	6477430	1294808	36679	899	647	49.4	1.1	24	0	875	900	933	0	25755.1	23.1	29621.7
Jun 6 2020	37104	1804	296	171013132	7773060	1295630	36703	900	652	49.7	0.9	24	0	877	900	918	0	25755.1	24.2	29645.9
Jun 7 2020	37410	2110	306	172309012	9068940	1295880	36710	900	674	51.4	0.5	24	0	837	900	937	0	25755.1	24.1	29670
Jun 8 2020	37714	2414	304	173604891	10364819	1295879	36710	900	670	51.1	0.6	24	0	864	900	930	0	25755.1	24.1	29694.1
Jun 9 2020	38015	2715	301	174899972	11659900	1295081	36687	899	661	50.5	0.7	24	0	870	900	925	0	25755.1	24.1	29718.2
Jun 10 2020	38312	3012	297	176181058	12940986	1281086	36291	900	654	50.5	0.8	23.7	1	197	897	946	0	25755.1	22.9	29741.1
Jun 11 2020	38605	3305	293	177476787	14236715	1295729	36705	900	643	49.1	1.1	24	0	868	900	922	0	25755.1	24.1	29765.2
Jun 12 2020	38897	3597	292	178772680	15532608	1295893	36710	900	643	49.1	1	24	0	880	900	916	0	25755.1	24.1	29789.4
Jun 13 2020	39196	3896	299	180068903	16828831	1296223	36719	900	659	50.2	0.8	24	0	857	900	922	0	25755.1	24.2	29813.6
Jun 14 2020	39499	4199	303	181365017	18124945	1296114	36716	900	666	50.8	0.7	24	0	882	900	916	0	25755.1	23.1	29836.7
Jun 15 2020	39802	4502	303	182661309	19421237	1296292	36721	900	667	50.8	0.7	24	0	841	900	970	0	25755.1	24.1	29860.8
Jun 16 2020	40106	4806	304	183956679	20716607	1295370	36695	900	668	51	0.7	24	0	870	900	924	0	25755.1	24.1	29884.9
Jun 17 2020	40345	5045	239	184978746	21738674	1022067	28953	900	526	50.9	0.8	18.9	0	847	900	942	0	25755.1	19.4	29904.3
Jun 18 2020	40521	5221	176	185702458	22462386	723712	20501	898	387	52.8	0.7	13.4	2	71	892	958	0	25755.1	12.5	29916.8
Jun 19 2020	40662	5362	141	186303929	23063857	601471	17038	899	309	50.8	0.8	11.1	0	868	900	938	0	25755.1	12.1	29928.8
Jun 20 2020	40823	5523	161	186950641	23710569	646712	18320	899	355	54.2	0.5	12	1	18	892	935	0	25755.1	11.6	29940.4
Jun 21 2020	40952	5652	129	187478583	24238511	527942	14956	900	283	52.9	0.6	9.7	0	858	900	929	0	25755.1	10.1	29950.4
Jun 22 2020	41122	5822	170	188168839	24928767	690256	19554	899	374	53.5	0.8	12.8	1	16	894	948	0	25755.1	12.1	29962.5
Jun 23 2020	41433	6133	311	189461767	26221695	1292928	36626	900	684	52.3	0.9	23.9	1	868	900	945	0	25755.1	24.3	29986.8
Jun 24 2020	41741	6441	308	190757955	27517883	1296188	36718	900	677	51.6	0.9	24	0	866	900	935	0	25755.1	24.2	30011
Jun 25 2020	42042	6742	301	192054090	28814018	1296135	36717	900	662	50.4	1	24	0	859	900	931	0	25755.1	23.1	30034.1
Jun 26 2020	42336	7036	294	193349831	30109759	1295741	36706	900	646	49.3	1.2	24	0	862	900	936	0	25755.1	24.2	30058.3
Jun 27 2020	42631	7331	295	194645598	31405526	1295767	36706	900	648	49.4	1.1	24	0	869	900	927	0	25755.1	24.1	30082.4
Jun 28 2020	42923	7623	292	195941436	32701364	1295838	36708	900	641	48.9	1.2	24	0	860	900	928	0	25755.1	23.2	30105.6
Jun 29 2020	43211	7911	288	197237159	33997087	1295723	36705	900	632	48.2	1.3	24	0	878	900	926	0	25755.1	24.2	30129.8
Jun 30 2020	43500	8200	289	198533429	35293357	1296270	36721	900	635	48.4	1.4	24	0	873	900	942	0	25755.1	24.1	30153.9
Jul 1 2020	43790	290	290	199829158	1295729	1295729	36705	900	638	48.7	1.6	24	0	857	900	945	0	25755.1	24.2	30178.1
Jul 2 2020	44081	581	291	201125401	2591972	1296243	36720	900	640	48.8	1.6	24	0	874	900	926	0	25755.1	23.2	30201.3
Jul 3 2020	44372	872	291	202421772	3888343	1296371	36724	900	639	48.7	1.6	24	0	861	900	935	0	25755.1	24.2	30225.5
Jul 4 2020	44573	1073	201	203317499	4784070	895727	25374	900	443	48.9	1.3	16.5	0	861	900	936	0	25755.1	17.1	30242.7
Jul 5 2020	44729	1229	156	203970758	5437329	653259	18506	899	343	51.8	1.2	12.1	1	50	893	945	0	25755.1	12	30254.6
Jul 6 2020	45027	1527	298	205266856	6733427	1296098	36716	900	655	49.9	1.5	24	0	867	900	942	0	25755.1	23.1	30277.7
Jul 7 2020	45323	1823	296	206562169	8028740	1295313	36694	900	652	49.7	1.4	24	0	853	900	946	0	25755.1	24.2	30301.9
Jul 8 2020	45621	2121	298	207857336	9323907	1295167	36690	899	655	50	1.2	24	0	861	900	939	0	25755.1	24.1	30326
Jul 9 2020	45908	2408	287	209154211	10620782	1296875	36738	901	631	48.1	1.8	24	0	847	900	963	0	25755.1	24.2	30350.3
Jul 10 2020	46189	2689	281	210451009	11917580	1296798	36736	901	619	47.2	1.8	24	0	863	900	938	0	25755.1	23.1	30373.4
Jul 11 2020	46377	2877	188	211286453	12753024	835444	23666	899	414	49	1.5	15.5	1	30	897	963	0	25755.1	15.7	30389.1
Jul 12 2020	46663	3163	286	212582608	14049179	1296155	36717	900	630	48	1.5	24	0	856	900	934	0	25755.1	24.2	30413.3
Jul 13 2020	46738	3238	75	212918045	14384616	335437	9502	898	165	48.7	1.4	6.2	2	28	877	950	0	25755.1	6.5	30419.8
Jul 14 2020	46915	3415	177	213675064	15141635	757019	21445	899	390	50.8	1.3	14.1	1	18	893	985	0	25755.1	13.6	30433.3
Jul 15 2020	47202	3702	287	214970838	16437409	1295774	36707	900	631	48.1	1.5	24	0	856	900	941	0	25755.1	24.1	30457.4
Jul 16 2020	47479	3979	277	216268180	17734751	1297342	36751	901	610	46.5	2	24	0	863	900	934	0	25755.1	23.2	30480.6
Jul 17 2020	47760	4260	281	217563510	19030081	1295330	36694	900	619	47.2	1.7	24	0	854	900	953	0	25755.1	24.2	30504.8
Jul 18 2020	48043	4543	283	218859169	20325740	1295659	36703	900	622	47.5	1.5	24	0	871	900	932	0	25755.1	24.1	30529
Jul 19 2020	48320	4820	277	220155544	21622115	1296375	36724	900	608	46.4	1.8	24	0	876	900	928	0	25755.1	24.2	30553.2

Date	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
Jul 20 2020	48592	5092	272	221451032	22917603	1295488	36699	900	599	45.7	2.1	24	0	850	900	946	0	25755.1	23.2	30576.4
Jul 21 2020	48867	5367	275	222747213	24213784	1296181	36718	900	605	46.1	1.8	24	0	871	900	920	0	25755.1	24.2	30600.6
Jul 22 2020	49141	5641	274	224042286	25508857	1295073	36687	899	603	46	1.8	24	0	867	900	926	0	25755.1	24.1	30624.7
Jul 23 2020	49415	5915	274	225322574	26789145	1280288	36268	899	602	46.5	1.6	23.7	1	168	897	958	0	25755.1	23.7	30648.4
Jul 24 2020	49693	6193	278	226609289	28075860	1286715	36450	900	612	47	1.6	23.8	1	355	899	941	0	25755.1	24	30672.4
Jul 25 2020	49969	6469	276	227905616	29372187	1296327	36722	900	607	46.3	1.8	24	0	869	900	925	0	25755.1	23.2	30695.6
Jul 26 2020	50240	6740	271	229202066	30668637	1296450	36726	900	596	45.4	1.8	24	0	870	900	931	0	25755.1	24.2	30719.8
Jul 27 2020	50512	7012	272	230498781	31965352	1296715	36733	901	598	45.6	1.8	24	0	863	900	935	0	25755.1	24.1	30743.9
Jul 28 2020	50783	7283	271	231795291	33261862	1296510	36728	900	595	45.3	1.8	24	0	872	900	927	0	25755.1	23.3	30767.2
Jul 29 2020	51050	7550	267	233090091	34556662	1294800	36679	899	587	44.8	2	24	0	864	900	942	0	25755.1	24.2	30791.4
Jul 30 2020	51315	7815	265	234386351	35852922	1296260	36720	900	584	44.5	2	24	0	862	900	938	0	25755.1	24.2	30815.6
Jul 31 2020	51582	8082	267	235683062	37149633	1296711	36733	900	588	44.8	1.9	24	0	870	900	940	0	25755.1	23.1	30838.7
Aug 1 2020	51657	75	75	236052616	369554	369554	10469	901	164	44	2.1	6.8	0	888	900	910	0	25755.1	7.9	30846.6
Aug 2 2020	51794	212	137	236648912	965850	596296	16892	899	301	49.9	1.5	11.1	1	35	893	964	0	25755.1	10.6	30857.2
Aug 3 2020	52070	488	276	237944463	2261401	1295551	36700	900	608	46.4	1.9	24	0	864	900	926	0	25755.1	24.2	30881.4
Aug 4 2020	52340	758	270	239237692	3554630	1293229	36635	900	594	45.4	2.1	23.9	1	0	899	951	0	25755.1	23.1	30904.5
Aug 5 2020	52610	1028	270	240533736	4850674	1296044	36714	900	594	45.3	2.1	24	0	876	900	938	0	25755.1	24.2	30928.7
Aug 6 2020	52874	1292	264	241819438	6136376	1285702	36421	899	582	44.7	2.3	23.8	1	262	897	962	0	25755.1	24	30952.7
Aug 7 2020	53141	1559	267	243115245	7432183	1295807	36708	900	587	44.7	2.2	24	0	877	900	923	0	25755.1	24.2	30976.9
Aug 8 2020	53402	1820	261	244411768	8728706	1296523	36728	900	574	43.8	2.5	24	0	867	900	927	0	25755.1	23.2	31000.1
Aug 9 2020	53663	2081	261	245708890	10025828	1297122	36745	901	574	43.8	2.5	24	0	858	900	926	0	25755.1	24.2	31024.3
Aug 10 2020	53921	2339	258	247005121	11322059	1296231	36720	900	567	43.2	2.7	24	0	865	900	933	0	25755.1	24.2	31048.5
Aug 11 2020	54126	2544	205	248041958	12358896	1036837	29372	899	451	43	3	19.2	2	34	893	947	0	25755.1	18.4	31066.9
Aug 12 2020	54361	2779	235	249272962	13589900	1231004	34872	900	518	41.6	3.4	22.8	1	64	897	973	0	25755.1	23	31090
Aug 13 2020	54603	3021	242	250569355	14886293	1296393	36724	900	531	40.5	3.7	24	0	860	900	925	0	25755.1	24.2	31114.2
Aug 14 2020	54843	3261	240	251865728	16182666	1296373	36724	900	529	40.3	3.7	24	0	866	900	927	0	25755.1	23.2	31137.4
Aug 15 2020	55086	3504	243	253161628	17478566	1295900	36710	900	534	40.7	3.6	24	0	861	900	935	0	25755.1	24.2	31161.6
Aug 16 2020	55325	3743	239	254457182	18774120	1295554	36700	900	526	40.1	3.8	24	0	862	900	928	0	25755.1	24.2	31185.8
Aug 17 2020	55563	3981	238	255753726	20070664	1296544	36728	900	523	39.9	4.1	24	0	856	900	940	0	25755.1	24.1	31209.9
Aug 18 2020	55806	4224	243	257049731	21366669	1296005	36713	900	535	40.8	4	24	0	863	900	941	0	25755.1	23.2	31233.1
Aug 19 2020	56038	4456	232	258279873	22596811	1230142	34847	899	511	41	4.1	22.8	1	78	897	947	0	25755.1	23	31256.1
Aug 20 2020	56281	4699	243	259575440	23892378	1295567	36701	900	535	40.8	4.2	24	0	877	900	923	0	25755.1	24.1	31280.2
Aug 21 2020	56524	4942	243	260871643	25188581	1296203	36719	900	536	40.8	4.3	24	0	878	900	922	0	25755.1	24.2	31304.4
Aug 22 2020	56766	5184	242	262167911	26484849	1296268	36721	900	532	40.5	4.3	24	0	873	900	921	0	25755.1	23.2	31327.6
Aug 23 2020	57006	5424	240	263464012	27780950	1296101	36716	900	528	40.3	4.5	24	0	865	900	923	0	25755.1	24.2	31351.8
Aug 24 2020	57244	5662	238	264760491	29077429	1296479	36727	900	524	40	4.6	24	0	846	900	925	0	25755.1	24.2	31376
Aug 25 2020	57407	5825	163	265587600	29904538	827109	23430	900	359	42.9	4	15.3	1	60	895	951	0	25755.1	14.5	31390.5
Aug 26 2020	57665	6083	258	266884108	31201046	1296508	36727	900	568	43.3	3.5	24	0	862	900	924	0	25755.1	24.2	31414.7
Aug 27 2020	57930	6348	265	268180131	32497069	1296023	36714	900	583	44.4	2.6	24	0	865	900	920	0	25755.1	24.2	31438.9
Aug 28 2020	58174	6592	244	269378676	33695614	1198545	33952	899	537	44.3	2.7	22.2	1	28	894	957	0	25755.1	22.4	31461.3
Aug 29 2020	58439	6857	265	270674861	34991799	1296185	36718	900	582	44.4	2.6	24	0	856	900	931	0	25755.1	23.1	31484.4
Aug 30 2020	58581	6999	142	271352695	35669633	677834	19202	900	313	45.6	2.3	12.5	0	876	900	918	0	25755.1	13.4	31497.8
Aug 31 2020	58581	6999	0	271352695	35669633	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	0	31497.8
Sep 1 2020	58738	157	157	272026999	674304	674304	19102	899	345	50.5	1.4	12.5	1	9	892	968	0	25755.1	11.9	31509.6
Sep 2 2020	59022	441	284	273322292	1969597	1295293	36693	900	624	47.6	1.9	24	0	854	900	935	0	25755.1	24.2	31533.8
Sep 3 2020	59295	714	273	274618199	3265504	1295907	36710	900	601	45.8	2.2	24	0	868	900	928	0	25755.1	24.2	31558
Sep 4 2020	59560	979	265	275894638	4541943	1276439	36159	901	583	45.1	2.2	23.6	0	868	900	934	0	25755.1	23.1	31581.1
Sep 5 2020	59560	979	0	275894638	4541943	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	0.4	31581.5
Sep 6 2020	59560	979	0	275894638	4541943	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	0	31581.5
Sep 7 2020	59635	1054	75	276243347	4890652	348709	9878	898	165	46.9	3.4	6.5	1	10	886	928	0	25755.1	6.5	31588
Sep 8 2020	59774	1193	139	276893070	5540375	649723	18405	898	306	46.6	3.4	12.1	1	10	891	953	0	25755.1	11.2	31599.2
Sep 9 2020	60042	1461	268	278189147	6836452	1296077	36715	900	589	44.9	3.8	24	0	854	900	929	0	25755.1	24.1	31623.3
Sep 10 2020	60302	1721	260	279484149	8131454	1295002	36685	899	572	43.7	4.1	24	0	866	900	926	0	25755.1	24.2	31647.5
Sep 11 2020	60553	1972	251	280780301	9427606	1296152	36717	900	553	42.1	4.7	24	0	883	900	916	0	25755.1	24.2	31671.7
Sep 12 2020	60804	2223	251	282076233	10723538	1295932	36711	900	551	42	4.7	24	0	877	900	920	0	25755.1	23.1	31694.8
Sep 13 2020	61046	2465	242	283373512	12020817	1297279	36749	901	533	40.6	4.9	24	0	884	900	911	0	25755.1	24.2	31719
Sep 14 2020	61290	2709	244	284668930	13316235	1295418	36697	900	536	40.9	4.7	24	0	872	900	925	0	25755.1	24.1	31743.1
Sep 15 2020	61523	2942	233	285955051	14602356	1286121	36433	900	514	39.5	4.8	23.8	0	886	900	914	0	25755.1	24.1	31767.2
Sep 16 2020	61649	3068	126	286575883	15223188	620832	17587	900	278	44.3	3.7	11.5	1	9	892	962	0	25755.1	10.7	31777.9
Sep 17 2020	61898	3317	249	287870771	16518076	1294888	36682	899	548	41.8	4.4	24	0	868	900	926	0	25755.1	24.1	31802
Sep 18 2020	62149	3568	251	289166245	17813550	1295474	36698	900	552	42.1	4.4	24	0	865	900	922	0	25755.1	24.2	31826.2
Sep 19 2020	62398	3817	249	290463368	19110673	1297123	36745	901	547	41.7	4.5	24	0	872	900	919	0	25755.1	24.2	31850.4
Sep 20 2020	62648	4067	250	291759216	20406521	1295848	36709	900	551	42	4.5	24	0	872	900	935	0	25755.1	23.2	31873.6
Sep 21 2020	62899	4318	251	293055037	21702342	1295821	36708	900	552	42.1	4.2	24	0	869	900	925	0	25755.1	24.1	31897.7
Sep 22 2020	63158	4577	259	294351041	22998346	1296004	36713	900	570	43.5	3.1	24	0	861	900	943	0	25755.1	24.2	31921.9
Sep 23 2020	63411	4830	253	295647291	24294596	1296250	36720	900	557	42.4	3.1	24	0	882	900	918	0	25755.1	23.2	31945.1
Sep 24 2020	63670	5089	259	296943863	25591168	1296572	36729	900	570	43.4	2.8	24	0	883	900	914	0	25755.1	24.1	31969.2

Date	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
Sep 25 2020	63926	5345	256	298240000	26887305	1296137	36717	900	563	42.9	3	24	0	860	900	934	0	25755.1	24.2	31993.4
Sep 26 2020	64181	5600	255	299536577	28183882	1296577	36729	900	560	42.7	2.9	24	0	862	900	942	0	25755.1	24.2	32017.6
Sep 27 2020	64422	5841	241	300831964	29479269	1295387	36696	900	529	40.4	3.5	24	0	863	900	927	0	25755.1	23.2	32040.8
Sep 28 2020	64558	5977	136	301521571	30168876	689607	19535	900	300	43	3.3	12.8	1	10	893	954	0	25755.1	13	32053.8
Sep 29 2020	64814	6233	256	302817896	31465201	1296325	36722	900	563	42.9	3.3	24	0	860	900	935	0	25755.1	24.1	32077.9
Sep 30 2020	65064	6483	250	304114757	32762062	1296861	36737	901	551	42	3.5	24	0	873	900	929	0	25755.1	24.2	32102.1
Oct 1 2020	65308	244	244	305410470	1295713	1295713	36705	900	537	41	3.7	24	0	873	900	928	0	25755.1	23.2	32125.3
Oct 2 2020	65561	497	253	306706834	2592077	1296364	36723	900	556	42.4	3.4	24	0	870	900	924	0	25755.1	24.1	32149.4
Oct 3 2020	65811	747	250	308002917	3888160	1296083	36715	900	550	42	3.6	24	0	867	900	925	0	25755.1	24.2	32173.6
Oct 4 2020	66069	1005	258	309299190	5184433	1296273	36721	900	567	43.2	3.3	24	0	870	900	923	0	25755.1	23.2	32196.8
Oct 5 2020	66326	1262	257	310596005	6481248	1296815	36736	901	566	43.1	3.4	24	0	869	900	942	0	25755.1	24.2	32221
Oct 6 2020	66375	1311	49	310843835	6729078	247830	7021	900	108	43.2	3.2	4.6	0	871	900	928	0	25755.1	5	32226
Oct 7 2020	66375	1311	0	310843835	6729078	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	0	32226
Oct 8 2020	66538	1474	163	311657876	7543119	814041	23060	900	359	43.6	3.1	15.1	1	304	896	922	0	25755.1	67.1	32293.1
Oct 9 2020	66789	1725	251	312954311	8839554	1296435	36725	900	552	42.1	3.7	24	0	862	900	931	0	25755.1	23.2	32316.3
Oct 10 2020	67037	1973	248	314250322	10135565	1296011	36713	900	545	41.5	3.9	24	0	871	900	924	0	25755.1	24.2	32340.5
Oct 11 2020	67173	2109	136	314927500	10812743	677178	19183	899	299	43.7	3.5	12.5	0	877	900	918	0	25755.1	13.1	32353.6
Oct 12 2020	67298	2234	125	315517093	11402336	589593	16702	899	275	46.1	3.8	11	1	25	894	967	0	25755.1	10.8	32364.4
Oct 13 2020	67556	2492	258	316812866	12698109	1295773	36707	900	567	43.2	4.7	24	0	860	900	935	0	25755.1	23.2	32387.6
Oct 14 2020	67794	2730	238	318026825	13912068	1213959	34389	900	523	42.5	4.4	22.5	2	46	893	926	0	25755.1	22.7	32410.3
Oct 15 2020	68040	2976	246	319322804	15208047	1295979	36713	900	540	41.2	3.9	24	0	873	900	923	0	25755.1	24.2	32434.5
Oct 16 2020	68287	3223	247	320619728	16504971	1296924	36739	901	543	41.4	3.9	24	0	864	900	932	0	25755.1	23.1	32457.6
Oct 17 2020	68529	3465	242	321915001	17800244	1295273	36693	900	532	40.6	4.1	24	0	874	900	926	0	25755.1	24.2	32481.8
Oct 18 2020	68767	3703	238	323210347	19095590	1295346	36695	900	524	39.9	4.4	24	0	876	900	927	0	25755.1	24.2	32506
Oct 19 2020	69004	3940	237	324505822	20391065	1295475	36698	900	521	39.7	4.6	24	0	869	900	923	0	25755.1	24.2	32530.2
Oct 20 2020	69150	4086	146	325293045	21178288	787223	22300	900	321	40.3	4.2	14.6	0	872	900	916	0	25755.1	14.6	32544.8
Oct 21 2020	69319	4255	169	326131837	22017080	838792	23761	899	372	43.8	5.2	15.6	1	-7	893	967	0	25755.1	14.7	32559.6
Oct 22 2020	69562	4498	243	327426819	23312062	1294982	36684	899	533	40.7	4.9	24	0	882	900	918	0	25755.1	24.2	32583.8
Oct 23 2020	69805	4741	243	328722558	24607801	1295739	36706	900	534	40.8	4	24	0	875	900	925	0	25755.1	24.2	32608
Oct 24 2020	70045	4981	240	330019400	25904643	1296842	36737	901	528	40.3	4.1	24	0	821	900	931	0	25755.1	23.1	32631.1
Oct 25 2020	70284	5220	239	331315702	27200945	1296302	36722	900	526	40.1	4.3	24	0	871	900	928	0	25755.1	24.2	32655.3
Oct 26 2020	70527	5463	243	332611587	28496830	1295885	36710	900	533	40.7	4.2	24	0	873	900	920	0	25755.1	24.2	32679.5
Oct 27 2020	70773	5709	246	333906988	29792231	1295401	36696	900	542	41.3	4.2	24	0	882	900	920	0	25755.1	24.2	32703.7
Oct 28 2020	70953	5889	180	334920990	30806233	1014002	28725	900	396	38.6	5.3	18.8	0	866	900	922	0	25755.1	18.8	32722.5
Oct 29 2020	71057	5993	104	335419951	31305194	498961	14135	900	229	45.3	3.3	9.3	1	52	893	953	0	25755.1	8.5	32731
Oct 30 2020	71311	6247	254	336714707	32599950	1294756	36678	899	559	42.6	3.8	24	0	876	900	915	0	25755.1	24.2	32755.2
Oct 31 2020	71550	6486	239	337986181	33871424	1271474	36018	899	526	40.9	4.5	23.5	1	93	891	923	0	25755.1	24	32779.2
Nov 1 2020	71797	247	247	339282135	1295954	1295954	36712	900	543	41.4	3.8	24	0	881	900	922	0	25755.1	24.6	32803.8
Nov 2 2020	72047	497	250	340565612	2579431	1283477	36358	900	551	42.4	3.5	23.7	2	0	897	954	0	25755.1	24.5	32828.3
Nov 3 2020	72301	751	254	341861566	3875385	1295954	36712	900	560	42.7	3.6	24	0	870	900	932	0	25755.1	24.7	32853
Nov 4 2020	72543	993	242	343156340	5170159	1294774	36678	899	533	40.7	4.4	24	0	864	900	929	0	25755.1	24.6	32877.6
Nov 5 2020	72786	1236	243	344450872	6464691	1294532	36672	899	535	40.9	4.1	24	0	856	900	941	0	25755.1	23.6	32901.1
Nov 6 2020	73034	1484	248	345743298	7757117	1292426	36612	900	546	41.8	3.4	23.7	1	867	900	936	0	25755.1	25.1	32926.2
Nov 7 2020	73086	1536	52	346008654	8022473	265356	7517	902	115	42.7	2.9	4.9	0	884	900	914	0	25755.1	5.2	32931.4
Nov 8 2020	73086	1536	0	346008654	8022473	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	0	32931.4
Nov 9 2020	73189	1639	103	346556656	8570475	548002	15524	900	226	40.8	3.3	10.1	1	271	892	935	0	25755.1	67.8	32999.2
Nov 10 2020	73435	1885	246	347853586	9867405	1296930	36739	901	540	41.2	3.1	24	0	824	900	946	0	25755.1	23.7	33022.9
Nov 11 2020	73679	2129	244	349147976	11161795	1294390	36667	899	537	41	3.2	24	0	876	900	929	0	25755.1	24.7	33047.6
Nov 12 2020	73913	2363	234	350443098	12456917	1295122	36688	899	515	39.3	3.5	24	0	864	900	928	0	25755.1	24.7	33072.3
Nov 13 2020	74158	2608	245	351738257	13752076	1295159	36689	899	540	41.2	3	24	0	863	900	930	0	25755.1	23.6	33095.8
Nov 14 2020	74265	2715	107	352297841	14311660	559584	15852	900	236	41.7	3	10.4	0	884	900	914	0	25755.1	11.4	33107.2
Nov 15 2020	74265	2715	0	352297841	14311660	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	0	33107.2
Nov 16 2020	74401	2851	136	353090129	15103948	792288	22444	901	299	37.3	4	14.6	1	866	900	925	0	25755.1	62.3	33169.4
Nov 17 2020	74631	3081	230	354385312	16399131	1295183	36690	899	505	38.5	3.7	24	0	848	900	945	0	25755.1	24.6	33194
Nov 18 2020	74844	3294	213	355504942	17518761	1119630	31717	899	468	41.3	3.1	20.7	1	3	898	1058	0	25755.1	21.3	33215.4
Nov 19 2020	75053	3503	209	356680742	18694561	1175800	33308	900	459	38.6	3.8	21.8	1	24	896	919	0	25755.1	21.3	33236.7
Nov 20 2020	75274	3724	221	357975837	19989656	1295095	36687	899	485	37	4	24	0	876	898	917	0	25755.1	24.6	33261.3
Nov 21 2020	75504	3954	230	359271564	21285383	1295727	36705	900	506	38.6	3.7	24	0	872	900	923	0	25755.1	24.6	33285.8
Nov 22 2020	75728	4178	224	360567636	22581455	1296072	36715	900	493	37.6	3.9	24	0	870	900	928	0	25755.1	24.7	33310.5
Nov 23 2020	75956	4406	228	361863786	23877605	1296150	36717	900	502	38.3	3.6	24	0	867	900	925	0	25755.1	23.6	33334.1
Nov 24 2020	76172	4622	216	363082373	25096192	1218587	34520	846	476	38.6	3.6	24	0	854	900	921	0	25755.1	24.6	33358.7
Nov 25 2020	76381	4831	209	364230880	26244699	1148507	32535	799	461	39.6	3.4	23.9	1	881	900	923	0	25755.1	25	33383.6
Nov 26 2020	76586	5036	205	365382878	27396697	1151998	32634	800	451	38.7	3.7	24	0	825	900	940	0	25755.1	23.6	33407.2
Nov 27 2020	76792	5242	206	366534104	28547923	1151226	32612	799	454	39	3.8	24	0	878	900	919	0	25755.1	24.7	33431.9
Nov 28 2020	77003	5453	211	367686691	29700510	1152587	32650	800	463	39.7	3.6	24	0	872	900	922	0	25755.1	24.6	33456.5
Nov 29 2020	77204	5654	201	368838160	30851979	1151469	32619	800	443	38	3.7	24	0	866	899	933	0	25755.1	24.7	33481.1
Nov 30 2020	77415	5865	211	369989812	32003631	1151652	32624	800	465	39.9	3.2	24	0	888	900	918	0	25755.1	23.6	33504.7

Date	CO2 Equivalents			Landfill Gas Flow						Methane	Oxygen	Flare	Flare	Temperature			Blower 1		Blower 2	
	Yearly	Monthly	Daily	Yearly	Monthly	Daily	Daily	Avg	Total	Avg	Avg	Run Hours	Starts	Min.	Avg.	Max.	Daily	Cumu.	Daily	Cumu.
	Tonnes CO2	Tonnes CO2	Tonnes CO2	scf	scf	scf	meter3	scfm	MMBTU	(%)	(%)			°C	°C	°C	Hours	Hours	Hours	Hours
Dec 1 2020	77621	206	206	371141926	1152114	1152114	32637	800	452	38.8	3.7	24	0	875	900	920	0	25755.1	24.6	33529.3
Dec 2 2020	77828	413	207	372293813	2304001	1151887	32631	800	456	39.1	3.7	24	0	875	900	915	0	25755.1	24.7	33554
Dec 3 2020	78047	632	219	373444974	3455162	1151161	32610	799	481	41.3	3	24	0	879	900	933	0	25755.1	24.6	33578.5
Dec 4 2020	78271	856	224	374597795	4607983	1152821	32657	801	493	42.2	2.5	24	0	862	900	927	0	25755.1	24.6	33603.1
Dec 5 2020	78389	974	118	375196077	5206265	598282	16948	800	260	42.9	2.3	12.4	1	872	900	918	0	25755.1	12.8	33615.9
Dec 6 2020	78389	974	0	375196077	5206265	0	0	0	0	0	0	0.0	0	0	0	0	0	25755.1	0	33615.9
Dec 7 2020	78496	1081	107	375676042	5686230	479965	13596	799	234	48.2	1.8	10	1	0	890	930	0	25755.1	9.6	33625.5
Dec 8 2020	78746	1331	250	376828503	6838691	1152461	32647	800	549	47.1	2.4	24	0	880	900	920	0	25755.1	24.5	33649.9
Dec 9 2020	78991	1576	245	377979987	7990175	1151484	32619	800	538	46.2	2.8	24	0	872	900	923	0	25755.1	24.4	33674.3
Dec 10 2020	79233	1818	242	379131111	9141299	1151124	32609	799	532	45.7	3.1	24	0	886	900	916	0	25755.1	24.6	33698.9
Dec 11 2020	79476	2061	243	380284207	10294395	1153096	32665	801	535	45.9	3.1	24	0	877	900	921	0	25755.1	24.7	33723.6
Dec 12 2020	79722	2307	246	381436714	11446902	1152507	32648	800	540	46.3	3	24	0	873	900	921	0	25755.1	23.6	33747.1
Dec 13 2020	79965	2550	243	382588403	12598591	1151689	32625	800	536	46	3.2	24	0	861	900	922	0	25755.1	24.7	33771.8
Dec 14 2020	80204	2789	239	383740835	13751023	1152432	32646	800	525	45	3.5	24	0	869	900	922	0	25755.1	24.6	33796.4
Dec 15 2020	80449	3034	245	384891201	14901389	1150366	32588	799	539	46.3	3.2	24	0	880	900	917	0	25755.1	24.7	33821.1
Dec 16 2020	80694	3279	245	386043642	16053830	1152441	32646	800	539	46.2	3.2	24	0	888	900	910	0	25755.1	23.6	33844.6
Dec 17 2020	80937	3522	243	387196770	17206958	1153128	32666	801	534	45.8	3.3	24	0	882	900	923	0	25755.1	24.7	33869.3
Dec 18 2020	81176	3761	239	388347764	18357952	1150994	32605	799	525	45.1	3.6	24	0	860	900	934	0	25755.1	24.7	33894
Dec 19 2020	81422	4007	246	389499800	19509988	1152036	32635	800	542	46.5	3.1	24	0	849	900	926	0	25755.1	23.6	33917.6
Dec 20 2020	81668	4253	246	390652070	20662258	1152270	32642	800	541	46.4	3.3	24	0	869	900	926	0	25755.1	24.7	33942.2
Dec 21 2020	81905	4490	237	391804604	21814792	1152534	32649	800	520	44.6	3.7	24	0	872	900	925	0	25755.1	24.6	33966.8
Dec 22 2020	82150	4735	245	392956364	22966552	1151760	32627	800	540	46.3	3.2	24	0	872	900	922	0	25755.1	24.7	33991.5
Dec 23 2020	82384	4969	234	394108380	24118568	1152016	32634	800	514	44.1	3.9	24	0	859	900	936	0	25755.1	23.6	34015.1
Dec 24 2020	82665	5250	281	395260390	25270578	1152010	32634	800	617	52.9	4.4	24	0	882	900	916	0	25755.1	24.7	34039.7
Dec 25 2020	82905	5490	240	396413282	26423470	1152892	32659	801	528	45.2	3.5	24	0	886	900	917	0	25755.1	24.6	34064.3
Dec 26 2020	83144	5729	239	397562421	27572609	1149139	32553	800	525	45.1	3.5	23.1	1	890	900	914	0	25755.1	24.1	34088.4
Dec 27 2020	83381	5966	237	398711960	28722148	1149539	32564	799	520	44.7	3.7	24	1	878	900	924	0	25755.1	24.4	34112.8
Dec 28 2020	83616	6201	235	399862984	29873172	1151024	32606	799	516	44.3	3.7	24	0	880	900	924	0	25755.1	24.6	34137.3
Dec 29 2020	83856	6441	240	401014971	31025159	1151987	32633	800	528	45.3	3.6	24	0	884	900	914	0	25755.1	24.6	34161.9
Dec 30 2020	84091	6676	235	402168158	32178346	1153187	32667	801	518	44.4	3.8	24	0	876	900	927	0	25755.1	24.7	34186.6
Dec 31 2020	84324	6909	233	403318727	33328915	1150569	32593	799	512	44	3.9	24	0	883	900	919	0	25755.1	23.6	34210.2