Alberta Environment and Parks

APPROVAL
PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended.

APPROVAL NO.: 454-03-00

APPLICATION NO.: 010-454

EFFECTIVE DATE: AUG 2 3 2018

EXPIRY DATE: August 1, 2028

APPROVAL HOLDER: NEWELL REGIONAL SERVICES CORPORATION

ACTIVITY: Construction, operation and reclamation of the Newell Regional waterworks system

is subject to the attached terms and conditions.

Designated Director under the Act: Susan McIntosh

Date Signed: AUG 2 3 2018

TERMS AND CONDITIONS ATTACHED TO APPROVAL

PART 1: DEFINITIONS

SECTION 1.1: DEFINITIONS

1.1.1 All definitions from the Act and the regulations apply except where expressly defined in this approval.

1.1.2 In all PARTS of this approval:

(a) "Act" means the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c.E-12, as amended;

(b) "alternate program" means the Alternate Laboratory Data Quality Assurance Program, as detailed in the Department's *Laboratory Data Quality Assurance Policy Procedures and Guidelines*;

(c) "approved laboratory" means laboratory accredited to the requirements of ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories,* for the drinking water tests methods specified by the Director;

(d) "as-built engineering drawings" means the drawings used in construction that have been updated to record what was actually built;

(e) "bacteriological analysis" means the analysis of water for the presence of *E. coli* or total coliforms;

(f) "chemical" means any substance that is added or used as part of the treatment process;

(g) "chlorine residual" means free chlorine, or combined chlorine or total chlorine;

(h) "clearwell" means a reservoir for the storage of filtered water of sufficient capacity to prevent the need to vary the filtration rate with variations in demand. May also be used to provide chlorine contact time for disinfection;

(i) "contact time" ("T_{10}") means the time taken in minutes for 10% of the water to pass through the particular process unit;

(j) "continuous monitoring" means flow measurement or sample analysis through in-line equipment that creates flow measurements or frequent, discrete sample analysis output and includes a data recorder;

(k) "CT" means disinfectant residual in mg/L multiplied by the contact time;

(l) "$CT_{lowest\ actual}$" means the lowest CT calculated in a particular day:

TERMS AND CONDITIONS ATTACHED TO APPROVAL

$$CT_{\text{lowest actual}} = C \times \frac{T_{10}}{T} \times \frac{V_{min}}{Q_{peak}}$$

Where: C = lowest recorded daily free chorine residual concentration (in milligrams per litre) at the point T_{10} is measured;

$\frac{T_{10}}{T}$ = 0.3; OR

Varies based on the empirical method using typical baffling conditions as per Appendix D in the Standards and Guidelines Document; OR

Varies based on a tracer study, where

T_{10} = the contact time established from the most recent tracer study; and

T = the calculated contact time, assuming no short-circuiting and obtained by dividing the treated water chlorine contact storage volume that was used to determine T_{10}, by the flow that was used to determine T_{10};

V_{min} = the daily minimum volume (in Litres) of water in the clearwell;

Q_{peak} = maximum recorded hourly flow (Litres per minute) or twice the daily average flow (Litres per minute);

(m) "$CT_{required}$" means the CT required to demonstrate the specified Log reduction of *Giardia* cysts and / or viruses as specified in Appendix A or Appendix B of the "Standards and Guidelines Document";

(n) "$CT_{performance\ ratio}$" means $CT_{lowest\ actual}$ / $CT_{required}$;

(o) "day" means calendar day;

(p) "direct integrity testing" means a physical test applied to a membrane unit in order to identify and isolate integrity breaches;

(q) "Director" means an employee of the Government of Alberta designated as a Director under the Act;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(r) "disinfectant residual" means total concentration of disinfectant in water;

(s) "disinfection" means a chemical or physical process of treating water to inactivate microorganisms;

(t) "*E. coli*" means *Escherichia coli* bacteria;

(u) "electronic reporting" means submitting monitoring results to the Director as required in this approval, electronically through the secure internet website provided by Environment and Parks at http://aep.alberta.ca/water/programs-and-services/drinking-water/knowledge/drinking-water-quality-information-electronic-submissions/default.aspx;

(v) "GCDWQ" means the *Guidelines for Canadian Drinking Water Quality*, published by Health Canada, as amended;

(w) "grab", when referring to a sample, means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;

(x) "ISO/IEC" means the International Organization for Standardization / the International Electrotechnical Commission;

(y) "Log reduction" means the base 10 logarithm of the ratio of raw water concentrations divided by the treated water concentration of total *Giardia* cysts, *Cryptosporidium* oocysts or viruses;

(z) "MAC" means the Maximum Acceptable Concentration, specified in the GCDWQ for a particular parameter;

(aa) "PWR" means the *Potable Water Regulation*, as amended;

(bb) "produced water" means all water that has gone through treatment and has entered the water distribution system;

(cc) "Provincial Laboratory of Public Health" means:

(i) the Environmental Microbiology Provincial Laboratory of Public Health, University of Alberta Hospital, Edmonton, Alberta, or

(ii) the Provincial Laboratory of Public Health, Foothills Hospital, Calgary, Alberta;

(dd) "raw water" means untreated source water from water wells, surface water intakes or infiltration galleries that constitute the water supply;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ee) "regulations" means the regulations enacted pursuant to the Act and as amended;

(ff) "Standards and Guidelines Document" means the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems*, published by the Alberta Environment, as amended; and

(gg) "User Agreement" means the *Drinking Water Quality User Agreement* signed by the approval holder and the Director.

PART 2: GENERAL PROVISIONS

SECTION 2.1: GENERAL

2.1.1 The approval holder shall comply with all conditions in this approval.

2.1.2 Any conflict between the approval application and the terms and conditions of this approval shall be resolved in favour of this approval.

2.1.3 The terms and conditions of this approval do not affect any rights or obligations created under any other authorization issued by the Department.

2.1.4 The approval holder shall carry out all electronic reporting, or cause all electronic reporting to be carried out in accordance with the User Agreement.

2.1.5 The approval holder shall comply with the terms and conditions of the User Agreement.

2.1.6 The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.

2.1.7 If the approval holder monitors for any substances or parameters, which are the subject of limits in this approval more frequently than is required, using procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the next reports required by this approval.

2.1.8 *Environmental Protection and Enhancement Act* Approval No. 454-02-00 is cancelled.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

PART 3: PLANNING, CONSTRUCTION AND / OR UPGRADING REQUIREMENTS

SECTION 3.1: PLANNING

3.1.1 The approval holder shall maintain a Drinking Water Safety Plan of the waterworks system.

3.1.2 The *Drinking Water Safety Plan* in 3.1.1 shall:

(a) identify potential risks to the waterworks system including, but not limited to risks associated with the following:

(i) the source of raw water,

(ii) the treatment processes associated with the water treatment plant,

(iii) the distribution of treated water within the water distribution system,

(iv) the consumer's premises located on the waterworks system; and

(b) prescribe appropriate measures to control and/or reduce such risks to the waterworks system

in accordance with the requirements in the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems; Part 1 Standards for Municipal Waterworks* (2012), as amended.

3.1.3 The *Drinking Water Safety Plan* in 3.1.1 shall utilize the *Drinking Water Safety Plan* template located at http://www.environment.alberta.ca/apps/regulateddwq/dwsp.aspx unless otherwise authorized in writing by the Director.

3.1.4 The approval holder shall update the *Drinking Water Safety Plan* at least once per calendar year in every year.

SECTION 3.2: CONSTRUCTION

Not used at this time.

SECTION 3.3: UPGRADE

3.3.1 If a MAC specified in the *GCDWQ* is changed or a new limit MAC is added in the *GCDWQ* and the waterworks system will be unable to meet the new or revised MAC, then the approval holder shall make application to the Director to upgrade the waterworks system such that the waterworks system will be able to meet the new or revised MAC within five (5) years of the date the new or revised guideline was published.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

PART 4: OPERATIONAL REQUIREMENTS

SECTION 4.1: WATERWORKS SYSTEM

4.1.1 The approval holder shall:

(a) operate; and

(b) maintain

a waterworks system which shall include all of the following:

(i) a source consisting of surface water from Lake Newell, NE ¼ 6-18-14-W4M;

(ii) a water treatment plant consisting of:

(A) enhanced coagulation and flocculation (optional),

(B) membrane filtration units,

(C) disinfection by chlorination (primary);

(D) disinfection by chloramination (secondary);

and

(iii) a clearwell.

4.1.2 The approval holder shall maintain a waterworks system *Operations Program* that shall include, at a minimum, all of the information in SCHEDULE 1 of this approval.

4.1.3 The approval holder shall update the *Operations Program* at least on an annual basis.

4.1.4 Where any sample of a sampling event pursuant to 5.1.1 exceeds the turbidity limit in SCHEDULE 3, the approval holder shall:

(a) immediately divert the water from entering the clearwell until the water does not exceed the turbidity limit in SCHEDULE 3; or

(b) in the event that the water has entered the clearwell then:

(i) immediately divert all the water from the clearwell to waste, and

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ii) continue to divert to waste until all the water that exceeded the turbidity limit in SCHEDULE 3 has been flushed from the clearwell; or

(c) report in accordance with 6.1.1.

4.1.5 Where any sample of a sampling event pursuant to 5.1.1 exceeds the particle count limit in SCHEDULE 3 the approval holder shall:

(a) immediately divert the water from entering the clearwell until the water does not exceed the particle count limit in SCHEDULE 3; or

(b) in the event that the water has entered the clearwell then:

(i) immediately divert all the water from the clearwell to waste, and

(ii) continue to divert to waste until all the water that exceeded the particle count limit in SCHEDULE 3 has been flushed from the clearwell; or

(c) report in accordance with 6.1.1.

4.1.6 Where any instance of a direct integrity testing event pursuant to 5.1.1 does not meet or exceed the log reduction credit limit for the membrane filtration system in SCHEDULE 3, the approval holder shall:

(a) immediately stop water production;

(b) identify and segregate the faulty membrane module in the membrane filtration system;

(c) retest the direct integrity of the remaining membrane modules until the testing verifies that the log reduction credit meets of exceeds the limit in SCHEDULE 3; and

(d) place the remaining membrane modules back into service.

SECTION 4.2: FACILITY CLASSIFICATION AND CERTIFIED OPERATOR REQUIREMENTS

FACILITY CLASSIFICATION

4.2.1 The water treatment plant in this approval is classified as Class II in accordance with the *Water and Wastewater Operators' Certification Guidelines.*

TERMS AND CONDITIONS ATTACHED TO APPROVAL

CERTIFIED OPERATOR

4.2.2 At all times the operation of the waterworks system shall be performed by, or under the direction of, a person who holds a valid Level II (or higher) Water Treatment Operators Certificate.

SECTION 4.3: PERFORMANCE LIMITS

POTABLE WATER QUALITY STANDARDS

4.3.1 All produced water shall meet the Treated Water Limits specified in SCHEDULE 3.

4.3.2 At all times, the disinfection and filtration, together, shall achieve:

(a) a total 4-Log reduction for viruses; and

(b) a total 4-Log reduction for *Giardia* and *Cryptosporidium (sp)*.

4.3.3 In addition to compliance with the limits specified in SCHEDULE 3, the produced water shall comply with the *Potable Water Quality* requirements of the *Potable Water Regulation,* as amended, for those parameters specified in SCHEDULE 4, and any parameters added to the GCDWQ.

SECTION 4.4: CHEMICALS USED

4.4.1 The approval holder shall not add any substance, material or compound to water being treated to be potable unless the substance, material or compound:

(a) conforms to American National Standards Institute and National Sanitation Foundation ANSI/NSF Standard 60 or Standard 61; or

(b) is certified for potable use by an agency accredited to the requirements of ISO/IEC 9000 and ISO/IEC 14001; and

(c) is added in a dosage that does not exceed the dosage specified as Maximum Use; or

(d) as otherwise authorized in writing by the Director.

SECTION 4.5: WASTE STREAM

4.5.1 Waste streams shall be released only as follows:

(a) floc basin blowdown shall be discharged to the reject water retention pond;

(b) filter backwash shall be discharged to the reject water retention pond;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(c) filter-to-waste shall be discharged to the reject water retention pond;

(d) membrane draindown shall be discharged to the reject water retention pond;

(e) membrane clean in place waste shall be discharged to

(i) the reject water sump, and

(ii) the reject water retention pond;

(f) membrane rejection stream shall be discharged to the reject water retention pond;

(g) process drains shall be discharged to the reject water retention pond;

(h) reject water retention pond shall be discharged into the Brooks Storm Drainage System;

(i) sanitary wastewater shall be discharged to the Brooks Wastewater System; and

(j) any other waste stream shall be discharged as authorized in writing by the Director.

PART 5: MONITORING REQUIREMENTS

SECTION 5.1: MONITORING

5.1.1 The approval holder shall monitor the waterworks system in accordance with:

(a) SCHEDULE 2; and

(b) SCHEDULE 3.

SECTION 5.2: DATA QUALITY ASSURANCE

5.2.1 With respect to any monitoring required pursuant to this approval, all samples shall be:

(a) collected;

(b) preserved;

(c) stored;

(d) handled; and

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(e) analysed in accordance with:

(i) the *Standard Methods for the Examination of Water and Wastewater*, published by the American Public Health Association, the American Waterworks Association and the Water Environment Federation, as amended or replaced from time to time, or

(ii) a method authorized in writing by the Director.

5.2.2 Any analysis of a sample required pursuant to this approval shall be done only in an approved laboratory or in a laboratory that complies with the Department's alternate program.

5.2.3 Data results of the on-line or continuous monitoring equipment must be validated to ensure that the results reflect the actual quality of the water and are not an electronic or meter spike by direct or indirect means.

5.2.4 Any analysis for treated water bacteriological quality required pursuant to this approval shall be conducted by the Provincial Laboratory of Public Health.

PART 6: REPORTING REQUIREMENTS

SECTION 6.1: CONTRAVENTION REPORTING

6.1.1 In addition to any other reporting required pursuant to this approval, the Act, or the regulations, the approval holder shall immediately report to the Director any contravention of this approval, either:

(a) by telephone at 1-780-422-4505; or

(b) by a method:

(i) in compliance with the release reporting provisions in the Act and the regulations, or

(ii) as authorized in writing by the Director.

6.1.2 In addition to any other reporting required pursuant to this approval, the Act, or the regulations, the approval holder shall immediately report to the Director by a method specified in 6.1.1, any structural or equipment malfunction in the waterworks system that may affect the quality or supply of potable water.

6.1.3 In addition to the immediate reporting in 6.1.1, the approval holder shall provide a report to the Director:

(a) in writing; or

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(b) by a method:

(i) in compliance with the release reporting provisions in the Act and the regulations, or

(ii) authorized in writing by the Director

within seven (7) calendar days after the discovery of the contravention, or within another time period specified in writing by the Director, unless the requirement for the report is waived by the Director.

6.1.4 The report required in 6.1.3 shall contain, at a minimum, the following information:

(a) a description of the contravention;

(b) the date of the contravention;

(c) the duration of the contravention;

(d) the legal land description of the location of the contravention;

(e) an explanation as to why the contravention occurred;

(f) a summary of all preventive measures and actions that were taken prior to the contravention;

(g) a summary of all measures and actions that were taken to mitigate any effects of the contravention;

(h) a summary of all measures that will be taken to address any remaining effects and potential effects related to the contravention;

(i) the number of the approval issued under the Act for the waterworks system, and the name of the approval holder who held the approval at the time the contravention occurred;

(j) the name, address, phone number and responsibilities of all persons operating the waterworks system at the time the contravention occurred;

(k) the name, address, phone number and responsibilities of all persons who had charge, management or control of the waterworks system at the time that the contravention occurred;

(l) a summary of proposed measures that will prevent future contraventions, including a schedule of implementation for these measures;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(m) any information that was maintained or recorded under this approval, as a result of the incident; and

(n) any other information required by the Director in writing.

6.1.5 Where a bacteriological quality sample shows the presence of:

(a) total coliform; or

(b) *E. Coli*

in addition to any reporting or other requirements pursuant to the Act, or the Regulations, the approval holder shall carry out the corrective actions set out in the *Communication and Action Protocol for Failed Bacteriological Results in Drinking Water for Waterworks Systems Authorized under the Environmental Protection and Enhancement Act*, August 2009, entered into by Alberta Environment, Alberta Health Services, Alberta Health and Wellness and Health Canada, as amended.

6.1.6 Where a sample does not meet the MAC for one or more of the physical, inorganic, organic chemical or pesticide parameters in SCHEDULE 4, in addition to any reporting or other requirements pursuant to the Act, or the Regulations, the approval holder shall carry out the corrective actions set out in the *Action Protocol for Exceedances of Chemical Health Parameters in Drinking Water*, Alberta Environment, August 2009, as amended.

SECTION 6.2: MONTHLY REPORTING

6.2.1 The approval holder shall compile and retain monthly reports at the water treatment plant.

6.2.2 The monthly report in 6.2.1 shall include, at a minimum:

(a) the name, telephone and fax numbers of all certified operators;

(b) the analytical results for all parameters required to be monitored in accordance with this approval during the month;

(c) the locations of all sampling performed during the month in accordance with this approval;

(d) the name and manufacturer of all treatment chemicals added during the month, and each manufacturer as listed by the certified agency that tested the chemical to ANSI/NSF Standard 60 or Standard 61;

(e) the results of all required monitoring and measurements conducted during the month in accordance with this approval; and

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(f) a description of any problems experienced, and corrective actions taken at the waterworks system during the month, including all actions taken as per 4.1.4 through 4.1.6.

SECTION 6.3: ANNUAL REPORTING

6.3.1 In addition to any other reporting required under the Act, the regulations and this approval, the approval holder shall compile an annual report, by February 28 of the year following the calendar year in which the information on which the report is based was collected.

6.3.2 Unless otherwise notified in writing by the Director, the approval holder shall submit to the Director the annual report in 6.3.1, by February 28 of the year following the calendar year in which the information on which the report is based was collected.

6.3.3 The annual report in 6.3.1 shall contain, at a minimum, all of the following information:

(a) a summary of the monthly reports, specifying the monthly minimum, average, and maximum results for each parameter monitored, excluding bacteriological results, for each month;

(b) a summary of the total volume of treated water, for each month;

(c) a summary of the number, sampling dates and analytical results of the bacteriological samples analyzed for each month;

(d) the results of any other compliance monitoring done during the year pursuant to this approval, that was not included in any monthly report;

(e) a description of any problems experienced, and corrective actions taken at the waterworks system during the year; and

(f) any changes to the *Operations Program*.

SECTION 6.4: ELECTRONIC REPORTING

6.4.1 The Director may, by notice in writing, require the approval holder to submit periodic reports:

(a) in an electronic format; and

(b) with the following frequency:

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(i) monthly, to the Director on or before the end of the month following the month in which the information on which the report is based was collected,

(ii) annually, to the Director on or before February 28 of the year following the year in which the information on which the report is based was collected, or

(iii) as specified in writing by the Director.

6.4.2 The approval holder who receives a notice as specified in 6.4.1 shall comply with the notice.

PART 7: RECORD KEEPING REQUIREMENTS

SECTION 7.1: GENERAL

7.1.1 The approval holder shall:

(a) record the following information; and

(b) maintain and retain the following records for five (5) years from the date the record was created:

(i) bacteriological analysis results,

(ii) daily records, including but not limited to:

(A) flow meter readings,

(B) chlorine concentrations,

(C) treatment chemical dosages, and

(D) all the requirements of SCHEDULE 3 specific to daily monitoring

required under this approval;

(iii) all monthly reports required under this approval, and

(iv) records of action taken by the approval holder to correct contraventions of the limits in SCHEDULE 3, including the following information for each contravention:

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(A) name and address of the person who discovered the contravention, and

(B) copies of all notifications to the public.

7.1.2 The approval holder shall retain the following records for the life of the waterworks system:

(a) the *Operations Program*;

(b) copies of all:

(i) applications submitted to the Department for an approval regarding the waterworks system which includes, but are not limited to:

(A) correspondence, and

(B) drawings;

(ii) project reports,

(iii) engineering drawings and specifications issued for approved construction,

(iv) as-built engineering drawings,

(v) reports of inspections conducted by the Department,

(vi) correspondence and written notifications sent to the Department regarding a proposed extension of a water distribution system, replacement of a portion of a water distribution system, expansion or modification of potable water storage within the water distribution system,

(vii) approvals issued under the Act for the waterworks system,

(viii) annual reports, and

(ix) reports prepared pursuant to 6.1.3 and 6.1.4;

(c) all physical, organic and inorganic chemical and pesticide analytical results required pursuant to this approval, excluding daily monitoring.

7.1.3 The results and records in 7.1.1(b) shall contain, at a minimum, all of the following information:

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(a) the date, location and time of monitoring, and the name of the person collecting the sample;

(b) identification of the sample type, including, but not limited to whether the sample is taken as required in the approval, a repeat sample, a source or potable water sample, or other special purpose sample;

(c) date of analysis;

(d) laboratory name and person responsible for performing analysis;

(e) the analytical method used; and

(f) the results of the analysis.

7.1.4 The approval holder shall immediately provide any records, reports or data required under this approval to the Director or an inspector, upon request.

PART 8: RECLAMATION REQUIREMENTS

SECTION 8.1: GENERAL

8.1.1 Where the land surface has been disturbed during construction, expansion, modification or repair of any portion of a waterworks system, reclamation of the land surface to equivalent land capability shall be performed following the construction, expansion, modification or repair, in accordance with the Standards and Guidelines Document.

8.1.2 Within six months after the waterworks system, or a portion of the waterworks system, permanently ceases operation, the approval holder shall submit a reclamation plan to the Director for the portion of the waterworks system that is no longer in operation.

8.1.3 The approval holder shall not commence reclamation of the waterworks system until that person has received written authorization from the Director for the reclamation.

DATED AUG 2 3 2018

Susan McIntosh
DESIGNATED DIRECTOR UNDER THE ACT

SCHEDULE 1

OPERATIONS PROGRAM

1) Routine Operational Procedures, which shall, at a minimum, include:

   (a) contact name and telephone numbers for the waterworks system owner, waterworks system operator, engineering consultants and equipment suppliers;

   (b) operating instructions:

      (i) general description of treatment process and operating procedures,

      (ii) performance requirements, and

      (iii) location of equipment major controls;

   (c) general maintenance schedule;

   (d) general maintenance instructions for:

      (i) treatment / process equipment,

      (ii) monitoring equipment,

      (iii) pumping equipment, and

      (iv) membrane repair and replacement procedures.

2) Routine Operational Procedures for Monitoring and Analysis, which shall, at a minimum, include:

   (a) operational and compliance tests to be performed;

   (b) bacteriological quality monitoring plan;

   (c) methods used for monitoring and analysis;

   (d) locations of monitoring points;

   (e) laboratory data quality assurance information;

   (f) direct integrity testing; and

   (g) data collection and analysis of integrity testing.

3) *Emergency Response Plan* which shall at a minimum, include:

SCHEDULE 1

OPERATIONS PROGRAM

(a) steps to be taken in the event of the following:

(i) bacteriological results exceeding the prescribed limits;

(ii) turbidity / particle counts exceeding the limits;

(iii) chemical overfeed;

(iv) no chemical or coagulant feed;

(v) low chlorine residual;

(vi) equipment breakdown;

(vii) flood;

(viii) power failure;

(ix) the waterworks system becoming inoperable, including steps in providing an alternate potable water supply;

(b) cover-off in the event that the Certified Operator is not available to operate the waterworks system;

(c) Water Shortage Response Plans for raw and treated water;

(d) list of contacts; Alberta Environment, Alberta Health, Regional Health Authorities, Fire Department, Disaster Coordinator, and other agencies; and

(e) date of last update.

4) Copy of the as-built engineering drawings.

SCHEDULE 2 – RAW WATER

Monitoring, Measuring and Reporting Frequency Requirements

PARAMETER	STATION LOCATION	MONITORING TYPE and FREQUENCY	REPORTING FREQUENCY
Turbidity	RAW WATER ENTERING THE WATER TREATMENT PLANT	Continuous monitoring and recording at ≤ 5 minute sampling intervals	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4
Volume		Metered, Once per day Reported as Total in m^3	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4
Total Chlorine	WASTE STREAM PRIOR TO ENTERING BROOKS STORM DRAINAGE SYSTEM	Grab sample, Once per month	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	LIMITS
Treated Water BACTERIOLOGICAL					
Bacteriological quality *E. coli* Total Coliforms	LEAVING WATER TREATMENT PLANT: BACTERIOLOGICAL	Grab samples in the quantity specified in the GCDWQ, and the samples shall be taken at regular intervals throughout the month	Number of Grab samples taken per month and Presence or Absence of indicator organisms	Reported monthly As per 6.2, 6.3 and 6.4 of this approval	Zero *E. coli* organisms per 100 mL Zero Total coliform organisms per 100 mL

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	LIMITS
MEMBRANE FILTER - *Treated Water TURBIDITY*					
Turbidity	MEMBRANE FILTER TRAIN #1 TRAIN #2 TRAIN #3 TRAIN #4 (after Individual filter train at a point upstream of the clearwell)	Continuous monitoring and recording at ≤ 5 minute sampling intervals	Report MAXIMUM DAILY value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	≤ 0.1 NTU, at least 99% of the samples on a daily basis; and ≤ 0.3 NTU, 100% of the time
			Report number of cumulative minutes per day the turbidity was between 0.1 and 0.3 NTU	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	LIMITS
MEMBRANE FILTER - *Treated Water PARTICLE COUNTS*					
Particle Counts of particles greater than 2 um	MEMBRANE FILTER TRAIN #1 TRAIN #2 TRAIN #3 TRAIN #4 (after Individual filter train at a point upstream of the clearwell)	Continuous monitoring and recording at ≤ 5 minute sampling intervals	Report MAXIMUM DAILY value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	≤ 20 particles/mL at least 99% of the samples on a daily basis; and < 50 particles/mL, 100% of the time
			In addition to the Membrane Filter limit specified above, the approval holder shall comply with a treated particle count level from each individual membrane filter train of less than or equal to:		
			# of cumulative minutes per day the particles/ml was between 20 and 50 particles/ml.	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	the readings between 20 and 50 particles/ml for a period of ≤ 15 minutes per day)

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	LIMITS
MEMBRANE FILTER – *Direct Integrity Testing*					
Direct Integrity Testing Verification of log removal credit in ultra membrane filters	In EACH MEMBRANE FILTER TRAIN #1 TRAIN #2 TRAIN #3 TRAIN #4	Once per day	Report PASS/FAIL	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	Pass (≥ 4-log credit removal for *Giardia* and *Cryptosporidium*)
Treated Water PRIMARY DISINFECTION					
Chlorine Residual	LEAVING WATER TREATMENT PLANT (where "C" is measured for log reduction of Viruses)	Continuous monitoring and recording at ≤ 5 minute sampling intervals	Record MINIMUM value mg/L Recorded Once per day	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	≥ 0.2 mg/L as Free Chlorine

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	LIMITS
Treated Water PRIMARY DISINFECTION – ALL WATERWORKS SYSTEMS					
$CT_{required}$	LEAVING WATER TREATMENT PLANT	Once per day	Daily values	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	
$CT_{lowest\ actual}$		Calculated Once per day			
CT performance ratio Viruses 4-log reduction	LEAVING WATER TREATMENT PLANT	Calculated Once per day	Daily value		≥ 1
Volume	CLEARWELL	Once per day	MINIMUM daily value in m^3		

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	LIMITS
Flow	LEAVING WATER TREATMENT PLANT	Continuous	MAXIMUM hourly flow or twice the daily average flow in L/Min Recorded Once per day	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	
pH	LEAVING WATER TREATMENT PLANT	Grab Sample Once per day	Daily value		as specified in the GCDWQ
Temperature	LEAVING WATER TREATMENT PLANT	Grab Sample Once per day	Daily value		

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	LIMITS
Treated Water SECONDARY DISINFECTION – ALL WATERWORKS SYSTEMS					
Haloacetic Acids (HAAs)	LEAVING WATER TREATMENT PLANT	1 Grab sample every 3 months	Analytical Results	Reported annually As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	As per the PWR
Total Trihalomethanes (TTHM)	LEAVING WATER TREATMENT PLANT	1 Grab sample every 3 months	Analytical Results	Reported annually As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	As per the PWR

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	LIMITS
Treated Water – ALL WATERWORKS SYSTEMS					
The physical, inorganic and organic chemical and pesticide parameters listed in SCHEDULE 4, and any new parameters with MAC's published in the GCDWQ	LEAVING WATER TREATMENT PLANT	2 Grab samples per annum for all parameters with the exception of Cyanobacterial toxins (as Total Microcystin): (a) One sample taken during winter (December to February); and (b) One sample taken during summer (June to August); and For Cyanobacterial toxins (as Total Microcystin) two grab samples: (a) One sample taken during the period August 1 – August 16; and (b) One sample taken during the period of September 1 to September 16 in any calendar year	Analytical Results	Reported annually As per Part 6 of the approval, unless notified in writing by the Director as per 6.4	As per the PWR

SCHEDULE 4

Table of Physical, Inorganic chemicals, Organic chemicals and Pesticides

Substance	Specific Parameter
Physical Parameters (Primary and Secondary	Colour; pH; Total Dissolved Solids
Inorganic chemicals (Primary)	Antimony; Arsenic; Barium; Boron; Bromate; Cadmium; Chloramines; Chromium; Cyanide; Fluoride; Lead; Mercury; Nitrate; Nitrite; Selenium; and Uranium;
Inorganic and Organic Chemicals (Secondary	Aluminum; Ammonia; Calcium; Chloride; Copper; Total Hardness; Iron; Magnesium; Manganese; Silver; Sodium; Sulphate; Sulphide; Total Organic Carbon; Xylenes (total); and Zinc;

Substance	Specific Parameter
Organic Chemicals and Pesticides (Primary)	Atrazine + metabolites; Benzene; Benzo(a)pyrene; Bromoxynil; Carbon Tetrachloride; Chlorpyrifos; Cyanazine; Cyanobacterial toxins (as Total Microcystin); Diazinon; Dicamba; 1,2-Dichlorobenzene; 1,4-Dichlorobenzene; 1,2-Dichlorethane; Dichloromethane; 2,4-Dichlorophenol; 2,4-D; Diclofop-methyl; Diuron; Dimethoate; Ethylbenzene; Glyphosate; Malathion; Methoxychlor; Metolachlor; Metribuzin; Monochlorobenzene; Nitrilotriacetic Acid (NTA); Pentachlorophenol; Picloram; Simazine; Terbufos; Tetrachloroethylene; 2,3,4,6-Tetrachlorophenol; Toluene; Trichloroethylene; 2,4,6-Trichlorophenol; Trifluralin; and Vinyl Chloride.