

# **ATTACHMENT A**

**Friesen Drillers Ltd. (2012)  
Municipal Groundwater Supply  
Expansion Investigation River Lot 70 –  
Parish of St. Paul, Steinbach, Manitoba**



## **ATTACHMENT B**

### **Sprinkling of Water By-Law No. 2002-31**



**THE RURAL MUNICIPALITY OF EAST ST. PAUL**

**BY-LAW NO. 2002 - 31**

**BEING A BY-LAW OF  
THE RURAL MUNICIPALITY OF EAST ST. PAUL  
TO REGULATE THE SPRINKLING OF WATER**

WHEREAS The Municipal Act, S.M. 1996, c. 58 Cap. M225 provides in part as follows:

“232(1) A council may pass by-laws for municipal purposes respecting the following matters:

- (a) The safety, health, protection and well-being of people and the safety and protection of property;....
- (l) public utilities;...
- (o) the enforcement of by-laws.

232(2) Without limiting the generality of subsection (1), a council may in a by-law passed under this Division:

- (a) regulate or prohibit....
- (c) deal with any development, activity, industry, business, or thing in different ways, or divide any of them into classes and deal with each class in different ways;
- (d) establish fees or other charges for services, activities or things provided or done by the municipality or for the use of property under the ownership, direction, management or control of the municipality;
- (e) subject to the regulations, provide for a system of licences, permits or approvals, including any or all of the following:
  - (i) establishing fees, and terms for payment of fees, for inspections, licences, permits and approvals, including fees related to recovering the costs of regulation, ....
  - (v) providing for the duration of licences, permits and approvals and their suspension or cancellation or any other remedy, including undertaking remedial action, and charging and collecting the costs of such action, for failure to pay a fee or comply with a term or condition or with the by-law or for any other reason specified in the by-law, and....

233 A by-law under clause 232(1)(c) (activities or things in or on private property) may contain provisions only in respect of....

(d) Activities or things that in the opinion of the council are or could become a nuisance, which may include noise, weeds odours, unsightly property, fumes and vibrations.

250(1) A municipality is a corporation and, subject to this Act, has the rights and is subject to the liabilities of a corporation and may exercise its powers for municipal purposes.

250(2) Without limiting the generality of subsection (1), a municipality may for municipal purposes do the following:

(a) ....

(b) ....

(c) acquire, establish, maintain and operate services, facilities and utilities; ....

252(1) A municipality exercising powers in the nature of those referred to in clauses 250(2)(b), (c) and (e) may set terms and conditions in respect of users, including

(a) setting the rates or amounts of deposits, fees and other charges, and charging and collecting them;

(b) providing for a right of entry onto private property to determine compliance with other terms and conditions, to determine the amount of deposits, fees or other charges, or to disconnect a service; and

(c) discontinuing or disconnecting a service and refusing to provide the service to users who fail to comply with the terms and conditions.”

WHEREAS Council of the Rural Municipality of East St. Paul deems it expedient and in the best interest of the public of the Rural Municipality of East St. Paul to regulate the sprinkling of water;

NOW, THEREFORE, the Council of the Rural Municipality of East St. Paul IN OPEN SESSION DULY ASSEMBLED enacts as follows:

1.0 Definitions

1.1 Municipality – Means the Rural Municipality of East St. Paul.

1.2 Person – Means any individual, firm, partnership, association, corporation, company or organization of any kind.

1.3 Premises – Means all land and premises within the Municipality which is used as a residence and/or for commercial activity;

1.4 Sprinkle or Sprinkling – Means the application or distribution of water on lawns or boulevards by sprinkling or spraying but does not include the method known as “drip irrigation”, i.e., supplying water to plants through capillary tubing at a rate of a few drops a minute as and when required.

2.0 Empowerment –

The Superintendent of Public Works for the Municipality is hereby authorized to impose restrictions to regulate the use of water for non-essential purposes and, where he deems appropriate, may issue permits to relax restrictions in specific circumstances. These restrictions shall only apply to residents on the Municipality’s Water Supply.

3.0 Prohibition

3.1 Between the last Saturday of May and September 30<sup>th</sup> in each year, no person shall sprinkle or allow sprinkling except in compliance with the provision of this By-law.

4.0 Sprinkling Restrictions Stage I

4.1 No person shall sprinkle or allow sprinkling except at Premises:

- (a) with even numbered civic addresses on Wednesdays, Fridays and Sundays between the hours of 4:00 a.m. and 9:00 a.m. and between the hours of 7:00 p.m. and 10:00 p.m.; and
- (b) with odd numbered civic addresses on Tuesdays, Thursdays and Saturdays between the hours of 4:00 a.m. and 9:00 a.m. and between the hours of 7:00 p.m. and 10:00 p.m.

4.2 Sprinkling Restrictions Stage II

If the Public Works Superintendent for the Municipality notifies the Chief Administrative Officer of the Municipality that a reduction in water use is necessary requiring Stage II restrictions, no person shall:

- (a) sprinkle or allow sprinkling except at Premises:
  - (i) with even numbered civic addresses on Wednesdays and Sundays between the hours of 4:00 a.m. and 9:00 a.m. and between the hours of 7:00 p.m. and 10:00 p.m.;
  - (ii) with odd numbered civic addresses on Tuesdays and Fridays between the hours of 4:00 a.m. and 9:00 a.m. and between the hours of 7:00 p.m. and 10:00 p.m.
- (b) wash down or hose sidewalks or driveways or other outdoor surfaces at any time;
- (c) wash motor vehicles with a hose unless the hose is equipped with a shut off device that is spring loaded and operates by using hand pressure.

#### 4.3 Sprinkling Restrictions Stage III

If the Superintendent of Public Works for the Municipality notifies the Chief Administrative Officer of the Municipality that a reduction in water use is necessary requiring Stage III restrictions, no person shall:

- (a) sprinkling or allow sprinkling at any time;
- (b) wash down or hose sidewalks or driveways or other outdoor surfaces at any time;
- (c) at any time water or spray any trees, shrubs, flowers, or vegetables (except for larger gardens where hand watering is impractical) or wash motor vehicles with a hose unless such spraying, watering or washing is done by way of a hand held container or hose equipped with a shut off device that is spring loaded and operates by using hand pressure.

- 4.4 The provisions of Section 4.1 and 4.3 inclusive do not apply to a person who has a valid and subsisting permit issued under Section 6.1 or to the class of water users exempted in Section 7.1, and the provisions of paragraphs 4.2(b) and 4.3(b) do not apply to restaurants or other commercial eating establishments which may be required by law to clean outdoor areas to comply with health standards.



## 5.0 Notice

5.1 Sufficient notice of the restrictions set out in Section 4 of this By-law or in any change or revocation thereof shall be deemed to have been given by an announcement made on behalf of the Municipality through one publication in a newspaper having circulation in the Municipality or in the form of a newsletter not less than 72 hours prior to the commencement, change or revocation of the restrictions.

## 6.0 Permits

6.1 A person who has installed a new lawn, either by placing sod or turf or by seeding, or who has installed new landscaping on a substantial part of the outdoor portion of a Premises may apply to the Municipality for a permit which will entitle the permittee to sprinkle outside the restricted times.

6.2 The Municipality shall issue a permit to an applicant pursuant to Section 6.1 upon payment to the Municipality of a fee in the amount of \$30.00 for a single family dwelling unit and in an amount determined by Council for a multi-family dwelling unit or commercial Premises.

6.3 A permit issued under Section 6.1 shall be valid for period of 21 days after the date of its issue and shall be conspicuously displayed at the Premises for which it was issued.

6.4 After the expiration of a permit issued under Section 6.1 a person may apply for and obtain only one subsequent renewal of the permit for the same Premises in any one calendar year for a fee under Section 6.2.

## 7.0 Exemptions

7.1 The provisions of Section 4.1 to 4.3 inclusive shall not apply to the following class of water users which rely upon the steady supply and use of water:

- (a) licensed nurseries;
- (b) licensed golf courses and driving ranges;
- (c) playing fields and public gardens owned by the Municipality where failure to water would result in permanent loss, will be exempt but on a very selective basis as the need arises;
- (d) for dust control if safety or sanitary concerns exist or for compaction during construction if no reasonable alternative exists.

8.0 Penalty

8.1 Any person found guilty of any breach of any of the provisions of this By-law shall, on summary conviction, be liable to pay a fine of not less than One Hundred (\$100.00) Dollars and not more than Five Hundred (\$500.00) Dollars in addition to costs for each offence.

8.2 Where the contravention, refusal, neglect, omission, or failure, continues for more than one day, the person is guilty of separate offence for each day that it continues.

9.0 Existing By-laws

9.1 This By-law is supplementary to the Municipality's By-law No. 96-20 as amended by By-laws No. 96-43, 97-15 and 99-11 and any conflict shall be governed by the provisions of this By-law.

DONE AND PASSED by the Council of the Rural Municipality of East St. Paul in Open session assembled at East St. Paul, in Manitoba, this 18<sup>th</sup> day of December, 2002.

Original signed by Deputy Reeve Lawrence  
Morris  
Reeve

Original signed by Jerome Mauws  
Chief Administrative Officer

Read a first time the 4<sup>th</sup> day of December, 2002.

Read a second time the 18<sup>th</sup> day of December, 2002.

Read a third time the 18<sup>th</sup> day of December, 2002.

# **ATTACHMENT C**

**Water Utility By-Law No. 2009-18**



THE RURAL MUNICIPALITY OF EAST ST. PAUL

BY-LAW NO. 2009-18

Being a by-law of the Rural Municipality of East St. Paul to provide for the establishment of regulations related to the Water Treatment and Distribution System within the Rural Municipality of East St. Paul.

WHEREAS SECTION 232 (1) of the Municipal Act provides in part as follows:

“A council may pass by-laws for municipal purposes respecting the following matters:

(l) public utilities; “

AND WHEREAS SECTION 232 (2) of the Municipal Act provides in part as follows:

“Without limiting the generality of subsection (1), a council may in a by-law passed under this Division

- (a) regulate or prohibit;
- (d) establish fees or other charges for services, activities or things provided or done by the municipality or for the use of property under the ownership, direction, management or control of the municipality;
- (e) subject to the regulations, provide for a system of licences, permits or approvals, including any or all of the following:
  - (i) establishing fees, and terms for payment of fees, for inspections, licences, permits and approvals, including fees related to recovering the costs of regulation,
  - (iv) providing that terms and conditions may be imposed on any licence, permit or approval, and providing for the nature of the terms and conditions and who may impose them,
  - (v) providing for the duration of licences, permits and approvals and their suspension or cancellation or any other remedy, including undertaking remedial action, and charging and collecting the costs of such action, for failure to pay a fee or to comply with a term or condition or with the by-law or for any other reason specified in the by-law, and;

NOW THEREFORE the Council of the Rural Municipality of East St. Paul, in Council duly assembled, hereby enacts as follows:

SHORT TITLE

1. This By-Law may be cited as the “Water Utility By-law.”

## DEFINITIONS

### 2. Where used herein

- (a) **“application”** means the application for permit for services provided or supplied by, or in connection with the Public Works Utility Division as set out in Schedule “A” attached to and forming part of this By-law.
- (b) **“approved”** means approved by the Public Works Utility Division.
- (c) **“customary service(s)”** means any work or service provided or supplied by the Public Works Utility Division in the performance of its normal function of a publicly owned and operated water utility.
- (d) **“customer”** means a property owner, tenant, occupant or person in charge or control of a premise, accepting or using any of the customary services provided or supplied by, or in connection with the Water Utility.
- (e) **“fire service”** means a connection that includes a direct or indirect pipe line connecting to the Water Utility for the purpose of providing a supply of water to a sprinkler system, a standpipe, or a private fire hydrant.
- (f) **“multiple metering”** means more than one (1) water meter installed by the Public Works Utility Division on a single water services to a premises.
- (g) **“person”** includes a firm, partnership or corporation.
- (h) **“premises”** means property (land or real estate) conveyed by a deed. Where the context so requires, **“premises”** means the building(s) thereon, or a unit thereof.
- (i) **“Public Works Utility Division”** means the Water Utility owned and operated by the Rural Municipality of East St. Paul.
- (j) **“quarter”** of **“quarterly”** as a measure of time may mean three (3) calendar months, or a period of time between two (2) water meter reading dates, and may commence on any day of any month.
- (k) **“service”** includes not only the supply of water from the Public Works Utility Division but also any hydrant, fire service(sprinkler), stand-by or any other of the customary services provided or supplied or in connection with the Water Utility. Where the context so requires, **“service”** means a water service pipe.
- (l) **“utility”** means any system, works, plant, pipe line, equipment, or service as further defined.
- (m) **“water meter”** means a measuring device provided and owned by the Public Works Utility Division to measure customer consumption in cubic meters.

- (n) **“water radio frequency box”** means a device placed on the water meter provided and owned by the Public Works Utility Division to measure customer consumption in cubic meters by radio waves.

FEES, LICENSES, RATES AND RENTALS DEFINED

- 3. The Fees, licenses, rates, and rentals are shown in the RM of East St. Paul Fee Schedule.

CLASSES OF WATER SERVICES (FOR WATER APPLICATION PURPOSES) AND RESPONSIBILITY FOR APPLICATIONS

- 4.
  - (a) Single unit family dwellings and single unit commercial premises.
  - (b) Other than single unit family dwellings and single unit commercial premises having one (1) water service connection and individual water meters.
  - (c) Other than single unit family dwellings and single unit commercial premises having one (1) water service connection and (1) water meter.

In (a) and (b), the owner, tenant, occupant or person in charge or control of the property shall make the application for water service. In (c), the owner of the premises shall make application for the water service.

APPLICATIONS FOR WATER SERVICE TURN ON

- 5. A person requiring water service from the Water Utility System shall make application to the Public Works Utility Division as set out in Schedule “A” attached to and forming part of this By-Law. A water service turn on will only be carried out upon payment of the required fees and the completion of Schedule “A” including any required signatures.

APPLICATION FOR WATER SERVICE CONNECTION

- 6. Applications for a water service connection shall be made to the Public Works Utility Division on a form as set out in Schedule “A” attached to and forming part of this By-Law. Upon request, the applicant shall supply a set of drawings.

PERMIT FEE

- 7. At the time of making application for a water service connection or disconnection when a service is no longer required, the applicant shall pay a permit fee for each application in the amount authorized in the RM of East St. Paul Fee Schedule.

COST AND INSTALLATION OF SERVICES

- 8. The applicant shall pay the cost of installation of the water service connection from the street watermain to the house or building. The services may be installed only by a person regularly licensed by the Rural Municipality of East St. Paul to perform that type of work under the Sewer Regulations By-law. The applicant shall also pay any Capital

Contributions and Capital Levies that may be required in accordance with the RM of East St. Paul By-laws and/or policies.

#### NUMBER SERVICES TO BE INSTALLED

9. Except as provided in sections 21 and 23 herein, only one (1) service pipe adequate to serve the premises shall be installed in the street.

#### INSPECTION OF WATER SERVICE INSTALLATION

10. Where a water service is installed by a licensed contractor, the Public Works Utility Division must be notified in advance of backfilling the service at the watermain and at the street line so that an inspection may be made of such installation. The Public Works Utility Division must be notified before 1100 hours for any inspection required in the afternoon of the same day and prior to 1600 hours the day previous for any inspections required in the morning. Inspections will be made only on regular working days unless special arrangements are made by the contractor who shall be liable for all extra expense arising out of such special arrangements.

#### SIZE OF WATER SERVICES

11. The Public Works Utility Division shall determine the size of water service in the street and in the property necessary to adequately serve the premises and no person shall install a service smaller than the size so determined. The minimum size of service permitted for any premises is three-quarters of one inch (3/4") inside diameter. The Public Works Utility Division may consult with the Municipal Engineer to determine the size of water service that may be required to service a premises.

#### DEPTH OF SERVICE PIPE

12. A water services, either in the street or in private property, shall be placed at least seven feet six inches (7'6") below the surface of the ground, but shall not be deeper than nine feet (9') in the ground unless a greater depth is approved.

#### TYPES OF SERVICE PIPES

13. For all permanent construction only approved types of pipe and appurtenances shall be used.

#### STOP COCKS AT STREET LINE

14. An approved water stop cock (or stop and drain cock or valve) and approved box shall be provided at or near the street line for control of water to the premises served. This stop cock and box shall not be operated except by employees of the Public Works Utility Division nor shall any person tamper or interfere with the same. Adaptors necessary to connect different types or sizes of pipe to the Water Utility System stop cock shall be provided by the owner. The owner when connecting to the water stop installed by others shall provide the approved box.



#### MAINTENANCE OF STREET PORTION

15. The municipality shall maintain that portion of the water service from the street watermain to the property line.

#### OWNER'S STOP AND DRAIN COCK

16. A stop and drain cock connected to the service pipe shall be placed inside the wall of the building as close as practical to the point at which the service pipe enters the building. The owner shall maintain the stop and drain cock in good mechanical condition and ensure that it is operable in cases of emergency.

#### INTERCONNECTION OF INTERIOR SERVICE

17. Two (2) or more services to the same building shall not be connected to each other except by special permission given by the Public Works Utility Division and in all such cases only after satisfactory valve and piping layout drawings have been received and approved by the Public Works Utility Division. Adequate check valves are required on each water service line to prevent back siphoning in case of shut down. A special interconnection between a Sprinkler and a Domestic service may be permitted by the Public Works Utility Division where it is desirable to ensure a continuous water supply and to avoid the laying of temporary hose lines due to an interruption of service. Except as provided in section 22 herein, the interconnection of any other water supply to that of the Water Utility System is prohibited (groundwater).

#### BOOSTING DEVICES

18. No booster pump or other boosting device shall be connected directly to a Water Utility watermain or to a service line without the approval of the Public Works Utility Division.

#### TEMPORARY WATER SUPPLY

19. After giving to any customer notification deemed adequate by the Public Works Utility Division, the Public Works Utility Division may shut off the water service of a customer in order to make repairs to the water system. In case of emergency such as a watermain break or where in the opinion of the Public Works Utility Division considerable damage may be caused, watermains or services may be shut off without notification. The Public Works Utility Division will recommend action at the customer's expense as he deems necessary to supply uninterrupted water service.

#### CUSTOMERS NOT TO FURNISH WATER TO OTHERS

20. No customer, except with the written consent of the Public Works Utility Division, shall furnish water to or permit any other person to sell water from his premises.

WASTE OF WATER PROHIBITED

21. Except by written permission of the Public Works Utility Division, no person shall permit water to run through any outlet to prevent freezing or to run for any other purpose longer than necessary. The Public Works Utility Division may, when deemed necessary, turn off the water or take such other lawful action as deemed proper to restrain and prevent wastage of water.

DRAINING PIPES WHEN WATER TURNED OFF

22. The owner or occupant of any premises who requests the Public Works Utility Division to turn off the water service to such premises shall, before such turn-off is made, close the stop and drain cock, and drain all water from the system of water pipes and plumbing fixtures in the premises, and the owner shall thereafter cause the said stop and drain cock to be kept closed and the said pipes and plumbing fixtures kept free from water until the Public Works Utility Division is notified that water is again required for the premises.

CROSS CONNECTION AND BACKFLOW PREVENTION

23. (a) No customer or person shall connect, cause to be connected, or allow to remain connected, any piping, fixture, fitting, container or appliance, in a manner which, under any circumstances, may allow water, waste water, or any harmful liquid or substance to enter the Municipal's water system.

If a condition is found to exist which in the opinion of the Public Works Utility Division is contrary to the aforesaid, the Public Works Utility Division may either:

- (i) Shut off the service or services, or
  - (ii) Give notice to the customer to correct the fault at his own expense within a specified time period. If the customer fails to comply with such notice, the Public Works Utility Division shall proceed in accordance with clause (i) of this section.
- (b) Without limiting the generality of the foregoing, the Public Works Utility Division may allow cross connection control devices to be installed on the customer's water piping at the sources of potential contamination and/or on the water service pipe.
- (c) Notwithstanding the foregoing, where, in the opinion of the Public Works Utility Division, a severe hazard exists, the customer shall install on his water service pipe a cross connection control device approved by the Public Works Utility Division in addition to the cross connection control devices installed on the customer's water piping at the source of potential contamination.

- (d) Cross connection control devices shall be tested at the expense of the customer, upon installation and thereafter annually, or more often if required by the Public Works Utility Division, by personnel approved by the Public Works Utility Division, to demonstrate that the device is in good working condition.
- (e) Should a test show that a cross connection control device is not in good working condition, the customer shall make repairs or replace the device within 96 hours, or such other specified period, and if the customer fails to comply, the Public Works Utility Division shall shut off the service or services.
- (f) Should a customer fail to have a cross connection control device tested, the said device shall be deemed defective and the Public Works Utility Division shall shut off the service or services until the said device has been tested and approved as required herein.
- (g) No water service piping shall be turned on at the curb stop for occupancy use until the private plumbing system has been approved by the Municipal Building Inspector or has been inspected for cross connections by personnel approved by the Public Works Utility Division.

#### PROVISION OF WATER METERS

- 24. The Public Works Utility Division shall determine the size of water meter and the rental charge in the amount authorized in the RM of East St. Paul Fee Schedule. The water meter shall be installed in any premises for measuring all water other than for firefighting use and shall provide and maintain such water meter. The owner shall provide a sufficient space as close as possible to the stop and drain cock in the building or premises to allow for placement of the water meter in a horizontal position. The owner or occupant must at all times have the water meter accessible so that it may be readily examined and read by employees of the Public Works Utility Division.

#### NO BRANCH EXCEPT ON OUTLET SIDE OF WATER METER

- 25. No branch shall be taken off the service pipe other than on the outlet side of the water meter. Any person who breaks or authorizes the breaking of a seal shall notify the Public Works Utility Division within six (6) hours after such breaking and failure to do so will render such breaking liable to the penalties provided for breach of this By-law.

#### MULTIPLE METERING

- 26. (a) Multiple metering of premises may be provided by the Public Works Utility Division under special agreement. In the case of a building containing a number of stores or other units, where separate accounting of water use is required, the Public Works Utility Division will provide an individual water meter to each unit, read it and submit a separate account provided that the owner.

- (i) Files with the Public Works Utility Division a plan of the building plumbing;
  - (ii) Provides sufficient space at a single location as close as possible to the shut off valve in the building for the installation of the required bank of water meters in a horizontal position, where they are readily accessible for removal, repair or replacement;
  - (iii) Provides adequate facilities for proper designation of the unit supplied by each water meter for billing purposes;
  - (iv) Accepts full responsibility for any errors in consumption by individual customers resulting from plumbing connections between units, damage to water meters from freezing, loss of water meters, and the illegal use of water where a water service has been discontinued;
  - (v) Accepts full responsibility for all uncollectible units water accounts; and
  - (vi) Renders the water meters readily accessible to Public Works Utility Division employee's at all reasonable times.
- (b) The Public Works Utility Division shall provide, upon request, a standard drawing showing the minimum requirements for the installation of multiple water meters.

TAMPERING WITH WATER METER FORBIDDEN

27. (a) Should any person alter any water meter installed upon any water service pipe or connection therewith, inside or outside any house, building or other place, so as to alter the amount of water registered thereby, unless specially authorized by the Public Works Utility Division for that particular purpose and occasion, such person is liable to the penalties imposed for breach of this By-law.
- (b) If any water meter of the Public Works Utility Division is lost or removed from the premises, the owner shall pay for replacement of the water meter. The cost of the water meter, if not paid by the owner, may be added to the taxes against the premises and collected in the same manner as ordinary municipal taxes.

UTILITY TO BE NOTIFIED OF FAILURE OF WATER METER

28. (a) In the case of breakage, stoppage or irregularity in a water meter, the customer shall notify the Public Works Utility Division immediately upon such condition being discovered. All installation, repair and disconnection of any water meter shall be performed only by Public Works Utility Division employees authorized to do such work.
- (b) In the event that the water meter is in operating condition, the Public Works Utility Division shall have the authority to charge an amount authorized in the RM of East St. Paul Fee Schedule.

DAMAGE TO WATER METERS BY HOT WATER

29. (a) Where a hot water system on any property is so constructed that backflow of hot water damages any water meter, the Public Works Utility Division will, at the expense of the owner, renew or repair such water meter, and all charges for removing, renewing or repairing and replacing the water meter, if not paid by the owner, may be added to the taxes on the property and collected in the same manner as ordinary municipal taxes.
- (b) If a check valve is or has been installed by the owner to prevent hot water from reaching a water meter, then there shall also be installed on the boiler side of such check valve, a relief valve of a pattern approved by the Public Works Utility Division.

DAMAGE TO WATER METERS BY FROST

30. Every owner of property served by the water utility system shall maintain that place where the service pipe enters the premises and where any water meter is situated at a temperature at all times sufficient to prevent the water service and water meter or water meters of the Public Works Utility Division from being damaged by frost. Should a water meter be damaged by frost, the Public Works Utility Division will remove, repair or renew and replace the same at the expense of the owner. The cost of such work if not paid by the owner may be added to the taxes against the premises and collected in the same manner as ordinary municipal taxes.

REPLACEMENT OF WATER METERS

31. (a) Each water service connection supplying a premises shall be metered, except fire service (sprinkler), and normally only one (1) water meter will be supplied for each such water service connection. In certain circumstances the Public Works Utility Division may authorize multiple metering of a water service connection supplying a premises which has been divided into units, and in such cases more than one (1) water meter will be supplied.
- (b) Each premises with a water meter and/or encoder that is required to be repaired or replaced shall, at the time of the repair or replacement for that premises also install a water radio frequency box supplied by the Public Works Utility Division. The repair or replacement shall be done at such time as determined by the Public Works Utility Division. All costs associated with the replacement of the water meter encoder to a water radio frequency box shall be borne by the Public Works Utility Division.

CANCELLATION OF WATER SERVICE

32. (a) The customer shall notify the Public Works Utility Division immediately when the water service is no longer required at a premises, and the Public Works Utility Division shall turn off the supply of water to the said premises as

provided for in this By-law unless a prior application for water service is received.

- (b) When the service is no longer required, the owner shall pay the cost of disconnecting it at the watermain. If not paid by the owner, the cost may be added to the taxes against the premises and collected in the same manner as ordinary municipal taxes.

#### ESTIMATING CONSUMPTIONS

- 33. Where a water meter is found not in use or out of proper working order or the scheduled reading is not obtained, or where no water meter is installed, the Public Works Utility Division shall estimate the consumption of water used for any quarterly period or other period based on the amount of water consumed during the time the water meter was working or from any other information or source available, and such estimate shall be basis for billing the customer for water used.

#### FIRE SERVICE CONNECTIONS

- 34. A fire service connection shall include a direct or indirect pipe line connecting to the Water Utility System watermain for the purpose of providing a supply of water to a sprinkler system, either of the wet or dry type, a standpipe with or without attached hose, and a private fire hydrant or any other apparatus of fire protection system, for the purpose of extinguishing fires in a building or other premises. Connections for public fire protection provided by the Water Utility System are not included.

#### APPLICATION FOR FIRE SERVICE CONNECTIONS

- 35. Every owner making application for a fire service connection shall in each case file with the Public Works Utility Division a set of drawings of the premises to be served showing the location and size of any building or buildings; the number, size and location of fire hose outlets, if any; the location and size of private hydrants, if any; the number, type and location of sprinkler heads, if any and the location of all valves, pipes, tanks and other appurtenances, wherever the same are situated upon the premises.

#### SIZE OF CONNECTIONS

- 36. The required size of each fire service connection shall be determined by the Public Works Utility Division, in consultation with the Municipal Engineer, and shall depend on the size of the street main; the available pressure on the main and the nature and capacity of the fire protection equipment in the premises to be served, provided, however, that the diameter of the fire service connection shall not be larger than the diameter of the watermain in the street to which it is connected.

#### OWNER TO PAY COST OF INSTALLATION

- 37. The installation of the street portion of a fire service connection shall be paid by the owner of the premises to be served by the connection.

## REGULATIONS GOVERNING USE OF FIRE SERVICES

38. (a) No water shall be drawn from the fire service pipes for any purpose whatsoever except for extinguishing fire or for testing of the system by the Water Utility System or by any authorized person, except as provided for in section 21 herein.
- (b) No connection shall be made between the fire protection system and any other water system in the premises served thereby other than any of those approved under section 21 of this By-law.
- (c) A valve on a hose outlet, drain cock or any other appurtenance shall be of such type that it may be sealed by the Public Works Utility Division, and whenever any such valve is opened, the customer shall immediately notify the Public Works Utility Division so that the same may be resealed. Any person opening or authorizing the opening of any such valve who fails to notify the Public Works Utility Division within six (6) hours of any such opening shall be guilty of a breach of this By-law.
- (d) A closed sprinkler system, both wet or dry, shall be supplied by a separate line direct from the watermain in the street, or by a single combined Fire Stand pipe and Sprinkler service line. The Domestic supply must be provided by a separate direct line from the watermain in the street.

Where a sprinkler system containing less than nine (9) sprinkler heads is installed to protect against special hazard(s) in an otherwise unsprinklered building, such system may be connected to the regular metered water supply, providing that the water supply is adequate to supply the number of sprinklers.

- (e) A fire standpipe may be supplied by a separate line direct from the watermain in the street or by a single combined Fire and Domestic service line. In the latter case, the fire standpipe connection shall be made on the watermain side of the water meter. Every fire standpipe service shall be provided at the expense of the owner and shall have an approved detector check valve complete with a detector water meter and check valve on the detector water meter line.

## MAINTENANCE OF FIRE SERVICES

39. The owner of premises served by a fire service connection shall be responsible for, the cost, as follows:
- (a) Repairing, renewing, supporting and making structural alterations in or removing any such fire service pipe, regardless of the reason for which such work may be deemed by the Public Works Utility Division to be necessary; and

- (b) Making good, to the satisfaction of the Public Works Utility Division, any subsidence in or damage to any street resulting from the performing of any work specified in paragraph (a), or from water leakage from such fire service.

NOT RESPONSIBLE FOR FAILURE OF SERVICE

- 40. The Public Works Utility Division shall not be liable for loss or damage by reason of low pressure or interruption or failure of service in any fire service connection for any cause, and the Public Works Utility Division may, at any time, discontinue the supply of water without any notice to the owner of any premises served by any fire service connection or fire protection system.

UNAUTHORIZED USE OF HYDRANTS PROHIBITED

- 41. The use of fire hydrants other than by the Municipal Fire Department for fire fighting and Public Works Utility Division employees for testing and maintenance purposes is prohibited except as provided in section 42.

USE OF HYDRANTS BY PUBLIC AUTHORITIES

- 42. Subject to supplementary regulations and charges approved by the Municipal Council, fire hydrants may be used by other Municipal Departments for furnishing water for street sprinkling or flushing, flushing sewers, street repairs, flooding rinks, watering boulevards or for any other purposes approved by the Public Works Utility Division.

USE OF HYDRANTS IN COLD WEATHER

- 43. Every person authorized to use fire hydrants between the First day of November of any year and the Thirtieth day of April of the year next following shall notify the Public Works Utility Division immediately of such use so that every hydrant so used may be inspected, pumped dry, repacked and serviced.

RELOCATION OF FIRE HYDRANTS

- 44. (a) Where an existing hydrant interferes with a property owner's use or proposed use of his property, the hydrant may be relocated by the Public Works Utility Division at the expense of the property owner making the request.
- (b) Where, at the request of a property owner, the grade of an existing street is altered so that an existing hydrant will not be at the proper elevation with respect to the new grade established, such hydrant shall, upon written application by such owner, be raised or lowered by the Public Works Utility Division at the expense of the said property owner.

OBSTRUCTION OF HYDRANTS

- 45. Nothing shall be constructed, erected or planted which interferes or is liable to interfere with the use of a fire hydrant. Sufficient clearance shall be maintained adjacent to every



hydrant to permit easy connection of hoses and complete operation of such hydrant from all directions using regular hydrant wrenches and hose spanners.

#### REMEDIES FOR DEFAULT IN PAYMENT

46. (a) Where there is a default in payment for any rates, penalties, or services provided under this By-law, the Rural Municipality of East St. Paul may enforce payment by shutting off the supply of water or by suit at law before any court of competent jurisdiction or by distress and sale of the goods and chattels of the occupant of the property in which such water or service is consumed or used, or of any goods and chattels in the occupant's possessions wherever they be found within the Municipality, such distress and sale to be levied and made in the same matter, so far as may be, as a distress and sale by law on a tenant for rent, and to provided that all such rates and penalties until paid shall be a lien on such property, and that in the case of rates, penalties and charges for water supplied or services rendered in connection with the Water Utility System, the same may be added to the taxes on such property and collected in the same matter as ordinary municipal taxes.
- (b) Where the supply of water has been turned off to enforce payment as outlined in clause 46 (a), the Public Works Utility Division may charge a turn-on fee as listed in the RM of East St. Paul Fee Schedule.

#### PROHIBITIONS

47. (a) No person shall lay or cause to be laid any pipe or main to communicate with any pipe or main of the Municipal Water Utility or in any way obtain or use any water thereof, without consent of the Municipality.
- (b) No person shall:
- (i) willfully or maliciously hinder or interrupt, or cause or procure to be hindered or interrupted, the Municipality or its servants, agents, contractors or workmen, or any of them, in the exercise of the powers and authorities granted herein as to water works, plant, or equipment or water supply; or
  - (ii) willfully or maliciously let off or discharge any water so that it runs waste or useless out of the Municipal Water Utility System; or
  - (iii) throw or deposit any injurious, noisome, or offensive matter into the water or the Municipal Water Utility or upon the ice, or in any way fouts them or commits any wilful damage or injury to the Municipal Water Utility or water, or encourages any of those things to be done.

## POLLUTION OF WATER SUPPLY

48. No person shall:
- (a) Bath or wash, or cleanse any cloth, wool, leather, skin, or animal, or place any nuisance or offensive thing, in any well, reservoir, lake, river, pond, source, or fountain from which the water is obtained; or
  - (b) Convey, cast, throw, or put, any filth, dirt, dead carcasses, or other noisome or offensive thing in any of the waters mentioned in clause (a) and within the distance therein mentioned from the source of supply; or
  - (c) Cause, permit, or suffer, the water of any sink, sewer, or drain to run or to be conveyed into any of the waters mentioned in clause (a); or
  - (d) Cause any other thing to be done whereby the waters mentioned in clause (a) may in anyway be tainted or fouled.

## **ENFORCEMENT**

50. (a) A By-law Enforcement Officer appointed under the Municipality's Enforcement By-law is authorized to enforce this By-law.
- (b) The By-law Enforcement Officer has all powers, duties, discretion and functions of a designated officer set out in the Act and of a By-law Enforcement Officer under the Municipality's Enforcement By-law in administering and enforcing this By-law.

## **OFFENCE**

51. THAT any person who violates, contravenes, or disobeys or refuses, omits, neglects, or fails to observe, obey or comply with any provision of this By-law is guilty of an offence and liable, on summary conviction, to a fine of not less than \$100.00 or more than \$1,000.00 or, in default, to imprisonment for a period not exceeding thirty (30) days and to the imposition of a penalty in the amount of the Municipality's enforcement costs associated with the conduct that gave rise to the offence.
52. That By-law No. 96-20, 96-43, 99-11, 2003-09 AND 2003-19 be hereby rescinded.

DONE AND PASSED by the Council of the Rural Municipality of East St. Paul, in Council duly assembled at East St. Paul, in Manitoba, this 16<sup>th</sup> day of December, A.D., 2009

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Mayor

---

Chief Administrative Officer

Read a first time this 18<sup>th</sup> day of November, A.D. 2009.

Read a second time this 16<sup>th</sup> day of December, A.D. 2009.

Read a third time this 16<sup>th</sup> day of December, A.D. 2009.

Schedule "A" to By-Law No. 2009-18 of the Rural Municipality of East St. Paul



**R.M. of East St. Paul**  
**Public Works Dept.**  
 2025 Camsell Avenue  
 East St. Paul Manitoba R2E 1A7  
 Email address: [publicworks.department@eaststpaul.com](mailto:publicworks.department@eaststpaul.com)

Telephone: 668-8112  
 Fax: 667-8312

Application for Permit

Date:

I HEREBY APPLY FOR THE FOLLOWING PERMIT:

<b>Address:</b>		<b>Roll #</b>	
<b>Contractor:</b>			
<b>Address:</b>		<b>Ph. #:</b>	
<b>Permit Fee</b>	<b>Quantity</b>	<b>Account Number</b>	<b>Fee</b>
The fee for new water services shall be as follows:			
Single Domestic Service		33315-77-0000-000	As per resolution (fee schedule)
Combined Domestic Fire Service, Industrial, etc.		33315-77-0000-000	As per resolution (fee schedule)
Sprinkler Service		33315-77-0000-000	As per resolution (fee schedule)
Inspection Fee		32577-77-0000-000	As per resolution (fee schedule)
Water Meter Fee		33315-77-0000-000	As per resolution (fee schedule)
Radio Frequency Box		33150-77-0000-000	As per resolution (fee schedule)
<b>Total Fees</b>			

I undertake to observe and perform the provisions of all Government or Provincial statutes or regulations, all by-laws and regulations of The Rural Municipality of East St. Paul, and all specifications or instructions issued by the duly authorized officers of The Rural Municipality of East St. Paul in respect of the work incidental to the subject matter of this application and to indemnify The Rural Municipality of East St. Paul against all loss, costs, charges or damages caused by or arising out of anything done pursuant to any permit issued under this application.

**Permit and Receipt** \_\_\_\_\_

**Signature**

This certifies that the above named applicant is granted a permit to do the work described in and for the purpose shown in the above application, and that payment has been made for the said permit of the amount shown hereon. Each permit is granted subject to the terms of the agreement contained in the said application and subject to the provisions of the by-laws of The Rural Municipality of East St. Paul or any statute or regulation of the Government of Canada or the Province of Manitoba.

This permit shall expire if active work is not commenced and reasonably continued within 30 days from the date hereof.

Please turn over for additional information

**WARNING – READ THIS BEFORE YOU BEGIN TO WORK** – If power equipment or explosives are to be used for the excavation authorized by the attached permit, no work shall be commenced

BEFORE:

1. The local office of the Gas Company has been notified of the proposed excavation, and
2. The Gas Company has marked out the location of any endangered gas installations, OR the Gas Company has advised that no gas installations will be endangered by the proposed excavation. For specific details, refer to Manitoba Regulation 377/88 made under The Gas Pipeline Act.

**Additional Conditions:**

1. The Manitoba Plumbing Code.
2. The meter is to be installed by a licensed plumber and inspected by the R.M. of East St. Paul. Water meters and accessories will be supplied by the R.M. of East St. Paul. This will include: 5/8 x 3/4 T-10 Neptune Water Meter, Radio Frequency Box and 2 Tailpieces.
3. Repeat/After Hour inspections will be charged to the applicant at a rate of \$100.00 per visit plus travel cost as prescribed in the Treasury Board of Canada Secretariat, Travel Directive, Appendix B – Kilometric Rates.
4. That the Applicant (or Company) have a valid and current Contractor’s License.
5. All aspects of the work performed be guaranteed in workmanship and free of any and all defects for a period of two years.
6. The Minneapolis style curb stop must be exposed and location identified.

Personal information collected will be used to determine whether or not a person is eligible for a water connection permit.

**Warning**  
The Permit Applicant shall contact the R.M. of East St. Paul Public Works Department @ 668-8336, **48 hours prior** to any construction. The Applicant is responsible to arrange for all necessary clearance from all underground utilities prior to any excavation.

R.F STICKER

**IF NOT COMPLIED WITH, FUTURE PERMITS MAY BE DENIED.**

**Meter Serial Number:** \_\_\_\_\_

**Meter Installation Date:** \_\_\_\_\_



**ATTACHMENT D**  
**Notification Letter to Residents**





Resident  
East St. Paul, Manitoba

Dear Resident:

**Reference: Residential Well Survey – Bray Road and PR202 Area  
East St. Paul Water Supply, East St. Paul, Manitoba**

The Rural Municipality of East St. Paul is continuing to undertake municipal water supply improvements to ensure the quantity and quality of domestic water is adequate for the long-term needs of the residents of East St. Paul. Part of our future planning is the installation of a raw water supply well at Bray Road and PR 202. This well site was identified during our 2004 water supply investigation as the most promising potential water source of several sites considered. This current project will confirm if the site is indeed a viable source and if so, develop the well site and secure a Water Rights License to utilize the well as a municipal water source.

The Rural Municipality of East St. Paul is initiating a residential well survey to assess private wells within a 1,250 meter radius of the proposed supply well location. The Water Rights Licensing process includes careful assessment of potential impacts of any new well on nearby existing wells. The survey includes a questionnaire regarding your private well that will provide information for the monitoring program during the testing of the water supply. Some wells may also be selected for additional follow up visits. Your participation in this survey is voluntary but you are requested to participate as your property is located within the designated area.

Information obtained from the questionnaire and the well evaluation will help in determining the range of private well capacities and well water requirements in your area and will be used to assist in the development of a water management plan for the proposed new municipal water supply well located at Bray Road and PR202.

As a **first step**, please review the attached questionnaire, and provide as many answers as possible. If you have any questions about the questionnaire, please feel free to contact the RM of East St. Paul staff at the number detailed below, or contact Manitoba Water Stewardship's well drilling inspector at (204) 945-7418. The well drilling inspector can provide copies of well logs, or other technical information if you do not have the well log. Please send the completed questionnaire to:

RM of East St. Paul  
Public Works Department  
2025 Camsell Avenue  
Bird's Hill, MB  
R2E 1A7

**Attention: Don Winsor, Public Works Utility Supervisor**

As a **second step**, staff from the RM of East St. Paul will contact you to go over the form, if necessary. The staff may also contact you if an individual site visit is required at your location.

Should you have any questions regarding the Residential Well Survey, please do not hesitate to contact **Bruce Schmidt, Public Works Manager** at 668-8336 for further information.

Thank you for your time.

**RURAL MUNICIPALITY OF EAST ST. PAUL**

# **ATTACHMENT E**

## **RM of East St. Paul Zoning Map**





# Rural Municipality Of East St Paul

## By-Law No. 2009-04 Zoning Map

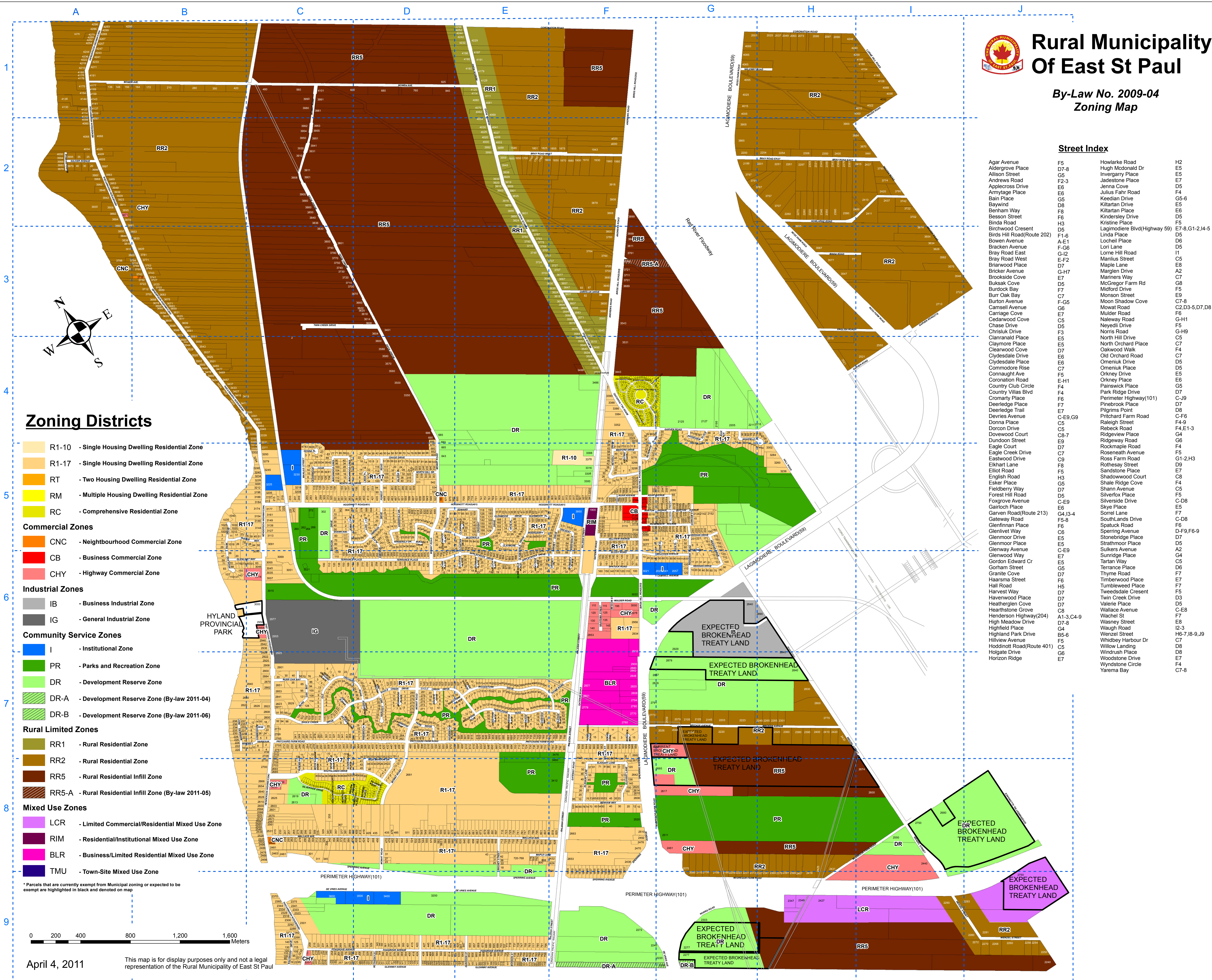
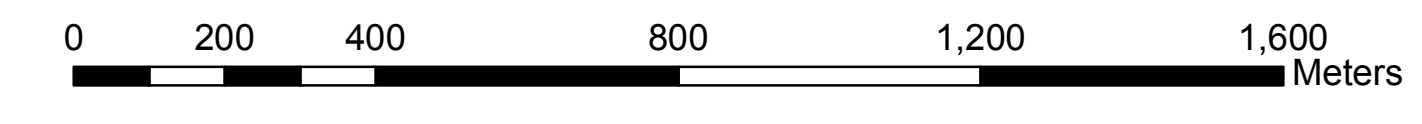
### Street Index

Agar Avenue	F5	Howlarke Road	H2
Aldergrove Place	D7-8	Hugh Modonald Dr	E5
Allison Street	G5	Invergray Place	E5
Andrews Road	F2-3	Jadestone Place	E7
Applecross Drive	E6	Jenna Cove	D5
Armgate Place	E8	Julius Fahr Road	F4
Bain Place	G5	Keedian Drive	G5-6
Baywind	D8	Kiltartan Drive	E5
Benham Way	F8	Kiltartan Place	E6
Besson Street	F6	Kindersley Drive	D5
Binda Road	H3	Kristine Place	F5
Birchwood Crescent	D5	Lagimodiere Blvd(Highway 59)	E7-8,G1-2,I4-5
Birds Hill Road(Route 202)	F1-6	Linda Place	D5
Bowen Avenue	A-E1	Lochell Place	D6
Bracken Avenue	F-G6	Lori Lane	D5
Bray Road East	G-12	Lorne Hill Road	I1
Bray Road West	E-F2	Manlius Street	C5
Brianwood Place	D7	Maple Lane	E8
Bricker Avenue	G-H7	Marglen Drive	A2
Brookside Cove	E7	Mariners Way	C7
Buksak Cove	D5	McGregor Farm Rd	G8
Burdock Bay	F7	Midford Drive	F5
Burr Oak Bay	C7	Monson Street	E9
Burton Avenue	F-G5	Moon Shadow Cove	C7-8
Camsell Avenue	G6	Mowat Road	C2,D3-5,D7,D8
Carriage Cove	E7	Mulder Road	F6
Cedarwood Cove	C5	Naleway Drive	G-H1
Chase Drive	D5	Neyedil Drive	F5
Christuk Drive	F5	Norris Road	G-H9
Clanranald Place	F5	North Hill Drive	C5
Claymore Place	E5	North Orchard Place	C7
Clearwood Cove	D7	Oakwood Walk	F4
Clydesdale Drive	E6	Old Orchard Road	C7
Clydesdale Place	E6	Omeniuk Drive	D5
Commodore Rise	C7	Omeniuk Place	D5
Connaught Ave	F5	Orkney Drive	E5
Coronation Road	E-H1	Orkney Place	E6
Country Club Circle	F4	Painkney Place	G5
Country Villas Blvd	F4	Park Ridge Drive	D7
Cromarty Place	F6	Perimeter Highway(101)	C-J9
Deerledge Place	F7	Pinebrook Place	D7
Deerledge Trail	E7	Pilgrims Point	D8
Devries Avenue	C-E9,G9	Pritchard Farm Road	C-F6
Donna Place	C5	Raleigh Street	F4-9
Dorcon Drive	C5	Rebeck Road	F4,E1-3
Dovewood Court	C8-7	Ridgeview Place	G4
Dundoon Street	E9	Ridgeway Road	G6
Eagle Court	D7	Rockdale Road	F4
Eagle Creek Drive	C7	Roseneath Avenue	F5
Eastwood Drive	C9	Ross Farm Road	G1-2,H3
Eikhart Lane	F8	Rothsay Street	D9
Elliot Road	F5	Sandstone Place	E7
English Road	H3	Shadowwood Court	C8
Esker Place	C5	Shale Ridge Cove	F4
Fieldberry Way	D7	Shann Avenue	C5
Forest Hill Road	D5	Silverfox Place	F5
Foxgrove Avenue	C-E9	Silverside Drive	C-D8
Gairloch Place	E6	Skye Place	E5
Garven Road(Route 213)	G4,I3-4	Sorrel Lane	F7
Gateway Road	F5-8	Southlands Drive	C-D8
Glenfinnan Place	F6	Spatuck Road	F6
Glenlivet Way	C6	Sperring Avenue	D-F9,F6-9
Glenmoor Drive	E5	Stonebridge Place	D7
Glenmoor Place	E5	Strathmoor Place	D5
Glenway Avenue	C-E9	Sulkers Avenue	A2
Glenwood Way	E7	Sunridge Place	G4
Gordon Edward Cr	E5	Tartan Way	C5
Gorham Street	G5	Terrance Place	D6
Granite Cove	D7	Thyme Road	F7
Haarsma Street	F6	Timberwood Place	E7
Hall Road	H5	Tumbleweed Place	F7
Harvest Way	D7	Tweeddale Crescent	F5
Havenwood Way	D7	Twin Creek Drive	D3
Heatherglen Cove	D7	Valerie Place	D5
Heartstone Grove	C8	Wallace Avenue	C-E8
Henderson Highway(204)	A1-3,C4-9	Wachel St	F7
High Meadow Drive	D7-8	Wasney Street	E8
Highfield Place	G4	Waugh Road	I2-3
Highland Park Drive	D5-6	Wenzel Street	H6-7,I8-9,I9
Hillview Avenue	F5	Whidbey Harbour Dr	C7
Hoddinott Road(Route 401)	C5	Willow Landing	D8
Holgate Drive	C6	Windrush Place	D8
Horizon Ridge	E7	Woodstone Drive	E7
		Wyndstone Circle	F4
		Yarema Bay	C7-8

### Zoning Districts

- R1-10 - Single Housing Dwelling Residential Zone
- R1-17 - Single Housing Dwelling Residential Zone
- RT - Two Housing Dwelling Residential Zone
- RM - Multiple Housing Dwelling Residential Zone
- RC - Comprehensive Residential Zone
- Commercial Zones**
- CNC - Neighbourhood Commercial Zone
- CB - Business Commercial Zone
- CHY - Highway Commercial Zone
- Industrial Zones**
- IB - Business Industrial Zone
- IG - General Industrial Zone
- Community Service Zones**
- I - Institutional Zone
- PR - Parks and Recreation Zone
- DR - Development Reserve Zone
- DR-A - Development Reserve Zone (By-law 2011-04)
- DR-B - Development Reserve Zone (By-law 2011-06)
- Rural Limited Zones**
- RR1 - Rural Residential Zone
- RR2 - Rural Residential Zone
- RR5 - Rural Residential Infill Zone
- RR5-A - Rural Residential Infill Zone (By-law 2011-05)
- Mixed Use Zones**
- LCR - Limited Commercial/Residential Mixed Use Zone
- RIM - Residential/Institutional Mixed Use Zone
- BLR - Business/Limited Residential Mixed Use Zone
- TMU - Town-Site Mixed Use Zone

\*Parcels that are currently exempt from Municipal zoning or expected to be exempt are highlighted in black and denoted on map





**ATTACHMENT F**  
**RM of East St. Paul/CMR Agreement**





**RM of East St. Paul  
Agreement**

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THIS AGREEMENT made this 23 day of August, 2011

BETWEEN: CENTRAL MANITOBA RAILWAY INC. duly incorporated under the laws of Manitoba,  
(hereinafter called the "Railway"),

OF THE FIRST PART;

A N D: RM OF EAST ST. PAUL  
(hereinafter called the "Company"),

OF THE SECOND PART.

WHEREAS the Company and the Railway wish to enter into agreements to provide for the construction, operation and maintenance of Crossings (as hereinafter defined) on, over or under the right-of-way, tracks or other property owned or controlled by the Railway (hereinafter collectively referred to as "Railway Property");

AND WHEREAS the parties have agreed that all such Crossings shall be governed by the terms, covenants and conditions of this Agreement, except as herein otherwise provided.

WITNESSETH that the parties, in consideration of the reciprocal promises and undertakings, as hereinafter set forth, do agree as follows:

1. DEFINITIONS

In this Agreement

- 1.1 "Crossing" or "Crossings" means the wire or wires, pipeline or pipelines, culverts, or private road or roads of the Company which cross, more or less, perpendicularly on, over or under the Right-of-Way of the Railway.
- 1.2 "Pipeline" or "Pipelines" means the pipe(s) or pipeline(s) of the Company actually used for the transmission of gas, oil, sewage or water.

- 1.3 "Wire" or "Wires" means communication cables or power lines of the Company, including the wires, cables, conductors and their supporting or containing structures and appliances, if any, forming part thereof or used in connection therewith, whether or not such supporting or containing structures and appliances are the property of the Company.
- 1.4 "Road" or "Roads" means the private roadways of the Company, which are not for public use.
- 1.5 "Right-of-way" means the lands of the Railway now or formerly used as corridors for the movement of trains. For purposes of this Agreement, Right-of-way shall not exceed one hundred (100) feet in width unless otherwise determined at the discretion of the Railway.
- 1.6 "Construction" means the installation of a new Crossing and the replacement or removal of an existing Crossing or, in the case of an aerial Crossing, any change affecting the supporting structure or the load on the supporting structure, as determined in accordance with the calculations specified in Canadian Standards Association Standard CAN/CSA-C22.3 No. I-M87.
- 1.7 "Maintenance", including repairing, means any work on Crossings and, in the case of an aerial Crossing, means any work on Crossings not affecting the supporting structure or the load on the supporting structure.
- 1.8 "Removal" means the physical removal or abandonment of a Crossing.
- 1.9 "Railway Property" means the Right-of-way, tracks or other property owned or controlled by the Railway.

## 2. SCHEDULES

- 2.1 The following schedules are hereby incorporated into and constitute part of this Agreement:
- Schedule "A" - Summary of Crossings
- Schedule "B" - A Guide to the Pipe, Wire, and Road Process
- Schedule "C" - Fee Schedule
- 2.2 The provisions of Schedule "B" or Schedule "C" may be amended from time to time by the Railway. In the event of any such change, an amended Schedule "B" or Schedule "C" shall be provided to the Company and such amended Schedule "B" or Schedule "C" shall be effective as of the date of delivery of the said amended Schedule "B" or Schedule "C" to the Company, pursuant to the provisions of Clause 14.2 and shall replace the Schedule "B" or Schedule "C" attached to this Agreement, and shall have the same force and effect as if originally attached to this Agreement.
- 2.3 Should there be any contradiction, conflict or variance between the provisions of a Schedule and the provisions of this Agreement, the provisions of this Agreement shall prevail.

3. RULES, ORDERS AND REGULATIONS

3.1 This Agreement is subject to all applicable laws, regulations and standards including, without limiting the generality of the foregoing, where the same are applicable, the rules, orders and regulations of Transport Canada or its successors, railway standards, National Energy Board General Orders and the standards of the Canadian Standards Association.

4. APPLICATION

4.1 This Agreement shall apply to all Crossings already established as referred to in Schedule "A" and such other Crossings within the territory served by the Company, which shall be established in accordance with the terms of this Agreement and the Schedules thereto, as amended from time to time. It is understood and agreed that this Agreement shall not apply to crossings that affect Railway Property, in addition to or other than Right-of-way.

4.2 This Agreement supersedes and replaces any and all prior verbal and written agreements for such existing Crossings referred to in Schedule "A".

5. APPLICATION, CONSTRUCTION, OPERATION AND MAINTENANCE OF CROSSINGS

5.1 As a condition precedent to the Construction of any Crossing under the terms of this Agreement, the Company shall forward to the Railway an application in accordance with the form and procedures set forth in Schedule "B".

5.2 The Construction, operation and Maintenance of Crossings shall be in accordance with the terms and conditions of Schedule "B".

6. REMOVAL OR ALTERATIONS OF CROSSINGS

6.1 The removal or alteration of Crossings shall be in accordance with the terms and conditions of Schedule "B".

7. ENVIRONMENTAL OBLIGATIONS

7.1 The Company hereby accepts the land and premises pertaining to any Crossing on an "as is" basis and hereby waives against the Railway, all rights and recourses of any nature whatsoever in respect of any defects therein. The Railway makes no representation or warranty with respect to the condition, nature, composition, use (past, present or future) of such land and premises.

7.2 The Company shall comply with the provisions of any federal, provincial or municipal environmental laws which during the continuance of this Agreement shall become applicable to the land and premises pertaining to any Crossing, as well as, those respecting the storing and handling of flammable liquids or gases. If any governmental authority exercising jurisdiction with respect to environmental protection requires, in respect of any Crossing, the installation of equipment or apparatus on any such land and premises, then the Company shall promptly install such equipment or apparatus or take such measures

as may be required by such governmental authority. The Company shall be solely responsible for the cost of all work carried out to comply therewith.

- 7.3 Upon the termination of this Agreement with respect to any Crossing, the Company shall leave the land and premises pertaining thereto free of any environmental contamination resulting from the Company's occupation or use thereof. If the Company has installed any installation on, over or under such land and premises, the Company shall remove such installation by the date of such termination, unless the Railway consents in writing to such installation remaining thereon pursuant to Clause 3 of Appendix "D-2" of Schedule "B". The Company shall have the burden of proving that any environmental contamination has not resulted from its occupation or use of such land and premises, In the event that the Company fails to comply with the above to the satisfaction of the Railway, the Railway may undertake any such work that it considers necessary to correct any environmental contamination which may have resulted from the Company's occupation or use of Railway Property and all expenses incurred by the Railway, either directly or indirectly, shall be payable by the Company upon receipt of Railway accounts therefor.
- 7.4 The responsibility of the Company to the Railway with respect to the environmental obligations contained herein shall continue to be enforceable by the Railway notwithstanding such termination.

## 8. TAXES, RATES AND ASSESSMENTS

- 8.1 The Company agrees to indemnify and save harmless the Railway against all taxes (plus applicable G.S.T.) (except income taxes), rates and assessments (hereinafter collectively referred to as "Taxes") at any time levied or assessed by any governmental authority against any such Crossings, or against the Railway or Railway Property by reason of and with respect to such Crossings.

## 9. ASSIGNMENT OR SALE

- 9.1 The Company shall not assign or sublet any of its rights, interests or privileges with respect to any Crossing governed by this Agreement other than to a parent subsidiary or affiliate of the Company as defined in the Canada Business Corporations Act without first obtaining the consent in writing of the Railway, which consent shall not be unreasonably withheld. Any such assignment or subletting shall be subject to the applicable assignment fees, as referred to in Schedule "C".
- 9.2 The Railway shall provide the Company with notice prior to any sale or other disposition (hereinafter referred to as "Disposition") of Railway Property on which a Crossing or Crossings covered by the Agreement may be located.

- 9.3 If a Disposition is to another railway, the parties to the Disposition agreement shall, as a condition precedent to the Disposition, sign an assumption agreement whereby the assignee agrees to assume or undertake to comply with the Railway's rights and responsibilities under this Agreement regarding the Crossings affected by the Disposition. All costs related to the entry into such assumption agreement shall be assumed by the Company.
- 9.4 If a Disposition is to a person other than a railway, such Disposition shall be conditional upon the Railway or that person granting to the Company an easement or right-of-way agreement. The Company shall pay the Grantor reasonable compensation based on market value for, and the Company shall be responsible for all costs of effecting such easements or right-of-way agreements such as, without restriction, survey and registration expenses.

10. FEES

- 10.1 The Company shall pay to the Railway for the Crossings subject to this Agreement the amount or amounts as specified in Schedule "C".
- 10.2 All amounts payable hereunder shall be subject to revision in accordance with the provisions of Schedule "C".
- 10.3 All amounts payable hereunder shall be non-refundable in the event of removal of a Crossing or Crossings.

11. INDEMNIFICATION

- 11.1 The Company shall indemnify and save harmless the Railway from and against all actions, causes of action, proceedings, claims and demands (hereinafter referred to as "Liability") for any direct losses, costs, damages or expenses suffered or incurred by the Railway, by reason of any damage to property including Railway Property or injury, including injury resulting in death, to persons, including the employees, servants, agents, licensees or invitees of the Railway caused by, resulting from or attributable to the existence, Construction, operation, Maintenance, relocation, modification or Removal of any Crossing and shall assume all risks of any damage to the property of the Company or injury, including injury resulting in death, to the employees, servants, agents, licensees or invitees of the Company while on Railway Property, except to the extent that such liability, damage or injury is contributed to, caused by, results from or is attributable to the acts, omissions, negligent acts or misconduct of the Railway.
- 11.2 Without limiting the generality of Clause 11.1 and notwithstanding the submission by the Company of any plan pursuant to Clause 5.1, or the subsequent approval thereof by the Railway, or the failure, if any, of the Railway to properly verify that said plan conforms to all applicable rules, requirements and specifications established from time to time by Transport Canada, and notwithstanding the Railway's supervision, if any, provided for in Appendix "D-1" of Schedule "B", the Company shall indemnify and save harmless the Railway from and against any Liability which the Railway may suffer, resulting from the inadequate or faulty Construction, operation, Maintenance, relocation, modification or Removal by the Company of any Crossing.

- 11.3 Notwithstanding anything to the contrary in this Agreement, neither the Company nor the Railway shall be liable for, and the indemnities set out herein shall be deemed not to include indirect or consequential damages or damages for pure economic loss.

12. GENERAL LIABILITY INSURANCE

- 12.1 The Company will procure and maintain throughout the term of this Agreement or any renewal thereof, commercial general liability insurance with insurance companies acceptable to the Railway, protecting both the Railway and the Company against liability for bodily injury and death and for damage to or destruction of property by the Company, as well as the exposures contemplated by Clause 7 of this Agreement, with liability coverage in an amount of not less than \$5,000,000 per occurrence, and such higher limits as the Railway may reasonably require from time to time. It is understood that the employees of the Company shall not be considered employees of the Railway.

The insurance provided herein shall apply to the Railway and the Company (the Insureds) in the same manner and to the same extent as if a separate policy had been issued to each and shall contain a cross liability clause.

The Company agrees that the insurance provided herein does in no way limit the Company's liability pursuant to the Indemnity provisions of this Agreement.

- 12.2 Subrogation - The Company shall have no claim against the Railway or the Railway's insurance for any damage the Company may suffer, and the Company shall require the insurers under the insurance in Clause 12.1 above to waive any right of subrogation by the insurers against the Railway.
- 12.3 Evidence of Insurance - Upon the written request of the Railway, the Company shall provide to the Railway evidence of such insurance having been obtained and maintained in the form of a certificate of insurance, and such insurance shall not be subject to cancellation except after at least ninety (90) days' prior written notice to the Railway. If the Company fails to comply with the requirements hereof to obtain insurance, the Railway may, but need not, obtain such insurance and keep the same in effect and the Company shall pay to the Railway the premium cost thereof upon demand.
- 12.4 Premiums - Notifications - The Railway shall not be responsible for the payment of any premiums with respect to such insurance, and shall not be responsible for notifying the insurers of any occurrence or accident in or around the land occupied by the Company.

13. TERMINATION

- 13.1 This Agreement shall be deemed to have come into full force and effect from the date provided in Clause 17 and shall continue in force for ten (10) years from that date and thereafter may be terminated on two (2) years' prior notice in writing given by either party to the other in accordance with Clause 14.



- 13.2 Notwithstanding such termination, all provisions of this Agreement, including payment provisions contained in Schedule "C", shall remain applicable to any Crossing until such time as such Crossing will have been physically removed from Railway Property unless such removal has been dispensed with pursuant to Clause 3 of Appendix "D-2" of Schedule "B".
- 13.3 Notwithstanding any other provision of this Agreement, in the event that the Company fails to comply with any of the terms and conditions of this Agreement, the Railway shall have the right to terminate this Agreement in whole or in part on notification to the Company in accordance with the following. The Railway shall give to the Company written notice pursuant to Clause 14 setting out the details of such breach and the Railway's intent to cancel this Agreement in whole or in part. At the expiration of thirty (30) days from the date of receipt of such notice, if the Company has failed to rectify the breach or to commence rectification of such breach in a reasonable and diligent manner, the Railway may cancel this Agreement in whole or in part effective at least thirty (30) days from a further written notice to the Company. Upon such termination, the provisions of Clause 13.2 shall apply.

14. NOTICES

- 14.1 Except as otherwise provided herein, notices shall be in writing and shall be delivered to the party entitled to receive the same by personal delivery, or by registered or certified mail. Notices may also be communicated by any electronic means, which can produce a written copy provided that written acknowledgment of receipt of the electronic communication notice is obtained.
- 14.2 Any notice given under this Agreement shall be effective as of the date of delivery in the case of personal delivery, as of the date of mailing in the case of notices sent by registered or certified mail and as of the date of electronic transmission in the case of notices given by electronic communication where receipt of the communication has been acknowledged in writing.
- 14.3 All notices and correspondence exchanged between the Railway and the Company as required to fulfill the obligations of this Agreement shall be sent by either of the following methods: by registered or certified mail, by facsimile, by personal delivery or by courier to:

The Railway: Central Manitoba Railway Inc.  
4<sup>th</sup> Floor 740 Rosser Avenue  
Brandon, MB R7A 0K9  
Attn: Karen Kowaluk

The Company: RM of East St. Paul  
Unit 1-3021 Birds Hill Road  
East St. Paul, MB  
R2E 1A7  
Attention: Bruce Schmidt

or to such other person or address as either party may designate by notice given in accordance with this Agreement.

14.4 Any communication relating to *Force Majeure*, or any matter of an emergency or operating nature, may be given by any reasonable means. If given verbally or by telephone, such communication shall be confirmed in writing or by electronic communication, which can produce a written copy.

15. PARTIES

15.1 Subject to Clause 9 hereof, this Agreement shall enure to the benefit of and shall be binding upon the successors and permitted assigns of the respective parties hereto.

16. APPLICABLE LAW

16.1 The Laws of the Province of Manitoba shall govern in the interpretation of this Agreement and the rights of the parties hereto in respect to each such Crossing.

16.2 Should any provision of this Agreement be held to be illegal or unenforceable by a court or statutory authority acting within its jurisdiction, only such provision shall be null and void and the remainder of the present Agreement shall remain in full force and effect.

17. EFFECTIVE DATE

17.1 The effective date of this Agreement shall be the August 23, 2011.



**SCHEDULE "A"**

**SUMMARY OF EXISTING CROSSINGS**

<b><u>Legal Description</u></b>	<b><u>Milepost</u></b>	<b><u>Subdivision</u></b>	<b><u>Utility</u></b>
Underground Watermain	Mile 7.35	Pine Falls	Underground Watermain

**SCHEDULE "B"**

**A GUIDE TO THE PIPE AND WIRE PROCESS**

**APPENDIX "A-1"**

**General Guidelines**

**1. Applications**

- 1.1 Applications must have four (4) copies of an acceptable plan attached, Plans must provide sufficient information to determine that installation will meet Railway Standards, General Order requirements and CSA Standards. They must be to scale or have all dimensions shown. They must clearly and accurately show Railway property lines. Refer to Appendix "C-1" for detail list of areas where Railway requirements exceed General Order or CSA Standards as well as a list of common omissions.
- i. Cost for reviewing the first plan received shall be included in the Basic Application Fee (Schedule "C"). The Company will be charged \$100.00 for each review after the initial application due to inadequate or missing information.

**2. Agreement**

- 2.1 When plans on hand are approved by the Railway for installation, the Company will be sent a Terms and Conditions Letter. It will include the following information:
- i. Agreement, or if the agreement is already in place, the agreement number.
- ii. Costs.
- iii. Special conditions will be identified.
- iv. Company responsibilities will be listed.
- 2.2 Acceptance by the Company will be by signing a duplicate copy of the Terms and Conditions Letter, under corporate seal, and returning it with a cheque in the amount requested. If the Company is not incorporated, the signature should be witnessed. If applicable, the signed Agreement must be returned with the Term and Conditions Letter.
- 2.3 When the Company's acceptance is received, the Railway will reply with a Letter of Acknowledgment. It will include plans approved for construction.

3. **Installation**

3.1 Installation can be done when the following requirements are met:

- i. The Terms and Conditions Letter is received by the Railway properly signed under corporate seal.
- ii. Five (5) working days' notice is received by the Railway from the Company or it's agent. This notice will allow the Railway to arrange for flagging protection and signals location as required. See Appendix "B-1".

3.2 After installation if there are no additional flagging charges, and payment was prepaid, the account will be closed. If additional charges are applicable, an invoice will be produced.

4. **Contact Names, Addresses and Phone Numbers**

4.1 Mail should be directed to:

Karen Kowaluk  
Central Manitoba Railway Inc.  
4<sup>th</sup> Floor 740 Rosser Avenue  
Brandon, MB R7A 0K9  
Ph. (204) 725-2627  
Fax. (204) 725-4100

## **APPENDIX "B-1"**

### **Flagging Protection & Signals & Communications Protection**

#### **What is flagging protection and signals protection?**

Flagging protection consists of protecting men and equipment from passing trains and protecting passing trains from possible damage that could occur to the track infrastructure as a result of construction. Signals protection is locating underground and/or above ground signal wires, underground Railway power lines, Railway fibre optics cable and the protection of these facilities while the work is in progress,

#### **When is it required?**

Flagging is required for men and equipment on the Railway right-of-way unless so specified, Signals protection is required if the Signals & Communication Department ("S&C") has identified the work area as being one of possible conflict.

#### **What are the costs?**

The Railway recovers from the Company its costs for actual time spent getting to, from, and on the site by Railway field forces. Flagging protection is provided by a flagging foreman, and the signals protection is provided by a S&C Maintainer.

Time required to contact the Railways Traffic Controller and set up "flagging protection" could vary daily, depending on conditions. Flags or other positive protection must be in place before the contractor starts work and removed only after the contractors day is over, or protection has expired.

Work blocks for the next twenty-four (24) hours have to be communicated to the Railway's Traffic Controller by 1400 hours. The Company, or its agent, is responsible to advise the Railway flagperson on site prior to that time, of their schedule for the following day.

Depending on the flagging protection provided, it may not be possible to provide extensions or reductions to the length of time set up to provide protection for the Company or its agent on that day.

## APPENDIX "C-1"

### Water/Sewer Pipe Line Crossings

Applicants must submit four (4) copies of an acceptable plan. Plans must meet TC E-10 and Railway Standards. Cost for reviewing the first plan received shall be included in the Basic Application Fee. The applicant will be charged an additional fee for each review after the initial application due to inadequate or missing information.

The following information is required on application drawings:

- application drawings must be to scale or have all dimensions shown.
- site plan showing location tied into legal description, width of the Railway right-of-way, number of tracks and angle of crossing.
- direction of flow, location of shut-off valve on pressure side of Railway right-of-way
- profile showing depth of burial from base of rail and ditch bottoms to top of pipe.
- cross-section showing or note stating carrier pipe will be held clear of casing pipe by supports (if applicable as per TC E- 10).
- type, wall thickness and pressures (operating and maximum test) of carrier and casing pipes.
- concrete pipe must be minimum of class V.
- casing is not required for gravity feed sewer lines
- steel casing is required for a water line.
- intention to install warning markers at each edge of Railway right-of-way.
- type of cathodic protection (if used).
- when casing is used, it must extend the full width of the Railway's core right-of-way and a minimum of fifty (50) feet on each side of outermost track.
- caption stating "Installation and maintenance to be in accordance with TC E- 10".
- note stating method of installation (i.e. boring/augering).
- must be shown or noted that the ends of the casing will not be sealed.
- professional engineer's stamp and signature.
- contact name, address and phone number of pipeline owner on plan or cover letter.
- copy of soils investigation (when required to support method of installation or as requested by the Railway at time of application).
- location of nearest excavation from nearest rail to be identified on drawing.

The nearest point at which digging can take place for boring pits, etc., is as follows: Starting ten (10) feet from the gauge side of the nearest rd, calculate a slope to the bottom of the proposed pipe at 1.5:1. If a 1.5:1 slope cannot be maintained or more restrictive conditions occur, approved shoring will be required.



## APPENDIX "C-1"

### Gas/Oil Pipe Line Crossings

Applicants must submit four (4) copies of an acceptable plan. Plans must meet TC E- I 0, latest revision of CSA Z 662-07 and Railway Standards.

Cost for reviewing the first plan received shall be included in the Basic Application Fee. The applicant will be charged an additional fee for each review after the initial application due to inadequate or missing information.

The following information is required on application drawings:

- application drawings must be to scale or have all dimensions shown.
- site plan showing location tied into legal description, width of Railway right-of-way, number of tracks and angle of crossing.
- direction of flow, location of shut-off valve.
- profile showing depth of burial from base of rail and ditch bottoms to top of pipe.
- cross-section showing or note stating carrier pipe will be held clear of casing pipe by supports (if applicable as per TC E- IO).
- type, wall thickness, contents and pressures (operating and maximum test) of carrier and casing pipes.
- intention to install warning markers at each edge of the Railway tight-of-way.
- type of cathodic protection (if used).
- when casing is used, it must extend the full width of the Railway's core right-of-way and a minimum of fifty (50) feet on each side of outermost track.
- caption stating "Installation and maintenance to be in accordance with TC E- IO and latest edition of the applicable CSA standard".
- note stating method of installation (i.e. boring/augering).
- hoop stress calculation.
- must be shown or noted that the ends of the casing will be sealed.
- professional engineers stamp and signature,
- contact name, address and phone number of pipeline owner on plan or cover letter.
- copy of soils investigation (when required to support method of installation or as requested by the Railway at time of application).
- location of nearest excavation from nearest rail to be identified on drawing.

The nearest point at which digging can take place for boring pits, etc., is as follows:

Starting ten (10) feet from the gauge side of the nearest rail, calculate a slope to the bottom of the proposed pipe at 1.5:1. If a 1.5:1 slope cannot be maintained or more restrictive conditions occur, approved shoring will be required.

## APPENDIX "C-1"

### Culvert Crossings

Applicants must submit four (4) copies of an acceptable plan. Plans must meet TC E- 1 0 and Railway Standards.

Cost for reviewing the first plan received shall be included in the Basic Application Fee. The applicant will be charged an additional fee for each review after the initial application due to inadequate or missing information.

The following information is required on application drawings:

- application drawings must be to scale or have all dimensions shown.
- site plan showing location tied into legal description, width of Railway right-of-way, number of tracks and angle of crossing.
- design grade and invert elevations.
- profile showing depth of burial from base of rail and ditch bottoms to top of pipe.
- type, grade and wall thickness (concrete pipe must be minimum of class V).
- caption stating "Installation and maintenance to be in accordance with TC E-10".
- note stating method of installation (i.e. boring/augering).
- professional engineer's stamp and signature.
- copy of soils investigation (when required to support method of installation or as requested by the Railway at time of application),
- plan must show how pipe will affect Railway drainage.
- contact name, address and phone number of pipeline owner on plan or cover letter.
- details of erosion control/embankment protection at both ends of culvert to be shown.
- location of nearest excavation from nearest rail to be identified on drawing.

The nearest point at which digging can take place for boring pits, etc., is as follows: Starting ten (10) feet from the gauge side of the nearest rail, calculate a slope to the bottom of the proposed pipe at 1.5:1. If a 1.5:1 slope cannot be maintained or more restrictive conditions occur, approved shoring will be required.

## APPENDIX "C-1"

### Communication Cable Crossings

Applicants must submit four (4) copies of an acceptable plan. Plans must meet TC E-1 I and E-12, latest revision of CAN/CSA-C22.3 No. I-M87 and/or CAN/CSAC22.3 No. 7-M86 and Railway Standard SQC-FWC-001.

Cost for reviewing the first plan received shall be included in the Basic Application Fee. The applicant will be charged an additional fee for each review after the initial application due to inadequate or missing information.

The following information is required on **all** application drawings:

- circuit voltage must be shown.
- application drawings must be to scale or have all dimensions shown.
  - site plan showing location tied into legal description, width of Railway right-of-way, number of tracks and angle of crossing.
  - caption stating "Construction, maintenance and operation of the line shall be in accordance with Transport Canada General Orders E- II and E- 1 2 and Canadian standards Association Standards CAN/CSA-C22.3 No. I-M87 and CAN3-C22.3 No. 7-M86 as applicable."
- professional engineer's stamp and signature required when in joint use with power lines.
- contact name, address and phone number of utility owner on plan or cover letter.
- revised drawings must be marked as revised and reason for revision stated.
- existing and proposed facilities must be clearly marked.

Additional requirements for **underground** crossing application drawings:

- type and details of cable and mechanical protection (if used).
  - if communication cables are mechanically protected with pipe or duct, it must extend at least 2 m beyond each outside rail.
- profile showing depth of burial from base of rail and ditch bottoms to cable.
- minimum depth of burial below base of rail is 1.1 m
- minimum depth of burial below road surface is 1.0 m
- minimum depth of burial below ditch bottom is 0.60 m
- intention to install warning markers at each edge of Railway right-of-way.
- note stating method of installation (i.e. boring/augering).
  - location of nearest excavation from nearest rail to be identified on drawing.

The nearest point at which digging can take place for boring pits, etc., is as follows: Starting ten (10) feet from the gauge side of the nearest rail, calculate a slope to the bottom of the proposed pipe at 1.5:1. If a 1.5:1 slope cannot be maintained or more restrictive conditions occur, approved shoring will be required.

Additional requirements for **overhead** crossing application drawings:

- when joint facilities are used, drawings must show information pertaining to both users. Applicant to ensure that other user is aware and has approved proposed joint facility.

- location and all information must be shown pertaining to: poles and adjacent structures or towers, anchors, guys, crossarms, insulators and power and communication cables.
- minimum clearances under maximum sag above top of rail and Railway Signals and Communications plant.
- add 0.3 m to clearance listed in CSA-C22.3 No. I-M87 to allow for future track lifts.
- horizontal and vertical separation between wires and cables.

## APPENDIX "C-1"

### Power Line Crossings

Applicants must submit four (4) copies of an acceptable plan. Plans must meet General Order E- 11 and E- 12, latest revision of CAN/CSA-C22.3 No. 1 -M87 and/or CAN/CSA-C22.3 No. 7-M86 and Railway Standard SQC-FWC-001.

Cost for reviewing the first plan received shall be included in the Basic Application Fee. The applicant will be charged an additional fee for each review after the initial application due to inadequate or missing information. Also, as Per 12.4 of Railway Standard SQCFWC-001 an additional fee for an electrical consultant may be charged.

The following information is required on all application drawings:

- power circuit voltage must be shown.
- application drawings must be to scale or have aff dimensions shown.
- site plan showing location tied into legal description, width of Railway light-of-way, number of tracks and angle of crossing.
- caption stating "Construction, maintenance and operation of the line shall be in accordance with Transport Canada General Orders E- 11 and E- 12 and Canadian standards Association Standards CAN/CSA-C22.3 No. 1-M87 and CAN3-C22.3 No. 7-MS6 as applicable."
- professional engineer's stamp and signature.
- contact name, address and phone number of utility owner on plan or cover letter,
- revised drawings must be marked as revised and reason for revision stated.
- existing and proposed facilities must be clearly marked.

Additional requirements for underground crossing application drawings:

- type and details of cable and mechanical protection
- supply cables must be protected for the full width of the Railway's light-of-way.
- if a pipe or duct is used under the tracks, it must extend at least 2 m beyond each outside rail.
- profile showing depth of burial from base of rail and ditch bottoms to cable.
- minimum depth of burial below base of rail is 1.1 m
- minimum depth of burial below road surface is 1.0 m
- minimum depth of burial below ditch bottom is 0.75 m
- intention to install warning markers at each edge of Railway right-of-way.
- note stating method of installation (i.e. boring/augering).
- Location of nearest excavation from nearest rail to be identified on drawing.

The nearest point at which digging can take place for boring pits, etc., is as follows: Starting ten (10) feet from the gauge side of the nearest rail, calculate a slope to the bottom of the proposed pipe at 1.5:1. If a 1.5:1 slope cannot be maintained or more restrictive conditions occur, approved shoring will be required.

Additional requirements for overhead crossing application drawings:

- when joint facilities are used, drawings must show information pertaining to both users. Applicant to ensure that another user is acceptable and has approved proposed joint facility.

- location and all information must be shown pertaining to: poles and adjacent structures or towers, anchors, guys, crossarms, insulators and power and communication cables.
- minimum clearances under maximum sag above top of rails and Railway Signals and Communication plant.
- add 0.3 m to clearance listed in CSA-C22.3 No. I-M87 to allow for future track lifts.
- horizontal and vertical separation between wires and cables.

## APPENDIX "C-1"

### Private Road Crossings

Applicants must submit four (4) copies of an acceptable plan. Plans must meet General and Railway Standards. Cost for reviewing the first plan received shall be included in the Basic Application Fee. The applicant will be charged an additional fee for each review after the initial application due to inadequate or missing information.

Once the plans have been approved, the Company shall be responsible for the following:

- Road construction of approaches up to the end of the ties and must be level for twenty feet on either side of the rails;
- Road construction must provide for maintenance, or improvement of existing surface drainage conditions, with all drainage to be diverted away from the track bed;
- Flagging protection provided Railway during construction and removal of approaches, whenever equipment or personnel is working within 30 feet of the track will be charged to Company as per Schedule "C";
- Clearing the sight lines at the crossing to meet or exceed Transport Canada Guideline G4A (back to the property line);
- Supply and install road stop signs, if required;
- Crossing is to be designed at 90 degrees to the track;
- All construction to be approved by Railway;
- No tracked vehicles are to use this crossing without flagging protection, This requirement is for your protection and the protection of Railway rail employees, equipment and cargo. Any flagging costs incurred regarding movement of tracked equipment will be billed as per Schedule "C";
- Future maintenance costs at the crossing done by Railway will be billed to Company on an actual cost basis; and,
- Advise Railway when crossing is no longer required. Company responsible for the cost of removal of crossing materials, approaches, return of track to normal state, and provision of barricades at access points. All materials to be removed by Railway.

## APPENDIX "C-1"

### Railway Standards and Common Omissions

The following is provided as a guideline and quick reference only. This information is subject to change when the regulations that they are based on changes, or when the Railway finds that stricter guidelines are required to ensure the safety of its rail lines.

#### 1. Underground Power Lines, Underground Communications Cables

##### 1.1 General:

- i. Must meet the requirement of General Order E- 11.
- ii. Plan must show sufficient information to indicate that crossing will be within the minimum requirements of CSA Standard CSA C22.3 No. 7-M86 and the latest amendments thereto.
  - a. Minimum depth of burial - 1.1 meters below base of the rail, dependent on voltage 0.60 meters in the ditch unless crossing a road then 1.0 meters is required.
  - b. Complete information on the type of cable and voltage must be shown.
  - c. Complete information on type of protection must be shown. If a casing is used, it must be steel and extend a minimum of 2 meters beyond the rail on each side. The pipe must meet wall thickness requirements as listed in TC E-10, or Schedule 40 pipe must be used.

##### 1.2 Railway Requirement:

- i. The Railway requires that markers be installed at the edge of the right-of-way and your intention to do so must be indicated on the plan.

#### 2. Overhead Communications Cables, Overhead Power Lines, Joint Use Power/Communications Lines

##### 2.1 General:

- i. Must meet the requirements of General Order E- 11.
- ii. If you require additional information for a wire crossing application, please request a copy of Standard SQC-FWC-001 - A Guide for Handling of Foreign Wire Crossings, Proximities and Parallelisms.

##### 2.2 Railway Requirements as listed in SQC-FWC-001 including:

- i. The Railway requires that all plans for overhead powerline and joint use power/communications crossings be stamped by a professional engineer.



- ii. The Railway requires that all plans for overhead powerline and joint use power/communications crossings have a note stating the crossing will be constructed, maintained and operated in accordance with the Board of Transport Commission of Canada, General Order E- II and CSA Standard CAN 3-C22.3 No. 1-M87 and the latest amendments thereto.

### 3. Water Pipe Crossings

#### 3.1 General:

- i. Water pipe crossings must meet the requirements of TC E- IO.
- ii. Carrier pipe must be cased in a steel casing.

#### 3.2 Common Omissions:

- i. Intention to use pipe supports within the casing must be shown if they are required.

#### 3.3 Railway Requirements:

- i. The Railway requires that a casing must be used and the casing must extend the full width of the Railway's core right-of-way and a minimum of fifty (50) feet on each side of the outermost track.

### 4. Sewer Pipe Crossing

#### 4.1 General:

- i. Sewer pipe crossings must meet the requirements of TC E-10.

#### 4.2 Common Omissions:

- i. Intention to use pipe supports within the casing must be shown if they are required.

#### 4.3 Railway Requirements:

- i. Concrete sewer pipe must be a minimum of Class V under the tracks.
- ii. If a casing is used, it must be steel, and it must extend the full width of the Railway's core right-of-way and fifty (50) feet beyond the outermost track,

### 5. Natural Gas & Oil Pipe Crossings

#### 5.1 General:

- i. Gas & Oil Pipes must meet the requirements of TC E- IO.

#### 5.2 Common Omissions:

- i. Intention to seal the ends of the casing and to install pipe supports, if required, must be shown.

- ii. Intention to install markers at the property line must be shown.
- iii. Location of nearest shut-off valve must be shown.
- iv. Sufficient information must be provided to calculate the hoop stress:
  - a. Maximum operating pressure;
  - b. Outside diameter in nun;
  - c. Nominal wall thickness in mm; and
  - d. Grade of pipe.

5.3 Railway Requirements:

- i. The Railway requires that all casings extend the full width of CEMR's core right-of-way and fifty (50) feet beyond the outermost track.

6. General Requirements All Crossings Applications

6.1 Railway Requirements:

- i. Proposed method of installation must be shown. (Not required for overhead wires.)
- ii. The nearest point at which digging can take place for bore holes, etc., is as follows: Starting ten (10) feet from the gauge side of the nearest rail, calculate a slope to the bottom of the proposed pipe at 1.5: 1. If a 1.5:1 slope cannot be maintained or more restrictive conditions occur, approved shoring will be required.

6.2 Common Omissions:

- i. Name, address, phone number and contact name for the applicant must be provided. The applicant is the Company that will sign and maintain the crossing agreement.
- ii, Plans must show correct Railway property lines, and the legal description of the area where the crossing will occur must be shown.
- iii. Plans must show which regulation the installation will conform to and be maintained by, for example; applicable CSA standards and the applicable General Order.
- iv. The Railway requires that all plans, except those for overhead or underground communication lines, must be stamped and signed by a professional engineer.

**APPENDIX "D-1"**

**Construction, Operation and Maintenance of Crossings**

1. The Company shall give the Railway at least five (5) days prior notice of its intention to do any construction or maintenance work. The determination of this notice period shall not include Saturdays, Sundays and statutory holidays. Should an emergency situation arise, the Company shall contact the Railway to make special arrangements. The Railway agrees to act reasonably in these situations.
2. Construction and maintenance by the Company of any crossing shall be subject to the supervision of the Railway or the Railways appointed representatives.
3. Should any work be required to support or repair the tracks or facilities of the Railway or to protect train movements due to the construction, operation, maintenance or removal of crossings, such work shall be performed by the Railway and the Company shall reimburse the Railway for all reasonable costs associated with such work upon receipt of the Railway's account.
4. The Company shall maintain all Crossings under this Agreement in good order and condition in accordance with the applicable rules, requirements and specifications issued from time to time by the Canadian Standards Association and approved by Transport Canada. If at any time during the term of this Agreement, the Company neglects to do any restoration and Maintenance work required to keep any Crossing free from hazard, the Railway, after giving reasonable prior written notice to the Company specifying the nature of the work required, may itself carry out such work, The Company shall reimburse the Railway for all reasonable costs associated with this work upon receipt of the Railway's account.
5. The construction, operation and Maintenance of Crossings shall be carried out in a manner so as to minimize interference with Railway Property, facilities and operations. When any such work has been completed, Railway Property shall be restored by the Company to its former condition so far as practicable, Subject to the provisions of Appendix "D-2", the Company shall, at its expense, expeditiously and effectively, remedy any interference that does occur, or, should no appropriate remedy be found, remove such crossing and restore the Railway Property to good order and condition. Should the Company fail to correct such interference, the Railway reserves the right to do so at the Company's expense and the Company will reimburse the Railway upon receipt of the Railway's account therefor.
6. The Railway may impose other construction conditions at time of application.

**APPENDIX "D-2"**

**Removal or Alterations of Crossings**

1. In the event that the Company decides to remove any particular Crossing, the Company shall give the Railway sixty (60) days' written notice of cancellation of the application of this Agreement to such Crossing. The Company shall forthwith at its expense remove such Crossing from Railway Right-of-way and in so doing, shall leave Railway Property in good order and condition. Such removal may be subject to the supervision of the Railway which may for such purpose appoint a representative to act as inspector, whose reasonable wages and expenses shall be paid by the Company upon receipt of Railway accounts therefor.
2. In the event that the Company has notified the Railway of its decision to remove a Crossing and in default of the Company so doing, in accordance with the provisions of Clause I of Appendix "D-2", the Railway, after having given to the Company ten (10) working days' notice of its intention, may remove same at the expense of the Company. Without limiting the generality of the foregoing, the Company shall pay forthwith to the Railway the reasonable costs of all such work incurred by the Railway, upon receipt of Railway accounts therefor.
3. Subject to Clauses I and 2 of Appendix 'D-2', the Company may request the Railway's written permission to dispense with the removal of such Crossing or portion thereof. Any abandoned installation shall be grouted by the Company to the complete satisfaction of the Railway and, without restricting the generality of the provisions of Clause 7 thereof, the Company shall be fully responsible for any environmental or settlement problems that may arise by reason of such abandoned installation. In the event that the parties are unable to develop an arrangement which is satisfactory to the Railway for allowing the installation to remain in place, the Crossing or portion thereof, as the case may be, shall be removed by the Company in accordance with the provisions of Clause I or by the Railway in accordance with the provisions of Clause 2.
4. Should it become necessary or expedient for the purposes of alterations in Railway Property, facilities or operations of the Railway that any Crossing be relocated or modified, the Company shall, upon ninety (90) days' prior written notice from the Railway, use its best efforts to relocate or modify, at the Company's expense, any such Crossing in order to accommodate such alterations. Should the Railway consent thereto and the progress of the Railway's work is not thereby interfered with, the Company may temporarily maintain the Crossing in such manner and at such point as the Railway may direct.
5. If the Company either is unable to, or fails to relocate or modify its Crossings within a reasonable period of time after receipt of the notice required by Clause 4, the Railway may arrange for the relocation or modification work to be carried out provided that the Railway provides written notice of its intention to do so fifteen (15) working days in advance of any work being done. The Railway shall do such work at the expense of the Company.

**SCHEDULE "C"**

**FEE SCHEDULE FOR THE PIPE AND WIRE PROCESS**

1. Basic Application Fee – New Installations \$ 255.00
  
2. Flagging Protection and Signals Protection During Installation  

Minimum cost:	Flagging protection	\$ 75/hour
Minimum cost:	Signals protection	\$ 200 per day

Additional costs will be invoiced if the time on site was more than one day or if a large number of hours were at overtime rates, i.e. weekend installations. Daily flagging rate will apply if notice of project cancellation on any given day is not received with twenty-four (24) hours notice.
  
3. Additional Review Fee \$ 100 per review  

Covers applications with incomplete or substandard information that require resubmission and further review.
  
4. Conversion Fee \$ 10 per crossing  

This is a one-time fee covering the Railway's review of each crossing agreement currently in existence between the Railway and the Company to determine the sites eligible for inclusion under a Master Agreement. No charge will be assessed for conversion of sites where existing fee is "nil" and the crossing is not on land owned by the Railway (i.e. Public Road).
  
5. Annual Administration Fee – Road Crossings \$255.00 per crossing  

The Company will be provided with one (1) invoice on inception and annually, indicating the total annual charge arrived at by multiplying the Annual Administration Fee and the number of sites in existence under this Agreement on inception and on each anniversary date of this Agreement. The amount determined and invoiced will be due and payable within thirty (30) days of the receipt of such invoice.

No charge will be assessed for existing crossings where the fee is "nil" and the crossing is not on land owned by the Railway (i.e. Public Road). Fees will be applicable to any new crossings of this type.

6. Annual Administration Fee – Other Crossings \$255 per crossing

The Company will be provided with one (1) invoice on inception and annually, indicating the total annual charge arrived at by multiplying the Annual Administration Fee and the number of sites in existence under this Agreement on inception and on each anniversary date of this Agreement. The amount determined and invoiced will be due and payable within thirty (30) days of the receipt of such invoice.

No charge will be assessed for existing crossings where the fee is "nil" and the crossing is not on land owned by the Railway (i.e. Public Road). Fees will be applicable to any new crossings of this type.

7. Additional Costs

The Railway reserves the right to charge for additional costs incurred by the Railway as a result of specific applications. Without limiting the generality, this includes items such as open-cut installations, inductive coordination, charges for train delays and slow orders, consulting and inspection costs.

8. Assignment Fee \$250

Should the Company wish to assign any of its rights, interests or privileges it has under this Agreement, and should the Railway consent, this fee will be applicable to each assignment document prepared.

9. Interest

The Company shall pay interest compounded monthly upon all amounts payable under this Agreement and not paid when due at an annual rate equal to three percentage points in excess of the prime commercial lending rate (the "Prime Rate"), charged by the Royal Bank of Canada on Canadian dollar loans to its most favoured commercial borrowers, calculated and computed monthly, with any adjustment and the Prime Rate to be effective on the date of any change in the Prime Rate. Interest runs from the due date, without any demand being made therefore, and is payable until all amounts owing, plus interest, are fully paid. The foregoing is

without prejudice to any other rights which the Railway may have under this Agreement arising out of such default.

10. Fee Review

All fees and charges that may be imposed under this Agreement are subject to annual review and adjustment by the Railway.





**ATTACHMENT G**  
**Significance Determination**



## Assessment Parameters

Determining “significance” involves scientific analyses and interpretation of the capacity of potential post-mitigation or benefits-enhancement scenarios to be free of, or to have reduced potential for adverse effects. The following parameters were relied upon in the EIA to evaluate the significance of environmental effects:

- Nature of the effects (positive, neutral, or negative/adverse).
- Temporal boundaries (when the effect would occur and if the Project effects can be reversed):
  - Frequency of the effect (how often the effect occurs, e.g., once, sporadic, or continuous).
  - Duration of the effect (how long the effect would last, i.e., short-term, intermediate-term, or long-term).
  - Reversibility of the effect (within the timeframe of the Project).
- Spatial boundaries or the geographic extent of the potential effect (area where the effect would be limited to, i.e., the Project Site, local area, regional scale, or global scale).
- Ecological/sociological context (potential effects of the Project on highly valued features [e.g., culturally or historically significant areas; protected species]).
- Uncertainty (determine if the overall effect is unknown or indefinable).

More detailed definitions of the above-mentioned terms used in the environmental assessment of the Project, are provided in the Environmental Assessment Definitions section below.

## Approach to Determining “Significance”

A systematic consideration of the above-noted parameters was relied upon for scoping the assessment of the Project’s effects and creating conclusions about their significance (Figures H-1 and H-2), as outlined below:

1. Define the Project.
2. Describe the effect (positive, negative, neutral) and if negative, determine if the impact is reversible (yes or no).
  - Determine whether effect is short-, intermediate- or long-term in nature.
3. Define the spatial extent of the effect:
  - Project Site, local, regional or global.

4. Define if and how the effect acts in a cumulative way with other projects or activities with respect to the spatial extent of the effect (applies to intermediate- and long-term effects occurring at local, regional or global scales).
  - It is assumed that effects, which are short-term in nature, or restricted to the Project Site, are not able to act cumulatively.
5. Define if the uncertainty associated with the assessment of the effect is acceptable.
  - If unacceptable, then the effect cannot be assessed further (and monitoring may be needed to create data needed to resolve the uncertainty).
6. Define the magnitude of the effect.
  - Is it likely that the effect will exceed an ecological or socio-cultural threshold that is identified within provincial or federal legislation, statutes or applicable regulations or guidelines? (If such a threshold is exceeded, then the effect is deemed “significant.”)

The final step is to make a professional judgment about the significance of the effect (this consideration is generally applied only to adverse effects, i.e., “impacts”). Figure H-2 summarizes the following approach to determining whether long-term adverse effects are “significant”:

- All impacts (after the integration of any potential cumulative effects) found (or judged) to be in excess of established regulatory ecological or socio-cultural thresholds are considered to be “significant.”
- Irreversible Long-Term Effects:
  - All long-term irreversible effects that are global in scope are considered to be “significant” (e.g., the Project being evaluated is going to permanently alter the world).
  - All high-magnitude, long-term, irreversible effects are considered to be “significant” (e.g., the Project is going to have a permanent and obvious effect).
  - All moderate-magnitude, long-term, irreversible effects, which are regional in scope, are considered to be “significant.”
- Reversible Effects:
  - All moderate- and high-magnitude, reversible effects, which are global in scope, are considered to be “significant.”
  - All moderate-magnitude, long-term, reversible effects, which are regional in scope, are considered to be “significant.”

All other Project effects (e.g., reversible, site-specific, and short-term effects) are considered to be “not significant.”

The residual effects of the Project (i.e., after mitigation) are assessed as “significant” or “not significant.” Further to this judgment, a qualitative assessment is conducted of the magnitude of the effects and whether it is positive, neutral, uncertain, or negative.

This process of determining significance of effects considers mitigation measures and incorporates the concept of “cumulative effects” into the assessment before determining whether the effect is “significant.” To determine the potential for cumulative effects, the residual effects of the Project are compared against past, present and future projects that have the potential to act cumulatively with the Project. To achieve this, a period of 10 years was used to assess past and future projects.

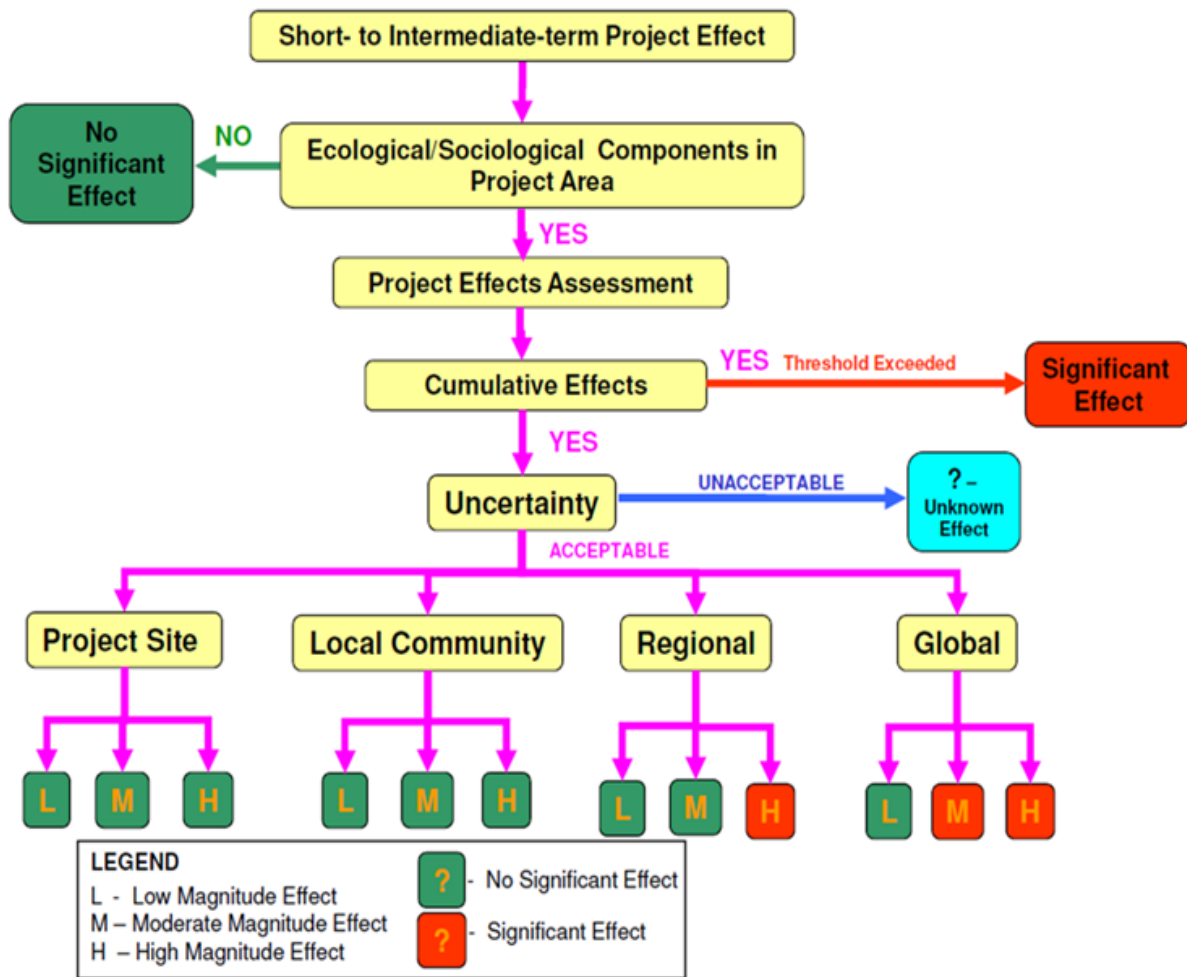


Figure H-1: Decision Tree for Determining Significance of Short- and Intermediate-term Effects

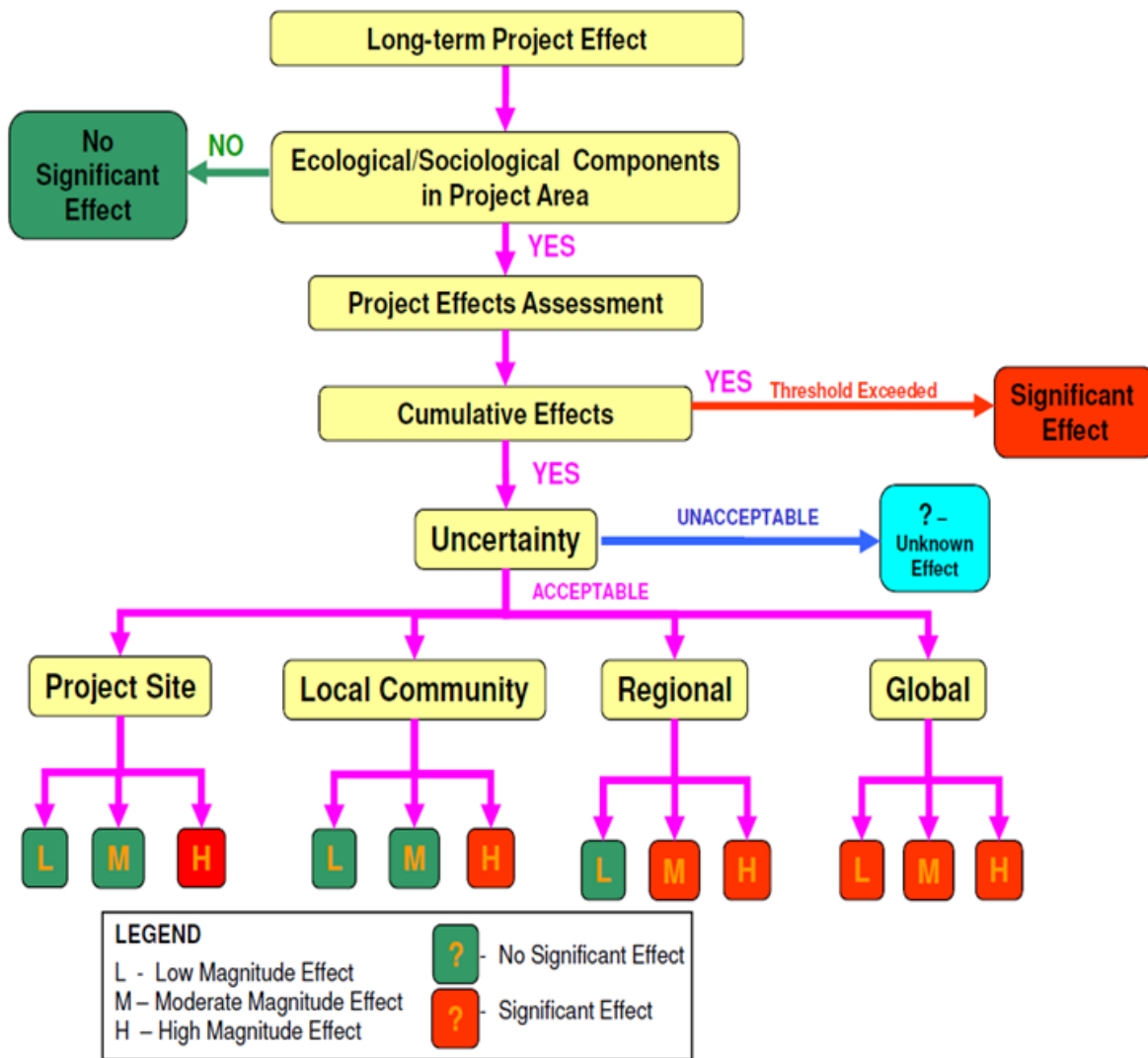


Figure H-2: Decision Tree for Determining Significance of Short- and Intermediate-term Effects

## Environmental Assessment Definitions

Provincial guidelines typically associated with environmental assessments and other federal guidance documents were reviewed and the following list of definitions were developed and used in the environmental assessment of the Project:

- **The Project:** Includes all physical works and activities associated with pre-construction, construction, operations, maintenance and decommissioning.
- **Nature of the Effect:**
  - Positive – effect is beneficial to the environment.
  - Neutral – no change to the environment.
  - Negative – effect is adverse.
- **Temporal Bounds:**
  - Reversibility:
    - Yes – Generally short-term and intermediate-term effects that do not persist in the environment after the application of reasonable Project-related mitigation and rehabilitation.
    - No – A long-term effect that persists in the environment beyond decommissioning of the Project, i.e., remains indefinitely as a residual effect.
  - Frequency:
    - Once – effects are expected to only occur once during the life of the Project.
      - Effects are unique and don't accumulate over the life of the Project.
    - Sporadic – effects are expected to occur occasionally but without any predictable pattern during the life of the Project.
      - Effects may accumulate over the life of the Project.
    - Continuous – effects are reoccurring continuously or periodically during the life of the Project.
      - Effects may accumulate over the life of the Project.
  - Duration:
    - Short-term effect – occurs for small proportion of the life of the Project, e.g., construction and operational manner.
      - The most common short-term effects are associated with preconstruction, construction, maintenance, and decommissioning activities.
    - Intermediate-term effect – occurs over most or all of the life of the Project.
      - The most common intermediate-term effects are related to Project operations.
    - Long-term effects – occurs beyond the life of the Project.
      - Effects cannot be mitigated and persist beyond any reasonable rehabilitation effort after decommissioning.



- **Physical Bounds:**
  - Spatial Bounds:
    - Project Site – defined by area of physical work or activities.
    - Local Area – defined by area of measurable influence of the physical work or activities.
      - This area will vary, depending on the component being evaluated, e.g., it may be the area of response to noise for wildlife, but for socio-economic environment it may be the recruitment area the workforce and where earned salaries are spent.
    - Regional – defined by the administrative districts used to manage the potentially affected environmental component.
      - For terrestrial wildlife ecodistricts, major basins and watersheds for aquatic organisms, and political boundaries including Rural Municipalities regarding socio-economic parameters.
    - Global Area – defined as the world.
  
- **Magnitude of Effect:**
  - Low – effects are anticipated to be within the range of natural variability and therefore cannot be quantified.
  - Moderate – effects exceed natural variability and could be quantified with a well-designed monitoring program.
  - High – effects are obvious and can be easily observed and described.
  
- **Ecological/Sociological Context:**

Defined as highly valued features (culturally significant, historic resources, protected areas, unique areas, etc.), listed species (SARA, MESA, etc.) or other valued species or components (hunting, trapping, air quality, fish habitat, etc.) considered for special management actions.

  - Yes – Project affects valued feature(s) or species.
  - No – Project does not affect valued feature(s) or species.
  - Threshold – an established regulatory value or objective (i.e., disturbance of critical habitat of a listed species, fish habitat HADD, etc., international agreements/national objectives on greenhouse gas emissions, etc.) or in the absence of such a value, an unacceptable or unjustifiable degree of effect given its specific nature.
  - Cumulative effect– defined as a Project-related effect that is the same effect as from a non-Project-related physical works or activities.
    - Short-term effects by definition are reversible and short-lived and therefore will not have a cumulative effect either spatially or temporally.
    - Intermediate-term temporal effects, applicable to the effects of other physical works and activities known to be planned or occurring over the Project’s life including the residual effects of physical works and activities that occurred before the Project.
    - For long-term temporal effects, applicable to all historic, Project-related and hypothetical future physical works and activities.

- **Uncertainty:**

The overall effect is unknown or not definable.

- Acceptable – a hypothetical range of potential effects can be defined and used in the assessment.
- Unacceptable – a hypothetical range of effects cannot be quantified (estimated) or defined sufficiently for use in the assessment.

**ATTACHMENT H**

**Guidelines for Canadian Drinking Water  
Quality**





Health  
Canada

Santé  
Canada

*Your health and  
safety... our priority.*

*Votre santé et votre  
sécurité... notre priorité.*

## **Guidelines for Canadian Drinking Water Quality Summary Table**

*Prepared by the*

Federal-Provincial-Territorial Committee on Drinking Water

of the

Federal-Provincial-Territorial Committee on Health and the Environment

August 2012

Canada 

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Other documents for the Guidelines for Canadian Drinking Water Quality can be found on the following web page:  
[www.healthcanada.gc.ca/waterquality](http://www.healthcanada.gc.ca/waterquality)

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## Introduction

The Guidelines for Canadian Drinking Water Quality are established by the Federal-Provincial-Territorial Committee on Drinking Water (CDW) and published by Health Canada. This summary table is updated regularly and published on Health Canada's website ([www.healthcanada.gc.ca/waterquality](http://www.healthcanada.gc.ca/waterquality)). It supersedes all previous electronic and printed versions, including the 6<sup>th</sup> edition of the Guidelines for Canadian Drinking Water Quality (1996).

Each guideline was established based on current, published scientific research related to health effects, aesthetic effects, and operational considerations. Health-based guidelines are established on the basis of comprehensive review of the known health effects associated with each contaminant, on exposure levels and on the availability of treatment and analytical technologies. Aesthetic effects (e.g., taste, odour) are taken into account when these play a role in determining whether consumers will consider the water drinkable. Operational considerations are factored in when the presence of a substance may interfere with or impair a treatment process or technology (e.g., turbidity interfering with chlorination or UV disinfection) or adversely affect drinking water infrastructure (e.g., corrosion of pipes).

The Federal-Provincial-Territorial Committee on Drinking Water establishes the *Guidelines for Canadian Drinking Water Quality* specifically for contaminants that meet all of the following criteria:

1. exposure to the contaminant could lead to adverse health effects in humans;
2. the contaminant is frequently detected or could be expected to be found in a large number of drinking water supplies throughout Canada; and
3. the contaminant is detected, or could be expected to be detected, in drinking water at a level that is of possible human health significance.

If a contaminant of interest does not meet all these criteria, CDW may choose not to establish a numerical guideline or develop a Guideline Technical Document. In that case, a Guidance Document may be developed.

Older guidelines are systematically reviewed in order to assess the need to update them; in the tables, guidelines that have been reaffirmed include both the original approval and reaffirmation year indicated after the name of the parameter.

Science-based documents published as part of the Guidelines for Canadian Drinking Water Quality (i.e., Guideline Technical Documents, Guidance Documents) are developed through a documented process which includes a literature review, internal and external peer-reviews, public consultations and Federal-Provincial-Territorial approval processes. For more information on specific guidelines, please refer to the guideline technical document or guidance document for the parameter of concern, available on the Health Canada website ([www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php)).



## Membership of the Federal-Provincial-Territorial Committee on Drinking Water

### Jurisdictional representatives

Alberta	Department of Environment and Water	Dr. Donald Reid
British Columbia	Ministry of Health	Mr. Barry Boettger
Manitoba	Manitoba Water Stewardship	Ms. Kim Philip
New Brunswick	Department of Health	Mr. Kevin Gould
Newfoundland and Labrador	Department of Environment and Conservation	Mr. Haseen Kahn
Northwest Territories	Department of Health and Social Services	Mr. Duane Fleming
Nova Scotia	Department of Environment	Ms. Judy MacDonald
Nunavut Territory	Department of Health and Social Services	Mr. Peter Workman
Ontario	Ministry of the Environment	Dr. Satish Deshpande
Prince Edward Island	Department of Environment, Energy and Forestry	Mr. George Somers
Québec	Ministère du Développement durable, de l'Environnement et des Parcs	Ms. Caroline Robert
Saskatchewan	Ministry of the Environment	Mr. Sam Ferris
Yukon Territory	Department of Health and Social Services	Ms. Patricia Brooks
Canada	Department of Health	Dr. John Cooper

### Liaison officers

Federal-Provincial-Territorial Committee on Health and the Environment (CHE)	Mr. Peter Workman
Environment Canada/Canadian Council of Ministers of the Environment	Dr. Doug Spry

### Committee coordinator

Health Canada (Water, Air and Climate Change Bureau)	Ms. Anne Vézina
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## Tables

**Table 1. Microbiological Parameters**

In general, the highest-priority guidelines are those dealing with microbiological contaminants, such as bacteria, protozoa and viruses. As a result of challenges with routine analysis of harmful microorganisms that could potentially be present in inadequately treated drinking water, the microbiological guidelines focus on indicators (*E.coli*, total coliforms) and treatment goals. The use of a multi-barrier approach that includes source water protection, adequate treatment, including disinfection, and a well-maintained distribution system can reduce microorganisms to levels that have not been associated with illness, as well as meet the guidelines outlined below.

Parameter (approval)	Guideline	Common sources	Health considerations	Applying the guideline
Bacterial waterborne pathogens (2006)	None required	Human and animal faeces; some are naturally occurring	Commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea); some pathogens may infect the lungs, skin, eyes, central nervous system or liver.	Use multi-barrier approach to reduce pathogens to levels that are non-detectable or not associated with illness.
Enteric viruses (2011)	Treatment goal: Minimum 4 log reduction and/or inactivation of enteric viruses	Human and animal faeces	Commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea); less common health effects can include respiratory symptoms, central nervous system infections, liver infections and muscular syndromes.	Routine monitoring for viruses is not practical; where possible, characterize source water to determine if greater than a 4 log removal or inactivation is necessary.
<i>Escherichia coli</i> ( <i>E. coli</i> ) (2006)	MAC: None detectable per 100 mL	Human and animal faeces	The presence of <i>E. coli</i> indicates recent faecal contamination and the potential presence of microorganisms capable of causing gastrointestinal illnesses; pathogens in human and animal faeces pose the most immediate danger to public health.	<i>E. coli</i> is used as an indicator of the microbiological safety of drinking water; if detected, enteric pathogens may also be present.
Heterotrophic plate count (HPC) (2006)	None required	Naturally occurring	HPC results are not an indicator of water safety and should not be used as an indicator of potential adverse human health effects; HPC is a useful operational tool for monitoring general bacteriological water quality through the treatment process and in the distribution system.	If increases in HPC values above baseline levels occur, the system should be inspected to determine the cause; HPC should be minimized through effective treatment and disinfection and remain constant over time.
Protozoa: <i>Giardia</i> and <i>Cryptosporidium</i> (2004)	Treatment goal: Minimum 3 log reduction and/or inactivation	Human and animal faeces	Commonly associated with gastrointestinal upset (nausea, vomiting, diarrhoea); less common health effects can include respiratory symptoms, central nervous system infections, liver infections and muscular syndromes.	Monitoring for <i>Cryptosporidium</i> and <i>Giardia</i> in source waters will provide valuable information for assessing treatment requirements.

Parameter (approval)	Guideline	Common sources	Health considerations	Applying the guideline
Total coliforms (2006)	<p><i>At exit of municipal treatment plant or throughout semi-public systems:</i> MAC of none detectable/100 mL</p> <p><i>In municipal distribution systems:</i> No consecutive samples or no more than 10% of samples should contain total coliforms</p>	Human and animal faeces; naturally occurring in water, soil and vegetation	Total coliforms are not used as indicators of potential health effects from pathogenic microorganisms; they are used as an operational tool to determine how well the drinking water treatment system is operating.	In water leaving a treatment plant, the presence of total coliforms indicates that the water has been inadequately treated and may contain pathogenic microorganisms; in semi-public systems, the presence of total coliforms generally indicates that the system is vulnerable to contamination and that additional actions need to be taken; in a distribution and storage system, detection of total coliforms can indicate regrowth of the bacteria in distribution system biofilms or intrusion of untreated water; thus, exceedances of the distribution system goal should be investigated.
Turbidity (2003)	<p>Guideline Treated water &lt; 0.1 NTU<sup>1</sup> at all times. Where not achievable: ≤ 0.3 NTU<sup>2</sup> ≤ 1.0 NTU<sup>3</sup> ≤ 0.1 NTU<sup>4</sup></p>	<p>Naturally occurring particles: <i>Inorganic:</i> clays, silts, metal precipitates <i>Organic:</i> decomposed plant &amp; animal debris, microorganisms</p>	Indirect associations: particles can harbour microorganisms, protecting them from disinfection, and can entrap heavy metals and biocides; elevated or fluctuating turbidity in filtered water can indicate a problem with the water treatment process and a potential increased risk of pathogens in treated water.	Guidelines apply to individual filter turbidity for systems that use surface water or GUDI; drinking water from some sources may meet exemption criteria from filtration requirements established by the appropriate authority; increases in distribution system turbidity can be indicative of deteriorating water quality and should be investigated.

<sup>1</sup> Where possible, filtration systems should be designed and operated to reduce turbidity levels as low as possible, with a treated water turbidity target of less than 0.1 NTU at all times

<sup>2</sup> Chemically assisted filtration: ≤ 0.3 NTU in at least 95% of a) measurements made or b) the time each calendar month; never to exceed 1.0 NTU.

<sup>3</sup> Slow sand or diatomaceous earth filtration: ≤ 1.0 NTU in at least 95% of a) measurements made or b) the time each calendar month; never to exceed 3.0 NTU.

<sup>4</sup> Membrane filtration: ≤ 0.1 NTU in at least 99% of a) measurements made or b) the time each calendar month; never to exceed 0.3 NTU.

**Table 2. Chemical and Physical Parameters**

Guidelines for chemical and physical parameters are:

1. health based and listed as a maximum acceptable concentrations (MAC);
2. based on aesthetic considerations and listed as an aesthetic objectives (AO); or
3. established based on operational considerations and listed as an operational guidance values (OG).

In general, the highest priority guidelines are those dealing with microbiological contaminants. Any measure taken to reduce concentrations of chemical contaminants should not compromise the effectiveness of disinfection.

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
T	Aluminum (1998)		OG: < 0.1 (conventional treatment); < 0.2 (other treatment types)	Aluminum salts used as coagulants in drinking water treatment; naturally occurring		Current weight of evidence does not indicate adverse health effects at levels found in drinking water.
I	Ammonia (1987)	None required		Naturally occurring; released from agricultural or industrial wastes; added as part of chloramination for drinking water disinfection		Guideline value not necessary as it is produced in the body and efficiently metabolized in healthy people; no adverse effects at levels found in drinking water.
I	Antimony (1997)	0.006		Naturally occurring (erosion); soil runoff; industrial effluents; leaching from plumbing materials and solder	<b>Health basis of MAC:</b> Microscopic changes in organs and tissues (thymus, kidney, liver, spleen, thyroid)	MAC takes into consideration analytical achievability; plumbing should be thoroughly flushed before water is used for consumption.
I	Arsenic (2006)	0.010 ALARA		Naturally occurring (erosion and weathering of soils, minerals, ores)	<b>Health basis of MAC:</b> Cancer (lung, bladder, liver, skin) (classified as human carcinogen) <b>Other:</b> Skin, vascular and neurological effects (numbness and tingling of extremities)	MAC based on treatment achievability; elevated levels associated with certain groundwaters; levels should be kept as low as reasonably achievable.

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I	Asbestos (1989, 2005)	None required		Naturally occurring (erosion of asbestos minerals and ores); decay of asbestos-cement pipes		Guideline value not necessary; no evidence of adverse health effects from exposure through drinking water.
P	Atrazine (1993)	0.005		Leaching and/or runoff from agricultural use	<b>Health basis of MAC:</b> Developmental effects (reduced body weight of offspring) <b>Other:</b> Potential increased risk of ovarian cancer or lymphomas (classified as possible carcinogen)	MAC applicable to the sum of atrazine and its <i>N</i> -dealkylated metabolites; persistent in source waters.
P	Azinphos-methyl (1989, 2005)	0.02		Leaching and/or runoff from agricultural use	<b>Health basis of MAC:</b> Neurological effects (plasma cholinesterase)	All uses to be phased out by 2012.
I	Barium (1990)	1.0		Naturally occurring; releases or spills from industrial uses	<b>Health basis of MAC:</b> Increases in blood pressure, cardiovascular disease	
O	Benzene (2009)	0.005		Releases or spills from industrial uses	<b>Health basis of MAC:</b> Bone marrow (red and white blood cell) changes and cancer (classified as human carcinogen) <b>Other:</b> Blood system and immunological responses	MAC considers additional exposure through showering and bathing; drinking water is generally a minor source of exposure.
O	Benzo[ <i>a</i> ]pyrene (1988, 2005)	0.000 01		Leaching from liners in water distribution systems	<b>Health basis of MAC:</b> Stomach tumours (classified as probable carcinogen)	
I	Boron (1990)	5		Naturally occurring; leaching or runoff from industrial use	<b>Health basis of MAC:</b> Reproductive effects (testicular atrophy, spermatogenesis) <b>Other:</b> Limited evidence of reduced sexual function in men	MAC based on treatment achievability.
DBP	Bromate (1998)	0.01		By-product of drinking water disinfection with ozone; possible contaminant in hypochlorite solution	<b>Health basis of MAC:</b> Renal cell tumours (classified as probable carcinogen)	MAC based on analytical and treatment achievability
P	Bromoxynil (1989, 2005)	0.005		Leaching or runoff from agricultural use	<b>Health basis of MAC:</b> Reduced liver to body weight ratios	

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I	Cadmium (1986, 2005)	0.005		Leaching from galvanized pipes, solders or black polyethylene pipes; industrial and municipal waste	<b>Health basis of MAC:</b> Kidney damage and softening of bone	
I	Calcium (1987, 2005)	None required		Naturally occurring (erosion and weathering of soils, minerals, ores)		Guideline value not necessary, as there is no evidence of adverse health effects from calcium in drinking water; calcium contributes to hardness
P	Carbaryl (1991, 2005)	0.09		Leaching or runoff from agricultural use	<b>Health basis of MAC:</b> Decreased kidney function (may be rapidly reversible after exposure ceases)	
P	Carbofuran (1991, 2005)	0.09		Leaching or runoff from agricultural use	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition) and growth suppression	
O	Carbon tetrachloride (2010)	0.002		Industrial effluents and leaching from hazardous waste sites	<b>Health basis of MAC:</b> Liver toxicity <b>Other:</b> Kidney damage; liver tumours (classified as probable carcinogen)	MAC considers additional exposure through showering and bathing
D	Chloramines (1995)	3.0		Monochloramine is used as a secondary disinfectant; formed in presence of both chlorine and ammonia	<b>Health basis of MAC:</b> Reduced body weight gain <b>Other:</b> immunotoxicity effects	MAC is for total chloramines based on health effects associated with monochloramine and analytical achievability
DBP	Chlorate (2008)	1		By-product of drinking water disinfection with chlorine dioxide; possible contaminant in hypochlorite solution	<b>Health basis of MAC:</b> Thyroid gland effects (colloid depletion)	Formation of chlorate ion should be prevented, as it is difficult to remove once formed; chlorate formation should be controlled by respecting the maximum feed dose of 1.2 mg/L of chlorine dioxide and managing /monitoring formation in hypochlorite solutions.
I	Chloride (1979, 2005)		AO: ≤ 250	Naturally occurring (seawater intrusion); dissolved salt deposits, highway salt, industrial effluents, oil well operations, sewage, irrigation drainage, refuse leachates		Based on taste and potential for corrosion in the distribution system

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
<b>D</b>	Chlorine (2009)	None required		Used as drinking water disinfectant	Guideline value not necessary due to low toxicity at concentrations found in drinking water	Free chlorine concentrations in most Canadian drinking water distribution systems range from 0.04 to 2.0 mg/L
<b>D</b>	Chlorine dioxide (2008)	None required		Used as drinking water disinfectant	A guideline for chlorine dioxide is not required because of its rapid reduction to chlorite in drinking water	A maximum feed dose of 1.2 mg/L of chlorine dioxide should not be exceeded to control the formation of chlorite and chlorate
<b>DBP</b>	Chlorite (2008)	1		By-product of drinking water disinfection with chlorine dioxide	<b>Health basis of MAC:</b> Neurobehavioural effects (lowered auditory startle amplitude, decreased exploratory activity), decreased absolute brain weight, altered liver weights	Chlorite formation should be controlled by respecting the maximum feed dose of 1.2 mg/L of chlorine dioxide and managing /monitoring formation in hypochlorite solutions.
<b>P</b>	Chlorpyrifos (1986)	0.09		Leaching and/or runoff from agricultural or other uses	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition)	Not expected to leach significantly into groundwater
<b>I</b>	Chromium (1986)	0.05		Naturally occurring (erosion of minerals); releases or spills from industrial uses	<b>Health basis of MAC:</b> Enlarged liver, irritation of the skin, respiratory and gastrointestinal tracts from chromium (VI)	Chromium (III) is an essential element; MAC is protective of health effects from chromium (VI)
<b>T</b>	Colour (1979, 2005)		AO: ≤ 15 TCU	Naturally occurring organic substances, metals; industrial wastes		May interfere with disinfection; removal is important to ensure effective treatment
<b>I</b>	Copper (1992)		AO: ≤ 1.0	Naturally occurring; leaching from copper piping	Copper is an essential element in human metabolism. Adverse health effects occur at levels much higher than the aesthetic objective	Based on taste, staining of laundry and plumbing fixtures; plumbing should be thoroughly flushed before water is used for consumption
<b>I</b>	Cyanide (1991)	0.2		Industrial and mining effluents; release from organic compounds	<b>Health basis of MAC:</b> No clinical or other changes at the highest dose tested	Health effects from cyanide are acute; at low levels of exposure, it can be detoxified to a certain extent in the human body
<b>O</b>	Cyanobacterial toxins— Microcystin-LR (2002)	0.0015		Naturally occurring (released from blooms of blue-green algae)	<b>Health basis of MAC:</b> Liver effects (enzyme inhibitor) <b>Other:</b> Classified as possible carcinogen	MAC is protective of total microcystins; avoid algicides like copper sulphate, as they may cause toxin release into water

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
P	Diazinon (1986, 2005)	0.02		Runoff from agricultural or other uses	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition)	Not expected to leach significantly into groundwater
P	Dicamba (1987, 2005)	0.12		Leaching or runoff from agricultural or other uses	<b>Health basis of MAC:</b> Liver effects (vacuolization, necrosis, fatty deposits and liver weight changes)	Readily leaches into groundwater
O	1,2-Dichlorobenzene <sup>2</sup> (1987)	0.2	AO: ≤ 0.003	Releases or spills from industrial effluents	<b>Health basis of MAC:</b> Increased blood cholesterol, protein and glucose levels	AO based on odour; levels above the AO would render drinking water unpalatable
O	1,4-Dichlorobenzene <sup>2</sup> (1987)	0.005	AO: ≤ 0.001	Releases or spills from industrial effluents; use of urinal deodorants	<b>Health basis of MAC:</b> Benign liver tumours and adrenal gland tumours (classified as probable carcinogen)	AO based on odour; levels above the AO would render drinking water unpalatable
O	1,2-Dichloroethane (1987)	0.005		Releases or spills from industrial effluents; waste disposal	<b>Health basis of MAC:</b> Cancer of the circulatory system (classified as probable carcinogen)	MAC based on treatment and analytical achievability
O	1,1-Dichloroethylene (1994)	0.014		Releases or spills from industrial effluents	<b>Health basis of MAC:</b> Liver effects (fatty changes)	
O	Dichloromethane (2011)	0.05		Industrial and municipal wastewater discharges	<b>Health basis of MAC:</b> Liver effects (liver foci and areas of cellular alteration). <b>Other:</b> Classified as probable carcinogen	MAC is protective of carcinogenic effects and considers additional exposure through showering and bathing
O	2,4-Dichlorophenol (1987, 2005)	0.9	AO: ≤ 0.0003	By-product of drinking water disinfection with chlorine; releases from industrial effluents	<b>Health basis of MAC:</b> Liver effects (cellular changes)	AO based on odour; levels above the AO would render drinking water unpalatable
P	2,4-Dichlorophenoxy acetic acid (2,4-D) (1991)	0.1		Leaching and/or runoff from use as a weed controller; releases from industrial effluents	<b>Health basis of MAC:</b> Kidney effects (tubular cell pigmentation)	



Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
P	Diclofop-methyl (1987, 2005)	0.009		Leaching and/or runoff from use as a weed controller; added directly to water to control aquatic weeds	<b>Health basis of MAC:</b> Liver effects (enlargement and enzyme changes)	Low potential for groundwater contamination
P	Dimethoate (1986, 2005)	0.02		Leaching and/or runoff from residential, agricultural and forestry use	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition)	
P	Diquat (1986, 2005)	0.07		Leaching and/or runoff from agricultural use; added directly to water to control aquatic weeds	<b>Health basis of MAC:</b> Cataract formation	Unlikely to leach into groundwater
P	Diuron (1987, 2005)	0.15		Leaching and/or runoff from use in controlling vegetation	<b>Health basis of MAC:</b> Weight loss, increased liver weight and blood effects	High potential to leach into groundwater
O	Ethylbenzene (1986, 2005)		AO: ≤ 0.0024	Emissions, effluents or spills from petroleum and chemical industries		Based on odour
I	Fluoride (2010)	1.5		Naturally occurring (rock and soil erosion); may be added to promote dental health	<b>Health basis of MAC:</b> Moderate dental fluorosis (based on cosmetic effect, not health)	Beneficial in preventing dental caries
DBP	Formaldehyde (1997)	None required		By-product of disinfection with ozone; releases from industrial effluents		Guideline value not necessary, as levels in drinking water are below the level at which adverse health effects may occur
O	Gasoline and its organic constituents (1986, 2005)	None required		Spill or leaking storage tank		No MAC due to complex composition of gasoline; strong taste and odour at concentrations well below those potentially eliciting adverse health effects (see benzene, ethylbenzene, toluene and xylenes for more information)
P	Glyphosate (1987, 2005)	0.28		Leaching and/or runoff from various uses in weed control	<b>Health basis of MAC:</b> Reduced body weight gain	Not expected to migrate to groundwater

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
DBP	Haloacetic acids – Total (HAAs) <sup>3</sup> (2008)	0.08 ALARA		By-product of drinking water disinfection with chlorine	<b>Health basis of MAC:</b> Liver cancer (DCA); DCA is classified as probably carcinogenic to humans <b>Other:</b> Other organ cancers (DCA, DBA, TCA); liver and other organ effects (body, kidney and testes weights) (MCA)	Refers to the total of monochloroacetic acid (MCA), dichloroacetic acid (DCA), trichloroacetic acid (TCA), monobromoacetic acid (MBA) and dibromoacetic acid (DBA); MAC is based on ability to achieve HAA levels in distribution systems without compromising disinfection; precursor removal limits formation
T	Hardness (1979)	None required		Naturally occurring (sedimentary rock erosion and seepage, runoff from soils); levels generally higher in groundwater	Although hardness may have significant aesthetic effects, a guideline has not been established because public acceptance of hardness may vary considerably according to the local conditions; major contributors to hardness -- calcium and magnesium -- are not of direct public health concern	Hardness levels between 80 and 100 mg/L (as CaCO <sub>3</sub> ) provide acceptable balance between corrosion and incrustation; where a water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended
I	Iron (1978, 2005)		AO: ≤ 0.3	Naturally occurring (erosion and weathering of rocks and minerals); acidic mine water drainage, landfill leachates, sewage effluents and iron-related industries		Based on taste and staining of laundry and plumbing fixtures; no evidence exists of dietary iron toxicity in the general population
I	Lead (1992)	0.010		Leaching from plumbing (pipes, solder, brass fittings and lead service lines)	<b>Health basis of MAC:</b> Biochemical and neurobehavioural effects (intellectual development, behaviour) in infants and young children (under 6 years) <b>Other:</b> Anaemia, central nervous system effects; in pregnant women, can affect the unborn child; in infants and children under 6 years, can affect intellectual development, behaviour, size and hearing; classified as probably carcinogenic to humans	Because the MAC is based on chronic effects, it is intended to apply to average concentrations in water consumed for extended periods. Exposure to lead should nevertheless be kept to a minimum; plumbing should be thoroughly flushed before water is used for consumption; most significant contribution is generally from lead service line entering the building

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I	Magnesium (1978)	None required		Naturally occurring (erosion and weathering of rocks and minerals)		Guideline value not necessary, as there is no evidence of adverse health effects from magnesium in drinking water
P	Malathion (1986, 2005)	0.19		Leaching and/or runoff from agricultural and other uses	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition)	Not expected to leach into groundwater
I	Manganese (1987)		AO: ≤ 0.05	Naturally occurring (erosion and weathering of rocks and minerals)		Based on taste and staining of laundry and plumbing fixtures
I	Mercury (1986)	0.001		Releases or spills from industrial effluents; waste disposal; irrigation or drainage of areas where agricultural pesticides are used	<b>Health basis of MAC:</b> Irreversible neurological symptoms	Applies to all forms of mercury; mercury generally not found in drinking water, as it binds to sediments and soil
P	2-Methyl-4-chlorophenoxyacetic acid (MCPA) (2010)	0.1		Leaching and/or runoff from agricultural and other uses	<b>Health basis of MAC:</b> Kidney effects (increased absolute and relative weights, urinary bilirubin, crystals and pH) <b>Other:</b> Systemic, liver, testicular, reproductive/developmental and nervous system effects	Can potentially leach into groundwater
O	Methyl tertiary-butyl ether (MTBE) (2006)		AO: ≤ 0.015	Spills from gasoline refineries, filling stations and gasoline-powered boats; seepage into groundwater from leaking storage tanks	There exist too many uncertainties and limitations in the MTBE database to develop a health based guideline.	AO based on odour; levels above the AO would render water unpalatable; as the AO is lower than levels associated with potential toxicological effects, it is considered protective of human health.
P	Metolachlor (1986)	0.05		Leaching and/or runoff from agricultural or other uses	<b>Health basis of MAC:</b> Liver lesions and nasal cavity tumours	Readily binds to organic matter in soil; little leaching expected in soils with high organic and clay content
P	Metribuzin (1986, 2005)	0.08		Leaching and/or runoff from agricultural use	<b>Health basis of MAC:</b> Liver effects (increased incidence and severity of mucopolysaccharide droplets)	Leaching into groundwater depends on the organic matter content of the soil
O	Monochlorobenzene (1987)	0.08	AO: ≤ 0.03	Releases or spills from industrial effluents	<b>Health basis of MAC:</b> Reduced survival and body weight gain	AO based on odour; levels above the AO would render water unpalatable

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I	Nitrate/nitrite (1987)	Nitrate: 45 as nitrate; 10 as nitrate-nitrogen	Nitrite (if measured separately): 3.2 as nitrite; 1.0 as nitrite-nitrogen	Naturally occurring; leaching or runoff from agricultural fertilizer use, manure and domestic sewage; may be produced from excess ammonia or from microbial activity in distribution systems	<b>Health basis of MAC:</b> Methaemoglobinaemia (blue baby syndrome) in infants less than 3 months old (short term) <b>Other:</b> Classified as possible carcinogen	MACs are protective of children and adults; systems using chloramine disinfection or that have naturally occurring ammonia should monitor nitrite and nitrate in distribution system
I	Nitritotriacetic acid (NTA) (1990)	0.4		Sewage contamination	<b>Health basis of MAC:</b> Kidney effects (nephritis and nephrosis) <b>Other:</b> Classified as possible carcinogen	
DBP	N-Nitroso dimethylamine (NDMA) (2010)	0.000 04		By-product of drinking water disinfection with chlorine or chloramines; industrial and sewage treatment plant effluents	<b>Health basis of MAC:</b> Liver cancer (classified as probable carcinogen)	MAC considers additional exposure through showering and bathing; levels should be kept low by preventing formation during treatment
A	Odour (1979, 2005)		Inoffensive	Biological or industrial sources		Important to provide drinking water with no offensive odour, as consumers may seek alternative sources that are less safe
P	Paraquat (1986, 2005)	0.01 as paraquat dichloride; 0.007 as paraquat ion		Leaching and/or runoff from agricultural and other uses; added directly to water to control aquatic weeds	<b>Health basis of MAC:</b> Various effects on body weight, spleen, testes, liver, lungs, kidney, thyroid, heart and adrenal gland	Entry into drinking water unlikely from crop applications (clay binding); however, may persist in water for several days if directly applied to water
O	Pentachlorophenol (1987, 2005)	0.06	AO: ≤ 0.03	By-product of drinking water disinfection with chlorine; industrial effluents	<b>Health basis of MAC:</b> Reduced body weight, changes in clinical parameters, histological changes in kidney and liver, reproductive effects (decreased neonatal survival and growth)	AO based on odour; levels above the AO would render drinking water unpalatable
T	pH (1979)		6.5–8.5 <sup>4</sup>	Not applicable		pH can influence the formation of disinfection by-products and effectiveness of treatment

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
P	Phorate (1986, 2005)	0.002		Leaching and/or runoff from agricultural and other uses	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition)	Some potential to leach into groundwater
P	Picloram (1988, 2005)	0.19		Leaching and/or runoff from agricultural and other uses	<b>Health basis of MAC:</b> Changes in body and liver weights and clinical chemistry parameters <b>Other:</b> Kidney effects (liver to body weight ratios and histopathology)	Significant potential to leach into groundwater
I	Selenium (1992)	0.01		Naturally occurring (erosion and weathering of rocks and soils)	<b>Health basis of MAC:</b> Essential nutritional element <b>Other:</b> Hair loss and weakened nails at extremely high levels of exposure	Most exposure from food; little information on toxicity of selenium from drinking water
I	Silver (1986, 2005)	None required		Naturally occurring (erosion and weathering of rocks and soils)		Guideline value not required as drinking water contributes negligibly to an individual's daily intake
P	Simazine (1986)	0.01		Leaching and/or runoff from agricultural and other uses	<b>Health basis of MAC:</b> Body weight changes and effects on serum and thyroid gland	Extent of leaching decreases with increasing organic matter and clay content
I	Sodium (1979)		AO: ≤ 200	Naturally occurring (erosion and weathering of salt deposits and contact with igneous rock, seawater intrusion); sewage and industrial effluents; sodium-based water softeners		Based on taste; where a sodium-based water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended
I	Sulphate (1994)		AO: ≤ 500	Industrial wastes	High levels (above 500 mg/L) can cause physiological effects such as diarrhoea or dehydration	Based on taste; health authorities should be notified of drinking water sources containing above 500 mg/L
I	Sulphide (1992)		AO: ≤ 0.05	Can occur in the distribution system from the reduction of sulphates by sulphate-reducing bacteria; industrial wastes		Based on taste and odour; levels above the AO would render water unpalatable
A	Taste (1979, 2005)		Inoffensive	Biological or industrial sources		Important to provide drinking water with no offensive taste, as consumers may seek alternative sources that are less safe

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
T	Temperature (1979, 2005)		AO: ≤ 15°C	Not applicable		Temperature indirectly affects health and aesthetics through impacts on disinfection, corrosion control and formation of biofilms in the distribution system
P	Terbufos (1987, 2005)	0.001		Leaching and/or runoff from agricultural and other uses	<b>Health basis of MAC:</b> Nervous system effects (cholinesterase inhibition)	Based on analytical achievability
O	Tetrachloroethylene (1995)	0.03		Industrial effluents or spills	<b>Health basis of MAC:</b> Increased liver and kidney weights <b>Other:</b> Classified as possible carcinogen; limited evidence of an increased risk of spontaneous abortion	Readily leaches into groundwater; MAC considers additional exposure through showering and bathing
O	2,3,4,6-Tetrachlorophenol (1986, 2005)	0.1	AO: ≤ 0.001	By-product of drinking water disinfection with chlorine; industrial effluents and use of pesticides	<b>Health basis of MAC:</b> Developmental effects (embryotoxicity)	AO based on odour; levels above the AO would render drinking water unpalatable
O	Toluene (1986, 2005)		AO: ≤ 0.024	Release of effluents or spills from petroleum and chemical industries		AO based on odour; levels above the AO would render drinking water unpalatable
A	Total dissolved solids (TDS) (1991)		AO: ≤ 500	Naturally occurring; sewage, urban and agricultural runoff, industrial wastewater		Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate
O	Trichloroethylene (2005)	0.005		Industrial effluents and spills from improper disposal	<b>Health basis of MAC:</b> Developmental effects (heart malformations) <b>Other:</b> Classified as probable carcinogen	MAC considers additional exposure through showering and bathing
O	2,4,6-Trichlorophenol (1987, 2005)	0.005	AO: ≤ 0.002	By-product of drinking water disinfection with chlorine; industrial effluents and spills	<b>Health basis of MAC:</b> Liver cancer (classified as probable carcinogen)	AO based on odour; levels above the AO would render drinking water unpalatable

Type <sup>1</sup>	Parameter (approval, reaffirmation)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
P	Trifluralin (1989, 2005)	0.045		Runoff from agricultural uses	<b>Health basis of MAC:</b> Changes in liver and spleen weights and in serum chemistry	Unlikely to leach into groundwater
DBP	Trihalomethanes <sup>3</sup> (THMs) (2006)	0.1		By-product of drinking water disinfection with chlorine; industrial effluents	<b>Health basis of MAC:</b> Liver effects (fatty cysts) (chloroform classified as possible carcinogen) <b>Other:</b> Kidney and colorectal cancers	Considers the most commonly found THMs, namely chlorodibromomethane, chloroform, bromodichloromethane and bromoform; MAC based on health effects of chloroform and considers additional exposure through showering and bathing; precursor removal limits formation
I	Uranium (1999)	0.02		Naturally occurring (erosion and weathering of rocks and soils); mill tailings; emissions from nuclear industry and combustion of coal and other fuels; phosphate fertilizers	<b>Health basis of MAC:</b> Kidney effects (various lesions); may be rapidly reversible after exposure ceases	Based on treatment achievability; MAC based on chemical effects, as uranium is only weakly radioactive; uranium is rapidly eliminated from the body
O	Vinyl chloride (1992)	0.002		Industrial effluents; degradation product from trichloroethylene and tetrachloroethylene in groundwater; leaching from polyvinyl chloride pipes	<b>Health basis of MAC:</b> Liver cancer (classified as human carcinogen) <b>Other:</b> Raynaud's disease, effects on bone, circulatory system, thyroid, spleen, central nervous system	Based on treatment and analytical achievability; leaching from polyvinyl chloride pipe is not expected to be significant
O	Xylene (1986, 2005)		AO: ≤ 0.3	Industrial effluents and spills		AO based on taste and odour; levels above the AO would render water unpalatable
I	Zinc (1979, 2005)		AO: ≤ 5.0	Naturally occurring; industrial and domestic emissions; leaching may occur from galvanized pipes, hot water tanks and brass fittings		AO based on taste; water with zinc levels above the AO tends to be opalescent and develops a greasy film when boiled; plumbing should be thoroughly flushed before water is consumed

<sup>1</sup> Parameter types: A – Acceptability; D – Disinfectant; DBP – Disinfection by-product; P – Pesticide; I – Inorganic chemical; O – Organic chemical; P – Pesticide; Treatment related parameter.

<sup>2</sup> In cases where total dichlorobenzenes are measured and concentrations exceed the most stringent value (0.005 mg/L), the concentrations of the individual isomers should be established.

<sup>3</sup> Expressed as a locational running annual average of quarterly samples.

<sup>4</sup> No units.

**Table 3. Radiological Parameters**

Guidelines for radiological parameters focus on routine operational conditions of existing and new water supplies and do not apply in the event of contamination during an emergency involving a large release of radionuclides into the environment. Maximum acceptable concentrations (MACs) have been established for the most commonly detected natural and artificial radionuclides in Canadian drinking water sources, using internationally accepted equations and principles and based solely on health considerations.

The MACs are based on exposure solely to a specific radionuclide. The radiological effects of two or more radionuclides in the same drinking water source are considered to be additive. Thus, the sum of the ratios of the observed concentration to the MAC for each contributing radionuclide should not exceed 1.

Water samples may be initially analysed for the presence of radioactivity using gross alpha and gross beta screening rather than measurements of individual radionuclides. If screening levels are exceeded (0.5 Bq/L for gross alpha and 1.0 Bq/L for gross beta), then concentrations of specific radionuclides should be analysed. A guideline for radon is not deemed necessary and has not been established. Information on radon is presented because of its significance for indoor air quality in certain situations.

Parameter (approval)	MAC (Bq/L)	Common sources	Health basis of MAC	Comments
Cesium-137 (2009)	10	Nuclear weapons fallout and emissions from nuclear reactors	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	
Iodine-131 (2009)	6	Sewage effluent	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	
Lead-210 (2009)	0.2	Naturally occurring (decay product of radon)	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	Corresponds to total lead concentration of $7 \times 10^{-8}$ µg/L
Radium-226 (2009)	0.5	Naturally occurring	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	
Radon (2009)	None required	Naturally occurring (leaching from radium-bearing rocks and soils; decay product of radium-226)	Health risk from ingestion considered negligible due to high volatility	Mainly a groundwater concern; if concentrations in drinking water exceed 2000 Bq/L actions should be taken to reduce release into indoor air (e.g. proper venting of drinking water supply)
Strontium-90 (2009)	5	Nuclear weapons fallout	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	
Tritium (2009)	7000	Naturally occurring (cosmogenic radiation); releases from nuclear reactors	Cancer of the lung, breast, thyroid, bone, digestive organs and skin; leukaemia	Not removed by drinking water treatment



**Table 4. Guidance Documents**

In certain situations, the Federal-Provincial-Territorial Committee on Drinking Water may choose to develop guidance documents for contaminants that do not meet the criteria for guideline development and for specific issues for which operational or management guidance is warranted. These documents are offered as information for drinking water authorities and help provide guidance relating to contaminants, drinking water management issues or emergency situations.

Parameter/subject (approval)	Comments
Issuing and rescinding boil water advisories (2009)	Summarizes factors for consideration when responsible authorities issue or rescind boil water advisories
Chloral hydrate in drinking water (2008)	Exposure levels in Canada far below concentration that would cause health effects; levels above 0.2 mg/L may indicate a concern for health effects and should be investigated
Controlling corrosion in drinking water distribution systems (2009)	Addresses strategies to deal with leaching of lead from materials in the distribution system; sampling protocols can be used to assess corrosion and the effectiveness of remediation/control measures to reduce lead levels in drinking water; corrective measures are outlined to address lead sources
Issuing and rescinding drinking water avoidance advisories in emergency situations (2009)	Summarizes factors for consideration when responsible authorities issue or rescind drinking water avoidance advisories in emergency situations
Potassium from water softeners (2008)	Not a concern for general population; those with kidney disease or other conditions, such as heart disease, coronary artery disease, hypertension or diabetes, and those who are taking medications that interfere with normal body potassium handling should avoid the consumption of water treated by water softeners using potassium chloride

**Table 5. Archived Documents**

The Federal-Provincial-Territorial Committee on Drinking Water has established a science-based process to systematically review older guidelines and archive those that are no longer required. Guidelines are archived for parameters that are no longer found in Canadian drinking water supplies at levels that could pose a risk to human health, including pesticides that are no longer registered for use in Canada and for mixtures of contaminants that are addressed individually.

Parameter	Type
Aldicarb	Pesticide
Aldrin + dieldrin	Pesticide
Bendiocarb	Pesticide
Cyanazine	Pesticide
Dinoseb	Pesticide
Gasoline and its organic constituents	Organic chemical
Methoxychlor	Pesticide

**Acronyms**

A	acceptability (parameter type)
ALARA	as low as reasonably achievable
AO	aesthetic objective
CDW	Committee on Drinking Water (FPT)
D	disinfectant (parameter type)
DBP	disinfectant by-product (parameter type)
HPC	heterotrophic plate count
I	inorganic chemical (parameter type)
MAC	maximum acceptable concentration
NTU	nephelometric turbidity units
O	organic chemical (parameter type)
OG	operational guidance value
P	pesticide (parameter type)
T	treatment-related (parameter type)
TCU	total colour units