

Water Stewardship and Biodiversity Division

Water Control Works and Drainage Licensing Section

Factsheet – Tile and Subsurface Drainage Proposals

The Water Rights Act as it Relates to Tile Drainage Development

The Water Rights Act

Section 3(1) (c):

Except as otherwise provided in this Act or the regulations, no person shall control water or construct, establish, operate or maintain any water control works, unless he or she holds a valid and subsisting license to do so.

Water Control Works:

According to the *Water Rights Act*, Water Control Works means – any dyke, dam, surface or subsurface drain, drainage, improved natural waterway, canal, tunnel, bridge, culvert borehole or contrivance for carrying or conducting water that:

- a) Temporarily or permanently alters or may alter the flow or level of water, including but not limited to water in a water body, by any means, including drainage, or
- b) Changes or may change the location or direction of flow of water, including but not limited to water in a water body, by any means, including drainage.

Definitions

Environment Act License:

An *Environment Act License* is required for projects of a certain scope that require approval under the *Environment Act*; for instance, projects that drain areas in excess of 50 square kilometers (19 square miles), such as proposed lake outlets, or, projects that have any effect on fish habitat or mobility regardless of drainage area.

Hydro-geological Impact Report

A *Hydro-geological Impact Report* is an in-depth review of groundwater resources for a given area that is prepared by a professional engineer, geological engineer, or hydro-geologist registered to practice in the Province of Manitoba that specializes in hydrogeology. The report outlines potential impacts from a development activity, such as dewatering a gravel pit, and proposes monitoring and remediation strategies to measure and mitigate these impacts.

Runoff Co-efficient:

The 3/8 - 24 hour runoff co-efficient for tile drainage projects represents the volume of water that can be drained via a header pipe or main per acre over a 24 hour period. Specifically, a main that is set on a 3/8 coefficient will drain 10 mm (3/8ths of an inch) of rain water each day, regardless of the soil's water holding capacity. The grade of the main does play a major factor in sizing the main, and the grade is determined by the topography of the ground, which means that increasing the coefficient is generally accomplished by increasing the size of the main. For example: a 305 mm (12 inch) main with a 0.1% grade will drain approximately 25 hectares (62 acres) at a rate of 10 mm (3/8 of an inch) of rain water per 24 hours.

Site Plan:

A *Site Plan* shall consist of an aerial photograph, or map depicting the extent and location of the proposed project. Relevant details shall include, but are not limited to:

- Location details, such as the legal land description/location of the proposed project (Section, Township, and Range E/W), the municipality where the works will be constructed, and the location of any roads/drains in relation to the project.
- Proposed project drainage infrastructure details.
- Existing site conditions, including existing drainage infrastructure.
- Existing surface water flow patterns, including drains and natural waterways.
- Any existing water features, such as wetlands.

Slope:

Calculated as a function of rise (difference in elevation) over run (total length of the drain), expressed in the same units of measure (feet or meters). For example: a 1 mile (5280 ft) drain cleanout with a drop of 12 ft per mile would be $12/5280 = 0.0023$, or a 0.23% grade, gradient or slope. Slope can also be expressed as a ratio. Using the previous example, and considering it is expressed as a percentage of slope, it would be calculated as follows: $100/0.23 = 434.8$, and is written as 1:434.8, or 1 in 434.8. This translates into: for every 434.8 horizontal units travelled (run), the slope would rise one unit.



Survey:

A *Survey Plan* shall consist of the following information:

- A profile showing the existing elevations of drain bottom, adjacent prairie, adjacent road, any drainage infrastructure, including, but not limited to culverts, dams, weirs, bridges, or any other relevant water feature within or affecting the drainage project in question.
- The survey shall be plotted with a readable scale.
- A *Site Plan*, as per the definition above, which also includes the direction and distance of project survey.
- Details of proposed construction parameters/design, including, but not limited to proposed drain gradient, proposed new culvert elevations or locations, proposed cross section of drain, and any other area within the project that alters or affects the flow of water.

Tile Drainage Development Proposals

Tile Drainage Project Licensing Requirements

The *Water Control Works and Drainage Licensing Section* requires the following technical information prior to the issuance of a *Water Control Works Licence* for a tile drainage project (please refer to the *Checklist* for additional information):

- Legal location (Section, Township, and Range E/W) of proposed project.
- Number of acres to be tiled within the land description.
- Written landowner and municipal consent.

Proposed Tile Drainage Network Specifications

Lateral Pipes:

- Location, size, flow direction.

- Perforated lateral pipe depth - average depth of lateral pipe not to exceed 1 meter (3 feet) unless proponent can demonstrate need.
- Pipe gradient.
- Detail of connection between lateral and header pipe.

Header Pipe Details:

- Header pipe location, size, depth, flow direction, and outlet location.
- Proposed runoff co-efficient should not exceed the 3/8 - 24 hour co-efficient¹.
- Co-efficient and system design shall include proposed system runoff rate (units: l/s or cfs).
- Header pipe outlet to be designed so that an operational control structure may be installed if required.
- Perforated header pipe depth – average depth of perforated pipe invert depth not to exceed 1.5 meters (5 feet).
- Any pipe exceeding 1.5 meters (5 feet) in depth should be non-perforated, unless the need for a perforated header pipe can be demonstrated by proponent.

Project Outlet

All tile drainage projects require:

- The outlet is to be rip-rapped with 1 cubic meter (1 cubic yard) of stone with an average diameter of 15cm (6 inches).
- The outlet pipe location to be marked or identified by visible bollards, antennae, or by any other means indentified by affected municipality, *Sustainable Development*, or other provincial agencies.

Sump-pit/Pump-out Structures:

Additional outlet structure information is required for sump-pits and pump-out structures, and is as follows:

- Proponent to provide design drawings that detail pit location, pump size, location, and proposed pump rate.
- Pump-out electrical panel to be equipped with an acceptable recording device (e.g. *HOBOT Data Logger*), which annotates pump operations; including length and frequency of pump operations.
- Annual proposed pump shutoff date.
- Proposed water/float level within the structure that the pump will operate – meaning what is the proposed water level (relative to prairie elevation) at which point the pump will activate and remove water from the structure.

¹ Please refer to the *Definitions Section* of this *Factsheet* for clarification.

Control Structure:

- If a control structure is deemed necessary on the outlet pipe - location and type of operational flow control structure and proposed operating plan should be detailed.
- Please note that in higher land slope areas where overall internal tile system elevation differences exceed 0.76 meters (30 inches), additional internal flow control structures may be required.

Technical Drainage Plan:

In the *Technical Drainage Plan* the proponent must clearly detail with drawings the route from the proposed outlet of the tile drainage network to its point of entry into the existing drainage system, and the location where the discharge would enter an established waterway or water body (drain, creek, river, lake, etc.), for a minimum of 3 kilometers (2 miles) downstream of the proposed project.

Hydro-geological Impact Report Requirements:

A *Hydro-geological Impact Report* consisting of an engineer's or hydrologist's analysis may be requested for tile drainage projects in sensitive areas. The report will contain technical drawings showing the location and extent of the proposed works, and the route proposed from the point of entry into the existing drainage system to the point where the discharge would enter an established waterway or water body (drain, creek, river, lake, etc.). Additionally, the applicant may be requested to provide pre and post development discharge calculations, to prove discharge rates have not changed and will not result in a negative effect on downstream landowners or infrastructure².

² Additional landowner consent may be required for projects in sensitive areas. The extent of landowner consent will depend on the scope of the project being applied for.

Checklist✓

	REQUIREMENTS							CONSENT			
PROJECT CONSIDERATIONS	SITE PLAN	SURVEY	WATER CONTROL WORKS LICENCE	TECHNICAL DRAINAGE PLAN	HYDRO-GEOLOGICAL IMPACT REPORT	ENVIRONMENT ACT LICENCE	LANDOWNER	MUNICIPAL/LGD	INFRASTRUCTURE (HIGHWAYS)	INFRASTRUCTURE (WATER MANAGEMENT & STRUCTURES)	DFO
The water table at the project site is within 1.8 meters (6 feet) of the surface during the frost-free period up to August 31 st each year, and within 2.4 meters (8 feet) of the surface the remainder of the year.	✓	✓	✓	✓							
The project site is within a known sensitive area.	✓	✓	✓	✓	✓						
The project is located on lands controlled by the proponent.	✓	✓	✓	✓							
The project is located on lands not controlled by the proponent (private, Municipal, or Crown).	✓	✓	✓	✓	✓		✓	✓			
The project involves construction on, or the outlet of water into a Provincial Road or Provincial Highway right-of-way.	✓	✓	✓	✓	✓				✓		
The project involves construction on, or the outlet of water directly onto the right-of-way of a Provincial Waterway.	✓	✓	✓	✓	✓					✓	
The project is within, or could potentially alter or harm known fish bearing waters or habitat.	✓	✓	✓	✓	✓	✓					✓