



Guide to excluding the domestic use aquifer based on municipal bylaws

Alberta 

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Definitions

Buried Channel – A valley eroded into the pre-glacial bedrock surface or channels nested within the overlying glacial drift in which alluvial deposits accumulate (i.e. gravel, sands, silts, etc.).

Domestic Use Aquifer (DUA) – For the purpose of selecting and applying a groundwater guideline for the protection of the human health exposure pathway via ingestion under the Alberta Tier 1 Soil and Groundwater Remediation Guidelines (Tier 1, AEP 2022), a DUA is defined as a geologic unit (either of a single lithology or inter-bedded units) that is above the base of groundwater protection having one or more of the following properties:

- (i) A bulk hydraulic conductivity of 1×10^{-6} m/s or greater and sufficient thickness to support a sustained yield of 0.76 L/min or greater; or
- (ii) Is currently being used for domestic purposes; or
- (iii) Any aquifer determined by Alberta Environment and Parks to be a DUA.

Domestic Use – Where the groundwater or surface water at or near a site is currently used for drinking water purposes.

Heavily Impacted Media – Heavily impacted media as described in the Alberta Risk Management Plan Guide (AEP, 2017).

Municipality – A municipality as defined under the *Municipal Government Act* (GOA, 2021).

Urban Service Area – An urban service area as defined in an order creating a specialized municipality formed under the *Municipal Government Act* (GOA, 2021).

1. Introduction

The Guide to Excluding the Domestic Use Aquifer (DUA) based on Municipal Bylaws (the Guide) clarifies the DUA pathway exclusion option for groundwater. Specifically, it provides further information on how to address groundwater affected by a substance release at a location within a municipality with a bylaw prohibiting the installation and use of potable groundwater supply wells. The Guide is founded upon the Government of Alberta's Contaminated Sites Policy Framework (ESRD, 2014) and is an addendum to the Alberta Tier 2 Soil and Groundwater Remediation Guidelines (Tier 2) (AEP, 2022), Appendix E, Domestic Use Aquifer.

This Guide applies to substance releases where:

- The release is within the incorporated boundary of a city, town, village, or the incorporated boundary of an urban service area within a specialized municipality as formed under the *Municipal Government Act* (MGA),
- Potable water is provided through a water distribution system and there is a municipal bylaw prohibiting the installation or use of potable groundwater supply wells, and
- The source of the groundwater and/or surface water supply, as well as any potential water well users, are located far enough away from the area affected by the substance release.

This Guide only applies to the Tier 2 DUA pathway exclusion option in the Contaminated Sites Policy Framework. It does not address other Tier 2 or exposure control options that may apply (see Section 5 of this Guide, Relation to Other Tier 2 Options).

The Guide is intended to be used by site managers, qualified environmental professionals and project managers who are responsible for risk assessments using a Tier 2 approach. Users of this Guide should be familiar with Alberta's legislation and contaminated sites management regime, particularly Tier 2 and the Alberta Environmental Sites Assessment Standard (AEP, 2016), as well as applicable federal guidance and protocols.

2. Applicable Contaminants

The option described in this Guide to exclude the DUA pathway can only be used for slightly soluble petroleum hydrocarbons and organic contaminants with a solubility equal to or lower than 10 g/L. A list of the solubilities for petroleum hydrocarbon and organic contaminants can be found in Table C-6 of listed in Alberta's Tier 1 Soil and Groundwater Guidelines (Tier 1) (AEP, 2019). The exclusion of the DUA pathway based on municipal bylaws cannot be applied where the contaminant of concern has a solubility in water greater than 10 g/L.

3. Conditions for Excluding the DUA based on Municipal Bylaws

The DUA pathway may be excluded if all of the following conditions are met:

- (i) The site property boundary is greater than 300 metres inside;
 - the incorporated boundary of a city, town, or village as formed under MGA or
 - the incorporated boundary of an urban service area within a specialized municipality as formed under the MGA;
- (ii) There is a municipal bylaw prohibiting the installation and use of potable groundwater supply wells;
- (iii) There is a municipal bylaw compelling property owners to connect to the potable water distribution system;
- (iv) Where there is remaining heavily impacted media in soil or groundwater, the areal extent of all non-aqueous phase liquids within the heavily impacted media must be equal to or less than 100 m²;
- (v) There are no water wells being used for domestic or municipal supply within 300 metres of the subject site boundary;
- (vi) Where heavily impacted media extend beyond the property boundary, there are no water wells being used for domestic or municipal supply within a radial distance of 300 metres from the heavily impacted media;
- (vii) The site property boundary and zone of heavily impacted media is located at a distance greater than 300 metres from a surface water body being used as a domestic or municipal supply.

Expectations When Evaluating Conditions

The following are expectations when evaluating conditions to exclude the DUA based on municipal bylaws.

Determining Potable Water Use

For site investigation purposes, nearby domestic water users (e.g. drinking water wells, groundwater fed dugouts and/or springs) or a surface water body used for potable water use include:

- those located within a radial distance of 300 metres from the subject site property boundary; and,
- where remaining heavily impacted material extends beyond the property boundary, a radial distance of 300 metres from the heavily impacted media.

The presence of current domestic water users or surface water body(s) users can be determined using the following methods:

- (i) A search of the Alberta Water Well Database (<http://groundwater.alberta.ca/WaterWells/d/>); and/or,
- (ii) Performing a door to door survey; and/or
- (iii) Contacting the local the municipality, water utility owners/operators, or Alberta Health Services.

The use of all the search methods listed above may not be required in every circumstance, provided the locations of current domestic water users and surface water body(s) users can be demonstrated to be accurate. It is expected that the applicant seeking to apply the Tier 2 DUA exclusion approach will, at a minimum:

- search the Alberta Water Well Database, and
- contact the city, town village, or urban service area of a specialized municipality to confirm no current potable water users in the area.

If potential users are identified, a door-to-door survey must be completed. Likewise, if the location of a well is in question, based on the judgment of the independent environmental professional documenting the exclusion based on municipal bylaw, the location must be verified.

Site Conditions Requiring Further Tier 2 Evaluation

There are conditions that may contribute to contaminant migration beyond 300 meters, which may make the methodology described in this Guide inappropriate for the site. Where the following conditions exist, additional information and analysis must be submitted to the regulator to rule out adverse effects to potential groundwater and/or surface drinking water users:

- (i) The Darcy Velocity of the lithology encountered is greater than 3.0×10^{-7} m/s;
- (ii) Preferential flow pathways are present such as buried channels or highly fractured bedrock zones are observed;
- (iii) Underground utility corridors intersect heavily impacted media;
- (iv) Groundwater contamination extends to within 10 m of a tributary connected to a surface water body used for domestic or municipal supply;
- (v) Comingled plumes are present; and/or
- (vi) There are high volume groundwater extraction wells (pumping rate greater than or equal to 45 litres/minute) within 500 meters of the edge of heavily impacted media.

Where additional evaluation demonstrates a stable and/or decreasing plume and no current effect, application of the DUA pathway exclusion based on municipal bylaw may be appropriate, as accepted by the Director. Horizontal and vertical delineation to domestic use Tier 1 guidelines in the groundwater must be achieved in order to demonstrate plume stability.

4. Municipal Bylaw Confirmation

In order to exclude the DUA pathway based on municipal bylaws, the applicant must provide confirmation from the municipality that they have bylaws in place that meets criteria outlined in this Guide. This confirmation is provided by submitting the following documents to the regulator:

- (i) A copy of the written referral to the city, town, village or urban service area of a specialized municipality of the applicant's intention to apply the exclusion of the DUA pathway based on municipal bylaws. The referral must clearly state that the applicant intends to use this approach in conducting a phase 2 environmental site assessment and preparing a record of site condition for the property, along with the applicant requirements;
- (ii) A copy of documentation from the city, town, village, or specialized municipality that confirms that a bylaw(s) meets criteria (i), (ii), and (iii) of this Guide (see attached example confirmation letter which outlines required elements in documentation submitted to the regulator).

If the applicant has not received a response from the municipality within 60 days after sending the written referral letter, the applicant may ask the Director to consider an alternative to the required municipal written confirmation. To proceed, the applicant will submit:

- A statement from the applicant that no response was received from the municipality to the written referral,
- A copy of bylaw clauses which the applicant deems meet conditions to exclude the DUA based on municipal bylaws,
- All documentation of correspondence with the municipality regarding the site and DUA exclusion referral,
- Contact information for the appropriate municipal official and
- Any other information the Director may require to consider, if the municipality does not provide the applicant with a confirmation letter.

A municipality has the discretion to object to the exclusion approach being used within their jurisdiction and may in their response specify comments or requirements to be met for the application of the exclusion within their municipal boundaries. AEP must be advised of any objection or specific comments/requirements.

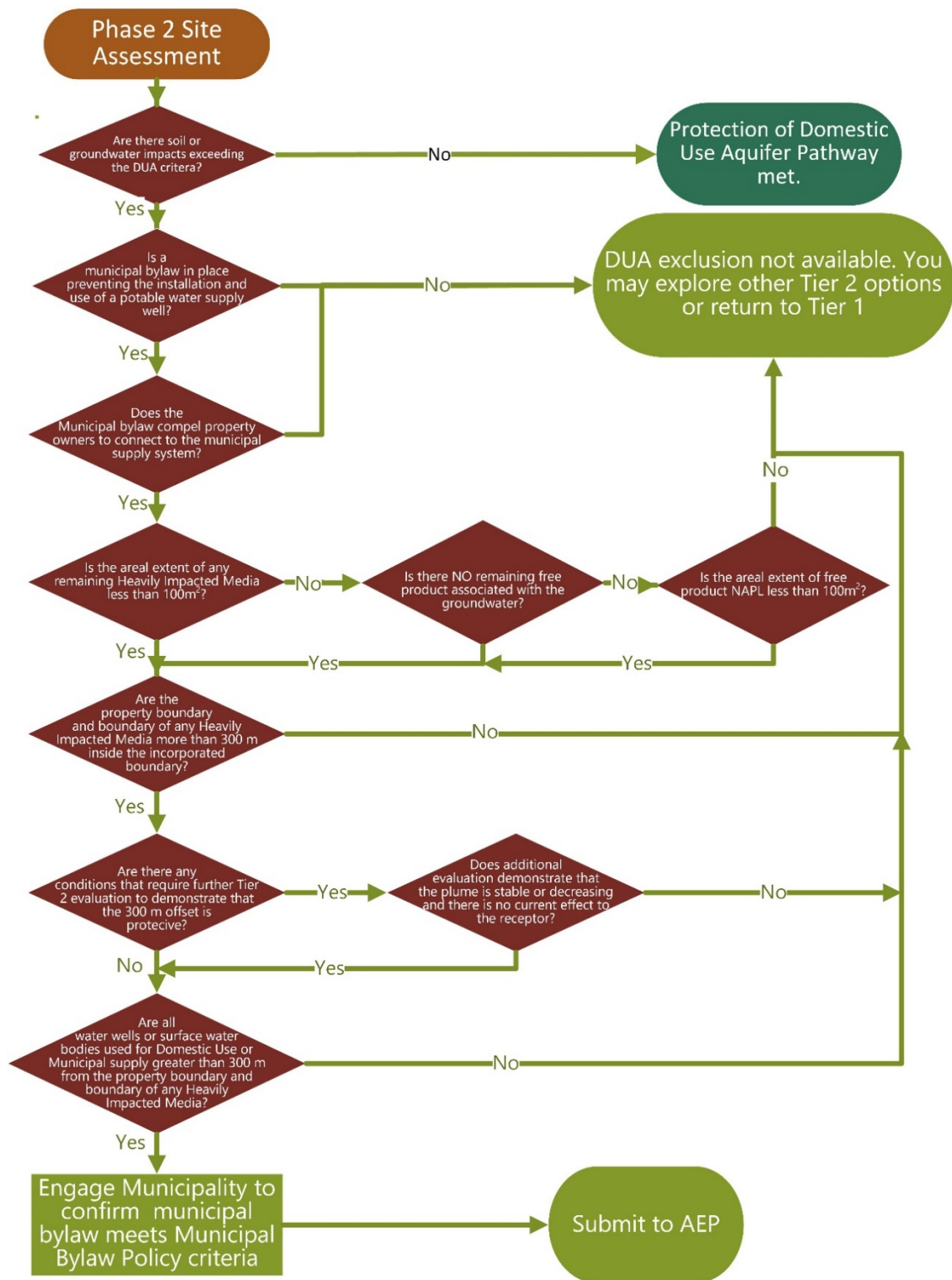
5. Guide Relation to other Tier 2 Options

There are three Tier 2 options under the Contaminated Sites Policy Framework: pathway exclusion, guideline adjustment, and site-specific risk assessment (SSRA). This Guide only addresses the DUA pathway exclusion based on municipal bylaw option under Tier 2. It does not address how to apply other Tier 2 options for substance releases where the release is within the incorporated boundary of a city, town, village, or the incorporated boundary of an urban service area within a specialized municipality as formed under the MGA. For more information on the guideline adjustment or SSRA options, see the Contaminated Sites Policy Framework and supporting documents.

Where the substance release is excluded from the approach outlined in this Guide, it may still be possible to use other Tier 2 options to support protection of the DUA pathway. For example, critical boundaries could be used as points of compliance and a Tier 2 adjustment under a SSRA could be used to determine if the point of compliance is still protected for the DUA pathway. Similarly, while sites impacted by chloride are excluded from this Guide because it is considered a conservative solute, it may still be possible to use the Subsoil Salinity Tool and appropriate points of compliance to demonstrate protection of the DUA. In these general examples, measured distances to the surface water body(s), zone of drawdown influence from existing water wells, and incorporated boundaries could be considered points of compliance to demonstrate protection of the DUA.

Other Tier 2 options should be discussed with the appropriate regulator to determine if applicable to site specific situations.

6. Policy Application Process Map



References

Alberta Environment and Parks (AEP), 2017. *Alberta Risk Management Plan Guide*. Land Policy Branch, Policy and Planning Division.

Alberta Environment and Parks (AEP). 2022 *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*. Land Policy Branch, Policy and Planning Division.

Alberta Environment and Parks (AEP). 2022 *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*. Land Policy Branch, Policy and Planning Division.

Government of Alberta (GOA) *Municipal Government Act*, 2021. Revised Statutes of Alberta 2000 Chapter M-26. Retrieved from the Government of Alberta Website: <https://www.alberta.ca/municipal-government-act-changes.aspx>

Appendix 1 - Municipal Bylaw Confirmation

The content below may be used as a form letter by an applicant who is preparing a written referral to a municipality, seeking confirmation that they have bylaws in place that meet criteria outlined in this Guide. Note, however that this content needs to be made clear to the municipality.

1. Introduction

Under Alberta's *Remediation Regulation*, a substance release to soil or groundwater may be remediated to meet the requirements of the Alberta Tier 2 Soil and Groundwater Remediation Guidelines if the applicant can demonstrate that;

- the Alberta Tier 2 Soil and Groundwater Remediation Guidelines meet the equivalent protection of environment and human health as outlined in the Alberta Tier 1 Soil and Groundwater Remediation Guidelines, and
- the area of land is remediated to the satisfaction of the Director (*Remediation Regulation*, Section 2.4).

For more information on Alberta's tiered approach to contaminated sites management, see the Alberta Contaminated Sites Policy Framework at <https://open.alberta.ca>.

The Domestic Use Aquifer (DUA) is one pathway that requires protection for current and future land use. Under the Alberta Tier 1 Soil and Groundwater Remediation Guidelines, protecting the DUA Pathway must be included in all assessments. Under the Alberta Tier 2 Soil and Groundwater Remediation Guidelines, the applicant is able to reassess the DUA Pathway and remove this pathway if they can demonstrate there is not a risk to human health or the environment at the location in question. One way of demonstrating that this risk is addressed is if there is a bylaw in place that prevents use or access to the groundwater resource within the municipal boundaries.

An applicant who wants to use the DUA exclusion pathway approach must determine if their site meets all the following conditions in the Guide to Excluding the Domestic Use Aquifer based on Municipal Bylaws (the Guide):

- (i) The site property boundary is greater than 300 metres inside;
 - the incorporated boundary of a city, town, or village as formed under MGA or
 - the incorporated boundary of an urban service area within a specialized municipality as formed under the MGA;
- (ii) There is a municipal bylaw prohibiting the installation and use of potable groundwater supply wells;
- (iii) There is a municipal bylaw compelling property owners to connect to the potable water distribution system;
- (iv) Where there is remaining heavily impacted media in soil or groundwater, the areal extent of all non-aqueous phase liquids within the heavily impacted media must be equal to or less than 100 m²;
- (v) There are no water wells being used for domestic or municipal supply within 300 metres of the subject site boundary;
- (vi) Where heavily impacted media extends beyond the property boundary, there are no water well being used for domestic or municipal supply within a radial distance of 300 metres from the heavily impacted media;
- (vii) The site property boundary and zone of heavily impacted media is located at a distance greater than 300 metres from a surface water body being used as a domestic or municipal supply.

2. Purpose

This letter will form part of an applicant's submission to Alberta Environment and Parks (AEP). AEP requires that the applicant obtain confirmation from the municipality of the site location and confirmation that bylaws exist that meet the requirements as outlined in Guide clauses (i) (ii) and (iii) above.

By completing this form, the municipality does not accept any responsibility for the contaminant release, is not confirming any other aspects regarding the condition of the site, whether the site meets any conditions noted in clauses (iv) through (vii) of the Guide to Excluding the Domestic Use Aquifer based on Municipal Bylaws, or any other requirements for Tier 2 Pathway Exclusion under the Alberta Tier 2 Soil and Groundwater Quality Guidelines. The completed form does not absolve any person responsible for the contaminant release from any duties to take remedial measures under the *Environmental Protection and Enhancement Act*, the Remediation Regulation, or any other measures required for the parcel of land.

3. Form Instructions for Municipality

Sections 1 and 2:

Review the applicant's information about the site in question. This information is part of the letter to ensure that you have a summary of the site condition and the reason the site is being submitted for confirmation of the municipal bylaw. If you wish additional information on the current status of the site, the applicant or other parties should have submitted additional information included a current Record of Site Condition that is available on the Environmental Site Assessment Repository at www.esar.alberta.ca. You are also encouraged to contact the applicant if you have questions about the application or site.

Section 3:

Complete the Acknowledgment and Bylaw Confirmation section

Section 4:

Complete the Comments/Requirements to the Additional Municipality Comments/Requirements section. As a stakeholder and (potential) affected party, you may object to the application of this exclusion or wish to add additional comments/requirements that will help the Director in the final decision. Additional comments/requirements may include knowledge of existing drinking water wells within the 300 metre radius, any concerns with the site based on existing knowledge or concerns with brownfield development within the municipal boundaries, or any additional information that may be pertinent if the municipality rejects the submission. The additional information does not in any way inhibit the municipality from commenting further in the future.

Section 5:

Complete the Representative Information section.

Example Form

Date:

Site information:

(to be completed by applicant and additional documents may submitted as an addendum to this form)

- i. Source Site Address;
 -
- ii. List of Contaminants of Concern;
 -
- iii. Site Figure;
 -
- iv. Figure(s) showing current
 - a. sampling information for soil and groundwater
 - b. summary showing current understanding of the conceptual site model and
 - c. summary of the current understanding of any contamination (including aerial extent of heavily impacted media) or contaminant plume attached to the site.

Applicant Information:

(to be completed by applicant)

- i. Name and company of the consultant
 -
 -
- ii. Name and company of the Applicant.
 -

Acknowledgment and Bylaw Confirmation:

In accordance to AEP's The Guide to Excluding the Domestic Use Aquifer (DUA) based on Municipal Bylaws (the Guide), the municipality acknowledges receipt of a request from the applicant in regards to potential application of the DUA exclusion approach outlined in the Guide and confirms the following:

- i. Bylaw _____; Section(s) _____ prevents the installation and use of potable groundwater supply wells for the above noted Site and any other parcel of land within 300 metres of the site.
- ii. Bylaw _____; Section(s) _____ requires that the Site be connected to the potable water distribution system; and
- iii. The Site is not located within a municipal ground or surface water source protection zone.

Additional Municipality Comments/Requirements:

Municipality Representative Information:

Name

Title

Date