DECISION FRAMEWORK AND SUPPORT TOOLS FOR CHANGE IN LAND USE VARIANCE REQUESTS RELATED TO MINERAL PADS IN PEATLANDS ON PUBLIC LAND

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EXECUTIVE SUMMARY

In 2018, the Petroleum Technology Alliance Canada (PTAC) funded a project titled *Reclamation Practices on Upland and Peatland Well Sites*. The project was established in response to challenges experienced by practitioners, regulators and industry related to reclamation certification. The specific sites in question are those that were constructed using mineral pads in peatland. The **goal of the overall project** was to provide recommendations for an acceptable framework/decision support tool(s) to assist industry and regulators in making decisions around appropriate management and certification of these sites that ensures that functioning ecosystems are developed and that there is a process that outlines eligibility for reclamation certification.

A draft report, *Certification of Mineral Pads in the Boreal Region – Decision Framework and Support Tools*, was released in October 2020 to provide opportunities for industry, practitioners, and government to review and comment on the document and to set the stage for a field verification trial of the Decision Framework and Support Tools in 2021. The goal of the reviews and field verification trial was to ensure the Decision Framework and Support Tools added value in recommending whether to leave a mineral pad in a peatland.

The 2020 Decision Framework and Support Tools report was updated in 2022 and 2023 based on stakeholder feedback and the field verification trial.

On December 14, 2023, EPA announced a new policy (*Interim Directive: Pilot for Reclaiming Peatlands - Decision Framework and Support Tools for Reclaiming Well Sites and Access Roads on Public Land*) that required use of the 2023 Update for change in land use variance requests on padded sites going from peatland to upland.

On September 22, 2025, InnoTech held an in-person and online workshop to discuss practitioners' and regulators' experiences with the 2023 Update and 2023 EPA policy, and ideas for revising the 2023 Update in preparation for a proposed change to the 2023 EPA policy. The results of the workshop are provided in a separate report.

Changes in this document include:

- Consideration of the comments and recommendations arising from the 2025 workshop and recommendations from field research work in 2023.
- Expansion of the scope to include all forested areas on public land in Alberta.
- Revisions to the Adjacent and regional Decision Support Tool and the Borrow Decision Support Tool.
- Clarification of terminology
    - access vs. access road
    - mineral pad vs. mineral soil pad
    - practitioner
- Additional factors to consider in the decision support tools and data collection needs.

- Discussion of the role of professional judgement when using the Decision Framework and Support Tools.
- Addition of a Change in Land Use Variance Request Checklist.

In addition, the associated Excel file (DFST Change in Land Use Recommendation Calculator) has been automated to simplify data entry and consistency in results.

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GLOSSARY

General terms are defined here. There are additional terms defined in various sections of the report.

Bog

A peatland fed by ombrogenous waters originating from precipitation with low concentrations of dissolved minerals

Change in Land Use

For the purposes of this report, it is a change from a site where the Peatland criteria apply to a site where the Forested Land criteria apply.

Decision Framework

A set of four Decision Support Tools and a rating system to determine the land use recommendation for the pad and/or access road as either a Candidate for Peatland Reclamation or a Candidate for Upland Reclamation.

Decision Support Tool

A flowchart with multiple Yes/No oval decision nodes that leads the practitioner to a land use recommendation indicating whether the site is a Candidate for Peatland Reclamation or a Candidate for Upland Reclamation.

DFST Change in Land Use Recommendation Calculator

The Excel file labeled DFST Change in Land Use Recommendation Calculator which contains the calculations necessary to develop a recommendation for reclaiming the site as a peatland or an upland. A description of the Calculator contents is provided in Appendix 2.

Fen

A minerogenous peatland with surface or subsurface water flow that range from moderately acidic to basic.

Forested Land Criteria

The 2010 Reclamation Criteria for Wellsites and Associated Facilities for Forested Lands (Updated July 2013) (Alberta Environment and Sustainable Resource Development, 2013).

Marsh

A mineral wetland with water levels near, at or above the ground surface for variable periods during the year, and which supports graminoid vegetation in the deepest portion of the wetland in the majority of years

Mineral Pad

Refers to all or a portion of a site that is constructed in a peatland, consisting of mineral soil fill materials, usually clay-based, built to support drilling and production operations. Geotextile or corduroy (logs) are typically placed on the surface of the peatland prior to the addition of the mineral soil fill.

Peatland

An area on the landscape covered by a minimal depth of 40 cm of peat, which is a deposit of plant and animal remains accumulated through incomplete decomposition under saturated conditions.

Peatland Criteria

The Reclamation Criteria for Wellsites and Associated Facilities for Peatlands (Alberta Environment and Parks, 2017).

Peatland Site

A site located in a peatland.

Practitioner

A qualified individual who meets the requirements set out under the *Professional Responsibilities in Completion and Assurance of Reclamation and Remediation Work in Alberta* (Professional Regulatory Organizations, 2012) or *Professional Practice Standard: Professional Responsibilities in Completion and Assurance of Wetland Science, Design and Engineering Work in Alberta* (Competency Advisory Group, 2017).

Shallow Open Water Wetland

A mineral wetland with water levels near, at or above the ground surface for variable periods during the year, which is less than two metres deep at midsummer and that contains an open water zone in the deepest wetland zone covering greater than 25% of the total area in most years.

Site

An upstream oil and gas wellsite and the associated facilities (e.g., access road and borrow pit) requiring reclamation to meet Alberta's reclamation criteria for peatland and/or forested sites.

Swamp

A mineral wetland with water levels near, at or above the ground surface for variable periods during the year which contains either more than 25% tree cover of a variety of species or more than 25% shrub cover.

ACRONYMS

AEP	Alberta Environment and Parks
AER	Alberta Energy Regulator
DFST	Decision Framework and Support Tools
DST	Decision Support Tool
EPA	Alberta Environment and Protected Areas

LOC	Licence of Occupation (for access road)
MSL	Mineral Surface Lease (for wellsite)
PTAC	Petroleum Technology Alliance Canada

1.0 BACKGROUND

1.1 Project Overview

In 2018, the Petroleum Technology Alliance Canada (PTAC) funded a project titled *Reclamation Practices on Upland and Peatland Well Sites*. The project was established in response to challenges experienced by practitioners, regulators and industry related to reclamation certification of sites constructed using mineral pads in peatlands. These sites generally present one or more reclamation deficiencies according to the applicable wellsite criteria and cannot receive a reclamation certificate without additional scrutiny and justification under current regulatory criteria and policies. The **goal of the overall project** was to provide recommendations for an acceptable framework/decision support tool(s) to assist industry and regulators in making decisions around appropriate management and certification of these sites that ensures that functioning ecosystems are developed and that there is a process that outlines eligibility for reclamation certification.

When dealing with peatland sites, the question arises of whether to remove mineral pads in peatlands. Historically, industry and regulators have agreed that in certain site-specific circumstances, sites with mineral pads in peatlands can be certified without the removal of the mineral pad or with partial removal of the pad. There has been a recognition that sites can be deemed to be on a trajectory towards developing a sustainable plant community from an ecological perspective, and to not be causing off-site impacts, without further disturbance/reclamation. A consistent and standard method to define and address these circumstances has been difficult to discern within the current regulatory and policy framework.

1.2 Decision Framework and Support Tools Development

Stage 1 of the project identified that there was limited guidance on how decisions were being made to accept or reject requests for a change in land use and that there were misperceptions associated with why requests are being made (from the government/regulator perspective) and how the requests were being evaluated (from the industry/practitioner perspective) (Tokay et al., 2019). It was determined that these perceptions must be addressed before meaningful change can occur. Stage 1 also identified the key factors to consider when assessing the ecological implications of a change in land use request (hydrology, cumulative effects and regional considerations, upland function, status of the borrow pit, site location, and land use considerations) and several knowledge gaps which should be addressed to confirm the effectiveness of a decision support tool and framework. However, consultation with Government of Alberta[1] and the Alberta Energy Regulator (AER) regarding the findings from Stage 1 was recommended before developing a framework and research project to address the knowledge gaps to ensure resources are allocated appropriately.

[1] Government of Alberta included representation from reclamation policy, public land officers, planning division, and wetland policy.

Preliminary Decision Support Tools (DSTs) were presented at a working session in December 2019 to facilitate a discussion involving industry (oil and gas and practitioners) and government (AEP and AER) related to change in land use requests. A summary of the working session and recommendations for changes to the preliminary DSTs is provided in Drozdowski et al. (2020a).

PTAC released a draft report, *Certification of Mineral pads in the Boreal Region – Decision Framework and Support Tools*, in October 2020 (Drozdowski et al., 2020b) to provide opportunities for industry, practitioners, and AEP/AER to review and comment on the document and to set the stage for a field verification trial of the Decision Framework and Support Tools in 2021. The goal of the reviews and field verification trial were to ensure the Decision Framework and Support Tools added value in recommending whether to leave a mineral pad in a peatland.

PTAC held a Knowledge Transfer webinar June 7, 2021, with presentations by Dean MacKenzie, Vertex Professional Services Ltd., and Bonnie Drozdowski, InnoTech Alberta (Mackenzie and Drozdowski, 2021)[2]. The goal of the Knowledge Transfer webinar was to increase awareness of the draft report and to request industry and practitioner participation in a field verification trial in 2021.

A second online webinar was held in June 2021 for industry and practitioners interested in conducting the field verification trial (webinar slides available in Powter et al. (2022))[3]. The goal of the second webinar was to familiarize people with the purpose, process, and expectations of the field verification trial.

The results of the stakeholder reviews and field verification trial are summarized in Powter et al. (2022a). The DST was revised in 2022 based on feedback from the webinars and field verification trial (Powter et al., 2022b). Significant changes included:

- General
    - Changed language in the Decision Support Tools for consistency and clarity.
    - Changed the tables supporting each Decision Support Tool to clarify that the purpose of the tables is to help practitioners decide how to answer Yes or No to the statements in specific decision nodes.
- Section 2.0
    - Added a section that describes the decision framework, defines the key terms used in the framework, sets out caveats for use of the framework, and provides a screening tool to determine if the Decision Framework and Support Tools should be used.

[2] The Knowledge Transfer webinar also discussed the *Guide to Variance Justifications for Reclamation Certification of Wellsites and Associated Facilities on Forested Land* (Tokay et al., 2020).

[3] A separate webinar was held to discuss the field verification trial for the *Guide to Variance Justifications for Reclamation Certification of Wellsites and Associated Facilities on Forested Land* (Tokay et al., 2020).

- Section 7.0
    - Clarified that when there is a tie arising from use of the modifications to the initial site rating the site is deemed to be a Candidate for Peatland Reclamation.
- Table 8 (previously Table 7)
    - Clarified that **all** rows in the Table must have an answer.
    - Removed several Factors that were already accounted for in the individual DSTs to reduce "double counting"
    - Changed the Table so that each factor can change the Peatland Rating or Upland Rating
    - Added new Factors
- Section 9.0
    - Added a section to describe recommended information to provide as backup documentation for the change in land use request to Alberta Environment and Parks.

The 2023 Update (Powter et al., 2023) included:

- Additional authors
- Changes to Alberta Environment and Protected Areas (EPA) from Alberta Environment and Parks (AEP), where applicable
- Minor changes to formatting and layout

On December 14, 2023, EPA announced a new policy (*Interim Directive: Pilot for Reclaiming Peatlands – Decision Framework and Support Tools for Reclaiming Well Sites and Access Roads on Public Land*; Alberta Environment and Protected Areas, 2023) that required use of the 2023 Update in applications for a change in land use on padded sites from peatland to upland.

PTAC provided funding in 2022 and 2023 for field research conducted by Vertex and InnoTech on several of the information needs identified in the 2022 Update. The research results were provided in Caron et al. (2022), Renkema et al. (2022) and Renkema et al. (2024).

In June 2024 PTAC and InnoTech held a hybrid online and in-person webinar for government, industry and consultants to provide information on the 2023 Update and the research conducted by Vertex (McGillivray et al., 2024).

On September 22, 2025, InnoTech held an in-person and online workshop to discuss practitioners' and regulators' experiences with the 2023 Update and 2023 EPA policy, and ideas for revising the 2023 Update in preparation for proposed changes to the 2023 EPA policy. The results of the workshop are provided in Schreiber et al. (2025).

1.3 Changes in this Document

This document includes the following changes to the 2023 Update:

- Consideration of the comments and recommendations arising from the 2025 workshop and recommendations from field research work in 2023.
- Expansion of the scope to include all forested areas on public land in Alberta.
- Revisions to the Adjacent and regional Decision Support Tool and the Borrow Decision Support Tool.
- Clarification of terminology
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- Additional factors to consider in the decision support tools and data collection needs.
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- Addition of a Change in Land Use Variance Request Checklist.

In addition, the associated Excel file (DFST Change in Land Use Recommendation Calculator) has been automated to simplify data entry and consistency in results.

2.0 DECISION FRAMEWORK OVERVIEW

Prior to December 14, 2023, Forestry and Parks was responsible for the decision to authorize leaving a mineral pad in place after reclamation of a wellsite or access road (i.e., approve a change in land use from peatland to upland) under the *Public Lands Act* (Alberta Environment and Parks, 2017; Drozdowski et al., 2020a). After issuance of EPA's Interim Directive on December 14, 2023, these decisions were temporarily directed to the AER, who also have authority under the *Public Lands Act* through the *Responsible Energy Development Act*. Once written agreement for the change in land use is received, industry may apply to the AER for the reclamation certificate (Alberta Environment and Parks, 2017; Drozdowski et al., 2020a) based on the Forested Land Criteria. If the change in land use variance request is returned, the mineral pad must be removed appropriately so that the site can be reclaimed to peatland, and a reclamation certificate submitted to the AER (Alberta Environment and Parks, 2017; Drozdowski et al., 2020a) based on the Peatland Criteria.

The purpose of the Decision Framework and Support Tools (DFST) is to provide a process to recommend if the mineral pad should remain in place and to provide supporting information for the change in land use variance request to the AER (often referred to as professional judgement; Alberta Environment and Parks, 2017).

3.0 CAVEATS FOR USE OF THE FRAMEWORK

Change in land use variance requests occur as part of the accepted regulatory framework for wellsite certification[4]. Caron et al. (2022) identified over 7,000 abandoned wellsites with mineral pads in peatlands, and the literature review and outreach work done for this project suggest there are over 1,000 mineral pads that have had natural vegetation encroachment on the mineral pad (Tokay et al., 2019). The Decision Framework and Support Tools provides a mechanism for practitioners to decide if the change request is appropriate and provides guidance on the supporting information to provide with the application.

Practitioners must consider the following caveats before using the Decision Framework and Support Tools:

1. **This document applies to change in land use variance requests for mineral pads on public land**. Practitioners may ask the AER if the Decision Framework and Support Tools can be used for other types of associated facilities on pads in a peatland.[5]
2. Change in land use variance requests should **only be submitted after careful review of reclamation options**. Generally, though, regulatory policies reviewed in Tokay et al. (2019) and referred to in Drozdowski et al. (2020a) imply that government's **preferred hierarchy of reclamation strategies** for peatland sites is: reclaim to peatland -> reclaim part of the site to peatland -> reclaim to upland. **Practitioners will need to provide detailed justification and documentation for the recommendation to change the land use**.
3. Practitioners should **consider whether peatland reclamation of the mineral pad will result in a better overall environmental outcome** even if it sets a site back a few years and delays certification (i.e., environmental outcomes should be given a greater weight in the final decision than factors such as ease of access, age of site, and cost).
4. The DFST **does not apply to sites where the entire mineral pad and geotextile fill materials are removed**, exposing the peat beneath. As this peat is typically compressed and hydrologically altered, full removal may result in open-water conditions that are not conducive to re-establishing peatland hydrology and vegetation. Because this approach does not return the site to a peatland, it is not considered within the scope of the DFST, although a change in land use approval would be required when this approach is used.
5. Practitioners should be aware that removal of all or part of a mineral pad may affect the remediation guidelines applicable to the site because cover depth to contaminants will be decreased (Alberta Environment and Parks, 2019a; Alberta Environment and Sustainable Resource Development, 2014).

[4] For example, of the 121 sites submitted as candidates for the field verification trial (Powter et al., 2022), 99 had been submitted to AEP for a change in land use.
[5] For example, a campsite.

6. Use of the Decision Framework and Support Tools **does not guarantee** acceptance of the change in land use variance request by AER.
7. Practitioners must be aware that a **change in land use is not an improvement left in place** – selecting the wrong classification in OneStop may result in rejection of the application.
8. The designation of a site as a Candidate for Peatland Reclamation or Candidate for Upland Reclamation in each Decision Support Tool, and the designation of the site as a Candidate for Peatland Reclamation or Candidate for Upland Reclamation in the Final Land Use Recommendation, are **recommendations only**. **AER will make the final decision** on the proposed change in land use.
9. Once a decision is made to leave a mineral pad in place, the *Preparing Variance Justifications for Reclamation Certification of Wellsites and Associated Facilities on Forested Land: 2023 Update* (Tokay et al., 2023) may need to be used if the site has deficiencies requiring a variance to meet the Forested Land criteria.
10. At any time up to certification of the site, if site, adjacent area or local area conditions change to the extent that they may invalidate the decision to change land use, the operator will be required to **update the results of the Decision Framework and Support Tools** and adjust their change in land use variance request as necessary.
11. Use of the Decision Framework and Support Tools **does not guarantee** issuance of the reclamation certificate by the AER. Sites must meet the relevant criteria and practitioners must apply for a reclamation certificate.
12. Use of the Decision Framework and Support Tools **does not change** any existing requirements or processes specified by EPA in the *Reclamation Criteria for Wellsites and Associated Facilities for Peatlands* (Alberta Environment and Parks, 2017) or by the AER in *Specified Enactment Directive 002 – Application Submission Requirements and Guidance for Reclamation Certificates for Well Sites and Associated Facilities* (Alberta Energy Regulator, 2025).

3.1 Screening Step

Before gathering the data necessary to use the Decision Framework and Support Tools, practitioners should determine if approval for a change in land use is likely given larger provincial goals and objectives.

For example, EPA has released three sub-regional plans (Bistcho Lake – Alberta Environment and Parks, 2022a; Cold Lake – Alberta Environment and Parks, 2022b; and, Upper Smoky – Alberta Environment and Protected Areas, 2025) that address boreal woodland caribou recovery requirements and revegetation requirements.[6] In general, the sub-regional plans impose requirements for revegetation of upland and wetland ecosystems and, more specifically, upland

[6] In December 2025 EPA began consultation on a draft South Athabasca Sub-regional Plan (Government of Alberta, 2025) which also references boreal woodland caribou recovery requirements and revegetation requirements.

ecosystems in caribou biophysical habitat. If a practitioner does not believe that reclamation efforts can be successful in meeting the requirements in the sub-regional plan, they cannot use the Decision Framework and Support Tools. It is **important to note** that the sub-regional plan documents are clear that:

1. Requirements to restore lands which are listed in this section are additional to reclamation requirements prescribed in regulation; and
2. Where there is a conflict between a restoration level described in the sub-regional plan and other requirements prescribed by regulation, the requirements prescribed in the sub-regional plan will take precedence.

Practitioners must also undertake a similar analysis of the likelihood that a change in land use will meet other provincial and federal objectives such as the Alberta Wetland Policy (Government of Alberta, 2013), regional watershed management plans (e.g., *Athabasca Integrated Watershed Management Plan*; Athabasca Watershed Council, 2022), and relevant species-at-risk recovery plans (e.g., *Alberta Northern Leopard Frog Recovery Plan 2010-2015*; Government of Alberta, 2012), where applicable. If the practitioner does not believe that reclamation efforts can be successful in meeting the requirements in the applicable documents, they cannot use the Decision Framework and Support Tools.

Where the site cannot meet the requirements described above, practitioners should discuss site reclamation requirements with AER to determine the preferred reclamation objective and potential options.

3.2 Decision Framework

The decision framework consists of four Decision Support Tools (DSTs) and a rating system to determine the land use recommendation. Figure 1 depicts the framework and Section 8.0 outlines the steps involved.

Each DST is assessed to determine a land use recommendation (Candidate for Peatland Reclamation or Candidate for Upland Reclamation) for each mineral pad on a site. The four DST recommendations are used to determine the Final Land Use Recommendation. The four DSTs are:

- Adjacent and Regional Impacts Decision Support Tool (described in Section 4.0)
- Site-specific Considerations Decision Support Tool (described in Section 5.0)
- Access Decision Support Tool (described in Section 6.0)
- Borrow Decision Support Tool (described in Section 7.0)

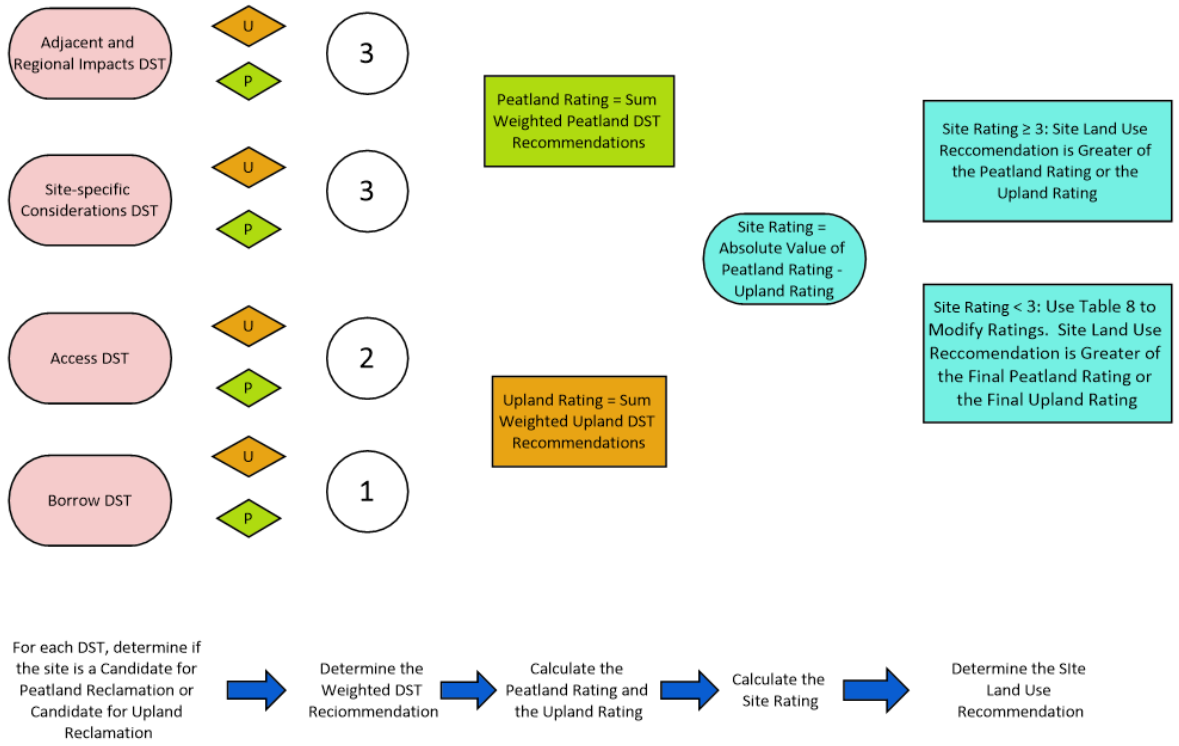

Figure 1. Decision framework for determining site land use recommendation.

Key terms in each DST are defined, and a table provides factors for the practitioner to consider when answering the questions in the DST decision nodes. Knowledge gaps requiring further research for factors that may influence the recommendation but for which answers are not currently available, are identified in section 11.0.

Although the DFST uses a mathematical formula to arrive at the Site Land Use Recommendation there is no formula specifying how to weight responses to each DST decision node and the related "factors to consider" tables for each decision node. Practitioners are expected to use professional judgement and a weight-of-evidence approach in making their decision and are expected to justify the rationale for their decision.

3.3 Decision Framework Terminology

The following terms are used in this report to describe the decision framework.

Decision Node

Each DST is presented as a flowchart with multiple Yes/No oval decision nodes (Figure 2). The practitioner answers Yes or No and follows the appropriate response arrow to the next node.

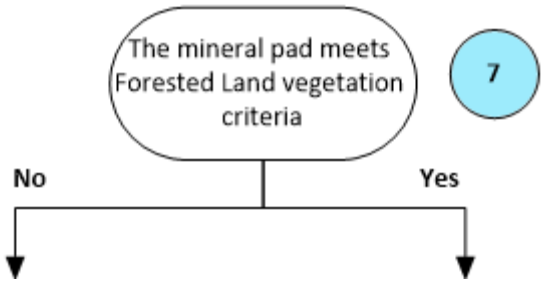

Figure 2. Example decision node in a DST.

Land Use Recommendation

In each DST, the final decision node leads the practitioner to a diamond land use recommendation (Figure 3) indicating whether the site is a Candidate for Peatland Reclamation, or a Candidate for Upland Reclamation. As shown in Figure 3, there may be several decision nodes that lead to a land use recommendation.

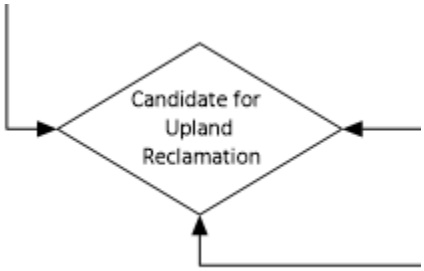

Figure 3. Example land use recommendation in a DST.

Decision Path

The sequence of decision nodes in a DST that leads to the land use recommendation. Documenting the decision path allows reviewers to better understand how the practitioner arrived at the land use recommendation for each DST. For example, a decision path for the Adjacent and Regional Impacts Decision Support Tool might be:

Mineral pad causing off-site hydrology and/or vegetation impacts – **No**

↓

Local area is a forested upland and peatland complex – **Yes**

↓

Peatland reclamation of mineral pad would cause adverse impacts to surrounding peatland – **Yes**

↓

Candidate for Upland Reclamation

To simplify documenting the decision path, the decision nodes have been numbered in the flowcharts (blue circles). In the above example, the decision path would be: 1, 3, 5, Candidate for Upland Reclamation. Note: decision nodes 2 and 4 were skipped as they were not part of the decision path.

DST Recommendation

The recommendation from each DST as either a Candidate for Peatland Reclamation or Candidate for Upland Reclamation.

Weighted DST Recommendation

Each DST Recommendation has been assigned a weight for input into a calculation of the Site Rating (Table 1). Weights were assigned to each DST based on consultation with Government of Alberta, industry, AER and practitioners in Stages 1 and 2 of the project (Drozdowski et al., 2020; Tokay et al., 2019). A higher weight indicates the DST has greater importance in determining the overall site land use recommendation.

Table 1. Weights assigned to each Decision Support Tool.

Decision Support Tool	DST Weight
Adjacent and Regional Impacts	3
Site-specific Consideration	3
Access	2
Borrow	1

Peatland Rating

The Peatland Rating is the sum of the weighted DST recommendations with a recommendation of Candidate for Peatland Reclamation (see examples in Table 2).

Upland Rating

The Upland Rating is the sum of the weighted DST recommendations with a recommendation of Candidate for Upland Reclamation (see examples in Table 2).

Site Rating

The absolute difference between the Peatland Rating and the Upland Rating is the Site Rating. For Site 1 in Table 2, the Site Rating is 1:

Site Rating = Peatland Rating – Upland Rating

= 5 – 4

= 1

When the result is a negative value, drop the negative sign (i.e., take the absolute value). For example, the Site Rating for Site 2 in Table 2 is 3 after dropping the negative sign:

Site Rating = Peatland Rating – Upland Rating

= 3 – 6

= -3

= 3

Table 2. Example calculations of Peatland Rating, Upland Rating and Site Rating.

Decision Support Tool*	Candidate for Peatland Reclamation	Candidate for Upland Reclamation	Candidate for Peatland Reclamation	Candidate for Upland Reclamation
	Site 1		Site 2	
Adjacent and Regional Impacts	3		3	
Site-specific Considerations		3		3
Access	2			2
Borrow		1		1
Peatland Rating	5		3	
Upland Rating		4		6
Site Rating [Peatland Rating – Upland Rating]	**1** Result: Apply Site Rating Modifications from Table 8		**3** Result: Candidate for Upland Reclamation	

Site Rating Modifications

When the Site Rating is less than 3, Table 8 is used to modify the Peatland Rating and Upland Rating. A value of 3 was chosen as the cutoff after evaluating various scenarios and determining that more information would be required to make a land use recommendation when the ratings were close.

Final Peatland Rating

The Final Peatland Rating is the sum of the initial Peatland Rating plus the sum of the modifications to the Peatland Rating from Table 8.

Final Upland Rating

The Final Upland Rating is the sum of the initial Upland Rating plus the sum of the modifications to the Upland Rating from Table 8.

Final Land Use Recommendation

Where the Site Rating is ≥3 the Final Land Use Recommendation is the greater of the Peatland Rating or the Upland Rating. Where the Site Rating is <3 the Site Rating Modifications are applied, and the Final Land Use Recommendation is the greater of the Final Peatland Rating or the Final Upland Rating.

DFST Change in Land Use Recommendation Calculator

An Excel tool is available to calculate the Peatland Rating, Upland Rating, Site Rating, Site Rating Modifications, Final Peatland Rating, Final Upland Rating, and to determine the Final Land Use Recommendation. The Calculator is available on EPA's website.

3.4 Application Process Notes

EPA and AER encourage practitioners to submit change in land use variance requests early in the reclamation planning stage to provide certainty about the land use and reclamation requirements. However, the AER will accept change in land use variance requests at any time leading up to the submission of the reclamation certificate application.

A separate change in land use variance request must be submitted for each disposition (Alberta Energy Regulator, 2025). For example, a site with an LOC (access road) and MSL (wellsite) requires two change in land use variance requests. Practitioners must use professional judgement in deciding whether a separate DFST submission is required for each disposition (i.e., the Land Use Recommendation would be different for the LOC and the MSL) or if the same DFST submission may be used for both requests. In either case, the practitioner should explain their rationale.

AER considers a borrow pit holding water to be a change in land use and authorization is required.

Reclaimed borrow pits holding water may require *Water Act* authorization (Alberta Environment and Protected Areas, 2022).

Since remediation guidelines depend on land use decisions, AER will accept change in land use variance requests prior to remediation of the well pad or access road. The well pad and access road must be remediated to the appropriate guidelines prior to submission of the reclamation certificate application.

3.5 Additional Information

For information on the application process, contact the Alberta Energy Regulator at recremquestions@aer.ca

For information on the policy, contact Alberta Environment and Protected Areas at Land.Management@gov.ab.ca.

4.0 ADJACENT AND REGIONAL IMPACTS DECISION SUPPORT TOOL

The Adjacent and Regional Impacts Decision Support Tool is shown in Figure 4 and a glossary is provided below for terms within the tool that require explanation and/or context.

The DFST Change in Land Use Recommendation Calculator will record a weighted DST recommendation of 3 to either the *Candidate for Peatland Reclamation* or *Candidate for Upland Reclamation* depending on the outcome for the Adjacent and Regional Impacts Decision Support tool.

4.1 Glossary

Alleviated: Off-site hydrology, chemistry and/or vegetation impacts are lessened or eliminated.

Adjacent Area: The area within 100 m of the edge of the mineral pad.

Forested Upland and Peatland Complex: The local area consists of a mixture of forested uplands and peatlands including transitional areas.

Local Area: The area within 500 m of the edge of the mineral pad. Professional judgement may be used to expand the assessment area where the peatland is large or where natural landform patterns only become apparent at a broader scale.

Off-site Hydrology Impact: Flooding or low water levels, or changing flow pattern/directions, leading to off-site vegetation impacts in the adjacent area.

Off-site Vegetation Impacts: Includes, but is not limited to, mortality, dieback, discolouration, reduced growth, reduced seed production, changes in species composition and assemblages that may result in long term implications for ecological sustainability.

Partial Mineral Pad Removal: Refers to any instance where a portion of the mineral pad is removed to alleviate drainage issues and/or reclaim part of the site to a peatland. For the purposes of the DFST, it does not specifically refer to the partial pad removal peatland reclamation technique, in which mineral material is removed to lower the pad surface toward the surrounding peatland elevation to re-establish hydrologic conditions that support peatland vegetation establishment. When this reclamation technique is successfully applied across an entire site, no land use change approval is required because the site is being returned to its original land use (peatland).

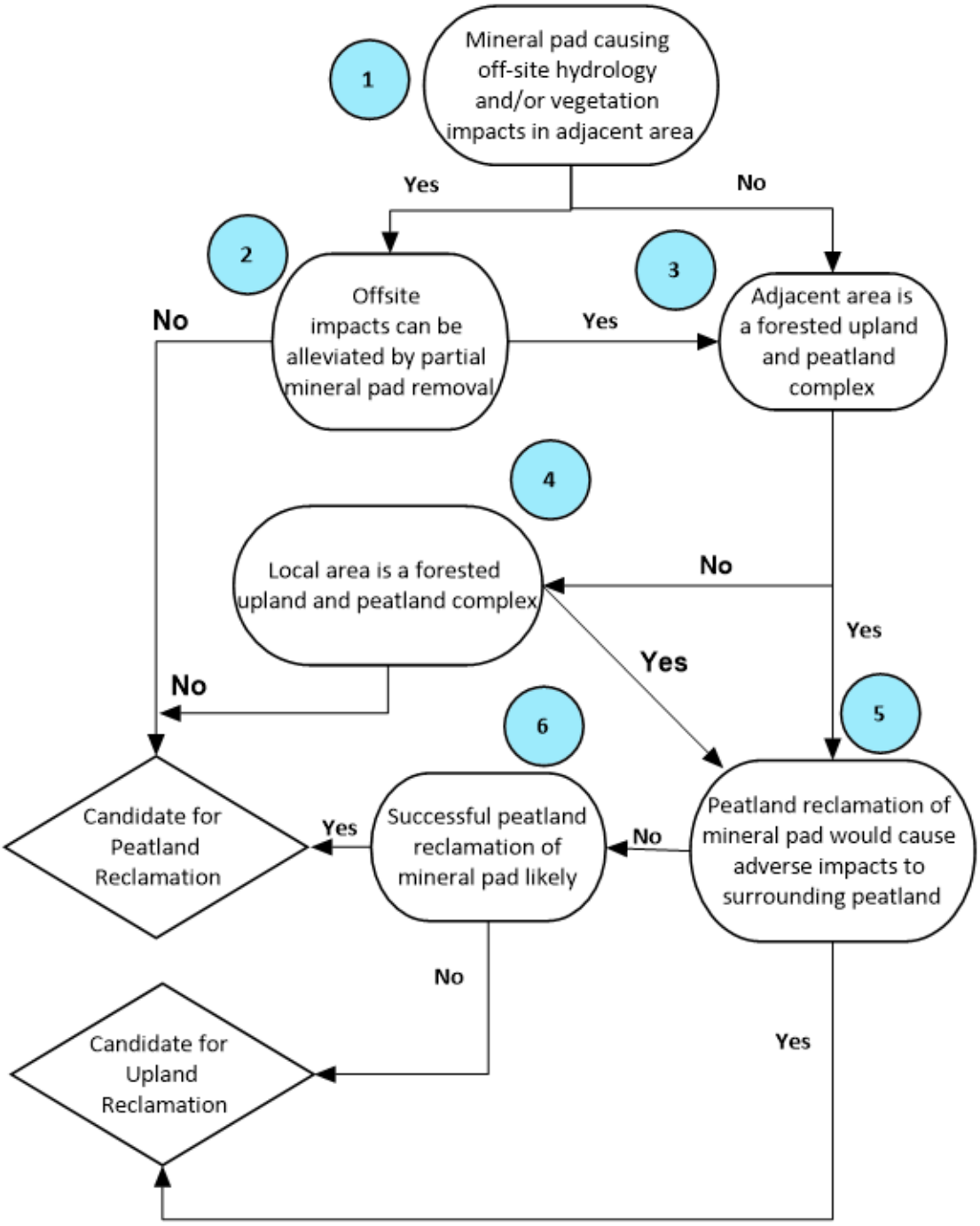

Figure 4. Adjacent and Regional Impacts Decision Support Tool.
Refer to the glossary for definitions of key terms.

4.2 Adjacent and Regional Impacts Decision Support Tool Supporting Information

Table 3 provides further information to help practitioners answer decision nodes in the Adjacent and Regional Impacts Decision Support Tool.

Table 3. Factors to consider when answering Yes or No for decision nodes in the Adjacent and Regional Impacts Decision Support Tool.
Numbered dark bars represent a specific decision node.

Factor	Yes	No
1: Mineral pad causing off-site hydrology and/or vegetation impacts in the adjacent area		
Mineral pad material chemistry	Unsuitable pad chemistry [1]	Suitable pad chemistry [1]
Existing erosion	Evidence of active erosion	No evidence of active erosion
Potential for erosion and peatland siltation	Exposed mineral soil	Mineral pad vegetated with no mineral soil exposed
Water ponding [2]	Evidence of water ponding upstream and not downstream of the mineral pad	No evidence of water ponding OR comparable ponding upstream and downstream of the mineral pad
Water levels [2]	Water level difference greater than 20 cm between upstream and downstream of the mineral pad	Water level differs by 20 cm or less between upstream and downstream of the mineral pad
Tree mortality [2]	Tree mortality exceeding 20%	Tree mortality less than 20%
Tree density [2]	Tree density varies by more than 50%	Tree density varies by 50% or less
Tree height [2]	Tree height varies by more than 50%	Tree height varies by 50% or less
Access road mineral pad thickness [3]	Mineral pad is thicker than 0.75 m	Mineral pad is thinner than 0.75 m
Access road mineral pad width [3]	Mineral pad is wider than 10 m	Mineral pad is narrower than 10 m
Access road orientation	Access road is closer to perpendicular than parallel to the peatland flow regime	Access road is closer to parallel than perpendicular to the peatland flow regime
Access road shape [3]	Access road has a bend or curve	Access road is straight

Factor	Yes	No
2: Offsite impacts can be alleviated by partial mineral pad removal		
Level of reclamation effort	Minor site work AND/OR small equipment required to alleviate off-site impacts	Major site work AND/OR large equipment required to alleviate off-site impacts
Remediation required	No remediation required OR minor site work AND/OR small equipment required for remediation	Major site work AND/OR large equipment required for remediation [4]
Impacts to peatland	Removal efforts will alleviate impacts OR will only have a short-term negative effect on peatland hydrology or vegetation	Removal efforts will not alleviate impacts OR will have a long-term negative effect on peatland hydrology or vegetation
3: Adjacent area is a forested upland and peatland complex		
Forested upland and peatland composition	Adjacent area is a mosaic of forested uplands, bogs and fens OR a transitional area between forested upland and peatland	Adjacent area is a large, continuous fen or bog
4: Local area is a forested upland and peatland complex		
Forested upland and peatland composition	Local area is a mosaic of forested uplands, bogs and fens OR a transitional area between forested upland and peatland	Local area is a large, continuous fen or bog
5: Peatland reclamation of mineral pad would cause adverse impacts to surrounding peatland		
Potential chemical impacts to peatland	Major chemical impacts (e.g., salinity, pH) likely	Minor chemical impacts (e.g., salinity, pH) likely
Potential siltation impacts to peatland	Major siltation impacts likely	Minor siltation impacts likely
6: Successful peatland reclamation of mineral pad likely		
Local area peatland type	Fen with mineral rich water	Bog or swamp
Peatland vegetation donor site	Nearby donor site (Sphagnum and brown mosses) available	No nearby donor sites

Factor	Yes	No
Vegetation type	Multiple desirable species present OR likely to develop	Monoculture of cattails OR undesirable species present OR desirable species unlikely to develop

[1] Based on Soil Quality Criteria Working Group (1987).

[2] Interpreted from the 2023 Research Program (Renkema et al., 2024) but not based on statistical results; refer to the report for methods on characterizing these factors.

[3] Based on results from the 2023 Research Program (Renkema et al., 2024); refer to the report for methods on characterizing these factors.

[4] In most cases requiring excavation of mineral material, remediation is likely to result in significant peatland disturbance.

5.0 SITE-SPECIFIC CONSIDERATIONS DECISION SUPPORT TOOL

The Site-specific Considerations Decision Support Tool is shown in Figure 5 and a glossary is provided below for terms within the tool that require explanation and/or context.

The DFST Change in Land Use Recommendation Calculator will record a weighted DST recommendation of 3 to either the *Candidate for Peatland Reclamation* or *Candidate for Upland Reclamation* depending on the outcome for the Site-specific Considerations Decision Support tool.

5.1 Glossary

Mitigated: Landscape, soil, or vegetation limitations or deficiencies are reduced or eliminated by work which will not impact the existing site characteristics that meet the Forested Land Criteria.

Landscape Deficiencies: Reclamation deficiencies that prevent the site from passing Forested Land landscape criteria.

Rooting Restrictions: Physical and/or chemical barriers (e.g., soil compaction, geotextile) that will result in roots being unable to extend to a depth equivalent to control vegetation.

Soil Limitations: Soil characteristics that are likely to impede establishment or growth of desired vegetation (e.g., rooting restrictions due to compaction, drought/flooding, mineral pad material chemistry, presence of shallow geotextile or corduroy).

Vegetation Deficiencies: Reclamation deficiencies that prevent the site from passing Forested Land vegetation criteria.

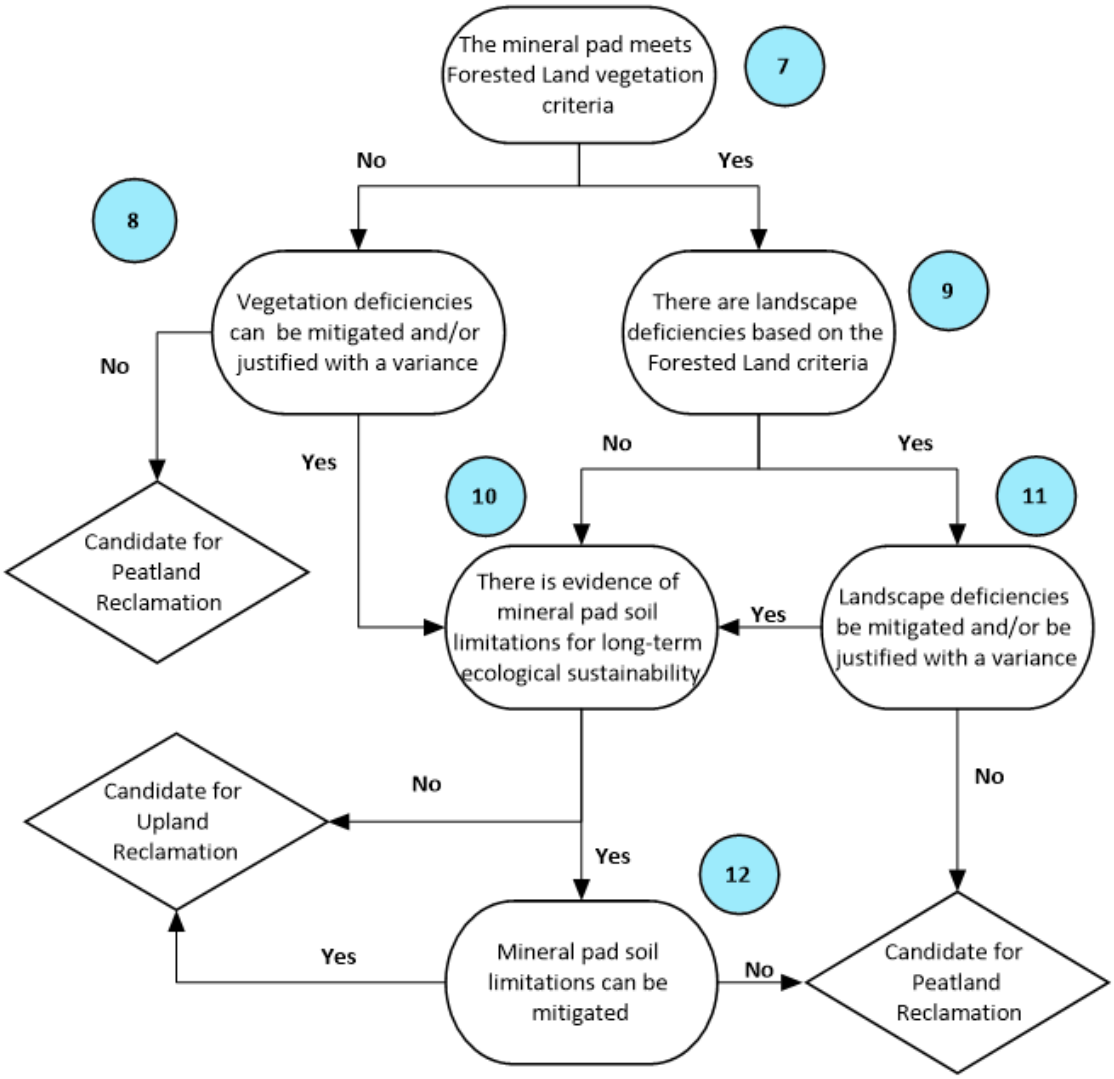

Figure 5. Site-specific Considerations Decision Support Tool
Refer to the glossary for definitions of key terms.

5.2 Site-specific Considerations Decision Support Tool Supporting Information

Table 4 provides further information to help practitioners answer decision nodes in the Site-specific Considerations Decision Support Tool.

Table 4. Factors to consider when answering Yes or No for decision nodes in the Site-specific Considerations Decision Support Tool.
Numbered dark bars represent a specific decision node.

Factor	Yes	No
7: The mineral pad meets Forested Land vegetation criteria		
Vegetation status of mineral pad	Mineral pad would pass a Detailed Site Assessment using the Forested Land Criteria with or without a vegetation override	Mineral pad has peatland vegetation OR has inappropriate or inadequate forested land vegetation OR is dominated by grass species
8: Vegetation deficiencies be mitigated and/or justified with a variance		
Level of effort	Infill hand planting will address issue	Removal of undesirable species and replanting required
Grasses [1]	Grasses are not dominant species	Grasses are dominant species
Weeds	No weeds OR only spot spraying or hand-pulling of a few weeds required	Site-wide weed problem
9: There are landscape deficiencies based on the Forested Land Criteria		
Presence of landscape deficiencies	Deficiencies in the Forested Land landscape criteria (e.g., bare ground, subsidence, erosion, coarse woody debris, contour) exist on the access road or pad	There are no landscape deficiencies on the site (site will pass Forested Land landscape criteria)
10: There is evidence of mineral pad soil limitations for long-term ecological sustainability		
Soil physical and chemical parameters [2]	Material is not suitable and there are rooting restrictions	Material is suitable and there are no rooting restrictions
Mineral pad thickness [3]	Thickness is greater than 1.2 m	Thickness is less than 1.2 m
Depth to moisture [3]	No evidence of moisture or water level (e.g., gleying, mottling) within 1.1 m of the surface	Evidence of moisture or water level (e.g., gleying, mottling) within 1.1 m of the surface
Liners	Geotextile liner is within 1 metre of the surface	No liner used OR corduroy liner used OR geotextile liner removed OR geotextile liner deeper than 1 metre from the surface

Factor	Yes	No
11: Landscape deficiencies can be mitigated and/or be justified with a variance		
Level of effort	Minor site work required using small equipment	Major site work AND/OR large equipment required
Impacts to site vegetation	Minimal impacts to existing desirable species; may require infill planting	Significant impacts to existing desirable species will require replanting
12: Mineral pad soil limitations can be mitigated		
Level of effort	Minor site work required using small equipment	Major site work AND/OR large equipment required
Impacts to site vegetation	Minimal impacts to existing desirable species; may require infill planting	Significant impacts to existing desirable species will require replanting

[1] Interpreted from the 2023 Research Program (Renkema et al., 2024) but not based on statistical results; refer to the report for methods on characterizing these factors.

[2] Based on results from the 2023 Research Program (Renkema et al., 2024); refer to the report for methods on characterizing these factors. NOTE: This question addresses the onsite effects of mineral pad chemistry whereas the question in Node 1 of the Adjacent and Regional Impacts DST addresses the offsite effects of mineral pad chemistry. Suitability in Node 10 is based on Soil Quality Criteria Working Group (1987).

[3] Some sites in the 2023 Research Program (Renkema et al., 2024) had adequate forest vegetation on mineral pads deeper than 1.2 m suggesting that soil limitations on deeper mineral pads may not always restrict forest development.

6.0 ACCESS DECISION SUPPORT TOOL

The Access Decision Support Tool is shown in Figure 6 and a glossary is provided below for terms within the tool that require explanation and/or context.

The DFST Change in Land Use Recommendation Calculator will record a weighted DST recommendation of 2 to either the *Candidate for Upland Reclamation* or *Candidate for Peatland Reclamation* depending on the outcome for the Access Decision Support Tool.

6.1 Glossary

Access: Refers to site accessibility and is broader than just the access road. **NOTE**: specific considerations for the impacts caused by the access road are addressed in the *Adjacent and Regional Impacts DST* and considerations related to the reclamation status of the access road are addressed in the *Site-specific Considerations DST*.

Limited Access**:** All or part of the access road is revegetated and would meet Forested Land vegetation criteria on upland portions and Peatland vegetation criteria on peatland portions.

Opportunity to Coordinate Reclamation Work**:** Operator has other sites to be reclaimed in the area.

Restricted Access**:** Site is accessible only by helicopter or amphibious vehicle[7] or boat OR site is accessible only by using other revegetated access roads OR site access requires constructing crossings over critical fish habitat.

[7] Adapted from Alberta Environment and Parks (2017).

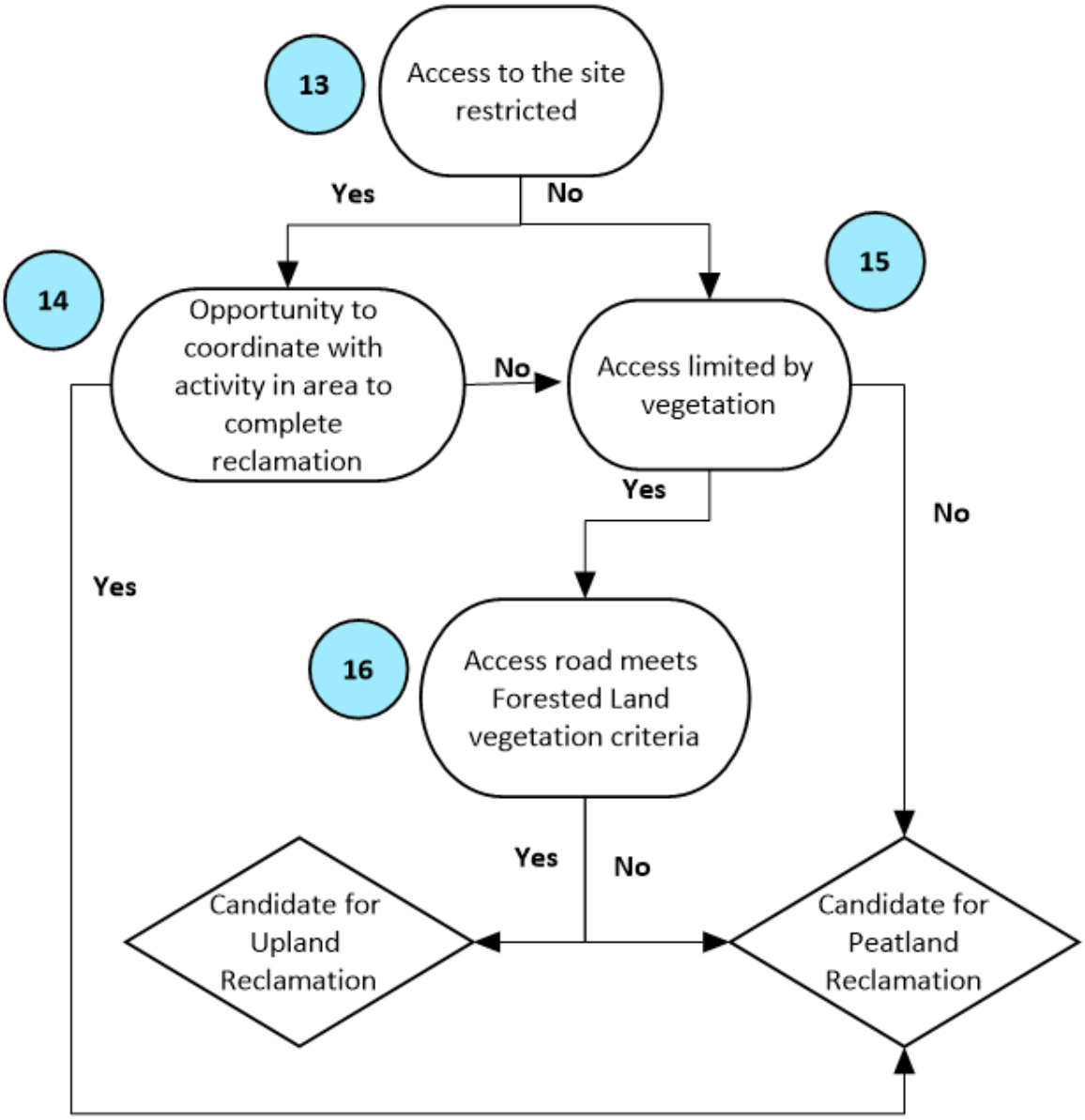

Figure 6. Access Decision Support Tool.
Refer to the glossary for definitions of key terms.

6.2 Access Decision Support Tool Supporting Information

Table 5 provides further information to help practitioners answer decision nodes in the Access Decision Support Tool.

Table 5. Factors to consider when answering Yes or No for decision nodes in the Access Decision Support Tool.

Numbered dark bars represent a specific decision node.

Factor	Yes	No
13: Access to the site restricted		
Site remoteness	Site only accessible in winter	Site accessible by all-weather road
Access road condition	Access road will require full or partial reconstruction to provide access causing significant impacts to site conditions	Access road can be used with minimal impact to site conditions OR the site is accessible without an access road
Access road length	Access road length from an all-weather road, or an LOC that will remain after the site is certified, is more than 100 metres	Access road length from an all-weather road, or an LOC that will remain after the site is certified, is less than 100 metres
14: Opportunity to coordinate with activity in area to complete reclamation		
Operator portfolio reclamation timeframe	Operator has other sites in the area that will be reclaimed within 3 years	Operator has no other sites in the area OR the operator's sites in the area will not be reclaimed for more than 3 years
15: Access limited by vegetation		
Access road peatland vegetation [1]	Inappropriate or inadequate peatland vegetation present	Appropriate peatland vegetation present
Access road forested land vegetation [2]	Appropriate forested land vegetation present	Inappropriate or inadequate forested land vegetation present
16: Access road meets Forested Land vegetation criteria		
Vegetation status	Access road would pass a Detailed Site Assessment using the Forested Land Criteria with or without a vegetation override	Access road has peatland vegetation OR has inappropriate or inadequate forested land vegetation OR is dominated by grass species

[1] Based on the Peatland Criteria.

[2] Based on the Forested Land Criteria.

7.0 BORROW DECISION SUPPORT TOOL

The Borrow Decision Support Tool is shown in Figure 7 and a glossary is provided below for terms within the tool that require explanation and/or context.

NOTE 1: The Borrow Decision Support Tool focuses on the borrow pit as it impacts the decision to remove the mineral material or leave the mineral material in place. The recommendation arrived at after using the Borrow Decision Support Tool is for the mineral pad **not** for the borrow pit.

NOTE 2: Decisions made about reclamation of the mineral pad may result in changes to the reclamation criteria used to assess the borrow pit (e.g., a decision to remove the mineral pad and fill in the borrow pit may change the borrow criteria to Forested Land).

The DFST Change in Land Use Recommendation Calculator will record a weighted DST recommendation of 1 to either the *Candidate for Peatland Reclamation* or *Candidate for Upland Reclamation* depending on the outcome for the Borrow Decision Support tool.

7.1 Glossary

Dugout Borrow: An excavation made to supply fill and/or construction material for a site which, when reclaimed, is designed to hold water for most of the season.

Functional Mineral Wetland**: S**pecifically in the context of this tool, this refers to the type and quality of a non-peat forming wetland that has established in a borrow. Where a larger borrow pit has been intentionally reclaimed to a marsh complex following the *Design Guidelines for Reclaiming Pits, Borrow Pits and Quarries to Marsh Complexes* (Alberta Environment and Protected Areas, 2026), it is typically considered committed to that wetland land use and therefore is not automatically considered as a potential location for receiving removed mineral pad material. Most borrow pits are too small to meet the site conditions needed for a marsh complex (e.g., larger footprint, multiple wetland zones, gentle slopes) and are therefore considered as a potential location for receiving removed material. In these instances, the *Guidelines for End Land Use Planning for Reclaiming Borrow Pits Supporting Energy Activities on Public Land*s (Alberta Environment and Parks, 2022c) should be used to evaluate the type and quality of the mineral wetland in the borrow pit.

Landscape Borrow**:** An excavation made to supply fill and/or construction material for a site which, when reclaimed, does not hold water for most of the season.

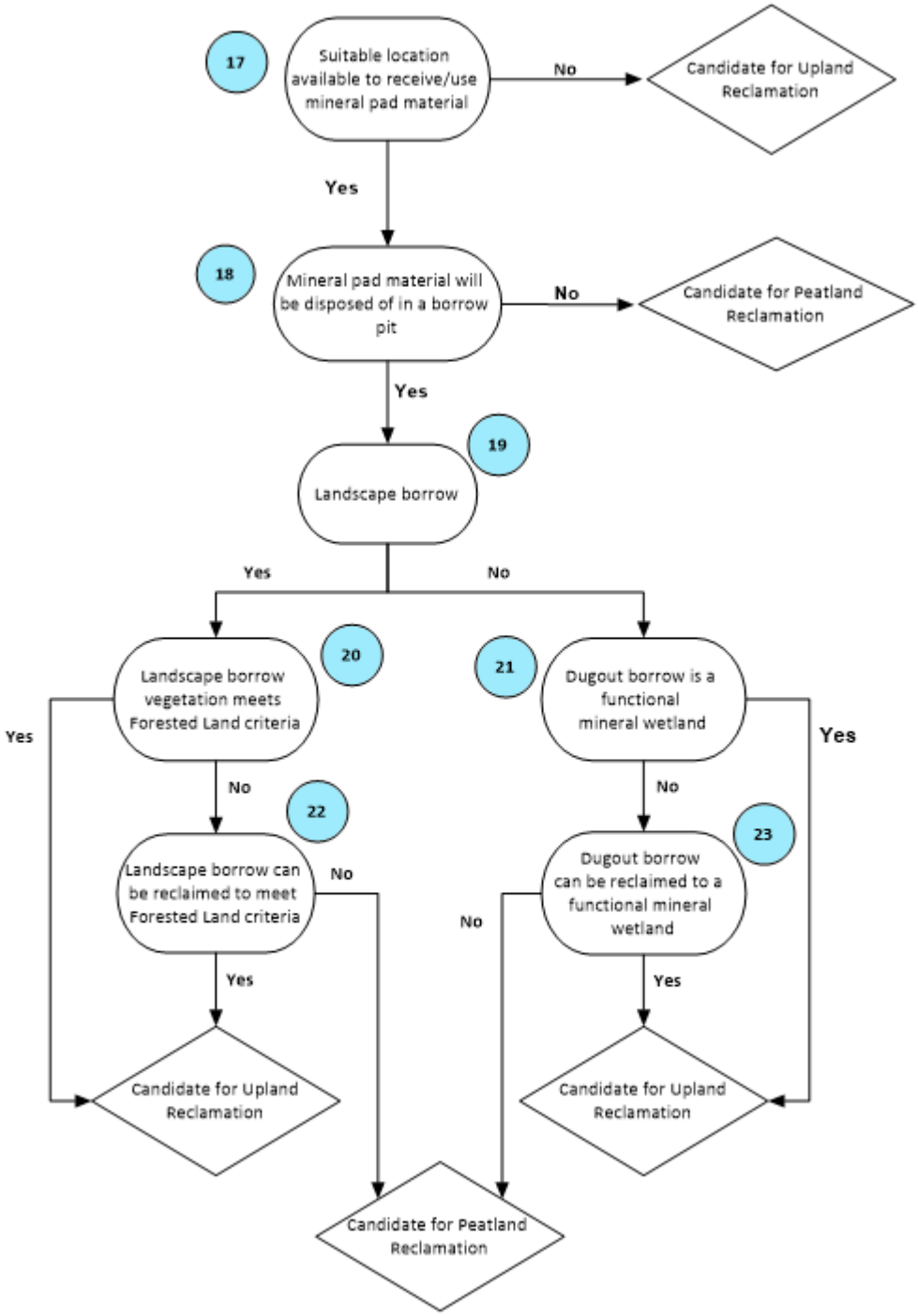

Figure 7. Borrow Decision Support Tool.
Refer to the glossary for definitions of key terms.

7.2 Borrow Decision Support Tool Supporting Information

Table 6 provides further information to help practitioners answer decision nodes in the Borrow Decision Support Tool.

Table 6. Factors to consider when answering Yes or No for decision nodes in the Borrow Decision Support Tool.
Numbered dark bars represent a specific decision node.

Factor	Yes	No
17: Suitable location available to receive/use mineral pad material		
Original borrow pit location [1]	Location has been identified (onsite or offsite)	Location unknown OR no borrow pit used OR borrow pit certified
Alternative site [1]	Mineral material could be reused OR disposed of in a different location	No potential for reuse of mineral material OR no site for disposal OR only a portion of mineral material could be reused or disposed of
18: Mineral pad material will be disposed of in a borrow pit		
Destination of the mineral pad material	Mineral pad material will be placed in the borrow pit associated with the LOC or MSL OR will be placed in a different borrow pit	Mineral pad material will be placed at a known alternative site (e.g., road repair, infrastructure project, disposal location, etc.)
19: Landscape borrow		
Borrow pit water status	Does not hold water for most of the season	Holds water for most of the season
20: Landscape borrow vegetation meets Forested Land vegetation criteria		
Vegetation status	Landscape borrow would pass a Detailed Site Assessment using the Forested Land Criteria with or without a vegetation override	Landscape borrow has inappropriate or inadequate forested land vegetation OR is dominated by grass species
21: Dugout borrow is a functional mineral wetland		
Site and vegetation condition [2]	Meets site and vegetation conditions needed for a marsh complex	Does not meet site and vegetation conditions needed for a marsh complex
22: Landscape borrow can be reclaimed to meet Forested Land criteria		
Level of effort	Minor landscape, soil, or vegetation work using small equipment required	Major landscape, soil, or vegetation work AND/OR large equipment required

Factor	Yes	No
Impacts to site vegetation	Minimal impacts to existing desirable species; may require infill planting	Significant impacts to existing desirable species will require replanting
23: Dugout borrow can be reclaimed to a functional mineral wetland		
Level of effort	Minor work on vegetation, shoreline or borrow pit contours using small equipment	Major work on vegetation, shoreline or borrow pit contours AND/OR large equipment required
Impacts to site vegetation	Minimal impacts to existing desirable species; may require infill planting	Significant impacts to existing desirable species will require replanting

[1] Practitioners will need to document efforts to identify borrow pit location and alternative sites.

[2] *Based on Design Guidelines for Reclaiming Pits, Borrow Pits and Quarries to Marsh Complexes* (Alberta Environment and Protected Areas, 2026).

8.0 PROCESS DECISION SUPPORT TOOL

Practitioners will take the following steps to determine the final recommendation about whether to apply for a change in land use (reclaim to upland) or to reclaim to peatland (Table 7).

NOTE: The entire process must be viewed together when determining if a site is a Candidate for Peatland Reclamation or a Candidate for Upland Reclamation (i.e., the answer to one DST does not determine the Final Land Use Recommendation).

Table 7. Steps for determining site land use recommendation.

Step 1	• Use each Decision Support Tool to determine whether the site is a Candidate for Peatland Reclamation or a Candidate for Upland Reclamation. • Document the decision path for each DST.
Step 2	• Assign the appropriate weighted DST rating for each DST: o Adjacent and Regional Impacts = 3 o Site-specific Considerations = 3 o Access = 2 o Borrow = 1
Step 3	• Calculate **Peatland Rating** by summing the weighted DST ratings that identified the site as a Candidate for Peatland Reclamation. • Calculate **Upland Rating** by summing the weighted DST ratings that identified the site as a Candidate for Upland Reclamation.
Step 4	• Calculate the **Site Rating** as the absolute difference between the **Peatland Rating** and **Upland Rating** o Where the Site Rating is ≥3 the Final Land Use Recommendation is the greater of the Peatland Rating or the Upland Rating. o Apply the Site Rating Modifications in Section 8.1 for Site Ratings <3.

8.1 Site Rating Modifications

When the Site Rating in Step 4 is less than three, the Peatland Rating and Upland Rating are modified based on answers to **all** the factors in Table 8. The DFST Change in Land Use Recommendation Calculator will assign a value of 1 when the answer to the factor is Yes.

The Final Peatland Rating is the sum of the initial Peatland Rating and the sum of the modifications to the Peatland Rating. Similarly, the Final Upland Rating is the sum of the initial Upland Rating and the sum of the modifications to the Upland Rating. Once the modifications are made, the Final Land Use Recommendation is the greater of the Final Peatland Rating or the Final Upland Rating. Example calculations are provided in Section 8.2 and Table 10.

NOTE: In the case of a tie after the modifications are made, the site is deemed a Candidate for Peatland Reclamation.

Table 8. Modifications to the initial Site Rating to determine the Final Land Use Recommendation.

Factor	Description	
Variances	**Peatland Modification:** Two or more variances will be required for mineral pad to be certified under the Forested Land Criteria	
	Upland Modification: No variances OR one variance will be required for mineral pad to be certified under the Forested Land Criteria	
Deep water dugout	**Peatland Modification:** Majority of the dugout borrow pit has a water depth greater than 2 m (i.e., it is not a mineral wetland)	
	Upland Modification: Not a dugout borrow OR majority of the dugout borrow pit has a water depth less than 2 m (i.e., it is a mineral wetland)	
Site use	**Peatland Modification:** No evidence of use of mineral pad by wildlife OR use of mineral pad by third parties is affecting site ecological function	
	Upland Modification: Mineral pad being used by wildlife OR use of mineral pad by third parties is not affecting site ecological function	
Age of woody vegetation	**Peatland Modification:** Desirable trees / woody species are less than 8 years old OR not meeting growth expectations	
	Upland Modification: Desirable trees / woody species are at least 8 years old AND meeting growth expectations	

All four factors must be assessed.

For each Factor, the practitioner enters Yes in the row of the third column that matches the Description.

A value of 1 is assigned to the Peatland Modifications if the answer in the first row of the Factor is Yes.

A value of 1 is assigned to the Upland Modifications if the answer in the second row of the Factor is Yes.

8.2 Examples

In the first example (Table 9), the Site Rating is 1 therefore Table 8 is used to determine the Final Land Use Recommendation.

Table 9. Example 1: Modifications to the initial Site Rating required.

Decision Support Tool	Candidate for Peatland Reclamation	Candidate for Upland Reclamation
Adjacent and Regional Impacts	3	
Site-specific Considerations		3
Access	2	
Borrow		1
Peatland Rating	5	
Upland Rating		4
Site Rating [Peatland Rating - Upland Rating]	1	

After applying the modifications (Table 10) the site is deemed to be a Candidate for Peatland Reclamation because the Final Peatland Rating is greater than the Final Upland Rating (7 vs. 6).

Table 10. Modifications to the initial Site Rating for Example 1.

Factor	Description	
Variances	**Peatland Modification:** Two or more variances will be required for mineral pad to be certified under the Forested Land Criteria	Yes
	Upland Modification: No variances OR one variance will be required for mineral pad to be certified under the Forested Land Criteria	
Deep water dugout	**Peatland Modification:** Majority of the dugout borrow area has a water depth greater than 2 m (i.e., it is not a mineral wetland)	
	Upland Modification: Not a dugout borrow OR majority of the dugout borrow area has a water depth less than 2 m (i.e., it is a mineral wetland)	Yes
Site use	**Peatland Modification:** No evidence of use of mineral pad by wildlife OR use of mineral pad by third parties is affecting site ecological function	Yes
	Upland Modification: Mineral pad being used by wildlife OR use of mineral pad by third parties is not affecting site ecological function	
Age of woody vegetation	**Peatland Modification:** Desirable trees / woody species are less than 8 years old OR not meeting growth expectations	
	Upland Modification: Desirable trees / woody species are at least 8 years old AND meeting growth expectations	Yes

Table 11. Modified site rating.

Decision Support Tool	Weight	Candidate for Peatland Reclamation	Candidate for Upland Reclamation
Adjacent and Regional Impacts	3	3	0
Site-specific Considerations	3	0	3
Access	2	2	0
Borrow	1	0	1
Peatland Rating		5	
Upland Rating			4
Site Rating		1	
Table 8 Modifications		2	2
Final Peatland Rating		7	
Final Upland Rating			6
Final Land use Recommendation		Candidate for Peatland Reclamation	

In the second example (Table 12), the Site Rating is 3, therefore modifications are not required, and the Final Land Use Recommendation is Candidate for Upland Reclamation since the Upland Rating is greater than the Peatland Rating.

Table 12. Example 2: No modifications to the Site Rating required.

Decision Support Tool*	Candidate for Peatland Reclamation	Candidate for Upland Reclamation
Adjacent and Regional Impacts	3	
Site-specific Considerations		3
Access		2
Borrow		1
Peatland Rating	3	
Upland Rating		6
Site Rating [Peatland Rating - Upland Rating]	3	
Final Land Use Recommendation	Candidate for Upland Reclamation	

9.0 RECOMMENDED INFORMATION TO PROVIDE IN SUPPORT OF THE CHANGE IN LAND USE APPLICATION

If use of the Decision Framework and Support Tools results in a Final Land Use Recommendation of Upland (i.e., to leave all or part of the mineral pad in place), then a change in land use application is required. This section provides recommendations on supporting information that should be included with the application to support the change in land use request.

NOTE 1: The information list provided here is a suggestion and is not intended to imply these are the minimum requirements nor do they necessarily represent the full suite of information that AER is looking for.

NOTE 2: Practitioners are encouraged to discuss application content with AER prior to submission to ensure the appropriate information is provided.

NOTE 3: Practitioners should focus the application on site-specific information rather than broad regional descriptive information that AER already has.

NOTE 4: Practitioners should provide detailed, ecological information and data to support the change in land use application (e.g., drone imagery, pad material characterization, vegetation assessments). A statement of professional judgement without supporting information/data will not be sufficient.

Appendix 1 provides this information in the form of a checklist which practitioners are encouraged to submit to the AER with their change in land use application.

9.1 Rationale for not Reclaiming to Peatland

Provide a detailed description of the **ecological** rationale for not reclaiming the mineral pad to a peatland. Include information and data on:

- Ecological impacts (type, nature, and extent) caused by removal and disposal of the mineral pad compared to the ecological benefits of returning the site to a peatland
- How the proposed forested upland site fits into the local and regional environment
- Ecological benefits of the proposed forested upland site in the local and regional context

NOTE: Information on cost of removal and disposal of mineral pad material may be provided in support of the ecological rationale but will not be accepted as the primary reason.

9.2 Site Background Information

Provide the basic background information about the site, including:

- Applicable sub-regional plan
- Unique well identifier
- Public land disposition number – MSL
- Public land disposition number – LOC

- Public land disposition number – borrow pit
- Overlapping land use dispositions/tenures
- Spud date
- Abandonment date
- Description of reclamation efforts
- Date of last reclamation work
- Description of third-party use
- Summary of discussions with other disposition/tenure holders about leaving the mineral pad in place

9.3 Results of the Decision Framework and Support Tools

The DFST Change in Land Use Recommendation Calculator documents the detailed Decision Framework and Support Tools information used to determine the final site land use recommendation. Appending the Initial or Modified Site Results tab data (Table 13 shows the Modified Site Results tab) and the DST Decision Path tab data (Table 14) from the Calculator to the application will show how the land use recommendation was arrived at. Alternatively, the same information can be provided in a different format to show how the recommendation was arrived at.

Table 13. Example Site Results tab data output from the DFST Change in Land Use Recommendation Calculator.

Decision Support Tool	Weight	Candidate for Peatland Reclamation	Candidate for Upland Reclamation
Adjacent and Regional Impacts	3	3	0
Site-specific Considerations	3	0	3
Access	2	2	0
Borrow	1	0	1
Peatland Rating		5	
Upland Rating			4
Site Rating		1	
Table 8 Modifications		2	2
Final Peatland Rating		7	
Final Upland Rating			6
Final Land Use Recommendation		Candidate for Peatland Reclamation	

Table 14. Example DST Decision Path tab output from the DFST Change in Land Use Recommendation Calculator.
The Rationale column provides space for the practitioner to describe the reasons for choosing Yes or No at each Node. The text can point to data or other supporting information that informed the choice.

Adjacent and Regional Impacts Decision Support Tool		Decision Path	Rationale
1	Mineral pad causing off-site hydrology and/or vegetation impacts in adjacent area	No	Water levels in the adjacent peatland to the north, south, east and west of the pad were all between 18 and 20 cm below the surface of the peat. There was no tree mortality.
2	Offsite impacts can be alleviated by partial mineral pad removal	Not applicable	
3	Adjacent area is a forested upland and peatland complex	Yes	Based on peatland and ecosite mapping of the local area, 10% of the area is comprised of low bush cranberry (d) ecosite, 25% Labrador tea – subhygric (g), 35% treed bog and 30% shrubby poor fen.
4	Local area is a forested upland and peatland complex	Not applicable	
5	Peatland reclamation of mineral pad would cause adverse impacts to surrounding peatland	No	Work could be completed under frozen conditions and appropriate erosion and sediment control measures could be implemented to prevent impacts to the adjacent peatland

6	Successful peatland reclamation of mineral pad likely	Yes	Approximately 2.5 m of peat is present under the pad, and the pad is located in a fen.
	DST Recommendation	**Candidate for Peatland Reclamation**	
Site-specific Considerations Decision Support Tool			
7	The mineral pad meets Forested Land vegetation criteria	Yes	
8	Vegetation deficiencies can be mitigated and/or justified with a variance	Not applicable	
9	There are landscape deficiencies based on the Forested Land Criteria	No	
10	There is evidence of mineral pad soil limitations for long-term ecological sustainability	No	Pad material is suitable and pad thickness is less than 1.2 m
11	Landscape deficiencies can be mitigated and/or be justified with a variance	Not applicable	
12	Mineral pad soil limitations can be mitigated	Not applicable	
	DST Recommendation	**Candidate for Upland Reclamation**	
Access Decision Support Tool			
13	Access to the site restricted	Yes	Access road to the site is not padded and is 2.3 km in length. The access road crosses both forested and peatland areas. Peatland and forest vegetation have established on the access road and meet the applicable Forested Land Criteria or Peatland Criteria.
14	Opportunity to coordinate with activity in area to complete reclamation	Yes	Three sites within 1 km of the pad area also being reclaimed in 2026.

15	Access limited by vegetation	Not applicable	
16	Access road meets Forested Land vegetation criteria	Not applicable	
	DST Recommendation	**Candidate for Peatland Reclamation**	
Borrow Decision Support Tool			
17	Suitable location available to receive/use mineral pad material	Yes	Municipality requires fill for their landfill at 08-09-085-083 W5M.
18	Mineral pad material will be disposed of in a borrow pit	No	The mineral pad material can be re-used at the municipal landfill.
19	Landscape borrow	Not applicable	
20	Landscape borrow vegetation meets Forested Land criteria	Not applicable	
21	Dugout borrow is a functional mineral wetland	Not applicable	
22	Landscape borrow can be reclaimed to meet Forested Land criteria	Not applicable	
23	Dugout borrow can be reclaimed to a functional mineral wetland	Not applicable	
	DST Recommendation	**Candidate for Peatland Reclamation**	

An alternative (or additional) format for the DST Decision Path table above is to show the decision path for each DST in graphic form (see Figure 8 for an example of one DST decision path).

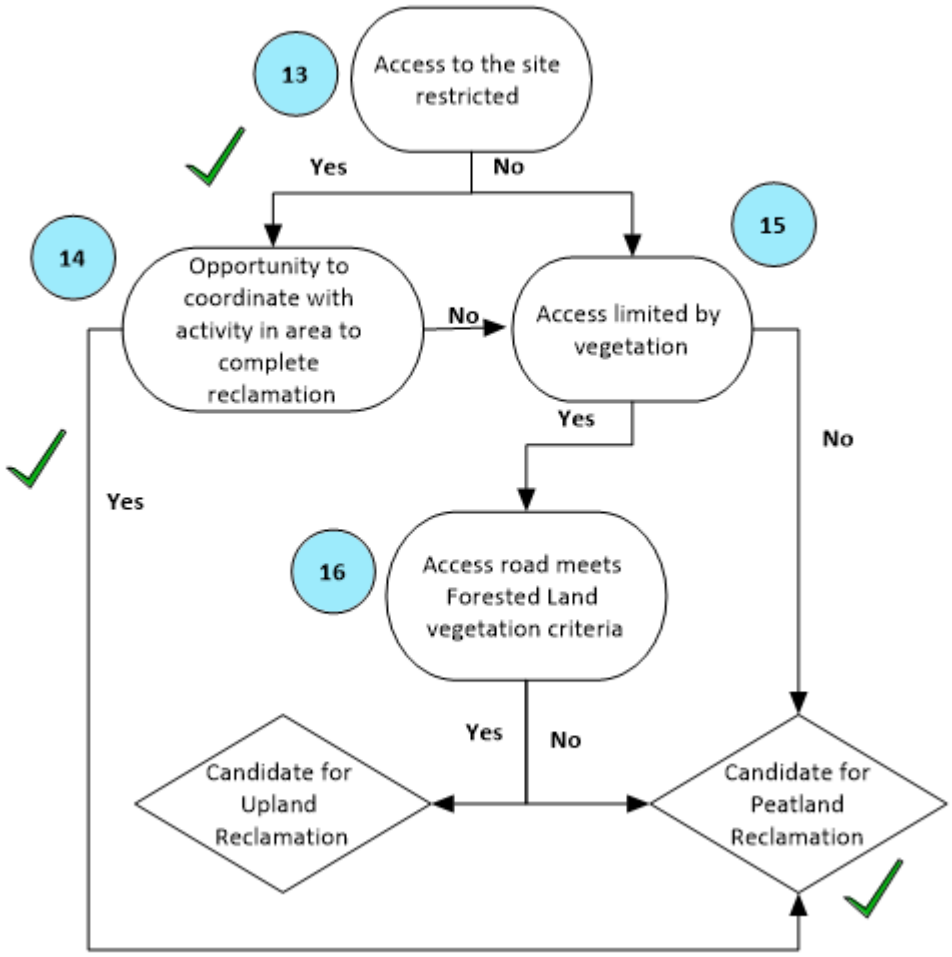

Figure 8. Visual depiction of a decision path.

Another way to show this path is to list the nodes encountered and the recommendation: in this example

Nodes 13, 14, Candidate for Peatland Reclamation.

9.4 Adjacent and Regional DST Information

The following information will help support the results from the Adjacent and Regional DST:

- Percentage of peatland in local area and adjacent area
- Adjacent peatland type

- Description of off-site impacts (comparisons of water levels, tree mortality, tree density, tree height, and vegetation composition between opposite sides of the mineral pad)
- Cause of off-site impacts
- Mineral pad chemistry
- Access road mineral pad thickness, width, orientation, and shape
- Locations along access road where swales could be / have been constructed to allow water flow
- Parts of the site where peatland reclamation could occur / has occurred
- Description of other adjacent, local, or regional considerations that would justify a change in land use

9.5 Site-specific Considerations DST Information

The following information will help support the results from the Site-specific Considerations DST:

- Mineral pad size (m x m)
- Mineral pad thickness
- Elevation and slope of mineral pad adjacent to a peatland
- Contours of the mineral pad relative to the adjacent peatland
- Depth to moisture
- Mineral pad chemistry
- Mineral pad vegetation assessment information – upland areas
- Mineral pad vegetation assessment information – peatland areas
- Description of vegetation deficiency(ies)
- Proposed mitigation strategy(ies) to correct vegetation deficiency(ies)
- Description of landscape deficiency(ies)
- Proposed mitigation strategy(ies) to correct landscape deficiency(ies), or the relevant variance that would be applied for
- Description of limitations for long-term ecological sustainability
- Proposed mitigation strategy(ies) to correct limitations
- Type and depth (m) to liner

9.6 Access DST Information

The following information will help support the results from the Access DST:

- Access road start location (Qtr – LSD – Sec – Twp – Rng – Mer)

- Access road end location (Qtr – LSD – Sec – Twp – Rng – Mer)
- Access road length (m)
- Access road width (m)
- Closest all-weather road (name/number)
- Distance to closest all-weather road or LOC to remain in place (km)
- Access construction method(s)
- Length (m) and % of access road padded in peatland
- Number and location of culverts to be removed
- Number of channels across the access road (other than those created by removing culverts) allowing crossflow
- Vegetation assessment information – upland areas
- Vegetation assessment information – peatland areas

9.7 Borrow DST Information

The following information will help support the results from the Borrow DST:

- Original borrow pit location (Qtr – LSD – Sec – Twp – Rng – Mer)
- Distance from mineral pad to original borrow pit (m)
- Borrow pit type (landscape or dugout)
- Estimated borrow pit volume (m^3)
- Estimated mineral pad material volume (m^3)
- Dugout borrow wetland type
- Borrow pit vegetation assessment
- Location(s) where the borrow material may be disposed of
- Location(s) where the borrow material may be used and the purpose

9.8 Additional Supporting Information

The following additional supporting information will help provide context for the Decision Framework and Support Tools recommendation:

- Site surveys
- Site sketch(es) showing drainage direction; culverts in place, removed or to be removed; and existing trails/roads
- Site and adjacent area contour sketch/map
- Air photographs of the site and adjacent area

- Satellite imagery of the site in a regional context
- Ground and/or drone photos of the site showing vegetation

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11.0 KNOWLEDGE GAPS

The following knowledge gaps require further research; however, the Decision Framework and Support Tools may still be used with confidence in the absence of results. Some of the original gaps in the 2022 Update were addressed by the Vertex work in Caron et al. (2022) and Renkema et al. (2022). Others were addressed in Renkema et al. (2024).

11.1 Adjacent and Regional Impacts Decision Support Tool Knowledge Gaps

The following factors may affect the decision to leave a pad in place but require further research.

1. Can offsite impacts be alleviated by partial mineral pad removal? Specifically:
    a. Does the type of peatland (e.g., fen vs. bog) impact success?
    b. Does the surrounding peatland type and characteristics of that peatland (e.g., peat depth and permeability) affect success?
    c. Does the water flow direction and velocity affect success?
    d. Does the access road length and orientation affect success?
    e. What mineral pad characteristics (e.g., depth, soil chemistry) would affect success?
2. Would successful peatland reclamation be likely after borrow material removal on the mineral pad? Specifically:
    a. Does the type of peatland targeted for reclamation affect success?
    b. Does the surrounding peatland type affect success?
    c. What is the extent of peat compression under the mineral pad and what is the potential for rebound?
    d. What is the impact of donor material type (Sphagnum mosses vs. fen mosses) for revegetation?
    e. What is the potential for natural ingress of trees, shrubs, herbs, and mosses from nearby sources?
    f. What are the impacts of adjacent invasive species on development of peat-forming species?
3. What are the impacts of mineral pads left in place on groundwater, wildlife habitat, wildlife movement, and wildlife use of the landscape?
4. What methods can be used to measure the occurrence and extent of current mineral pad impacts to hydrology, as well as the potential for future impacts?

    Based on the 2023 Research Program (Renkema et al., 2024), measurements comparing the peatland on either side of an access road could be indicative of current mineral pad impacts. Suggested measurements include tree mortality, tree height and tree density, and depth to water. The 2023 Research Program identified access road pad thickness, width, and shape as predictors for future impacts.

5. What are the cumulative impacts of multiple mineral pads on local and regional peatland hydrology, chemistry, vegetation and greenhouse gas fluxes, and the threshold at which cumulative impacts degrade overall ecological function of the region?
6. Is there a cumulative effect threshold, based on scientific and geographical approaches, that would allow a proportion of peatland in an area to be "lost" without significant degradation of function of the region?
7. What is the magnitude of carbon emissions released during mineral pad removal (including site access) and associated net environmental "benefit" associated with partial mineral pad removal vs. leaving the mineral pad in place?

11.2 Site-specific Considerations Decision Support Tool Knowledge Gaps

The following factors may affect the decision to leave a mineral pad in place but require further research.

1. What characteristics result in sites with mineral pads impacting the surrounding peatland ecosystems in the long term, and affect the extent and severity of these impacts?

   The 2023 Research Program (Renkema et al., 2024) identified access road mineral pad thickness, width, and shape as predictors for future impacts.
2. Are partial reclamation activities effective in alleviating impacts resulting from mineral pads in peatlands?
3. What is the likelihood of success for peatland recovery if the mineral pad is removed?
4. What characteristics determine the recovery of forest ecosystem on mineral pads left in place in the long term? Specifically:
   a. What is the relative importance of factors that influence successful reforestation of mineral pads (e.g., soil quality, topsoil depth, compaction, dispersal vectors, historical revegetation efforts, time, surrounding peatland type, water quality and levels, etc.)?

      The 2023 Research Program (Renkema et al., 2024) identified mineral pad thickness and depth to moisture as important factors. Years since abandonment and historical reclamation practices, such as seeding grasses, were also factors affecting forest recovery.

   b. What is the potential for the water table to rise into the rootzone over time?

      Interpretation of the results from the 2023 Research Program (Renkema et al., 2024), suggested that even after 35 years, water table rise into the rootzone could be minimal, particularly for pads constructed with fine-textured material.

   c. Are upland ecosystems developed on mineral pads left in place resilient over time?

APPENDIX 1 Change in Land Use Variance Request Checklist

Check the applicable boxes in the list and submit to the AER with your change in land use variance request and the supporting information referred to in the checklist.

Rationale for not Reclaiming to Peatland

☐ Detailed description of the **ecological** rationale for not reclaiming the mineral pad to a peatland

☐ Ecological impacts (type, nature, and extent) caused by removal and disposal of mineral pad material compared to the ecological benefits of returning the site to a peatland

☐ How the proposed forested upland site fits into the local and regional environment

☐ Ecological benefits of the proposed forested upland site in the local and regional context

☐ Cost of removal and disposal of mineral pad material (optional; not the sole determining factor)

Site Background Information

Provide the basic background information about the site, including:

☐ Applicable sub-regional plan

☐ Unique well identifier

☐ Public land disposition number – MSL

☐ Public land disposition number – LOC

☐ Public land disposition number – borrow pit

☐ Overlapping land use dispositions/tenures

☐ Land use requirement(s) in the public land disposition(s)

☐ Spud date

☐ Abandonment date

☐ Description of reclamation efforts

☐ Date of last reclamation work

☐ Description of third-party use

☐ Summary of discussions with other disposition/tenure holders about leaving the mineral pad in place

Results of the Decision Framework and Support Tools

☐ Site Results tab data (or equivalent)

☐ DST Decision Path tab data (or equivalent)

Adjacent and Regional DST Information

The following information will help support the results from the Adjacent and Regional DST

☐ Percentage of peatland in local area and adjacent area

☐ Adjacent peatland type

☐ Description of off-site impacts (comparisons of water levels, tree mortality, tree density, tree height, and vegetation composition between opposite sides of the mineral pad)

☐ Cause of off-site impacts

☐ Mineral pad chemistry

☐ Access road mineral pad thickness, width, orientation, and shape

☐ Locations along access road where swales could be / have been constructed to allow water flow

☐ Parts of the site where peatland reclamation could occur / has occurred

☐ Description of other adjacent, local, or regional considerations that would justify a change in land use

Site-specific Considerations DST Information

The following information will help support the results from the Site-specific Considerations DST:

☐ Mineral pad size (m x m)

☐ Mineral pad thickness

☐ Elevation and slope of each side of the mineral pad adjacent to a peatland

☐ Contours of the pad or access road relative to the adjacent peatland

☐ Depth to moisture

☐ Mineral pad chemistry

☐ Mineral pad vegetation assessment information – upland areas

☐ Mineral pad vegetation assessment information – peatland areas

☐ Description of vegetation deficiency(ies)

☐ Proposed mitigation strategy(ies) to correct vegetation deficiency(ies)

☐ Description of landscape deficiency(ies)

☐ Proposed mitigation strategy(ies) to correct landscape deficiency(ies), or the relevant variance that would be applied for

☐ Description of limitations for long-term ecological sustainability

☐ Proposed mitigation strategy(ies) to correct limitations

☐ Type and depth (m) of liner

Access DST Information

The following information will help support the results from the Access DST:

☐ Access road start location (Qtr – LSD – Sec – Twp – Rng – Mer)

☐ Access road end location (Qtr – LSD – Sec – Twp – Rng – Mer)

☐ Access road length (m)

☐ Access road width (m)

☐ Closest all-weather road (name/number)

☐ Distance to closest all-weather road or LOC to remain in place (km)

☐ Access construction method(s)

☐ Length (m) and % of access road padded in peatland

☐ Number and location of culverts to be removed

☐ Number of channels across the access road (other than those created by removing culverts) allowing crossflow

☐ Vegetation assessment information – upland areas

☐ Vegetation assessment information – peatland areas

Borrow DST Information

The following information will help support the results from the Borrow DST

☐ Original borrow pit location (Qtr – LSD – Sec – Twp – Rng – Mer)

☐ Distance from mineral pad to original borrow pit (m)

☐ Borrow pit type (landscape or dugout)

☐ Estimated borrow pit volume (m^3)

☐ Estimated mineral pad material volume (m^3)

☐ Dugout borrow wetland type

☐ Borrow pit vegetation assessment

☐ Location(s) where the borrow material may be disposed of

☐ Location(s) where the borrow material may be used and the purpose

Additional Supporting Information

The following additional supporting information will help provide context for the Decision Framework and Support Tools recommendation.

☐ Site surveys

☐ Site sketch(es) showing drainage direction and existing trails/roads

☐ Site and adjacent area contour sketch/map

☐ Air photographs of the site and adjacent area

☐ Satellite imagery of the site in a regional context

☐ Ground and/or drone photos of the site showing vegetation

APPENDIX 2 DFST CHANGE IN LAND USE RECOMMENDATION CALCULATOR

The DFST Change in Land Use Recommendation Calculator is an Excel file that contains all the calculations necessary to determine the Land Use Recommendation.

The Calculator consists of 11 tabs:

Instructions Tab

Explains how to use the Calculator and what information the other Tabs contain.

DST Decision Path Tab

Requires a practitioner to enter Yes/No answers to each decision node for each DST. If a practitioner attempts to answer Yes/No in a decision node that is not relevant the Calculator shows Not applicable as the only possible response. Practitioners can choose to select the Not applicable responses to more clearly show the Decision Path.

The DST diagram with numbered decision nodes is provided.

The Calculator automatically generates the DST Recommendation (i.e., Candidate for Upland Reclamation or Candidate for Peatland Reclamation) based on the Yes/No answers.

Initial Site Results Tab

This Tab automatically fills from the responses in the DST Decision Path Tab.

If the Site Rating is <3, then the practitioner **must** use the Site Rating Modifications Tab, otherwise the Land Use Recommendation is the Final Land Use Recommendation.

Site Ratings Modifications Tab

Use this Tab when the Site Rating (from the Initial Site Results Tab, Row 8) is < 3.

Requires a practitioner to select Yes for the appropriate description for each of the four factors considered in determining the modifications to the Site Rating from the. Select only one description for each factor.

Modified Site Results Tab

This Tab automatically fills from the Initial Site Results Tab and the responses in the Site Ratings Modifications Tab.

The Final Land Use Recommendation is generated based on the absolute difference between the Final Peatland Rating and Final Upland Rating. If the two ratings are the same the Final Land Use Recommendation defaults to Candidate for Peatland Reclamation.

Adjacent & Regional Impacts DST Tab

Factors to consider when answering Yes or No for decision nodes in the Adjacent and Regional Impacts Decision Support Tool.

Site-specific Considerations DST Tab

Factors to consider when answering Yes or No for decision nodes in the Site-specific Considerations Decision Support Tool.

Access DST Tab

Factors to consider when answering Yes or No for decision nodes in the Access Decision Support Tool.

Borrow DST Tab

Factors to consider when answering Yes or No for decision nodes in the Borrow Decision Support Tool.

Glossary

Provides descriptions for each of the defined terms in each DST.

References

Provides links to the documents referenced in the DSTs.