Volume 1, Section 10 Snake Lake Reservoir Expansion Project
Project Description
Conceptual Conservation and Reclamation Plan

Submitted to:

MPE
a division of Englobe
Lethbridge, Alberta

On behalf of:

Eastern Irrigation District
Brooks, Alberta

Submitted by:

AAR Environmental Services
Calgary, Alberta

March 27, 2025
AARES Project #: 21-127

Executive Summary

The Eastern Irrigation District (EID) is applying for approval under the *Environmental Protection and Enhancement Act* (EPEA) to construct the proposed Snake Lake Reservoir (SLR) Expansion Project (the Project). The Project, located between Bassano and Brooks in Alberta, involves the construction of a roughly 8 km long, up to 20 m high dam to increase the storage capacity of the reservoir system from 19.25 million m^3 to 87.4 million m^3. The Project occurs in a region dominated by agricultural lands, pasture lands, grasslands, and wetlands.

This Conceptual Conservation and Reclamation Plan (CCRP) for the Snake Lake Reservoir (SLR) Expansion Project (the Project) is based on plans and best practices for achieving successful reclamation. The EID's reclamation objective is, to the degree practicable, re-establishing a natural functioning grassland on disturbed and berm sites. Additional areas will not be reclaimed, as this Project will not be decommissioned. For the purposes of the CCRP, the Project is broken into three phases, to better understand the different activities that will occur at each stage: Conservation, Construction, and Reclamation. The Conservation Phase includes reclamation materials salvage and stockpiling; the Construction Phase includes excavation and construction of the berms and maintenance of the stored reclamation materials; and the Reclamation Phase includes calculations for the estimated area and volume of topsoil and subsoil that will be stripped and salvaged for use in reclamation.

This CCRP should be considered along with the Mitigation Measures, Management Practices, and Monitoring Plans (Volume 1, Section 11), Grassland Restoration Proposal (Volume 2, Section 10, Appendix H9), and the Soil and Terrain Environmental Impact Assessment (Volume 2, Section 9).

Table of Contents

10.1 INTRODUCTION 1
10.1.1 Background 1
10.1.2 Regulatory Context 1
10.2 CONSERVATION AND RECLAMATION OBJECTIVE 2
10.3 SLR RECLAMATION REQUIREMENTS 2
10.3.1 Construction Schedule 3
10.3.2 Project Phases and Progressive Reclamation 3
10.3.3 Key Activities 4
10.4 CONSERVATION PHASE 4
10.4.1 Soil Salvage and Stockpiling 4
10.4.2 Other Disturbances 5
10.4.3 Soil Contamination from Spills 5
10.4.4 Soil Contamination from Other Sources 6
10.5 CONSTRUCTION PHASE 6
10.5.1 Excavation and Construction of the Reservoir 6
10.5.2 Maintenance of Stored Reclamation Material 6
10.5.3 Weed Control 6
10.6 RECLAMATION PHASE 7
10.6.1 Surface Preparations 7
10.6.2 Reclamation Material Balance 7
10.6.3 Topsoil and Upper Subsoil Placement and Stabilization 8
10.6.4 Revegetation Plan 8
10.6.5 Anticipated Timeframe for Reclamation 9
10.7 MONITORING 9
10.8 RECLAMATION UNCERTAINTIES AND CONSTRAINTS 9
10.9 REFERENCES 10

Tables

Table 10-1: Estimated area, stripping depth, and volume of suitable topsoil 7
Table 10-2: Estimated area, stripping depth, and volume of suitable subsoil 7
Table 10-3: Estimated topsoil and subsoils replacement depths and volumes 8

Attachments

Figure 10A-1: Conceptual Construction Plan 2
Figure 10A-2: Soil Series and Suitability of Topsoil and Subsoil Resources for Reclamation in the Soil and Terrain Local Study Area 3

Abbreviations

CCRP	Conceptual Conservation and Reclamation Plan
ECB	Erosion Control Blankets
EIA	Environmental Impact Assessment
EID	Eastern Irrigation District
ELC	Equivalent Land Capability
EPEA	*Environmental Protection and Enhancement Act*
FTOR	Final Terms of Reference
GOA	Government of Alberta
PCRA	Post Construction Reclamation Assessment
SLR	Snake Lake Reservoir
STLSA	Soil and Terrain Local Study Area

10.1 INTRODUCTION

This section provides a Conceptual Conservation and Reclamation Plan (CCRP) for the Snake Lake Reservoir (SLR) Expansion Project (the Project) based on plans and best practices for achieving successful reclamation. This CCRP has been prepared to meet the requirements outlined in the Final Terms of Reference (FTOR; Volume 2, Appendix A).

Reclamation is the process of re-establishing functioning terrain and soil systems to provide natural habitat, productive land, or other land uses. The primary goal of reclamation is to restore site stability and ecosystem functions and return disturbed lands to their use prior to disturbance or to another desired end land use. The CCRP addresses methods to replace functioning soils in upland areas surrounding the new reservoir. This CCRP should be considered along with the following documents:

- Volume 1, Section 11 – Mitigation Measures, Management Practices, and Monitoring Plans; which provides more in-depth best management practices for topsoil stripping and handling.
- Volume 2, Section 10, Appendix H9 – Grassland Restoration Proposal; which addresses the need to replace functioning grassland communities following reservoir construction, offsetting some of the lost native grassland area, and providing future benefits relating to maintenance of grassland biodiversity.
- Volume 2, Section 9 – Soil and Terrain Environmental Impact Assessment; which provides information about soil and terrain resources, including an assessment of the topsoil and subsoil for their quality and reclamation suitability.

10.1.1 Background

The Eastern Irrigation District (EID) is applying for approval under the *Environmental Protection and Enhancement Act* (EPEA) to construct the proposed Snake Lake Reservoir (SLR) Expansion Project (the Project). The Project, located between Bassano and Brooks in Alberta, involves the construction of a roughly 8 km long, up to 20 m high dam to increase the storage capacity of the reservoir system from 19.25 million m^3 to 87.4 million m^3.

The Project occurs in a region dominated by agricultural lands, pasture lands, grasslands, and wetlands. Much of the area is composed of clay-loam soils supporting native grasslands, with fine soils in low depressions supporting wetlands. Soil orders present in the Project area are Solonetzic, Chernozemic, and Gleysolic. High salinity affects soils in most of the low-lying portions of the Project area, which makes it unsuitable for use in reclamation. However, well-drained upland soils are suitable and available for reclamation of the outer reservoir berms and surrounding lands (see Volume 2, Section 9 – Soil and Terrain).

10.1.2 Regulatory Context

The CCRP has been developed in consideration of the following:

- Final Terms of Reference (Volume 2, Appendix A);
- *Alberta Weed Control Act and Regulations* (Government of Alberta [GOA], 2008; GOA, 2010);
- *Environmental Protection and Enhancement Act: Conservation and Reclamation Regulation* (GOA, 1993);

- Environmental Code of Practice for Pesticides (GOA, 2025);
- *Soil Conservation Act* (GOA, 2000a); and
- *Water Act* (GOA, 2000b).

These documents are discussed briefly in the EIA Summary (Volume 2, Section 3.2).

10.2 CONSERVATION AND RECLAMATION OBJECTIVE

The general goal of reclamation is to return the land to equivalent capability compared to pre-disturbance conditions. The *Conservation and Reclamation Regulation* from the *Environmental Protection and Enhancement Act* (GOA, 1993) states that equivalent land capability (ELC) is "*the ability of the land to support various land uses after conservation and reclamation … similar to the ability that existed prior to a specified land activity being conducted on the land, but that the individual land uses will not necessarily be identical"*. Though the regulation does not apply to closure of this project, as the reservoir will not be removed and the land within the Project footprint will not be reclaimed, it provides a useful reference for achieving successful reclamation.

The EID's reclamation objective is, to the degree practicable, to re-establish a natural functioning grassland on disturbed areas and berm sites, outside of the inundated area (Attachment 10, Figure 10A-1). This does not imply that identical uses will occur, but the potential to support similar uses will exist. The CCRP therefore applies to the salvage of topsoil, constructed berms around the reservoir, and other disturbances that may require reclamation after the reservoir is complete.

Reclamation will include activities such as placing salvaged soil to the appropriate thickness and quality, weed control, revegetation, and natural development (naturalization) towards a preferred end state. Monitoring will follow, and additional remedial actions implemented, as needed.

The reclamation objective will be achieved by:

- controlling erosion and stabilizing subsoils on reclaimed surfaces, and establishment of suitable reclaimed soils;
- re-establishing natural, healthy plant communities;
- providing reclaimed habitat which supports wildlife, species at risk, and species of traditional or cultural importance;
- encouraging habitat connectivity with nearby ecosystems;
- reducing invasive/non-native species in the reclaimed habitat; and
- improving the aesthetic values of the land and providing safe access to human land users for recreation activities, if applicable.

Native species will be selected that provide protection of the berms and disturbed areas while allowing continued recruitment of other native species, putting the reclaimed areas on a trajectory toward a diverse plant community. Additional details about vegetation restoration are available in Volume 2, Section 10, Appendix H9 – Grassland Restoration Proposal.

10.3 SLR RECLAMATION REQUIREMENTS

Since the expanded reservoir will be a permanent feature on the landscape, and will not be decommissioned, the CCRP encompasses only the following components of the Project:

- outer berm slopes;

- surrounding natural grassland and wetland areas (i.e., those used as temporary workspace or accidentally damaged); and
- the temporary topsoil storage area.

Reclaimed sites will include 53 ha of land on the berms and 52 ha surrounding the reservoir, from the berm to the section edge. Topsoil stripping is not planned for the 41-ha temporary soil storage area, as the intention for this area is to leave the soil surface intact and use landscape fabric to protect soil integrity (see Attachment 10, Figure 10A-1). However, topsoil stripping may require reclamation if the soils are compacted or damaged while used for storage of reclamation soil materials. Thus, if topsoil in the storage area is damaged or compromised, it will be subject to the same reclamation requirements as the other areas.

Reservoir berms (i.e., dams) will range in height based on the elevation of the land, from <5 m to near 20 m. They will be developed at a maximum 3:1 slope, with an intervening 50:1 bench for berm stability, and will be composed of subsoil and overburden materials obtained from excavation of borrow pits within the Project footprint. Once the berms are developed and stable, suitable topsoil (i.e., reclamation quality) will be placed to an appropriate depth on the outside of the berm that slopes away from the reservoir. The portion of the berm sloping in towards the reservoir will be protected with rip-rap along the berm walls up to the top of the dam, and the top of the berms will be developed into a gravel road surface. Once topsoil is placed and spread, stabilization features will be installed to maintain soil integrity and prevent slumping and erosion. These may include features such as straw wattles, boulders, anchored logs, or coconut matting.

The EID understands the importance of planning Project construction so that it integrates with structures and functions of the regional and local environment. Project design incorporates mitigation measures to reduce effects on resources assessed in the EIA. Protection of valued components such as surface water resources, wetlands, biodiversity, and socio-cultural resources are discussed in Volume 2. The reclamation of reservoir berms is integral to the assessment of residual effects on natural resources, as these reclaimed areas are needed to partially offset losses of features, such as natural grasslands.

10.3.1 Construction Schedule

Assuming favourable regulatory approval, it is anticipated that construction will begin in 2026. Construction is expected to take approximately 3 years from site preparation to reclamation and final clean up. A breakdown of the anticipated timeframe for each major phase of the Project can be found in Volume 1, Section 2.7 (Overview).

10.3.2 Project Phases and Progressive Reclamation

The phases for the Project include planning and site preparation, construction, filling, reclamation, and operation of the reservoir. Conservation practices, such as conserving stockpile topsoil resources, will begin during the site preparation and construction stages. Reclamation of the site will happen during the reclamation phase which overlaps with testing and commissioning of the dams and reservoir-filling activities.

Progressive reclamation was not considered as part of this CCRP. Progressive reclamation refers to a technique use for projects where, concurrent to Project operations, interim reclamation begins to occur on areas no longer being disturbed. This is a common practice for *in-situ* oil sands

operations and oil production sites. Progressive reclamation is not applicable to this type of project that will be fully built and remain operational indefinitely.

10.3.3 Key Activities

Key Project activities are organized into the three Project phases mentioned above, as they pertain to this CCRP.

The **conservation** phase of the CCRP describes the following:

- reclamation material (soils) salvage and stockpiling measures;
- other disturbances; and
- soil contamination.

The **construction** phase of the CCRP describes the following:

- soil excavation and construction of dam and reservoir;
- maintenance of reclamation material; and
- weed control practices.

The **reclamation** phase of the CCRP describes the following:

- reclamation material (soils) balance calculations; and
- reclamation material (soils) placement and stabilization.

10.4 CONSERVATION PHASE

The CCRP provides a general framework for construction of the Project to reduce environmental effects and maximize the retention of reclamation materials for future use. General strategies provide guidance to Project construction practices.

Activities will be supervised by qualified construction and environmental liaisons. Adjustments will be made, as required, to effectively salvage and stockpile soils based on what is encountered in the field at the time of the activities.

10.4.1 Soil Salvage and Stockpiling

Topsoil and upper subsoil materials will be stripped, salvaged, and stored for later re-use within the planned reservoir footprint and topsoil storage area. Topsoil salvage is not recommended for certain soil series that are strongly saline and sodic at or near the surface and have poor quality soil (see Attachment 10, Figure 10A-2). Topsoil quality and depths for materials balance and storage calculations were based on the overall average topsoil depths across the Soil and Terrain Local Study Area (STLSA; see Volume 2, Section 9), using averages for map units identified on the soil survey mapping. These topsoil and subsoil depths presented in the Soil and Terrain Environmental Impact Assessment (Volume 2, Section 9) are provided as guidance. A qualified environmental liaison will be on-site, as needed, to address any discrepancies and provide oversight. The liaison will use visual observations such as differences in colour, texture, and structure between topsoil and subsoil to inform the on-site Project manager and equipment operators.

Salvaged topsoil and upper subsoil material will be stored at the edge of the proposed site, where it will be readily accessible for reclamation. A temporary stockpile area has been designated for storage of topsoil and upper subsoil to be used for reclamation.

Proper soil handling techniques are important to minimizing adverse effects to soils. The following general mitigation measures and techniques will be followed to conserve soil quality and quantity during construction and reclamation:

- accurately stripping topsoil to avoid admixing and maintain the quality of the topsoil;
- avoiding topsoil salvage under wet or extremely windy conditions;
- suspending soil handling when sustained strong winds or intense precipitation events (rainfall or snowmelt) develop potential for soil erosion;
- where colour transition between the topsoil and subsoil is poor, the on-site environmental inspector will determine the appropriate salvage depth and communicate it to the construction contractor;
- storing topsoil and stripped upper subsoil materials in a manner that provides protection from soil erosion by wind and water and avoids mixing of stored topsoil with subsoil;
- maintaining stockpile slopes at an appropriate gradient for safety and stability (e.g. 3:1); and
- utilizing erosion and sedimentation control measures on stockpiles, as needed, to prevent slumping and runoff of topsoil.

10.4.2 Other Disturbances

Other disturbances outside of the reservoir expansion area will involve a 41-ha area at the northeast corner of the reservoir, designated as a temporary topsoil storage area. This space will be used for the duration of the Project to store salvaged topsoil and subsoil to be used in reclamation. Landscape fabric will be used to prevent admixing of subsoil with in-site topsoil in the storage area; however, some incidental damage such as compaction could occur.

Soil stripping techniques and best practices provided in this document will also be followed in the temporary soil storage area, if stripping is needed. Compaction in the storage area will be assessed prior to reclamation. Other temporary workspace areas used as access roads will potentially require decompaction via discing or scarifying before topsoil can be replaced.

Native grasslands, where affected, will be protected by avoiding stripping and covering with matting to reduce negative Project effects. Any areas requiring reclamation of native vegetation will follow the grassland restoration protocol, summarized in Volume 2, Appendix H9 – Grassland Restoration Proposal. The dugout on the western edge of the Project, within the temporary soil storage area, will be protected using silt fencing and other aquatic resource protection methods, if necessary.

Clay till will be borrowed within the Project area, but only within the reservoir expansion area. Therefore, the borrow pits will not be subject to reclamation goals or criteria.

10.4.3 Soil Contamination from Spills

The main source of potential soil contamination is equipment used on site for Project activities. Appropriate measures will be followed to minimize the risk of spills and to respond to spills, as required. Additional information on spill prevention and response is available in Volume 1, Section 11 (Mitigation Measures, Management Practices, and Monitoring Plans).

10.4.4 Soil Contamination from Other Sources

It is possible that previously unreported contamination could be encountered during construction, such as debris from oil and gas operations or waste buried in previous decades. Torxen, a private oil and gas exploration company, completed the decommissioning of 29 gas wells and abandonment of all pipelines within the Project footprint in 2024.

While unlikely, it is possible – even with best efforts – that residual contamination associated with historical infrastructure and activities could remain. If contamination is suspected at any point during Project activities, work will be stopped, and appropriate steps will be taken to address the concern. This may include identification of the contamination substance via a site assessment, reporting to the relevant regulatory bodies, and, if needed, remediation or removal of contaminants.

10.5 CONSTRUCTION PHASE

This section of the CCRP discusses the construction of the reservoir, the maintenance of salvaged soils, site management, and vegetation management during the Project construction phase.

10.5.1 Excavation and Construction of the Reservoir

Construction of the reservoir includes overburden excavation, excavation and transport of clay till, berm surface preparations, berm construction, grading and contouring, placement of filter sands, bedding gravels and riprap, inspections, and filling. Further details on construction activities are available in the Project Overview (Volume 1, Section 2). During construction, all environmental protection measures will be followed.

10.5.2 Maintenance of Stored Reclamation Material

It is important to appropriately maintain the quality of stored reclamation materials. This involves monitoring the stockpiles to ensure mitigation measures in place are functioning as intended. These measures include maintaining proper distance between topsoil and subsoil piles and applying erosion control measures such as broadcast seeding a cover crop on the stockpiled topsoil. Additional best practices are provided in Volume 1, Section 11 (Mitigation Measures, Management Practices, and Monitoring Plans).

10.5.3 Weed Control

The EID's Weed Management Program focuses on the control of noxious weeds (as designated in the Alberta *Weed Control Act* [GOA, 2008]) in disturbed and reclaimed areas. As discussed in Volume 2, Section 10 (Vegetation and Wetlands), three noxious weeds, Canada Thistle (*Cirsium arvense)*, Perennial Sow Thistle (*Sonchus arvensis)*, and Field Bindweed (*Convolvulus arvensis)*, as well as two prohibited noxious weeds, Hoary Alyssum (*Berteroa incana)* and Nodding Thistle (*Carduus nutans)*, were observed in the Project area. Several other non-native plant species were also identified in the Project area.

A combination of mechanical and chemical methods will be used to control weeds in the Project area. Handpicking could be used to control smaller infestations or where chemical/mechanical control is not appropriate (e.g., in or near sensitive habitat). Use of chemical weed control will be completed or supervised by a qualified applicator, per the *Environmental Code of Practice for Pesticides* (GOA, 2025). An on-site environmental monitor should also conduct walkthroughs of

reclamation material stockpiles in storage to make observations and determine if weed control is required.

10.6 RECLAMATION PHASE

The EID's reclamation goal is to re-establish a natural functioning grassland on berm sites and any other disturbed areas outside of the reservoir area. A successfully reclaimed site will have stable soils and revegetated berms allowing continued recruitment of native species and showing a trajectory towards a diverse plant community. The reclamation phase includes using the salvaged topsoil for reclamation, re-establishing vegetation, and monitoring soil development and stability after Project completion.

10.6.1 Surface Preparations

The reservoir berm surface will be a hard layer composed of clay and coarse mineral material, forming an impervious layer, preventing water flow from seeping into the berm. Preparations will ensure the surface is ready to accept soils and allow an interface where water can soak in and then drain to the bottom of the berm. Preparations will include:

- grading and contouring the berms to match the construction specifications;
- reconstruction, infilling, and recontouring sites outside the Project footprint that may need repairs; and
- roughening the reclamation surface to facilitate binding of topsoil to subsoil.

10.6.2 Reclamation Material Balance

Soil considered suitable for use in reclamation will be stripped and stockpiled during construction of the Project and used during soil replacement activities. In practice, whatever materials are in the stockpiles will be returned during reclamation to a sufficient depth to develop the rooting zone for reclamation vegetation growth. If there is a surplus of reclamation soil materials, they may be stored permanently along the site perimeters or removed from site and used elsewhere.

The tables below present estimated stripping area, depths and volumes of suitable topsoil (Table 10-1) and subsoil (Table 10-2). The values are calculated by taking the area of suitable topsoil and multiplying it by the estimated topsoil stripping depth, based on the Soil and Terrain assessment (Volume 2, Section 9).

Table 10-1: Estimated area, stripping depth, and volume of suitable topsoil

Project Component	Area for Suitable Topsoil Salvage[1] (ha)	Estimated Topsoil Stripping Depth (m)	Estimated Volume of Topsoil Salvaged (m^3)
Reservoir Site (project footprint)	640.0	0.1	**640,000**

1. Suitable topsoil only.

Table 10-2: Estimated area, stripping depth, and volume of suitable subsoil

Project Component	Area Suitable for Upper Subsoil Salvage[1] (ha)	Estimated Upper Subsoil Stripping Depth (m)	Estimated Volume of Upper Subsoil Salvaged (m^3)
Reservoir Site (project footprint)	259.9	0.1	**259,900**

1. Suitable subsoil only.

As shown in Table 10-1 and 10-2, stripping depths of 0.1 m yield 640,000 m^3 of topsoil and 259,900 m^3 of subsoil, respectively. Using these estimated volumes, even at a minimal stripping depth of 0.1 m, there is enough topsoil at the site for a topsoil replacement depth of approximately 0.6 m and a subsoil replacement depth of approximately 0.2 m, presented in Table 10-3. The topsoil replacement depth of 0.6 m will provide sufficient rooting depth for vegetation. These calculations are based on an estimate of the yield of suitable topsoil that will be salvaged, but does not necessarily represent the exact depth the topsoil will be replaced at. A minimum 0.20 m of topsoil replacement is recommended. If there is a surplus of reclamation soil materials, they may be stored along the site perimeters or removed from site and used elsewhere for EID projects.

Calculations for reclamation materials considered only the suitable topsoil and subsoil, as identified in the Soil and Terrain Section (Volume 2, Section 9). Table 10-3 below shows the distribution of the topsoil and subsoil for the reclamation areas (i.e. the berms and the outer edge of the Project area), which total approximately 105 ha.

Reclamation Areas	Area of Feature (ha)	Estimated Volume of Topsoil Available (m^3)	Hypothetical Topsoil Replacement Depth (m)	Estimated Volume of Subsoil Available (m^3)	Hypothetical Upper Subsoil Replacement Depth (m)
Berms	53	323,000	0.6	131,100	0.2
Outer Edge	52	317,000	0.6	128,800	0.2
TOTAL	*105*	*640,000*	-	*259,900*	-

10.6.3 Topsoil and Upper Subsoil Placement and Stabilization

Salvaged upper subsoil and then topsoil will be spread and prepared to facilitate regrowth of reclamation vegetation on the berms. The goal of salvaged soil replacement is to establish a growing medium that supports the establishment of an initial vegetation cover and subsequent natural recovery of the plant community.

Steps to ensure successful topsoil and upper subsoil placement include:

- distributing upper subsoil and topsoil appropriately to achieve even replacement depths and proper drainage; and
- leaving materials in a rough condition (i.e., textured, lumpy) to reduce surface water runoff and establish microsites for vegetation growth; surface roughening promotes seed germination and protects the seeds from being washed down slope.

10.6.4 Revegetation Plan

A conceptual grassland restoration proposal has also been developed for this Project (see Volume 2, Appendix H9: Grassland Restoration Proposal). The proposal outlines natural recovery strategies and techniques for restoration with seeding. While this CCRP includes a goal to achieve sufficient vegetation cover to support soil function and protect the soil surface from erosion, the restoration plan aims to achieve a functioning native grassland that can partially offset Project grassland losses. This plan will use grass seed mixes native to the Dry Mixedgrass Natural Subregion with species adapted to the physical and chemical properties of the soil and terrain of the Project site. Important components of restoration vegetation to the area include proper seed certification, seeding rates and methods, timing of seeding, protecting recently seeded areas, and monitoring for weed control and germination/establishment success. Seed mixes and seeding

rates in the restoration plan, will be followed so that an initial vegetation community is established that will allow native grassland species to infill, and add to species diversity, over time. Further detail is provided in the Grassland Restoration Proposal (Volume 2, Section 10, Appendix H9).

10.6.5 Anticipated Timeframe for Reclamation

The Project schedule (see Volume 1, Section 2.7 – Overview) provides a high-level overview of the anticipated timeframe for the Project. Based on these assumptions, it is expected that reclamation will take place in late 2028 to late 2029, with reclamation and associated monitoring expected to take another 3 to 5 years. The general reclamation stages following berm construction include topsoil placement, vegetation seeding, weed management, and monitoring. The reclamation phase is deemed complete once monitoring shows stable, functioning soils, and sufficient vegetation cover to protect the soil surface from precipitation, runoff, and wind events. The Grassland Restoration Proposal (Volume 2, Appendix H9) also requires longer term monitoring to ensure restoration goals for a native vegetation community are achieved.

10.7 MONITORING

It is recommended that a Post-Construction Reclamation Assessment (PCRA) program be implemented to evaluate the success of reclamation after the 1st, 2nd and 3rd years (growing seasons) following completion of Project construction. The PCRA may include assessments of landscape features, vegetation cover, and soil conditions on reclaimed areas for the purpose of identifying remedial actions that may be required to correct any deficiencies. It is common practice to compare reclaimed areas to undisturbed land directly adjacent or nearby (i.e., control sites).

Vegetation establishment may be assessed by comparing growth on the reclaimed areas to adjacent control areas to evaluate parameters such as, stand density and species composition and presence of weeds or undesirable species. Where observations on reclaimed areas indicate conditions are not equivalent to adjacent lands or to preconstruction conditions, further reclamation work may be needed to reach ELC goals.

10.8 RECLAMATION UNCERTAINTIES AND CONSTRAINTS

As reclamation proceeds, the EID will apply adaptive reclamation management techniques. This involves using the results of soil and vegetation performance, to track progress and determine whether end land use objectives are being met and if additional activities are required. Availability of reclamation materials is not identified as a constraint to reclamation as it has been determined that there is a topsoil surplus at the site. As the natural processes acting upon the reclaimed landscape, such as growing season air temperatures and precipitation levels, as well as future environmental modifiers such as climate change are not fully predictable, they are identified as possible factors affecting reclamation success. This CCRP document was developed using the current state of knowledge in the development stages of the Project; the objectives, information and targets outlined in this document are likely to be updated as the Project progresses.

10.9 REFERENCES

Governemnt of Alberta (GOA). (1993). Conservation and Reclamation Regulation. *With amendments up to and including AR 267/2022*. Edmonton, Alberta: Alberta King's Printer. Retrieved from https://open.alberta.ca/publications/1993_115

GOA. (2000a). Soil Conservation Act. *Current as of November 16, 2022.* Edmonton, Alberta: Alberta King's Printer. Retrieved from https://open.alberta.ca/publications/s15

GOA. (2000b). Water Act (RSA 2000, c. W-3). *Current as of December 15, 2017*. Edmonton, Alberta: Alberta King's Printer. Retrieved from https://open.alberta.ca/publications/w03

GOA. (2010). Weed Control Regulations (AR 19/2010). *With amendments up to and Including Alberta Regulation 125/2016*. Edmonton, Alberta: Alberta King's Printer. Retrieved from https://kings-printer.alberta.ca/570.cfm?frm_isbn=9780779792474&search_by=link

GOA. (2025). Environmental Code of Practice for Pesticides. Edmonton, Alberta: Alberta King's Printer. Retrieved from https://open.alberta.ca/publications/pesticide2

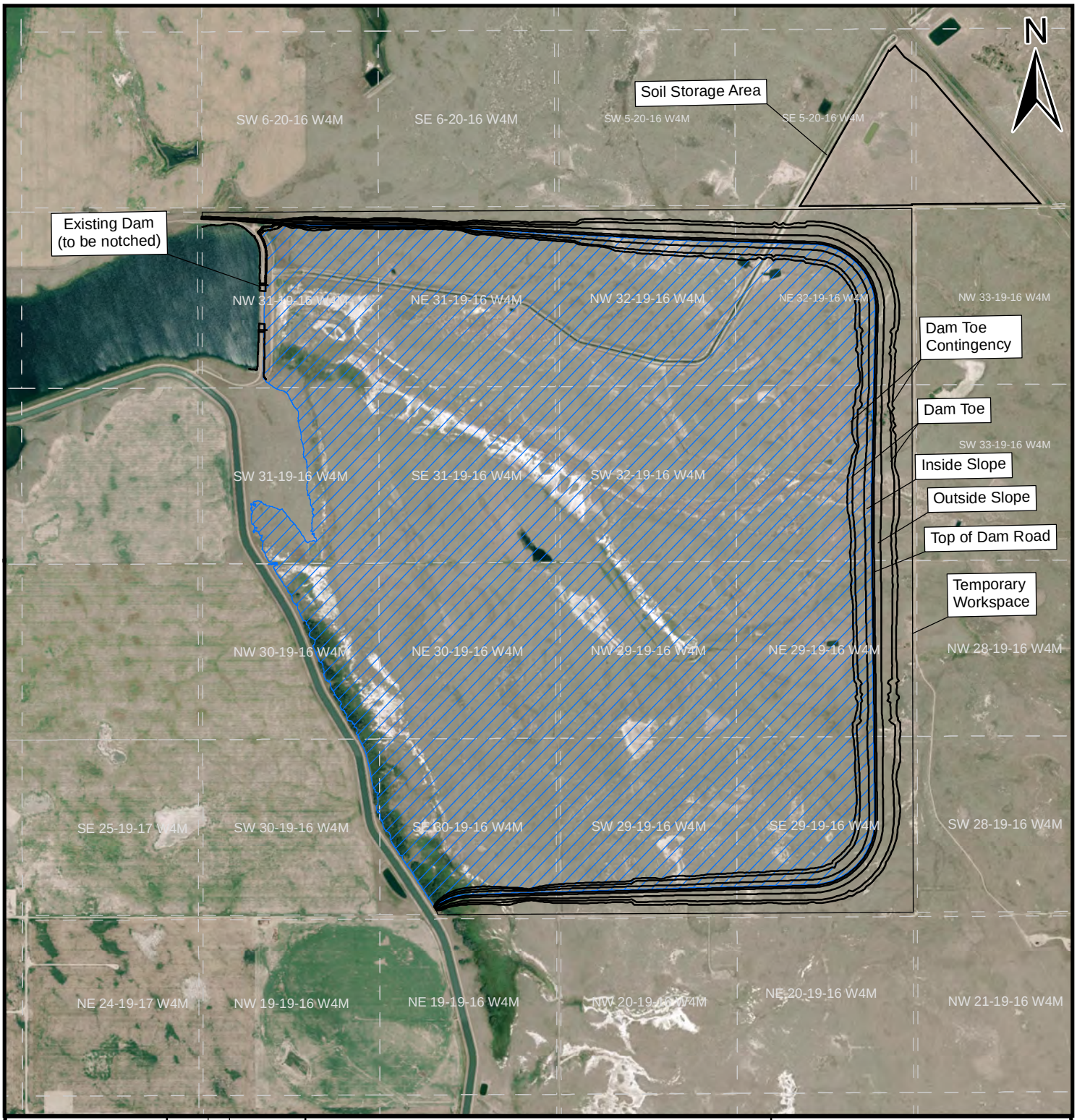
GOA. (2008). Weed Control Act (2008, c.W-51). *Current as of December 15, 2017*. Edmonton, Alberta: Alberta King's Printer. Retrieved from https://kings-printer.alberta.ca/570.cfm?frm_isbn=9780779845521&search_by=link

Attachment 10

Figures

Figure 10A-1: Conceptual Construction Plan 2
Figure 10A-2: Soil Series and Suitability of Topsoil and Subsoil Resources for Reclamation in the Soil and Terrain Local Study Area 3

Attachment 10A: Figures



SCALE: 1:25,000

150 0 150 300 M

Drafted:	JNB	Date:	Mar 14, 2025
Approved:	WB	Revision:	0
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
Imagery Reference: ESRI 2021/07/10
ATS Grid: AltaLIS 2007

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present

Legend

- Design Feature
- Inundated Area

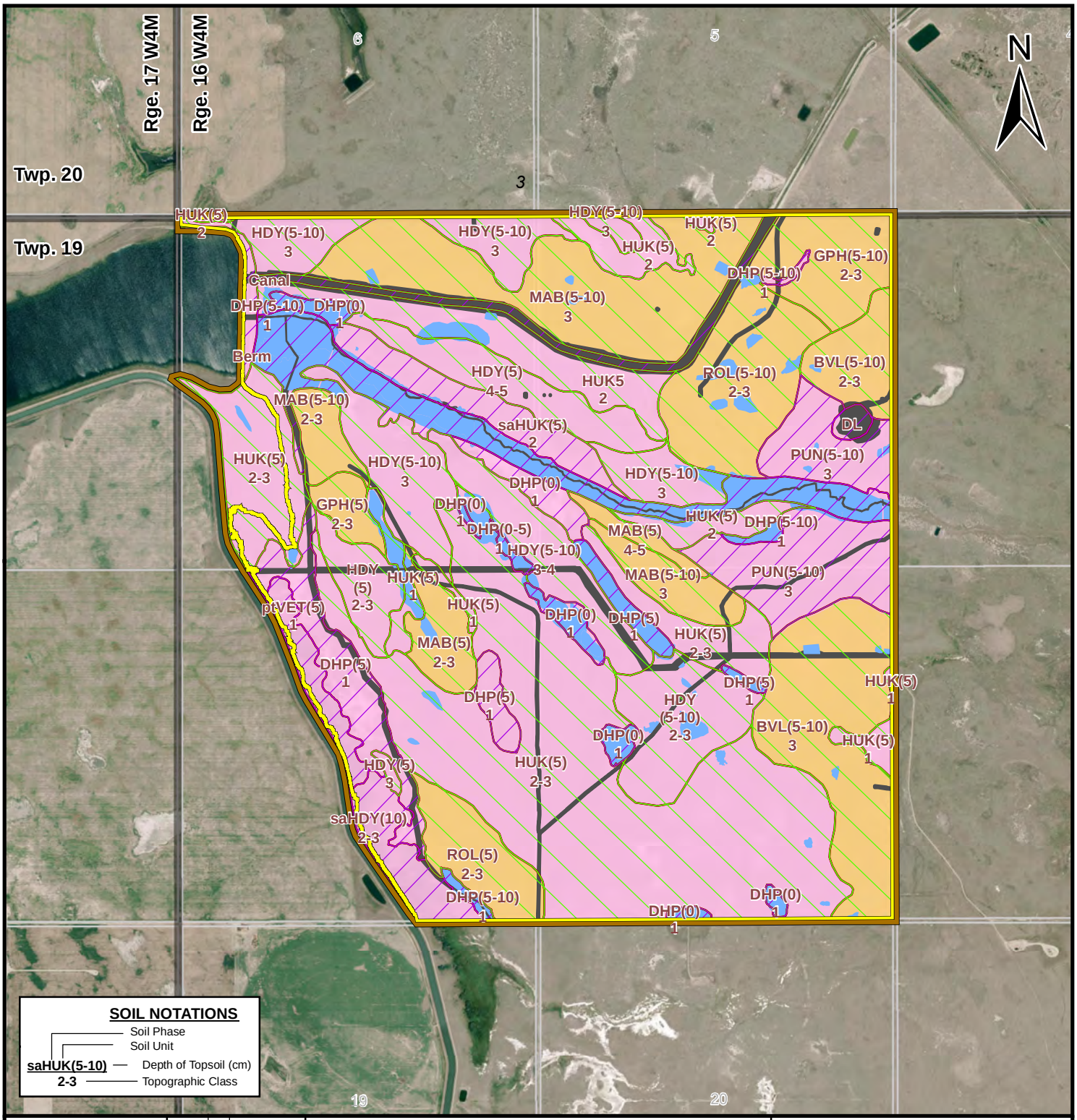
EID

Conceptual Construction Plan

March 2025

REF.: AARES21-127
(ProjectDescription)

Figure 10A-1



SCALE: 1:25,000

200 0 200 400 m

Drafted:	JNB	Date:	Mar 17, 2025
Approved:	WB	Revision:	0
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware of that discrepancies may be present.

Legend

Routing:

- Soil and Terrain Local Study Area
- Snake Lake Reservoir Expansion Project Area

Topsoil and Subsoil Groups:

- Group 1 - Suitable Topsoil
- Group 2 - Unsuitable Topsoil
- Group 3 - Suitable Subsoil
- Group 4 - Unsuitable Subsoil
- Water Feature
- Disturbance

EID

Soil Series and Suitability of Topsoil and Subsoil Resources for Reclamation in the Soil and Terrain Local Study Area

March 2025

REF.: AARES21-127 (Soils)

Figure 10A-2