

Lehigh Hanson Materials Limited

# Scott Property – Cumulative Effects Assessment

Prepared by:

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Date: July, 2020

Project #: 60610856

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## Revision History

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Ms. Valerie Haaf  
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July 16, 2020

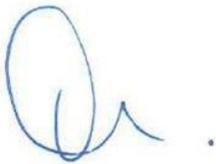
**Project #**  
60610856

Dear Ms. Haaf:

**Subject: Scott Property – Cumulative Effects Assessment**

AECOM Canada Ltd. is pleased to provide Lehigh Hanson Materials Limited with the following Cumulative Effects Assessment report for the Scott Property Project. If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,  
**AECOM Canada Ltd.**



Robin Reese, M.E.Des., P.Biol, RPBio  
Technical Lead – Permitting  
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LC:mm  
Encl.  
cc: KA, LC

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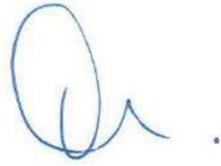
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# Executive Summary

Lehigh Hanson Materials Limited (Lehigh) is proposing to construct and operate the Scott Property Project (the Project), which will be a Class I Aggregate Pit located in Rocky View County (RVC), in the rural community of Bearspaw, Alberta. The Project will occupy the majority of 05-26-02-W5M, with the exception of 33.9 acres located in the southwest corner (the Project Area). The Project Footprint refers to the proposed area of disturbance within the Project Area. The property totals an area of approximately 600 acres (243 hectares [ha]), of which 395 acres (160 ha) are proposed for development as a sand and gravel pit. The Project will be constructed and operated in six phases with an anticipated operational lifespan of 25 to 30 years; each phase will be approximately five years in duration. Project development is planned to commence in 2022, with material extraction starting in 2024.

This Cumulative Effects Assessment (CEA) report was prepared to address RVC's County Servicing Standards (RVC 2013) requirements in support of a re-designation application for the Project.

A Valued Component (VC) is a feature that is considered to have importance or value to a stakeholder, regulatory authorities or a proponent and has the potential to be adversely affected by a project. For a VC to be carried forward for further cumulative effects analysis, the VC must be subject to moderate to high residual effects from the Project. Those VCs that were determined to have negligible or minor residual effects were not carried forward as the severity of their residual effect did not warrant further analysis.

The Biophysical Impact Assessment (BIA; AECOM 2020a) determined that potential residual effects on the following VC warranted further assessment: wetlands and ephemeral water bodies. Based on Technical Reports completed in support of the Project's planning efforts and municipal applications, VCs of air quality, visual aesthetics and property value were identified as having Project-related residual adverse effects. These VCs have also been frequently raised as concerns based on the Project's Communication and Engagement Program. These components were also carried forward into the first step of the CEA framework for scoping.

The second step for scoping VCs within the CEA framework involved defining the spatial and temporal boundaries for the VCs and identifying their potential interaction with past, present and reasonably foreseeable future physical activities within defined spatial and temporal boundaries. During this step, it was determined that only wetlands and ephemeral water bodies warranted further review within the CEA framework; air quality, visual aesthetics and property value were removed from the CEA framework.

Based on the findings in this CEA and absence of known foreseeable future physical activities within the West Nose Creek watershed, the potential for residual adverse cumulative effects on wetlands and ephemeral water bodies were deemed to be *minor* and did not warrant the development of specific cumulative effects follow-up program.

In summary, AECOM anticipates that there will not be any moderate to severe adverse residual cumulative effects on any VCs identified.

# Table of Contents

	page
<b>1. Introduction .....</b>	<b>1</b>
1.1 Project Description .....	1
1.1.1 Project Components .....	1
1.1.2 Project Activities .....	2
1.1.2.1 Site Preparation .....	2
1.1.2.2 Operation .....	2
1.1.2.3 Final Reclamation .....	2
1.1.3 Project Schedule .....	2
1.2 Scope and Approach of Scott Property’s CEA .....	4
1.2.1 Cumulative Effects .....	4
1.2.2 CEA Framework and Approach .....	4
1.2.3 Scoping and Screening Criteria for VCs .....	6
<b>2. Scoping .....</b>	<b>8</b>
2.1 Rationale and Justification for VC Selection .....	8
2.1.1 VC Selection for CEA .....	8
2.1.2 Spatial and Temporal Boundaries for Selected VCs .....	10
2.1.2.1 Spatial .....	10
2.1.2.2 Temporal .....	12
2.1.3 Past, Present and Foreseeable Future Activities .....	12
2.2 Interaction of Past, Present and Foreseeable Future Physical Activities with VC Selection .....	15
2.3 Final VC Selection for CEA .....	17
<b>3. Analysis of Potential Cumulative Effects .....</b>	<b>18</b>
3.1 Wetlands and Ephemeral Water Bodies .....	18
<b>4. Mitigation .....</b>	<b>20</b>
<b>5. Adverse Cumulative Effects .....</b>	<b>21</b>
5.1 Characterization of Adverse Cumulative Effects .....	21
5.2 Determining Severity of Residual Adverse Effects .....	21
5.3 Cumulative Adverse Effects Summary .....	22
5.3.1 Wetlands and Ephemeral Water Bodies .....	23
5.3.2 Summary .....	23
<b>6. Follow-Up .....</b>	<b>24</b>
<b>7. Conclusions .....</b>	<b>25</b>
<b>8. References .....</b>	<b>27</b>

## List of Figures

Figure 1: Project Area..... 3  
 Figure 2: Scoping and Screening for VCs for Further Cumulative Effects Assessment ..... 6  
 Figure 3: Spatial Boundaries for CEA VCs..... 11  
 Figure 4: BASP Development Context (RVC N.D.b) ..... 13

## List of Tables

Table 1: Project Schedule ..... 2  
 Table 2: Summary of Technical Report Findings on VC ..... 8  
 Table 3: Spatial Boundaries for Selected VCs ..... 10  
 Table 4: Past, Present and/or Foreseeable Future Activities Considered in this CEA ..... 15  
 Table 5: Temporal Distribution of Past, Present and Foreseeable Future Activities ..... 16  
 Table 6: VCs Interaction with Past, Present and Foreseeable Future Activities ..... 16  
 Table 7: VC Inclusion in CEA for Analysis ..... 17  
 Table 8: VCs Potentially Affected by Past, Present and Foreseeable Future Activities ..... 18  
 Table 9: Criteria used to Characterize Residual Adverse Effects ..... 21  
 Table 10: Criteria for Adverse Effect Severity ..... 22  
 Table 11: Cumulative Effects Conclusions For VCs ..... 22

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# 1. Introduction

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AECOM Canada Ltd. (AECOM) was retained by Lehigh Hanson Materials Limited (Lehigh) to complete environmental studies and reporting for various technical disciplines, including a Cumulative Effects Assessment (CEA) for the proposed Scott Property Project (the Project). This report describes the Project, outlines Project components and Project activities that may impact Valued Components (VCs), summarizes regulatory requirements associated with conducting a CEA, presents methods and results of assessments undertaken, and recommends mitigation measures to reduce or avoid cumulative impacts to VCs.

This CEA has been prepared in accordance with the Rocky View County (RVC) Biophysical Impact Assessment (BIA) framework and assessment of cumulative effects (RVC 2013) and AECOM's standardized environmental assessment approach (AECOM 2020a). The CEA has been developed in support of the re-designation application and Master Site Development Plan (MDSP) for the Project.

The purpose of the CEA is to identify and assess potential residual adverse effects of the VCs identified in the BIA and other technical reports and determine their cumulative impact when they interact with potential effects of past, present and reasonably foreseeable future physical activities within their defined temporal and spatial boundaries.

## 1.1 Project Description

Lehigh is proposing to construct and operate the Project, which will be a Class I Aggregate Pit located in RVC, in the rural community of Bearspaw, Alberta. The Project will occupy the majority of 05-26-02-W5M with the exception of 33.9 acres located in the southwest corner (the Project Area). The Project Footprint refers to the proposed area of disturbance within the Project Area. The Project is bound by 144 Avenue NW (also known as Burma Road) to the south, Range Road 24 to the East, and Range Road 25 (also known as Twelve Mile Coulee Road) to the west (see **Figure 1**).

The property totals an area of approximately 600 acres (243 hectares [ha]), of which 395 acres (160 ha) are proposed for development as a sand and gravel pit, with a maximum open pit area of 60 acres (24 ha) at any given time. The Project will be constructed and operated in six phases with an anticipated operational lifespan of 25 to 30 years; each phase will be approximately five years in duration.

The Project Area is currently pastureland, predominantly used for agricultural purposes (i.e., hay, tame pasture and cattle grazing). Surrounding lands include residential areas and other industrial activities (e.g., transmission lines and adjacent existing aggregate operations). The nearest residential development is Crestview Estates which the Project borders the southwest corner of the Project boundaries.

The Project location was selected for development as the lands contain a significant quantity of high quality, close to market aggregate resources. The Project land use is currently pastureland with several wetlands and ephemeral water bodies throughout. Following operation, the Project lands will be reclaimed to an equivalent end land use.

### 1.1.1 Project Components

The Project will include the following key components:

- Crusher with in-pit conveyor
- Access roads

- Off-site conveyor system
- Operation & Maintenance Building
- Perimeter berms
- Site ponds for water management

Please refer to the Master Site Development Plan (MSDP) for additional details.

**1.1.2 Project Activities**

Project activities are described in detail in the MSDP and include the following:

**1.1.2.1 Site Preparation**

- Initial topsoil, subsoil and overburden stripping and stockpiling for future reclamation.
- Berm construction.
- Establishing operating footprint (access roads, crusher, conveyors, buildings, stormwater ponds).

**1.1.2.2 Operation**

- Material excavation.
- Crushing and screening with use of in-pit conveyors to move material.
- Dust control.
- Conveying material to Inland’s Spy Hill Property using off-site conveyor.
- Topsoil, subsoil and overburden stripping and stockpiling for future reclamation.
- Progressive reclamation.

**1.1.2.3 Final Reclamation**

- Replacing and recontouring reclamation materials.
- De-compaction.
- Removing infrastructure.
- Seeding and weed control.

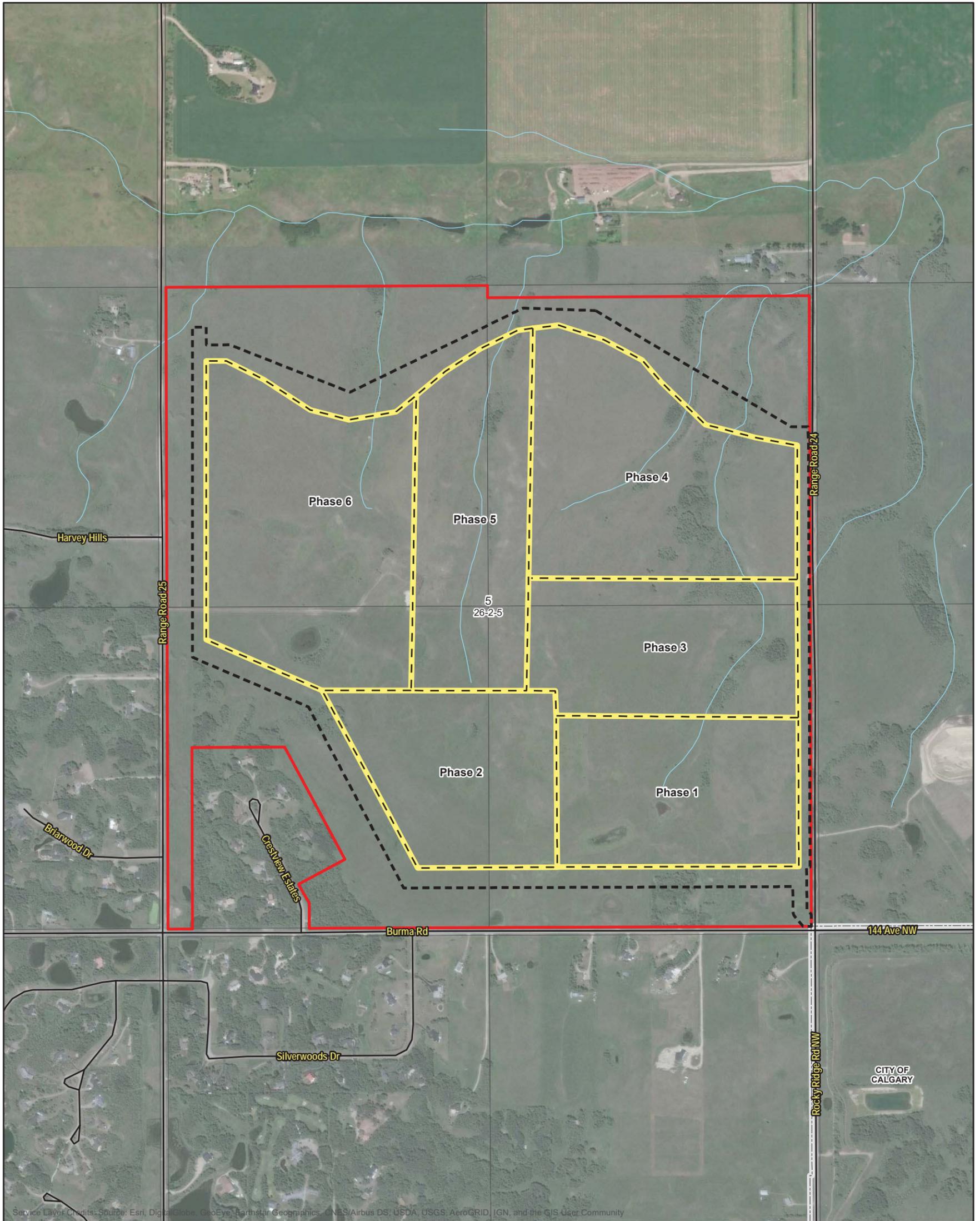
**1.1.3 Project Schedule**

Pending regulatory approval, Project development is planned to commence in 2022, with material extraction starting in 2024.

The anticipated schedule for each Project activity (as described in Section 1.1.2) is provided below in **Table 1**.

**Table 1: Project Schedule**

Project Activity	Period
Site Preparation	Commencing in 2022 for an estimated period of 2 years.
Operation (including Progressive Reclamation)	Commencing in 2024 for an estimated period of 25 – 30 years.
Final Reclamation	Commencing following operational activities for an estimated period of 3 years.



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**Legend**

- Property Boundary
- Project Footprint
- Project Phases

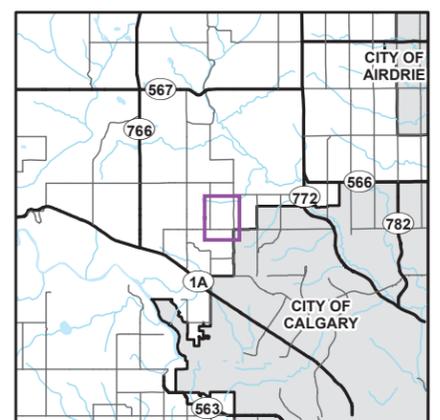
**General Features**

- Road
- Ephemeral Drainage \*
- City of Calgary Limits

Source: AltaLIS; NRCan

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\* Ephemeral drainage feature classifications only apply to the Project Area



**Key Map**

## 1.2 Scope and Approach of Scott Property's CEA

### 1.2.1 Cumulative Effects

Cumulative effects are the changes to the environment caused by past, present and reasonably foreseeable human activities. The assessment of cumulative effects requires an understanding of both the estimated cumulative effects on a VC and the contribution of a project to cumulative effects (CEAA 2018).

As defined by the federal *Impact Assessment Act*, an “effect means, unless the context requires otherwise, changes to the environment or to health, social or economic conditions and the positive and negative consequences of these changes” (GOC, 2019). Foreseeable is considered a physical activity that is expected to proceed (e.g., the proponent has publicly disclosed the intention to build or obtain the necessary approvals to proceed). Cumulative effects may result if (GOC, 2020a):

- The implementation of a project may cause a direct residual adverse effect to a VC; and
- The same VC may be affected in combination with other past, present and future physical activities.

The County Servicing Standards (RVC 2013) state that the Canadian Environmental Assessment Agency's (the Agency) identification and selection of VCs is an acceptable approach for municipal applications. Though this Project is not a designated project under federal law, use of federal legislation terminology and CEA methodology reference material were applied to this CEA to remain compliant with RVC's approach to assessing cumulative effects.

Since the publication of the County Servicing Standards in 2013, federal legislation has changed:

- The *Canadian Environmental Assessment Act 2012* (CEAA 2012) was repealed when the *Impact Assessment Act* (IAA 2019) came into force on August 28, 2019.
- The Impact Assessment Agency of Canada (IAAC) has advised proponents that until new Technical Guidelines under IAA 2019 are released, the assessment of cumulative effects can be developed through using the Interim Technical Guidance document “Assessing Cumulative Environment Effects under the *Canadian Environmental Assessment Act*” (GOC, 2020b).

With the repeal of CEAA 2012 and the implementation of the new IAA 2019, terminology has also changed whereby formerly referred to ‘valued ecosystem components’ are now referred to as *valued components* or VCs to encompass a broader spectrum of potential effects for assessment consideration.

These changes to federal legislation were considered within the context of completing the Project's CEA.

### 1.2.2 CEA Framework and Approach

The approach taken for this CEA was to apply the five-step CEA framework put forward in the federal Interim Technical Guidance document (CEAA 2018) to this CEA report:

- **Scoping (Section 2)**
  - Focus the assessment of cumulative effects by identifying Project VCs, defining temporal and spatial boundaries, evaluating interactions with past, present, and foreseeable future activities and determining the VCs to be carried forward within the CEA framework (**Figure 2**).

- **Analysis (Section 3)**
  - Determine how the Project, combined with past, present, and reasonably foreseeable physical activities, may affect the selected VCs within the defined CEA spatial and temporal boundaries.
- **Mitigation (Section 4)**
  - Identifies technically and economically feasible mitigation measures to manage potential cumulative effects on selected VCs.
- **Adverse Cumulative Effects<sup>1</sup> (Section 5)**
  - Evaluate severity of potential residual cumulative effects on selected VCs likely to result from the Project in combination with past, present and foreseeable future activities.
- **Follow-up (Section 6)**
  - Monitor effectiveness of mitigation measures to address both project-specific residual effects and cumulative effects.

Determining the interaction of cumulative effects is challenging and it is possible that cumulative effects can vary based on the individual VC being considered. Thus, the following approach was considered throughout the Project's CEA process (CEAA 2018):

- Existing sources of information – where possible, collection and review of past reports, data collected, or information provided will be considered.
  - This includes information provided by technical experts, government and stakeholders
- Data limitations and uncertainties – where data are not available for a VC, the use of modelling and completion of new or additional studies could be completed.

Ideally, a CEA is completed concurrently with other assessments; however, the analysis for a CEA is done after the initial identification of Project-related effects (CEAA, 1999). Numerous technical studies have been completed in support of the Project's BIA, the MSDP and re-designation applications, and overall Project planning. These technical studies, municipal planning documents, and feedback collected through the Project's Communication and Engagement Program have formed the basis for VC selection and understanding past, present and foreseeable future activities to focus cumulative effects analysis. Municipal planning documents include:

- RVC / City of Calgary's Intermunicipal Development Plan (IDP; City of Calgary, RVC, 2018)
- RVC County Plan (RVC 2014 and RVC 2018)
- Bears paw Area Structure Plan (BASP; RVC N.D.a<sup>2</sup>.)
- DRAFT RVC Municipal Development Plan (RVC, 2020)
- RVC Revised Draft Aggregate Resource Plan (RVC 2018)
  - Document was rescinded by RVC; however, was used for planning purposes
- Agricultural Master Plan (AMP; RVC 2011)
- RVC County Servicing Standards (RVC 2013)

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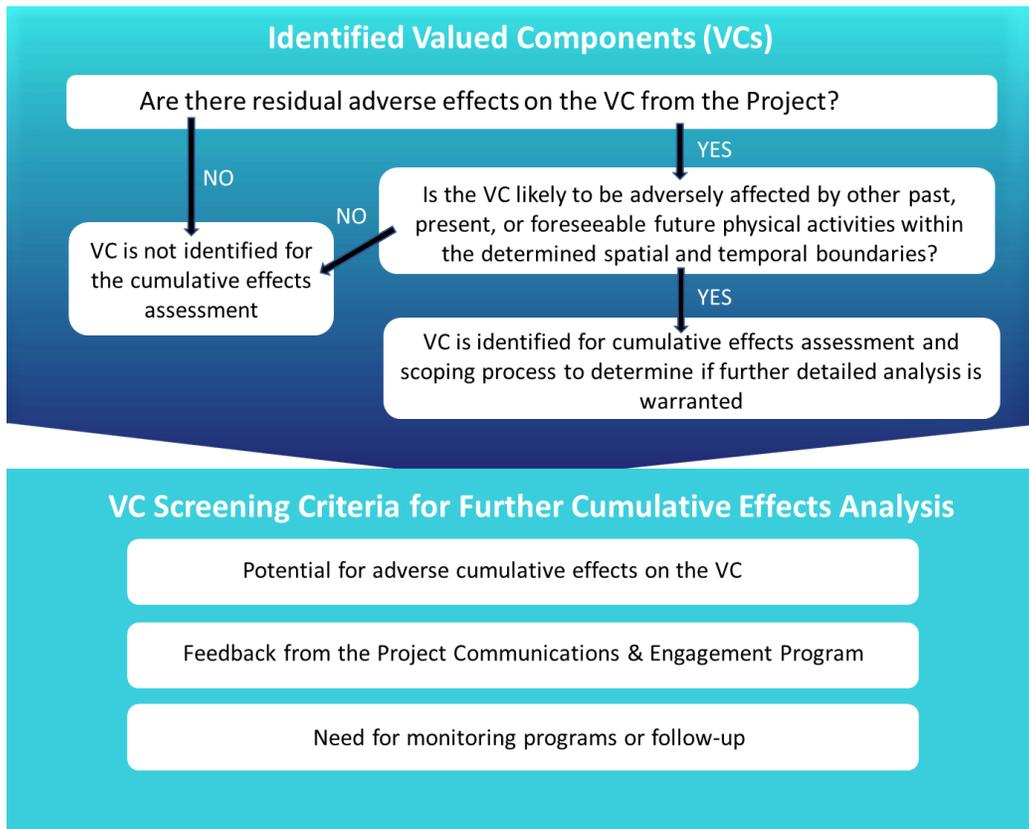
1. *It should be noted that through the transition of CEAA 2012 to the IAA 2019, determining whether adverse effects of a Project are deemed significant is now associated with federal and ministerial decision (GOC, 2019). Though the Project is not a federally designated project, this CEA framework has been developed to align with RVC's approach to cumulative effects and has considered the most current federal legislation and terminology. Thus, this CEA framework step (formerly known as 'Significance' under CEAA 2012) has been modified to describe and, where appropriate, quantify the severity of the adverse cumulative effects (GOC, 2020b). The decision of whether adverse effects are significant or not should be completed by the appropriate regulatory authority. In this case, RVC is the deciding regulatory authority.*

2. *N.D. represents 'no date'*

### 1.2.3 Scoping and Screening Criteria for VCs

Scoping, the first step of the CEA framework, involves the following three steps (Figure 2):

- Identifying VCs for which adverse residual effects from the Project are anticipated.
  - VCs that would be affected positively by the Project or those which anticipated negligible or minor residual effects from the Project were eliminated from the CEA framework.
- Determining the spatial and temporal boundaries to capture potential cumulative environmental effects on VCs that may be subject to residual effects; and
- Identifying the past, present, and foreseeable future physical activities that are anticipated to contribute to residual adverse effects on VCs.



**Figure 2: Scoping and Screening for VCs for Further Cumulative Effects Assessment<sup>3</sup>**

Screening criteria can also be used to justify the inclusion of a VC to be carried forwarded in the CEA framework. Potential screening criteria may include:

- Potential for severe adverse cumulative effects *after* application of Project mitigation measures;
- Feedback from the Project’s Communication and Engagement Program (e.g., concern frequently expressed by individuals potentially affected); or
- Need for VC-related monitoring or follow-up programs to ensure no long term cumulative residual adverse effects.

3. Figure 2 developed by AECOM interpreting CEAA 2018 reference material

For a VC to be carried forward within the CEA framework, two decision points were evaluated:

1. If potential adverse effects on a VC could be mitigated and managed at the project-level to an extent whereby no or minor *residual* adverse effects are anticipated, the VC would not be carried forward in the CEA.
  - Negligible or minor residual adverse effects would be confined to the Project boundary and / or not result in a change in the VC that will alter its condition or state beyond an acceptable or regulated level.
2. If the VC was anticipated to have moderate to severe adverse residual effects at the project-level but not likely to be adversely affected by other past, present or foreseeable physical activities within the defined spatial and temporal boundaries, the VC would not be carried forward in the CEA.

## 2. Scoping

### 2.1 Rationale and Justification for VC Selection

#### 2.1.1 VC Selection for CEA

A Valued Component (VC) is a feature that is considered to have importance or value to a stakeholder, regulatory authorities or a proponent and has the potential to be adversely affected by a project. For a VC to be first carried forward for further cumulative effects analysis, the VC must be subject to moderate to severe residual effects from the Project. Determining if the Project would have moderate to severe adverse residual effects on a VC required individual assessment within their respective Technical Reports, submitted under separate cover. The selection of VCs also included feedback from Project's Communication and Engagement Program, including comments received on the Project, the Open House conducted on February 8, 2020 and the Online Public Engagement Session conducted from June 15, 2020 to July 7, 2020. Several comments and concerns have been raised regarding air quality, noise and property value.

A high-level summary of the results of the Technical Reports and rationale for inclusion or elimination in the CEA framework is presented in **Table 2**.

**Table 2: Summary of Technical Report Findings on VC**

VC Identified	Results of Technical Findings for Adverse Effects	Was VC Carried Forward due to Moderate to Severe Residual Adverse Effect?
<b>Terrain and Soils</b>	<ul style="list-style-type: none"> <li>■ Topsoil and subsoil will be stripped and maintained separately for future reclamation.</li> <li>■ Project will also progressively reclaim throughout the mining phases.</li> </ul>	No
<b>Surface Water Bodies (excluding wetlands) and Hydrology</b>	<ul style="list-style-type: none"> <li>■ No watercourses identified within the Project Area.</li> <li>■ All surface water will be managed and mitigated through culverts, drainage ditches and storm ponds.</li> <li>■ Stormwater management will be implemented on site to manage off-site potential adverse effects.</li> <li>■ Storm ponds will require provincial approval prior to construction and any off-site discharge will be in adherence to regulatory approvals.</li> <li>■ Storm ponds will also enhance water quality through capturing of particulate matter prior to release off-site.</li> </ul>	No
<b>Groundwater</b>	<ul style="list-style-type: none"> <li>■ The Tertiary Sand and Gravel deposit contains local presence of groundwater, the Paskapoo Aquifer is the only source of drinking water underlying the surficial sediments at the Project Area.</li> <li>■ The impact of the development activities on surface water quantity and groundwater quantity is anticipated to be minor and negligible, respectively.</li> <li>■ The impacts on groundwater quality are anticipated to be minor and can be managed at the Project level.</li> </ul>	No
<b>Wetlands and Ephemeral Water Bodies</b>	<ul style="list-style-type: none"> <li>■ Removal of 11 ha of identified wetlands within the Project Area is anticipated.</li> <li>■ A <i>Water Act</i> Application and financial compensation to permanently remove wetlands will be required.</li> </ul>	Yes

**Table 2: Summary of Technical Report Findings on VC**

VC Identified	Results of Technical Findings for Adverse Effects	Was VC Carried Forward due to Moderate to Severe Residual Adverse Effect?
<b>Vegetation Species and Communities</b>	<ul style="list-style-type: none"> <li>■ Majority of vegetation is forage species.</li> <li>■ No rare plants or vegetative communities identified.</li> <li>■ Area will be reclaimed progressively, and preliminary final reclamation plan is equivalent end land use.</li> </ul>	No
<b>Wildlife and Wildlife Habitat</b>	<ul style="list-style-type: none"> <li>■ Wildlife surveys illustrate a small population and common species currently use the Project Area.</li> <li>■ The lands have been grazed since early 2000s.</li> <li>■ Species observed in the Project Area have alternative sources for habitat surrounding the Project.</li> <li>■ No federal Species at Risk identified.</li> <li>■ Provincially sensitive features have been identified and will not be impacted during breeding season or when active.</li> </ul>	No
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>■ Lehigh introduced a series of mitigation measures to reduce on-site dust emissions including the use of an off-site conveyor to eliminate haul traffic.</li> <li>■ Model predicted 100% compliance with air quality objectives for diesel exhaust emissions.</li> <li>■ Model demonstrated exceedances of the Alberta particulate air quality objectives for PM2.5 and TSP at both the Project boundary and at the nearest residences to the Project boundary (approximately 100 m to the southwest of the Project).</li> </ul>	Yes
<b>Noise</b>	<ul style="list-style-type: none"> <li>■ An acoustic assessment was undertaken to assess the potential sound egress from the Project operations in relation to the nearest noise sensitive receptors.</li> <li>■ Sound propagation modelling was undertaken using international standards and worst-case assumptions for Project operations, meteorological and topographic conditions.</li> <li>■ Modelling results showed that the operational sound at the nearest noise sensitive receptors would be below the proposed criteria agreed with RVC for all phases with inclusion of appropriate acoustic mitigation and best practices, by a margin of more than 5 decibels.</li> </ul>	No
<b>Fiscal Impact</b>	<ul style="list-style-type: none"> <li>■ Increasing non-residential tax basis for RVC.</li> <li>■ No municipal services (i.e., waterline or road development) required for the Project's construction and operation.</li> <li>■ No real expenditure increases required for RVC to deliver municipal services or infrastructure to maintain.</li> </ul>	No
<b>Economic Activity</b>	<ul style="list-style-type: none"> <li>■ Local job creation for the Project</li> <li>■ Local labour income</li> <li>■ Increase of local Gross Domestic Product.</li> </ul>	No
<b>Historical Resources</b>	<ul style="list-style-type: none"> <li>■ The Project has received <i>Historical Resource Act</i> Clearance as the area was deemed to be low potential for historical resources.</li> </ul>	No
<b>Visual Aesthetics</b>	<ul style="list-style-type: none"> <li>■ Feedback from February 8, 2020 Open House included concerns about the visual impact of the Project's conveyor system (B&amp;A 2020).</li> <li>■ A berm will be constructed and contoured, the berm and setback will be landscaped to minimize visual impact of the Project.</li> <li>■ Project Area will be re-vegetated and contoured during progressive and final reclamation.</li> <li>■ One existing residential lot directly north of the Project Area is located on top of a hill with open views and may have open views to the Project Area post-mitigation (AECOM 2020d).</li> </ul>	Yes

**Table 2: Summary of Technical Report Findings on VC**

VC Identified	Results of Technical Findings for Adverse Effects	Was VC Carried Forward due to Moderate to Severe Residual Adverse Effect?
	<ul style="list-style-type: none"> <li>■ Approximately three existing residential lots directly south of the Project Area and one residential lot to the north are elevated and may have open views to the Project Area post-mitigation (AECOM 2020d).</li> </ul>	
<b>Traffic</b>	<ul style="list-style-type: none"> <li>■ No residual adverse effect is anticipated due to planned use of an off-site conveyor system which will eliminate haul trucks on existing road network.</li> </ul>	No
<b>Property Value</b>	<ul style="list-style-type: none"> <li>■ Feedback from February 8, 2020 Open House included concerns about the surrounding property values (B&amp;A 2020).</li> <li>■ Three externalities were considered: air, noise, and aesthetics (i.e., visual aesthetics). Noise has been removed from the CEA framework but air and visual aesthetics are carried forward (<b>Table 2</b>).</li> <li>■ In-migration related to local job creation, creating upward pressure on local property values is not anticipated.</li> </ul>	Yes

Based on **Table 2**, only the following VCs were selected to move forward to the next step of the CEA framework:

- Wetlands and Ephemeral water bodies
- Air quality
- Visual aesthetics
- Property value

## 2.1.2 Spatial and Temporal Boundaries for Selected VCs

### 2.1.2.1 Spatial

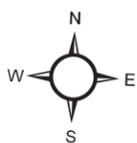
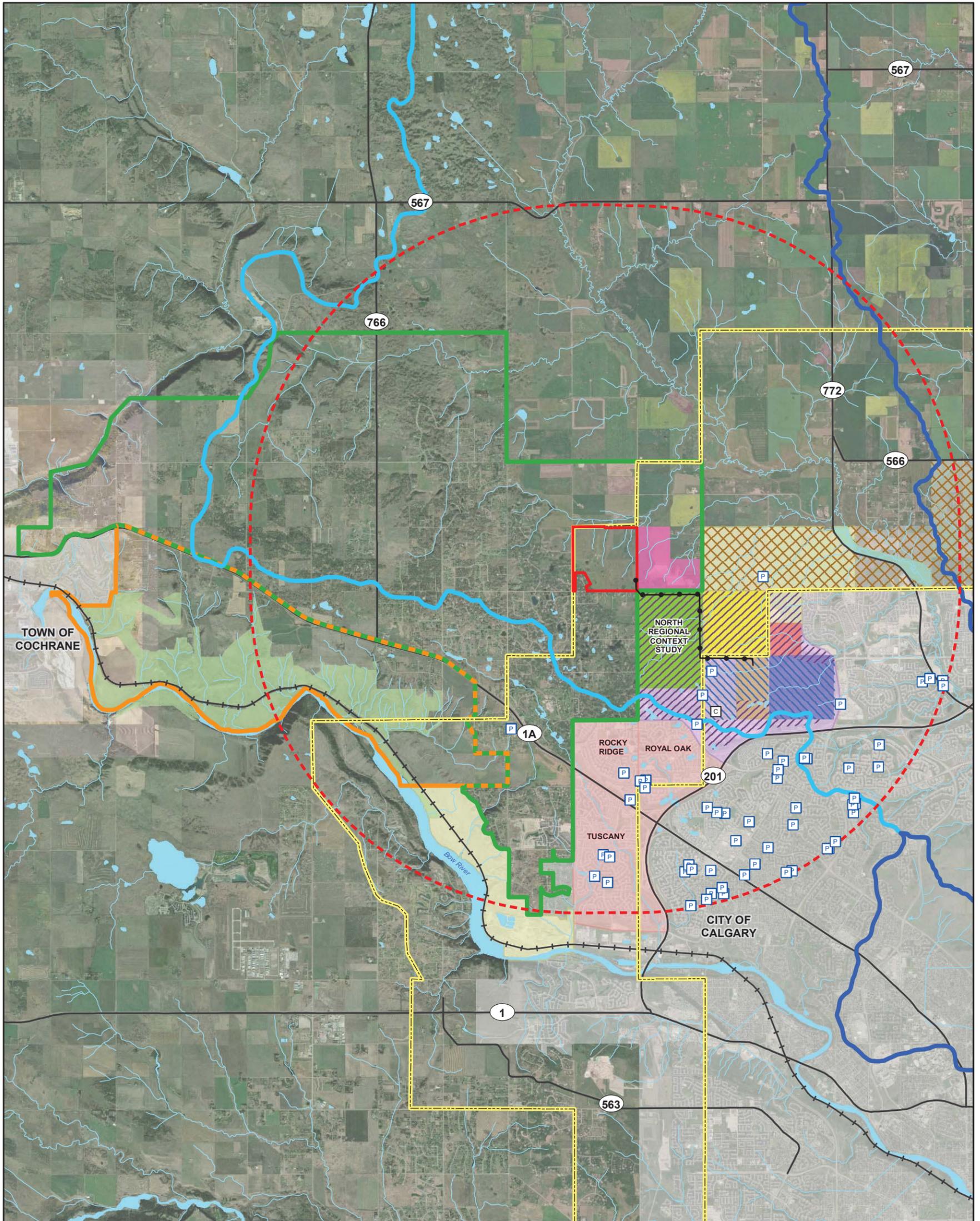
According to RVC's rescinded Aggregate Resource Plan (2018), the assessment of cumulative effects should include a five-mile (or 8.04 km) radius from the proposed development and consider both aggregate and non-aggregate development.

In consideration of the Project's location (**Figure 1**), the selection of the spatial boundaries considered in this CEA were also based on the regional management areas or regional extent most applicable for each VC being assessed (**Table 3; Figure 3**) within a five-mile radius.

**Table 3: Spatial Boundaries for Selected VCs**

VC Identified	Spatial Boundary
<b>Wetlands and Ephemeral Water Bodies</b>	West Nose Creek Watershed
<b>Air Quality</b>	Modelling domain spatial boundaries are 10 km in all directions from the Project's location within the SW corner (AECOM 2020b)
<b>Visual Aesthetics</b>	2.5 km radius from the Project*
<b>Property Value</b>	Same boundaries as Visual aesthetics

Note: \* It is unlikely that any visual receptors located beyond 2.5 km would have clear views of the Project (AECOM 2020d).



1:100,000

NAD 1983 UTM Zone 11N



**Legend**

- |                               |                                |
|-------------------------------|--------------------------------|
| Calgary Correctional Centre   | Industrial/Employment          |
| Public Service                | Institutional                  |
| Conveyor                      | Residential                    |
| Property Boundary             | Glenbow Ranch Provincial Park  |
| CEA Spatial Boundary          | Nose Creek Watershed           |
| IDP Policy Area               | West Nose Creek Watershed      |
| Existing Bears paw ASP        | Burnco                         |
| Glenbow Ranch ASP             | City of Calgary Landfill Site  |
| Calgary ASP                   | Government of Alberta STAR Pit |
| Calgary Built Out Communities | Lafarge Spyhill                |
| North Regional Context Study  | Lehigh Spyhill                 |
| Open Space                    | Volker Stevin Spyhill          |

**General Features**

- Highway
- Railway
- Ephemeral Drainage \*
- Waterbody

Source: AEP; AltaLIS; NRCan; Bears paw ASP Terms of Reference  
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\* Ephemeral drainage feature classifications only apply to the Project Area

### 2.1.2.2 Temporal

The temporal boundary for those VCs moving forward in the CEA requires the establishment of a temporal scale to consider past, present and foreseeable future activities. For this Project's CEA, a time period of approximately 75 years, commencing in 1980 was selected.

This time period was selected as it aligns with the expansion into and the continued development within the BASP and northwest of the City of Calgary (City of Calgary, 2016). The temporal boundary extends to the end of the Project life in 2055, when the Project reclamation is anticipated to be complete.

### 2.1.3 Past, Present and Foreseeable Future Activities

The Project is situated on the northwestern border of the City of Calgary and within RVC. It is located within the BASP and IDP boundaries (**Figure 4**). Past, present and foreseeable future activities within both jurisdictions were considered in the CEA.

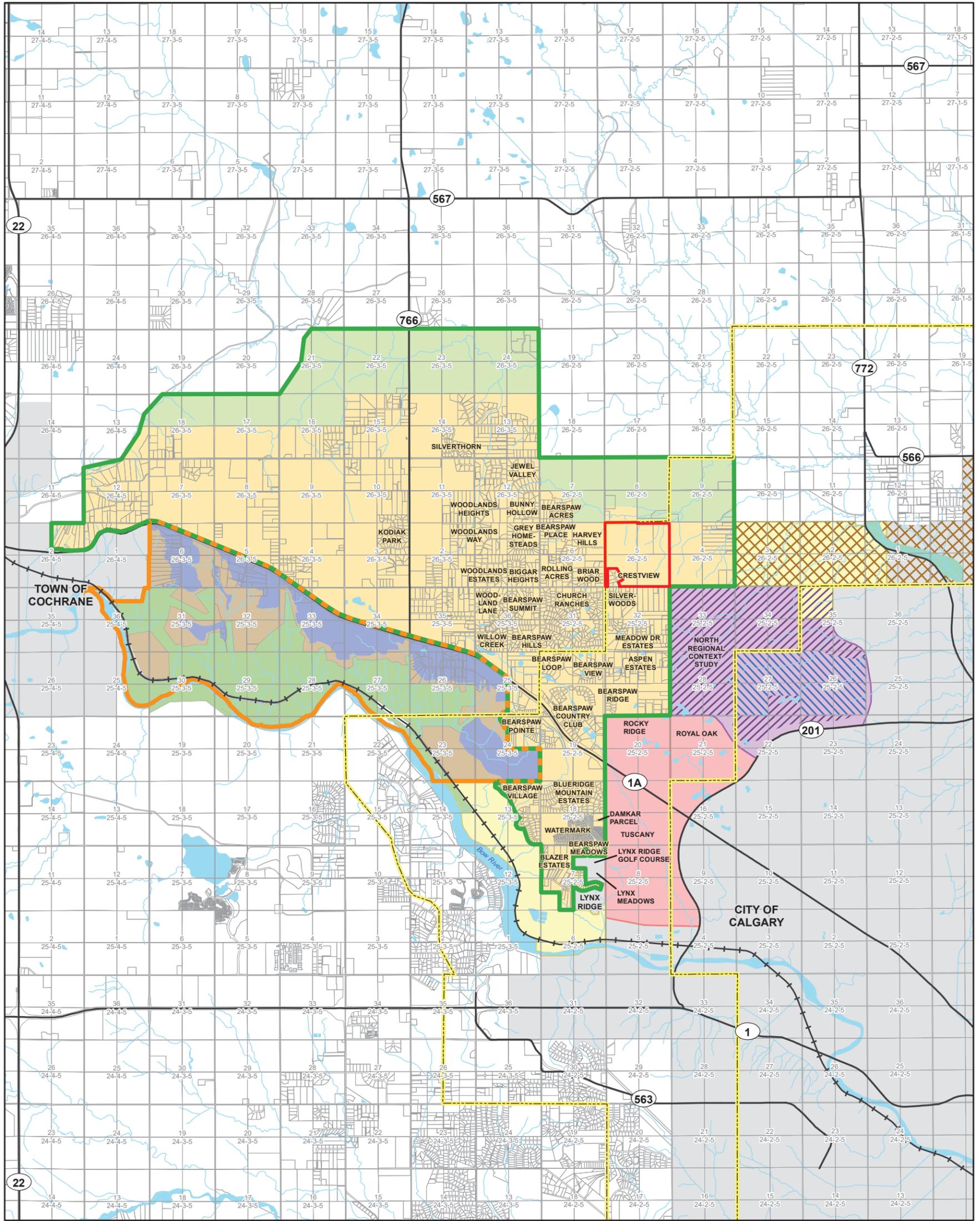
The Bearspaw Area Structure Plan (BASP) refers to four general land use categories: agricultural, residential, commercial/industrial and public service (i.e., schools, religious worship). These terms will be used in this CEA framework.

According to the RVC County Plan (2014), Rocky View is *an inviting, thriving and sustainable county that balances agriculture with diverse residential, recreational and business opportunities*. RVC underwent tremendous growth with its population doubling from 1991 to 2011 due to the desire to live rurally yet remain close to an urban centre. Canadian census data are not collected in a manner that enables the RVC to determine growth by Area Structure Plan (ASP) boundary; however, RVC has completed two census inventories (one in 2006 and one in 2013) and the majority of growth has occurred within the Residential Growth Areas of Langdon, Bearspaw, Calgary Chestermere Corridor, Springbank and Cochrane Lakes (RVC 2014).

The DRAFT Municipal Development Plan (MDP) for RVC designates the region of Bearspaw primarily for residential use (RVC 2020). The BASP is in the process of being updated as the original plan is more than 20 years old. The area covered by the BASP is approximately 25,000 acres with an estimated 2,213 dwellings and has the potential to expand to 7,411 (RVC N.D.a). The development rate within the BASP has been an average of 57.6 dwellings per year over the last 20 years. Out of the electoral divisions in RVC, Division 8 (where the Project is situated) has the second highest development rate by square kilometre and the BASP is known to have substantial potential for future development for the next 89 years (RVC, 2016). There are currently five parcels within the BASP designated as aggregate extraction comprising one active gravel pit (Burnco's Burma Road Pit). The BASP also identifies tertiary gravel resources throughout the central and southern ASP area (RVC N.D.a).

The City of Calgary's North ASP Phase 1 dates back to the 1980s (City of Calgary 2016). This quadrant of the City has experienced heavy expansion and development over the last 40 years, primarily residential with industrial/commercial centres and supporting public services with major transportation corridors to connect residential communities to the downtown core. There are six City of Calgary projects currently planned for or underway within the northwest of Calgary: Brentwood Co-op Redevelopment, Grace Hospital Land Use re-designation, Banff Trail-Capitol Hill Community Planning, Calgary Cancer Centre development, West View Area Structure Plan and the North Hill Local Growth Planning (City of Calgary 2020). None of these foreseeable future developments are within the spatial boundaries of VCs identified for this CEA.

There are five active ASPs within the City of Calgary (City of Calgary 2016). Only the Glacier Ridge ASP (the Plan) is within the spatial boundaries for this CEA. Immediately south and southwest of the Plan boundaries are existing and future gravel extraction lands, an important resource for Calgary's growth (LAPINPDA 2015).



1:100,000

NAD 1983 UTM Zone 11N



**Legend**

- Property Boundary
- IDP Policy Area

**Bearspaw ASP**

- Existing Bearspaw ASP

**Future Land Use Scenario**

- Agriculture
- Country Residential

**Glenbow Ranch ASP**

- Glenbow Ranch ASP
- Glenbow Ranch Provincial Park

**Conservation Area and Build Area**

- Existing Build Area
- Existing Conservation Area

**Calgary ASP**

- Calgary ASP
- Calgary Built Out Communities
- North Regional Context Study
- Open Space
- Industrial/Employment
- Institutional
- Residential

**General Features**

- Highway
- Railway
- Ephemeral Drainage \*
- Waterbody

\* Ephemeral drainage feature classifications only apply to the Project Area

Source: AltaLIS; NRCan; Bearspaw ASP; Glenbow Ranch ASP  
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The City of Calgary adopted the North Regional Context Study in June 2010. The North Regional Context Study identifies Industrial/Employment and Institutional development on the east boundary of the BASP (**Figure 4**). The 2018 IDP highlights mutually agreed upon growth corridor areas between the RVC and the City of Calgary. According to the IDP, development along Highway 1A, which is located approximately 3.5 km to the south of the Project, is considered to be one of the targeted growth areas; therefore, it is anticipated that development as a whole will continue within the spatial boundaries of each VC identified for this CEA. The 2018 IDP also has the goal to provide for inter-municipal co-operation for aggregate extraction, with the commitment to consider the possible impacts in approving applications on existing and planned uses in the adjacent municipality (City of Calgary, RVC 2018).

There are six known industrial operations within the northwest of Calgary (**Figure 3**):

- Spyhill Aggregates by Lafarge
- Spyhill Aggregates by Volker Stevin
- Spyhill Operations (Aggregates, Concrete and Pipe) by Lehigh Hanson
- Spyhill Municipal Landfill by City of Calgary
- Stoney Trail Aggregate Resource Pit (STAR; jointly operated by three companies: 60% Lafarge, 30% Burnco, 10% Volker-Stevin)
  - STAR is located on provincial lands, though located within the City of Calgary
- Burnco – Burma Road Pit (located on the boundary of the City of Calgary within RVC)

The RVC's AMP was developed to acknowledge the importance of the existing agricultural areas within the County but also provide a vision for new opportunities and diversification for future agricultural development in response to growing global demands. The AMP is a guiding plan for future policy development and implementation as the County envisions that agriculture will continue to be a major economic force. RVC acknowledges that the county continues to thrive with new residential, business and industrial growth in strategic locations (RVC 2011).

The West Nose Creek watershed is a subset of the Nose Creek watershed. The Nose Creek watershed has been historically impacted cumulatively due to increasing residential and commercial development, residential growth, stormwater discharge, agricultural activities and channelization resulting in degraded water quality, loss and degradation of riparian areas, and overall reduction in channel length. Since the implementation of various drainage area investigations and water quality monitoring programs (2014-2016), results show improvements to water quality and riparian function to Nose Creek's watershed. To achieve the goals and objectives of the Nose Creek Watershed Water Management Plan, criteria and development guidelines have been implemented (Nose Creek Watershed Partnership, 2018).

Current baseline conditions described in the respective Technical Reports for the Project (AECOM 2020a,b,c,d, Nichols 2020, SLR 2020) represent the effects from past and present land use practices and natural processes that have shaped the biophysical and socio-economic components of the Project Area and spatial CEA boundaries. Since 1994, communities of the BASP and the northwest of Calgary have experienced a large amount of growth, changing the development context and landscape (RVC 2014). Foreseeable future activities will include those that are publicly known or within the public domain. The CEA has considered these past, present and foreseeable future physical activities, with respect to the spatial and temporal boundaries for the VCs selected (**Table 4**; RVC 2018; RVC N.D.b).

**Table 4: Past, Present and/or Foreseeable Future Activities Considered in this CEA**

Category of Physical Activity	Specific Physical Activity	Description of Physical Activities
<b>Past or Present Physical Activities that have been, or are in the process of, being carried out</b>		
<b>Residential</b>	Communities within the BASP; <b>Figure 4</b>	Numerous communities exist within the BASP and the area has seen an average of 58 homes built per year since the ASP's adoption. As of 2018, there were 2,213 dwellings.
	Tuscany	A City of Calgary community fully built out
	Rocky Ridge	A City of Calgary community fully built out
	Royal Oak	A City of Calgary community fully built out
	Glacier Ridge ASP	ASP approved in 2015; several developments (i.e., Nolan Hill, Symons Valley, Sage Hill) underway and expected to continue in the future.
<b>Commercial/Industrial</b>	Tuscany, Rocky Ridge, Royal Oak	City of Calgary community expansion and required associated commercial development to support residential population.
	Burnco Burma Road Pit	Aggregate development
	STAR Pit	Aggregate development
	Spyhill by Lafarge	Aggregate development
	Spyhill by Lehigh	Aggregate development
	Spyhill by Volker Stein	Aggregate development
<b>Public Service</b>	Glenbow Ranch Provincial Park	Park created in 2008, providing over 3,000 acres of open space for recreational activities
	Tuscany light rail transit station	Opened in 2014, located 1.6 km from the boundary of the BASP
	Tuscany, Rocky Ridge, Royal Oak	A City of Calgary community – associated public services to support residential and commercial operations
	University of Calgary	Clinical and educational services for the University of Calgary's Faculty of Veterinary Medicine.
	Correctional Facilities	City of Calgary's Adult Correctional and Remand Centre.
	Spyhill Landfill	Landfill services for northwest of Calgary
	Fire Services	Bearspaw - 2014
<b>Agricultural</b>	Livestock and large-scale production	Agriculture has been a mainstay of the RVC's economy.
<b>Foreseeable Future Activities</b>		
<b>Residential</b>	Glacier Ridge ASP (continued)	City of Calgary ASP approved in 2015. Will have an estimated population greater than 58,000 (LAPINPDA 2015)
	Country Residential	Majority of lands within the BASP have a future land use scenario as being country residential (RVC, 1994)
<b>Commercial/Industrial</b>	STAR	Aggregate operation to full build out (including progressive and final reclamation)
	Burnco Burma Road Pit	Aggregate operation to full build out (including progressive and final reclamation)
<b>Public Service</b>	Glacier Ridge ASP	A City of Calgary community – associated public services to support residential and commercial operations
<b>Agricultural</b>	Livestock and crop production	County Plan (RVC 2018) supports a diverse, sustainable and viable agricultural opportunities.  BASP has identified the northern border of the ASP to be agricultural (RVC 1994).

## 2.2 Interaction of Past, Present and Foreseeable Future Physical Activities with VC Selection

The general temporal distributions of the past, present, and future physical activities are illustrated in **Table 5**. Past and present infrastructure and residential areas, including local community developments, aggregate resources and agricultural activities taken into account in this CEA which are illustrated **Figure 4**

**Table 5: Temporal Distribution of Past, Present and Foreseeable Future Activities**

Activity	Pre-Project (1980-present)	Project Construction & Initial Phases (Present -2022)	2022-2055 (Life of the Project)
<b>Past or Present Physical Activities that have been, or are in the process of, being carried out</b>			
Residential	✓	✓	✓
Commercial/Industrial	✓	✓	✓
Public Service	✓	✓	✓
Agricultural	✓	✓	✓
<b>Foreseeable Future Activities</b>			
Residential		✓	✓
Commercial/Industrial		✓	✓
Public Service		✓	✓
Agricultural		✓	✓

As the CEA framework should consider the interaction of a selected VC with past, present and foreseeable future activities, **Table 6** summarizes the rationale for inclusion of the previously selected VCs (those identified in **Table 2**) to move forward within the CEA framework.

**Table 6: VCs Interaction with Past, Present and Foreseeable Future Activities**

VC Identified	Adversely Affected by Other Past, Present, or Foreseeable Future Activities?	Rationale for Decision
Air	No	<ul style="list-style-type: none"> <li>■ The Project was modelled and assessed with worst-case design emissions.</li> <li>■ All industrial development within five km of the site was explicitly included in the air dispersion model, and the effects of sources beyond five km (e.g., the Spyhill landfill, the City of Calgary urban emissions) and residential/urban/commercial activities within five km were included as additional background air quality.</li> <li>■ Modelling accounted for future urban/residential development as background air quality concentrations were based on measurements in existing fully developed areas of Calgary. All other aggregate developments within CEA spatial boundaries were assessed at their existing conditions (i.e., final reclamation has not been initiated).</li> <li>■ No known additional industrial or aggregate development is planned outside of those listed in this report, including the Project (AECOM 2020b).</li> <li>■ Assume by 2055, some of the existing aggregate operations will be further or fully reclaimed, including this Project. Future reductions in emissions as a result of partial or full closure and reclamation of other pits was not considered, making this CEA assessment conservative.</li> </ul>
Wetlands and Ephemeral Water Bodies	Yes	<ul style="list-style-type: none"> <li>■ Conservation, management and mitigation of effects to wetlands and ephemeral water bodies have been identified as part of the RVC’s County Plan (RVC 2014) and implementation of the Wetland Conservation and Management Policy (WCMP 2010).</li> <li>■ Removal of all identified wetlands and ephemeral water bodies within the Project Area is anticipated. Based on County plans and known foreseeable future activities, continued residential and agricultural growth is anticipated, which would increase potential growth of commercial/development areas within the temporal and spatial boundaries.</li> <li>■ Should future growth occur within the BASP, Glacier Ridge ASP and lands within the spatial and temporal boundaries, assume additional effects and potential loss to wetlands and ephemeral water bodies.</li> <li>■ A <i>Water Act</i> Application and financial compensation to permanently remove wetlands and ephemeral water bodies will be required for any development.</li> </ul>

VC Identified	Adversely Affected by Other Past, Present, or Foreseeable Future Activities?	Rationale for Decision
Visual Aesthetics	No	<ul style="list-style-type: none"> <li>■ It is unlikely that any visual receptors located beyond the boundary of the 2.5 km Study Area would be able to obtain clear views of the Project (AECOM 2020d).</li> <li>■ No substantial impacts are considered likely to occur on visual amenity as the wider landscape has an undulating topography featuring hill and hollows. Also, the presence of existing vegetation provides partial screening of the Project (AECOM 2020d).</li> <li>■ Project will have berms constructed to mitigate viewpoints.</li> <li>■ Setback landscaping / planting in the setback and on berms at Project start will aid in mitigating direct views and visual impacts.</li> <li>■ By 2055, the end of the temporal boundary of this CEA, the Project will have been reclaimed and recontoured.</li> </ul>
Property Value <sup>4</sup>	No	<ul style="list-style-type: none"> <li>■ Air and visual aesthetics (i.e., the visual impact of the Project) were considered to have adverse residual effects from the Project (Table 2) and initially carried forward into the CEA.</li> <li>■ However, air and visual aesthetics have subsequently been removed from the CEA framework (Table 6).</li> </ul>

## 2.3 Final VC Selection for CEA

Based on this scoping exercise and Technical Report findings, the VCs carried forward for further evaluation for CEA only include wetlands and ephemeral water bodies (Table 7).

The remainder of VCs have been removed from the CEA framework based on their lack of anticipated moderate to severe residual effect (results from Table 2) and/or lack of potential adverse interaction with past, present and foreseeable future physical activities (results from Table 6).

**Table 7: VC Inclusion in CEA for Analysis**

VC Identified	Residual Adverse Effect from the Project? (Table 2)	Adversely Affected by Other Past, Present, or Foreseeable Future Activities? (Table 6)	VC to be carried forward for analysis in the CEA?
Terrain and Soils	No	No	No
Surface Water Bodies and Hydrology	No	No	No
Groundwater	No	No	No
Wetlands and Ephemeral Water Bodies	Yes	Yes	Yes
Vegetation Species and Communities	No	No	No
Wildlife and Wildlife Habitat	No	No	No
Air Quality	Yes	No	No
Noise	No	No	No
Property Value	Yes	No	No
Visual Aesthetics	No	No	No
Traffic	No	No	No
Historical Resources	No	No	No

4. As per Table 2, Property Value is influenced by externalities of air quality, noise and visual aesthetics.

### 3. Analysis of Potential Cumulative Effects

This analysis will consider how the Project's physical activities, combined with past, present, and reasonably foreseeable physical activities, may affect the selected VC, within their respective spatial and temporal boundaries of the CEA (**Table 8**).

**Table 8: VCs Potentially Affected by Past, Present and Foreseeable Future Activities**

Activity	VC Carried Forward within CEA Framework Wetlands and Ephemeral Water Bodies
Residential	✓
Commercial/Industrial	✓
Public Service	✓
Agricultural	✓

#### 3.1 Wetlands and Ephemeral Water Bodies

Project development will result in partial or full loss of 11 ha of wetlands and ephemeral water bodies. A Water Act application will be submitted to the Government of Alberta to remove wetlands and Lehigh will be responsible for financial compensation for lost wetlands. Lehigh plans on reclaiming and recontouring the area progressively throughout the life of the operation. When mining is complete final reclamation will return the landscape to pre-disturbance equivalency, which will support the development of future wetlands. Lehigh will also be designing stormwater management infrastructure to not only maintain surface flow across and around the Project. Proposed stormwater management will also improve water quality through capture of particulate matter in constructed storm ponds and water quantity through managing off-site discharge.

Residential development and agricultural activities have the potential to impact wetlands within the West Nose Creek Watershed even further through:

- Loss of wetland area
- Change in surface water drainage pattern
- Change in water quantity
- Loss of surface water quantity
- Alteration of surface water quality

Based on the municipal development plans reviewed in support of this CEA and the historical trend of development in the area over the past 20 years, the City of Calgary's northwest and RVC will continue to develop and expand in the foreseeable future.

It is anticipated that most of the foreseeable development within the BASP will be residential, with the northern portion dedicated to agricultural use (**Figure 3**, RVC, 1994). The lands located within the Glenbow Ranch ASP and within the spatial boundaries of the VC have historically been designated for agricultural use; however, within the ASP, there are now designated buildable areas and lands proposed for conservation use (**Figure 4**; RVC, 2017).

The lands located to the north of the BASP, but within the jurisdiction of RVC surrounding the West Nose Creek Watershed do not have an ASP. At this time, it is unknown what foreseeable future activities or development will occur on these lands; however, for the purpose of the CEA, it has been assumed that any future ASP will

implement provincial *Water Act* and Wetland Policy (GOA 2013) and municipal policy for wetland mitigation measures (RVC 2010). Any future development will also require the following (RVC 2014):

- Adoption of provincial wetland policies;
- Stormwater flowing into a wetland be treated in a manner than maintains the value and function of the wetland; and
- Retention of wetlands that form part of a stormwater drainage system.

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## 4. Mitigation

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Mitigation includes determining technologically and economically feasible measures that can be applied to mitigate adverse cumulative effects. According to CEAA (2018), mitigation may include: elimination, reduction or control, or if not possible, consider implementing replacement, restoration or compensation measures. Mitigation should also be aligned with RVC's regional planning efforts.

In 2010, the RVC adopted the WCMP, endorsing the County's commitment to conserve and manage wetlands (and ephemeral water bodies) in alignment with provincial conservation and management objectives (RVC, 2010). Foreseeable future development within RVC that cannot avoid wetland loss or wetland removal must also adhere to this Policy and the respective provincial regulatory requirements. For the purpose of this CEA, it is assumed that should any foreseeable future physical activities within the spatial and temporal boundaries be constructed, these developments would also adhere to the WCMP and implement equivalent or additional mitigation to that proposed by Lehigh in the Scott Property Wetland Technical Assessment (AECOM 2020c) to minimize potential cumulative effects to wetlands and ephemeral water bodies.

The Project will be constructed, operated, and decommissioned in accordance with municipal and provincial approval conditions. The mitigation measures proposed for this Project are summarized in the respective Technical Report (AECOM 2020c). Considering these mitigation measures in conjunction with how RVC will direct foreseeable future development to minimize potential new adverse effects, it is anticipated that mitigation measures for wetlands and ephemeral water bodies will be sufficient such that residual effects will not be moderately or severely adverse.

# 5. Adverse Cumulative Effects

## 5.1 Characterization of Adverse Cumulative Effects

For the VCs carried forward into the cumulative effects assessment, a matrix (Table 9) was developed to describe the specific criteria by which the severity of adverse cumulative effects are categorized in consideration of the spatial and temporal boundaries.

**Table 9: Criteria used to Characterize Residual Adverse Effects**

Criteria	Description
<b>Direction</b>	The desirability of the effect on the VC: – Positive – the effect is desirable or beneficial – Negative – the effect is undesirable or adverse
<b>Magnitude</b>	The measure of the amount of change to the VC: – Negligible – no detectable change from existing conditions – Low – change is detectable but well within established criteria/standards or range of natural variability – Moderate – change approaches the limits of established criteria/standards or range of natural variability – High – change exceeds established criteria/standards or beyond range of natural variability
<b>Geographical Extent</b>	The area within which the change to the VC occurs: – Project Footprint – Project Area – Regional Study Area – Beyond the Regional Study Area
<b>Duration</b>	The amount of time over which the effect will be present: – Short-term – effect is detectable during site preparation – Medium-term – effect is detectable for a defined period after site preparation or during operation but not beyond final reclamation – Long-term – effect is detectable for a defined period after final reclamation – Permanent – effect is irreversible
<b>Frequency</b>	How often the effect might occur: – Once – effect may occur one time – Infrequent – effect may occur rarely – Frequent – effect may occur intermittently – Continuous – effect may occur continually
<b>Reversibility</b>	The likelihood that the VC will recover from an effect: – Reversible – Irreversible
<b>Likelihood</b>	The probability of the effect occurring: – Low – effect not likely to occur – Moderate – effect may occur – High – effect is likely to occur

## 5.2 Determining Severity of Residual Adverse Effects

The severity of residual adverse effects considers the direction, magnitude, geographic extent, duration, frequency, irreversibility and likelihood that a residual effect could result in a change in the VC that would alter its condition or state beyond an acceptable level at a cumulative scale. The determination of predicted severity of residual effects

is based on professional judgement guided by industry standards (i.e., land use plans, policies, legislation, regulations, and guidelines) and criteria metrics presented in **Table 10**.

**Table 10: Criteria for Adverse Effect Severity**

Severity	Description
<b>Negligible</b>	<ul style="list-style-type: none"> <li>▪ The residual effect is indistinguishable from existing conditions.</li> <li>▪ Cumulative effects not applicable.</li> <li>▪ No follow-up or monitoring program warranted.</li> </ul>
<b>Minor</b>	<ul style="list-style-type: none"> <li>▪ The residual effect is not likely to result in a change in the VC that will alter its condition or state beyond an acceptable level.</li> <li>▪ Cumulative effects unlikely.</li> <li>▪ Need for follow-up or monitoring program unlikely.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>▪ The residual effect is likely to result in a change in the VC that may alter its condition or state beyond an acceptable level.</li> <li>▪ Cumulative effects possible.</li> <li>▪ Follow-up or monitoring program consideration warranted. Recommend discussing with regulators.</li> </ul>
<b>Major</b>	<ul style="list-style-type: none"> <li>▪ The residual effect is likely to result in a change in the VC that will alter its condition or state beyond an acceptable level (i.e., potential significant adverse effect or significant concern).</li> <li>▪ Cumulative effects likely.</li> <li>▪ Warrants follow-up or monitoring program detailed consideration and discussion with regulators.</li> </ul>

### 5.3 Cumulative Adverse Effects Summary

To determine the degree of potential adverse residual cumulative effects within their respective spatial and temporal boundaries, each of the VCs carried forward within the CEA framework received specific severity categories ranging from negligible to major. These categories were developed based on the criteria listed in **Table 9** and subsequently classified as per **Table 10** metrics and are summarized below in **Table 11**.

**Table 11: Cumulative Effects Conclusions For VCs**

VC	Potential Scenarios for Severity of the Cumulative Effect				Severity of Cumulative Effect Anticipated
	Negligible	Minor	Moderate	Major	
Wetlands and Ephemeral Water Bodies	<p>Cumulative contributions of particulates to wetlands/ephemeral water bodies and watershed are minor and do not result in a detectable negative change within the spatial and temporal boundaries.</p> <p>Residual effects remain confined to the boundary of the Project Area.</p>	<p>Cumulative contributions of particulates to wetlands/ephemeral water bodies and watershed are moderate and do not result in a detectable negative change within the spatial and temporal boundaries.</p> <p>Residual effects remain confined to the Regional Study Area of the BIA (1,000 m radius from the Project Area).</p>	<p>Cumulative contributions of particulates to wetlands/ephemeral water bodies and watershed result in a detectable negative change within the spatial and temporal boundaries.</p> <p>Residual effects extend beyond the Regional Study Area of the BIA (1,000 m radius from the Project Area) but within the Nose Creek Watershed.</p>	<p>Cumulative contributions of particulates to wetlands/ephemeral water bodies and watershed result in a severe detectable negative within the spatial and temporal boundaries.</p> <p>Residual effects extend well beyond the Regional Study Area of the BIA (1,000 m radius from the Project Area) and remain persistent in the West Nose Creek Watershed.</p>	<i>minor</i>

### 5.3.1 Wetlands and Ephemeral Water Bodies

The Project will remove approximately 11 ha of wetlands and ephemeral water bodies within the Project Footprint. During final reclamation, all disturbed lands will be reclaimed to an equivalent end land use and promote the return of surface water drainage patterns similar to pre-development conditions. A *Water Act* approval will be obtained prior to any wetland disturbance, which will include financial compensation (AECOM 2020b).

The lands north of the Project located within the BASP and non-ASP regions of RVC will have to adhere to similar mitigation measures and approvals for any permanent loss to wetlands and water bodies as a result of future development. There are also no known foreseeable future activities planned for these areas within the spatial and temporal boundaries at this time; only the land within the current BASP have been classified for future use type.

Thus, the predicted residual cumulative effect is deemed to be *minor* as any residual effects are anticipated to be confined to the Regional Study Area of the BIA.

### 5.3.2 Summary

Based on the cumulative effects assessment criteria described in **Table 10**, the analysis and descriptions of anticipated cumulative effects, and the mitigation measures summarized in this CEA and supporting Technical Report (AECOM 2020c), adverse residual cumulative effects on wetlands and ephemeral water bodies are anticipated to be minor.

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## 6. Follow-Up

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Follow-up usually involves commitments or development of a program that will address project-specific residual effects but also to determine if any adaptive management and/or monitoring should be applied to a project or physical activity. The nature of the follow-up program should be designed to verify the accuracy of the cumulative effects assessment or the effectiveness of mitigation measures for cumulative effects (CEAA 2018).

Considering no moderate to major adverse residual cumulative effects are anticipated from the VC's interaction with the Project and past, present and reasonably foreseeable future physical activities (**Table 11**), it is not expected that follow-up programs will be required for wetlands and ephemeral waterbodies.

Should the results of mitigation strategies proposed in the respective Wetland Technical Assessment Report (AECOM 2020c) indicate adaptive management measures are required to manage unforeseen adverse effects, Lehigh will consult with RVC and AEP to sufficiently address potentially unacceptable adverse effects.

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## 7. Conclusions

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Cumulative effects assessments include:

- Identifying and analyzing potential cumulative effects;
- Where warranted, identifying proposed mitigation measures to address cumulative effects; and
- Evaluating the severity of predicted residual cumulative effects.

The first stage of any CEA, scoping, has two conditions that must be met for a proposed project to act cumulatively with the environmental effects of other physical activities:

- The proposed project has predicted residual environmental effects on VCs; and
- The proposed project residual effects must act cumulatively with effects of other physical activities that have been or are foreseeable that will be carried out.

Residual effects are those effects remaining after implementing mitigation measures. If it can be demonstrated that no adverse residual effects from the Project are predicted, further analysis of cumulative effects is not required. For this CEA framework, it was assumed that those VCs with predicted moderate to severe residual adverse effects were carried forward for consideration. Negligible or minimal residual adverse effects were assumed to be confined to the Project boundary and / or not result in a change in the VC that will alter its condition or state beyond an acceptable or regulated level.

Based on the results of the BIA, overall Project planning efforts, and supporting Technical Reports, moderate residual effects as a result of the Project have been predicted for the following VCs:

- Wetlands and Ephemeral Water Bodies
- Air Quality
- Visual Aesthetics
- Property Value

Potential cumulative effects on selected VCs should consider the effects of the Project in combination with past, present and foreseeable future physical activities within a five-mile or 8.04 km radius (RVC 2018). With this spatial boundary and a temporal boundary of 75 years, it was determined that wetlands and ephemeral water bodies should be carried forward within the CEA framework for assessment. Air quality, visual aesthetics and property value were subsequently removed from the CEA after the second scoping step as there are no anticipated residual effects when considering these VCs with respect to past, present and foreseeable physical activities within their temporal and spatial boundaries.

Wetlands and ephemeral water bodies will be removed due to the Project development. Lehigh will be required to receive *Water Act* approval prior to removal and will be responsible for financial compensation for wetland removal. During progressive and final reclamation of the Project, the site will be recontoured to promote natural draining topography (AECOM 2020b). There are no known foreseeable future activities planned for areas within the spatial and temporal boundaries at this time; only the land within the BASP has been classified for future use type. RVC's adoption of the WCMP demonstrates that any foreseeable development within the County will adhere to similar regulatory requirements and thus apply additional mitigation, if needed, for future development within the temporal and spatial boundaries of the VC.

Considering the spatial and temporal boundaries defined for this VC, and the past, present and reasonably foreseeable future activities with the spatial and temporal boundaries, it was determined that the potential for adverse residual cumulative effects on wetlands and ephemeral water bodies are anticipated to be minor and do not warrant the development of cumulative effects focused follow-up programs.

In summary, the results of this Project's CEA support a conclusion that moderate to severe adverse residual cumulative effects are not anticipated for any VC.

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