Associated Environmental

ENVIRONMENTAL IMPACT STATEMENT

# Conceptual Land Use Plan
# 3rd Avenue South Land

MARCH 2021

# REVISIONS PAGE

| Conceptual Land Use Plan<br>3rd Avenue South Land | |
|---|---|
| Client: Jan and Bernie McCaffery | Project Manager: Keenan Rudichuk, R.P.Bio. |
| Environmental Impact Statement | Associated Environmental Consultants Inc. |

| Revision/ Issue | Date | Description | Prepared by | Client Review |
|---|---|---|---|---|
| 1.0 | 2020-12-01 | First Draft delivered to the Town of Canmore | Keenan Rudichuk, R.P.Bio. | JM, BM |
| 2.0 | 2021-02-24 | Revised version following Information Requests from the Town of Canmore | Keenan Rudichuk, R.P.Bio. | JM, BM |
| 3.0 | 2021-03-25 | Revised version to clarify body text and revise Spring Creek setback | Keenan Rudichuk, R.P.Bio. | JM, BM |
| 4.0 | 2021-04-01 | Further revised Spring Creek setback wording | Keenan Rudichuk, R.P.Bio. | JM, BM |

# EXECUTIVE SUMMARY

Associated Environmental Consultants Inc. completed an Environmental Impact Statement (EIS) for a Conceptual Land Use Plan for an 8.64 ha privately held parcel of land at 800 3rd Avenue in Canmore, Alberta (the property). A portion of the property is within an area designated by the Town as a Conservation Area (i.e., the South Canmore Local Habitat Patch [SCLHP]). The Conceptual Land Use Plan will require an amendment of the Land Use designation and an adjustment to the Urban Growth Boundary. As a result, an EIS is required to be submitted to the Town's decision-making authorities under the Town's Municipal Development Plan.

The EIS adheres to the Town of Canmore's EIS Policy and was developed in accordance with a Terms of Reference that set the scope of the EIS and identified the biophysical resources that were to be assessed for the project. The purpose of the EIS is to inform the Town's decision-making authorities about the Conceptual Land Use Plan and how the plan interacts with key biophysical resources.

The Conceptual Land Use Plan proposes the 8.64 ha parcel be divided into four subdistricts, labeled A to D. Subdistrict A will be 0.82 ha and will be gifted to the Palliative Care Society of the Bow Valley to construct a hospice for end-of-life care. Subdistricts B (0.62 ha, divided into three lots) and C (1.14 ha, divided into two lots) will be reserved for residential development. Subdistrict C will require the construction of a clear span bridge across Spring Creek; although no bridge design is in place, the bridge will be clear span and will adhere to all environmental best management practices to avoid effects on Spring Creek. A total of five residential buildings are proposed for Subdistricts B and C, and each residential building footprint will not exceed 372 $m^2$. The property owners will retain approximately 5.61 ha that will become Subdistrict D, which will include their 700 $m^2$ family residence. The remaining 0.45 ha of the property is within the wetted boundary of Spring Creek and Policeman Creek and will not be disturbed.

In compliance with the Town's 2020 bylaw related to streamside setbacks, the entire proposed development (except for a single, clear span bridge to access Subdistrict C) is set back 20 m from Spring Creek and Policeman Creek and will avoid adverse effects on the stream and riparian vegetation. Section 5.2.1 discusses streamside setbacks and how they relate to *Stepping Back from the Water* (GoA 2012) guidance document. All buildings have been sited to reduce the potential effect on vegetation, ecosystems (e.g., by completely avoiding the swamp wetland on the property), wildlife, and wildlife habitat.

The property is currently vegetated with native species that comprise four distinct ecosystem types: 1) coniferous forest (dominated by mature spruce trees), 2) tall shrub (dominated by regenerating balsam poplar and willow), 3) low shrub-grass (an historic burned area that is primarily willow and grassy species), and 4) a shrubby swamp wetland (a predominantly dry, forested swamp dominated by willow and balsam poplar). The Conceptual Land Use Plan will completely avoid the shrubby swamp wetland.

Historical and existing land use on the property includes agricultural uses (e.g., grazing by horses) and recreational use (e.g., walking, hiking, skiing). Grazing by horses has occurred within the property for at least 60 years since occupation by the original landowners. Adjacent land uses include highly densified residences to the north (community of Spring Creek Mountain Village); residences and a transportation corridor to the east (CP Rail, Bow Valley Trail and the Trans-Canada Highway); the Waste Transfer Facility, Wastewater Treatment Facility, and Canmore Nordic Provincial Park to the south; and Millennium Park to the northwest. Except for the community of Spring Creek Mountain Village (which

is high-density residential housing), the land surrounding the property is largely forested and disturbed by human activity (e.g., hiking trails, ski trails, dog walking).

The EIS focuses on the potential effects of the project on biophysical resources in the area, such as vegetation, ecosystems, and wildlife and wildlife habitat. Through development of the EIS, considerations to avoid and reduce potential effects of the project were incorporated into the Conceptual Land Use Plan. The EIS concluded that potential residual effects, or any effect that will remain once all mitigation, restoration, and compensation is completed, are negligible to low overall. The magnitude and geographical extent of current and proposed wildlife habitat disturbed (both directly and indirectly) in the SCLHP is a key topic of discussion in the EIS. The SCLHP is a Conservation Area set aside for large-ranging wildlife in the Bow Valley. In particular, the SCLHP is intended to provide sufficient habitat for wildlife (e.g., elk, bear, deer) to meet the food, rest, and water needs for a short period of time while they negotiate a corridor network (e.g., the SCLHP) towards a larger, regional habitat patch (in this instance, the Bow Flats Habitat Patch) at its end. To function as intended, habitat patches need to provide sufficient intact habitat in their interior for wildlife to rest or forage with security from human disturbance. Since its establishment in 2009, habitat in the SCLHP has been fragmented and continues to be disturbed by frequent and ongoing incursions by humans through industrial development (e.g., the Waste Transfer Station), recreation (e.g., hiking, dog walking, cross country skiing, cycling), and sensory disturbance (e.g., Highway 1, Highway 1A, CP Rail, Alpine Helicopters Heliport). The Bow Corridor Ecosystem Advisory Group note that, even if it were completely intact, the SCLHP is not large enough to meet the minimum standards set for a functional habitat patch. In addition, the Tipple Wildlife Corridor is the only wildlife corridor directly connected to the SCLHP and was considered by the Bow Corridor Ecosystem Advisory Group to be not functioning as intended given the level of development and human activity in the area. Studies focused on large mammal use of the SCLHP and the Tipple Wildlife Corridor found that although deer and elk use the SCLHP, large carnivore (e.g., bears, cougars, wolves) use was low. In total, based on the current Conceptual Land Use Plan, 0.42 ha of land will be disturbed for buildings and 0.49 ha for roads and driveways, amounting to 0.5% of the SCLHP.

Key considerations of potential effects of the project on biophysical resources addressed in the EIS are as follows:

- Soil disturbance (e.g., alteration, compaction, or erosion);
- Vegetation disturbance (e.g., vegetation clearing or ecosystem degradation from invasive plants);
- Large mammal movement, habitat selection, habitat fragmentation, and wildlife security;
- Large carnivore habitat selection and their documented use of the SCLHP;
- Effects on the water quality of Spring and Policeman Creeks; and
- Riparian habitat disturbance.

Mitigation measures have been proposed for each potential effect that will avoid, reduce, or offset potential effects of the project. Key mitigation to avoid, reduce, or offset potential effects of the project include, but are not limited to:

- The development of a Construction Environmental Management Plan (CEMP) in advance of construction that addresses potential spills, erosion and sediment control, dust management, and monitoring requirements.
- The requirement to retain a qualified environmental monitor to direct construction activities and enforce the CEMP.
- The incorporation of wildlife-friendly design (e.g., lighting, building siting) to avoid or reduce the effect on wildlife and reduce the potential for wildlife-human conflict.
- Timing construction activities to avoid effects on wildlife during sensitive seasons (e.g., nesting birds).

- Planting trees and shrubs within 20 m of Spring Creek to compensate for habitat loss from the proposed clear span bridge construction and to improve wildlife habitat value, erosion, and flood resiliency of the stream.

A cumulative effects assessment was completed following the Terms of Reference prepared by the Town and included past, current, and reasonably foreseeable developments. Potential residual effects of the project are any effect that has the potential to remain once all mitigation has been applied or implemented. Mitigation proposed for the project is expected to be effective in avoiding, reducing, or offsetting for potential effects of the project; however, following mitigation, residual effects of the project will remain. Potential residual effects of the project are:

- Permanent disturbance to soil and terrain within the proposed project footprint;
- A reduction in native vegetation within the proposed project footprint;
- Wildlife habitat loss or habitat avoidance; or
- Potential spread of invasive plants during construction.

The direct footprint of the Conceptual Land Use Plan will result in the permanent disturbance of some soil and vegetation that provides habitat for wildlife. The development of new buildings in the currently natural setting of the SCLHP will affect wildlife use through habitat loss and habitat avoidance. However, the species most-likely affected (e.g., deer or elk) are species that are already living amongst extensive physical and sensory human disturbance in the SCLHP, and the proposed project is expected to have negligible to low short and long-term effects on wildlife. The project has been designed to minimize all potential effects through building siting and orientation (e.g., to avoid or reduce wildlife-human conflict). Offsetting to compensate for potential effects that cannot be fully mitigated, such as planting trees and shrubs within the Spring Creek riparian corridor, is proposed to enhance habitat for fish and wildlife while improving erosion resiliency of the creek.

The Conceptual End Land Use Plan will result in low to negligible potential effects on the biophysical resources assessed in the EIS. Mitigation measures have been recommended to avoid, reduce, or compensate potential effects of the project; however, once a detailed design has been developed, additional permitting and environmental monitoring will be required to ensure the construction follows all applicable regulations and designs meet criteria set out by federal and provincial laws, such as the *Water Act*. Permitting necessary for the project and environmental monitoring during construction may include, but are not limited to the following:

- A *Water Act* application will be pursued for any instream work that may be required as part of a future bridge into Subdistrict C. No instream work is anticipated based on the design assessed in the EIS.
- A *Water Act* Code of Practice Notification for Watercourse Crossings will be pursued (e.g., where there is no impact to the bank, bed or shores of a waterbody, but where the waterbody will be crossed with a structure).
- A Qualified Professional will be retained to complete an auditory or visual presence/non-detection survey to determine if the shrubby swamp is used by amphibians if construction occurs during a season where the shrubby wetland has standing water.
- A Qualified Aquatic Environmental Specialist (QAES) will be retained for any instream works in Spring Creek in support of the construction of a bridge and installation of offsetting.

Additional mitigation measures proposed to be included in the Direct Control District to manage cumulative effects on Spring Creek include:

- Maintaining a minimum setback of at least 20 m for all buildings and landscaping along Spring and Policeman Creek. The minimum 20 m setback will prevail over any other setback that may conflict with the minimum 20 m setback.

- Avoid planting non-native species such as manicured lawns immediately adjacent to the minimum 20 m setback to maintain riparian water quality function (e.g., sediment, nitrate, or phosphorus transport).
- Where not in conflict with the FireSmart directive, mature trees over 0.3 m in diameter will be protected in perpetuity throughout the minimum 20 m setback on Spring and Policeman Creeks. Trees removed within 20 m of Spring Creek to meet FireSmart objectives should be replaced by less flammable species such as poplar or cottonwood.
- The existing undisturbed areas adjacent to Spring and Policeman Creeks and within the minimum 20 m setback should be protected as a non-disturbance zone. No soil or vegetation disturbance (except where FireSmart thinning is required) will occur within this area, except for the removal of noxious or invasive plant species. In the removal of noxious or invasive species, only mechanical methods such as cutting or hand-pulling will occur, and no use of herbicides will be allowed.

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# 1 INTRODUCTION

## 1.1 Background

Associated Environmental Consultants Ltd. (Associated) was retained to complete an Environmental Impact Statement (EIS) for a proposed land use plan for a parcel of land in the S.1/2 of L.S. 13, Sec 28, TWP. 24, Rge. 10 W5M, in Canmore, Alberta (the property). An EIS is required as per the Canmore Municipal Development Plan (MDP) (TOC 2016) because a portion of the property is located within an area designated as a Conservation Area (such as a habitat patch) and is outside the Urban Growth Boundary. The property is within the South Canmore Local Habitat Patch (SCLHP) and proposes a land use change, which requires an amendment to the Urban Growth Boundary. The EIS is to be submitted to the decision-making authorities of the Town (Town of Canmore 2016).

The general contents to be provided in an EIS are outlined in the Canmore EIS Policy (2016). The Town is responsible for preparing a Terms of Reference (ToR) that considers the EIS Policy and sets the specific requirements for what must be included in the EIS (Town of Canmore 2016). The Town contracted a qualified, independent, third-party reviewer that helped prepare the ToR and review the EIS.

The property is approximately 8.65 ha, including 0.45 ha that accounts for the approximate wetted width of Spring Creek and a portion of Policeman Creek, which flow through the northern portion of the property. A Conceptual Land Use Plan (**Appendix A**) has been developed for the property, which may be revised to a Final Land Use Plan following the EIS and land use amendment process. The Conceptual Land Use Plan proposes a land use change to Direct Control District that will include four subdistricts: a Palliative Care Centre (Subdistrict A will be 0.82 ha), lots for five residential units (Subdistricts B and C; totalling 0.62 ha and 1.14 ha respectively), and 1 single-family residential dwelling (zoned Residential and Agricultural) (Subdistrict D will be 5.61 ha) (the Project).

This version of the EIS has been reviewed once by the Town and their third-party reviewer[1] and has been amended to reflect the comments provided on the initial draft.

## 1.2 Purpose of the EIS

The purpose of the EIS is to provide information to the Town of Canmore Council to make an informed decision on the proposed land use plan. In summary, the EIS will:

- Describe the proposed new land use;
- Describe the existing environmental conditions and features on and surrounding the property;
- Identify significant natural ecological features;
- Describe potential impacts of the project, prior to mitigation;
- Recommend measures to avoid or reduce these impacts and identify residual impacts and their significance after the implementation of proposed mitigation;
- Recommend if any further studies or monitoring is to be undertaken through the course of mitigation implementation;
- Discuss cumulative effects in reference to existing, approved, and future developments in the area; and
- Identify additional mitigation measures to minimize impacts on ecosystem components and cumulative effects.

[1] Information requests from the Town's initial review received December 21, 2020.

## 1.3 Physical Setting

The property is located immediately south of the community of Spring Creek Mountain Village and is accessed by 3rd Avenue. The ecological condition of the property is comprised of deciduous and coniferous forest, shrubby ecosystems, and grassy ecosystems. Spring Creek flows through the north portion of the property and discharges into Policeman Creek above its confluence with the Bow River to the southeast. Surrounding existing land uses include residences and Spring Creek Mountain Village to the north, a single ranchland residence and transportation corridors to the east (i.e., CP Rail, Bow Valley Trail, and the Trans-Canada Highway), a Waste Transfer Station and Wastewater Treatment Facility and the Canmore Nordic Centre Provincial Park to the south, and Millennium Park to the west. The Bow Valley is an important movement corridor for wildlife occurring in the region, and wildlife corridors and habitat patches have been identified for the areas surrounding the Town of Canmore (BCEAG 2012, Edwards 2013).

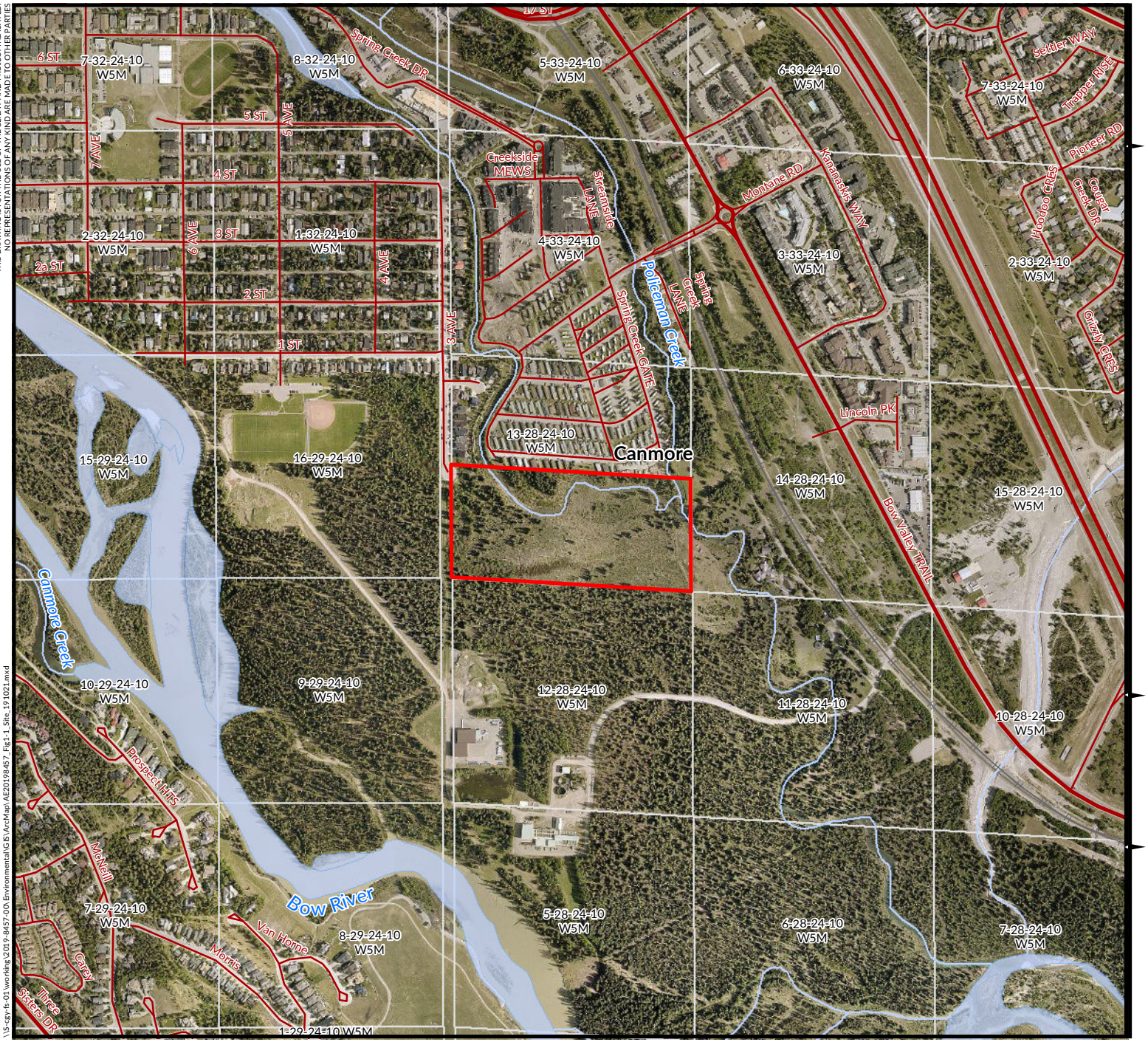
A portion of the property is located within the SCLHP as defined by the Bow Corridor Ecosystem Advisory Group (BCEAG 2012) and the MDP (TOC 2016). The property is adjacent to the Tipple Wildlife Corridor (which is connected to the Three Sisters Along Valley Corridor) and the Bow Flats Regional Habitat Patch (Figure 1-1, Figure 1-2). The SCLHP is isolated from the Tipple Wildlife Corridor to the south by the Bow River. The Tipple Wildlife Corridor has been cleared of native vegetation and terrain has been reshaped as a result of historic disturbance, likely related to historic mining operations in Canmore. Adjacent to the Tipple Wildlife Corridor (west and east) residential houses and access roads exist. The portion of the Tipple Wildlife Corridor that is immediately adjacent to the SCLHP is a large area cleared of trees and shrubs and that has revegetated with grasses. The Tipple Wildlife Corridor does not support wildlife use as intended "given the level of development and human activity within and adjacent to [the] corridor" (BCEAG 2012) likely due to the cleared vegetation and close proximity to human development.

The SCLHP is approximately 182.2 ha (1.8 $km^2$) with an existing linear feature (e.g., roads, trails) density of 2.9 $km/km^2$ and 5.3 ha of non-linear anthropogenic disturbance (e.g., buildings, housing[2]). Human use of the SCLHP includes cycling (year-round), hiking/walking (year-round), dog walking (year-round, both on lease and off leash), running (year-round), and skiing/snowshoeing (winter). The SCLHP is located in a Key Wildlife and Biodiversity Zone (ESRD 2019), that encompasses the Bow River and portions of the adjacent land to the east and southeast. Key Wildlife and Biodiversity Zones are "considered to be a combination of key winter ungulate habitat and higher habitat potential for biodiversity" (ESRD 2015a). These zones occur along major river corridors in Alberta and are identified for their uniqueness on the landscape and the value they provide ungulates during winter.

Adjacent to the SCLHP to the east is the Bow Flats Regional Habitat Patch, which is currently fragmented from the SCLHP by Highway 1. A "conceptual wildlife corridor" connects the two habitat patches; however, the habitat patches are separated by a significant barrier to movement (i.e., Highway 1) and are currently not contiguously connected habitat. The Highway 1 crossing on the Bow River provides a narrow movement corridor for wildlife between the SCLHP and the Bow Flats Regional Habitat Patch (Edwards 2013).

The location of the property is provided in Figure 1-1 and regional context of wildlife habitat patches in relation to the project is provided in Figure 1-2.

[2] Summaries of linear and non-linear densities are based on ortho-interpretation of 2017 imagery completed specifically for this study.



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Associated Environmental

**Legend**

- Site
- Road
- Highway
- Railway
- Watercourse
- Water Body

0 50 100 150 200 250 300 m

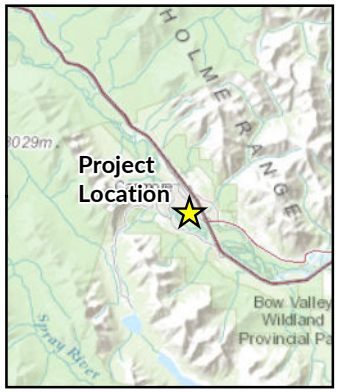


FIGURE 1-1
Site Location

3rd Avenue South Land

| | |
|---|---|
| **AE PROJECT No.** | 2019-8457 |
| **DATE** | 2019 OCTOBER |
| **SCALE*** | 1:10,000 |
| **COORD. SYSTEM** | NAD 1983 UTM ZONE 11N |
| **REV** | 0 |
| **DESCRIPTION** | ISSUED FOR DRAFT |
| **DRAWN BY** | LAW |
| **CHECKED BY** | JL |

ESRI World Imagary: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; Roads: Statistics Canada, 2018; Railway: Government of Canada, 2018; Hydrography: Altalis Ltd., 1996.

RGE.11 W5

RGE.10 W5

RGE.9 W5

RGE.8 W5

TWP.25

TWP.24

Harvie Heights and Georgetown-CNC Regional Habitat Patch are contiguous with Banff National Park

13-28-24-10 W5M

Canmore

Harvie Heights

Carrot Creek

Bow River

Policeman Creek

Whitemans Pond

Goat Creek

BANFF NATIONAL PARK

Goat Pond

Sisters Creek

Three Sisters Creek

Fall Creek

Stewart Creek

The Three Sisters

Corridor Disconnect to be resolved

Marsh Creek

Cairnes Creek

Pigeon Creek

Dead Man's Flats

Grotto Mountain

Grotto Mtn Pond

Gap Lake

Exshaw Creek

Exshaw Mountain

Exshaw

Lac des Arcs

McGillivray Pond

Lac Des Arcs

Pigeon Mountain

Mount McGillivray

Wind Valley West Creek

Wind Valley Creek

Wind Valley Regional Habitat Patch is contiguous with the Kananaskis Valley

The area between Bow Valley Provincial Park and the Bow Flats Regional Habitat Patch is currently under review to determine wildlife movement patterns

Old Fort Creek

Stoney I.R. No.142,143,144

Seebe

Kananaskis River

Chilver Lake

Heart Mountain

Smith Creek

Barrier Lake

Lusk Creek

Mount Baldy

Figure Modified From BCEAG 2012

THIS DRAWING IS FOR THE USE OF THE CLIENT AND PROJECT INDICATED. NO REPRESENTATIONS OF ANY KIND ARE MADE TO OTHER PARTIES

Road
Rail
Hydrography
Banff National Park
First Nation Reserve

**Wildlife Underpass**
- Wind Valley
- Stewart Creek

**Wildlife Crossing Structure**
- Rundle Canal

**Regional Habitat Patch**
1. Harvie Heights
2. Georgetown - CNC
3. Bow Flats
4. Wind Valley
5. Yamnuska
6. Bow Valley Provincial Park

CNC - Canmore Nordic Centre

**Local Habitat Patch**
7. Quarry Lake
8. South Canmore
9. Indian Flats

**Wildlife Corridor**
1. Upper Silvertip
2. Lower Silvertip
3. Georgetown Quarry Lake
4. Tipple
5. Three Sisters Along Valley
6. Stewart Creek
7. Wind Valley
8. Dead Man's Flats
9. Pigeon

**Conceptual Wildlife Corridor**

**Conservation Easements**
- A Palliser
- B Eagle Terrace
- C Canyon Ridge
- D 2003 Easement
- E 35m Easement



Prepared by: ASRD, Southern Rockies Area, RIU-Calgary.

SCALE
0 1 2 3 4
Kilometres

Government of Alberta

# FIGURE 1
# WILDLIFE CORRIDORS AND HABITAT PATCHES

## WILDLIFE CORRIDOR AND HABITAT PATCH GUIDELINES FOR THE BOW VALLEY

2011

\\S-sgrfs-01\working\2010-04457-00\mxd\GIS\ArcMap\SITEA\20100457_Fig1-2_BCEAG_20080820.mxd

## 1.4 Proposed Land Use Description

The area of the property is approximately 8.65 ha. Table 1-1 presents the maximum areas proposed in the Conceptual Land Use Plan and may be smaller than presented when final plans are developed (**Appendix A**, Figure 1-3). The areas presented in Table 1-1 are summaries of the conceptual building footprints and proposed access roads based on the Conceptual Land Use Plan. Areas presented in Table 1-1 are based on disturbances within each proposed Subdistrict and will vary from area summaries in the Land Use application (i.e., road surface areas are included in each respective Subdistrict in Table 1-1). Areas required for vegetation clearing, including any FireSmart thinning necessary[3], have not been accounted for in Table 1-1. The area summaries presented in Table 1-1 may change in the future once the Land Use Plan is finalized following the EIS and land use amendment consultation process.

The proposed land use for these areas are summarized, noting that only 0.07 ha be disturbed for a single residence and outbuilding in Subdistrict D, with 5.54 ha (including 0.30 ha of driveway surface) of the surrounding area remaining as wildlife-friendly, agricultural land left in a natural state. Overall, based on the Conceptual Land Use Plan, the project will only functionally change land use by approximately 0.91 ha (11% of the Project Area and 0.5% of the SCLHP) (sum of buildings and road/driveway) from the historical uses.

**Table 1-1**
**Area Summaries of the Project Area and the Conceptual Land Use Plan**

| Subdistrict | Project Component in hectares | | | | | Footprint Percent of the SCLHP[2] |
|---|---|---|---|---|---|---|
| | Buildings | Natural | Road/Driveway | Spring Creek | Total Area | |
| Spring Creek[1] | | | | 0.46 | 0.46 | - |
| A | 0.16 | 0.62 | 0.04 | | 0.82 | 0.1 |
| B | 0.11 | 0.43 | 0.08 | | 0.62 | 0.1 |
| C | 0.07 | 0.99 | 0.07 | | 1.14 | - |
| D | 0.07 | 5.24 | 0.30 | | 5.61 | 0.2 |
| **Grand Total** | **0.42** | **7.27** | **0.49** | **0.46** | **8.65** | **0.5** |

**Note**: Area summaries may vary from Appendix A due to area summary methods.
[1] Spring Creek will not be disturbed, and a 20 m setback has been incorporated into Project design (Figure 1-3).
[2] Percent of proposed footprint in the SCLHP = South Canmore Local Habitat Patch, based on area summaries of the SCLHP from BCEAG 2012.
[3] Subdistrict C is not within the SCLHP.

The Project incorporates sensitive wildlife design throughout. Considerations for reducing effects on wildlife are summarized in Section 4, and include situating buildings in the northwestern periphery of the SCLHP to reduce movement barriers; using existing linear corridors to focus human activity to areas with existing high human use; incorporating low-density lighting options to reduce the effect of light on wildlife; and orienting buildings in a manner that dissipates human development from high concentrations to lower concentrations (e.g., reduces densification from Spring Creek community). Following comments from the Town on the initial EIS draft, the Conceptual Land Use Plan incorporates further building re-orientation to avoid a shrubby wetland ecosystem and reduce effects on wildlife and their habitat (**Appendix A;** Figure 1-3).

[3] FireSmart thinning is discussed in further detail in Section 3.3.3 and Table 3-3.


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LEGEND:

- Wetland
- Proposed Road Extension
- Property Line
- Minimum Lot Setbacks (proposed)

N

0 100 m

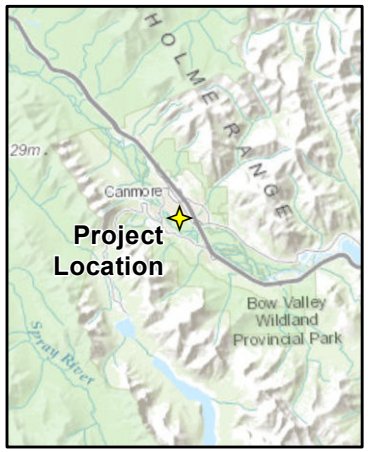



FIGURE 1-3:
CONCEPTUAL DESIGN

South Canmore EIS for 3rd Avenue South Land

| | |
|---|---|
| **AE PROJECT No.** | 2019-8457.000 |
| **DATE** | FEB. 2021 |
| **SCALE** | 1:2231 |
| **COORD. SYSTEM** | NAD 83 UTM 11 |
| **REV** | 1 |
| **DESCRIPTION** | ISSUED FOR DRAFT |
| **DRAWN BY** | DA |
| **CHECKEC BY** | KR |



PATH: F:\mapping_projects\2019\19-8457_McCaffery_Canmore\Fig 1-3.mxd / PLOT DATE: 2/25/2021 9:45:09 AM

### Subdistrict A - Palliative Care House

The proponent has gifted a portion of the property (Subdistrict A) for the Palliative Care Society of the Bow Valley. The Palliative Care Society plans to construct a hospice for the purpose of providing and supporting 'full-spectrum' palliative and end-of-life care for the local communities. The hospice will support families from the time of diagnosis through to grief and bereavement support for the family and caregivers after the death of the patient. The hospice will provide an **exceptional benefit** to the community and is supported by the Palliative Care Society of the Bow Valley (**Appendix F**) The plan is for six suites for patients of the hospice, complete with private washrooms and two day-use hospice suites for family members within the Bow Valley. Hospice programs such as music therapy and physical therapy as well as administrative offices for the Palliative Care Society, staff, and volunteer spaces will also be included. The hospice will be tied into the existing roads to provide patient and staff vehicle access. Following review by the Town and their third-party reviewer, the hospice was relocated to avoid a shrubby swamp wetland identified on the property. Cul-de-sac effects of the design (i.e., instances where wildlife are "cornered" in a development, potentially resulting in human-wildlife conflicts) were also addressed. The updated design will avoid or reduce cul-de-sac effects on large ranging mammals (e.g., elk) by creating relatively wide movement corridors and long line-of-sight for wildlife. Because cul-de-sac effects are unlikely, the updated design will not require wildlife exclusion fencing for this subdistrict (Figure 1-3).

The area partitioned for Subdistrict A will be approximately 0.82 ha in area (including roads) and the proposed area required for the buildings and access roads is approximately 0.20 ha (0.1% of the SCLHP; Figure 1-3, Table 1-1).

### Subdistrict B and C - Lots for Residential Units

Subdistricts B and C are intended for the development of residential units. Subdistrict C is not within the SCLHP. The lots are near existing services and utilities, close to amenities in the downtown area, and near schools and recreational areas. The lots will maintain their natural features and vegetation and the design development will be sensitive to the needs of wildlife by carefully selecting their placement, design lighting, and suitable landscaping to reduce effects on wildlife and their behaviour. Both subdistricts will be set back from Spring Creek by a minimum of 20 m to avoid effects on important riparian vegetation and a Direct Control District (that describes development parameters) will be in place to mitigate effects on water quality and fish habitat. Subdistrict B will be approximately 0.62 ha and Subdistrict C will be approximately 1.14 ha (including access roads). The location proposed for these lots is immediately adjacent to existing development to the north and is not expected to act as a barrier to wildlife movement; therefore, no wildlife exclusion fencing is being proposed for these subdistricts.

The proposed area set aside for the buildings and access roads in Subdistrict B is approximately 0.19 ha (0.1% of the SCLHP) and 0.14 ha (0.0% of the SCLHP) for Subdistrict C. Each residential building footprint in Subdistricts B and C will not exceed 372 $m^2$.

### Subdistrict D - Residential and Agricultural

Subdistrict D is proposed for Residential and Agricultural use. An Agricultural subdistrict is in keeping with the characteristics, history, and discretionary uses of the land under its current Land Use bylaw designation. In addition, this pursuit is consistent with that of the agricultural operation of the adjacent neighbour to the east. Subdistrict D will include a single residential unit and outbuilding. The proposed land use is to provide future provision, if desired, for small, low-impact animal husbandry for the personal use of the landowners. The operation may entail grazing and sheltering of not more than three horses; however, decisions to pasture horses in Subdistrict D have not been confirmed. The grazing area will be on land immediately adjacent to the grazing land of the neighbour to the east (Figure 1-3). Currently, horses are grazed seasonally in a portion of Subdistrict D. An existing, single-wire electric fence is installed and removed seasonally by the neighbour to reduce impacts of grazing on the property and Spring and Policeman Creeks. The property owners view wildlife use of their property as an intrinsic value that they want to

maintain and do not want to exclude wildlife from their land. If future grazing is desired by the proponent, a wildlife-permeable fence (e.g., split rail or page wire) may be erected to enclose approximately 0.6-0.8 ha of the parcel for continued grazing use and to reduce effects of horse grazing on Spring Creek, Policeman Creek, and the larger parcel.

Subdistrict D is approximately 5.61 ha in total. All proposed development will occur outside of the setback on Spring Creek (Figure 1-3). Approximately 0.07 ha will be used for the building footprints and approximately 0.30 ha will be used for the access road and driveway. The remaining 5.24 ha will remain in its current state (i.e., currently vegetated) and will be grazed at the same or less intensity than has historically been grazed.

The total area of proposed development in Subdistrict D is approximately 0.37 ha (0.2% of the SCLHP).

## 1.5 Legislation and Guidelines

The following guidelines and policy documents were reviewed as part of the EIS:

- Municipal Development Plan Bylaw 2016-03, Town of Canmore (TOC 2016) Amended 2020.
- South Saskatchewan Regional Plan 2014-2024: An Alberta Land-use Framework Integrated Plan (GoA 2017).
- Town of Canmore. Human Use Management Review. Consultation Summary, Final Recommendation and Implementation Plans (Town of Canmore 2015).
- Town of Canmore Wildfire Mitigation Strategy Review. Montane Forest Management Ltd. (Montane 2018).
- Town of Canmore Noise Bylaw (Town of Canmore 1997).
- Human-Wildlife Coexistence: Recommendations for Improving Human-Wildlife Coexistence in the Bow Valley. Town of Canmore, Town of Banff, Alberta Government (GoA 2018).
- Recommendations for Trails and Management of Recreational Use for the Town of Canmore: South Canmore and West Palliser (TERA 2012).
- Bow Corridor Ecosystem Advisory Group. Wildlife Corridor and Habitat Patch Guidelines for the Bow Valley (BCEAG 2012).

Table 1-2 summarizes regulatory considerations applicable to the proposed project. For this project, approval or notification under the *Fisheries Act* is not required because the proposed project will not involve activities within a waterbody or result in potential for harmful alteration, disruption or destruction of fish habitat through construction activities (i.e., no construction activities will occur in the water and no potential disturbance to the banks, shoreline, or water quality are anticipated to occur). The proposed bridge across Spring Creek will be clear span and all work related to bridge construction will be above the high-water mark for the creek.

A *Water Act* approval will be required for project activities because the Project Area is within the Bow River flood fringe. An approval is required for all activities that have the potential to temporarily or permanently affect the location or direction of flow of water or may become capable of altering the flow of water, whether or not the flow or presence of water is continuous, intermittent or occurs only during a flood.

**Table 1-2**
**Regulatory Considerations**

| Legislation | Environmental Conditions and Restrictions |
|---|---|
| **Federal** | |
| *Migratory Birds Convention Act* | • Provides protection for migratory birds and their nests; prohibiting disturbing, destroying, or taking a nest, egg, or nest shelter of a migratory bird.<br>• The project is in the B4 nesting zone, with a breeding and nesting period from approximately April 15 to August 30. |
| *Species at Risk Act* (SARA) | • The Act prohibits the killing, harming, harassment, possession, capturing or taking of a species listed as extirpated, endangered or threatened; the damage or destruction of a residence on federal lands. |
| *Fisheries Act* | • Potential for harmful alteration, disruption, or destruction of fish habitat through construction activities (e.g., the potential introduction of deleterious materials into the water). |
| **Provincial** | |
| *Environmental Protection and Enhancement Act* | • Modifications are being made to the Town's existing stormwater system. A Notification will be submitted to Alberta Environment and Parks. |
| *Wildlife Act* | • The Act provides protection and conservation of wildlife in Alberta.<br>• A person shall not willfully molest, disturb, or destroy a house, nest, or den of prescribed wildlife. |
| *Water Act* | • The Act protects Alberta's waterbodies.<br>• Temporary and permanent project activities that may directly or indirectly affect water flow, quality, or aquatic environments require prior authorization from Alberta Environment and Parks. |
| *Historical Resources Act* | • Applies when ground disturbance in an area of known and potential archaeological resources occurs or is in the vicinity of a provincially designated Provincial Historic Resource (Historic Resource Value Notations of 4a, 5a, and 1h respectively).<br>• Approval may require additional studies (i.e., Historical Resources Impact Assessment). |
| *Weed Control Act* | • Requires the management of noxious or invasive weeds.<br>• Weed management will be a requirement in the project tender documents. |

# 2 ASSESSMENT METHODS

## 2.1 Project scope

A Terms of Reference (ToR) for the project was developed by the Town and their independent third-party reviewer. The ToR outlines the scope of the EIS (**Appendix B**).

## 2.2 Spatial and Temporal Boundaries

### Spatial Boundaries

To capture the variability of effects of the project locally and regionally, the project was assessed at the following three spatial scales (Figure 2-1):

- Project Area;
- Local Study Area; and
- Regional Study Area.

**Project Area**

The Project Area is the property boundary as described in Section 1 and comprises approximately 8.65 ha of privately-owned land as described in Section 1.4.

**Local Study Area**

The Local Study Area (LSA) is the area where direct and indirect effects of the project may affect the environment. The LSA was selected based on the estimated range of sensory disturbance (e.g., noise and vibration), and potential physical impacts of the project. The LSA is a 150 m buffer around the property boundary, to capture the direct and indirect project effects on selected environmental components. The total area of the LSA is 34.2 ha.

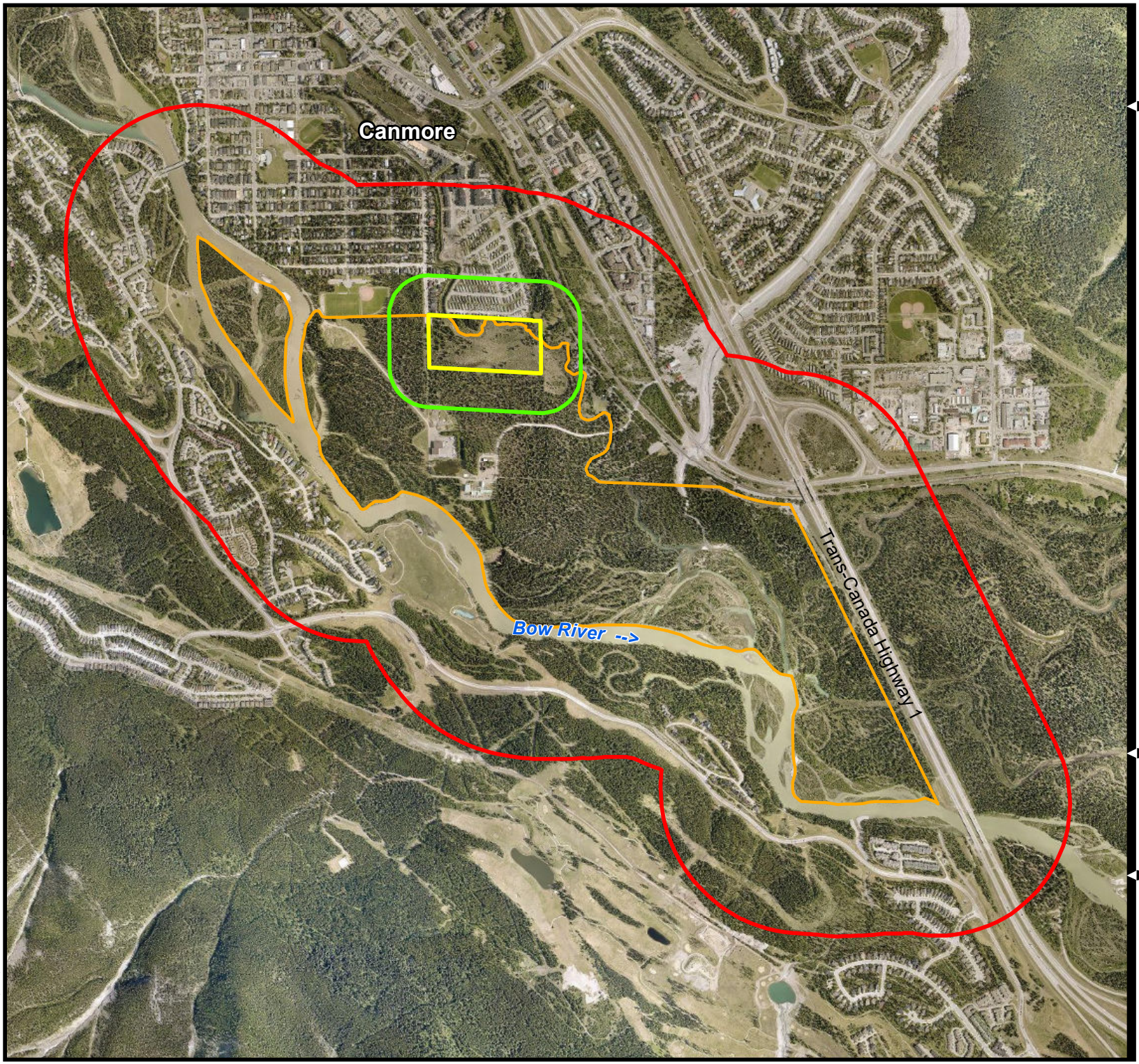
**Regional Study Area**

The Regional Study Area (RSA) was determined with input from the third-party consultant for the Town and was selected to capture potential cumulative effects associated with the proposed project. The RSA is a 500 m buffer around the SCLHP, assessed for the localized and direct project effects on selected environmental elements. The total area of the RSA is 664.1 ha.

### Temporal Boundaries

The project was assessed using two temporal boundaries, the construction and operation phases, to capture variation in project effects at different phases of the project. The construction phase includes all of the physical and sensory disturbance that may result from land clearing, site preparation and building construction (e.g., short term effects). The operation phase includes all physical and sensory disturbance that may result during the normal operations of the hospice and the residential buildings (e.g., long term effects).

For each phase, the project effects were characterized as baseline conditions, application case (i.e., the effects of the project), and reasonably foreseeable development (i.e., the effects of the project plus any additional effects from proposed or approved projects within the RSA). The Cumulative Effects Assessment is provided in Section 5.




Associated Environmental

LEGEND:

- Site Boundary
- Local Study Area
- Regional Study Area
- South Canmore Local Habitat Patch

0 500 m

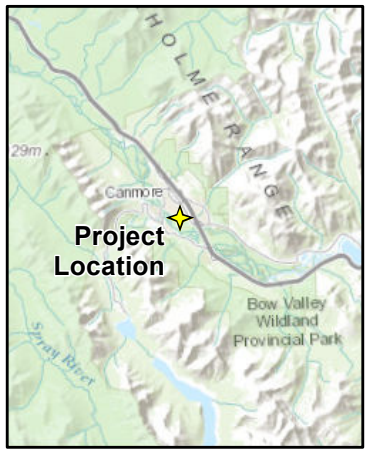



FIGURE 2-1: STUDY AREAS

South Canmore EIS for 3rd Avenue South Land

| | |
|---|---|
| **AE PROJECT No.** | 2019-8457.000 |
| **DATE** | AUG 2020 |
| **SCALE** | 1:20000 |
| **COORD. SYSTEM** | NAD 83 UTM 11 |
| **REV** | 1 |
| **DESCRIPTION** | ISSUED FOR DRAFT |
| **DRAWN BY** | DA |
| **CHECKEC BY** | KR |

## 2.3 Analysis of Alternatives

Based on preliminary work completed on the property in 2019 and consultation with regulatory agencies (AEP) and Town officials (e.g., Fire, Land), the Conceptual Land Use Plan was adjusted to align existing land use and potential future land use (**Appendix A**). Following an initial review by the Town and their third-party reviewer (dated December 21, 2020), changes were made to the proposed design to further reduce effects on vegetation, wetlands, wildlife, and wildlife habitat.

Alternatives to the project have been considered with the primary focus being on reducing the effects on biophysical components (e.g., vegetation, wetlands, wildlife, and wildlife habitat) and maintaining suitable forage and resting habitat for wildlife using the SCLHP. Variations in building configurations, site layouts (including changes in setbacks), and amount of proposed development have been explored. The orientation of the buildings in the Project Area have been consolidated to the far north-western periphery of the parcel to reduce habitat fragmentation or any potential effects on wildlife movement through the Project Area. The location and orientation of the proposed hospice was reconfigured to avoid a shrubby wetland ecosystem and reduce cul-de-sac effects on wildlife movement. The Conceptual Land Use Plan situates all buildings and access roads in an orientation that minimizes physical or perceived barriers to wildlife movement and concentrates disturbance adjacent to an area where human development already exists (e.g., 3rd Avenue) and all access roads are planned to concentrate traffic to originate from 3rd Avenue).

The following are descriptions of the subdistrict layouts and how the analysis of alternatives has resulted in avoiding or reducing effects on vegetation, wetlands, wildlife, and wildlife habitat.

**Subdistrict A** will include a palliative care facility (i.e., a hospice) that, during operation, will house a limited number of beds (six hospice suites and two day-use suites). Each bed will have a limited number of assigned personnel, and visitors to the hospice are anticipated to restrict their movements between the parking lot and interior of the building. The orientation of the building has been considered in the subdistrict and is being proposed in a location that concentrates human activity to one area, limits the amount of linear disturbance required to access the building (i.e., the access is coupled with access to Subdistrict D along an existing cleared area of 3rd Avenue), and focuses all work in an area where existing human disturbance (e.g., an existing berm, walking trails) likely contributes to reduced use by wildlife species.

Following review by the Town and their third-party reviewers, the footprint of the hospice was moved east and reconfigured to both avoid a wetland ecosystem and reduce cul-de-sac effects on wildlife movement by improving line-of-sight for wildlife (see Section 3.4 for more detail).

**Subdistrict B** has been situated such that all access locations originate from an existing cleared extension of 3rd Avenue and to maintain suitable forage and rest opportunities for all wildlife in the remaining portion of the SCLHP. The associated noise disturbance, once construction is complete, is expected to be minimal and similar to residential noise in adjacent developments. Development in Subdistrict B will 'feather' human development into the SCLHP compared to the hard-line development boundaries to the north.

**Subdistrict C** is not within the SCLHP and is situated such that access to the Project Area is concentrated with the other developments and a 20 m setback from Spring Creek is observed. A single, clear span crossing over Spring Creek is proposed to access Subdistrict C. Although no design is currently in place, permits and authorizations for this crossing will be pursued upon approval to develop this area. The crossing will incorporate design features that will avoid Spring Creek (i.e., clear span) and reduce the footprint of the bridge within 20 m of Spring Creek (as defined by the high-water mark). Options for the bridge location were provided to the Town, and the Town selected the currently sited location as the preferred option. All potential alternative locations for the crossing were considered and the

currently proposed location will result in the least disturbance to vegetation and ecosystems because the least amount of access road and utilities will be required.

**Subdistrict D** includes the proposed main residence of the proponent. The building footprint for this residence is situated at the northern periphery of Subdistrict D to maintain suitable temporary forage and rest for wildlife in the area and reduce any potential effects on wildlife movement through the SCLHP. Many options were considered for the location of this building and the final location is a balance between maintaining the existing low-shrub grassland area and reducing any visual or movement disturbance of the building on wildlife. The main residence is oriented to the east-central extent of the subdistrict to maintain movement, forage, and rest opportunities for wildlife in a manner that will not change significantly from current conditions.

## 2.4 Impact Assessment Criteria

The criteria described in Table 2-1 are used to assess potential impacts on ecological components and selected biophysical resources.

**Table 2-1**
**Impact Assessment Criteria**

| Direction | Magnitude | Scale | Duration | Reversibility | Frequency | Confidence |
|---|---|---|---|---|---|---|
| **Positive:** Effects represent a real or potential increase in quantity, quality or other attribute of the biophysical resource receptor. | **Negligible:** Measured or estimated effect results in no change to the biophysical resource (i.e., quantity, quality or other attribute) compared to existing conditions. | **Project:** Effect occurs within the project building envelope | **Short-term:** Effect occurs only during construction. | **Short-term:** Effect can be reversed after completion of construction. | **Isolated:** Effects occur for a limited or specific time frame during construction. | **Predictable:** Effect on biophysical resource is well understood based on known knowledge and mitigation measures. |
| **Negative:** Effects represent a real or potential decrease in quantity, quality or other attribute of the biophysical resource receptor. | **Low:** Measured or estimated effect results in no noticeable effects to the biophysical resource (i.e., quantity, quality or other attribute) compared to existing conditions. Effects are within the understood range of natural variation. | **Local:** Effect occurs within the Project Study Area. | **Long-term:** Effect persists beyond the construction. | **Long-term:** Effects persist into operations. | **Intermittent:** Effects occur periodically throughout construction | **Uncertain:** Effect on biophysical resource is not well understood and/or effectiveness of mitigation measures are not known or uncertain. |
| **Neutral:** No observable effect in quantity, quality or other attribute of the biophysical resource receptor. | **Moderate:** Measured or estimated effect results in a noticeable affect to the biophysical resource (i.e., quantity, quality or other attribute) compared to existing conditions. Effects are within the understood range of natural variation and may require specialized mitigation. | **Regional:** Effect occurs within the Regional Study Area. | | | **Frequent:** Effects occur continuously for the duration of construction and persist into operations. | |
| | **High:** Measured or estimated effect results in an affect to the biophysical resource (i.e., quantity, quality or other attribute) compared to existing conditions. Effects are beyond the understood range of natural variation, and likely require specialized mitigation. | | | | | |

# 3 IMPACT ASSESSMENT

## 3.1 General Overview

The scope of the EIS is based on the 2016 Town of Canmore Environmental Impact Statement Policy and the approved ToR for the project (**Appendix B**). Included in this assessment are biophysical resources considered important by the applicant, public, scientists, or government agencies. Based on the background review, results of three field visits completed for the project and the ToR, the following biophysical resources are addressed in this EIS:

- Soils and Terrain;
- Vegetation and Wetlands;
- Wildlife and Wildlife Habitat;
- Fish and Fish Habitat;
- Water Quality, Hydrology, and Hydrogeology;
- Land and Resource Use;
- Air Quality; and
- Cultural and Heritage Resources.

Based on the location of the property, the Conceptual Land Use Plan (in relation to Canmore as a whole; **Appendix A**), data from field assessments, research for the Bow Valley and the habitat of the RSA, the EIS will also considered the following:

- South Canmore Local Habitat Patch (SCLHP) – A portion of the proposed project will be undertaken in the SCLHP. A local habitat patch is defined as an area meant to meet the food, rest and water needs of wildlife for a short period while they negotiate a corridor network towards a larger, regional habitat patch at its end. Habitat patches need to provide sufficient habitat in their interior for an animal to rest or feed with security from human disturbance (BCEAG 2012). Habitat patches are recognized municipal planning considerations in the Town of Canmore.
- Elk and elk habitat - Elk were selected as a valued component for the project because they may be affected by the project, are known to habituate to human disturbance (i.e., are likely to persist throughout the project life), and are known to use habitats throughout the Bow Valley, including the LSA. As such, elk may use habitats within the LSA during both the construction and operation phases. By focusing the effects assessment on elk and elk habitat, their ecological requirements and life history are considered in Project planning and mitigation recommendations.
- Large carnivores, such as black bear, grizzly bear, cougar, coyote, and wolf were assessed through a review of existing reports. Habitat suitability for each species was assessed during three surveys of the property during various seasons. Existing disturbance, proximity to human use areas, ambient noise, sign (e.g., rubs, tracks, pellets, beds, scat), anecdotal reports, and species-behavioural response to disturbance were considered in the assessment for large carnivores.
- Species at Risk - Species at risk include any plant or wildlife species listed by the Alberta *Wildlife Act*, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and the *Species at Risk Act* (SARA) for their conservation concern. Species at risk are known to, or have the potential to, occur in the Bow Valley and species at risk were assessed based on the habitat suitability of the Project Area for each species. The ecological requirements of each species at risk with potential to occur on the property are considered in project planning, project design, and mitigation recommendations.

A review of existing environmental conditions included available reports, desktop information, guidelines and the proposed Conceptual Land Use Plan. In 2019 and 2020, air photographs, existing reports (e.g., BIAs), and data layers were reviewed before the completion of site visits to identify vegetation communities, wildlife habitat suitability and potential for sensitive or at-risk plants, plant communities, fish and wildlife, flood risk, and historical resource values (HRVs). In 2021, interviews with provincial biologists and land users familiar with the site were conducted. Documents related to adjacent proposed developments were reviewed prior to a winter survey to assess relative wildlife habitat use during winter. Winter is a limiting season for wildlife. The winter survey focused on the SCLHP (including the property) and wildlife use within it. The review of existing information focused adjacent land use and potential effects of the project on the LSA and RSA.

Site visits were completed on October 2, 2019, July 23, 2020, and January 15, 2021 to verify information identified in the desktop review, describe existing environmental conditions, and support responses to the initial review of the EIS by the Town and their third-party reviewers. The site visits focused on the LSA and SCLHP.

Potential impacts of the proposed land use change on the biophysical environment was evaluated against potential impacts from the construction and operation of the project.

For purposes of this EIS, construction activities include:

- Staging and laydown.
- Vegetation clearing.
- Grubbing, excavation, grading, and soil compaction.
- Access road construction.
- Building foundation installation.
- Utilities installation.
- Building construction (interior and exterior).
- Landscaping and restoration.

For purposes of this EIS, operational activities could include:

- Horse pasturing and grazing.
- Vehicle access to and from the Project Area.
- Increased adjacent land use (i.e., increased foot/bicycle traffic in surrounding area, including unsanctioned trails).

## 3.2 Soils and Terrain

### 3.2.1 Methods

A desktop review was conducted to determine soil information in the LSA including review of the Alberta Soil Inventory Database (AGRASID) (AARD 2015), Environmental Site Assessment Repository (ESAR) (GoA 2020a), and existing public reports relevant to the LSA.

Additional soil and terrain information was acquired during field assessments completed on October 2, 2019 and July 23, 2020. Soils in the Project Area were inspected to a depth of approximately 30 cm using a shovel. Soil texture and colour were investigated as per the Field Handbook for the Soils of Western Canada (Watson and Pennock 2016). Detailed subsurface soil characteristics will be acquired as part of future geotechnical investigations, pending approval of the application.

### 3.2.2 Baseline Conditions

The Project Area is located in the valley bottom of the Bow River Valley. A review of AGRASID (AARD 2015) suggests that Chernozems and Orthic Regosols are the most common soil types in and surrounding the Project Area. Geotechnical investigations were completed in the Project Area in 2003 and results indicate that the soils are similar to conditions found elsewhere in South Canmore (Matrix Planning and Wildlife & Company 2003). They consist of 0.6 to 1.0 m of sandy silt overlying gravel which is relatively thick (up to 30 m) of sands and coarse gravels. These gravels are interpreted to be glacial outwash deposits originating during the retreat of glaciers from the Bow Valley. Soil development in the Project Area has been influenced by past fluvial deposits from high water levels as well as vegetation decomposition. Soils within undeveloped portions of the LSA are considered to be native and minimally disturbed.

During the site visits in 2019 and 2020, the terrain was identified as being primarily level and hummocky. An existing berm is located along the western boundary of the Project Area and has an elevation that is generally higher than the Project Area. Soils in the hummocks include mineral soils with a silty loam texture with pockets of sand. Soils in the hummock depressions include mineral soils with a clayey loam to silty loam texture. No organic soils or restrictive layers (e.g., clay) were encountered. Soil colour was variable across the Project Area have the following values and chroma:

- 10YR 2/2 (Very Dark Brown) in the coniferous forest;
- 10YR 4/3 (Brown) in the tall shrub and low shrub-grass areas; and
- 10YR 5/1 (Gray) in shrubby swamp.

### 3.2.3 Potential Impacts

Potential impacts to soil and terrain from the proposed land use include:

- Handling, grubbing, excavation, mixing, and grading of soils.
- Wind and water erosion on areas of exposed soil, especially if soils are fine to coarse textured (e.g., silt, sand and silty sand).
- Compaction of fine textured (clay loams) soils.

Table 1-1 summarizes the proposed changes to land cover in the Project Area. Approximately 1.24 ha of the Project Area does not occur in the SCLHP (i.e., it is either within Subdistrict C or area classified as Spring Creek).

Approximately 0.92 ha of soil may be disturbed to support residences, access roads, and outbuildings. Some soil disturbance (approximately 0.37 ha) will occur as a result of construction of a residence, support building and access road proposed for Subdistrict D; however, soil disturbance will be primarily associated with the proposed land uses for Subdistricts A, B, and C (approximately 0.55 ha) and impacts are expected primarily during construction when soil stripping, handling, excavation, and grading will occur. Construction in all subdistricts will alter existing terrain and topography as fill is required to raise the buildings to ensure the structures are above the 1:100-year flood level. Based on calculations of the Conceptual Land Use Plan, the majority of the Project Area (approximately 7.73 ha, 89% of the Project Area), will remain in an unaltered state, preserving existing soil and terrain characteristics.

With the implementation of mitigation measures (Section 3.2.4) effects on soils and terrain are predicted to be **negative** in direction and **negligible** in magnitude as a result of the Project. Confidence in this prediction is **predictable**.

Environmental effects on soils and terrain are summarized in Table 3-7, Section 3.10.

### 3.2.4 Recommended Mitigation

Recommended mitigation measures for soils and terrain include:

- Develop and implement mitigation measures and controls provided in an Erosion and Sediment Control (ESC) Plan before any soil disturbance occurs. The ESC will address risks associated with soil and terrain, including erosion, stockpiling requirements, and will remain in place during construction and until soils have revegetated.
- Retain a qualified Environmental Monitor during construction. Implementation and authority for mitigation related to soils and terrain will be at the discretion of an environmental monitor who will adhere to a Construction Environmental Management Plan that will be in place prior to construction.
- Salvage topsoil and stockpile for use in restoration following construction. Topsoil that has been salvaged for restoration should be handled once during the first growing season and seeded with native grasses to minimize soil loss and weed encroachment. Any soil piles present on the Project Area will be inspected by the Environmental Monitor for regulated weeds. An Invasive Species Management Plan will be implemented if necessary.
- Topsoil stripping should be restricted to the construction envelope (i.e., only the area necessary to safely construct) and topsoil handling and re-handling should be minimized.
- Minimize potential disturbance caused by stockpiles. No stockpiles, whether topsoil or fill, will be stored within 20 m of Spring Creek or Policeman Creek or within areas of the property that are not already planned for disturbance.
- Prevent the loss of soil during wind or rain events. Stockpiles of any soils required to be brought onto the property should not exceed the volume necessary for construction. If stockpiles are to be kept for longer than one construction season, the stockpiles will be vegetated with native grass seed to reduce erosion or invasive plant encroachment potential. Short term stockpiles should be covered with tarps or wetted if dust plumes are observed leaving the property.

Mitigation measures recommended for the project are further described in Section 4.

## 3.3 Vegetation and Wetlands

### 3.3.1 Methods

#### Vegetation Communities

Vegetation communities and plants observed were recorded during field visits completed on October 2, 2019 and July 23, 2020. The field assessment included a species inventory (including weed species) and habitat delineation. Vegetation inventories were completed in each habitat type throughout the Project Area and the LSA. Vegetation communities are described based on their dominant species. The provincial guidance document *Stepping Back from the Water* (GoA 2012) was used as a guide when assessing vegetation communities along Spring Creek and Policeman Creek (Section 5.2.1). Representative photographs were taken throughout the LSA.

Vascular plant species observed during the vegetation surveys were classified as native, non-native, or invasive species using the following reference manuals:

- Flora of Alberta (Moss 1996);
- Plants of the Western Boreal Forest and Aspen Parkland (Johnson et al. 1995); and
- Weeds of Canada and the Northern United States: A Guide for Identification (Royer and Dickinson 1999)

Species listed as prohibited noxious or noxious weed species according to the *Weed Control Act* were identified and their level of infestation in each vegetation community recorded.

### Rare and Sensitive Plants

A background review and directed surveys to detect rare plants was completed within the development footprint.

A desktop review was conducted using ACIMS (AEP 2019) and FWMIS (AEP 2021) to identify potential rare and at-risk plants that may be present within 5 km of the Project Area. The ACIMS list was cross-referenced with those listed as "At Risk" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2019), those listed as "At Risk," "May Be at Risk," and "Sensitive" in the General Status of Alberta Wild Species (ESRD 2015b), as well as those listed in Schedules 1 to 3 of the federal Species at Risk Public Registry (GoC 2019).

Procedures for rare plant surveys were based on the recommendations and guidelines outlined in the Alberta Native Plant Council (ANPC) Guidelines for Rare Vascular Plant Surveys in Alberta – 2012 Update (ANPC 2012). A meandering rare plant survey completed throughout the LSA on July 23, 2020 focused on all proposed construction components and habitats of highest likelihood of occurrence for plants of conservation concern. The site visits were designed to verify and characterize ecosystem types present, document any sensitive species encountered, and record non-native species (weeds).

### Weed Species

Weed species were recorded during surveys completed on October 2, 2019 and July 23, 2020 to identify regulated (GoA 2017b) and nuisance species that occur on the property.

## 3.3.2 Baseline Conditions

No sensitive species were identified from the desktop search (**Appendix C**). Representative photographs taken during the field visits are provided in **Appendix D**.

The Project Area is located in the Rocky Mountain Region and the Montane natural subregion (Natural Regions Committee 2006). The Project Area consists of native upland, wetland, and riparian vegetation along the banks of Spring and Policeman creeks. The Project Area is comprised of the following vegetation communities:

- **Coniferous forest**: dominated by white spruce (*Picea glauca*), silverberry (*Elaeagnus commutate*), shrubby cinquefoil (*Dasiphora fruticosa*), willow (*Salix spp.*), kinnikinnick (*Arctostaphylos uva-ursi*) and several grass species (*Leymus innovatus; Poa palustris*). This community comprises a small proportion of the Project Area due to existing disturbance (fire) at the site but dominates the rest of the LSA, extending further into the RSA.
- **Tall shrub:** dominated by regenerating balsam poplar (*Populus balsamifera*), spruce, willow (*Salix spp.*), bluegrass (*Poa spp.*) and moss species. The tall shrub community is similar to the coniferous forest ecosystem, but less dense.
- **Low shrub-grass:** is likely the result of an historic fire based on the presence of fire scars at the base of mature trees and abundance burned woody debris (standing and fallen) throughout this area. Approximately 319.6 $m^2$ of this ecosystem is within 20 m of Spring Creek (i.e., riparian). Large portions of the open-shrub grass community are currently being used by the adjacent lease holders as horse pasture, as evidenced by the grazing of the willow and grass species. Horses have been contained to this ecosystem by an electric fence that is installed when horses are grazing and removed when they are rotated to another pasture (east and on an adjacent landowner parcel). Subdistrict D was observed to be heavily grazed in 2019 when the horses were present. No horses were present at the time of the field survey on July 23, 2020, which resulted in more

prominent cover of native species in 2020 compared to 2019. White spruce saplings less than 1 m in height are located throughout this community. This community is the largest ecosystem represented within Subdistrict D and will remain largely intact in its current condition following construction.

- **Shrubby swamp wetland:** dominated by shining willow (*Salix lasiandra*), wild rose, balsam poplar and turned sedge (*Carex retrorsa*). One shrubby swamp is located in the western portion of the Project Area, partially within proposed Subdistrict A. The natural subsurface water flow has been impounded in this area by an artificial berm extending due south from 3rd Avenue. The establishment of this shrubby swamp likely resulted from a combination of the constructed berm (located along the western boundary of the property) and historic beaver activity (causing regular flooding) in Spring Creek. Beavers and their structures have been removed from the system and no recent evidence of beaver activity was observed anywhere along Spring or Policeman creeks. The shrubby swamp is hummocky and vegetated throughout (i.e., no exposed mineral soils exist) and likely holds water in the spring and early summer during years with abnormally high-water tables. It is not likely that standing water occurs annually. In years with abnormally high-water tables, standing water likely only persists until water levels recede following freshet (i.e., spring runoff) because water levels in the shrubby swamp is likely hydraulically connected to the Bow River.

Total area represented by each vegetation community is presented in Table 3-1. Vegetation communities are shown on Figure 3-1. A complete list of vegetation species observed in the Project Area is provided in **Appendix C.**

**Table 3-1**
**Vegetation Community Proportions of the Project Area***

| Vegetation Community | Total Area (ha) | Percent of Project Area |
|---|---|---|
| Coniferous forest | 2.02 | 22% |
| Tall shrub | 0.97 | 16% |
| Low shrub-grass** | 4.96 | 54% |
| Shrubby swamp | 0.25 | 3% |
| Spring Creek | 0.45 | 5% |
| **Total area** | **8.65** | |

*Area summaries are based on Conceptual Land Use Plan, ecosystem mapping in the field and do not include existing disturbance; summaries may differ from Appendix A.
**Approximately 1.8 ha (21% of the Project Area) is within 20 m of Spring Creek (i.e., riparian).


Associated Environmental

Legend

- Habitat Patch
- Site
- Riparian Area

Vegetation Community

- Coniferous Forest
- Low Shrub-Grass
- Tall Shrub
- Shrubby Swamp Wetland

N

0 20 40 60 80 100 m


# FIGURE 3-1
# Vegetation Communities

## 3rd Avenue South Land

| | |
|---|---|
| AE PROJECT No. | 2019-8457 |
| DATE | 2020 AUGUST |
| SCALE* | 1:3,000 |
| COORD. SYSTEM | NAD 1983 UTM ZONE 11 N |
| REV | 1 |
| DESCRIPTION | ISSUED FOR DRAFT |
| DRAWN BY | EC |
| CHECKED BY | WL |

ESRI World Imagery: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; Roads: Statistics Canada, 2018; Railway: Government of Canada, 2018; Hydrography: Altalis Ltd., 1996.Habitat Patch:Town of Canmore, 2020

The Town of Canmore requires that all developments adhere to their FireSmart guidelines (Montane 2018). Overall, the property is "Moderate-Low" FireSmart Hazard Level. Much of the property has been classified as "Cured-Grass" and the remaining classified as "Mature Spruce (C-2)[4]" wildland fuel types, which is consistent with the existing conditions. FireSmart activities will be applied to the property following guidelines from Montane (2018).

Several non-native species were identified in the Project Area, including dandelion (*Taraxacum officinale*), creeping thistle (*Cirsium arvense* ), ox-eye daisy (*Leucanthemum vulgare*), tall buttercup (*Ranunculus acris*), alsike clover (*Trifolium hybridum*), timothy grass (*Phleum pretense*), quackgrass (*Elymus repens*), tumbling mustard (*Sisymbrium altissimum*), and common plantain (*Plantago major*). Most non-native species were confined to the existing berm at the western extent of the Project Area and included quackgrass, timothy, tumbling mustard, creeping thistle, dandelion, common plantain.

No rare plants, plant species at risk or rare plant communities were observed in the Project Area or LSA. No limber pine or whitebark pine were identified in the Project Area or adjacent areas.

### 3.3.3 Potential Impacts

Potential impacts to vegetation and wetlands from the proposed Conceptual Land Use Plan include:

- Disturbance to rare plants not observed during site assessments.
- Disturbance or fragmentation of native vegetation communities, including riparian ecosystems.
- Tree removal or shrub pruning to meet FireSmart requirements.
- Spread and introduction of regulated weeds or other non-native species.
- Introduction of non-native species such as ornamental grasses that require additional nitrates or phosphates for fertilizer may affect water quality.

#### Disturbance to Rare Plants

Rare plant surveys were conducted in all proposed or potential locations for construction. Rare plants are difficult to detect and may only occur for a short duration each year or may only germinate during specific climatic conditions (e.g., excessively wet seasons). Construction activities (e.g., vegetation or land clearing) may result in disturbance to rare plants that were not observed during the rare plant surveys. Mitigation proposed in Section 3.3.4 are intended to avoid or reduce potential effects on rare plants.

#### Vegetation Disturbance

Construction proposed for Subdistrict D will have a minimal impact on vegetation communities, with impacts being primarily associated with the development of the main residence, support outbuilding, and access road (Figure 3-2). Vegetation disturbance in Subdistrict D (total 0.37 ha) will primarily affect the low shrub-grass community that has historically been (and continues to be) used by the adjacent neighbour to the east to pasture horses. Grazing has occurred within Subdistrict D for at least 60 years (pers. comm. Kerry Kaleta) and although not currently planned, the proponent may desire to continue grazing in the future. Grazing has helped to maintain the low-shrub-grass community. If future grazing continues on the property, grazing will be managed using electric fences to avoid effects on riparian areas. It is expected that if grazing does continue, the low-shrub composition of this vegetation community will be maintained.

[4] Mature Spruce (C-2) classification is considered by Montane (2018) to be within the "Extreme" FireSmart Area Hazard Level.

The Conceptual Land Use Plan would involve the clearing of approximately 0.92 ha of vegetation within the coniferous forest, tall shrub, low shrub-grass, shrubby swamp and riparian communities (Table 3-2). Long-term impacts of the land use in the Project Area may include the establishment or spread of invasive plant species into native communities. Following initial review by the Town, design updates in Subdistrict A have resulted in the reconfiguration of the proposed hospice to avoid the shrubby wetland.

Riparian vegetation in the Project Area has been affected by an existing human-use trail created by people walking along the banks of Spring Creek. Considering the long history of the Town of Canmore, this trail may have occurred many decades previous, long before the existence of the Town. The proposed construction of a bridge over Spring Creek to connect Subdistrict C to Subdistrict B will also result in approximately 326 $m^2$ (2% of total riparian in Project Area) of disturbance to riparian vegetation, fragmenting the contiguous nature of the riparian corridor for wildlife. The proposed bridge will be clear span, and just above grade on completion, which is not expected to affect wildlife movement. No evidence of disturbance from horses on riparian vegetation was observed during the site visits in 2019 or 2020; likely because of the temporary electric fences that are installed when horses are grazing in the area. Animal sign (e.g., tracks, pellets, browse) observed along the banks of Spring Creek originated from elk and deer. Willow and grass species have been browsed along Spring Creek, suppressing the growth of shrubs. No additional effects of the project on riparian vegetation is expected because the proposed land use will implement a 20 m setback along Spring and Policeman creeks.

**Table 3-2**
**Proposed Project Effects on Ecosystems in the Project Area**

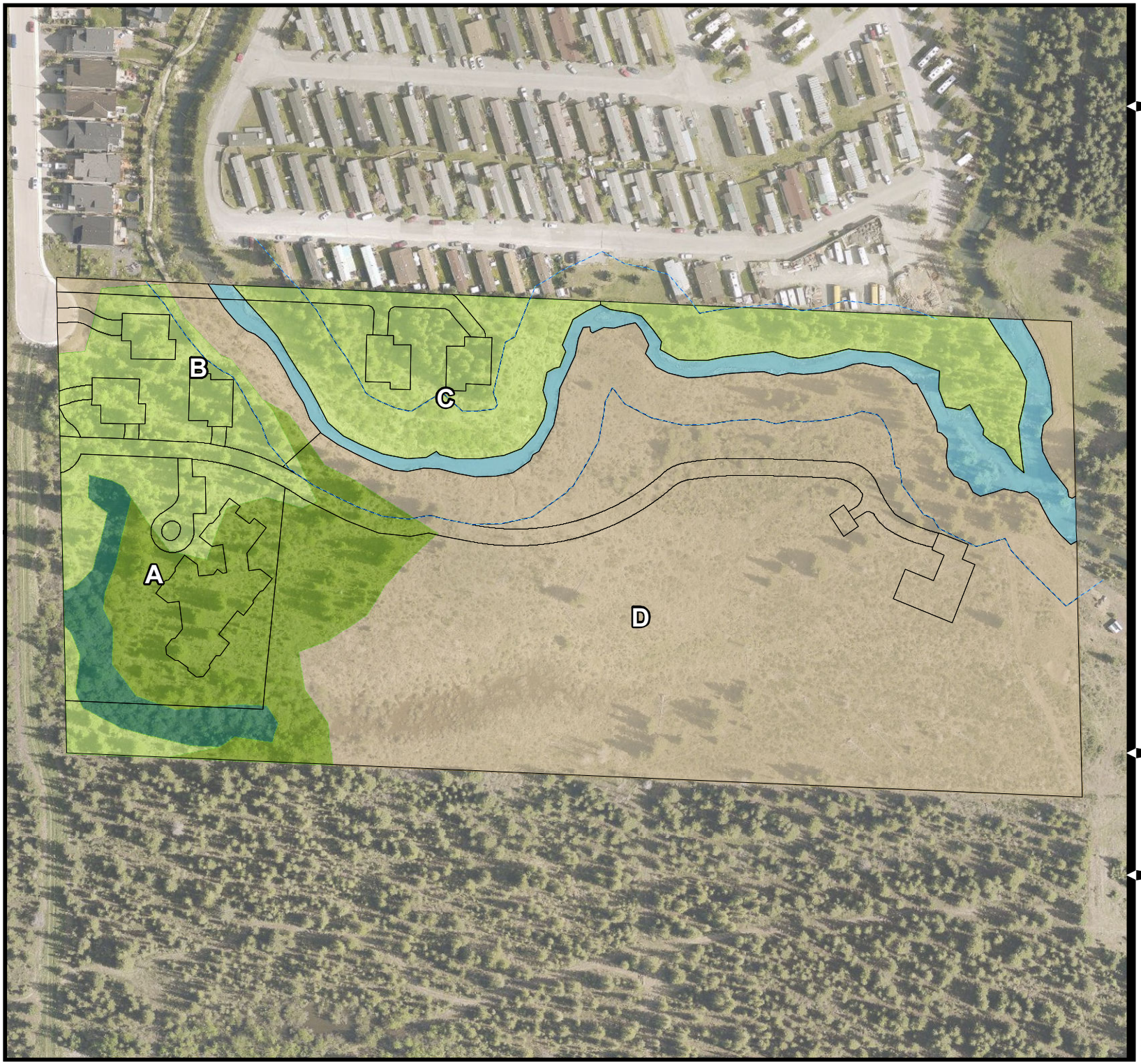
| Ecosystem Type | Total Ecosystem Area (ha) | Conceptual Design Footprint (ha)* | Percent of the Project Area |
|---|---|---|---|
| Coniferous Forest | 2.02 | 0.44 | 24% |
| Tall Shrub | 0.97 | 0.19 | 13% |
| Shrubby Swamp Wetland | 0.25 | - | - |
| Low-Shrub Grass** | 4.96 | 0.29 | 6% |
| Spring Creek | 0.45 | - | - |
| **Total** | **8.65** | **0.92** | **11%** |

*Includes driveways/roads.
**Approximately 1.8 ha (21% of the Project Area) is within 20 m of Spring Creek (i.e., riparian).

### FireSmart Thinning

FireSmart mitigations and guidelines will be applied to each building. Combustible materials (e.g., trees and "ladder fuels") will be removed within 10 m of any structures. Additional measures may be required in areas beyond 10 m including, but not limited to, thinning understorey woody species, pruning the boles of some trees to 2.0 m, or removing coarse woody debris (i.e., reducing fuel loads). Because the conceptual design may change before final design, the amount of vegetation that will be disturbed is not confirmed. The reconfiguration of the hospice in Subdistrict A will result in fewer trees removed because the new location (and its 10 m FireSmart setback) occupies more of the low shrub-grass vegetation community than its previous location (which was dominated by mature

spruce). Estimates based on the current conceptual design have been provided in Table 3-3 and are subject to change when designs are finalized.



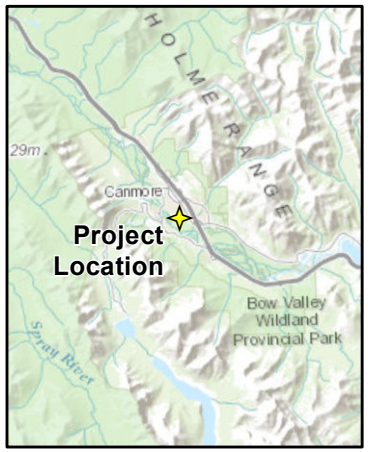

Associated Environmental

LEGEND:

- 20m Setback
- Proposed Plan
- Stream
- Coniferous Forest
- Low Shrub-Grass
- Tall Shrub
- Shrubby Swamp

N

0 100 m




# FIGURE 3-2: PROJECT CONCEPTUAL DESIGN AND ECOSYSTEM MAP

South Canmore EIS for 3rd Avenue South Land

| | |
|---|---|
| **AE PROJECT No.** | 2019-8457.000 |
| **DATE** | FEB. 2021 |
| **SCALE** | 1:2231 |
| **COORD. SYSTEM** | NAD 83 UTM 11 |
| **REV** | 1 |
| **DESCRIPTION** | ISSUED FOR DRAFT |
| **DRAWN BY** | DA |
| **CHECKEC BY** | KR |

**Table 3-3**
**Estimated Area of FireSmart Vegetation Disturbance**

| Subdistrict | Conceptual Building Footprint | Estimated FireSmart Thinning Area* | Estimated Number of Trees Removed** |
|---|---|---|---|
| A | 0.16 | 0.25 | 5 |
| B | 0.11 | 0.22 | 15 |
| C | 0.07 | 0.15 | 24 |
| D | 0.07 | 0.21 | 6 |
| **Total** | **0.42** | **0.82** | **50** |

*This is the area of 10 m setback and is not reflective of total vegetation disturbance. Some areas will not need to change from current condition.
**Estimate based on high resolution imagery. Actual areas and number of trees removed are expected to change once designs are finalized, and only trees required for removal will be cut.

#### Invasive Plants

Invasive species may be introduced, may expand their current level of infestation, or may be transported off of the Project Area to other locations, as a result of construction or operation of the Project. Several non-native species were identified along the berm at the western boundary of the Project Area and throughout the LSA, along the designated and non-designated multi-use trails.

With the implementation of mitigation measures, effects on vegetation and vegetation communities can be avoided or reduced. The proposed land uses are expected to have a **negative** and **low** impact on vegetation and wetlands in the Project Area. Confidence in this prediction is **predictable.**

Environmental effects to vegetation and wetlands are summarized in Table 3-7, Section 3.10.

### 3.3.4 Recommended Mitigation

Recommended mitigation measures for vegetation and wetlands include:

- Develop and implement a Construction Environmental Management Plan that addresses management practices that avoid or reduce effects on vegetation. Minimizing construction disturbance areas and avoiding disturbance to the shrubby wetland and areas within 20 m of Spring and Policeman creeks (except in areas necessary for the bridge crossing) should be addressed in the plan.
- Offset the removal of some of the trees on the property by planting trees to replace them. Replacement should be 1:1, but of a species that is not considered a wildfire risk (e.g., plant cottonwood instead of spruce).
- Improve the erosion resiliency of Spring Creek's riparian area by planting native shrubs or trees along the south (left) bank of Spring Creek within 20 m of the stream high-water mark.
- If grazing continues on the property, isolate grazing activities from Spring and Policeman Creek by installing electric fencing outside the 20 m setback of the streams. Monitoring the fences regularly during grazing and remove the electric fence when grazing stops.
- Minimize the extent of the construction footprint to reduce impacts on vegetation, in particular rare plants that may be growing, or in the soil seedbank, on the periphery of construction.

- Native vegetation should be left undisturbed wherever possible except for those activities required for construction (e.g., land clearing or FireSmart).
- Implement restoration activities that use native plants in areas where construction is complete to meet objectives set out in the Town of Canmore land use bylaws and prevent wind or water erosion issues.
- Post signage that educates construction personnel and other individuals that may access the Project Area about the importance of not spreading invasive vegetation on or off the site. Signage should include information about the risk of invasive plant spread into the SCLHP.
- Manage non-native and regulated weed species within the Project Area prior to initiating construction to prevent the spread of these species.
- Implement WildSmart and FireSmart mitigations and guidelines for the Town of Canmore (Montane 2018).

Mitigation measures recommended for the project are summarized in Section 4.

## 3.4 Wildlife and Wildlife Habitat

### 3.4.1 Methods

#### Background Review

Wildlife and wildlife habitat near the LSA have been studied in previous applications to the Town or in related studies (e.g., Golder 2017, Edwards 2013, MSES 2019, Corvidae 2018, BCEAG 2012, TERA 2012). Wildlife information gathered during those studies or projects was used to inform this EIS. Wildlife species identified in other studies or projects were reviewed and included in this EIS if suitable habitat exists in the LSA and the species has potential to be affected by the project. Wildlife and wildlife habitat (including species at risk) was assessed by identifying wildlife species that have potential to be affected by the project based on the habitat suitability of the property.

As part of the wildlife and wildlife habitat assessment, relevant studies, literature, and data were reviewed, including but not limited to:

- Home Ranges, Resource Selection, and Parasite Diversity of Urban Versus Rural Elk (*Cervus elaphus*) - Master Thesis (Edwards 2013).
- Calgary Canmore Areas Aerial Winter Elk Survey 2008 (ASRD 2008).
- Connectivity of Elk Migration in Southwestern Alberta – Master Thesis (Paton 2012).
- Spatial and Temporal Dynamics of Wildlife Use of a Human-Dominated Landscape (Hojnowski 2017).
- Spatio-temporal Patterns of Wildlife Distribution and Movement in Canmore's Benchlands Corridor (Miistakis 2010).
- Wildlife Corridor and Habitat Patch Guidelines for the Bow Valley (BCEAG 2012).
- Recommendations for Improving Human-Wildlife Coexistence in the Bow Valley (GoA 2018).
- Recommendations for Trails and Management of Recreational Use for the Town of Canmore: South Canmore and West Palliser (TERA 2012).
- Spring Creek Land Exchange EIS (Matrix Planning and Wildlife & Company 2003)
- Environmental Impact Statement for the Resort Centre Area Structure Plan Amendment (Golder 2017).
- Environmental Impact Statement Addendum WMC Expansion Project (MSES 2019).
- Bow Valley Bear Hazard Assessment (Honeyman 2007).
- Cougar Occurrence Summary 2000-2018 (Alberta Government 2019).
- Fish and Wildlife Internet Mapping Tool (FWIMT) (ESRD 2019).

- Species at Risk Public Registry (GoC 2019).
- Camera-trap data for the SCLHP available between 2008 and 2017 (FWMIS 2021).
- Various additional reports and information related to the species of interest for the Project.

A search of the FWMIS database was completed to identify known occurrences of wildlife and wildlife habitat (e.g., nests, dens, hibernacula) that have been recorded in the RSA. The search was conducted for a 5 km radius around the Project Area. A desktop review of available public data was completed and a comprehensive list of wildlife species with potential to occur in the Canmore region was reviewed (Golder 2017). MSES (2019) presents a refined list of wildlife species that were detected within 1 km of the Project Area. The wildlife species list (MSES 2019) was cross-referenced with the Alberta Wild Species Status, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and the *Species at Risk Act* (SARA) registry lists to verify their conservation status (AEP 2015, GoC 2019a and GoC 2019b).

Interviews with regional AEP biologists responsible for the Bow-Crow District were conducted to gather information about wildlife use and occurrence in the SCLHP and ensure that all publicly available wildlife data was being included in the EIS. Camera-trap data for the SCLHP and available collar data in the RSA were provided by AEP following the interviews.

The Strava online data tracking application was used to detect relative use of the SCLHP and the Project Area by the public. Strava is a tool used by serious recreationists (e.g., skiers, cyclists, runners who want to track their distance over time) to collect and track their data and share it with a global community. Strava represents a portion of the public and is not a representative sample of the public; however, it can be used to show presence/non-detection of the public use of the land.

Alberta Environment and Parks (AEP) has been conducting remote camera trap studies in the Bow Valley around Canmore. One of the camera traps is located within the SCLHP and data from that camera was reviewed. The camera trap is located immediately north of the braided floodplain of the Bow River, in the southeastern corner of the SCLHP (UTM 11 616667E, 5659195N).

### Field Surveys

Wildlife surveys completed in the Project Area were designed to characterize habitat suitability for those species likely to occur in the LSA. The surveys followed provincial protocols outlined in the Sensitive Species Inventory Guidelines (ESRD 2013). A meandering transect was completed on July 23, 2020 that focused on general wildlife habitat suitability, breeding bird potential, and raptor nests in the LSA. The meandering transects intersected all ecosystem types in the Project Area, including areas where high density of wildlife sign was anticipated (e.g., areas that provided important forage, cover, or resting habitat). Wildlife presence/detection, habitat use, and habitat features within the LSA were recorded. Habitat use was determined by the presence and relative density of wildlife sign observed during the surveys. Tracks, scat, pellets, beds, game trails, and browse were the primary indicators of wildlife use in the LSA. No wildlife features (e.g., dens, burrows, nests) were observed during the meandering transect.

A follow-up, winter wildlife survey was conducted on January 14 and 15, 2021 to characterize wildlife habitat suitability and relative wildlife use during their most limiting season (winter). A meandering transect was conducted and wildlife sign (e.g., tracks, pellets, scat, rubs, beds, cratering, scrapes, and browse) and relative wildlife habitat use was recorded. At the time of the survey, snow depth was 15-20 cm deep with relatively soft snow conditions (10-15 cm foot penetration in consolidated base with 0.5 cm of fresh powder on top) that allowed observers to identify tracks from both large mammals (e.g., ungulates) and small mammals (e.g., mice, voles). The survey was completed at least six

days since the previous snowfall, which provided suitable winter tracking conditions and excellent conditions to assess habitat selection during periods of deep and shallow snowpack.

#### Habitat Fragmentation and Patches in SCLHP

Habitat fragmentation was evaluated by delineating existing disturbance in the SCLHP using available ortho-imagery and ArcGIS software. Linear and non-linear disturbance was identified and mapped, and interior patch availability was measured using the ArcGIS Spatial Analyst Euclidian straight line distance tool. Interior patch availability (i.e., distance to human disturbance) was defined as the distance that a wildlife individual would have from the nearest human disturbance and was a relative measure of disturbance or security.

### 3.4.2 Baseline Conditions

#### 3.4.2.1 South Canmore Local Habitat Patch

The Project Area is partially located within the SCLHP (Figure 2-1). Habitat patches are defined as areas that "likely meet the food, rest, security, and water needs of species for short periods of time while negotiating the corridor network toward larger regional habitat patches". For the SCLHP, larger regional patches exist to the east (Bow Flats Habitat Patch) and to the west (Georgetown – CNC Habitat Patch) via connecting corridors and local habitat patches that are highly fragmented by human development (Figure 1-2). The Wildlife Corridor and Habitat Patch Guidelines (BCEAG 2012) recommend that the size of a Local Habitat Patch must be sufficient to meet the minimum security needs for a female grizzly bear, which is 4.5 km2 (Gibeau et al. 1996) with a minimum width of 1.2 km. The 2012 BCEAG guidelines suggests that new human development should not be allowed within patches that are less than 4.5 $km^2$. BCEAG (2012) outlines preferred configurations for the shape, size, and location of wildlife corridors and habitat patches.

Recommendations in the Human-Wildlife Coexistence report for the Bow Valley states that if development is to be considered in the SCLHP, development should be directly adjacent to existing development to limit further fragmentation and planned in a manner that limits wildlife-human conflict (GoA 2018). The Conceptual Plan situates development in the northern periphery of the Project Area and buildings have been configured to avoid or reduce effects on wildlife.

When considering the scale at which wildlife in the Bow Corridor move (e.g., 4.5 $km^2$ or larger home range), and based on the general principles described for the preferred shape of a habitat patch (i.e., the SCLHP is the least favourable shape) (BCEAG 2012), the SCLHP in its entirety can be considered a cul-de-sac shape, or even a dead-end that terminates in high density urban setting for wildlife, when considering wildlife movement from east to west.

The SCLHP is adjacent to the Tipple Wildlife Corridor, a narrow, highly disturbed strip of land that connects the SCLHP to the Three Sisters Along Valley wildlife corridor to the south. A 'conceptual wildlife corridor' exists on the eastern boundary of the SCLHP and is intended to connect the SCLHP across Highway 1 to the Bow Flats Regional Habitat Patch to the east (Figure 1-2; BCEAG 2012). This conceptual corridor has no infrastructure to accommodate wildlife movement, and as a result, the SCLHP is functionally isolated from the Bow Flats Regional Habitat Patch, except for a narrow underpass beneath the crossing of Highway 1 over the Bow River (BCEAG 2012, Jacques Whitford Limited 2008). This underpass may facilitate wildlife movement between the habitat patches during seasons with low water volume in the Bow River.

#### Existing Disturbance

The SCLHP is fragmented, isolated, and may be considered a dead-end habitat feature; any large-ranging wildlife such as grizzly bears or wolves entering the SCLHP from the south or west are impounded to the north and east of the

SCLHP by the Spring Creek Development and Highway 1/CP Rail corridors, respectively. The total area of the SCLHP is 1.8 $km^2$ and under 0.9 km at its widest. These areas do not meet the minimum recommended size for a local habitat patch (BCEAG 2012) and may be more suitable as a wildlife corridor for medium-sized mammals, such as coyotes or lynx (Matrix Planning and Wildlife & Company 2003).

Based on disturbance mapping using 2017 ortho-imagery, approximately 5.3 km of linear features exist in the SCLHP, amounting to a linear feature density of 2.9 $km/km^2$. Using 2009 imagery, the BCEAG (2012) estimated the total length of linear features in the SCLHP to be 12.3 km, for a linear feature density of 6.8 $km/km^2$. The discrepancy between the two estimates may be a result of variations in mapping methods, image resolution, or map scale.

The Project Area is a privately-owned parcel partially within the SCLHP. Public users of the SCLHP have been detected using the Project Area for walking, cycling, hiking, snowshoeing, and skiing. The Canmore Nordic Center is situated south of the Project Area and is an area of high human use in the winter. Human use is concentrated in the north western portion of the SCLHP, along the major trails that are designated for hiking, walking, and cycling. Numerous trails, roads, and old buildings are scattered throughout the SCLHP, fragmenting the landscape south of the Project Area. The south eastern portion of the SCLHP is relatively less fragmented, although it is laced with non-designated trails that are used in all seasons, particularly in the winter, which is a sensitive season for wildlife.

Based on disturbance mapping using 2017 ortho-imagery, the SCLHP has been fragmented by human disturbance into 9 distinct patches. Analysis of this fragmentation resulted in a maximum distance from physical human disturbance (e.g., roads or trails) for wildlife being approximately 400 m at anytime while using the SCLHP (Table 3-4). Wildlife using the Project Area are always subjected to some form of sensory disturbance (e.g., Highway 1, CP Rail, Heliport, dog walkers, trail users).

**Table 3-4**
**SCLHP Fragmentation, Patch Size, and Interior Habitat Availability**

| Patch Count | Patch ID[1] | Patch Area (ha) | Interior Habitat Distance[2] (m) |
|---|---|---|---|
| 1 | 1 | 11.3 | 238 |
| 2 | 2 | 23.7 | 220 |
| 3 | 3.1 | 5.2 | 87 |
| 4 | 3.2 | 18.6 | 140 |
| 5 | 3.3 | 3.0 | 55 |
| 6 | 4 | 75.9 | 400 |
| 7 | 5 | 1.2 | 30 |
| 8 | 6 | 6.2 | 70 |
| 9 | 7 | 19.9 | 220 |
| **Total** | | **165.0** | - |

[1] Patch ID relates to the number of patches since the SCLHP was established (i.e., it was established with 7 patches, and Patch number 3 has been fragmented twice since.

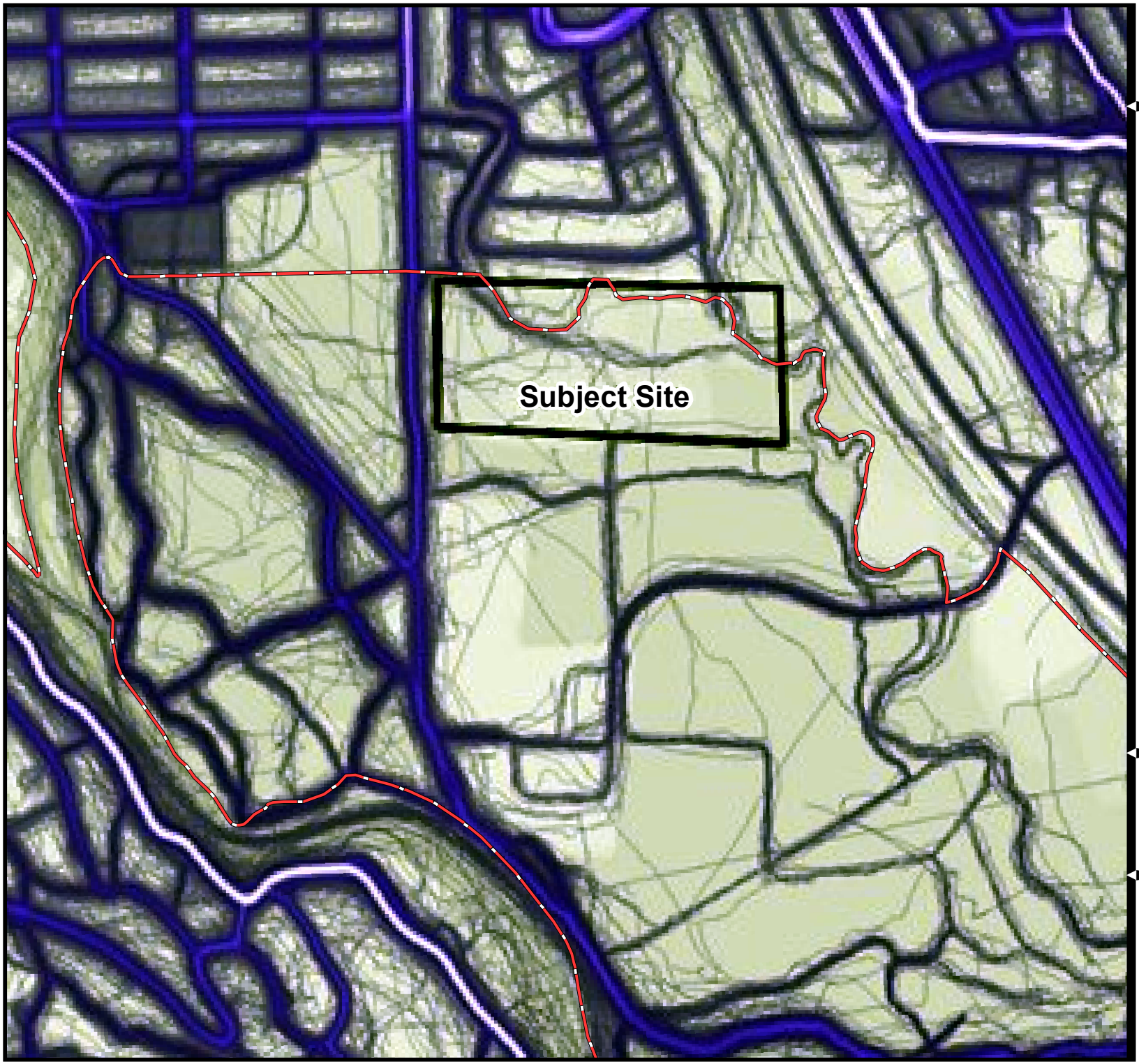
[2] Interior Habitat Distance is the furthest distance (estimated using ArcGIS Euclidian straight line distance tools) available inside a patch from disturbed habitat. Data are based on 2017 ortho imagery.

The Waste Transfer Station and Waste Management Centre and their two access roads (oriented east-west) further fragments habitats in the broader landscape south of the Project Area. Regular heavy and light vehicle traffic is a common and ongoing disturbance along these roads during operational hours, which may deter large carnivores (e.g., cougar) from entering the SCLHP any further north. A ranchland property located south of the Waste Transfer Station is surrounded by wooden fencing, presumably to contain horses, and may isolate some wildlife species such as bears from accessing the property.

Although the Canmore Community Monitoring Report (Town of Canmore 2017) states that a number of trails were closed and rehabilitated to prevent use of non-designated trails, there is evidence that non-designated trails, including non-trails (i.e., hiking off-trail), are being used by the public throughout the SCLHP and the Project Area. During all of the field surveys, human use was documented throughout the SCLHP and Project Area. Sign of cycling, hiking, on-and-off leash dog walking, skiing, and snowshoeing on non-designated trails were activities observed or detected during the three visits that were completed. Although educational signage may be encouraging some of the public to use designated trails, the non-designated trails in the SCLHP and the Project Area are still being used for recreation by the public.

Figure 3-3 presents a "heatmap" generated from a data collection application called Strava[5]. In the heatmap, each user leaves a GPS track. The track becomes brighter with each additional user. The most highly used trails appear wide and orange-white, while less frequently used trails appear dull purple (Figure 3-3).

[5] Strava Heatmaps are regularly growing with continued use and map human use over time. Strava can be accessed at: https://www.strava.com/heatmap#13.68/-115.35866/51.07426/hot/all




Associated Environmental

LEGEND:

South Canmore Local Habitat Patch

N

0 150 m

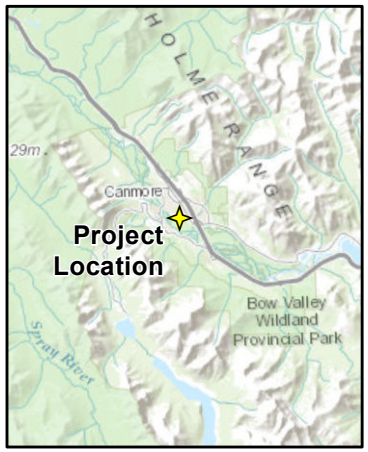



FIGURE 3-3 STRAVA HEATMAP AND HUMAN USE IN THE SCLHP

South Canmore EIS for 3rd Avenue South Land

| | |
|---|---|
| **AE PROJECT No.** | 2019-8457.000 |
| **DATE** | MAR. 2021 |
| **SCALE** | 1:7000 |
| **COORD. SYSTEM** | NAD 83 UTM 11 |
| **REV** | 1 |
| **DESCRIPTION** | ISSUED FOR DRAFT |
| **DRAWN BY** | DA |
| **CHECKED BY** | KR |



PATH: F:\mapping_projects\2019\19-8457_McCaffery_Canmore\Fig 3-3.mxd / PLOT DATE: 3/23/2021 2:26:09 PM

The Strava heatmap shows a high degree of human use in the Project Area and throughout the SCLHP. The evidence of use presented by Strava shows a relatively lower amount of incursions into the Project Area; however, it is important to note that only serious recreational users upload data to Strava, and these data are not representative of the larger population of casual users who may be dog walking or hiking (i.e., far more trail users are likely to not use Strava, than are likely). During the site visit in January 2021, a total of eighteen trail users were asked if they were currently or had previously used Strava in the area. None of those questioned reported using Strava, and only four of those questioned were aware of Strava or its use.

Sensory disturbance (noise) originates from many sources adjacent to, and from within, the SCLHP. Most notably, Highway 1 and the CP Rail line present persistent, regular background noise from vehicles and trains traveling through Canmore. In all portions of the SCLHP visited during the field visit in 2021, noise from Highway 1 and CP Rail was present and constant. Both CP Rail and Highway 1 are primary east-west transportation corridors for vehicles (estimated at 21,500 vehicles per day) and trains (40 trains per day; 1.7 trains/hour) traveling through Canmore (Alberta Government 2019). Additional sources of noise that could be considered disturbance to wildlife include:

- Alpine Helicopters Heliport (frequent from approaching, departing, and maintenance of helicopters);
- Waste Transfer Station and Waste Water Treatment Plant (noise from vehicles accessing the sites);
- Waste Transfer Station (noise from back-up warning alarms on large vehicles); and
- Construction noise originating from the Spring Creek expansion occurring to the north.

Section 3.7 discusses existing land use, resources, and the impact of those on the Project Area in further detail.

#### 3.4.2.2 Wildlife and Species at Risk

Based on the location and habitat suitability of the LSA relative to Canmore as a whole, wildlife data from the Bow Valley and relevant reports, existing disturbance in the area, large mammals that have the potential or have been reported to use the LSA and SCLHP include black bear (*Ursus americanus*), grizzly bear (*Ursus arctos*), wolf (*Canis lupus*), coyote (*Canis latrans*), cougar (*Puma concolor*), deer (*Odocoileus* spp), moose (*Alces alces*), and elk (*Cervus elaphus*).

Results of a search of the FWMIT data base indicated that fourteen fish and five wildlife species have been detected in the LSA (AEP 2018). No species at risk have been reported within the terrestrial LSA; however, following an interview with regional biologists, observations of barred owl (*Strix varia*; provincially listed as “Sensitive”), grizzly bear (provincially listed as “At Risk” and federally listed under Schedule 1 of the Species at Risk Act as Special Concern) and Canadian toad (*Anaxyrus hemiophrys*; provincially listed as “May Be At Risk”) have been reported in the SCLHP. Appendix E presents the results of the FWMIT species search for the project.

During field surveys, evidence of use by large carnivores (e.g., bear, wolf, cougar) was assessed by looking for sign (e.g., hair snagged on barbed wire, rubs on large trees, claw marks on trees, scat, tracks). Using concepts developed in Mowat and Stroebeck (2000), a survey of the existing barbed wire fence located throughout the SCLHP was completed. The hypothesis was that if large carnivores crossed the fence line, they may leave evidence in the form of hairs snagged on the barbs. Only elk hair (differentiated from bear, cougar, or wolf hair by colour, texture, and professional experience) was observed snagged out of over 2 km of barbed wire that was surveyed.

Camera trap data were reviewed, and all available data were summarized. Table 3-5 is a summary of the wildlife species detected on the cameras between 2011 and 2017.

**Table 3-5 Wildlife Species Captured in Game Cameras in SCLHP[1]**

| Species Guild | Common Name | Scientific Name | 2011 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|
| Bird | Common Raven | *Corvus corax* | | | | 1 |
| Carnivore | Cougar | *Puma concolor* | | | 3 | |
| | Coyote | *Canis latrans* | | | 20 | 7 |
| | Grizzly bear | *Ursus arctos* | | | 6 | |
| Ungulate | Moose | *Alces alces* | | | 1 | |
| | Wapiti (elk) | *Cervus elaphus* | | 44 | 12 | 1 |
| | Mule deer | *Odocoileus hemionus* | | 3 | | |
| | White-tailed deer | *O. virginianus* | | 2 | 3 | |
| Small Mammal | Marten | *Martes americanus* | | | | 2 |
| | Red squirrel | *Sciurus vulgaris* | | | 13 | 1 |
| | Red-tailed chipmunk | *Neotamis ruficaudus* | | | 1 | |
| | Snowshoe hare | *Lepus americanus* | | | 6 | 1 |
| **Total count** | | | **0** | **50** | **65** | **13** |

[1] Captures do not indicate number of individuals but number of images with that species. One individual may be captured multiple times.

### Large Carnivores

Portions of SCLHP are highly valuable for wildlife, whereas others are either highly used by people (e.g., Waste Water Treatment Plant, recreational trails throughout) or provide dead-ends to wildlife movement (e.g., Spring Creek development) (pers. comm. Brett Boukall, AEP Regional Biologist). In a recent study comparing wildlife response to human interaction, Hojnowski (2017) found "strong evidence that animals responded to recreation over extended periods (e.g., two weeks), rather than simply real-time (daily) human use", suggesting that regular human use tends to deter use by wildlife. The SCLHP is clearly used by recreational users in all seasons, during daytime and nighttime hours, for a multitude of activities ranging from off-leash dog walking, to skiing and cycling.

Large carnivores that are known to use habitats that occur in the LSA include: grizzly bear, black bear, wolf, coyote, and cougar. Existing information suggests that the LSA is a low-use area for carnivores because the area is highly disturbed by human development and sees regular human recreational use (TERA 2012; MSES 2019; Alberta Government 2019; GoA 2018; Hojnowski 2017). The following subsections discuss potential interactions between the project and large carnivores and any associated uncertainty. Mitigation provided in Section 3.4.4 is expected to reduce or avoid effects on large carnivores if they do occupy habitats near the LSA.

#### Grizzly Bear

Grizzly bears are omnivorous and select certain habitats based on the availability of forage, seasonal requirements, and proximity to human disturbance (Hojnowski 2017). Seasonally, grizzly bears will forage for berries in the fall in preparation for hibernation, hunt for newborn ungulates in spring, and forage opportunistically on forbs and

graminoids during the summer. Winter seasons are spent hibernating, in both mountainous and plateau terrain, well away from human disturbance. Den site fidelity is high (Ciarniello et al. 2005). The home range for a female grizzly bear is 4.5 $km^2$ and given that the SCLHP is only 1.8 $km^2$ (BCEAG 2012) it likely provides limited, short term habitat requirements for grizzly bears. Recent work into fine-scale habitat selection by grizzly bears has shown that grizzly bears select habitats in response to the degree of spatial and temporal disturbance caused by humans, and found that although grizzly bear habitat use "overlapped broadly with human activity, analysis of disturbance… suggested that bears made fine-scale behavioural adjustments to avoid the times and places of highest recreation intensity" (Hojnowski 2017).

Extensive work has been completed in the Bow Valley to monitor and reduce hazards associated with human-bear interactions. Bear-proof bins, changes to municipal bylaws, passive and active management, and bear attractant management (e.g., fruit-bearing tree and shrub removal) are methods that have been implemented by wildlife managers since 2000 (Honeyman 2007, GoA 2018). Recent and ongoing management tools (e.g., attractant management, public awareness) is expected to continue to reduce the potential for human-bear conflicts.

The Project Area and SCLHP provide suitable seasonal forage requirements for grizzly bear in the form of grazing. Hunting for newborn ungulates, an important food source for grizzly bears in spring, is less likely in the Project Area, because calving ungulates (e.g., elk, moose) have been known to use the island in the Bow River west of the Project Area for security during calving. Suitable and abundant early-season forage for grizzly bears to meet their energetic needs in spring is available in the southeastern portion of the SCLHP along the braided floodplain area and south of the Bow River along golf courses.

Although suitable habitat exists in the SCLHP for grizzly bear, the habitat is less functional due to the amount of existing and ongoing human disturbance than other habitats adjacent to the south of the SCLHP. Only six images of grizzly bear have been captured on game cameras in the SCLHP since 2011, and it is unclear if those observations originated from a single individual or multiple individuals (i.e., all observations were in 2016; Table 3-5). Anecdotally, grizzly bears have been known to use the southern portion of the SCLHP for forage on vegetation, but do not stay long, presumably due to the high amount of human use in the SCLHP (pers. comm. Brett Boukall, AEP Biologist). The southeastern tip and braided floodplain in the southeast of the SCLHP may provide forage and rest for grizzly bears, although human use is quite common in this area as well and may deter extended use by grizzly bears. The primary source of mortality for grizzly bears continues to be associated with transportation corridors (i.e., collisions along CP Rail and Highway 1) and less often with management interaction (e.g., destruction by wildlife management officials) (GoA 2018).

**Black Bear**

Habitat requirements for black bears are similar to those of grizzly bears, although black bears are more tolerant to human use and disturbance than grizzly bears (Honeyman 2007, GoA 2018). In support of this declaration, Honeyman (2007) reports three times as many black bear interactions with humans than grizzly bear. Most of these interactions occurred during the berry season on the south side of the Bow River, near the Stewart Creek golf course and Canmore Nordic Centre. In response, the Town of Canmore has implemented berry removal programs to deter bear foraging near the Town site, including areas in the SCLHP. No berry producing shrubs were identified during studies within the Project Area; however, suitable graminoid and forb forage does exist. Hojnowski (2017) found that in areas where off-leash dogs accompany their owners, black bears were less likely to occupy those areas.

Ancillary mitigation conducted by the Town of Canmore includes installing bear-proof garbage bins, bylaw amendments, and fruit-bearing tree and shrub removal to reduced negative interactions between black bears and humans (GoA 2018). With attractants being managed by the Town of Canmore, the historic, current, and ongoing

recreational, residential, and industrial disturbance observed in the northern portion of the SCLHP (including the Project Area) will also reduce the potential for black bear and human conflict in the SCLHP. No black bears were captured during camera traps deployed in the SCLHP; however, black bears may use habitats in the SCLHP for forage or resting.

**Wolf**

Telemetry data on GPS collared-wolves interacting with both the Town of Banff and Town of Canmore indicate clear avoidance by wolves of townsites, while demonstrating large, long distance movements along low-elevation habitats throughout the Bow Valley (GoA 2018). The Fairholme wolf pack has been reported to occupy habitats in the Bow Valley, primarily north west and north of the Town of Canmore. With a long history of persecution by humans, wolves have become sensitive to human disturbance (Hojnowski 2017), and the year-round, high volume of human use in the SCLHP (off leash dog walking, skiing, running, biking) would likely deter any wolves from entering or spending significant time the habitat patch (GoA 2018). In a study just south of the SCLHP (Hojnowski 2017), camera traps recorded wolves in fewer than 1% of the images (<100 images of 6,948 total, over 36,145 camera-trap days). Recent and ongoing management tools (e.g., attractant management, public awareness) is expected to continue to reduce potential conflict between wolves and humans.

**Cougar**

Cougars are habitat generalists and select their habitats in response to the availability of their primary prey species, deer, and opportunistically elk or moose. Deer, elk, and moose are known to use habitats in the SCLHP for forage, security, and rest, which may attract individual cougars into the SCLHP from adjacent habitats. Cougar are known to be very cryptic, although recent research has shown that some individuals may occupy habitats near human development (Alberta Government 2019). Often, these occurrences near human development are associated with cougars being attracted to the area by small pets. Images of cougar were captured on three occasions in the SCLHP in 2016; however, it is unclear if the images were of the same or multiple individuals.

Cougar home range varies in size between sexes, with females occupying territories ranging between 62 $km^2$ and 412 $km^2$ and males occupying territories between 221 $km^2$ and 1,311 $km^2$ (Alberta Government 2019). In comparison, the SCLHP is 1.8 $km^2$, which does not meet the home range needs for cougar; therefore, it is assumed that the primary range for cougar will be outside the SCLHP with only incidental occurrences within the SCLHP.

The Government of Alberta reported on cougar occurrence in the Bow Valley between 2000-2018 and ranked location zones within their study area based on number and severity of cougar interactions with humans. Despite relatively robust cougar populations in the Bow Valley, rates of conflict between cougar and humans are relatively low (GoA 2018). The Project Area (identified as South Industrial, Alberta Government 2019) was ranked as Low occurrence. Hojnowski (2017) found that hikers and off-leash dogs were negatively associated with cougar, elk, and deer (cougar's primary prey species) habitat use, and that cougar overlapped the least with human activity of all large carnivores in the study.

Based on available information, cougar may enter the SCLHP in pursuit of potential prey but are not likely to spend time in the SCLHP, due to the small size of the SCLHP and the amount of human disturbance, in particular the concentrated recreational activities in the northern portion of the SCLHP, including the Project Area. Public awareness campaigns currently in place are expected to continue to reduce potential future conflicts between humans and cougars.

### Coyote

Coyotes use habitats in the SCLHP. Sign of coyote (i.e., tracks, scat, kill site) was detected throughout the SCLHP and most prominently in areas with dense, coniferous canopy cover, such as is found in the east-central portion of the SCLHP. Recent studies have shown that coyotes and humans can coexist with very little conflict. Off leash dogs have been shown to displace coyotes (Hojnowski 2017), likely because off leash dogs present a mortality risk to coyotes. Roads and trails were extensively used by coyotes in a camera trap study conducted in similar habitats to those found in the SCLHP (Hojnowski 2017).

Based on evidence collected during the winter track survey, trails and roads appeared to be used primarily for travel, while dense coniferous understorey habitat was found to have areas of higher use for hunting and investigating. Although no den sites or sign of denning was detected, the relatively undisturbed portions of the east central SCLHP may be used for denning. Coyotes have been reported to follow or stalk dogs on and off leash, and some records of coyotes biting children; these instances are attributed to food-conditioned, individual coyotes (GoA 2018). Attractant management and public awareness campaigns are expected to continue to reduce the potential for human-coyote conflicts.

### Ungulates

Ungulates detected on the property include deer, moose, and most prominently, elk. In general, elk largely choose areas of forage availability, followed by areas of lower development, and lower slope. Attractants for elk include urban areas with large green spaces or open forested habitat that provide forage and security from predators (GoA 2018). Elk were shown to select habitats in the valley bottom over the steeper valley slopes of the Bow Valley and are known to occupy habitats in the LSA. Elk showed the strongest overall selection for habitats near existing residential developments, which is attributed to a reduction in mortality risk due to predation (Edwards 2013).

In a three-year study from 2000 to 2003, eleven elk were captured and radio-collared in the 'Canmore Corridor', an area that includes the Town's municipal boundary (Matrix Planning and Wildlife Company 2003). This study noted that:

- Approximately half of the radio-collared Canmore elk appeared to be non-migratory.
- Few elk movements were detected from the Bow Flats Natural Area across Highway 1A onto the Canmore Benchlands.
- Most elk use of the Benchlands occurred between Harvie Heights and SilverTip by elk with home ranges centered west of Town (including Banff National Park).
- Elk calving was focused around the Bow River Valley, on the island in the Bow River in the SCLHP, Three Sisters property, Wind Valley, and Pigeon Mountain.

Previous tracking and aerial survey information indicate that three spatially distinct elk herds are present in the greater Bow Valley area comprising the Bow Valley Provincial Park, Dead Man's Flats and the Canmore Townsite (Edwards 2013). Previous studies indicate that the local Canmore elk herd is part of a larger herd whose range extends from the Banff Park gates to the Stony Nation. Habitat in the valley bottom is most strongly selected by elk and they tend to show the strongest overall selection for habitats in lower elevations and level areas (river floodplains, open fields, developed areas) and near existing residential areas. Spring is an important season for elk as it signifies their calving season. Calves are at risk to predation by carnivores (e.g., wolf, bear, cougar) during this season, and in response, elk have adapted to select remote areas with good sightlines to avoid predators. Islands in the middle of rivers have been documented to provide suitable elk calving conditions, as have open forested habitat with limited disturbance (GoA 2018; Edwards 2013).

Data collected from field investigations during the growing season indicate that the Project Area and LSA are not as highly selected for by elk as they are deer. During a field visit completed on October 2, 2019, ungulate sign from elk and deer was observed, including trails, pellets, and tracks. Most tracks and pellets were from deer species, and a small amount of elk pellets and tracks observed within the Project Area, along the southern boundary. As part of the meandering survey completed on July 23, 2020, some elk and deer tracks were observed in the Project Area, with most tracks observed in the coniferous forest areas to the west and south of the Project Area. Very little sign was observed in either the Project Area or the LSA. Various game trails were observed in the LSA in the coniferous forest communities to the south and west of the property. Two well-used ungulate trails, with predominantly elk and deer tracks, were observed along the southern boundary of the property along the treeline. Additional deer and elk tracks were also observed along the bank and shore of Spring Creek; however, the elk sign was largely attributed to movement. Most tracks and scat observed within the Project Area was from horses, which were not present on the property at the time of the survey.

During winter track surveys in 2021, elk sign (e.g., grazing, browse, beds, tracks, pellets, chewing on boles of deciduous trees) was common throughout the SCLHP, with relatively less sign in the Project Area. Beds, pellets, and tracks of elk walking were observed in the Project Area, indicating that the Project Area provided rest and security from predators during the winter. Based on elk sign (i.e., tracks, pellets, sign of grazing), the existing Waste Transfer Station and Waste Water Treatment Plant south of the Project Area did not appear to affect elk movement from east to west, or from north to south; elk tracks were observed traveling past these facilities and cratering (i.e., areas where elk had used their hoof to expose grasses) was abundant along the margins of all roads in the SCLHP.

The highest concentration of elk sign was in the south eastern portion of the SCLHP, near the braided floodplain area that is predominantly graminoid and shrub species. Six elk were observed grazing in this area on January 15, 2021. Beds and abundant cratering and browse on shrubs was observed throughout the floodplain, indicating that this area provides forage, rest, and security from predators in all winter conditions (i.e., deep and shallow snowpack). The snowpack on January 15, 2021 was shallow, ranging between 15 and 20 cm in depth. Very high browse was observed on shrubby species (e.g., willow) in the floodplain area, indicating heavy reliance by elk or moose on the floodplain area over multiple years, in variable snowpack conditions, including when the snowpack is too deep to crater for grasses. Habitat throughout the rest of the SCLHP was also used by elk, primarily for walking and forage. This evidence supports anecdotal reports that the south eastern portion of the SCLHP may provide higher suitability habitat than the Project Area, based on the amount of use observed over many years. A large, open area immediately adjacent to the CP Rail line was used heavily for bedding and forage by elk, supporting the reports that elk in the SCLHP are not easily disturbed by human use when considering that trains pass through Canmore on average of 1.7 trains per hour (Alberta Government 2019).

Given that the Conceptual Land Use Plan is located in a portion of the SCLHP that is not currently or historically heavily relied on by elk during their important seasons (e.g., calving, wintering occurs in other locations of the SCLHP), the project is not expected to have a significant impact on elk or their use of habitats in the SCLHP.

Mitigation provided in Section 3.4.4 is expected to reduce or avoid effects on ungulates and their habitats.

**Birds**

A number of bird species that are particularly sensitive during the nesting season have potential to use habitats that occur in the LSA. Common bird species (e.g., black-billed magpie, American crow) likely occupy habitats in the LSA. Species of note that may occur on the property include the barred owl (*Strix varia*) and the provincially 'sensitive' and federally 'Special Concern' short-eared owl (*Asio flammeus*) (MSES 2019). The Project Area contains few trees large enough to support raptor (e.g., falcons, hawks, eagles, or owls) stick nests. During the field surveys completed in 2019

and 2020, no stick nests were observed within the Project Area or the LSA. Mitigation provided in Section 3.4.4 is expected to reduce or avoid effects on birds and their habitats.

**Amphibians**
Amphibians are most sensitive to disturbance during their reproductive life stage (spring and early summer) because they are restricted to aquatic environments for breeding, egg laying, and growing (metamorphosis).

The shrubby swamp will not be disturbed by the Conceptual Land Use Plan (Figure 3-2). The shrubby swamp is hummocky and vegetated throughout (i.e., no exposed mineral soils exist that are typical of suitable egg laying and security for amphibians) and may hold water in the spring and early summer during years with abnormally high-water tables (i.e., the shrubby swamp is hydraulically connected to the Bow River). Based on the characteristics of the shrubby swamp (i.e., limited soil gleying, vegetation, and groundcover) it is not likely that standing water occurs annually and if it does, the water does not last for any significant amount of time.

Amphibians are known to reproduce between April and July, depending on local water and air temperature (ASRD 2002). Amphibians use ponds, lakes, marshes, and temporary bodies of water for reproduction. Eggs are laid in the substrate, on vegetation, or in the water column. Once the eggs hatch, juvenile amphibians live in the water column and undergo metamorphosis (e.g., from tadpole to adult). In early life stages amphibians are restricted to aquatic environments because they acquire oxygen through external gills. Once metamorphosis is complete (approximately 1-2 weeks after eggs hatch), the juvenile will resorb their external gills and begin respiring through their skin (a process called cutaneous gas exchange) and their lungs (Tattersall et al. 2013). Juveniles metamorphose from aquatic life stages (i.e., with fins and gills) to terrestrial life stages (i.e., adults with legs and lungs) moving into terrestrial environments to forage and overwinter until the next breeding season.

Canadian toad has been identified within the SCLHP and may occupy habitats for foraging or travel during their adult stage, which is primarily terrestrial for this species (pers. comm. Brett Boukall AEP biologist). Canadian toads are most often associated with river valleys with sandy banks that are used for living and hibernation. Habitat of this description is found approximately 900 m from the Project Area in the southern portion of the SCLHP. Canadian toads, and most amphibians, breed between May and July each year in lakes, ponds, marshes, and areas with temporary bodies of water. They are known to breed in ponds that are several hundred metres from their overwintering sites (ASRD 2002).

The shrubby swamp may provide suitable amphibian breeding habitat (i.e., standing water) during seasons of abnormally high groundwater tables where the shrubby swamp holds standing water. If standing water is available and amphibians migrate to the shrubby swamp, it is possible that a full cycle of metamorphosis (i.e., from egg laying to emergence) may be completed. Emerging adults may then be found using terrestrial habitats to meet their life requisites.

Mitigation measures presented in Section 3.4.4 are intended to avoid or reduce effects on amphibians in the Project Area.

### 3.4.3 Potential Impacts

Potential effects on wildlife and wildlife habitat from the proposed Project include:

- Direct habitat disturbance (i.e., physical disturbance) of habitat used by wildlife.
- Sensory disturbance (including habitat avoidance) and human activities.
- Increased mortality risk.

### Direct Habitat Disturbance

Wildlife habitat will be directly disturbed through the clearing and grading of land to accommodate the building footprints and access roads (Appendix A). Potential effects of direct disturbance include physical habitat loss or changes in behaviour (e.g., habitat abandonment or movement deflections). Wildlife exclusion fencing is not proposed for the project; therefore, no barriers to movement are expected to result from the Project because wildlife will be able to move through retained natural habitat within and adjacent to the Project Area. Wildlife in the area, such as elk and deer, are already habituated to moving through the already disturbed South Canmore Local Habitat Patch and the Town of Canmore despite the existing amount of disturbance (e.g., residential development). Consequently, the Project is expected to have a negligible effect on wildlife movement and habitat avoidance will likely be temporary (i.e., for the duration of construction).

Approximately 0.37 ha of wildlife habitat in Subdistrict D will be disturbed to accommodate a residence, outbuilding and gravel access road. The remaining 5.24 ha of Subdistrict D will remain unaltered. Approximately 0.53 ha of wildlife habitat in Subdistricts A, B, and C will be disturbed to accommodate residences and driveways. In total, the Project will have an affect on 0.92 ha of the 8.65 ha Project Area (i.e., the property) and much of that land will remain functionally connected to the rest of the SCLHP, resulting in a **negligible** to **low** effect on wildlife habitat.

### Sensory Disturbance

Construction will result in a temporary increase in noise above the current background noise levels from the existing CP Rail line, highways, and heliport. Noise generated from construction will have short-term impacts on some wildlife species that may avoid the area due to higher noise levels from construction equipment and construction crew presence. Increased human activity may result in temporary habitat avoidance or movement deflections. However, based on work by completed by Hojnowski (2017), wildlife may habituate to the construction noise as construction progresses. The construction of the Project will not require any blasting, so vibration resulting from the work will be limited to earth-moving equipment.

Potential sensory disturbance effects on wildlife during operation and occupation of the land include an increase in vehicle noise and human activity associated with the Conceptual Land Use Plan; however, the concept of the plan considers the spatial layout of the Project in relation to existing disturbance and land use and concentrates potential sensory effects to one area (the northwest) that already has existing human disturbance (e.g., 3rd Avenue) (Section 2.3). The increase in vehicle noise and human activity may result in changes in habitat use or movement deflections; however, the site is currently adjacent to the community of Spring Creek to the north, will be within 130 m of the CP Rail line to the east, and 200 m to the Waste Transfer Station and Wastewater Treatment facilities to the south. In addition, other commercial and residential areas, the Municipal Heliport, Bow Valley Trail and the Trans-Canada Highway are all located within 650 m of the east boundary. Noise from these features was heard throughout the site visit on October 2, 2019, July 23, 2020, and January 15, 2021 and it is expected that noise from the operation of the proposed land use plan will be below the ambient noise from these existing surrounding land uses.

There is existing human use within and adjacent to the Project Area; however, the Project Area is used relatively less than an existing berm located along the western boundary of the Project Area (Figure 3-3). For example, the berm was observed to be used by various recreationists throughout the visit, including joggers, mountain bikers, cyclists, skiers, on-and-off leash dog walkers, and hikers. The wildlife in the area are likely habituated to this existing human use and presence as evidenced by extensive grazing by elk along the margin of the berm. Mitigation presented in Section 3.4.4 is expected to avoid or reduce effects of sensory disturbance on wildlife.

### Increased Mortality Risk

The project may marginally increase the risk of human-wildlife interactions or may result in increased mortality risk on individual wildlife during construction or during operation/occupation of the Project Area. This potential effect may occur due to improper storage of garbage and food, through direct management action on problematic large carnivores (e.g., in the unlikely event of a Very High or Extreme interaction[6] between cougar and humans; Alberta Government 2019), or through accidental mortality caused through direct disturbance. The proposed development will avoid or reduce surprise encounters between humans and all wildlife species because the conceptual plan maintains suitable line-of-sight for wildlife (i.e., reducing cul-de-sac effects) while concentrating development along the northern periphery of the SCLHP. It is anticipated that the open concept spacing of the buildings (relative to adjacent development to the north), the sight-lines available, and the availability of "escape terrain" (i.e., open space where wildlife can flee) will reduce potential aggressive or defensive behaviour if wildlife and humans interact.

Available mapping that shows pre-berry human-bear conflict in the Bow Valley in and around Canmore by Alberta Environment and Parks indicates that adjacent lands are high-risk of conflict interactions. This area mapped as high-risk is a highly densified portion of Canmore, and mapping speaks to the density of housing, the assumed higher encounter rates of humans, and a limited available escape terrain for wildlife if humans and wildlife do interact. The Conceptual Land Use Plan presents an open concept that provides good line-of-sight and available escape terrain.

It is expected that the Town of Canmore will continue to implement passive and active mitigation measures to avoid and reduce increased mortality risk on large carnivores (e.g., fruit and berry producing plant removal) (GoA 2018). Therefore, the project will avoid increased mortality risk on large carnivores by reducing attractants for specific species (e.g., black bear).

If amphibians are using the shrubby swamp for breeding during construction, emerging adults may subject to mortality if the adults enter the construction area. During occupation of the Project Area, amphibians moving to and from the shrubby swamp may be killed crossing a road or parking area.

Mitigation presented in Section 3.4.4 is expected to avoid or reduce the risk of increased mortality on wildlife during construction and operation/occupation of the Project Area. With the implementation of mitigation measures (Section 3.4.4) effects wildlife and wildlife habitat are predicted to be **low** in magnitude and **long-term** in duration as a result of the project. The confidence in this prediction is **predictable**.

Environmental effects on wildlife and wildlife habitat are summarized in Table 3-7, Section 3.10.

## 3.4.4 Recommended Mitigation

Recommended mitigation measures to avoid and reduce effects on wildlife and wildlife habitat as presented below.

### Direct Habitat Disturbance

- Limit the area of land clearing and vegetation disturbance to only the area necessary for construction and personnel safety. The limits of construction in the shrubby swamp area should be clearly demarked in the field to ensure that vegetation associated with the wetland is not disturbed. A construction monitor should be on site during all vegetation clearing activities to ensure that no accidental encroachment occurs beyond what is proposed.

[6] Very High = Cougar depredating on domestic animals (livestock, pets) in developed areas or charges people or domestic pets. Extreme = Cougar injures or kills people. (Alberta Government 2019)

- Fence off open excavations during construction to prevent wildlife entrapment and remove fencing following construction.

### Sensory Disturbance

- Implement a Construction Management Plan to be approved by the Town to mitigate construction activities that could pose a hazard to people and wildlife.
- Follow the Town of Canmore's Noise Bylaw to reduce the effects of noise on wildlife, including work starting after dawn and ceasing before dusk.
- Design street and outdoor lighting to screen and prevent illumination into the SCLHP.
- Use dark-sky lighting in the design of all buildings to minimize light disturbance at night.
- Consider planting trees along the periphery of the Project Area, including along the margin of Spring Creek, to improve wildlife security. Seedling density should target at least 40% cover when seedlings mature to function as suitable cover for elk (BCEAG 2012).
- If a species at risk is encountered in the Project Area, cease construction activities until consultation has occurred with Alberta Environment and Parks (AEP), and appropriate mitigation measures have been implemented (e.g., setbacks, timing restrictions).

### Increased Mortality Risk

- Develop and implement a Wildlife Management Plan during construction to keep the site clean of food waste and other attractants that could attract wildlife, in particular bears. Continue to remove natural wildlife attractants such as buffaloberry. The wildlife management plan should include adaptive management strategies if wildlife mortalities are reported.
- Remove vegetation designated for clearing outside of the migratory breeding season for this region (i.e., do not disturb vegetation between April 15 and August 20), to minimize breeding bird mortality. Inspect vegetation for nests before being felled, limbed, or removed as an additional measure.
- Do not harass, feed, or interact with wildlife.
- Dispose of waste appropriately, including following the Town's bylaws related to bear-proof waste storage.
- Report project related wildlife injury or mortality to the Town of Canmore and AEP.
- Prior to construction, retain a Qualified Professional to conduct auditory monitoring of the shrubby swamp during the spring and early summer to determine if the swamp is being used by amphibians for breeding. If presence is detected, install isolation fencing between the shrubby swamp and any construction activities to avoid accidental mortality of amphibians that may be moving to the swamp.
- Monitor any amphibian mortality on roads or parking lots and report to the Alberta FrogWatch registry. Report observations of Canadian toad to AEP.
- Following construction of the Project Area, continue to manage the Project Area in accordance with WildSmart guidelines by not planting trees or shrubs that bear fruit that may become an attractant for wildlife.

Mitigation measures recommended for the Project are summarized in Section 4.

## 3.5 Fish and Fish Habitat

### 3.5.1 Methods

A desktop review and field investigation were completed to determine aquatic resources present in the Project Area. The desktop review consisted of searches of online databases for documented species occurrences or additional

habitat information and review of exiting environmental reports, where available. A field assessment to address information gaps and document existing conditions or environmental sensitivities was completed on October 2, 2019. The area of assessment focused on Spring Creek and surrounding riparian areas. The assessment was completed on foot during low water levels in Spring Creek.

Information collected during the assessment was used to prepare qualified aquatic environmental specialist recommendations outlining mitigation measures to prevent, avoid or reduce potential project effects, and information required to submit applicable regulatory permit or approval applications, such as a request for review to Fisheries and Oceans Canada, if the need arises.

Information on fish species present in Spring Creek were identified in the desktop assessment reports and online databases reviewed. Fish sampling was not completed during the field assessment due to the large number of information currently available on Spring and Policeman Creek.

Alternative watercourse crossing locations and riparian areas were assessed along Spring Creek to provide additional information on site-specific environmental features to support planning, project design, and consideration of potential contingencies, as discussed in the *Stepping Back from Water* development guidelines (GoA 2012).

### 3.5.2 Baseline Conditions

Spring Creek runs through the north section of the Project Area. Spring Creek is a tributary of the Bow River which is approximately 160 m southwest of the proposed land use Project Area. Spring Creek discharges into Policeman Creek before its confluence with the Bow River (Figure 3-1). As Spring Creek is hydraulically connected to the Bow River, there is the potential for any species that occurs in the Bow River to be present in Spring Creek. A search of the Fish and Wildlife Information Management System showed Spring Creek to be a known fish bearing waterbody that supports: brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), bull trout (*Salvelinus confluentus*; provincially listed as At Risk, and federally as a Threatened species on Schedule 1 of the *Species at Risk Act*.), cutthroat trout (*Oncorhynchus clarki*), lake trout (*Salvelinus namaycush*), longnose sucker (*Catostomus catostomus*), and mountain whitefish (*Prosopium williamsoni*).

Under the *Water Act* Code of Practice for Watercourse Crossings – Canmore Management Area Map, Spring Creek is a mapped waterbody and adopts the Class B Classification for Policeman Creek and the September 1 to April 30 restricted activity period (RAP) and has been identified as brown trout and bull trout spawning habitat.

Four unidentified fish were observed from the channel banks in Spring Creek during the field visit. The Spring Creek channel substrates were primarily fines with some gravel dominated areas. Fines substrates present are unconsolidated and were overlaying gravels and cobbles substrates. Where observed, gravel and cobble substrates had small amounts of algae growing on the surface. The riparian vegetation along the creek bank has stabilized the banks, large amounts of grasses and willows line the channel. Small diameter woody debris was abundant in the reaches of Spring Creek near subdivisions B and C, likely originating from historic beaver activity in the area. Dense woody debris deposited in the channel creates a barrier or mat of organic material covering large areas of the channel substrates. The channel banks of the creek were well defined, and there was little evidence of erosion or sloughing observed. Fish habitat potential in Spring Creek includes rearing, cover and foraging habitat potential provided by overhanging riparian and emergent vegetation, large and small woody debris, and a few locations with undercut banks (primarily downstream of Subdivision C, near the confluence with Policeman Creek).

There were no deep pools observed in or adjacent to the Project Area and the channel is unlikely to provide overwintering habitat for the species present in the Bow River and its tributaries. Gravels and vegetation (emergent

and woody debris) may provide spawning potential for salmonids and forage species respectively. Overall, habitat features provide moderate quality rearing, foraging and spawning potential for fish species present. This may include use of habitat in Spring Creek by bull trout (Threatened under Schedule 1 of the *Species at Risk Act*) and other salmonids.

There was evidence of horse movement within the creek; banks had hoof prints in the fine channel substrates. In addition to horse disturbance, there was evidence of human disturbance; anthropogenic debris was seen embedded in the channel bottom. Below the confluence to Policeman Creek both stream depth and water volume increased, providing improved habitat potential for larger bodied fish species. The confluence of Spring Creek and Policeman Creek has large pools, riffles, and a gravel bar. The substrate diversity increased with an increase in gravels and cobbles. The gravel bar situated below the confluence may function as a spawning area for some fish species. The junction of Spring Creek and Policeman Creek could provide moderate habitat for larger bodied fish species.

### 3.5.3 Potential Impacts

Potential impacts to fish and fish habitat could occur through:

- Temporary changes in water quality for fish as a result of sedimentation or spills during construction.
- Disturbance to riparian habitat associated with the construction of a bridge between Subdivision B and Subdivision C.
- Increase in impervious surfaces associated with development and alteration of drainage and surface runoff.

Following the Town of Canmore bylaws[7] and discussion with the Town planning department, the proposed land use activities have been designed to occur at least 20 m away from Spring Creek, with the exception of a single, clear span bridge that will access Subdivision C from 3rd Avenue.

The clear span bridge will result in the permanent disturbance of approximately 319 $m^2$ of riparian habitat within 20 m of Spring Creek. No bridge design is currently in place, and detailed bridge design and all required permits and authorizations will be pursued upon approval of the Conceptual Land Use Plan. The bridge will be designed to be clear span and mitigation measures are expected to be successful to avoid all impacts on the instream habitat of Spring Creek. No temporary or permanent disturbance to Spring Creek below the high-water mark is anticipated. In recognition of provincial guidance documents (e.g., GoA 2012), mitigation in the form of offsetting has been proposed to replace the habitat disturbed within 20 m of Spring Creek (i.e., for the bridge approach) by improving riparian habitat downstream of the proposed bridge, along portions of Subdistrict D and C that are currently vegetated with low growing shrubs and grasses. Proposed offsetting will include planting trees and shrubs that are intended to improve habitat for fish, wildlife, and reduce future erosion of Spring Creek's banks.

Mitigation measures presented in Section 3.5.4 are intended to avoid or reduce effects on fish and fish habitat and potential effects on fish and fish habitat are summarized in Table 3-7, Section 3.10. With the implementation of mitigation measures (Section 3.5.4) effects on fish and fish habitat are predicted to be **neutral** in direction and **negligible** in magnitude as a result of the Project. The confidence in this prediction is **predictable**.

[7] 2020 Revised Town of Canmore Land Use Bylaw Section 2.5.1. Available at: https://canmore.ca/municipal-services/residents-development-planning/planning-reference/land-use-bylaw

### 3.5.4 Recommended Mitigation

The primary approach to protect Spring Creek is mitigation through avoidance. All project activities will be set back at least 20 m from the top of bank of Spring Creek, except for a single, clear span bridge to access Subdivision C. The following mitigation measures are intended to avoid or reduce effects on fish and fish habitat:

- Develop a Construction Environmental Management Plan (CEMP) that identifies risks and mitigates potential effects on Spring Creek. Spill protection, spill response, and erosion and sediment control (ESC) will be primary components of the CEMP to reduce effects on fish and fish habitat.
- Develop and implement an Erosion and Sediment Control (ESC) Plan before any construction begins to avoid changes in water quality. ESC measures must be implemented, amended or altered during, and post-construction depending on site conditions. All ESC measures must be maintained and monitored throughout construction activities. All deficiencies must be immediately addressed. ESC measures may need to remain in place post-construction until final restoration and landscaping activities are complete and re-vegetated areas are established.
- Retain a qualified professional during all work within 20 m of Spring Creek to monitor construction and proactively implement mitigation to avoid effects on Spring Creek. The monitor will have the authority to stop work if they deem the work presents a risk to fish or fish habitat.
- Install temporary ESC measures according to the ESC Plan to prevent erosion or potential sediment deposition into Spring Creek until revegetation occurs. ESC measures should be inspected regularly and frequently to ensure they are working as designed.
- Avoid erosion or sedimentation into Spring Creek or Policeman Creek by restricting access to the creek by horses, if horses are boarded in the Project Area. Restrict access by horses to the creeks by installing, and monitoring the effectiveness of, single-strand electric fence similar to the existing temporary fence. Install the electric fence at least 20 m from Spring and Policeman creeks and remove the electric fence if horses are not using the Project Area.
- Improve habitat quality for fish and wildlife by offsetting for disturbed areas associated with the bridge. Select areas along Spring Creek for restoration that are currently not shrubby and plant native shrub species (e.g., willow or poplar staking) within 20 m of the high-water mark of the stream. Stakes should be installed at a density of 0.5 stakes/$m^2$ and sites selected for offsetting should focus on the outside bank of bends in the stream to double as flood and erosion mitigation.
- Develop a spill response plan and ensure sufficient spill response materials are present in all equipment or readily available and in quantities appropriate for the equipment used. Ensure crews are trained in the proper use of spill response materials.
- Clearly demark in the field the limits of construction, including areas surrounding the clear span bridge. Retain an environmental monitor to ensure that no construction (except for the clear span bridge) occurs within 20 m of the stream banks as per the Conceptual Land Use Plan.
- Avoid storing hydrocarbons (e.g., fuels or lubricants for equipment) in the Project Area. If hydrocarbon storage is required, store, service, and re-fuel equipment more than 30 m from any waterbody, ditch, or channel that may result in fuels reaching Spring Creek or Policeman Creek. All hydrocarbons stored on site must be stored in double-walled containers with at least 110% capacity of the volume to be stored.

Mitigation measures recommended for the project are further described in Section 4.

## 3.6 Water Quality, Hydrology and Hydrogeology

### 3.6.1 Methods

Searches of the FWMIS database and the Code of Practice (COP) for Watercourse Crossings Calgary Management Area Map were completed for the Project Area (AEP 2018; GoA 2012). The field assessment included a visual inspection of the Project Area and verification of the hydrologic features identified during the desktop review, including a search of the Alberta Waterwells Database (GoA 2020b), Alberta Flood Risk Mapping (AEP 2019) and existing reports (e.g., Spring Creek Properties Ltd. 2003). The provincial guidance document *Stepping Back from the Water* (GoA 2012) was reviewed to determine the appropriateness of using 20 m as a setback for development (Section 5.2.1).

### 3.6.2 Baseline Conditions

Spring Creek is a spring and groundwater charged stream. Spring Creek flows into Policeman Creek, a tributary of the Bow River. Both Spring Creek and Policeman Creek are Class B streams and support habitat for fish.

During the site visit conducted October 2, 2019 the temperature, dissolved oxygen, specific conductance, and pH were recorded at three different locations along Spring Creek and Policeman Creek (Table 3-6). The first site was measured immediately downstream of the community of Spring Creek Mountain Village. Site 2 was measured further downstream, near the horse were grazing area. Site 3 was measured below the confluence of Spring and Policeman Creeks. From the measurements taken it can be inferred the creek has high water quality suitable to support fish species. The water was clear, with low levels of turbidity.

Banks of Spring Creek ranged from 0.3 – 0.6 m above the channel bed. No floodway or flood fringe has been developed for Spring Creek as it falls within the Bow River flood fringe. Because the Project Area occurs in the Bow River flood fringe, it may have a high-water table. Within the Bow River flood fringe, groundwater has been previously detected between 0.6 – 2.0 m below the ground surface (Spring Creek Properties Ltd. 2003). Groundwater levels are likely lowest in March/April and highest during freshet in May/June. A *Water Act* approval will be required for project activities because the Project Area is within the Bow River flood fringe. An approval is required for all activities that have the potential to temporarily or permanently affect the location or direction of flow of water or may become capable of altering the flow of water, whether or not the flow or presence of water is continuous, intermittent or occurs only during a flood.

No additional surveys were completed during the field visit on July 23, 2020. Water levels in 2019 (fall) and 2020 (summer) were visually observed to be comparable in depth and flow.

**Table 3-6**
**Water Quality Parameters**

| | Temperature (°C) | Specific Conductance (µs/cm) | pH | Dissolved Oxygen (mg/L) |
|---|---|---|---|---|
| Site 1 | 6.8 | 474.2 | 7.31 | 11.61 |
| Site 2 | 7.2 | 473.3 | 8.05 | 10.96 |
| Site 3 | 7.3 | 472.8 | 8.29 | 11.17 |

The Steep Creek hazard mapping suggests that the western- most portion of the Project Area is located in a low hazard area associated with the Cougar Creek drainage. No structures associated with Subdistrict A or B are located within this low hazard area.

### 3.6.3 Potential Impacts

Following the Town of Canmore bylaws and discussion with the Town planning department, the proposed land use activities have been designed to occur at least 20 m away from Spring Creek, with the exception of a single, clear span bridge that will access Subdivision C from 3rd Avenue. Activities around the proposed bridge construction may affect water quality in Spring Creek if mitigation is not implemented.

Potential impacts of the project on surface and ground water quantity and quality may occur through:

- Increased sedimentation from surface runoff during construction.
- Flood potential.
- Reduced water quality resulting from introduction of hydrocarbons (e.g., fuel spills).
- Continued nutrient loading from horse manure.
- Potential future nutrient loading (contamination) from lawn fertilizers;
- Obstruction of surface or groundwater flow.

#### Increased Sedimentation

Runoff into Spring Creek during construction and operation is unlikely; however, sediments may accumulate in low-lying areas, and overland flow from natural rain events may carry sediment from exposed soils into Spring Creek. The transfer of sediment can be prevented with the proper implementation of ESC mitigation measures and the maintenance of the vegetative buffer surrounding Spring Creek. Project-specific ESC measures and retention of a 20 m setback will prevent runoff from hard, unvegetated surfaces associated with Subdistricts A or B resulting in a negligible environmental impact to water quality.

A proposed bridge across Spring Creek will provide access from 3rd Avenue/Subdistrict B to Subdistrict C, which is located on the northern side of Spring Creek (Figure 1-3). Many guidelines and best practices exist for bridge construction in Alberta, including restricted activity periods for fish, ESC measures and monitoring and regulatory requirements (e.g., Alberta *Water Act* and federal *Transportation Act* and *Fisheries Act*) depending on the type, span and construction methods for the bridge. Prior to bridge construction over Spring Creek, the proponent will complete necessary field investigations and acquire all required regulatory approvals prior to initiating construction. Based on the width of Spring Creek (approximately 8 to 10 m at the location of the proposed bridge location) a clear span bridge will be designed to avoiding direct impacts on areas below the high-water mark of Spring Creek. The design will be reviewed by a Qualified Professional, who will look for opportunities to alter the design and avoid or reduce impacts to riparian areas.

#### Flood Potential

The 100-year flood elevation is factored into the design and construction of all structures in all subdistricts. In the event of a flood from the Bow River, the Project Area is currently provided some protection by a berm which has been built above the 100-year flood level elevation. Flooding from Spring Creek will be addressed in a similar manner, including designing and constructing structures above the 1:100-year flood elevation level.

### Fuel Spills

Potential introduction of hydrocarbons (e.g., fuel spills) into Spring Creek may occur if fuel is stored or vehicles or equipment are fueled within 30 m of the stream. Mitigation measures intended to avoid the fuel spills into Spring Creek are presented in Section 3.6.4.

### Continued Nutrient Loading

Nutrient inputs from pastured animals may affect water quality should mitigation measures not be implemented. Currently, horses in the area are limited from accessing Spring Creek by an electrified fence. Animals have grazed in the Project Area for decades without observable impacts to the creeks (e.g., eutrophication). With continued restrictions on pastured animals from entering the creek, the amount of nutrient loading occurring within Spring Creek will remain unchanged and the proposed conceptual land use for the Project Area will have negligible environmental consequences to the water quality or hydrology of Spring Creek.

### Potential Future Nutrient Loading from Lawn Fertilizers

The water quality of Spring or Policeman Creek may be affected by additional nutrients if manicured lawns are a large portion of future landscaping in Subdivisions B and C. Mitigation measures proposed and restrictions in a Direct Control District over these areas are expected to avoid this potential effect (Section 5.2.1).

### Obstruction of Surface or Groundwater

Impacts to groundwater in the Project Area are considered negligible as construction into the groundwater table is limited to building footings and foundations, and the soil present in the Project Area will allow for water movement around these features. No surface water will be obstructed because no other streams, ditches, or watercourses occur in the Project Area.

With the implementation of mitigation measures (i.e., 20 m setback), regulatory requirements and proven best management practices (i.e., ESC measures, spill avoidance/response plans), potential impacts to water quality, hydrology, and hydrogeology are predicted to be **neutral** in magnitude and **negligible** in their effects. The confidence in this prediction is **predictable**.

Environmental effects to water quality, hydrology and hydrogeology are summarized in Table 3-7, Section 3.10.

## 3.6.4 Recommended Mitigation

Recommended mitigation measures for water quality and hydrology include:

- Avoid effects on Spring Creek or Policeman Creek by implementing a Construction Environmental Management Plan that that identifies risks and mitigates potential effects on surface and groundwater quality. Spill protection, spill response, and erosion and sediment control (ESC) will be primary components of the CEMP to reduce effects on surface and groundwater quality.
- Develop and implement an Erosion and Sediment Control (ESC) Plan before any construction begins to avoid changes in water quality. ESC measures must be implemented, amended or altered during, and post-construction depending on site conditions. All ESC measures must be maintained and monitored throughout construction activities. All deficiencies must be immediately addressed. ESC measures may need to remain in place post-construction until final restoration and landscaping activities are complete and re-vegetated areas are established.

- Retain a qualified professional during all work within 20 m of Spring Creek to monitor construction and proactively implement mitigation to avoid effects on Spring Creek. The monitor will have the authority to stop work if they deem the work presents a risk to surface or groundwater quality.
- Excavations in the Project Area, in particular areas associated with Subdistrict B and C should occur outside of freshet to avoid groundwater interactions.
- No construction may occur within 20 m of the creek banks, except for construction of the proposed bridge, as per the proposed land use plan. Clearing limits should be delineated in advance of any work to maintain the 20 m setback area.
- Limit the amount of vegetation disturbance outside the minimum 20 m buffer and retain as much of the native vegetation and soil as possible. Incorporate into the Direct Control District a Non-disturbance area for the entire portion of Spring and Policeman Creeks that are within the Project Area (See Section 5.2.1).
- Develop a spill response plan and ensure sufficient spill response materials are present in all equipment, or readily available, and in quantities appropriate for the equipment used. Ensure crews are trained in the proper use of spill response materials.
- Store, service, and fuel equipment more than 30 m from the water body's banks or slope breaks.

Mitigation measures recommended for the project are further described in Section 4.

## 3.7 Land and Resource Use

### 3.7.1 Methods

Aerial photographs, satellite imagery, and a field survey were used to document land and resource use, including visual resources, within the Project Area. Aerial photographs and satellite imagery dating back to 2006 were used. The desktop assessment identified various natural and anthropogenic features with the potential to directly or indirectly interact with project activities. The field assessment included a visual inspection of the Project Area and verification of features identified during the desktop review.

### 3.7.2 Baseline Conditions

The Project Area is located on private property located within the municipal boundaries of the Town of Canmore. The Project Area is currently native vegetation with a portion of the land being used for the grazing of two horses. The grazing area is surrounding by an electrified fence. Grazing has occurred within the Project Area for at least 60 years since occupation by the original landowners (Pers. Comm. Kerry Kaleta). Adjacent land uses include residences to the north (community of Spring Creek Mountain Village), residences and a transportation corridor to the east (CP Rail, Bow Valley Trail and the Trans-Canada Highway), the Waste Transfer Facility and the Wastewater Treatment Facility to the south, and Millennium Park to the northwest. Except for the community of Spring Creek Mountain Village, forested land that has been disturbed by human activity (e.g., hiking trails, dog walking) surrounds the Project Area.

### 3.7.3 Potential Impacts

The following potential impacts to land and resource use are associated with the proposed land use concept:

- Additional vehicle traffic and parking.
- Increased residents and human activity in the area (i.e., increased foot/bike traffic in surrounding area, including unsanctioned trails).
- Ornamental landscaping.
- Provision of a hospice for residents of the Bow Valley

The proposed land use for Subdistricts A, B, and C will result in five single detached residences and a Palliative Care Centre. This may result in 30 to 40 additional people occupying the area depending largely on the capacity of the hospice and will result in an increase in traffic and vehicles in the area, in particular along 3rd Avenue. The proposed land use for Subdistrict D will result in a negligible change in traffic, as it will comprise a single residence.

There is existing human use within and adjacent to the Project Area. For example, the berm was observed to be used by various recreationists throughout the visits completed on October 2, 2019 and July 23, 2020. This included joggers, mountain bikers and hikers/walkers. The surrounding areas are already being used (access road to the WTS and high use/well developed human use trails in the portions of the LSA west of the Project Area. The proposed land use may result in a small increase in recreational uses within the LSA since Subdistricts B and C include the construction of up to six new residences. However, considering recreational use already present in the area, the increase in potential recreational use from these additional residences will be negligible. The hospice will result in the largest increase in human activity in the area; however, based on the intent of this facility it is not expected to result in recreational activity in surrounding areas. The hospice will provide exceptional benefit to the community as it provides respite and solace for individuals and their families during difficult times of grieving (Appendix F).

The implementation of ornamental landscaping will introduce non-native species. With the planting of only native vegetation and avoidance of use of vegetation species that attract wildlife, potential negative impacts from landscaping can be avoided.

With the implementation of mitigation measures, **negative** and **negligible** environmental impacts are expected for the proposed Subdistricts A to D. More people will be permanently located in the area, but the area is already a high use recreation area, especially along the berm, the access road to the WTS and the coniferous forest between these two areas. It is likely that human activity will decrease in the Project Area once the Project Area becomes developed, and signage may improve conditions for wildlife by restricting unauthorized access onto private land. Given the intent of the hospice, this centre will provide the exceptional benefit to the community through a facility that serves residents of the Bow Valley area. Confidence in these predictions are **predictable**

Environmental effects to land and resource use are summarized in Table 3-7, Section 3.10.

### 3.7.4 Recommended Mitigation

Mitigation measures proposed for vegetation (Section 3.3.4) and wildlife habitat (Section 3.4.4) are also applicable to land and resource use. Informative signage may be installed to educate public about access to private lands, which would benefit wildlife, wildlife habitat, and vegetation and ecosystems.

Mitigation measures recommended for the Project are further described in Section 4.

## 3.8 Air Quality

### 3.8.1 Methods

A desktop review was completed of existing conditions to describe factors contributing to the existing air quality in the LSA and RSA.

### 3.8.2 Baseline Conditions

Air quality in the Bow Valley is primarily affected by transportation on Highway 1, CP Rail, local dust generation, and industrial facilities (e.g., Graymont and LaFarge quarries and processing) and the transfer, compaction, baling and storage of waste at the Waste Transfer Facility. The addition of traffic into the Project Area will be minimal and primarily associated with people coming to and from the proposed residences and hospice.

### 3.8.3 Potential Impacts

During construction activities, emissions from equipment may result in reduced air quality in the immediate vicinity of the work. Given the scale of work and likely duration, this effect is expected to be mitigated by standard vehicle emission mitigation (e.g., exhaust mufflers). Stockpiled soils may contribute to reduced air quality if particles from the stockpiles are transported into the air from wind. Mitigation to reduce aeolian erosion proposed in Section 3.2 of this EIS is expected to avoid or reduce the effects of wind-borne erosion and reduced air quality.

For all activities associated with the proposed land use, the increase in local vehicle traffic and associated emissions in the Project Area will be the largest impact. The low number of vehicles coming and going as part of the proposed land use for Subdistricts A to D will be negligible relative to emissions from traffic along Bow Valley Trail, Highway 1 or the CP Rail line.

With the implementation of mitigation measures (Section 3.8.4) effects on air quality are predicted to be **neutral** in direction and **negligible** in magnitude as a result of the Project. The confidence in this prediction is **predictable**.

Environmental effects to air quality are summarized in Table 3-7, Section 3.10.

### 3.8.4 Recommended Mitigation

No additional mitigation measures are proposed beyond what is provided in the Town's bylaws and those presented in Section 3.2.4 (Soils and Terrain) of this EIS. To offset the impacts from vehicle emissions, additional native species could be planted in areas to be restored post-construction. The implementation of a no idling policy for vehicles during construction and using the hospice will minimize emissions generated in the Project Area, LSA, and RSA.

Mitigation measures recommended for the project are further described in Section 4.

## 3.9 Cultural and Heritage Resources

A desktop review of historical resources was completed using the Historical Resources Listing Database (April 2020 edition) (GoA 2020c). The category of listing and historical resource value was identified to determine the type of resource listed and the likelihood of encountering the resource.

No historical resources are known to occur within the Project Area.

## 3.10 Summary of Predicted Effects

**Table 3-7**
**Summary of Predicted Effects**

| Biophysical Resources* | Direction | Magnitude | Scale | Duration | Reversibility | Frequency | Confidence |
|---|---|---|---|---|---|---|---|
| Soils and Terrain | Negative | Negligible | Project | Short-term | Long-term | Isolated | Predictable |
| Vegetation and Wetlands | Negative | Low | Project | Long-term | Long-term | Isolated | Predictable |
| Wildlife and Wildlife Habitat | Negative | Low | Local | Long-term | Long-term | Frequent | Predictable |
| Fish and Fish Habitat | Neutral | Negligible | Project | Short-term | Short-term | Isolated | Predictable |
| Water Quality, Hydrology and Hydrogeology | Neutral | Negligible | Project | Short-term | Short-term | Isolated | Predictable |
| Land and Resource use | Negative environmental<br>Positive - social | Negligible | Project | Short-term | Short-term | Isolated | Predictable |
| Air Quality | Neutral | Negligible | Local | Long-term | Long-term | Isolated | Predictable |

* Potential impacts on Cultural and Heritage Resources will be addressed in accordance with the requirements of the *Historical Resources Act*

# 4 MITIGATION MEASURES

The mitigation measures provided in Table 4-1 are to guide the planning, design, construction and operation of a proposed private agricultural land use and a Palliative Care House land use for the 3rd Avenue South Land (parcel of land in the S1/2 of L.S. 13, Sec 28, TWP. 24, Rge. 10 W5M) in Canmore, Alberta.

**Table 4-1**
**Recommended Mitigation Measures**

| Environmental Components | Potential Effect | Mitigation Measures |
|---|---|---|
| **Soils and Terrain** | • Soil stripping;<br>• Erosion and Sedimentation resulting from surface disturbance;<br>• Siltation from runoff into creeks | • Develop and implement mitigation measures and controls provided in an Erosion and Sediment Control (ESC) Plan before any soil disturbance occurs. The ESC will address risks associated with soil and terrain, including erosion, stockpiling requirements, and will remain in place during construction and until soils have revegetated.<br>• Retain a qualified Environmental Monitor during construction. Implementation and authority for mitigation related to soils and terrain will be at the discretion of an environmental monitor who will adhere to a Construction Environmental Management Plan that will be in place prior to construction.<br>• Salvage topsoil and stockpile for use in restoration following construction. Topsoil that has been salvaged for restoration should be handled once during the first growing season and seeded with native grasses to minimize soil loss and weed encroachment. Any soil piles present on the Project Area will be inspected by the Environmental Monitor for regulated weeds. An Invasive Species Management Plan will be implemented if necessary.<br>• Topsoil stripping should be restricted to the construction envelope (i.e., only the area necessary to safely construct) and topsoil handling and re-handling should be minimized.<br>• Minimize potential disturbance caused by stockpiles. No stockpiles, whether topsoil or fill, will be stored within 20 m of Spring Creek or Policeman Creek or within areas of the property that are not already planned for disturbance.<br>• Prevent the loss of soil during wind or rain events. Stockpiles of any soils required to be brought onto the property should not exceed the volume necessary for construction. If stockpiles are to be kept for longer than one construction season, the stockpiles will be vegetated with native grass seed to reduce erosion or invasive plant encroachment potential. Short term stockpiles should be covered with tarps or wetted if dust plumes are observed leaving the property. |
| **Vegetation and Wetlands** | • Project planning considerations;<br>• Removal and fragmentation of vegetation communities;<br>• Spread and establishment of weedy species;<br>• Rare plants | • Develop and implement a Construction Environmental Management Plan that addresses management practices that avoid or reduce effects on vegetation. Minimizing construction disturbance areas and avoiding disturbance to the shrubby wetland and areas within 20 m of Spring and Policeman creek (except in areas necessary for the bridge crossing) should be addressed in the plan.<br>• Improve the erosion resiliency of Spring Creek's riparian area by planting native shrubs or trees along the south (left) bank of Spring Creek within 20 m of the stream high-water mark.<br>• Minimize the extent of the construction footprint to reduce impacts on vegetation, in particular rare plants that may be growing, or in the soil seedbank, on the periphery of construction.<br>• Native vegetation should be left undisturbed wherever possible except for those activities required for construction (e.g., land clearing or FireSmart).<br>• Implement restoration activities that use native plants in areas where construction is complete to meet objectives set out in the Town of Canmore land use bylaws and prevent wind or water erosion issues.<br>• Post signage that educates construction personnel and other individuals that may access the Project Area about the importance of not spreading invasive vegetation on or off the site. Signage should include information about the risk of invasive plant spread into the SCLHP.<br>• Manage non-native and regulated weed species within the Project Area prior to initiating construction to prevent the spread of these species.<br>• Implement WildSmart and FireSmart mitigations and guidelines for the Town of Canmore (Montane 2018).<br>• Introduction of non-native species such as ornamental grasses that require additional nitrates or phosphates for fertilizer may affect water quality. |
| **Wildlife and Wildlife Habitat** | • Direct habitat disturbance;<br>• Sensory disturbance;<br>• Increased mortality risk | • Limit the area of land clearing and vegetation disturbance to only the area necessary for construction and personnel safety. The limits of construction in the shrubby swamp area should be clearly demarked in the field to ensure that vegetation associated with the wetland is not disturbed. A construction monitor should be on site during all vegetation clearing activities to ensure that no accidental encroachment occurs beyond what is proposed.<br>• Fence off open excavations during construction to prevent wildlife entrapment and remove fencing following construction.<br>• Implement a Construction Management Plan to be approved by the Town to mitigate construction activities that could pose a hazard to people and wildlife.<br>• Follow the Town of Canmore's Noise Bylaw to reduce the effects of noise on wildlife, including work starting after dawn and ceasing before dusk.<br>• Design street and outdoor lighting to screen and prevent illumination into the SCLHP.<br>• Use dark-sky lighting in the design of all buildings to minimize light disturbance at night. |

| Environmental Components | Potential Effect | Mitigation Measures |
|---|---|---|
| | | • Consider planting trees along the periphery of the Project Area, including along the margin of Spring Creek, to improve wildlife security. Seedling density should target at least 40% cover when seedlings mature to function as suitable cover for elk (BCEAG 2012).<br>• If a species at risk is encountered in the Project Area, cease construction activities until consultation has occurred with Alberta Environment and Parks (AEP), and appropriate mitigation measures have been implemented (e.g., setbacks, timing restrictions).<br>• Develop and implement a Wildlife Management Plan during construction to keep the site clean of food waste and other attractants which could attract wildlife, in particular bears. Continue to remove natural wildlife attractants such as buffaloberry. The wildlife management plan should include adaptive management strategies if wildlife mortalities are reported.<br>• Remove vegetation designated for clearing outside of the migratory breeding season for this region (i.e., do not disturb vegetation between April 15 and August 20), to minimize breeding bird mortality. Inspect vegetation for nests before being felled, limbed, or removed as an additional measure.<br>• Do not harass, feed, or interact with wildlife.<br>• Dispose of waste appropriately, including following the Town's bylaws related to bear-proof waste storage.<br>• Report project related wildlife injury or mortality to the Town of Canmore and AEP.<br>• Prior to construction, retain a Qualified Professional to conduct auditory monitoring of the shrubby swamp during the spring and early summer to determine if the swamp is being used by amphibians for breeding. If presence is detected, install isolation fencing between the shrubby swamp and any construction activities to avoid accidental mortality of amphibians that may be moving to the swamp.<br>• Monitor any amphibian mortality on roads or parking lots and report to the Alberta FrogWatch registry. Report observations of Canadian toad to AEP.<br>• Following construction of the Project Area, continue to manage the Project Area in accordance with WildSmart guidelines by not planting trees or shrubs that bear fruit that may become an attractant for wildlife. |
| **Fish and Fish Habitat** | • Changes in water quality<br>• Disturbance to riparian habitat | • Develop a Construction Environmental Management Plan (CEMP) that identifies risks and mitigates potential effects on Spring Creek. Spill protection, spill response, and erosion and sediment control (ESC) will be primary components of the CEMP to reduce effects on fish and fish habitat.<br>• Develop and implement an Erosion and Sediment Control (ESC) Plan before any construction begins to avoid changes in water quality. ESC measures must be implemented, amended or altered during, and post-construction depending on site conditions. All ESC measures must be maintained and monitored throughout construction activities. All deficiencies must be immediately addressed. ESC measures may need to remain in place post-construction until final restoration and landscaping activities are complete and re-vegetated areas are established.<br>• Retain a qualified professional during all work within 20 m of Spring Creek to monitor construction and proactively implement mitigation to avoid effects on Spring Creek. The monitor will have the authority to stop work if they deem the work presents a risk to fish or fish habitat.<br>• Install temporary ESC measures according to the ESC Plan to prevent erosion or potential sediment deposition into Spring Creek until revegetation occurs. ESC measures should be inspected regularly and frequently to ensure they are working as designed.<br>• Avoid erosion or sedimentation into Spring Creek or Policeman Creek by restricting access to the creek by horses, if horses are boarded in the Project Area. Restrict access by horses to the creeks by installing, and monitoring the effectiveness of, single-strand electric fence similar to the existing temporary fence. Install the electric fence at least 20 m from Spring and Policeman creeks and remove the electric fence if horses are not using the Project Area.<br>• Improve habitat quality for fish and wildlife by offsetting for disturbed areas associated with the bridge. Select areas along Spring Creek for restoration that are currently not shrubby and plant native shrub species (e.g., willow or polar staking) within 20 m of the high-water mark of the stream. Stakes should be installed at a density of 0.5 stakes/$m^2$ and sites selected for offsetting should focus on the outside bank of bends in the stream to double as flood and erosion mitigation.<br>• Develop a spill response plan and ensure sufficient spill response materials are present in all equipment or readily available and in quantities appropriate for the equipment used. Ensure crews are trained in the proper use of spill response materials.<br>• Clearly demark in the field the limits of construction, including areas surrounding the clear span bridge. Retain an environmental monitor to ensure that no construction (except for the clear span bridge) occurs within 20 m of the stream banks as per the Conceptual Land Use Plan.<br>• Avoid storing hydrocarbons (e.g., fuels or lubricants for equipment) in the Project Area. If hydrocarbon storage is required, store, service, and re-fuel equipment more than 30 m from any waterbody, ditch, or channel that may result in fuels reaching Spring Creek or Policeman Creek. All hydrocarbons stored on site must be stored in double-walled containers with at least 110% capacity of the volume to be stored. |

| Environmental Components | Potential Effect | Mitigation Measures |
|---|---|---|
| **Water Quality and Hydrology** | • Increased sedimentation<br>• Flood potential.<br>• Reduced water quality<br>• Continued nutrient loading<br>• Obstruction of surface or groundwater flow. | • Avoid effects on Spring Creek or Policeman Creek by implementing a Construction Environmental Management Plan that that identifies risks and mitigates potential effects on surface and groundwater quality. Spill protection, spill response, and erosion and sediment control (ESC) will be primary components of the CEMP to reduce effects on surface and groundwater quality.<br>• Develop and implement an Erosion and Sediment Control (ESC) Plan before any construction begins to avoid changes in water quality. ESC measures must be implemented, amended or altered during, and post-construction depending on site conditions. All ESC measures must be maintained and monitored throughout construction activities. All deficiencies must be immediately addressed. ESC measures may need to remain in place post-construction until final restoration and landscaping activities are complete and re-vegetated areas are established.<br>• Retain a qualified professional during all work within 20 m of Spring Creek to monitor construction and proactively implement mitigation to avoid effects on Spring Creek. The monitor will have the authority to stop work if they deem the work presents a risk to surface or groundwater quality.<br>• Excavations in the Project Area, in particular areas associated with Subdistrict B and C should occur outside of freshet to avoid groundwater interactions.<br>• No construction may occur within 20 m of the creek banks, except for construction of the proposed bridge, as per the proposed land use plan. Clearing limits should be delineated in advance of any work to maintain the 20 m setback area.<br>• Develop a spill response plan and ensure sufficient spill response materials are present in all equipment, or readily available, and in quantities appropriate for the equipment used. Ensure crews are trained in the proper use of spill response materials.<br>• Store, service, and fuel equipment more than 30 m from the water body's banks or slope breaks. |
| **Land and Resource Use** | • Additional vehicle traffic and parking.<br>• Increased residents and human activity in the area (i.e., increased foot/bike traffic in surrounding area, including unsanctioned trails).<br>• Ornamental landscaping.<br>• Provision of a Palliative Care Centre for residents of the Bow Valley | Mitigation measures proposed for vegetation (Section 3.3.4) and wildlife habitat (Section 3.4.4) are also applicable to land and resource use. Informative signage may be installed to educate public about access to private lands, which would benefit wildlife, wildlife habitat, and vegetation and ecosystems. |
| **Cultural and Heritage Resources** | • Effects on unidentified artifacts | • Acquire *Historical Resource Act* (HRA) Clearance for the project area as part of project planning.<br>• HRA clearance is required prior to disturbing soils or beginning construction.<br>• Any mitigation required will be specified in the *Historical Resource Act* Approval. This should be understood early in the project planning phase. |

# 5 CUMULATIVE EFFECTS

## 5.1 Methods

Cumulative effects are changes to the environment that are caused by an action in combination with other past, present, and future human actions (Hegmann et al. 1999). In assessing potential cumulative effects, the following was considered:

- Effects over a larger area (i.e., the RSA).
- Effects during a longer period of time in the past and into the future.
- Effects on biophysical resources due to interactions with other developments, inclusive of the effects of the proposed project.
- Inclusion of other past, existing, and future reasonably foreseeable developments (RFD).
- Evaluation of significance in consideration of effects other than just local, direct effects.

Analysis of the potential cumulative effects of the Conceptual Land Use was completed considering the effects of previous development and human activity in the South Canmore Local Habitat Patch plus a 500 m buffer (i.e., the RSA) (Figure 2-1). The cumulative effects analysis included:

- A quantitative description of landcover/wildlife habitat change over time inside the habitat patch.
- A quantitative description of change in human-related disturbance levels over time inside the habitat patch (e.g., roads, designated vs undesignated recreational trails).
- Assessment of potential changes in the riparian value of Spring Creek, based on the provincial guideline *Stepping Back from the Water*, as a result of the 20 m setback.
- Assessment of existing and future/proposed development effects on the quality and quantity of wildlife habitat inside the patch and wildlife use of it, including quantitative estimates of potential changes in overall patch size and fragmentation level.
- The temporal range of the analysis spans from the period when the SCLHP was first established (1997), approximately 10 years later (2011), current conditions, and into the foreseeable future.

At the time the report was written, the BCEAG (2012) report summarized existing disturbance within the SCLHP, using 2009 ortho imagery as the base year. Because mapping methods vary among projects and spatial analysts (e.g., image resolution, spatial scale of mapping), total disturbance mapped for this EIS does not match that provided in the BCEAG (2012) report. To provide a consistent comparison across the time steps evaluated in this EIS, linear and non-linear delineation was completed by a single spatial analyst using ArcGIS software and publicly available imagery. Disturbance delineation was completed at a scale of 1:3,000. All predictions related to cumulative effects of this project are based on mapping completed specific to this project.

## 5.2 Cumulative Effects Assessment

The cumulative effects assessment for the Project focused on the RSA. As requested in the TOR, the SCLHP was evaluated quantitatively. The RSA was evaluated qualitatively. Several projects have been completed or are proposed to occur on land within the RSA. Specific to the SCLHP, only one other project is proposed within the SCLHP (upgrades to the Waste Management Facility). The land surrounding the RSA is highly developed in the north and northeast, west and south of the RSA. Habitat within the RSA is currently fragmented by the Bow River, Highway 1, Highway 1A, the Waste Management Facility, residential developments, and numerous roads and recreational trails throughout the area, including the SCLHP. Based on current ortho imagery, and aside from fragmented patches of

habitat within the SCLHP, very little undisturbed habitat exists in the RSA, resulting in few opportunities for future development in undisturbed ecosystems.

The following is a list of recent development in the RSA not yet visible in ortho-imagery:

- 308 Bow Valley Trail - Ford Dealership (complete in the last 2 years).
- 306 Bow Valley Trail - Industrial development in early stages of construction.

The following is a list of potential, reasonably foreseeable developments that may occur within the RSA:

- Three Sisters Mountain Village (TSMV) – proposed development located south of the SCLHP. The TSMV development may result in changes to existing land use for wildlife as a result of the installation of a proposed wildlife exclusion fence around its perimeter (Figure 5-1). This EIS assumes that the wildlife exclusion fencing will be included in the TSMV development.
- 400 Bow Valley Trail - currently used as temporary material laydown and dewatering pond for construction projects in the area.
- 304 Bow Valley Trail - currently used as temporary material laydown for construction projects in the area.
- Waste Management Facility addition (accessed from 91 Bow Valley Trail): building addition to handle Town's organic waste collection and an additional 4 trips/day (from 35 trips/day to 39 trips/day) by maintenance vehicles (MSES 2019). The upgrade is not expected to result in significant changes to the landscape and most of the new development will occur under the existing footprint.
- The proposed Project Area and surrounding SCLHP is already used for recreational activities and is located adjacent to the existing community of Spring Creek. Future proposed recreational activities include formalizing trail networks within the SCLHP.
- Within the developed portions of the RSA, the community of Spring Creek Mountain Village (north of the project area) will continue to undergo redevelopment in accordance with the approved Area Redevelopment Plan.
- It can also be expected that the commercial lands along Highway 1A will continue to be developed. Applications for commercial use are unknown at this time and are not included in this EIS.

### 5.2.1 Stepping Back from the Water

The provincial document *Stepping Back from the Water* ("*Stepping Back*") outlines effects of development near water bodies in Alberta's settled region (GoA 2012). The purpose of the *Stepping Back* document is to provide decision makers with recommended vegetated filter strips (i.e., riparian setback distances) based on a variety of ecological considerations, such as:

- Water quality functions;
- Flood water conveyance and storage;
- Bank and shoreline stabilization; and
- Habitat and biodiversity.

Riparian setback recommendations are provided in *Stepping Back* and take into consideration the potential cumulative effects of human disturbance along an entire watercourse. The guidelines outline various considerations such as soil texture, slopes, groundwater and other considerations for sites. The intensity of the development also needs to be taken into account to understand how the risk factors plus the development plan interact to understand the risk and recommended setback.

Spring Creek is a relatively short tributary (1,321 m estimated total length) of Policeman Creek that has a high degree of existing human disturbance along its banks; much of which includes intensive disturbance less than 5-10 m from the stream. The following subsections discuss the ecological considerations identified in *Stepping Back* and relates them to the Conceptual Land Use Plan.

### Water Quality Functions

The purpose of the setback is to allow sufficient buffer on the stream to remove nitrates and trap other contaminants (such as sediment or phosphorus) before they reach Spring Creek through subsurface flow. Appendix 3 of *Stepping Back* also references "Contaminant Removal Results for Nitrate, Phosphorus, and Sediment" where measured buffer widths and percent reduction in contaminants are presented.

Based on results of empirical data presented in Appendix 3 of *Stepping Back*, the mean buffer width that removes at least 90% of nitrates from subsurface flow in forested or grass environments (similar to the Project Area) is measured to be 24.7 m (minimum width = 5 m; maximum width = 50 m). Measured setbacks to reduce phosphorus was between 5 m and 9 m, and for sediment between 5 and 10 m (GoA 2012). The overall risk of measurable contamination from the Conceptual Land Use Plan is low because the project is a low-density development that is well spread out. In addition, mitigation is proposed in this EIS to reduce the key potential sources of contamination, namely avoiding the migration of fertilizer applied to manicured lawns by only revegetating with native species that will not require nitrates or phosphorus to survive (Section 4).

Mitigation measures proposed in the EIS also recommend limiting the amount of vegetation disturbance to only those areas necessary for construction of the Conceptual Land Use Plan. Compensation is proposed in the EIS in the form of tree and shrub planting along the right bank of Spring Creek to improve riparian function on the stream which will offset for any disturbance caused by the proposed bridge. Additional mitigation measures proposed to be included in the Direct Control District to manage cumulative effects on Spring Creek include:

- Maintaining a minimum setback of at least 20 m for all buildings and landscaping along Spring and Policeman Creek. The minimum 20 m setback will prevail over any other setback that may conflict with the minimum 20 m setback.
- Avoid planting non-native monoculture species such as manicured lawns immediately adjacent to the minimum 20 m setback to maintain riparian water quality function (e.g., sediment, nitrate, or phosphorus transport). Any permanent landscaping that affects the vegetation outside the 20 m setback will be comprised of native vegetation.
- Where not in conflict with the FireSmart directive, mature trees over 0.3 m in diameter will be protected in perpetuity throughout the minimum 20 m setback on Spring and Policeman Creeks. Trees removed within 20 m of Spring Creek to meet FireSmart objectives should be replaced by less flammable species such as poplar or cottonwood.
- The existing undisturbed areas adjacent to Spring and Policeman Creeks and within the minimum 20 m setback should be protected as a non-disturbance zone. No soil or vegetation disturbance (except where FireSmart thinning is required) will occur within this area, except for the removal of noxious or invasive plant species. In the removal of noxious or invasive species, only mechanical methods such as cutting or hand-pulling will occur, and no use of herbicides will be allowed.

If the mitigation measures presented above are implemented by the Direct Control District, it is anticipated that the overall project effect on Spring Creek will be positive due to improved fish and wildlife habitat and bank and shoreline stability, and the EIS concludes that the 20 m setback is appropriate by weighing the likelihood (low) and the magnitude (negligible) of the effect happening.

### Flood Water Conveyance and Storage

The Project Area is within the Flood Fringe of the Bow River. The Conceptual Land Use Plan has considered flood mitigation and plans are to elevate buildings to avoid the risk of floods, even in the uncertain future of climate change. The future final Land Use Plan will be designed to a 1 in 100-year flood elevation line.

### Bank and Shoreline Stabilization

Slope stability is not a concern in the Project Area because slopes do not exceed 5% anywhere on the property. Bank erosion is not a concern in the Project Area because the stream gradient is not sufficient to change the channel course; however, the proposed compensation planting of trees and shrubs will improve bank stability and shoreline stabilization once plantings become established.

### Habitat and Biodiversity

The Conceptual Land Use Plan will have a negligible effect on wildlife movement and use of the Spring and Policeman Creek riparian corridors due to the thoughtful building siting and open-spaced concept. By implementing mitigation measures in the Direct Control District as presented in this section, it is expected that the overall effect on Spring and Policeman Creeks will be positive and benefit fish and wildlife. Once planted trees and shrubs mature, they will create cover, forage, and thermal regulation for fish and wildlife.

## 5.2.2 South Canmore Local Habitat Patch

The SCLHP was designated between 1992 and 1999 (BCEAG 2012). The SCLHP has continued to undergo changes since its designation. Existing disturbance and habitat fragmentation of the SCLHP is discussed in Section 3.4.2. Table 5-1 presents changes in linear and non-linear disturbance. Table 5-2 presents changes in habitat fragmentation and patch size and maximum interior distance from human disturbance based on 1997, 2011, and 2017 imagery.

The SCLHP has not changed significantly since its establishment (based on 1997 ortho-imagery). In 1997 around the time of its designation, the SCLHP was already undersized to meet habitat patch objectives and had existing human disturbance within and adjacent to its boundaries (BCEAG 2012). When considering habitat fragmentation only, the SCLHP was established with seven distinct patches of intact habitat (considering Elk Island as a distinct patch) (Figure 5-1). Since 2011, a small portion of habitat has been disturbed. In 2017 imagery, linear development (3$^{rd}$ Avenue berm) and vegetation clearing (expansion of Waste Facilities) resulted in additional fragmentation, resulting in a total of nine distinct patches (Table 5-2). Currently, the density of linear features in the SCLHP is approximately 2.9 km/km$^2$ (Table 5-1).

## SCLHP Established (1997)

## Current Conditions (2020)

## Reasonable Foreseeable Development

Canmore

Propose Project Design

Proposed Future development

Proposed Three Sisters Development

Bow River -->

Trans-Canada Highway 1

1 2 3 3.1 3.2 3.3 4 5 6 7

0 1,000 m

Fig 3-5 11x17.mxd / 2/19/2021 / 10:02:58 AM

Associated Environmental

Disturbance

Incremental Disturbance

Reasonable Foreseeable Development

Regional Study Area

South Canmore Local Habitat Patch

N

| | |
|---|---|
| AE PROJECT No. | 2019-8457.000 |
| DATE | FEB. 2021 |
| SCALE | |
| COORD. SYSTEM | NAD 83 UTM 11 |
| REV | 1 |
| DESCRIPTION | ISSUED FOR DRAFT |
| DRAWN BY | DA |
| CHECKEC BY | KR |

**FIGURE 5-1 HISTORIC, CURRENT, AND RFD IN THE RSA**

South Canmore EIS for 3rd Avenue South Land

**Table 5-1**
**Linear and Non-Linear Disturbance in the SCLHP Since Establishment in 1999**

| Disturbance Type | 1997 | 2011 | Current Condition | Application Case[2] | Reasonably Foreseeable Development[1] | Cumulative Total |
|---|---|---|---|---|---|---|
| Linear Features | 4.7 km | 0.6 km | 5.3 km | 6.0 km | - | 6.0 km |
| Non-Linear Features | 8.2 ha | 1.3 ha | 9.5 ha | 9.9 ha | - | 9.9 ha |

*Calculations based on ortho imagery interpretation and the Conceptual Land Use Plan.

[1] No future development is proposed in the SCLHP.

[2] Application Case is the footprint of the proposed project and is 0.7 km linear disturbance and 0.42 ha non-linear. The application case is 27.6% more linear features than 1997 and 13% more than current condition.

**Table 5-2**
**SCLHP Fragmentation, Patch Size, and Interior Habitat in 1997, 2011, and Current Condition**

| Patch Count | Patch ID[1] | 1997 | | 2011 | | Current Condition | | Total Change in Patch Size[3] |
|---|---|---|---|---|---|---|---|---|
| | | Patch Area (ha) | Interior Habitat Distance[2] (m) | Patch Area (ha) | Interior Habitat Distance[1] (m) | Patch Area (ha) | Interior Habitat Distance[2] (m) | |
| 1 | **1** | 11.3 | 238 | 11.3 | 238 | 11.3 | 238 | - |
| 2 | **2** | 24.3 | 220 | 23.7 | 220 | 23.7 | 220 | -0.6 |
| 3 | **3.1** | 27.9 | 180 | 5.2 | 87 | 5.2 | 87 | -22.7 |
| 4 | **3.2** | - | - | 18.6 | 140 | 18.6 | 140 | - |
| 5 | **3.3** | | | 3.0 | 55 | 3.0 | 55 | - |
| 6 | **4** | 76.3 | 410 | 75.9 | 400 | 75.9 | 400 | -0.4 |
| 7 | **5** | 1.2 | 30 | 1.2 | 30 | 1.2 | 30 | - |
| 8 | **6** | 6.2 | 70 | 6.2 | 70 | 6.2 | 70 | - |
| 9 | **7** | 19.9 | 220 | 19.9 | 220 | 19.9 | 220 | - |

Note: Imagery or mapping methods used for estimates in BCEAG (2012) may differ from this assessment.

[1] Patch Count is the number if distinct patches, Patch ID is the unique identifier for each patch (shown in Fig 5-1). Patch 3 has been fragmented twice.

[2] Interior Habitat Distance is the furthest distance (estimated using ArcGIS Euclidian Distance tool) available inside a patch from disturbed habitat. Current data are based on 2017 ortho imagery.

[3] Total change in patch size is the difference between 1999 and 2017.

Based on the imagery available, only Patch #3 has been fragmented by linear development since the SCLHP was established. Patch #3 was approximately 27.9 ha in size in 1997. In the 2011 imagery, Patch #3 is fragmented by two new linear corridors, resulting in the creation of Patch #4 and Patch #5 (Table 5-2):

1. the construction of the berm extending south of 3rd Avenue, and
2. the construction of a trail north of the Waste Transfer Facility to the Project Area (Figure 5-1).

This fragmentation reduced Patch #3 to 5.2 ha, while creating Patch #4 (18.6 ha) and Patch #5 (3.0 ha).

All other disturbance that has reduced patch size is the result of vegetation clearing along already cleared areas (i.e., expanding footprints) (Table 5-2). The fragmentation of the SCLHP over time has resulting in a patchwork of intact habitat separated by linear corridors or non-linear disturbance (e.g., vegetation clearing). The fragmentation over time may affect smaller-ranging wildlife such as squirrels or rodents and may improve movement and forage for larger mammals such as coyote, elk, deer, or moose. Although the SCLHP has been fragmented somewhat over time, it is unlikely that the fragmentation has measurably affected the ability of wildlife to complete their life requisites as they had when the SCLHP was established. A summary of changes in the SCLHP and RSA is provided below.

### 5.2.3 Regional Study Area

The RSA is a 500 m buffered area surrounding the SCLHP. The RSA has been altered significantly more than the SCLHP since its establishment in 1999. The following is a summary of observed changes in the RSA (including the SCLHP) using historical aerial photographs and historical imagery.

**1997 Ortho-imagery**

- The total estimated disturbance in the SCLHP is 13.5 ha, including roads, infrastructure, and areas cleared of vegetation.
- Baseline conditions for the SCLHP. The SCLHP is highly fragmented with roads and trails. The SCLHP is intersected east-west with a major access road for the Wastewater Treatment Plant and Waste Transfer Station.
- The south eastern portion of the SCLHP is fragmented by north-south oriented linear disturbance parallel and perpendicular to Highway 1.
- Non-linear disturbance is primarily associated with the Wastewater Treatment Plant, Waste Transfer Station, and cleared road verges.
- Historic trails and roads, including historic fords of the Bow River, are visible in the imagery south of the Project Area.
- The cleared road and berm that extends south of 3rd Avenue has not yet been constructed.
- The RSA has less disturbed area (fewer houses) south of the SCLHP.
- The Tipple Wildlife Corridor appears to be under construction with recent soil disturbance.

**2011 Ortho-imagery**

- The total estimated disturbance in the SCLHP is 15.6 ha, including roads, infrastructure, and areas cleared of vegetation.
- Minimal change is observed in the SCLHP since 1997 (2.1 ha total).
- The Waste Transfer Facility footprint is expanded in the SCLHP within an existing disturbed area – minimal vegetation disturbance involved.

- The cleared road and berm that extends from 3rd Avenue to the Waster Management Facility has been constructed.
- Some densification has occurred in the community of Spring Creek as many mobile homes have been replaced with condominiums and commercial amenities.
- Significant residential densification around Three Sisters Drive, including the construction of Three Sisters Parkway.

**2017 – Current Conditions**

- The total estimated disturbance in the SCLHP is 15.6 ha, including roads, infrastructure, and areas cleared of vegetation.
- Minimal change is observed in the RSA since 2011. No new developments have occurred within the SCLHP; however, densification has occurred in the community of Spring Creek (RSA) as many mobile homes have been replaced with condominiums and associated commercial amenities.

**Reasonably Foreseeable Development**

- Conceptual Land Use Plan – Change in the SCLHP as a result of the Project will amount to approximately 0.7 km of new linear disturbance and 0.35 ha of new non-linear features (i.e., buildings not including Subdivision C). In total (accounting for area of linear disturbance), the proposed project will contribute an additional 0.8 ha of additional disturbance (not including Subdistrict C). Combined with existing disturbances (15.6 ha; 9% of the SCLHP), the total disturbance in the SCLHP will increase to 16.4 ha (9% of the SCLHP). The new access road into Subdistrict D will convert low shrub ecosystem to a gravel surface, which fragments the Low-Shrub Grass ecosystem. This effect is not expected to have the same effect on wildlife as creating a linear corridor in a forested environment (i.e., no security cover is being affected); therefore, an additional functional habitat fragment is not being created. Because of the location of the Project in relation to the overall SCLHP, this added disturbance is not anticipated to affect the ability of wildlife to meet their life requisites (e.g., reproduction, living, security) in the Project Area or the SCLHP.
- No additional developments are proposed within the SCLHP. The SCLHP is approximately 182.2 ha in area and factoring in existing and proposed developments for the SCLHP, a total of 9% of the SCLHP will remain disturbed into the foreseeable future.
- Change in the RSA as a result of other reasonably foreseeable future developments can be summarized as:
    - Shifts in wildlife use of the Tipple Wildlife Corridor may occur as a result of the proposed TSMV development. It is anticipated that the wildlife exclusion fencing proposed for the TSMV will influence wildlife traveling east-west along the Along Valley Corridor. Wildlife may use the Tipple Corridor more often, or they may defer to move further south (where there is less disturbance) of the TSMV during east-west travel. It is not expected that the fencing proposed for the TSMV will significantly influence wildlife use of the Tipple Corridor to an extent that changes wildlife-human interaction at the Project Area. Species that may move into the SCLHP as a result of avoiding the TSMV will likely continue their route to the east or to the west, and visual and sensory queues from existing disturbance (e.g., the traffic for the Waste Transfer Station) is expected to influence wildlife sensitive to disturbance to leave the SCLHP. The SCLHP does not provide sufficient space to meet all of the life requisites of large ranging mammals such as grizzly bear or cougar, and these species are most likely to enter the SCLHP intermittently.
    - Changes in large mammal wildlife use of the SCLHP as a result of the proposed TSMV wildlife exclusion fencing. Habitat will be lost within the footprint of the proposed TSMV wildlife exclusion fencing area. Wildlife will be displaced and may defer to using the SCLHP as an alternative.

- Shifts in human use in the Spring Creek Mountain Village, north of the Project Area. It is unclear if human use of the SCLHP will increase or decrease as a result of the Spring Creek development. No change in land cover in this area is anticipated.
- Developments within the RSA that may result in further reduce vegetated cover, if potential developments choose to replace native vegetation with hard infrastructure such as roads or buildings; however, the amount of land base available for development is limited (approximately 14 ha).

The remaining undisturbed portions of the SCLHP comprise public lands that are not expected to be developed given the existing provincial and municipal policy and guidelines in place. The SCLHP is surrounded by a variety of existing land uses that are disruptive to wildlife, in particular, the Trans-Canada Highway and the CP Rail line. The existing amount of habitat fragmentation in the SCLHP does not appear to affect wildlife use, most likely due to the scale that large mammals use the landscape. Specifically, elk do not appear to be negatively influenced by the habitat fragmentation in the SCLHP, and may rely on the linear corridors for security during foraging (especially in winter).

The Conceptual Land Use presented in this EIS is not expected to have an affect on wildlife use as a result of the TSMV development because suitable habitat remains within the southern portion of the SCLHP, which is the portion that provides the largest patches of intact habitat. In addition, the SCLHP will continue to not meet the spatial criteria for home range of large carnivores (i.e., large carnivores will require much larger range than the SCLHP) and any incursion by large carnivores into the SCLHP can be considered incidental and short term.

It is understood that elk use the SCLHP despite these existing constraints, and it is anticipated that elk and other wildlife will continue to use the SCLHP in the same manner as they do currently.

Within implementation of the proposed mitigation measures, potential cumulative effects associated with native vegetation cover loss, increase human use, and loss of habitat area in the SCLHP will be negligible in the long-term.

Future impacts on the quality and quantity of habitat in the SCLHP is not expected to change. In particular, habitat use as a result of fragmentation is not expected to increase as a result of the Project because all project components are situated in the northern periphery of the Project Area. The adjacent Bow Flats Regional Habitat Patch is not expected to be affected by the Project or reasonably foreseeable developments within the RSA, and the Bow Flats Regional Habitat patch will remain fragmented from the SCLHP unless the “conceptual corridors” are developed into functional wildlife crossings.

## 5.3 Residual Impacts

Residual impacts are those that remain once mitigations and cumulative impacts have been applied (Table 5-3).

**Table 5-3**
**Residual Impact Summary**

| Ecosystem Component | Residual Impacts |
|---|---|
| Soils and Terrain | **Negligible** residual impacts expected with mitigation. |
| Vegetation and Wetlands | **Low** residual impacts due to a reduction in native vegetation cover and potential spread of weeds. |
| Wildlife and Wildlife Habitat | **Low** to **Negligible** from alteration of habitat and more human activity. |
| Cumulative Impacts | **Negligible** and long-term residual impacts from habitat loss adjacent to and within SCLHP. The TSMV may result in movement deflections of wildlife caused by wildlife exclusion fencing.<br><br>**Negligible** effects are anticipated because wildlife are habituated to presence of people, the Conceptual Plan considers wildlife movement and human-conflict, and the majority of the Project Area will remain in a natural state. |

## 5.4 Future Permitting, Mitigation, and Monitoring

Based on the final designs for the proposed residential areas in Subdistricts B and C, additional assessments may be required in support of regulatory applications. These may include but are not limited to the following:

- *Water Act* application for any instream work that may be required as part of a future bridge. No instream work is anticipated at this time.
- *Water Act* Code of Practice Notification for Watercourse Crossings (e.g., where there is no impact to the bank, bed or shores of a waterbody, but where the waterbody will be crossed with a structure).
- Retain a Qualified Professional to complete an auditory or visual presence/non-detection survey to determine if the shrubby swamp is used by amphibians. Surveys should be completed during the spring in a year when the shrubby swamp holds water.
- Retain a Qualified Aquatic Environmental Specialist (QAES) for any instream works in Spring Creek in support of the construction of a bridge.

Additional mitigation measures proposed to be included in the Direct Control District to protect Spring and Policeman Creek's riparian habitat value include:

- Maintaining a minimum setback of at least 20 m for all buildings and landscaping along Spring and Policeman Creek. The minimum 20 m setback will prevail over any other setback that may conflict with the minimum 20 m setback.
- Avoid planting non-native monoculture species such as manicured lawns immediately adjacent to the minimum 20 m setback to maintain riparian water quality function (e.g., sediment, nitrate, or phosphorus transport). Any permanent landscaping that affects the vegetation outside the 20 m setback will be comprised of native vegetation.

- Where not in conflict with the FireSmart directive, mature trees over 0.3 m in diameter will be protected in perpetuity throughout the minimum 20 m setback on Spring and Policeman Creeks. Trees removed within 20 m of Spring Creek to meet FireSmart objectives should be replaced by less flammable species such as poplar or cottonwood.
- The existing undisturbed areas adjacent to Spring and Policeman Creeks and within the minimum 20 m setback should be protected as a non-disturbance zone. No soil or vegetation disturbance (except where FireSmart thinning is required) will occur within this area, except for the removal of noxious or invasive plant species. In the removal of noxious or invasive species, only mechanical methods such as cutting or hand-pulling will occur, and no use of herbicides will be allowed.

# REFERENCES

Alberta Agriculture and Rural Development (AARD). 2015. Agricultural Region of Alberta Soil Inventory Database (AGRASID 4.0). Alberta Soil Information Centre. Accessed in September 2019.

Alberta Environment and Sustainable Resource Development (ESRD). 2019. Fish and Wildlife Internet Mapping Tool (FWIMT). Accessed in September 2019.

Alberta Environment and Sustainable Resource Development (ESRD). 2015a. Recommended Land Use Guidelines: Key Wildlife and Biodiversity Zones. Accessed Jan 2021.

Alberta Environment and Sustainable Resource Development (ESRD). 2015b. Wild Species Status Search. Accessed in September 2019.

Alberta Sustainable Resource Development (ASRD). 2008. Calgary and Canmore Areas Aerial Winter Elk Survey 2008. Fish and Wildlife Division. Available at: https://www.ab-conservation.com/publications/report-series/calgary-and-canmore-areas-aerial-winter-elk-survey-2008/

Alberta Sustainable Resource Development (ASRD). 2002. Alberta's Canadian Toad. *Bufo hemiophrys*. *Species at Risk* Fact Sheet. Available at: https://open.alberta.ca/dataset/417892dc-d442-4640-9e5c-5976194cb679/resource/2e410353-85a6-454f-ae82-ef1852f9d2aa/download/SAR-CanadianToad-FactSheet-Mar2002.pdf

Alberta Environment and Parks (AEP). 2021. Fish and Wildlife Management Information System (FWMIS). Accessed January 2021.

Alberta Environment and Parks (AEP). 2019. ACIMS Data Request Search. Accessed in September 2019.

Alberta Environment and Parks (AEP). 2018. List of Elements – Vascular Species. March 2018. Accessed July 2020.

Alberta Environment and Parks (AEP). 2019. Flood Hazard Map Application. Updated August 14, 2019. Available at: https://maps.alberta.ca/FloodHazard/

Alberta Government. 2019. Human-Cougar Coexistence in the Bow Valley. Cougar Occurrence Summary 2000-2018. 30 pp. Available at: https://open.alberta.ca/dataset/314e2bdd-08c0-48d0-bc21-2f871b04af71/resource/bc5f7c93-80bb-4c79-a382-03eefe6b63da/download/aep-cougar-occurrence-summary-2000-2018.pdf

Alberta Native Plant Council (ANPC). 2012. Alberta Native Plant Council (ANPC) Guidelines for Rare Vascular Plant Surveys in Alberta 2012 Update. Edmonton, Alberta. April 2012.

Bow Corridor Ecosystem Advisory Group (BCEAG) 2012. Wildlife Corridor and Habitat Patch Guidelines for the Bow Valley. Town of Canmore: Municipal District of Bighorn: Banff National Park: Government of Alberta. 128 pgs.

Ciarniello, L., M. Boyce, D. Heard, D. Seip. 2005. Denning Behavior and Den Site Selection of Grizzly Bears Along the Parsnip River, British Columbia, Canada. Ursus 16(1):47-58. 12 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2019. Candidate Wildlife Species Status Reports. Wildlife Species Assessment. Accessed in September 2019.

Corvidae Environmental Consulting Inc. 2018. Environmental Impact Statement for Peaks Landing Development, Canmore Alberta. Prepared for Hillcroft Developments Ltd. Corvidae Project No. CE 2018-09. 69 pp.

Edwards, B.C. (2013). Home ranges, resource selection, and parasite diversity of urban versus rural elk (Cervus elaphus) (Unpublished master's thesis). University of Calgary, Calgary, AB. doi:10.11575/PRISM/26378http://hdl.handle.net/11023/1229.

Gibeau, M.L., S. Herrero, J.L. Kansas and B. Benn. 1996. Grizzly bear population and habitat status in Banff National Park: a report to the Banff Bow Valley Task Force. University of Calgary, Alberta, Canada. 62pp.

Golder Associates Ltd (Golder). 2017. Environmental Impact Statement for the Resort Centre Area Structure Plan Amendment. Submitted to the Town of Canmore. Report Number 1539221. 283 pp.

Government of Alberta (GoA). 2017. South Saskatchewan Regional Plan 2014-2024: An Alberta Land-use Framework Integrated Plan.

Government of Alberta (GoA). 2018. Human-Wildlife Coexistence Recommendations for Improving Human-Wildlife Coexistence in the Bow Valley. Prepared by the Town of Canmore, Town of Banff and the Government of Alberta. June 2018.

Government of Alberta (GoA). 2012. Stepping Back from the Water: A Beneficial Management Practices Guide of New Development Near Water Bodies in Alberta's Settled Region.

Government of Alberta (GoA). 2020a. Environmental Site Assessment Repository. Available at: http://www.esar.alberta.ca/esarmain.aspx.

Government of Alberta (GoA). 2020b. Alberta Water Wells. Available at: http://groundwater.alberta.ca/WaterWells/d/

Government of Alberta (GoA). 2020c. Listing of Historical Resources. Available at: https://www.alberta.ca/listing-historic-resources.aspx

Government of Canada (GoC). 2019. Species at Risk Public Registry. Species at Risk Act, A to Z species list. Accessed September 2019.

Hegmann, G., C. Cocklin, R. Creasey, S. Dupuis, A. Kennedy, L. Kingsley, W. Ross, H. Spaling and D. Stalker and AXYS Environmental Consulting Ltd. 1999. Cumulative Effects Assessment Practitioners Guide. Prepared for the Canadian Environmental Assessment Agency. February 1999.

Honeyman, J. 2007. Bow Valley Bear Hazard Assessment. Karelian Bear Shepherding Institute of Canada. Prepared for Alberta Sustainable Resource Development (ASRD). 96 pp. Available at: http://www.bearconflict.org/wp-content/uploads/2011/10/BVBHA-FINAL-Sep-2007-online.pdf

Hojnowski, C.E. 2017. Spatial and Temporal Dynamics of Wildlife Use of a Human-Dominated Landscape. A dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Philosophy in Environmental Science, Policy, and Management in the Graduate Division of the University of California, Berkeley.

Jacques Whitford AXYS Limited. 2008. Three Sisters Mountain Village Wildlife Monitoring Program 2005-2007 Update Report. Prepared for Three Sisters Mountain Village ULC. March 2008.

Johnson D. L. Kershaw, J. Pojar. 1995. Plants of the Western Boreal Forest and Aspen Parkland. Lone Pine Publishing and the Canadian Forest Service. Edmonton, Alberta.

Matrix Planning and Wildlife & Company. 2003. Proposed Spring Creek Land Exchange Environmental Impact Statement. Volume I. Prepared for the Town of Canmore and Alberta Sustainable Resource Development. 119 pp.

Management and Solutions in Environmental Science (MSES). 2019. Environmental Impact Statement Addendum WMC Expansion Project. Prepared for Town of Canmore. 37 pp.

Miistakis Institute (Miistakis). 2010. Spatio-temporal Patterns of Wildlife Distribution and Movement in Canmore's Benchlands Corridor. Prepared for Alberta Tourism, Parks and Recreation. 86 pp.

Moss E.H. 1996. Flora of Alberta. Second Edition. Revised by John G. Packer. University of Toronto Press. Toronto, Ontario.

Mowat, G. and C. Stroebeck. 2000. Estimating Population Size of Grizzly Bears using Hair Capture, DNA Profiling, and Mark-Recapture Analysis. J. Wildl. Manage. 64(1):2000.

Natural Regions Committee. 2006. Natural Regions and Subregions of Alberta. Compiled by Downing D.J. and W.W. Pettapiece. Government of Alberta. Pub. No. T/852. ISBN: 0-7785-4573-3.

Paton, D. G. 2012. Connectivity of Elk Migration in Southwestern Alberta (Unpublished master's thesis). University of Calgary, Calgary, AB. doi:10.11575/PRISM/25419 http://hdl.handle.net/11023/344 master thesis

Personal Communication Kerry Kaleta. October 18, 2019.

Royer F. and R. Dickinson. 1999. Weeds of Canada and the Northern United States. University of Alberta Press. Edmonton, Alberta.

Spring Creek Properties Ltd. 2003. Environmental Impact Statement: Proposed Spring Creek Land Exchange Volume I. Town of Canmore, Spring Creek Properties Ltd. and Alberta Sustainable Resource Development.

Tattersall. G., S. Currie, D.M. LeBlanc. 2013. Pulmonary and Cutaneous O2 Gas Exchange: A Student Laboratory Exercise in the Frog. Adv Physiol Educ 37: 97–105, 2013; doi:10.1152/advan.00087.2012.

TERA Environmental Consultants (TERA). 2012. Recommendations for Trails and Management of Recreational Use of the Town of Canmore: South Canmore and West Palliser. July 2012. Prepared for the Town of Canmore. 16 pp.

Town of Canmore. 1997. Noise Bylaw. 11-97. Available at: https://canmore.ca/municipal-services/emergency-services/bylaw-services/noise-nuisance-control.

Town of Canmore (TOC). 2016. Canmore Municipal Development Plan Bylaw 2016-03. Adopted January 2020.

Town of Canmore. 2016. Environmental Impact Statement (EIS) Policy.

Town of Canmore. 2015. Human Use Management Review. Consultation Summary, Final Recommendation and Implementation Plans.

Town of Canmore. 2017. Canmore Community Monitoring Program. 2016 Final Report. Biosphere Institute of the Bow Valley. 240 pp.

Montane. 2018. Wildfire Mitigation Strategy Review. Prepared by Montane Forest Management Ltd.

Town of Canmore. 2020. Revised Land Use Bylaw 2018-22: Schedule A. Revised April 1, 2020. Available at: https://canmore.ca/municipal-services/residents-development-planning/planning-reference/land-use-bylaw

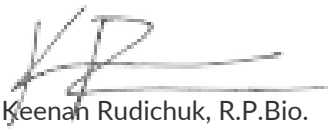
Watson, K. and D. Pennock 2016. Section 3. Soil Profile Description. From: D. Pennock, K. Watson, and P. Sanborn. 2016. Field Handbook for the Soils of Western Canada. Pedology Subcommittee, Canadian Society of Soil Science.

# CERTIFICATION PAGE

This report presents our findings for an Environmental Impact Statement completed for the proposed Conceptual Land Use Plan 3rd Avenue South Land.

Respectfully submitted,

Prepared by:



Keenan Rudichuk, R.P.Bio.
Senior Wildlife Biologist

Reviewed by:

Richard Simpson, RFP, M.Sc.
Regional Manager

# APPENDIX A – CONCEPTUAL LAND USE PLAN


Associated Environmental

LEGEND:

- Wetland
- Proposed Road Extension
- Property Line
- Minimum Lot Setbacks (proposed)

N

0 100 m

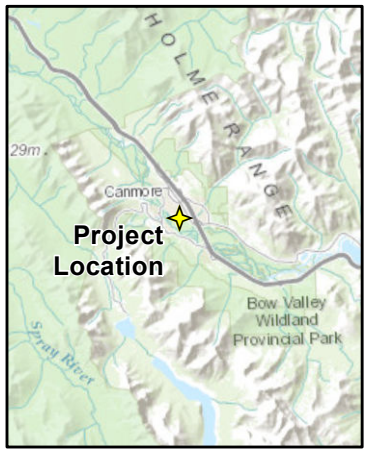



FIGURE 1-3:
CONCEPTUAL DESIGN

South Canmore EIS for 3rd Avenue South Land

| | |
|---|---|
| **AE PROJECT No.** | 2019-8457.000 |
| **DATE** | FEB. 2021 |
| **SCALE** | 1:2231 |
| **COORD. SYSTEM** | NAD 83 UTM 11 |
| **REV** | 1 |
| **DESCRIPTION** | ISSUED FOR DRAFT |
| **DRAWN BY** | DA |
| **CHECKEC BY** | KR |



PATH: F:\mapping_projects\2019\19-8457_McCaffery_Canmore\Fig 1-3.mxd / PLOT DATE: 2/25/2021 9:45:09 AM

# APPENDIX B - TERMS OF REFERENCE

# Terms of Reference

## Environmental Impact Statement (EIS) for the South Canmore Lands – 800 3rd Avenue

## 1.0 Introduction

### 1.1 Project Description

The Town of Canmore has received a proposal to develop 20 acres of currently undeveloped land east of Spring Creek Gate and north of 3rd avenue (See Attachment 1). The property is privately owned by Bill and Jan McCaffery. The legal description of the property is S. ½ of L.S.D. 13, QTR NW, Sec. 28, TWP 24, Range 10. The municipal address is 800 3rd Avenue, Canmore, AB.

Development plans for the site have not been finalized, but initial plans call for the construction of five to seven private homes and a palliative care home. There are also plans to build a barn and fenced horse paddock in association with one of the homes on the property. New roads will be required to access the site.

The property falls within the South Canmore Local Habitat Patch. A habitat patch is defined as an area meant to meet the food, rest and water needs of animals for a short period while they negotiate a corridor network towards a larger, regional habitat patch at its end. Habitat patches need to provide sufficient habitat in their interior for an animal to rest or feed with security from human disturbance (BCEAG 2012).

### 1.2 Requirement for an EIS

The applicant's property is located within the South Canmore Local Habitat Patch, including the northern peninsula area (see Map 4 in MDP 2016). As per Canmore's Municipal Development Plan (2016), an EIS is required for proposed projects located within areas designated as Conservation areas, such as Habitat Patches, but that are outside of the Growth Boundary:

*4.1.2 Development in Conservation areas should be limited to recreational use, agricultural uses, infrastructure and utilities, and will be subject to any additional restrictions on these activities contained in the MDP including Environmentally Sensitive Areas policies contained in Section 4.2.*

*4.1.4 Changes in zoning for lands within Conservation areas that would allow new or additional development of those lands shall be discouraged unless exceptional community benefit can be demonstrated. Should an application for amendment be considered, an EIS will be required to be prepared and potential impacts of the development addressed and mitigated.*

The EIS should also consider:

***New Development Within or Adjacent to Wildlife Corridors and Habitat Patches***

*4.2.13 Development proposals within or adjacent to a wildlife corridor or habitat patch shall have regard for the BCEAG Wildlife Corridor and Habitat Patch Guidelines for the Bow Valley (2012) and most recent principles of wildlife conservation to ensure the values and function of the corridor or habitat patch are not compromised.*

**Wildlife Sensitive Design**

*4.2.16 Developments should be designed to minimize impacts on any adjacent wildlife habitat patch or corridor. Design elements that should be addressed include, but are not limited to, placement of buildings, lighting, landscaping and fencing, educational signage and location of trails and trail heads.*

**Waterbodies – Setbacks for New Development**

*4.2.23 Setbacks from waterbodies shall be stablished at the area structure plan, land use bylaw amendment or subdivision phase to ensure that:*
*a. Land adjacent to a waterbody is dedicated as Environmental Reserve pursuant to Section 4.3,*
*b. Riparian areas, the waterbody and watershed processes are maintained in a natural state,*
*c. Public access is provided where desirable, and*
*d. Fish and wildlife habitat is protected.*

*4.2.24 The Provincial guidelines Stepping Back from the Water: A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region (2012) should be used as a guideline for the identification of riparian areas and development of management options to determine waterbody setback distances.*

**Flood Risk Areas**

*3.4.1 Development within the areas identified as floodway, flood fringe and overland flow areas shall be designed to protect buildings and habitable spaces in addition to protecting the natural function of waterbodies.*

The preparation of an EIS is outlined in the Town's Environmental Impact Statement Policy. Prior to preparing the EIS, the Town must obtain input from a qualified third-party reviewer. The scope of the EIS is to assess the impacts of building five to seven private homes, one horse paddock, and a palliative care home within the South Canmore Local Habitat Patch – the land use and development level impacts of construction and operation of the facility including associated mitigations.

This EIS Terms of Reference was prepared and reviewed by the Town's third-party reviewer.

## 2.0 Purpose of the EIS

The purpose of the EIS is to provide sufficient information to Council and Town staff in order to make an informed decision on the application to amend the Municipal Development Plan and change the land use zoning to allow development in the South Canmore lands at 800 3rd Avenue. The EIS will outline existing conditions, identify significant natural and ecological features, determine the nature and scale of the potential impacts generated by the proposal, provide recommendations for how to best avoid or mitigate those impacts, and identify residual impacts and their significance.

## 3.0 Scope of the EIS

The EIS will be based on available information and accumulated data on environmental resources from the surrounding environments and identified linkages to the proposed development. The accumulated data and most recent scientific thought will form the basis of the EIS. In addition to existing information, it is recommended that a reconnaissance level survey be conducted to ground truth existing information.

1) Proposal Overview
    - A description of the proposal.
    - Mapping of the proposal in relation to regional and existing site conditions and constraints.
    - Identification of federal or provincial requirements or restrictions relevant to the study, and how the proposal will meet the intent or legislative requirements.
    - An overview of the municipal planning policy context, including statutory documents and zoning.

2) Existing Site Conditions
    - Identification of previous relevant literature/studies, if publicly available
    - A description of existing environmental conditions, including:
        i. Site location map,
        ii. Soils, landforms and surficial geology,
        iii. Hydrological or hydrogeological (desktop assessment only) resources including wetlands,
        iv. A biophysical inventory and analysis of terrestrial and aquatic communities (studies being undertaken during the appropriate season), and the relationship to the larger local and regional ecosystem,

v. A summary description of the natural features and components, and the proposed criteria to be applied for evaluation of their significance, and
vi. Hazards and constraints resulting from existing site conditions.

- .

3) Analysis of Impacts

- Analysis and criteria for evaluation of the foreseeable short and long term positive and negative impacts of the proposal with respect to:
    i. Fish and associated habitat,
    ii. Wildlife and associated habitat,
    iii. Vegetation,
    iv. Soils and terrain,
    v. Ground water impacts,
    vi. Surface water impacts, and
    vii. Air quality.
- Analysis of the human use impacts resulting from the proposal.
- Analysis of alternatives and modifications to the proposal to limit or remove impacts.
- An evaluation of whether the form of the development/proposal can be accommodated given any identified ecological sensitivities or constraints, including land use type and intensity of the proposed development.
- Analysis of the cumulative impacts of the proposal considering the impacts of previous development and human activity in the South Canmore Local Habitat patch. For the purposes of this analysis the focal area should include the South Canmore Local Habitat patch plus a 500 m buffer around its boundary. At a minimum the cumulative effects analysis should include:

    - A quantitative description of landcover/wildlife habitat change over time inside the habitat patch
    - A quantitative description of change in human-related disturbance levels over time inside the habitat patch (e.g., roads, designated vs undesignated recreational trails)
    - A discussion of how existing, and future/proposed development impacts the quality and quantity of wildlife habitat inside the patch and wildlife use of it, including quantitative estimates of potential changes in overall patch size, fragmentation level etc.

- Temporal range of the analysis should span from the period when the South Canmore Habitat Patch was first established (~1992-1999) and include analysis of landscape change every 5 to 10 years to existing conditions. It will also include a discussion of predicted Future impacts (i.e., with Project and other Reasonably Foreseeable Developments)

4) Mitigations, Recommendations & Conclusions
    - Provide recommendations for how to reduce, avoid or mitigate negative impacts or build on positive impacts.
    - Identification of residual impacts and criteria proposed to evaluate their significance.

Wildlife habitat patches are a valid municipal planning issue and the EIS will need to consider how development or any proposed mitigations will impact wildlife use of the adjacent habitat patch as well as how cumulative effects are impacting the South Canmore Local Habitat patch.

## 4.0 EIS Report

The report will contain all information required by this Terms of Reference. The format of the report will include mapping, tables and supporting text. The Town will require a digital copy of the document.

## 5.0 Review of the EIS

The EIS Policy requires that this EIS Terms of Reference and the resulting EIS are reviewed by an independent, qualified third party that reports directly to the Town. The EIS Policy also requires that the third-party reviewer be involved from the beginning of the process. The Town and its third-party reviewer will work with the applicant's consultant to update and revise the EIS as may be necessary through the review process. Where significant changes are proposed to the EIS, the project or recommended mitigation strategies through the EIS review process, the applicant's consultant will produce an updated EIS that reflects these changes.

The EIS must be submitted and reviewed by the Town's third-party reviewer prior to First Reading by Council.

The Town may also refer the EIS to other agencies or committees for comment, including but not limited to the Province of Alberta and Canmore's Environmental Advisory Review Committee (EARC).

## 6.0 Relevant and Available Documents

- Recommendations for Trails and Management of Recreational Use for the Town of Canmore: South Canmore and West Palliser (TERA Environmental Consultants, 2012)
- BCEAG (Bow Corridor Ecosystem Advisory Group). 1999. Wildlife corridor and habitat patch guidelines for the Bow Valley. 34pp.
- BCEAG. 2001. Wildlife and Human Use Monitoring Recommendations for the Bow Valley.
- BCEAG. 2012 (DRAFT). Wildlife corridor and habitat patch guidelines for the Bow Valley: Updated 2011. 29pp, plus appendices.
- MSES Inc. 2019. EIS Addendum WMC Expansion Project.
- Summit Environmental. 2013. Environmental Impact Statement. Proposed WTS and MRF Relocation.
- Town of Canmore. 2016. *Canmore Municipal Development Plan (Amended 2018)*.
- Town of Canmore. 2016. *Environmental Impact Statement (EIS) Policy*. 5 pp
- Town of Canmore. 2019b. Human - Wildlife Coexistence in the Bow Valley.
- Flood risk mapping – available here

**Attachment 1**

Area overview


(Source: 3rd Avenue South Land: Conceptual Land Use Plan (Mta, 2020)

# APPENDIX C - VEGETATION OBSERVED IN PROJECT AREA

| Scientific Name | Common Name | Layer | Provincial Rank[1] | Project Area Classification | | | |
|---|---|---|---|---|---|---|---|
| | | | | Coniferous Forest | Wetland | Open | Riparian |
| *Achillea millefolium* | common yarrow | Forb | S5 | ● | | | |
| *Amelanchier alnifolia* | saskatoon | Shrub | S5 | ● | | | |
| *Anemone canadensis* | Canada anemone | Forb | S5 | ● | | | |
| *Arctostaphylos uva-ursi* | common bearberry | Shrub | S5 | ● | | | |
| *Betula pumila* | dwarf birch | Shrub | S5 | ● | | ● | |
| *Bromus ciliatus* | fringed brome | Graminoid | S5 | ● | | ● | |
| *Calamagrostis canadensis* | bluejoint | Graminoid | S5 | | | | |
| *Calamagrostis stricta ssp. inexpansa* | northern reed grass | Graminoid | S4 | | | ● | |
| *Carex aquatilis* | water sedge | Graminoid | S5 | | ● | ● | ● |
| *Carex flava* | yellow sedge | Graminoid | S2S3 | | | | |
| *Carex saxatilis* | rocky-ground sedge | Graminoid | S4 | | ● | | ● |
| *Carex spp.* | sedge species | Graminoid | SNR | ● | | ● | ● |
| *Carex spp2.* | sedge species | Graminoid | SNR | ● | | ● | ● |
| *Carex utriculata* | small bottle sedge | Graminoid | S5 | | | | ● |
| *Cirsium arvense* | creeping thistle | Forb | SNA | | ● | | ● |
| *Dasiphora fruticosa* | shrubby cinquefoil | Shrub | S5 | ● | ● | ● | |

| Scientific Name | Common Name | Layer | Provincial Rank[1] | Project Area Classification | | | |
|---|---|---|---|---|---|---|---|
| | | | | Coniferous Forest | Wetland | Open | Riparian |
| *Deschampsia cespitosa* | tufted hair grass | Graminoid | S5 | | ● | ● | ● |
| *Elaeagnus commutata* | silverberry | Shrub | S5 | | | | ● |
| *Elymus repens* | quackgrass | Graminoid | SNA | | | | |
| *Elymus trachycaulus* | slender wheatgrass | Graminoid | S5 | | ● | ● | |
| *Equisetum arvense* | common horsetail | Forb | S5 | | | | ● |
| *Equisetum pratense* | meadow horsetail | Forb | S5 | ● | ● | | |
| *Fragaria virginiana* | wild strawberry | Forb | S5 | ● | | ● | |
| *Galium boreale* | northern bedstraw | Forb | S5 | ● | | | |
| *Geum rivale* | purple avens | Forb | S5 | | | ● | |
| *Geum spp.* | avens | Forb | SNR | | | | ● |
| *Halenia deflexa* | spurred gentian | Forb | S4 | ● | | | |
| *Hordeum jubatum* | foxtail barley | Graminoid | S5 | | | | |
| *Juncus balticus* | wire rush | Graminoid | S5 | | | | ● |
| *Juncus spp.* | rush species | Graminoid | SNR | | | | |
| *Koeleria macrantha* | June grass | Graminoid | S5 | | | | |
| *Lathyrus ochroleucus* | cream-colored vetchling | Forb | S5 | ● | | | |
| *Leymus innovatus* | hairy wild rye | Graminoid | S5 | ● | | ● | |
| *Moss spp.* | moss species | Bryophyte | SNR | | | | |

| Scientific Name | Common Name | Layer | Provincial Rank[1] | Project Area Classification | | | |
|---|---|---|---|---|---|---|---|
| | | | | Coniferous Forest | Wetland | Open | Riparian |
| *Oryzopsis asperifolia* | white-grained mountain rice grass | Graminoid | S5 | ● | | | |
| *Packera paupercula* | balsam groundsel | Forb | S5 | | | ● | |
| *Phleum pratense* | timothy | Graminoid | SNA | ● | ● | ● | |
| *Picea glauca* | white spruce | Tree | S5 | ● | | ● | ● |
| *Plantago major* | common plantain | Forb | SNA | | | | |
| *Plantago spp.* | plantain species | Forb | SNR | | | | |
| *Platanthera dilatata* | tall white bog orchid | Forb | S3 | | ● | ● | |
| *Poa palustris* | fowl bluegrass | Graminoid | S5 | | | | |
| *Poa pratensis* | Kentucky bluegrass | Graminoid | S5 | | ● | | |
| *Poa spp.* | bluegrass species | Graminoid | SNR | | | ● | |
| *Populus balsamifera* | balsam poplar | Tree | S5 | | ● | | |
| *Populus tremuloides* | aspen | Tree | S5 | | | ● | |
| *Potentilla anserina* | silverweed | Forb | S5 | | | | |
| *Prunella vulgaris* | heal-all | Forb | S3 | | | | |
| *Pyrola asarifolia* | common pink wintergreen | Forb | S5 | | | | |
| *Ranunculus acris* | tall buttercup | Forb | SNA | | ● | ● | |
| *Ribes oxyacanthoides* | northern gooseberry | Shrub | S5 | | | | |
| *Rosa acicularis* | prickly rose | Shrub | S5 | ● | ● | ● | |
| *Rubus pubescens* | dewberry | Forb | S5 | | ● | | |

| Scientific Name | Common Name | Layer | Provincial Rank[1] | Project Area Classification | | | |
|---|---|---|---|---|---|---|---|
| | | | | Coniferous Forest | Wetland | Open | Riparian |
| *Salix lasiandra* | shinning willow | Shrub | S5 | | ● | | ● |
| *Salix scouleriana* | Scouler's willow | Shrub | S5 | | | | |
| *Salix spp.* | willow species | Shrub | SNR | ● | | ● | |
| *Schizachne purpurascens* | purple oat grass | Graminoid | S5 | | | ● | |
| *Shepherdia canadensis* | Canada buffaloberry | Shrub | S5 | | | | |
| *Sisymbrium altissimum* | tumbling mustard | Forb | SNA | | | | |
| *Sisyrinchium montanum* | common blue-eyed grass | Graminoid | S5 | | | ● | |
| *Symphyotrichum spp.* | aster species | Forb | SNR | | | | |
| *Taraxacum officinale* | common dandelion | Forb | SNA | | | ● | |
| *Trifolium hybridum* | alsike clover | Forb | SNA | ● | | ● | |
| *Viola spp.* | violet species | Forb | S4 | | | | |
| *Leucanthemum vulgare* | ox-eye daisy | Forb | SNA | | | ● | |
| *Solidago missouriensis* | low goldenrod | Forb | S5 | | | ● | |
| *Galearis rotundifolia* | round-leaved orchid | Forb | S5 | ● | | | |

# APPENDIX D - SITE PHOTOGRAPHS

**Photo 1**
**Subdistrict D, looking northwest**

**Photo 2**
**Subdistrict D, looking northwest**

**Photo 3**
**Subdistrict D, looking southeast**

**Photo 4**
**Subdistrict C, looking northeast with Spring Creek and residences**

# APPENDIX E - FWMIT SPECIES SUMMARY REPORT

# Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

## Species Summary Report

**Report Created:** 30-Sep-2019 15:36

### Species present within the current extent :

**Fish Inventory**

- ARCTIC GRAYLING
- BROOK STICKLEBACK
- BROOK TROUT
- BROWN TROUT
- BULL TROUT
- BULL TROUT X BROOK TROUT HYBF
- CUTTHROAT TROUT
- LAKE TROUT
- LONGNOSE SUCKER
- MOUNTAIN WHITEFISH
- RAINBOW TROUT
- SUCKER FAMILY
- TULLIBEE (CISCO)
- UNKNOWN
- WHITE SUCKER

**Wildlife Inventory**

- BARRED OWL
- BOREAL TOAD
- COLUMBIA SPOTTED FROG
- COUGAR
- GRIZZLY BEAR

**Stocked Inventory**

- ARCTIC GRAYLING
- BROOK TROUT
- BROWN TROUT
- CUTTHROAT TROUT
- RAINBOW TROUT

### Buffer Extent

| Centroid (X,Y): | Projection | Centroid: (Qtr Sec Twp Rng Mer) | Radius or Dimensions |
|---|---|---|---|
| 475613, 5656466 | 10-TM AEP Forest | NW 28 24 10 5 | 5 kilometers |

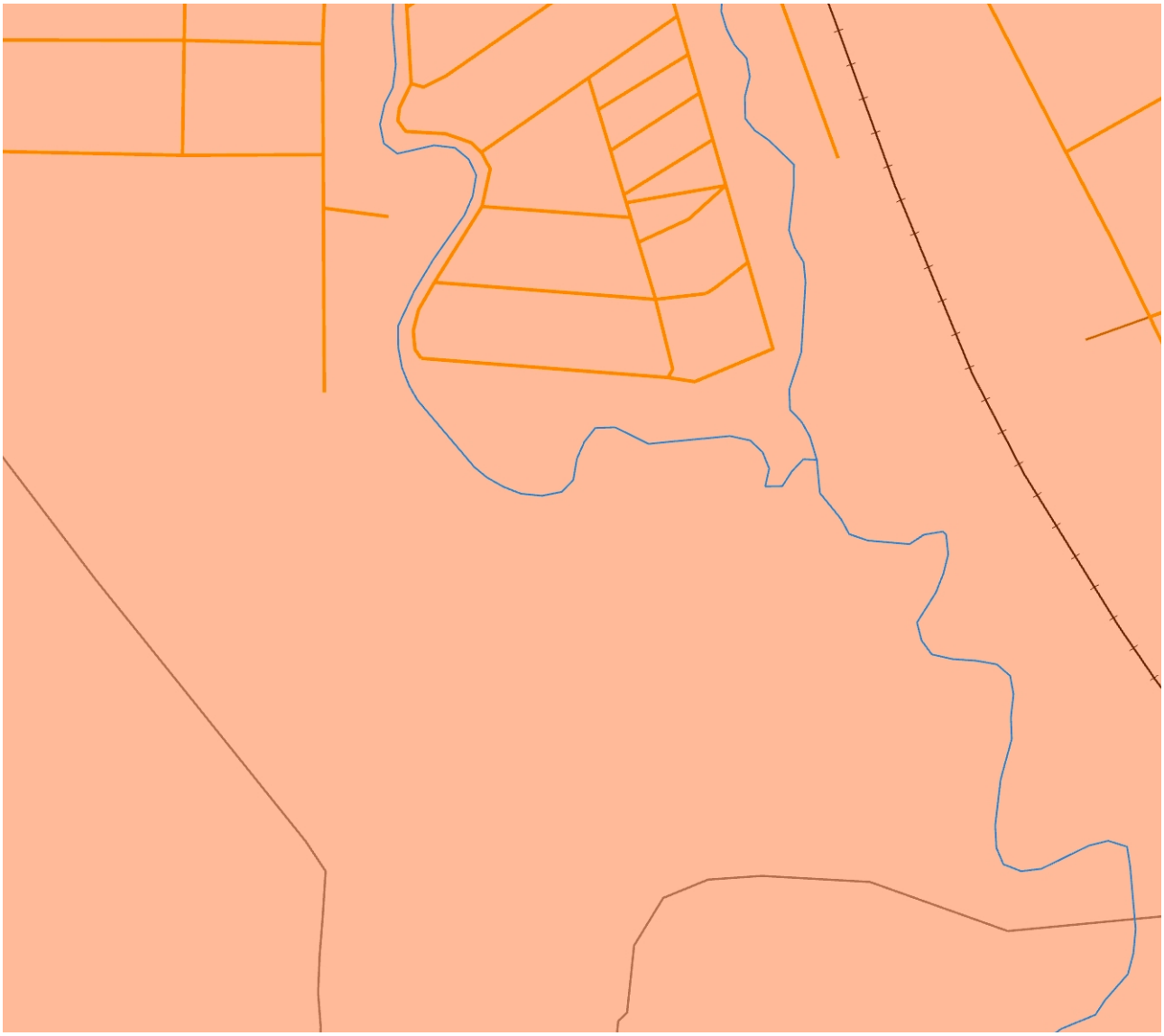
### Contact Information

For contact information, please visit:

http://aep.alberta.ca/about-us/contact-us/fisheries-wildlife-management-area-contacts.aspx

30-Sep-2019 15:36

**Map Results**



# APPENDIX F - LETTER OF SUPPORT

Palliative Care Society of the Bow Valley

**Building Community;**
**Hospice Palliative Care in the Bow Valley**

#202 1080 Railway Avenue
PO Box 40113
Canmore Crossing
Canmore T1W 1P4

**August 19, 2020**

**Letter of Support from:**
Julie Hamilton
Chair, Board of Directors
Palliative Care Society of the Bow Valley

**To:** Lauren Miller
Manager of Planning & Development

Alaric Fish
Senior Planner

**Re:** Land Use Rezoning Application from Bernie and Jan McCaffery for 3rd Avenue South Land in Canmore

The Palliative Care Society of the Bow Valley (PCSBV) is a not-for-profit society run by a volunteer Board of Directors. Palliative care is a branch of health care for individuals and families who are living with a life-limiting illness that is usually at an advanced stage. The main goal of the PCSBV is to provide comfort and dignity for the person living with the illness as well as the best quality of life for both the patient and his or her family.

While an important objective is the relief of pain and other symptoms, enhancing the overall quality of life is the primary goal. Palliative care meets not only the physical needs but also the psychological, social, cultural, emotional and spiritual needs of each person and family.

Many patients with terminal illness living in the Bow Valley, are choosing to stay at home and consequently, are not receiving the full spectrum of palliative care that is offered in an urban setting such as Calgary. This situation appears to be inconsistent with how Canmore prides itself in the quality of life it offers, and with the reasons many people choose to live in the Bow Valley.

It is for this reason that the PCSBV board of directors is moving forward with construction in Canmore of a 6-bed residential hospice which will also include day hospice palliative care programs. The board determined that the innovative approach being planned will result in a world class rural palliative care model where patients and their families will be able to choose how their palliative end of life care is to be provided. This model will be integrated seamlessly with existing palliative care, long term, cancer and acute care delivery programs based in Canmore and Banff.

In June 2019, Jan and Bernie McCaffery indicated to the PCSBV of their intention to donate 2 acres of their property in south Canmore to be used as the site to build our planned hospice. Having this property donated to the PCSBV will provide enormous benefit to residents of Canmore and the Bow Valley.

**Benefits of the hospice in this location include;**

- Improving quality of life for families and patients living with terminal illness.
- The full spectrum of health care needs for the Bow Valley's aging population will be met locally.
- Hospice located within proximity of Canmore town centre which avoids having to travel to Calgary for hospice care.

Palliative Care Society of the Bow Valley

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- Bringing appropriate primary palliative end-of-life care to Canmore residents and other Bow Valley communities.
- Enhancing family centered care.
- Providing important and close links with the Bow Valley Community Cancer Center in the Canmore Hospital.
- Accommodating First Nations cultural needs.
- Allow the use of local contractors and businesses for construction and furnishing of the hospice.

The PCSBV is very appreciative of the donation of this property from McCaffery's and supports their application to the Town of Canmore to Re-Zone the land use of their property so that it can be used for the site for a 6- bed residential hospice. The planned facility is one story and would be designed to blend into the landscape. The location of this property is ideally situated for the purpose of a rural residential hospice with its mountain views and proximity to medical amenities.

On behalf of the PCSBV, I thank the McCaffery's for their generous support of the PCSBV and their transformational gift which not only will improve the experience of people and their families on the end of life journey but also will contribute to making Canmore a leader in rural hospice care.

Respectfully submitted

Julie Hamilton
Chair, PCSBV
403-609-8985
jchamilton52@icloud.com