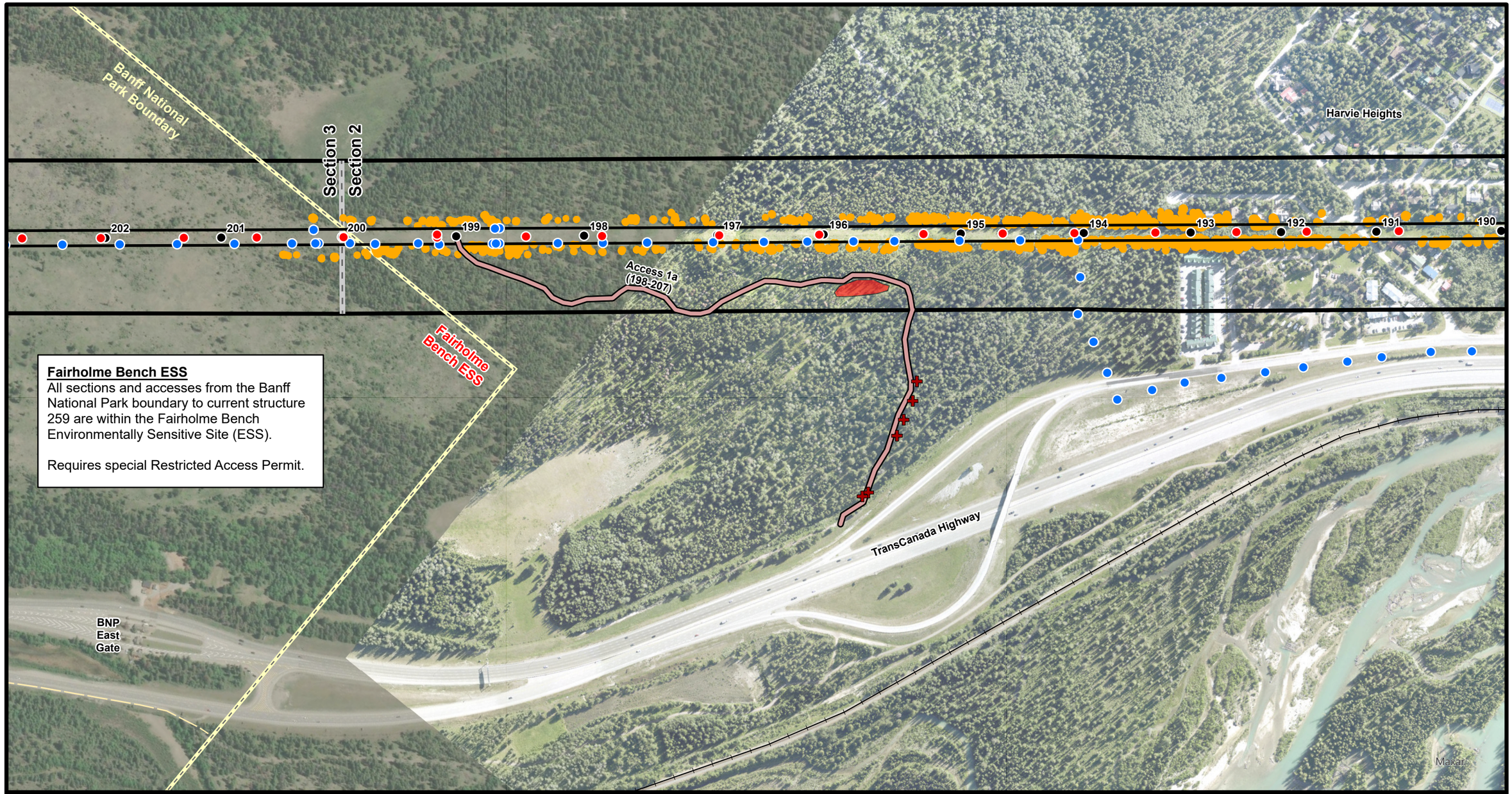
Appendix A

Access and ROW Constraint Maps



Fairholme Bench ESS
All sections and accesses from the Banff National Park boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS).

Requires special Restricted Access Permit.

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Access 1A

Legend

- Current Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 50 100 200 300 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

2022/24 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map A

Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Fairholme Bench ESS

All sections and accesses from the Banff National Park boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS).

Requires special Restricted Access Permit.

Access 1c (198-216)

Access 1b (208-213)

Access 1c (198-216)

Access 2 (214-216)

Access 2: See Map C

Carroll Creek

Wildlife movement corridor

Dry drainage

Unnamed Creek

PIWO observation

Sora observation

Active RTH Arrest

Section 4

Section 3

216 215 214 213 212 211 210 209 208 207 206 205

Canmore

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Access 1B, 1C

Legend

- Current Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 50 100 200 300 Meters

N

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

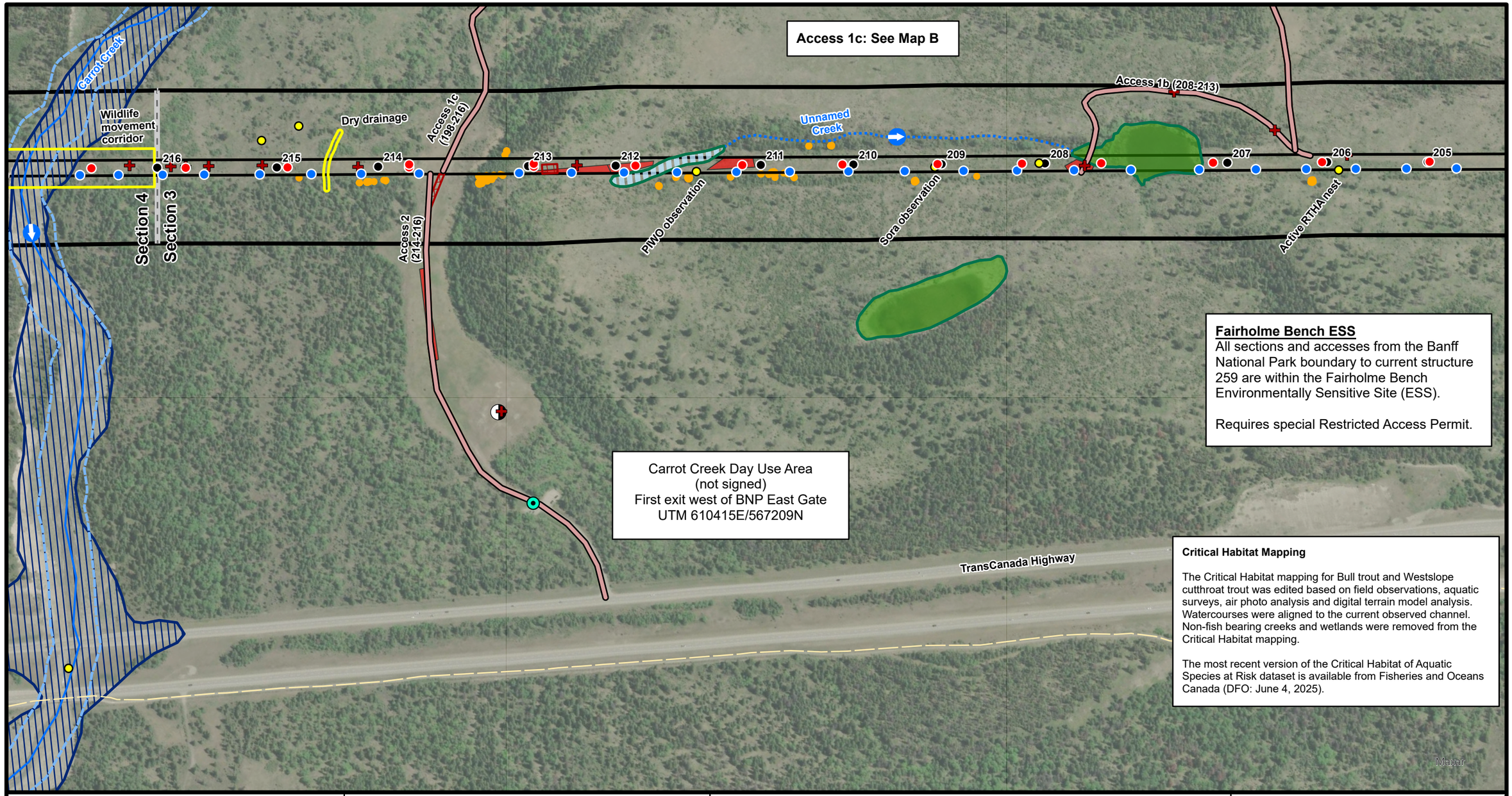
Drawn By: Bruce Gleig

Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map B



Fairholme Bench ESS
All sections and accesses from the Banff National Park boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS).

Requires special Restricted Access Permit.

Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Access 2

Legend

- Current Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 50 100 200 300 Meters

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map C

Access Option 2:
Access 3c. Access is overgrown, need to clear vegetation to re-establish.

Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Rare H13 grassland

Access 3c (232-264)

Nesting cavities in dead snags

Tunux's moonwort

Access 3b (232-264)

Dry drainage

Wildlife movement corridor

237 236 235 234 233 232 231 230 229 228 227 226 225

Section 5

Section 4

Access Option 1:
Route Access 3b around steep slope at current structure 231

Access 3a (Morrison Coulee 217-264)

Morrison Coulee Access 3a
Morrison Coulee is a sensitive area for wildlife with additional access restrictions.

Two weeks prior notice to arrange permission and permits is required. Contact the Environmental Monitor to make arrangements
(Andrea Ram - 403-763-3568).

UTM 609056E/5668948N

Fairholme Bench ESS
All sections and accesses from the Banff National Park boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS).

Requires special Restricted Access Permit.

Fairholme Bench Closure
Annual: April 1 to July 15. Current structures 230-257. No access.

Fairholme Bench Wolf Den Closure

TransCanada Highway

Wildlife underpass

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Access 3A, 3B, 3C

Legend

- Current Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 50 100 200 300 Meters

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

2023 Base Imagery

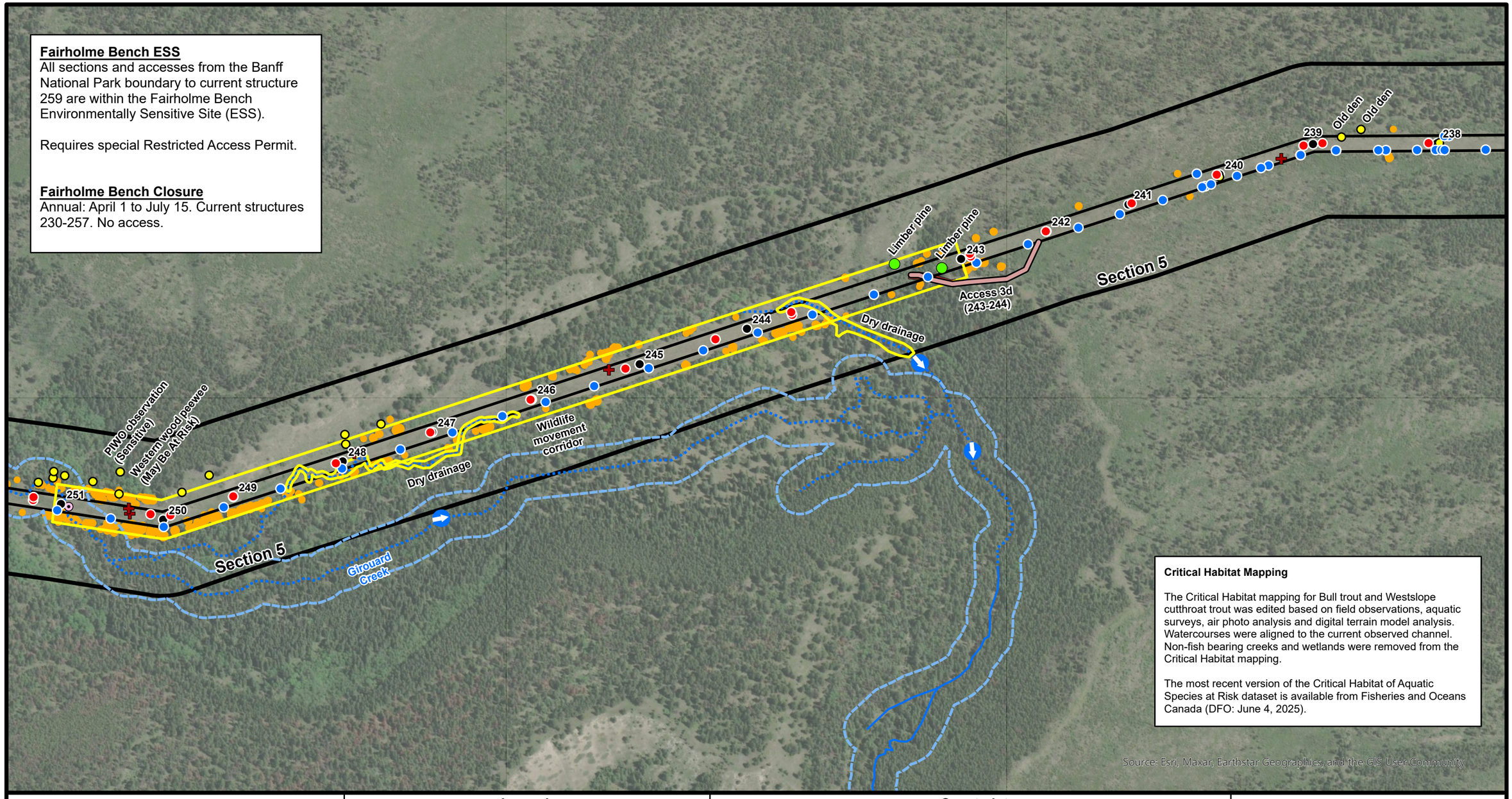
ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map D

Fairholme Bench ESS
All sections and accesses from the Banff National Park boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS).

Requires special Restricted Access Permit.

Fairholme Bench Closure
Annual: April 1 to July 15. Current structures 230-257. No access.



Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Access 3D

Legend

- Current Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas
- **Tunnel Toe Wildfire**

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)
- **Tunnel Toe Wildfire Project Boundary**

0 50 100 200 300 Meters

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map E

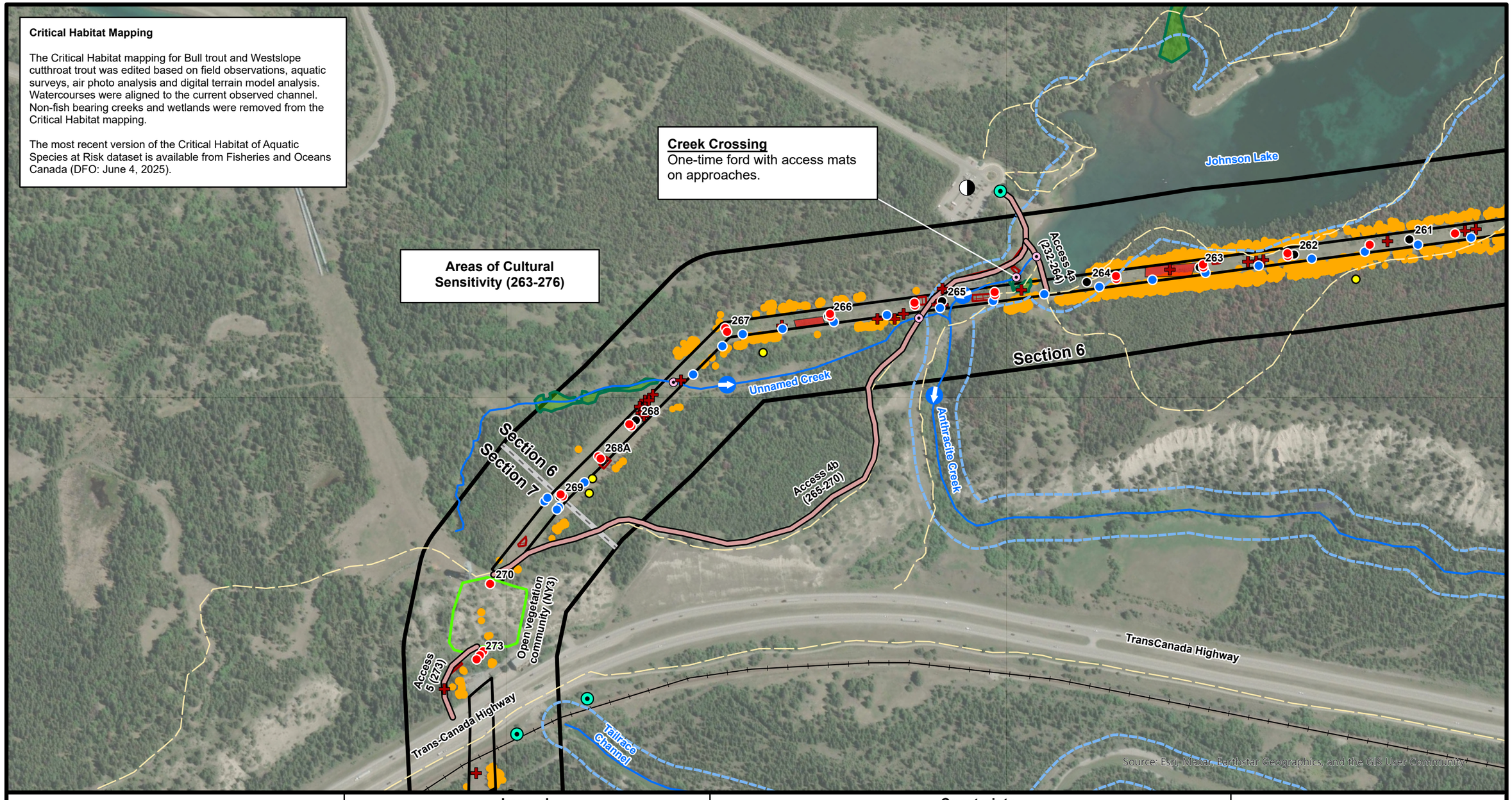
Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Creek Crossing
One-time ford with access mats on approaches.

Areas of Cultural Sensitivity (263-276)



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Access 4A, 4B, 5

Legend

- Current Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 50 100 200 300 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map F

Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Areas of Cultural Sensitivity (263-276, Access 6)

Access 6 begins off Tunnel Mtn Road at the old King George Highway.

UTM 602987E/5673510N

Note:
Cascade Creek crossing - one time ford across creek on Access 6.

Trans-Canada

TransCanada Highway

Tailrace Channel

274

Small mammal den

Access 6 (274-275)

Dry drainage

Dry drainage

275

Cascade Creek

Section 7

Section 8

276

Active OSPR nest

277

278

Access 7 (276-278)

Tunnel Mtn Rd

Access 8a (279-294)

Tunnel Mtn Rd

Access 6 (274-275)

Tunnel Mtn Rd

Tunnel-Toe Wildfire Risk Reduction Project
(recent tree clearing not reflected on air photo)

Maxar

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Access 6, 7

Legend

- Current Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)
- Tunnel Toe Wildfire Project Boundary

0 50 100 200 300 Meters

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

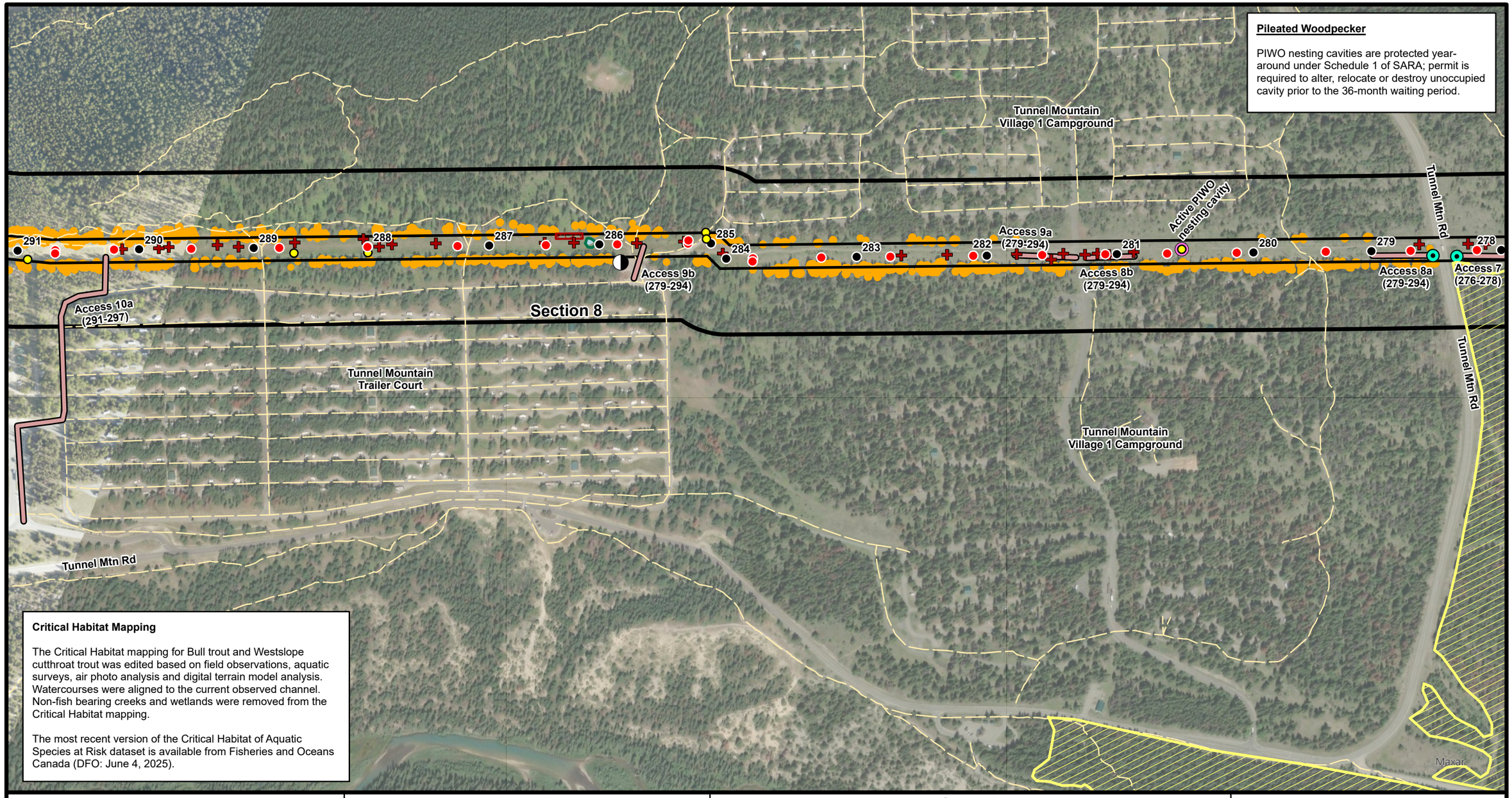
Drawn By: Bruce Gleig

Date: July 03, 2025

2021/23 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map G



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Access 8A, 8B, 9A, 9B, 10A

Legend

- Current Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)
- Tunnel Toe Wildfire Project Boundary

0 50 100 200 300 Meters

N

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

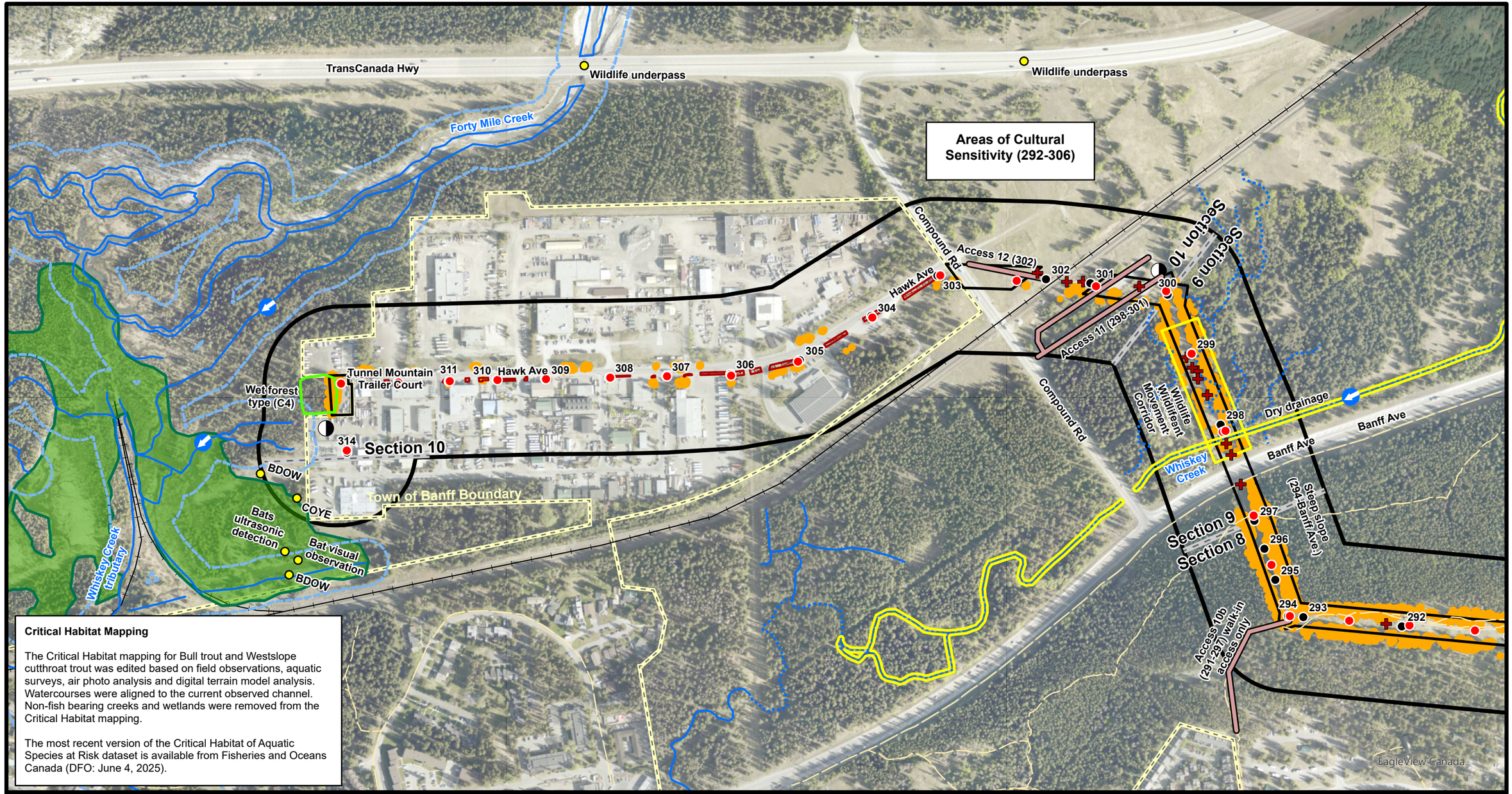
Drawn By: Bruce Gleig

Date: July 03, 2025

2023 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map H



Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Access 10B, 11, 12

Legend

- Current Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 50 100 200 300 Meters

N

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

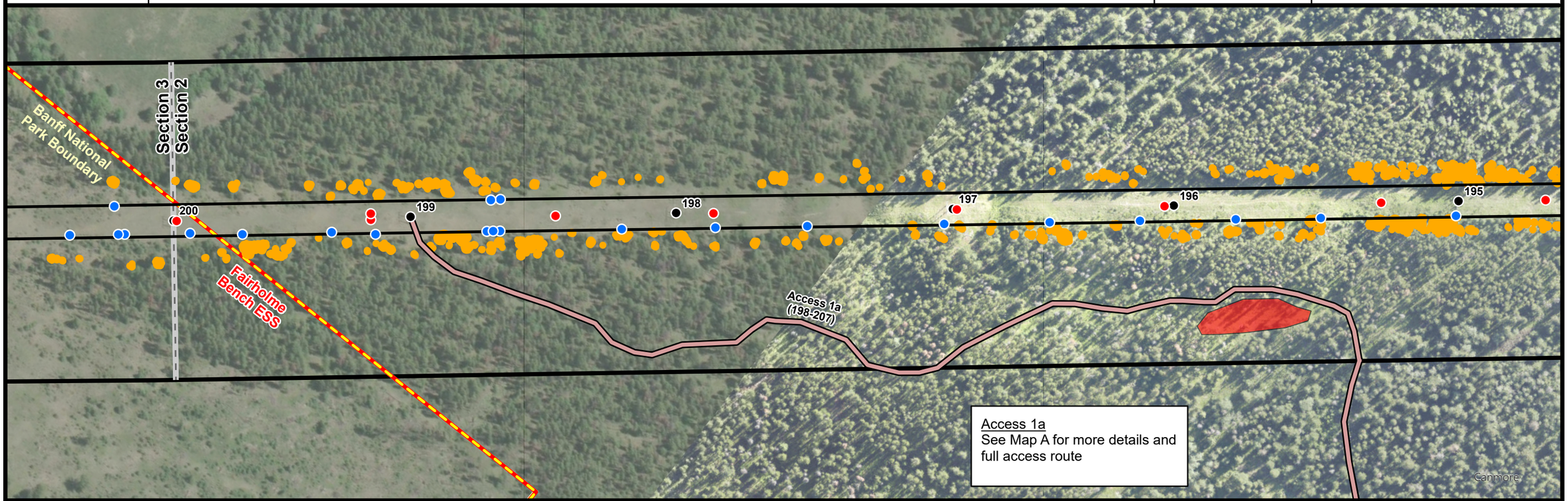
Date: July 03, 2025

2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map I

VEGETATION		
WILDLIFE		
WATERCOURSES AND FISH SPECIES		
WETLANDS		
CULTURAL SENSITIVITY		
CLOSURES & RESTRICTIONS	**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.	
CONSTRUCTION SEASON	Section 3 (200-216): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).	
OTHER		Cut and fill (Access 1a)



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 2
Banff National Park Boundary

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

0 12.5 25 50 75 100 125 150 Meters

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

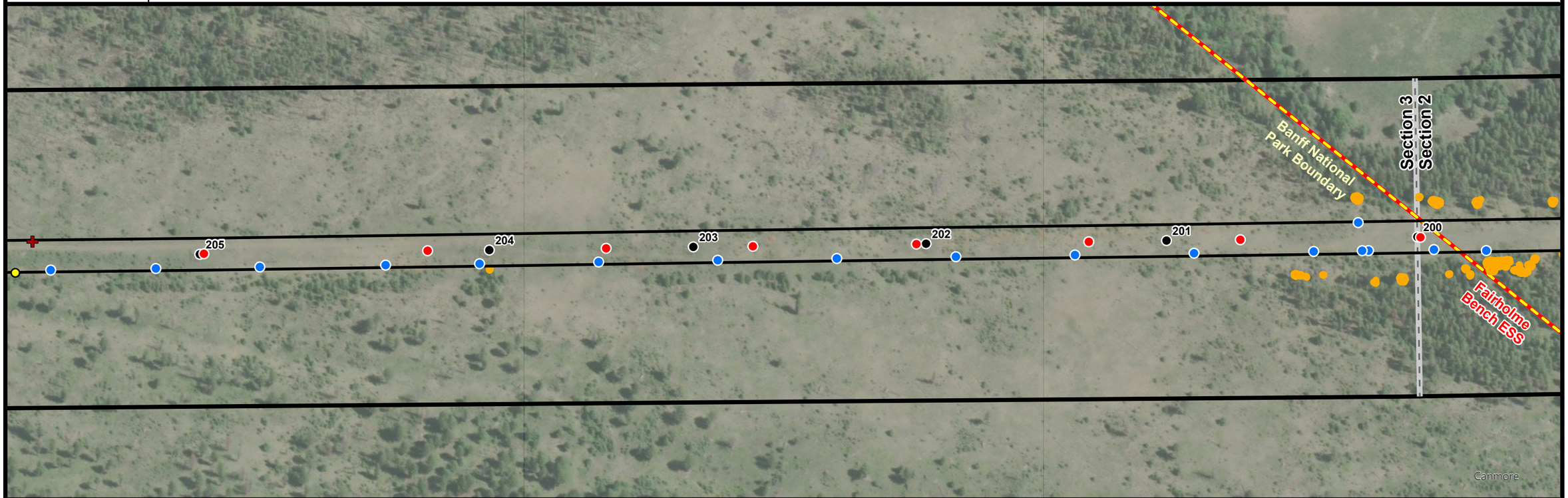
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 1

VEGETATION	Weeds: Canada thistle (204-205)	
WILDLIFE	Grizzly Bear Secure Habitat Area (204-255)	
WATERCOURSES AND FISH SPECIES		
WETLANDS		
CULTURAL SENSITIVITY		
CLOSURES & RESTRICTIONS	**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.	
CONSTRUCTION SEASON	Section 3 (200-216): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).	
OTHER		



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 3 - Part 1

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 2

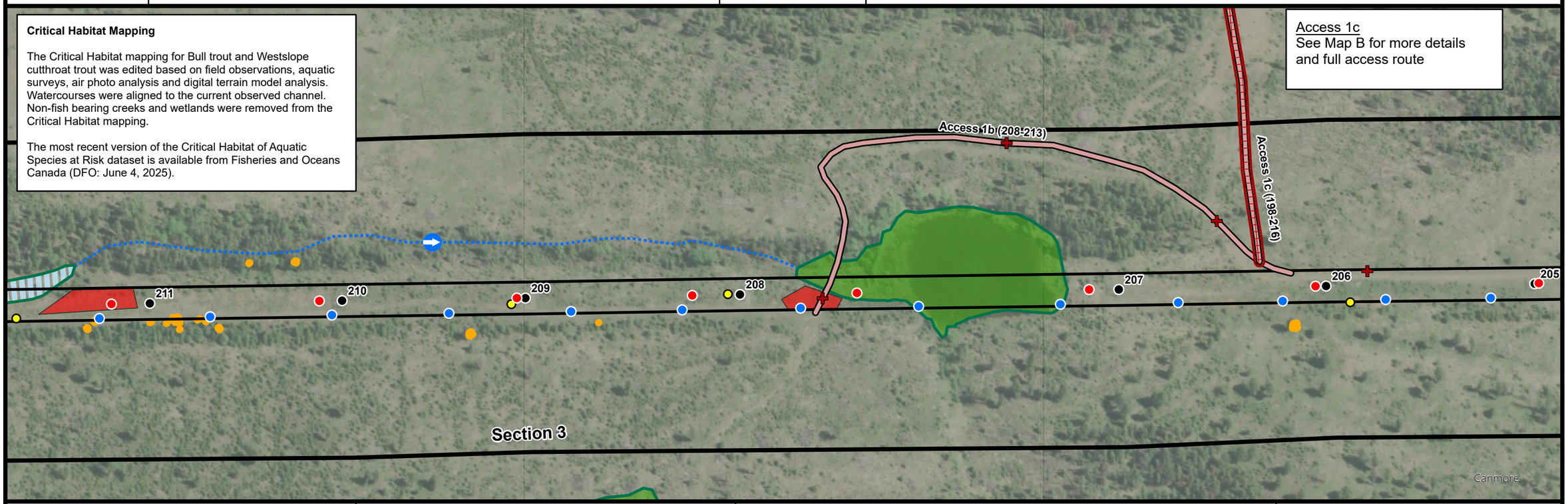
VEGETATION				Weeds: oxeye daisy (Access 1c, 205-207) bird vetch (Access 1b)			
WILDLIFE	Grizzly Bear Secure Habitat Area (204-255)	Sora observation (Sensitive) (209)	Cavity - structure (208)	Observations: NPOW (Sensitive), OSFL (Special concern) (207-208)		Active RTHA nest (206)	
WATERCOURSES AND FISH SPECIES	Ephemeral creek. Not fish bearing. (208-212)						
WETLANDS				Graminoid fen: WOFR. WOFR eggs (207-209) Machine crossing (snow road)			
CULTURAL SENSITIVITY							
CLOSURES & RESTRICTIONS	**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.						
CONSTRUCTION SEASON	Section 3 (200-216): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).						
OTHER				Cut and fill (207-208)			

Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Access 1c
See Map B for more details and full access route



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 3 - Part 2

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

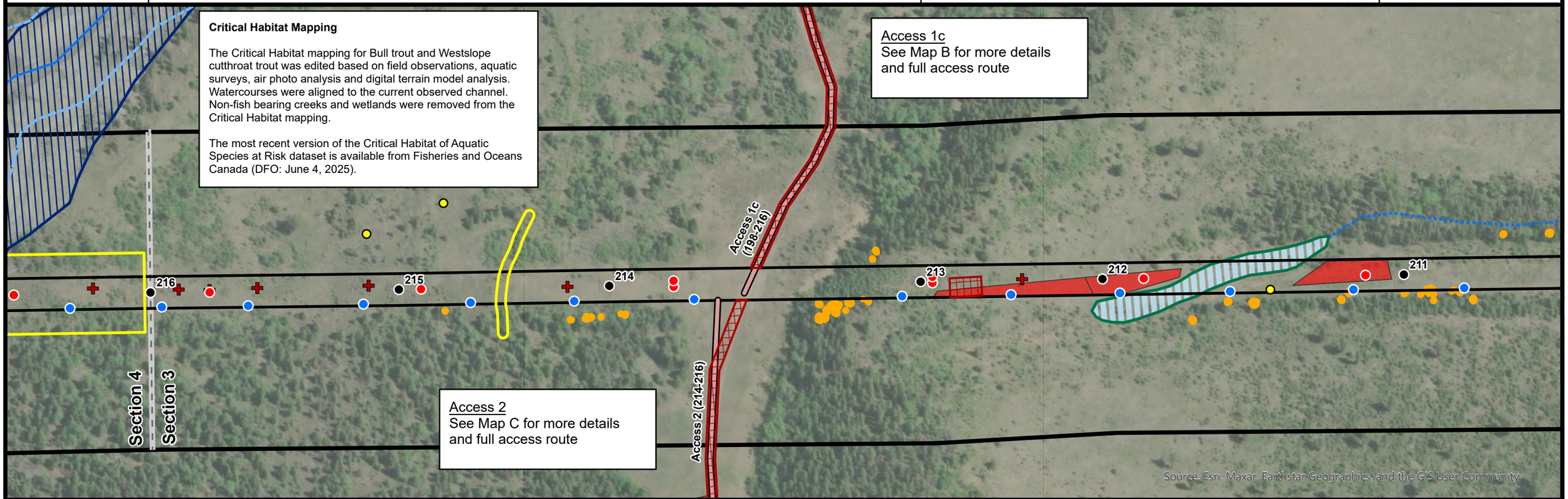
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 3

VEGETATION	Weeds: oxeye daisy (214-217)			Weeds: Canada thistle, oxeye daisy, bird vetch (212-214, Access 1c, Access 2)			
WILDLIFE		Cavity (215-216)	Dry drainage: mammal crossing, cavity (214-215)	Grizzly Bear Secure Habitat Area (204-255)		PIWO observation (Sensitive) (211-212)	
WATERCOURSES AND FISH SPECIES							Ephemeral creek. Not fish bearing. (208-212)
WETLANDS					Wet depression, not wetland: WOFR (211-212) Machine crossing (snow road)		
CULTURAL SENSITIVITY							
CLOSURES & RESTRICTIONS	**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.						
CONSTRUCTION SEASON	Section 3: Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31) (200-216)						
OTHER					Cut and fill (211-213)		



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 3 - Part 3

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

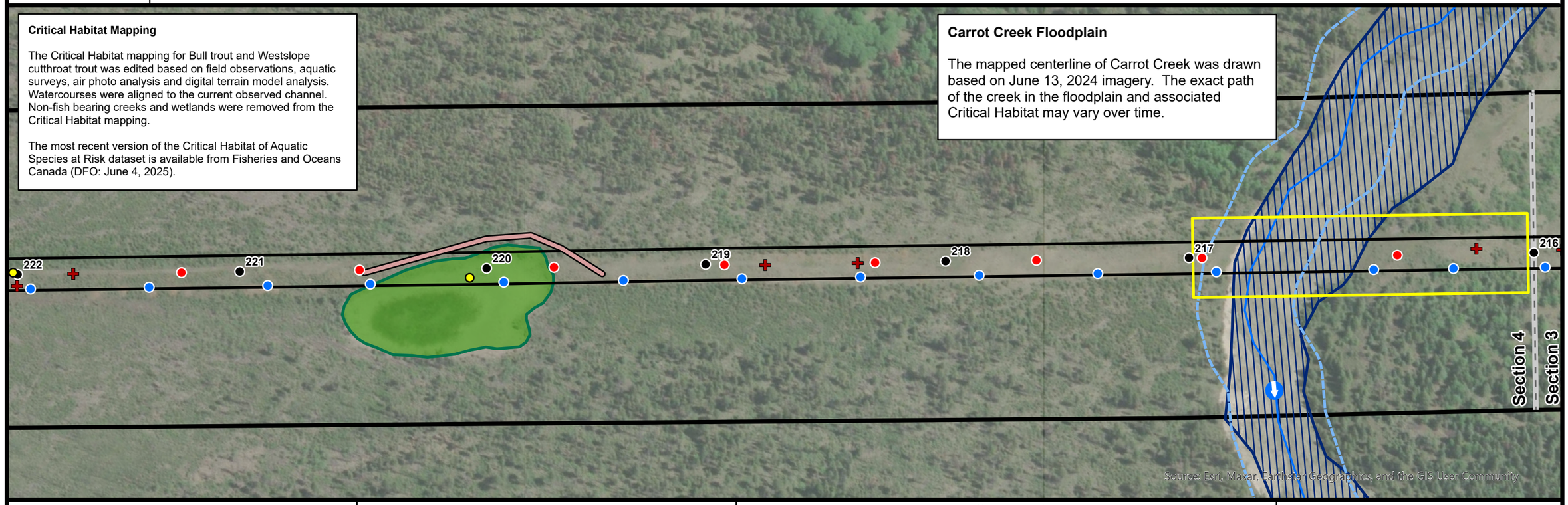
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 4

VEGETATION	Weeds: cicer vetch, oxeye daisy (221-222)		Weeds: oxeye daisy (218-219)		Weeds: oxeye daisy (216-217)	
WILDLIFE	Sora observation (Sensitive) (220), Bats detected (ultrasonic recording) (220-221)	Grizzly Bear Secure Habitat Area (204-255)		Wildlife movement corridor (216-217)		
WATERCOURSES AND FISH SPECIES				Carrot Creek: Bull trout Critical Habitat. BNTR, BKTR (216-217) No machine crossing.		
WETLANDS	Seasonal freshwater marsh. LTSA, WOFR (219-221) Machine access required to remove str 220 and install bypass structure.					
CULTURAL SENSITIVITY						
CLOSURES & RESTRICTIONS	**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.					
CONSTRUCTION SEASON	Section 4 (216-233): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).					
OTHER						



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 4 - Part 1

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

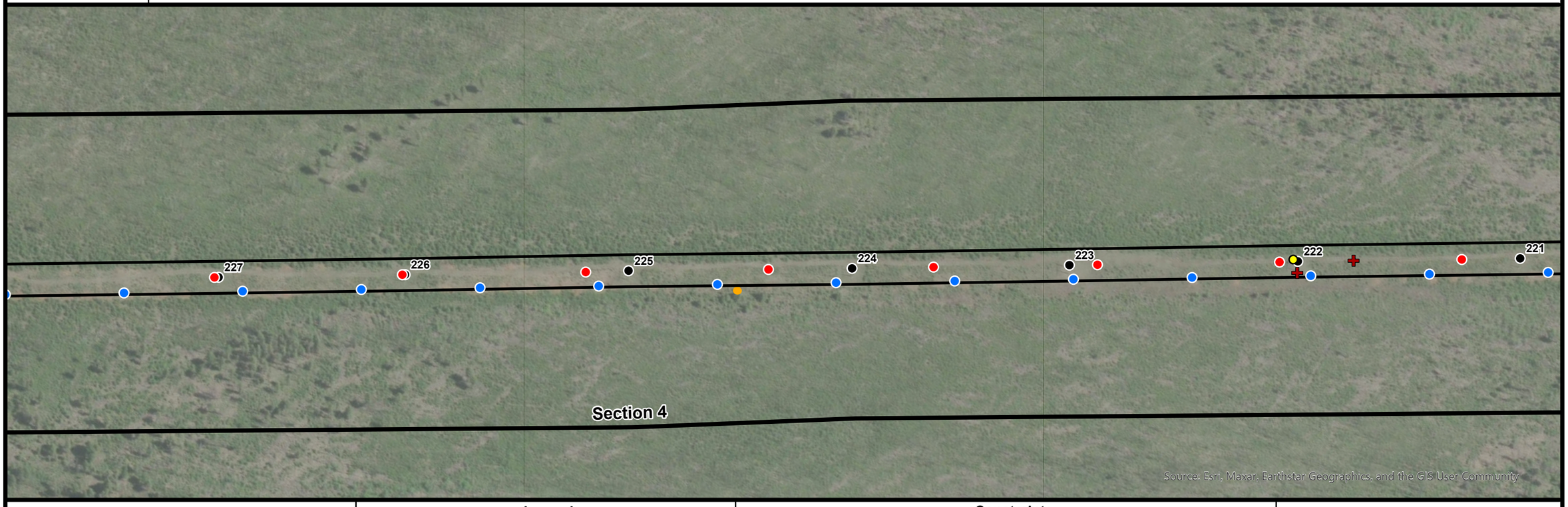
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 5

VEGETATION		Weeds: cicer vetch, oxeye daisy (221-222)	
WILDLIFE	Grizzly Bear Secure Habitat Area (204-255)	Active osprey nest (222)	
WATERCOURSES AND FISH SPECIES			
WETLANDS			
CULTURAL SENSITIVITY			
CLOSURES & RESTRICTIONS	**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.		
CONSTRUCTION SEASON	Section 4 (216-233): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).		
OTHER			



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 4 - Part 2

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

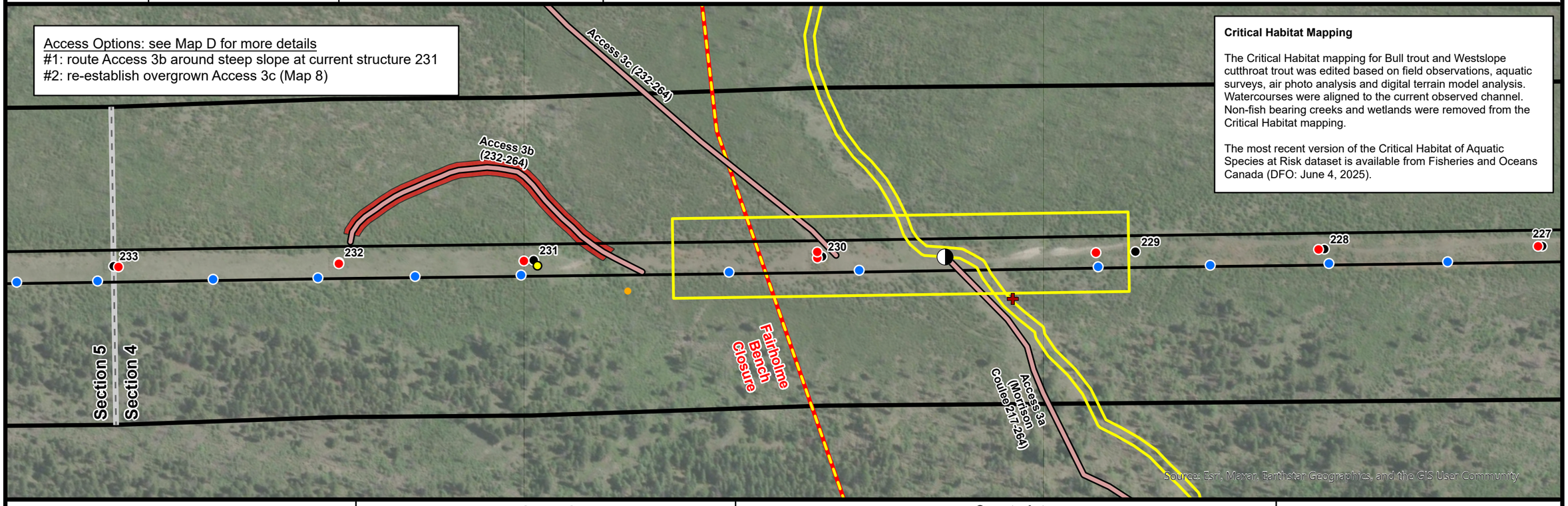
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 6

VEGETATION				Weeds: oxeye daisy (Access 3a)	
WILDLIFE		Cavity - structure (231)		Dry drainage: mammal crossing (229-230) Wildlife movement corridor (229-231)	Grizzly Bear Secure Habitat Area (204-255)
WATERCOURSES AND FISH SPECIES			Morrison Coulee: dry drainage (229-230)		
WETLANDS					
CULTURAL SENSITIVITY					
CLOSURES & RESTRICTIONS	**Fairholme Bench Closure** Annual: April 1 to July 15. Current structures 230-257. No access.			**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.	
CONSTRUCTION SEASON	Section 4 (216-233): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).				
OTHER		Cut and fill (Access 3b)			



Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 4 - Part 3

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

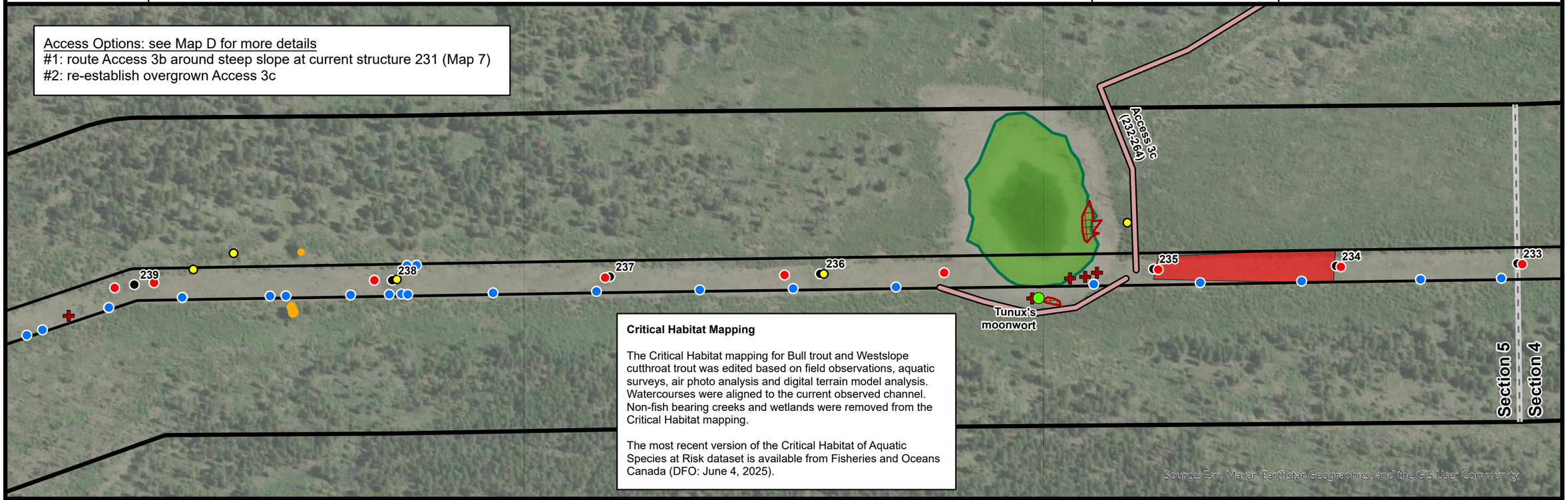
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 7

VEGETATION					Rare plant: Tunux's moonwort (235-236) Weeds: cicer vetch (235-236)		
WILDLIFE	Old den sites (238-239)	Cavity - structure (238)	Grizzly Bear Secure Habitat Area (204-255)	Cavity - structure (236)		Nesting cavities in dead snags, remove if Access 3c is redeveloped.	
WATERCOURSES AND FISH SPECIES							
WETLANDS				Seasonal freshwater marsh: LTOR, WOFR, WETO. No machine crossing (235-236)			
CULTURAL SENSITIVITY							
CLOSURES & RESTRICTIONS	**Fairholme Bench Closure** Annual: April 1 to July 15. Current structures 230-257. No access.			**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.			
CONSTRUCTION SEASON	Section 5 (233-255): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).						
OTHER					Cut and fill (234-235)		



Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 5 - Part 1

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

0 12.5 25 50 75 100 125 150 Meters

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

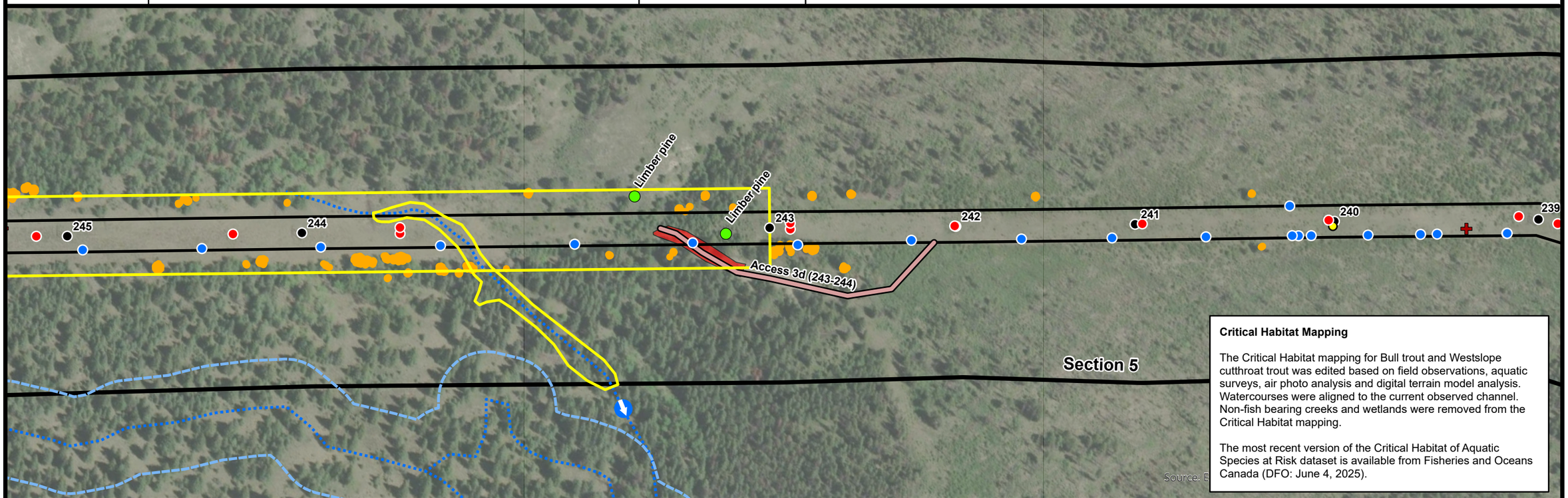
Date: July 03, 2025

2024 Base Imagery

ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 8

VEGETATION		Rare plants: limber pine (243-244)			Weeds: oxeye daisy (239-240)
WILDLIFE		Dry drainage: mammal crossing (243-244) Wildlife movement corridor (243-251)	Grizzly Bear Secure Habitat Area (204-255)	Cavity - structure (240)	
WATERCOURSES AND FISH SPECIES					
WETLANDS					
CULTURAL SENSITIVITY					
CLOSURES & RESTRICTIONS	**Fairholme Bench Closure** Annual: April 1 to July 15. Current structures 230-257. No access.		**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.		
CONSTRUCTION SEASON	Section 5 (233-255): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).				
OTHER		Cut and fill (Access 3c)			



Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 5 - Part 2

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

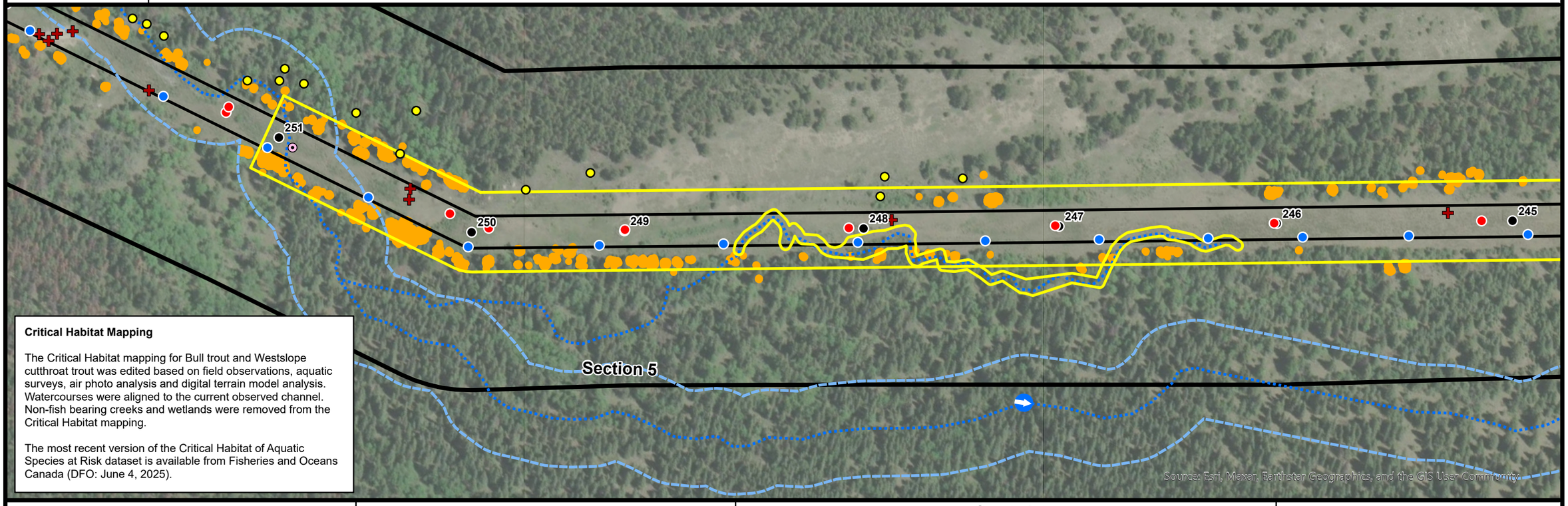
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 9

VEGETATION	Weeds: bull thistle, oxeye daisy, cicer vetch (250-252)		Weeds: cicer vetch (247-248)		Weeds: cicer vetch (245-246)	
WILDLIFE	Observations: PIWO (Sensitive), Western wood peewee (May Be At Risk) (250-251)	Cavity x5 (249-251)	Dry drainage: mammal crossing (246-249) Wildlife movement corridor (243-251)	Cavity x3 (247-248)	Grizzly Bear Secure Habitat Area (204-255)	
WATERCOURSES AND FISH SPECIES	Girouard Creek. Bull trout Critical Habitat. Ephemeral. Not fish bearing. Machine crossing (250-252)					
WETLANDS						
CULTURAL SENSITIVITY						
CLOSURES & RESTRICTIONS	**Fairholme Bench Closure** Annual: April 1 to July 15. Current structures 230-257. No access.		**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required..			
CONSTRUCTION SEASON	Section 5 (233-255): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).					
OTHER						



Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 5 - Part 3

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

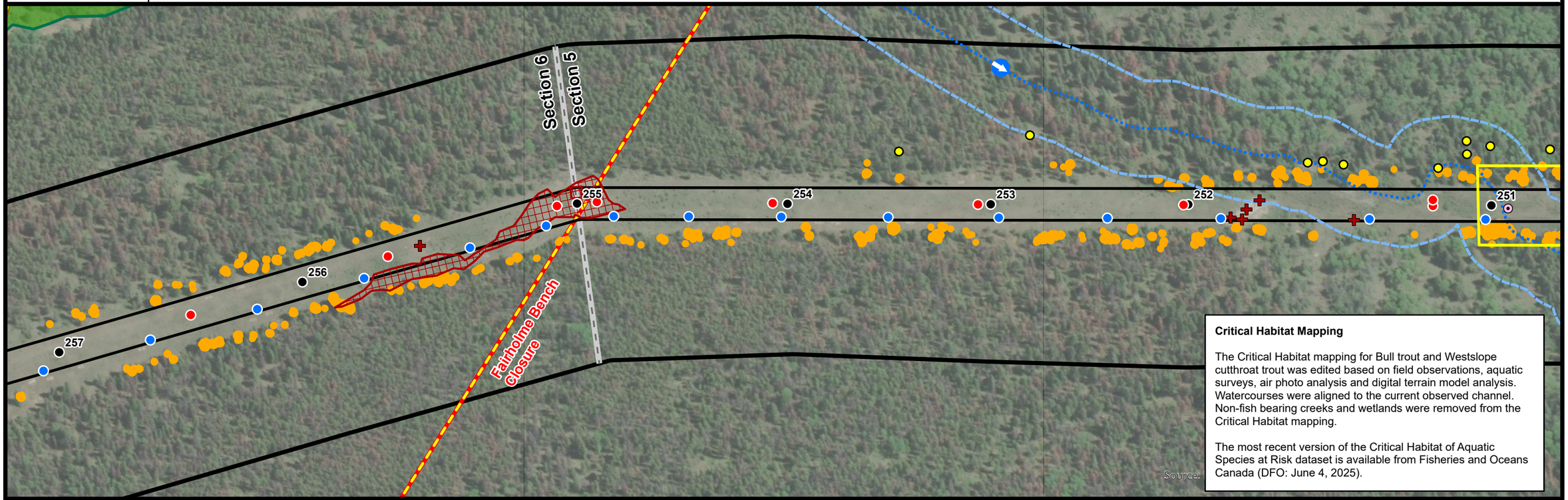
Date: July 03, 2025

2024 Base Imagery

ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 10

VEGETATION		Weeds: oxeye daisy (254-256)			Weeds: oxeye daisy, cicer vetch (251-252)			
WILDLIFE		Grizzly Bear Secure Habitat Area (204-255)		Cavity x2 (253-254)		Cavity x7 (251-252)		
WATERCOURSES AND FISH SPECIES					Girouard Creek. Bull trout critical habitat. Ephemeral. Not fish bearing. Machine crossing. (250-252)			
WETLANDS								
CULTURAL SENSITIVITY								
CLOSURES & RESTRICTIONS	**Fairholme Bench Closure** Annual: April 1 to July 15. Current structures 230-257. No access.			**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.				
CONSTRUCTION SEASON		Section 5 (233-255): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).						
OTHER								



Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 5 - Part 4

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

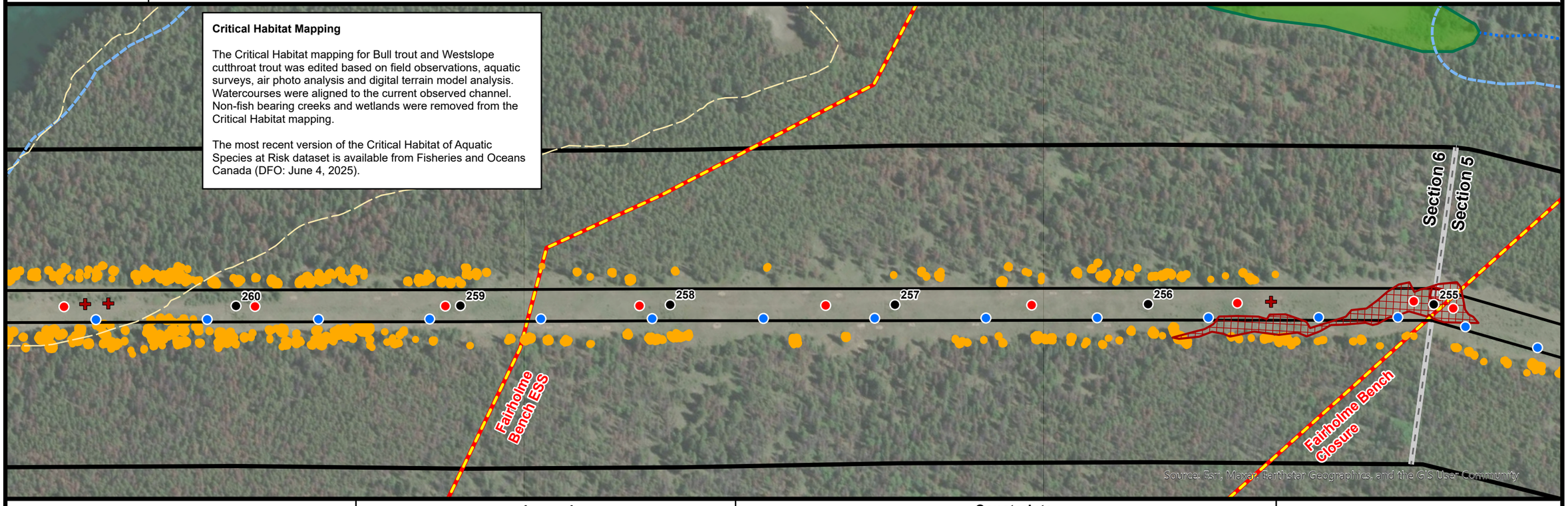
Date: July 03, 2025

2024 Base Imagery

ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 11

VEGETATION	Weeds: Oxeye daisy (260-261)		Weeds: oxeye daisy (254-256)	
WILDLIFE				
WATERCOURSES AND FISH SPECIES				
WETLANDS			Wetland: WOFR (southeast end of Johnson Lake)	
CULTURAL SENSITIVITY				
CLOSURES & RESTRICTIONS	**Fairholme Bench ESS:** All sections and accesses from the BNP boundary to current structure 259 are within the Fairholme Bench Environmentally Sensitive Site (ESS). RAP required.		**Fairholme Bench Closure** Annual: April 1 to July 15. Current structures 230-257. No access.	
CONSTRUCTION SEASON	Section 6 (255-269): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).			
OTHER				



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 6 - Part 1

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

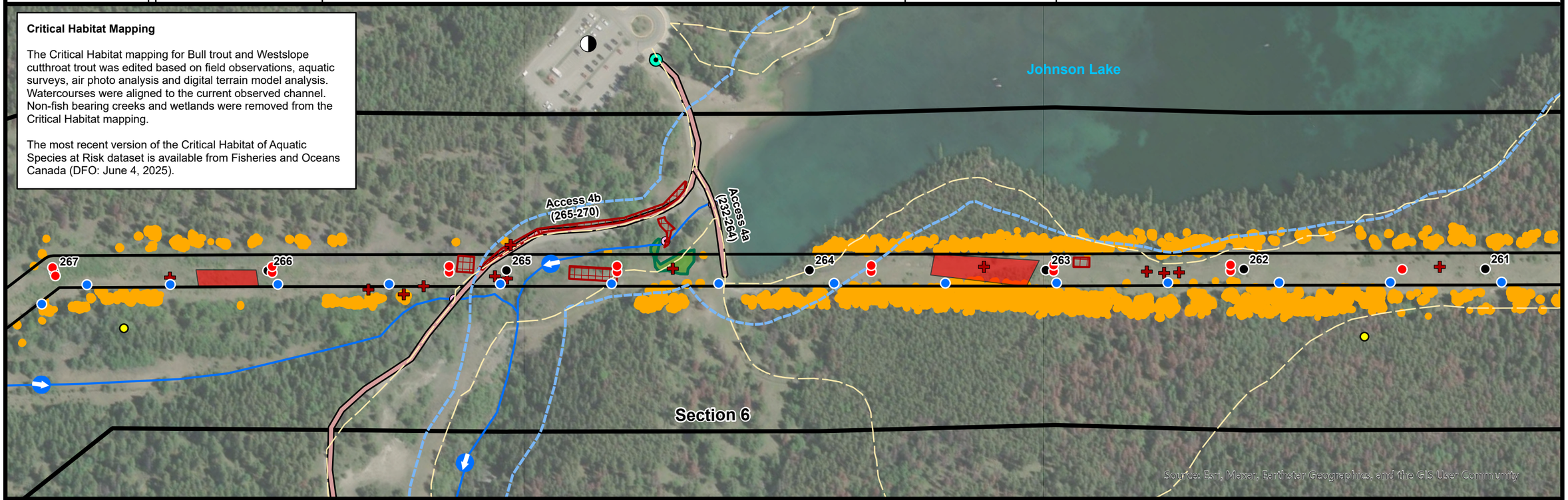
Map 12

VEGETATION	Weeds: Canada thistle, cicer vetch, tall buttercup (264-267, Access 4b)		Weeds: oxeye daisy (262-264)		Weeds: cicer vetch (261-262)	
WILDLIFE	Cavity (266-267)	Special Note (creeks and lake) Johnson Lake (and outflow) & Anthracite Creek: Bull trout Critical Habitat (261-266)		Cavity (261-262)		
WATERCOURSES AND FISH SPECIES	Unnamed creek (flows from penstock) (264-268). Machine crossing existing culvert (Access 4b 265-266)	Anthracite Creek. Machine crossing ford/clear span bridge (Access 4a 264-265) BNTR and BKTR 150 m downstream from crossing site at fish barrier. Bull trout Critical Habitat (264-266)		Johnson Lake: WHSC, BOTO, CSFR, WOFR, LTSA. Bull trout Critical Habitat (261-265)		
WETLANDS		Manmade fen (264-265) Machine crossing access mat				
CULTURAL SENSITIVITY	Areas of Cultural Sensitivity (263-276)					
CLOSURES & RESTRICTIONS						
CONSTRUCTION SEASON	Section 6 (255-269): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).					
OTHER	Cut and fill (266-267)		Cut and fill (263-264)			

Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 6 - Part 2

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

0 12.5 25 50 75 100 125 150 Meters

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

2024 Base Imagery

ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

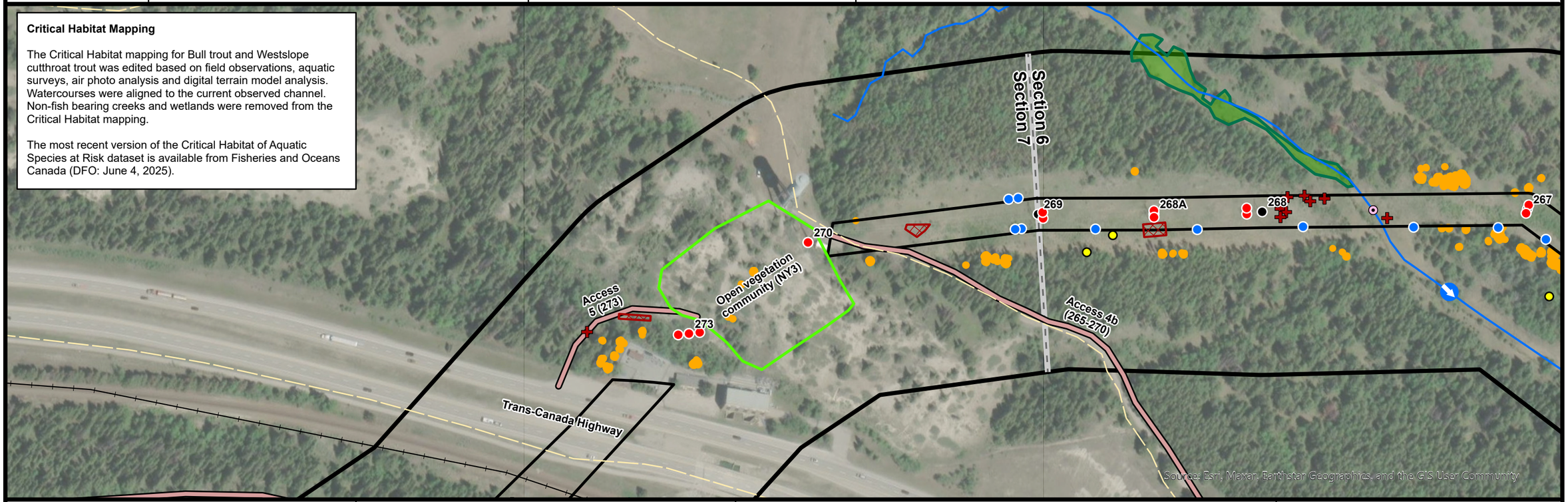
Map 13

VEGETATION		Weeds: cicer vetch (Access 5)	Unique open vegetation community (NY3) (270-273)		Weeds: cicer vetch (269-270)	Weeds: meadow hawkweed (268A)	Weeds: oxeye daisy, Canada thistle, cicer vetch (267-268A)	
WILDLIFE						Cavity x2 (268A-269)		Cavity (266-267)
WATERCOURSES AND FISH SPECIES			Two Jack Lake Canal to Tailrace Channel: underground flows (270-274)				Unnamed creek (264-268; flows from penstock). Machine crossing access mat (267-268)	
WETLANDS				Creek/wetland complex: Western toad (north of ROW)		Marsh: WETO. No machine crossing (267-268)		
CULTURAL SENSITIVITY	Areas of Cultural Sensitivity (263-276)							
CLOSURES & RESTRICTIONS								
CONSTRUCTION SEASON	Section 7 (269-276): Access preparation and line construction (Aug 1-Oct 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).				Section 6 (255-269): Access preparation and line construction (frozen ground Dec 1-Mar 31). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).			
OTHER			Very steep slope - no machine access (270-273)					

Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 6 - Part 3
Section 7 - Part 1

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

N

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

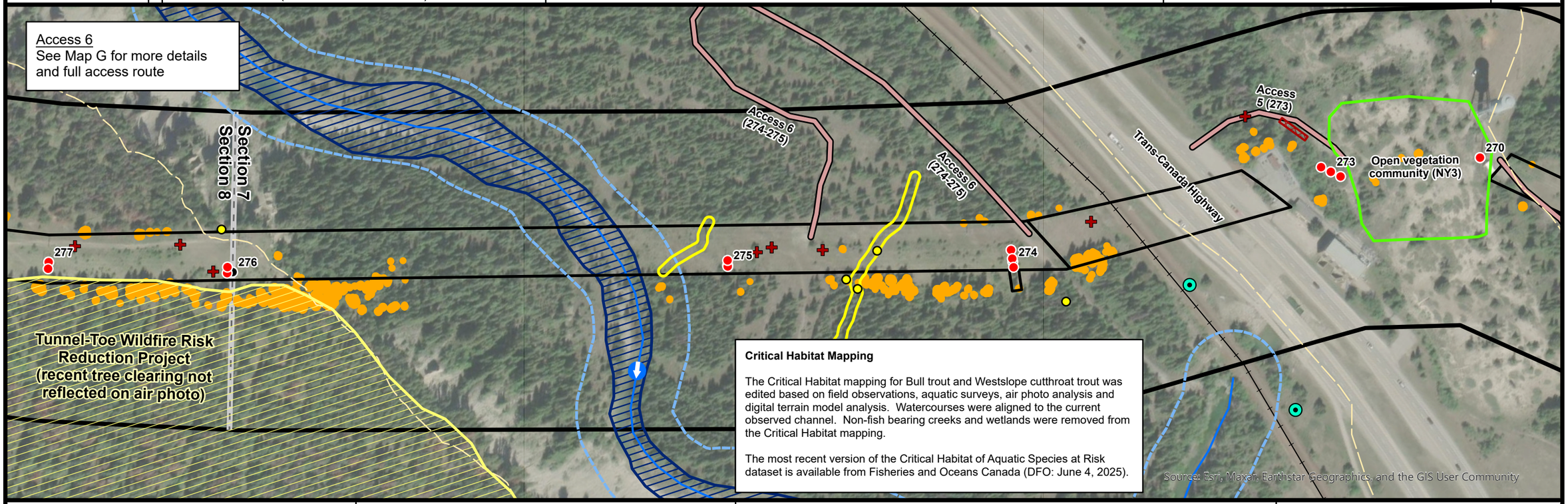
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 14

VEGETATION	Weeds: cicer vetch (276-277)		Weeds: common toadflax, oxeye daisy (274-275)		Weeds: bull thistle (273-274)	Weeds: cicer vetch (Access 5)	Unique open vegetation community (NY3) (270-273)	
WILDLIFE		Dry drainage: Mammal crossing (275-276)	Dry drainage: mammal crossing, small mammal den, Cavity x2 (274-275)		Cavity (273-274)			
WATERCOURSES AND FISH SPECIES		Cascade Creek: Bull trout and Westslope cutthroat trout Critical Habitat. BNTR and BKTR approx. 350 m downstream from crossing site at fish barrier. No machine crossing (275-276)					Two Jack Lake Canal to Tailrace channel: underground flows (270-274)	
WETLANDS								
CULTURAL SENSITIVITY	Areas of Cultural Sensitivity (263-276)							
CLOSURES & RESTRICTIONS								
CONSTRUCTION SEASON	Section 7 (269-276): Access preparation and line construction (Sept long weekend-Oct 15). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).							
OTHER		Very steep slope - no machine access (Cascade Creek to 276)					Very steep slope - no machine access (270-273)	



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 7 - Part 2

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)
- Tunnel Toe Wildfire Project Boundary

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

0 12.5 25 50 75 100 125 150 Meters

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

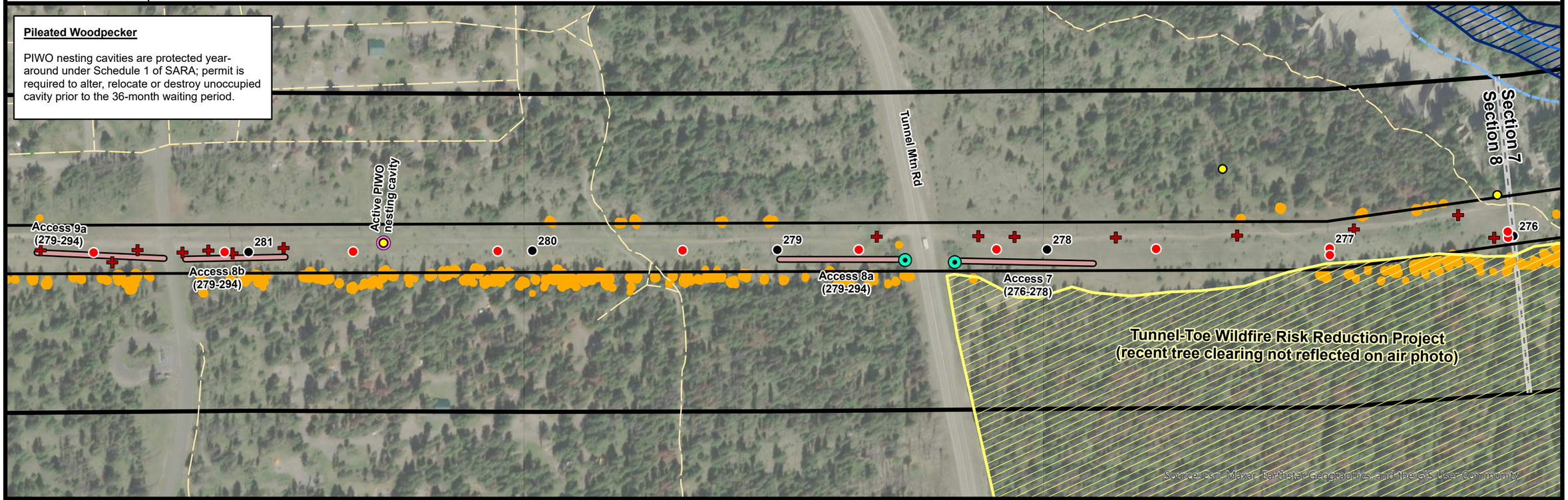
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 15

VEGETATION	Weeds: oxeye daisy, cicer vetch, Canada thistle, common toadflax (280-282)			Weeds: oxeye daisy, cicer vetch (276-279)				
WILDLIFE		Active PIWO nesting cavity (PIWO "special concern"; cavity Schedule 1 SARA) (280-281)			Cavity (277-278)		Active osprey nest (267-268)	
WATERCOURSES AND FISH SPECIES								
WETLANDS								
CULTURAL SENSITIVITY								
CLOSURES & RESTRICTIONS								
CONSTRUCTION SEASON	Section 8 (276-297): Access preparation and line construction (Sept long weekend-Oct 15). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).							
OTHER								



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 8 - Part 1

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)
- Tunnel Toe Wildfire Project Boundary

0 12.5 25 50 75 100 125 150 Meters

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

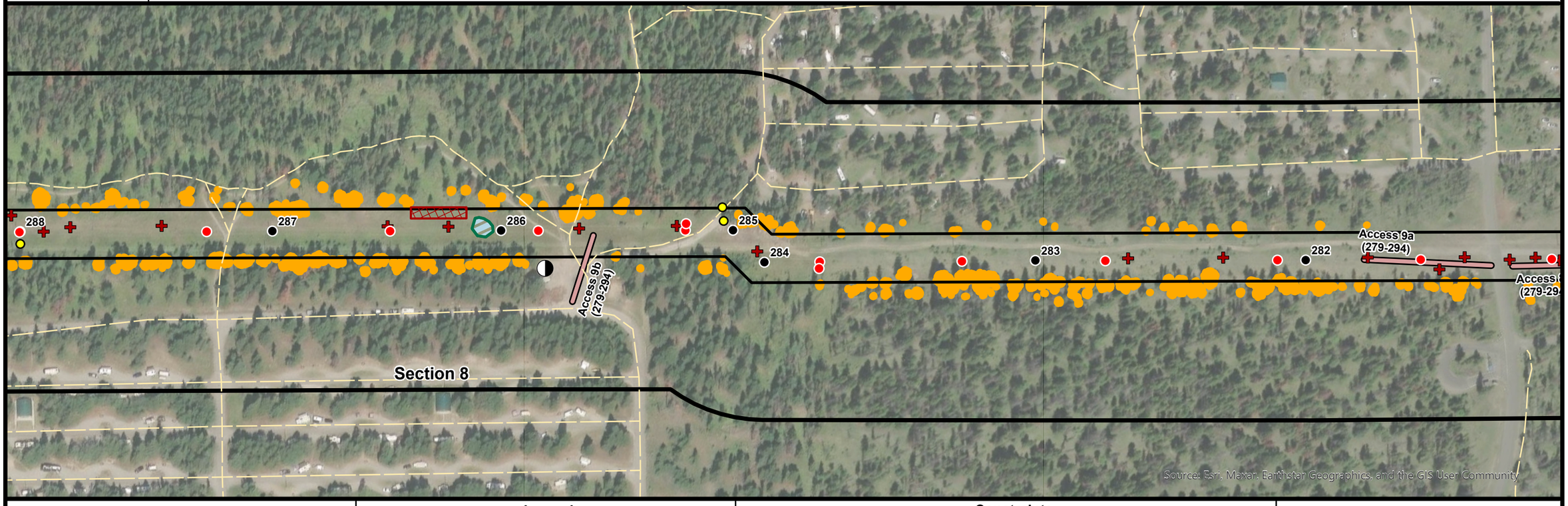
Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 16

VEGETATION	Weeds: oxeye daisy, cicer vetch (284-288)		Weeds: oxeye daisy, cicer vetch, Canada thistle, common toadflax (280-283)	
WILDLIFE		Cavity x2 (285)		
WATERCOURSES AND FISH SPECIES				
WETLANDS		Marsh: wetland artifact. WETO. No machine crossing (286-287)		
CULTURAL SENSITIVITY				
CLOSURES & RESTRICTIONS				
CONSTRUCTION SEASON	Section 8 (276-297): Access preparation and line construction (Sept long weekend-Oct 15). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).			
OTHER				



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 8 - Part 2

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

N

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

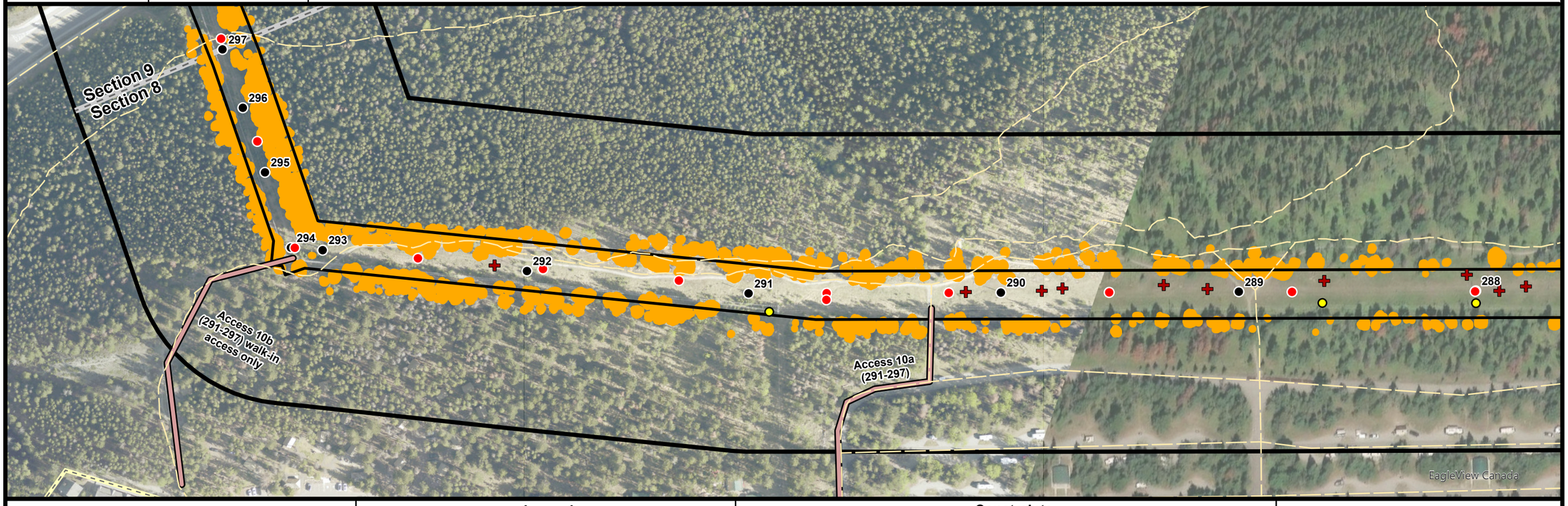
Date: July 03, 2025

2023 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 17

VEGETATION		Weeds: cicer vetch (292-293)		Weeds: cicer vetch (288-291)			
WILDLIFE	Fenlands-Indian Grounds Wildlife Corridor (290-314)		Cavity - Fortis (291)			Cavity - Fortis x2 (288-289)	
WATERCOURSES AND FISH SPECIES							
WETLANDS							
CULTURAL SENSITIVITY	Area of Cultural Sensitivity (292-295)						
CLOSURES & RESTRICTIONS							
CONSTRUCTION SEASON	Section 8 (276-297): Access preparation and line construction (Sept long weekend-Oct 15). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).						
OTHER	Steep slope (294-300)						



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 8 - Part 3

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

2024 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

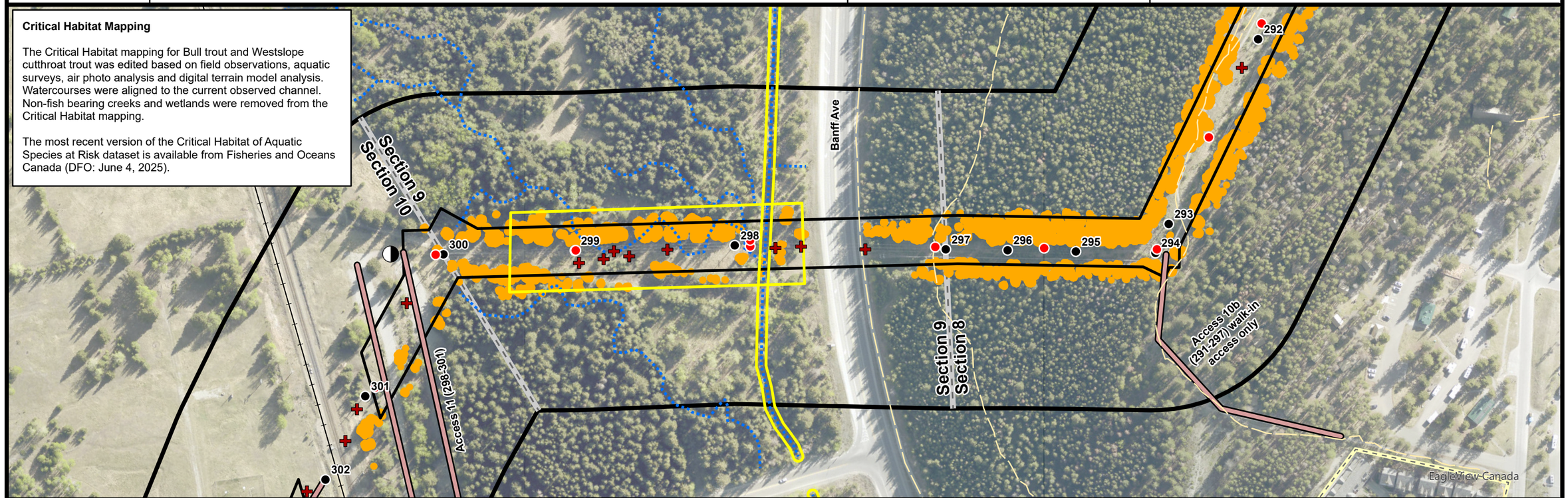
Map 18

VEGETATION		Weeds: Canada thistle, tall buttercup, oxeye daisy, cicer vetch (Banff Ave-302)		Weeds: Canada thistle (297-Banff Ave)	
WILDLIFE		Wildlife movement corridor (298-300)	Whiskey Creek dry drainage: Mammal crossing (Banff Ave-298)		Fenlands-Indian Grounds Wildlife Corridor (290-314)
WATERCOURSES AND FISH SPECIES			Whiskey Creek dry drainage (Banff Ave-298)		
WETLANDS					
CULTURAL SENSITIVITY	Area of Cultural Sensitivity (297-301)				
CLOSURES & RESTRICTIONS					
CONSTRUCTION SEASON	Section 9 (297-300): Access preparation and line construction (Sept long weekend-Oct 15). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).				
OTHER				Steep slope (294-Banff Ave.)	

Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 9

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

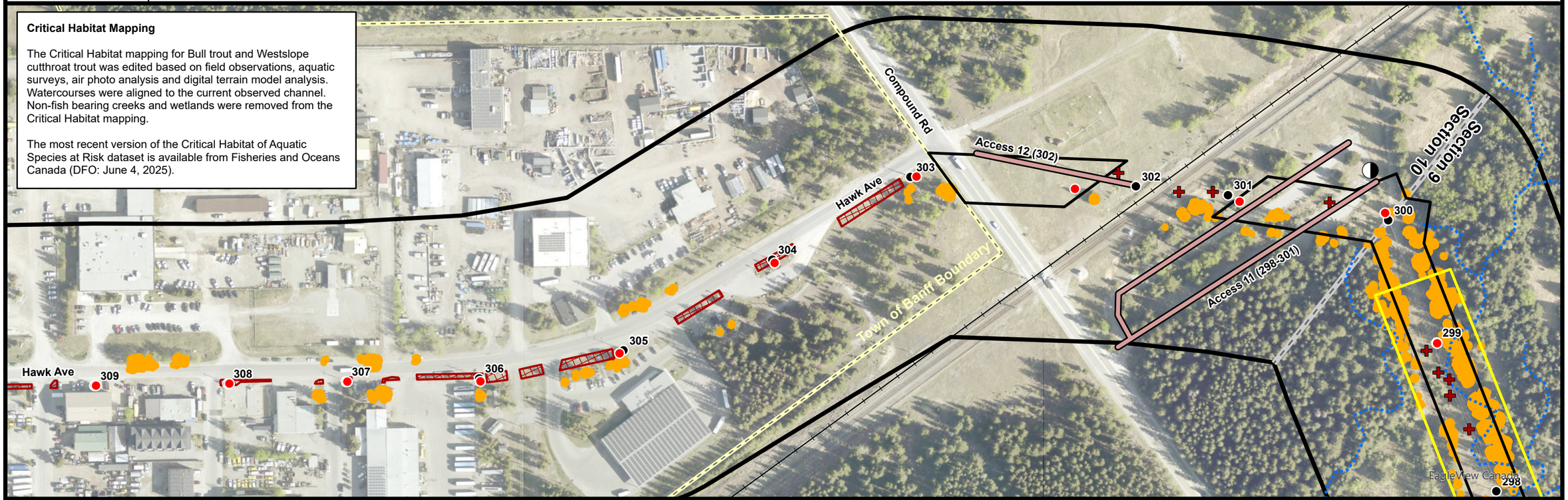
Date: July 03, 2025

2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 19

VEGETATION	Weeds: many species (303-313)		Weeds: Canada thistle, common toadflax, cicer vetch (300-302)	
WILDLIFE	Fenlands-Indian Grounds Wildlife Corridor (290-314)			
WATERCOURSES AND FISH SPECIES				
WETLANDS				
CULTURAL SENSITIVITY	Areas of Cultural Sensitivity (297-306)			
CLOSURES & RESTRICTIONS				
CONSTRUCTION SEASON	Section 10 (300-314): Access preparation and line construction (Sept long weekend-Oct 15). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).			
OTHER				



Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 10 - Part 1

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

N

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

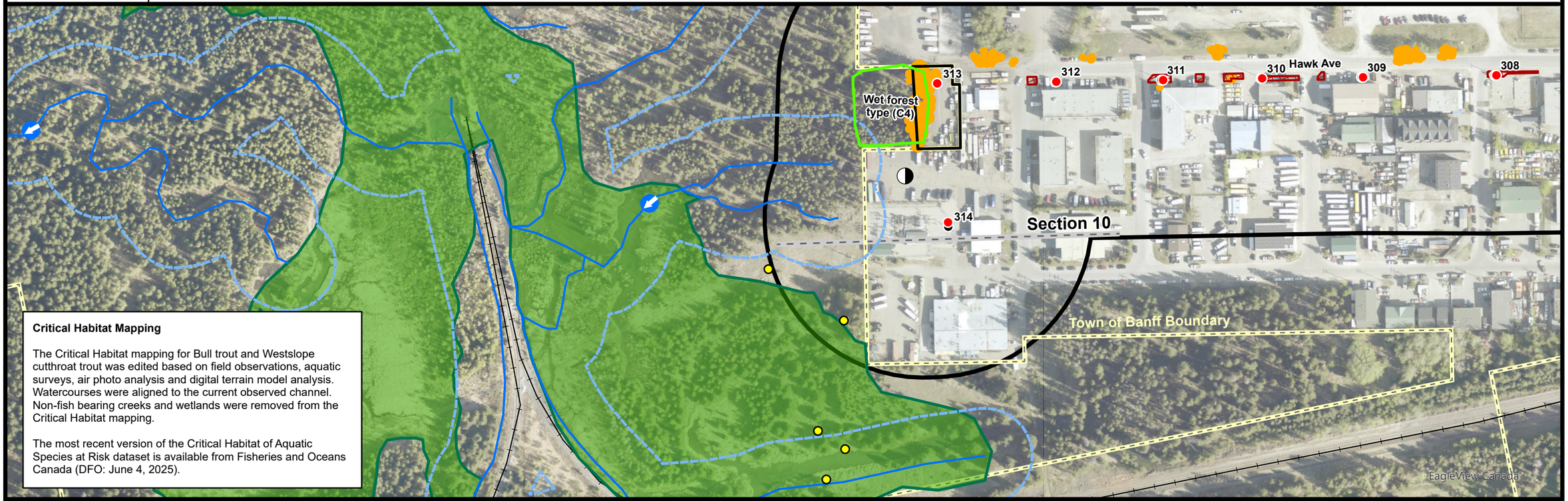
Date: July 03, 2025

2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 20

VEGETATION		Wet forest type (C4) avoid machinery use off hardened road surface (313-314)		Weeds: many species (306-313)
WILDLIFE		Observations: Bat visual, bat ultrasonic recording, BDOW x2 (Sensitive), COYE (Sensitive) (313-314)		Fenlands-Indian Grounds Wildlife Corridor (290-314)
WATERCOURSES AND FISH SPECIES	Forty Mile Creek and Whiskey Creek (and tributaries). Bull trout and Westslope cutthroat trout Critical Habitat (west of 313-314)			
WETLANDS				
CULTURAL SENSITIVITY				
CLOSURES & RESTRICTIONS				
CONSTRUCTION SEASON		Section 10 (300-314): Access preparation and line construction (Sept long weekend-Oct 15). Logging and burning (frozen ground Dec 1-Mar 31)/Hand removal only (no machines Sept 1-Mar 31).		
OTHER				



Critical Habitat Mapping

The Critical Habitat mapping for Bull trout and Westslope cutthroat trout was edited based on field observations, aquatic surveys, air photo analysis and digital terrain model analysis. Watercourses were aligned to the current observed channel. Non-fish bearing creeks and wetlands were removed from the Critical Habitat mapping.

The most recent version of the Critical Habitat of Aquatic Species at Risk dataset is available from Fisheries and Oceans Canada (DFO: June 4, 2025).

Ecological Constraints and 20-Year Danger Trees on the AltaLink 54L Right-of-Way

Section 10 - Part 2

Legend

- Current Structures
- Proposed Structures
- Proposed Bypass Structures
- 54L ROW
- Local Study Area
- Construction Sections
- Highway Access Gate
- Creek Crossing
- Access
- Railway
- Fall Over Analysis - Cut Trees
- Potential Cut And Fill
- Laydown Areas

Constraints

- PIWO Nesting Cavity
- Cavity or Wildlife Feature
- Wildlife/Habitat Feature
- Rare Plants
- Vegetation Community
- Closure/Restriction
- Noxious Weeds
- Noxious Weeds
- Official Trail
- Creek
- Dry/Ephemeral Creek
- Flow Direction
- Wetland
- Wet Depression
- Floodplain
- Critical Habitat (Bull or Westslope Cutthroat Trout)

0 12.5 25 50 75 100 125 150 Meters

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: July 03, 2025

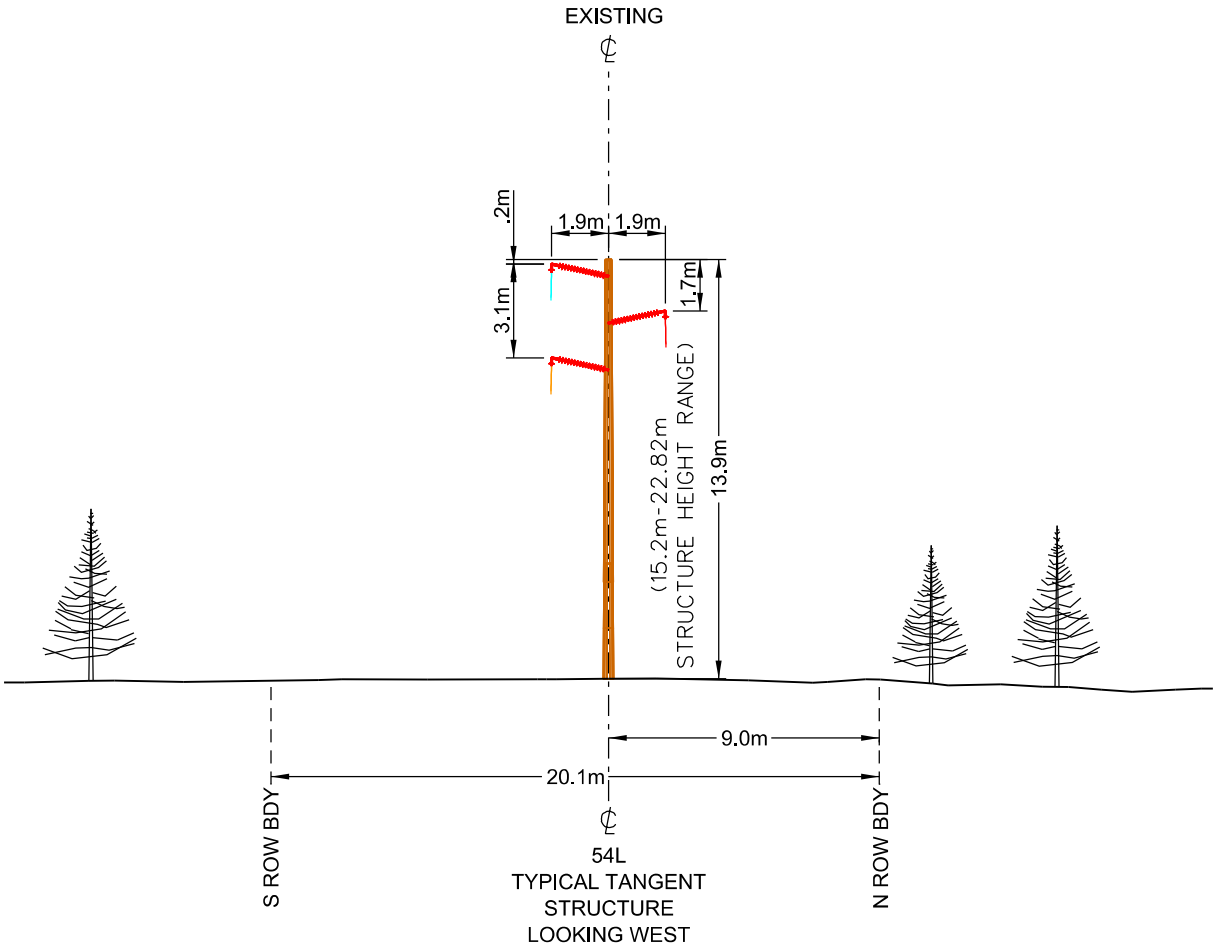
2022 Base Imagery

ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 21

Appendix B

Structure Drawings and Photos



FOR INFORMATION ONLY

NOTES

SEE ROUTE MAP 54L MAP-001 SH11 OF 20 FOR CROSS SECTION LOCATIONS.

N.T.S.

NO.: 35029196
DRAWN: F.SARINO-MHV
REVISION: B
DWG: 54L_SEC-0008
DATE: 2021-03-08

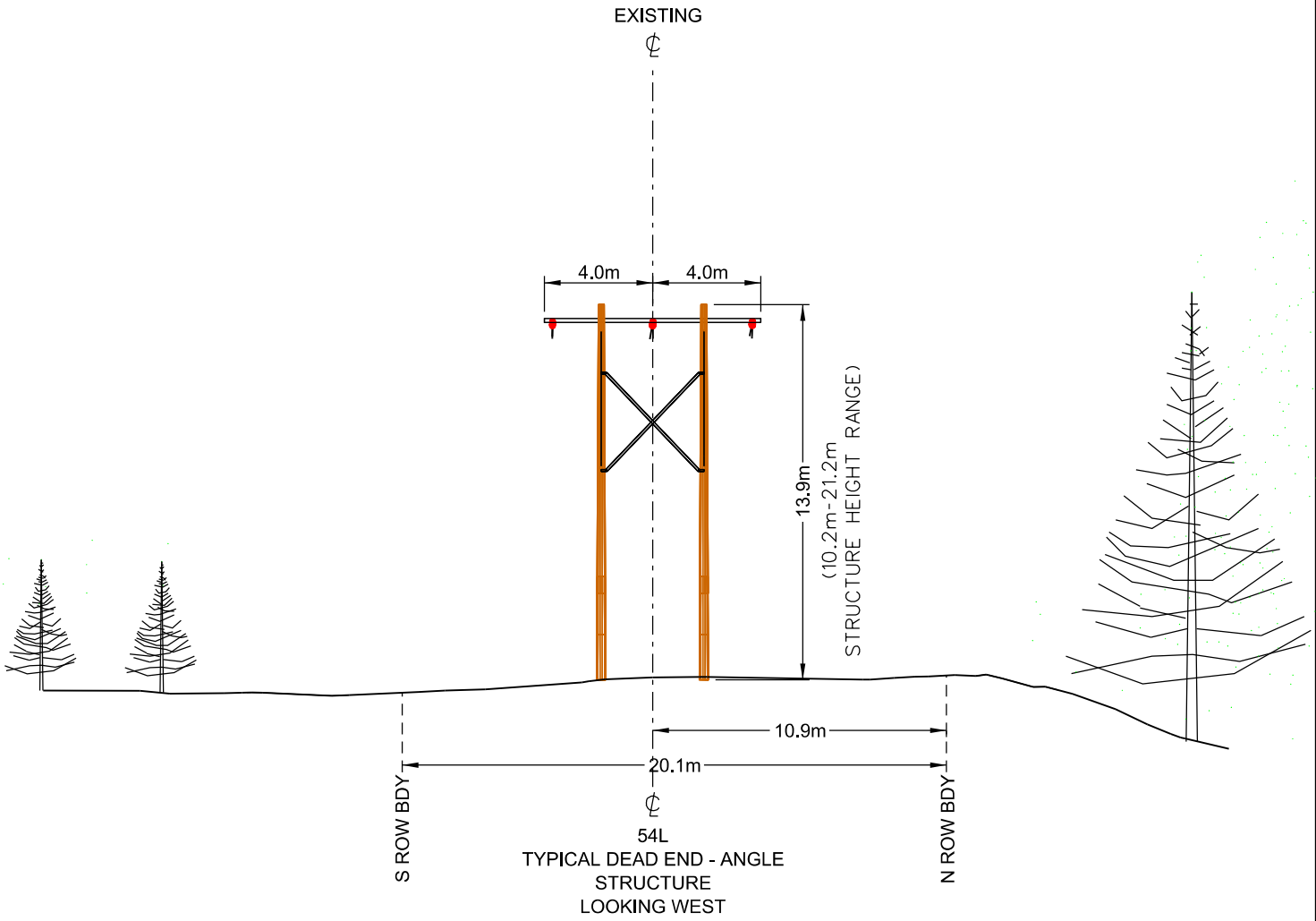
CROSS SECTION **X8**

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

PROPOSED

54L REBUILD
CANMORE - BANFF

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present. All distances shown are approximate and may change based on final structure type, landowner input, final environmental assessment and engineering.



FOR INFORMATION ONLY

NOTES

SEE ROUTE MAP 54L MAP-001 SH17 OF 20 FOR CROSS SECTION LOCATION.

N.T.S.

NO.: 35029196
DRAWN: F.SARINO-MHV
REVISION: A
DWG: 54L_SEC-0010
DATE: 2021-03-08

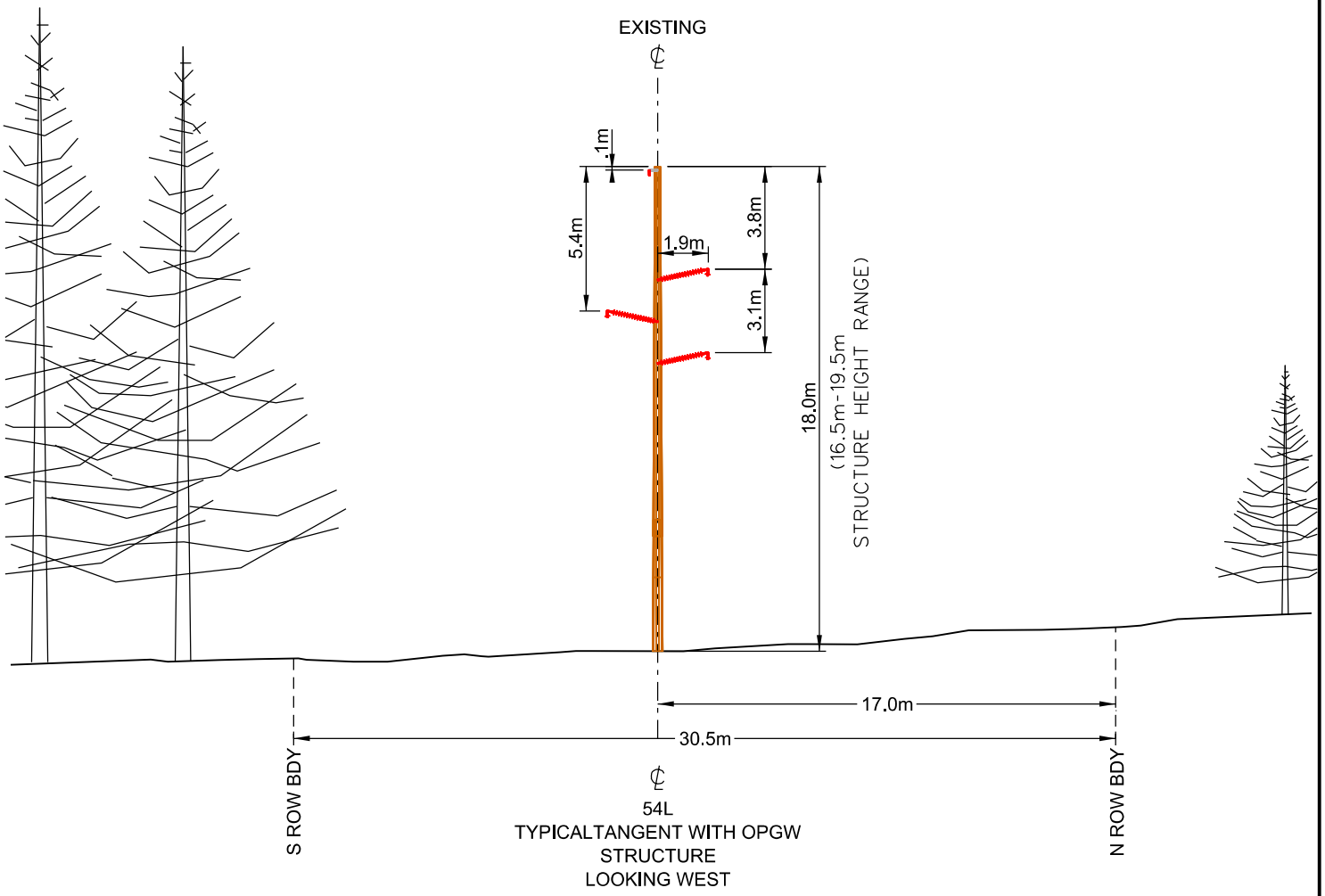
CROSS SECTION **X10**

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

PROPOSED

54L REBUILD
CANMORE - BANFF

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present. All distances shown are approximate and may change based on final structure type, landowner input, final environmental assessment and engineering.



FOR INFORMATION ONLY

NOTES

SEE ROUTE MAP 54L MAP-001 SH18 OF 20 FOR CROSS SECTION LOCATION.

N.T.S.

NO.: 35029196
DRAWN: F.SARINO-MHV
REVISION: B
DWG: 54L_SEC-0012
DATE: 2021-03-08

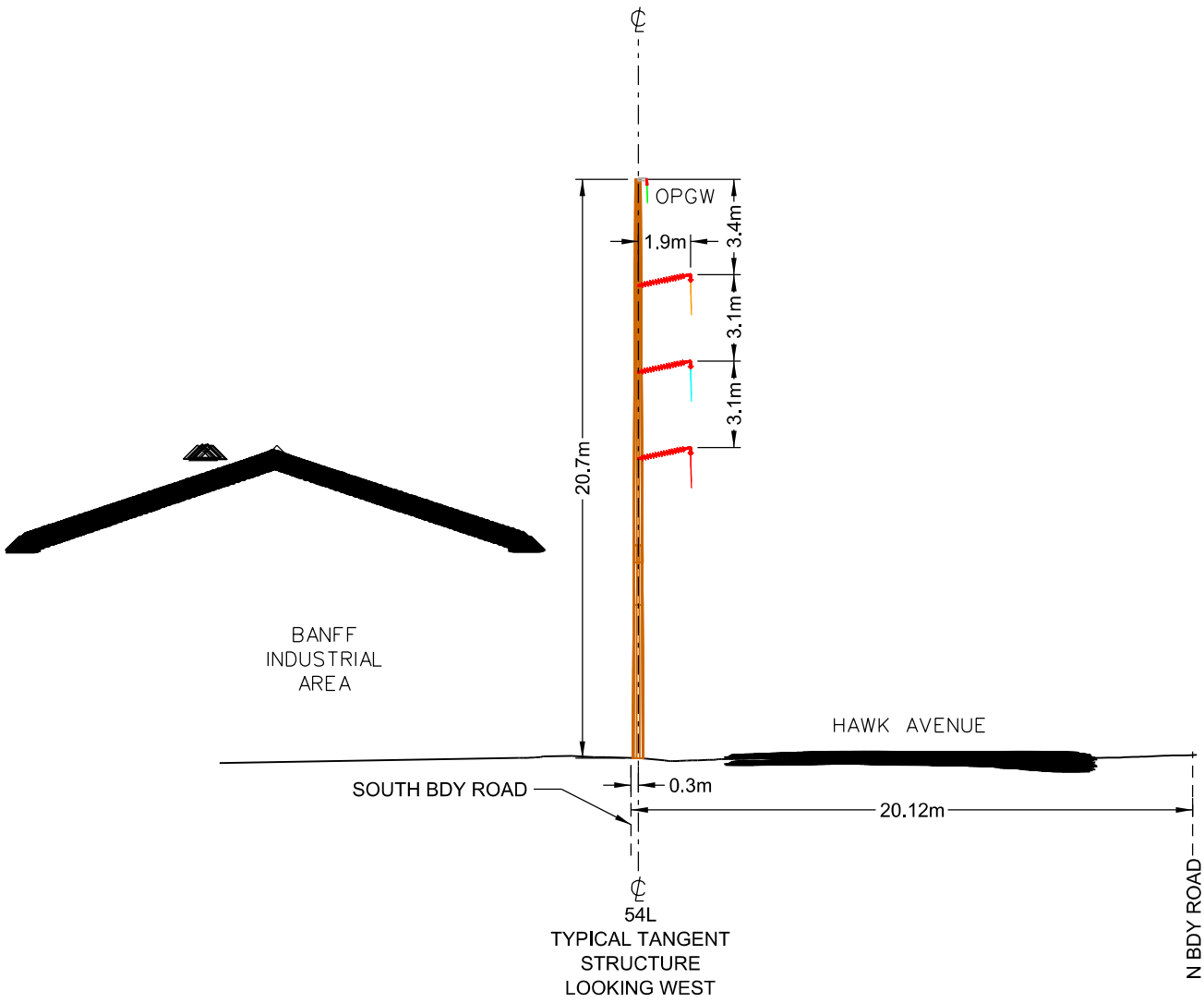
CROSS SECTION **X12**

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

PROPOSED

54L REBUILD
CANMORE - BANFF

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present. All distances shown are approximate and may change based on final structure type, landowner input, final environmental assessment and engineering.



FOR INFORMATION ONLY

NOTES

SEE ROUTE MAP 54L MAP-001 SH20 OF 20 FOR CROSS SECTION LOCATION.

N.T.S.

NO.: 35029196
DRAWN: F.SARINO-MHV
REVISION: B
DWG: 54L_SEC-0015
DATE: 2021-03-08

CROSS SECTION **X15**

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present. All distances shown are approximate and may change based on final structure type, landowner input, final environmental assessment and engineering.

PROPOSED

54L REBUILD
CANMORE - BANFF

Image of screw piles being installed on an AltaLink transmission line.

Image of installed screw pile.

Appendix C

Additional soil data

Ecosite (# of pits)	Span	Drainage	A Horizon Avg Depth cm (range)	Horizon	Texture	Course Fragment Content	Notes
PT1 (8) Upland terraces	200-213 216-226 257	Well	7 (2- 15)	A	Silty clay loam	0-5%	Variable well drained, coarse soils with high cobble / gravel content, low to moderate susceptibility to rutting , topsoil in most pits <5cm thick
				B	Silty clay loam, clay loam	5-40%	
PT1 (3) Marsh wetlands	207-208 211-212 235-236	Poorly	10 (4-15)	Om	Silty clay	0%	Soil saturated throughout year, very fine textured soil, highly susceptible to compaction and rutting, unlikely to freeze in winter
				B	Silty clay	0%	
HD1 (3) Carrot Crk alluvial plain	213 -216	Well to very rapidly	12 (7-17)	A/ B	Silty clay loam, sandy loam	0%	Floodplain mixture of pockets of fine textured soil and straight sand >30 cm deep with areas of cobble and boulders, little soil development, no distinct A horizon, moderate susceptibility to compaction, good soil nutrients for reclamation
				B	Silty clay loam, sandy loam	0-80%	
FR1 (1) Morrison Coulee	229-231	Rapidly	2	A	Clay loam	0%	High gravel/cobble content in matrix of very fine textured clay soil, very thin topsoil, difficult to reclaim, low to moderate susceptibility to compaction
				B	Clay loam	65%	

Ecosite (# of pits)	Span	Drainage	A Horizon Avg Depth cm (range)	Horizon	Texture	Course Fragment Content	Notes
NY3 (3) Steep dry slopes	243-244 249-250	Rapidly	3 (2-5)	A	Sandy loam, silt clay loam	0% - 20%	Steep slopes on SW or NW aspects, thin topsoil, rocky, moderately eroded, high gravel content, low to moderate susceptibility to rutting, challenging to reclaim, organic matter required
				B	Sandy loam, silt clay loam	10-25%	
HD1 (5) Girouard Crk Floodplain	243-246 250-251	Moderately Well to Well	6 (5-7) buried Ah	A	Silty clay loam or sand	0%	Three pits had recent deposition of silt or sand on top of A horizon indicating this area is an active floodplain of Girouard Crk (timing of last deposition likely 2013 during floods) , no coarse fragments, fine textured soil, highly susceptible to compaction and rutting
				B	Silty clay	0%	
AT1 (2) Upland terrace	265-266 267-268	Moderately Well	8 (7-9)	A	Silty clay loam	0 -1%	Fine textured soil with low coarse fragment content, highly susceptible to compaction and rutting
				B	Sandy clay loam	0-1%	
HD2 (2) Cascade creek floodplain	274-275	Moderately well to rapidly	7 (5-9)	A	Sandy clay loam	0%	One pit had buried A horizon and fine textured soil indicating recent flooding further from stream and one pit was in an abandoned creek channel with very high gravel and cobble content and very little fines; floodplain sites are highly susceptible to rutting and compaction
				B	Silty clay loam	0-85%	

Ecosite (# of pits)	Span	Drainage	A Horizon Avg Depth cm (range)	Horizon	Texture	Course Fragment Content	Notes
PT1 (2) Tunnel Mtn Campground	277-278 286-287	Moderately well	7 (4-9)	A	Silty clay, silty clay loam	0%	Fine textured soil, no coarse fragments in top 30 cm, highly susceptible to compaction and rutting, soil appears to be previously disturbed and compacted on ROW 276-293, very hard layer at 9 – 25cm below surface, likely compacted during construction of original transmission line, existing rutting on trail down ROW
				B	Silty clay loam	0%	
NY3 (2) Steep slope	294-295 297-298	Well	3 (2-4)	A	Silty clay loam	0%	Fine textured soil, no coarse fragments in top 30 cm, highly susceptible to compaction and rutting, highly erodible soil, challenging to stabilize if soils disturbed on steep slope
				B	Silty loam	0%	
VL4 (2) Wet floodplain	298-299 299-300	Imperfectly to poorly	5 (4-5)	A	Silty clay loam	0%	Evidence of periodic saturation (mottling) in B horizon, wet soils likely in growing season, highly susceptible to rutting and compaction
				B	Sandy loam	0%	

Appendix D

Plants recorded on the 54L ROW

Common Name	Scientific Name	S Rank
Forbs		
Alfalfa	*Medicago sativa*	SNA
Alpine Goldenrod	*Solidago multiradiata*	S5
Alpine Hedysarum	*Hedysarum alpinum*	S5
Alpine Milkvetch	*Astragalus alpinus*	S5
Alsike Clover	*Trifolium hybridum*	SNA
American Brooklime	*Veronica americana*	S5
American Milk Vetch	*Astragalus americanus*	S5
Bishop's-Cap	*Mitella nuda*	S5
Black Medick	*Medicago lupulina*	SNA
Blue Columbine	*Aquilegia brevistyla*	S5
Blueweed	*Echium vulgare*	SNA
Blunt-Leaved Bog Orchid	*Platanthera obtusata*	S5
Broad-Leaved Fireweed	*Chamerion latifolium*	S4
Bull Thistle	*Cirsium vulgare*	SNA
Bunchberry	*Cornus canadensis*	S5
Canadian Milkvetch	*Astragalus canadensis*	S4
Caraway	*Carum carvi*	SNA
Cicer Milk Vetch	*Astragalus cicer*	SNA
Common Blue-Eyed Grass	*Sisyrinchium montanum*	S5
Common Caragana	*Caragana arborescens*	SNA
Common Comandra	*Comandra umbellata*	S5
Common Dandelion	*Taraxacum officinale*	SNA
Common Fireweed	*Chamerion angustifolium*	S5
Common Goat's-Beard	*Tragopogon dubius*	SNA
Common Horsetail	*Equisetum arvense*	S5
Common Pink Wintergreen	*Pyrola asarifolia*	S5
Common Plantain	*Plantago major*	SNA
Common Ragweed	*Ambrosia artemisiifolia*	S3
Common Red Paintbrush	*Castilleja miniata*	S5
Common Toadflax	*Linaria vulgaris*	SNA
Common Yarrow	*Achillea millefolium*	S5
Cream-Colored Vetchling	*Lathyrus ochroleucus*	S5
Creeping Thistle	*Cirsium arvense*	SNA
Cut-Leaved Anemone	*Anemone multifida*	S5
Cut-Leaved Fleabane	*Erigeron compositus*	S5
Drummond's Thistle	*Cirsium drummondii*	S5

Common Name	Scientific Name	S Rank
Dwarf Bramble	*Rubus pedatus*	S5
Dwarf Scouring-Rush	*Equisetum scirpoides*	S5
Early Blue Violet	*Viola adunca*	S5
Early Yellow Locoweed	*Oxytropis sericea*	S5
Felwort	*Gentianella amarella*	S5
Few-Flowered Ragwort	*Packera pauciflora*	S3
Field Mouse-Ear Chickweed	*Cerastium arvense*	S5
Gaillardia	*Gaillardia aristata*	S5
Golden Bean	*Thermopsis rhombifolia*	S5
Graceful Cinquefoil	*Potentilla gracilis*	S5
Great Plains Bladderpod	*Physaria arenosa*	S3
Grouseberry	*Vaccinium scoparium*	S5
Harebell	*Campanula rotundifolia*	S5
Heart-Leaved Alexanders	*Zizia aptera*	S5
Heart-Leaved Arnica	*Arnica cordifolia*	S5
Hoary Draba	*Draba cana*	S3
Hooded Ladies'-Tresses	*Spiranthes romanzoffiana*	S5
Horseweed	*Erigeron canadensis*	S4
Indian Milkvetch	*Astragalus australis*	S5
Late Yellow Locoweed	*Oxytropis monticola*	S5
Leafy Thistle	*Cirsium foliosum*	S3
Lindley's Aster	*Symphyotrichum ciliolatum*	S5
Long-Leaved Chickweed	*Stellaria longifolia*	S5
Long-Stalked Chickweed	*Stellaria longipes*	S5
Loose-Flowered Milk Vetch	*Astragalus tenellus*	S4
Lyall's Rockcress	*Boechera lyallii*	S3
Meadow Hawkweed	*Pilosella caespitosum*	SNA
Moonwort	*Botrychium lunaria*	S5
Mountain Valerian	*Valeriana sitchensis*	S5
Narrow-Leaved Puccoon	*Lithospermum incisum*	S4S5
Nodding Onion	*Allium cernuum*	S5
Northern Bastard Toadflax	*Geocaulon lividum*	S5
Northern Bedstraw	*Galium boreale*	S5
Northern Fairy Candelabra	*Androsace septentrionalis*	S5
Northern Green Bog Orchid	*Platanthera huronensis*	S5
Northern Hedysarum	*Hedysarum boreale*	S5
Northern Stitchwort	*Stellaria calycantha*	S4

Common Name	Scientific Name	S Rank
Northern Willowherb	*Epilobium ciliatum*	S5
One-Sided Wintergreen	*Orthilia secunda*	S5
Ox-Eye Daisy	*Leucanthemum vulgare*	SNA
Pale Coralroot	*Corallorhiza trifida*	S5
Palmate-Leaved Coltsfoot	*Petasites frigidus var. palmatus*	S5
Pasture Sagewort	*Artemisia frigida*	S5
Perennial Sow-Thistle	*Sonchus arvensis*	SNA
Plains Wormwood	*Artemisia campestris*	S5
Prairie Groundsel	*Packera cana*	S5
Prairie Sagewort	*Artemisia ludoviciana*	S5
Prairie Selaginella	*Selaginella densa*	S5
Purple Clematis	*Clematis occidentalis*	S5
Purple Milk Vetch	*Astragalus agrestis*	S5
Red-Osier Dogwood	*Cornus stolonifera*	S5
Red-Seeded Sandwort	*Minuartia rubella*	S4
Reflexed Locoweed	*Oxytropis deflexa*	S5
Reflexed Rockcress	*Boechera retrofracta*	S3
Rhubarb	*Rheum rhabarbarum*	SNA
Rosy Everlasting	*Antennaria rosea*	S5
Round-Leaved Orchid	*Galearis rotundifolia*	S5?
Scapose Hawk's-Beard	*Crepis runcinata*	S5
Scentless Chamomile	*Tripleurospermum inodorum*	SNA
Showy Aster	*Eurybia conspicua*	S5
Showy Everlasting	*Antennaria pulcherrima*	S4
Showy Locoweed	*Oxytropis splendens*	S5
Silverweed	*Potentilla anserina*	S5
Slender Blue Beardtongue	*Penstemon procerus*	S5
Slender Bog Orchid	*Platanthera stricta*	S3
Small Northern Grass-Of-Parnassus	*Parnassia parviflora*	S3
Small Wood Anemone	*Anemone parviflora*	S5
Small-Leaved Everlasting	*Antennaria parvifolia*	S5
Smooth Aster	*Symphyotrichum laeve*	S5
Smooth Fleabane	*Erigeron glabellus*	S5
Spreading Sweet Cicely	*Osmorhiza depauperata*	S5
Star-Flowered Solomon's-Seal	*Maianthemum stellatum*	S5

Common Name	Scientific Name	S Rank
Sticky Alumroot	*Heuchera cylindrica*	S4
Sticky Goldenrod	*Solidago simplex*	S5
Swamp Horsetail	*Equisetum fluviatile*	S5
Sweet-Flowered Androsace	*Androsace chamaejasme*	S5
Tall Buttercup	*Ranunculus acris*	SNA
Tall Larkspur	*Delphinium glaucum*	S5
Three-Flowered Avens	*Geum triflorum*	S5
Thyme-Leaved Sandwort	*Arenaria serpyllifolia*	SNA
Timber Milkvetch	*Astragalus miser*	S4
Tower Mustard	*Turritis glabra*	S4
Tufted Fleabane	*Erigeron caespitosus*	S5
Tufted Vetch	*Vicia cracca*	SNA
Twinflower	*Linnaea borealis*	S5
Veiny Meadow Rue	*Thalictrum venulosum*	S5
Venus'-Slipper	*Calypso bulbosa*	S5?
Virginia Grape Fern	*Botrychium virginianum*	S5
Western Meadow Rue	*Thalictrum occidentale*	S5
Western Wood Lily	*Lilium philadelphicum*	S5
White Camas	*Zigadenus elegans*	S5
White Cockle, Bladder Campion	*Silene latifolia*	SNA
White Thistle	*Cirsium hookerianum*	S3
Wild Blue Flax	*Linum lewisii*	S5
Wild Lily-Of-The-Valley	*Maianthemum canadense*	S5
Wild Strawberry	*Fragaria virginiana*	S5
Wild Vetch	*Vicia americana*	S5
Woolly Cinquefoil	*Potentilla hippiana*	S5
Yellow Avens	*Geum aleppicum*	S5
Yellow Beardtongue	*Penstemon confertus*	S5
Yellow False Dandelion	*Agoseris glauca*	S5
Yellow Hedysarum	*Hedysarum sulphurescens*	S5
Yellow Mountain Avens	*Dryas drummondii*	S5
Yellow Rattle	*Rhinanthus minor*	S4
Graminoid		
Alpine Bluegrass	*Poa alpina*	S5
Alpine Sweetgrass	*Anthoxanthum monticola*	S3
Beautiful Sedge	*Carex concinna*	S5
Bluebunch Wheatgrass	*Pseudoroegneria spicata*	S4

Common Name	Scientific Name	S Rank
Bluejoint	*Calamagrostis canadensis*	S5
Canada Bluegrass	*Poa compressa*	SNA
Columbia Needle Grass	*Achnatherum nelsonii ssp. dorei*	S5
Common Tall Manna Grass	*Glyceria grandis*	S5
Fowl Bluegrass	*Poa palustris*	S5
Foxtail Barley	*Hordeum jubatum*	S5
Fringed Brome	*Bromus ciliatus*	S5
Golden Sedge	*Carex aurea*	S5
Hair-Like Sedge	*Carex capillaris*	S5
Hairy Wild Rye	*Leymus innovatus*	S5
Inland Bluegrass	*Poa interior*	S5
Intermediate Oat Grass	*Danthonia intermedia*	S5
June Grass	*Koeleria macrantha*	S5
Kentucky Bluegrass	*Poa pratensis*	S5
Low Northern Sedge	*Carex concinnoides*	S4
Mountain Rough Fescue	*Festuca campestris*	S5
Narrow Reed Grass	*Calamagrostis stricta*	S5
Pine Reed Grass	*Calamagrostis rubescens*	S5
Purple Oat Grass	*Schizachne purpurascens*	S5
Richardson Needle Grass	*Achnatherum richardsonii*	S5
Richardson's Sedge	*Carex richardsonii*	S4
Rocky Mountain Fescue	*Festuca saximontana*	S5
Rough Hair Grass	*Agrostis scabra*	S5
Rush-Like Sedge	*Carex scirpoidea*	S5
Sheep Fescue	*Festuca ovina*	SNA
Slender Arrow-Grass	*Triglochin palustris*	S5
Slender Wheatgrass	*Elymus trachycaulus*	S5
Small Bottle Sedge	*Carex utriculata*	S5
Smooth Brome	*Bromus inermis*	SNA
Spike Trisetum	*Trisetum spicatum*	S5
Timothy	*Phleum pratense*	SNA
Tufted Hair Grass	*Deschampsia cespitosa*	S5
Water Sedge	*Carex aquatilis*	S5
White-Grained Mountain Rice Grass	*Oryzopsis asperifolia*	S5
White-Scaled Sedge	*Carex xerantica*	S4

Common Name	Scientific Name	S Rank
Wire Rush	*Juncus balticus*	S5
Red-stemmed Feathermoss	*Pleurozium schreberi*	NA
Step Moss	*Hylocomium splendens*	NA
Shrubs		
Beaked Willow	*Salix bebbiana*	S5
Bog Birch	*Betula glandulosa*	S5
Bracted Honeysuckle	*Lonicera involucrata*	S5
Bristly Black Currant	*Ribes lacustre*	S5
Canada Buffaloberry	*Shepherdia canadensis*	S5
Common Bearberry	*Arctostaphylos uva-ursi*	S5
Creeping Juniper	*Juniperus horizontalis*	S5
Farr's Willow	*Salix farriae*	S4
Flat-Leaved Willow	*Salix planifolia*	S5
Ground Juniper	*Juniperus communis*	S5
Low-Bush Cranberry	*Viburnum edule*	S5
Myrtle-Leaved Willow	*Salix myrtillifolia*	S5
Northern Gooseberry	*Ribes oxyacanthoides*	S5
Prickly Rose	*Rosa acicularis*	S5
Rocky Mountain Juniper	*Juniperus scopulorum*	S3
Saskatoon	*Amelanchier alnifolia*	S5
Shrubby Cinquefoil	*Dasiphora fruticosa*	S5
Silverberry	*Elaeagnus commutata*	S5
Smooth Willow	*Salix glauca*	S5
Snowberry	*Symphoricarpos albus*	S5
Twining Honeysuckle	*Lonicera dioica*	S5
White Meadowsweet	*Spiraea betulifolia*	S5
Wild Red Raspberry	*Rubus idaeus*	S5
Trees		
Aspen	*Populus tremuloides*	S5
Balsam Poplar	*Populus balsamifera*	S5
Douglas-Fir	*Pseudotsuga menziesii*	S5
Limber Pine	*Pinus flexilis*	S3
Lodgepole Pine	*Pinus contorta*	S5
Water Birch	*Betula occidentalis*	S4
White Spruce	*Picea glauca*	S5

Appendix E

Potential and observed wildlife species in the RSA and their provincial and federal status.

Common Name	Scientific Name	AB Status[1]	SARA Status[2]	Observed[3]
Amphibians				
Long-toed Salamander	*Ambystoma macrodactylum*	SN		x
Western Toad	*Anaxyrus boreas*	SN	SC	x
Columbia Spotted Frog	*Rana luteiventris*	SN		x
Wood Frog	*Rana sylvatica*			x
Reptiles				
Terrestrial Garter Snake	*Thamnophis elegans*	SN		
Plains Garter Snake	*Thamnophis radix*	SN		
Mammals				
Bats				
Silver-haired Bat	*Lasionycteris noctivagans*	SN		
Hoary Bat	*Lasiurus cinereus*	SN		
Long-eared Bat	*Myotis evotis*	SN		
Little Brown Bat	*Myotis lucifugus*	MBAR	EN	
Northern Long-eared Bat	*Myotis septentrionalis*	MBAR	EN	
Long-legged Bat	*Myotis volans*	UN		
Bat *sp.*	-	-	-	x
Bears				
Black Bear	*Ursus americanus*			x
Grizzly Bear	*Ursus arctos*	AR	SC	x
Cat family				
Cougar	*Felis concolor*			
Lynx	*Lynx canadensis*	SN		
Dog family				
Coyote	*Canis latrans*			x
Grey Wolf	*Canis lupus*			x
Red Fox	*Vulpes vulpes*			x

Pikas and hares				
Snowshoe Hare	*Lepus americanus*			x
Pika	*Ochotona princeps*			
Raccoons				
Common Raccoon	*Procyon lotor*			
Rodents				
Beaver	*Castor canadensis*			
Red-tailed Chipmunk	*Neotamias ruficaudus*	SN		
Yellow-pine Chipmunk	*Neotamias minimus*			
Least Chipmunk	*Neotamias amoenus*			
Chipmunk *sp.*	-	-	-	x
Hoary Marmot	*Marmota caligata*			
Columbian Ground Squirrel	*Spermophilus columbianus*			x
Golden-Mantled Ground Squirrel	*Spermophilus lateralis*			
Richardson's Ground Squirrel	*Spermophilus richardsonii*			
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	UN		
Northern Flying Squirrel	*Glaucomys sabrinus*			
Red Squirrel	*Tamiasciurus hudsonicus*			x
Northern Pocket Gopher	*Thomomys talpoides*			
House Mouse	*Mus musculus*	EX/Al		
Northern Grasshopper Mouse	*Onychomys leucogaster*			
Deer Mouse	*Peromyscus maniculatus*			
Western Harvest Mouse (Dychei Subspecies)	*Reithrodontomys megalotis dychei*	UN	EN	
Western Jumping Mouse	*Zapus princeps*			
Mouse *sp.*	-	-	-	x
Bushy-tailed Woodrat	*Neotoma cinerea*			
Southern Red-backed Vole	*Clethrionomys gapperi*			
Sagebrush Vole	*Lemmiscus curtatus*			

Long-Tailed Vole	*Microtus longicaudus*			
Meadow Vole	*Microtus pennsylvanicus*			
Water Vole	*Microtus richardsoni*	SN		
Heather Vole	*Phenacomys intermedius*			
Vole *sp.*	-	-	-	x
Muskrat	*Ondatra zibethicus*			x
Nearctic Brown Lemming	*Lemmus trimucronatus*	UN		
Northern Bog Lemming	*Synaptomys borealis*			
Common Porcupine	*Erethizon dorsatum*			
Shrews				
Masked Shrew	*Sorex cinereus*			
Dusky Shrew	*Sorex monticolus*			
Vagrant Shrew	*Sorex vagrans*	MBAR		
Water Shrew	*Sorex palustris*			
Pygmy Shrew	*Sorex hoyi*			
Ungulates				
Moose	*Alces alces*			x
Elk	*Cervus elaphus*			x
Mule Deer	*Odocoileus hemionus*			x
White-tailed Deer	*Odocoileus viginianus*			x
Mountain Goat	*Oreamnos americanus*			
Bighorn Sheep	*Ovis canadensis*			
Weasel				
Wolverine	*Gulo gulo*	MBAR	SC	
American Marten	*Martes americana*			x
Fisher	*Martes pennanti*	SN		
Striped Skunk	*Mephitis mephitis*			
Ermine	*Mustela erminea*			
Long-tailed Weasel	*Mustela frenata*	MBAR		
Least Weasel	*Mustela nivalis*			

Mink	*Mustela vison*			
American Badger	*Taxidea taxus*	SN		
North American River Otter	*Lontra canadensis*			
Avian				
Ducks, Geese, and Swans				
Greater White-fronted Goose	*Anser albifrons*			
Snow Goose	*Chen caerulescens*			
Ross's Goose	*Chen rossii*			
Canada Goose	*Branta canadensis*			x
Trumpeter Swan	*Cygnus columbianus*	SN		
Tundra Swan	*Cygnus columbianus*			
Wood Duck	*Aix sponsa*			
Gadwall	*Anas strepera*			
Eurasian Widgeon	*Anas penelope*	AC/VA		
American Widgeon	*Anas americana*			
Mallard	*Anas platyrhynchos*			x
Blue-winged Teal	*Anas discors*			
Cinnamon Teal	*Anas cyanoptera*			
Northern Shoveler	*Anas clypeata*			
Northern Pintail	*Anas acuta*			
Green-winged Teal	*Anas crecca*			x
Canvasback	*Aythya valisineria*			
Redhead	*Aythya americana*			
Ring-necked Duck	*Aythya collaris*			
Greater Scaup	*Aythya marila*			
Lesser Scaup	*Aythya affinis*			
King Eider	*somateria spectabilis*	AC/VA		
Harlequin Duck	*Clangula hyemalis*	SN		
Surf Scoter	*Melanitta perspicillata*			
White-winged Scoter	*Melanitta fusca*	SN		

Long-tailed Duck	*Clangula hyemalis*			
Bufflehead	*Bucephala albeola*			
Common Goldeneye	*Bucephala clangula*			
Barrow's Goldeneye	*Bucuphala islandica*			
Hooded Merganser	*Lophodytes cucullatus*			
Common Merganser	*Mergus merganser*			
Red-Breasted Merganser	*Mergus serrator*			
Ruddy Duck	*Oxyura jamaicensis*			
Partridges, Grouse and Turkeys				
Ruffed Grouse	*Bonasa umbellus*			x
Blue Grouse	*Dendragapus obscurus*			
Spruce Grouse	*Falcipennis canadensis*			x
Sharp-tailed Grouse	*Tympanuchus phasianellus*	SN		
Ring-necked Pheasant	*Phasianus colchicus*	EX/AL		
Gray Partridge	*Perdix perdix*	EX/AL		
Willow Ptarmigan	*Lagopus lagopus*			
White-tailed Ptarmigan	*Lagopus leucura*			
Loons				
Red-throated Loon	*Gavia stellata*			
Pacific Loon	*Gavia pacifica*			
Common Loon	*Gavia immer*			x
Yellow-billed Loon	*Gavia adamsii*	AC/VA		
Grebes				
Pied-Billed Grebe	*Podilymbus podiceps*	SN		
Horned Grebe	*Podiceps auritus*	SN	SC	
Red-necked Grebe	*Podiceps grisegena*			
Eared Grebe	*Podiceps nigricollis*	SN		
Western Grebe	*Aechmophorus occidentalis*	AR	SC	
Cormorants				
Double-crested Cormorant	*Phalacrocorax auritus*			

Pelicans				
American White Pelican	*Pelecanus erythrorhynchos*	SN		
Bitterns, Herons, and Egrets				
American Bittern	*Botaurus lentiginosus*	SN		
Great Blue Heron	*Ardea herodias*	SN		
Great Egret	*Ardea alba*	AC/VA		
Little Blue Heron	*Egretta caerulea*	AC/VA		
Green Heron	*Butorides virescens*	AC/VA		
New World Vultures				
Turkey Vulture	*Cathartes aura*			
Osprey				
Osprey	*Pandion haliaetus*			x
Eagles, Kites and Hawks				
Bald Eagle	*Haliaetus leucocephalus*	SN		
Golden Eagle	*Aquila chrysaetos*	SN		
Northern Harrier	*Circus hudsonius*			
Sharp-Shinned Hawk	*Accipiter striatus*			
Cooper's Hawk	*Accipiter cooperii*			
Northern Goshawk	*Accipiter gentilis*	SN		
Broad-winged Hawk	*Buteo platypterus*	SN		
Swainson's Hawk	*Buteo swainsoni*			
Red-tailed Hawk	*Buteo jamaicensis*			x
Ferruginous Hawk	*Buteo regalis*	AR	THR	
Rough-legged Hawk	*Buteo lagopus*			
Caracaras and Falcons				
American Kestrel	*Falco sparverius*	SN		
Merlin	*Falco columbarius*			
Gyrfalcon	*Falco rusticolus*			
Peregrine Falcon	*Falco peregrinus*	AR		
Prairie Falcon	*Falco mexicanus*	SN		

Falcon Sp.				x
Rails, Gallinules and Coots				
Yellow Rail	*Coturnicops noveboracensis*	UN	SC	
Virginia Rail	*Rallus limicola*	UN		
Sora	*Porzana carolina*	SN		x
American Coot	*Fulica americana*			
Cranes				
Sandhill Crane	*Grus canadensis*	SN		
Lapwings and Plovers				
Black-bellied Plover	*Pluvialis squatarola*			
American Golden Plover	*Pluvialis dominica*			
Semipalmated Plover	*Charadrius semipalmatus*			
Killdeer	*Charadrius vociferus*			
Avocets and Stilts				
Black-necked Stilt	*Himantopus mexicanus*	SN		
American Avocet	*Recurvirostra americana*			
Sandpipers, Phalaropes and Allies				
Upland Sandpiper	*Bartramia longicauda*	SN		
Long-billed Curlew	*Numenius americanus*	MBAR	SC	
Marbled Godwit	*Limosa fedoa*			
Ruddy Turnstone	*Arenaria interpres*			
Stilt Sandpiper	*Calidris himantopus*			
Sanderling	*Calidris alba*			
Baird's Sandpiper	*Calidris bairdii*			
Least Sandpiper	*Calidris minutilla*			
Pectoral Sandpiper	*Calidris melanotos*			
Semipalmated Sandpiper	*Calidris pusilla*			
Short-billed Dowitcher	*Limnodromus griseus*	UN		
Long-billed Dowitcher	*Limnodromus scolopaceus*			

Wilson's Snipe	Gallinago delicata			
Wilson's Phalarope	*Phalaropus tricolor*			
Red-necked Phalarope	*Phalaropus lobatus*		SC	
Red Phalarope	*Phalaropus fulicarius*	AC/VA		
Spotted Sandpiper	*Actitis macularius*			
Solitary Sandpiper	*Tringa solitaria*			
Wandering Tattler	*Tringa incana*	AC/VA		
Greater Yellowlegs	*Tringa melanoleuca*			
Willet	*Tringa semipalmata*			
Lesser Yellowlegs	*Tringa flavipes*			
Gulls, Terns, and Skimmers				
Sabine's Gull	*Xema sabini*			
Bonaparte's Gull	*Chroicocephalus philadelphia*			
Franklin's Gull	Leucophaeus pipixcan			
Mew Gull	*Larus canus*			
Ring-billed Gull	*Larus delawarensis*			
California Gull	*Larus californicus*			
Herring Gull	*Larus argentatus*			
Glaucous-winged Gull	*Larus glaucescens*	AC/VA		
Glaucous Gull	*Larus hyperboreus*			
Caspian Tern	*Hydroprogne caspia*	SN		
Black Tern	*Chlidonias niger*	SN		
Common Tern	*Sterna hirundo*			
Forster's Tern	*Sterna forsteri*	SN		
Pigeons and Doves				
Rock Pigeon	*Columba livia*	EX/AL		x
Band-tailed Pigeon	*Patagioenas fasciata*	AC/VA		
Eurasian Collared-dove	*Streptopelia decaocto*	AC/VA		
Mourning Dove	*Zenaida macroura*			

Barn Owls and Typical Owls				
Barn Owl	*Tyto alba*	AC/VA	THR	
Eastern Screech Owl	*Megascops asio*	AC/VA		
Great Horned Owl	*Bubo virginianus*			
Snowy Owl	*Bubo scandiacus*			
Northern Hawk Owl	*Surnia ulula*			
Northern Pygmy Owl	*Glaucidium gnoma*	SN		x
Burrowing Owl	*Athene cunicularia*	AR	EN	
Barred Owl	*Strix varia*	SN		x
Great Gray Owl	*Strix nebulosa*	SN		
Long-eared Owl	*Asio otus*			
Short-eared Owl	*Asio flammeus*	MBAR	SC	
Boreal Owl	*Aegolius funereus*			
Northern Saw-whet Owl	*Aegolius acadicus*			
Goatsuckers				
Common Nighthawk	*Chordeiles minor*	SN	SC	
Common Poorwill	*Phalaenoptilus nuttallii*	UN		
Swifts				
Black Swift	*Cypseloides niger*	MBAR	EN	
Vaux's Swift	*Chaetura vauxi*	AC/VA		
Hummingbirds				
Ruby-throated Hummingbird	*Archilochus colubris*			
Black-chinned Hummingbird	*Archilochus alexandri*	AC/VA		
Rufous Hummingbird	*Selasphorus rufus*			
Calliope Hummingbird	*Selasphorus calliope*			
Kingfishers				
Belted Kingfisher	*Megaceryle alcyon*			
Woodpeckers				
Lewis's Woodpecker	*Melanerpes lewis*	SN		

Red-Headed Woodpecker	*Melanerpes erythrocephalus*	AC/VA		
Yellow-bellied Sapsucker	*Sphyrapicus varius*			x
Red-naped Sapsucker	*Sphyrapicus nuchalis*	UN		
Red-breasted Sapsucker	*Sphyrapicus ruber*	AC/VA		
Downy Woodpecker	*Picoides pubescens*			x
Hairy Woodpecker	*Picoides villosus*			x
American Three-toed Woodpecker	*Picoides dorsalis*			x
Black-backed Woodpecker	Picoides arcticus	SN		
Northern Flicker	Colaptes auratus			x
Pileated Woodpecker	Dryocopus pileatus	SN		x
Tyrant Flycatchers				
Olive-sided Flycatcher	*Contopus cooperi*	MBAR	SC	x
Western Wood-pewee	*Contopus sordidulus*	MBAR		
Yellow-bellied Flycatcher	*Empidonax flaviventris*	UN		
Alder Flycatcher	*Empidonax alnorum*			
Willow Flycatcher	*Empidonax traillii*			x
Least Flycatcher	*Empidonax minimus*			
Hammond's Flycatcher	*Empidonax hammondii*			x
Dusky Flycatcher	*Empidonax oberholseri*			x
Pacific-slope Flycatcher	*Empidonax difficilis*	UN		
Cordilleran Flycatcher	*Empidonax occidentalis*	UN		
Eastern Phoebe	*Sayornis phoebe*	SN		
Say's Phoebe	*Sayornis saya*			
Great Crested Flycatcher	*Myiarchus crinitus*	SN		
Western Kingbird	*Tyrannus verticalis*			
Eastern Kingbird	*Tyrannus tyrannus*	SN		
Shrikes				
Northern Shrike	*Lanius borealis*			
Vireos				

Cassin's Vireo	*Vireo cassinii*	UN		
Blue-headed Vireo	*Vireo solitarius*			
Philadelphia Vireo	*Vireo philadelphicus*			
Warbling Vireo	*Vireo gilvus*			x
Red-eyed Vireo	*Vireo olivaceus*			x
Crows and Jays				
Canada Jay	*Perisoreus canadensis*			x
Steller's Jay	*Cyanocitta stelleri*			x
Blue Jay	*Cyanocitta cristata*			
Black-billed Magpie	*Pica hudsonia*			x
Clark's Nutcracker	*Nucifraga columbiana*	SN		
American Crow	*Corvus brachyrhynchos*			x
Common Raven	*Corvus corax*			x
Larks				
Horned Lark	*Eremophila alpestris*			
Swallows				
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*			
Tree Swallow	*Tachycineta bicolor*			x
Violet-green Swallow	*Tachycineta thalassina*			
Bank Swallow	*Riparia riparia*	SN	THR	
Barn Swallow	*Hirundo rustica*	MBAR	THR	
Cliff Swallow	*Petrochelidon pyrrhonota*			
Titmice and Chickadees				
Black-capped Chickadee	*Poecile atricapillus*			x
Mountain Chickadee	*Poecile gambeli*			x
Chestnut-backed Chickadee	*Poecile rufescens*	AC/VA		
Boreal Chickadee	*Poecile hudsonicus*			x
Nuthatches				
Red-breasted Nuthatch	*Sitta canadensis*			x

White-breasted Nuthatch	*Sitta carolinensis*			
Pygmy Nuthatch	*Sitta pygmaea*	AC/VA		
Creeper				
Brown Creeper	*Certhia americana*	SN		
Wrens				
Rock Wren	*Salpinctes obsoletus*			
House Wren	*Troglodytes aedon*			x
Pacific Wren	*Troglodytes pacificus*			
Winter Wren	*Troglodytes troglodytes*			
Marsh Wren	*Cistothorus palustris*			
Dipper				
American Dipper	*Cinclus mexicanus*			
Kinglets				
Golden-crowned Kinglet	*Regulus satrapa*			x
Ruby-crowned Kinglet	*Regulus calendula*			x
Thrushes				
Eastern Bluebird	*Sialia sialis*			
Western Bluebird	*Sialia mexicana*			
Mountain Bluebird	*Sialia currucoides*			x
Townsend's Solitaire	*Myadestes townsendi*			x
Veery	*Catharus fuscescens*			
Gray-cheeked Thrush	*Catharus minimus*	UN		
Swainson's Thrush	*Catharus ustulatus*			x
Hermit Thrush	*Catharus guttatus*			x
American Robin	*Turdus migratorius*			x
Varied Thrush	*Ixoreus naevius*			
Mockingbirds and Thrashers				
Gray Catbird	*Dumetella carolinensis*			
Brown Thrasher	*Toxostoma rufum*			
Northern Mockingbird	*Mimus polyglottos*			

Starlings				
European Starling	*Sturnus vulgaris*	EX/AL		
Pipets				
American Pipit	*Anthus rubescens*			
Waxwings				
Cedar Waxwing	*Bombycilla cedrorum*			x
Bohemian Waxwing	*Bombycilla garrulus*			
Longspurs and Buntings				
Lapland Longspur	*Calcarius lapponicus*			
Chestnut-collared Longspur	*Calcarius ornatus*	MBAR	THR	
Smith's Longspur	*Calcarius pictus*			
Snow Bunting	*Plectrophenax nivalis*			
Wood Warblers				
Ovenbird	*Seiurus aurocapilla*			
Northern Waterthrush	*Seiurus noveboracensis*			
Black-and-white Warbler	*Mniotilta varia*			
Tennessee Warbler	*Leiothlypis peregrina*			x
Orange-crowned Warbler	*Vermivora celata*			x
Nashville Warbler	*Leiothlypis ruficapilla*			x
Connecticut Warbler	*Oporornis agilis*			
Macgillivray's Warbler	*Oporornis tolmiei*			
Common Yellowthroat	*Geothlypis trichas*	SN		x
Hooded Warbler	*Setophaga citrina*	AC/VA		
American Redstart	*Setophaga ruticilla*			x
Cape May Warbler	*Dendroica tigrina*	SN		
Magnolia Warbler	*Dendroica magnolia*			
Bay-Breasted Warbler	*Dendroica castanea*	SN		
Blackburnian Warbler	*Dendroica fusca*	SN		
Yellow Warbler	*Dendroica petechia*			x
Chestnut-sided Warbler	*Dendroica pensylvanica*			

Blackpoll Warbler	*Dendroica striata*			
Black-throated Blue Warbler	*Setophaga caerulescens*	AC/VA		
Palm Warbler	*Dendroica palmarum*			
Pine Warbler	*Setophaga pinus*	AC/VA		
Yellow-rumped Warbler	*Dendroica coronata*			x
Black-throated Gray Warbler	*Setophaga nigrescens*	AC/VA		
Townsend's Warbler	*Dendroica townsendi*			x
Black-throated Green Warbler	*Dendroica virens*	SN		
Canada Warbler	*Wilsonia canadensis*	MBAR	THR	
Wilson's Warbler	*Wilsonia pusilla*			x
Yellow-breasted Chat	*Icteria virens*			
Emberizids				
Grasshopper Sparrow	*Ammodramus avannarum*	SN		
Baird's Sparrow	*Ammodramus bairdii*	SN	SC	
Le Conte's Sparrow	*Ammodramus leconteii*			
Nelson's Sparrow	*Ammodramus nelsoni*			
American Tree Sparrow	*Spizelloides arborea*			
Chipping Sparrow	*Spizella passerina*			x
Clay-colored Sparrow	*Spizella pallida*			
Brewer's Sparrow	*Spizella breweri*	SN		
Lark Sparrow	*Chondestes grammacus*			
Lark Bunting	*Calamospiza melanocorys*	SN	THR	
Fox Sparrow	*Passerella iliaca*			
Dark-eyed Junco	*Junco hyemalis*			x
White-crowned Sparrow	*Zonotrichia leucophrys*			x
Golden-crowned Sparrow	*Zonotrichia atricapilla*			
Harris's Sparrow	*Zonotrichia querula*		SC	
White-throated Sparrow	*Zonotrichia albicollis*			x
Vesper Sparrow	*Pooecetes gramineus*			x
Savannah Sparrow	*Passerculus sandwichensis*			

Song Sparrow	*Melospiza melodia*			x
Lincoln's Sparrow	*Melospiza lincolnii*			x
Swamp Sparrow	*Melospiza georgiana*			
Green-tailed Towhee	*Pipilo chlorurus*	AC/VA		
Spotted Towhee	*Pipilo maculatus*			
Tanagers				
Western Tanager	*Piranga ludoviciana*	SN		
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			x
Black-headed Grosbeak	*Pheucticus melanocephalus*			
Lazuli Bunting	*Passerina amoena*			
Indigo Bunting	*Passerina cyanea*	AC/VA		
Blackbirds				
Bobolink	*Dolichonyx oryzivorus*	SN	THR	
Red-winged Blackbird	*Agelaius phoeniceus*			x
Western Meadowlark	*Sturnella neglecta*			
Yellow-headed Blackbird	*Xanthocephalus*			
Rusty Blackbird	*Euphagus carolinus*	SN	SC	
Brewer's Blackbird	*Euphagus cyanocephalus*			
Common Grackle	*Quiscalus quiscula*			
Brown-headed Cowbird	*Molothrus ater*			x
Baltimore Oriole	*Icterus galbula*			
Fringilline and Cardueline Finches				
Gray-crowned Rosy Finch	*Leucosticte tephrocotis*			
Pine Grosbeak	*Pinicola enucleator*			
House Finch	*Haemorhous mexicanus*			
Purple Finch	*Haemorhous purpureus*			
Cassin's Finch	*Haemorhous cassinii*			
Red Crossbill	*Loxia curvirostra*			x
White-winged Crossbill	*Loxia leucoptera*			x

Common Redpoll	*Acanthis flammea*			
Hoary Redpoll	*Acanthis hornemanni*			
Pine Siskin	*Spinus pinus*			x
American Goldfinch	*Spinus tristis*			
Evening Grosbeak	*Coccothraustes vespertinus*		SC	
Old World Sparrows				
House Sparrow	*Passer domesticus*	EX/AL		

[1]Government of Alberta. 2022. Alberta wild species general status listing - 2020.

UN - undetermined: Any species for which insufficient information, knowledge of data is available to reliably evaluate its general status

EX/AL - exotic/alien: Any species that has been introduced as a result of human activities

AC/VA - accidental/vagrant: Any species occurring infrequently and unpredictably in Alberta

MIG

SN - sensitive: Any species that is not at risk of extinction or extirpation but may require special attention or protection to prevent it from becoming at risk

AR - at risk: Any species known to be at risk after formal detailed status assessment and legal designation as Endangered or Threatened in Alberta

MBAR - may be at risk: Any species that may be at risk of extinction or extirpation and is therefore a candidate for detailed risk assessment

[2]Government of Canada. 2021. Species at risk public registry: Status on Schedule 1.

SC - special concern: A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats

THR - threatened: A wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction

EN - endangered: A wildlife species that is facing imminent extirpation of extinction

[3]Observed incidentally or during field surveys (auditory, visual, or signs)

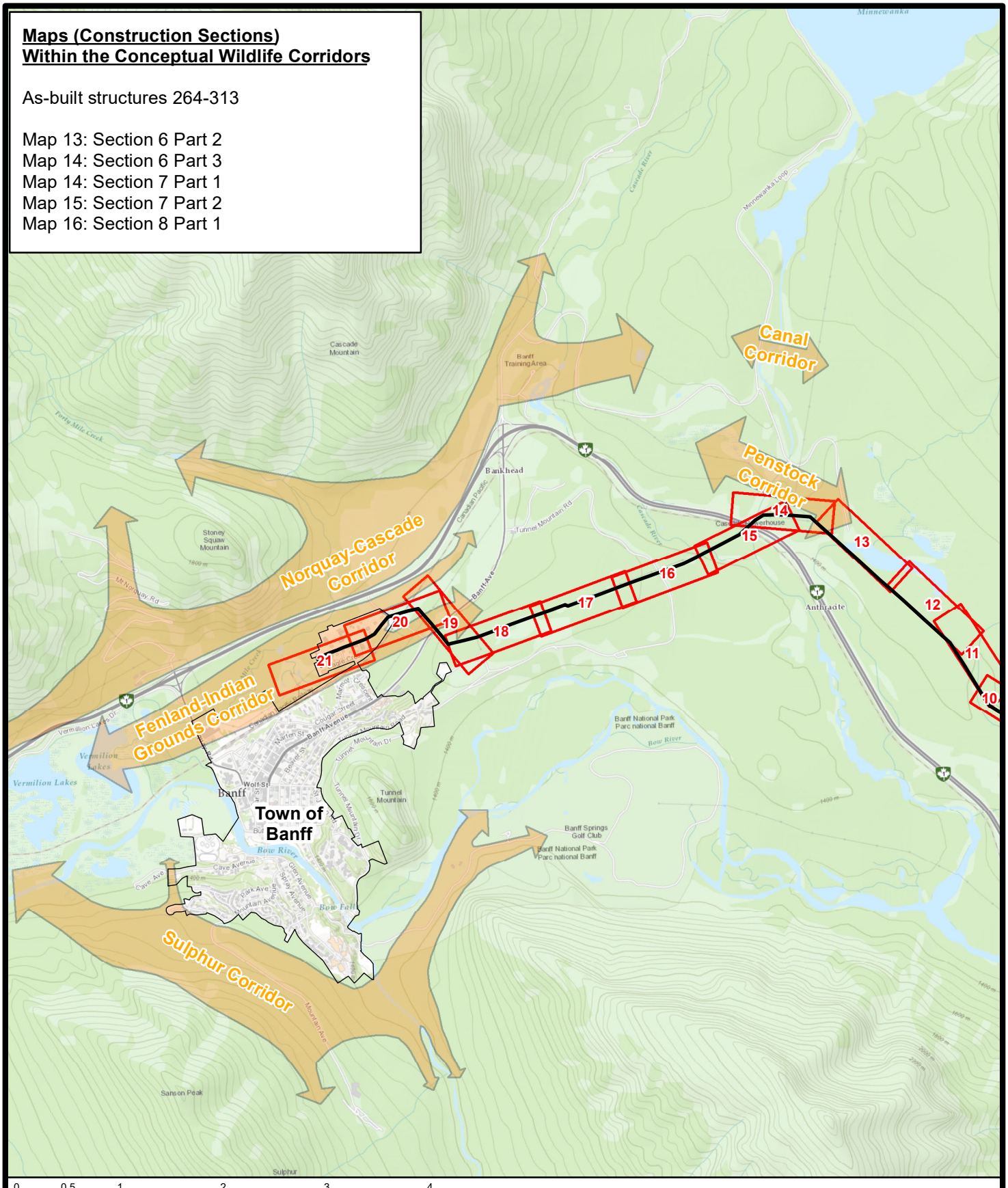
Appendix F

Wildlife Maps (Wildlife corridors, elk, sheep, grizzly bear, wolf, cougar)

Maps (Construction Sections)
Within the Conceptual Wildlife Corridors

As-built structures 264-313

Map 13: Section 6 Part 2
Map 14: Section 6 Part 3
Map 14: Section 7 Part 1
Map 15: Section 7 Part 2
Map 16: Section 8 Part 1



AltaLink 54L
Conceptual Wildlife Corridors
Near the Town of Banff

Map Extents

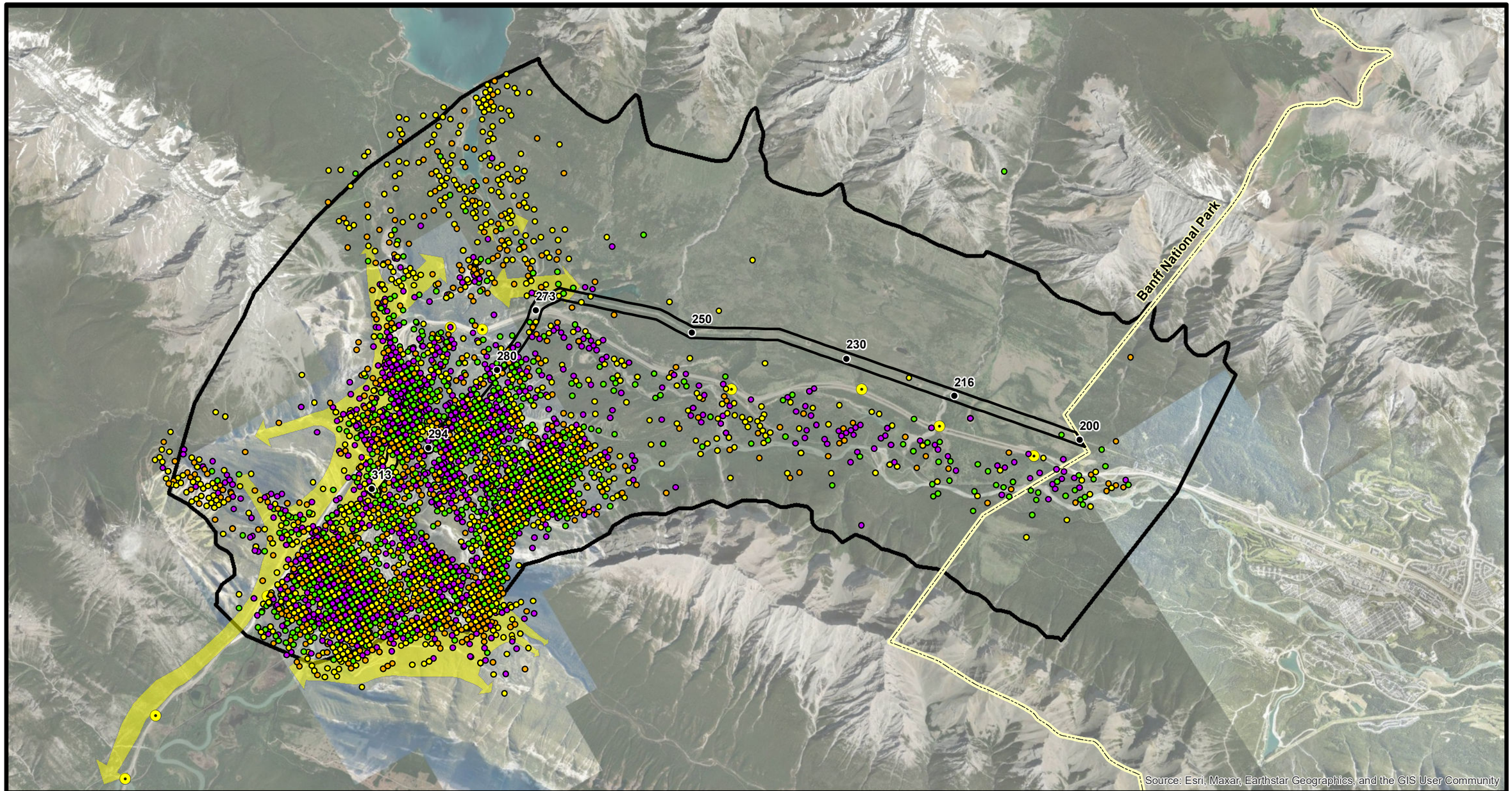
Legend
- Altalink 54L
- Wildlife Corridor (Conceptual)
- Alignment Sheet (with Map Number)

Drawn By: Bruce Gleig **Date: June 3, 2024**

Scale
1 : 50,000

Prepared By:
AVENS CONSULTING

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY



AltaLink 54L: Elk VHF Collar Points (1996-2020)

Notes

Legend

- Altalink 54L Structures (selected)
- Wildlfe Crossing Structures
- Wildlife Corridors (Conceptual)
- Regional Study Area (RSA)
- Local Study Area (LSA)
- BNP Boundary
- VHF Spring (Mar-May)
- VHF Summer (Jun-Aug)
- VHF Fall (Sep-Nov
- VHF Winter (Dec-Feb)

1:70,000

0 0.5 1 2 3 4 5 km

N

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

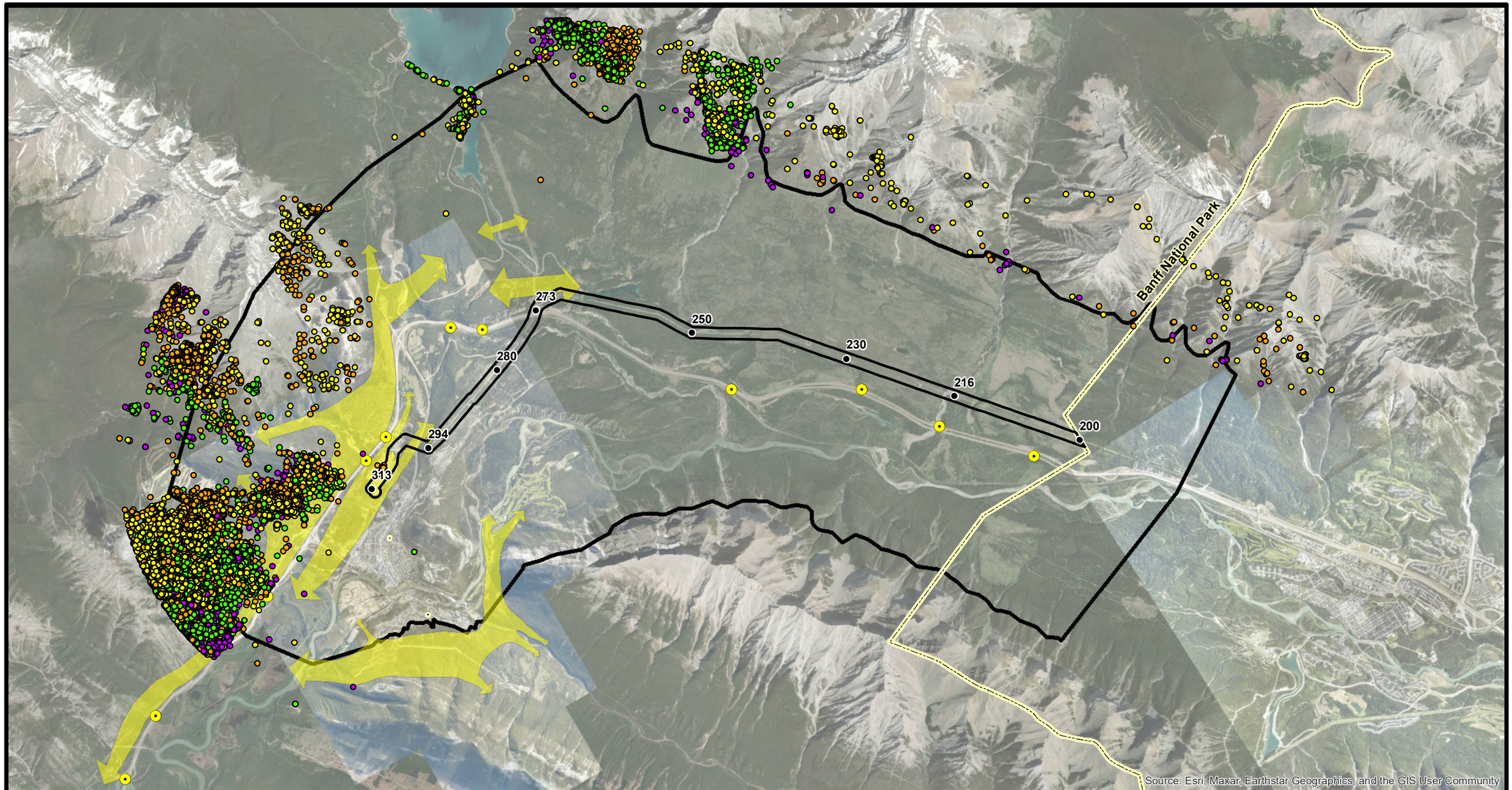
Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: December 01, 2023

2021/2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY



AltaLink 54L: Bighorn Sheep GPS Collar Points (n=38) 2019-2022

Notes

Legend

- Altalink 54L Structures (selected)
- Wildlfe Crossing Structures
- Wildlife Corridors (Conceptual)
- Regional Study Area (RSA)
- Local Study Area (LSA)
- BNP Boundary
- GPS Spring (Mar-May)
- GPS Summer (Jun-Aug)
- GPS Fall (Sep-Nov)
- GPS Winter (Dec-Feb)

1:70,000

0 0.5 1 2 3 4 5 km

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

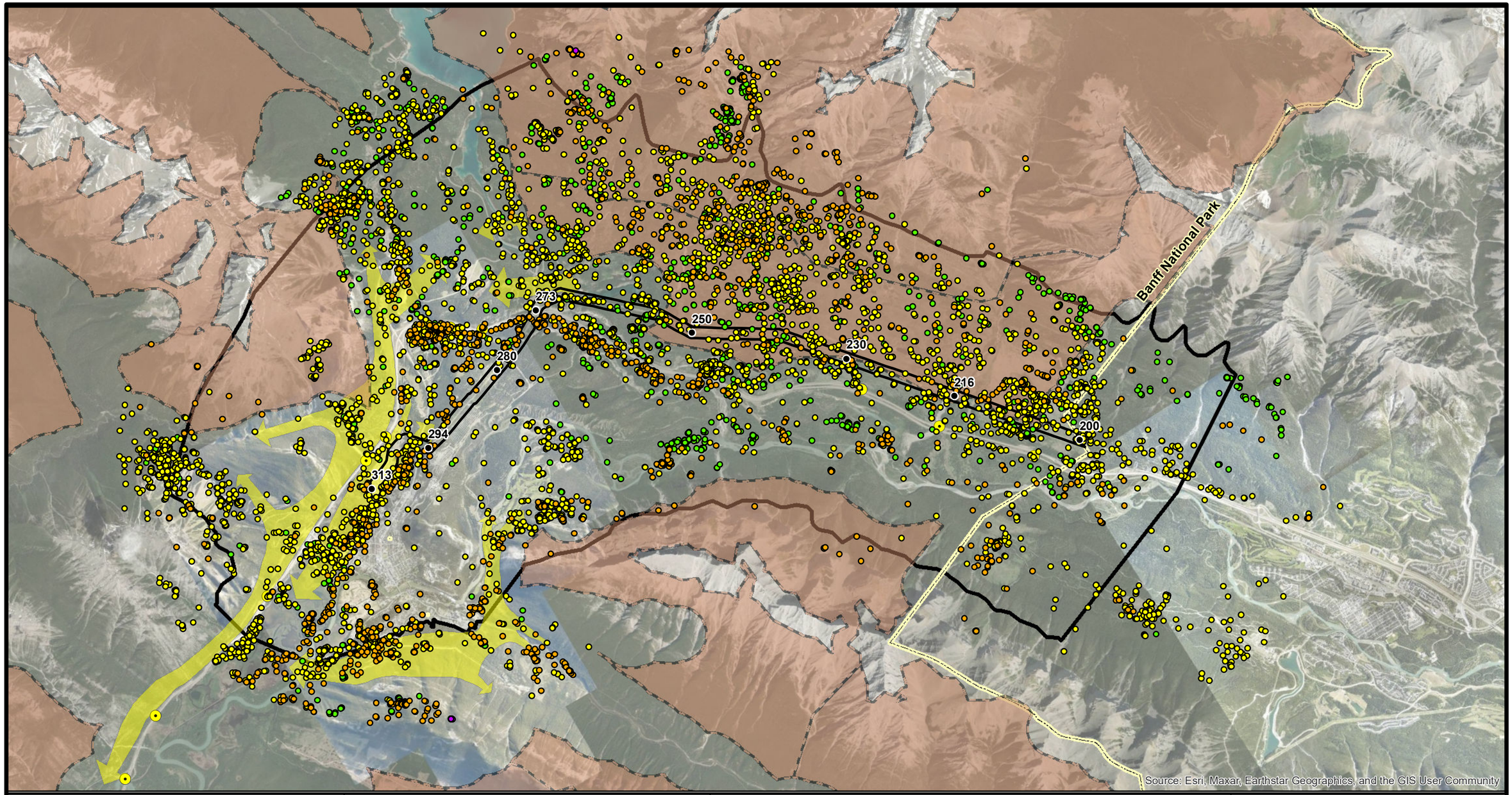
Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: December 01, 2023

2021/2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY



AltaLink 54L: Grizzly Bear GPS Collar Points (n=14)

2001, 2002, 2012-2017, 2020

Notes

Legend

- Altalink 54L Structures (selected)
- Wildlfe Crossing Structures
- Grizzly Bear Secure Habitat
- Wildlife Corridors (Conceptual)
- Regional Study Area (RSA)
- Local Study Area (LSA)
- BNP Boundary
- GPS Spring (Mar-May)
- GPS Summer (Jun-Aug)
- GPS Fall (Sep-Nov)
- GPS Winter (Dec-Feb)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

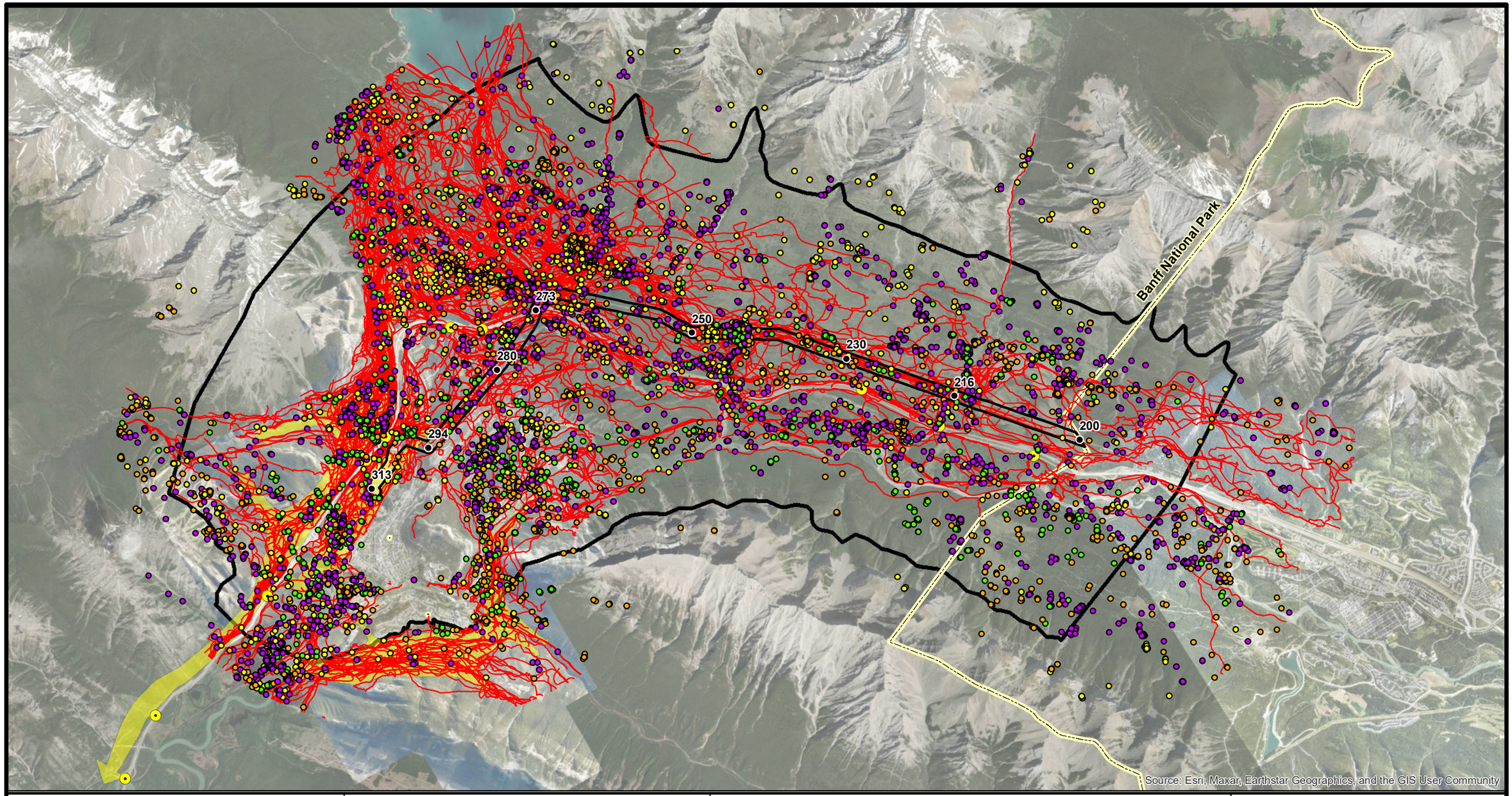
Drawn By: Bruce Gleig

Date: December 01, 2023

2021/2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

1:70,000
0 0.5 1 2 3 4 5 km



AltaLink 54L: Wolf GPS Collar Points (n=11) 2004, 2005, 2009, 2010, 2015-2022 and Winter Tracking 1993-2018

Notes

Legend

- Altalink 54L Structures (selected)
- Wildlife Crossing Structures
- Wildlife Corridors (Conceptual)
- Regional Study Area (RSA)
- Local Study Area (LSA)
- BNP Boundary
- GPS Spring (Mar-May)
- GPS Summer (Jun-Aug)
- GPS Fall (Sep-Nov)
- GPS Winter (Dec-Feb)
- Winter Tracking (1993-2018)

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: December 01, 2023

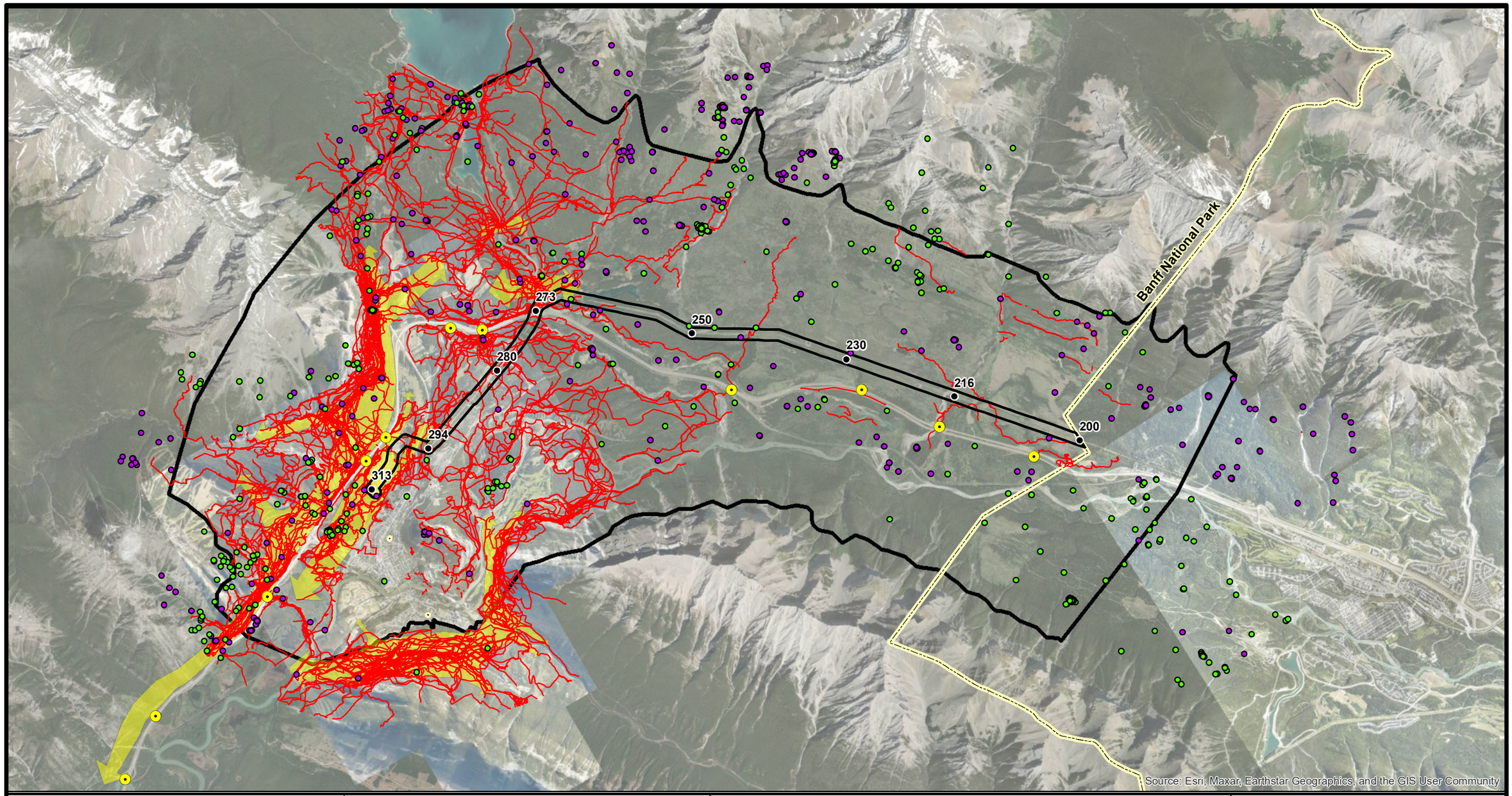
2021/2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

1:70,000

0 0.5 1 2 3 4 5 km

N



AltaLink 54L: Cougar GPS Collar (n=5) 2001-2003 and Winter Tracking 1994-2018

Notes

Legend

- Altalink 54L Structures (selected)
- Wildlfe Crossing Structures
- Wildlife Corridors (Conceptual)
- Regional Study Area (RSA)
- Local Study Area (LSA)
- BNP Boundary
- GPS Spring (Mar-May)
- GPS Winter (Jan-Feb)
- Winter Tracking (1994-2018)

1:70,000

0 0.5 1 2 3 4 5 km

N

This map is a graphical representation of data compiled from numerous sources and is intended to provide general information only. A degree of error is inherent in all data sources and maps, therefore all locations and distances should be confirmed by site visit or field survey.

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: December 01, 2023

2021/2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Appendix G

Bat Density Map and Bat Detections within LSA

AltaLink 54L: Bat Habitat - Potential Bat Habitat Trees

Notes

Identification of moderate to high potential bat roosting trees adjacent to the 54L ROW. Surveys were conducted where danger trees were mapped (Appendix A).

Spatial distribution modeled using Kernel Density function with a 200m search radius.

Legend

- Bat Observation
- Current Structures
- Regional Study Area (RSA)
- Local Study Area (LSA)
- BNP Boundary

Kernel Density - Potential Bat Habitat Trees

Lower — Higher

*Darker shade indicates higher potential

1:30,000

0 0.5 1 2 km

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: June 03, 2024

2021/2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Note: Bat detections via ultrasonic recording devices over a two-week period placed at two wetlands within the LSA. The temperature and time that bats started calling on each night relative to sunset are provided.

Date 2023	Structure[1]	Sunset	Bat Calling Start Time	Temp Initial (° C)
09-May	220	9:17 PM	None	8 (rain)
10-May	220	9:18 PM	None	10
11-May	220	9:20 PM	None	12
12-May	220	9:21 PM	10:07 PM	17
13-May	220	9:23 PM	10:07 PM	20
14-May	220	9:24 PM	10:19 PM	20
15-May	220	9:26 PM	10:23 PM	22
16-May	220	9:27 PM	10:13 PM	16
18-May	313-314	9:30 PM	10:03 PM	16
19-May	313-314	9:32 PM	10:13 PM	21
20-May	313-314	9:33 PM	10:13 PM	20
21-May	313-314	9:34 PM	10:07 PM	18
22-May	313-314	9:36 PM	10:07 PM	9
23-May	313-314	9:37 PM	10:08 PM	11

[1] Structure 220 = wetland; 313-314 = wetland area to the southwest of structures; see Appendix A and I for locations.

Appendix H

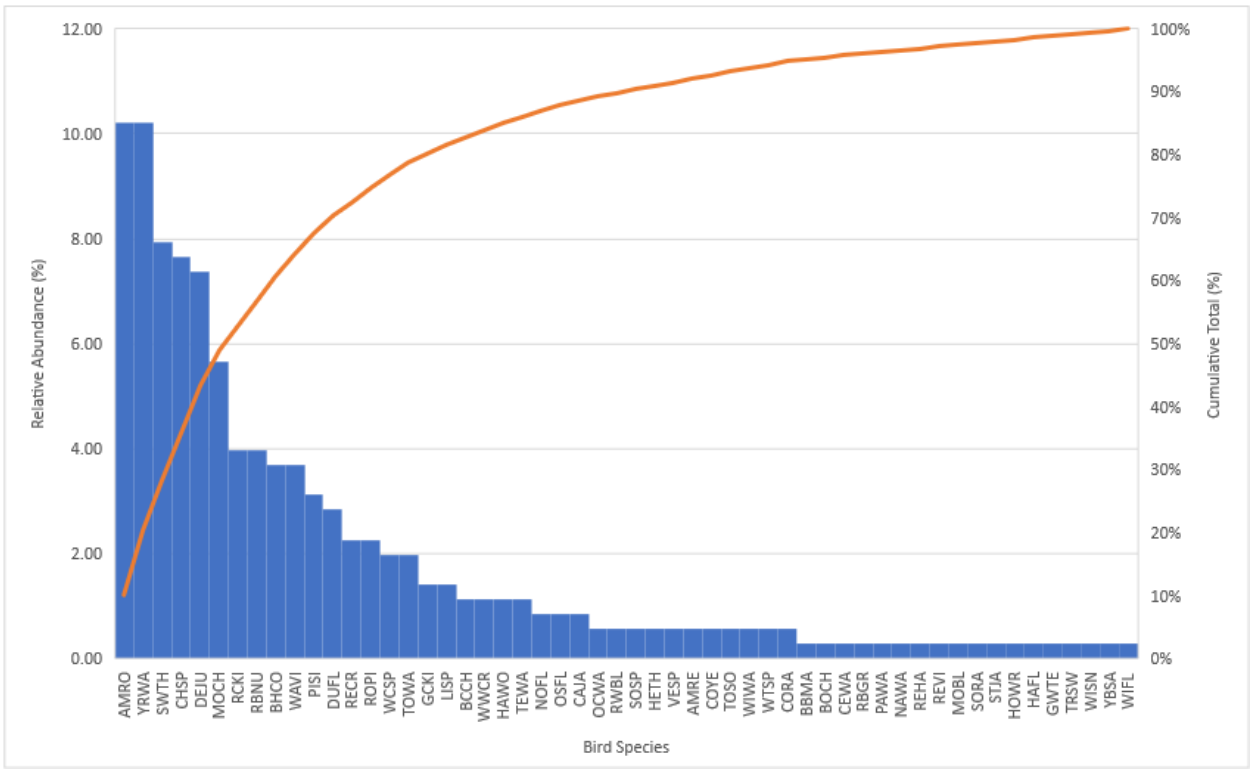
Relative and species abundance of breeding bird species in the LSA

Note: Highlighted rows in table indicate listed species.

Common Name*	# of Plots	# of Detections	Species Abundance (Detections/ 40 ha)	Relative Abundance (%)
American Redstart	2	2	0.05	0.57
American Robin	24	36	0.90	10.20
Black-billed Magpie	1	1	0.03	0.28
Black-capped Chickadee	3	4	0.10	1.13
Brown-headed Cowbird	8	13	0.33	3.68
Boreal Chickadee	1	1	0.03	0.28
Canada Jay	2	3	0.08	0.85
Cedar Waxwing	1	1	0.03	0.28
Chipping Sparrow	20	27	0.68	7.65
Common Raven	2	2	0.05	0.57
Common Yellowthroat	2	2	0.05	0.57
Dark-eyed Junco	21	26	0.65	7.37
Dusky Flycatcher	8	10	0.25	2.83
Golden-crowned Kinglet	5	5	0.13	1.42
Green-winged Teal	1	1	0.03	0.28
Hammond's Flycatcher	1	1	0.03	0.28
Hairy Woodpecker	4	4	0.10	1.13
Hermit Thrush	2	2	0.05	0.57
House Wren	1	1	0.03	0.28
Lincoln's Sparrow	5	5	0.13	1.42
Mountain Bluebird	1	1	0.03	0.28
Mountain Chickadee	15	20	0.50	5.67
Nashville Warbler	1	1	0.03	0.28
Northern Flicker	3	3	0.08	0.85
Orange-crowned Warbler	2	2	0.05	0.57
Olive-sided Flycatcher	3	3	0.08	0.85

Pennsylvania Warbler	1	1	0.03	0.28
Pine Siskin	9	11	0.28	3.12
Rose-breasted Grosbeak	1	1	0.03	0.28
Red-breasted Nuthatch	9	14	0.35	3.97
Ruby-crowned Kinglet	14	14	0.35	3.97
Red-winged Crossbill	4	8	0.20	2.27
Red-tailed Hawk	1	1	0.03	0.28
Red-eyed Vireo	1	1	0.03	0.28
Rock Pigeon	1	8	0.20	2.27
Red-winged Blackbird	2	2	0.05	0.57
Sora	1	1	0.03	0.28
Song Sparrow	2	2	0.05	0.57
Steller's Jay	1	1	0.03	0.28
Swainson's Thrush	21	28	0.70	7.93
Tennessee Warbler	4	4	0.10	1.13
Townsend's Solitaire	2	2	0.05	0.57
Townsend's Warbler	7	7	0.18	1.98
Tree Swallow	1	1	0.03	0.28
Vesper Sparrow	2	2	0.05	0.57
Warbling Vireo	9	13	0.33	3.68
White-crowned Sparrow	5	7	0.18	1.98
Willow Flycatcher	1	1	0.03	0.28
Wilson's Snipe	1	1	0.03	0.28
Wilson's Warbler	2	2	0.05	0.57
White-throated Sparrow	2	2	0.05	0.57
White-winged Crossbill	4	4	0.10	1.13
Yellow-bellied Sapsucker	1	1	0.03	0.28
Yellow-rumped Warbler	28	36	0.90	10.20
LSA	**51**	**353**	**8.83**	**100**

* Highlighted rows in table indicate listed species.


12.00
10.00
8.00
6.00
4.00
2.00
0.00
Relative Abundance (%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Total (%)
AMRO YRWA SWTH CHSP DEJU MOCH RCKI RBNU BHCO WAVI PISI DUFL RECR ROPI WCSP TOWA GCKI LISP BCCH WWCR HAWO TEWA NOFL OSFL CAJA OCWA RWBL SOSP HETH VESP AMRE COYE TOSO WIWA WTSP CORA BBMA BOCH CEWA RBGR PAWA NAWA REHA REVI MOBL SORA STJA HOWR HAFL GWTE TRSW WISN YBSA WIFL
Bird Species

Appendix I

Amphibian detections within the LSA (Auditory/visual surveys, incidental observations 2023)

Note: Highlights indicate amphibian presence within the LSA, listed species are provided in bold; surveys were also conducted in June 2020, but no amphibians were recorded.

Span	UTM (Nad 83)	Visual Survey (2023)				Auditory Survey (2023)					Incidental (Date)
		01-May	02-May	09-May	10-May	01-May	09-May	10-May	12-May	May 9-17[1]	
207-209	611320 E 5667031 N	NS[2]	None	WOFR[3]	NS	NS	NS	NS	NS	NS	-
211-212	610901 E 5667510 N	NS	None	None	NS	NS	NS	NS	NS	None	**WETO[4] (2020)**
220	609968 E 5668512 N	NS	None	None	NS	NS	NS	NS	NS	WOFR[5]	-
247	607197 E 5671238 N	NS	NS	NS	NS	NS	NS	NS	NS	NS	**WETO (Jul 21 2023)**
267-268	605008 E 5673272 N	NS	NS	NS	NS	NS	NS	NS	NS	NS	**WETO (Ju 15 2023)**
269-270	604715 E 5673333 N	NS	NS	None	None	NS	None	None	None	NS	**WETO (Ju 15 2023)**
286	602638 E 5672328 N	None[6]	NS	NS	NS	None[4]	NS	NS	NS	NS	-
313-314	600257 E 5671648 N	None	NS	NS	None	None	NS	None	None	NS	-

[1] Auditory recording device

[2] NS = not sampled

[3] Wood frog (WOFR) egg masses detected, no further surveys

[4] WETO = western toad

[5] Wood frog (WOFR) multiple individuals calling

[6] Location was only surveyed once (visual and auditory) due to low potential for amphibians

Appendix J

Parks Canada amphibian observations within 500 m of ROW (2016-2019, 2021, 2022)

Note: listed species are provided in bold.

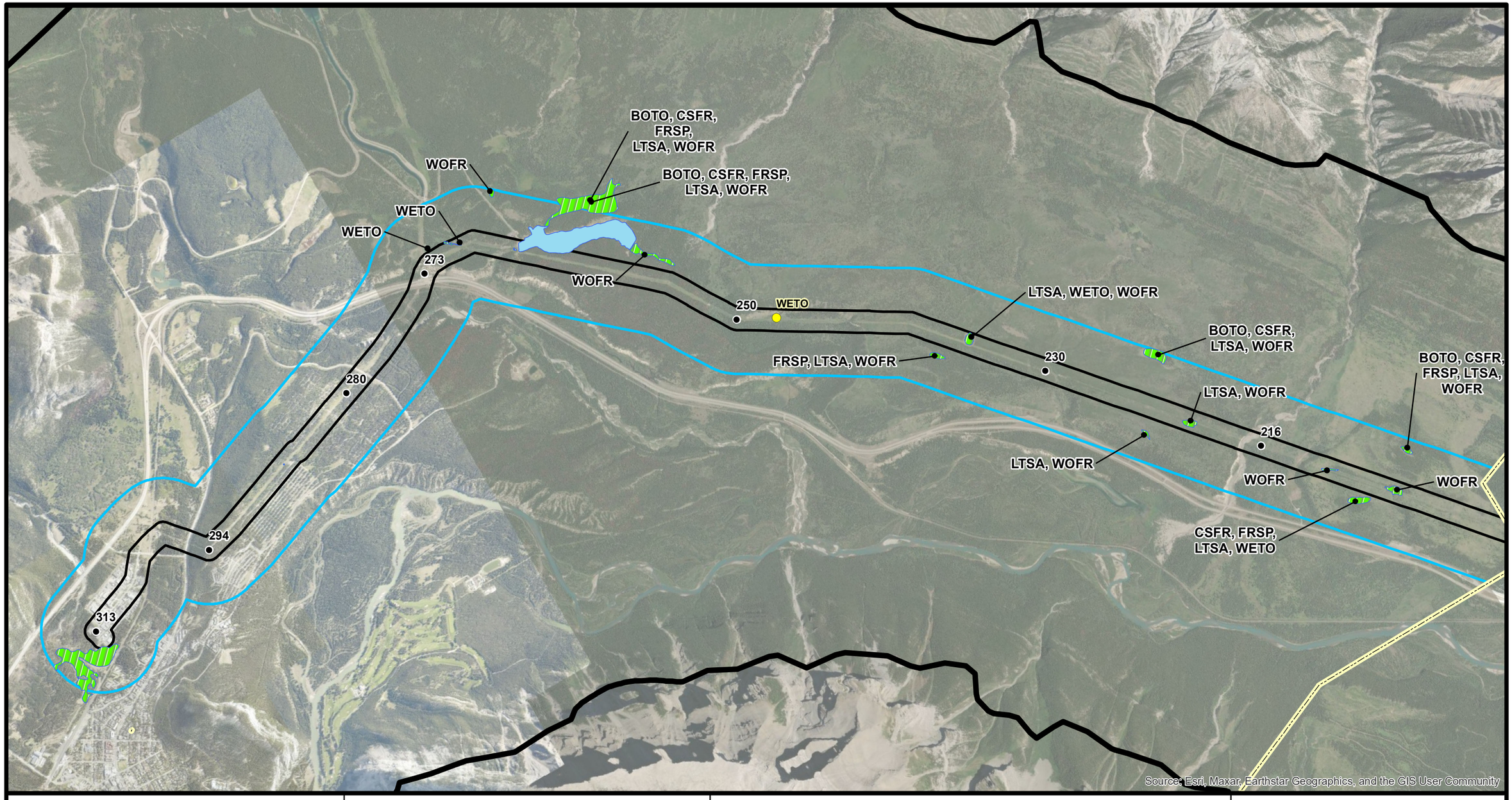
Span	Location Description	UTM (NAD 83)	Species[1] (years detected[2])
207-208	Wetland ~350 m W of ROW	611586 E 5667275 N	WOFR (2016-2019, 2021) **CSFR** (2016-2018, 2021) **WETO** (2017) **LTSA** (2016, 2021)
208-209	Wetland ~150 m W of ROW	611050 E 5667098 N	WOFR (2016-2019, 2022) **CSFR** (2018, 2022) **LTSA** (2016, 2018, 2022)
222-223	Wetland ~200 m SW of ROW	609608 E 5668597 N	WOFR (2016-2019) **LTSA** (2016, 2018)
223-224	Wetland ~400 m NE of ROW	610083 E 5669114 N	WOFR (2016, 2017, 2019) **CSFR** (2021) **WETO** (2018) **LTSA** (2016, 2021)
235	Wetland on ROW	608599 E 5670152 N	WOFR (2016-2019) **LTSA** (2016, 2018)
236-237	Wetland ~200 m W of ROW	608322 E 5670188 N	WOFR (2016, 2017, 2022) **CSFR** (2016) **LTSA** (2016, 2018, 2022)
261	Wetland ~475 m NE of ROW	606137 E 5673000 N	WOFR (2016-2019, 2021) **CSFR** (2016-2019, 2021) **WETO** (2016-2019, 2021) **LTSA** (2016, 2018, 2019, 2021)
263-264	NW end of Johnson Lake	605717 E 5673058 N	WOFR (2016-2019, 2021) **CSFR** (2018) **WETO** (2016, 2018) **LTSA** (2021)
266	Vernal pool ~450 m NE of ROW	605504 E 5673547 N	WOFR (2022)

[1]WOFR = wood frog, CSFR = Columbia spotted frog, WETO = western toad, LTSA = long-toed salamander

[2]No data collected in 2020

Appendix K

Map of amphibians based on PC and 2023 field data within 500 m of ROW



AltaLink 54L

Amphibians within 500m of ROW and RSA

Amphibian Codes

BOTO - Boreal Toad
CSFR - Columbia Spotted Frog
FRSP - Frog species (unidentified)
LTSA - Long-Toed Salamander
WETO - Western Toad
WOFR - Wood Frog

Legend

- AltaLink 54L Structures (selected)
- Incidental Observation
- Lake
- Wetlands
- 500m Buffer
- Local Study Area (LSA)
- Regional Study Area (RSA)
- BNP Boundary

1:35,000
0 0.5 1 2 km

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: June 03, 2024

2021/2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Appendix L

Waterbodies within the LSA along the AltaLink 54L transmission line

Note: The highlighted rows are waterbodies or dry channels that need to be crossed during construction, bold indicates species at risk

Span	Waterbody; Winter flow type	Aquatic community [1] (fish, amphibians)	Hydrological Connectivity to Bow River [2]	Aquatic habitat and hydrological features[3]	Proposed Winter Access Methods
207- 208	Wetland	WOFR[(a)]	N	Graminoid fen, seasonal isolated pools; **BLTR CH [(b)]**	Snow road
208- 212	Unnamed Creek; dry	None	N	Ephemeral (dry at time of survey); channel gradient 2.3%(H); bankfull width ~14 m; overgrown grasses, willow, CWD in creek bed (no substrate); S, vegetated banks, M-H sloped banks; riparian spruce, pine, buffaloberry, juniper, willow	No machine crossing
211- 213	Wet depression	**WETO**[(a)]	N	Surface depression; ephemeral	Snow road
216- 217	Carrot Creek; visible flow	BKTR, BRTR[(c,e)]	A	Perennial floodplain, meandering/braided channels; channel gradient 1.2% (M); bankfull width ~60 m, wetted width 5 m; water depth 0.19 m (Jul), velocity 2.2 m/s; riffle habitat with some pools; substrate C (50%), B (25%), G (18% mainly at ROW crossing and 200 m DS), S/F (7%); low % UCB/OHV; H-E sloped, U, high banks (>20m DS from ROW); gentle approach slopes; riparian poplar, wolf willow and avens sp.; **BLTR CH 216-217[(b)]**	No machine crossing
219- 221	Wetland (marsh)	WOFR, snails [(a)]	N	Marsh with seasonal isolated pools; **BLTR CH 219-221[(b)]**	Snow road (install/ salvage str)

229-230	Morrison Coulee; dry	None	N	No flow (for 10+ years); channel not defined, disappears completely ~40m south of ROW; 1.7% channel gradient; bankfull width 2.0 m; vegetated creek bed (no substrate); low bank, H sloped and S banks; gentle approach slope; riparian grasses, buffaloberry, rose, willow, potentilla, bearberry; **BLTR CH 216-217**[(b)]	Snow fill
235-236	Wetland (marsh)	**LTSA**, WOFR[(d)]	N	Marsh with seasonal isolated pools; **BLTR CH 235-236**[(b)]	No machine crossing
250-252	Girouard Creek; dry on ROW	None (BKTR, **WETO** DS of LSA[(a,e,f)])	S	Ephemeral creek (no flow within 300 m of ROW for 3+ years), irregular and undefined channel; 0.3% channel gradient; bankfull width 1.9 m; substrate C and shrubs/saplings in creek bed; H sloped, S, low banks; gentle approach slope on ROW; riparian grasses, rose, spruce, dogwood, juniper, poplar, wolf willow; **BLTR CH 251-252**[(b)]	Snow fill
261-265	Johnson Lake; frozen	**CSFR, LTSA, WETO,** WOFR[(d)]; WHSU	A , S	Lake outlets into Girouard Creek from SE end and joins Bow River during high water/flood events (2013); outlets into Anthracite creek from west end and joins BR all seasons; steep approach slopes; **BLTR CH 261-265**[(b)]	No machine crossing
264-265	Wetland (manmade graminoid fen)	Potential for amphibians[(g)]	N	Manmade graminoid fen, seasonal isolated pools; **BLTR CH 264-265**[(b)]	One-time ford (bridge installation)
264-265	Anthracite Creek; visible flow	BKTR, BRTR[(c,e,h)] DS of barrier; WHSU	A	Perennial; channel gradient 2.4%; bank-full width 3.9 m; wetted width 3.7 m (Au); water depth 0.26 m (Au); velocity 0.51 m/s; habitat run/riffle; substrate C (78%), boulder (20%), sand/gravel (2%); 10% OHV; banks U, slope H, height H; very steep approach slopes; riparian: poplar, aspen, spruce, horsetail, buffaloberry; **BLTR CH 264-265**[(b)]	Permanent bridge

267-268	Unnamed Creek; unknown	**WETO**[a]; not fish-bearing	A	Perennial; channel gradient 3.4%; bankfull width 1.2 m; wetted width 0.9 m; water depth 0.03 m (Oct); run habitat; substrate C (%35), F (%63), G (2%); instream cover and OHV; banks S below ROW, slope E, height L; gentle approach slopes; riparian: sedge grass, willow, spruce, balsam poplar, juniper, buffaloberry, rose, horsetail, black current, thistle, wolf willow, potentilla, clover	Access mat
269-270	Wetland artifact north of ROW	**WETO**[a]	A	Wetland artifact, seasonal isolated pools; connected to braided creek system	No machine crossing
275-276	Cascade Creek; visible flow	None (BKTR, BRTR, **BLTR**, MNWH, CT DS of LSA [c,e,i])	A	Perennial regular meandering creek; channel gradient 0.9%; bankfull width 17 m; wetted width 11 m (Jun); ave. water depth 0.24 m (Jun); ave. velocity 0.74 m/s (0.37 m/s on ROW) (Jun 2020); discharge 1m^3/s; riffle, run, pool habitat; substrate: C (40%), F (25%), S (20%), G (10%) with some B; OHV and WD; RDS banks E, U, H height, LDS banks H, S, L-M height; gradual approach slopes; riparian salix sp., horsetail, poplar, potentilla, rose, grass, spruce; **BLTR CH 275-276**[b]	No machine crossing
Access 6	Cascade Creek; visible flow	None (BKTR, BRTR, **BLTR**, MNWH, CT DS of LSA [c,e,i])	A	Perennial regular meandering creek; channel gradient 2.4%; bankfull width 11.9 m; wetted width 8.4 m (Au); ave. water depth 0.55 m (Au); ave. velocity 0.39 m/s (Au); discharge 1m^3/s; riffle, run, pool habitat; substrate: C (60%), F (33%), G (7%); OHV, WD; banks U, slope H, height L; gradual approach slopes; riparian: rose, Oxeye daisy, wolf willow, fireweed, strawberry, rose, grass, spruce, balsam, aster, potentialla, yarrow, bluebell; **BLTR CH** [b]	Temporary (project duration); permanent hard-ford (long-term)
286-287	Wet depression	None	N	Surface depression; ephemeral	Snow road

297-298	Whiskey Creek tributary; dry	None (BKTR, **BLTR** downstream of LSA[a, e])	S	Ephemeral creek (no flow for 10+ years); may flow into Whiskey and Forty Mile Creek during periods of high flow; channel gradient 1.6%; bankfull width 5 m; no substrate (vegetated, WD, moss); bank slope H, S (vegetated), M height; gradual approach slopes; riparian: aspen, spruce saplings 1-2m tall, juniper, bearberry, buffaloberry; no defined riparian zone; **BLTR CH 298-299[b]**	No machine crossing

[1] Species listed is based on electrofishing/fish habitat surveys 2023, amphibian surveys 2023, literature review, background information; see list of abbreviations for fish and amphibians on page vii

Sources and Species info:

[a)] Field data collected 2020, 2023; [b)] DFO critical habitat layer; [c)] PCA Fish chart; [d)] PCA amphibian data 2016-2022;

[e)] Other fish species that occur in the Bow River may be found in this waterbody due to hydrological connectivity, including listed species

[f)] BKTR, WETO were recorded >350 m south of ROW in ephemeral creek channel.

[g)] Not surveyed for amphibians, but potential for occurrence due to suitable habitat

[h)] Fish barrier located ~160 m downstream from ROW

[i)] Fish barriers located upstream at Minnewanka dam and ~350 m downstream from ROW

[2] Connectivity to Bow River: All Season (A); Seasonal (S); N (None); U (Unknown).

[3] Fines (F; silt/clay), sand (S; <0.2cm), gravel (G; 0.2-5 cm), cobble (C; 5-25cm), boulder (B; >25cm), bed rock (BR; solid rock, not loose); woody debris (WD); submerged vegetation (SV); aquatic vegetation (AV); Overhead vegetation (OHV); Undercut banks (UCB); RDB – right downstream bank; LDB – left downstream bank; ROW – Right-of-Way; Bank Slope: L – Low (<10°), M – Moderate (10-20°), H - Steep (20-45°); E - Extreme (>45°), Bank Stability: U-Unstable; S-Stable; Bank Height: L - Low (<1m), M - Moderate (1-2m), H - High (>2 m); Low Upstream (US); Downstream (DS); Channel Gradient: Low = 0-0.5%(L), medium = 0.51-2%(M), high = 2+%(H)

Appendix M

Electrofishing results in Carrot and Girouard Creeks (Fish Sampling 2023)

Creek Name	Survey Date	Electrofishing Effort (sec)	Fish Species[1] (No. captured)	Fork Length (mm)		Weight (g)	
				Ave.	Range	Ave.	Range
Carrot	11-May	2097	None	N/A	N/A	N/A	N/A
Girouard[2]	25-Jul	704	BKTR (20) [3]	115.5	20-200	24.2	1.5-100

[1] BKTR: Brook Trout

[2] Note: Electrofishing was conducted >350 m downstream of ROW

[3] Note: Many fish missed due to survey limitations.

Appendix N

Physical characteristics of proposed watercourse crossing locations

(Field Surveys 2020, 2023)

Creek Name	Pole Spans	Avg. Channel Gradient (%)	Mean Bankfull Width (m)	Mean Wetted Width (m)	Mean Water Depth (m)*	Maximum Water Depth (m)*
Unnamed Creek (dry on ROW)	208-212	2.3	17.2	N/A	0.0	0.0
Carrot Creek	216-217	1.2	63.0	5.6	0.17 (Jul 2023)	0.22 (Jul 2023)
Morrison Coulee (dry on ROW)	229-230	1.7	1.7	N/A	0.0	0.0
Girouard Creek (dry on ROW)	250-252	0.3	1.9	N/A	0.0	0.0
Anthracite Creek (Johnson Lake outlet)	264-265	2.4	3.9	3.7	0.14 (Aug 2020)	0.35 (Aug 2020)
Unnamed Creek	267-268	3.4	1.2	0.9	0.03 (Oct 2020)	0.09 (Oct 2020)
Cascade Creek (ROW)	275-276	0.9	16.9	10.7	0.40 (Jun 2023)	0.44 (Jun 2023)
Cascade Creek (Access 6)	N/A	2.4	11.9	8.4	0.83 (Aug 2020)	1.05 (Aug 2020)
Whiskey Creek Tributary (dry on ROW)	297-298	1.6	4.6	N/A	0.0	0.0

* Average measurement where ROW crosses channel.

Appendix O

Water quality parameters of watercourses along 54L

(Fish Habitat Assessments 2023)

Watercourse[1]	Structure Span	Survey Date	Water Temperature (°C)	Dissolved Oxygen (mg/L)	pH	Conductivity (µs/cm)	Turbidity (NTU)
Carrot Creek	216-217	17-May	7.2-12.7	10.5	8.22	450.8	4.3
Girouard Creek[3]	244-251	25-Jul	8.4	9.69	8.19	309.7	0.43
Unnamed Creek	267-268	12-May	5.0	10.95	8.29	334.3	-0.5
Cascade Creek	275-276	24-Jul	13.1[2]	8.89	8.33	303.2	0.79

[1] Note: Water Quality was not measured in three watercourses (unnamed creek between strs 208 and 212, Whiskey Creek tributary between strs 297 and 298) as they are ephemeral channels; no data available for Anthracite Creek.

[2] Possible equipment calibration error.

[3] Girouard Creek: measurements taken 350 m downstream of ROW.

Appendix P

Evaluation of DFO Critical Habitat for bull trout in watercourses along 54L

(Note: N/A = Not applicable; N/S = Not surveyed/measured).

Watercourse	Gradient	Water Depth (m)	Substrate[4]	Cover	Habitat Types	Velocity (m/s)	Turbidity (NTU)	Temp (°C)	Instream DO (mg/L)	Critical Habitat Suitability (Y/N)[3]
Carrot Creek	1.20%	0.19 (Jul)	C,B; some G	UCB, low OHV	riffle w/ some pool	2.2	4.3	7.2-12.7 (May-Aug)	10.5	N
Morrison Coulee	1.70%	0	Vegetated, no substrate	N/A	N/A	N/A	N/A	N/A	N/A	N
Girouard Creek	0.30%	0	some C, vegetated	N/A	N/A	N/A	0.43[1]	8.4[1] (Jul)	9.69[1]	N
Johnsons Lake	N/A	N/A	N/A	N/A	lake	N/A	N/S	N/S	N/A	N
Anthracite Creek	2.40%	0.26 (Aug)	C, some B	OHV	run, riffle	0.52	N/S	6 (Aug)	N/S	Y
Cascade Creek 275-276	0.90%	0.24 (Jun)	C, S,F; some G	OHV, WD	run, riffle	0.74	0.79	13.1[2] (Jul)	8.89	N
Cascade Creek Access 6	2.90%	0.56 (Aug)	C, F; some G	OHV, WD, rock	run, riffle, pools	0.39	N/S	N/S	N/S	N
Whiskey Creek tributary	1.60%	0	Vegetated, no substrate	N/A	N/A	N/A	N/A	N/A	N/A	N

[1] Measurements collected ~350 m downstream (DS) of ROW.

[2] Possible equipment error

[3] Critical habitat suitability was assessed after comparing attributes collected on-site with characteristics of Bull Trout critical habitat (see explanation below).

[4] Fines (F; silt/clay), sand (S; <0.2cm), gravel (G; 0.2-5 cm), cobble (C; 5-25cm), boulder (B; >25cm), bed rock (BR; solid rock, not loose); woody debris (WD); submerged vegetation (SV); aquatic vegetation (AV); Overhead vegetation (OHV); Undercut banks (UCB).

When comparing the above parameters with BLTR Critical Habitat attributes, the following assessments were made:

- Carrot Creek does not fit characteristics of BLTR CH due to its high velocity, highly erodible banks, turbid water, high water temperature in August (too high for spawning), and the banks lack overhanging vegetation.
- Morrison Coulee, Girouard Creek, and Whiskey Creek tributary do not meet the characteristics of BLTR CH as they are dry year-around on the ROW (and have likely been dry for over 10 years based on height of vegetation growth in the dry channel), and they do not have spawning/rearing/over-wintering substrate.
- Johnson Lake does not fit characteristics of BLTR CH as the lake has an artificial fish barrier ~140 m DS of the ROW, fish have been removed from the system in 2016 due to Whirling disease, and the only fish known to occur are white suckers.
- Anthracite Creek may meet the characteristics of bull trout critical habitat below the fish barrier (~140m DS of ROW) based on low water temperature, low turbidity, smaller-sized cobble substrate (5-15cm), low velocity back-waters further downstream, over-head vegetation and cobble cover, run/riffle habitat type, potential for groundwater upwellings downstream, and potential connectivity between spawning and rearing habitat. Although the watercourse is not fish-bearing where the ROW crosses, the Project may affect fish populations downstream depending on magnitude and duration of release (i.e. sediment release from bridge installation/fording).
- Currently Cascade Creek does not qualify as BLTR CH as it has artificial fish barriers 350 m DS of the ROW (from access 6). Parks Canada plans on releasing WSCT in 2024/2025 and will possibly release other fish species after the WSCT population becomes established; therefore, it may meet BLTR CH characteristics in the future.

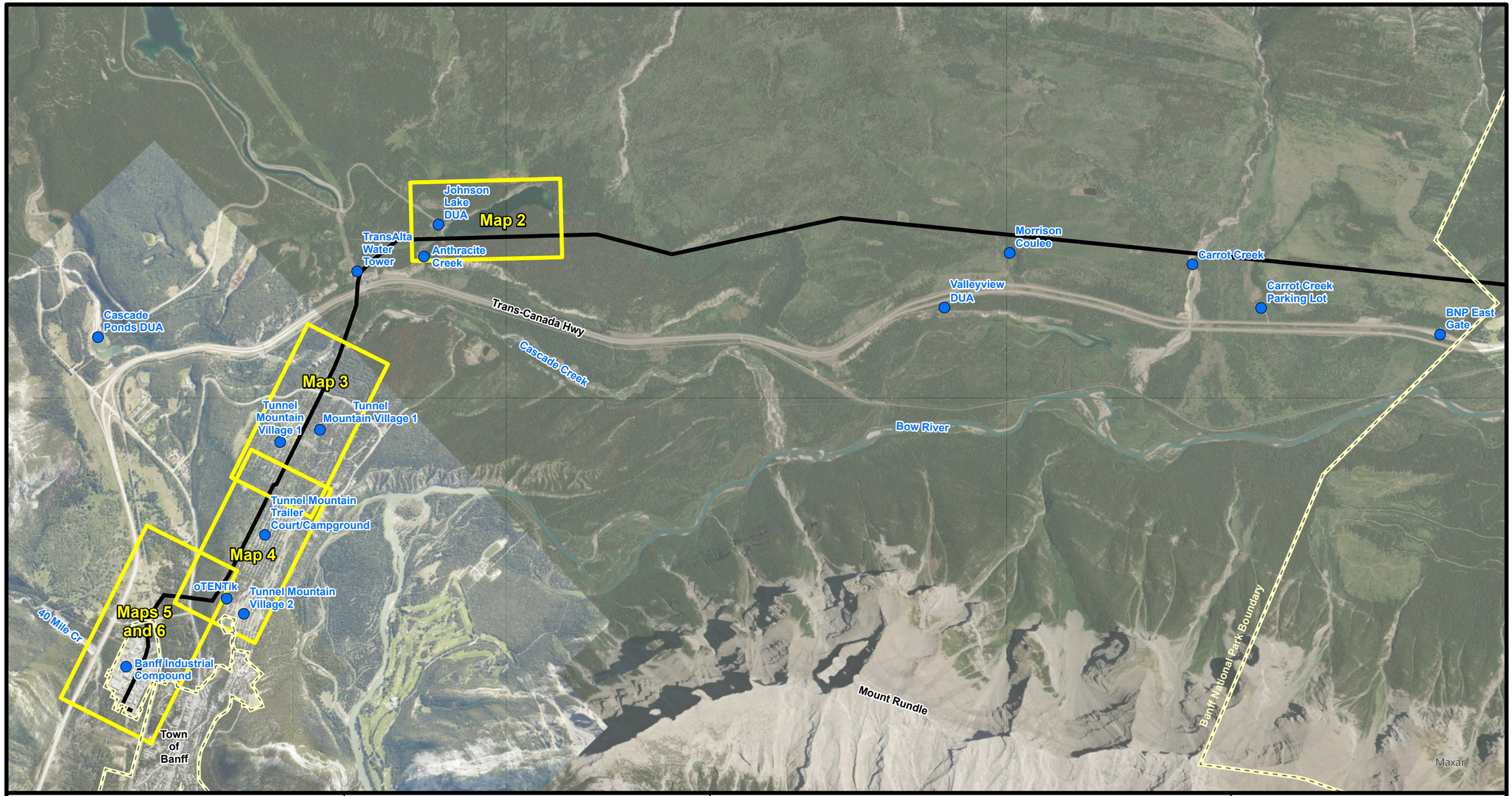
Appendix Q

Summary of the biophysical functions, features, and attributes of critical habitat necessary for each life stage of the Bull Trout (Sawatzky 2016, DFO 2020a)

Life Stage	Function	Feature(s)	Attribute(s)	Summary CH
Adult	•Reproduction	•Interstices of bottom substrate in small tributary streams; redds found around perennial groundwater upwellings •Spawning occurs late September to October; eggs hatch April	•High gradient streams (1.0 to 15.6%) •Spawning depth range: 0.07 to 0.93 m •Incubation depth range: 0.1 to 0.2 m •Substrate: gravel/cobble dominated substrate; 2.0 to 200 mm •Cover: overhanging vegetation, undercut banks, large woody debris, root wads; redds constructed along river margins. •Run habitat; low gradient and flood plain sections •Velocity: 2 to 99 cm/s •Turbidity: 0.1 to 1.0 NTU •Oxygen: Inter-gravel 8 to 12 mg/L, mean 9 mg/L; Instream 10 to 11.5 mg/L, mean 10 mg/L •Water temp: Spawning 5 to 9°C; Incubation 1.2 to 5.4°C; perennial groundwater upwellings	•Unimpeded access to spawning areas •Gravel/cobble dominated substrate; perennial groundwater upwellings •Minimal disturbances, low levels fine sediment
Fry to Parr (to age one)	•Nursery •Cover •Feeding •Overwintering	•Shallow shoreline pools and riffles of side channels; deeper pools; interstices of bottom substrate; overwinter with perennial groundwater	•Depth range: 0.07 to 0.93 m •Substrate: cobble and boulder, silt •Cover: overhanging vegetation, undercut banks, large woody debris, gravel substrate, boulders, small wood, cobble, velocity breaks •Velocity: low velocity backwaters, side channels; Nose Velocity: 0 to 0.1 m/s; upper limit: 0.33 m/s •Bottom velocity: 0.05 to 0.15 m/s; upper limit: 0.23 m/s •Water temp: 2 to 20°C; ultimate upper incipient lethal temp (UUILT) 20.9°C (60 days), 23.5°C (7 days) •Pool and run habitats •Connectivity between spawning sites/ rearing locations	•Low velocity backwaters and side channels; pool and run habitats •Adequate cover (intact riparian zone) •Seasonal and perennial groundwater upwellings •Connectivity between spawning sites and rearing locations
Juvenile (age one to sexual maturity at approx. age five) and Adult	•Feeding •Cover •Overwintering	•Higher gradient habitats, shallow pools and riffles; interstices of bottom substrates; overwinter in isolated pools, perennial groundwater upwellings •Adfluvial populations: pools, riffles, runs, lakes	•Gradient: 1.0 to 15.6% •Depth: deeper water during the day and shallower water (littoral zone, runs, channel margins, backwaters) at night; pools associated with groundwater input for overwintering •Substrate: cobble, boulder, silt (juveniles), rubble, sand (night) •Oxygen: acute limit ≥2 mg/L; likely the same for juveniles and adults •Cover: overhanging vegetation, undercut banks, large woody debris, substrate, boulders, root wads (juveniles), velocity breaks (juveniles), deep-water habitat; diel shifts to habitats without cover at night; •Water temp: < 12°C; UUILT lower than for yoy; max daily-max temp 12°C, max weekly-max temp 11°C; average max summer temp 17°C •Fluvial Bull Trout migrate to overwintering areas; require well-connected habitat •Velocity (Juvenile): Nose velocity: 0.05 to 0.25 m/s, upper limit: 0.48 m/s; Bottom velocity: 0.20 to 0.28 m/s, upper limit: 0.31 m/s, Mean column velocity: 0.0 to 0.20 m/s, upper limit: 0.8 m/s	•Unimpeded access to overwintering areas •Adequate cover (intact riparian zone) •Pools and riffles •Seasonal and perennial groundwater upwellings

Appendix R

Visibility Analysis Maps



Altalink 54L Visibility Analysis

Overview - Key Areas of Interest

Legend

- Point of Interest
- Altalink 54L Transmission Line
- Boundary

0 0.5 1 2 km

Maps

The following maps detail key areas of interest. Please see the included photo simulations for a visual representation of the current and anticipated future conditions at each location.

Map 1 - Overview - Key Areas of Interest
Map 2 - Johnson Lake
Map 3 - Tunnel Mtn Campground East
Map 4 - Tunnel Mtn Campground West
Map 5 - TCH Minnewanka to 40 Mile Creek
Map 6 - Town of Banff and Adjacent Areas

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: March 02, 2025

2021/2023 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 1

Comments: Johnson Lake Day Use Area and Trails
Johnson Lake is a popular and scenic location. A total of 240m of line and two structures are currently visible to the northwest of the lake, concentrated in an open span from structures 264-265. From structures 261-264 portions of an additional 275m of the line and 2 structures are partially visible (very intermittent views) through the trees.

Based on the proposed design and danger tree removal, the open span of line is predicted to increase from 240 to 290m with an additional visible structure. The intermittent visibility from structures 261-264 is expected to increase from 275m to 335m with one additional structure.

Douglas Fir Bench

Johnson Lake DUA

266 (+7.0m) (+8.4m) 265 264 (+8.8m) 263 (+3.9m) (+2.1m) 262 261 260 (+6.9m) (+6.1m) 259 (+6.7m) 258 (+9.7m)

Current Structure 264
Current structure 264 is located at the end edge of the forest and is fully visible from the DUA. The existing tree buffer at this location is very thin (1-2 trees wide) and provides limited screening of the ROW.

The replacement structure will be 8.8m taller and will be placed 39m SE of this location. The remaining tree buffer will provide some partial, but not complete cover for the structure. An additional new structure is proposed west of the Johnson Lake outflow. This structure will be partially obscured by trees, with the upper sections visible to viewers at the main beach area and along the north shore of the lake.

Please see Viewpoints 3 and 4 for photo simulations of existing and proposed conditions.

Maxar

Altalink 54L Visibility Analysis

Johnson Lake Day Use Area and Trails (261-266)

Notes

-Viewer locations were placed in open locations with a potential view of the 54L line. The results are a composite viewshed of the modeled viewer locations.
-Not all sections of 54L are visible from all potential viewer angles.
-The open Douglas fir bench is ~20m higher than the lake surface and provides expansive views of the general area.

Legend

- Proposed Structures
- Existing Structures
- Existing Visibilty
- Existing Visibility (Intermittent)
- Future Visibility
- Official Trail
- Facility or Point of Interest
- Altalink 54L Transmission Line
- 54L Right of Way (ROW)
- Fall Over Analysis - Danger Trees

0 25 50 100 150 200 Meters

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

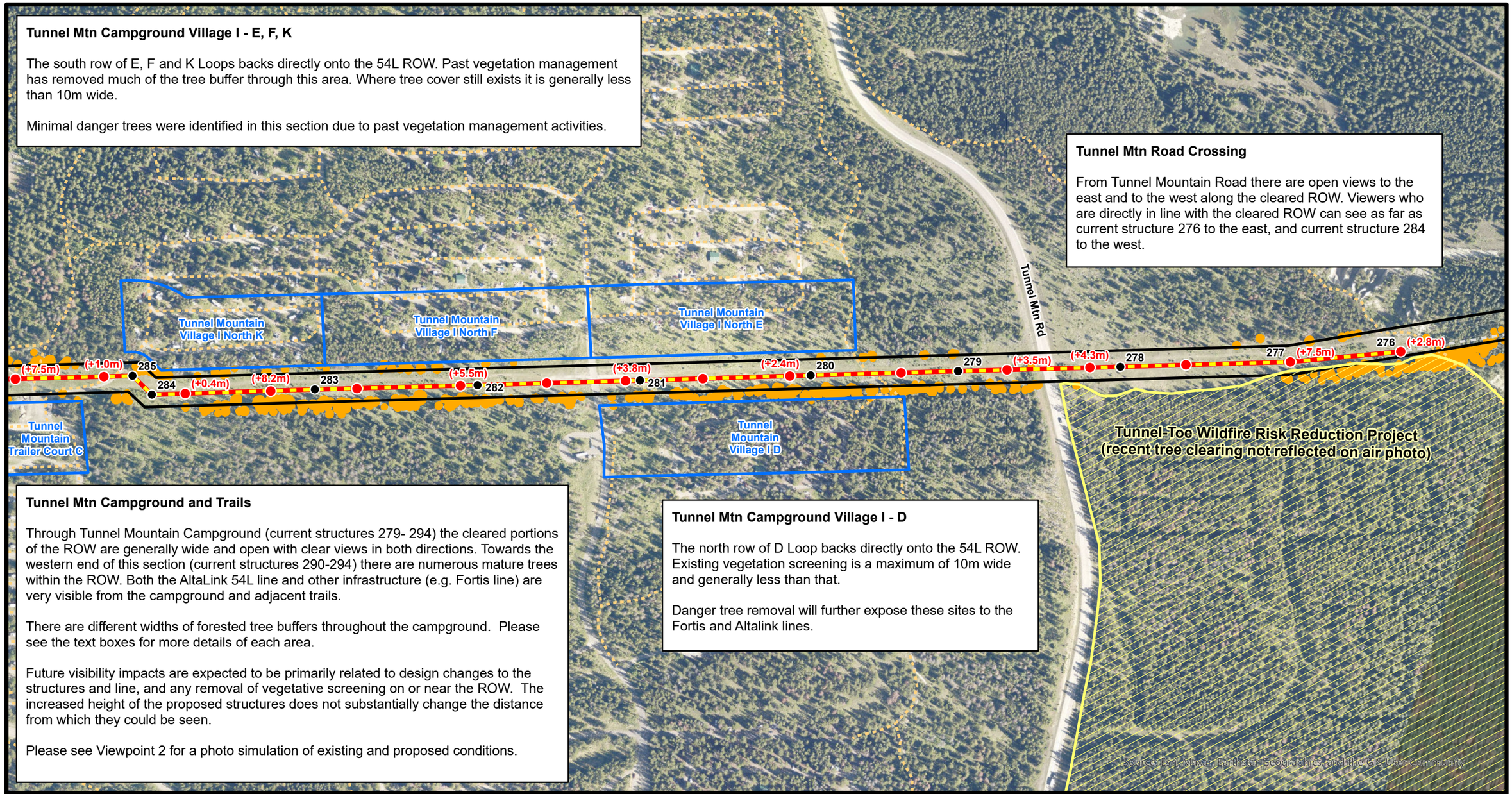
Drawn By: Bruce Gleig

Date: March 04, 2025

2023 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 2



Altalink 54L Visibility Analysis

Tunnel Mountain Campground and Adjacent Areas (276-294) Part 1

Notes

Visibility modeling indicates that the existing and future visibility impacts are primarily confined to campsites, trails, and roads that are immediately adjacent to the ROW. Successive rows of trees in the campgrounds block longer distance views of the 54L transmission line.

Legend

- Existing Structures
- Proposed Stuctures
- Existing and Future Visibility
- Official Trail
- 54L Right of Way (ROW)
- Altalink 54L Transmission Line
- Campground Areas
- Fall Over Analysis - Danger Trees
- Tunnel Toe Wildfire Project Boundary

0 25 50 100 150 200 250 Meters

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

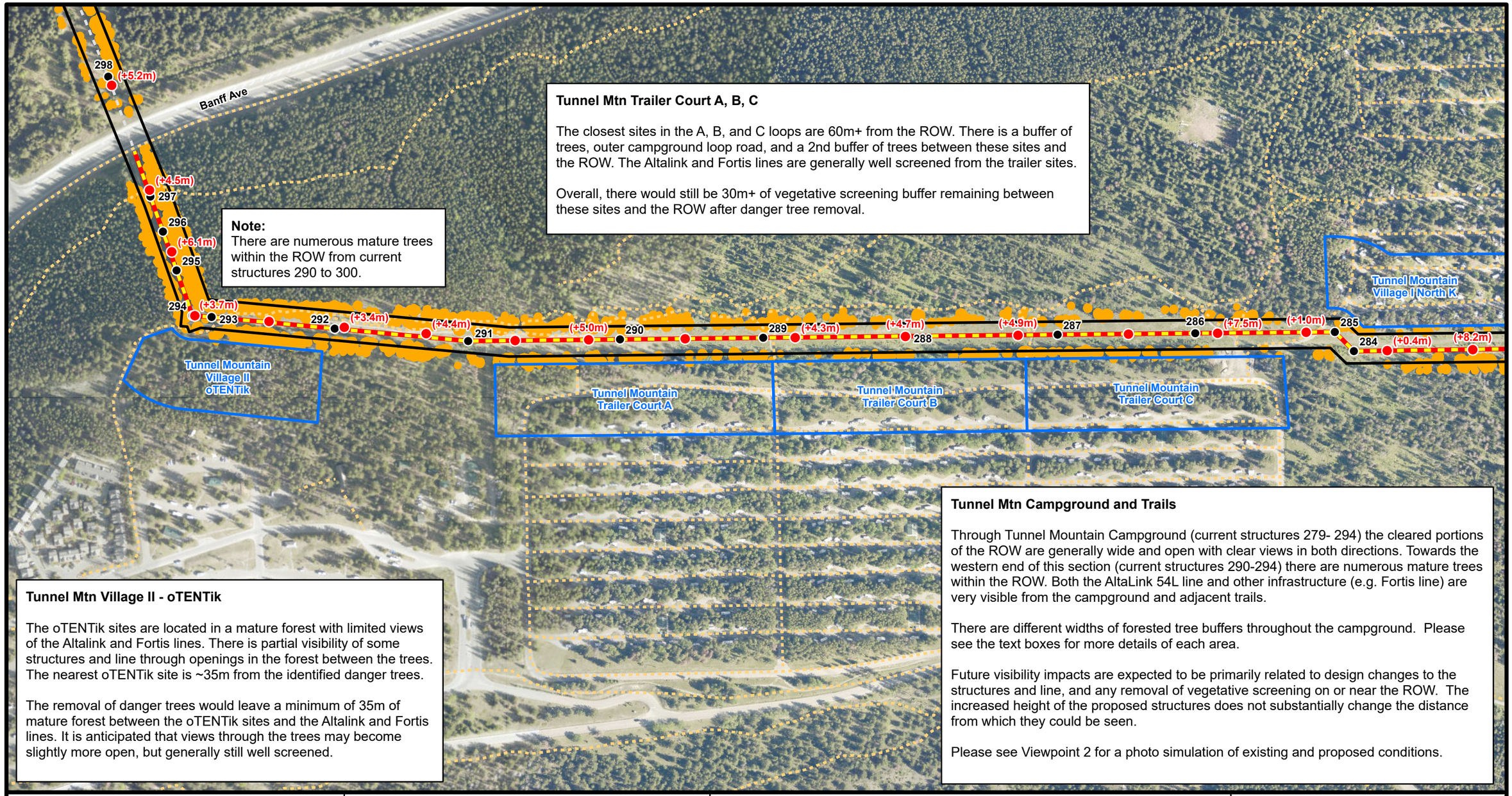
Drawn By: Bruce Gleig

Date: March 25, 2025

2021 Base Imagery

ALTALINK A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 3



Note:
There are numerous mature trees within the ROW from current structures 290 to 300.

Tunnel Mtn Trailer Court A, B, C

The closest sites in the A, B, and C loops are 60m+ from the ROW. There is a buffer of trees, outer campground loop road, and a 2nd buffer of trees between these sites and the ROW. The Altalink and Fortis lines are generally well screened from the trailer sites.

Overall, there would still be 30m+ of vegetative screening buffer remaining between these sites and the ROW after danger tree removal.

Tunnel Mtn Village II - oTENTik

The oTENTik sites are located in a mature forest with limited views of the Altalink and Fortis lines. There is partial visibility of some structures and line through openings in the forest between the trees. The nearest oTENTik site is ~35m from the identified danger trees.

The removal of danger trees would leave a minimum of 35m of mature forest between the oTENTik sites and the Altalink and Fortis lines. It is anticipated that views through the trees may become slightly more open, but generally still well screened.

Tunnel Mtn Campground and Trails

Through Tunnel Mountain Campground (current structures 279- 294) the cleared portions of the ROW are generally wide and open with clear views in both directions. Towards the western end of this section (current structures 290-294) there are numerous mature trees within the ROW. Both the AltaLink 54L line and other infrastructure (e.g. Fortis line) are very visible from the campground and adjacent trails.

There are different widths of forested tree buffers throughout the campground. Please see the text boxes for more details of each area.

Future visibility impacts are expected to be primarily related to design changes to the structures and line, and any removal of vegetative screening on or near the ROW. The increased height of the proposed structures does not substantially change the distance from which they could be seen.

Please see Viewpoint 2 for a photo simulation of existing and proposed conditions.

Altalink 54L Visibility Analysis

Tunnel Mountain Campground and Adjacent Areas (276-294) Part 2

Notes

Visibility modeling indicates that the existing and future visibility impacts are primarily confined to campsites, trails, and roads that are immediately adjacent to the ROW. Successive rows of trees in the campgrounds block longer distance views of the 54L transmission line.

Legend

- Existing Structures
- Proposed Stuctures
- Existing and Future Visibility
- Campground Areas
- Official Trail
- 54L Right of Way (ROW)
- Altalink 54L Transmission Line
- Fall Over Analysis - Danger Trees

0 25 50 100 150 200 250 Meters

N

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

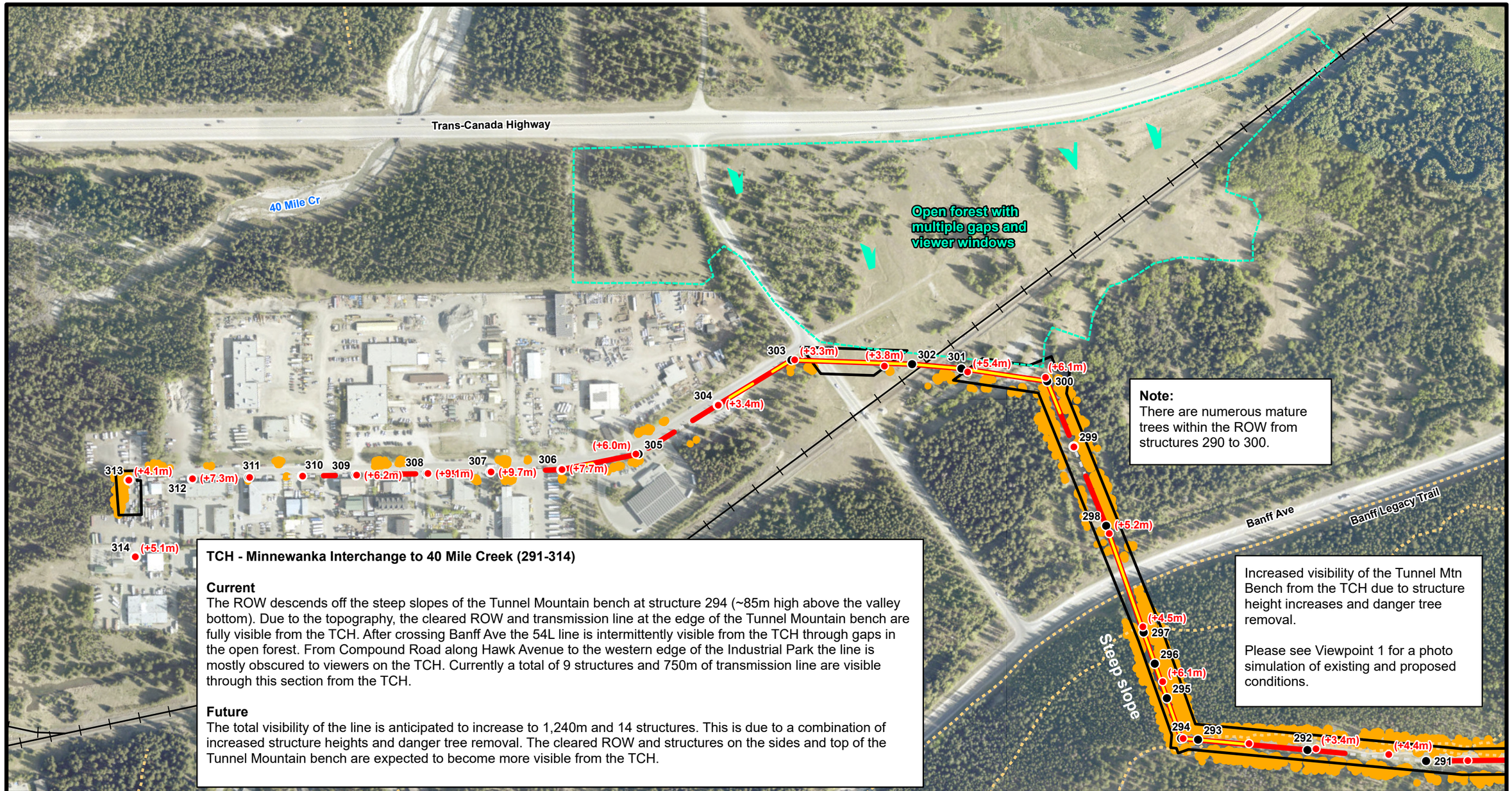
Drawn By: Bruce Gleig

Date: March 02, 2025

2021 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 4



TCH - Minnewanka Interchange to 40 Mile Creek (291-314)

Current
The ROW descends off the steep slopes of the Tunnel Mountain bench at structure 294 (~85m high above the valley bottom). Due to the topography, the cleared ROW and transmission line at the edge of the Tunnel Mountain bench are fully visible from the TCH. After crossing Banff Ave the 54L line is intermittently visible from the TCH through gaps in the open forest. From Compound Road along Hawk Avenue to the western edge of the Industrial Park the line is mostly obscured to viewers on the TCH. Currently a total of 9 structures and 750m of transmission line are visible through this section from the TCH.

Future
The total visibility of the line is anticipated to increase to 1,240m and 14 structures. This is due to a combination of increased structure heights and danger tree removal. The cleared ROW and structures on the sides and top of the Tunnel Mountain bench are expected to become more visible from the TCH.

Altalink 54L Visibility Analysis

TCH - Minnewanka to 40 Mile Creek (292-314)

Notes

This is a complex viewshed with changing viewer angles on the curved TCH and intermittent gaps in forest cover resulting in a changing viewshed as vehicles travel the TCH. West of 40 Mile Creek, towards Norquay Road the forest cover thickens and the 54L line disappears from view.

0 50 100 200 Meters

N

Legend

- Existing Visibility
- Future Visibility
- Viewer Window
- Proposed Structures
- Existing Structures
- Altalink 54L Transmission Line
- 54L Right of Way (ROW)
- Official Trail
- Fall Over Analysis - Danger Trees
- Railway

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: March 02, 2025

2021 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 5

Banff Industrial Compound (Current Structures 303-314)

The 54L line parallels Hawk Ave. in the Banff Industrial Compound. Within this urban area the line is fully exposed to view as there is little to no roadside vegetation in this industrial area. The primary change in this section will be increased structure heights (to accommodate the required clearances). Structure heights will increase by a range of 3.3m up to 9.7m. All structures and spans of line are clearly visible from street level.

Compound Road (Current Structures 298-302)

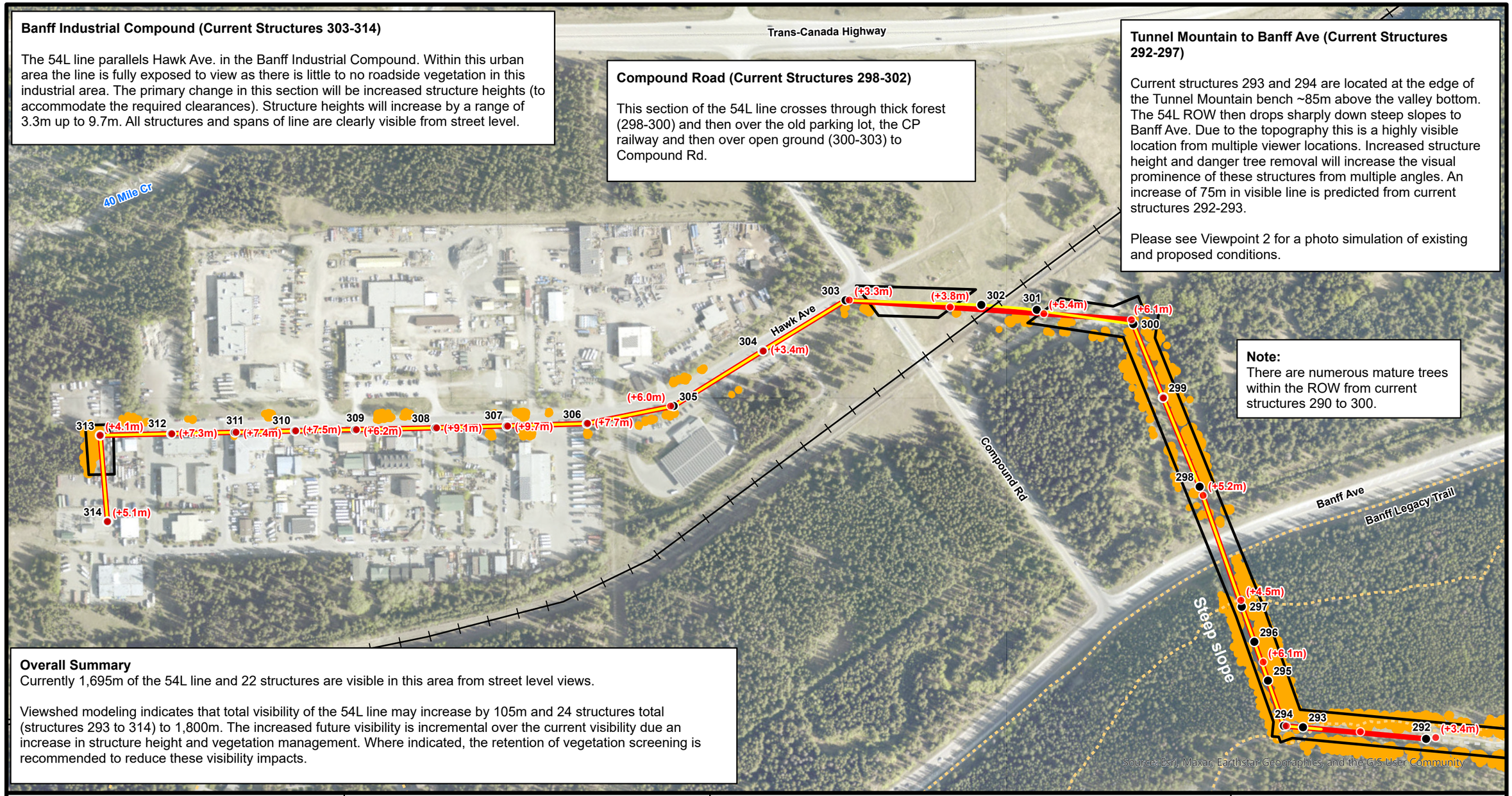
This section of the 54L line crosses through thick forest (298-300) and then over the old parking lot, the CP railway and then over open ground (300-303) to Compound Rd.

Tunnel Mountain to Banff Ave (Current Structures 292-297)

Current structures 293 and 294 are located at the edge of the Tunnel Mountain bench ~85m above the valley bottom. The 54L ROW then drops sharply down steep slopes to Banff Ave. Due to the topography this is a highly visible location from multiple viewer locations. Increased structure height and danger tree removal will increase the visual prominence of these structures from multiple angles. An increase of 75m in visible line is predicted from current structures 292-293.

Please see Viewpoint 2 for a photo simulation of existing and proposed conditions.

Note:
There are numerous mature trees within the ROW from current structures 290 to 300.



Overall Summary
Currently 1,695m of the 54L line and 22 structures are visible in this area from street level views.

Viewshed modeling indicates that total visibility of the 54L line may increase by 105m and 24 structures total (structures 293 to 314) to 1,800m. The increased future visibility is incremental over the current visibility due an increase in structure height and vegetation management. Where indicated, the retention of vegetation screening is recommended to reduce these visibility impacts.

Altalink 54L Visibility Analysis

Town of Banff and Adjacent Areas (Hawk Ave, Banff Ave, Compound Rd) (292-314)

Notes

Due to the complexity of structure heights, roofs, and window locations a detailed assessment of visibility from structures within the Town of Banff has not been undertaken.

0 50 100 200 Meters

N

Legend

- Proposed Structures
- Existing Structures
- Existing Visibility
- Future Visibility
- Altalink 54L Transmission Line
- 54L Right of Way (ROW)
- Official Trail
- Fall Over Analysis - Danger Trees
- Railway

Prepared For: Parks Canada, Banff National Park

Prepared By: AVENS CONSULTING

Drawn By: Bruce Gleig

Date: March 02, 2025

2021/2022 Base Imagery

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

Map 6

Appendix S

Photo simulations Showing Changes to Visibility of the 54L as a Result of the Rebuild Project.

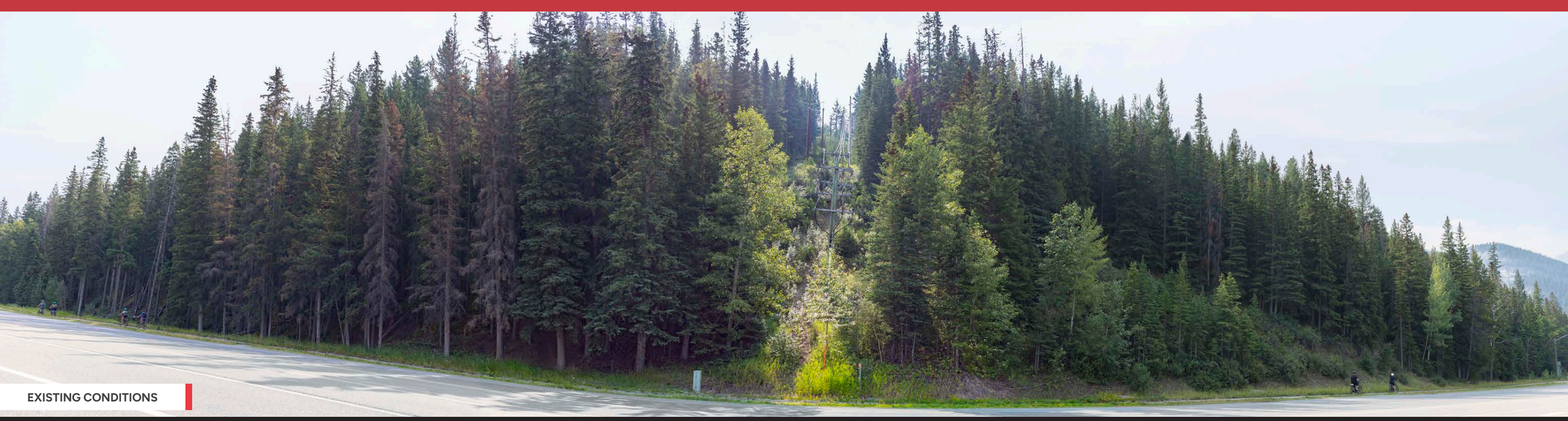
ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

54L
TRANSMISSION LINE REBUILD

Viewpoint Location Map

① Photo Location
— Transmision Line

PRIVILEGED AND CONFIDENTIAL



ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

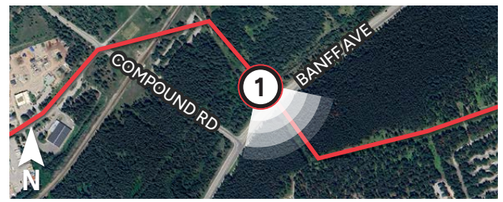
54L
TRANSMISSION LINE REBUILD

Viewpoint 1

Date: 8/16/2023 **Time:** 12:22 pm **Viewing Direction:** Southeast

① Photo Location — Transmision Line

Photo simulations are for demonstration purposes only. Final design is subject to change pending public, utility, and regulatory review.



EXISTING CONDITIONS

PROPOSED CONDITIONS | BARE WIRE OPTION

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

54L
TRANSMISSION LINE REBUILD

Viewpoint 2

Date: 8/16/2023 **Time:** 11:56 am **Viewing Direction:** East

② Photo Location — Transmision Line

Photo simulations are for demonstration purposes only. Final design is subject to change pending public, utility, and regulatory review.

ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

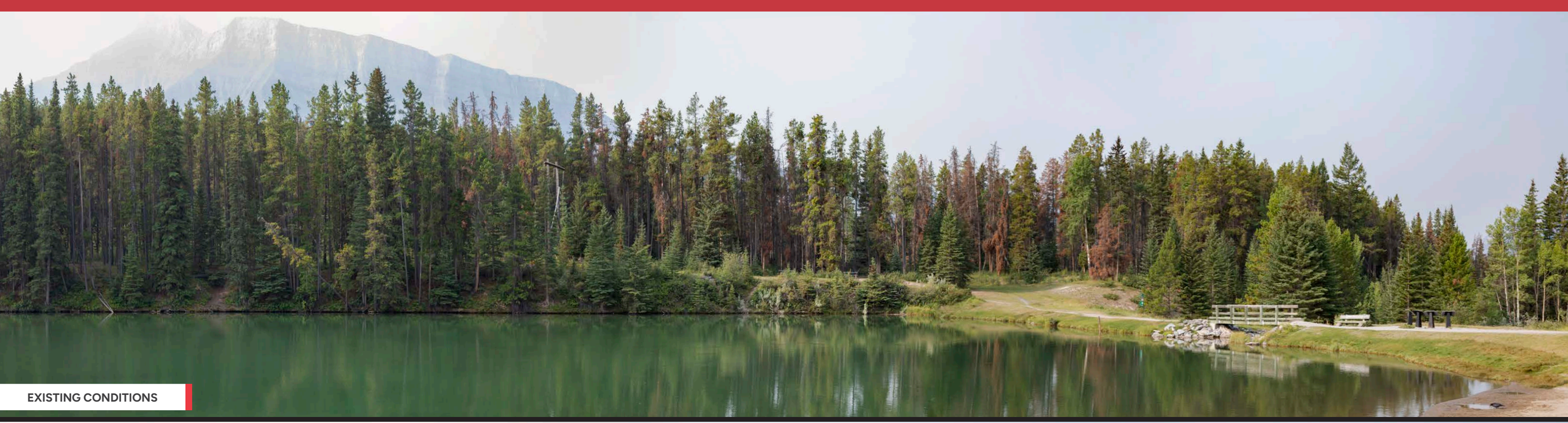
54L
TRANSMISSION LINE REBUILD

Viewpoint 3

Date: 8/16/2023 **Time:** 11:09 am **Viewing Direction:** Southeast

③ Photo Location — Transmision Line

Photo simulations are for demonstration purposes only. Final design is subject to change pending public, utility, and regulatory review.



ALTALINK
A BERKSHIRE HATHAWAY ENERGY COMPANY

54L
TRANSMISSION LINE REBUILD

Viewpoint 4

Date: 8/16/2023 **Time:** 11:01 am **Viewing Direction:** Southwest

④ Photo Location — Transmision Line

Photo simulations are for demonstration purposes only. Final design is subject to change pending public, utility, and regulatory review.

PRIVILEGED AND CONFIDENTIAL