Environmental Impact Assessment for the Dunn Lake Road Realignment and Paving Project

Prepared for:
Indigenous Services Canada / Government of Canada

Prepared by:
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Date:
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DISCLAIMER

This report is rendered solely for the use of the Ministry of Transportation and Infrastructure (MOTI) and Indigenous Canada Services (ISC) in connection with the Environmental Impact Assessment (EIA) for the Dunn Lake Road Realignment and Paving Project (the Project), and no person may rely on it for any other purpose without Simpcw Resources LLP (SRLLP) prior written approval. Should any other third party use this report without the approval of SRLLP, they may not rely upon it. SRLLP accepts no responsibility for loss or damages suffered by any third party as a result of decisions made or actions taken based on this report.

The objective of this report is to address the following scope requirements:

1. Provide a detailed environmental impact assessment for activities related to the realignment and paving of Dunn Lake Road.
2. Provide mitigation strategies that focus on adhering to relevant Best Management Practices.
3. Provide recommendations to minimize impacts to terrestrial and aquatic resources within the Project area.

This report considers all relevant information contained within the referenced documents, including the results of any data collection programs carried out in relation to this report, in addition to Project-specific information pertaining to all phases of the proposed scope of work. Industry accepted professional practices and standards were followed in developing and interpreting data provided by client or third-party sources.

Results or recommendations contained in this report may change if new information becomes available or if any information previously relied upon is altered. This report must be considered as a whole; selecting only portions of this report may result in misleading view of the results or recommendations.

Executive Summary

The Ministry of Transportation and Infrastructure (MOTI) retained Simpcw Resources LLP (SRLLP) to complete an Environmental Impact Assessment (EIA) for the proposed Dunn Lake Road Realignment and Paving Project (the Project). The Project will see the upgrade of Dunn Lake Road through North Thompson IR 1 of the Simpcw First Nation to improve the road to Rural Local Undivided design criteria and provide a one-time hard surface within the boundaries of North Thompson IR 1. The MOTI is committed, as part of Section 35 land transfer negotiations, to establish a BC MOTI Right-of-Way (ROW), as surveyed in 1999.

Dunn Lake Road is located approximately 66 km north of Kamloops, BC. The total length of the Project is 10 km, consisting of an approximately 9.3 km south segment and 0.7 km north segment near the townsite of Chu Chua. The Project scope will include vegetation clearing, cutting and filling, ditching, drainage improvement and road base compacting and paving. The drainage upgrades will involve replacing and upsizing culverts based on flow analysis, hydrotechnical assessment, geomorphic assessment, and future climate change projections.

The level of detail contained in the EIA corresponds to the nature and magnitude of the anticipated environmental impacts and has been prepared to meet requirements of Indigenous Services Canada for Section 28(2) Application as required under the *Indian Act*. The following environmental field surveys and desktop assessments were conducted by SRLLP to support the EIA: Dunn Lake Road Environmental Overview Assessment (EOA); Newhykulston Creek Fish Habitat Functional Assessment; 2020 Species at Risk Assessment; Watercourse Assessment RECUL – 37 (1400 mm); and a Preliminary Wetland Function Assessment completed in November 2021. In addition, traditional land and resource use studies and an Archaeological Impact Assessment were also completed from 2019 to 2021 with the support and participation of members of Simpcw First Nation.

This EIA evaluated the potential impacts of construction and operations of the Project on the following Valued Ecosystem Components and Indicators: Geographic Environment (Geology and Topography; Stability and Soils); Atmospheric Environment (Climate, Air Quality, Light and Noise); Aquatic Environment (Water Quality and Drainage, Wetland and Riparian Areas, Freshwater Fisheries and Ecosystems); Terrestrial Vegetation (Ecosystem Classification, Native Vegetation, Rare Plants and Ecosystems, Invasive Species); Wildlife (Wildlife and Wildlife Habitat, Wildlife Species at Risk); Social and Economic (Indigenous Communities, Employment and Procurement); Cultural (Traditional Knowledge and Land Use, Archaeology and Heritage); Health (Accidents and Malfunctions).

The environmental effects associated with the Project are those that are routinely encountered during secondary road paving projects. Overall, the conclusions of this EIA are that, with planned implementation of mitigation and offset measures, and Best Management Practices, construction and operation of the new road will not result in any significant adverse environmental, social, cultural or cumulative effects.

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1.0 Introduction

The Ministry of Transportation and Infrastructure (MOTI) retained Simpcw Resources LLP (SRLLP) to complete an Environmental Impact Assessment (EIA) for the proposed Dunn Lake Road Realignment and Paving Project (the Project). The level of detail contained in this report corresponds to the nature and magnitude of the anticipated environmental impacts and has been prepared to meet requirements of Indigenous Services Canada for Section 28(2) Application as required under the *Indian Act*.

The Project will see the upgrade of Dunn Lake Road through North Thompson IR 1 of the Simpcw First Nation. The purpose of the Project is to improve Dunn Lake Road to Rural Local Undivided design criteria and provide a one-time hard surface within the boundaries of North Thompson IR1. The MOTI is committed, as part of Section 35 land transfer negotiations, to establish a BC MOTI Right-of-Way (ROW), as surveyed in 1999.

Dunn Lake Road is located approximately 66 km north of Kamloops, BC. The total length of the Project is 10 km, consisting of an approximately 9.3 km south segment and 0.7 km north segment near the townsite of Chu Chua (Figure 1). The Project scope will include vegetation clearing, cutting and filling, ditching, drainage improvement and road base compacting and paving. The drainage upgrades will involve replacing and upsizing culverts based on flow analysis, hydrotechnical assessment, geomorphic assessment, and future climate change projections. BC Hydro utilities along the length of the Project will be relocated to within the MOTI ROW. Segments of Telus fibre optic line will also be relocated along the MOTI ROW.

The Project team will work in close consultation with Simpcw First Nation stakeholders, Project team members and Engineers of Record to optimize the design to fit within the constraints of the existing ROW and proximity to the Canadian National (CN) Railway line.

Dunn Lake Road Realignment and Paving Project
Figure 1 - Project Overview

Northern Limit Section 2
Southern Limit Section 2
Northern Limit Section 1
Southern Limit Section 1
Chu Chua
Darfield
Chinook Mountain
Chinook Cove
Hwy 5
Dunn Lake Rd
Chu Chua Creek
Sanborn Lake
Darling Creek
Bowden Rd
Cemetery Rd
Kikwilli Creek
NEWHYKULSTON CR FSR
Old Coal Creek Rd
Coal Creek Cres
Ollies Rd
Newhykulston Creek
Darlington Creek
DARLINGTON FSR
Darlington Creek FSR
Lindquist Creek
Frog Lakes
FSR
MacColl Rd
North Thompson River
Skowootum Creek
Frog Lakes FSR
Boulder Mountain Rd
Disdero Rd
Ipsoot Creek
McDougall Rd
Chinook Creek
Kenkeknem Rd
Nanak Lake
Nanak Creek
Bonaparte Lake Rd
KA8590.23 FSR
Posby Lake
pullout
Chu Chua Ferry Rd
LEONIE CREEK FSR
Leonie Creek
Leonie Lake FSR
Seven Sisters Equestrian Trail
Meyer Rd
Nelson Creek
Mitchell Rd

- Project Limits
- Highway
- Dunn Lake Road
- Other Roads
- Railway
- Transmission Line
- Watercourse
- Waterbodies / Large Rivers
- Wetland
- North Thompson IR#1

N
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E
S

Map Scale: 1:40,000

0 0.5 1 km

Simpcw Resources Group

Date: 2021-09-15

2.0 First Nation Involvement and Considerations

The Simpcw First Nation technical team and Chief and Council have been involved in early Project planning and design. Design features and pre-construction works have all been completed in consultation with the technical team and Chief and Council.

As part of the Memorandum of Agreement (MOA), signed on December 13, 2019, for the Section 35 transfer and overall engagement regarding Dunn Lake Road between the MOTI and Simpcw, MOTI has agreed to have Simpcw provide the following pre-construction works:

- Clearing and brushing
- Archaeological investigations
- Controlled stripping, stockpiling and high-level evaluation of all archaeological areas
- Environment investigations and assessments
- Relocation of third-party fibre-optics infrastructure
- Design and engineering of waterline relocation as impacted by the Works in and around Newhykulston Creek
- Design of environmental off-setting area
- Cultural monitoring (pre-construction)
- Cultural monitoring (during construction)
- Produce and stockpile Granular Materials including SGSB and 25mm WGB

The Simpcw First Nation will be involved in contract tender documents to ensure the protection of First Nation land and interest. Contract language will be included to ensure continued economic benefit for the Simpcw Community.

3.0 Project Description

3.1 Project Purpose

The purpose of this Project is to fulfil the MOTI commitment as part of the Section 35 land transfer negotiation to provide a one-time hard surface to Dunn Lake Road. Meeting the obligations of the Section 35 Agreement will ultimately provide the Simpcw First Nation Community in Chu Chua, BC, with a safe, reliable transportation route connecting the community to resources and services in the region.

3.2 Project Justification

Simpcw First Nation has worked on negotiations for the Dunn Lake Road realignment for over forty years (Simpcw First Nation 2020). School buses and other vehicles carrying members of the community must travel over the existing gravel, two-lane road, which is narrow and uneven. Potholes, 'washboard' road surfaces, dust and excess noise are a few examples of concerns raised by the community.

Upgrading the road will benefit the community in many ways. Realignment and paving of the road surface will increase safety and facilitate reliable access to/from Chu Chua. The paved road surface will result in a significant reduction in nuisance noise and dust, increase visibility and provide wider, more pedestrian friendly travel shoulders. The aquatic and terrestrial environment is expected to benefit as well, for example through upgrading of drainage ditches, and installation of underpasses to improve wildlife crossing corridor management.

3.3 Route selection

Most of the proposed road overlaps with the existing road, however, certain segments have been realigned to improve safety and grade. The Project route is predominantly within the existing MOTI ROW. Parcels of land have been identified for acquisition by MOTI in support of the Project where the road realignment footprint extends beyond the MOTI ROW.

3.4 Project Location

The Project is located within North Thompson IR 1 within in the Thompson Nicola Regional District. The Simpcw Community of Chu Chua is located along the proposed realignment, and the District of Barriere is located approximately 6 km south of the Project.

3.5 Project Footprint and Components

The road will be designed to Rural Local Undivided Road Criteria and will include two 3.5 m paved lanes with 1.5 m graveled shoulders on both sides of the road. Temporary access for construction is required in a number of areas (see Detailed Construction Drawings). No permanent maintenance access is required during operation. Most of the Project Footprint is on lands that were previously disturbed during construction of the

original Dunn Lake Road, BC Hydro Power Line and CN Rail and associated operating easements.

Land parcels overlapped by the Project Footprint are detailed in Table 1, and shown at a 1:2,000 scale on a set of 18 map sheets in Appendix 1.

Table 1 Project Footprint Area – Detailed Description

Drawing #	Lot	Plan	Impact	Area (ha)
R2-1051-101	227	105263CLSRBC	Driveway tie-in	0.004
R2-1051-102		66587	Existing road to be restored	0.048
R2-1051-102	79-2-1	RSBC3893	Driveway tie-in	0.006
R2-1051-103	245	15LS0646	Driveway tie-in	0.011
R2-1051-104	105	66587	Driveway tie-in	0.001
R2-1051-104	207	94419	Driveway tie-in	0.001
R2-1051-104		rr1213a	Driveway tie-in	0.011
R2-1051-104	76	66587	Driveway tie-in	0.015
R2-1051-105	76	66587	Driveway tie-in	0.005
R2-1051-105	77-2	99527	Driveway tie-in	0.011
R2-1051-105	77-1	99527	Driveway tie-in	0.010
R2-1051-105	212	94417	Driveway tie-in	0.006
R2-1051-105		BC223CLSR	Instream access and works	0.095
R2-1051-105		BC223CLSR	Instream access and works	0.090
R2-1051-105		BC223CLSR	Driveway tie-in	0.020
R2-1051-105		BC223CLSR	Existing road to be restored	0.006
R2-1051-106		BC223CLSR	Existing road to be restored	0.629
R2-1051-107		BC223CLSR	Existing road to be restored	0.074
R2-1051-107		BC223CLSR	Existing road to be restored	0.108
R2-1051-108		BC223CLSR	Existing road to be restored	0.001
R2-1051-108		BC223CLSR	Driveway tie-in	0.004
R2-1051-109		BC223CLSR	Driveway tie-in	0.010
R2-1051-111		BC223CLSR	Existing road to be restored	0.184
R2-1051-111		BC223CLSR	Wetland replacement area	0.054
R2-1051-112	136	RSBC3353	Instream access and works	0.023
R2-1051-112	137	RSBC3353	Instream access and works	0.019
R2-1051-112	95	RSBC756	Driveway tie-in	0.046
R2-1051-112	215	100198	Driveway tie-in	0.009
R2-1051-112		BC223CLSR	Instream access and works	0.180
R2-1051-112	139	RSBC3353	Driveway tie-in	0.030
R2-1051-113	141	RSBC3353	Driveway tie-in	0.019
R2-1051-113	207(road)	RSBC3353	Driveway tie-in	0.010
R2-1051-106		BC223CLSR	Arch stripping	Determined in the field at the time of stripping by project archaeologist
R2-1051-107		BC223CLSR	Arch stripping	
R2-1051-108		BC223CLSR	Arch stripping	
R2-1051-109		BC223CLSR	Arch stripping	
R2-1051-110		BC223CLSR	Arch stripping	
R2-1051-111	(Crown Land)	KAP54263	Arch stripping	

Note(s):
Data obtained from BC Ministry of Transportation and Infrastructure

3.6 Construction Schedule and Activities

A summary of major works associated with reconstruction of approximately 10 km of Dunn Lake Road from two-lane gravel to two-lane, paved is provided in Table 2. A detailed construction schedule of work sequences will be completed by the major works contractor, following Project approval and construction contract award.

Table 2 Schedule of Project Activities

Project Phase – Planning and Design		
Work Type	**Timeframe**	**Details**
Section 35 Negotiations	1999 to 2019	Section 35 transfer and engagement between MOTI and Simpcw First Nation
Baseline Studies	Spring 2018 – Fall 2021	Archaeological Impact Assessment
		Environmental • environmental baseline survey • bird nest sweeps • rubber boa assessment • environmental investigations for species at risk • wetland function assessment
		Hydrotechnical - Design and engineering of waterline relocation as impacted by the Works in and around Newhykulston Creek
		Cultural Heritage Assessment
		Geotechnical evaluations
Project Phase – Construction		
Clearing and Brushing	Summer 2021	Vegetation (grasses, timber, stumps, brush and other woody vegetation) were mowed and cleared from the construction right-of-way.
Power and Telecommunications Infrastructure Replacement	Fall 2020 – Summer 2021	The relocation of approximately 50% of the inventory of BC Hydro power poles (70 total) along the Project ROW has concluded; this work was completed between October 2020 and October 2021. Prior to relocation, some hydro poles had been located outside the ROW; all hydro poles are now located within the ROW. Isolated segments of Telus fibre optic line were replaced along the ROW
Road Surface Rehabilitation, Resurfacing and Partial Realignment	2022-2023	Construction activities will include (but may not be limited to) vegetation clearing and grubbing, topsoil salvage, cutting and filling, ditching, drainage improvement and road base compacting and paving. The proposed new alignment is likely to be cut, while terrain west of the road will be filled to reach a suitable grade. The newly constructed road surface will be leveled and paved. Equipment used during construction of the Project include work trucks, chainsaws, excavators, graders, loaders, dump trucks, pile drivers, asphalt pavers, compactors, and generators.
Culverts, In-Stream Works, and Drainage Upgrades		Twenty existing primary road crossing culverts were surveyed in 2019, ranging in size (diameter) from 300 mm to 1200 mm. Of these culverts, the majority (14) are constructed of corrugated polyethylene pipe (CPP); the remaining six are made of corrugated steel pipe (CSP). Seven of the existing culverts will be replaced, and four newly installed (see Table 3). An

		additional 31 secondary cross culverts are to be installed; 8 of these will be dry culverts intended for wildlife crossings, ranging in size from 600 to 900 mm diameter. The drainage upgrades will involve replacing and upsizing culverts based on 100-year peak flow analysis, and hazard modeling (hydrotechnical assessment, geomorphic assessment, and future climate change projections). Instream works (e.g., channelization, watermain relocation) scheduling will occur following contract award, and in accordance with fisheries timing windows. Roadside ditching within the ROW to establish connectivity to the highway drainage system will occur in accordance with regulatory bird nesting and breeding windows.
Restoration and Revegetation	2023-2025	Following construction, disturbed areas adjacent to the newly aligned road will be restored, stabilized and revegetated. Post-construction environmental monitoring will be conducted to monitor sensitive sites such as watercourses and wetlands and ensure soil stabilization and the restoration of native vegetation. Following construction, restoration and revegetation of selected wetland offset areas will be completed and monitored over several growing seasons to assess wetland function.

3.7 Operations and Maintenance

Operations and maintenance activities are limited to routine highway works such as snow plowing, road dusting and sweeping, line painting, pot-hole repair, MOTI ROW brushing and weed control, and drainage maintenance (e.g., ditches, culverts).

3.8 Regulatory Framework and Environmental Permitting

The purpose of this document is to provide an Environmental Impact Assessment (EIA), a permitting requirement under the *Indian Act,* which considers potential environmental, health, social and economic impacts of the proposed project, including benefits. The Impact Assessment Act (IAA) outlines a process by which the Federal government assesses the impacts of designated and/or major projects and projects carried out on federal lands, or outside of Canada. Regulations included within the Act include the *Physical Activities Regulations* (the Project list) and the *Information and Management of Time Limits Regulations*.

Multiple federal and provincial regulatory agencies are involved in permitting the works on this Project; environmental features that require legislated permitting or the application of due diligence measures or Best Management Practices to prevent contravention of environmental protection legislation are outlined in Table 3.

Table 3 Environmental Regulations, Permits and Approvals

LEGISLATION	AGENCY	AREA OF REGULATION	REGULATIONS, PERMITS, APPROVALS
Federal			
Indian Act	Indigenous Services Canada (ISC)	Authorization to cut trees on Indian Reserve Land	ISC Timber Permit
Fisheries Act	Department of Fisheries and Oceans (DFO)	Protects fish and fish habitat, working in and around a waterbody.	Instream works at Newhykulston, Skowootum and unnamed creek. Approval for Project riparian and instream works under DFO regulation is required.
Species at Risk Act	Environment Canada	Protects aquatic and terrestrial wildlife and wildlife habitat listed as threatened or endangered.	No species at risk were identified in the project zone though listed species could be present in the area; operate under due diligence practices. No permit required.
Migratory Birds Convention Act	Environment Canada	Prohibits injury, molestation and destruction of migratory birds and their nests.	Conduct vegetation clearing outside of the bird breeding nesting period of March 15 to August 15, if possible. Any vegetation to be removed during the bird nesting season must be monitored by an appropriately qualified professional (AQP) in accordance with the MOTI Breeding Bird Nest Survey Protocol. No permit required.
Provincial			
Water Sustainability Act	Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD)	Regulated activities in and around water and water use.	Instream works at Newhykulston, Skowootum and unnamed creek. Approval for Project riparian and instream works, under the WSA, is required.
Wildlife Act	FLNRORD	Regulates works around the protected nests of bald eagle, great blue heron, golden eagle, peregrine falcon, gyrfalcon, osprey and burrowing owl.	These nests are protected year-round under the BC Wildlife Act and may not be cleared. Refer to the Guidelines for Raptor Conservation for species-specific information on sensitive breeding and nesting time periods and buffers for these nests according to their tolerance to human disturbance. To date, no stick nests for these species have been identified with the potential to be impacted by Project activities.
		Regulates works that impact breeding birds.	Conduct vegetation clearing outside of the bird breeding nesting period of March 15 to August 15, if possible. Any vegetation to be removed during the bird nesting season must be monitored by an

LEGISLATION	AGENCY	AREA OF REGULATION	REGULATIONS, PERMITS, APPROVALS
			AQP in accordance with the MOTI Breeding Bird Nest Survey Protocol.
		Regulates wildlife salvage activities.	A salvage permit may be needed to safely remove and relocate potentially impacted wildlife (e.g., amphibians), as determined by the AQP.
Wildlife Act Designation & Exemption Regulation	FLNRORD	Exempts from permitting required under the *Wildlife Act* for nuisance wildlife.	Certain nuisance birds such as house sparrows, starlings, cowbirds, and crows are not protected under the *Wildlife Act*.
Weed Control Act	Ministry of Environment (MOE)	Regulates control of designated noxious plants.	Noxious plants have been identified in and around the work site that will require control measures as per the *Weed Control Act*. Implement Best Management Practices to control spread of noxious weeds.
Environmental Management Act	MOE	Regulates the disposal and storage of hazardous materials and hazardous materials spill reporting.	Permit may be required for the transportation, storage or disposal of listed waste materials generated by the Project.
Heritage Conservation Act	FLNRORD	Protection of archaeological and heritage sites.	Several areas of archaeological significance exist along the alignment. Permits and assessments required related to archaeological and heritage impact management such as a heritage inspection permit and a site alteration permit.

4.0 Scope of Assessment

This assessment evaluates the potential environmental, social and cultural impacts of construction and operations of the Project. The assessment consists of the following methodology:

- determination of spatial and temporal boundaries for VCs
- identification of environmental, social and cultural VCs
- identification of potential environmental, social and cultural effects
- development of Project-specific mitigation measures that align with regulatory requirements and industry standards and best practices
- identification of potential residual effects after implementation of mitigation measures
- determination of the significance of residual effects and cumulative effects.

This impact assessment methodology has been developed based on the following guidelines and reference documents:

- The Practitioner's Guide to Federal Impact Assessments under the Impact Assessment Act (Government of Canada, 2021a)
- Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012 (Government of Canada, 2021b)
- Cumulative Effects Assessment Practitioners' Guide (Hegmann et al. 1999)
- BC Effects Assessment Policy (BC Environmental Assessment Office, 2020)

4.1 Valued Components

This assessment evaluates the potential environmental, social and cultural impacts of construction and operations of the Project. Project activities have the potential to interact with the following valued components and associated indicators:

- Geographic Environment
    - Geology and topography
    - Stability and soils
- Atmospheric Environment
    - Climate
    - Air quality
    - Light and noise
- Aquatic Environment
    - Water quality and drainage
    - Freshwater fisheries and ecosystems
    - Wetland and riparian areas
- Terrestrial Vegetation
    - Ecosystem Classification
    - Native vegetation
    - Rare plants and ecosystems
    - Invasive species
- Wildlife

    - Wildlife and wildlife habitat
    - Wildlife species at risk
- Social and Economic
    - Indigenous communities
    - Employment and procurement
- Cultural
    - Traditional knowledge and land use
    - Archaeology and heritage
- Health
    - Accidents and malfunctions

4.2 Spatial Boundaries

The geographic area that was assessed for potential effects associated with Project activities (that is, spatial scale) includes the Project Footprint, Local Study Area (LSA) (Figure 2), and the Regional Study Area (RSA) (Figure 3). The Project Footprint is the area directly disturbed by Project activities as summarized in Section 3.5. The LSA is the zone of influence or area where the VC is most likely to be affected by Project activities. For Project activities, the outermost LSA is defined as the Project Footprint plus the area extending beyond the Footprint up to 500 m, although for most components, the zone of influence is considerably smaller (for example, 100 m for vegetation). The larger zone of influence encompasses potential impacts to wildlife from noise or in watercourses where 90% of the sediment load caused by construction activities is expected to fall out of suspension.

The RSA is also variable but generally extends beyond the LSA boundary to the area of the Simpcw IR and beyond up to 5 km, where the direct and indirect influence of other activities could overlap with Project-specific effects or cause cumulative effects. The RSA also considers potential effects associated with the social and cultural VCs within the Simpcw IR.

Combined, the Project Footprint, LSA and RSA may also be referred to as the Project area: the area for which specific baseline data was collected to better inform Project interactions with a specific VC or Indicator.

Chu Chua Creek
Northern Limit Section 2
Mature Douglas-fir with broken top and new cavities
Southern Limit Section 2
Kikwilli Creek / Fish (None)
Kikwilli Creek
Northern Limit Section 1
Newhykulston Creek / Fish (Yes)
Birds
Mineral lick
Dunn Lake Rd
New holes in snags
Northern Flicker on aspen
Trembling aspen snags with holes
Chu Chua
Burrowing into silt wall
Waterfowl, Birds, and amphibians
Small stick nest - unknow species
Skowootum Creek
Man-made sump
American Badger
Columbia Ground Squirrel
Wildlife snags
Southern Limit Section 1
Darling Creek
Sanborn Lake
Bowden Rd
Cemetery Rd
Old Coal Creek Rd
Coal Creek Cres
Ollies Rd
Newhykulston Creek
Kikwilli Creek
NEWHYKULSTON CR FSR
Darlington Creek
DARLINGTON FSR
Darlington Creek FSR
Lindquist Creek
Darfield
Chinook Mountain
Hwy 5
North Thompson River
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Nanak Creek
Posby Lake
Pullout
Chinook Cove
Chu Chua Ferry Rd
LEONIE CREEK FSR
Leonie Creek
Leonie Lake FSR
Seven Sisters Equestrian Trail
Meyer Rd
Nelson Creek
Mitchell Rd

Dunn Lake Road Realignment and Paving Project
Figure 2 - Local Study Area (Identified Environmental Features)

- Project Limits
- Local Study Area
- EOA - Features
- Highway
- Dunn Lake Road
- Other Roads
- Railway
- Transmission Line
- Watercourse
- Waterbodies / Large Rivers
- Wetland

Lewis's Woodpecker
- Critical Habitat for Federally Listed SAR

American Badger
- CDC Spp/Ecosystems at Risk
- North Thompson IR#1

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Map Scale: 1:40,000

0 0.5 1 km

Simpew Resources Group

Date: 2021-09-15

Dunn Lake Road Realignment and Paving Project
Figure 3 - Regional Study Area

Northern Limit Section 2
Southern Limit Section 2
Northern Limit Section 1
Southern Limit Section 1
Chu Chua

Chu Chua Mountain
Chinook Mountain
Darfield
Chinook Cove
Genier Hill
Borthwick, Mount
Garrison Mountain
McGregor, Mount
Barrière Mountain

Project Limits
Regional Study Area
Highway
Dunn Lake Road
Other Roads
Railway
Transmission Line
Watercourse
Waterbodies / Large Rivers
Wetland
North Thompson IR#1

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Map Scale: 1:70,000

0 0.5 1
km

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Date: 2021-09-15

4.3 Temporal Boundaries

The temporal scale considered in the assessment consists of the time required to complete Project activities within. Project construction activities are anticipated to occur in 2022 and 2023. Clean-up and reclamation will commence after construction activities are completed, as weather conditions permit and in consideration of seasons and timing windows. The Project Phases that interact with VECs of interest are presented in Table 2. The assessment period for the EIA includes construction, operations and maintenance, and decommissioning and abandonment phases. In addition to the phases included in the assessment period of the impact assessment, the assessment period for the cumulative effects assessment also considers any planning, construction, and operations phases of projects or activities that are currently present or underway on the landscape or planned or proposed and publicly disclosed.

4.4 Potential Effects and Mitigation

The potential effects resulting from the Project were identified through engagement and previous discussions and feedback with members of Simpcw First Nation, including Chief and Council; government and regulatory agencies and associated consultation with Simpcw First Nation; experience gained during previous road construction and paving projects with similar conditions/potential issues; baseline environmental surveys and detailed Project planning; as well as the professional judgement of the assessment team. The potential environmental, social and cultural effects arising from the construction and operation of the road are identified and assessed in Section 6 of this EIA.

Mitigation is considered to be the elimination, reduction or control of a project's adverse environmental effects, including restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. The severity of potential Project impacts can be reduced or completely avoided through implementation of appropriate and proven effective, industry standard mitigation. General and site-specific mitigation measures and, in some cases enhancement measures, are recommended based upon current industry-accepted standards and best practices, detailed Project planning and consultation with regulatory agencies, engagement and feedback from members of Simpcw First Nation, resulting of baseline studies, and the professional judgement of the assessment team.

4.5 Significance Evaluation of Potential Residual Effects and Cumulative Effects

Following the implementation of mitigation, any residual adverse effects or cumulative effects are identified and evaluated for significance. Criteria used to evaluate significance of the residual effects and cumulative effects are listed below and further defined in Table 4.

- Spatial Boundary (i.e., Project Footprint, LSA, RSA, Provincial, National, International).
- Duration (i.e., duration of the event that results in or causes the residual effect and whether the residual effect is reversible).
- Frequency (i.e., frequency of the event that results in or causes the residual effect).

- Magnitude (i.e., the intensity or severity of the residual adverse effect relative to existing conditions and/or applicable regulatory standards).
- Probability or likelihood of occurrence of the residual effect based on previous experience and proven success of mitigation measures.

Table 4 Characterization of Residual Effects for Evaluation of Significance

ASSESSMENT CRITERIA	DEFINITION
Spatial Boundaries	
Project Footprint	The land area directly disturbed by Project construction and operation activities, including associated physical works and activities (e.g., power lines, fibre optic).
LSA	The LSA varies with the VC being considered and includes Project Footprint and extends beyond it to incorporate the area within which the VC is most likely to be affected by the Project. This EIA conservatively assesses an outermost LSA of a 500 m buffer extending from the Project Footprint (Figure 2). This outermost LSA is the maximum extend to which most VCs are likely to be affected by the Project (i.e., the Zone of Influence of potential effects on any given VC resulting from the Project).
RSA	The RSA includes the Project Footprint and LSA and is the area extending beyond the LSA where there is potential for the Project to have regional effects on the VC. The RSA also encompasses the area to which cumulative effects have the potential to interact with potential Project residual effects on any given VC. This EIA conservatively assesses an outermost RSA of a 5 km buffer extending from the Project Footprint (Figure 3). This RSA encompasses the entirety of North Thompson IR 1.
Provincial	The area extending beyond regional or administrative boundaries but confined to BC.
National	The area extending beyond BC but confined to Canada.
International	The area extending beyond Canada.
Duration	
Short-term	The residual effect occurs during construction or operation (e.g., maintenance, road use), and is reversible during or on completion of construction or during operation.
Medium-term	The residual effect occurs either during construction or operation and is reversible at either completion of construction or end of operations (i.e., decommissioning and abandonment).
Long-term	The residual effect occurs during construction or operation and persists beyond decommissioning and abandonment but is reversible to pre-construction or equivalent conditions.
Permanent	The residual effect occurs during construction or operation and is irreversible (i.e., permanent).
Frequency	
Infrequent	Residual effect occurs infrequently or rarely.
Frequent/Regular	Residual effect occurs frequently either intermittently or at regular intervals.

ASSESSMENT CRITERIA	DEFINITION
Continuous	Residual effect occurs continuously.
Magnitude	
Negligible	There is no detectable change from baseline conditions resulting from a residual effect. In the case of emissions, there is no measurable contribution to provincial or national emissions thresholds or inventories.
Low	The residual effect results in conditions that differ from the average value for baseline conditions but remain within the range of natural variation and below any applicable guideline or threshold value, where applicable. In the case of heritage or archaeological resources, changes to sites are detectable, but confined to smaller areas of a site or to areas already substantially disturbed. In the case of emissions, there is a small contribution to provincial or national emissions but no exceedances of provincial or federal emissions thresholds or inventories.
Medium	The residual effect results in conditions that differ measurably from average baseline conditions and are equal to or slightly above limits of natural variation and/or slightly above a guideline or threshold value, where applicable, but are unlikely to be of ecological or management concern. In the case of heritage or archaeological resources, changes occur to either small but intact portions of heritage or archaeological sites of moderate or high significance, or to larger sites but of relatively low significance. In the case of emissions, there is a moderate contribution to provincial or national emissions but are within regulatory limits and objectives.
High	The residual effect results in conditions that differ substantially from baseline conditions, resulting in a clearly detectable, possibly severe, change beyond the range of natural variation and/or in exceedance of a guideline or threshold value and/or are of ecological or management concern. In the case of heritage or archaeological resources, there are changes to larger, intact heritage or archaeology sites of moderate or high significance. In the case of emissions, there are exceedances of provincial or national emissions limits or standards.
Probability	
Low	The residual effect is unlikely to occur (e.g., a spill).
Medium	The residual effect may occur and depends on the effectiveness of mitigation measures.
High	The residual effect will occur.

4.6 Determination of Significance

All criteria in Table 4 were considered by the assessment team for each residual effect. Following characterization, a residual effect is significant under the following definitions:

- Is medium-term in duration with a moderate to high probability of occurrence and high magnitude that cannot be further mitigated.
- Is long-term or permanent with a moderate or high probability of occurrence and high magnitude that cannot be further mitigated.

Level of confidence in the certainty of conclusions and outcomes of the significance evaluation may vary depending of the residual effect. The level of certainty is determined within the assessment of each residual effect and is determined predominantly as a result of the availability of data and level of understanding of effectiveness of mitigation and resultant outcomes and previous success of mitigative measures. Level of certainty also takes into account variability of environment and social circumstances that may be beyond the control of the assessment team or Project personnel.

4.7 Cumulative Effects Assessment

Cumulative effects are changes to the environment that are caused by an action in combination with other past, present, and reasonably foreseeable human actions (Hegmann et al. 1999). The scope of the cumulative effects assessment is a Project-specific cumulative effects assessment based on the Cumulative Effects Assessment Practitioners' Guide, that assesses whether the incremental effects of the Project act cumulatively with the effects of other actions, either past, existing, or future.

The cumulative effects assessment was conducted in accordance with the Terms of Reference for the proposed Project.

4.7.1 Past, Present, and Reasonably Foreseeable Projects or Activities

Past, present, or reasonably foreseeable projects and activities were identified within the Project RSA that were considered to have potential interaction with the Project to result in a cumulative residual adverse effect on a selected VC.

Past and present projects and activities include those that have already been built or conducted for which the environmental effects overlap with those of the proposed Project. Reasonably foreseeable projects and activities include those that are either proposed (public disclosure) or have been approved to be built, but are not yet built, for which the environmental effects overlap the proposed Project (i.e., reasonably foreseeable).

Although the spatial area of cumulative interactions may differ depending on the residual effects being considered, for the interests of this assessment, only past, present, or reasonably foreseeable projects and activities within the RSA are further described.

Existing activities and disturbances in the proposed Project LSA and RSA:

- Forestry (e.g., timber harvesting, silviculture, wildfire management)
- Agriculture (e.g., crop and pasture lands)
- Utilities and energy transmission (e.g., power lines, fibre optic, gas lines)
- Recreation and tourism (e.g., canoeing, mountain biking, hiking, hunting, fishing, snowmobiling)
- Rural and community development (e.g., Chu Chua, Barriere)
- Transportation and infrastructure (e.g., traffic, highways, roads, railways)

Sources reviewed to identify any projects or activities that could have cumulative interactions with the proposed Project include CEA Agency Environmental Assessment Registry, Canadian Energy Regulator (CER), BC EAO Project Information and

Collaboration System (EPIC), BC Major Projects Inventory, Transportation Projects BC, BC Utilities Commission, and Simpcw First Nation.

The only reasonably foreseeable development identified within the RSA is the Trans Mountain Expansion Project (TMEP). Specifically, a portion of the reactivation segment of the TMEP overlaps with the Project RSA. Construction of the TMEP is expected to overlap with construction of the proposed Project and is expected to be completed by early 2023.

Other reasonably foreseeable activities expected to take place in the proposed Project LSA and RSA may include forestry, agriculture, utilities and energy transmission projects, and transportation and infrastructure projects.

4.8 Impact Assessment Methodology

This assessment was completed predominantly using a qualitative approach. This is expected to be an adequate and accurate approach due to the limited scope and predicted adverse impacts of the Project, in addition to the limited access to applicable and meaningful regulatory standards, guidelines or objectives to which a more accurate assessment would benefit. The significance evaluation is therefore based on qualitative thresholds for all VCs. For some VCs or potential effects, the evaluation of significance benefited from an understanding of similar issues or interactions associated with operation of the Chu Chua road. A conclusion of significance of residual adverse effects and cumulative was determined and is provided for each VC. Positive residual effects were not carried through to the cumulative effects stage, and no significance evaluation was provided.

4.8.1 Assessment Team

The EIA team was comprised of Qualified Environmental Professionals (QEP) with experience in completing assessments for VECs (e.g., wetlands) that fall within the Project Footprint. Desktop reviews were completed for different components of the Project relating to environmental features using applications such as iMap, Habitat Wizard, etc., and queries completed for previous baseline studies and pre-construction work completed for the Project to date. This also included reviewing specific construction and operational details provided by MoTI. This impact assessment assumes that the information provided by previous studies and programs, and all participating individuals, is both complete and accurate.

The conclusions and recommendations contained in this report are based upon the applicable guidelines, regulations and legislation existing at the time the report was produced. It is expected that all Project work will be performed in alignment with recommended mitigation measures provided in this assessment. It is assumed that any relevant improved or more stringent regulatory requirements or guidelines will be implemented between the time of completion of this assessment and beginning of construction or during operations.

Key contributors to this EIA and a summary of relevant experience is provided in Table 5.

Table 5 Environmental Assessment Team

EP	VEC Expertise
Caroline Feischl (M.Sc., R.P. Bio; Pag)	• A biologist and agrologist with 6 years of experience as a consultant and environmental professional. • Skills include wildlife surveys, such as bird nest, amphibian and mammal, stream and fish habitat assessments, amphibian and fish salvaging, beaver dam assessments and wetland surveys and delineation. • Authored numerous technical reports and plans including EMPs, CEMPs, EOAs.
Ceryne Staples (BNRSc., B.I.T)	• Over the past 13 years, completed numerous wetland determination, delineation, and function assessments following provincial and federal evaluation standards. • Planned and implemented a variety of surveys and written reports for wildlife, endangered species (SAR), and habitat assessments for federal Human and Ecological Risk Health Assessments (HHERAs), municipal and provincial Environmental Characterization Reports, Environmental Impact Assessments (EIAs)
Kyle Walker, Project Manager (BNRSc., R.P.Bio.)	• Preliminary wetland offset planning • Specializing in post-construction restoration (planning and field implementation) of wetland, stream, riparian, and terrestrial ecosystems within BC's interior.
Paul Van Velzen, Environmental Manager (BA)	• Environment Project Manager at SRLLP with 12 years of environment consulting experience and an extensive background as an environmental assessment practitioner for small to large-scale oil and gas and other industrial projects at provincial and federal levels.

5.0 VEC Baseline Conditions

A summary of environmental and socio-economic baseline conditions for the Project and, where appropriate, the Project area, is provided in the following subsections. In addition, select environmental information is provided on map sheets provided in Appendices 1 to 3. Information was gathered from existing literature and internet searches, all of which are cited in Section 9, in addition to various field surveys and site visits, including the following:

- Dunn Lake Road Environmental Overview Assessment (EOA) (Estsék' 2019a)
- Newhykulston Creek Fish Habitat Functional Assessment (Estsék'2019b)
- 2020 Species at Risk Assessment (SRLLP 2020a)
- Watercourse Assessment RECUL – 37 (1400 mm) (SRLLP 2020b)
- Preliminary Wetland Function Assessment

5.1 Geographic Environment

5.1.1 Geology and Topography

The Project is located on the eastern side of the North Thompson River, along the boundary between the Thompson Plateau to the west, and the Shuswap Highland to the east, and separated by the Louis Creek fault zone which runs northward along the North Thompson River from Louis Creek to Canim Lake (Holland 1976). Landforms in both the Thompson Plateau and Shuswap Highland are influenced by a Pleistocene-era ice sheet that, in the Thompson Highland, formed a thick mantle of till over the underlying bedrock and steep valley sides (Holland 1976; BGC Engineering 2019). The Shuswap Highlands consist of gentle to moderate sloping plateaus divided by rivers and their tributaries, with steep valley sides and relatively rounded mountain peaks (Holland 1976).

Physiography and bedrock geology of the area is characterized by moderate to high relief and dissected by glaciofluvial and fluvial features overlying metamorphic, sedimentary, and intrusive rocks (Holland 1976; Paulen et al. 2005; BGC Engineering 2019). Current-day material is an unconsolidated mixture of till, colluvium, glaciofluvial, fluvial, glaciolacustrine and organic sediments (Paulen et al. 2005).

5.1.2 Stability and Soils

Mesic soils in the Thompson Moist Warm Interior Douglas-fir biogeoclimatic zone variant are generally represented by Gray Luvisols and Dystric Brunisols (Lloyd et al., 1990).
Many watersheds in the region display gentle over steep topography (BGC Engineering 2019); geohazard assessment data for the Thompson Watershed identifies the gentle over steep topography of the region as influential over the distribution of hydrogeomorphic hazards, where upper portions of watersheds are subject to floods and lower reaches can experience steep creek hazards (debris flows and debris floods) (BGC Engineering 2019). Within the Project area, Chu Chua Creek has a moderate hazard rating for steep

creek hazards; Newhykulston Creek has a high hazard rating, and Skowootum Creek, a low rating (Fraser Basin Council 2021). The North Thompson River 200-Year floodplain is adjacent to Dunn Lake Road, and at time overlaps it (Fraser Basin Council 2021). The clear-water flood hazard rating for the North Thompson River is high for the assessed 200-year floodplain depth, which intersects, sometimes overlaps with Dunn Lake Road (Fraser Basin Council 2021).

5.2 Atmospheric Environment

5.2.1 Climate

The Project Footprint is in the Thompson-Nicola Regional District and is situated within the Interior Douglas Fir Moist Warm (IDFmw2) Biogeoclimatic Ecosystem Classification (BEC) subzone and variant (Meidinger and Pojar 1991). The IDF zone has a warm, dry climate, where moisture deficits are common, a relatively long growing season, cool, wet winters with relatively high snowfall, and is a transition zone between drier zones (e.g., IDF mw1), and wetter zones (e.g., Interior Cedar Hemlock Zone) (Lloyd et al. 1990; BGC Engineering 2019).

5.2.2 Air Quality

The Project is within the Southern Interior air zone[1], where for the 2017 to 2019 period, in the Kamloops area, annual fine particulate matter levels was 11.9 µg/m^3 (over air quality standard of 10 µg/m^3), due to the influence of wildfire smoke (3-year average of the annual average concentration of fine particulate matter) (B.C. MoEPS 2021). Poor air quality is experienced when there is a combination of atmospheric turbulence and low-level winds that create a poor ventilation index for communities (B.C. MoEPS 2021). Activities such as slash-pile burning, mill operations, residential woodstove burning may contribute to poor air quality during different seasons of the year.

5.2.3 Light and Noise

Noise and light inputs in the general Project area are unknown; however, typical sources of disturbances in Chu Chua include rural residential buildings and infrastructure buildings, waste collection centres, and industrial sites. In comparison with the nearest city of Kamloops, B.C., housing, and infrastructure density low, and not considered to contribute much to noise and light pollution.

Dunn Lake Road serves the village of Chu Chua and surrounding rural residential properties on the east side of the North Thompson River; noise and light pollution emissions from vehicles traveling along Dunn Lake Road have potential to impact sensitive wildlife

[1] Air zones are areas that exhibit similar air quality characteristics, issues, and trends, and that form the basis for monitoring and reporting air quality in the province (B.C. MoEPS 2021)

species. For example, the impact of lights in urban neighborhoods in a Kamloops subdivision was found to reduce use in the lighted areas by bats (GCC 2009).

5.3 Aquatic Environment

5.3.1 Water Quality and Drainage

The proposed road crosses Skowootum Creek (S3), Newhykulston Creek (S2) and two unnamed watercourses. During baseline surveys, all four watercourses were observed with significant volumes of flowing water due to the spring runoff. All watercourses and drainages are upstream of the North Thompson River Watershed, part of the Fraser River Basin. The sensitivity of these watercourses to Project activities depends on land and water use conditions and their influence on natural flow regimes and water quality, in addition to the size of the receiving basin. The large watershed of the North Thompson River is anticipated to be very resilient to an incremental impact to water quality or hydrology resulting from the Project

There are no known surface water points of diversion downstream along any watercourses crossed by the Project within the LSA.

The proposed road traverses elevated, even to undulating terrain predominantly overlapping the existing gravel road. No groundwater features such as springs, wells or shallow aquifers were identified with the potential to be impacted by Project activities. Consequently, no potential effects related to groundwater were identified in this impact assessment.

5.3.2 Freshwater Fisheries and Ecosystems

Five main watercourses and drainages were identified as occurring within the general Project area (Table 6); the North Thompson River runs adjacent to the Project area and is not included in additional discussions as it does not directly intersect with the Project.

Table 6 Named Watercourses Within the General Project Area

Stream Name	Watershed Code	Waterbody ID	Length (km)	Stream Order	Strahler Number
Chu Chua Creek*	129-254600	35243	13.9	2	4
Kikwilli Creek*	129-251100	35241	6	2	3
Unnamed creek (Coal Creek)*	None	none	-	-	1
Newhykulston Creek	129-241800	35198	8	2	3
Skowootum Creek	129-227200	35191	6.6	2	3
North Thompson River*	129	34447	365.5	7	8

Notes:

*Watercourse is not crossed by the proposed Project
Fish Inventory Data Query, Watershed Dictionary Codes (BC MOE 2021)

Two of the watercourses are classified as fish-bearing and exhibit varying levels of fish habitat functional quality (Estsék' 2019a).

Newhykulston Creek contains resident rainbow trout (*Oncorhynchus mykiss*) both upstream and downstream of the Dunn Lake Road crossing, and coho salmon (O. kisutch)are known to spawn and rear downstream of the road crossing (Estsék' 2019b). Varying levels of fish habitat quality were observed during baseline studies, and fish presence was confirmed in Newhykulston Creek(Estsék' 2019b). In most cases, habitat immediately upstream of Dunn Lake Road is limited due to steep gradient and only seasonal discharge (Estsék' 2019b). Additional information on aquatics and fisheries components are provided in the SAR Assessment (SRLLP 2020a). Rearing habitat observed within the defined sections of watercourse was seasonal (ephemeral) and poor due to lack of pool development and instream/overhead cover. No overwintering habitat was observed, with no significant pools (>30 cm depth) present or continuous stream flow through winter months. No spawning habitat for resident or migratory salmonids was identified (SRLLP 2020b).

5.3.1 Wetlands and Riparian Areas

Five wetlands and wetland complexes were identified in the Project area, ranging in size from a small man-made sump (approximately 295 m^2) to a marsh and swamp wetland complex, approximately 6 ha in size. Documented previously as (Estsék' 2019a; SRLLP 2020a), these wetlands were delineated and evaluated for wetland class and function (National Wetland Working Group 1997; Triton Environmental 2021) in December 2021. Sites B and C represent the marsh wetland class and provide low to moderate wetland function; Sites A and C are wetland complexes (A - riparian marsh and swamp; D - floodplain marsh and swamp) and display moderate to high wetland function. Site E is a riparian swamp displaying moderate to high wetland function. Wetlands with the potential to be impacted by Project construction are delineated with the Project Footprint in Appendix 3, and summarized below in Table 7.

Table 7 Wetlands Present in the General Project Footprint Area

Wetland ID	Location (UTM 10U)		Wetland Class[1]	Description	Size (m^2)	Wetland Function (N, L, M, H)[2]
	Easting (m)	Northing (m)				
Site A	*Northern Extent*		Marsh Complex	A mixture of spring marsh and riverine swamp. Dominant vegetation is cattails and willow / dogwood shrubs. Hydraulic influences - two 1st and 2nd order streams, and likely from surface runoff and groundwater discharge. Seasonal flow.	9,250 (0.93 ha)	M – H (53%)
	698939	5681745				
	Southern Extent					
	698909	5681402				
Site B	*Northern Extent*		*Slope Marsh	Wetland displays characteristics of, and functions as, a slope marsh (influenced by surface runoff and	394	L – M (34%)
	698704	5683655				
	Southern Extent					

Wetland ID	Location (UTM 10U)		Wetland Class[1]	Description	Size (m^2)	Wetland Function (N, L, M, H)[2]
	Easting (m)	Northing (m)				
	698709	5683523		groundwater discharge, soggy / saturated ground, seepage discharge), but has been anthropogenically modified (ditched / channelized, constrained by Dunn Lake Road). Hydraulic influences: groundwater discharge, surface runoff. Semi-permanent flow.		
Site C	*Northern Extent*		Isolated Basin Marsh	Wetland displays characteristics of and functions as an isolated basin marsh (hydraulic inputs) and may have historically been a linked basin marsh, but has been anthropogenically modified (dredged, isolated from Site B wetland by berms / ditches and a culvert on Dunn Lake Road, impacted by livestock grazing further downstream). Hydraulic influences: groundwater discharge, surface runoff, precipitation, roadside drainage. Permanent feature.	295	L – M (30%)
	698677	5683645				
	Southern Extent					
	698681	5683612				
Site D	*Northern Extent*		Marsh Complex	A mixture of riparian floodplain marsh and floodplain swamp, highly influenced by annual snowmelt / rainfall levels, and constrained to the east by Dunn Lake Road, and to the west by the CN Railway track that borders the entire west margin. Alluvial patterns (marshes / levees) influence vegetation structure in this complex; dominant vegetation in low-lying marsh include graminoids, sedges and mosses; dominant vegetation in the swamp portions include trembling aspen, black cottonwood, red-osier dogwood, and high-bush cranberry. Transition areas dominated by reed-canary grass. Hydraulic influences - two 1st and 2nd order streams, precipitation, groundwater discharge, roadside and railway drainage constraints. Seasonal flow.	63,344 (6.3 ha)	M – H (45%)
	698530	5685263				
	Southern Extent					
	698512	5684408				
Site E	*Northern Extent*		Swamp	A riverine riparian swamp. Bordered by on the east by Dunn Lake Road, and to the west by the CN Railway track. Dominant vegetation includes trembling aspen, black cottonwood, lady fern, high-bush cranberry, and skunk cabbage. Transition areas	19,107 (1.91 ha)	M – H (64%)
	698448	5688679				
	Southern Extent					
	698423	5688498				

Wetland ID	Location (UTM 10U)		Wetland Class[1]	Description	Size (m^2)	Wetland Function (N, L, M, H)[2]
	Easting (m)	Northing (m)				
				contain common burdock and knapweed. Hydraulic influences - Four 1st and 2nd-order streams, precipitation, groundwater discharge; year-round flow. Outflow is constrained by the CN track – one culvert observed at the southwest corner of the wetland. Permanent feature.		

Notes:
1: Wetland delineation occurred in December 2021; wetland boundaries were determined from a combination of visible extent of 50/50 wetland plants, and the presence of permanent / standing water. Wetland Class determined using the Canadian Wetland Classification System (National Wetland Working Group 1997).
2 (Triton Environmental 2021):
N - None
L - Low
M - Moderate
H - High

The Conservation Data Centre (CDC) lists several aquatic plant species-at-risk with potential to occur in the Project area (SRLLP 2020a; Appendix 4). No aquatic plant species at risk were identified during baseline surveys for the Project. Additional wetland surveys are planned for late spring 2022 to inform the wetland offset program, and to identify presence and suitability for potential aquatic plant species at risk.

5.4 Terrestrial Vegetation

5.4.1 Native Vegetation

Within the RSA, terrestrial land cover is represented by five Biogeoclimatic (BEC) Zones (B.C. Government 2021):

- Thompson Moist Warm Interior Douglas-fir (IDFmw2)
- North Thompson Dry Mild Montane Spruce (MSdm3)
- North Thompson Dry Cold Engelmann Spruce – Subalpine Fir (ESSFdc3)
- Cascade Dry Cool Interior Douglas Fir (IDFdk2)
- Thompson Moist Cool Interior Cedar Hemlock (ICHmk2)

The predominant land cover zone in the RSA is the IDFmw2, which occurs in valley bottomlands and hillsides of the North Thompson River valley from 335 to 1100 m elevation (Lloyd et al. 1990). Typical climatic conditions are characterized by warm, dry summers where moisture deficits are common.

Vegetation throughout the Project area is a combination of hayfields, urban use, and mixed forested species. Dominant tree species in the area consist of Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), and trembling aspen (*Populus tremuloides*). Dominant shrub vegetation includes black hawthorn, (Crataegus douglasii), alder (*Alnus spp*), and rose (*Rosa spp*). A full list of plant species encountered can be found in Appendix E of the SAR Assessment (SRLLP 2020a).

The CDC lists six plant species-at-risk, as well as two at-risk ecological communities with potential to occur in the Project area (SRLLP 2020a; Appendix 4). No plant species at risk were identified during baseline surveys for the Project.

5.4.2 Invasive Species

Fourteen invasive plant species were observed in the Project area, including three provincially noxious species, and six regionally noxious species (SRLLP 2020a)(Table 8). Large areas of diffuse knapweed (*Centaurea diffusa*) and spotted knapweed (*C. stoebe*) were recorded in urbanized areas within the Project area (SRLLP 2020a). A full list of invasive plant species encountered can be found in Appendix E of the SAR Assessment (SRLLP 2020a).

Table 8 Regional and Provincial noxious weeds observed in the Project Area (SRLLP 2020a)

Species		**Provincial Ranking[1]**
Latin Name	**English Name**	
Provincially Noxious		
Cirsium arvense	Canada thistle	SNA / Exotic
Centaurea diffusa	Diffuse knapweed	SNA / Exotic
C. stoebe	Spotted knapweed	SNA / Exotic
Regionally Noxious		
Arctium minus	Common burdock	SNA / Exotic
Tanacetum vulgare	Common tansy	SNA / Exotic
Galium aparine	Cleavers	S5 / Yellow
Berteroa incana	Hoary alyssum	SNA / Exotic
Leucanthemum vulgare	Oxeye daisy	SNA / Exotic
Potentilla recta	Sulphur cinquefoil	SNA / Exotic

Notes:

[1] - Provincial Conservation Status – SNA = Not applicable, S5 = Demonstrably widespread, abundant and secure.

- B.C. List Status – Exotic = Species that have been moved beyond their natural range as a result of human activity. Yellow = Includes species or ecological communities that are apparantely secure and not at risk of extinction.

5.5 Wildlife

5.5.1 Wildlife and Wildlife Habitat

Since 2019, there have been 569 bird, 14 mammal, 7 reptile, and 8 amphibian observations, representing 67 bird, 9 mammal, 3 reptile and 1 amphibian species, recorded via bird nest sweeps, songbird point counts, wildlife habitat surveys, and incidental observations (Table A1). The most numerous species encountered was the American robin (*Turdus migratorius*) with 90 individual sightings, followed by western tanager (*Piranga ludoviciana*) (39), spotted towhee (*Pipilo maculatus*) (22), and northern flicker (*Colaptes auratus*) (21).

Songbird point count surveys were conducted throughout the Project area (49 stations total) and approximately 50 different species of birds were identified (Estsék' 2019). Several woodpecker species including the hairy woodpecker (*Dryobates villosus*)and northern flicker were observed with active nests and actively foraging on trees along the ROW, which were marked with appropriate buffers (Estsék' 2019). Waterfowl were observed in the wetland areas as well as flying over the Project area (Estsék' 2019). A red-tailed hawk's nest was observed approximately 2 km north of the Chu Chua Fire Department (Estsék' 2019). Columbian ground squirrels (*Urocitellus columbianus*) and burrows were observed to be prolific throughout the Project area (Estsék' 2019).

A natural mineral lick was observed on the east side of Dunn Lake Road, approximately 800 m south of the SFN band office with signs of active use and wildlife trails connecting to it (Estsék' 2019). An inactive black bear den was identified 2 km north of the SFN band office (no recent use was noted) (Estsék' 2019). A full list of observed wildlife features identified during the surveys is provided in Table A2 of the 2020 SAR Assessment and incidental findings since then (e.g., wildlife crossings, bear dens) are presented in Appendix 2.

5.5.2 Wildlife Species at Risk

The CDC lists 35 wildlife species of concern with potential to occur in the Project area (BC CDC 2021). American badgers (*Taxidea taxus jeffersonii*) have been observed in the general Project area, as recently as November 2021 in fields along the Project Footprint area (G. Lampreau, *pers. comm.*), likely due to the presence of Columbian ground squirrels in the area. Badgers and eight other species at risk have been observed in the general Project area within the past five years, with habitat present along the Project Footprint area and or LSA.

- Northern rubber boa (*Charina bottae*)
- Swainson's hawk (*Buteo swainsoni*)
- Barn swallow (*Hirundo rustica*)
- Bank swallow (*Riparia riparia*)
- Lewis's woodpecker (*Melanerpes lewis*)
- Long-billed curlew (*Numenius americanus*)
- Common nighthawk (*Chordeiles minor*)
- Evening grosbeak (*Coccothraustes vespertinus*)

- American badger (*Taxidea taxus jeffersonii*)

The proposed Recovery strategy for the American badger jeffersonii (ECCC 2021) identifies candidate core and safe movement Critical Habitat within the Project Footprint, LSA and RSA.
Nine species with potential habitat present in the general Project area, and have been observed in region, but not in Project area include:

- Rough-legged hawk (*Buteo lagopus*)
- Western screech-owl (*Megascops kennicottii macfarlanei*)
- Yellow-breasted chat (*Icteria virens*)
- Northern goshawk (*Accipiter gentilis atricapillus*)
- Great blue heron (*Ardea herodias herodias*)
- Sharp-tailed grouse (*Tympanuchus phasianellus columbianus*)
- Olive-sided flycatcher (*Contopus cooperi*)
- Bobolink (*Dolichonyx oryzivorus*)
- Fisher – Columbian population (*Pekania pennanti* pop. 5)

Two species with potential or historical occurrence in the general Project area, with habitat present, include western toad (*Anaxyrus boreas*) and painted turtle (*Chrysemys picta* pop. 2). The remaining 15 species were not observed within the past 5 years, have unknown occurrence in the general Project area, or are data deficient. Additional desktop and field survey results from the 2019 Environmental Overview Assessment and Species at Risk Assessment (Estsék' 2019a; SRLLP 2020a) are provided in Appendices 2 and 3.

5.6 Social and Economic

5.6.1 Indigenous Communities

Simpcw is a part of the Secwepemc Nation, with Territory extending over 5 million ha of land from south of Vinsulla, BC, to east of Jasper, AB, and Kakwa Park to the north, and to Bowron Lake Park in the west (Simpcw First Nation 2021). Chu Chua, BC, located approximately 20 km north of Barriere, BC along the North Thompson River, is the main village of Simpcw First Nation. Demographic information for the community shows a steady growth in the population in recent years; between 1986 and 2016, total membership of Simpcw First Nation grew from 365 individuals to 718, with a membership population of 687 in 2020 (TNRD 2020; Simpcw First Nation 2021).

Simpcw First Nation, as a representative member of the Secwepemc Government to Government (G2G) Initiative, share collective interests and initiatives with other Secwepemc communities, or campfires, including "*the recognition of Secwepemc title and rights, changes in provincial legislative and policy developments in forestry, environment, wildlife, mining, and land use planning*" (Simpcw First Nation 2020).

The community of Chu Chua is supported by the following resources:

- A Band Administration office
- The Neqweyqwelsten School and Education Coordinator
- Health and Wellness Department
- Public Works Department
- Lands Department
- Natural Resources Department
- Fire Department
- Language and Culture Department
- Simpcw Fisheries – Dunn Creek Hatchery
- Archives and Genealogy Department

5.6.2 Employment and Procurement

Economic development initiatives for Simpcw First Nation are supported by several member-owned businesses, including Simpcw Resources Group Ltd., Estsék' Environmental Services LLP, and T'micw-kt Cultural Services LLP.

5.7 Cultural

5.7.1 Traditional Knowledge and Land Use

The Simpcw people have traditionally been hunters; summer hunting camps were established along the North Thompson and upper Fraser Rivers for hunting and fishing, collecting plants for food, medicine, and technologies, and trading with other Secwepemc and other Nations (Simpcw First Nation 2021). Community resources such as the Neqweyqwelsten School, Language and Culture Department, and Archives and Genealogy Department work to incorporate Secwepemctsin (the language of the Secwepemc), traditional knowledge, land use and cultural teachings into the community.

Traditional knowledge and use surveys and community member engagement were completed by SFN for the Project. SFN community members continue to use IR and Crown lands throughout the RSA for a variety of purposes including hunting, trapping, fishing and plant gathering, the use of trails and travel-ways, as well as spiritual and cultural pursuits.

5.7.2 Archaeology and Heritage

Simpcw First Nation cultural heritage is overseen by the Cultural Heritage and Archaeology Monitoring Program. Hunting sites, traditional traplines, trail systems and travel corridors, fisheries, harvesting and gathering, habitation, spiritual and ceremonial sites, sacred areas, and wildlife, are all examples of cultural heritage types monitored by Simpcw First Nation; culturally significant areas such as wetlands are also monitored (Simpcw First Nation 2020).

An Archaeological Impact Assessment was completed for the Project and is on file with the BC Archaeology Branch. Archaeological sites have been identified, and all excavation works within known archaeological sites has been completed in accordance

with the Site Alteration Permit. Overview maps and additional details for each site are provided in the Site Alteration Permit.

Complete avoidance of archaeological sites is recommended as the ideal management for all the sites however, the Ministry Right of Way was established in 1999 and the Section 35 replacement land transfer Memorandum of Agreement was signed in December 2019. The Archaeological Impact Assessment provides information gathered through Systematic Data Recovery and survey of areas of archaeological potential. Regulatory permitting will provide legislative permission to engage in impacting activities and will outline mitigation measures. Special Provisions for contract tender will provide further information of regulatory requirements for control, handling, documentation, and monitoring of archaeological materials.

5.8 Health

5.8.1 Community Health and Safety

Community health and safety is administered through the Simpcw Health Program, a community-based service provider governed by the Simpcw Health Board and funded by the First Nations Health Authority. The Health Board plans, organizes and implements a broad range of health programs and services for the community such as community health nursing, home and community care, medical transportation, and injury surveillance & prevention.
Medical emergencies within the community are referred to the Provincial 911 Emergency dispatch system, run by BC Emergency Health Services under the Interior Health Authority. Several of the Chu Chua Volunteer Fire Department & First Responders are qualified Medical First Responders. The following health centres are within 100 km of the village of Chu Chua:

- Barriere Health Centre, 4537 Barriere Town Rd, Barrière, BC – 20 km
- Dr. Helmcken Memorial Hospital, 640 Park Drive, RR#1, Clearwater, BC – 80 km
- Royal Inland Hospital, 311 Columbia St, Kamloops, BC – 85 km

Specialized pediatric care is located approximately 550 km southwest of the community, at BC Children's Hospital in Vancouver, BC.

Public safety is addressed by the following:

- Chu Chua Fire Department
- Royal Canadian Mounted Police

The Simpcw Fire Department also helps with emergency response and wildfire response.

5.8.2 Accidents and Malfunctions

The B.C. Environmental Emergency Program (EEP) is responsible for responding to hazardous material spills in the province. Under the Environmental Management Act and

Spill Reporting Regulation(s), spills must be immediately reported to the Report a spill hotline.

5.8.3 Contaminated Sites

The Phase 1 Environmental Site Assessment (ESA) identified areas of concern and recommended further investigation. A Soil Characterization program investigated the areas outlined in the ESA and soils were sampled, characterized, and classified. Special Provision for contract tender will outline the required mitigation, handling, and disposal of these material at a Registered Receiving Facility. The Ministry will monitor compliance as part of the Major Works contract.

6.0 Effects and Cumulative Effects Assessment

Using the assessment methodology described in Section 4.0 of this EIA, an assessment of the potential environmental, social and cultural effects associated with the construction and operation of the Project was conducted.

The potential environmental, social and cultural effects associated with the Project are presented in the following Interactions Table (Table 4) for all VCs, as well as for accidents and malfunctions. An evaluation of significance using the criteria presented in Table 5.3 for the residual effects and cumulative effects associated with the applicable environmental, social and cultural VCs is also provided.

Interactions Table

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
Geographic Environment					
Geology and Topography	• Project activities that have the potential to interact with geology and topography include: – Road cutting, filling and re-grading – ditching – channelization work – road widening – power pole installation and fibre optic realignment • The proposed road traverses even to undulating terrain predominantly overlapping the existing gravel road. Project activities are not anticipated to result in any alterations or increased disturbance to bedrock. Consequently, associated potential effects, such as acid-rock drainage and metal leaching, are not predicted to occur, and an assessment of the potential effects of the Project on Geology is not warranted. • Road widening and associated ditching will, however, result in minor, continuous alteration to topography for the length of the Project. This will be partially offset by decommissioning and restoration of abandoned road surfaces.	• Alterations to topography as a result of the Project	• Re-establish surface drainage patterns following construction, install drainage and erosion control measures and complete the installation of sedimentation control measures at all watercourse crossings. • Revegetation seeding shall be applied to all disturbed areas of the Site including all soil cuts and embankment slopes. • Abandoned road surfaces will be decommissioned and restored to a representation of natural contours.	• The predicted residual effect of alteration to topography as a result of the Project is considered to be short- to medium term in duration, negligible to low magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Medium-term – **Frequency**: Frequent/Regular to Continuous – **Magnitude**: Negligible to Low – **Probability**: High	The Project has the potential to contribute to cumulative alterations in topography within the RSA. Since the residual effect is assessed to be of negligible to low magnitude, relative to existing conditions and previous levels of topographic alteration to the Project Footprint, the predicted residual cumulative effect is considered to be short- to medium term in duration, negligible to low magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.
Stability and Soils	• Project activities that have the potential to interact with stability and soils include: – grading – ditching – channelization work – road widening – power pole installation and fibre optic realignment – reclamation – operations and maintenance activities • Minor areas terrain alteration are anticipated due to grading and sidehill slope cuts. However, since the Project Footprint and associated Project construction activities are located along previously altered terrain, and any new	• Diminished slope stability due to vegetation clearing or changes in drainage patterns • Reduced topsoil productivity due to admixing or compaction • Reduced topsoil productivity due to loss of surface material through wind and water erosion • Reduced soil productivity due to disturbance of previous contaminated sites	***Terrain Stability*** • Follow erosion and sediment control (ESC) measures provided in the Erosion and Sediment Control Plan. Deploy ESC measures before starting work. • Regularly inspect and repair all ESC measures and structures throughout construction. • Clearing and Grubbing shall be carried out to the limits as shown on the Detailed Construction Drawings or as otherwise modified by the Ministry Representative. • Re-establish surface drainage patterns following construction, install drainage and erosion control measures and complete the installation of sedimentation control measures at all watercourse crossings. • Abandoned road surfaces will be decommissioned and restored through hydroseeding or planting of trees and shrubs that are natural to the area.	• Mitigation is likely to prevent any residual effects associated with terrain stability, or reduce it to negligible levels. As a result, the residual effect is avoided or entirely alleviated with mitigation, or would be negligible and confined to localized areas within the Project Footprint, and likely to be resolved during construction or reclamation. No further assessment was conducted. • The predicted residual effect of reduced soil productivity due to loss of surface material through wind and water erosion or admixing or compaction is considered to be reversible in the short-term, low magnitude, with a low probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows:	The assessment concluded that residual effects of the Project on Stability and Soils were unlikely to occur, or would be minor and effectively resolved through standard mitigation. Consequently, a cumulative interaction was deemed unlikely and a cumulative effects assessment was not warranted for this VC.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
	alterations in topography are anticipated to be negligible. • Minor areas of terrain alteration may create areas of terrain instability, causing slope failure, erosion or slumping. Slope instability may also occur in areas where the existing terrain conditions are vulnerable to construction activities causing site disruption (*e.g.*, due to soil erosion, vegetation removal and changes to drainage patterns).		• Revegetation seeding shall be applied to all disturbed areas including all soil cuts and embankment slopes. • Ensure all areas excavated, graded, or otherwise disturbed by the Contractor have been shaped and stabilized, by revegetation seeding or other means, so as to prevent weathering, erosion, slumping or siltation, and so that the Contract requirements for protection of the environment have been, and will continue through the winter, to be met. • During Seasonal Shut-Down, there may be an increased risk that sediment will be released from the Project, the Contractor shall be responsible for implementing remedial Sediment and Drainage Management Plan. • Additional mitigation for terrain stability at watercourse crossings is provided under the Aquatic Environment VC of this Interactions Table. ***<u>Topsoil Productivity</u>*** • Follow ESC measures provided in the Erosion and Sediment Control Plan. Deploy ESC measures before starting work. • Regularly inspect and repair all ESC measures and structures throughout construction. Separate Erosion and Sediment Control Plans for Work in the Special Erosion Protection Areas will be required and will be subject to review on a weekly basis by the Ministry Representative and the Contractor. Where required by the Ministry, the Contractor shall submit an updated Erosion and Sediment Control Plan to the Ministry Representative for acceptance. • Restrict vehicles and equipment from accessing natural soil surfaces to be retained. Where possible provide exclusion fencing for no-go zones. • In areas determined by the Environmental Monitor to have high erosion or siltation potential, clearing and brushing activities will be conducted to limit the amount of exposed surface area and construction will promptly proceed with earthwork and stabilization. • The sites shall be stripped of topsoil and organic materials over the entire excavation and embankment area except as modified herein: – Materials stripped from the excavation areas shall be placed outside the embankment toes to the greatest extent possible. In no circumstances shall the stripped material be placed above the subgrade elevation on the embankment slopes.	– **Spatial Boundary**: Footprint – **Duration**: Short-term – **Frequency**: Frequent/Regular – **Magnitude**: Low – **Probability**: Low • Mitigation is likely to prevent any residual effects associated with disturbance of previously contaminated sites. As a result, the residual effect is avoided or entirely alleviated with mitigation. No further assessment was conducted. For an assessment of contamination of soils due to Project-related spill, refer to the Health VC of this Interactions Table.	

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			– Where there is insufficient room for the stripping to be placed outside of the embankment areas, the topsoil shall be stockpiled at a location determined by the Contractor for later use, to be hauled and spread on the cleared right-of way and up the fill slopes as slope dressing. – Where there is insufficient room to dispose of the stripped material at the embankment areas the excess material shall be removed and disposed of in the Ministry provided disposal site. • Reseed impacted areas, for soil stabilization with hydroseeding, in accordance with MOTI requirements. ***<u>Soil Contamination</u>*** • It has been determined that the excavation between station 102+20 and 106+20 and 128+70 to 129+00 is characterized as IL+ and must be disposed of at a facility licensed to receive material meeting this level of contamination. • If materials are identified from station ranges 65+00 to 102+20, 106+20 to 128+70, 129+00 to 159+25 and 180+00 to 187+00 that are believed to be potentially contaminated (evidence of contamination is observed), the Contractor shall immediately cease work in that area, notify the Ministry Representative, and manage and characterize the materials. • Examples of evidence of contamination include the presence of free product, sheen, staining, debris and/or hydrocarbon odors. • The Contractor shall remove and dispose of potentially contaminated materials from the site to a facility licensed to receive the material. • Ensure spill kits are provided on-site and stored on all heavy equipment during construction. • In the event of an accidental spill, implement the Spill Contingency Plan.		
Atmospheric Environment					
Climate	• Project activities that have the potential to interact with climate through the release of greenhouse gas emissions (GHGs) include: – vehicle and equipment use during construction – land clearing – vehicle traffic during operations • Construction-related GHG emissions will result from the exhaust emissions of	• Project contribution to provincial and national GHG emissions	• Reduce idling of equipment, where practical. • The Contractor will ensure equipment is well-maintained. • Ensure compliance with the BC *Carbon Tax Act*. • Minimize (through Project engineering design and operational/maintenance procedures) the intermittently vented Emissions. • Disposal of slash by burning will not be permitted.	• The predicted residual effect of Project contribution to provincial and national GHG emissions is considered to be long-term duration, but negligible in magnitude, with a high probability of occurrence. Relative to existing conditions, and with implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance	The Project will be designed and operated to comply with provincial and federal GHG emission programs. Considering existing traffic use along Chu Chua Road and overall Project scope relative to baseline conditions, the Project's GHG emissions would not be reasonably expected to materially contribute to global climate change.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
	on-road and off-road vehicles and equipment during construction, and emissions from slash burning during land clearing where timber salvage is not feasible. • The primary source of GHG emissions during operations would be from regular vehicle traffic, which may experience an incremental increase as a result of the transition from gravel to paved.		• The Contractor shall exercise diligent dust control to prevent construction dust damaging crops, or property, or creating labour intensive operations for the property owners. The Contractor shall be responsible for any crop or property damage and any claim as a result of construction activities. • The Contractor shall monitor the effects of dust on the travelling public and local residents and immediately rectify unfavorable conditions. • Implement additional measures provided in the Project-specific Air Quality and Dust Control Plan.	evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: International – **Duration**: Long-term – **Frequency**: Frequent/Regular – **Magnitude**: Negligible – **Probability**: High	
Air Quality	• Project activities that have the potential to interact with this air quality include: – exhaust from vehicle and equipment use – smoke from slash burning – odour and emissions associated with laydown of asphalt – vehicle traffic during operations • The North Thompson airshed affected by the Project is considered remote and typically exhibits excellent air quality. Predominant factors resulting in decreased air quality within the airshed predominantly result from wildlife fire smoke during summer months and smoke from residential wood burning in winter months, particularly during temperature inversions, common throughout the valley bottom. Nevertheless, background levels of air contaminants are typically very low in the airshed, and therefore has a low sensitivity to Project related emissions. • Notably, dust levels during operation of the paved road are expected to be substantially lower than present levels along the graveled road. Consequently, only dust emissions associated with construction are considered in this assessment.	• Increased levels of particulate matter during construction. • Increased levels of nuisance emissions and odours during construction and operation		• The predicted residual effect of increased levels of particulate matter during construction is considered to be short-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: RSA – **Duration**: Short-term – **Frequency**: Frequent/Regular – **Magnitude**: Negligible to Low – **Probability**: High • The predicted residual effect of increased levels of nuisance emissions and odours during construction and operation is considered to be short-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: RSA – **Duration**: Short-term – **Frequency**: Frequent/Regular – **Magnitude**: Negligible to Low – **Probability**: High	The Project has the potential to contribute to cumulative increases in levels of nuisance emissions and odours within the RSA. Since the residual effects are assessed to be of negligible to low magnitude, relative to existing conditions, the predicted residual cumulative effect is considered to be short- to medium term in duration, negligible to low magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.
Light and Noise	• Project activities that have the potential to interact with light and noise include: – vehicle and equipment use during construction • Sources of noise from the Project will occur during construction from vehicle	• Increase in nuisance noise generated during construction	• Construction activities will take place during daytime hours • Reduce idling of equipment, where practical. • ensuring vehicles and equipment are well-maintained.	• The predicted residual effect of increased levels of nuisance noise during construction is considered to be short-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual	• The Project has the potential to contribute to cumulative increases in levels of nuisance noise within the RSA. Since the residual effect is assessed to be of negligible to low magnitude, relative to existing conditions, the predicted residual cumulative effect is

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
	and equipment use, and operation during vehicle traffic and maintenance activities. • Sound levels resulting from the Project are expected to vary depending the activities. Project activities take place in a relatively rural setting containing sporadic, low density residential sites within the 500 m LSA. • Noise levels resulting from Project construction are expected to increase relative to existing noise levels created by the Chu Chua road and adjacent CN railway. • Roadway noise is the collective sound energy emanating from motor vehicles. During operations, a slight decrease in acoustic levels will likely result from the transition from gravel to paved road conditions, for example, from absence of washboard rattling and reduced vibrations from uneven road surfaces. Consequently, this impact assessment only considers nuisance noise generated from construction activities. • Existing light emissions sources in the LSA are predominantly associated with rural residential areas, street lights, and the CN railway. Construction will take place during daylight hours, and the location and frequency of any high-mast lighting is expected to remain unchanged. No other additional sources of light pollution beyond existing vehicle use are anticipated. Consequently, no potential effects related to light pollution were identified in this impact assessment.		• Take reasonable measures to mitigate any excess noise concerns brought forward by affected landowners and users.	effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: LSA – **Duration**: Short-term – **Frequency**: Frequent/Regular – **Magnitude**: Negligible to Low – **Probability**: High	considered to be short-term in duration, negligible to low magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.
Aquatic Environment					
Water Quality and Drainage	• Project activities that have the potential to interact with water quality and drainage include: – clearing and grubbing – road cutting, filling and re-grading; – ditching and drainage structures – channelization work – road widening – power pole installation and fibre optic realignment – reclamation	• Reduction of surface water quality during construction and operations. • Alteration of natural drainage patterns. • Contamination of the aquatic environment due to an accidental spill.	• The Contractor will obtain and follow all applicable federal and provincial permits and/or authorizations prior to the commencement of construction and in-stream activities. • All notifications will be completed in accordance with Fisheries and Oceans Canada (DFO) requirements as well as the BC Water Sustainability Act and Water Sustainability Regulation. • The Contractor shall retain an Environmental Monitor. The Qualified Environment Professional (QEP) shall be on site for all construction activities taking place at sensitive watercourses and other	• The predicted residual effect of a reduction of surface water quality during construction and operations is considered to be short-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: LSA – **Duration**: Short-term	• The Project has the potential to contribute to cumulative impacts on water quality within the RSA. Since the residual effects are assessed to be of negligible to low magnitude, relative to existing conditions, the predicted residual cumulative effect is considered to be short to long-term in duration, negligible to low magnitude, with a high probability of occurrence. With implementation of mitigation, this

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
	– operations and maintenance activities • The sensitivity of these watercourses to Project activities depends on land and water use conditions and their influence on natural flow regimes and water quality, in addition to the size of the receiving basin. The large watershed of the North Thompson River is anticipated to be very resilient to an incremental impact to water quality or hydrology resulting from the Project. • No groundwater features such as springs, wells or shallow aquifers were identified with the potential to be impacted by Project activities. Consequently, no potential effects related to groundwater were identified in this impact assessment.		environment features (e.g., wetlands, breeding birds, amphibian and reptile habitat). ***Surface Water Quality*** • At the completion of grading the Contractor shall flush all culverts, storm drains and associated appurtenances to leave them clean and hydraulically efficient. • The Contractor shall construct instream works as shown on the Detailed Construction Drawings. • All instream works shall be carried out in accordance with Protection of the Environment. • Stockpiles containing erodible material generated from clearing and/or grubbing will be situated where sediment and/or other deleterious material can be contained and prevented from entering any watercourse. • The Contractor shall supply and place natural streambed material as shown on the Detailed Construction Drawings. • Natural streambed material shall be salvaged from excavated in-situ channel bed substrate and stockpiled for re-use. • Upon completion of the riprap the Contractor shall place the channel infill material as shown on the Detailed Construction Drawings. • Follow erosion and ESC measures provided in the Erosion and Sediment Control Plan. Deploy ESC measures before starting work. • Regularly inspect and repair all ESC measures and structures throughout construction. • Implement additional measures provided in the Water Quality and Fish Habitat Protection Plan. ***Natural Drainage Patterns*** • The Contractor shall supply and install culverts at locations, depths, grades and lengths as necessary to field fit the designed pipe to the actual post-stripping ditches and drainage patterns. • The Contractor shall supply, and place riprap of the various classes as shown on the Detailed Construction Drawings. • Areas of the Project, which may be characterized by poor drainage, standing water, and/or drainage flowing directly into fish-bearing streams or sensitive watercourses, will be designated as Special Erosion Protection Areas.	– **Frequency**: Infrequent – **Magnitude**: Negligible to Low – **Probability**: High • The predicted residual effect of a alteration of natural drainage patterns is considered to be short to long-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Short to Long-term – **Frequency**: Frequent/Regular to Continuous – **Magnitude**: Negligible to Low – **Probability**: High • The predicted residual effect of contamination of the aquatic environment due to an accidental spill is considered to be short to long-term duration, low to high in magnitude, with a low probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: LSA to RSA – **Duration**: Short to Long-term – **Frequency**: Infrequent – **Magnitude**: Low to High – **Probability**: Low	predicted residual cumulative effect is not significant. • The assessment concluded the residual effect of contamination of the aquatic environment due to an accidental spill was unlikely to occur, or would be minor and effectively resolved through standard mitigation. Consequently, a cumulative interaction was deemed unlikely and a cumulative effects assessment was not warranted.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			• Immediate stabilization of any banks or shoreline disturbed during construction by revegetating as soon as practicable. <u>*Riprap – Skowootum Creek Instream Works*</u> • The Contractor shall reserve sufficient quantity of the natural streambed material to fill interstices of riprap and to place in the completed channel as shown on the Detailed Construction Drawings. The Contractor shall ensure the interstices are filled to the extent that water flows over top of the riprap as opposed to through it. • The Contractor shall supply and install Class 1 Geotextile as shown on the Detailed Construction Drawings. <u>*Riprap – Newhykulston Creek Instream Works*</u> • All 500 kg Class rock riprap used for the instream grade control weirs shall be subrounded in shape and meet the gradation limit. • The voids of all 250 kg Class and 500 kg Class rock rip riprap shall be infilled with natural creek substrate (i.e., sand and gravel) to reduce the potential for interstitial flow of water. Particular attention shall be made to adequately infilling the downstream-most grade control weir. • The Contractor shall reserve sufficient quantity of the natural streambed material to fill interstices of riprap and to place in the completed channel as shown on the Detailed Construction Drawings. The Contractor shall ensure the interstices are filled to the extent that water flows over top of the riprap as opposed to through it. ***<u>Accidental Spills</u>*** • All equipment will be clean, leak free and in top operating condition prior to mobilization to the site. • Contractor personnel trained in refueling procedures and the proper use of spill kits will carry out all refueling procedures. All construction personnel will be made aware of the refueling and servicing protocols for onsite vehicles and equipment during regular tailgate meetings. • Refueling and servicing of major, mobile equipment will be conducted a minimum 30 m away from all water bodies, drainages, and environmentally sensitive areas. • Use secondary containment for all fuels and other hazardous materials storage containers.		

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			• Ensure spill kits are provided on-site and stored on all heavy equipment during construction. • Potentially deleterious substances including paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals will not enter any drainage or watercourse. • In the event of a spill, implement the Spill Contingency Plan.		
Wetland and Riparian Areas	• Project activities that have the potential to interact with wetland and riparian areas include: – clearing and grubbing – road cutting, filling and re-grading; – ditching and drainage structures – channelization work – road widening – reclamation – operations and maintenance activities • The Project is estimated to impact approximately 300 m^2 of wetland area. • Although expected to be minor, Project construction activities have the potential to impact riparian habitat areas associated with the watercourses and wetland areas impacted by the Project. Riparian areas are ecosystems that are the interface between aquatic and terrestrial environments. Riparian areas usually have visible vegetative or physical characteristics reflecting the influence of water.	• Alteration or loss of wetlands and wetland habitat. • Alteration or loss of riparian habitat.	• The Contractor shall retain an Environmental Monitor. The QEP shall be on site for all construction activities taking place at sensitive sites such as wetlands and riparian areas. • Conduct wetland crossings in accordance with Detailed Construction Drawings. • Reduce damage to wetlands and riparian areas by flagging or fencing buffers for avoidance. ***Wetlands and Wetland Habitat*** • Use geotechnical matting, rig mats, swamp mats or access mats for access through wet areas. • If warranted, install appropriate temporary erosion and sediment control structures. *Wetland Offsetting* • Wetland offset to take place during new road alignment construction activities as excavator will be required to facilitate reclamation activities. • Road surface shall be excavated to a depth not greater than the existing wetland. Wetland boundary will remain at least 10m from toe of the fill slope of the new road alignment as per MOTI Geotechnical department recommendations. Survey shall be on-site during excavation activities as to ensure wetland dimensions/specs conform to those allowed by MOTI Geotechnical department. • Soils shall be examined by qualified professional(s) to determine suitability for wetland reclamation. • Hydrophytic plant species shall be planted within new wetland area and suitable species planted within the upland/transitional area. Vegetation shall be planted to match existing vegetation cover (%) upon maturity. Erosion control matting shall be seeded and/or planted with hydrophytic grass species as to ensure vegetated growth throughout the reclaimed area. Simpcw First Nation Natural Resource Department shall be consulted prior to planting to determine culturally	• The predicted residual effect of alteration or loss of wetlands and wetland habitat is considered to be short to long-term duration, low in magnitude, with a high probability of occurrence. With implementation of mitigation and offset measures, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Short to Long -term – **Frequency**: Frequent/Regular to Continuous – **Magnitude**: Low – **Probability**: High • The predicted residual effect of alteration or loss of riparian habitat is considered to be short to long-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation and wetland offset measures, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Short to Long -term – **Frequency**: Frequent/Regular to Continuous – **Magnitude**: Low – **Probability**: High	• The Project has the potential to contribute to cumulative impacts on wetlands and riparian areas within the RSA. However, the residual effects resulting from the Project are considered incremental contributions relative to the RSA, and will be partially offset. Relative to existing conditions, the predicted residual cumulative effect is considered to be short to long-term in duration, low magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			significant species to be utilized in revegetation activities • Additional mitigation and specific offset measures will be provided in the Wetland Offset Plan, to be submitted to the ISC prior to start of Project construction. ***Riparian Areas*** • Limit impacts to on-site vegetated and adjacent riparian areas. • All efforts will be made to preserve and stockpile coarse woody debris for the reclamation of any riparian area. • Work activities will be restricted to areas within the limits of construction, and the storage of hazardous materials will occur outside of the road right-of-way. Where Project areas are located adjacent to or on steep slopes above riparian areas and watercourses, care will be taken to avoid introduction of deleterious or hazardous materials into riparian areas, drainages, and watercourses. Follow additional measures in the Erosion and Sediment Control Plan and Spill Contingency Plan. • Riparian vegetation will be planted to native riparian species.		
Freshwater Fisheries and Ecosystems	• Project activities that have the potential to interact with freshwater fisheries and ecosystems include: – clearing and grubbing – road cutting, filling and re-grading – ditching and drainage structures – channelization and enhancement work – road widening – reclamation – operations and maintenance activities • Fish species with the potential to be present include pink and coho salmon, as well as rainbow and bull trout. However, quality of fish and fish habitat for life stages such as rearing, spawning and overwintering was observed to be negligible to low during baseline studies. In most cases, habitat immediately upstream of Dunn Lake Road is limited due to steep gradient and seasonal or highly variable discharge. In addition, steep gradients, perched culverts and/or	• Alteration or loss of fish and fish habitat.	• The Fishery Timing Window for designated streams on this Project is the period from July 22 to September 30. • Any activity within the wetted perimeters of the Designated Fisheries Sensitive Zones shall be carried out only within the Fishery Timing Window, except where the Contractor has applied for a variance and received written notification from the Ministry Representative of any relaxation to this requirement that may have been permitted by the Ministry of Forests, Lands and Natural Resource Development and Rural Development and/or Fisheries and Oceans Canada. • An Environmental Monitor shall be present and or work activities have the potential to impact fish or aquatic habitat. • Minimize disturbance and unnecessary construction activities or delays within the 30 m riparian areas of fish-bearing watercourses. • Clearing activities will be conducted to avoid falling timber into any watercourses apart from those situations approved by the Environmental Monitor.	• The predicted residual effect of alteration or loss of fish and fish habitat is considered to be short to long-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation and fish habitat enhancement measures, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Short to Long -term – **Frequency**: Frequent/Regular to Continuous – **Magnitude**: Low – **Probability**: High	• The Project has the potential to contribute to cumulative impacts on fish and fish habitat within the RSA. However, the residual effects resulting from the Project are considered incremental contributions relative to the RSA. Furthermore, enhancement measures will be implemented and are expected to improve long-term fish habitat relative to existing conditions. Consequently, the predicted residual cumulative effect is considered to be short to long-term in duration, low magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
	instream debris were also observed has potential obstacles to upstream migration from the North Thompson River.		• A QEP will be present to support instream works to salvage and relocate fish, as needed, for isolation of the work zone. • All areas impacted by initial clearing and grubbing and decommissioning of abandoned road surfaces will be revegetated and restored. • The existing low-quality habitat for any fish in Newhykulston will be improved with the replacing the existing perched culvert with an open bottom Deep Corrugated Steel Pipe. Instream works will be hydraulicly designed to support fish habitat and protect the banks for erosion and the structures from scour. Similar habitat improvements will be completed at Skowootum Creek and the unnamed watercourse crossings. • Disturbed riparian areas will be planted with native riparian species. • Additional mitigation pertaining to watercourses and the protection of fish and fish habitat is provided under the Geographic Environment and Aquatic Environment VCs of this Interactions Table. • Implement additional measures provided in the Water Quality and Fish Habitat Protection Plan.		
Terrestrial Vegetation					
Native Vegetation	• Project activities that have the potential to interact with native vegetation and ecosystems include: – clearing and grubbing – reclamation and seed mix selection – operations and maintenance activities	• Alteration or loss of native vegetation communities.	• Clearing and Grubbing shall be carried out within the limits of the Project Footprint shown on the Detailed Construction Drawings or as otherwise modified by the Ministry Representative. • Reduce damage to vegetation by flagging or fencing sensitive areas for avoidance. • Prior to the commencement of clearing or brushing activities the Contractor's Environmental Representative will familiarize construction personnel with the environmental requirements and acceptable construction practices associated with the project. • Clearing or brushing activities will be conducted to protect vegetation outside of the Project Footprint except for danger trees, which will be removed with minimal disturbance to surrounding vegetation. • Clearing and brushing will be performed outside of the relevant watercourse and wetland buffers. • Minimized removal of vegetation and when practicable; prune rather than clearing/grubbing. • The Contractor shall remove and dispose of clearing and grubbing debris. Clearing and	• The predicted residual effect of alteration or loss of native vegetation is considered to be short to long-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation measures, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Short to Long -term – **Frequency**: Frequent/Regular to Continuous – **Magnitude**: Negligible to Low – **Probability**: High	• The Project has the potential to contribute to cumulative impacts on native vegetation within the RSA. However, the residual effects resulting from the Project are considered incremental contributions relative to the RSA. Relative to existing conditions, the predicted residual cumulative effect is considered to be short to long-term in duration, low magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			grubbing debris shall be disposed of in accordance with Contractor provided Disposal Site. • All areas disturbed by construction will be restored through hydroseeding or with planting of trees and shrubs that are natural to the area. • Areas for reclamation as shown on the drawing shall be scarified, filled to grade with topsoil and have revegetation seeding supplied. Other planting and revegetation in reclamation areas will be as directed by the Ministry Representative. • Additional fall rye and/or annual ryegrass nurse crop grass seed (aka cover crop grass seed) shall be provided by the Contractor, as needed for temporary erosion control on soil disturbances as required by the Construction Environmental Management Plan. • All disturbed areas within the Project boundaries are to receive treatment as soon as the Ministry Representative has approved the finished grading works. Seeding operations shall be carried out within forty-eight (48) hours of such approval being given. The Contractor shall record all details of seeding operations and shall provide these records to the Ministry Representative. • Slope preparation may include roughening, organic stripping or biotic soil media (BSM), as applicable, at locations determined by the Ministry Representative. • Biotic soil media shall be supplied by one of the suppliers on the Ministry's Recognized Products list. • Riparian vegetation will be planted to native riparian species.		
Weeds	• Project activities that have the potential to interact with weeds include: – clearing – topsoil salvage – transport of weeds by construction equipment – seed mix selection – reclamation and seed mix selection – operations and maintenance activities	• Introduction or spread of invasive plants.	• Due care should be taken to protect the site and surrounding area from the introduction or spread of invasive plants during construction. • Monitor areas with disturbed soils and remove regulated weeds as per the *Weed Control Act*. • Any new topsoil brought to site will be weed free. • Undercarriages, tracks, and blades of equipment will be visually inspected prior to entry onto the construction site and when vehicles are leaving the site, and all weed matter will be removed and disposed of appropriately. • Revegetate exposed soils with native species appropriate for the site condition, as soon as possible and where practical.	• The predicted residual effect of introduction or spread of invasive plants is considered to be short-term duration, low in magnitude, with a moderate to high probability of occurrence. With implementation of mitigation measures, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Short-term – **Frequency**: Infrequent – **Magnitude**: Low – **Probability**: Moderate to High	• The Project has the potential to contribute to cumulative increases of invasive plants within the RSA. However, the residual effects resulting from the Project are considered incremental contributions relative to the RSA. Relative to existing conditions, the predicted residual cumulative effect is considered to be short to long-term in duration, low to medium magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			• Monitoring efforts may include, ensuring preventative seeding of exposed soils, conducting checks of construction equipment entering the site for visible plant parts, and notifying the ministry representative of new invasive plant infestations.		
Wildlife					
Wildlife and Wildlife Habitat	• Project activities that have the potential to interact with wildlife and wildlife habitat include: – Clearing and grubbing – transportation of Project personnel and equipment – operations and maintenance activities • Except for the paving phase of the project, construction activities have the potential to result in loss of vegetation and the potential foraging and nesting habitat associated with disturbed areas.	• Alteration or loss of wildlife habitat suitability and effectiveness. • Increased wildlife disturbance and disruption during construction. • Increased wildlife mortality risk during operations.	***<u>Alteration or Loss of Wildlife Habitat</u>*** • Minimize forest clearing and cutting through reduced footprint. Replant non-hard surfaces with native vegetation. • Avoid clearing large mature trees wherever possible. If such trees cannot be avoided, it is recommended that they be reused on site as large woody debris for wildlife habitat • Retain or provide for the reuse of wildlife trees. Leave cut trees on the remaining forest floor to provide habitat and foraging opportunities. • Implement additional measures to mitigate and offset wildlife habitat provided in the Aquatic Environment and Terrestrial Vegetation VCs of this Interactions Table. • Implement spill response and clean-up measures provided in the Spill Contingency Plan. ***<u>Increased Wildlife Disturbance and Disruption</u>*** • Follow least risk breeding windows for clearing vegetation, if possible, and schedule construction activities that generate loud noises, that could disturb breeding birds, to occur within the least risk window. • Bird nest sweeps shall be completed prior to clearing and brushing to the standards of the provided Ministry of Transportation Breeding Bird Nest Sweep Protocol. • Provide an AQP to monitor active bird nests within the study area during construction outside the least risk window. AQP monitoring of active nests for disturbance within 200 m of construction noise is recommended. • Buffer zones to be placed around active nests. Monitoring of active nests for disturbance during construction by an AQP to determine impacts. • During the breeding bird nest sweeps, the qualified professional should also inspect all potential roost sites including bridges, buildings, cliffs, and snags for day roosting bats, and potential maternity roosts in the Project area.	• The predicted residual effect of alteration or loss of wildlife habitat suitability and effectiveness is considered to be short to long-term duration, low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Short to Long-term – **Frequency**: Frequent/Regular to Continuous – **Magnitude**: Low – **Probability**: High • The predicted residual effect of increased wildlife disturbance and disruption during construction is considered to be short-term duration, low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: LSA – **Duration**: Short-term – **Frequency**: Infrequent to Frequent/Regular – **Magnitude**: Low – **Probability**: High	• The Project has the potential to contribute to cumulative impacts on wildlife and wildlife habitat within the RSA. However, the residual effects resulting from the Project are considered incremental contributions relative to the RSA. Consequently, the predicted residual cumulative effect is considered to be short to long-term in duration, low magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			• The Environmental Monitor will perform a sweep of vegetated areas which may contain reptile or amphibian habitat prior to construction. Should a reptile or amphibian be observed, the Environmental Monitor will be notified immediately, and construction will cease until a site specific mitigation plan is developed. • Amphibian salvage and isolation fencing will be required for all areas identified as Amphibian Breeding Zone and conducted according to guidelines set forth in the *Guidelines for Amphibian and Reptile Conservation During Urban and Rural Land Development in British Columbia*. • Implement mitigation measures to reduce noise provide in the Atmospheric Environment VC of this Interactions Table. • Implement additional measures provided in the Project-specific Wildlife Management Plan. ***<u>Increased Mortality Risk</u>*** • Approximately 8 secondary dry-cross culverts are to be installed, intended for wildlife crossings, ranging in size from 600 to 900 mm diameter. • Implement measures to reduce wildlife mortality such as signage and speed limits. • Each construction site will be equipped with adequate garbage receptacles for solid non-hazardous wastes and debris. These materials will be collected, as required, and disposed of at approved locations. Food wastes will be stored in animal proof (bearproof) containers and transported to an appropriate landfill site. • Implement the Project-specific Traffic Control Plan.		
Wildlife Species at Risk	• Project activities that have the potential to interact with wildlife species at risk include: – Clearing and grubbing – transportation of Project personnel and equipment – operations and maintenance activities	• Activities that are counter to American badger Recovery Strategy initiatives include: a. The creation of new, or expansion of existing, barriers that prevent safe movement within and between Core and Safe Movement Critical Habitat. b. Converting habitat within an area containing Core	***<u>Alteration or Loss of Wildlife Habitat</u>*** • Minimize forest clearing and cutting through reduced footprint. Replant non-hard surfaces with native vegetation. • Avoid clearing large mature trees wherever possible. If such trees cannot be avoided, it is recommended that they be reused on site as large woody debris for wildlife habitat • Retain or provide for the reuse of wildlife trees. Leave cut trees on the remaining forest floor to provide habitat and foraging opportunities. • Implement additional measures to mitigation and offset wildlife habitat provided in the Aquatic	• The predicted residual effect of alteration or loss of wildlife habitat suitability and effectiveness is considered to be short to long-term duration, low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Short to Long-term – **Frequency**: Frequent/Regular to Continuous	• The Project has the potential to contribute to cumulative impacts on species at risk and their habitat within the RSA. However, the residual effects resulting from the Project are considered incremental contributions relative to the RSA. Consequently, the predicted residual cumulative effect is considered to be short to long-term in duration, high magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
		Critical habitat, effecting a net loss of biophysical attributes (e.g., suitable soils, active dens, forage) availability / potential. c. Purposely removing prey colonies from within Core Critical Habitat areas. • Increased disturbance to and potential mortality of species at risk during construction • Increased wildlife mortality risk during operations.	Environment and Terrestrial Vegetation VCs of this Interactions Table. • Implement spill response and clean-up measures provided in the Spill Contingency Plan. <u>*American Badger*</u> The following mitigation measures are recommended to avoid injuring or killing badgers in the Project area: • Create barriers without resulting in destruction of safe movement corridors between Core and Safe Movement Critical Habitat. • Restore foraging biophysical attributes elsewhere in Core Habitat; where denning attributes exist, and safe movement is possible within 20 km of the converted habitat. • Do not remove prey colonies from within Core Critical Habitat. • Time construction activities to avoid sensitive timing periods for American badgers. a. Avoidance of Burrows i. Winter burrows: Winter (November – February) ii. Natal burrows: Spring (March – April) * Summer burrows are not typically inhabited for long, as little as one night. To avoid impacts to active badger burrows, the following measures are recommended: • An appropriately qualified professional should conduct pre-construction burrow surveys and perform routine monitoring during construction to detect any badgers or their prey, that may re-establish in the construction area prior to construction completion. • Burrow surveys should distinguish between badger burrows and burrows created by other species; inactive and active badger burrows; winter and maternal natal burrows versus summer burrows. Summer Badger Movement (May - October) – summer foraging and mate selection efforts expand badger movements over larger home range areas, particularly males, increasing the risk of mortality due to vehicle collisions. Avoiding Project construction during summer movement timing window may not be feasible; to avoid impacts to individual badgers and badger populations, the following measures are recommended (R. Packham, 2022, unpublished document):	– **Magnitude**: High – **Probability**: Moderate to High • The predicted residual effect of increased wildlife disturbance and disruption during construction is short-term duration, high in magnitude, with a moderate to high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: LSA – **Duration**: Short-term – **Frequency**: Infrequent to Frequent/Regular – **Magnitude**: High – **Probability**: High	

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			• Reduce the use of concrete road barriers (CRBs) and avoid using solid CRBs to the greatest extent possible, in roadway construction and avoid placing such structures at known badger roadway crossings. • Locate culverts at known badger roadway crossing locations. • Install culverts as low in the road profile as possible but not enough to allow water to enter culvert inlets or pool at culvert outlets. • Install culverts on a slight grade (3-5%) to prevent water pooling in culverts. • Culvert sizes should be a minimum of 600 mm, preferably 900 mm, in diameter. • Where pooling at culvert outlets occurs, and drainage is not possible, dig water "infiltration sumps" at least one metre beyond the culvert outlet. • Install rip rap headwalls at culvert inlets and outlets to prevent sloughing and / or erosion of road embankments that can block wildlife access to culverts and allow water to pool in culverts. Alternatively, sufficiently extend culvert length beyond the toe of the road embankment to counter potential road embankment sloughing/erosion provided a hanging culvert isn't created. • Install culverts with substrates filling 30-50% of the culvert diameter. Although badgers readily use culverts without substrates, culverts with substrates are likely to be more suitable to provide passage for more species. If American Badger will be affected by the project activities in a way that contravenes the SARA (i.e., s.32 and s.33) a SARA Permit, under s.73 of the SARA, would be required authorizing the activities, to be compliant with the Act. • If badgers are encountered, particularly while at their burrows, within the [Project Site / LSA], notify the BC Badger Recovery Team. If badgers are harmed or killed, the BC Badger Recovery Team should be notified of the incident, with the following information: Photo / specimen, # of individuals observed, condition of specimen, location, nearest town, and distance to site; road name, date and time, name and email of observer.		

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			If there is a badger conflict situation, the B.C. Provincial Conservation Officer Service RAPP line (1-877-952-7277) should be contacted ***Increased Wildlife Species at Risk Disturbance and Disruption*** • Follow least risk breeding windows for clearing vegetation, if possible, and schedule construction activities that generate loud noises, that could disturb breeding birds, to occur within the least risk window. • Bird nest sweeps shall be completed prior to clearing and brushing to the standards of the provided Ministry of Transportation Breeding Bird Nest Sweep Protocol. • Provide an AQP to monitor active bird nests within the study area during construction outside the least risk window. AQP monitoring of active nests for disturbance within 200 m of construction noise is recommended. • Buffer zones to be placed around active nests. Monitoring of active nests for disturbance during construction by an AQP to determine impacts. • During the breeding bird nest sweeps, the qualified professional should also inspect all potential roost sites including bridges, buildings, cliffs, and snags for day roosting bats, and potential maternity roosts in the Project area. • The Environmental Monitor will perform a sweep of vegetated areas which may contain reptile or amphibian species at risk habitat prior to construction. Should a reptile or amphibian be observed, the Environmental Monitor will be notified immediately, and construction will cease until a site-specific mitigation plan is developed. • Amphibian salvage and isolation fencing will be required for all areas identified as Amphibian Breeding Zone and conducted according to guidelines set forth in the Guidelines for Amphibian and Reptile Conservation During Urban and Rural Land Development in British Columbia. • Implement mitigation measures to reduce noise provide in the Atmospheric Environment VC of this Interactions Table. • Implement additional measures provided in the Project-specific Wildlife Management Plan. ***Increased Mortality Risk***		

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			• Approximately 8 secondary dry-cross culverts are to be installed, intended for wildlife crossings, ranging in size from 600 to 900 mm diameter. • Implement measures to reduce wildlife mortality such as signage and speed limits. • Each construction site will be equipped with adequate garbage receptacles for solid non-hazardous wastes and debris. These materials will be collected, as required, and disposed of at approved locations. Food wastes will be stored in animal proof (bearproof) containers and transported to an appropriate landfill site. • Implement the Project-specific Traffic Control Plan.		
Social and Economic					
Indigenous Communities	• Project activities that have the potential to interact with Indigenous communities include: – general Project construction activities – operations and maintenance activities	• Disruption of day-to-day activities for Simpcw community members and road users.	• Continue to communicate with SFN community members regarding Project details and scheduling. • Implement the CEMP to avoid or reduce effects of Project construction on the environment, including air quality and noise. • Adhere to all WorkSafe BC safety standards on work sites during construction. • During worker and Contractor orientation sessions, reinforce the importance of Aboriginal awareness and respectful conduct. • Implement the Project-specific Traffic Control Plan. • Restrict all construction activities and construction traffic to the approved, surveyed Project Footprint and associated access routes.	• The predicted residual effect of disruption of day-to-day activities for Simpcw community members and road users is considered to be short-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. Furthermore, once completed, the paved road is anticipated to provide a benefit to the Simpcw community and other road users through increased safety, accessibility and reliability. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: LSA – **Duration**: Short-term – **Frequency**: Frequent/Regular – **Magnitude**: Negligible to Low – **Probability**: High	• The Project has the potential to contribute to cumulative impacts on disruption of day-to-day activities for Simpcw community members and road users within the RSA. However, the residual effects resulting from the Project are considered incremental contributions relative to the RSA. Consequently, the predicted residual cumulative effect is considered to be short-term in duration, low magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant.
Employment and Procurement	• Simpcw First Nation has lead a key role in the planning of the Project and many of the qualified Simpcw workforce and band-owned companies are expected to participate in the various phases of Project construction. For example, Simpcw Resources LLP (SRLLP) is comprised of a group of dedicated staff professionals, experienced workforce, and SFN owned companies and partnerships. SRLLP provides environmental, archaeological, forestry, management and general contracting services, primarily within natural resource	• Increased contracting and employment opportunities.	• Implement a procurement strategy that provides opportunities for qualified SFN and SFN-owned contractors. • Continue discussions with SFN and SFN-owned contractors to communicate Project requirements, potential contract opportunities and related qualifications (e.g. insurance, safety, required personnel, skills, certifications, experience, equipment, materials).	• Construction of the Project is expected to result in a positive economic benefit to SFN through increased contracting and employment opportunities. This positive residual effect is considered to be short-term duration, low in magnitude, with a high probability of occurrence. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: RSA to Provincial – **Duration**: Short-term	• N/A

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
	industries, and largely within Simpcwúl'ecw - the Territory of SFN in the interior of British Columbia. The goal of SRLLP is to create economic growth from the commercial development of natural resources within the Simpcw Territory.			– **Frequency**: Infrequent to Frequent/Regular – **Magnitude**: Low – **Probability**: High	
Cultural					
Traditional Knowledge and Land Use	• Project activities that have the potential to interact with traditional knowledge and land use include: – general Project construction activities – operations and maintenance activities • Within the Project LSA of 500 m, land uses such as hunting and fishing are not anticipated to take place during Project construction. Some disruption of other activities, such as trail and travelway use and plant gathering within the LSA, may occur during Project construction.	• Potential disturbance of land and resource use activities by members of the Simpcw community.	• Continue to communicate with SFN community members regarding Project details and scheduling. • Implement the CEMP to avoid or reduce effects of Project construction on the environment, including air quality and noise. • During worker and Contractor orientation sessions, reinforce the importance of Aboriginal awareness and respectful conduct. • Restrict all construction activities and construction traffic to the approved, surveyed Project Footprint and associated access routes. • Implement access control measures such as signage and speed limits. • Implement the Project-specific Traffic Control Plan.	• The predicted residual effect of disruption of disturbance of land and resource use activities by members of the Simpcw community is considered to be short-term duration, negligible to low in magnitude, with a high probability of occurrence. With implementation of mitigation, there is high confidence that this predicted residual effect is not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: LSA – **Duration**: Short-term – **Frequency**: Frequent/Regular – **Magnitude**: Negligible to Low – **Probability**: High	• The Project has the potential to contribute to cumulative impacts on disturbance of land and resource use activities by members of the Simpcw community within the RSA. However, the residual effects resulting from the Project are considered incremental contributions relative to the RSA. Consequently, the predicted residual cumulative effect is considered to be short-term in duration, low to medium magnitude, with a high probability of occurrence. With implementation of mitigation, this predicted residual cumulative effect is not significant
Archaeology and Heritage	• Project activities that have the potential to interact with archaeology and heritage include: – clearing and grubbing – grading – ditching – road widening – power pole installation and fibre optic realignment • The Project encounters numerous identified sites and features of archaeological or heritage significance.	• Potential disturbance of archaeological artifacts or remains during soil disturbance activities.	• Prior to commencement of construction activities, the Contractor shall arrange a documented meeting with the Ministry Representative, the Project Archaeologist and the Cultural Monitors to ensure a clear understanding of the roles and responsibilities of each party with regard to land altering activities. • The Ministry will retain the services of a Professional Archaeologist (Project Archaeologist) and Cultural Monitors in consultation with First Nations to monitor works as required. • Cultural monitors will be observing all land altering activities that take place within the Site, within or outside of the identified archaeological site boundaries and throughout the Contract period. • Archaeological Monitoring is required for the archaeological sites identified in the Archaeological Documents. • The monitoring will be undertaken by the Project Archaeologist as described in the Site Alteration Permit. The Ministry will retain the services of professional Archaeologists and Cultural Monitors in consultation with First Nations.	• The disturbance to archaeological resources is generally offset by the recovery of knowledge about the site gained by meticulous excavations and preservation of artifacts and features with oversight of SFN and in compliance with requirement of the SFN and provincial guidelines. Consequently, no potential residual adverse effects have been identified.	• N/A

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			• Areas designated as requiring Archaeological monitoring may require controlled excavations as detailed in the Archaeological Documents. • In the event that additional archaeological materials are uncovered during construction (a "Chance Find"), the Contractor shall follow the procedures outlined in the Archaeological Chance Find Procedure and Ancient Remain Protocol. • In the event of a discovery, the Contractor shall immediately flag off a 30 m radius around the discovery site(s) and relocate any impacted equipment to resume Work outside of the discovery site. The Ministry Representative may increase or decrease this radius in collaboration with the Project Archaeologist. • Any Work within an Archeological site, including any Chance Find sites, shall only be undertaken in accordance with the Site Alteration Permit and in a manner acceptable to the Ministry Representative and the Project Archeologist. • Implement additional measures for each specific site as provided in the Site Alteration Permit.		
Health					
Accidents and Malfunctions	• Project activities that have the potential to result in accidents or malfunctions include: – hazardous materials storage and refueling of vehicles and equipment – operation and use of Project tools and equipment – transportation to and from the worksite – routine maintenance activities and vehicle travel during operations	• Accidental spill of hazardous material. • Workplace injuries. • Motor vehicle accident. • Wildfire	***Accidental Spill*** • Ensure spill kits are provided on-site and stored on all heavy equipment during construction. • All equipment will be clean, leak free and in top operating condition prior to mobilization to the site. • Contractor personnel trained in refueling procedures and the proper use of spill kits will carry out all refueling procedures. All construction personnel will be made aware of the refueling and servicing protocols for onsite vehicles and equipment during regular tailgate meetings. • Refueling and servicing of major, mobile equipment will be conducted a minimum 30 m away from all water bodies, drainages, and environmentally sensitive areas. • Use secondary containment for all fuels and other hazardous materials storage containers. • Potentially deleterious substances including paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals will not enter any drainage or watercourse.	• The predicted residual effects of accidental spills, workplace injuries, motor vehicle accidents and wildfire during construction or operation are considered to be short to long-term duration, low to high in magnitude, with a low probability of occurrence. With implementation of mitigation, there is high confidence that these predicted residual effects are not significant. A summary of the significance evaluation for this predicted residual effect is as follows: – **Spatial Boundary**: Footprint to LSA – **Duration**: Short to Long-term – **Frequency**: Infrequent – **Magnitude**: Low to High – **Probability**: Low	• The assessment concluded the residual effects of accidental spills, workplace injuries, motor vehicle accidents and wildfire during construction or operation were unlikely to occur. Consequently, a cumulative interaction was deemed unlikely and a cumulative effects assessment was not warranted.

Environment and Socio-Economic VCs and Indicators	Description of Interaction(s)	Description of Potential Effects	Mitigation	Prediction of Residual Effects after Mitigation	Description of the Cumulative Effects
			• In the event of a spill, implement the Spill Contingency Plan ***Workplace Injuries*** • Adhere to all WorkSafe BC safety standards on work sites during construction. • During worker and Contractor orientation sessions, communicate all Project-specific safety procedures and personal protection requirements. • Ensure that the proposed Project will be staffed with sufficient numbers of emergency medical personnel with appropriate certifications, supplies and conveyance requirements based on numbers of workers, hazard risk at the work sites and proximity to medical facilities. • Implement the Project-specific Emergency Response Plan in the event of a workplace accident. ***Motor Vehicle Accident*** • Restrict all construction activities and construction traffic to the approved, surveyed Project Footprint and associated access routes. • Implement access control measures such as signage and speed limits. • Implement the Project-specific Traffic Control Plan. ***Wildfire*** • The Contractor shall contact an Appropriately Qualified Professional in wildfire management if a high risk activity is occurring as part of the Project works and the Fire Danger Rating is above Moderate. The AQP will prepare a Wildfire Prevention Plan. The Wildfire Prevention Plan may include, but not be limited to: – Defining those Works that are considered high risk activities under the BC Wildfire Act. – Restrictions and mitigations measures that will be in place should the Fire Danger Class reach a moderate, or higher, rating. – Details of how the entire work Site, not just high risk activities, will be managed to reduce wildfire risk regardless of Fire Danger Class rating (e.g. management of hot work, cigarette butts, etc.). – Emergency Contact Information in the event of a wildfire.		

7.0 Monitoring Requirements

The Contractor and the Contractor's Appropriately Qualified Professional (AQP) will be responsible for the development and sign-off of a Construction Environmental Management Plan (CEMP) for all aspects of construction that may have an impact on the environment for the duration of that phase. The Contractor will also be required to adhere to the specifications and conditions set out in the regulatory agency approvals, contract special provisions, and relevant sections of the Ministry Standard Specifications for Highway Construction Section 165 Protection of the Environment.

Environmental monitoring requirements for a limited time after construction is complete will also be required and will be undertaken by the Ministry.

Phase	**Plan**
Construction	Clearing and Grubbing
	Erosion and Sediment Control
	Invasive Plan Management
	Instream Works (including offset wetland construction)
	Winter Lay-up
	Air Quality and Dust Control
	Spill Response
	Revegetation
	Road Decommissioning
Post Construction	Revegetation Planting

The Contractor's AQP will jointly prepare the CEMP for construction and will be responsible to conducting regular monitoring to ensure that the plan requirements are being met.

Construction Environmental Management Plans and Monitoring will include, but not be limited to, the following Project activities.

7.1 Clearing and Grubbing

The Contractor will be expected to undertake clearing and grubbing works within the Project Footprint in a controlled manner that does not contribute to sediment and erosion. Monitoring activities may

include ensuring marking of the clear and grub lines to avoid unnecessary disturbance and ensuring works are staged to avoid long periods of soil exposure. In addition, where clearing activities are required within the bird nesting window which is defined by Environment and Climate Change Canada as April 1 to August 15, the Contractor will be responsible for conducting a survey of the site where vegetation is to be removed following the Breeding Bird Nest Survey Protocol (MOTI, 2020). A Wildlife Management

Plan will be prepared to mitigate potential negative effects to wildlife due to construction activities.

7.2 Erosion and Sediment

The Contractor will be responsible for preparing a Sediment and Erosion Control Plan that describes the methods and materials that will be employed on the site to prevent soil mobilization to Environmentally Sensitive Areas including watercourses and wetlands. Monitoring of sediment and erosion control activities may include regular inspections of installed silt fence, ensuring staged soil removal is undertaken, and ensuring seeding coverage is acceptable. Monitoring should also be focused on environmentally sensitive receiving sites such as streams and wetlands.

7.3 Invasive Plant Management

The Contractor will be expected, to the extent possible, to mitigate the impacts of invasive plants on the site and work to prevent new invasive plant infestations from establishing. Monitoring efforts may include, ensuring preventative seeding of exposed soils, conducting checks of construction equipment entering the site for visible plant parts, and notifying the Ministry representative of new invasive plant infestations.

7.4 Instream Works

The Contractor will be responsible for ensuring all instream works adhere to the requirements outlined in the regulatory agency approvals and applicable Best Management Practices, which will be provided in the Water Quality and Fish Habitat Protection Plan.

The Least Risk Window for Instream Works within watercourses is July 22 to September 30. Fish salvage permits will be obtained by the Contractor. Monitoring efforts may include checking equipment operated near watercourses for leaks, ensuring equipment is operated from the top of bank, ensuring fish salvage and work site isolation are effective, regular monitoring of water turbidity at select instream locations, and ensuring that temporary sediment and erosion controls are in place and functioning adequately. Offsetting wetland construction monitoring may include ensuring that proper isolation is in place prior to construction works commencing, ensuring that construction equipment and materials used are clean, and ensuring that the site is protected from erosion or sediment release to nearby waterbodies.

If prior to any instream works, amphibian salvage is deemed necessary within environmentally sensitive areas, the Contractor must provide a minimum of 15 days notice prior to commencement of work activities in these areas for the Ministry to conduct any necessary amphibian surveys and salvage. The Contractor will be required to set up and monitor any isolation required for the salvage and ensure that the areas are adequately protected so that amphibians are prevented form re-entering the construction area.

7.5 Winter Lay-Up

The Contractor will be responsible for preparing a winter lay-up plan for winter shut-down, if required. The plan will specify the mitigations applied to the site to protect environmentally sensitive areas from impacts during the shut down period and will specify the frequency of inspections of these measures during that time.

7.6 Air Quality and Dust Control

The Contractor will be expected, to ensure that procedures outlining how drivers and equipment operators will be engaged in idle reduction practices are implemented and monitored. Watering and dust control measures will also be used, as needed. Additional measures will be provided in the Project-specific Air Quality and Dust Control Plan and Traffic Control Plan.

7.7 Spill Response

The Contractor will be expected to ensure that toxic or hazardous spills are dealt with immediately and reportable spills are forwarded to the Ministry Representative and Emergency Management BC. Monitoring may include ensuring that spill abatement materials are complete and stored on site and ensure that all documentation is complete and submitted to the proper authorities. For any observed spills in the vicinity of the Project that are not the result of Project-related activities, the Contractor will be responsible for notifying Environmental Agencies. Additional measures for spill response will be provided in the Project-specific Spill Contingency Plan.

7.8 Revegetation

The Contractor will be responsible for ensuring that revegetation seeding is applied in a timely fashion and at an appropriate time of year to ensure that slopes and other soil exposure areas are protected from erosion. Monitoring efforts may include ensuring that hydroseed and mulch coverage is adequate and no significant bare spots are present, ensuring all exposed soil areas requiring revegetation are treated, and where feasible, temporary broadcast seeding (or other temporary methods) is used to protect bare soils until hydroseeding is applied. In addition, during periods of inclement weather, the Contractor will be responsible for watering of seeded areas to ensure survival.

7.9 Decommissioning

The Contractor will be responsible for implementation of decommissioning procedures for abandoned road sections within the Project Footprint following the Special Provision language. Monitoring activities may involve, ensuring that road materials are adequately scarified to the depth required, ensuring that growing medium (stripping, biotic soil medium, etc.) are applied correctly and hydroseeding coverage is adequate.

7.10 Revegetation Planting

The Ministry of Transportation and Infrastructure will be responsible for ensuring that any regulatory requirements pertaining to post-construction monitoring of riparian planting on the site are implemented. This may involve ensuring that riparian tree and shrub plantings are meeting the survival guidelines set out by the regulatory approvals or Best Management Practices for a set time frame.

7.11 Environmental Offsetting Wetland Replacement Area

The Project is estimated to impact approximately 300 m^2 of wetland area (Estsék' 2019). SRLLP was contracted to develop a conceptual Wetland Offset Plan by MOTI in late 2020, which was informed by a site visit by SRLLP, MOTI and SFN representatives (SRLLP 2020a). SRLLP identified a proposed offset site within existing Dunn Lake Road alignment (51.312945°, -120.152101°), 0.53 km south of the SFN band office (SRLLP 2020a).

The Project is estimated to impact approximately 300m3 of wetland area. The Project proposes to offset impact to wetland area with improvements to a designated off-setting area. The design of the off-setting area will be developed in consultation with Simpcw. Prior to revegetation, Simcpw will be consulted to determine culturally significant species to be utilized in revegetation activities.

(a) Proposed Offset Site

(i) Proposed offset site is located within existing Dunn Lake Road alignment (51.312945°,-120.152101°) approximately 0.53km south of SFN band office.

(ii) Standing water was present in adjacent wetland during site visit.

(iii) Road surface is ≈1.0m greater in elevation from existing wetland (other sites were ≈10m difference), this increases the feasibility of offset work by reducing earthworks required to facilitate seasonal/permanent water saturation of the offset area. Seasonal/permanent water saturation is one of the defining characteristics of a wetland1, therefore it is important this be integrated into the offset project.

(b) Preliminary Execution Plan

(i) Wetland offset to take place during new road alignment construction activities as excavator will be required to facilitate reclamation activities. Area to be reclaimed is outlined in Figure 2. Excavator shall be 200 size or greater.

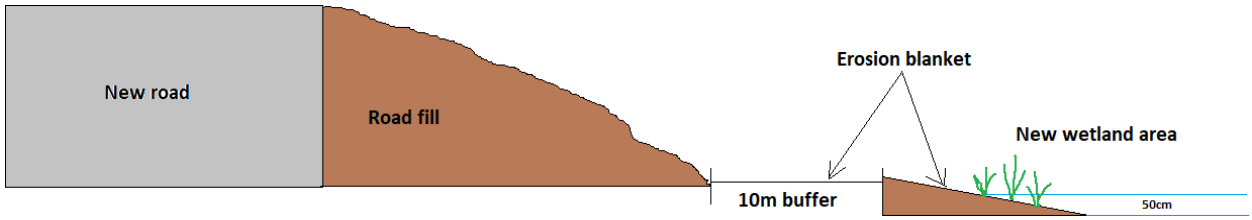
(ii) Road surface shall be excavated to a depth not greater than the existing wetland. Wetland boundary will remain at least 10m from toe of the fill slope of the new road alignment as per MOTI Geotechnical department recommendations. Survey shall be on-site during excavation activities as to ensure wetland dimensions/specs conform to those allowed by MOTI Geotechnical department.

(iii) East portion of the new wetland area (closest to the new road alignment) shall be tapered as to create upland transitional area and decrease potential water depth as wetland approaches toe of the fill slope of the new road alignment. Ensure new

wetland edge is 10m from toe of the fill slope as per MOTI Geotechnical recommendations. In addition to excavator and operator, two labourers shall be on-site and equipped with hand tools (shovels and rakes) to complete final shaping/grade.

(iv) Soils shall be examined by qualified professional(s) to determine suitability for wetland reclamation. Soils with high course-fragment content, high sand content, or excess large cobbles may not be suitable for wetland construction as they may allow excessive drainage of surface moisture. Suitable soils include but may not be limited to: Clay, Clay loam, Silty clay, Silty clay loam, Sandy clay etc. Soil texture analysis shall be conducted by qualified professional(s) prior to soil being approved for use/re-use. If parent soil is deemed inadequate for use, offsite soil sources may be examined for suitability. Liner may be used to prevent drainage and maintain standing water. If soils are deemed unsuitable, soils shall be excavated and replaced with suitable material.

(v) Replacement soils shall be compacte utilizing 500lb plate compactor (or other suitable compaction device). Nilex (or like) erosion control matting shall be utilized in new wetland upland area to toe of new fill slope (or area designated by MOTI Geotechnical department). Matting shall be composed of biodegradable natural fibers.



(vi) Hydrophytic plant species shall be planted within new wetland area and suitable species planted within the upland/transitional area. Vegetation shall be planted to match existing vegetation cover (%) upon maturity. Erosion control matting shall be seeded and/or planted with hydrophytic grass species as to ensure vegetated growth throughout the reclaimed area. Simpcw First Nation Natural Resource Department shall be consulted prior to planting to determine culturally significant species to be utilized in revegetation activities.

Potentially impacted wetlands are delineated in Appendix 3. Figure 4 of Appendix 3 shows the approximate proposed area of wetland to be offset. This area will be field-verified and refined as part of the Wetland Offset Plan, to be submitted to the ISC prior to construction.

7.12 Post-Construction Environmental Monitoring

Post-construction environmental monitoring (PCEM) will occur during the first full growing season following completion of construction and reclamation activities. The PCEM program will include an assessment of reclamation success, revegetation, bed and bank stability and erosion control, and any weed problem areas along the Project Footprint.

The PCEM program will take into consideration other construction and reclamation related information and reporting, in addition to recommendations made and any unresolved issues identified by the environment monitors and/or AQPs during construction or reclamation.

Following completion of PCEM, a summary report will be prepared documenting effectiveness of reclamation efforts and will include any outstanding issues and concerns and associated recommended mitigation measures to address issues identified.

A separate PCEM program will be developed and implemented to monitor success of wetland offsetting efforts, to be further detailed in the final Wetland Offsetting Plan.

8.0 Final Statement

In this report, Simpcw Resources LLP has documented the results of its environmental impact assessment (EIA) for the Dunn Lake Road Realignment and Paving Project, in Barrier, BC. The elements of the Project and the activities that will be carried out as part of it have been described, and the potential environmental effects of the Project have been assessed to meet the requirements of the *Impact Assessment Act* (IAA).

This EIA concludes that the concerns and potential impacts of the Project can be effectively mitigated as to avoid resulting in any detrimental ecological impacts, or social or cultural impacts to SFN community members and other land users. Adverse residual effects associated with the construction and operation of the Project are generally expected to be short-term in duration and negligible to low in magnitude.

Overall, this EIA concludes that, with planned implementation of mitigation and offset measures, and Best Management Practices, construction and operation of the new road will not result in any significant adverse environmental, social, cultural or cumulative effects.

8.1 Professional Sign-Off

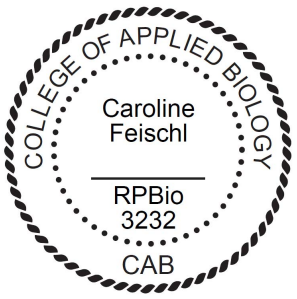
We trust that this document meets your requirements as an EIA for the Dunn Lake Road Realignment and Paving Project. If you have any questions or concerns, please contact:

Paul Van Velzen, SRLLP, Environmental Manager

And/or:

Caroline L Feischl

Caroline Feischl, SRLLP, R.P.Bio



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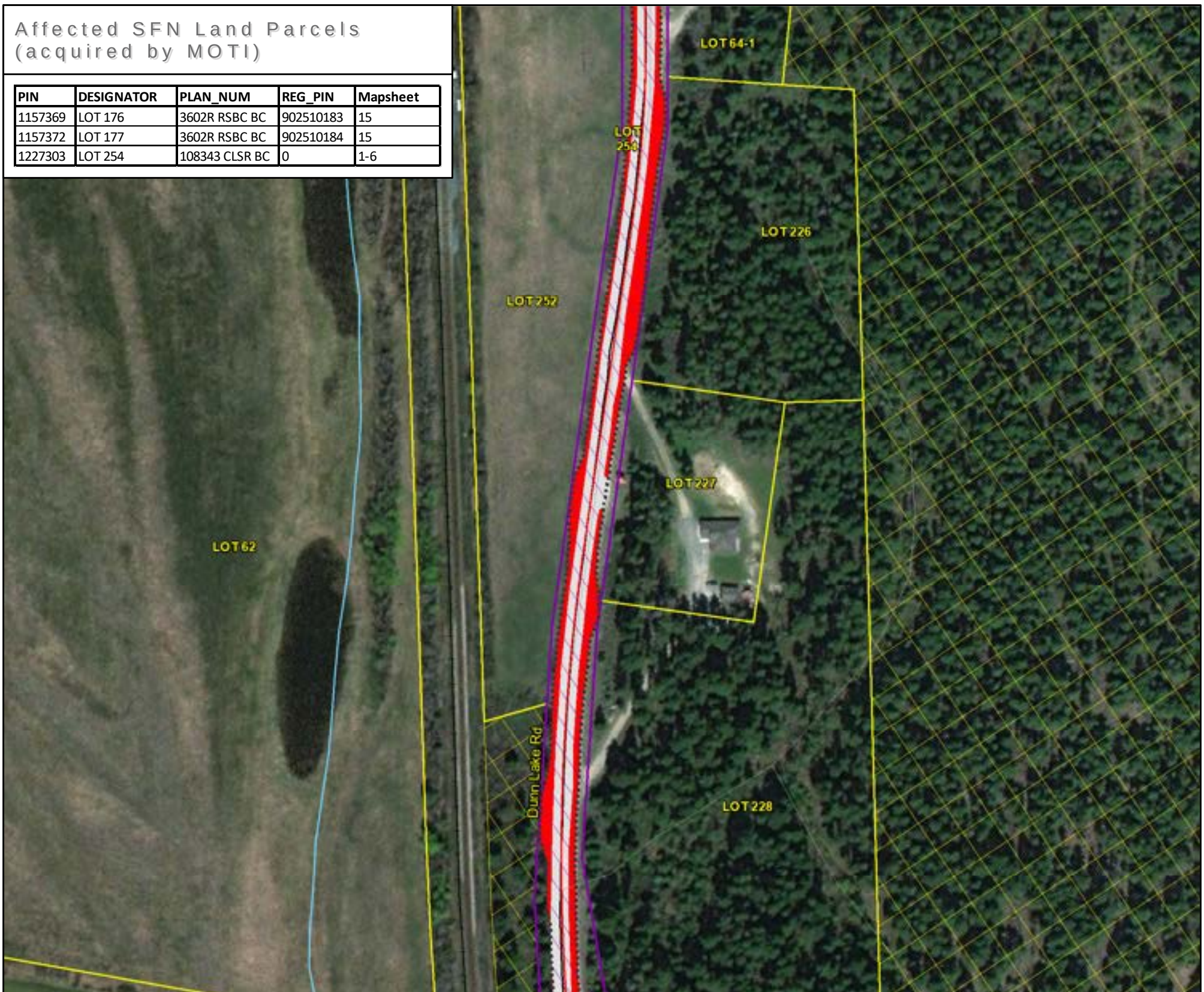
APPENDIX 1

AFFECTED SFN LAND PARCELS (18 MAPSHEETS)

Affected SFN Land Parcels (acquired by MOTI)

PIN	DESIGNATOR	PLAN_NUM	REG_PIN	Mapsheet
1157369	LOT 176	3602R RSBC BC	902510183	15
1157372	LOT 177	3602R RSBC BC	902510184	15
1227303	LOT 254	108343 CLSR BC	0	1-6



Dunn Lake Road Realignment and Paving Project

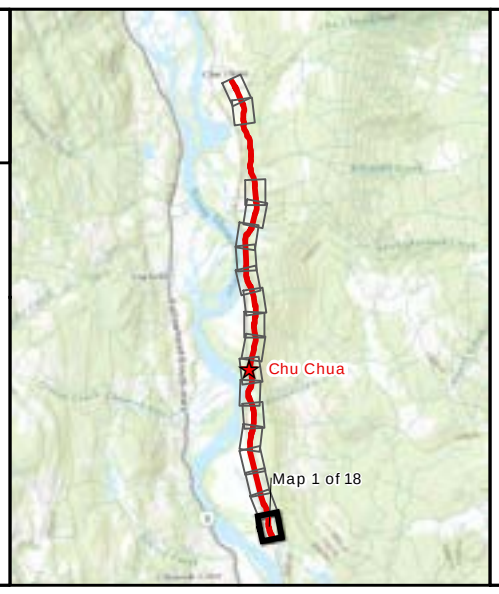
Appendix 1

Map 1 of 18

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
- Existing Road Centreline
- Other Roads
- Watercourse
- Project Footprint
- Affected SFN Land Parcels

Land Parcels

- North Thompson IR1
- CP Lands (Lawful Possession)
- Proposed New Build / Realigned ROW
- Existing Built ROW
- Waterbodies / Large Rivers



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Simpcw Resources Group

Date: 2022-02-17

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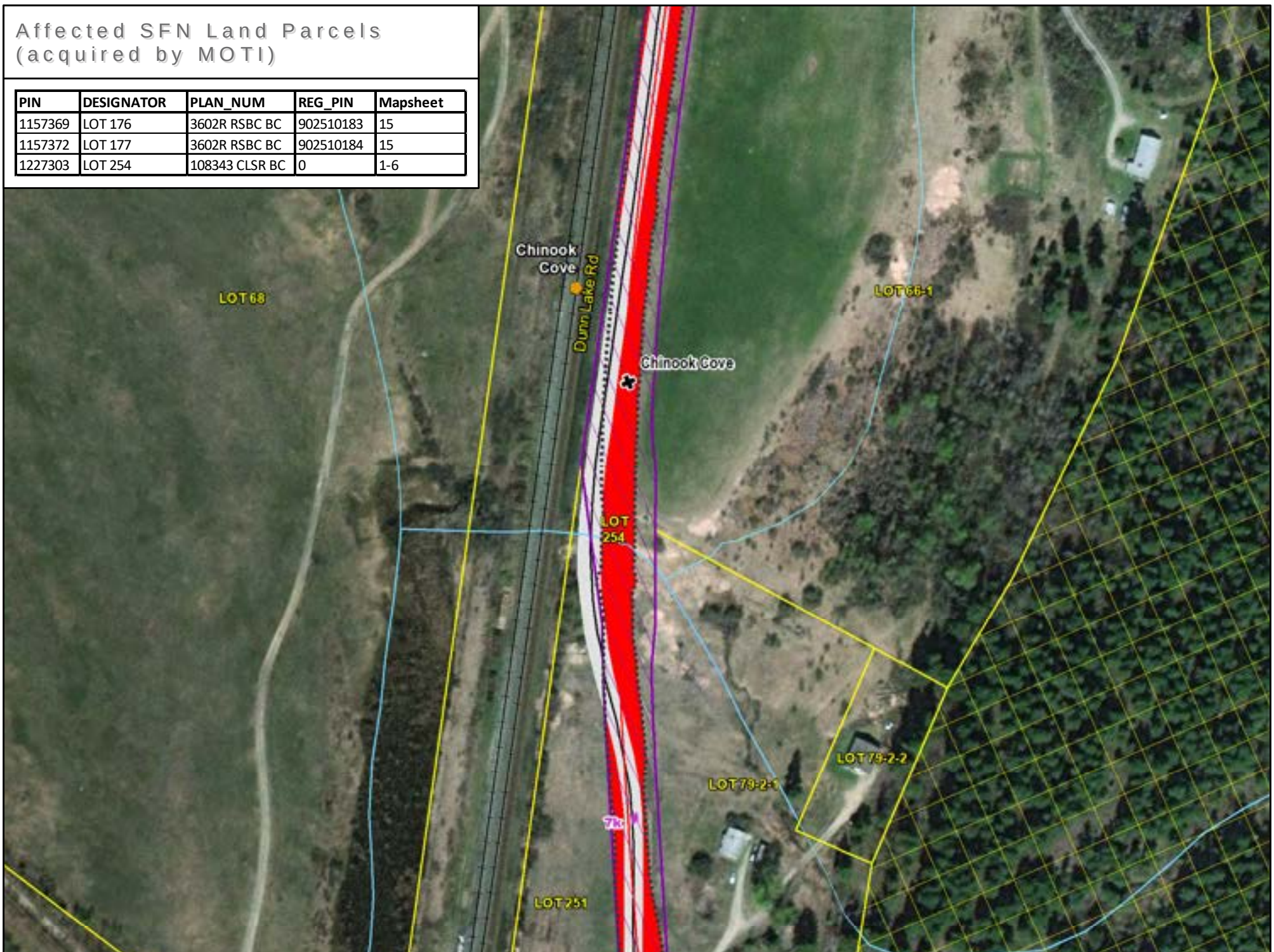

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 2 of 18

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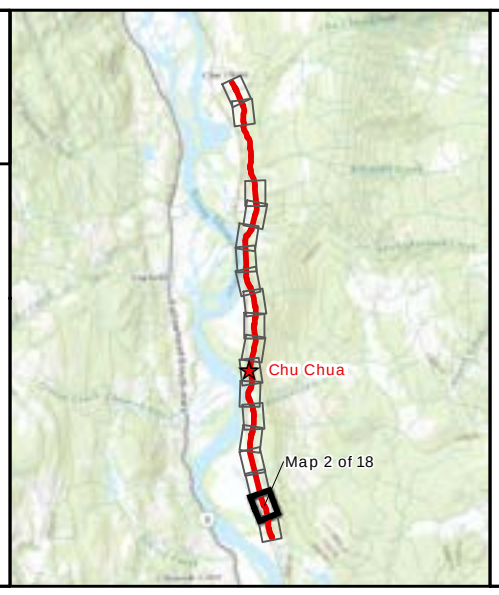

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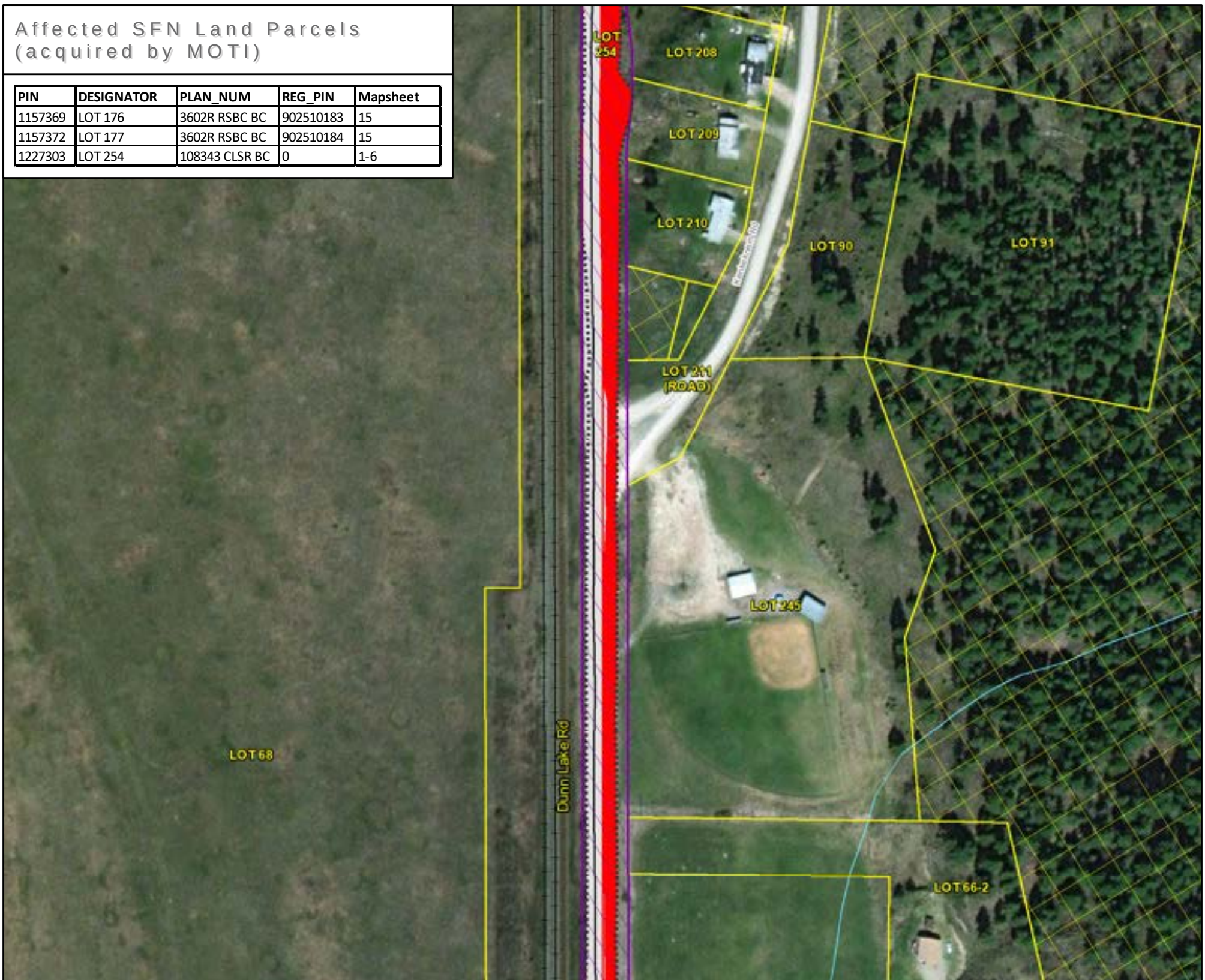

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 3 of 18

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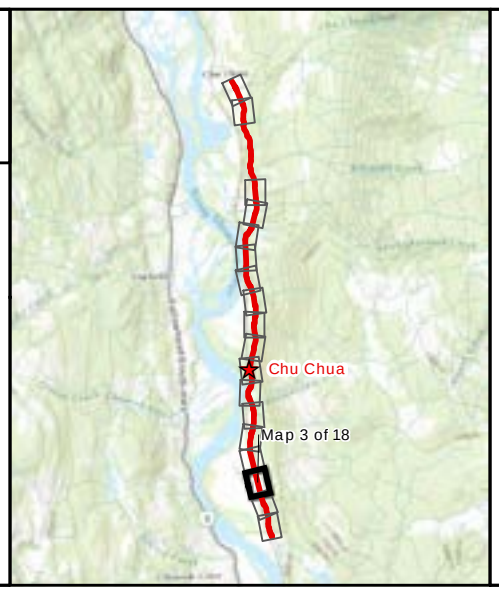

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Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 4 of 18

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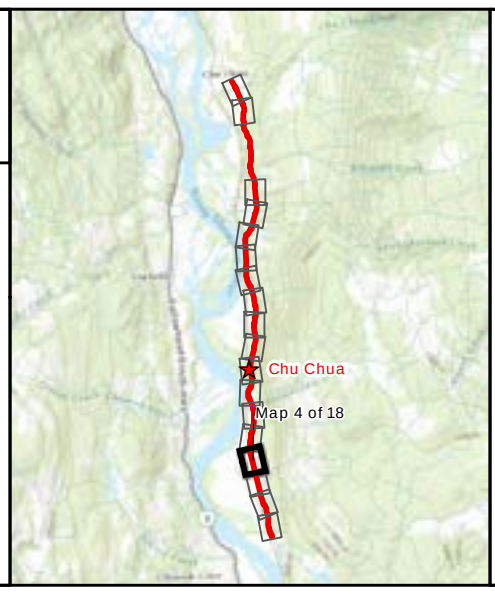

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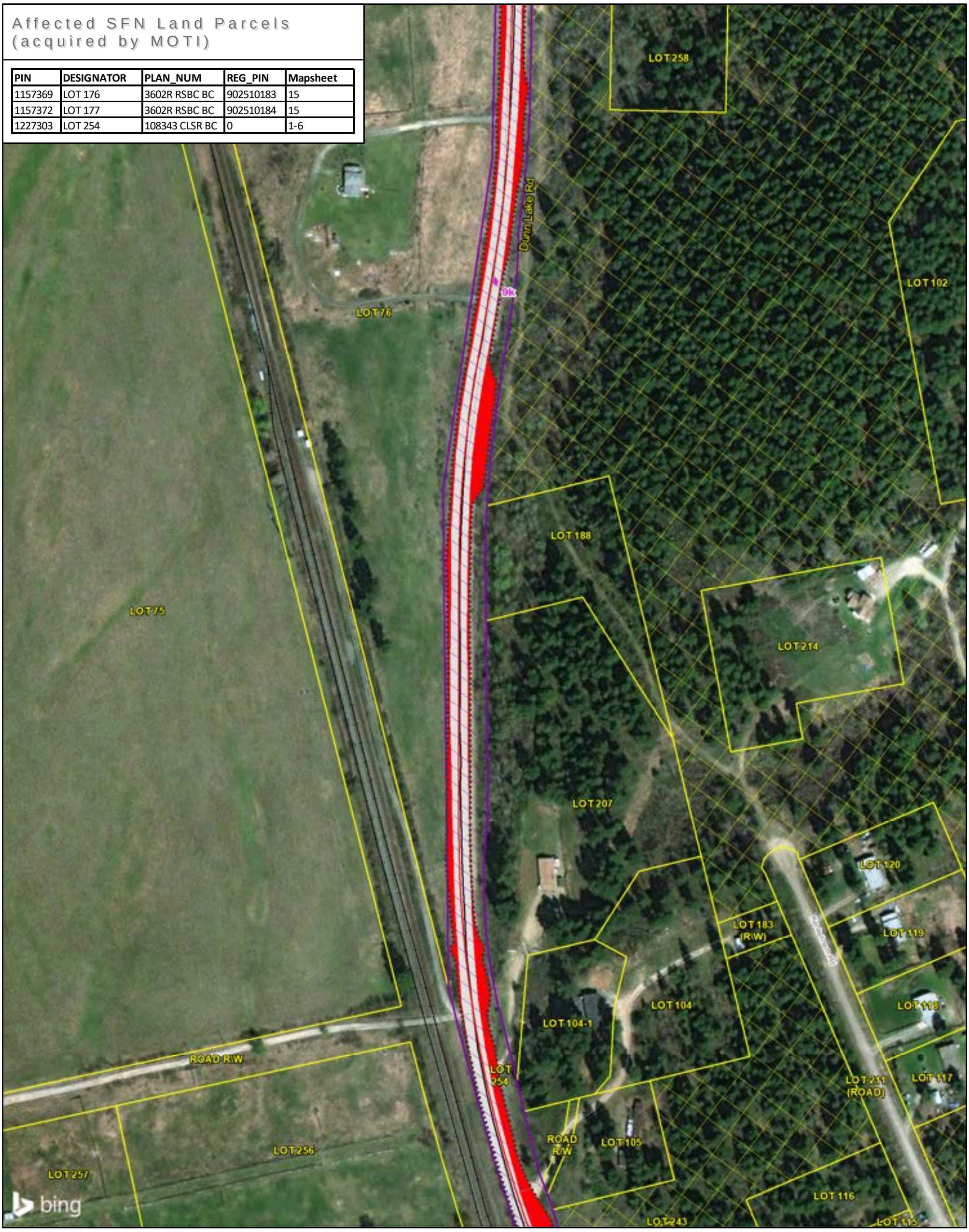

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 5 of 18

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
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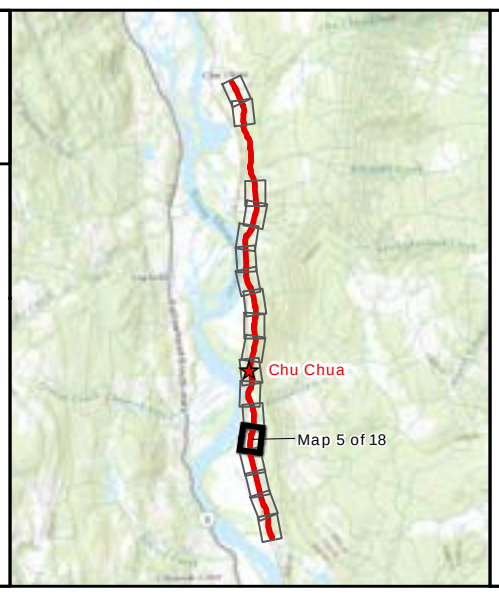
- Affected SFN Land Parcels

Land Parcels

- North Thompson IR1
- CP Lands (Lawful Possession)
- Proposed New Build / Realigned ROW
- Existing Built ROW
- Waterbodies / Large Rivers



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Simpcw Resources Group

Date: 2022-02-17

Affected SFN Land Parcels (acquired by MOTI)

PIN	DESIGNATOR	PLAN_NUM	REG_PIN	Mapsheet
1157369	LOT 176	3602R RSBC BC	902510183	15
1157372	LOT 177	3602R RSBC BC	902510184	15
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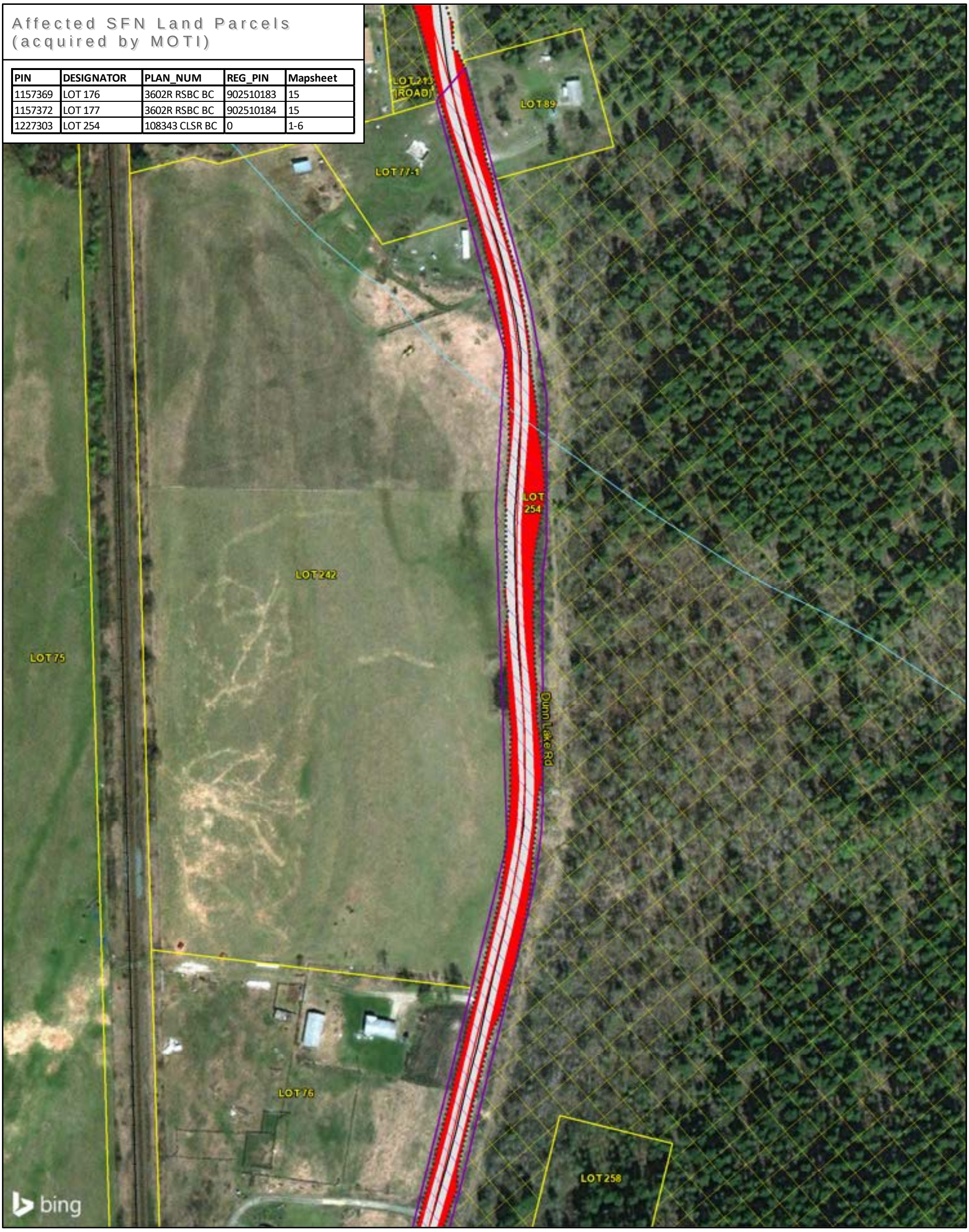

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 6 of 18

- Project Limits
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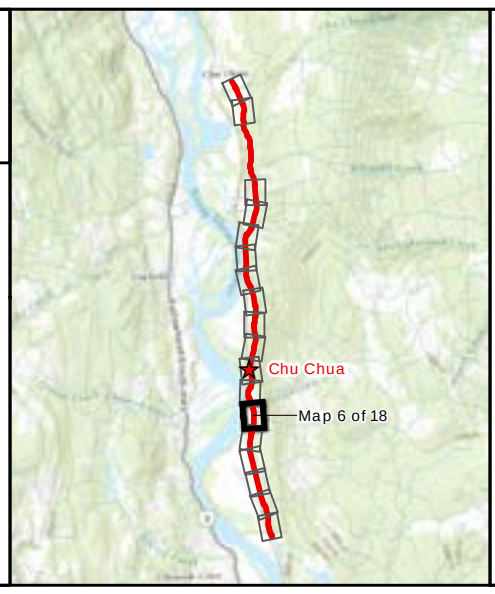

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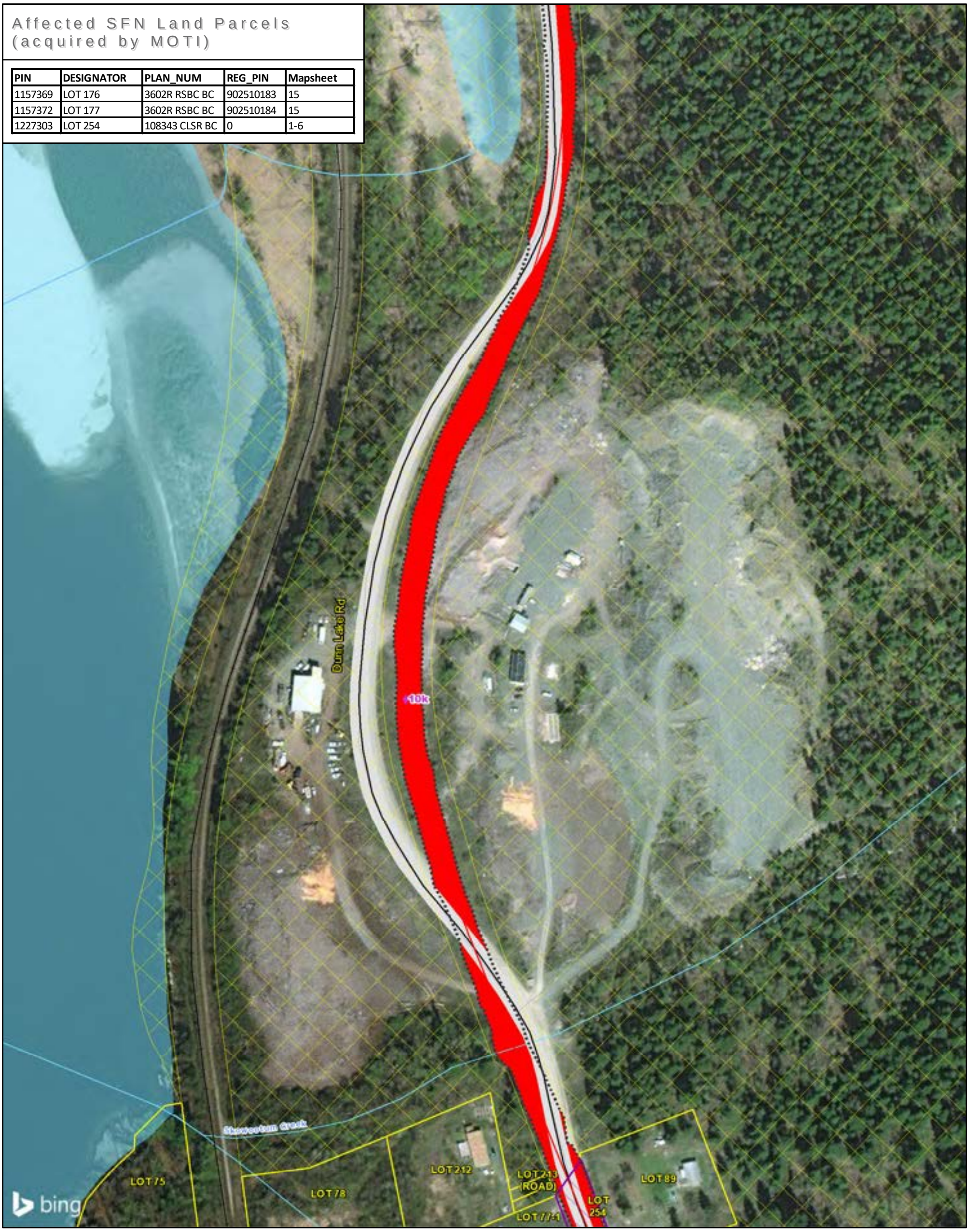

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 7 of 18

- Project Limits
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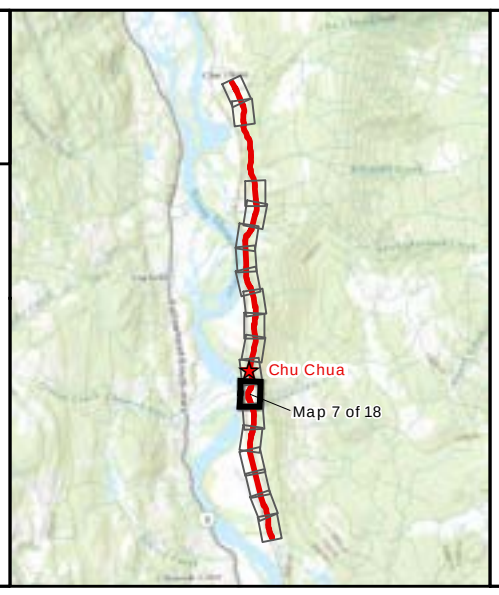

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1157372	LOT 177	3602R RSBC BC	902510184	15
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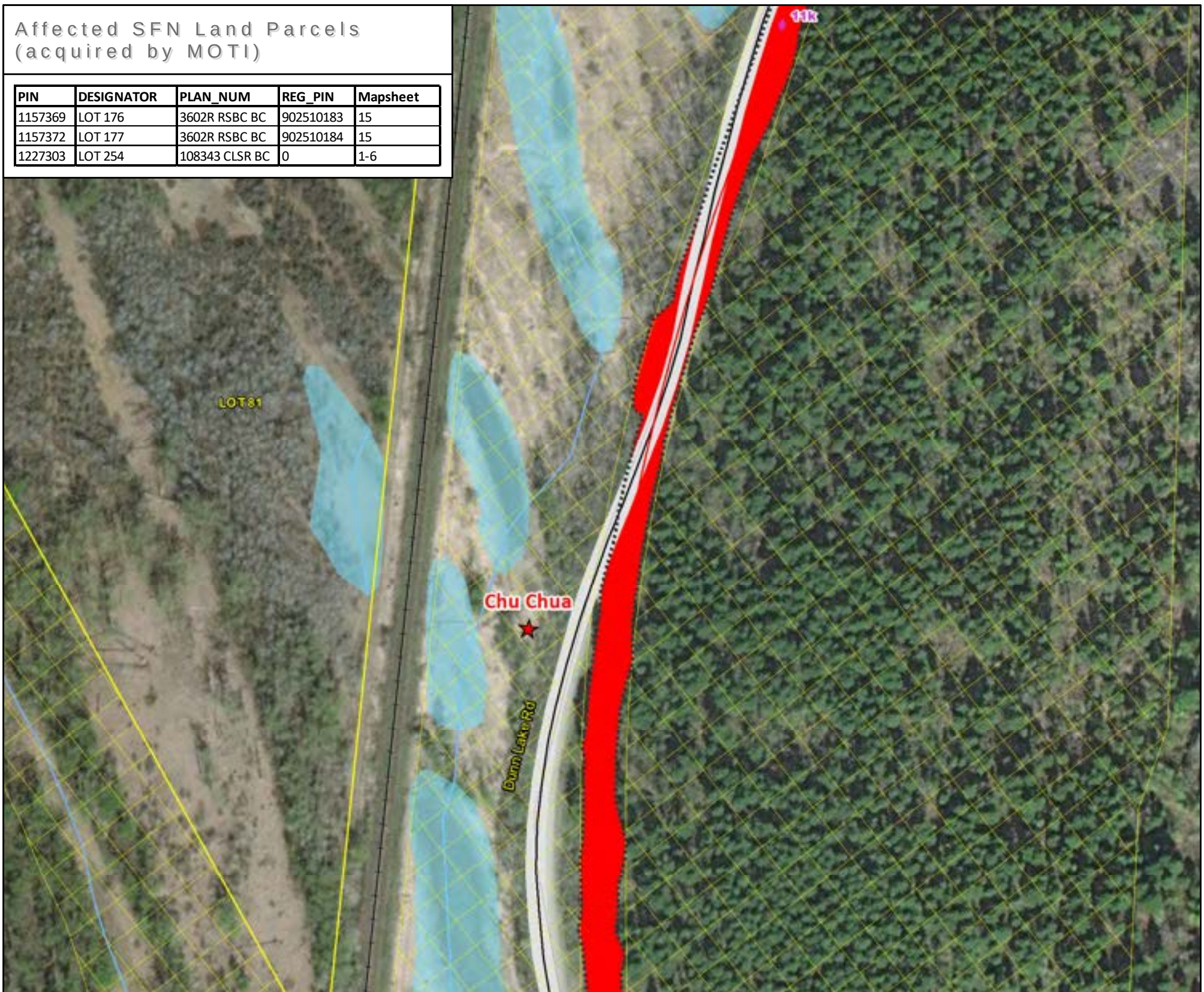

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 8 of 18

- Project Limits
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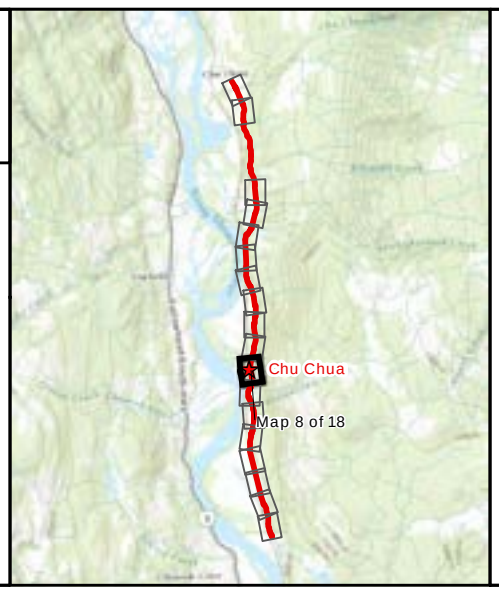

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Simpcw Resources Group

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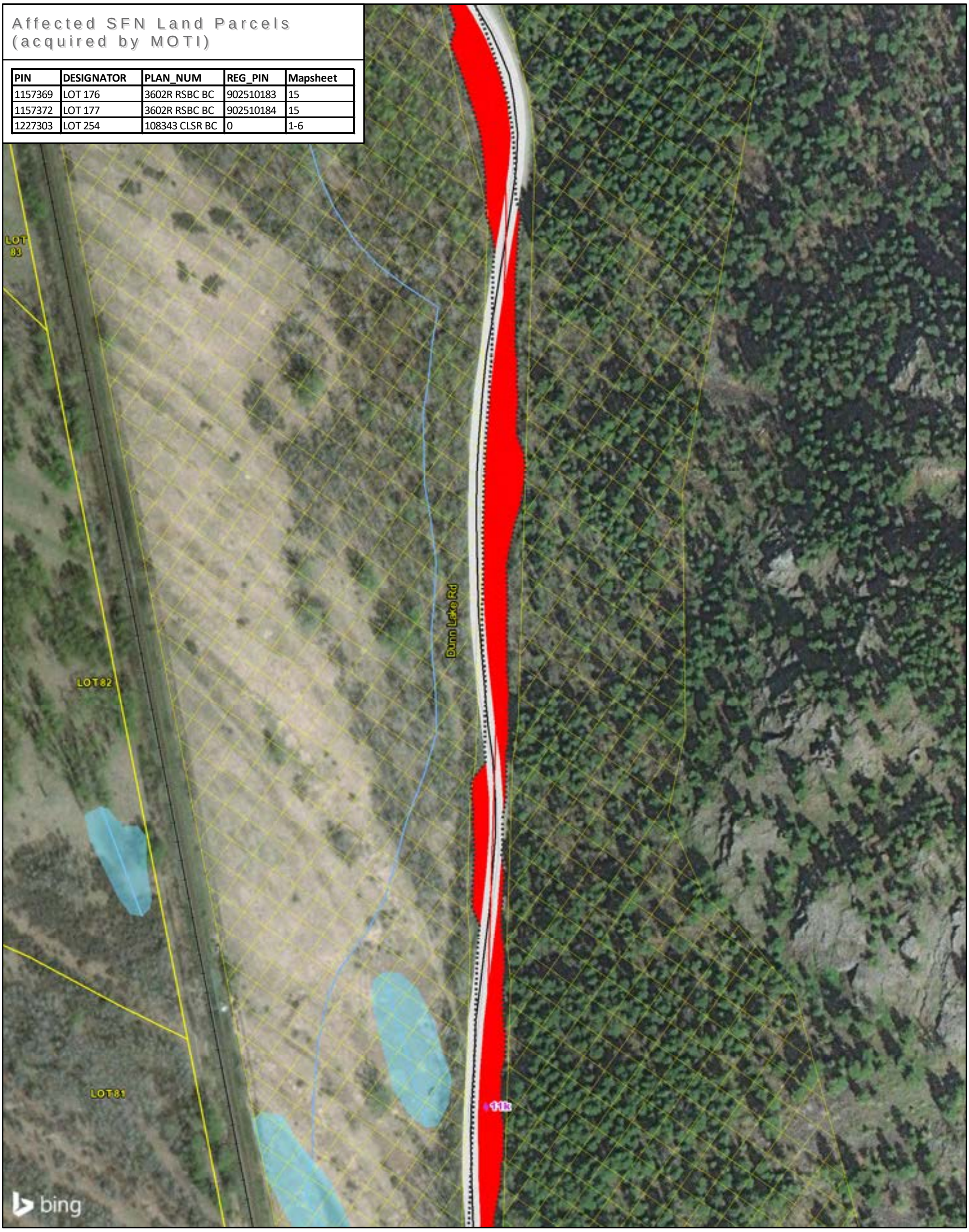

Dunn Lake Road Realignment and Paving Project
Appendix 1

Map 9 of 18

- Project Limits
- Kilometer Markers
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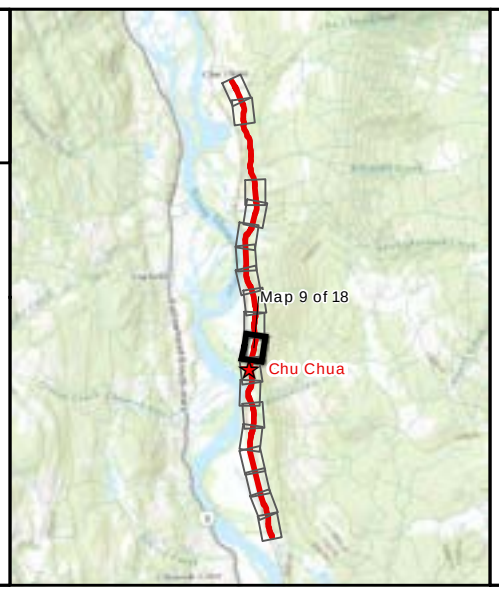

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Simpcw Resources Group

Date: 2022-02-17

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Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 10 of 18

- Project Limits
- Kilometer Markers
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- Affected SFN Land Parcels

Land Parcels

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- CP Lands (Lawful Possession)
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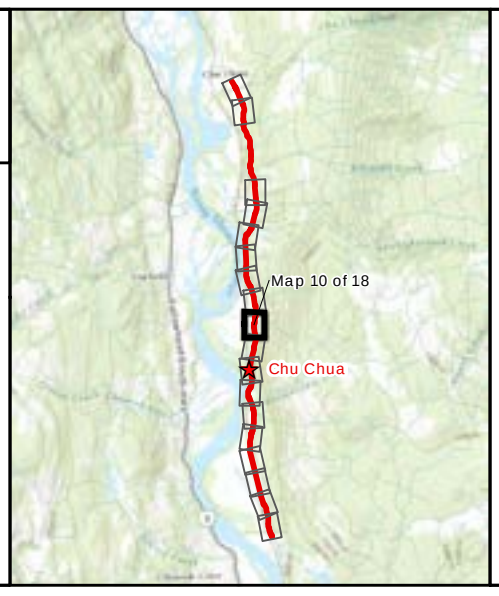

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Simpcw Resources Group

Date: 2022-02-17

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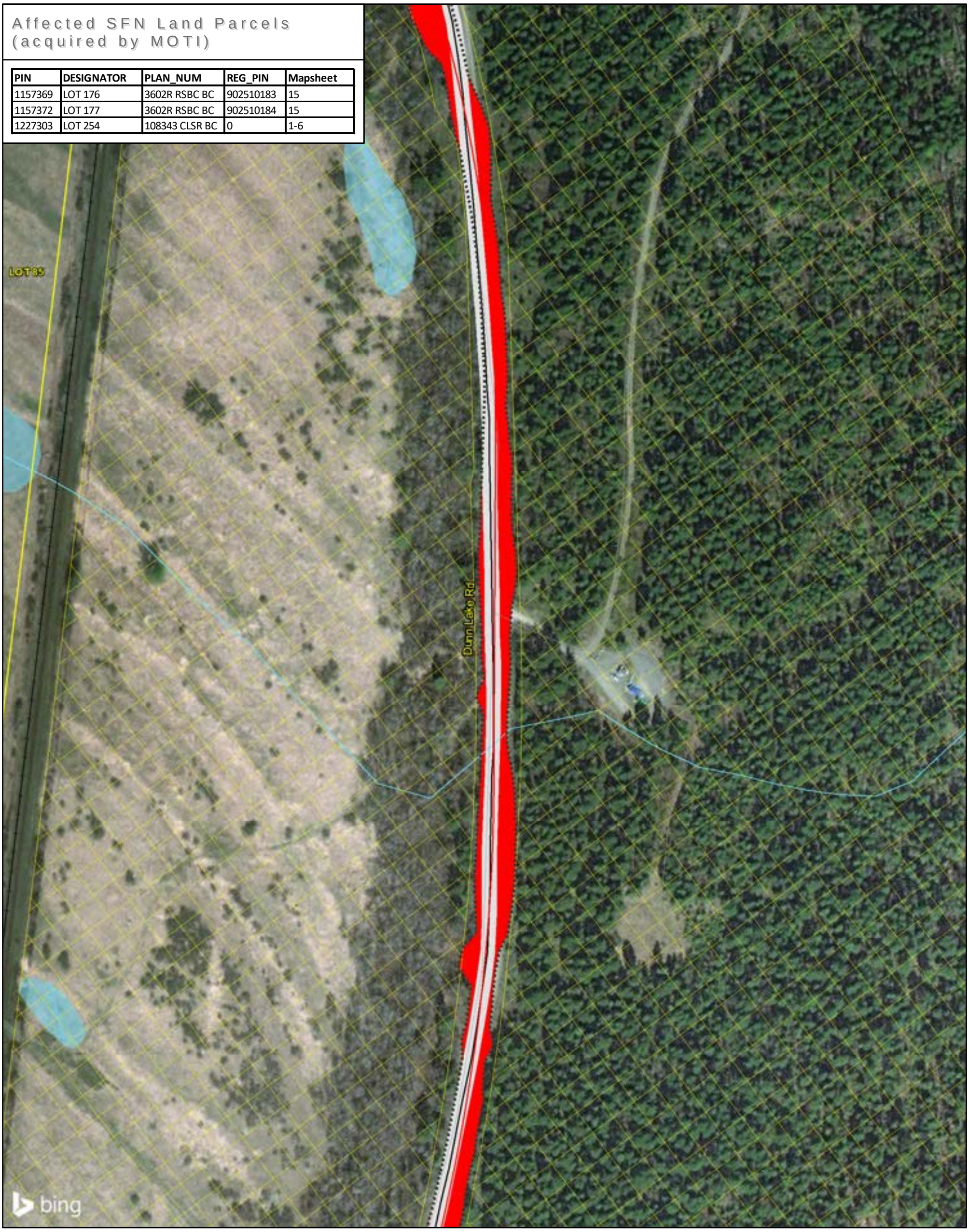

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 11 of 18

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
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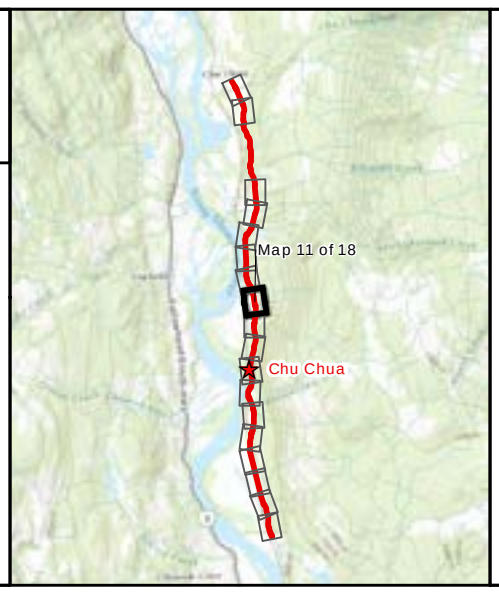

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Map Scale: 1:2,000

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Simpcw Resources Group

Date: 2022-02-17

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1227303	LOT 254	108343 CLSR BC	0	1-6

Dunn Lake Road Realignment and Paving Project
Appendix 1

Map 12 of 18

- Project Limits
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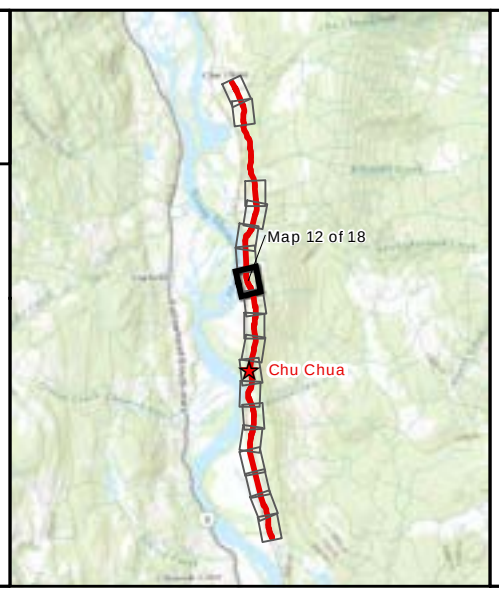

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Simpcw Resources Group

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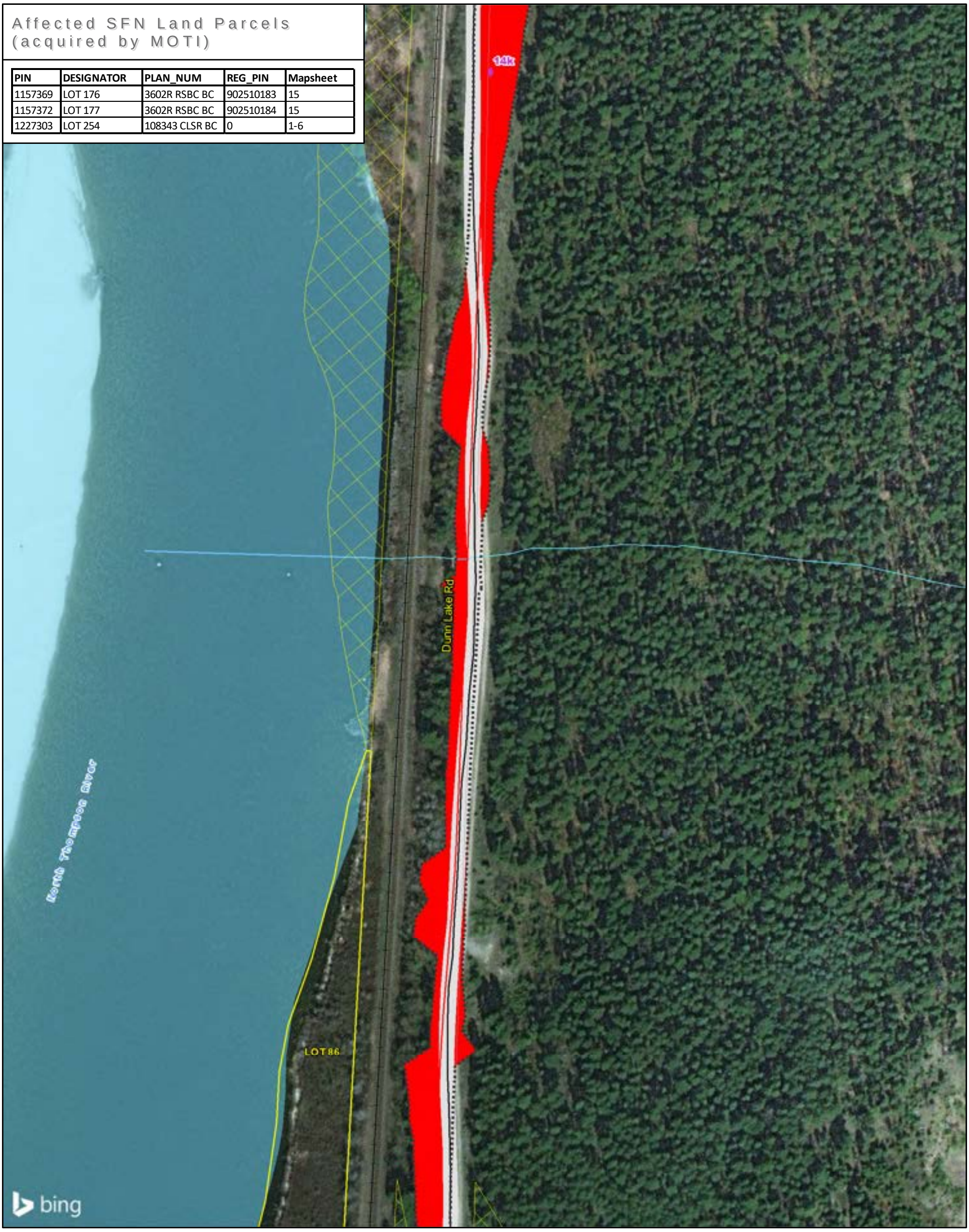

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 13 of 18

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
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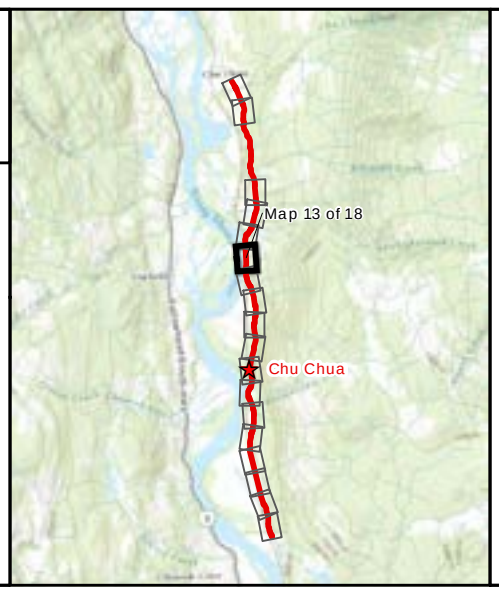

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Simpcw Resources Group

Date: 2022-02-17

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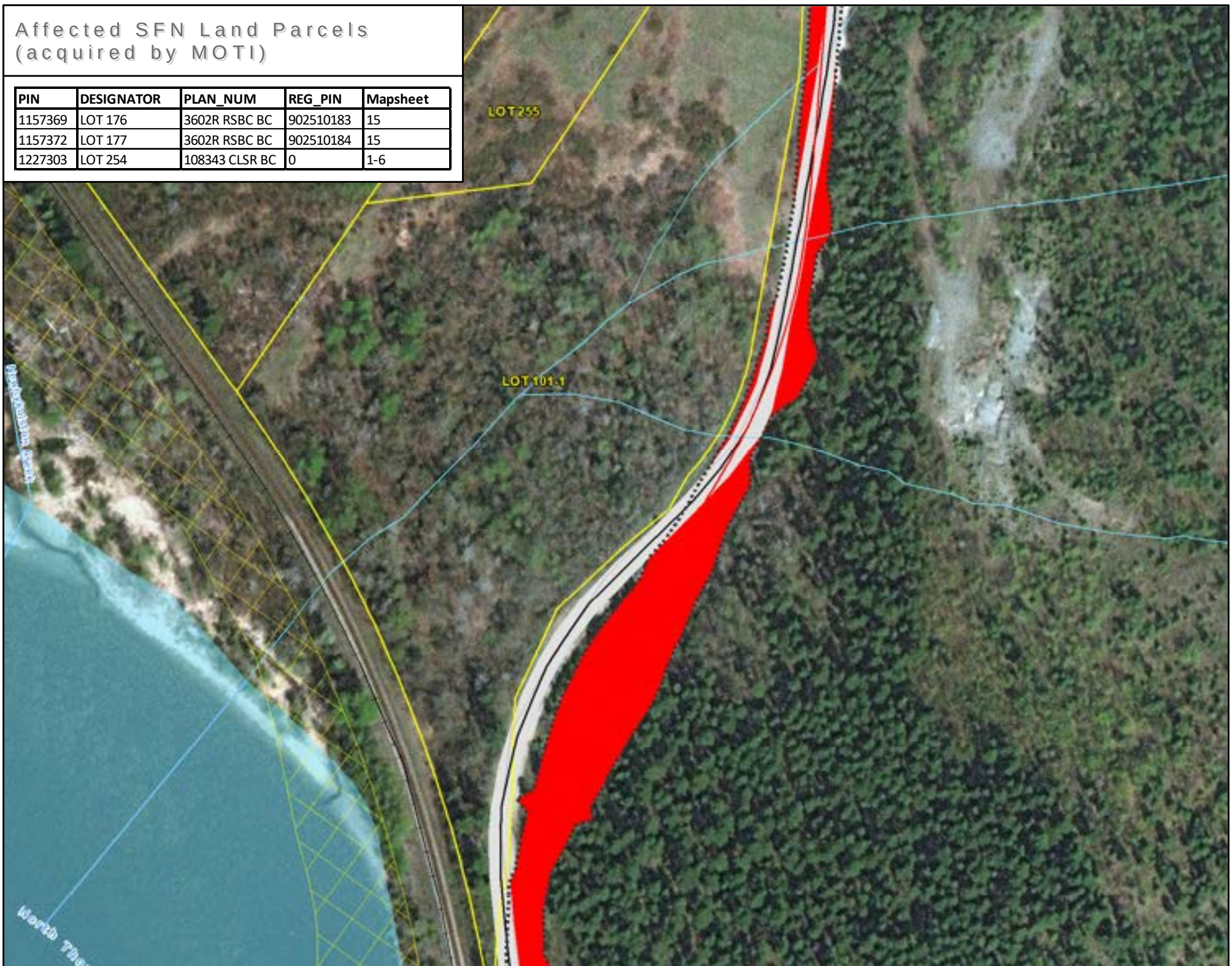

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 14 of 18

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
- Existing Road Centreline
- Other Roads
- Watercourse
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- Affected SFN Land Parcels

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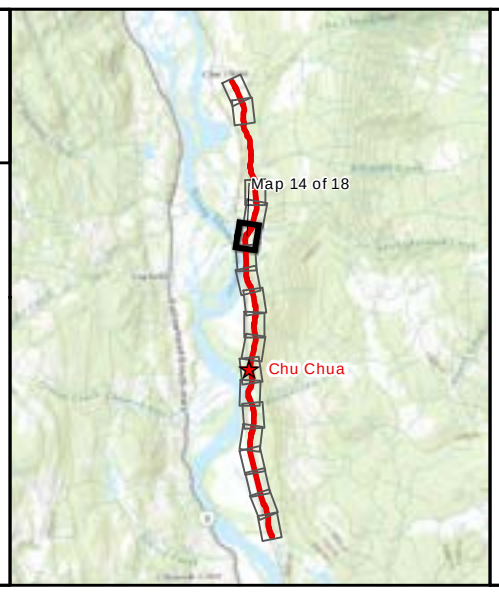

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Simpcw Resources Group

Date: 2022-02-17

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PIN	DESIGNATOR	PLAN_NUM	REG_PIN	Mapsheet
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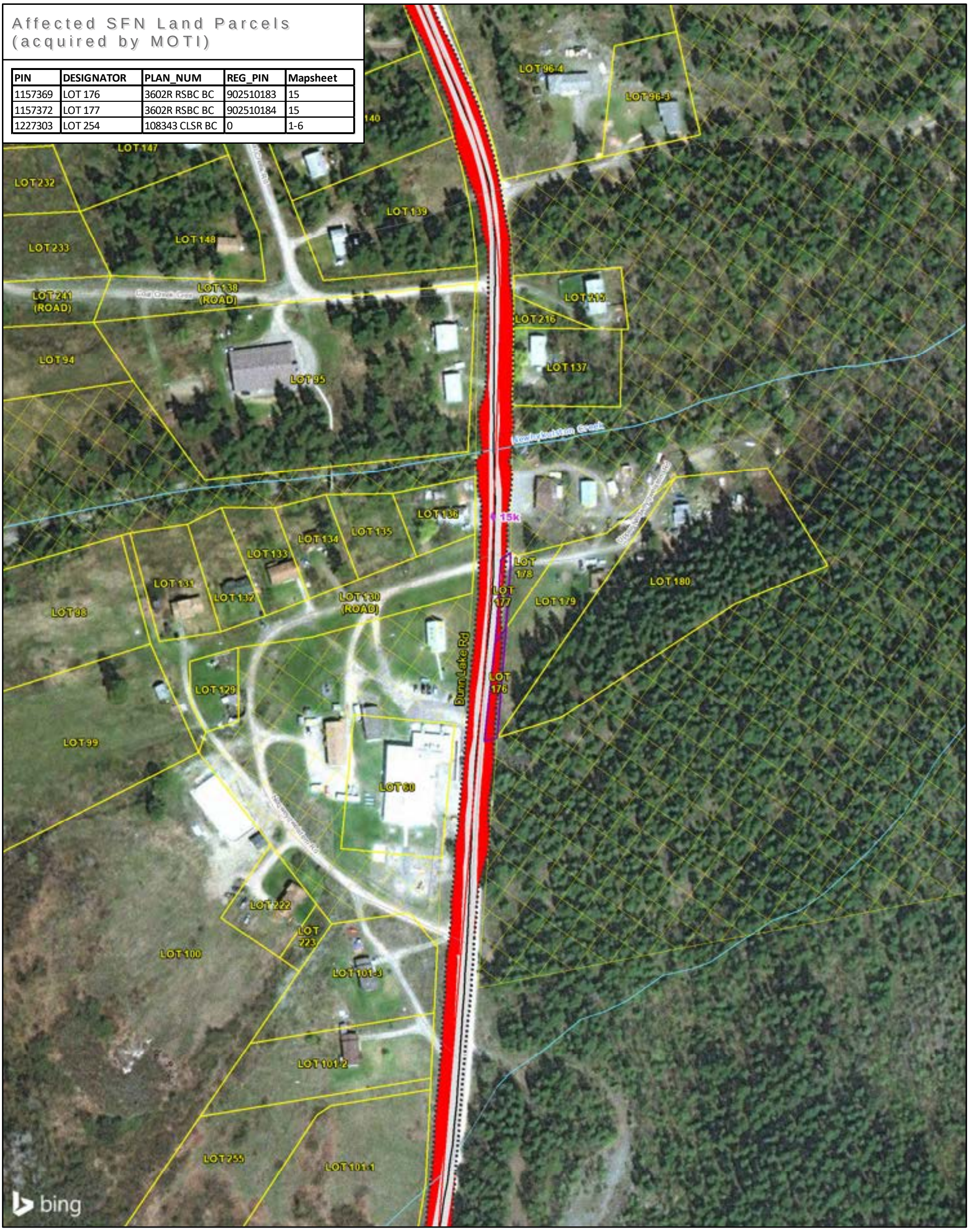

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 15 of 18

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
- Existing Road Centreline
- Other Roads
- Watercourse
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- Affected SFN Land Parcels

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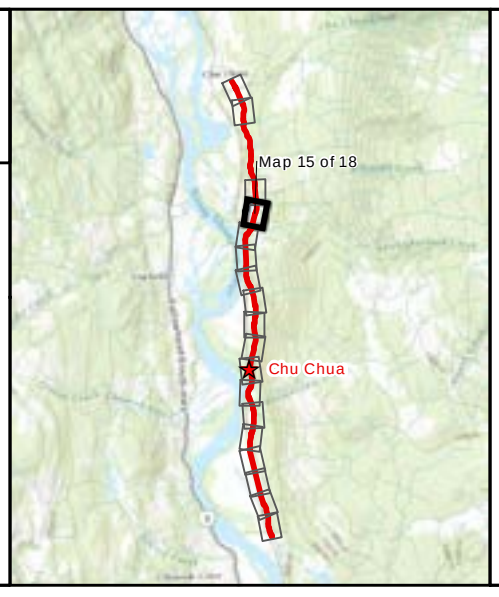

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Simpcw Resources Group

Date: 2022-02-17

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Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 16 of 18

- Project Limits
- Kilometer Markers
- CNR Stations
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- Watercourse
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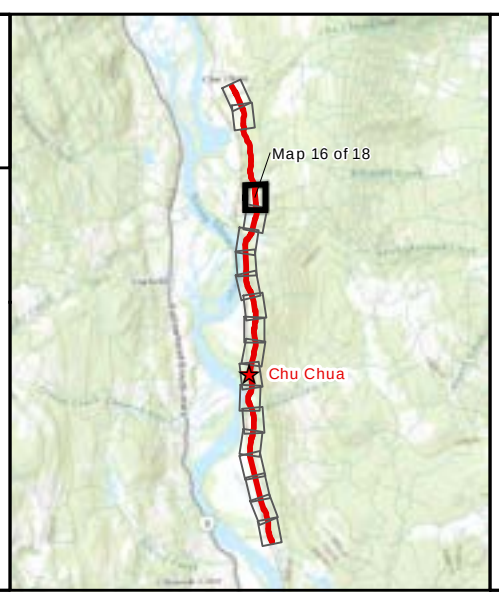

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Map Scale: 1:2,000

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Simpcw Resources Group

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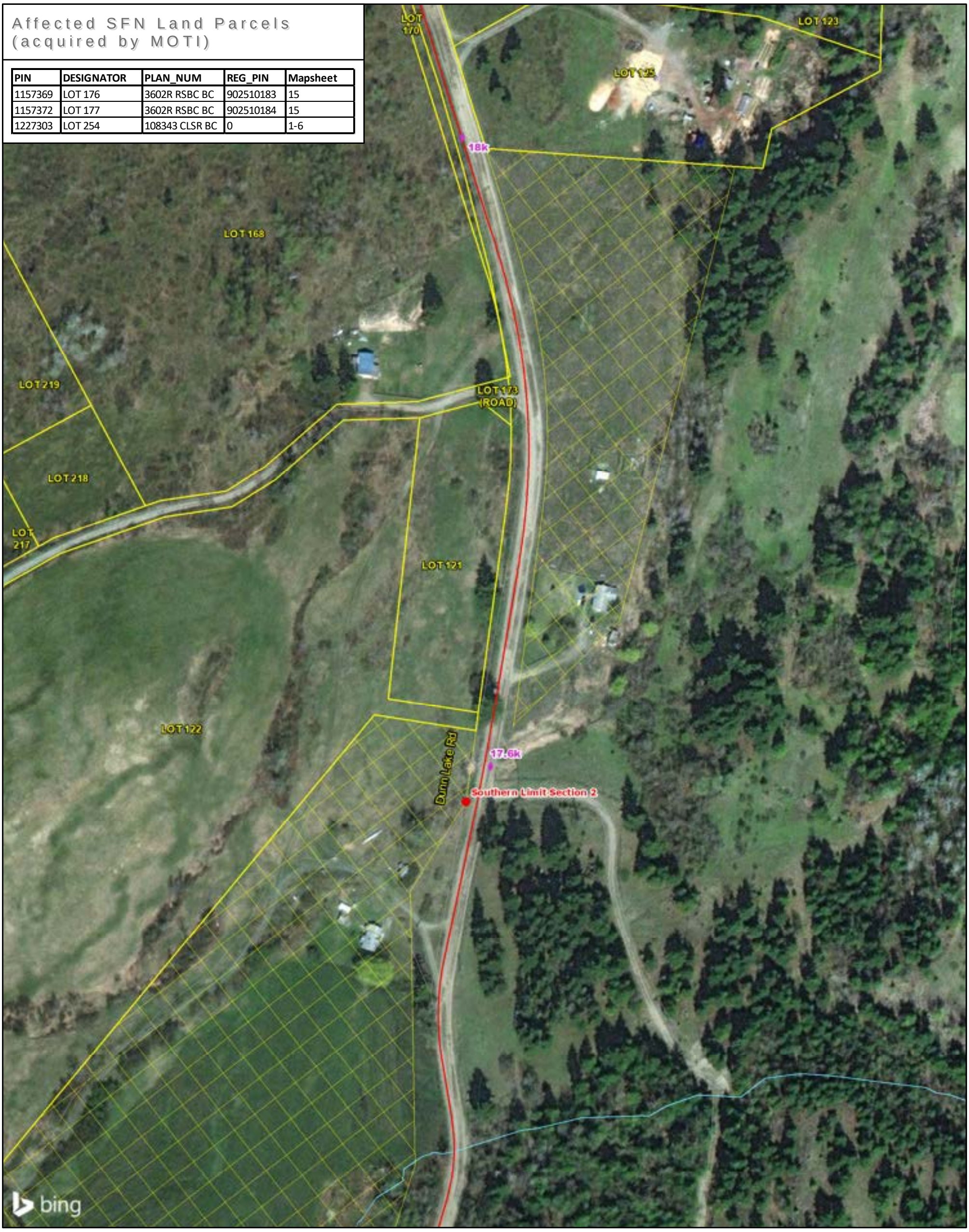

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 17 of 18

- Project Limits
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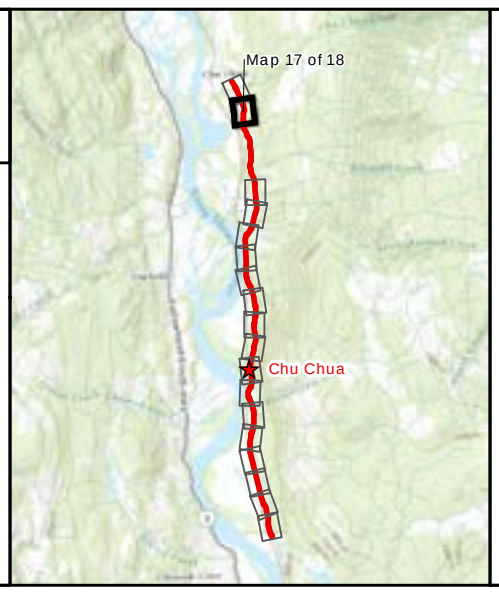

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Map Scale: 1:2,000

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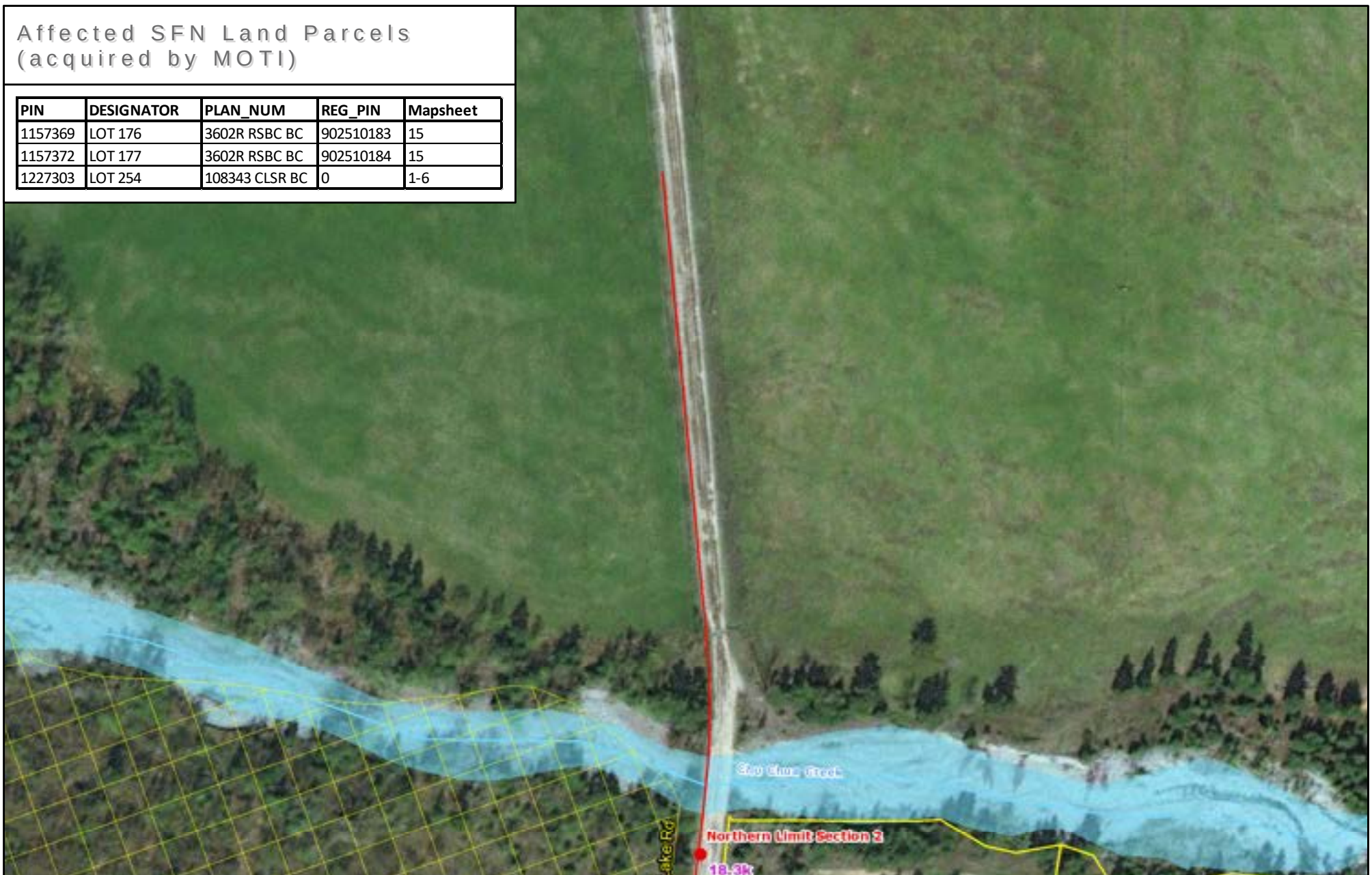

Dunn Lake Road Realignment and Paving Project

Appendix 1

Map 18 of 18

- Project Limits
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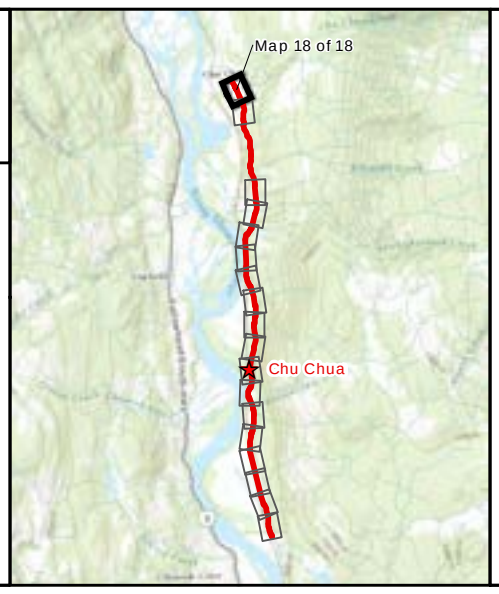

Map Scale: 1:2,000

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Simpcw Resources Group

Date: 2022-02-17

APPENDIX 2

ENVIRONMENT FEATURES (9 MAPSHEETS)

Columbian ground squirrel

2016

Site A

Chinook Cove

Chu Chua Ferry Rd

American kestrel

Dunn Lake Rd

2016

2016

Wildlife Trail

Common Garter Snake

Southern Limit Section 1

Map 1 of 9

Dunn Lake Road Realignment and Paving Project

Appendix 2

- Project Limits

EIA - Consolidated Wildlife Points

- Historical
- Incidental Wildlife Observation
- Wildlife Habitat Observation

Labelled by Species Common Name

- Wildlife Spp Inventory Incidental Observations

Badger Occurences in Simpcwúłecw

Data Authenticity Rank Weir2003

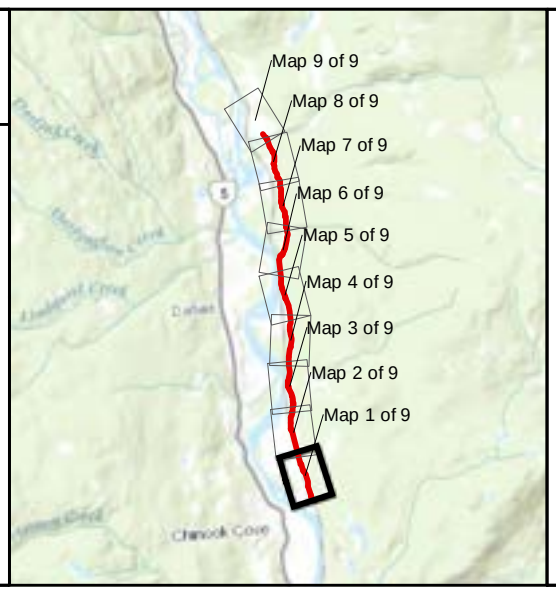
- 1
- 2; 3
- Ministry Sightings

Labelled by Observation Year — 2021

- Highway
- Proposed Dunn Lake Road Centreline
- Other Roads
- Watercourse
- Waterbodies / Large Rivers
- SRG Delineated Wetlands
- Wetland

Lewis's Woodpecker

- Critical Habitat for Federally Listed SAR
- North Thompson IR#1
- Project Footprint



N W E S

Map Scale: 1:5,000

0 50 100

Meters

Simpcw Resources Group

Date: 2022-02-17

North Thompson River

Northern Rubber Boa

Eastern Kingbird

Columbian ground squirrel

Upper Kenkeknem Rd

Dunn Lake Rd

Columbian ground squirrel

Kenkeknem Rd

American Badger

2021

Columbian ground squirrel

2016

Map 2 of 9

Dunn Lake Road Realignment and Paving Project

Appendix 2

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- Wildlife Habitat Observation

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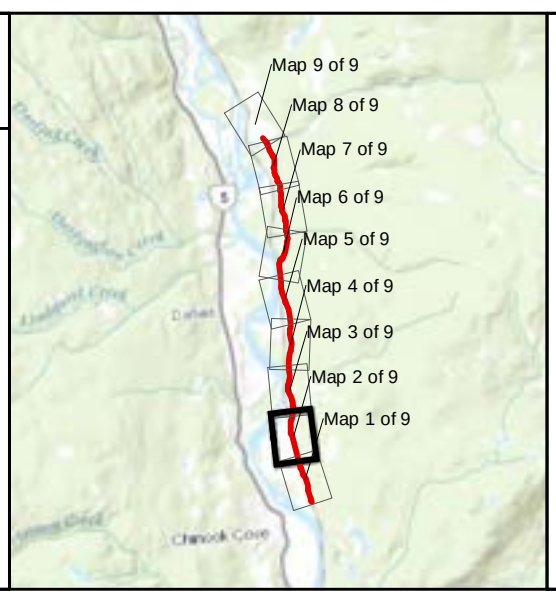

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Map Scale: 1:5,000

0 50 100 Meters

Simpcw Resources Group

Date: 2022-02-17

Chu Chua
Western Painted Turtle
Site D
North Thompson River
American Robin
Cedar Waxwing
Swainson's Thrush
Mountain Chickadee
Dark-eyed Junco
Pacific Treefrog
2016
Skowoolum Creek
Dunn Lake Rd
American Robin
Western Wood-Pewee
Song Sparrow
Red-naped sapsucker
Turkey vulture
Western Painted Turtle
Mallard
Site C
Pacific Treefrog
Site B
Brewer's Blackbird
Map 3 of 9

Dunn Lake Road Realignment and Paving Project
Appendix 2

- Project Limits

EIA - Consolidated Wildlife Points

- Historical
- Incidental Wildlife Observation
- Wildlife Habitat Observation

Labelled by Species Common Name

- Wildlife Spp Inventory Incidental Observations

Badger Occurences in Simpcwúłecw

Data Authenticity Rank Weir2003

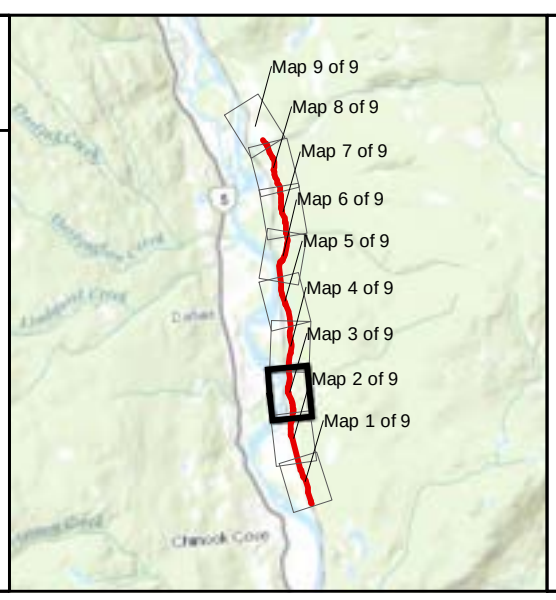
- 1
- 2; 3
- Ministry Sightings

Labelled by Observation Year — 2021

- Highway
- Proposed Dunn Lake Road Centreline
- Other Roads
- Watercourse
- Waterbodies / Large Rivers
- SRG Delineated Wetlands
- Wetland

Lewis's Woodpecker

- Critical Habitat for Federally Listed SAR
- North Thompson IR#1
- Project Footprint



N
W E
S

Map Scale: 1:5,000

0 50 100
Meters

Simpcw Resources Group

Date: 2022-02-17

Common Garter Snake
Common Garter Snake
Red-tailed Hawk
Pacific Treefrog
Pacific Treefrog
Dunn Lake Rd
Wildlife Tree
Pacific Treefrog
Wildlife Tree
Site D
Chu Chua
Map 4 of 9

Dunn Lake Road Realignment and Paving Project
Appendix 2

- Project Limits

EIA - Consolidated Wildlife Points

- Historical
- Incidental Wildlife Observation
- Wildlife Habitat Observation

Labelled by Species Common Name

- Wildlife Spp Inventory Incidental Observations

Badger Occurences in Simpcwúłecw

Data Authenticity Rank Weir2003

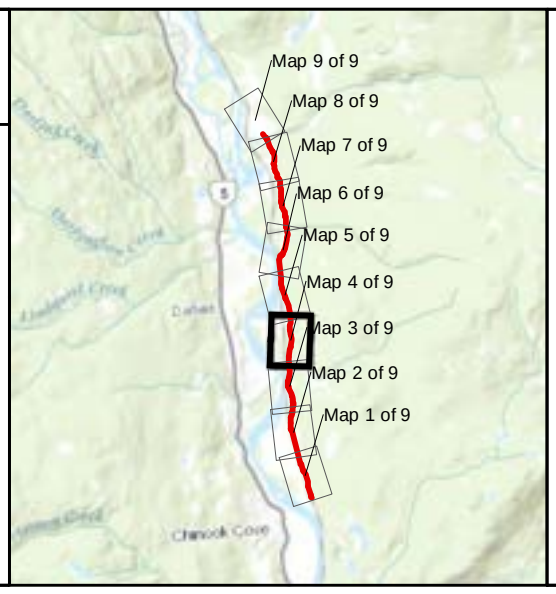
- 1
- 2; 3
- Ministry Sightings

Labelled by Observation Year — 2021

- Highway
- Proposed Dunn Lake Road Centreline
- Other Roads
- Watercourse
- Waterbodies / Large Rivers
- SRG Delineated Wetlands
- Wetland

Lewis's Woodpecker

- Critical Habitat for Federally Listed SAR
- North Thompson IR#1
- Project Footprint



N W E S

Map Scale: 1:5,000

0 50 100 Meters

Simpcw Resources Group

Date: 2022-03-24

North Thompson River

Dark-eyed Junco

Spotted Towhee

Dunn Lake Rd

Pacific Treefrog

Pacific Treefrog

Common Garter Snake

Pacific Treefrog

Red-tailed Hawk

Common Garter Snake

Map 5 of 9

Dunn Lake Road Realignment and Paving Project

Appendix 2

- Project Limits

EIA - Consolidated Wildlife Points

- Historical
- Incidental Wildlife Observation
- Wildlife Habitat Observation

Labelled by Species Common Name

- Wildlife Spp Inventory Incidental Observations

Badger Occurences in Simpcwúłecw

Data Authenticity Rank Weir2003

- 1
- 2; 3

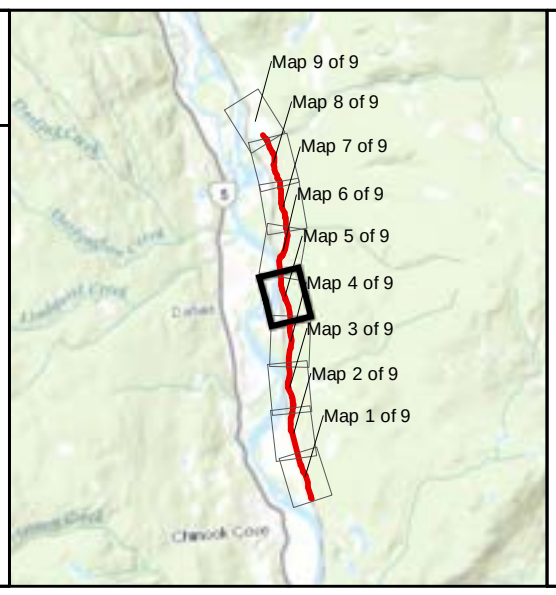
Labelled by Observation Year — 2021

- Ministry Sightings

- Highway
- Proposed Dunn Lake Road Centreline
- Other Roads
- Watercourse
- Waterbodies / Large Rivers
- SRG Delineated Wetlands
- Wetland

Lewis's Woodpecker

- Critical Habitat for Federally Listed SAR
- North Thompson IR#1
- Project Footprint



N W E S

Map Scale: 1:5,000

0 50 100 Meters

Simpcw Resources Group

Date: 2022-02-17

Northern Rubber Boa
Ollies Rd
Cemetery Rd
Coal Creek Cres
Old Coal Creek Rd
Black-capped Chickadee
Ruby-crowned Kinglet
American Robin
American Robin
Newhykulston Creek
Upper Nequweyqweistem Rd
2016
Nequweyqweistem Rd
Dunn Lake Rd
Red-winged Blackbird
Northern Flicker
Moose
2016
Wildlife Crossing
Site E
North Thompson River
Common Garter Snake
Mineral Lick
Map 6 of 9

Dunn Lake Road Realignment and Paving Project
Appendix 2

- Project Limits

EIA - Consolidated Wildlife Points

- Historical
- Incidental Wildlife Observation
- Wildlife Habitat Observation

Labelled by Species Common Name

- Wildlife Spp Inventory Incidental Observations

Badger Occurences in Simpcwúłecw

Data Authenticity Rank Weir2003

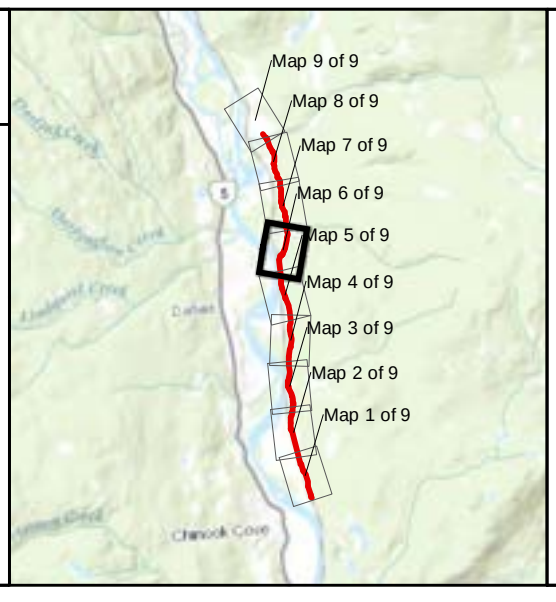
- 1
- 2; 3
- Ministry Sightings

Labelled by Observation Year — 2021

- Highway
- Proposed Dunn Lake Road Centreline
- Other Roads
- Watercourse
- Waterbodies / Large Rivers
- SRG Delineated Wetlands
- Wetland

Lewis's Woodpecker

- Critical Habitat for Federally Listed SAR
- North Thompson IR#1
- Project Footprint



Map Scale: 1:5,000

0 50 100 Meters

Simpcw Resources Group

Date: 2022-03-24

Kikwilli Creek

Cemetery Rd

Coal Creek Cres

Old Coal Creek Rd

Dunn Lake Rd

2005

Northern Limit Section 1

Bank Swallow

Northern Rubber Boa

Ollies Rd

Map 7 of 9

Dunn Lake Road Realignment and Paving Project

Appendix 2

- Project Limits

EIA - Consolidated Wildlife Points

- Historical
- Incidental Wildlife Observation
- Wildlife Habitat Observation

Labelled by Species Common Name

- Wildlife Spp Inventory Incidental Observations

Badger Occurences in Simpcwúłecw

Data Authenticity Rank Weir2003

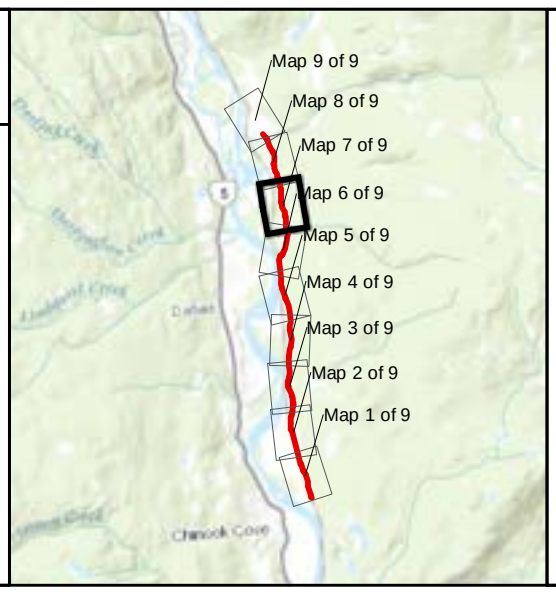
- 1
- 2; 3
- Ministry Sightings

Labelled by Observation Year — 2021

- Highway
- Proposed Dunn Lake Road Centreline
- Other Roads
- Watercourse
- Waterbodies / Large Rivers
- SRG Delineated Wetlands
- Wetland

Lewis's Woodpecker

- Critical Habitat for Federally Listed SAR
- North Thompson IR#1
- Project Footprint



N W E S

Map Scale: 1:5,000

0 50 100 Meters

Simpcw Resources Group

Date: 2022-02-17

Chu Chua Creek

Northern Limit Section 2

2021

2019

Dunn Lake Rd

Southern Limit Section 2

2016

Red-tailed Hawk

American Black Bear

Mineral Lick

Map 8 of 9

Dunn Lake Road Realignment and Paving Project

Appendix 2

- Project Limits

EIA - Consolidated Wildlife Points

- Historical
- Incidental Wildlife Observation
- Wildlife Habitat Observation

Labelled by Species Common Name

- Wildlife Spp Inventory Incidental Observations

Badger Occurences in Simpcwúłecw

Data Authenticity Rank Weir2003

- 1
- 2; 3

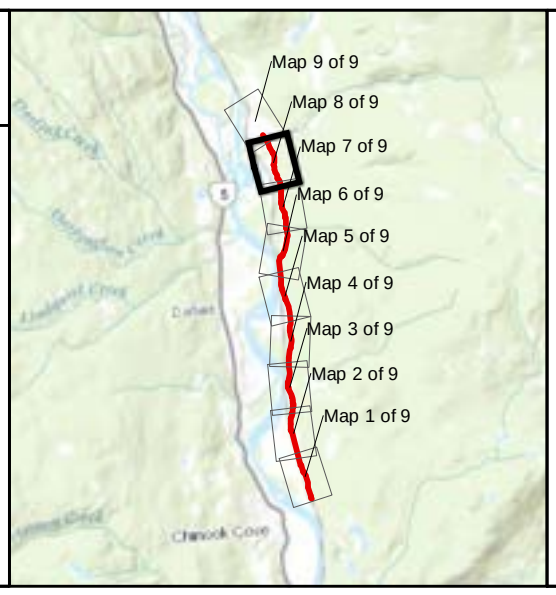
Labelled by Observation Year — 2021

- Ministry Sightings

- Highway
- Proposed Dunn Lake Road Centreline
- Other Roads
- Watercourse
- Waterbodies / Large Rivers
- SRG Delineated Wetlands
- Wetland

Lewis's Woodpecker

- Critical Habitat for Federally Listed SAR
- North Thompson IR#1
- Project Footprint



N W E S

Map Scale: 1:5,000

0 50 100 Meters

Simpcw Resources Group

Date: 2022-03-24

North Thompson River

Dunn Lake Rd

2016

Northern Limit Section 2

Chu Chua Creek

Map 9 of 9

Dunn Lake Road Realignment and Paving Project

Appendix 2

- Project Limits

EIA - Consolidated Wildlife Points

- Historical
- Incidental Wildlife Observation
- Wildlife Habitat Observation

Labelled by Species Common Name

- Wildlife Spp Inventory Incidental Observations

Badger Occurences in Simpcwúłecw

Data Authenticity Rank Weir2003

- 1
- 2; 3

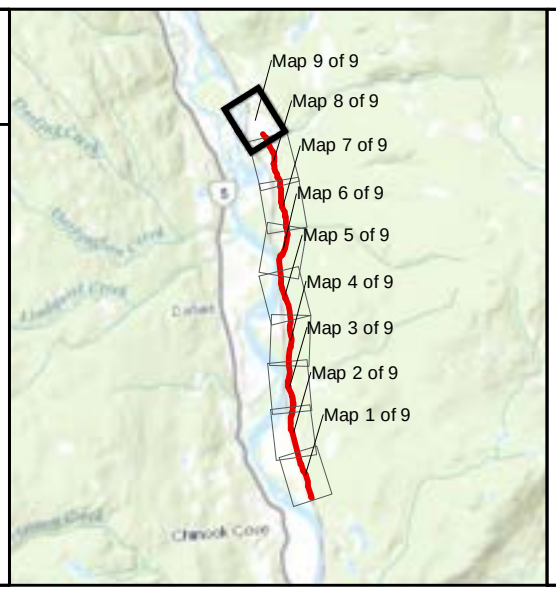
Labelled by Observation Year — 2021

- Ministry Sightings

- Highway
- Proposed Dunn Lake Road Centreline
- Other Roads
- Watercourse
- Waterbodies / Large Rivers
- SRG Delineated Wetlands
- Wetland

Lewis's Woodpecker

- Critical Habitat for Federally Listed SAR
- North Thompson IR#1
- Project Footprint



Map Scale: 1:5,000

0 50 100

Meters

Simpcw Resources Group

Date: 2022-02-17

APPENDIX 3

DELINEATED WETLANDS (4 MAPSHEETS)

LOT 66-2
LOT 66-1
LOT 68
Chinook Cove
Dunn Lake Rd
Chinook Cove
Site A
LOT 254
LOT 79-2-2
LOT 79-2-1
7k
LOT 251
LOT 165 (R/W)
LOT 79-1
bing

Dunn Lake Road Realignment and Paving Project

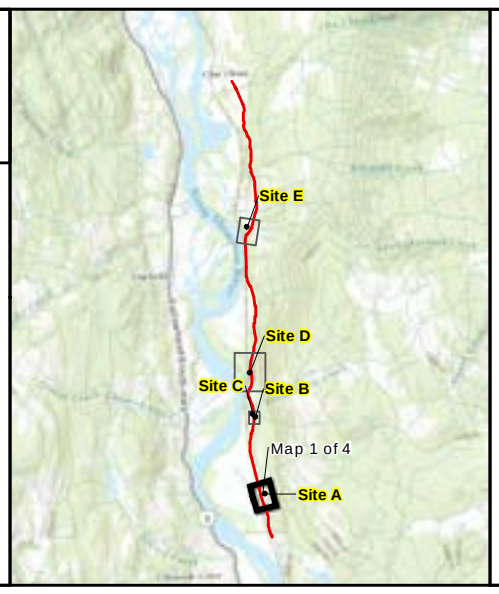
Appendix 3

Map 1 of 4

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
- Existing Road Centreline
- Other Roads
- Watercourse
- Project Footprint
- Compensation Wetland
- Non-Compensation Wetland

Land Parcels

- North Thompson IR1
- CP Lands (Lawful Possession)
- Proposed New Build / Realigned ROW
- Existing Built ROW
- Waterbodies / Large Rivers



N
W
E
S

Map Scale: 1:2,000

0 25 50 (m)

Simpcw Resources Group

Date: 2022-02-17

LOT 254

LOT 242

Site C

Dunn Lake Rd

Site B

LOT 76

bing

Dunn Lake Road Realignment and Paving Project

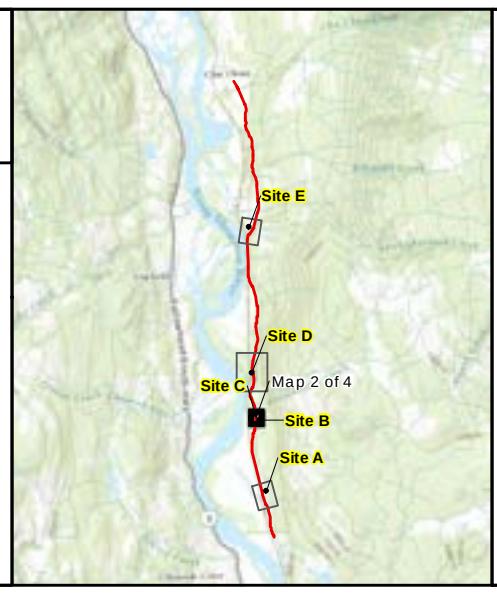
Appendix 3

Map 2 of 4

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
- Existing Road Centreline
- Other Roads
- Watercourse
- Project Footprint
- Compensation Wetland
- Non-Compensation Wetland

Land Parcels

- North Thompson IR1
- CP Lands (Lawful Possession)
- Proposed New Build / Realigned ROW
- Existing Built ROW
- Waterbodies / Large Rivers



N
W
E
S

Map Scale: 1:1,000

0 25 50

Simpcw Resources Group

Date: 2022-02-17

LOT 82

LOT 81

13k

Chu Chua

Site D

Dunn Lake Rd

North Thompson River

bing

Dunn Lake Road Realignment and Paving Project

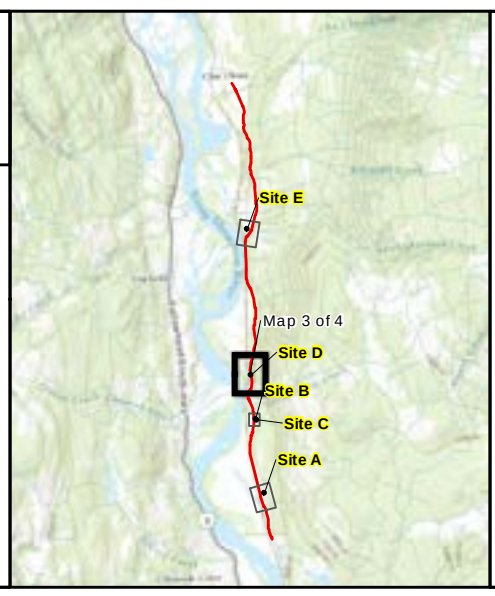
Appendix 3

Map 3 of 4

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
- Existing Road Centreline
- Other Roads
- Watercourse
- Project Footprint
- Compensation Wetland
- Non-Compensation Wetland

Land Parcels

- North Thompson IR1
- CP Lands (Lawful Possession)
- Proposed New Build / Realigned ROW
- Existing Built ROW
- Waterbodies / Large Rivers



N
W
E
S

Map Scale: 1:3,000

0 25 50

(m)

Simpcw Resources Group

Date: 2022-02-17

LOT 99
LOT 222
LOT 223
LOT 101-3
LOT 101-2
LOT 100
LOT 255
LOT 101-1
Site E
Area - 1,323 m2
North Thompson River
Dunn Lake Rd
bing

Dunn Lake Road Realignment and Paving Project

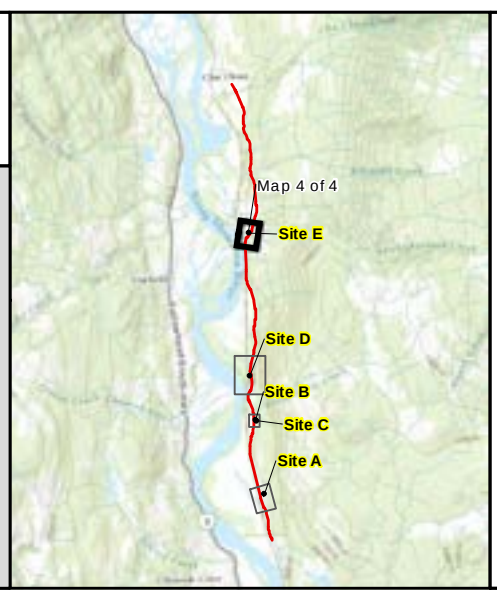
Appendix 3

Map 4 of 4

- Project Limits
- Kilometer Markers
- CNR Stations
- Proposed Road Centreline
- Existing Road Centreline
- Other Roads
- Watercourse
- Project Footprint
- Compensation Wetland
- Non-Compensation Wetland

Land Parcels

- North Thompson IR1
- CP Lands (Lawful Possession)
- Proposed New Build / Realigned ROW
- Existing Built ROW
- Waterbodies / Large Rivers
- Proposed Offset Polygon



N
W
E
S

Map Scale: 1:2,000

0 25 50
(m)

Simpcw Resources Group

Date: 2022-03-24

APPENDIX 4

FEDERAL AND PROVINCIAL SPECIES-AT-RISK WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Table 1 Plant Species and Ecological Communities at Risk with Potential to Occur in the General Project Area

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
Bryophytes								
Cladonia cyanipes	blue-footed pixie	Blue	Not listed	Not listed	Mossy boulder beds (Gov't of BC, undated)	Unknown	Unknown	Unknown
Dermatocarpon intestiniforme	quilted stippleback	Blue	Not Listed	Not listed	Over rock, rarely over exposed soil. Infrequent over base-rich rock in open, usually rather exposed sites throughout (E-Flora BC 2021). Occurrence noted in Clearwater, BC (alpine).	Unknown	Unknown	Unknown
Phaeophyscia ciliata	greater eye shadow	Blue	Not Listed	Not listed	Over rock, bark, moss and other substrates. Rare over deciduous shrubs in open forests at lowland elevations throughout (BC CDC 2021). Occurrence noted in Clearwater, BC.	Unknown	Unknown	Unknown
Pterygoneurum kozlovii	alkaline wing-nerved moss	Blue	THR	THR	In BC, grows at low elevations in sagebrush, grassland and less commonly, in open ponderosa pine and Douglas-fir forests. Grows among litter and vascular plants, and is restricted to seasonally damp, alkaline, usually silt or clay-rich soil at the edges of open ponds, lakes, and sloughs, and on seepage slopes in relatively dry environments. Associated species include field sedge, saltgrass, and foxtail barley. Four occurrences noted in the North Thompson River valley between Kamloops and the	Unknown	Unknown	Unknown

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
					Ashcroft/Cache Creek area (BC CDC 2021).			
Ferns								
Azolla mexicana	Mexican mosquito fern	Blue	THR	THR	BC populations are in three general locations: near Shuswap Lake, North Thompson River valley (Little Fort), and Vernon. Occurs in IDFxh1a, IDFxh2, in a range of aquatic environments from ponds, sloughs, backwaters, oxbow lakes, human-made ditches to slow and strongly flowing streams. Most sites in BC occur in broad flat river floodplains that were initially formed by post-glacial outwash deposited in broad mountain valleys (BC CDC 2021).	Unknown	Unknown	Critical Habitat identified.
Herbaceous Plants								
Olsynium douglasii var. inflatum	satinflower	Red	Not listed	Not listed	Occurs in sagebrush steppes, dry conifer forests, and less commonly in grasslands and shrublands (BC CDC 2021). Habitat includes sagebrush slopes in the montane zone. Is considered rare in South-central BC (The Illustrated Flora of British Columbia, undated).	Unknown	Unknown	Unknown
Ecological Communities								
Carex lasiocarpa / Drepanocladus aduncus	slender sedge / common hook-moss	Blue	N/A	N/A	A fen wetland limited to organic materials on depressional sites, or edges of shallow lakes and ponds where high water table levels maintain the community type. Occurs primarily on permanently saturated organic soils consisting of deep sedge peat, and	Unknown	Unknown	Unknown

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
					occasionally on organic veneers. Found in ICHmw1/Wf05 and ICHmw3/Wf05 site series (BC CDC 2021).			
Equisetum fluviatile - Carex utriculata	swamp horsetail - beaked sedge	Blue	N/A	N/A	A swamp community restricted to uncommon but wide-ranging freshwater sites. Requires fairly consistent high-water levels adjacent to lakeshores, back-levee depressions along low-gradient streams, other marshes and fens. Found in ICHmw3/Wm02 site series (BC CDC 2021).	Unknown	Unknown	Unknown

Notes:
1 – BC List – At-risk species in BC are assigned to the Red (extirpated, endangered, or threatened), Blue (special concern), or Yellow (at least risk of being lost) Lists, based on each species' provincial conservation status rank.
COS - COSEWIC = Committee on the Status of Endangered Wildlife in Canada; species are designated as END (endangered), THR (threatened), or SC (of Special Concern). Species without these designations are either NAR (not at risk), or not listed.
SARA – Species at Risk Act designation for species listed on Schedule 1; species are designated as END (endangered), THR (threatened), or SC (of Special Concern). Species without these designations are either NAR (not at risk), or not listed.
2 – Project Footprint Area = the area directly disturbed by Project activities
3 – LSA = Local Study Area = the Project Footprint plus the area extending beyond the Footprint up to 500 m (100 m for plants).
4 – RSA = Regional Study Area = extends beyond the LSA boundary to the area of the Simpcw IR and beyond up to 5 km.

Table 2 Wildlife Species at Risk with Potential to Occur in the General Project Area

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
Molluscs								
Magnipelta mycophaga	Magnum Mantleslug	Blue	SC	SC	Occurs under moist logs, bark, in depressions in moist earth, and in talus slopes in cool, moist coniferous forests. Occurrence noted	Species not observed.	Potential habitat may be present.	Potential habitat may be present.

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
					in Barriere (1992, 1993) in pitfall traps as part of a survey for forest floor invertebrates (BC CDC 2021).	Potential habitat may be present.		
Physella virginea	Sunset Physa	Blue	Not listed	Not listed	Occurs over a large range across southern BC. Use broad habitat types (lakes, rivers, creeks and sloughs) (BC CDC 2021).	Species not observed. Potential habitat may be present.	Potential habitat may be present.	Potential habitat may be present.
Promenetus umbilicatellus	Umbilicate Sprite	Blue	Not listed	Not listed	Vernal ponds, marshes and spring freshet-flooded margins of intermittent streams; associated with dense vegetation and mud bottoms (BC CDC 2021).	Species not observed. Potential habitat may be present.	Potential habitat may be present.	Potential habitat may be present.
Sphaerium occidentale	Herrington Fingernailclam	Blue	Not listed	Not listed	Found in calm water in swamps, ditches and ponds in habitats that dry up for part of the year. Can be found in damp leaves on land; only known from regions containing calcareous deposits (BC CDC 2021).	Species not observed. Potential habitat may be present.	Potential habitat may be present.	Potential habitat may be present.
Insects								
Danaus plexippus	Monarch	Red	END	SC	Caterpillar Hosts: Milkweeds including common milkweed (*Asclepias syriaca*), swamp milkweed (*A. incarnata*), and showy milkweed (*A. speciosa*). Adult Food: Nectar from all milkweeds, dogbane, lilac, red clover, lantana, thistles,	Species not observed. Potential habitat may be present.	Potential habitat may be present.	Potential habitat may be present.

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
					goldenrods, blazingstars, ironweed, and tickseed sunflower (BC CDC 2021).			
Ophiogomphus occidentis	Sinuous Snaketail	Blue	Not listed	Not listed	Lakes, streams, rivers (BC CDC 2021).	Species not observed. Potential habitat may be present.	Potential habitat may be present.	Potential habitat may be present.
Amphibians								
Anaxyrus boreas	Western Toad	Yellow	SC	SC	Breed in slow-moving, shallow zones of lakes, temporary and permanent pools and wetlands, bogs, fens, and roadside ditches. Adults forage through adjacent riparian areas and a variety of terrestrial habitats (e.g., forests, woodlands, shrublands agricultural croplands, grasslands). Hibernacula are in loose soils, rodent burrows. (BC CDC 2021).	Species not observed. Potential habitat may be present.	Potential breeding, foraging and overwintering habitat present	Potential breeding, foraging and overwintering habitat present
Reptiles								
Charina bottae	Northern Rubber Boa	Yellow	SC	SC	Habitat includes woodlands, forest clearings, meadows grasslands near water. Generally found in or under rotting logs or stumps, under rocks or in crevices, or under the bark of dead fallen trees (BC CDC 2021).	Species observed in suitable habitat.	Potential habitat present	Potential habitat present;
Chrysemys picta pop. 2	Painted Turtle - Intermountain -	Blue	SC	SC	Aquatic habitats provide foraging, daily movement, basking and mating habitat	Yes*	Potential habitat present	Potential habitat present;

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
	Rocky Mountain Population				for painted turtles. They require wetlands, small lakes, slow-moving streams with mud bottoms and aquatic vegetation, that have relatively warm water, are at least 1 m deep (for overwintering), and contain secure basking areas. Suitable nearby terrestrial habitat is required for nesting / hatchling development, and migration between aquatic features (B.C. Ministry of Environment. 2017).			
Birds								
Buteo swainsoni	Swainson's Hawk	Red	Not listed	Not listed	Breeding and foraging habitat requirements include open woodlands, crop fields, where nests are typically placed in a tree, bush or small grove of trees; nests have been found in areas heavily disturbed by humans, such as shelterbelts and hedgerows (BC CDC 2021).	Species observed. Potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat present
Icteria virens	Yellow-breasted Chat	Red	END	END	Breeding habitat in BC includes shrubby second growth and riparian areas with open areas (e.g., old pastures) and dense subcanopy layers (e.g., black cottonwood / water birch stands with dense understoreys of wild rose, willow, common snowberry, as well as hawthorn, trembling aspen and	Species not observed. Potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat present

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
					chokecherry) (BC CDC 2021).			
Accipiter gentilis atricapillus	Northern Goshawk, atricapillus subspecies	Blue	NAR	Not listed	Require dense, mature to old growth conifer stands with a relatively dense canopy for nesting (BC CDC 2021; Squires et al. 2020).	Species and habitat not observed	Potential nesting and foraging habitat present	Potential habitat present
Ardea herodias herodias	Great Blue Heron, herodias subspecies	Blue	Not listed	Not listed	Nest in trees, shrubs, on ground and artificial structures, typically near water, but prefer to nest in vegetation on islands for predator avoidance. Forages in wetlands, water bodies, water courses and occasionally upland areas (e.g., pasture and cultivated fields). (Vennesland and Butler 2020).	Species not observed; potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat present
Asio flammeus	Short-eared Owl	Blue	THR	SC	Breeding habitat includes large areas of open land with low vegetation, some dry upland for nesting, and that support suitable prey species' populations may be considered potential breeding habitat, although many will not have breeding short-eared owls (BC CDC 2021).	Species not observed. Potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat present
Buteo lagopus	Rough-legged Hawk	Blue	NAR	Not listed	In BC, typically nests on cliffs or in trees in mountain sides and forests with plenty of open ground. Sometimes nests on the ground or on man-made structures (BC CDC 2021).	Species observed; potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat present

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
Contopus cooperi	Olive-sided Flycatcher	Blue	SC	THR	Olive-sided flycatcher (Contopus cooperi) nests predominantly in dead, standing conifer snags in coniferous and mixed wood forests; often in forest edges, clearings and near water (Altman and Sallabanks 2020).	Species observed; potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat present
Cypseloides niger	Black Swift	Blue	SC	THR	Nesting habitat is typically found behind waterfalls, wet cliffs and in limestone caves; forages over forests and open areas (BC CDC 2021).	Species not observed. Potential foraging habitat is present.	Potential foraging habitat present.	Potential nesting and foraging habitat present
Dolichonyx oryzivorus	Bobolink	Blue	THR	THR	Breeding habitat includes tall grass areas, flooded / wet meadows, prairie, deep cultivated grains, and hayfields. Generally, selects moderate to tall / dense vegetation, and moderately deep litter (BC CDC 2021).	Species not observed. Potential nesting and foraging habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat present
Eremophila alpestris merrilli	Horned Lark, merrilli subspecies	Blue	Not listed	Not listed	Breeding habitat includes open, barren land. In non-agricultural lands, short vegetation or bare ground (bare ground preferred) (e.g., shrub steppe, recent burned areas, sandy beaches, and alpine habitat). In agricultural areas, inhabit bare ground, fields, row crop stubble, livestock feed lots, and grazing lands). In migration,	Species not observed. Potential habitat not observed.	Potential migration habitat present.	Potential nesting, foraging and migration habitat present

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
					makes extensive use of beaches. (Beason 2020).			
Hirundo rustica	Barn Swallow	Blue	SC	THR	Foraging habitat includes open areas (e.g., meadows, ponds); nesting sites require a (typically) vertical, enclosed substrate with nearby access to water (Brown and Brown 2020).	Species observed; potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat likely present
Megascops kennicottii macfarlanei	Western Screech-Owl, macfarlanei subspecies	Blue	THR	THR	In BC, strongly associated with riparian habitats and deciduous trees; prefers lowland riparian habitats dominated by water birch, black cottonwood or trembling aspen. Foraging habitat includes adjacent open ponderosa pine and Douglas-fir forests and bunchgrass habitat at low elevations and with abundant understory vegetation (BC CDC 2021).	Species not observed. Potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat likely present
Melanerpes lewis	Lewis's Woodpecker	Blue	THR	THR	Breeding and foraging habitat is strongly associated with fire-maintained, old-growth open pine forests, mature riparian cottonwood forests, woodlands, orchards, with a shrubby understory, ground cover, woody debris, perch sites, and abundant insects (BC CDC 2021).	Species observed. Potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat likely present
Numenius americanus	Long-billed Curlew	Blue	SC	SC	Prefers open, sparse grasslands with low vegetation structure for breeding habitat, and uses	Species observed.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat likely present

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
					crop fields for foraging on soil invertebrates (Duggar and Duggar 2020).	Potential habitat is present.		
Patagioenas fasciata	Band-tailed Pigeon	Blue	SC	SC	This species is strongly nomadic in response to food availability. In BC, breeding and foraging habitat is generally found in mid-to high elevation temperate and mountain coniferous, mixed forests. Mineral springs and mineral graveling sites are important habitat features during the nesting season (BC CDC 2021).	Species not observed. Potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat likely present
Sphyrapicus thyroideus	Williamson's Sapsucker	Blue	END	END	Nesting habitat includes mature mid-to high elevation montane and subalpine coniferous forest with suitable snags for nesting. In migration and winter this woodpecker also occurs in lowland forests (e.g., pine, deciduous riparian) (BC CDC 2021).	Species not observed. Potential habitat not observed.	Potential habitat not present.	Potential nesting and foraging habitat likely present
Chordeiles minor	Common Nighthawk	Yellow	SC	THR	Nesting habitat includes open areas (e.g., grasslands, beaches, forest cut block slash burn areas, and open forests) throughout BC (BC CDC 2021).	Species observed. Potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat likely present
Coccothraustes vespertinus	Evening Grosbeak	Yellow	SC	SC	Commonly occurs in mixed conifer and spruce-fir forests in BC during the breeding season (Gillihan and Byers 2020).	Species observed. Potential habitat is present.	Potential nesting and foraging habitat present	Potential nesting and foraging habitat likely present
Mammals								

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
Taxidea taxus jeffersonii	American Badger	Red	END	END	Prefers open areas (e.g., grasslands, shrub steppes), will occupy forested areas; occurrence is driven by prey availability (fossorial rodents) and soil texture (loose).	Species observed. Potential habitat is present.	Potential burrowing and foraging habitat present	Potential burrowing and foraging habitat present
Pekania pennanti pop. 5	Fisher - Columbian Population	Red	Not listed	Not listed	Upland and lowland forests (e.g., coniferous, mixed, and deciduous forests) primarily in dense coniferous or mixed wood forests. Generally, avoids areas with little forest cover or significant human disturbance (BC CDC 2021).	Species not observed. Potential habitat present.	Potential habitat present.	Potential habitat present.
Corynorhinus townsendii	Townsend's Big-eared Bat	Blue	Not listed	Not listed	Distribution in BC is likely determined by the presence of hibernacula sites - cave-rich terrain, and moderate climate (dry / warm summers, mild winters). Will occupy buildings and large trees, although summer maternity roosting sites are unknown. Insect-rich foraging habitats include riparian zones, wetlands, forest and woodland edges (Blood 1998).	Species not observed. Potential foraging and roosting habitat present.	Potential foraging and roosting habitat present.	Potential foraging and roosting habitat present; overwintering habitat presence unknown.
Myotis lucifugus	Little Brown Myotis	Yellow	END	END	Summer roosts include dead or dying (hollows) trees, rock crevices and outcrops, cliffs, mines, buildings, bridges, and bat houses; winter roosts include mines and caves. Forages in forest openings	Species not observed. Potential foraging and roosting	Potential foraging and roosting habitat present.	Potential foraging and roosting habitat present; overwintering habitat presence unknown.

Scientific Name	English Name	Legislation[1]			Preferred Habitat	Project Footprint[2]	LSA[3]	RSA[4]
		BC List	COSEWIC	SARA				
					near water, over wetlands, lakes and watercourses. Maternity colonies are in warm sites (e.g., buildings, infrequently in hollow trees) (BC CDC 2021).	habitat present.		

Notes:
1 – **BC List** – At-risk species in BC are assigned to the Red (extirpated, endangered, or threatened), Blue (special concern), or Yellow (at least risk of being lost) Lists, based on each species' provincial conservation status rank.
COS - COSEWIC = Committee on the Status of Endangered Wildlife in Canada; species are designated as END (endangered), THR (threatened), or SC (of Special Concern). Species without these designations are either NAR (not at risk), or not listed.
SARA – *Species at Risk Act* designation for species listed on Schedule 1 as being species are designated as END (endangered), THR (threatened), or SC (of Special Concern). Species without these designations are either NAR (not at risk), or not listed.
2 – Project Footprint Area = the area directly disturbed by Project activities
3 – LSA = Local Study Area = the Project Footprint plus the area extending beyond the Footprint up to 500 m (100 m for plants).
4 – RSA = Regional Study Area = extends beyond the LSA boundary to the area of the Simpcw IR and beyond up to 5 km.