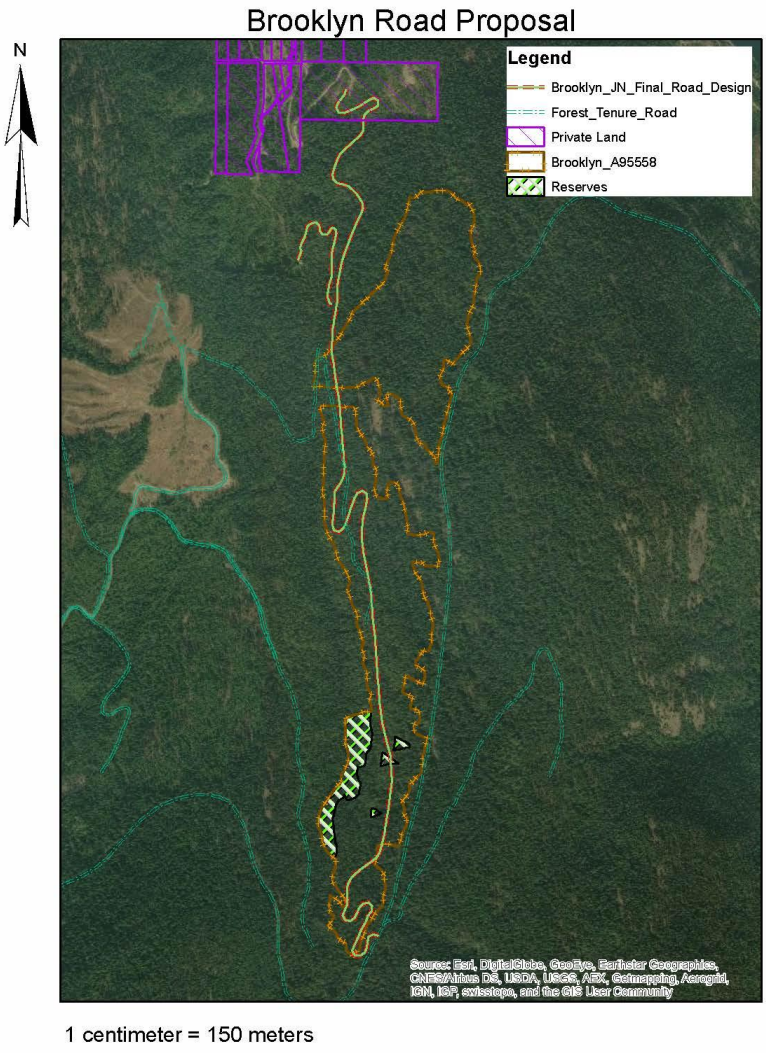

BROOKLYN ROADWAY MANAGEMENT PLAN

Brooklyn and Pup POD Roads

ABSTRACT

This is a management plan for a Licence of Occupation, prepared in accordance with Front Counter BC Crown Land Tenure Application requirements

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BACKGROUND

Project Overview

The project is to construct a permanent road which will permit safe year-round access to Brooklyn private lands. In addition, there is a short spur that will be constructed to have safe year-round access to Brooklyn's point of diversion for their waterworks. The proponent, Jeremy Nelson, will adhere to this management plan details of use, occupancy, construction and operational requirements for a roadway, which is consistent with Crown Land use.

Investigative work

No investigative work was completed.

First Nations

The Brooklyn Road proposal was referred to First Nations as listed on the Consultation Areas Database from October 20, 2020 to November 20, 2020

LOCATION

General Description

This management plan is prepared in accordance with Front Counter BC Crown Land Tenure Application requirements. Providing access road authorization to build an all-seasons road into Brooklyn private lands. In addition, the road will provide access to the domestic water licence point of diversion for the residence of Brooklyn (Pup POD road). The Brooklyn road will be constructed to a year-round long-term standard with a 5m to 8m (on switch backs) running surface maintaining road grades ranging from 5% to 10%.

Location Justification

From Castlegar travel to the end of Arrow Lakes Drive to the start of the Columbia Western Rail Grade (CWRG). Follow the CWRG 26km to the point of commencement of Brooklyn road. (Appendix A)

The location of this road was chosen to facilitate safe passage of service vehicles (propane, concrete, vacuum trucks, etc.) and Brooklyn residents, as well to reduce travel time to the community. The current access to Brooklyn is either by water with barge or Bull Dog Forest Service Road (FSR). The Bull Dog FSR has sections of road with grades in excess of 15%, including a few poorly designed road sections and switch backs, limiting service truck access. Water access for vehicles is by barge, which is becoming troublesome due to safety regulations and stringent insurance requirements.

The location of Brooklyn road will enable a low maintenance road, with suitable grades permitting safe year-round access to the Brooklyn Community. The design of the road requires 450mm culverts with one location requiring an 800mm culvert. Drainage structures of this size are less expensive and present much less risk to maintain by a small community such as Brooklyn.

In consultation with British Columbia Timber Sales (BCTS) they have suggested they would prefer for the Brooklyn residents to build off the end of the Bull Dog FSR as it is already in place, however this access has two major drainage structures to maintain; Brooklyn creek 2000mm culvert, grizzly gate and Pup creek bridge. All these structures present a risk to the domestic water intake and hydro electric dam for Brooklyn. Equally, they have a life-cycle of use and require inspections every two to three years by a

qualified Inspector who has appropriate training and experience. Inspectors will determine whether structural deficiencies require evaluation by a professional engineer or minor repairs. The central issue underlying the importance of the life-cycle of a major structure is the need for a rational to make informed decisions regarding design, construction, inspection, monitoring, maintenance, repair, rehabilitation, replacement and management while balancing the timber value behind them and the cost to maintain. Once these structures reach their end of life-cycle all the timber behind them will have been harvested. They will be downgraded and rendered unsafe for use. Who will pay for the maintenance and replacement cost of these structures in the future, if timber is no longer the priority for there use? A better alternative is to build the Brooklyn road, hence its location, eliminating the need for Brooklyn and Pup creeks major structures and the maintenance and replacement costs associated with them.

Seasonal Expectations of Use

The Brooklyn road will be built to a long-term standard to facilitate year-round use.

INFRASTRUCTURE

New Infrastructure

The majority of the Brooklyn road right-of -way resides within previously harvested Timber Sale Licence (TSL) A95558 with the lower section outside of the TSL residing in forested Crown Land. This section of the road right-of-way will have to be harvested requiring a Forest Licence to Cut.

Land clearing will be completed along the entire length of the road grubbing organics and unsuitable material. Road subgrades will be constructed with local material found within the road right-of-way. In areas, material will have to be excavated to enable long-pushing and end hauling to maintain a subgrade of 7% to 10%. (Appendix B)

Drilling and blasting is not anticipated and is very unlikely, however there could be rock encountered that is not rippable and would require drilling and blasting, or a rock hammer. In this case, the excavated material would be use for drainage and surfacing. Any course cobbles and boulder material encountered during construction will be collected and keyed into specific areas to enable drainage, ditching, filtration and road stability.

Approximately thirty 450mm culverts and one 800mm culvert are planned to be installed, which will maintain drainage and reduce ditch outflow siltation. Grass seeding of the cut and fill slope will be completed to mitigate soil erosion from the new construction. A final grading of the roads running surface will be completed to properly crown the road to enable runoff.

The same road crew that constructed the roads for TSL A95558 will be constructing Brooklyn road, which was constructed and deactivated with no problems.

The deactivated Bull Dog 9000 road will be re-countered and rehabilitated as the Brooklyn road is located just above it and this road will no longer be required. The rehabilitation of Bull Dog 9000 will be necessary in order to reduce the permanent disturbance limits of A95558 block-2. The proponent is willing to planted with appropriate trees over the rehabilitated area of Bull Dog 9000 if British Columbia Timber Sales requests it. In addition, the proponents are willing to complete the necessary Site Plan amendments that will be required for A95558 block-2 Site Plan.

Access

The holder of the Roadway tenure will allow public access without interference and will place gates restricting access at private land boundaries. Appropriate vehicle turn arounds will be located and constructed in advance of private land gates. Signage will be posted warning of private land gates.

Utilities, Water Supply and Waste associated with Residency

Not applicable to this application.

ENVIRONMENTAL

Land Impacts

Vegetation removal

Land clearing, grubbing organics and unsuitable material, will be completed along the entire length of the road to facilitate subgrade construction. The road right-of-way outside of TSL A95558 will have to have the timber harvested requiring a Forest Licence to Cut authorization.

Soil Disturbance

There is no potential to encounter contaminated soil as the road is located over unoccupied Crown Land.

The permanent disturbance limits of TSL A95558 block 2 will not exceed 7% with a planned 5m running surface along the majority of the Brooklyn road except for pull-outs and switch-backs that will have an 8m running surface. In order to ensure permanent disturbance is well below 7% Bull Dog 9000 must be re-contoured.

Riparian Encroachment

The Brooklyn Mainline does not cross or encroach on any classifiable riparian features. There is one non-classifiable drainage which the road crosses and is designed to have an 800mm culvert installed to facilitate a high freshet and potential impacts from Climate Change.

The Pup POD road does encroach on the Pup Creek riparian area as it provides access to the Brooklyn Community point of diversion and dam site. Pup Creek is classified as a S5 stream, which has a riparian management area of 30m with no riparian reserve zone. The requirement to ensure that greater than 10% of the total basal area will remain as standing trees will be met post-road construction. This does not include the area in which the road subgrade resides.

Riparian habitat, including the stream bank and channel, will not be impacted by the road construction as the area is stable with suitable road construction material. Surface drainage will be controlled to eliminate the potential for direct siltation to Pup Creek. The road will be in-sloped with no ditch to reduce the amount of cut and fill material needed to construct the road. The road area within the Pup Creek riparian management area will be grass seeded.

Pesticides and Herbicides

Not applicable to this application.

Visual Impact

The scenic area where the Brooklyn road is located will still meet the landscape objective of Partial Retention once the road is constructed. The majority of the road will not be visible from Arrow lake or Deer Park.

Archaeological Sites

A joint archaeology review of the area was complete with BCTS, Penticton Indian Band and the Osoyoos First Nation where there were no findings. If previously unidentified cultural heritage resources and/or archaeological sites are observed, becomes known, or is brought to the proponent's attention, the proponent will cease operations to the extent necessary to protect the resource. The proponent within 5 business-days of discovering a cultural heritage resource will make attempts to contact the appropriate archaeological / heritage authority and First Nations. Recommencement of operations will not begin until recommendations relative to protecting the resource have been agreed upon by the relevant parties or the resource is otherwise protected.

Construction Methods/Materials

Both roads (Brooklyn and Pup POD) will be constructed with local material excavated from within the right-of-way and will be carried out in accordance with the road site plan. Terrain and soil conditions will govern the clearing width, but typically the road will require a 25m clearing width. The road will be constructed with no placement of snow, ice or frozen material in the fill as the road will be constructed to an all-season standard. Debris resulting from grubbing and stripping within the clearing width will be carefully disposed of as to not have a material adverse effect on forest resources or create hazards for any subsequent operations. The debris will typically be buried outside the road subgrade on the downhill side while maintaining natural drainage. In areas with heavy slash loads, debris will be piled and burned.

The road site plan is located outside of potentially unstable terrain. Will Halleran, P.Geo, L.Eng of Apex Geoscience Consultants Ltd. conducted a site terrain review August 18, 2020 (Appendix C) because a pervious DTSFA (Sitkum Consultants Limited Project #17-1402) (Appendix D) completed in this area indicated some concern for terrain stability along the side slope above Pup Creek. The primary concern raised in the DTSFA was altered slope drainage by upslope development affecting terrain stability on the terrace scarp that forms the side slope of Pup Creek. During Halleran field tour he reviewed three sections of the Brooklyn road:

1. Section 1 the egress off the CWRG to ensure egress does not undermine the fill slope stability of the rail grade and how close can the road subgrade encroach onto the side slope of the northern most gully.
2. Section 2 series of switch-backs to improve road grade in which the lowest switch crosses a series of springs and seeps. This area was shallow gravel over bed rock that is insensitive to alteration in slope drainage.
3. Section 3 old slides along the side slope (terrace scarp) to Pup Creek, which were ancient and likely formed while Pup Creek was downcutting through the glaciofluvial deposits.

Will Halleran's recommendations have been incorporated into the road site plan and construction techniques will adhere to the plan. This will result in a low likelihood of landslide initiation associated with the road construction and/or use.

In areas having steep slopes (Pup POD approach to diversion site) ¾ bench construction techniques will be used. All surface drainage patterns will be maintained through the use of culverts and French-drain construction techniques as per the road site plan. In addition, culvert inlets/outlets will be protected where discharges are expected to have energies sufficient to erode fill material. Sediment delivery to Pup Creek is not a concern as the natural drainage pattern is discontinuous and not directly connected, irrespective of this, sediment control techniques will be utilized throughout the road construction. Borrow pits and debris disposal sites will not be within in any riparian areas. The road site plan does not cross through any classifiable stream channels except for as mentioned above in the Riparian Encroachment section above.

Road Maintenance

Road maintenance would be based on routine road inspections in which culverts, sediment traps and the roads running surface would be inspected semi annually. Any necessary maintenance that is required would be taken care of by the proponent while ensuring drainage structures are functional and able to withstand the annual freshet, and the roads running surface is suitable for residential and service trucks travel.

Atmospheric Impacts

This road proposal does not pose any deleterious impacts to any other resource value.

Aquatic Lands

No aquatic lands will be affected by this road.

Fish and Wildlife or Wildlife Habitat

The road construction will be carried out in accordance with general wildlife measures and will not damage any wildlife resource or wildlife habitat features.

The road is located within Ungulate Winter Range management unit 251 where there is a general wildlife measure to manage for the winter habitat requirements for Mule Deer. Both the snow interception and early seral forest cover requirements of this MU will be maintained post-road construction.

The road is located within the Schedule A area of GAR order 8-373. None of the general wildlife measures are applicable.

No species at risk have been identified or observed within or near the road location.

There are fish species present within Pup creek where the encroachment to the Pup Creek riparian area will not be impacted by the Pup POD road as per the riparian encroachment section above.

Biodiversity

The road is located within landscape unit N509 and does not infringe on any established Old Growth Management Areas. In addition, N509 is managing for mature plus old forest requirements where there will continue to be a surplus post-road construction.

The road infringes on a 0.1ha established Wildlife Tree Retention Area (WTRA). The road will impact the upper portion WTRA 2 of A95558 Block 2. It is estimated that 0.06ha of the WTRA will be impacted. The

legislated requirement of 7% for WTRA retention will still be met as the current WTRAs are 8.5% of the cutblock area. The impact will reduce the percentage down to 8.4%.

SOCIO-COMMUNITY

Land Use

The road location is not within a Range Licence area.

The Road is located within the Pup Creek domestic watershed. The increase in equivalent clearcut area associated with timber harvesting of the right-of-way is minimal and will maintain a low peak flow hazard post-road construction.

The road location and application for a Licence of Occupation was referred to First Nations on Oct 20, 20. No comments pertaining to the proposal were received.

The road is not located within or adjacent to any established recreation site or trail with legal objectives. The road will connect with the CWRG, which is classified as a non-status road.

The road is located within British Columbia TSL A95558 and will have an impact on the associated cutblock site plans and silvicultural obligations.

Land Management Plans and Regional Growth Strategies

The Kootenay Boundary Land Use Plan has established resource management objectives over the area in which the road is located. The majority of the objectives within the plan are not applicable to the road. Objectives for Biodiversity, Consumptive Use Streams and Grizzly Bears will be met as per sections above.

There are no regional strategies that cover the area where the road is located.

Socio-Community Conditions

The road will not impact the Brooklyn community economically or socially due to the change in land use for the location in which the road resides.

Adjacent Users or Communities

The road will affect the community of Brooklyn as it will enable easier access for both residents and service vehicles. In addition, the road will enable a lesser cost to develop and harvest the second pass of timber out of the east side of the Pup Creek watershed basin.

Existing Services

There will be no increase in demands for services such as fire/health or emergency services as the Brooklyn community is well outside the catchment area for such services.

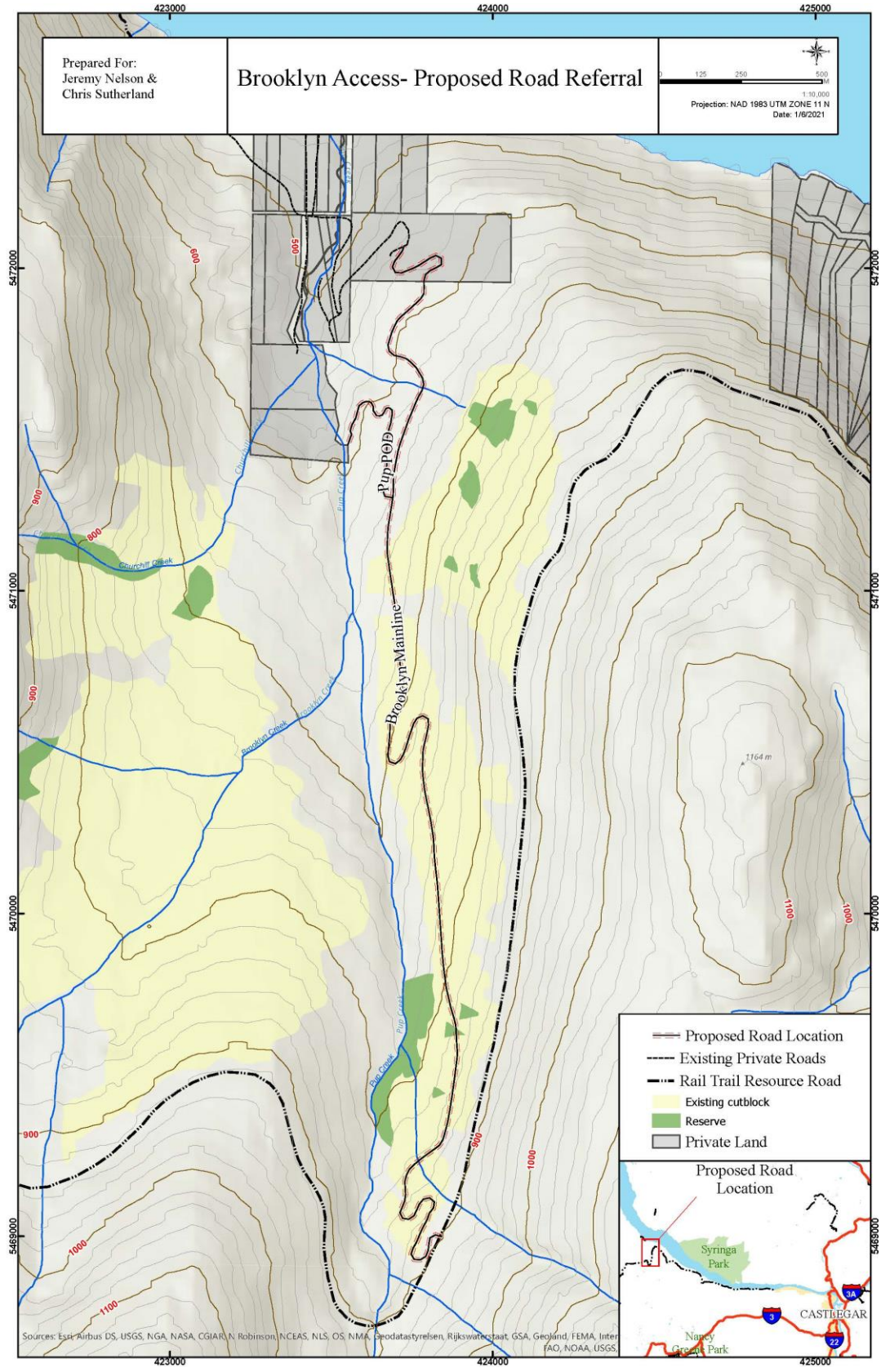
RECLAMATION PROGRAM

Land use after Reclamation and procedures

The road could easily be recontoured and rehabilitate to grow trees. The road is not intended to be reclaimed, but is wanted for permanent access to the Community of Brooklyn. If the road was to be reclaimed all the culverts would be removed and the running surface of the road would be

decompacted. The lower toe of the road, where the initial grubbing and stripping of organic materials was deposited, would be excavated and placed over the final recontoured surface. Tree seedlings could be planted to re-establish a working-forest.

APPENDIX A LOCATION MAP



APPENDIX B ROAD LAYOUT AND DESIGN

APPENDIX C APEX GEOSCIENCE GEOTECHNICAL REPORT

APPENDIX D SITKUM CONSULTANTS PROJECT #17-1402