

COLUMBIA RIVER PUBLIC ACCESS FEASIBILITY STUDY



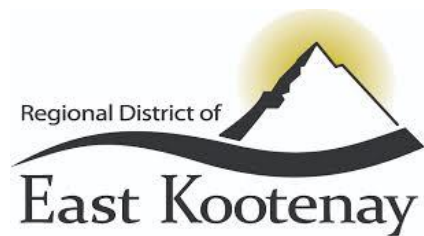
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Executive Summary

The Regional District of East Kootenay (RDEK) retained Cordillera Technical Services to conduct a study that examines the feasibility of establishing a series of designated public access points to the upper Columbia River between Columbia Lake and Spillimacheen, BC. If the initiative proceeds, the objective would be to provide basic facilities such as parking areas, toilet facilities, signage, and small ramps for recreationists to launch small watercraft. Some of these sites would also function as day use destinations for picnicking, fishing, and other activities. Together, these sites may be operated by the RDEK as a multi-site Regional Park.

Ten individual sites were identified and investigated. Four sites are located in a relatively compact area in and near the community of Fairmont Hot Springs. Six additional sites are located at roughly equal intervals between the communities of Invermere and Spillimacheen. All but one of the sites are already seeing some degree of public use for accessing the Columbia River.

Information is presented about each site, including physical description, overview photographs, the current patterns of public use, the status of the land, permitting and land use authorizations needed to pursue designation, recommended facility development, and cost estimates for development and operation of future designated access points.

In total, it was determined formal public river access designation and basic facility development by the RDEK is feasible at six of the ten sites. For three of the remaining sites it was determined that designation as public river access points is not feasible. During the course of this project it was discovered that the tenth site was recently purchased by the Village of Radium Hot Springs and that the Village is proceeding with their own plans to develop the site as a public river access point.

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1. Introduction

This report contains information on the key findings of a study to determine the feasibility of establishing a series of designated access points to the upper Columbia River between the outlet of Columbia Lake and Spillimacheen, BC. This project was commissioned by the Regional District of East Kootenay and completed by Jeff Volp of Cordillera Technical Services in spring and summer 2018. The objective of establishing designated river access points is to provide the public with locations to park vehicles, put in and take out small, non-motorized watercraft, and enjoy day use activities in natural riverside settings. If the project proceeds, the designated sites would be operated as a regional park.

The report presents an overview of the study area as well as detailed information about ten individual potential river access sites that were investigated. Information about each site includes physical description, overview photographs, the current patterns of public use, the status of the land, permitting and land use authorizations needed to pursue designation, recommended facility development, and cost estimates for development and operation of future designated access points.

Additional site photographs, maps, regulatory info, and facility information is included in Appendices A through D.

1.1. Study Area Description

The study area extends from the outlet of Columbia Lake where the Columbia River originates, downstream in a northerly direction to Spillimacheen, a distance of approximately 75 km. This section of the Columbia River is located in the Rocky Mountain Trench, a long and continuous valley running in a northwest-southeast direction at the base of the western slopes of the Rocky Mountains that begins at the BC-Yukon border in the north and continues into Montana in the south. Within the study area the river flows past the communities of Fairmont, Invermere, Radium Hot Springs, Wilmer, Edgewater, Brisco, and Spillimacheen.

The Columbia River within the study area flows at a relatively low gradient, with an elevation difference of only 25 m between Columbia Lake and Spillimacheen. With the exception of Lake Windermere, the valley bottom, averaging approximately 1 km wide, is dominated by wetlands. The Columbia River flows through these wetlands, in some locations as a single main channel while in other areas the river splits into multiple channels. In addition to the main and side channels of the Columbia River, the valley bottom also contains many lagoons and seasonally-flooded areas. The upper Columbia River wetlands are designated as a Wetland of International Importance due to their biodiversity and quality of wildlife habitat.

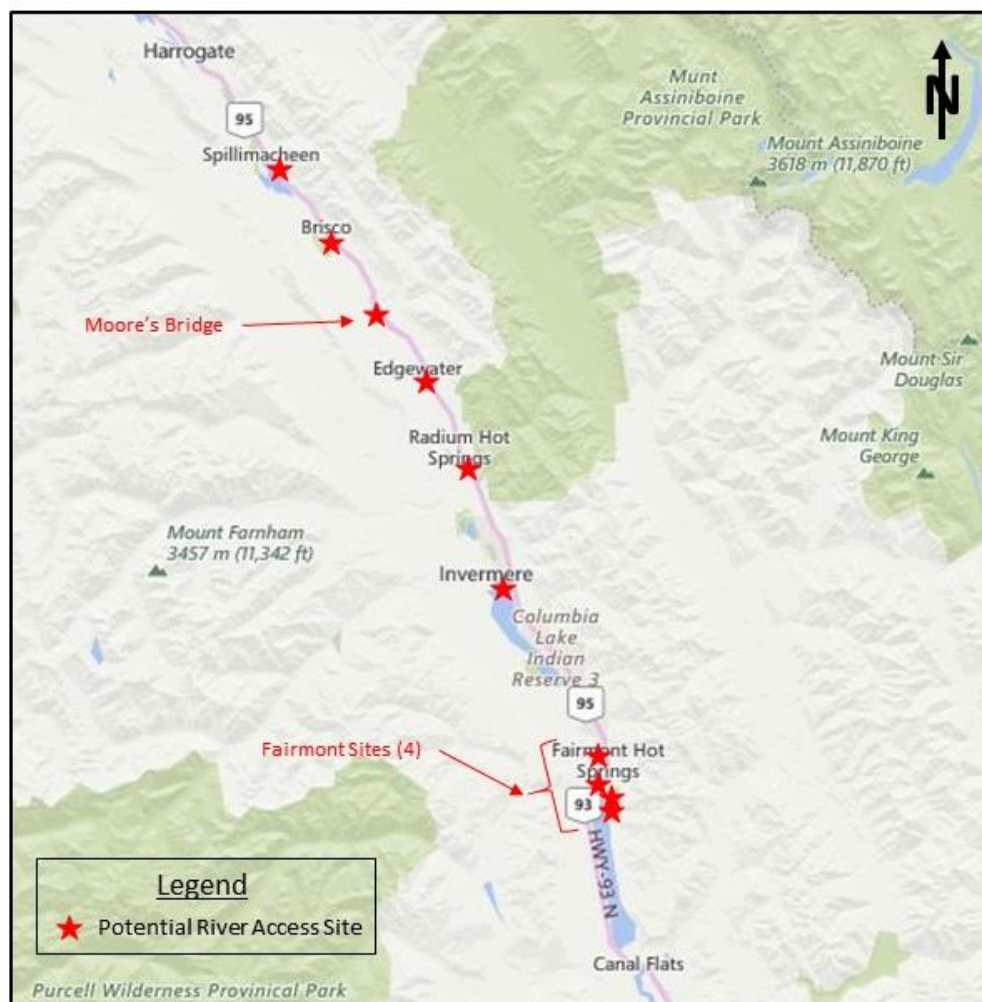


Figure 1. Study Area Overview map. Note that map is not to scale.

The wetlands and uplands adjacent to the Columbia River within the study area fall under a wide variety of ownership and management regimes. The majority of the wetland sections and some smaller areas of uplands is Crown Land within the 180-km long Columbia Wetlands Wildlife Management Area (CWWMA), a designated protected area that is administered by the Province of BC. Outside of the CWWMA there are lands located within or owned by local municipalities and the Shuswap Indian Reserve, as well as many lands that are privately owned by individuals, corporations, and conservation organizations.

There are 5 roads that cross the Columbia River within the study area: Highway 95 at Fairmont, Athalmer Road at Invermere, Foresters Landing Road (at the start of Horsethief Creek Forest Service Road) at Radium Hot Springs, Brisco Road at Brisco, and Westside Road at Spillimacheen.

Canadian Pacific Railroad (CPR) operates a rail line that follows the Rocky Mountain Trench from Elko to Donald. This rail line runs parallel to the Columbia River and in places runs right through the wetlands within the study area.

1.2. Recreational Use of the Columbia River

The Upper Columbia River and its adjacent riverbank is a destination for people undertaking a variety of recreation activities including canoeing, kayaking, tubing, stand up paddle-boarding, birdwatching, fishing, hunting, picnicking, dog walking etc. River users are a mixture of local residents and visitors. Although most people using the river take part in self-guided activities, there are at least two commercial operations that provide guided river adventures within the study area. There are also multiple businesses offering kayak, canoe, tube and paddle board rentals.

The locations currently being used to access the river range from easily accessed, well utilized and developed, to informal, completely undeveloped sites on the riverbank. Detailed information on ten of these access points is included in Section 3.2 below.

In early May each year the upper Columbia Valley is host to the week-long Wings Over the Rockies festival, a celebration of the natural values of the Columbia Wetlands. The festival facilitates numerous events throughout the valley including a number of guided birdwatching and educational tours on the Columbia River.

Recreational use of the Columbia River within the study area can be broken down into two distinct geographic areas: the upper, or south section in the Fairmont area and the lower, or north section between Invermere and Spillimacheen.

Most recreational use of the upper section of the river takes place on a relatively short section of river that winds through the Riverside Golf Course in Fairmont. Although some canoeing and kayaking occurs in the spring and fall seasons, the bulk of the use is during the busy summer tourist season when there can be hundreds of people on the river per day. Most of the summer users are floating down the river on tubes rented locally in Fairmont. A typical float on this section of river takes 1-4 hours depending on the put-in location and the river level/velocity. A smaller number of people float the river downstream from Fairmont through a more natural wetland setting to Lake Windermere.

The lower section of the Columbia River between Invermere and Spillimacheen attracts users who are looking for a more natural experience with a greater chance of observing wildlife. Most of the use occurs on the section between Invermere and Radium Hot Springs; this trip through relatively undisturbed wetlands typically takes about 4 hours by canoe or kayak and has

convenient access points at both ends. A commercial operator located at the outlet of Lake Windermere offers watercraft rentals, a shuttle service, and guided tours on this section of the river.

There is much less river use occurring north of Radium Hot Springs. People using this section of the river are often dedicated naturalists and birdwatchers and are, in general, more self sufficient. This section of river has fewer access points and is more challenging to navigate due to multiple side channels that diverge and converge along its length. Although there are no designated camp sites along the river, some users are taking part in multi day trips and camping wherever they find a suitable site.

Most of the hunting activity is thought to occur on the lower section of the river in the fall hunting season. Hunters pursue migratory game birds as well as big game such as elk and deer. Travel is likely via both unpowered watercraft as well as small powerboats. Although the section of the Columbia River within the study area isn't well known as a fishing destination, some fishing does occur for a wide variety of fish species. Fishing takes place from shore, concentrated around the road access points, as well as by powered and unpowered watercraft.

There are several registered trap lines that encompass areas adjacent to the section of the Columbia River within the study area. The actual amount of trapping that takes place on and adjacent to the river is unknown, although there is expected to be minimal overlap with recreational activities due to the trapping season being during the winter months when there is very little public recreational use occurring.

1.3. Boating Regulations and Protection of Wildlife Values

Transport Canada has imposed regulations governing boating on the Columbia River within the study area to protect the river's natural values:

- On the main channel of the Columbia River, motorized vessels are limited to 20 horsepower (15 kw) or less;
- Towing (waterskiing, wakeboarding etc.) is not permitted in these reaches of the river;
- Motorized watercraft are not permitted on side channels, sloughs and wetlands.

The upper Columbia River and its wetlands contain critically important wildlife values. The wetlands are used by water birds for nesting and rearing their young during the spring, from April to mid-July. There are ongoing educational campaigns by local conservation organizations and land managers to reduce and prevent disturbance to these species. A set of "green boating" guidelines have been developed to help achieve this objective.

2. Methods

2.1. Field Work

The field work component of this project involved four days of field trips that included visits to ten identified potential river access points.

The first field trip was a familiarity tour with the Regional District Area Directors on April 9th, 2018. The sites in the Fairmont were visited in the morning with Area F Director Wendy Booth and the sites between Invermere and Spillimacheen were visited with Area G Director Gerry Wilkie. These tours provided an introduction to each site and their recreational uses.

Two additional field trips were completed in early May 2018 to conduct detailed reviews of each site and to collect aerial and ground-level photography.

A fourth field trip was completed to several of the more popular sites on a warm and sunny weekend day in early July to assess the usage levels during the busy summer season.

2.2. Land Status Investigation & Consultation

A major component of this project was to determine the legal status of the land at each identified site and to consult with the land owner or land manager, as applicable, to determine their position on the proposal to develop the sites into designated access points.

The RDEK GIS department assisted with land status work by providing mapping showing property lines and ownership in the vicinity of each identified site. These maps are provided in Appendix B.

Contact was made by phone and/or email with most of the land owners and/or land managers to discuss the overall project and the proposal to formalize the respective river access points. Research was conducted on the process required to obtain authorization to proceed with the proposed developments.

Searches were conducted to determine if any of the identified sites or river sections have existing or pending commercial recreation or other tenures with the Provincial Government.

2.3. Facility Needs Analysis

A facility needs assessment was conducted for each site where preliminary investigations indicate that development of formalized river access points by the RDEK is feasible. The analysis

is based on the physical layout of each site as well as the current and anticipated future public use of each site.

2.4. Site Development & Operational Cost Analysis

After determining the facility needs for each site, an analysis was conducted to estimate the costs associated with initial facility development. Estimates were then developed to determine annual costs to operate the facilities.

2.5. Investigation of Permitting Requirements

Research was conducted to determine what permits would be required from the provincial and federal governments to conduct development work in and around the identified river access sites.

3. Results

3.1. Facility Development and Site Operations Overview

3.1.1. Initial Site Development

For each river access point for which formal designation is recommended a conceptual site development plan is provided. Proposed developments range from simple improvements such as installing signage at the low use sites, to more comprehensive facility development such as parking areas, concrete vault toilets, and river bank stabilization and boat ramp installation at high use sites. An overview of these facilities and their rough costs are listed below. Note that initial development cost estimates are based on utilizing contracted service providers:

Signage

Signage is recommended for all sites for which development is proposed. All sites would receive basic signage in a consistent format identifying the sites as a designated river access point as well as educational signage that describes the boating regulations and responsible river use. This signage could be installed on small to medium sized kiosks. Larger kiosks would be needed if additional signage such as interpretive panels are installed.

In addition to this basic sign package, informational, directional, and regulatory signs may be needed, such as signs to identify designated parking areas, no parking areas, toilet locations etc.

The estimated cost for a medium-sized kiosk and complete sign package (installed) is approximately \$4,000.

Toilets

Toilet facilities are recommended for all sites for which development is proposed. The standard of toilet varies depending on the level of use and the physical characteristics of each site.

The minimum standard would be portable plastic toilets rented from and serviced by a local septic pumping service. These toilets would be installed at the start of the season in the spring and then removed for winter in the fall. Installation of these units is very simple and only requires a level area to place it on. The downside of these units is that they are not aesthetically pleasing, they are more prone to odours, and they are more susceptible to vandalism compared to a permanent structure. The initial cost for these toilets would be limited to creating a level, gravelled surface to place it on, which is estimated at \$500. The costs for renting and servicing of these toilets is discussed in Section 3.1.2.

For higher use sites a more permanent toilet solution is recommended. For these sites a pit toilet building mounted on a concrete vault holding tank is proposed. The building style would need to be finalized, but concrete or composite (plastic wood) structures both have long service lives and require minimal maintenance. The estimated cost for purchase and installation of a concrete or composite toilet and concrete vault holding tank is approximately \$12,000-\$18,000, depending on the units selected. There may be physical limitations to installing a toilet with a below-grade holding tank at some locations due to regulations regarding proximity to the water table and surface water. These sites are identified and discussed in Section 3.2.

Another consideration with the concrete vault holding tanks is impacting potential archaeological sites while digging the hole for the vaults. It is recommended that an archaeological overview assessment is conducted by a qualified professional during the initial planning stages for sites where this type of toilet is proposed.

For this project, the cost estimates are based on a per-unit price of \$18,000.

Garbage Receptacles

Installation of garbage receptacles are an optional facility development at the sites for which development is proposed. It is understood that it is standard practice within all the RDEK parks to not provide garbage collection services; visitors are expected to remove their own garbage. However, at one location there is already a garbage receptacle present, so a decision would need to be made if development proceeds as to whether any of the sites will have garbage collection.

The cost to purchase and install a single-compartment bear-proof steel garbage receptacle (the Hid-A-Bag model by Haul All Equipment) on a pre-cast concrete slab on a gravel pad is approximately \$1,600.

Picnic Tables

Picnic tables are recommended as optional facilities at two high-use sites in the Fairmont area (described in Section 3.2). The cost of picnic tables varies widely depending on the style selected. Basic units constructed out of standard unfinished lumber start at around \$150, with higher end steel or concrete units installed on concrete slabs can cost over \$3,000. For this project, the cost estimates are based on a per-unit price of \$3,000.

Parking Areas

Development of formal parking areas or improvement of existing parking areas is recommended at several sites (described in Section 3.2). In some cases, all that is recommended is delineating the vehicle parking area while in others full new parking lot development is proposed. The costs of this work varies widely depending its extent; details are discussed in the individual site descriptions.

River Bank Stabilization and Access Ramps/Steps

Many of the identified river access points have steep banks that are difficult to negotiate, particularly when hauling a small watercraft. In one location in the Fairmont area the riverbank is being actively eroded by the river, resulting in increasingly difficult access and incremental loss of land that is currently heavily used as a day use site.

Improvements to make river access easier is recommended for several sites. In the case of the site in Fairmont that is experiencing riverbank erosion, a combination project to stabilize the erosion and improve river access is recommended. These improvements are described in Section 3.2.

Note that all work taking place in the river or below the high-water mark on the river bank must comply with the BC Water Sustainability Act, and all work must occur during the fisheries timing window, which describes when work will have the least impact on fish, depending on which species of fish are present. For minor works (as described in Part 3 of the BC Water Sustainability Regulation) a notification to a BC Habitat Officer is required before the work takes place. For more significant work that will change a stream (such as conducting erosion mitigation work), a Change Approval is required. Notifications and authorizations for in-stream works are processed through FrontCounter BC.

In addition to complying with the BC Water Sustainability Act, projects in or near water must also comply with the Federal Fisheries Act. For projects requiring new or an increased amount of fill on the stream bed below the high-water mark (such as new boat ramps and rip-rap for erosion mitigation) the project will need to be reviewed by Fisheries and Oceans Canada.

It is recommended that a qualified professional is engaged to prepare detailed plans for river bank stabilization and boat ramp installation. This will ensure that suitable, site-specific solutions are developed and constructed in accordance with applicable provincial and federal legislation.

3.1.2. Site Operations

Ongoing operation of the sites proposed for formal public river access designation will involve periodic visits to clean toilet facilities, collect litter, trim encroaching vegetation, and other miscellaneous maintenance tasks.

This work may be conducted by RDEK staff, by contracted service providers, by volunteer groups, or by a combination of the three. However, for this feasibility study the operational cost estimates assume maintenance work will be conducted by in-house RDEK staff working on hourly rates and are based on estimated time spent at each site. The cost estimates are based on a May to September operating season.

Pumping of pit toilets will be required; the frequency of pumping will vary depending on the level of use and the size of the holding tanks.

3.2. River Access Points

Nine existing river access points were identified within the study area at the outset of this feasibility study. One additional site (Moore's Bridge) was identified as a potential designated access point and investigated during the research phase of this project. The sites were assigned names based on their locations and are listed from south to north. Suggestions for suitable facilities are provided for each site for which formal designation is proposed. Detailed site design and layout will need to be conducted for each site in consultation with stakeholders if the RDEK proceeds with formal designation.

Overview photographs and detailed information about each site are contained in Sections 3.2.1 to 3.2.10 below. Additional photographs of each site are found in Appendix A.

3.2.1. Fairmont – Columbia River Road Put-In

Site Description

This site is located at a prominent eddy in the Columbia River, immediately adjacent to Columbia River Road. There is a pull out on the opposite side of the road from the river that can accommodate 4-5 vehicles. There is also a 1-2 vehicle parking spot on the river side of the road that is used as a loading and unloading area. There is an existing sign kiosk with information on accessing the east side of Columbia Lake. There is also a separate educational river use sign of the same type that is located at other river access points in the Fairmont area.



Figure 2. Overview of the Fairmont – Columbia River Road Put-In site.

The site is well positioned for launching watercraft due to its proximity to the river and because of the large back eddy that makes it a safe launch site that is out of the main river current. There is no formal boat launch, but in this location the river bank is low and not overly steep, so it is relatively easy to access the water's edge from the road with small watercraft.

The hillside rises steeply above the east side of the road, limiting space for development of a parking area or other facilities. Most of the land between the river and the west side of the road in this area is low lying wetland and not suitable for development without major infill.

Current Recreational Use

This site is the main put-in for recreational river use in the Fairmont area. It experiences frequent use in the shoulder seasons and heavy use in the summer months. On hot summer days there can be dozens of vehicles lining the road edges.

Land Status

The river bank at the launch site and a portion of the loading/unloading area is located on provincial Crown Land. The parking area on the east side of the road is located within the Ministry of Transportation and Infrastructure (MoTI) road right-of-way.

There are two commercial recreation tenures covering the Columbia River in the Fairmont area. This put-in site marks the southern extent of both tenures. No commercial recreation tenures exist on the land adjacent to the river in this area.

Proposed Facility Development

Currently the only formal facilities that exist are the two informational signs. Considering the high volume of use at this location, this site is a good candidate for development as a formal put-in site. Recommended facilities include improved signage, a toilet, possibly a garbage receptacle, and some improvements to the boat launching site to make access easier and to prevent erosion from both high-water events and human traffic.

While there is a need for more parking capacity, developing more parking spaces is not practical due to the physical limitations of the site. Reports from local residents suggest that even when there are vehicles parked on the road edge this does not have a significant effect on traffic flow on the road.

It is recommended that the single parking space on the river side of the road is designated as a loading zone and signed as such. A new kiosk installed beside the loading zone and outfitted with a new sign package is recommended. A bear-proof garbage receptacle is an optional addition.

There are limitations on placement of a vault pit toilet at this site because of its proximity to the river and the limited amount of flat ground between the river and the hillside. It will likely be difficult to meet the Interior Health vault toilet guidelines of having the toilet located 15 m away

from the river and to ensure that the bottom of the vault is above the seasonal water table. It is recommended that a more detailed survey of the site is conducted by a qualified person to determine if it is possible to install a vault toilet at this site according to the guidelines (particularly regarding the height of the water table). An alternative or interim solution is to construct a gravel pad adjacent to the loading zone and place a portable toilet here on a seasonal basis.

While not strictly required, installation of a durable revetment system such as ArmorFlex® (see Appendix D for product information) at the current boat launch site would serve to stabilize the river bank, preventing erosion, and enabling easier access for users to launch their watercraft. A 3-m wide x 5-m long strip of this material would provide adequate space to easily hand-launch watercraft at this location. There appears to be a significant deposit of silt and sand approximately 3 m off shore from the launch site; some of this material could potentially be removed and trucked away at the same time that the launch site is improved. This would ensure that the water is deep enough to launch canoes, kayaks, and rafts.

Land Use Authorization(s) Required

The lands at this site are all owned by the BC Government but are administered by two different Ministries: the Ministry of Transportation and Infrastructure, and the Ministry of Forests, Lands, Natural Resource Operations & Rural Development. Authorization would be needed by both. The most appropriate mechanism to obtain authorization is through a Nominal Rent Tenure with the Province. The tenure would be applied for via Front Counter BC. More info on Nominal Rent Tenures is found here: <https://www2.gov.bc.ca/gov/content/industry/natural-resource-use/land-use/local-government/community-institutional-program>.

Cost Analysis

Table 1. Development and operational cost estimates, Fairmont – Columbia River Road Put-In

Initial Site Development			
Item / Description			Cost Estimate
Toilet – gravel pad for portable toilet to mount on.			\$500
Signage – new kiosk and sign package including install			\$4,000
Hid-A-Bag garbage receptacle and installation on pre-cast slab & gravel			\$ 1,600
River Bank stabilization / ramp for hand launching watercraft, including engineering (very approximate costing)			\$ 8,000
Initial Site Development Total:			\$ 14,100
*Note: if a concrete vault toilet building is installed, add \$18,000 to the estimate above.			
Annual Operating Cost Estimate (based on a May to September operating season)			
Item / Task	Frequency per Year	Cost per Item / Task	Annual Cost Estimate
Regular maintenance routine for toilet cleaning, litter pickup etc.	36	\$60	\$2,160
Vegetation mowing/trimming	5	\$100	\$500
Portable toilet mob/demob	2	\$100	\$200
Portable toilet rental/month	5	\$75	\$375
Portable toilet pumping	4	\$75	\$300
Annual Operating Cost Total:			\$3,235
*Note: if a concrete vault toilet building is installed, portable toilet mob/demob costs will be eliminated, and frequency of pumping would go down to once per year or less.			

3.2.2. Fairmont – Columbia River Road Day Use

Site Description

This is a large site located along Columbia River Road. It has an existing, established parking area near Columbia River Road with a capacity for approximately 10 vehicles. A RDEK river use educational sign is present at this parking area. A rough road suitable for high clearance vehicles continues for approximately 75 m down to the river bank, then follows the river for another 100 m under a steep and unstable cut slope to another smaller parking area with a capacity for another 4-6 vehicles. The road forks at this point; the right branch ends nearby at a barricade located at a private property line and the left branch ends within 20 m where the river has eroded it away, leaving a drop off approximately 1 m high that leads directly into the river. An even rougher 4x4 road continues past the eroded road section for approximately 50 m to a larger gravel beach.

A small grassy area with an adjacent beach is located at the river's edge between the two parking areas. It is accessed by two short and overly steep foot paths from the high-clearance road. The main beach at the end of the road is flat and gradually transitions to a riparian vegetation at the downstream end. Both beaches have gentle inclines into the water.



Figure 3. Overview of the Fairmont – Columbia River Road Day Use site. The upper parking area is near the top right of the photo, and the site extends along the river from the right edge of the photo downstream to the prominent beach at the left edge of the photo.

Current Recreational Use

This site is mainly used as a day use recreational destination for swimming, picnicking, fishing and playing with dogs. It does see a small amount of use as a put-in site for floating down the river but the main put-in point 850 m upstream is much more convenient for launching watercraft.

It appears as though about half the users of this site park at the upper parking area and walk down to the river while the other half, with higher clearance vehicles, drive down to one of the parking spots closer to the river. There is some evidence of campfires and partying but in general the site appears to be well maintained by the users.

Land Status

The entire area is located within a Ministry of Transportation and Infrastructure road right-of-way. The history of this right-of-way is unclear, but it is currently not used as a public road.

There are two commercial recreation tenures covering the Columbia River in the Fairmont area. No commercial recreation tenures exist on the land adjacent to the river in this area.

Proposed Facility Development

With the current pattern of recreational use of this site and increased use anticipated in the future, facility development is recommended at this site.

The recommended strategy would be to provide a formal, delineated parking area, a sign kiosk, possibly a garbage receptacle, and a pump-out concrete vault pit toilet at the existing upper parking area. The road leading to the lower sites would remain open to vehicles to the lower parking area with a sign explaining that it is for high clearance vehicles and that there is limited space for parking and turning around. Some minimal improvements to the existing high-clearance road would be recommended to address erosion and safety concerns. The road should be physically blocked at this lower parking area to prevent people from driving to the washout and on the 4x4 route to the beach beyond. Alternatively, this entire section of road between the upper and lower parking areas could also be closed to vehicle access right at the upper parking lot and converted to a foot path; this could be done immediately, or it could be done in the future if problems develop with having vehicle access to the two beach areas.

The two day-use beach areas would remain largely in a natural state. If the high-clearance road between the upper and lower parking areas does end up being closed, the lower parking area could be converted to a walk-in picnic site with 2-4 picnic tables.

The first very steep foot path leading down to the first beach area should be closed with a rail fence. The second foot path should be improved by installing a switchback to lessen the grade and by surfacing it with crushed gravel. No improvements to the foot access to the second beach area are needed.

Land Use Authorization(s) Required

Authorization to designate this area as a RDEK regional park is needed from MoTI because it is a right-of-way. The most appropriate mechanism to obtain authorization is through a Nominal Rent Tenure with the Province. The tenure would be applied for via Front Counter BC.

Preliminary consultation with a local MoTI representative conducted during the research phase of this project revealed that the Ministry would likely support the idea of the area being used as a recreational facility operated by the RDEK. However, it is unlikely the Ministry would support the installation of any permanent structures; it is unclear at this time if toilet buildings or sign kiosks would be considered permanent structures.

Cost Analysis

Table 2. Development and operational cost estimates, Fairmont – Columbia River Road Day Use

Initial Site Development			
Item / Description			Cost Estimate
Toilet – concrete or composite building on pump-out concrete vault			\$18,000
Signage – new kiosk and sign package including install			\$4,000
Hid-A-Bag garbage receptacle and installation on pre-cast slab & gravel			\$ 1,600
Parking lot upgrades – gravelling, delineation with boulders or rail fencing			\$3,000
Road improvements – drainage & levelling of high clearance road, blocking access to washout and second beach			\$2,000
Trail upgrades – new trail w/ switchback to first beach, surface with gravel			\$500
Initial Site Development Total:			\$29,100
*Note: if 4 concrete picnic tables are installed, add \$12,000 to the estimate above.			
Annual Operating Cost Estimate (based on a May to September operating season)			
Item / Task	Frequency per Year	Cost per Item / Task	Annual Cost Estimate
Regular maintenance routine for toilet cleaning, litter pickup etc.	36	\$60	\$2,160
Vegetation mowing/trimming	5	\$300	\$1,500
Toilet pumping	0.5	\$500	\$250
Annual Operating Cost Total:			\$3,910

3.2.3. Fairmont – Highway 95 Access

Site Description

This site encompasses the areas on both sides of the Columbia River immediately south (upstream) of the Highway 95 bridge. There are short access roads on both sides of the river that used to be the approaches to a former bridge at the site. Both of these roads end 20-40 m from the river.

There is limited parking on the west access road, with the only practical place to park being along the road edge. The road is blocked with concrete barricades approximately 40 m away from the river and there is minimal room on the road for turning vehicles around. There are two

signs at this location, a large kiosk with interpretive signage provided by the Friends of the Columbia Wetlands, and a smaller RDEK river use educational sign. The shoreline on the west side is a mix of grass and rocks and is quite steep.

There is informal parking for numerous vehicles on the east side of the river along the access road and on private land adjacent to water system infrastructure owned and operated by Fairmont Hot Springs Resort. The shoreline on the east side of the river is rocky and difficult to negotiate while carrying small watercraft.

The river at this location is steeper than most sections in the Fairmont area and there is a small rapid right at the site, making it more challenging and potentially dangerous launching spot, particularly during high water in the spring. There are some old pilings in the river approximately 30 m upstream of the bridge that are a hazard to people floating down the river. There are electrical and communications lines crossing above the river just upstream of the bridge.



Figure 4. Fairmont – Highway 95 access points, taken from the bridge on the east side of the river

Current Recreational Use

The Highway 95 access points are heavily used as launching points for people floating down the river. This is despite the fact that they require walking a longer distance to the water from the parking areas compared to the two upstream access points. The area is also used for fishing, and there appears to be a small amount of hiking use on a rough trail that follows the east river bank upstream for approximately 250 m.

Land Status

The river access points on both sides of the river are located within the Highway 95 right-of-way administered by MoTI. There are utility poles and associated overhead electrical and communications lines located in this right-of-way above the river access points.

The lands located adjacent to the right-of-way are privately owned by Fairmont Hot Springs Resort. There are two commercial recreation tenures covering the Columbia River in the Fairmont area. No commercial recreation tenures exist on the land adjacent to the river in this area.

Proposed Facility Development

Aside from signage, no facility development is recommended for this site for the following reasons:

- The river is swift in this area and is not as suitable for launching watercraft as nearby areas upstream;
- There is limited space to develop formalized parking areas within the MoTI right-of-way;
- The site is noisy and not very aesthetic because of the immediate proximity of the highway;
- There are three other river access points that are much more suitable for development within a distance of 2 km.

The site can continue to serve as an informal and more rustic river access point if users do not want to use one of the other three nearby sites. If the volume of use becomes too great and problems develop from too many vehicles trying to park in the area it may become necessary to designate parking areas and/or direct people to other river access points; this would be the responsibility of the MoTI and/or Fairmont Hot Springs Resort.

An additional river use educational sign could be considered for the east side access point. The standard river use guidelines could also be supplemented by some information that outlines the hazards associated with the swift water located at this site.

Land Use Authorization(s) Required

Although development of this site as a designated river access point is not recommended, if the RDEK chooses to proceed authorization would be required from MoTI because it is a highway right-of-way. The most appropriate mechanism to obtain authorization is through a Nominal Rent Tenure with the Province. The tenure would be applied for via Front Counter BC.

3.2.4. Fairmont – River Drive Take Out

Site Description

This is a relatively small but very popular site located immediately adjacent to the junction of River Drive and Downey Ave. in Fairmont. It is situated on an outside bend of the river. In total, the area encompasses approximately 150 m of river bank between two private residences.

There are already some basic facilities present at this site: a portable toilet on a gravel pad, a double-container garbage receptacle, an older picnic table and some benches, some RDEK and boating regulatory signage, a single section of rail fencing, and an older improvised boat ramp fashioned out of old tires. The site is cooperatively maintained by an alliance of stakeholders: Fairmont Hot Springs Resort, Fairmont Community Association, the Fairmont Lions Club, Columbia Basin Trust, Columbia Lake Stewardship Society, and the RDEK.

There is evidence of significant and recent erosion of the river bank along the river bank at this site, caused by high river flows during the spring freshet. The outside bank is being actively eroded, which is causing the lawn area where the facilities are located to collapse into the river, leaving a steep drop-off approximately 1 m in height. A significant amount of land has been lost to the river in recent years. The improvised boat launch area constructed of tires has remained in place while the river has eroded the land above it; this has resulted in the tire ramp being disconnected and ineffective for its intended purpose. The active erosion has potential to negatively affect River Drive as well as a BC Hydro pole at the upstream end of the site. The owners of the private residences above and below the site have already taken steps to mitigate loss of their land through erosion by armouring the bank with rip rap and wood retaining walls.

There is no parking area at the site; visitors park on the road edges of both River Drive and Downey Ave. There are undeveloped private land parcels located on the opposite sides of these roads from the river. These land parcels are low lying, seasonal wetlands.



Figure 5. Overview of the Fairmont – River Drive Take Out site

Current Recreational Use

This site is heavily used by the public, especially in the summer season. It serves as the main take-out point for people floating down the river from the upstream put-in points described above. It is also a place where people go to swim, play with dogs, and fish. On busy days there can be more than 50 vehicles parked along both sides of the roads in the area. It is, by a wide margin, the busiest river access point within the entire study area.

Land Status

The site is located within a narrow strip of private land that is squeezed between the River Drive road right-of-way and the river. The parcel is owned by Fairmont Hot Springs Resort. The roads are administered by the MoTI. The seasonal wetlands on the other side of the roads are also owned by Fairmont Hot Springs Resort.

There are two commercial recreation tenures covering the Columbia River in the Fairmont area. This take-out site marks the northern extent of both tenures. No commercial recreation tenures exist on the land adjacent to the river in this area.

Proposed Facility Development

As the most heavily used river access site in the study area, formal designation of this site is recommended. However, before any further facility development occurs the erosion issue needs to be addressed to prevent further loss of land and to protect the road and hydro pole from damage.

The recommended first step is to have a qualified professional conduct a hydrological assessment of the river in this section to determine the best method to mitigate river bank erosion and to provide a cost estimate to complete the work. As part of this assessment a detailed engineering plan should be developed to provide a durable and erosion resistant access ramp for users to move watercraft out of the river and up the bank to the grassy area beside the road. A revetment system similar to what is suggested for the Columbia River Road Put-In site (ArmorFlex®) is recommended. Because the problems with the river bank erosion have potential to affect the road and the hydro pole it is recommended that funding for the mitigation work is pursued through a cost-sharing arrangement with MoTI, BC Hydro, and the RDEK.

Once the river bank has been stabilized the site could use some facility upgrades. Considering the heavy use, a more permanent, concrete vault pit toilet would be more appropriate than the portable plastic toilet that is currently deployed. However, it may be difficult to meet the Interior Health vault toilet guidelines of having the toilet located 15 m away from the river and to ensure that the bottom of the vault is above the seasonal water table. It is recommended that a more detailed survey of the site is conducted by a qualified person to determine if it is possible to install a vault toilet at this site according to the guidelines (particularly regarding the height of the water table).

The existing picnic table and improvised benches could be replaced with several, more permanent picnic tables. The area in front of the existing section of rail fence could be designated as a loading zone with no parking allowed. This could be explained with signage mounted to the rail fencing. The existing section of rail fence could be extended (with a wide opening in the middle for people to carry watercraft through) to better delineate the loading zone and foot access point to the launching ramp. A new information kiosk and sign package is also recommended. If the RDEK become the operator of the site a decision will need to be made about whether to keep the existing garbage receptacles or remove them and rely on the "pack it in, pack it out" system.

An optional development to consider is the construction of a dedicated parking lot for river users if there is a desire to move the current vehicle parking off the road shoulders. There is sufficient space on the privately-owned seasonal wetland parcels on the other side of the road,

but this would require extensive infill to raise the grade and ensure a dry surface during the spring when the water table is high. If the objective is to provide space for the current volume of parking, a parking lot that could accommodate 50-60 vehicles would be needed.

Land Use Authorization(s) Required

The RDEK would need to enter into an arrangement to secure the right to use the land in question, which is privately owned by Fairmont Hot Springs Resort. The resort was contacted about this option during the research phase of this project; they expressed a willingness to work with the RDEK to find a suitable solution to allow the land to be designated as a formal river access point operated by the RDEK. This could be in the form of a lease or rental agreement, a licence of occupation, a land acquisition etc.

MoTI would need to be consulted with regard to the parking issue – i.e. for their perspective on roadside parking vs. constructing a dedicated parking lot, and traffic flow on the road and in and out of any proposed parking lots. There is also a very old, wood-stave culvert passing under the road in the area that would need to be considered when planning this site development.

Cost Analysis

Table 3. Development and operational cost estimates, Fairmont – River Drive Take Out

Initial Site Development			
Item / Description			Cost Estimate
Toilet – concrete or composite building on pump-out concrete vault			\$18,000
Signage – new kiosk and sign package including install			\$4,000
Extension to rail fence			\$1,000
Picnic tables – 4 tables			\$12,000
Engineering assessment study and design for river bank erosion mitigation			\$25,000
River bank erosion mitigation and boat ramp construction*			\$150,000
Parking lot construction – 50 vehicle capacity*			\$30,000
Initial Site Development Total:			\$240,000
*Very approximate estimations only. More accurate estimates would be a deliverable of the initial planning study.			
Annual Operating Cost Estimate (based on a May to September operating season)			
Item / Task	Frequency per Year	Cost per Item / Task	Annual Cost Estimate
Regular maintenance routine for toilet cleaning, litter pickup etc.	36	\$60	\$2,160
Vegetation mowing/trimming	5	\$200	\$1,000
Toilet pumping	0.5	\$500	\$250
Annual Operating Cost Total:			\$3,410

3.2.5. Invermere – Athalmer Road

Site Description

This site is located near the outlet of Lake Windermere, immediately north (downstream) of the bridge over the river. It consists of a medium-sized gravel parking area that gradually transitions into a wide boat launch area. There is a boating regulation sign, invasive species signs, and an interpretive kiosk installed by the Friends of the Columbia Wetlands. There is also a small gravel pad for a portable plastic toilet that is placed at the site on a seasonal basis by the District of Invermere. The entire area is under a BC Hydro transmission line as well as smaller scale communications line (phone and/or cable). The access road to the site is a mix of pavement and gravel.



Figure 6. Overview of Invermere – Athalmer Road site (bottom right, downstream of bridge)

Upstream of the bridge there is a marina, boat launch for power boats, a large parking area, and a business offering non-motorized watercraft rentals (canoes, kayaks, paddle boards) and guided tours of the Columbia River between Invermere and Radium.

Current Recreational Use

This site is used as an informal launch point for primarily non-motorized watercraft. It does also see a lesser amount of use for launching power boats destined for Lake Windermere. The site is also a popular place for locals to play with their dogs as it is known locally as an unofficial “dog beach”.

Land Status

The site is owned by the District of Invermere. The District performs basic maintenance to the site including vegetation trimming, garbage pickup, road grading, and covers the cost to install and service the seasonal portable toilet.

Proposed Facility Development

The configuration of this site is already quite suitable for formal designation as a public river access point. Recommended improvements include installation of a permanent toilet with concrete pump-out vault, improved signage, and possibly installation of a garbage receptacle.

Land Use Authorization(s) Required

The District of Invermere (DOI) is already maintaining this site as an informal public river access point. The DOI has expressed interest in undertaking improvements to the site and designating it as a formal launching point for non-powered watercraft. It would possibly be tied into potential future development of a wetland interpretive facility with boardwalks and a viewing platform that would be located in the nearby Columbia Wetlands.

The DOI is open to the idea of a cooperative agreement with the RDEK to improve the site and operate it as part of the RDEK park system. However, if this does not occur it is likely that the DOI will proceed with some amount of improvements to the site on their own in the medium term (1-5 years).

Cost Analysis**Table 4.** Development and operational cost estimates, Invermere – Athalmer Road site

Initial Site Development			
Item / Description			Cost Estimate
Toilet – concrete or composite building on pump-out concrete vault			\$18,000
Signage – new kiosk and sign package including install			\$4,000
Hid-A-Bag garbage receptacle and installation on pre-cast slab & gravel			\$ 1,600
Initial Site Development Total:			\$23,600
Annual Operating Cost Estimate (based on a May to September operating season)			
Item / Task	Frequency per Year	Cost per Item / Task	Annual Cost Estimate
Regular maintenance routine for toilet cleaning, litter pickup etc.	36	\$60	\$2,160
Vegetation mowing/trimming	5	\$200	\$1,000
Toilet pumping	0.5	\$500	\$250
Annual Operating Cost Total:			\$3,410

3.2.6. Radium – Foresters Landing RoadSite Description

This site is located immediately north (downstream) of the Foresters Landing Road (also known as Horsethief FSR) bridge over the Columbia River. It is an informal site that has a rough boat launch, a small parking area for 2-4 vehicles, and a short dead-end road with turnaround. A portable toilet is located near the parking area and boat launch.

Current Recreational Use

This is a busy site that experiences regular use, mostly as a take-out point for river users who have floated down the river from Invermere but also as a launching point for river travellers heading north. The site is also a destination for swimming, fishing, and playing with dogs.

Land Status

Formerly private property, the parcel of land that contains the river access point was recently acquired by the Village of Radium Hot Springs. The Village intends to redevelop this site as a designated river access point, with a boat launch, a concrete vault pit toilet, four picnic tables, and a ten-vehicle parking area. An engineered plan has been developed and it is the intent of the Village to proceed with this development with one year.



Figure 7. Overview of Radium – Foresters Landing Road site

Proposed Facility Development

Because the Village of Radium Hot Springs is proceeding with formal development of this site there is no need for the RDEK to consider further work at this site. The only recommendation is to perhaps have some educational signage installed here that is consistent with the signage to be located at the other designated access points.

Land Use Authorization(s) Required

Authorization to install educational signage would be needed from the Village if the RDEK wanted to supplement the existing signage.

3.2.7. Edgewater – Edgewater Station Road

Site Description

This site is located at the end of Edgewater Station Road, where the road ends at the river bank after crossing twin CPR tracks. A large open area on the east side of the tracks serves as a parking lot. The road continues across the tracks for another ~30 m to the river bank. The river bank in this area is at a moderate angle and made up of fine textured, silty soil. There is a smaller area between the river bank and the tracks that is used as a turnaround, a loading/unloading zone, and as a day use site. There are no facilities at the site; however, in previous years a portable plastic toilet was placed at the edge of the loading/unloading zone between the river and the tracks.

At the time of the field review there was evidence of heavy trucks using the site, likely as a water source for a construction project.



Figure 8. Overview of Edgewater – Edgewater Station Road site

Current Recreational Use

This site receives moderate use for people putting in and taking out small watercraft as well as a destination for swimming, fishing and playing with dogs. It is suspected that most people that use the site are local residents of the Edgewater area.

Land Status

This site straddles the CPR right-of-way, which is private property. The parking area is located completely within the CPR right of way. In this area the tracks are located very close to the western (river side) of the right-of-way, leaving a narrow strip of land between the tracks and the river bank. This strip of land is listed as being privately owned by a numbered company (393491 Alberta Ltd.). Current RDEK mapping shows that Edgewater Station Road is actually not located within its designated legal right-of-way in the vicinity of the river access site; the mapping shows that the road is crossing private land owned by the same numbered company for a distance of approximately 175 m before entering onto the CPR right-of-way. If this mapping is correct, then Edgewater Station Road is trespassing on private property.

Research Transport Canada's national rail crossing inventory has revealed that there is a legal public crossing at Edgewater Station Road that appears to have the RDEK listed as the Road Authority responsible for the crossing. This means that legal public access is already in place for this road crossing; however, based on the most current RDEK mapping, the road is trespassing on private property on both sides of the CPR right-of-way so there is some uncertainty around the status of this public crossing point.

Please refer to maps of the Edgewater area in Appendix B.

Proposed Facility Development

Designation of this site a formal public river access point is recommended. As this is a relatively low use site, extensive facility development is not suggested. The site would be adequately served with a portable toilet on a gravel pad, an information kiosk and an associated sign package. Optional or future improvements would include installation of garbage receptacles and some improvement to the riverbank, such as box steps, to make it easier to carry small watercraft between the water and the loading area.

Land Use Authorization(s) Required

Further research is required to determine with certainty the status of the last 175 m of Edgewater Station Road and the loading/unloading area between the CPR right-of-way and the water's edge. This may require the involvement a professional land surveyor and perhaps some

advice from a lawyer. If the road and the water access point are indeed trespassing on private property, the RDEK would need to check to see if the registered public crossing in the Federal inventory is valid. If so, the RDEK would then need to reach an agreement with the land owner to designate the site as a formal river access point.

If after completing the above steps it appears that designating the site as a public river access point is feasible, the RDEK would need to negotiate an agreement with CP Rail to use a portion of their right-of-way as a parking area, as there is insufficient space on the river side of the tracks to park more than one or two vehicles.

Cost Analysis

Table 5. Development and operational cost estimates, Edgewater – Edgewater Station Road

Initial Site Development			
Item / Description			Cost Estimate
Toilet – gravel pad for portable toilet to mount on.			\$500
Signage – new kiosk and sign package including install			\$4,000
Hid-A-Bag garbage receptacle and installation on pre-cast slab & gravel*			\$ 1,600
Box steps on river bank for facilitating hand launching watercraft*			\$ 1,000
Initial Site Development Total:			\$ 7,100
*Optional items			
Annual Operating Cost Estimate (based on a May to September operating season)			
Item / Task	Frequency per Year	Cost per Item / Task	Annual Cost Estimate
Regular maintenance routine for toilet cleaning, litter pickup etc.	36	\$60	\$2,160
Vegetation mowing/trimming	5	\$100	\$500
Portable toilet mob/demob	2	\$100	\$200
Portable toilet rental/month	5	\$75	\$375
Portable toilet pumping	2	\$75	\$150
Annual Operating Cost Total:			\$3,385

3.2.8. Moore's Bridge

Site Description

This site is a former bridge crossing of the Columbia River between Edgewater and Brisco. It is accessed from the west via a rough road that leaves from the Red Rock FSR approximately 12 km south of Brisco. This 1.7 km road is becoming overgrown from lack of use and maintenance.

The access to Moore's Bridge from the east side follows a very overgrown road across the CPR tracks and through the valley bottom wetlands from the bench lands between Highway 95 and the Columbia Wetlands.



Figure 9. Overview of the Moore's Bridge site, looking north

Current Recreational Use

The west side approach road was travelled on foot during the research phase of this project. Although the road bed is in good shape, the road is becoming too overgrown for travel by truck or SUV, but is still passable by ATV, dirt bike, or on foot to the river. There was evidence of a very small amount of ATV use on this road.

A detailed, low-level aerial survey of the route to the bridge on the east side of the river revealed that the original road is barely discernable and is not receiving much if any human use.

Land Status

The access road on the west side of the river as well as the west side of the former bridge site is located on BC Crown Land. The road that accesses the former bridge site from the east is located on private property currently owned by Wagemma Holdings Ltd.

Proposed Facility Development

This site was investigated for its potential to serve as a mid-way access point to the river between Edgewater and Brisco, which is a relatively long section of river to paddle between access points. However, this investigation determined that Moore's Bridge is not a practical place to develop a formal access point with visitor facilities because of the following factors:

1. Access from Highway 95 on the east side requires crossing the CPR tracks without a designated public crossing followed by travel on a completely overgrown road located on private land;
2. The west side access requires travelling a significant distance on the rough Red Rock FSR resource road, which is a deterrent to regular public use
3. The 1.7 km access road that leads down to the river from the Red Rock FSR would need significant upgrades to allow travel with passenger vehicles, and there is limited space to turn around or park at the former bridge site.

Land Use Authorization(s) Required

Although it is not recommended at this time, if development of a designated access point is pursued the most likely site would be on the west side of the river on Crown Land. A Licence of Occupation or Nominal Rent Tenure would be needed, which can be applied for through FrontCounter BC.

3.2.9. Brisco – Brisco Road

Site Description

This site is located where Brisco Road crosses the Columbia Wetlands and two main channels of the Columbia River. There are two bridge crossings, one over each channel. The entire road through the wetlands has been built up with fill to be 1-3 m higher than the surrounding area. There is one existing, well established river access point located on the east side of the eastern channel, just south of the eastern bridge; it is reached via a short dirt road that leaves Brisco Road approximately 25 m from the bridge and ends at a small grassy turnaround area and dirt boat launch area at the river bank.

Due to the entire road being made up of imported fill to bring it up above the level of the surrounding wetlands, the shoulders of Brisco Road are narrow and there is very little space for vehicles to park on or adjacent to the road. The existing short spur road leading the river bank is also made up of imported fill and has no space for vehicle parking. There is room for 2-3 vehicles to park at the turnaround area adjacent to the river. There is no other "dry" land in the area, all of the surrounding lands are seasonal wetlands.

The boat launch was constructed and is suitable for car-top boats as well as trailered boats, although 4x4 vehicles may be required to launch a trailered boat because of the soft and slippery soil that makes up the river bank.

There is a regulatory sign in place explaining the boating restrictions on the river and the adjacent wetlands. Aside from what has already been described, no other facilities exist at this site.



Figure 10. Overview of the Brisco – Brisco Road site, with river access road at lower left

Current Recreational Use

This site appears to receive regular use by vehicles driving to the river access. While the amount of recreational river use in this area is not known with certainty, it is suspected that the site experiences low to moderate use as a launching point for both small trailered boats and canoes and kayaks. It is likely that people also use the site for picnicking, fishing, playing with dogs etc.

Land Status

Brisco Road is located within a MoTI right-of-way. The lands on the east side of the eastern channel, including the existing river access point and its dirt access road are privately owned by Lorisa Jean. The lands located in between the western and eastern river channels are owned by the Nature Trust (TNT), a non-profit conservation organization. These TNT lands are leased on a long-term basis to the Canadian Wildlife Service (CWS) and managed for their conservation values as part of the Columbia National Wildlife Area. The lands on the west side of the western river channel are privately owned by members of the Trescher family.

Proposed Facility Development

The recommendation for this site is to leave it as status quo, with no facility development or formalization as a designated river access point. The rationale for this recommendation is as follows:

- The existing access point is located on private land;
- The short spur road that leads to the existing access point joins Brisco Road at a location that is too close to the bridge over the eastern channel, and would not meet MoTI safety standards for sight lines;
- Development of an alternative site in this area would require major earthworks in order to build up an area large enough to accommodate a staging area and parking area. This would be expensive and would impact conservation values of the wetlands that would be infilled;
- Any alternative sites would need to be located on private land:
 - Discussions with the Nature Trust and the Canadian Wildlife Service have revealed that this type of development would not be supported on their lands in between the two river channels;
 - The land to the west of the western channel is actively used for agriculture with an irrigation pumping station located on the only piece of dry land near the river, located immediately north of the bridge. Even if permission could be arranged with the landowner to develop a designated river access point on the south side of the bridge, it would be a major undertaking and at this point there is insufficient public use or public demand to justify it.

The current informal river access situation at Brisco appears to be working ok at this time. This assessment to leave it as-is could be revisited in the future if public access is ever restricted to the existing privately-owned access point.

Land Use Authorization(s) Required

As described above, there are some significant obstacles to developing a formal public river access point in the Brisco area. However, if the current situation with river access changes and the RDEK decides to pursue access, authorizations would be needed from MoTI for approval to develop any new access roads leaving from Brisco road and from the relevant land owner for the lands that are proposed for development.

3.2.10. Spillimacheen – Westside Road

Site Description

This site is located on a 185-m long old road right-of-way that parallels Westside Road on the west side of the main channel of the Columbia River. There is a wide pull out area with several concrete barricades at the western end of the old road, where it meets the current alignment of Westside Road. There is room here for 4-5 vehicles to parallel park. There is a steep section at the eastern end of the old road where it climbs up the embankment formed by the approach to the bridge on Westside Road. This embankment is not passable by low clearance vehicles. There are no suitable parking spaces at this end of the old road alignment.

A side channel of the Columbia River lies parallel and immediately adjacent to the old road alignment. This side channel joins the main channel just south of the bridge. A Friends of Columbia Wetlands interpretive sign kiosk is located along the old road approximately 50 m from the parking area at the west end. A short but steep bank approximately 2.5 m high connects the old road surface to the river channel. This embankment is used as access to the main channel of the river via the side channel with canoes and kayaks.

There is a BC Hydro distribution line that follows the alignment of the old road.

Current Recreational Use

There is currently low to moderate amount of use occurring at the Spillimacheen river access point. It is used as a put-in and take-out point for people exploring the river and wetlands. This requires travelling the short section of side channel in order to access the main river channel. This section of the river is more wilderness in character with fewer and more rustic access points than further south. These river users are undertaking both day trips and multi-day trips on the river.

This site is also used by highway travellers looking to stretch their legs and read the interpretive information. Because this site does not access the main channel directly and the access to the side channel is via a steep and difficult embankment, there is little swimming and fishing use

taking place; this type of recreational use is likely more popular at the bridge over the main channel.



Figure 11. Overview of the Spillimacheen – Westside Road site

Land Status

The current and former alignments of Westside Road are within MoTI right-of-way. The lands to the north and south of Westside Road west of the bridge are owned by the Nature Trust and leased on a long-term basis to the Canadian Wildlife Service and managed for their conservation values as part of the Columbia National Wildlife Area. The lands on the east side of the bridge are a mix of private and Crown ownership.

Proposed Facility Development

Designation of this site as a formal public river access point is recommended. As this is a relatively low use site, extensive facility development is not suggested. The site would be adequately served with a portable toilet on a gravel pad located near the existing kiosk, a new

information kiosk and a new sign package. A garbage receptacle is not suggested for this site due to the low level of use.

The area near the existing interpretive kiosk could be signed as a loading zone with no parking permitted. The parking area beside Westside Road could be signed as such. The old road between the kiosk and the bridge could be blocked off using boulders or perhaps two of the existing concrete barricades that are present in the parking area at the west end of the old road.

To improve access to the water from the kiosk site it is recommended that a set of box steps are installed in the embankment. With an elevation difference of approximately 2.5 m and a horizontal distance of 4.5 m a set of ten steps would be sufficient to allow much easier passage to reach the bank of the side channel from the road.

Land Use Authorization(s) Required

The proposed developments would be located entirely within MoTI right-of-way. The property line between the right-of-way and the TNT/CWS property lies just south of the bottom of the embankment leading into the side channel. While encouraging public use of National Wildlife Areas is not a mandate of the CWS, public use is permitted so there is unlikely to be any significant conflict with users of non-motorized watercraft using the 180-m long side channel to access the main channel.

The most appropriate mechanism to obtain authorization from MoTI is through a Nominal Rent Tenure with the Province. The tenure would be applied for via Front Counter BC. Consultation with a MoTI representative during the research phase of this project determined that there would be no problems with sight lines or with parking vehicles in the existing pull out area.

Cost Analysis**Table 6.** Development and operational cost estimates, Spillimacheen – Westside Road

Initial Site Development			
Item / Description			Cost Estimate
Toilet – gravel pad for portable toilet to mount on.			\$500
Signage – new kiosk and sign package including install			\$4,000
Box steps on river bank for facilitating hand launching watercraft			\$ 1,500
Initial Site Development Total:			\$ 6,000
Annual Operating Cost Estimate (based on a May to September operating season)			
Item / Task	Frequency per Year	Cost per Item / Task	Annual Cost Estimate
Regular maintenance routine for toilet cleaning, litter pickup etc.	14	\$60	\$840
Vegetation mowing/trimming	2	\$100	\$200
Portable toilet mob/demob	2	\$150	\$300
Portable toilet rental/month	5	\$75	\$375
Portable toilet pumping	1	\$150	\$150
Annual Operating Cost Total:			\$1,865

Appendix A – Additional Site Photographs

Fairmont – Columbia River Road Put-In



Overview of site showing the section of road used for vehicle parking.



Looking north to put in site and parking area.



Parking area and existing signage, put-in site on opposite side of road.



Close-up image of existing boat launch area and loading zone.

Fairmont – Columbia River Road Day Use



Overview of access road and upper parking area



Overview of first grassy beach area showing access trails



Overview of lower parking area with road washout visible



Overview of second beach area with road washout visible

Fairmont – Highway 95 Access



The blocked access road and parking area on the west side of the river



The two sign panels on the west side access



The east river bank and east side parking area, as viewed from bridge



Looking upstream at the swift water from under the bridge

Fairmont – River Drive Take Out



Overview of site from the north.



River bank, showing active erosion with drop off and tension cracks



Looking towards the site from the road on a busy Saturday afternoon in July 2018. There were approximately 40 vehicles parked here at this time.

Invermere – Athalmer Road



Overview of the site from the east



The existing interpretive kiosk, and gravel pad for portable toilet



The boat launching area and part of the parking area.

Edgewater – Edgewater Station Road

Looking back towards the rail line from the "loading/unloading area"



Examples of "private property / no trespassing" signs present in area



The river access point at Edgewater

Moore's Bridge



An aerial view of the west side of the former bridge site



An aerial view of the east side of the former bridge site



A typical section of the 1.7 km west side access road

Brisco – Brisco Road



Overview of the eastern bridge and existing access point on private land



Overview of the western bridge, looking west



The existing boat launch area with Brisco Road and bridge in the background

Spillimacheen – Westside Road



Overview of the interpretive kiosk and current river access point



The river access point leading down steep bank to side channel



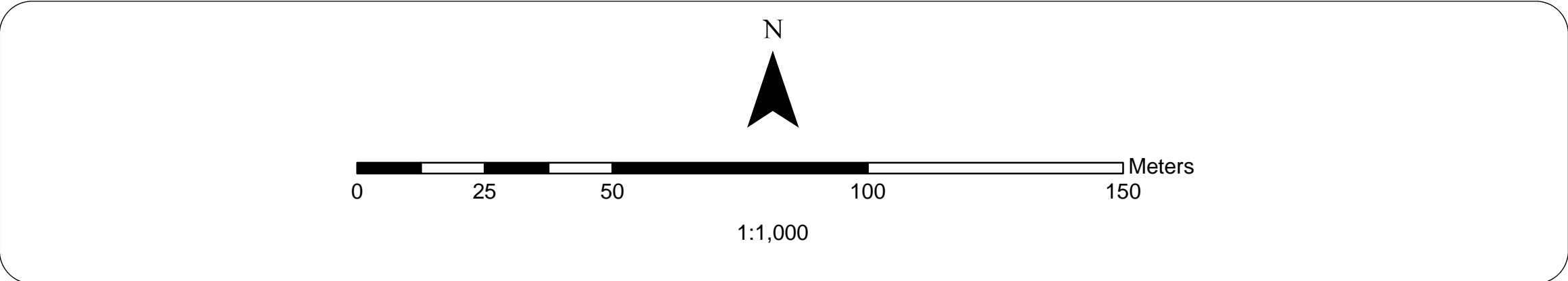
The old road right-of-way paralleling Westside Road



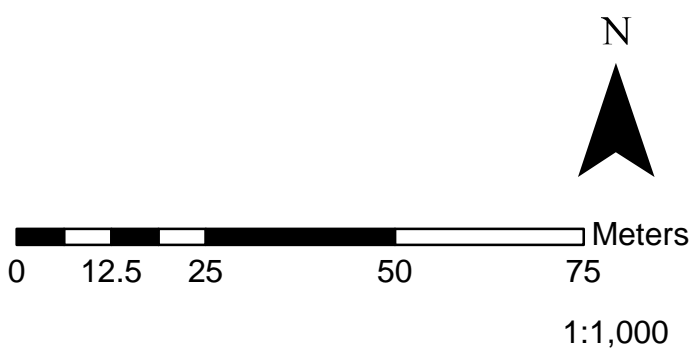
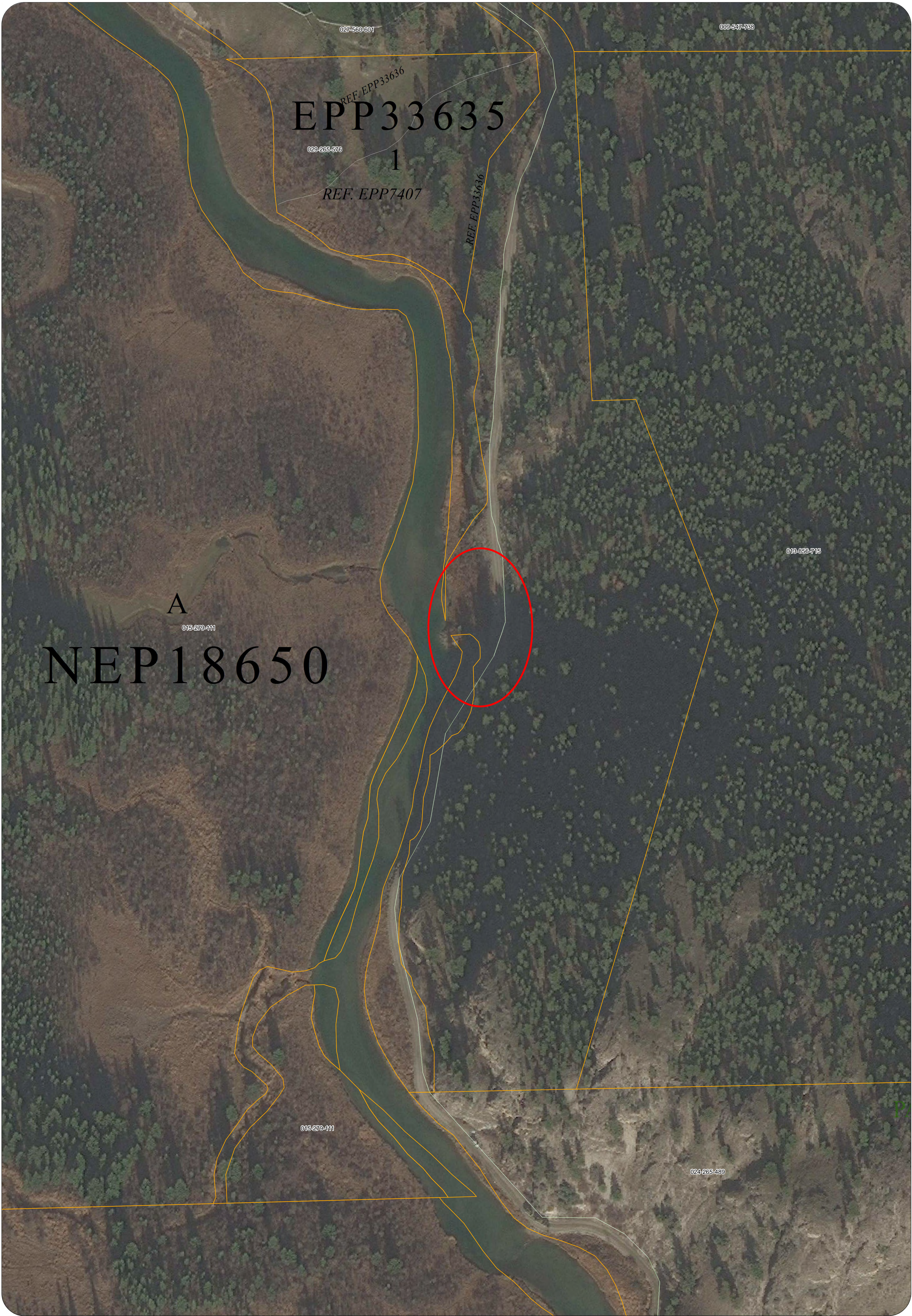
The confluence of the side channel and the main channel of the river

Appendix B – Site Maps

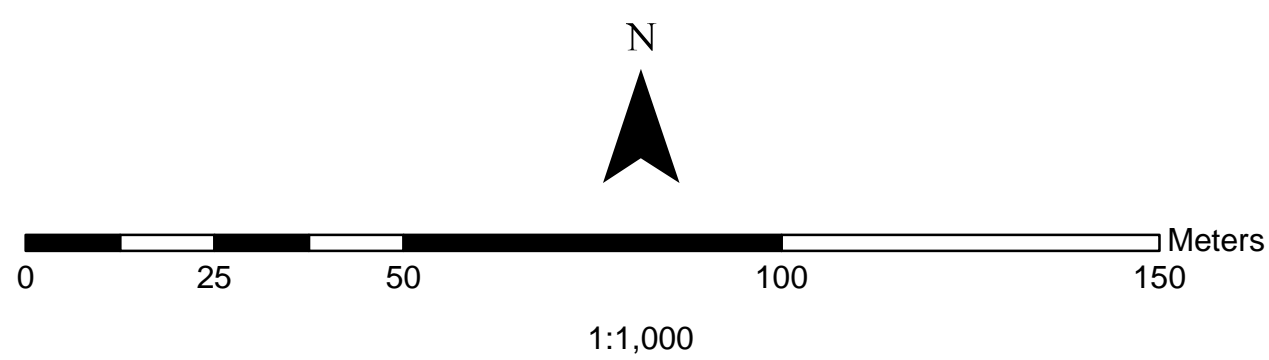
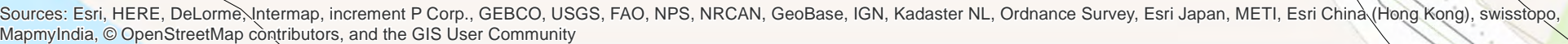
Two maps are provided for each site: one showing the property parcel lines with ownership status and one showing the property parcel lines with imagery as the base map. These maps were produced by Nicole Jung, GIS Database Technician with the RDEK.



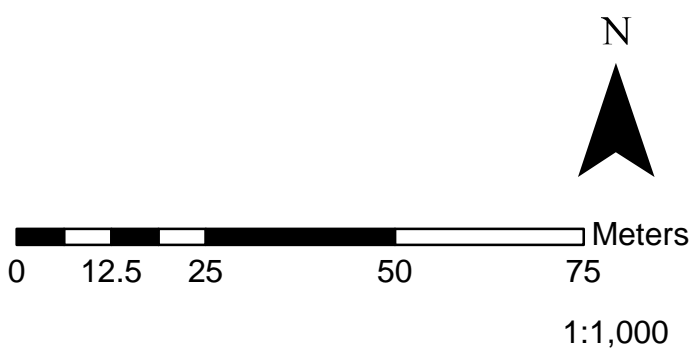
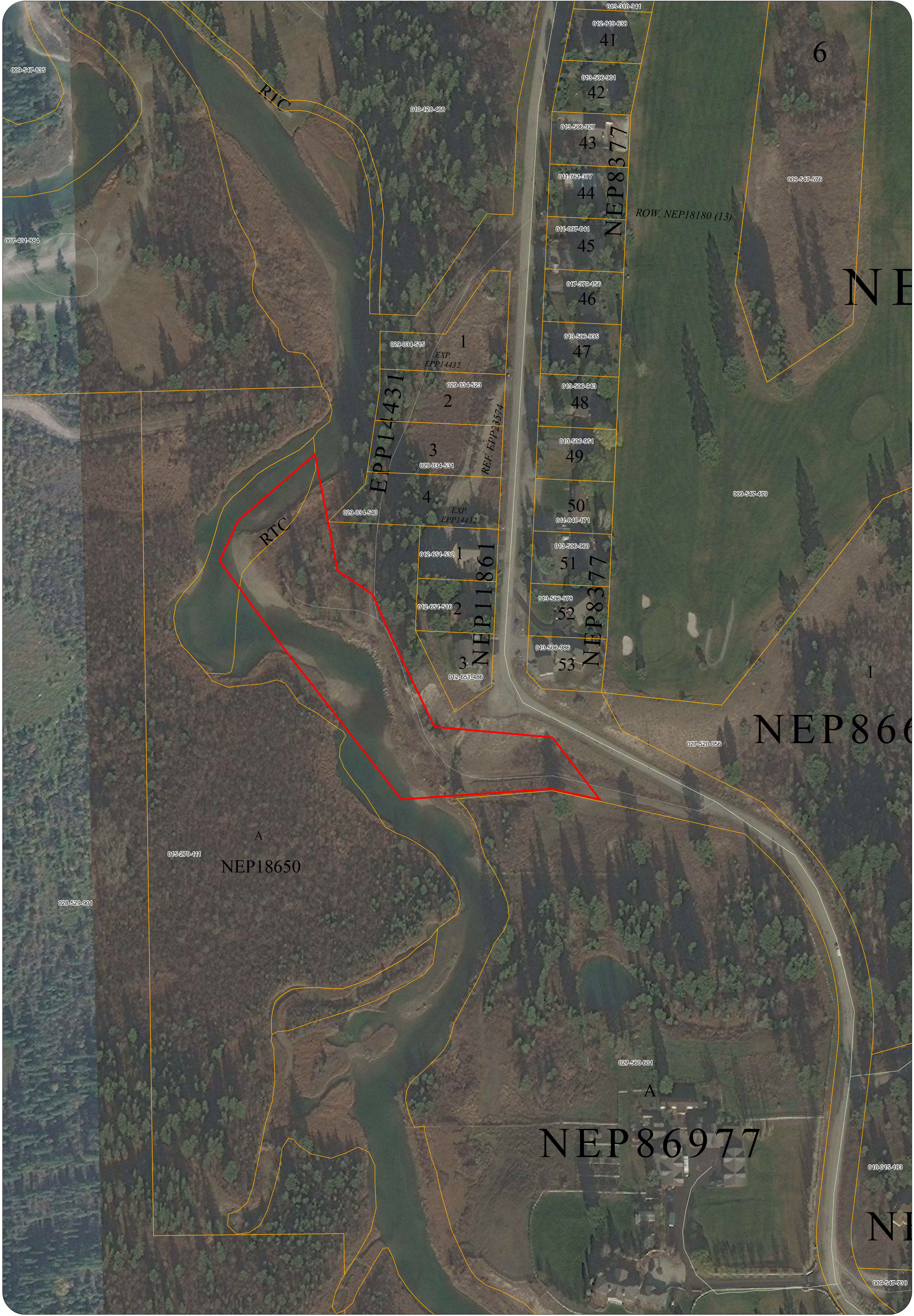
Fairmont - Columbia River Road
Put-In



Fairmont - Columbia River
Road Put-In



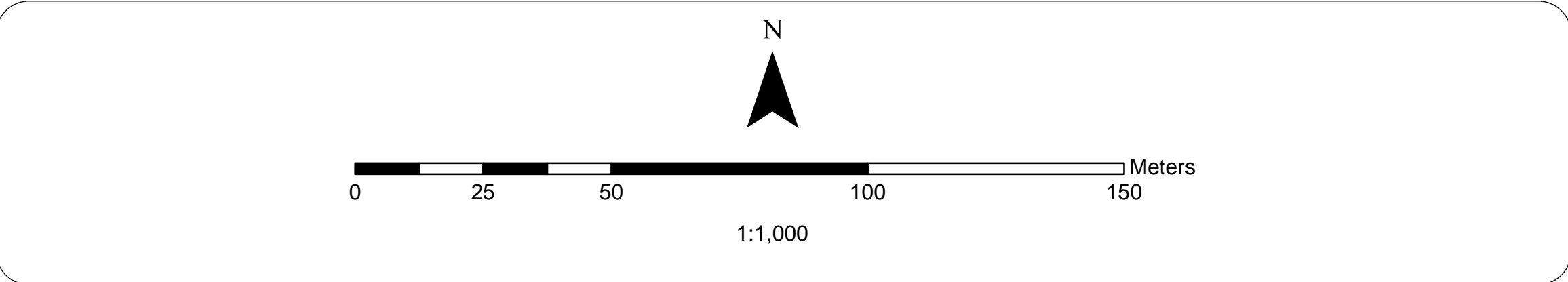
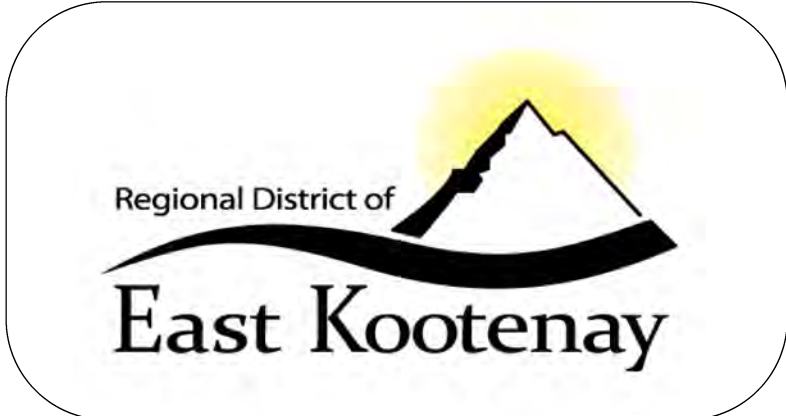
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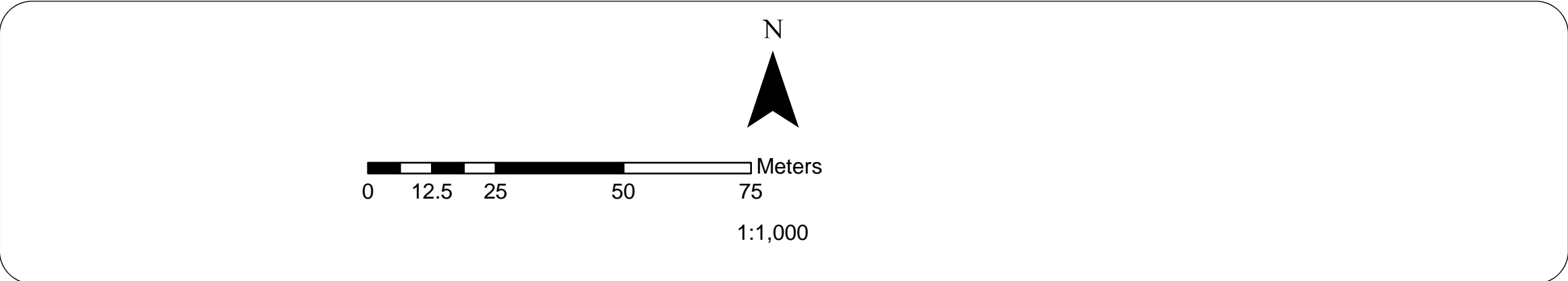
Fairmont - Columbia River Road
Day Use



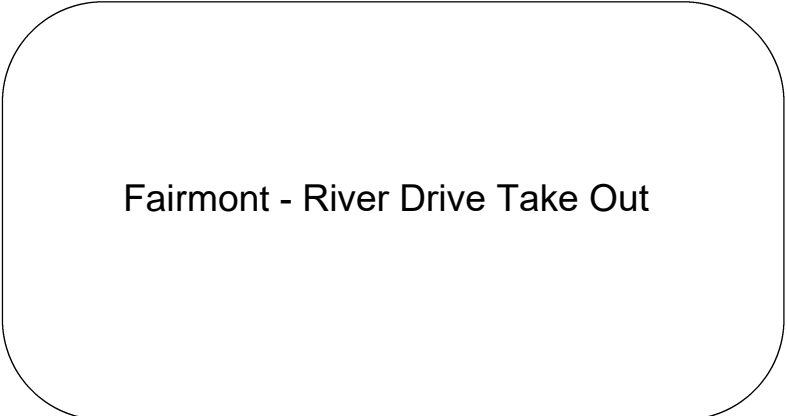
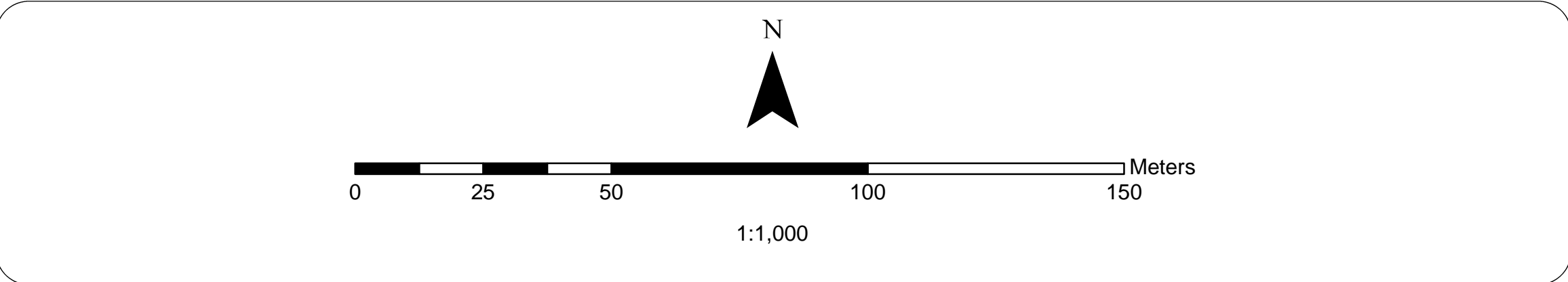
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

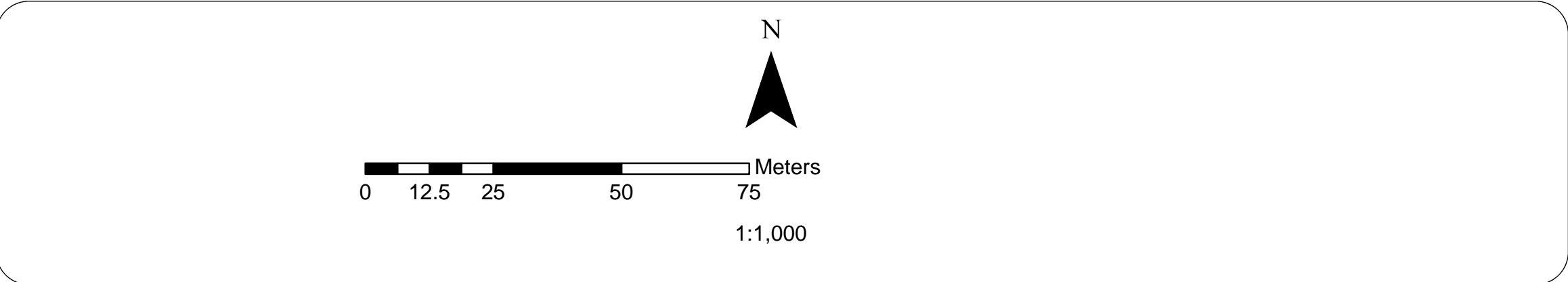


Fairmont - Highway 95 Access

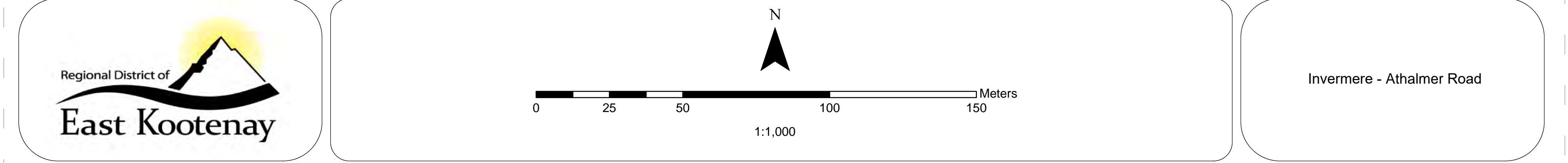


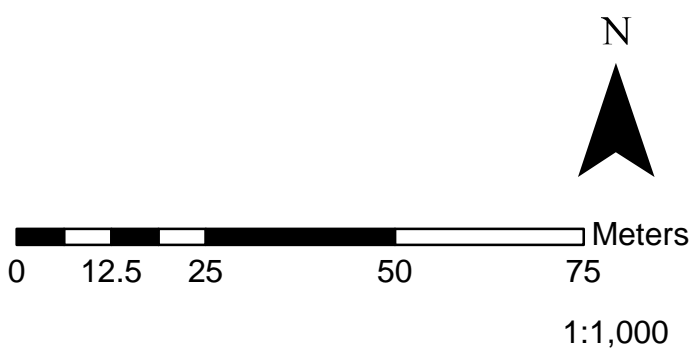
Fairmont - Highway 95 Access



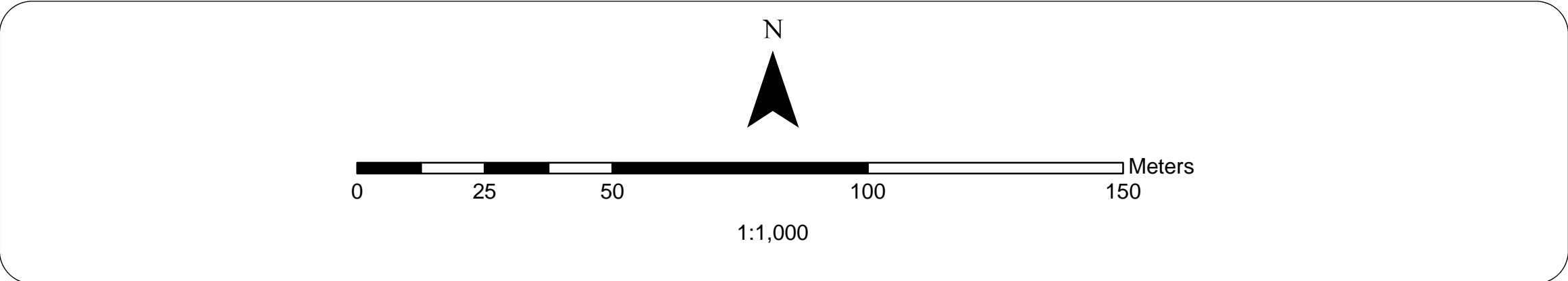


Fairmont - River Drive Take Out

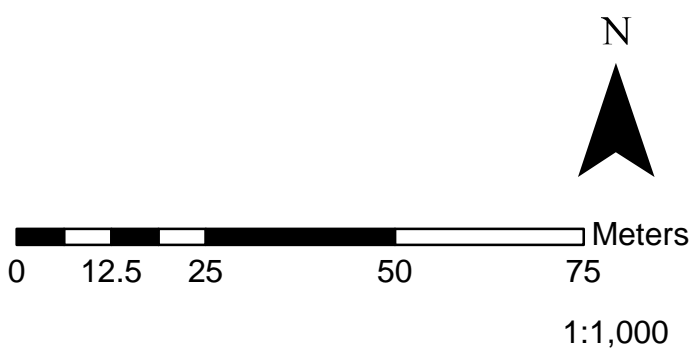
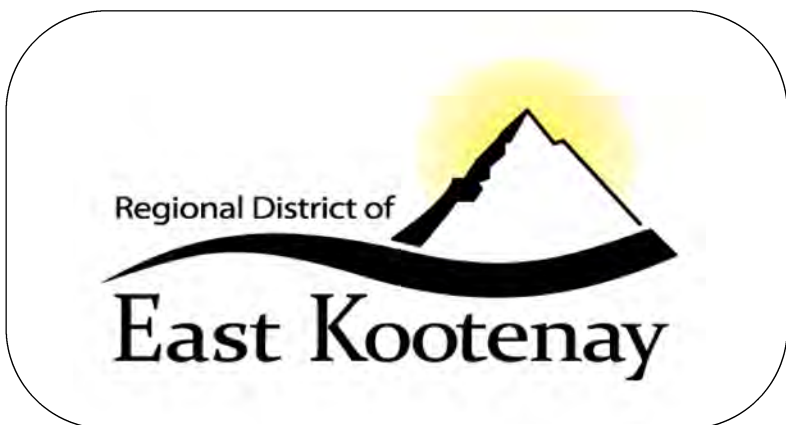




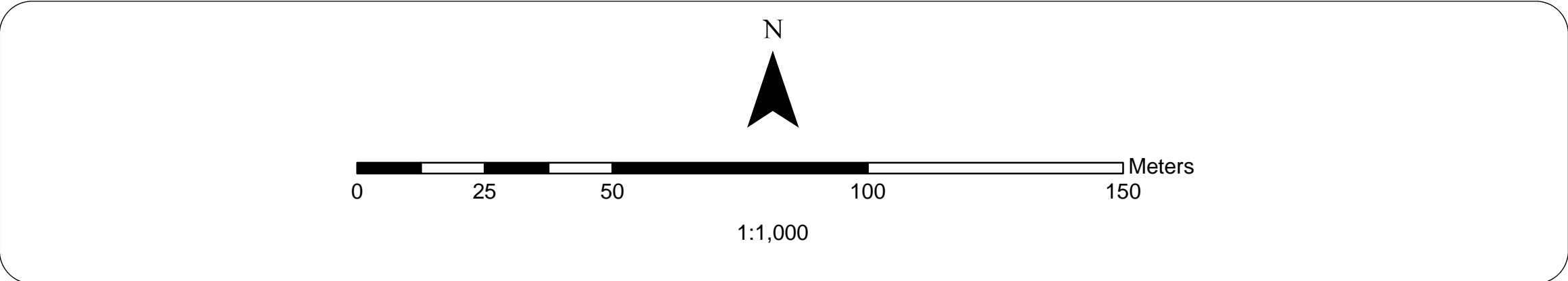
Invermere - Athalmer Road



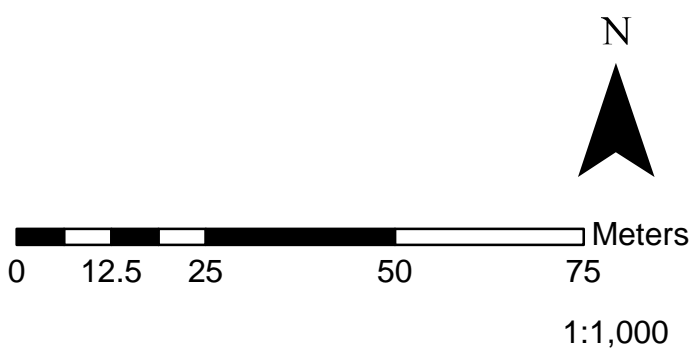
Radium - Foresters Landing Road



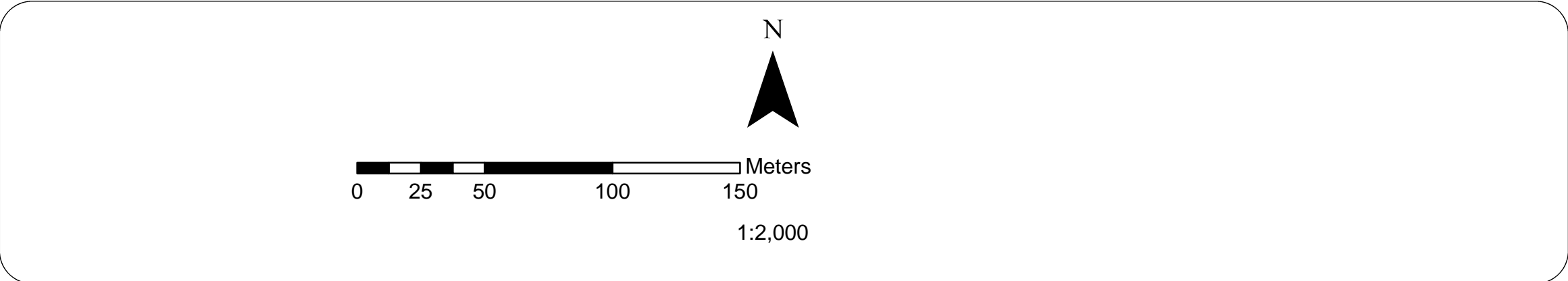
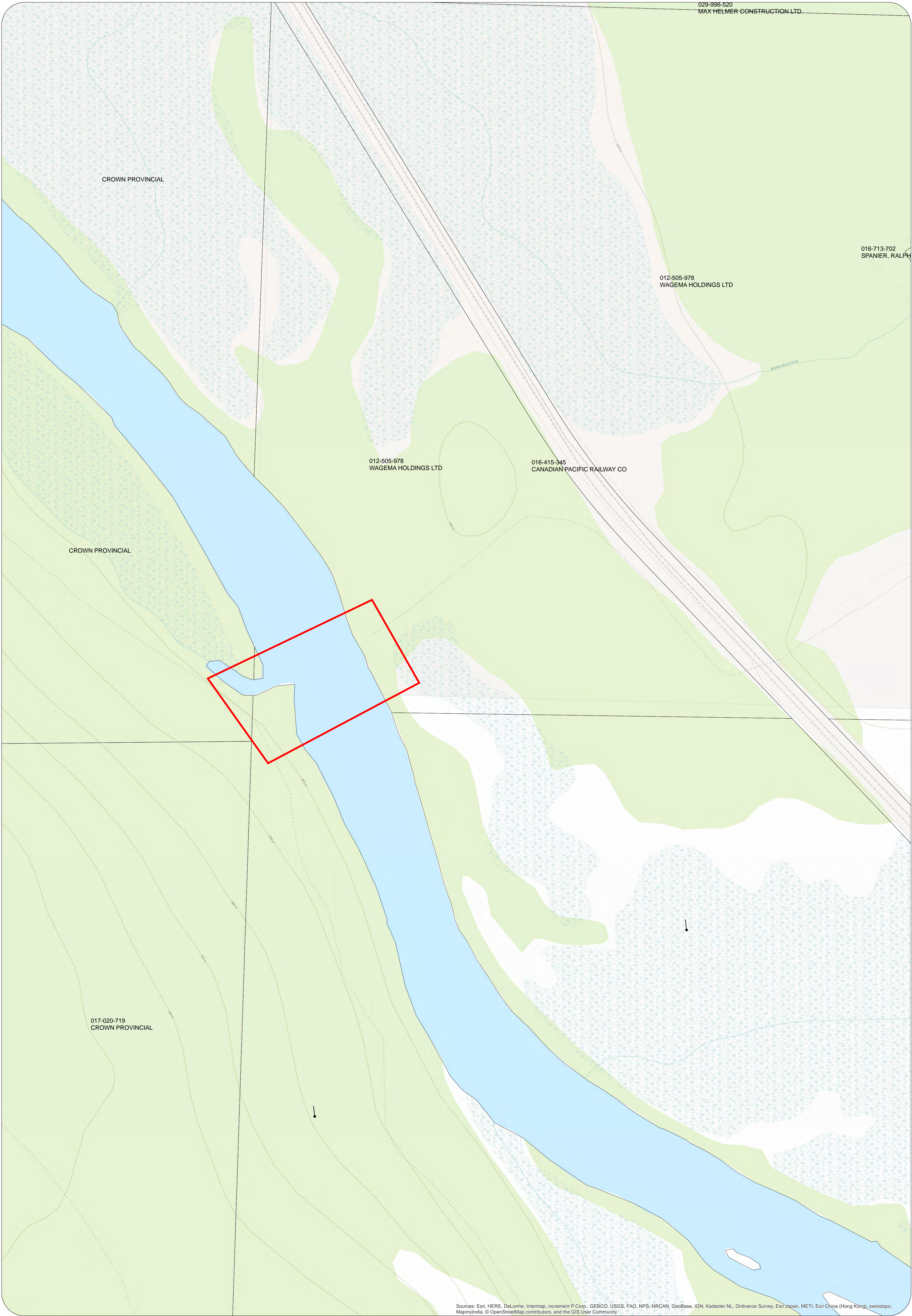
Radium - Foresters Landing Road



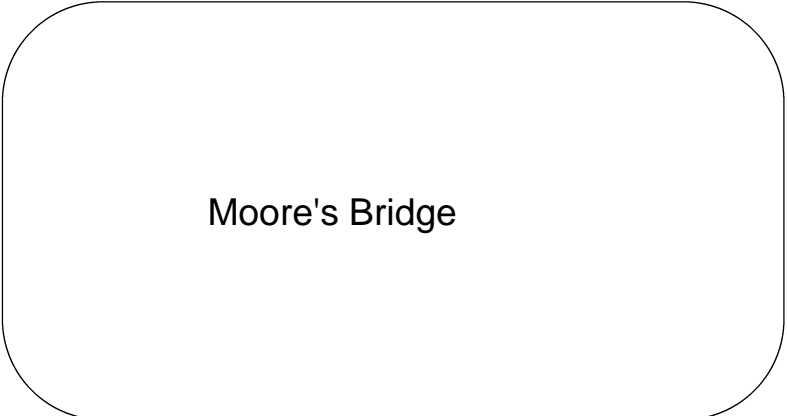
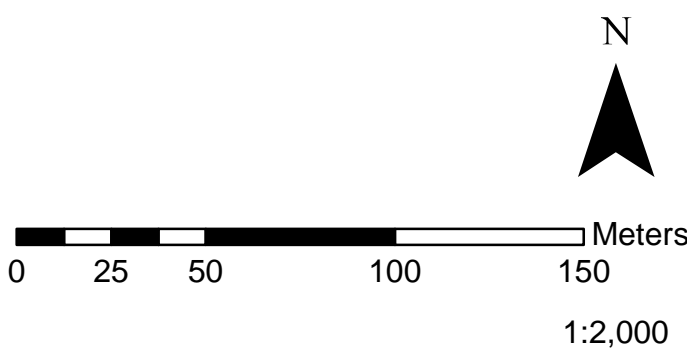
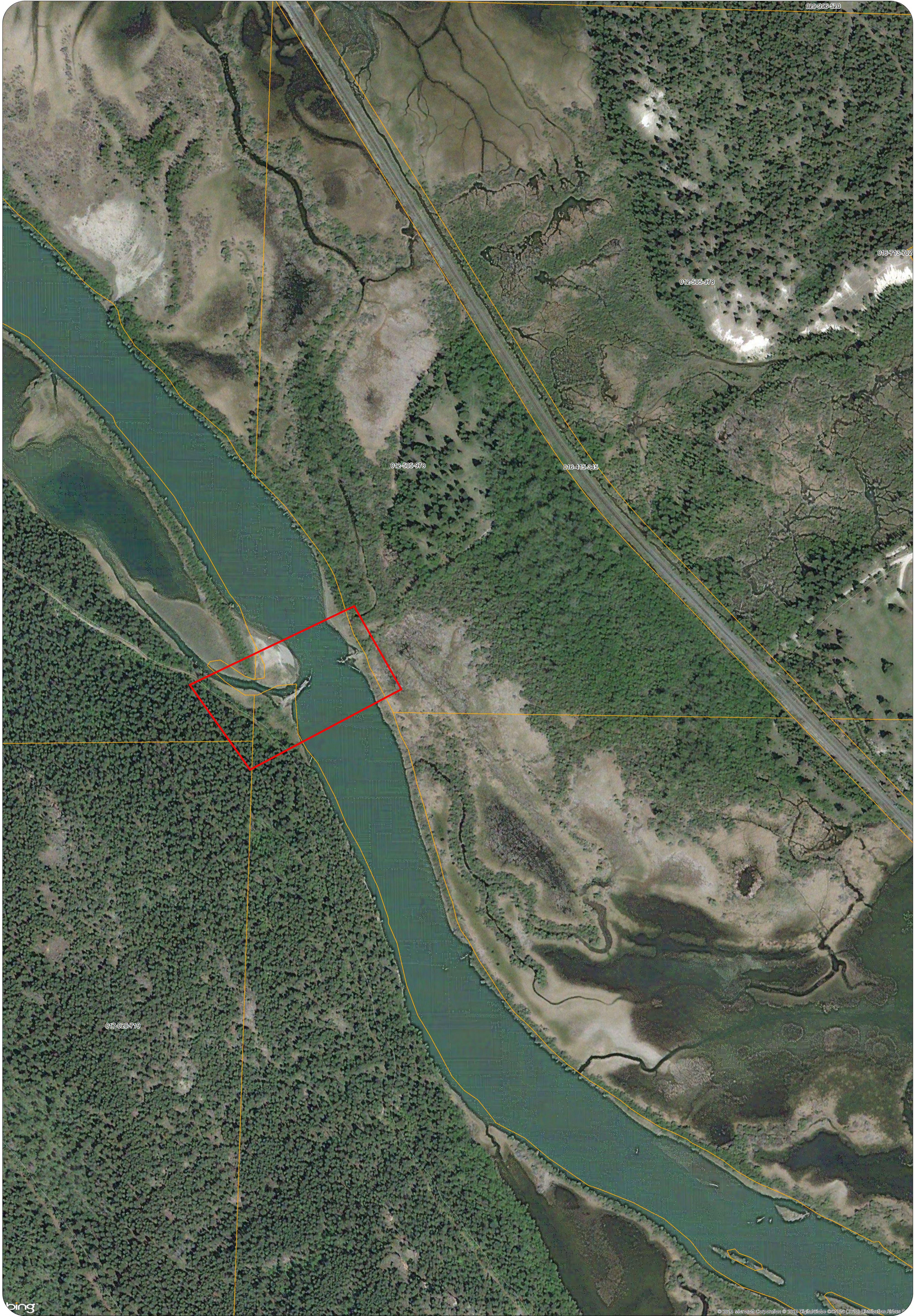
Edgewater - Edgewater Station Road

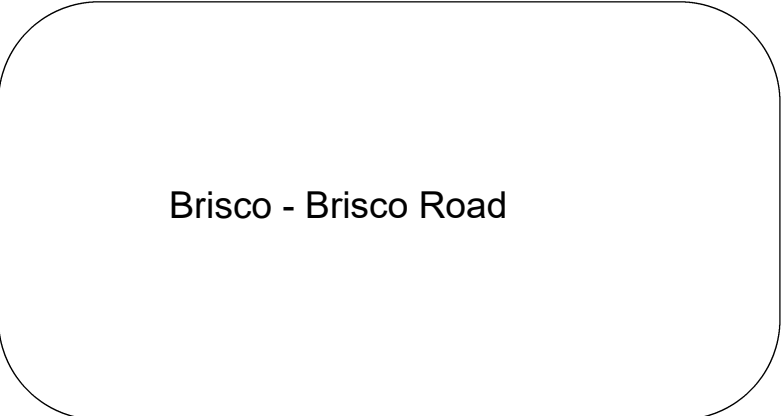
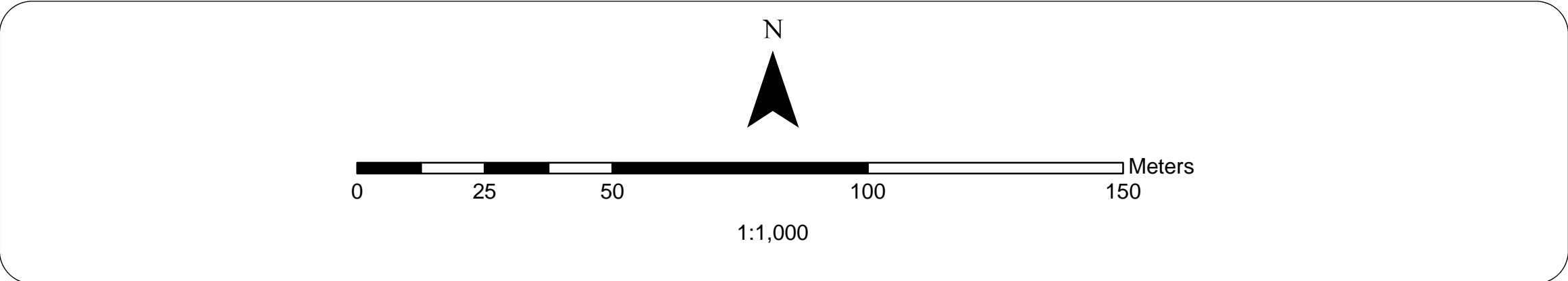
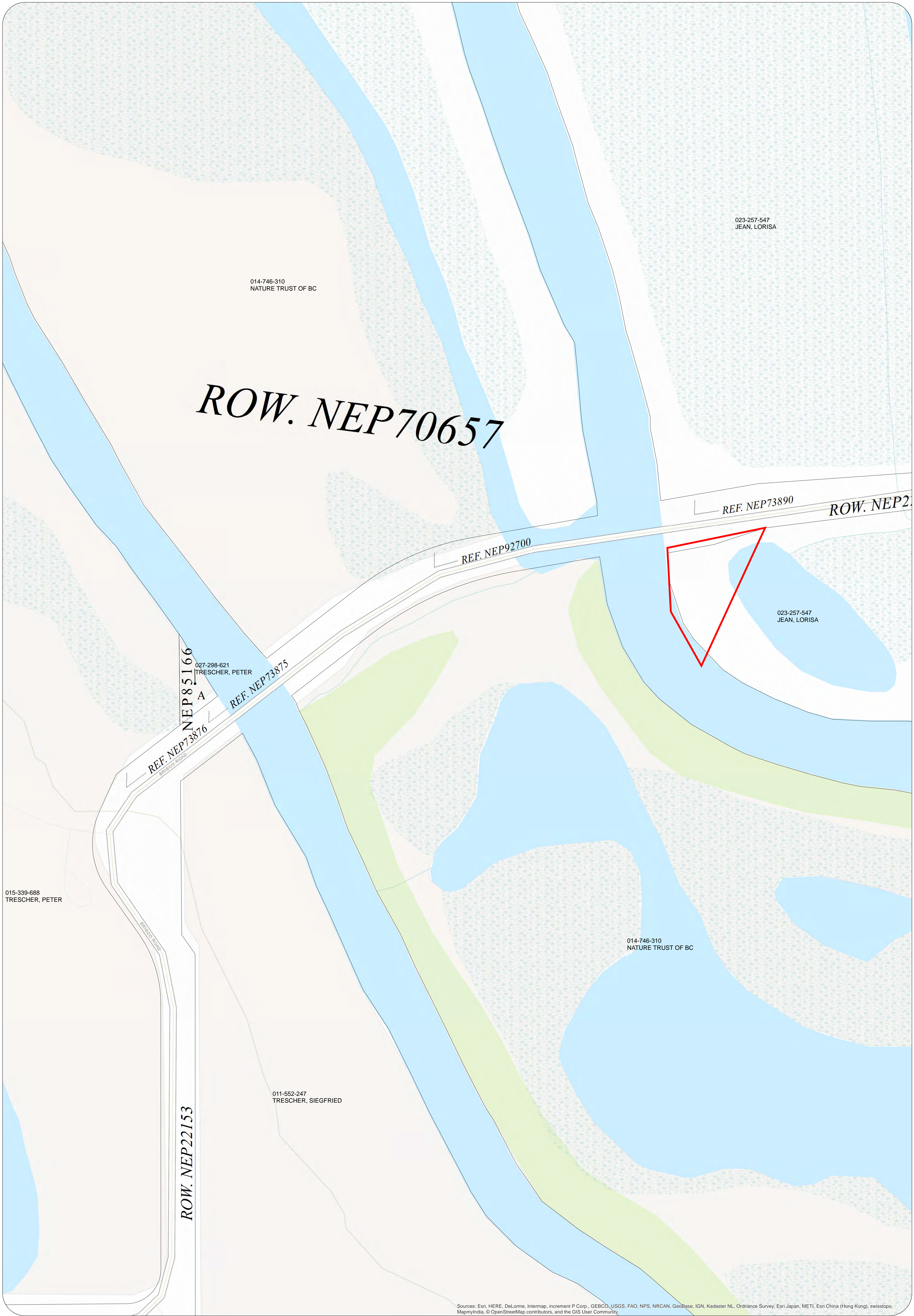


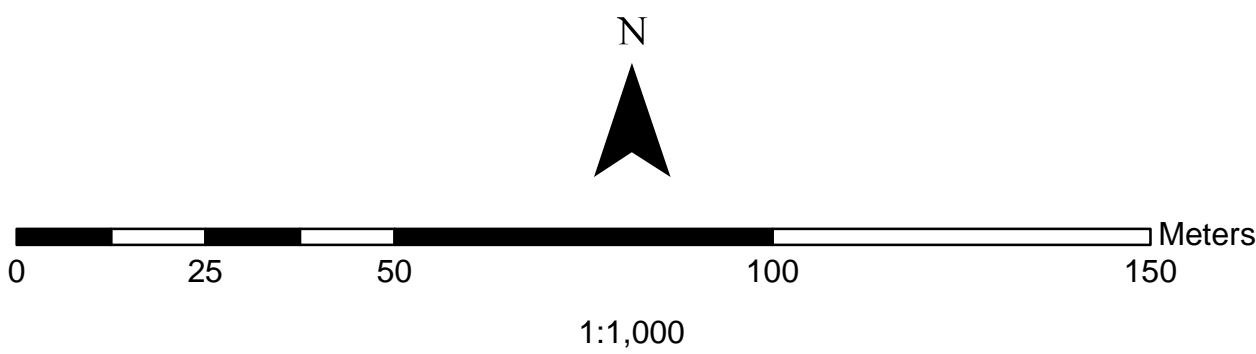
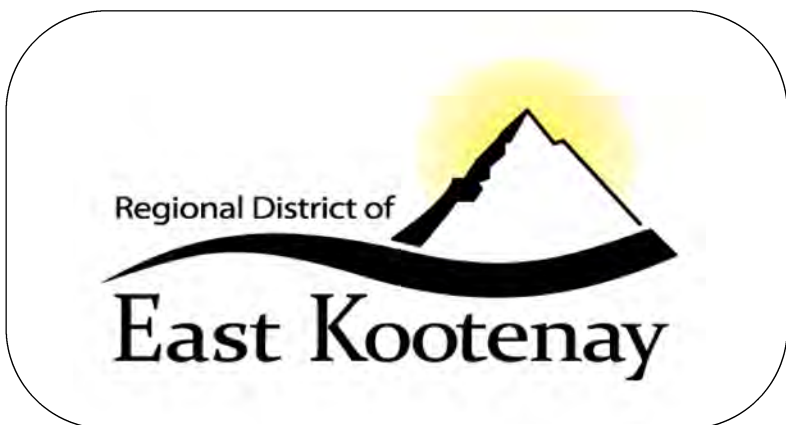
Edgewater - Edgewater Station Road



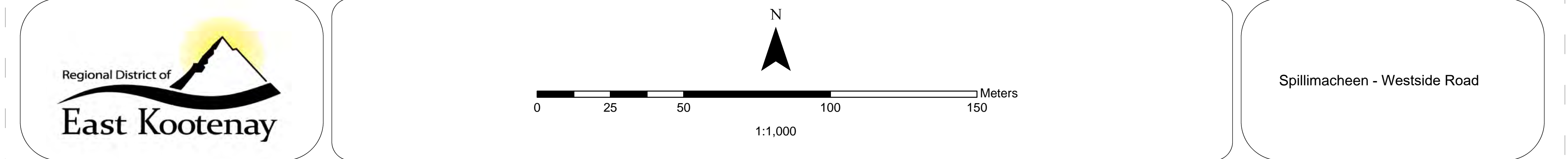
Moore's Bridge

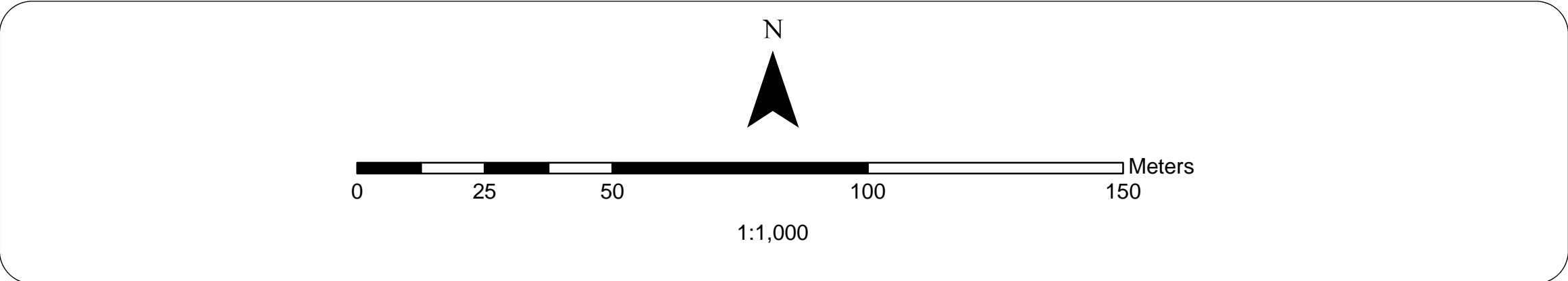
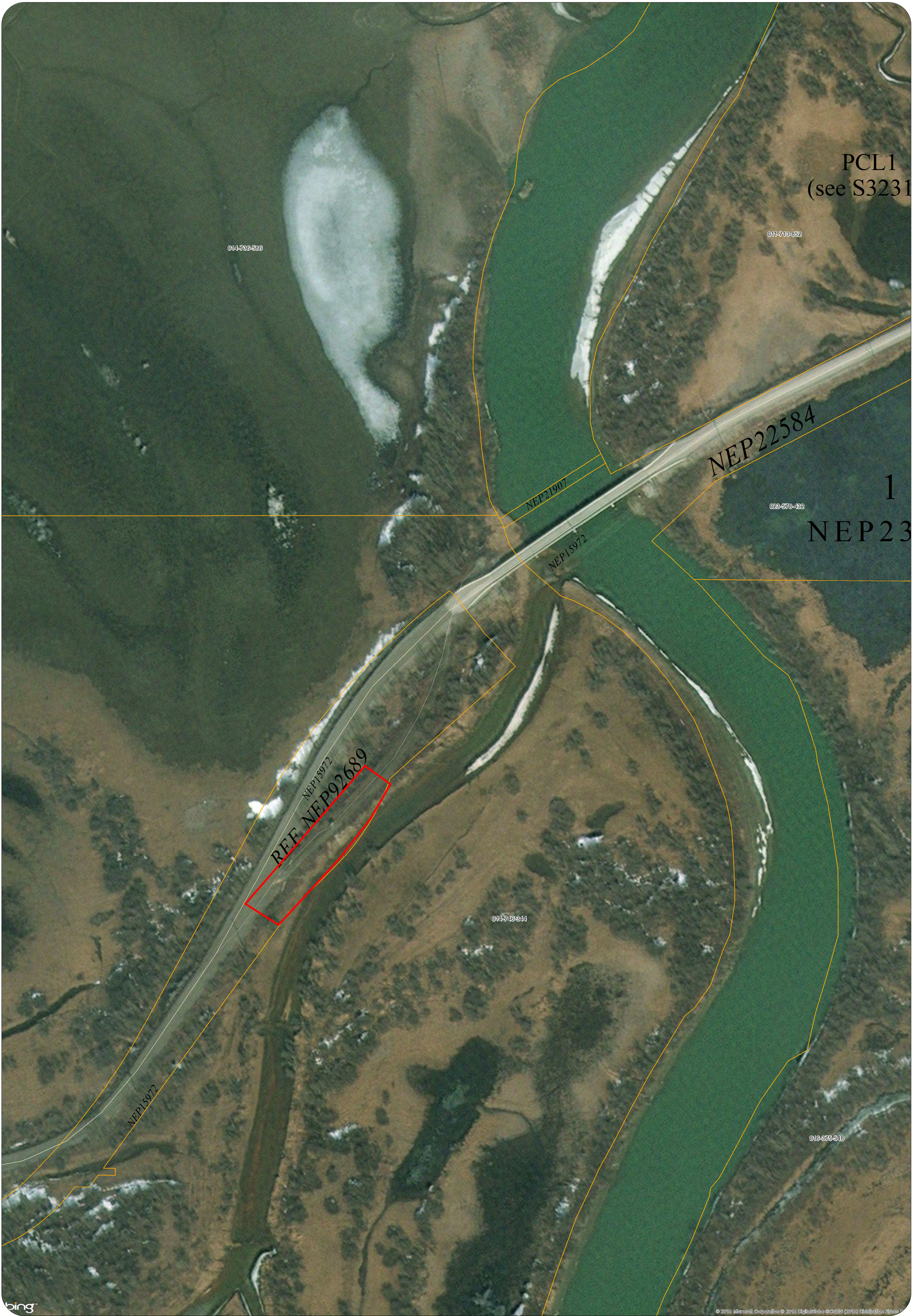






Brisco - Brisco Road





Spillimacheen - Westside Road

Appendix C – Regulatory Resources



Request for Review

A) Contact information

Name of Business/Company:

Name of Proponent:

Mailing address:

City/Town:

Province/Territory:

Postal Code:

Tel. No. :

Fax No.:

Email:

Select additional contact:

Contractor/Agency/Consultant (if applicable):

Mailing address:

City/Town:

Province/Territory:

Postal Code:

Tel. No. :

Fax No.:

Email:

Is the Proponent the main/primary contact? ☐ Yes ☐ No

If no, please enter information for the primary contact or any additional contact.



B) Description of Project

If your project has a title, please provide it.

Is the project in response to an emergency circumstance*? ☐ Yes ☐ No

Does your project involve work in water? ☐ Yes ☐ No

If yes, is the work below the High Water Mark*? ☐ Yes ☐ No

What are you planning to do? Briefly describe all project components you are proposing in or near water.

How are you planning to do it? Briefly describe the construction materials, methods and equipment that you plan to use.

Include a site plan (figure/drawing) showing all project components in and near water.

Are details attached? ☐ Yes ☐ No

Identify which work categories apply to your project.

- | | |
|---|---|
| <input type="checkbox"/> Aquaculture Operations | <input type="checkbox"/> Log Handling / Dumps |
| <input type="checkbox"/> Aquatic Vegetation Removal | <input type="checkbox"/> Log Removal |
| <input type="checkbox"/> Beaches | <input type="checkbox"/> Moorings |
| <input type="checkbox"/> Berms | <input type="checkbox"/> Open Water Disposal |
| <input type="checkbox"/> Blasting / Explosives | <input type="checkbox"/> Piers |
| <input type="checkbox"/> Boat Houses | <input type="checkbox"/> Riparian Vegetation Removal |
| <input type="checkbox"/> Boat Launches / Ramps | <input type="checkbox"/> Seismic Work |
| <input type="checkbox"/> Breakwaters | <input type="checkbox"/> Shoreline Protection |
| <input type="checkbox"/> Bridges | <input type="checkbox"/> Stormwater Management Facilities |
| <input type="checkbox"/> Cable Crossings | <input type="checkbox"/> Surface Water Taking |
| <input type="checkbox"/> Causeways | <input type="checkbox"/> Tailings Impoundment Areas |
| <input type="checkbox"/> Culverts | <input type="checkbox"/> Temporary Structures |
| <input type="checkbox"/> Dams | <input type="checkbox"/> Turbines |
| <input type="checkbox"/> Dewatering / Pumping | <input type="checkbox"/> Water Control Structures |
| <input type="checkbox"/> Docks | <input type="checkbox"/> Water Intakes / Fish Screens |
| <input type="checkbox"/> Dredging / Excavation | <input type="checkbox"/> Water Outfalls |
| <input type="checkbox"/> Dykes | <input type="checkbox"/> Watercourse Realignment |
| <input type="checkbox"/> Fishways / Ladders | <input type="checkbox"/> Weirs |
| <input type="checkbox"/> Flow Modification (hydro) | <input type="checkbox"/> Wharves |
| <input type="checkbox"/> Groundwater Extraction | <input type="checkbox"/> Wind Power Structures |
| <input type="checkbox"/> Groynes | |
| <input type="checkbox"/> Habitat Restoration | |
| <input type="checkbox"/> Ice Bridges | |

☐ Other Please Specify



Was your project submitted for review to another federal or provincial department or agency? ☐ Yes ☐ No

If yes, indicate to whom and associated file number(s).

C) Location of the Project

Coordinates of the proposed project Latitude N Longitude W

OR UTM zone ; Easting
 Northing

Include a map clearly indicating the location of the project as well as surrounding features.

Name of Nearest Community (City, Town, Village):

Municipality, District, Township, County, Province:

Name of watershed (if applicable):

Name of watercourse(s) or waterbody(ies) near the proposed project:

Provide detailed directions to access the project site:

D) Description of the Aquatic Environment

Identify the predominant type of aquatic habitat where the project will take place.

- ☐ Estuary (Estuarine)
☐ Lake (Lacustrine)
☐ On the bank/shore at the interface between land and water (Riparian)
☐ River or stream (Riverine)
☐ Salt water (Marine)
☐ Wetlands (Palustrine)

Provide a detailed description of biological and physical characteristics of the proposed project site.

Include representative photos of affected area (including upstream and downstream area) and clearly identify the location of the project.



E) Potential Effects of the Proposed Project

Have you reviewed the Pathways of Effects (PoE) diagrams (<http://www.dfo-mpo.gc.ca/pnw-ppe/pathways-sequences/index-eng.html>) that describe the type of cause-effect relationships that apply to your project?

☐ Yes ☐ No

If yes, select the PoEs that apply to your project.

- | | |
|---|---|
| <input type="checkbox"/> Addition or removal of aquatic vegetation | <input type="checkbox"/> Placement of material or structures in water |
| <input type="checkbox"/> Change in timing, duration and frequency of flow | <input type="checkbox"/> Riparian Planting |
| <input type="checkbox"/> Cleaning or maintenance of bridges or other structures | <input type="checkbox"/> Streamside livestock grazing |
| <input type="checkbox"/> Dredging | <input type="checkbox"/> Structure removal |
| <input type="checkbox"/> Excavation | <input type="checkbox"/> Use of explosives |
| <input type="checkbox"/> Fish passage issues | <input type="checkbox"/> Use of industrial equipment |
| <input type="checkbox"/> Grading | <input type="checkbox"/> Vegetation Clearing |
| <input type="checkbox"/> Marine seismic surveys | <input type="checkbox"/> Wastewater management |
| <input type="checkbox"/> Organic debris management | <input type="checkbox"/> Water extraction |
| <input type="checkbox"/> Placement of marine finfish aquaculture site | |

Will there be changes (i.e., alteration) in the fish habitat*? ☐ Yes ☐ No ☐ Unknown

If yes, provide description.

Will the fish habitat alteration be permanent*? ☐ Yes ☐ No ☐ Unknown

Is there likely to be destruction or loss of habitat used by fish? ☐ Yes ☐ No ☐ Unknown

What is the footprint (area in square meters) of your project that will take place below the high water mark*?

Is your project likely to change water flows or water levels? ☐ Yes ☐ No ☐ Unknown

If your project includes withdrawing water, provide source, volume, rate and duration.

If your project includes water control structure, provide the % of flow reduction.

If your project includes discharge of water, provide source, volume and rate.

Will your project cause death of fish? ☐ Yes ☐ No ☐ Unknown

If yes, how many fish will be killed (for multi-year project, provide average)? What species and lifestages?

Are there aquatic species at risk (http://www.sararegistry.gc.ca/species/aquatic_e.cfm) present? If yes, which ones?



What is the time frame of your project?

The construction will start on

and end by

If applicable, the operation will start on

and end by

If applicable, provide schedule for the maintenance

If applicable, provide schedule for decommissioning

Are there additional effects to fish and fish habitat that will happen outside of the time periods identified above?

☐

Yes

☐

No

(If yes, provide details)

Have you considered and incorporated all options for redesigning and relocating your project to avoid negative effects to fish and fish habitat?

☐

Yes

☐

No

If yes, describe.

Have you consulted DFO's Measures to Avoid Harm to Fish and Fish Habitat (<http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html>) to determine which measures apply to your project?

☐

Yes

☐

No

Will you be incorporating applicable measures into your project? ☐ Yes ☐ No

If yes, identify which ones. If No, identify which ones and provide reasons.

Have you considered and incorporated additional best practices and mitigation measures recommended in relevant guidelines to avoid negative effects to fish and fish habitat?

☐

No

☐

Yes

If Yes, include a list of the guidelines being used to avoid negative effects to fish and fish habitat.

Are there any relevant best practices or mitigation measures that you are unable to incorporate? ☐ Yes ☐ No

(If yes, identify which ones.)



Can you follow appropriate Timing Windows (<http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html>) for all your project activities below the High Water Mark*?

☐ Yes ☐ No

(If no, provide explanations.)

What residual effects to fish and fish habitat do you foresee after taking into account the avoidance and mitigation measures described above?

F) Signature

I,

(print name) certify that the information given on this form is to the best of my knowledge, correct and completed.

Signature

MM/DD/YYYY

Date

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the fisheries protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-PPU-680. Under the *Privacy Act*, Individuals have a right to, and on request shall be given access to any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provision of the *Access to Information Act*.

**All definitions are provided in Section G of the Guidance on Submitting a Request for Review*



Guidance on Submitting a Request for Review

This document explains the requirements for a Request for Review by DFO under the fisheries protection provisions of the *Fisheries Act*. To determine whether you should request a review, follow the steps for proponent Self-Assessment on DFO's Projects Near Water webpage (<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>).

Incomplete Requests for Review will be returned to the applicant without review by DFO. All information requested must be provided. If you attach documents to your application with additional information, you must still provide appropriate summaries in the spaces provided on the application document or your application will be considered incomplete.

Section A: Contact Information

Provide the full legal name of the proponent and primary mailing address for the proponent. When the proponent is a company, identify the full legal registered name of the company.

If applicable, also provide the contact information of the duly authorized representative of the proponent. Please note that a copy of correspondence to Contractor/Agency/Consultant will also be sent to the Proponent.

Section B: Description of Project

This information is meant to provide background about the proposed project. All components of the proposed project in or near water, must be described.

Proponents should provide information about all appropriate phases of the project, i.e., the construction, operation, maintenance and closure phases for the proposed project.

All details about the construction methods to be used, associated infrastructure, permanent and temporary structures, building materials to be used, machinery and equipment to be used must also be provided. For example, the construction of **permanent structures** may require the construction of temporary structures such as temporary dikes, in conjunction with other associated activities like the withdrawal of water, land clearing, excavation, grading, infilling, blasting, dredging, installing structures, draining or removing debris from water. Similarly, the equipment and materials to be used may include hand tools, backhoes, gravel, blocks or armor stone (provide the average diameter), concrete (indicate if pre-cast or poured in-water), steel beams or wood.

When physical structures in or near water are proposed, provide the plan and specifications of those works which would require a review.

Section C: Location of the Project

The purpose for this information is to describe and illustrate the location of the proposed project, and to provide geographical and spatial context. The information should also facilitate an understanding of how the project will be situated in relation to existing structures.

The details to be provided must include:

- Coordinates of the project (e.g., Latitude and Longitude or Universal Transverse Mercator Grid coordinates);
- A map(s), site plan, or diagrams indicating the high water mark and the location, size and nature of proposed and existing structures (e.g., floating or fixed), landmarks and proposed activities. In a marine setting, it may be helpful to depict the approximate location of the proposed development on a nautical chart or showing the relation of the site to sea marks or other navigational aids. These plans, maps or diagrams should be at an appropriate scale to help determine the relative size of the proposed structures and activities, the proximity to the watercourse or waterbody and the distance from existing structures;
- The community nearest to the location of the proposal as means to provide a general reference point. When possible, proponents should use geographical names recognized by the Geographical Names Board of Canada (<http://www.nrcan.gc.ca/earth-sciences/geography-boundary/geographical-name/11680>).
- If available, provide aerial photographs or satellite imagery of the water source(s) and waterbody(ies);
- Names of the watershed(s), water source(s) and/or waterbody(ies) likely to be affected by the proposal; and
- Brief directions to access the proposed project site.



Section D: Description of the Aquatic Environment

Proponents must describe the environmental context and aquatic resources present at the proposed site. The information must identify the current state of the fish and fish habitat prior to the carrying on of the project.

It is important to include information about the fish species present, the biological, chemical, physical features present (habitat characteristics), and the fish life-cycle functions (fish characteristics).

The spatial scope for assessing fish and fish habitat should encompass the direct physical footprint of the project, and the upstream and downstream areas affected.

As an example, the following is a non-exhaustive and non-prescriptive list of some common attributes which may characterize the aquatic environment:

- Type of water source or watercourse (groundwater, river, lake, marine, estuary, etc.);
- Characteristics of the water source or waterbody could include:
 - Substrate characterization - describe the types of substrate (e.g., bedrock, boulder, cobble, gravel etc.), identify the predominant substrate type (e.g., 80% cobble, 20% gravel etc.) and provide maps of the substrate;
 - Aquatic and riparian vegetation characterization - identify the prevalent types of vegetation (e.g. rooted, submerged, emergent, etc.), identify the relative abundance of the vegetation (e.g., 10% cattails, 80% grass, 10% sedge) , indicate the predominant vegetation (e.g., by species or types) and identify the vegetation densities (e.g., type of vegetation/ area);
 - Flow characterization - specify if the flow is controlled or if it is natural, identify if the flow is permanent or intermittent, identify the current and tide (marine environment) etc.;
 - Physical waterbody characterization - identify the average depth of water for water bodies, identify bathymetry of water bodies, provide bathymetric maps where available, channel width (determine the width of the channel from the high water mark), slope ;
 - Water quality characterization - (e.g., annual or average pH, salinity, alkalinity, total dissolved solids, turbidity, temperature etc.);
 - Biological water quality characterization - (e.g., benthic macro-invertebrates, zooplankton, phytoplankton, etc.)
- Fish species characterization - identify the fish species (including molluscs, crustaceans, etc.) known or suspected to be in the area, predator prey relationships etc. Identify what source of information was used and to determine the presence of fish in that area; and
- Estimate the fish abundance - estimate the number of fish present, estimate the year class for each species etc.

There are many different methods and attributes available to characterize fish and fish habitat. Proponents must describe all sources of information used, all fish and environment sampling techniques used, all modelling techniques used and all other approaches used to define the fish and fish habitat. Proponents are encouraged to use recognized fisheries inventory methods such as those approved by DFO or provinces and territories, or scientifically defensible methodologies and techniques whenever possible.

Whenever possible, proponents should support descriptions of the aquatic environment with the use of detailed drawings, such as plans or maps and photographs of the habitat features. In an offshore marine setting, photos may not be useful to depict the proposed development site. Instead describe and/or sketch the specific features of the sea floor which may include the presence of submarine features such as canyons, cliffs, caverns, etc.

Section E: Potential Effects of the Proposed Project

The objective of this section is to identify all anticipated effects on fish and fish habitat likely to be caused by the project. Proponents should consider all mitigation or avoidance techniques.

The description must include qualitative and/or quantitative information about the predicted/potential effects to fish species and fish habitat. Some examples of likely effects may include mortality to fish, changes to the life stages of fish affected, area of habitat loss, change to flow, changes to habitat function, reduction in prey availability etc.



The spatial scope of the aquatic effects assessment would include the direct physical "footprint" of the proposed project, and any areas indirectly affected, such as downstream or upstream areas. This may also include areas in or on the water, on the shoreline, coast or bank(s) (i.e., in the riparian zone).

The assessment must include the following attributes:

- Identification of all fish species affected by the proposed project ;
- Identification of the type of fish habitat affected (e.g., spawning habitat - gravel and cobble, feeding and rearing areas - side channel slough, small tributaries, etc.), estimate of the affected area (e.g., square meters or hectares);
- Of the affected fish, identify the life stages affected (e.g., juvenile, yearling, adult etc.);
- Description of the effect (e.g., mortality to fish from entrapment, delayed migration of spawning adults, reduction in prey availability, etc.)
- Probability of the effect - this is the likelihood of the effect occurring (e.g., probability of fish strike from turbines for specific fish sizes, probability of sediment plume within a distance from source, etc., or qualitative assessment: low, medium, high)
- Magnitude of the effect - this is the intensity or severity of the effect (e.g., total number of fish affected, or qualitatively assessment: low, medium, high).
- Geographic extent of the effect - this is the spatial range of the effect (e.g., localized to 100m from the work, channel reach or lake region, entire watershed etc.); and
- Duration of the effect - this is the temporal period for which the effect will persist (e.g., duration of delay to fish migration in hours, days, months or years).

The information to be provided must also describe the methods and techniques used to conduct the assessment. As much as possible, methods and techniques used should be scientifically defensible.

The schedule should, at minimum, identify the proposed start and end dates for carrying out each proposed activity, and where applicable, identify the respective phase of the proposal; i.e., the construction, operation, maintenance and closure phases. In some cases, in order to provide additional context, it may be relevant to identify other information such as the expected life span of permanent and temporary structures.

Proponents must provide comprehensive information about all best available measures and standards that are proposed to avoid or mitigate potential serious harm.

Residual serious harm to fish is any serious harm to fish remaining after the consideration of the application of proposed measures or standards to avoid or mitigate serious harm.

It is important to clearly describe and quantify residual serious harm because DFO will use this information as part of its decision making on whether an authorization is required under subsection 35(2)(b) of the *Fisheries Act*.

Section F: Submission and Signature

The proponent must sign the application. A signed original of the Request for Review must be provided to the regional DFO office (<http://www.dfo-mpo.gc.ca/pnw-ppe/contact-eng.html>), even if an electronic copy was sent by email. Should the review of your project indicate that residual serious harm to fish is likely, the information provided in the Request for Review document can be referred to in the subsequent Application for an Authorization under Paragraph 35(2)(b) of the *Fisheries Act*.

Section G: Definitions

Emergency circumstance: If your project must be conducted in response to an emergency, you may apply for an Emergency Authorization. The emergency situations are:

- The project is required as a matter of national security
- The project is being conducted in response to a national emergency where special temporary measures are being taken under the federal *Emergencies Act*



- The project is required to address an emergency that poses a risk to public health or safety or to the environment or property.

Fish habitat: Means spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes.

High Water Mark: The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to leave a mark on the land.

Permanent alteration to fish habitat: An alteration of fish habitat of a special scale and a duration that limits or diminishes the ability of fish to use as spawning grounds for nursery or rearing, or as food supply, or as a migration corridor in order to carry out one or more of their life processes.

BC Water Sustainability Act

Apply for a Change Approval or Submit Notification of Instream Work

A change approval is written authorization to make complex changes in and about a stream. A notification is used for specified low risk changes in and about a stream that have minimal impact on the environment or third parties.

Change Approvals

Change approvals are granted with terms and conditions attached. The terms and conditions may relate to the time of year in which you may do the work, and/or to other measures that protect the aquatic ecosystem, the hydraulic integrity of the stream channel and the rights of water users and landowners downstream.

- [Section 11, Water Sustainability Act](#)

Application process

After you submit your application and all required fees and signatures at FrontCounter BC, your application will be reviewed by the Water Manager at the Ministry of Forests, Lands and Natural Resource Operations (FLNR). Applications for change approvals are typically referred to other provincial and federal regulatory agencies for comment during the adjudication process.

Consultation with First Nations, other water users, community groups or other parties may be required if existing rights could be affected by your application.

The Water Manager will notify you when a decision has been made.

Notifications

Notifications are used for specified low risk changes in and about a stream that have minimal impact on the environment or third parties. The work must meet the requirements of the Water Sustainability Regulation, and comply with any conditions set out by a habitat officer in response to a notification.

- [Part 3 of the Water Sustainability Regulation describes the type of work that may be completed under notification](#)

Notification process

You must submit your notification of proposed work to FrontCounter BC a minimum of 45 days before beginning work (submitting more than 45 days ahead of time is recommended). Your

notification will be sent to a habitat officer in the region in which you have proposed to make the change. If you have not heard from the habitat officer within 45 days of FrontCounter BC receiving your notification, you must make sure that your work meets the terms and conditions described in Part 3 of the Water Sustainability Regulation, and you may proceed with the proposed changes.

BC Water Sustainability Act (Part 3 Excerpt)

Part 3 — Changes in and about a Stream (No Change Approval or Authorization)

Definitions

36 (1) In this Part:

"acid-generating rock" means rock that when ground to paste has a paste pH of less than 4.5;

"authorized changes" means the changes in and about a stream described in section 39 (1), (2), (3) or (5) [*authorized changes*];

"clear span bridge" means a single span structure without piers that spans a stream channel from top of bank to top of bank with the bridge abutments outside the stream channel;

"culvert" means one or more pipes, pipe arches or structures, covered with soil and lying below the land surface, used to carry water, but does not include log structures;

"embankment" means a structure made of earth, gravel or similar material raised above the surrounding land surface;

"engineering professional" means a person who is

(a) a professional engineer as defined in the [Engineers and Geoscientists Act](#), or

(b) a holder of a limited licence under the [Engineers and Geoscientists Act](#) that permits the person to practise professional engineering and who is acting within the scope of the limited licence;

"fish-bearing", in relation to a stream, means that the stream has a fish population present at some time during the year;

"habitat officer" means a public service employee or an employee of a government corporation designated in writing by the comptroller as a habitat officer for the purposes of this Part;

"public utility" has the same meaning as in the [Utilities Commission Act](#) and includes a similar utility regulated by Canada.

(2) A habitat officer has the powers of an officer under section 89 [*right of access to land and premises by authorized persons*] of the Act for the purpose of exercising powers and performing duties assigned to the habitat officer under this Part.

Authority to make changes in and about a stream

37 (1) A person may make an authorized change without holding an authorization or change approval authorizing the changes if

(a) the person satisfies the requirements in relation to making changes in and about a stream that are imposed by this Part, and

(b) the changes in and about a stream are made in accordance with this Part, including, if applicable, the terms and conditions specified by a habitat officer under section 44 [*protection of aquatic ecosystem*].

(2) Despite subsection (1), if an engineer considers that an authorized change may have a significant adverse impact on the nature of the stream, including the flow of water in the stream, or the stream channel, the engineer may require that an application for a change approval or an authorization be made in connection with the change.

(3) If an engineer imposes a requirement under subsection (2), the authorized change may not be carried out under this Part.

Notice to habitat officer

38 (1) A person proposing to make an authorized change, other than an authorized change described in section 39 (1) (o) to (s), (2) and (5), must

(a) provide a notice, signed by the person or the person's agent, to a habitat officer of the particulars of the proposal at least 45 days before beginning the authorized change, and

(b) obtain from a habitat officer a statement of the terms and conditions described in section 44 (2) [*protection of aquatic ecosystem*] on which the authorized change can proceed.

(2) A notice under subsection (1) must

(a) be in a form approved by the comptroller, and

(b) include the information specified in section 4 [*applications for change approvals*].

(3) Section 12 [*consents respecting personal information*] applies in relation to a notice under this section.

(4) Despite subsection (1), if a person who has given notice under that subsection is not contacted by a habitat officer within 45 days after the notice is received by a habitat officer, the person may proceed with the authorized change that is the subject of the notice.

(5) A person who makes an authorized change described in section 39 (1) (o) or (p) must

- (a) report the authorized change to a habitat officer within 72 hours after making the change, and
- (b) comply with the terms and conditions, if any, specified by a habitat officer in relation to matters described in section 44 (2).

Authorized changes

39 (1) The following changes in and about a stream are authorized changes:

(a) the installation, maintenance or removal of a culvert for crossing a stream for the purposes of a road, trail or footpath, if all the following conditions are met:

(i) the equipment used for site preparation, or for installation, construction, maintenance or removal of the culvert, is situated in a dry stream channel or operated from the top of the bank;

(ii) if the stream is fish-bearing, the culvert allows fish in the stream to pass up or down stream under all flow conditions;

(iii) the culvert inlet and outlet incorporate measures to protect the structure and the stream channel against erosion;

(iv) debris can pass through the culvert;

(v) the installation, maintenance or removal of the culvert does not destabilize the stream channel;

(vi) the culvert and its approach roads do not produce a backwater effect or increase the head of the stream;

(vii) the culvert capacity is equivalent to the hydraulic capacity of the stream channel or is capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert inlet exceeding the top of the culvert;

(viii) the culvert has a minimum equivalent diameter of 600 mm;

(ix) if the culvert has an equivalent diameter of 2 m or greater, or has a design capacity to pass a flow of more than 6 m³ per second, the culvert is designed by an engineering professional and constructed in conformance with that design;

(x) the culvert is installed in a manner that permits the removal of obstacles and debris within the culvert and at the culvert ends;

(xi) if the changes in and about the stream are related to a right of way, the stream channel, except the portion within the right of way, is not altered;

(xii) embankment fill materials do not, and are unlikely to, encroach on culvert inlets and outlets;

(xiii) the culvert has a depth of fill cover that is at least 300 mm or as required by the culvert manufacturer's specifications;

(xiv) the maximum fill heights above the top of the culvert do not exceed 2 m;

(xv) the culvert is made of materials that meet the applicable standards of the Canadian Standards Association;

(b) the construction, maintenance or removal of a clear span bridge, if all the following conditions are met:

(i) the equipment used for site preparation, or for construction, maintenance or removal of the bridge is situated in a dry stream channel or operated from the top of the bank;

(ii) the bridge and its approach roads do not produce a back water effect or increase the head of the stream;

(iii) the hydraulic capacity of the bridge is equivalent to the hydraulic capacity of the stream channel, or is capable of passing the 1 in 200 year maximum daily flow;

(iv) the height of the underside of the bridge is adequate to provide free passage of flood debris and ice flows;

(v) the bridge is made of materials that meet the applicable standards of the Canadian Standards Association;

(c) the construction or maintenance of a pipeline crossing of a stream, if both the following conditions are met:

(i) the pipeline and associated works are installed in a dry stream channel at a depth so that the top of the pipe is at least 1 m below the lowest elevation of the bed of the stream;

(ii) in the case of an aerial crossing, the crossing is constructed in accordance with the conditions of paragraph (b) for clear span bridges;

(d) the construction, maintenance or removal of a pier or wharf in a stream, if the ebb and flow of water and the movement of material under the influence of waves or currents is not obstructed;

(e) the construction, maintenance or removal by the Crown in right of either Canada or British Columbia of a flow or water level measuring device in a stream;

(f) the construction or removal by the Crown in right of either Canada or British Columbia of a fish fence, fish screen or fish or game guard across a stream if the fence, screen or guard is designed, constructed, maintained and used in a manner that does not obstruct the flow of water in the stream;

- (g) the restoration or maintenance of a stream channel by the government;
- (h) the restoration or maintenance of a stream channel by a municipality or regional district;
- (i) the mechanical or manual cutting of annual vegetation within a stream channel;
- (j) the restoration or maintenance of fish habitat by the Crown in right of either Canada or British Columbia;
- (k) the repair or maintenance of existing dikes or existing erosion protection works to their original state, if the dikes or works were functional during the previous year;
- (l) the construction or maintenance of storm sewer outfalls, if both the following conditions are met:
 - (i) the storm sewer outfall is designed by an engineering professional;
 - (ii) the storm sewer outfall is constructed, maintained and used in a manner that does not obstruct the flow of water in the stream or cause erosion of the stream channel;
- (m) the mechanical or manual control of Eurasian watermilfoil and other invasive species of aquatic vegetation by a land owner, a municipality, a regional district or the Greater Vancouver Water District, or an improvement district or other body, established or continued under an enactment, that has jurisdiction in relation to the control of invasive aquatic vegetation;
- (n) the construction or maintenance of ice bridges, winter fords or snowfills if,
 - (i) in the cases of ice bridges, winter fords or snowfills, only clean ice and snow are used in the construction or maintenance and are removed from the stream channel before ice breakup, and
 - (ii) in the case of ice bridges, any logs, timber and other structural materials used are removed, before ice breakup, without causing a significant risk of harm to public safety, the environment, land or other property;
- (o) the construction or placement, under the direction of the Crown in right of British Columbia, a municipality or a regional district, or an agent of any of them, of erosion protection works or flood protection works during an emergency declared under the [*Emergency Program Act*](#) that involves flooding;
- (p) the clearing of an obstruction from a bridge or culvert by the Crown in right of British Columbia, a municipality or a regional district during a flood, if the obstruction is causing or has the potential to cause a significant risk of harm to public safety, the environment, land or other property;
- (q) the installation or cleaning of drainage outlets;

- (r) the repair or maintenance of the superstructure of a bridge, other than the bridge's foundation;
- (s) the installation, repair, maintenance or removal of a fence, if the fencing materials
 - (i) are not in the stream channel,
 - (ii) do not block debris in the stream channel, and
 - (iii) do not interfere with navigation of the stream;
- (t) maintenance of a minor and routine nature by a public utility of its works;
- (u) the removal of a beaver dam under section 9 of the [Wildlife Act](#), if the removal is carried out in such a manner that downstream flooding and erosion do not occur;
- (v) the construction of a temporary ford for vehicular traffic across a stream, if
 - (i) the construction occurs at a time in the year during which the construction can occur without causing a risk of significant harm to fish, wildlife or the aquatic ecosystem of the stream,
 - (ii) the 1 in 10 year maximum daily flow over the ford is accommodated without the loss of the ford and without eroding the stream channel,
 - (iii) any culvert is designed and installed to pass the average low flow for the period of use,
 - (iv) the stream channel is protected against any anticipated erosion
- (A) for the period of construction and use of the ford, and
- (B) after the ford is removed,
- (v) sediment from approach ditches does not enter the stream,
- (vi) the driveable running surface is erosion-free,
- (vii) the stream remains in its channel,
- (viii) channel debris will pass over the ford, and
- (ix) the ford is removed at the end of the period of use at a time when the removal can proceed without causing a risk of significant harm to fish, wildlife or the aquatic ecosystem of the stream;
- (w) the construction of a temporary diversion around or through a worksite for the purposes of constructing or maintaining bridge abutments, constructing or maintaining piers other than bridge piers, maintaining bridge piers or constructing works authorized under this section, if

- (i) the size of the worksite is minimized,
- (ii) any pumps, pipes or conduits used to divert water around or through the worksite are sized to divert the 1 in 10 year maximum daily flow for the period of construction,
- (iii) any pump or intake withdrawing water from a fish-bearing stream is screened to prevent potential loss of fish due to entrainment or impingement,
- (iv) any cofferdams used to isolate successive parts of the construction occurring at the worksite are designed by an engineering professional and constructed in accordance with that design,
- (v) the natural channel remaining outside of any cofferdams is adequate to pass the 1 in 10 year maximum daily flow for the period of construction,
- (vi) the flow of water diverted around the worksite using ditches remains within the stream channel,
- (vii) any ditches used to divert the flow of water around the worksite are designed and constructed to divert the 1 in 10 year maximum daily flow around or through the worksite and are protected from any anticipated erosion for the period of construction and use of the ditch, and
- (viii) any ditches are completely backfilled and the area returned as closely as possible to the state that existed before the changes in and about the stream were made;
- (x) the construction and maintenance of a dry hydrant in a stream if
 - (i) the dry hydrant is designed by an engineering professional, and
 - (ii) the dry hydrant is constructed, maintained and used in a manner that does not cause erosion of the stream channel or sedimentation in the stream.
- (2) A change in and about a stream to which a standard or regulation under the [Forest and Range Practices Act](#) applies is an authorized change if
 - (a) the change is made by
 - (i) a municipality, a regional district or another person who
 - (A) holds an agreement or road use permit under the [Forest Act](#), an agreement under the [Range Act](#) or a special use permit under the [Forest Practices Code of British Columbia Act](#), or
 - (B) is authorized under the [Coal Act](#), the [Geothermal Resources Act](#), the [Mining Right of Way Act](#) or the [Petroleum and Natural Gas Act](#) to construct or modify a road, or
 - (ii) the Crown in right of British Columbia, and

(b) the person making the change complies with the [Forest and Range Practices Act](#) and the regulations and standards established under that Act.

(3) A change in and about a stream is an authorized change if

(a) the change is made by a person who holds a permit under section 10 of the [Mines Act](#), and

(b) the person making the change complies with

(i) Part 9 of the Health, Safety and Reclamation Code for Mines in British Columbia, and

(ii) the conditions included in the permit respecting changes in and about the stream.

(4) For the purposes of section 38, an application for a permit to carry out exploration activities under section 10 of the [Mines Act](#) constitutes notice of the change.

(5) A change in and about a stream is an authorized change if

(a) the activities in relation to which the change in and about the stream is to be made are authorized by a permit issued under the [Oil and Gas Activities Act](#), and

(b) the change in and about the stream is made in accordance with

(i) applicable regulations under the [Oil and Gas Activities Act](#), and

(ii) the conditions respecting changes in and about the stream included in the permit.

(6) If a person making changes in and about a stream under subsection (5) causes damage to an aquatic ecosystem, which damage is not authorized under the [Oil and Gas Activities Act](#) or the permit referred to in that subsection, the person must

(a) report the damage to the Oil and Gas Commission within 72 hours after the damage is caused, and

(b) take any action ordered under the [Oil and Gas Activities Act](#) by an official, as defined in that Act, to repair the damage and restore the aquatic ecosystem.

[am. B.C. Reg. 130/2017, s. 4.]

Limitation on making authorized changes under this Part

40 A person must not, for any purpose related to making an authorized change in accordance with this Part, enter onto any private land or premises, or use any privately owned works, unless the person has the written consent of the owner of the land, premises or works.

Obligations of persons making authorized changes under this Part

41 (1) A person making or proposing to make an authorized change, other than an authorized change described in section 39 (5) [*authorized changes*], in accordance with this Part must, on request of an engineer, officer or habitat officer, provide the information that the engineer, officer or habitat officer requires to assess the impact of the authorized changes on the nature of the stream or stream channel.

(2) A person making an authorized change in accordance with this Part must, once the person begins making the change, complete the authorized change without delay unless the delay is necessary to preserve the nature of the stream or stream channel.

(3) A person making an authorized change in accordance with this Part must ensure that the authorized change is designed, constructed and maintained so that the change does not pose a significant risk of harm to public safety, the environment, land or other property.

Failure to comply with this Part when making authorized change

42 (1) If a person purporting to make an authorized change in accordance with this Part fails to comply with this Part, the person must

(a) report the non-compliance to the closest regional office of the minister's ministry within 72 hours after the non-compliance,

(b) take the measures, if any, specified by an engineer to remedy the effects of the non-compliance, and

(c) comply with the terms and conditions, if any, specified by a habitat officer in relation to matters described in section 44 (2) [*protection of aquatic ecosystem*] to remedy the effects of the non-compliance.

(2) Compliance with subsection (1) does not relieve a person of any other consequences that may be imposed under the Act for non-compliance.

Protection of water quality

43 (1) A person making an authorized change in accordance with this Part must ensure that

(a) making the authorized change does not cause a significant adverse impact on the ambient water quality of the stream,

(b) there is no disturbance or removal of stable natural materials and vegetation in and about the stream that contribute to stream channel stability except as authorized under this Part and in accordance with any terms and conditions specified by a habitat officer under section 44 (2) [*protection of aquatic ecosystem*],

(c) temporary material, fill, bridges, culverts, pumps, pipes, conduits, ditches or other structures used to assist in the construction of any works are constructed and maintained only for the period of construction and are removed on completion of the works,

(d) all cast-in-place concrete and grouting is completely separated from fish-bearing waters for a minimum of 48 hours,

(e) rock from acid-generating rock formations is not used for construction, and

(f) on completion of the authorized change the stream is restored to the state that existed before the authorized change was made.

(2) Subsection (1) (c) does not apply in relation to a person making an authorized change described in section 39 (5) [*authorized changes*].

Protection of aquatic ecosystem

44 (1) In this section, "**timing window**", in relation to a stream, means a period of the calendar year, specified under this section by a habitat officer, during which changes in and about the stream can be made without causing a risk of significant harm to fish, wildlife or the aquatic ecosystem of the stream.

(2) A habitat officer may provide to a person carrying out or proposing to carry out an authorized change in accordance with this Part, for the protection of an aquatic ecosystem, a written statement containing terms and conditions applicable to the person in relation to the following:

(a) the timing window during which the change may be made;

(b) the minimum instream flow or the minimum flow of water that must remain in the stream while the change is being made;

(c) the removal of material from the stream or stream channel in connection with the change;

(d) the addition of a substance, sediment, debris or material to the stream or stream channel in connection with the change;

(e) the salvage or protection of fish or wildlife while the change is being made or after the change has been made;

(f) the protection of natural materials and vegetation that contribute to the aquatic ecosystem or stream channel stability;

(g) the restoration of the worksite after the change has been made.

(3) If a person making an authorized change in accordance with this Part, other than an authorized change described in section 39 (5) [*authorized changes*], causes damage to an aquatic ecosystem, the person must

(a) report the damage to a habitat officer within 72 hours after the damage is caused, and

(b) repair the damage and restore the aquatic ecosystem to the state that existed before the damage was caused, or as directed by the habitat officer.

(4) Compliance with subsection (3) does not relieve a person of any other consequences that may be imposed under the Act in relation to the damage.

Protection of other water users

45 (1) A person making an authorized change in accordance with this Part, other than a change described in section 39 (1) (o) to (s), (2) or (5) [*authorized changes*], must ensure that the water supply and works of persons who are lawfully diverting or using water under the Act will not be adversely affected.

(2) Despite subsection (1), if the water supply of persons who are lawfully diverting or using water under the Act may be adversely affected by making the authorized change, the person proposing to make the authorized change, other than a change described in section 39 (1) (o) to (s), (2) or (5), must

(a) give 3 days' notice to those persons before starting to make the change, and

(b) provide an adequate supply of water to those persons while making the change, if required by those persons.



Kootenay-Boundary *Water Sustainability Regulation* Notification Terms and Conditions

The terms and conditions described within this document do not indicate compliance with other provincial, federal or municipal requirements. The proponent must be aware of, and comply with, obligations under the federal *Fisheries Act*, *Species at Risk Act*, *BC Wildlife Act*, *BC Riparian Areas Protection Act* (where applicable), *Local Government Act* or any other legislation related to the proposed works.

General Information

Only changes in and about a stream of the kind listed in Part 3 of the *Water Sustainability Regulation* (http://www.bclaws.ca/civix/document/id/complete/statreg/36_2016) can proceed as a Notification. Changes must occur in accordance with requirements of the regulation including any terms and conditions specified by a Habitat Officer (i.e., this document).

A proposed ‘change in and about a stream’ not listed in Part 3, Section 39 will require a separate Approval under the *Water Sustainability Act*.

Under the provisions of the regulation, a government Habitat Officer has 45 days following receipt of your application by the Ministry of this Notification:

- to request additional information from you; and
- to specify additional terms and conditions specific to your proposal.

A person making a change in and about a stream under this regulation, other than under section 39(1)(o) to (s) or 39(2) or 39(5), must then make that change in accordance with the regulation and any terms and conditions specified by the Habitat Officer. This includes the terms and conditions described below or as specified subsequently within 45 days of Habitat Officer receipt of this notification.

If you are not contacted by a Habitat Officer within 45 days of submitting your *Water Sustainability Act* application, you may proceed with your proposed changes in and about a stream.

It is recommended that copies of the following documents be kept or posted at the work site during implementation of the works so they may be shown to a Ministry official upon request:

1. A copy of your Notification letter, if received
2. A copy of your application
3. A copy of this document.
4. A copy of any impact mitigation plan(s) if developed by a Qualified Professional as described above.
5. A copy of any other documentation pertinent to the works.

Notification Terms and Conditions

44 (2) A habitat officer may provide to a person carrying out or proposing to carry out an authorized change in accordance with this Part, for the protection of an aquatic ecosystem, a written statement containing terms and conditions applicable to the person in relation to the following:

a) the timing window during which the change may be made;

- i. If works are proposed on a stream that contains fish (fish-bearing), all works must be completed during the applicable timing window to protect fish, wildlife or the aquatic ecosystem within that stream. Timing windows represent periods during which works can occur to ensure the lowest risk to environmental and wildlife values. For the Kootenay Boundary Region, timing windows are determined by the geographic location of the works and the species of fish found at the site (https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/working-around-water/work_window_kootenays.pdf)
- ii. Worksites located in the *Delayed Instream Work Window Zone* are typically at higher elevations. Colder temperatures associated with higher elevations often delay the lifecycles of resident fish species, which is why the timing windows in these areas occur later in the year.
- iii. If any one of the following conditions is met, the timing window is not applicable:
 - a. If the stream channel is naturally dry (no flow) or frozen to the bottom at the worksite and the instream activity will not adversely impact fish habitat (e.g. result in the introduction of sediment into fish habitat).
 - b. If construction of a winter crossing is proposed and such works does not adversely impact the stream channel (including stream banks), fish habitat or fish passage.
 - c. The structure does not encroach below the high water mark, no work is proposed below the high water mark of a fish stream, and measures will be taken to prevent the delivery of sediments or contaminants into fish habitat.
 - d. You retain a Qualified Professional (such as a Registered Professional Biologist) to prepare a prescription that provides specific measures to comply with to prevent impacts to fish or fish habitat. This document must be submitted to the Habitat Officer via Front Counter B.C. with reference to your Notification file number.
 - e. Work is in a non-fish stream and measures will be taken to prevent the delivery of sediments into downstream fish habitat or the stream is not fish-bearing and discontinuous with no connection to downstream fish habitat.
 - f. If you are uncertain if the stream on which works will occur is fish bearing, please consult the Fisheries Inventory Data Queries: <http://gov.bc.ca//fish-inventory-data-queries>. The lack of fish records for a particular area does not necessarily indicate fish absence.

b) the minimum instream flow or the minimum flow of water that must remain in the stream while the change is being made;

- i. The original rate of water flow in the stream (existing prior to commencing work) must be maintained upstream and downstream of the worksite during all phases of instream activity associated with the work.
- ii. Any post-application changes to the proposed works in and about a stream that includes the alteration or diversion of stream flows will require a formal *Water Sustainability Act* Approval.

c) the removal of material from the stream or stream channel in connection with the change;

- i. The stream channel width must not change as a result of the work.
- ii. The permanent removal of stable, naturally occurring material from the stream or stream channel must be minimized and completed only as necessary to make the change in accordance with Part 3 of the *Water Sustainability Regulation*.

d) the addition of a substance, sediment, debris or material to the stream or stream channel in connection with the change;

- i. The stream channel width must not change as a result of the work.
- ii. Any work associated with the proposed changes in and about a stream must not cause stream channel instability or increase the risk of sedimentation into the stream.
- iii. During works, erosion and sediment control materials must be available onsite at all times and must be installed if sedimentation is likely to occur into the stream (e.g. silt fences, straw bale dikes, settling basins, ditch blocks, or filter cloth). A contingency plan must be developed outlining the measures to be taken by workers when carrying out any work to control erosion and sediment. All erosion and sediment control devices must be regularly inspected and maintained to remain functional during works. These devices and any accumulated sediment must be removed from the site after the completion of works.
- iv. Soil disturbance must not occur in heavy rain conditions and any soil removed must be placed in a location that ensures that sediment or debris does not enter the stream.
- v. Work must be suspended if the sediment control measures are ineffective and result in the introduction of sediment into the stream. In the event of sediment release into a stream, proponents are directed to immediately stabilize and mitigate the release, and then notify the Habitat Officer.
- vi. There must be no deposition of concrete materials into the stream or any watercourse through spillage, hosing off, rain, cleaning of tools, etc. All cast-in-place concrete and grouting must be completely separated from any stream or watercourse for a minimum of 48 hours if ambient air temperature is greater than 0°C or 72 hours if ambient air temperature is less than 0°C.
- vii. The only preservative that will be accepted for use on materials that could come in contact with water is copper chromate arsenate (CCA; wood preservative). Application of CCA must be upland, well away from any stream or watercourse. Application of treatment solutions must never be carried out on or over water. The use of creosote is not permitted under any circumstances.
- viii. Bridge abutments or other structures and materials must not be placed within the stream channel width. Rip-rap must be keyed into the stream bank and must not constrict the natural stream channel width.
- ix. Road material and gravel on a bridge deck or culvert fill must be prevented from entering the stream.
- x. Machinery must operate from outside the wetted perimeter of the stream (e.g. from the top of the bank or from within a naturally dry stream channel).

- xi. Any equipment used in conducting work must be in good mechanical condition. When operating in close proximity to the wetted perimeter of a stream, the operator must prevent entry of any substance (i.e., fuel, hydraulic fluid), sediment or debris into the stream. Failure to comply may result in a remediation order.
- xii. Fueling and servicing of vehicles and equipment must occur away from the streams and any spills must be properly cleaned up and reported as required by the *Spill Reporting Regulation* (B.C. Reg. 263-90). Every effort must be made to contain the spill and prevent adverse impacts to the environment.
- xiii. Any materials, such as riprap or gabion rock, used for stream bank armouring must be clean and not contain substances that could be harmful to fish, wildlife or the aquatic ecosystem of the stream.

e) the salvage or protection of fish or wildlife while the change is being made or after the change has been made;

- i. All activities in and about streams must be conducted in a manner that does not cause harm to fish or fish habitat and species at risk or their habitat.
- ii. All water pumps used within fish-bearing streams are to be fitted with screens to prevent fish entrainment. Details of required mesh sizes can be found at www.dfo-mpo.gc.ca/Library/223669.pdf
- iii. Open bottom structures such as clear span bridges or open bottom culverts are preferred on all fish bearing streams. If proponents wish to install a closed bottom culvert (e.g. round or elliptical) on a fish bearing stream, they must ensure that upstream fish passage through the culvert is maintained. In addition, closed bottom culverts must be embedded in order to provide a natural substrate such that there is no net loss of fish habitat. To achieve this, proponents must comply with the requirements detailed in Section 3.2 of the 2012 *Fish-Stream Crossing Guidebook*. See weblink in Best Management Practices section (below).
- iv. Culvert flow capacity after embedment must be equivalent to the hydraulic capacity of the stream channel or it must be capable of passing the 1 in 200-year maximum daily flow (as per Section 39(1)(a) (vii) of the WSA).

f) the protection of natural materials and vegetation that contribute to the aquatic ecosystem or stream channel stability;

- i. The disturbance of natural materials (e.g. embedded logs) and stream bank vegetation must not occur or be minimized as much as possible. Any trees at the work site or within the clearing width area adjacent to streams that must be removed must be felled away from the stream to the fullest extent possible.

g) the restoration of the worksite after the change has been made.

- i. Any areas that are disturbed during the work (such as exposed soil) must be promptly restored to the pre-disturbance (or better) condition. All disturbed soils adjacent to the stream shall be re-vegetated with a suitable mix of grass, shrubs and/or trees immediately after the completion of

works, or as soon as site conditions are conducive to growth.

Additional Information

It is the responsibility of persons intending to carry out changes in and about a stream, as described under Part 3 of the *Water Sustainability Regulation* to:

- Ensure that all sections of the Notification form are properly completed;
- Comply with provincial, federal and municipal requirements; and
- Obtain the approval of the landowner for proposed changes and related works or activities intended to take place on private land or premises or to use any privately owner works, before proceeding.

In the event of non-compliance with the requirements of the regulation (including habitat officer terms and conditions), it is the responsibility of persons carrying out changes in and about a stream to:

- Report non-compliance with the regulation within 72 hours and then to take measures to remedy the non-compliance, as may be specified by a Water Sustainability Act Engineer, as well as to comply with any additional terms and conditions specified by the Habitat Officer; and
- Report damage to an aquatic ecosystem within 72 hours to a Habitat Officer and then to restore and repair the habitat to the state that existed before the damage was caused or as directed by the Habitat Officer.

Best Management Practices

Additional guidance when proposing works in and about a stream can be found at:

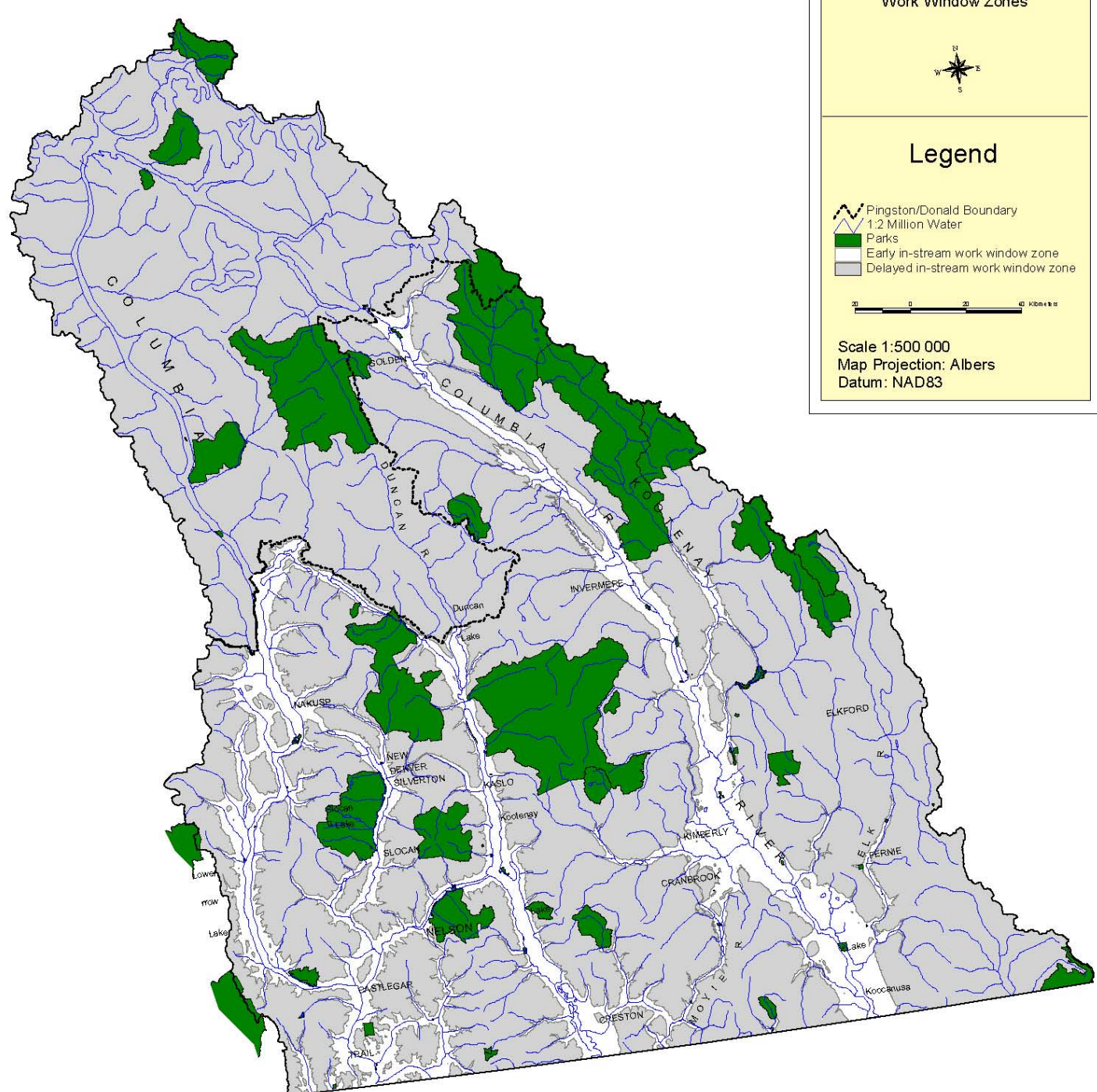
- *Standards and Best Practices for Instream Works*
<http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>
- *Fish Stream Crossing Guidebook*
https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/resource-roads/fish-stream_crossing_web.pdf
- *BC Guidelines and Best Management Practices*
<https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/natural-resource-standards-and-guidance/best-management-practices>

Kootenay Region (Region 4) Periods of Least Risk for Instream Works by Fish Species																
	April		May		June		July		August		September		October		November	
	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30
Bull Trout/ Dolly Varden																
Rainbow Trout																
Rainbow Trout *										20th						
Cutthroat Trout																
Cutthroat Trout *										20th						
Kokanee																
Kokanee West Arm **																
Mountain Whitefish																
Burbot																
Brook Trout																

The shaded area on this table represents the general time period or ‘window’ in which changes in and about a stream would cause the least risk of impact to specific fish species in the Kootenay Region. All terms and conditions related to the protection of fish and fish habitat must be employed even when works are conducted within the appropriate instream work window. Knowledge of fish behaviour in specific streams, unusual weather, natural phenomena, specific events, unusual circumstances or activities that do not create disturbance below the high water mark in fish bearing streams could allow for work outside these windows. If works in fish bearing streams that involve activities that create disturbance below the high water mark must be conducted outside of these windows, the services of a Qualified Professional will be required (refer to “Terms and Conditions for Changes In and About a Stream Specified by Ministry of Environment (MoE) Habitat Officers, Kootenay Region (Region 4)” dated June 2009). In the Kootenay Region, the “delayed instream work window zone” is designated as those streams or portions thereof that are within the light shaded areas in the attached “Figure 1. Kootenay Region Rainbow/Cutthroat Trout Instream Work Window Zones” (dated January 2, 2004) and are generally greater than 1100 metres above sea level, with the exception of streams north of the “Pingston/Donald Boundary” which are all within the delayed instream work window zone regardless of elevation (refer to attached Figure 1 for detail).

* Applicable instream work window where these species occur within the “Delayed Instream Work Window Zone” as shown in the attached Figure 1.

** The “West Arm” is inclusive of the “Upper West Arm” and the “Lower West Arm” of Kootenay Lake as defined in the “Freshwater Fishing Regulations Synopsis” (<http://www.env.gov.bc.ca/fw/fish/regulations/>).



BRITISH COLUMBIA

Kootenay Region Rainbow/Cutthroat Trout In-Stream Work Window Zones

Legend

- Pingston/Donald Boundary
- 1:2 Million Water
- Parks
- Early in-stream work window zone
- Delayed in-stream work window zone

Scale 1:500 000
Map Projection: Albers
Datum: NAD83

January 2, 2004

Figure 1. Kootenay Region Rainbow/Cutthroat Trout In-Stream Work Window Zones

Privy and Vault Privy Guideline

Privies

A privy (also called an outhouse or pit toilet) is generally not considered to be a suitable method of disposing human waste. An improperly constructed or located privy can cause a health hazard because animals and insects can spread disease from the waste material back to humans. Nitrates from sewage can seep into well water contributing to methemoglobinemia (blue-baby syndrome) or into swimming water. Additionally, the waste matter can contribute to the polluting of our lakes and creeks with phosphorous and nitrogen causing eutrophication and algal blooms.

There is no regulation in BC describing how or where to construct a privy, therefore a Public Health Inspector will not issue a permit and will not inspect the privy construction.

If a privy causes a health hazard, the Public Health Inspector has authority under the Health Act and Sanitary Regulations to order it corrected.

A privy is less likely to cause a health hazard if these guidelines are followed.

When is a privy suitable?

- Privies are constructed where water under pressure is not available or practical.
- The water table must be at least 1.6 to 2.1 metres below the surface of the ground in silty or clay soils, or 4 to 4.5 metres below the surface in sandy soils, deeper in gravel.

Where should a privy be placed? A minimum of:

- 30m from a lake, creek, pond, river, etc.
- 30m from wells
- 3m from property boundary
- 10m from own house/cottage
- 15m from neighbour's house/cottage

Please note that a number of non vault privies are periodically pumped out by pumper trucks and therefore should be accessible to these trucks.

How should a privy be constructed?

- See attached plans.
- Excavate pit 1 to 1.5 metres deep. Crib sides to prevent sloughing.
Bottom of pit must be:
 - at least 60cm above water table in silty or clay soil.
 - at least 3m above water table in sandy soil, more in gravel.
- Place privy structure so pit is not accessible or visible from the exterior.
- Mound excavated earth so rain water and runoff don't enter the pit.
- Screen all openings in outhouse building and put self-closing device on the door to exclude insects.

- If water is hauled inside a cabin/building by bucket, then one sink can have a waste pipe that empties into the privy pit. Alternatively, wash water can be collected in a bucket and dumped into the privy. No other discharges should be connected to a privy.
- A construction template is available.

Vault Privies

If the above construction guidelines cannot be met due to water table or setback to water, consider constructing a vault privy. A vault privy must be accessible for approved septic pumping truck to empty periodically. The location should be at least:

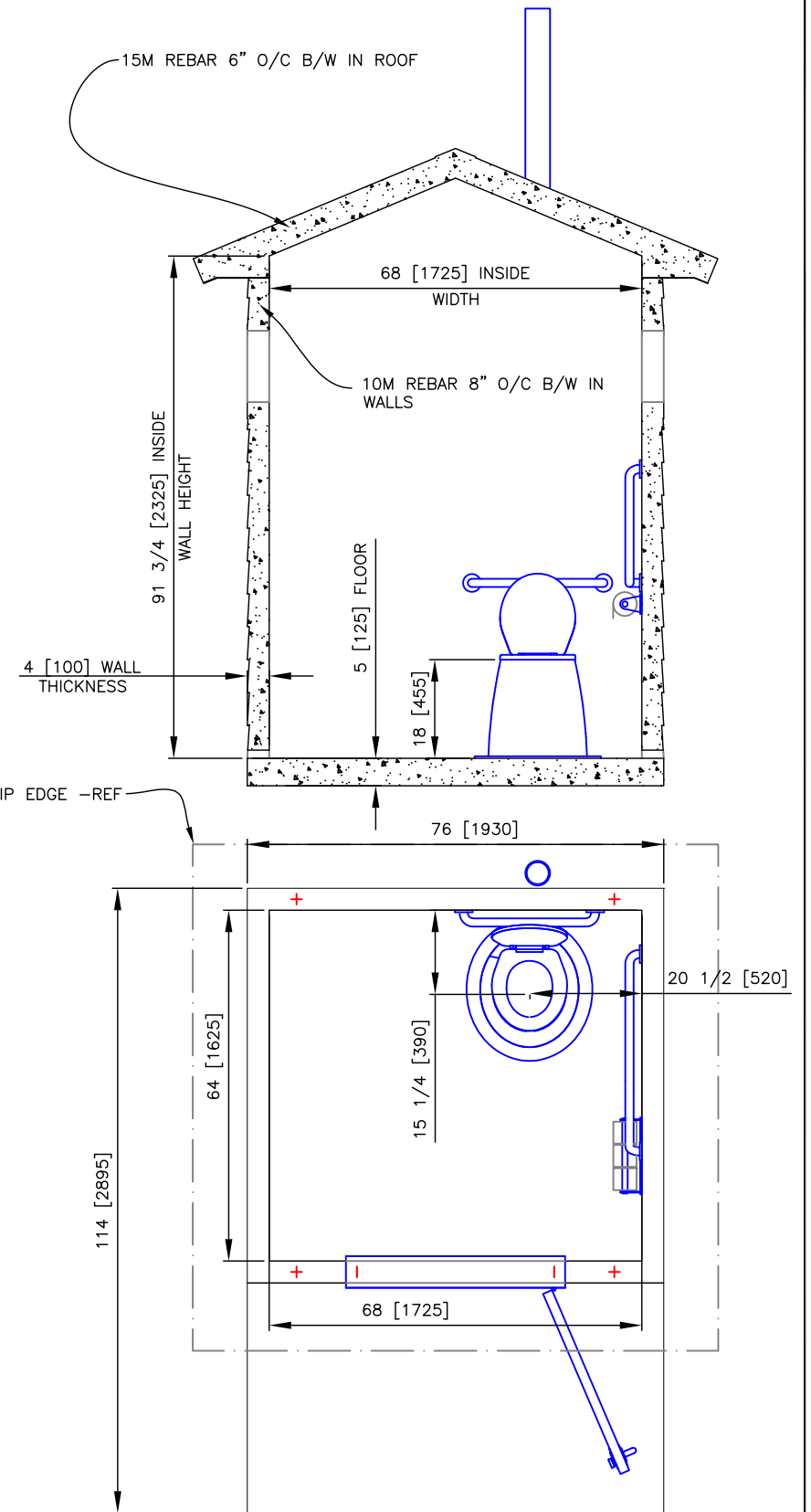
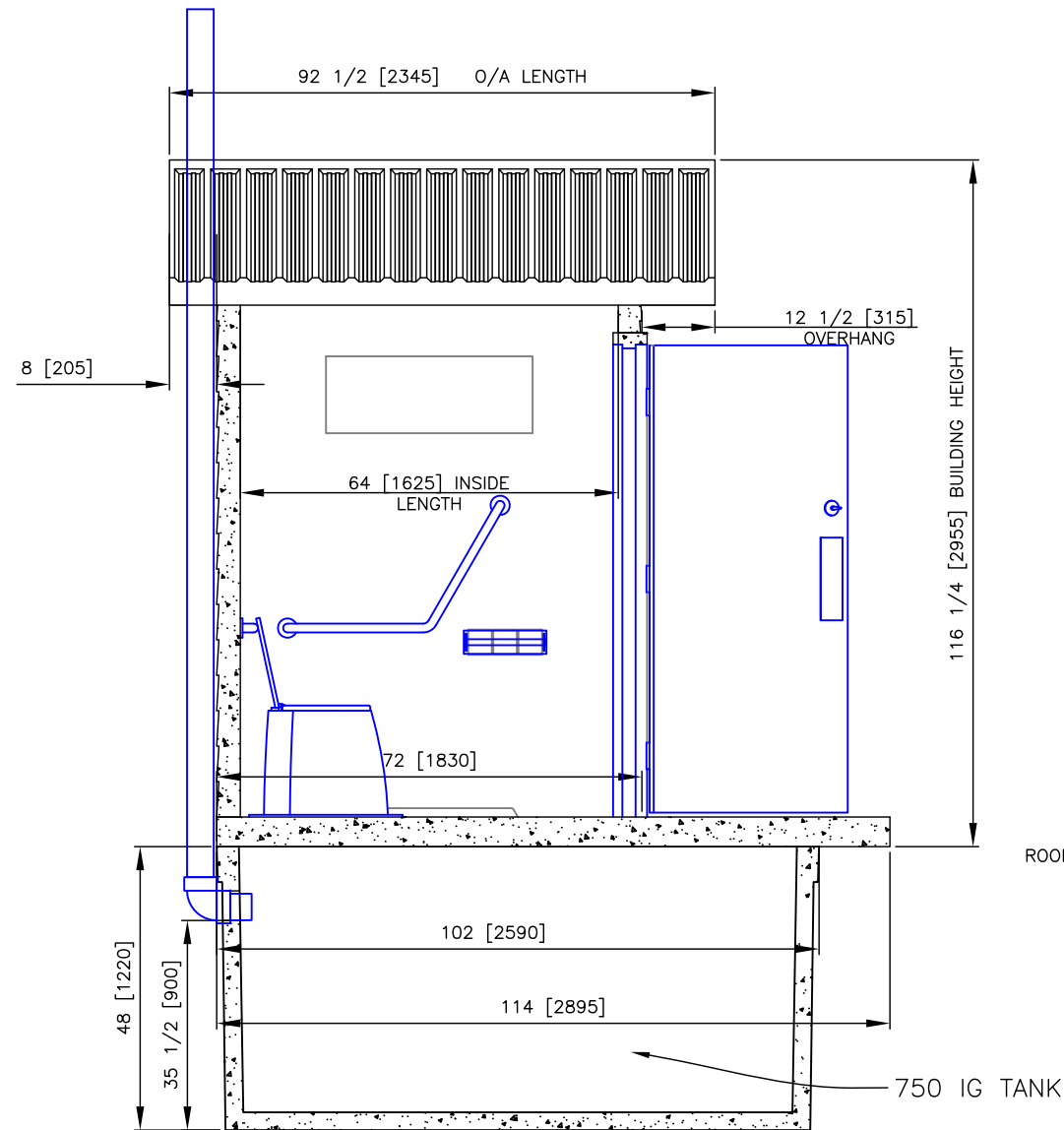
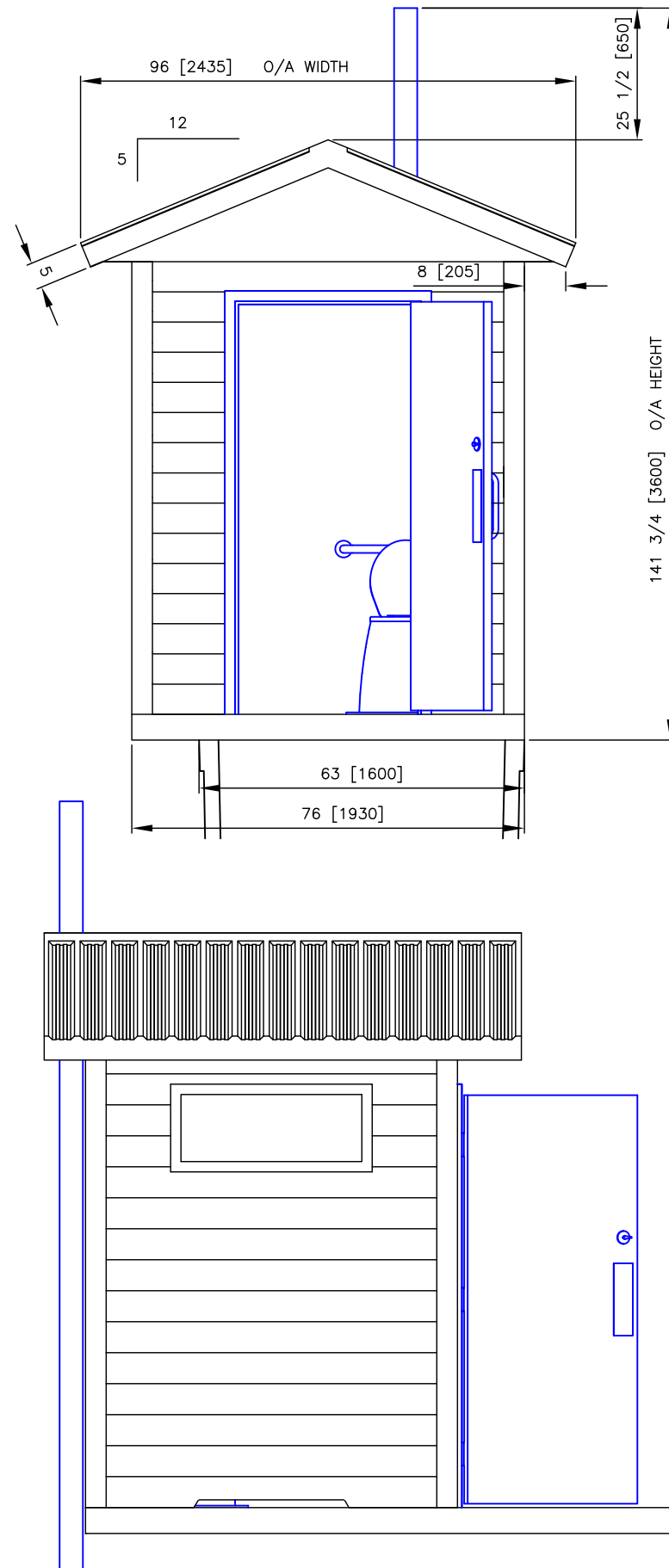
- 15m from lake, stream, etc.
- 15m from wells
- 3m from property boundary
- 10m from own house/cottage
- 15m from neighbour's house/cottage
- the bottom of the vault should be above the highest seasonal water table

Please note: Two privy construction templates are attached. Larger and clearer versions are available.

If you have any questions please contact your nearest Public Health Inspection office.



Appendix D – Facility Information



GENERAL NOTES

Precast concrete shall be exposure Class S and meet min compressive strength of 30MPa

Cement: Type GU
Air Category: 4.0% - 7.0%
Aggregate: CSA/CAN A23.4 Maximum Size: 20mm
Admixtures: CSA/CAN A23.4
Reinforcing: Grade 400W CSA G30.18-09
Inserts/Embeds: As noted in drawing details

Manufacture of precast concrete units shall be in accordance with specification CSA A23.4

** LEKO PRECAST LTD SHALL NOT BE RESPONSIBLE FOR ANY INSTALLATION PRACTICES FOLLOWED ON-SITE UNLESS PERFORMED BY LEKO PRECAST LTD **



JOHNNY TOILET BUILDING, short roof w/vault			
DRAWN BY: JA	CHECKED BY:	APPROVED BY:	DATE: DECEMBER 22, 2015
ASSEMBLY DWG.	PREVIOUS DWG.	DRAWING NO.	REVISION
SCALE: 3/8"=1'-0" ISOMETRIC:			P2001
DO NOT SCALE THIS DRAWING			

THE "JOHN" PIT TOILET BUILDING

Model Number : PTR-6 (Regular) PTR-6H (Handicap)

Wishbone
site furnishings

PRODUCT SPECIFICATIONS

Produits Re-Plast Avantage +™ Recycled Plastic Slats

This product will not rot, splinter, or warp reducing maintenance costs over the life of the

product.

Colours Available: Black, Green, Harbour Grey, Light Grey, Redwood, Sand, Walnut

Durable Powder Coated Cast Aluminum Frame

Standard colours: Black Super Texture, Bostwick Textured Brown, Cardinal Textured Black, Cardinal Textured Grey, Cold Textured Brown, Lakeside Textured Sand, Oil Rub Textured Bronze, Pewter, Bengal Textured Silver

Long Lasting Stainless Steel Hardware

Heavy Duty Door Hinge Hardware

Super Durable UV stabilized "Suntuf" Polycarbonate Roof

Adjustable Aluminum Vent Stack Support

Regular Ships unassembled on 84"L x 48"W x 28"H Pallet

Handicap Ships unassembled on 84"L x 72"W x 36"H Pallet

Two people can assemble easily in less than 1 hour



Regular PTR-6

Wheel Chair Accessible (PTR-6H)

DESIGNER NOTES

The "John" Outhouse addresses many of the issues typically associated with outdoor latrine buildings for every user group. Most outhouses are brought to semi-remote locations and take considerable time to assemble. The John was strategically designed as a modular system that could be put together with minimal tools and time. The tongue-in-groove recycled plastic lumber slats fit seamlessly into channels with only a few hidden fasteners (also making the unit theft and tamper proof). The other benefit of plastic lumber is significant odour resistance. Traditional outhouses made of wood absorb moisture and odours that are virtually impossible to eliminate. Conversely, recycled plastic lumber will not rot or take in moisture (any by extension those bad smells) and can be sprayed with bleach or disinfectant without damage. After cleaning excess water simply drains out the sides from the raised walls. Lack of lighting has also been addressed with a translucent one-piece roof. The roof slides onto the top of the outhouse effectively "capping" the entire unit and provides ample protection from the elements while still allowing in light. From a maintenance perspective it is easy to transport, build, clean, and maintain. From a user perspective it is bright, open, and possesses amazing odour control. Wheel Chair Accessible Model available.

CUSTOMIZED SOLUTIONS

Custom Powder Coating (Setup Charges May Apply)

Wheel Chair Accessible Model (PTR-6H)

Toilet, urinal, toilet paper dispenser, sanitizer dispenser and vent stack are not included. Can be provided if requested.

Corner Urinal in White Model #WCU-14

PRODUCT DIMENSIONS

PTR-6	Total Height	92 inches / 2337mm
	Depth	55 inches / 1397mm
	Width	48 inches / 1219mm
	Weight	800lbs / 363kg
PTR-6H	Total Height	95.5 inches / 2426mm
	Depth	68 inches / 1727mm
	Width	68 inches / 1727mm
	Weight	1100lbs / 499kg

RECYCLED CONTENT

65% RECYCLED CONTENT BY WEIGHT
100% RECYCLABLE

AVAILABLE RECYCLED PLASTIC LUMBER COLOURS



Black

Green

Harbour Grey

Light Grey

Redwood

Sand

Walnut



100% Canadian Made

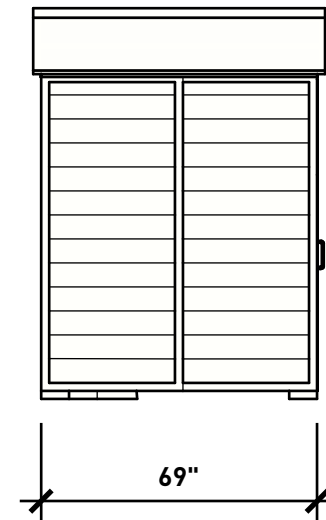
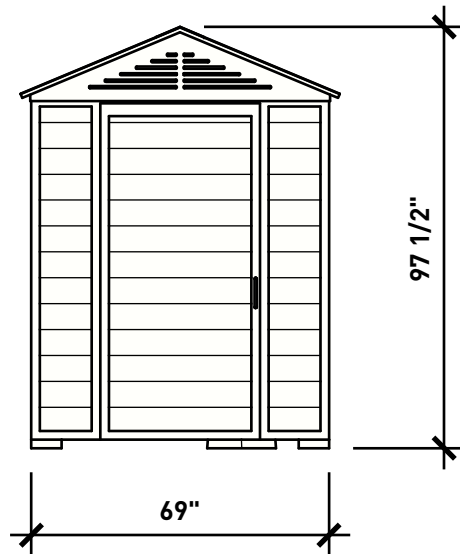
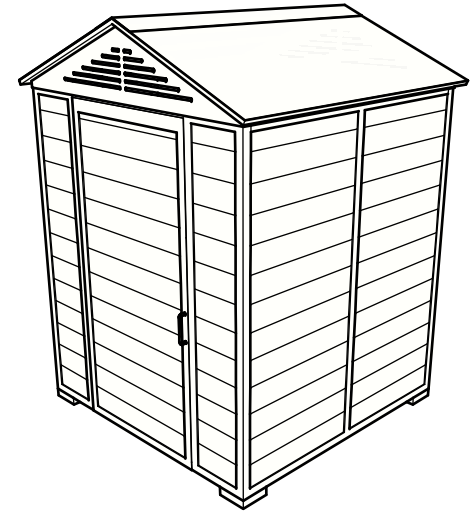
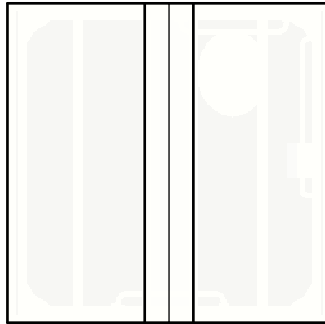


Wishbone Ltd. provides an extended
10 year limited warranty from the date
of invoice.



Visit us online at
www.Wishboneltd.com

Wishbone Site Furnishings | #109-27090 Gloucester Way | Langley, BC CANADA V4W 3Y5
1.866.626.0476 sales@wishboneltd.com



Wishbone
site furnishings

WISHBONE SITE FURNISHINGS LTD
210-27090 GLOUCESTER WAY LANGLEY, BC

DWG. TITLE: HANDICAP ACCESSIBLE PIT TOILET BUILDING
REVISION: 15/02/17 R:00

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ALUMINUM

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DWSBHOH15021700

DRAWN BY:
BRAD SULLIVAN

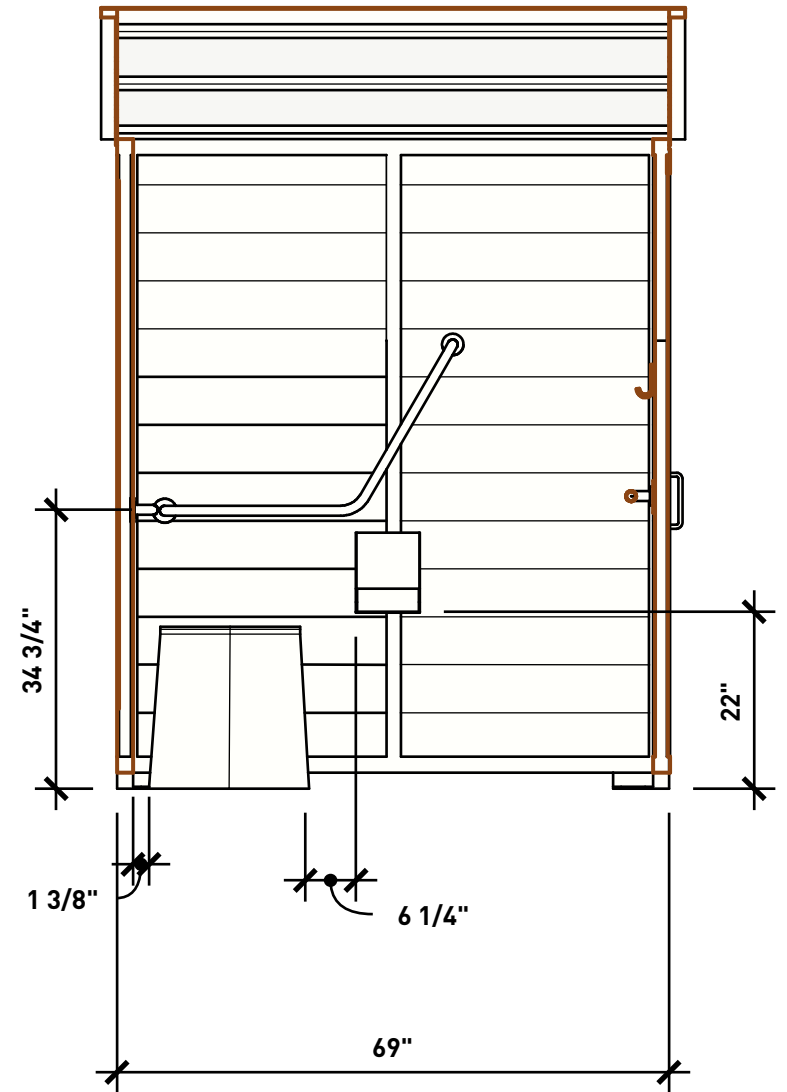
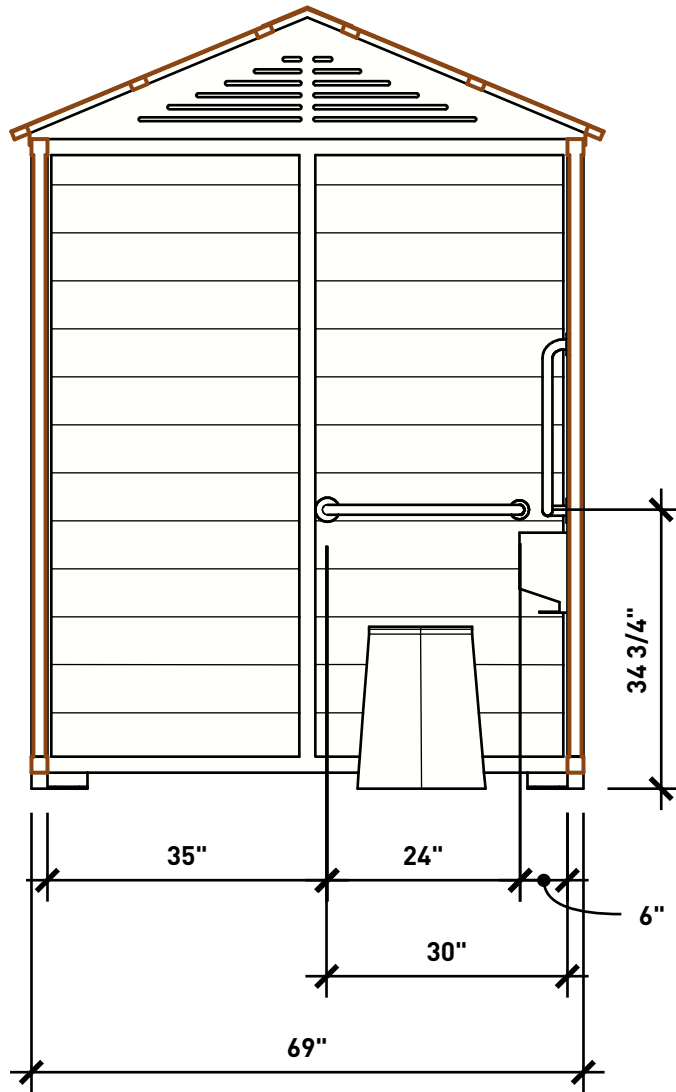
PATTERN NO.
N/A

MODEL NO.
PTR-6H

SCALE:
AS SHOWN

SHEET:
1 OF 4

DATE:
15 FEB 17



Wishbone
site furnishings

WISHBONE SITE FURNISHINGS LTD

210-27090 GLOUCESTER WAY LANGLEY, BC

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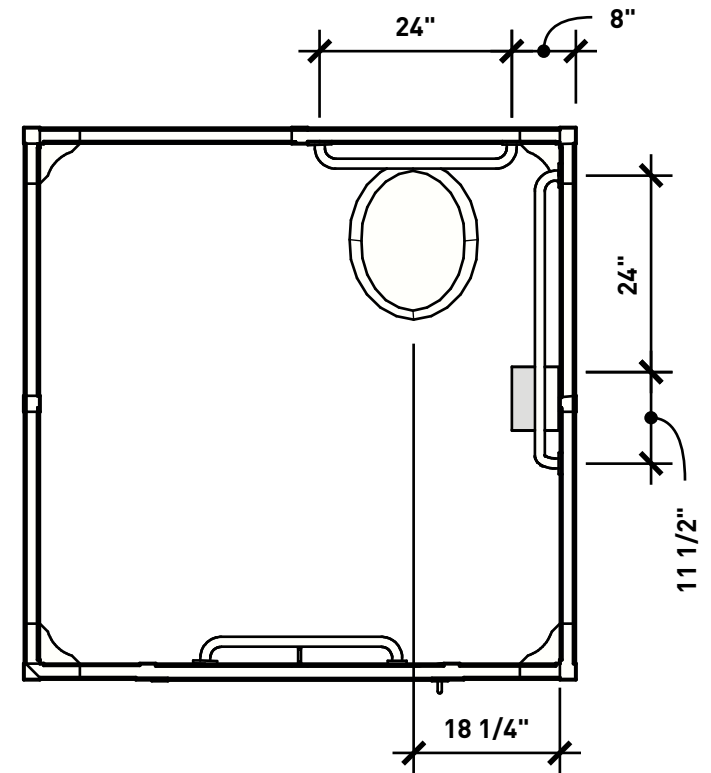
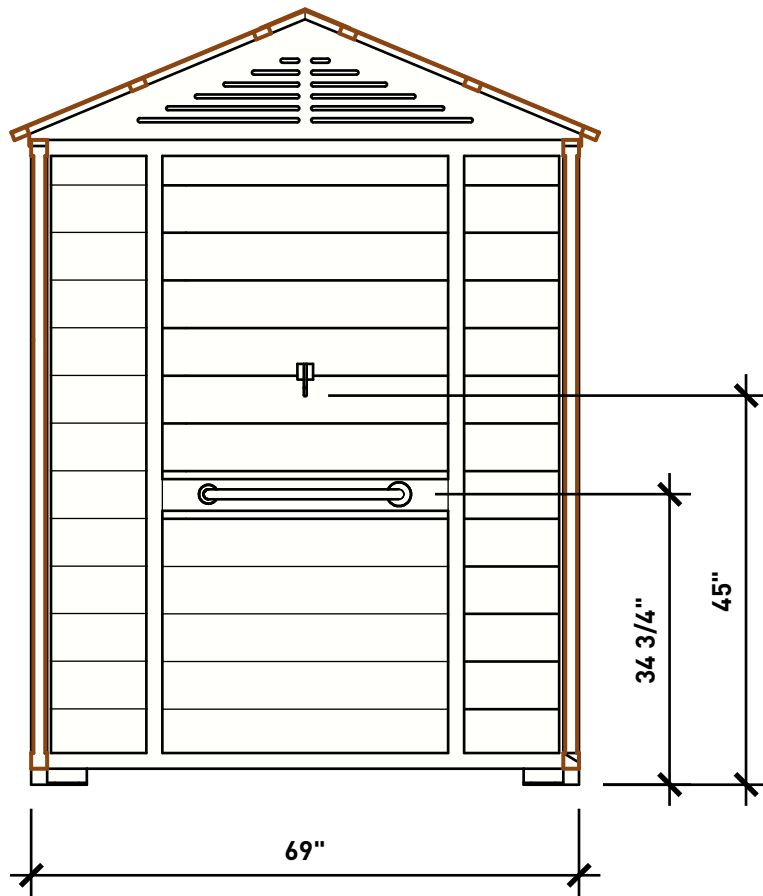
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N/A

MODEL NO.
PTR-6H

SCALE:
AS SHOWN

SHEET:
2 OF 4

DATE:
15 FEB 17



Wishbone
site furnishings

WISHBONE SITE FURNISHINGS LTD

210-27090 GLOUCESTER WAY LANGLEY, BC

DWG. TITLE: HANDICAP ACCESSIBLE PIT TOILET BUILDING

REVISION: 15/02/17 R:00

MATERIAL:
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DWG. NO.
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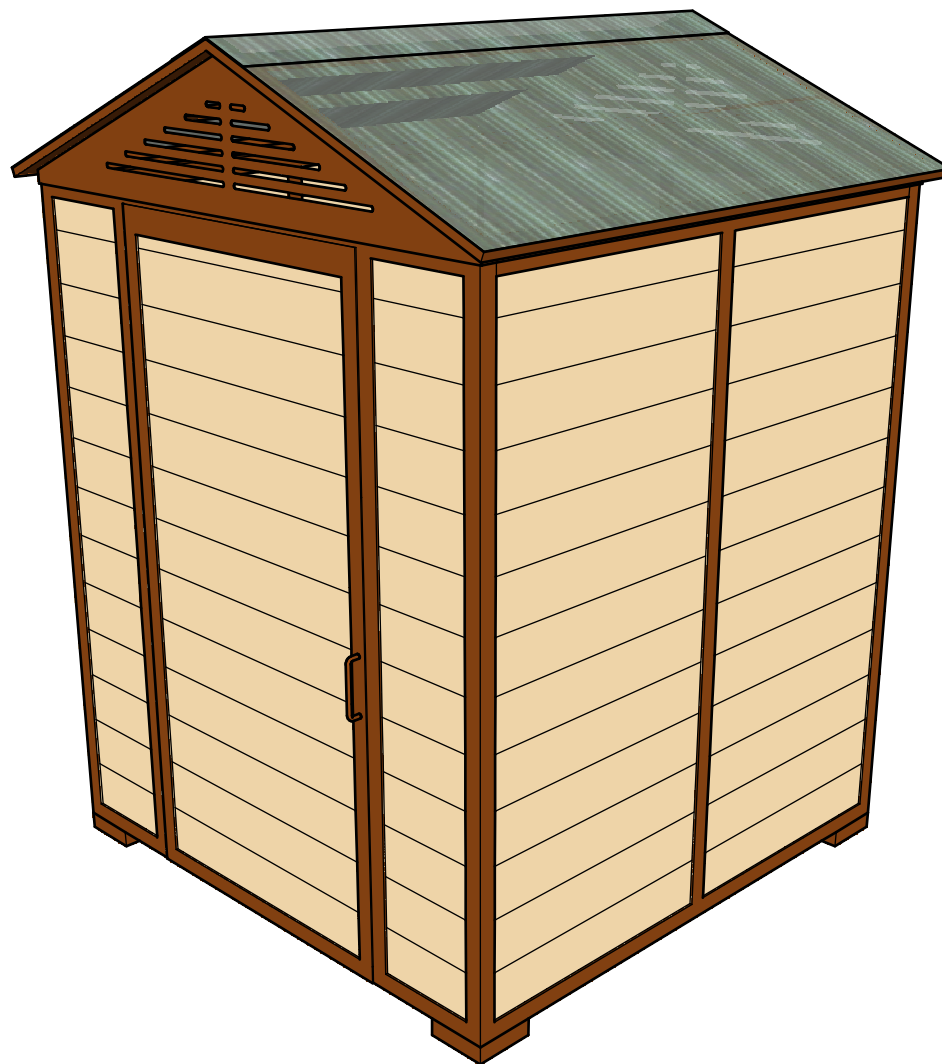
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MODEL NO.
PTR-6H

SCALE:
AS SHOWN

SHEET:
3 OF 4

DATE:
15 FEB 17



Wishbone
site furnishings

WISHBONE SITE FURNISHINGS LTD

210-27090 GLOUCESTER WAY LANGLEY, BC

DWG. TITLE: HANDICAP ACCESSIBLE PIT TOILET BUILDING

REVISION: 15/02/17 R:00

MATERIAL:
ALUMINUM

DWG. NO.
DWSBHOH15021700

DRAWN BY:
BRAD SULLIVAN

PATTERN NO.
N/A

MODEL NO.
PTR-6H

SCALE:
AS SHOWN

SHEET:
4 OF 4

DATE:
15 FEB 17

Hid-A-Bag



**AESTHETIC
CONTAINMENT.
PROTECTING NATURE.**

STORAGE

COLLECTION

TRANSFER



Hid-A-Bag

Features



Industry standard for bear resistant containment.



Enhanced accessibility with optional side-hinge loading door.



Decorative poly siding or vinyl wrap look great with zero upkeep.



Combination collection for waste and/or recyclables.



Specifications

HB1M (1 bag)	HB2M (2 bags)	HB3M (3 bags)	HB1S (1 bag)	HB2S (2 bags)
Capacity 120 L (32 Gal)	Capacity 225 L (60 Gal)	Capacity 360 L (95 Gal)	Capacity 265 L (70 Gal)	Capacity 500 L (130 Gal)
Length 890 mm (35 in)	Length 890 mm (35 in)	Length 915 mm (36 in)	Length 1070 mm (42 in)	Length 1070 mm (42 in)
Width 535 mm (21 in)	Width 965 mm (38 in)	Width 1398 mm (55 in)	Width 710 mm (28 in)	Width 1220 mm (48 in)
Height 1090 mm (43 in)	Height 1090 mm (43 in)	Height 1090 mm (43 in)	Height 1350 mm (53 in)	Height 1350 mm (53 in)

Distributor

Phone: 888-HAUL-ALL (428-5255) Fax: 403.328.9956
403.328.7788

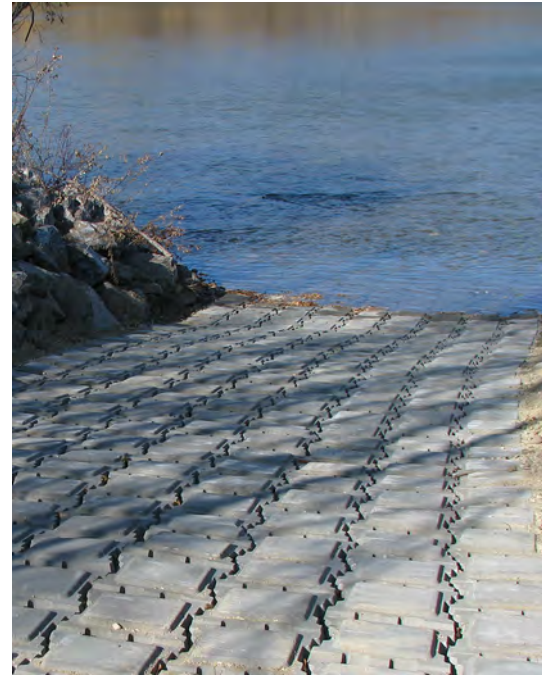
E-mail: sales@haulall.com

www.haulall.com

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ArmorFlex®



Articulating Concrete Block Revetment System

ArmorFlex®

ASTM-validated system lets you design with confidence

ArmorFlex is in a class by itself.

Developed for high-scour, high-flow applications, the ArmorFlex Articulated Concrete Block (ACB) revetment system meets all four standards established by the American Society for Testing and Materials (ASTM) at the time of their 2016 update. ASTM standards help ensure industry brings only the highest quality products to the public.

ArmorFlex is a flexible interlocking matrix of machine-compressed cellular concrete blocks. Each block is a uniform size and is formed with ducts, through which cables run to form connections with other blocks in the matrix. This “mat” design makes it easy to transport to site, lift into place and position.

ArmorFlex comes in several block classes (based on weight, height and a broad range of flow dynamics), can be open or closed-cell and is capable of facilitating vegetation if desired for the project site’s planned uses and aesthetics.

Closed Cell



10% Open

Open Cell



20% Open

ArmorFlex and ASTM: Understanding the Nilex Advantage

With over 12,000 standards in use around the world, ASTM defines product quality and performance excellence. The organization was founded in 1898 and is driven by the voluntary consensus contributions of the world’s top technical experts. Products must meet certain protocols to achieve an ASTM standard.

The four standards involved in testing and evaluating ACBs are:

- Materials and manufacture (ASTM D-6684)
- Hydraulic stability testing methods (ASTM D-7277)
- Analysis of this test data (ASTM D-7276)
- Installation practices (ASTM D-6884).

These standards help ensure the best products are in place to protect private and public infrastructure, and ultimately, public safety. They provide designers with a recognized method to compare different systems, allowing them to design with confidence. They can rest assured the materials they’re using are suitable for the project, using third-party, unbiased design and testing criteria.

ASTM standards reflect the values and practices Nilex was built on and follows everyday. We strive to provide the best solution for each situation and each client. ArmorFlex armors sites with unsurpassed ACB scour erosion protection in hydraulic flows, with an extensive lifespan, providing true value for the investment.



Features

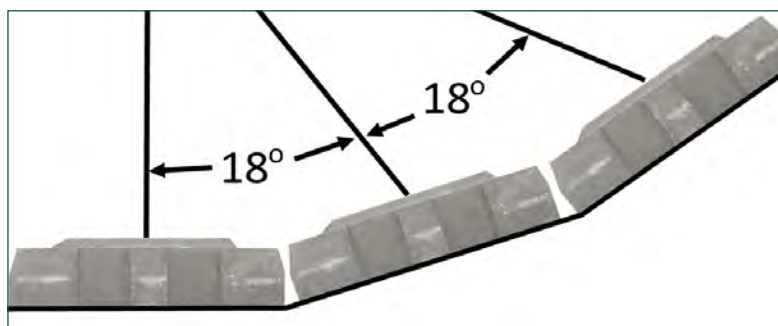
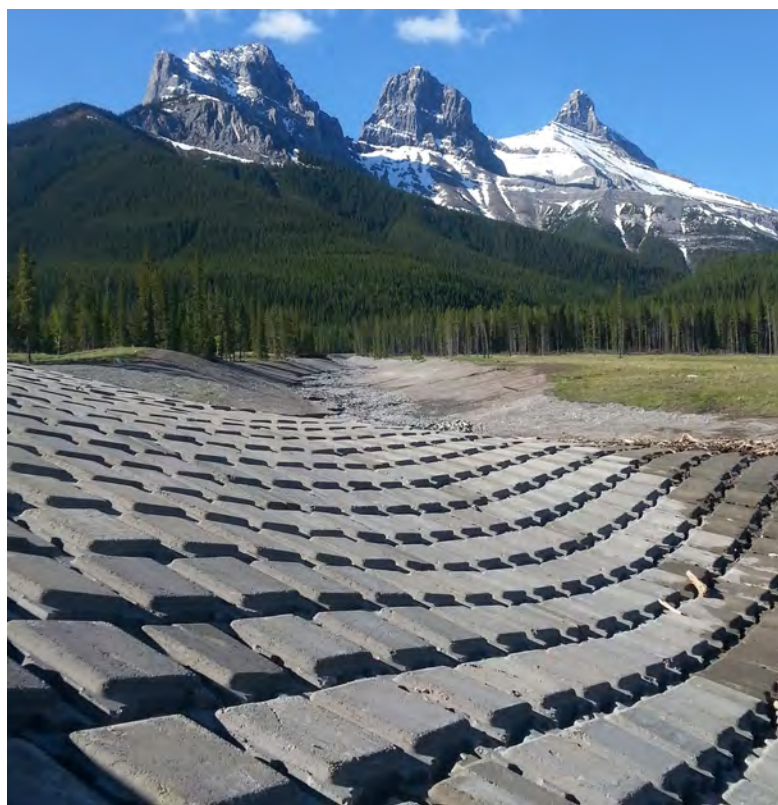
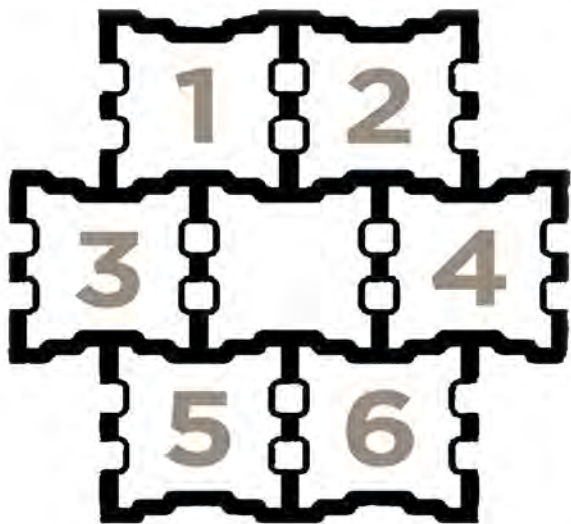
With stringent ASTM validation and long-standing proven ACB design methods, ArmorFlex brings design certainty to projects. The Quality Assurance / Quality Control of a manufactured product brings additional predictability to projects.

ArmorFlex is a low-profile hard armor suitable for new construction and infrastructure retrofits. It's also an alternative to rip-rap, gabions, structural concrete and other heavy-duty erosion protection systems. Due to the increasing cost and scarcity of local rock, its permanence (life-cycle costs) also provides significant savings for many project owners. The ease of installation of a connected matrix also helps reduce overall project costs.

ArmorFlex is also safer to install than rock alternatives. It removes the risk of pinch-points between the rocks, can be installed on site with stationary equipment and requires less on-site machinery overall.

Combining the best aspects of lightweight blankets with the strength and performance of rigid liners, ArmorFlex is:

- Cost effective
- Stable
- Easy to install
- Permeable
- Vegetation supportive
- Frost resistant
- Wave and high-scour resistant
- Suitable for underwater installation



Form and Function

Total block surface area can be as high as 20% open, allowing ground water drainage and helping to eliminate hydrostatic pressure behind the mat. Combined with geotextile, ArmorFlex keeps soil on site and can be made to encourage vegetation.

Each interior block in an ArmorFlex mat is interlocked by six other blocks, giving the system excellent stability.

Applications

The features, quality materials and flexibility of ArmorFlex make it well-suited to a wide range of sites and applications, including:

- Channel and ditch lining
- Dam crests and spillways
- Boat ramps
- Liner ballast and protection
- Weir and overflow channels
- Low level crossings
- Riverbank protection
- Dikes and levy protection
- Lake shoreline protection
- Pipeline protection
- Reservoir slope protection
- Bridge abutment protection

Installation

1. Site Preparation

It's important to properly level installation sites to allow for the mats' close contour. This preparation step is easily achieved with conventional construction equipment, keeping costs down.

Typical applications utilize nonwoven geotextile to hold soil fines in place. The geotextile can be applied directly on the ground or can be fastened to the underside of the blocks in the field, so both are installed in one step. Some applications require aggregate or a geocomposite for drainage. This should be laid prior to placing ArmorFlex.

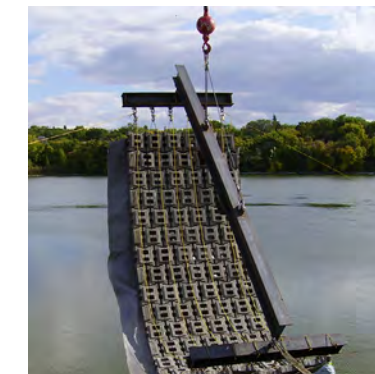


2. Delivery & Unloading

ArmorFlex arrives on site as a series of pre-assembled mats stacked on a flat-bed trailer. They are easily unloaded using a crane, forklift or hydraulic excavator. Staging at site is efficient and requires minimal laydown space. Project coordinators can get a lot of material to site in minimal time, especially compared to alternatives like rock rip-rap, which requires many truckloads and large staging piles. The elimination of haul trips means safer project delivery as well as a reduction in emissions-related environmental impacts.

3. Installation

A variety of lifting beams can be used to remove the ArmorFlex mats from the delivery truck and for placement on the ground. Nilex can arrange for a suitable device. Once the end loops of the mat wires are secured to the beam, the ground crew can easily lower the mats into place; many installations are completed in a single workday. The mats must be carefully placed to ensure they are properly abutting. Adjoining mats can also be connected using high compressive strength concrete.



4. Finishing Details

Careful detailing is key to a successful ArmorFlex installation. Nilex works with the owner, designer or contractor to ensure proper finish detailing. Anchor trenches, side trenches, toe trenches, mat joints, transition to adjoining treatments, anchoring and backfill/overburden are all considered. Where ArmorFlex is to be vegetated, additional details are considered to ensure sustainable growth. Nilex can assist with all adjoining product and treatment details.

ArmorFlex Block Design Mixes Strength with Articulation

High-scour and high-flow situations are common along natural waterways and man-made drainage channels. Proper subgrade preparation is crucial before installation of ArmorFlex mats. The double-taper edges and interlocking shape allow the mats to maintain close contour with the landscape.

Once installed, the mats readily support vegetation, which provides stability through the root network and improves aesthetic appeal. The mats can be anchored temporarily using wooden stakes, anchored permanently using ground anchors and cables, or can be removed and reused elsewhere.



Before and After: Protection with Vegetation



ArmorFlex® Block Specifications (gross area for all types is 0.165 m² / 1.77 ft²)

Block Class	Cell type	% open	Dimensions, L x W x H		Block Weight	
			cm	inches	kg	lbs
40	Open	20%	44.1 x 39.3 x 12	17.4 x 15.5 x 4.75	26.7 - 29	59 - 64
45	Closed	10%	44.1 x 39.3 x 12	17.4 x 15.5 x 4.75	32.7 - 35.4	72 - 78
50	Open	20%	44.1 x 39.3 x 15	17.4 x 15.5 x 6	34.5 - 37.2	76 - 82
55	Closed	10%	44.1 x 39.3 x 15	17.4 x 15.5 x 6	41.3 - 45.4	91 - 100
60	Open	20%	44.1 x 39.3 x 19	17.4 x 15.5 x 7.5	42.2 - 48.1	93 - 106
70	Open	20%	44.1 x 39.3 x 22	17.4 x 15.5 x 8.75	52.2 - 56.2	115 - 124
75	Closed	10%	44.1 x 39.3 x 19	17.4 x 15.5 x 7.5	50.1 - 54.9	117 - 127
<i>Tapered blocks (below) are designed for higher flow conditions</i>						
40T	Open	20%	44.1 x 39.3 x 12	17.4 x 15.5 x 4.75	26.7 - 29	59 - 64
60T	Open	20%	44.1 x 39.3 x 19	17.4 x 15.5 x 7.5	42.2 - 48.1	93 - 106
70T	Open	20%	44.1 x 39.3 x 22	17.4 x 15.5 x 8.75	52.2 - 56.2	115 - 124

Imperial measurements govern; metric conversions are not intended for design purposes



Think Nilex

Nilex is a leader in the geosynthetics industry, providing innovative solutions to support the unique challenges of civil, resource and environmental construction projects. Our engineered, technically advanced materials and construction techniques are used in road building, Mechanically Stabilized Earth (MSE) solutions for grade changes, erosion and sediment control, water management and containment.

With over 39 years of experience, a long-standing commitment to the environment and highly qualified staff, Nilex delivers the products and technologies that give clients an economic advantage with environmental benefit.

Simply stated, it's a better way of building.



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