Appendix - Phase 1 Fish Passage Assessment Data and Photos

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	8530	Diameter (m)	2.4
External ID	–	Length (m)	38
Crew	LS AI TP VJ	Embedded	No
UTM Zone	9	Depth Embedded (m)	–
Easting	582719	Resemble Channel	–
Northing	6073883	Backwatered	No
Stream	Sandstone Creek	Percent Backwatered	–
Road	McDonnell fsr	Fill Depth (m)	9
Road Tenure	MoF	Outlet Drop (m)	0.5
Channel Width (m)	3.9	Outlet Pool Depth (m)	0.4
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	No	Slope (%)	5
Habitat Value	High	Valley Fill	Deep Fill
Final score	42	Barrier Result	Barrier
Fix type	Replace with New Open Bottom Structure	Fix Span / Diameter	33
Comments: The stream has good quality habitat with abundant overhanging vegetation and boulders providing cover, pools for overwintering fish, and gravel suitable for spawning. Rainbow trout, cutthroat trout, and Dolly Varden were captured during sampling. Very large culvert with a significant amount of road fill (9m). There was an engineering site survey conducted in 2024 but the design plans were put on hold due to high replacement costs and uncertainty around if salmon could access the crossing due to potential barriers downstream. DFO was involved and reported that coho were spawning downstream of the crossing in October 2024.			
Photos: PSCIS ID 8530. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-18	Crossing Sub Type	Bridge
PSCIS ID	58235	Diameter (m)	12
External ID	–	Length (m)	10
Crew	AI	Embedded	–
UTM Zone	9	Depth Embedded (m)	–
Easting	616177	Resemble Channel	–
Northing	6074155	Backwatered	–
Stream	Kathlyn Creek	Percent Backwatered	–
Road	Highway 16	Fill Depth (m)	–
Road Tenure	MoTi	Outlet Drop (m)	–
Channel Width (m)	–	Outlet Pool Depth (m)	–
Stream Slope (%)	–	Inlet Drop	–
Beaver Activity	No	Slope (%)	–
Habitat Value	–	Valley Fill	–
Final score	0	Barrier Result	Passable
Fix type	–	Fix Span / Diameter	–
Comments: New, well built, bridge.			
Photos: PSCIS ID 58235. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	**Crossing Characteristics**	–
Date	2024-09-19	Crossing Sub Type	Round Culvert
PSCIS ID	195934	Diameter (m)	1.2
External ID	–	Length (m)	16
Crew	LS VJ	Embedded	No
UTM Zone	9	Depth Embedded (m)	–
Easting	645128	Resemble Channel	–
Northing	6034597	Backwatered	Yes
Stream	Dunalter Creek	Percent Backwatered	15
Road	Barret station rd	Fill Depth (m)	2
Road Tenure	MoTi	Outlet Drop (m)	0
Channel Width (m)	1.6	Outlet Pool Depth (m)	0.15
Stream Slope (%)	1	Inlet Drop	No
Beaver Activity	No	Slope (%)	4
Habitat Value	Medium	Valley Fill	Deep Fill
Final score	29	Barrier Result	Barrier
Fix type	Replace Structure with Streambed Simulation CBS	Fix Span / Diameter	3
Comments: The inlet of the culvert is approximately 3 m downstream of the outlet of culvert 195935, which crosses under the Houston Airport Rd. The stream has an estimated slope of 1%. Downstream of the culvert, the stream is heavily overgrown. The culvert has holes in the bottom about 2 m from the outlet and is backwatered up to that point. MoTi chris_culvert_id: 1755233			
Photos: PSCIS ID 195934. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	**Crossing Characteristics**	–
Date	2024-09-19	Crossing Sub Type	Round Culvert
PSCIS ID	195935	Diameter (m)	1.2
External ID	–	Length (m)	38
Crew	LS VJ	Embedded	No
UTM Zone	9	Depth Embedded (m)	–
Easting	645104	Resemble Channel	–
Northing	6034615	Backwatered	No
Stream	Dunalter Creek	Percent Backwatered	–
Road	Houston Airport rd	Fill Depth (m)	9.9
Road Tenure	MoTi	Outlet Drop (m)	0.2
Channel Width (m)	1.7	Outlet Pool Depth (m)	0.15
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	No	Slope (%)	1
Habitat Value	Medium	Valley Fill	Deep Fill
Final score	32	Barrier Result	Barrier
Fix type	Replace Structure with Streambed Simulation CBS	Fix Span / Diameter	35.5

Comments: Upstream of the crossing, there is good habitat for fish, including undercut banks, functional large woody debris, healthy riparian vegetation, and several pools suitable for overwintering fish. A fish ~100 mm in length was observed in one of the pools upstream. A barbed wire fence is present when accessing the inlet. The culvert is extremely long (38 m), with its outlet located approximately 3 m upstream of the inlet of crossing 195934. Downstream of crossing 195934 the stream is heavily overgrown.Fill depth 11 m but changed to 9.9 m to meet submission requirements. MoTi chris_culvert_id: 2078335

Photos: PSCIS ID 195935. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-19	Crossing Sub Type	Oval Culvert
PSCIS ID	195943	Diameter (m)	2.2
External ID	–	Length (m)	14
Crew	LS	Embedded	No
UTM Zone	9	Depth Embedded (m)	–
Easting	645439	Resemble Channel	–
Northing	6035050	Backwatered	No
Stream	Stock Creek	Percent Backwatered	–
Road	Barrett station rd	Fill Depth (m)	0.4
Road Tenure	MoTi	Outlet Drop (m)	1.05
Channel Width (m)	2.6	Outlet Pool Depth (m)	0.6
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	No	Slope (%)	1.5
Habitat Value	Medium	Valley Fill	Deep Fill
Final score	28	Barrier Result	Barrier
Fix type	Replace with New Open Bottom Structure	Fix Span / Diameter	15

Comments: The culvert has a substantial outlet drop of 1.05 m, with signs of high flows at the outlet. The stream likely contains numerous pools during higher flows but had very low flows at the time of assessment. Flowing through agricultural land on both sides, the stream is heavily eroded downstream, making it a strong candidate for fencing and riparian management. Upstream habitat was less eroded and consisted of mature riparian vegetation providing good habitat for fish. Only two fish were captured during sampling (both in the deep outlet pool), which was unexpected given the good habitat. Conductivity was extremely high, possibly due to upstream cattle activity and surrounding land use. MoTi chris_culvert_id: 1755230

Photos: PSCIS ID 195943. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-10-03	Crossing Sub Type	Round Culvert
PSCIS ID	197967	Diameter (m)	5.6
External ID	–	Length (m)	40
Crew	AI	Embedded	Yes
UTM Zone	9	Depth Embedded (m)	2
Easting	692426	Resemble Channel	Yes
Northing	6032341	Backwatered	No
Stream	Taman Creek	Percent Backwatered	–
Road	Highway 16	Fill Depth (m)	7
Road Tenure	MoTi	Outlet Drop (m)	0
Channel Width (m)	5.5	Outlet Pool Depth (m)	0
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	Yes	Slope (%)	3
Habitat Value	Medium	Valley Fill	Deep Fill
Final score	16	Barrier Result	Potential
Fix type	Replace with New Open Bottom Structure	Fix Span / Diameter	27

Comments:
This is a brand-new replacement structure, extremely well built with extensive embedment that includes numerous large boulders, cobbles, and gravel. The multiplate round structure is embedded nearly 2 m. Upstream, woody debris and boulder structures are cabled together for added stability. This massive construction project involved a substantial amount of fill extending 60 m downstream and over 200 m upstream. The site now offers migration conditions for fish that are equal to or better than previous conditions. MoTi chris_culvert_id: 2076452

Photos: PSCIS ID 197967. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-24	Crossing Sub Type	Bridge
PSCIS ID	198217	Diameter (m)	14
External ID	–	Length (m)	4
Crew	LS AI	Embedded	–
UTM Zone	9	Depth Embedded (m)	–
Easting	582850	Resemble Channel	–
Northing	6130490	Backwatered	–
Stream	Sik-e-dakh	Percent Backwatered	–
Road	Sik-e-dakh Water Tower Rd	Fill Depth (m)	–
Road Tenure	MoTi	Outlet Drop (m)	–
Channel Width (m)	–	Outlet Pool Depth (m)	–
Stream Slope (%)	–	Inlet Drop	–
Beaver Activity	No	Slope (%)	–
Habitat Value	–	Valley Fill	–
Final score	0	Barrier Result	Passable
Fix type	–	Fix Span / Diameter	–
Comments: The culvert was replaced with a bridge, featuring excellent construction with a wide channel beneath the structure. Riprap has been covered with soil to promote vegetation growth, and significant riparian restoration is underway with trees and shrubs being planted. Overall, this is a well-executed replacement project.			
Photos: PSCIS ID 198217. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-20	Crossing Sub Type	Round Culvert
PSCIS ID	203122	Diameter (m)	3
External ID	1805555	Length (m)	25
Crew	AI	Embedded	No
UTM Zone	9	Depth Embedded (m)	–
Easting	614941	Resemble Channel	Yes
Northing	6075232	Backwatered	No
Stream	Simpson Creek	Percent Backwatered	–
Road	Railway	Fill Depth (m)	1
Road Tenure	CN Rail	Outlet Drop (m)	0.05
Channel Width (m)	5	Outlet Pool Depth (m)	0.9
Stream Slope (%)	1	Inlet Drop	Yes
Beaver Activity	Yes	Slope (%)	2
Habitat Value	High	Valley Fill	Deep Fill
Final score	24	Barrier Result	Barrier
Fix type	Replace with New Open Bottom Structure	Fix Span / Diameter	15

Comments: Although this culvert is on Simpson Creek, it is not currently conveying the main flow and remains mostly dry. Two 1.5 m diameter pipes run under the railway, approximately 30 m apart. The southern pipe is fully embedded with an average embedment depth of 25 cm, while the northern pipe is currently passing all stream flow. This is a high-value stream with extensive gravel areas suitable for steelhead, coho, and chinook salmon spawning upstream. The adjacent landowner has reported recent observations of steelhead spawning and has historical knowledge of chinook spawning approximately 300 m downstream from Nielsen Road.

Photos: PSCIS ID 1805555. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-25	Crossing Sub Type	Round Culvert
PSCIS ID	203123	Diameter (m)	0.6
External ID	8300088	Length (m)	16
Crew	AI JO	Embedded	No
UTM Zone	9	Depth Embedded (m)	–
Easting	581685	Resemble Channel	–
Northing	6114465	Backwatered	No
Stream	Tributary to Gershwin Creek	Percent Backwatered	–
Road	Cormeau Road	Fill Depth (m)	0.4
Road Tenure	MoTi	Outlet Drop (m)	0
Channel Width (m)	0.5	Outlet Pool Depth (m)	0
Stream Slope (%)	1.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	1
Habitat Value	Low	Valley Fill	Deep Fill
Final score	18	Barrier Result	Potential
Fix type	Replace Structure with Streambed Simulation CBS	Fix Span / Diameter	3
Comments: No visible channel was observed; the area appeared to be a wet draw during the survey, with some sedges present upstream. It is unlikely to provide fish habitat. MoTi chris_culvert_id: 1524657			
Photos: PSCIS ID 8300088. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	**Crossing Characteristics**	–
Date	2024-09-25	Crossing Sub Type	Round Culvert
PSCIS ID	203124	Diameter (m)	0.6
External ID	8300015	Length (m)	14
Crew	AI JO	Embedded	No
UTM Zone	9	Depth Embedded (m)	–
Easting	581852	Resemble Channel	–
Northing	6115965	Backwatered	No
Stream	Tributary to Gershwin Creek	Percent Backwatered	–
Road	Comeau Road	Fill Depth (m)	0.5
Road Tenure	MoTi	Outlet Drop (m)	0
Channel Width (m)	0.95	Outlet Pool Depth (m)	0
Stream Slope (%)	1	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	3
Habitat Value	Medium	Valley Fill	Deep Fill
Final score	26	Barrier Result	Barrier
Fix type	Replace Structure with Streambed Simulation CBS	Fix Span / Diameter	3

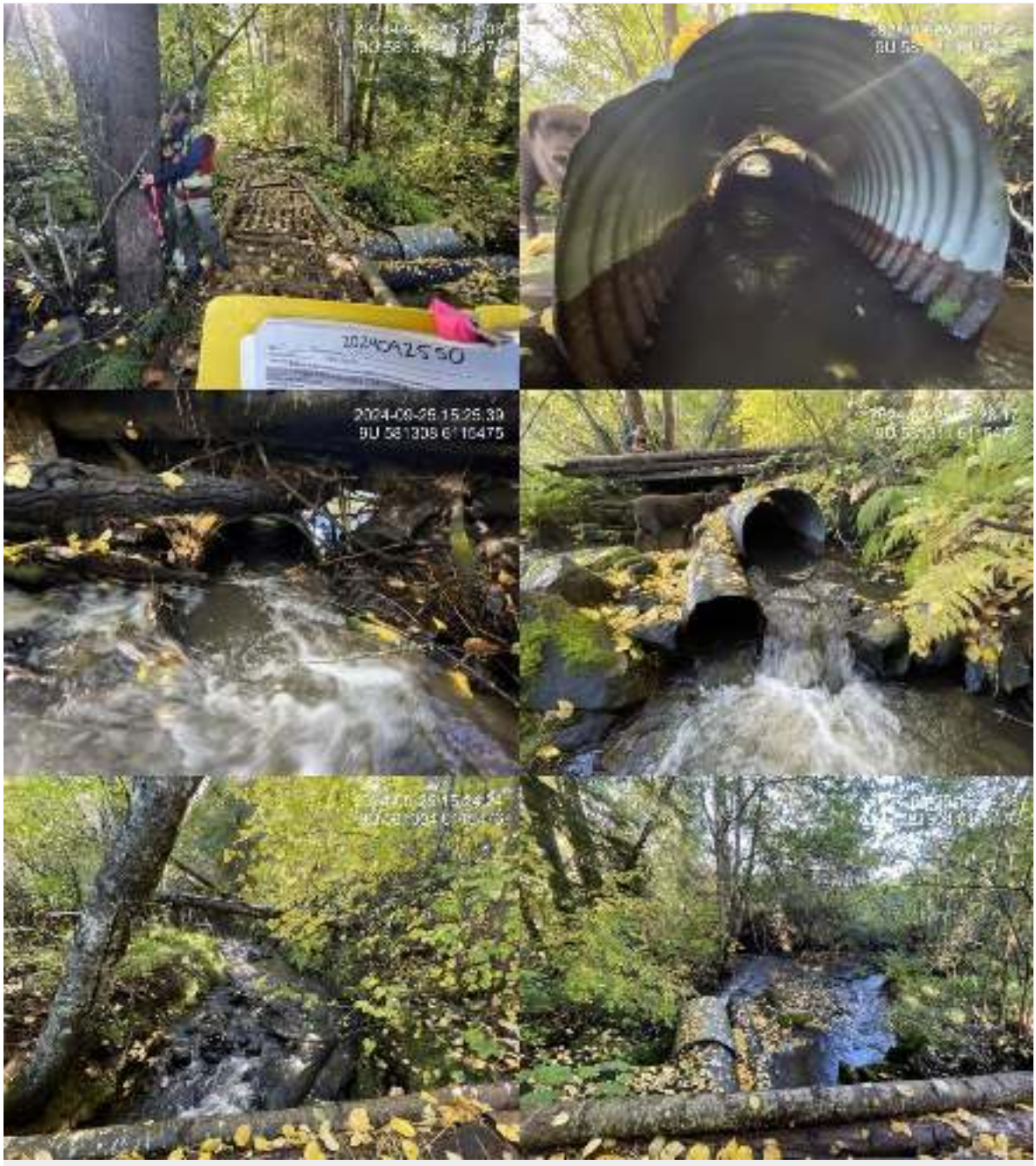
Comments:
This is a newer PVC pipe with a beaver grate on the inlet. Debris clogging about 20 cm of the inlet has caused water to back up upstream of the crossing. Downstream, the drainage is very small, with a fence located approximately 10 m away. Cutthroat trout and Dolly Varden are known to inhabit the lake upstream. MoTi chris_culvert_id: 1524661

Photos: PSCIS ID 8300015. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-25	Crossing Sub Type	Round Culvert
PSCIS ID	203125	Diameter (m)	1.37
External ID	2024092550	Length (m)	6
Crew	LS JD	Embedded	No
UTM Zone	9	Depth Embedded (m)	–
Easting	581313	Resemble Channel	–
Northing	6115473	Backwatered	No
Stream	Gershwin Creek	Percent Backwatered	–
Road	Private property	Fill Depth (m)	0.5
Road Tenure	Private	Outlet Drop (m)	0
Channel Width (m)	6	Outlet Pool Depth (m)	0.3
Stream Slope (%)	5	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	2
Habitat Value	High	Valley Fill	Deep Fill
Final score	21	Barrier Result	Barrier
Fix type	Replace with New Open Bottom Structure	Fix Span / Diameter	15
Comments: The landowner has constructed a bridge over the stream with two culverts, measuring 0.47 m and 0.9 m in diameter. Some flow passes through the culverts while some bypasses them, though it is unclear if fish can navigate the bypassing flow. The bridge appears to provide access to adjacent agricultural fields. High-quality habitat with numerous pools and abundant gravel is present, but strong currents in the culverts due to significant flow likely inhibit fish passage.			
Photos: PSCIS ID 2024092550. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–



Location and Stream Data	•	**Crossing Characteristics**	–
Date	2024-09-20	Crossing Sub Type	Round Culvert
PSCIS ID	203126	Diameter (m)	2.85
External ID	2024092003	Length (m)	7
Crew	AI	Embedded	Yes
UTM Zone	9	Depth Embedded (m)	0.2
Easting	615326	Resemble Channel	Yes
Northing	6075142	Backwatered	No
Stream	Simpson Creek	Percent Backwatered	–
Road	Private driveway	Fill Depth (m)	1
Road Tenure	Private	Outlet Drop (m)	0
Channel Width (m)	7	Outlet Pool Depth (m)	0.3
Stream Slope (%)	1.5	Inlet Drop	Yes
Beaver Activity	Yes	Slope (%)	3
Habitat Value	High	Valley Fill	Deep Fill
Final score	21	Barrier Result	Barrier
Fix type	Replace with New Open Bottom Structure	Fix Span / Diameter	15

Comments:
Three 0.95 m pipes run under a private driveway. The pipe lengths and gradients are estimated, with two pipes appearing fully embedded and one slightly elevated by approximately 30 cm. The stream is channelized with large boulders throughout the property. Beaver activity is evident, with debris at the inlet and three dams ranging from 0.4 to 1 m high within 150 m upstream. The landowner reported previous blockages caused by beavers, requiring the inlet to be cleared and significant amounts of accumulated material to be dredged out.

Photos: PSCIS ID 2024092003. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-20	Crossing Sub Type	Bridge
PSCIS ID	203127	Diameter (m)	12
External ID	2024092001	Length (m)	4
Crew	AI	Embedded	–
UTM Zone	9	Depth Embedded (m)	–
Easting	614346	Resemble Channel	–

Location and Stream Data	•	Crossing Characteristics	–
Stream	Simpson Creek	Percent Backwatered	–
Road	Private driveway	Fill Depth (m)	–
Road Tenure	Private	Outlet Drop (m)	–
Channel Width (m)	–	Outlet Pool Depth (m)	–
Stream Slope (%)	–	Inlet Drop	–
Beaver Activity	No	Slope (%)	–
Habitat Value	–	Valley Fill	–
Final score	0	Barrier Result	Passable
Fix type	–	Fix Span / Diameter	–
Comments: Steel bridge, potentially for pedestrian or ATV use only, located on a private road on private land.			
Photos: PSCIS ID 2024092001. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-20	Crossing Sub Type	Bridge
PSCIS ID	203128	Diameter (m)	7.4
External ID	2024092002	Length (m)	1
Crew	AI	Embedded	–
UTM Zone	9	Depth Embedded (m)	–
Easting	614775	Resemble Channel	–
Northing	6075153	Backwatered	–
Stream	Simpson Creek	Percent Backwatered	–
Road	Whalen Road	Fill Depth (m)	–
Road Tenure	MoTi	Outlet Drop (m)	–
Channel Width (m)	–	Outlet Pool Depth (m)	–
Stream Slope (%)	–	Inlet Drop	–
Beaver Activity	No	Slope (%)	–
Habitat Value	–	Valley Fill	–
Final score	0	Barrier Result	Passable
Fix type	–	Fix Span / Diameter	–
Comments: Small wooden foot bridge linking private property on Whalen Road right of way.			
Photos: PSCIS ID 2024092002. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-25	Crossing Sub Type	Bridge
PSCIS ID	203129	Diameter (m)	13
External ID	2024092501	Length (m)	2
Crew	AI JO	Embedded	–
UTM Zone	9	Depth Embedded (m)	–
Easting	581028	Resemble Channel	–
Northing	6115707	Backwatered	–
Stream	Gershwin Creek	Percent Backwatered	–
Road	Private	Fill Depth (m)	–
Road Tenure	Private	Outlet Drop (m)	–
Channel Width (m)	–	Outlet Pool Depth (m)	–
Stream Slope (%)	–	Inlet Drop	–
Beaver Activity	No	Slope (%)	–
Habitat Value	–	Valley Fill	–
Final score	0	Barrier Result	Passable
Fix type	–	Fix Span / Diameter	–
Comments: Steel structure suitable for foot traffic or ATV use, located on private land.			
Photos: PSCIS ID 2024092501. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–

Location and Stream Data	•	Crossing Characteristics	–
Date	2024-09-27	Crossing Sub Type	Ford
PSCIS ID	203130	Diameter (m)	9
External ID	2024092751	Length (m)	3
Crew	LS AI	Embedded	–
UTM Zone	9	Depth Embedded (m)	–
Easting	613951	Resemble Channel	–
Northing	6074629	Backwatered	–
Stream	Simpson Creek	Percent Backwatered	–
Road	Transmission line road	Fill Depth (m)	–
Road Tenure	–	Outlet Drop (m)	–
Channel Width (m)	–	Outlet Pool Depth (m)	–
Stream Slope (%)	–	Inlet Drop	–
Beaver Activity	No	Slope (%)	–
Habitat Value	–	Valley Fill	–
Final score	0	Barrier Result	Passable
Fix type	–	Fix Span / Diameter	–
Comments: Ford across transmission line road which parallels the transmission lines. Fully passable.			
Photos: PSCIS ID 2024092751. From top left clockwise: Road/Site Card, Barrel, Outlet, Downstream, Upstream, Inlet.			

Location and Stream Data	•	Crossing Characteristics	–