PREPARED FOR BC HYDRO

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
TERRACE – KITIMAT TRANSMISSION PROJECT
ENVIRONMENTAL AND SOCIO-ECONOMIC EFFECTS REPORT

Appendix B

Fisheries and Aquatic Habitat



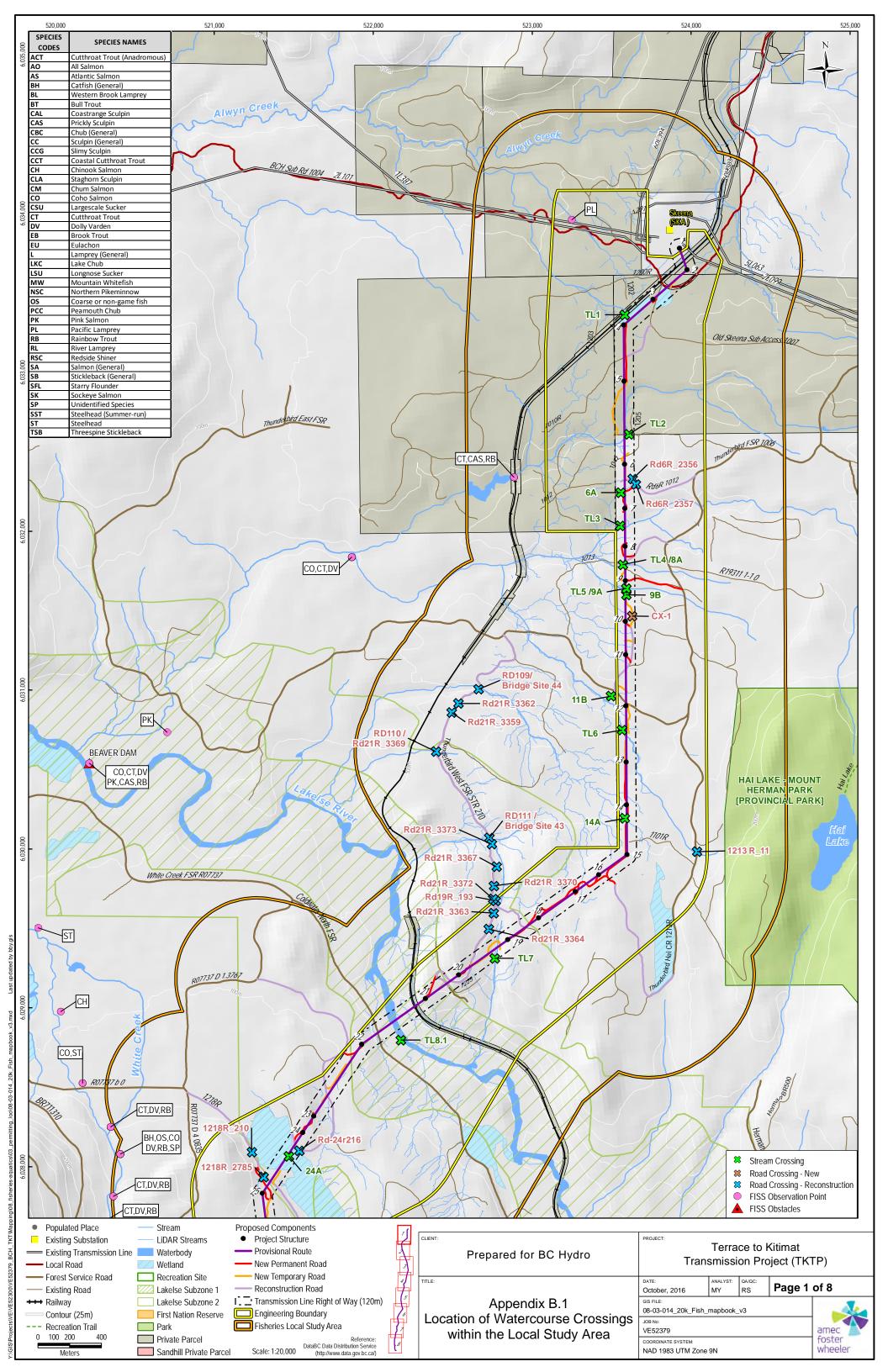
PREPARED FOR BC HYDRO

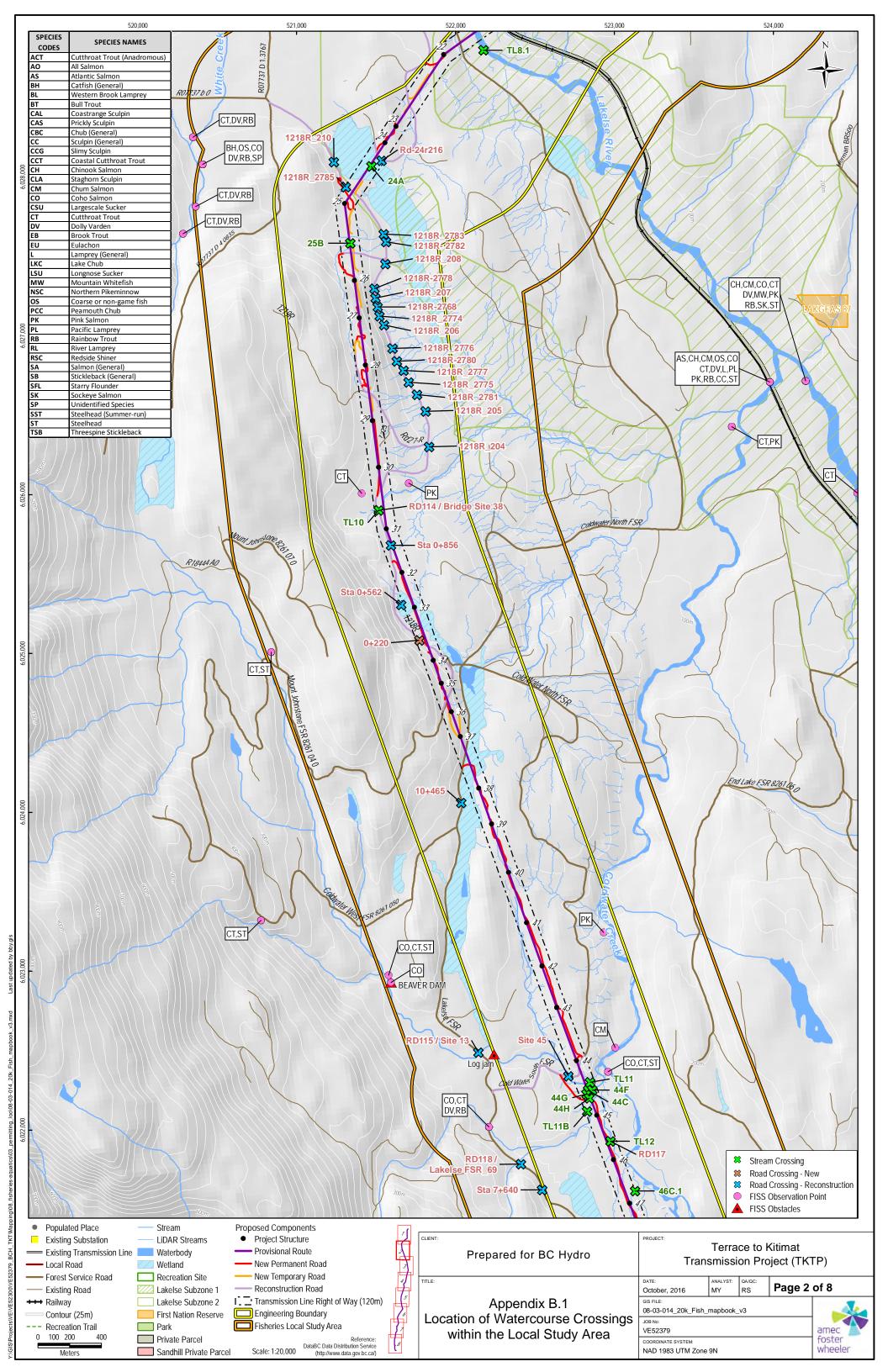
BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
TERRACE – KITIMAT TRANSMISSION PROJECT
ENVIRONMENTAL AND SOCIO-ECONOMIC EFFECTS REPORT

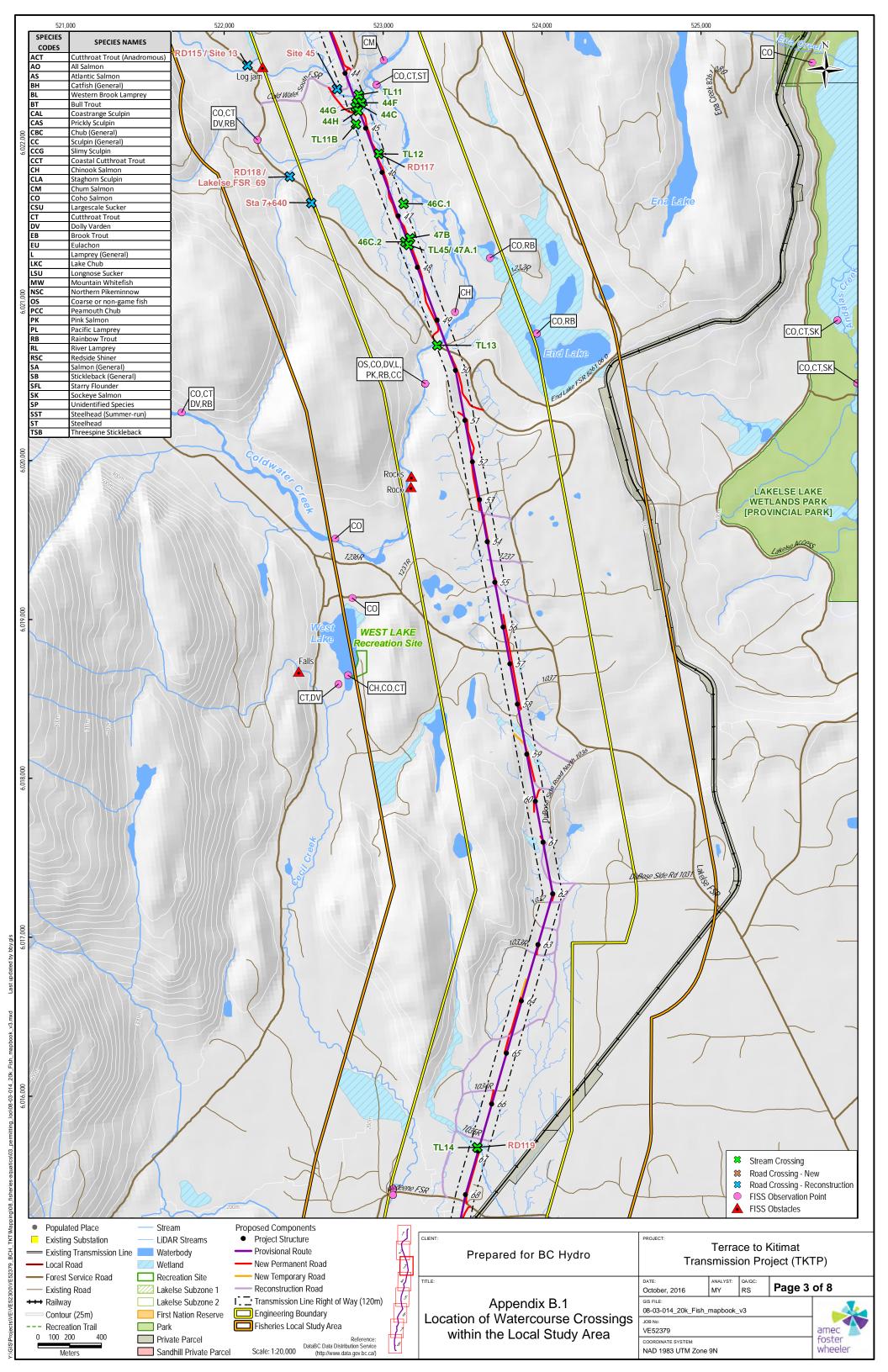
Appendix B.1

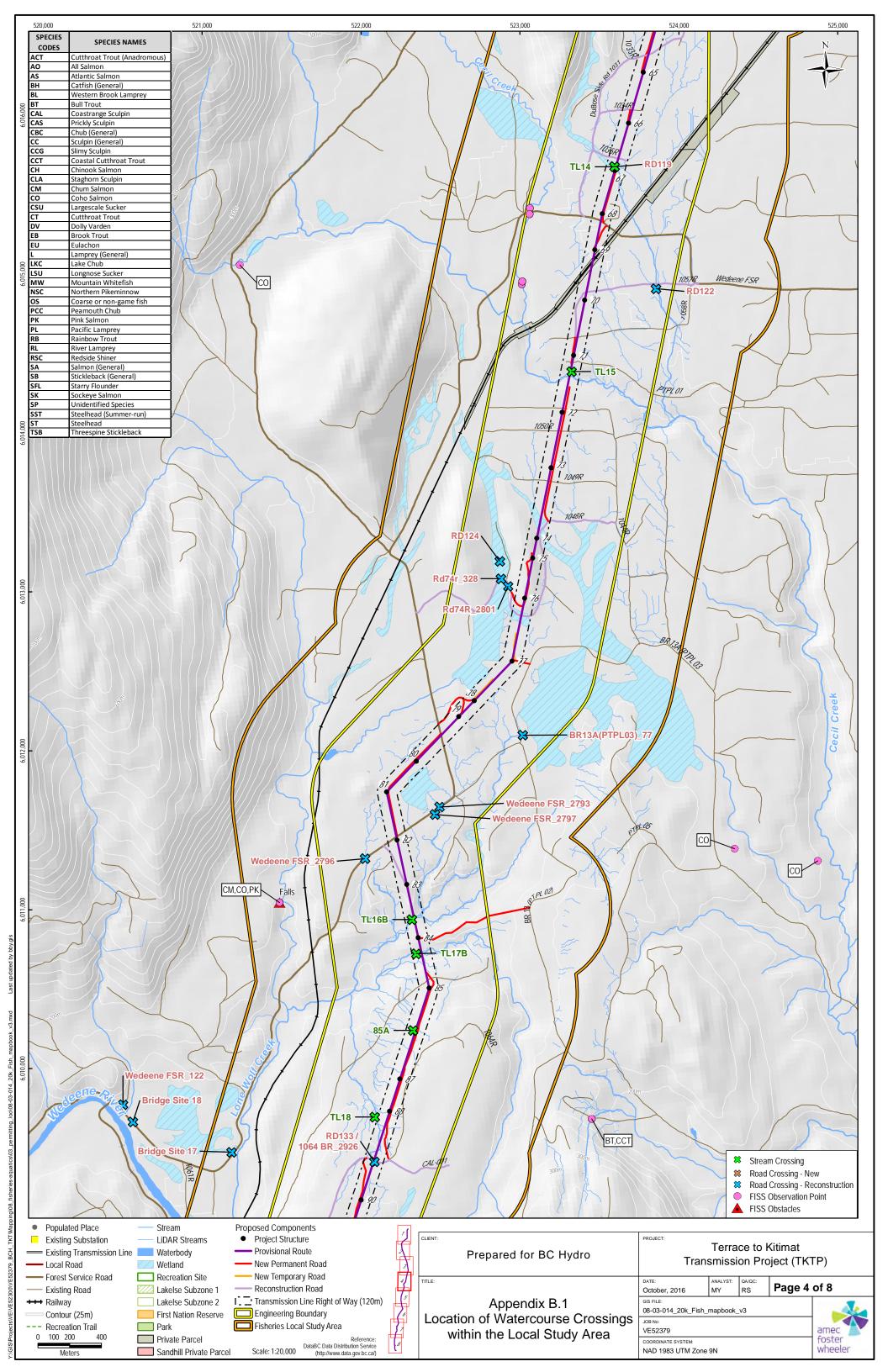
Mapbook of Location of Watercourse Crossings within the Local Study Area

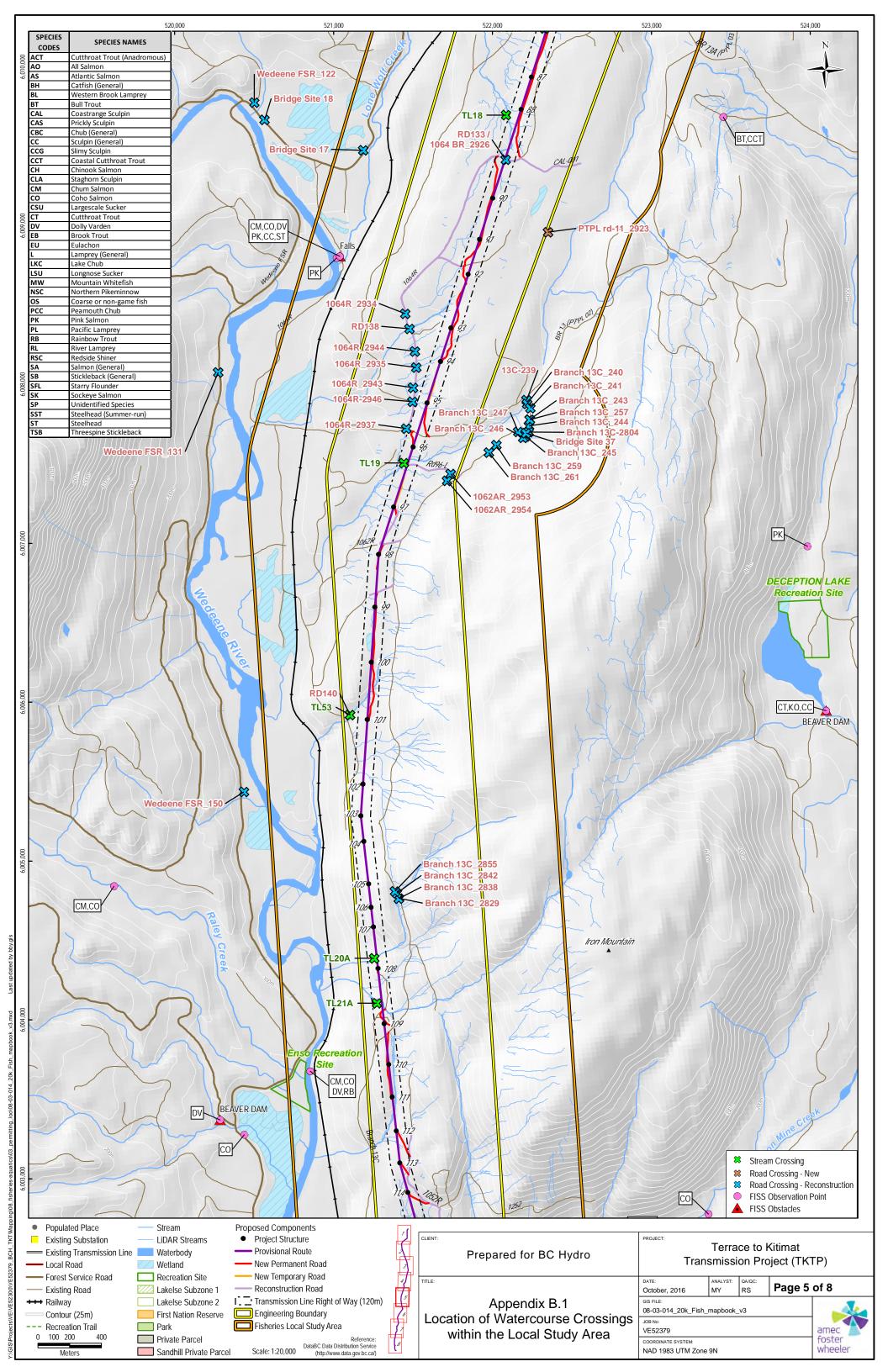


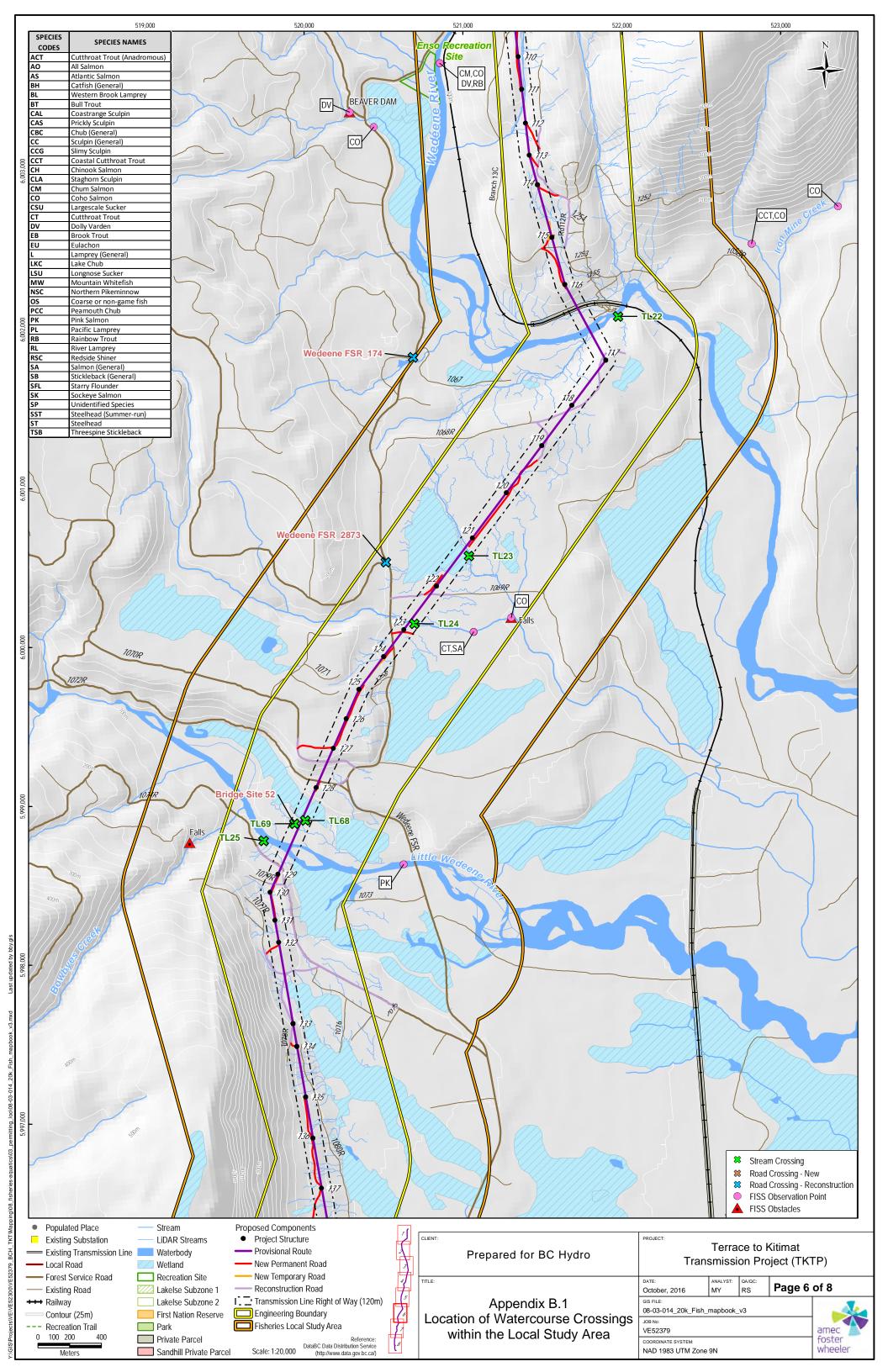


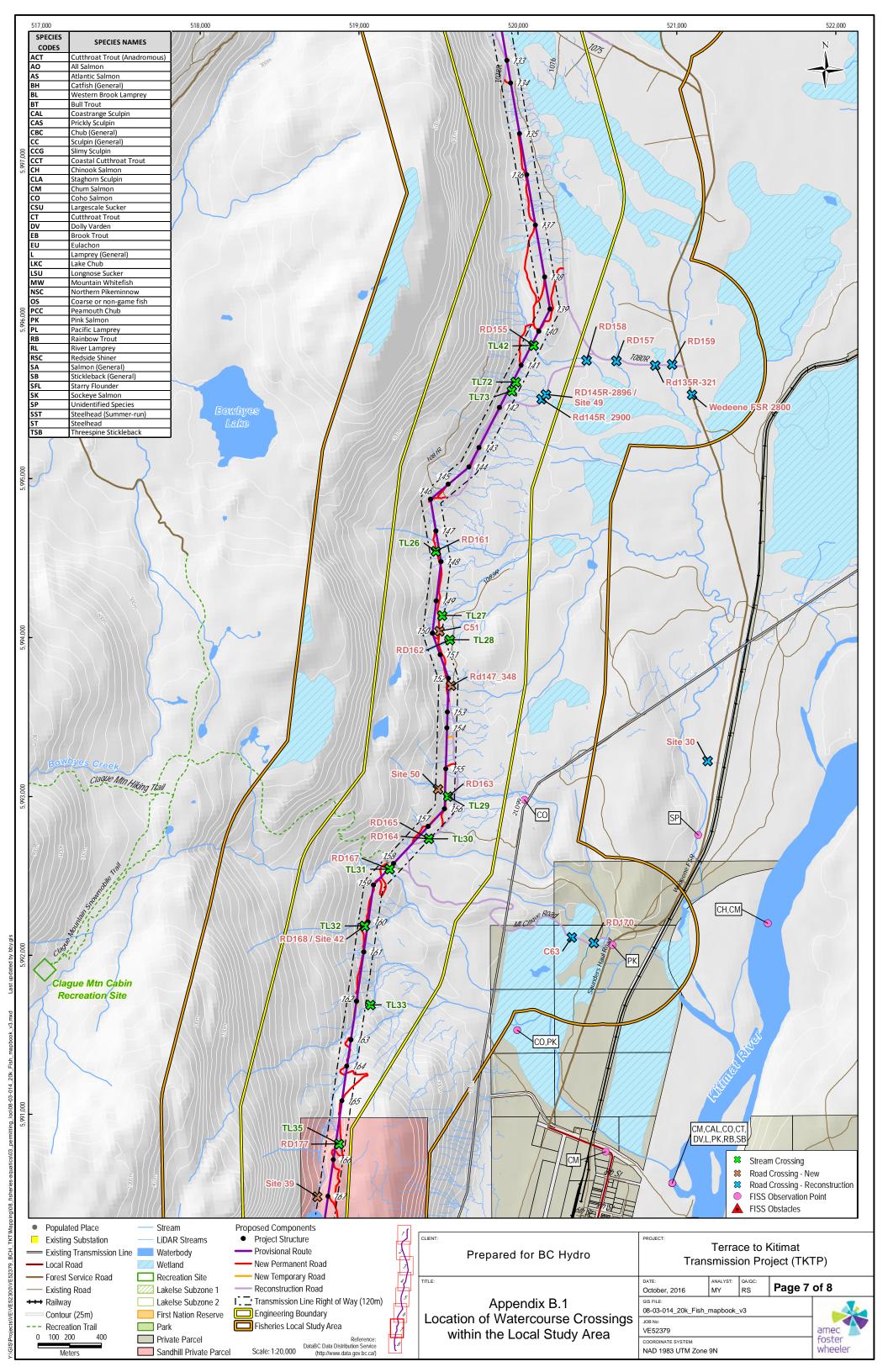


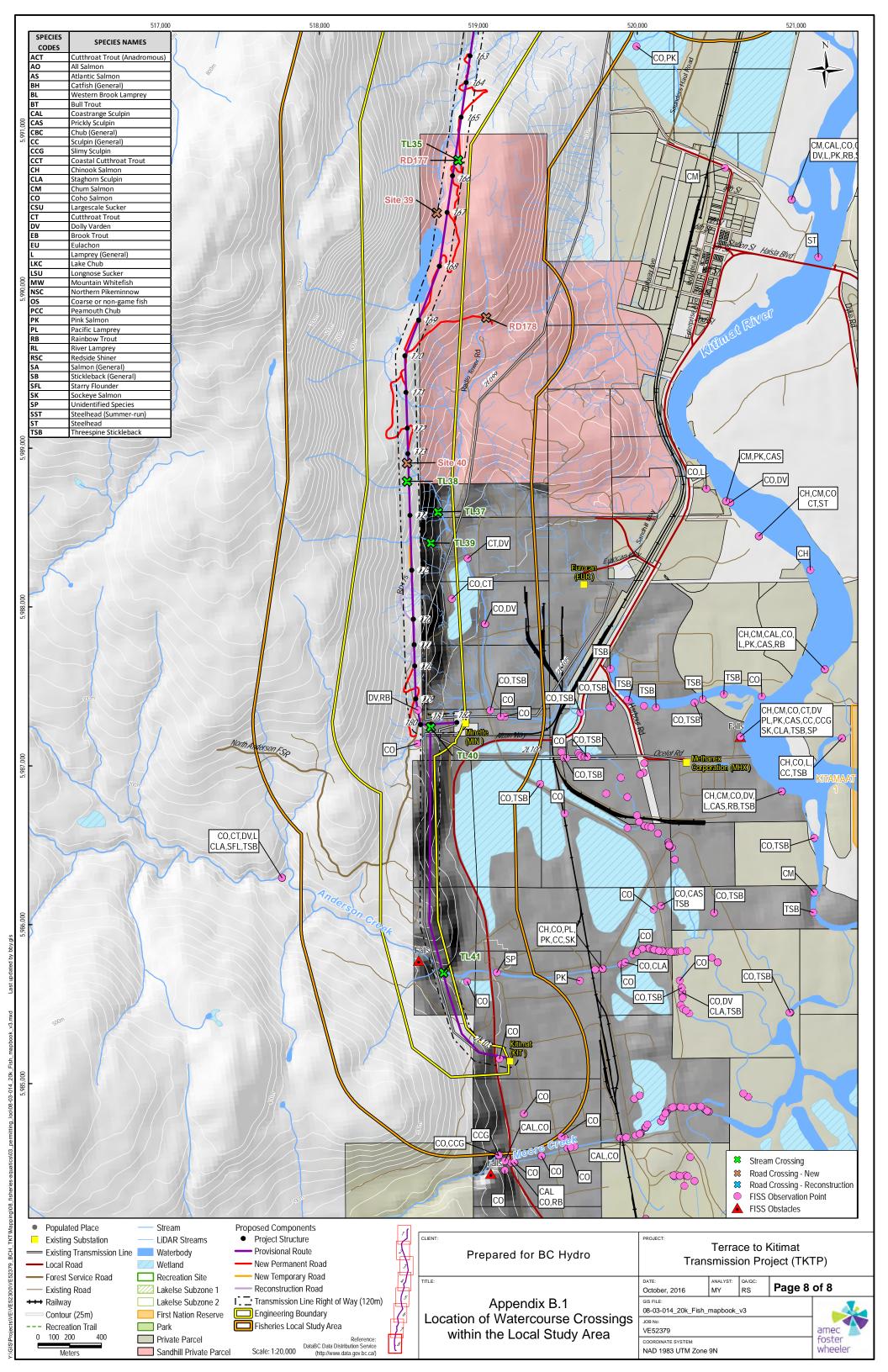












PREPARED FOR BC HYDRO

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
TERRACE – KITIMAT TRANSMISSION PROJECT
ENVIRONMENTAL AND SOCIO-ECONOMIC EFFECTS REPORT

Appendix B.2

Aquatic Catalogue



Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmission	on Line	Site N	umber	11B				Structure	e No.	7
Watershed Code:		No data				Stream Ord	er	1				
Stream Name		Unnamed				Stream Clas	S	S3				
Crew		IM, HC, JS				UTM_Zone		09	UTN	1 Northin	5	6030961
Survey Date		6/28/2016							UTN	1 Easting		523496
Time		15:28:02				Site Length	Site Length (m) 150					
Channel		Dry Channe	el			Features	Features None					
Mean Channel Wid	dth (m)	1.95	Mean We	tted Wi	dth (m)	0.00	0.00 Mean Residual Pool Depth (m)					
Mean Gradient (%)	4	ate	Fines Sub-dominate Substrate Grav						vels .		
In-stream Cover		Abundant	Dominant		OV	OV Sub-dominant co				LWD	, SWD	
Water Quality	Tempe	rature (Deg C)	Conductivit	m)	No data	Turbi	dity	No data				
Riparian Vegetation	on					Crown Clos	ure			71-90%		
Left Bank Shape		Sloping	Ţ.			Right Bank	Shape			Sloping		
Left Bank Texture		Fines				Right Bank	Right Bank Texture Fines					
Left Bank Riparian	Vegetat	ion Mixed	vood			Right Bank	Riparia	n Veget	ation	Mixedwo	od	
Left Bank Stage		Young	Forest			Right Bank	Stage			Young Fo	rest	
Habitat Comment	s F	ish Species	AO - All Salm	onids								
Spawning	No	one - Very limited g	ravel, abundant find	es cloggin	g interstices							
Rearing	Po	or - Limited by lack	of flows. Only prov	vides rear	ing during fr	eshet. Good cove	r availabil	ity.				
Overwintering	No	one - None, no deep	pools, likely no wa	ater depth	ns.							
Migration	Po	oor - No barriers ide	ns, possible	only during high w	ater.							
Fish Information	Historical Fish Presence No data											
Fished -2015	N	ot visited	Species Capt	ured-20)15	N/A Species S		Stage-201	.5	N/A		
Fished -2016	No Species Captured-2016					N/A			Species :	Stage-201	.6	N/A

Photo Comments

Downstream extent of transects.

Site Comments

Dry channel, only potential for fish habitat during high flow periods. Fish may access site from downstream fish-bearing creek when water present, no barriers present. Downstream channel is well defined with alluvial materials present. Upstream of culvert, drainage becomes undefined, broad and damp area, with abundant skunk cabbage, poor to nil fish habitat. Culvert is wood log culvert, appears to allow water through. Potentially fish bearing during high flows.



Notes:	Cove	•	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD B	Small woody debris Large woody debris Boulder	AS CC CCT	Atlantic salmon Sculpins Coastal cutthroat trout	DV L PK PL	Dolly varden Lamprey Pink salmon Pacific Lamprey	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	UC DP	Undercut bank Deep pools	CH CM	Chinook salmon Chum salmon	RB SA	Rainbow trout Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmissio	n Line	Site N	umber	14A				Structure	e No.	4
Watershed Code:		No data				Stream C)rder	1				
Stream Name		Unnamed				Stream C	lass	S3				
Crew		HC, IM, JS				UTM_Zoi	ne	09	UTN	/I Northin	5	6030192
Survey Date		6/28/2016							UTN	/I Easting		523581
Time		10:51:54				Site Leng	Site Length (m) 100					
Channel		Dry Channe	I			Features None						
Mean Channel Wid	dth (m)	1.82	Mean We	tted Wi	dth (m)	0.00		Mean	Residual P	ool Depth	(m)	0.00
Mean Gradient (%))	6	Dominate	ate	Fines Sub-dominate Substra					Grav	rels	
In-stream Cover		Abundant	Dominant		LWD	LWD Sub-dominant cove), OV	
Water Quality	Tempera	mperature (Deg C) No data pH No data					ivity (uS/c	m)	No data	Turbi	dity	No data
Riparian Vegetation	on					Crown C	Closure			41-70%		
Left Bank Shape		Underc	ut		Right Ba		Sloping					
Left Bank Texture		Fines				Right Ba	nk Texture	9		Gravels		
Left Bank Riparian	Vegetatio	on Conifer	ous			Right Ba	nk Riparia	n Veget	ation	Coniferou	IS	
Left Bank Stage		Mature	Forest			Right Ba	nk Stage			Mature F	orest	
Habitat Comments	s Fis	sh Species	AO - All Salm	onids								
Spawning	Non	ie - Ephemeral stre	am where egg mo	rtality is l	ikely, given	hat the chann	el was dry du	iring time	of survey.			
Rearing	Poo	r - Poor flow conne	ectivity may strand	l rearing f	fish during lo	w water perio	ds. Small cha	nnel area	offers limited	rearing area		
Overwintering	Non	ie - Dry, no deep po	ools observed.									
Migration	Poo	Poor - Dry during survey. No migration potential during low					No permanen	t barriers	to fish passag	e observed.		
Fish Information	Historical Fish Presence No data											
Fished -2015	5 Not visited Species Captured-2015					N/A			Species	Stage-201	.5	N/A
Fished -2016	No Species Captured-2016					N/A Species Stage-2016 N/A				N/A		

Photo Comments

Crossing location. Downstream extent of survey, showing the dry, defined channel.

Site Comments

Ephemeral, defined channel was dry during time of survey. Drainage likely has flow conenctivity only during meltwater/runoff periods. Site is upstream of perched culvert barrier at the downstream railroad crossing.



Notes:	Cove	r	Fish	Species	D1./	B II I	St	ream Class		
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fis S1 S2 S3	h bearing > 20 m > 5 m - 20 m 1.5 m - 5 m < 1.5 m	S5 S6 NVC	fish bearing > 3 m No visible channel Non-classified drainage
	DP OV IV	Deep pools Overhanging vegetation Instream vegetation	CM CO CCG	Chum salmon Coho salmon Slimy sculpin	SA SK TSB	Salmon Sockeye salmon Threespine stickleback	54	< 1.5 m	NCD	and wetlands are non-fishing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Trai	nsmissior	n Line	Site N	lumber	24A			·	Structur	e No.	24
Watershed Code:		No	data		*		Stream	Order	1				·
Stream Name		Unr	named				Stream	Class	Wetla	nd			
Crew		IM,	HC, JS				UTM_Zc	ne	09	UTI	И Northin	g	6028066
Survey Date		6/2	9/2016							ITU	√ Easting		521470
Time		11::	15:29				Site Len	Site Length (m) 100					
Channel		We	tland				Featur	Features None					
Mean Channel W	idth (m) No da	ata	Mean We	tted Wi	idth (m)	No data		Mean	Residual P	ool Depth	n (m)	No data
Mean Gradient (%	6)	No da	ata	Dominate	Substr	ate	No data		Sub-d	ominate Su	ıbstrate	No c	data
In-stream Cover	er No data Dominant cover						No data Sub-dominant cover No data					data	
Water Quality	Tem	perature (Deg C)	No data	рН	No data	Conduc	ctivity (uS/c	m)	No data	Turb	idity	No data
Riparian Vegetati	ion			•			Crown	Closure			No data		
Left Bank Shape			No data				Right B	ank Shape			No data		
Left Bank Texture	!		No data				Right B	ank Texture	е		No data		
Left Bank Ripariar	n Veget	tation	No data				Right B	ank Riparia	n Vege	tation	No data		
Left Bank Stage			No data				Right B	ank Stage			No data		
Habitat Commen	ts	Fish Spe	cies	N/A									
Spawning		N/A											
Rearing		N/A											
Overwintering		N/A											
Migration		N/A											
Fish Information		Historical	Fish Pres	sence N	o data								
Fished -2015		No		Species Capt	tured-2	015	N/A			Species	Stage-20	15	N/A
Fished -2016	d -2016 Yes Species Captured -2016				016	NFC				Stage-20		N/A	

Photo Comments

Crossing site overview.

Site Comments

Site consists of a series of open water wetland pools, separated by beaver dams and vegetated marsh sections. No channelization or scour observed. No flowing water, pools are connected by groundwater seep only. No overland flow. Organic substrates only, no alluvial material present. Abundant algal mats. Drainage offers no fish habitat.



Notes:	Cove	r	Fish	Species	D) /	Dellassenden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throoping sticklohook		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Trai	nsmissior	n Line	Site N	lumber	25B			Structure N	lo. 26		
Watershed Code:		No	data				Stream Order	1					
Stream Name		Unr	named				Stream Class	NCD					
Crew		HC,	IM, JS				UTM_Zone	09	UT	M Northing	6027584		
Survey Date		6/2	9/2016						UT	M Easting	521338		
Time		12:2	26:31				Site Length (m)	100					
Channel		Nor	n-classifie	d Drainage			Features						
Mean Channel Wid	dth (m)	0.59		Mean W	etted Wi	idth (m)	0.00	Mea	n Residual F	ool Depth (m	0.00		
Mean Gradient (%))	9		Dominat	e Substr	ate	Fines	iravels					
In-stream Cover		N/A		Dominan	nt cover		N/A	I/A					
Water Quality	Tempe	rature (Deg C)	No data	рН	No data	Conductivity (uS/	cm)	No data	Turbidit	y No data		
Riparian Vegetatio	on						Crown Closure			N/A			
Left Bank Shape			Sloping				Right Bank Shape		Sloping				
Left Bank Texture			Fines				Right Bank Textur	re		Fines			
Left Bank Riparian	Vegetat	ion	Conifero	us			Right Bank Riparia	an Vege	etation	Mixedwood			
Left Bank Stage			Young Fo	orest			Right Bank Stage			Young Fores	st		
Habitat Comments	s F	ish Spe	cies	N/A									
Spawning	N/	'A											
Rearing	N/	/A											
		/ ^											
Overwintering	N/	'A											
Migration	N/	'A											
				1									
Fish Information	Hi	istorical	Fish Pres	sence	No data								
Fished -2015	N	Not visited Species Captured-2015					N/A		Species	Stage-2015	N/A		
-													

N/A

Photo Comments

Fished -2016

At crossing location.

Site Comments

Intermittent channel definition present, fine substrates with few sections of gravel. Some isolated shallow pools present with depth <10 cm. Fish access restricted due to subsurface flow and lack of connection between any visible surface water. Non-fish bearing. No obvious barriers observed downstream where stream crosses track.

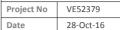
Species Captured-2016

No



Notes:	Cover		Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish

Prepared for BC Hydro





Crossing Type		Transmission	ı Line	Site N	lumber	44C			Structure No	o. 45
Watershed Code:		No data				Stream Order	1			
Stream Name		Unnamed				Stream Class	S3			
Crew		NN, DF, JR				UTM_Zone	09	UTN	1 Northing	6022251
Survey Date		6/29/2016						UTN	1 Easting	522835
Time		12:39:59				Site Length (m)	100			
Channel		Visible chann	nel			Features				
Mean Channel W	idth (m)	1.72	Mean W	etted W	idth (m)	0.30	0.02			
Mean Gradient (%	ó)	1	Domina	te Substr	ate	Fines	Sub-de	ominate Su	bstrate Fi	nes
In-stream Cover		Abundant	Domina	nt cover		OV	Sub-de	ominant co	ver LV	VD, SWD
Water Quality	Tempe	rature (Deg C)	14.3	рН	6.6	Conductivity (uS/	/cm)	37	Turbidity	C-Clear
Riparian Vegetati	on					Crown Closure			71-90%	
Left Bank Shape		Sloping				Right Bank Shape	ž		Sloping	
Left Bank Texture		Fines				Right Bank Textu	re		Fines	
Left Bank Ripariar	n Vegetati	on Mixedwo	boc			Right Bank Ripari	an Veget	tation	Mixedwood	
Left Bank Stage		Mature F	Forest			Right Bank Stage			Mature Fore	st
Habitat Commen	ts Fi	ish Species	AO - All Sa	Imonids						
Spawning	No	ne - No habitat. Fines	s for bed mate	rial, no coa	rse gravels.					
Rearing		or - Poor to moderate grade to moderate in		ıveniles dep	ending on w	ater levels and time of ye	ar. Currently	ly poor habitat	due to low flow.	Rated as poor but would
Overwintering	No	ne - Too shallow no d	edo slooq qəək	served.						
Migration	Pod	or - Juveniles can mig	rate at high flo	ows. Shallov	w isolated po	ools at present with no flo	w connectir	ng the pools.		
Fish Information	Hi	storical Fish Pres	sence	No data						
Fished -2015	No	ot visited	Species Ca	ptured-2	015	N/A		Species	Stage-2015	N/A
	-2016 Yes Species Captured-2016									

Photo Comments

View of dry channel at upper limit of survey.

Low energy stream, fine bed material with diverse cover. Moderate coho juvenile habitat. Cool water although shallow. No spawning or overwintering habitat. A trace of small gravels at the lower end of site. Coho juveniles viewed in pools, 2 captured.



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	1\/	Instream vegetation	CCG	Slimy sculpin	TCD	The second second second second		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmissio	n Line	Site N	umber	44F			St	ructure No		
Watershed Code:		No data				Stream Order	2					
Stream Name		Unnamed				Stream Class	S	3				
Crew		NN, DF, JR				UTM_Zone	0	9	UTM N	orthing	6022253	
Survey Date		6/29/2016							UTM E	asting	522861	
Time		14:21:23				Site Length (m)	Site Length (m) 100					
Channel		Visible char	nnel			Features	Features None					
Mean Channel Wi	dth (m)	2.35	Mean W	etted Wid	dth (m)	0.93	0.03					
Mean Gradient (%	ó)	1	Fines	es								
In-stream Cover		Abundant	OV	OV Sub-dominant cov			· SW	/D				
Water Quality	Tempe	rature (Deg C)	14.3	рН	6.9	Conductivity (uS/cm)	75		Turbidity	C-Clear	
Riparian Vegetati	on		Crown Closure	!		71-	-90%					
Left Bank Shape		Sloping				Right Bank Shape Slo				ping		
Left Bank Texture		Fines				Right Bank Tex	ture		Fin	es		
Left Bank Riparian	Negetat	ion Mixedv	vood			Right Bank Rip	arian V	/egetation	Mi	xedwood		
Left Bank Stage		Mature	Forest			Right Bank Sta	ge		Ma	ature Fores	t	
Habitat Comment	ts F	ish Species	AO - All Sa	Imonids								
Spawning	No	one - No habitat. No	alluvial substra	tes.								
Rearing	Ро	or - Poor habitat du	e to poor conne	ectivity to ma	in channel.	Lower 10 m connected	d with ea	asy access nea	ar confluen	ce with 44C.		
Overwintering	No	one - No deep pools										
Migration	Ро	or - Poor migration	uveniles fis	h.								
Fish Information	formation Historical Fish Presence No data											
Fished -2015	No	ot visited	Species Ca	ptured-20)15	N/A		Sp	ecies Sta	ge-2015	N/A	
Fished -2016	No	No Species Captured-2016				N/A		Sp	ecies Sta	ge-2016	N/A	

Photo Comments

Photos of shallow standing water with coho fry observed near confluence with 44C.

Site Comments

Small channel that is connected to 44C. Coho observed downstream in 44C drainage.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon Slimy sculpin	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Tr	ansmissio	n Line	Site N	lumber	44G	St	Structure No. 45			
Watershed Code:	No	o data				Stream Order	1				
Stream Name	Ur	nnamed				Stream Class	S4				
Crew	1/1	N, DF, JR				UTM_Zone	09	UTM N	Vorthing		6022226
Survey Date	6/	29/2016						UTM E	asting		522826
Time	15	:07:08				Site Length (m)	100				
Channel	Dr	y Channel				Features	None				
Mean Channel Width (m) 1.16	5	Mean We	etted W	idth (m)	0.00	Mean Residual Pool Depth (m) 0.00				0.00
Mean Gradient (%)	2		Dominate	Substr	ate	Fines	Sub-domin	Sub-dominate Substrate Gravels			
In-stream Cover	Abu	ndant	Dominant	t cover		OV	Sub-domin	ant cove	r	LWD,	SWD
Water Quality Ter	mperature	(Deg C)	No data	рН	No data	Conductivity (uS/o	cm) No	data	Turbid	ity	No data
Riparian Vegetation						Crown Closure 71-90%					
Left Bank Shape		Sloping				Right Bank Shape		Slo	Sloping		
Left Bank Texture		Fines				Right Bank Textur	e	Fir	nes		
Left Bank Riparian Veg	etation	Mixedw	ood			Right Bank Riparia	an Vegetation	n Mi	ixedwoo	d	
Left Bank Stage		Mature	Forest			Right Bank Stage Mature Forest					
Habitat Comments	Fish Sp	ecies	AO - All Saln	nonids							
Spawning	None - No	gravels prese	ent.								
Rearing	Poor - Sea	sonal channe	l with limited siz	e.							
Overwintering	None - No	deep pools.									
Migration	Poor - Poo	r for migratio	on although poss	ible durin	g higher wat	er.					
Fish Information	Historic	al Fish Pre	sence N	lo data							

N/A

N/A

Photo Comments

Fished -2015

Fished -2016

Dry channel in thick understory.

Site Comments

Dry channel but when wetted would be poor to moderate for coho juveniles.

Not visited

Species Captured-2015

Species Captured-2016



Species Stage-2015

N/A

Notes:	Cove	r	Fish	Species	D1./	B. II I	Stı	eam Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fis	n bearing	Non-fish	bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3	3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD No	n-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and	wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing e	except where noted.

Prepared for BC Hydro





Crossing Type	Transmission	Line	Site N	umber	44H	Structure No. 44					
Watershed Code:	No data				Stream Order	2	2				
Stream Name	Unnamed				Stream Class	S3					
Crew	NN, DF, JR				UTM_Zone	09	UTM	Northing	5	6022202	
Survey Date	6/29/2016						UTM	Easting		522842	
Time	13:49:31				Site Length (m)	100					
Channel	Dry Channel				Features	None					
Mean Channel Width (m)	1.75	Mean Wet	ted Wi	dth (m)	0.00	Mean	Mean Residual Pool Depth (m)			0.00	
Mean Gradient (%)	1	Dominate	Substra	ate	Fines	Sub-d	Sub-dominate Substrate Fines				
In-stream Cover	Abundant	Dominant	cover		OV	Sub-d	lominant cov	er	LWD,	SWD	
Water Quality Temper	ature (Deg C)	No data	рН	No data	Conductivity (uS/d	Conductivity (uS/cm) No data Turbidity No			No data		
Riparian Vegetation				Crown Closure 71-909			1-90%				

Water Quality	Temperature	(Deg C)	No data	рН	No data	Conductivity (uS/cm)	No data	Turbidity	No data
Riparian Vegetation	on					Crown Closure	7	1-90%	
Left Bank Shape		Sloping				Right Bank Shape	S	loping	
Left Bank Texture		Fines				Right Bank Texture	F	ines	
Left Bank Riparian	Vegetation	Mixedwo	od			Right Bank Riparian Vege	etation N	1ixedwood	
Left Bank Stage	•	Mature F	orest			Right Bank Stage	N	lature Forest	·
Habitat Comment	s Fish Sp	ecies	AO - All Salm	nonids	-				

Habitat Comments	risit species AO - Ali Salitionius
Spawning	None - No alluvial substrates for spawning.
Rearing	Poor - Coho could use this habitat at high water, based on proximity and potential connectivity to downstream observed rearing habitat.
Overwintering	None - No pools observed.
Migration	Poor - Some areas are poor for migration of juveniles due to dewatering or low flows. May be possible at higher flows.

Fish Information	Historical Fish Pre	sence	No data			
Fished -2015	Not visited	Species C	aptured-2015	N/A	Species Stage-2015	N/A
Fished -2016	No	Species C	aptured-2016	N/A	Species Stage-2016	N/A

Photo Comments

View of dry channel.

Site Comments

Dry channel, habitat poor to moderate in the rainy season or spring snow melt.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon Slimy sculpin	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Transmis	sion Line	Site N	lumber	46C.1			Structure No	. 47		
Watershed Code:	No data				Stream Order	2					
Stream Name	Unnamed				Stream Class	S3					
Crew	NN, DF				UTM_Zone	09	UTN	1 Northing	6021618		
Survey Date	6/30/201	6					UTN	1 Easting	523130		
Time	09:58:49				Site Length (m)	300					
Channel	Visible ch	annel			Features	None	None				
Mean Channel Width (r	n) 2.62	Mean V	Wetted Wi	dth (m)	1.37	1.37 Mean Residual Pool Depth (m) 0					
Mean Gradient (%)	1	ate Substra	ate	Fines	Sub-do	ominate Su	bstrate Co	bbles			
In-stream Cover	Moderate	Domina	ant cover		SWD	Sub-do	ominant co	ver LW	/D, OV		
Water Quality Tem	nperature (Deg C) 8.3	рН	6.6	Conductivity (uS/o	cm)	45	Turbidity	C-Clear		
Riparian Vegetation				•	Crown Closure		41-70%				
Left Bank Shape	Slopi	ng			Right Bank Shape		Sloping	ng			
Left Bank Texture	Fines				Right Bank Textur	е		Fines			
Left Bank Riparian Vege	etation Mixe	dwood			Right Bank Riparia	ın Vegeta	ation	Mixedwood			
Left Bank Stage	Matu	re Forest			Right Bank Stage	Right Bank Stage Mature Forest					
Habitat Comments	Fish Species	AO - All Sa	almonids								
Spawning	None - No gravels i	surveyed area. A	All fine substr	rates and so	me boulders.						
Rearing	Poor - Wetted chan	nel choked with a	algae and bec	omes dry fu	rther upstream.						
0											
Overwintering	Poor - Limited flow	and lacking deep	pools. One la	arge pool (a	pprox 0.75m depth) at upstr	ream exten	it may provide	e some overwinte	ring habitat.		
Migration		etted at downstre	eam extent of	f transmissio	on crossing but becomes dry	y further u	pstream. Beav	er dam between	tributaries creates a barrier		
	during low flows.		ı								
Fish Information	Historical Fish I	resence	No data								
Fished -2015	Not visited	Species C	aptured-20	015	N/A		Species	Stage-2015	N/A		

N/A

Photo Comments

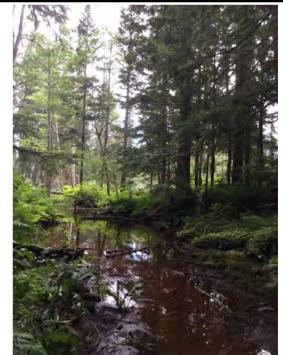
Fished -2016

At the downstream limit of the transmission line crossing.

Site Comments

At downstream extent of survey area the channel is choked in algae and the bed material is predominantly fine and organic materials. Further upstream the channel becomes dry with areas of isolated pools. Coarse substrate is more common further upstream. Fish observed at the downstream extent of the site.

Species Captured-2016



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmissio	n Line	Site N	lumber	46C.2			Structure	e No.	48	
Watershed Code:		No data				Stream Order	2					
Stream Name		Unnamed				Stream Class	S2					
Crew		DF, NN				UTM_Zone	09	09 UTM Northing			6021378	
Survey Date		6/30/2016						UTM Easting 523138				
Time		13:46:19				Site Length (m)	100	100				
Channel		Visible chan	inel			Features	BD	BD - Beaver dam				
Mean Channel W	idth (m	13.33	Mean W	etted Wi	idth (m)	8.67	8.67 Mean Res			(m)	0.77	
Mean Gradient (%	ean Gradient (%) 0 Domina				ate	Fines	Sub	o-dominate Su	ubstrate	Fines		
In-stream Cover	rer Abundant Dominant co					LWD	Sub	o-dominant co	over	SWD,	DP, IV, OV	
Water Quality	Tem	perature (Deg C)	20.1	рН	6.4	Conductivity (uS	/cm)	28	Turbi	dity	C-Clear	
Riparian Vegetat	ion		<u> </u>		•	Crown Closure		1-20%				
Left Bank Shape		Sloping				Right Bank Shape			Sloping			
Left Bank Texture)	Fines				Right Bank Text	ıre		Fines			
Left Bank Riparian	n Vege	tation Mixedw	/ood			Right Bank Ripa	ian Ve	getation	Mixedwo	od		
Left Bank Stage		Young F	orest			Right Bank Stage	Right Bank Stage Young Forest					
Habitat Commen	ts	Fish Species	AO - All Sal	monids								
Spawning		None - No gravel or co	arse substrate. I	Bed materia	als is organi	and fine materials.						
Rearing		Moderate - Impoundm	nents may provid	de rearing o	pportunitie	s as they maintain water	year roui	nd and provide hi	gh amounts o	of cover.		
Overwintering		Good - Sufficient deptl	n for overwinter	ing juvenile	2S.							
Migration		Poor - Beaver dams cre	eate fish barriers	s during lov	v flow seaso	ns. Likely overtopped du	ring highe	er flows.				
Fish Information		Historical Fish Pre	sence	No data								
Fished -2015		Not visited	Species Cap	otured-2	015	N/A		Species	Stage-201	15 I	N/A	
Fished -2016		No	Species Car	otured-2	016	N/A			Stage-201		N/A	

Photo Comments

First beaver impoundment. Looking upstream at the next beaver dam.

Site Comments

Reach 2 is defined by beaver activity creating a series of dams and impoundments. Cover is abundant from depth and woody debris that has entered the impoundments. One small beaver impoundment is in the transmission line right of way and a second, larger beaver is just upstream of the proposed transmission line right of way.



Notes:	Cove	r	Fish	Species	DV	Dellamenten	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vagetation	CCG	Slimy sculpin	TCD	The second second section of the second seco		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Tran	smission	Line	Site N	umber	47B			Structure I	No. 71	
Watershed Code:	No o	data				Stream Order	1				
Stream Name	Unn	amed				Stream Class	S3				
Crew	DF, I	NN				UTM_Zone	09	UTN	/ Northing	6021401	
Survey Date	6/30	0/2016						UTN	1 Easting	523170	
Time	11:4	0:15				Site Length (m)	100				
Channel	Dry	Channel				Features	None				
Mean Channel Width (m) 2.02		Mean We	tted Wi	dth (m)	0.12	Mean	Residual Po	ool Depth (r	m) 0.01	
Mean Gradient (%)	1	2 20111111			ate	Fines	Sub-do	ominate Su	bstrate (Cobbles	
In-stream Cover	Mode	Moderate Dominant cover				SWD	Sub-do	ominant co	ver l	LWD, OV	
Water Quality Ter	nperature (I	Deg C)	No data	рН	No data	Conductivity (uS/d	cm)	No data	Turbidi	ty No dat	:a
Riparian Vegetation						Crown Closure			41-70%		
Left Bank Shape		Sloping				Right Bank Shape			Sloping		
Left Bank Texture		Fines				Right Bank Textur	е		Fines		
Left Bank Riparian Veg	etation	Mixedwoo	od			Right Bank Riparia	an Veget	ation	Mixedwood	b	
Left Bank Stage		Mature Fo	orest			Right Bank Stage Mature Forest					
Habitat Comments	Fish Spec	cies A	AO - All Salm	nonids							
Spawning	None - No gr	avel substrat	te. All fine mate	erials.							
Rearing	Poor - Dry ch	annel. Likely	provides some	rearing h	abitat durin	g higher flows.					
Ü											
Overwintering	None - No de	eep pools. M	ajority of chann	iel dry at t	time of surv	ey.					
Migration	Poor - Dry ch	nannel preve	nt migration. No	o other ba	arriers obser	ved.					
Fish Information	Historical	Fish Prese	ence N	o data							
Fished -2015	Not visited	d S	Species Capt	ured-20)15	N/A		Species	Stage-2015	N/A	
								T T			

N/A

Photo Comments

Fished -2016

Upstream extent of transmission line facing upstream.

Site Comments

Limited channel development at upstream end of the proposed transmission line right of way. Channel dry at time of survey. Bed material predominantly fine and organic materials however some cobble and gravel observed in downstream portion. Ferns and other shrubs growing along stream margins provide cover. Woody debris common in study area.

Species Captured-2016

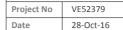


Notes:	Cove	r	Fish	Species	DV	Dellementer	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	Throoping stickloback		bearing except where noted.

Terrace to Kitimat Transmission Project (TKTP)

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type		Transmissio	on Line	Site N	lumber	6A				Structure	e No.	12
Watershed Code:		No data				Stream Order		1				
Stream Name		Unnamed				Stream Class		S3				
Crew		DF, NN				UTM_Zone		09	UTM	Northin	pb	6032244
Survey Date		6/30/2016					Ü					523556
Time		17:10:01				Site Length (m	Site Length (m) 100					
Channel		Visible char	nnel			Features		None				
Mean Channel W	idth (m)	1.58	Mean We	etted W	idth (m)	0.38		Mean Residual Pool Depth (m)				0.04
Mean Gradient (%	6)	6	Dominat	e Substr	ate	Fines		Sub-d	ominate Sub	strate	Grav	/els
In-stream Cover		Abundant	Dominan	t cover		SWD		Sub-d	ominant cov	er	LWE),DP, OV, UC
Water Quality	Temp	erature (Deg C)	12.8	рН	8.5	Conductivity ((uS/cı	m)	90	Turbi	dity	C-Clear
Riparian Vegetat	rian Vegetation					Crown Closur	·e		2	21-40%		
Left Bank Shape		Vertica	I			Right Bank Sh	nape		l	Jndercut		
Left Bank Texture	<u>,</u>	Fines				Right Bank Te	j	ı	Fines			
Left Bank Riparia	n Vegeta	tion Conifer	ous			Right Bank Ri	paria	n Veget	ation	Иixedwo	od	
Left Bank Stage		Mature	Forest			Right Bank St	age		1	Mature F	orest	
Habitat Commen	ts	Fish Species	AO - All Salı	monids								
Spawning	N	lone - Gravel substra	tes limited.									
Rearing	P	oor - Channel not flo	wing at time of s	urvey. Mas	ster course r	may provide rearing օլ	pportu	nities at h	igher flows.			
Overwintering	N	None - Low flow and r	no deep pools.									
Migration	igration Poor - Checked for barriers about halfway to confluence do					nstream. None observ	ved. Se	ctions of	dry channel lim	it migratior	1.	
Fish Information	H	Historical Fish Pro	esence N	No data								
Fished -2015	N	Not visited	Species Cap	tured-2	015	N/A	Species Stage-2015 N/A		N/A			
Fished -2016	N	No	Species Cap	tured-2	016	N/A					N/A	

Photo Comments

Downstram extent of survey, showing an intermittently dry channel with some small pools.

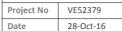
Site Comments

Watercourse is a well-defined, intermittently wet stream. The upstream section is dominated by fine substrates and mostly dry at the time of survey. Some isolated pools are present. Near the downstream extent, the substrate has a greater proportion of gravel/cobble and more of the channel is wetted. Creek is confined by steep valley walls. Mature forest on top of valley. Stream may provide rearing and migration habitat during high-water periods. No barriers observed between survey site and downstream watercourses.



Notes:	Cove	•	Fish	Species	DV	Dellementer	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	There are in a set in laborate		hearing except where noted

Prepared for BC Hydro





Crossing Type		Transmiss	on Line	е	Site N	umber	85A				Structure	e No.	86
Watershed Code:		No data					Stream Order		1				
Stream Name		Unnamed					Stream Class		S6				
Crew		NN, DF					UTM_Zone		09	UTN	/ Northin	pb	6010240
Survey Date		7/6/2016						8					522328
Time		13:46:54					Site Length (m	Site Length (m) 150					
Channel		Visible cha	nnel				Features None						
Mean Channel W	idth (m)	0.57	N	lean Wet	tted Width (m) 0.71				Mean	Residual P	ool Depth	(m)	0.09
Mean Gradient (%	6)	16	D	ominate	Substra	ate	Fines		Sub-d	ominate Su	bstrate	Grav	vels
In-stream Cover		Abundant	D	ominant	cover		UC		Sub-d	ominant co	ver	LWD), SWD, OV
Water Quality	Temp	erature (Deg C)	7.9	9	рН	8.2	Conductivity ((uS/c	m)	68	Turbi	dity	C-Clear
Riparian Vegetat	egetation						Crown Closur	e			21-40%		
Left Bank Shape		Under		Right Bank Sh	ape			Sloping					
Left Bank Texture	2	Fines					Right Bank Texture				Fines		
Left Bank Riparia	n Vegeta	ntion Conife	rous				Right Bank Rij	paria	n Veget	tation	Coniferou	ıs	
Left Bank Stage		Young	Forest	t			Right Bank Sta	age			Young Fo	rest	
Habitat Commen	ts	Fish Species	AO -	- All Salm	onids								
Spawning	N	None - No spawning	habitat, ı	no gravels a	ınd limite	d channel a	rea.						
Rearing	P	Poor - Some small dr	ops and s	subsurface	flow mak	e this strea	m poor rearing potent	tial for	salmonio	ds.			
Overwintering	N	None - No deep poo	s and sm	nall amount	of flow a	t the time o	f survey.						
Migration	Poor - Migration potential for juveniles is poor due to sub-						ace flow and small dro	ops. A	dult migra	ation is limited	by low flow	depths	i.
Fish Information	H	Historical Fish P	esence	e N o	o data								
Fished -2015	N	Not visited	Spec	cies Capt	ured-20	015	N/A	N/A Species Stage-2015 N/A			N/A		
Fished -2016	Υ	⁄es	Spec	cies Capt	ured-20	016	NFC	C Species Stage-2016 N/A			N/A		

Photo Comments

View of channel near downstream end of site.

Some subsurface flow and small drops about 50 cm high. Becomes spread out in places upstream with some overland flow. Flow disappears downstream and goes subsurface for at least 30 m.



Notes:	Cover		Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Trans	smission	Line	Site N	lumber	91	В			Structure	e No.	
Watershed Code:		No d	ata				St	tream Order	1				
Stream Name		Unna	amed				St	tream Class	NCD				
Crew		HC, I	M, JS				U	TM_Zone	09	UTI	M Northin	pb	6031600
Survey Date		6/28	/2016							UTI	Ⅵ Easting		523592
Time		17:1:	1:37				Si	ite Length (m)	100				
Channel		Non-	classifie	d Drainage				Features	None				
Mean Channel W	idth (n	n) 0.71		Mean We	an Wetted Width (m)			51	Mean	Residual P	ool Depth	(m)	0.00
Mean Gradient (%	6)	17		Dominate	Substr	ate	Fir	nes	Sub-dominate Substrate Fines				S
In-stream Cover		N/A		Dominan	t cover		N/	'A	Sub-d	lominant co	ver	N/A	
Water Quality	Tem	perature (D	eg C)	No data	рН	No data	a (Conductivity (uS/ci	m)	No data	Turbi	dity	No data
Riparian Vegetat							(Crown Closure			N/A		
Left Bank Shape	ft Bank Shape Vertical						F	Right Bank Shape			Vertical		
Left Bank Texture	!	F	ines				F	Right Bank Texture	9		Fines		
Left Bank Riparian	n Vege	tation (Conifero	us		Right Bank Riparian Vege			tation	Coniferou	ıs		
Left Bank Stage		ľ	Mature F	orest			F	Right Bank Stage			Mature F	orest	
Habitat Commen	ts	Fish Speci	es	N/A									
Spawning		N/A											
Rearing		N/A											
Overwintering		N/A											
Migration		N/A											
Fish Information		Historical F	ish Pres	ence N	lo data								
Fished -2015		Not visited		Species Cap	tured-2	015	N/A Species Stage-2015 N/A			N/A			
Fished -2016 No Species Captured-2016					016	N/A Species Stage-2016 N/A				N/A			

Photo Comments

Taken at crossing location.

Site Comments

Incised drainage with little to no surface water present at crossing location or surveyed reach. Approx 30 m upstream of crossing drainage channel disappears and ends at a pool of groundwater seep. No alluvial substrate materials present. High gradient. No fisheries access above crossing location and below crossing slumping banks nearly close channel and flow becomes subsurface. Very small drainage area and flows are likely minimal even during freshet. Small residual pools present and less than 5cm depth.



Notes:	Cove	•	Fish	Species	DV	Dellermades	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	Throoping stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Transmission	n Line	Site N	lumber	TL1			Structure No	. 9	
Watershed Code:	400-181319-	-64198			Stream Order	N/A	· · · · · · · · ·			
Stream Name	Unnamed				Stream Class	NVC				
Crew	IM, NN				UTM_Zone	09	UTN	1 Northing	6033363	
Survey Date	6/16/2015						UTM Easting 523581			
Time	17:15:27				Site Length (m)					
Channel	No Visible Cl	nannel			Features	None			-	
Mean Channel Width	(m) N/A	Mean W	Vetted Wi	idth (m)	N/A	Mean F	Residual Po	ool Depth (m)	N/A	
Mean Gradient (%)	N/A	Domina	te Substr	ate	N/A	Sub-do	minate Su	bstrate N/	4	
In-stream Cover	N/A	Domina	nt cover		N/A	Sub-do	minant co	ver N/	Α	
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/d	cm)	N/A	Turbidity	N/A	
Riparian Vegetation					Crown Closure			N/A		
Left Bank Shape	t Bank Shape N/A				Right Bank Shape			N/A		
Left Bank Texture	N/A				Right Bank Textur	е		N/A		
Left Bank Riparian Veg	getation N/A			·	Right Bank Riparia	n Vegeta	ation	N/A		
Left Bank Stage	N/A				Right Bank Stage			N/A		
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
Overwintering	N/A									
Overwintering	IV/A									
Migration	N/A									
		1								
Fish Information	Historical Fish Pre	sence	No data							
Fished -2015 No Species Captured-2015			N/A Species Stage-2015 N/A			N/A				
ished -2016 No Species Captu				016	N/A		Species	Stage-2016	N/A	

Photo Comments

No visible channel, shallow depression area. Looking upslope.

Site Comments

No scour or substrate present. No water.



Notes:	Cove	r	Fish	Species	DV	Dellassenden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback		bearing except where noted.

Terrace to Kitimat Transmission Project (TKTP)

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

 Project No
 VE52379

 Date
 28-Oct-16



Crossing Type		Tran	smission	Line	Site N	lumber	TL10			Structure No.	. 31
Watershed Code:		400-	-174068-	59390			Stream Order	1			
Stream Name		Unn	amed				Stream Class	S2			
Crew		BH,	IM				UTM_Zone	09	ITU	M Northing	6025902
Survey Date		6/26	5/2015						UTI	M Easting	521516
Time		14:2	4:31				Site Length (m)				
Channel		Visik	ole Chanr	nel			Features	cade, CV -	Culvert, BD - B	eaver dam	
Mean Channel Wi	dth (m)	6.34		Mean V	Vetted W	idth (m)	2.65	Mean	Residual P	ool Depth (m)	0.11
Mean Gradient (%	ó)	11		Domina	ite Substr	ate	Fines	Sub-d	ominate Su	ubstrate Gra	ivels
In-stream Cover		Abund	dant	Domina	nt cover		IV	Sub-d	ominant co	over SW	D, OV
Water Quality	Temp	erature (I	Deg C)	14.8	рН	7.6	Conductivity (uS/d	cm)	59	Turbidity	L-Lightly turbid
Riparian Vegetati	rian Vegetation					•	Crown Closure	·		21-40%	
Left Bank Shape	Sloping						Right Bank Shape			Sloping	
Left Bank Texture			Fines				Right Bank Textur	Fines			
Left Bank Riparian) Vegeta	ation	Mixedwo	od			Right Bank Riparia	an Veget	ation	Mixedwood	
Left Bank Stage		,	Young Fo	rest			Right Bank Stage			Young Forest	
Habitat Comment	ts	Fish Spec	ies	AO - All Sa	almonids						
Spawning	N	Moderate - P	Patches of g	ravels are pre	esent downs	tream away	from the influence of the u	ıpstream r	oad crossing.		
Rearing	N	Moderate - G	Good cover	and diversity,	, although lir	mitied by lov	w flow depths.				
5											
Overwintering	P	Poor - Limite	d by few, sh	nallow pools a	at crossing s	ite.					
Migration	ation Poor - No barrier between downstream habitat and cross						site. Bedrock cascades with	low flow a	and high gradi	ent present upstre	am of TL10 crossing.
				1							
Fish Information	ŀ	Historical	Fish Pres	ence	CCT, PK						
Fished -2015							5 N/A Species Stage-2015 N/A			N/A	
							-				T .

Photo Comments

Fished -2016

Looking upstream towards the barrier site upstream of the crossing site.

Species Captured-2016

Site Comments

There are two bedrock chute/cascades upstream of the transmission line crossing towards site RD114 / Bridge Site 38. Gradient in the chutes is high (>20%) with two cascade drops of approximately 2 m and is a barrier to fish passage. Morphology at the TL10 crossing is bedrock chute habitat for about 40 meters before flowing in a cobble gravel stream. Electrofishing and minnow trapping upstream habitat did not capture any fish in 2015 or 2016. Electrofishing was conducted in the pool immediately below the barrier in 2016 and a cutthroat trout was captured quickly. The stream is therefore rated as fish-bearing up to the barrier and at the TL10 crossing site.



Juvenile

Notes:	Cove	r	Fish	Species	D) /	Dellerenden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmissio	n Line	Site N	lumber	TL11			Structure	No.	45
Watershed Code:		400-174068	3-59390			Stream Order	3				
Stream Name		Unnamed				Stream Class	S2				
Crew		IM, BH, KE,	PG			UTM_Zone	09	UTN	/ Northing	(6022301
Survey Date		6/26/2015						UTN	/I Easting	Į	522847
Time		09:01:38				Site Length (m)	Site Length (m) 100				
Channel		Visible Char	nnel			Features	BG -	Crossing, ge	neral		
Mean Channel W	idth (m)	10.40	Mean V	Vetted Wi	idth (m)	7.77	Mear	n Residual P	ool Depth (m)	0.65
Mean Gradient (%	6)	2	Domina	ite Substr	ate	Cobbles	Sub-c	dominate Su	bstrate	Grave	ls
In-stream Cover		Abundant	Domina	int cover		DP	Sub-o	dominant co	ver	LWD,	SWD, B, UC
Water Quality	Temp	erature (Deg C)	10.6	рН	7.3	Conductivity (uS/	cm)	20	Turbid	lity	C-Clear
Riparian Vegetat	ion					Crown Closure			41-70%		
Left Bank Shape		Underci	ut			Right Bank Shape			Undercut		
Left Bank Texture	<u>.</u>	Gravels				Right Bank Texture			Gravels		
Left Bank Riparia	n Vegeta	ation Mixedw	/ood			Right Bank Riparia	an Vege	etation	Mixedwoo	d	
Left Bank Stage		Mature	Forest			Right Bank Stage			Mature Fo	rest	
Habitat Commen	ts	Fish Species	AO - All Sa	lmonids							
Spawning	E	Excellent - Abundant g	ravels, riffle po	ool sequence	s, good grav	el variety.					
Rearing	E	Excellent - High cover,	excellent pool	habitats, go	od habitat v	ariety, many fry and parr ol	bserved.				
Overwintering	E	Excellent - Abundant d	eep pools, goo	d flow, good	doxidation f	rom small step pools.					
Migration	ration Excellent - No barriers, deep flows for all species, modera						g pools.				
Fish Information	ŀ	Historical Fish Pre	esence	CO, CCT,	DV, RB, C	CM, ST					
Fished -2015	1	No	Species Ca	aptured-2	015	N/A		Species	Stage-2015	5 N	I/A
Fished -2016						N/A		Species	Stage-2016	6 N	I/A

Photo Comments

Crossing site looking downstream.

Site Comments

Overall excellent stream for all life stages, excellent diversity of habitats, good substrate variety, abundant refugia, high cover, deep pools abundant. Abundant young of the year coho observed.



Notes:	Cove	•	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmissio	n Line	Site No	umber	TL11B	45					
Watershed Code:		400-174068	3-59390			Stream Order	2					
Stream Name		Unnamed				Stream Class	S2					
Crew		BH, IM				UTM_Zone	09	UTN	1 Northin	g	6022118	
Survey Date		6/26/2015						UTN	1 Easting		522828	
Time		09:55:51				Site Length (m)	100					
Channel		Visible char	inel			Features None						
Mean Channel Wie	dth (m)	6.02	Mean We	tted Wid	dth (m)	3.99	Mean	0.22				
Mean Gradient (%)	3	Dominate	Substra	te	Cobbles	Sub-d	ominate Su	bstrate	Grav	rels	
In-stream Cover	-stream Cover Abundant					LWD	Sub-d	ominant co	ver	SWD	, DP,UC	
Water Quality	Tempe	erature (Deg C)	12.5	рН	6.8	Conductivity (uS/d	cm)	35	Turbi	dity	C-Clear	
Riparian Vegetation	on					Crown Closure			41-70%			
Left Bank Shape		Sloping				Right Bank Shape			Undercut			
Left Bank Texture		Fines				Right Bank Textur	е		Fines			
Left Bank Riparian	Vegeta	tion Mixedw	/ood			Right Bank Riparian Vegetation			Mixedwood			
Left Bank Stage		Mature	Forest			Right Bank Stage Mature Forest						
Habitat Comment	s F	Fish Species	AO - All Salm	nonids								
Spawning	G	ood - Abundant grav	els in riffles and po	ool tail out	S.							
Rearing	G	ood - Lots of shallow	pools, undercuts,	and funct	ional large	woody debris.						
Overwintering	M	loderate - Deep pool	s are rare. Most p	ools are <	50 cm deep	o.						
Migration	G	ood - No obvious bar	riers to adults in t	o barriers	to juveniles at any flow.							
Fish Information	Н	listorical Fish Pre	esence -									
Fished -2015	N	lo	Species Capt	15	N/A	Species Stage-2015			L5	N/A		
Fished -2016	N	lot visited	Species Capt	ured-20	16	N/A		Species :	Stage-201	16	N/A	

Photo Comments

Looking downstream from top of site.

Site Comments

Good-quality salmon and trout stream. Well defined channel with diverse habitat types and abundant cover. Good spawning habitat on gravel side-channel bars. Salmon fry visible in pools and along margins.



Notes:	Cove	r	Fish	Species	D1./	B. II I	Stı	eam Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fis	n bearing	Non-fish	bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3	3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD No	n-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and	wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing e	except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type											
J. J		Transmissio	n Line	Site No	umber	r TL12 Structure No.					
Watershed Code:		400-174068	-59390			Stream Order	2				
Stream Name		Unnamed				Stream Class	S3				
Crew		BH, IM				UTM_Zone	09	UTN	√ Northing		6021931
Survey Date		6/26/2015						UTN	√ Easting		522974
Time		10:50:16				Site Length (m)	100				
Channel		Visible Chan	nel			Features	None				
Mean Channel Wi	idth (m)	3.48	Mean W	etted Wid	dth (m)	2.75	2.75 Mean Residual Pool Depth (m				
Mean Gradient (%	6)	1	Domina	te Substra	ite	Fines	Sub-d	ominate Su	ıbstrate	Grave	els
In-stream Cover		Abundant	Domina	nt cover		OV	Sub-d	ominant co	over	SWD,	DP,UC
Water Quality	Tempe	nperature (Deg C) 12.4 pH 7.5				Conductivity (uS/c	m)	21	Turbio	dity	C-Clear
Riparian Vegetati	ion					Crown Closure			41-70%		
Left Bank Shape		Undercu	ut			Right Bank Shape			Undercut		
Left Bank Texture	<u> </u>	Fines				Right Bank Texture		Fines			
Left Bank Ripariar	n Vegetati	ion Mixedw	ood			Right Bank Riparia	n Vege	tation	Mixedwoo	od	
Left Bank Ripariar Left Bank Stage	n Vegetati	ion Mixedw Mature				Right Bank Riparia Right Bank Stage	n Vege	tation	Mixedwoo		
				lmonids			n Vege	tation			
Left Bank Stage	ts Fi	Mature ish Species	Forest AO - All Sa		el availabilit				Mature Fo	rest	l cutthroat trout
Left Bank Stage Habitat Commen	ts Fi	Mature ish Species oderate - Low water	Forest AO - All Sa depths current	ly limit grave	el availabilit	Right Bank Stage			Mature Fo	rest	Il cutthroat trout
Left Bank Stage Habitat Commen Spawning	ts Fi	Mature ish Species oderate - Low water awning.	Forest AO - All Sa depths current	ly limit grave		Right Bank Stage y, gravels would likely be su			Mature Fo	rest	Il cutthroat trout
Left Bank Stage Habitat Commen Spawning Rearing	ts Fi	Mature ish Species oderate - Low water awning. oderate - Good cover	Forest AO - All Sa depths current r in pools but lo	ow flow.	d oxygen in	Right Bank Stage y, gravels would likely be su			Mature Fo	rest	Il cutthroat trout
Left Bank Stage Habitat Commen Spawning Rearing Overwintering Migration	ts Fi Mc spa Mc	Mature rish Species oderate - Low water awning. oderate - Good cover	Forest AO - All Sa depths current r in pools but lo	ow flow.	d oxygen in	Right Bank Stage y, gravels would likely be su			Mature Fo	rest	Il cutthroat trout
Left Bank Stage Habitat Commen Spawning Rearing Overwintering	ts Fi Mc spa Mc	Mature ish Species oderate - Low water awning. oderate - Good cover or - Shallow low flow or - Poor for adult fis	Forest AO - All Sa depths current r in pools but lo	ow flow. low dissolved low. Juvenile:	d oxygen in s migration	Right Bank Stage y, gravels would likely be su		at high flow.	Mature Fo	r coasta	ol cutthroat trout

Photo Comments

Crossing site looking downstream.

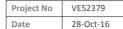
Site Comments

TL12 site was assessed downstream of actual crossing site. Channel characteristics are the same at the crossing site and the assessed site. Channel meanders significantly more than is marked on the FWA 20k map. Red algae present throughout site, coating channel substrates.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro





Transmissio	n Line	Site N	umber	TL13			Structu	re No.	12	
400-174068	-59390			Stream Order	4					
Coldwater C	reek			Stream Class	S1					
BH, IM				UTM_Zone	09	U ⁻	TM Northir	ng	6020727	
6/25/2015						U ⁻	TM Easting		523339	
14:37:41				Site Length (m)	100					
Visible Chan	nel			Features	Features BR - Bridge					
n) 21.7 5	Mean We	etted Wi	dth (m)	15.25 Mean Residual Pool Depth (m) 0					0.00	
3	Dominate	e Substra	ate	Boulders	ominate S	Substrate	Cob	bles		
Moderate	Dominan	t cover		В	Sub-d	ominant (cover	OV		
nperature (Deg C)	8.9	рН	7.7	Conductivity (uS/o	cm)	21	Turb	idity	L-Lightly turbid	
-				Crown Closure			1-20%			
Sloping				Right Bank Shape			Sloping			
Cobbles				Right Bank Textur	e		Cobbles			
etation Mixedw	ood			Right Bank Riparia	an Vege	tation	Mixedwood			
Young F	orest			Right Bank Stage			Young Fo	orest		
Fish Species	AO - All Saln	nonids								
Good - Main stem is to	o fast and rocky	for spawni	ing but dry s	ide channel may be good h	abitat at h	nigher flow.				
Poor - Only along the n	nargins due to ve	ery fast flov	w. Behind b	oulders but not in thalweg.						
Poor - Pools are scarce	at the particular	site. Habi	itat is almos	t exclusively a rapid.						
Good - Adults could pa	ss at current flow	v using bou	ulders as ref	ugia from strong current.						
Historical Fish Pre	sence D	OV, CC, R	B, AS, PK	K, CO, CH, L,						
No				N/A	Species Stage			15	N/A	
Not visited	Species Cap	tured-20	016	N/A				16	N/A	
	A00-174068 Coldwater C BH, IM 6/25/2015 14:37:41 Visible Chan 1) 21.75 3 Moderate 1) Cobbles 1) Cob	6/25/2015 14:37:41 Visible Channel n) 21.75 Mean We 3 Dominate Moderate Dominan perature (Deg C) 8.9 Sloping Cobbles tation Mixedwood Young Forest Fish Species AO - All Salr Good - Main stem is too fast and rocky Poor - Only along the margins due to ve Poor - Pools are scarce at the particular Good - Adults could pass at current flow Historical Fish Presence C	A00-174068-59390 Coldwater Creek BH, IM 6/25/2015 14:37:41 Visible Channel n) 21.75 Mean Wetted Wi 3 Dominate Substra Moderate Dominant cover nperature (Deg C) 8.9 pH Sloping Cobbles Station Mixedwood Young Forest Fish Species AO - All Salmonids Good - Main stem is too fast and rocky for spawning Poor - Only along the margins due to very fast flow Poor - Pools are scarce at the particular site. Hab Good - Adults could pass at current flow using both Historical Fish Presence DV, CC, R No Species Captured-2	Coldwater Creek BH, IM 6/25/2015 14:37:41 Visible Channel n) 21.75 Mean Wetted Width (m) 3 Dominate Substrate Dominant cover perature (Deg C) 8.9 PH 7.7 Sloping Cobbles Ptation Mixedwood Young Forest Fish Species AO - All Salmonids Good - Main stem is too fast and rocky for spawning but dry s Poor - Only along the margins due to very fast flow. Behind b Poor - Pools are scarce at the particular site. Habitat is almos Good - Adults could pass at current flow using boulders as ref Historical Fish Presence DV, CC, RB, AS, PK, No Species Captured-2015	A00-174068-59390 Coldwater Creek BH, IM 6/25/2015 14:37:41 Visible Channel Noderate Dominate Substrate Right Bank Shape Cobbles Right Bank Shape Cobbles Right Bank Riparia Young Forest Right Bank Stage Fish Species AO - All Salmonids Good - Main stem is too fast and rocky for spawning but dry side channel may be good h Poor - Only along the margins due to very fast flow. Behind boulders but not in thalweg Poor - Pools are scarce at the particular site. Habitat is almost exclusively a rapid. Historical Fish Presence DV, CC, RB, AS, PK, CO, CH, L, No Species Captured-2015 N/A	A00-174068-59390 Stream Order 4				

Photo Comments

Taken from bridge looking downstream.

Site Comments

Deep fast-flowing creek.



					1000		A A COLOR	
Notes:	Cove	r	Fish	Species	DV	Dellassades	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCR	Threesnine sticklehack		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



									THICCICI	
Crossing Type	Transmission	Line	Site Number TL14				Structure No. 6			
Watershed Code:	910-665062-	30171			Stream Order	N/A				
Stream Name	Unnamed				Stream Class	NVC				
Crew	BH, IM				UTM_Zone	09	UTM I	Northing	6015677	
Survey Date	6/25/2015						UTM E	asting	523593	
Time	13:39:26				Site Length (m)	100				
Channel	No Visible Ch	nannel			Features	None				
Mean Channel Width	(m) N/A	Mean W	etted Width	n (m)	N/A	Mean Re	esidual Poo	l Depth (m)	N/A	
Mean Gradient (%)	Dominat	e Substrate		N/A	Sub-dominate Substrate			A		
In-stream Cover	Dominar	nt cover		N/A	Sub-don	ninant cove	r N/A	A		
Water Quality Te	mperature (Deg C)	N/A	pH N	I/A	Conductivity (uS/c	m) N	I/A	Turbidity	N/A	
Riparian Vegetation		<u>'</u>			Crown Closure		N,	/A		
Left Bank Shape	N/A				Right Bank Shape		N,	/A		
Left Bank Texture	N/A				Right Bank Texture	е	N,	/A		
Left Bank Riparian Veg	getation N/A				Right Bank Riparia	n Vegetat	ion N,	/A		
Left Bank Stage	N/A				Right Bank Stage		N,	/A		
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
	21/2									
Overwintering	N/A									
Migration	N/A									
		Í								
Fish Information	Historical Fish Pres	sence I	No data				1			
ished -2015 No Species Captured-2015				5	N/A		Species St	age-2015	N/A	
Fished -2016	No	otured-2016	5	N/A		Species St	age-2016	N/A		

Photo Comments

Thick vegetation, no watercourse.

Site Comments

No channel present at crossing location.



Notes:	Cove	r	Fish	Species	DV	Dollywarden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	Throoping stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Tran	nsmission	Line	Site N	lumber							49		
Watershed Code:		910-	-665062-	30171			Stream Order	•	3						
Stream Name		Ceci	l Creek				Stream Class		S2						
Crew		BH,	IM				UTM_Zone		09	UTN	1 Northin	g	6014388		
Survey Date		6/25	5/2015							UTM Easting 523324					
Time		11:1	.6:40				Site Length (m	n)	100						
Channel		Visik	ole Chanr	nel			Features		X - LW	/D jam					
Mean Channel W	Channel Width (m) 9.41 Mean Wetted Wi						9.18		Mean	Residual Po	ol Depth	(m)	0.41		
Mean Gradient (9	lean Gradient (%) 2 Do					ate	Gravels		Sub-d	ominate Su	bstrate	Cob	bles		
n-stream Cover Abundant				Dominant	cover		LWD		Sub-d	ominant co	ver	SWE	D, DP, OV, UC		
Water Quality	Tem	perature (Deg C)	8.4	рН	6.9	Conductivity	(uS/c	m)	50	Turb	idity	C-Clear		
Riparian Vegetat	ion						Crown Closur	re			21-40%				
Left Bank Shape			Undercut	t			Right Bank Sh	hape			Undercut	t			
Left Bank Texture	ā		Gravels				Right Bank Texture				Gravels				
Left Bank Riparia	n Vege	tation	Mixedwo	ood			Right Bank Riparian Vegetation Mixedwoo					od			
Left Bank Stage			Mature F	orest			Right Bank Stage Mature Forest								
Habitat Commen	its	Fish Spec	cies	AO - All Salm	nonids										
Spawning		Excellent - Ex	cellent grav	vels in riffle and	pool tailo	outs.									
Rearing		Excellent - Lo	ots of cover	variety available	e for juve	niles.									
Overwintering		Excellent - De	eep pools w	vith sufficient de	pth exist	throughout	the channel.								
Migration	igration Good - Adults could pass even at flows observed. No barr							ed.							
Fish Information	Fish Information Historical Fish Presence No data														
Fished -2015							N/A		Species Stage-2015 N/A			N/A			
Fished -2016		Not visite	d	Species Capt	tured-2	016				N/A					

Photo Comments

Big pool at top of site looking upstream.

Site Comments

Beautiful trout and salmon stream. Excellent spawning habitat and lots of cover for fry and juveniles. Observed schools of salmon parr along the margins and in the pools behind large woody debris.



			D. 1. /	B II I	Stream Class	
LWD L B E UC L DP C OV 0	Small woody debris AS Large woody debris CC Boulder CC' Undercut bank CH Deep pools CN Overhanging vegetation CO Instream vegetation CC	Sculpins CT Coastal cutthroat trout Chinook salmon Chum salmon Coho salmon	DV L PK PL RB SA SK TSB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout Salmon Sockeye salmon Threespine stickleback	S4 < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage NCD and wetlands are non-fish bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Trai	nsmission	Line	Site Nu	mber	TL16B			Structure	No.	84	
Watershed Code:	910	-665062-2	20282			Stream Order	2					
Stream Name	Unr	named				Stream Class	S3					
Crew	NN,	DF				UTM_Zone	09	UTI	UTM Northing		6010938	
Survey Date	7/5	/2016						UTM Easting 522320				
Time	12:2	12:28:28				Site Length (m)	130					
Channel	Visi	Visible channel				Features	None	None				
Mean Channel Width (m) 2.83	2.83 Mean Wetted Width (m)				2.84	Mean	Residual P	ool Depth	(m)	0.34	
Mean Gradient (%)	1	1 Dominate Substrate				Fines				e Substrate Fines		
In-stream Cover	Mode	erate	Dominant	cover		UC	Sub-dominant			LWD	, SWD, DP, IV, OV	
Water Quality Temp	perature (Deg C)	11.7	рН	8.0	Conductivity (uS/cm) 42			Turbio	dity	C-Clear	
Riparian Vegetation						Crown Closure	· ·		21-40%			
Left Bank Shape		Undercut				Right Bank Shape			Sloping			
Left Bank Texture		Fines				Right Bank Texture	е		Fines			
Left Bank Riparian Veget	ation	Mixedwo	od			Right Bank Riparia	n Veget	etation Coniferous				
Left Bank Stage	Mature Forest				Right Bank Stage			Mature Fo	orest			
Habitat Comments	Fish Species AO - All Salmonids											
Spawning	None - No spawning gravels.											

Rearing	Good - Good rearing habitat for fish 0+ to 2+ year age classes.
Overwintering	Moderate - Some deep pools for overwintering are available at the site.
Migration	Good - No obstructions to fish migration were observed.

Fish Information	Historical Fish Pre	sence	No data			
Fished -2015	Not visited	Species Captured-2015		N/A	Species Stage-2015	N/A
Fished -2016	Yes	Species C	aptured-2016	СО	Species Stage-2016	Fry

Photo Comments

View of channel near upper end of survey.

Site Comments

Abundant cover and moderate flows with cool water make this an excellent rearing stream for young salmonids. Mature forest with canopy gaps. Some areas are more shaded than others. Good large woody debris recruitment here.



Notes:	Cover		Fish	Fish Species			Stream Class			
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing		
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m		
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m		
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel		
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish		
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	Throopping stickloback		bearing except where noted.		

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Transmissio	n Line	Site Number	TL17B		Structure N	o. 84		
Watershed Code:	910-665062	2-20282		Stream Order	2				
Stream Name	Unnamed			Stream Class	S2				
Crew	NN, DF			UTM_Zone	09	UTM Northing	6010724		
Survey Date	7/5/2016					UTM Easting	522348		
Time	14:45:04			Site Length (m)	120				
Channel	Visible char	nnel		Features	None				
Mean Channel Width	(m) 5.43	Mean V	Vetted Width (m)	2.35	Mean Re	sidual Pool Depth (m	0.32		
Mean Gradient (%)	2	Domina	te Substrate	Cobbles	Sub-dom	inate Substrate G	ravels		
In-stream Cover	Abundant	Domina	nt cover	LWD	Sub-dom	inant cover S	WD, B, DP, OV, UC		
Water Quality Te	mperature (Deg C)	11.7	pH 8.2	Conductivity (uS/	/cm) 93	3 Turbidit	y C-Clear		
Riparian Vegetation				Crown Closure		41-70%			
Left Bank Shape	Sloping			Right Bank Shape	Right Bank Shape Undercu				
Left Bank Texture		Right Bank Textu	re	Gravels	Gravels				
Left Bank Riparian Veg	getation Mixedv	vood		Right Bank Ripari	Right Bank Riparian Vegetation Mixedwood				
Left Bank Stage	Mature	Forest		Right Bank Stage	Right Bank Stage Mature Forest				
Habitat Comments	Fish Species	AO - All Sa	lmonids						
Spawning	Moderate - Gravels ba	rs are present a	as well as holding area	s for trout and salmon.					
Rearing	Good - Diverse cover,	Good - Diverse cover, cool water and mature forest make this stream good for salmon and trout rearing.							
Overwintering	Good - Deep pools are abundant for overwintering juvenile salmonids. Deep pools coupled with small and large woody debris offer good cover as overwintering fish.								
Migration	Good - There are no o	Good - There are no obstructions to migration. Good for all life stages.							
Fish Information	Historical Fish Pre	esence	No data						
Fished -2015	Yes	Species Ca	ptured-2015	CO, DV, CCT		Species Stage-2015	Fry, Parr, Adult		
Fished -2016	No	Species Ca	ptured-2016	N/A		Species Stage-2016	N/A		

Photo Comments

View of stream at lower end of site.

This is a good quality stream with consistent cool water flow. Diverse channel with all cover types for trout and salmon.

Sampling conducted in 2015 captured coho salmon, Dolly Varden and coastal cutthroat trout. Juveniles observed during 2016 assessment.



Notes:	Cover		Fish	Fish Species		Dellywarden	Stream Class		
N/A Assessed but no data to report	SWD LWD B	Small woody debris Large woody debris Boulder	AS Atlantic salmon CC Sculpins CCT Coastal cutthroat trout	DV L PK PL	L Lamprey PK Pink salmon	Fish bearing S1 > 20 m S2 > 5 m - 20 m	Non-fish bearing S5 > 3 m S6 < 3 m		
	UC DP	Undercut bank Deep pools	CH CM	Chinook salmon Chum salmon	RB SA	Rainbow trout Salmon	S3 1.5 m - 5 m S4 < 1.5 m	NVC No visible channel NCD Non-classified drainage	
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish	

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16

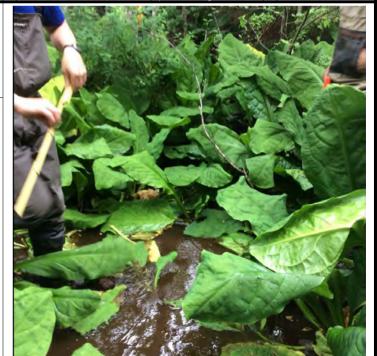


Crossing Type		Transmission Line Site Number TL18 Structure No. 88							88		
Watershed Code:		910-665062-20282 Stream Order 1									
Stream Name		Unnamed			Stream Class	S6					
Crew		IM, BH, KE, F	PG		UTM_Zone	09	UT	ΓM Northin	ng	6009696	
Survey Date		6/24/2015						UT	ΓM Easting		522085
Time		11:16:40				Site Length (m)	100				
Channel		Visible Chan	nel			Features	None				
Mean Channel Wi	dth (m)	2.60	Mean We	tted Wi	dth (m)	1.53	Mean	Residual	Pool Depth	n (m)	0.22
Mean Gradient (%)	0	Dominate	Substra	ate	Fines	Sub-d	lominate S	Substrate	Grav	els
In-stream Cover		Abundant	Dominan	t cover		OV	Sub-d	lominant d	cover	DP, I	V,
Water Quality	Tempe	rature (Deg C)	12.4	рН	7.2	Conductivity (uS/	cm)	15	Turb	idity	C-Clear
Riparian Vegetation	on					Crown Closure			41-70%		
Left Bank Shape		Sloping				Right Bank Shape	Right Bank Shape Sloping				
Left Bank Texture		Fines				Right Bank Texture Fines					
Left Bank Riparian	Vegetati	on Mixedw	ood			Right Bank Riparian Vegetation Mixedwood					
Left Bank Stage		Pole/Sag	oling			Right Bank Stage	k Stage Pole/Sapling				
Habitat Comment	s Fi	ish Species	AO - All Saln	nonids							
Spawning	No	ne - No adequate gra	avels, no flow rat	te, stagnar	nt pools, like	ely low dissolved oxygen.					
Rearing	No	None - No flows, stagnant pools, poor connectivity, likely low dissolved oxygen.									
Overwintering	No	None - Stagnant pools, low dissolved oxygen in winter.									
Migration	No	None - Isolated pools, no connection between pools.									
Fish Information	His	storical Fish Pre	sence N	lo data							
Fished -2015	No)	Species Cap	tured-20	015	N/A		Specie	s Stage-20	15	N/A
Fished -2016	No	ot visited	Species Cap	tured-20	016	N/A		Specie	s Stage-20	16	N/A

Photo Comments

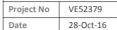
Crossing site.

No fish habitat, no fish access. Stagnant, disconnected pools. Likely low dissolved oxygen. No observed flow rate. Not fished.



Notes:	Cover		Fish	Fish Species		Delluverden	Stream Class			
N/A Assessed but no data to report	SWD LWD	Small woody debris Large woody debris Boulder	. ,	Atlantic salmon L Sculpins PK Coastal cutthroat trout PI	Dolly varden Lamprey Pink salmon	Fish bearing S1 > 20 m S2 > 5 m - 20 m	Non-fish bearing S5 > 3 m S6 < 3 m			
	UC DP	Undercut bank Deep pools	CH	Chinook salmon Chum salmon	PL RB SA	Pacific Lamprey Rainbow trout Salmon	S3 1.5 m - 5 m S4 < 1.5 m	NVC No visible channel NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish		

Prepared for BC Hydro





Crossing Type	Trans	smission L	ine	Site N	umber	TL19			Structure	No.	96	
Watershed Code:	910-6	665062-20	0282			Stream Order	1					
Stream Name	Unna	amed				Stream Class	S3					
Crew	BH, I	M				UTM_Zone	09	UTN	1 Northing	5	6007506	
Survey Date	6/23	/2015						UTN	1 Easting		521442	
Time	10:35	5:18				Site Length (m)	100					
Channel	Visib	le Channe	إذ			Features	Features None					
Mean Channel Width (m) 3.59		Mean We	tted Wi	dth (m)	2.84	Mean Residual Pool Depth (m) 0.20					
Mean Gradient (%)	7		Dominate	Substra	ate	Cobbles						
In-stream Cover	Moder	rate	Dominant	cover		В	Sub-do	ominant co	ver	SWD), DP	
Water Quality Temp	nperature (Deg C) 11.0 pH 7.0					Conductivity (uS/c	m)	52	Turbio	dity	C-Clear	
Riparian Vegetation						Crown Closure			71-90%			
Left Bank Shape	S	Sloping				Right Bank Shape		Sloping				
Left Bank Texture	(Gravels				Right Bank Texture	9		Gravels			
Left Bank Riparian Veget	ation N	Mixedwoo	od			Right Bank Riparia	n Vegeta	ation	Mixedwoo	od		
Left Bank Stage	N	Mature Fo	rest			Right Bank Stage			Mature Fo	orest		
Habitat Comments	Fish Speci	es A	O - All Salm	nonids								
Spawning	Good - Limite	d only by rel	atively shallow	depth an	d narrow w	dth at high flows.						
Rearing	Excellent - Exc	cellent qualit	ty spawning an	nd rearing	habitat for o	coho salmon and cutthroat t	trout.					
			, , ,	J								
Overwintering	Moderate - Li	mited only b	y relative scar	city of dee	ep pools. Su	itable pools do exist for salr	mon and tr	rout parr howe	ever.			
Migration	Good - No bar	rriers observ	ed in surveyed	section.	Only limited	by low flow in summer and	d winter.					
	_											
Fish Information	Historical F	ish Prese	nce N	o data								
Fished -2015	Yes Species Captured-2015					CCT, CO Species Stage-2015 Parr, Fry					Parr, Fry	

Photo Comments

Fished -2016

Looking upstream at top of site.

Site Comments

Stream is excellent trout and coho salmon rearing and spawning habitat. $\ensuremath{\mathsf{Good}}$ habitat variety, pools, riffles, steps. Presence of coho salmon parr indicates no barrier further downstream to Wedeene River. Many fry observed in pools.

Not visited



Notes:	Cover		Fish	Species	DV	Dollyworden	Stream Class	
N/A Assessed but no data to report	SWD LWD B	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL	Dolly varden Lamprey Pink salmon Pacific Lamprey	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CH CO	Chum salmon Coho salmon Slimy sculpin	RB SA SK	Rainbow trout Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Trans	smission I	Line	Site N	umber	TL2			Structure	No.		
Watershed Code:	400-	174068-3	4330			Stream Order	2					
Stream Name	Unna	amed				Stream Class	S3					
Crew	IM, N	NN				UTM_Zone	09	UTN	1 Northing		6032612	
Survey Date	6/16	/2015						UTN	1 Easting		523608	
Time	15:42	2:44				Site Length (m)	100					
Channel	Visib	le Channe	el			Features None						
Mean Channel Width (m) 4.80		Mean We	tted Wid	dth (m)	3.21	.21 Mean Residual Pool Depth (m) 0.33					
Mean Gradient (%)	2		Dominate	Substra	ate	Fines	Sub-do	ominate Su	bstrate	Grav	els	
In-stream Cover	Abund	lant	Dominant	cover		SWD	Sub-do	ominant co	ver	LWD	DP, OV	
Water Quality Ter	mperature (D	Deg C)	No data	рН	No data	Conductivity (uS/o	cm)	No data	Turbid	lity	No data	
Riparian Vegetation		·				Crown Closure			41-70%			
Left Bank Shape	9	Sloping				Right Bank Shape	0 1					
Left Bank Texture	F	Fines				Right Bank Textur	е		Fines			
Left Bank Riparian Veg	etation N	Mixedwoo	bc			Right Bank Riparia	n Vegeta	ation	Mixedwoo	d		
Left Bank Stage	ľ	Mature Fo	orest			Right Bank Stage			Mature Fo	rest		
Habitat Comments	Fish Speci	ies A	AO - All Salm	nonids								
Spawning	Moderate - So	ome pea-size	ed spawning gr	avel in riff	fles and poo	I tail outs.						
Rearing	Excellent - Go	ood cover lev	vels and variety	, habitat t	type variety,	many holding and feeding	areas.					
Overwintering	Good - Some	deep pools,	good flows.									
Migration	Excellent - No barriers, good flows.											
Fish Information	Historical F	Fish Prese	ence N	o data								
Fished -2015	Yes Species Captured-2015					5 RB, CCT Species Stage-2015 Adult, Parr					Adult, Parr	
	Yes Species Captured-2015					,		opecies.	2128C -011	_	100.0, 1011	

Photo Comments

Fished -2016

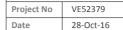
Crossing site looking downstream.

Good fish stream, high diversity in cover and habitat units. Lots of cover. Salmonid rearing and spawning habitat.



Notes:	Cove	r	Fish	Species	D1./	B. II I	Stı	eam Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fis	n bearing	Non-fish	bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3	3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage	
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and	wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing e	except where noted.

Prepared for BC Hydro





Crossing Type		Trar	nsmissio	n Line	Site N	lumber	TL20A			Structur	e No.	108	
Watershed Code:		No	data				Stream Order	1					
Stream Name		Unn	amed				Stream Class	S6					
Crew		IM,	HC, JS				UTM_Zone	09	UTN	1 Northin	g	6004388	
Survey Date		6/30	0/2016						UTM	1 Easting		521255	
Time		10:5	54:47				Site Length (m)	100					
Channel		Oth	er				Features	None	None				
Mean Channel Wie	dth (m)	No da	ata	Mean We	tted Wi	dth (m)	No data	Mean	Residual Po	ool Depth	(m)	No data	
Mean Gradient (%)	40		Dominate	Substr	ate	No data	Sub-d	ominate Su	bstrate	No d	lata	
In-stream Cover		No da	ata	Dominant	cover		No data	Sub-d	ominant co	ver	No d	lata	
Water Quality	Tempe	erature (Deg C)	No data	рН	No data	Conductivity (uS/d	cm)	No data	Turbi	dity	No data	
Riparian Vegetation	on						Crown Closure			No data			
Left Bank Shape			No data				Right Bank Shape			No data			
Left Bank Texture			No data				Right Bank Textur	e		No data			
Left Bank Riparian	Vegeta	tion	Conifero	ous			Right Bank Riparia	an Vege	tation	Coniferou	JS		
Left Bank Stage			Young F	orest			Right Bank Stage			Young Fo	rest		
Habitat Comment	s I	Fish Spec	cies	N/A									
Spawning	N	/A											
Rearing	N	/A											
Overwintering	N	/A											
Migration	N	/A											
Fish Information	Н	listorical	Fish Pre	sence N	o data								
Fished -2015	N	lot visite	d	Species Capt	ured-2	015	N/A Species Stage-2015 N/A			N/A			
Fished -2016	N	No Species Captured-2016				016	N/A	Species Stage-2016 N/A					

Photo Comments

Barrier site, steep above and below marked site.

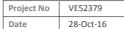
Site Comments

Very steep mountain stream. Water is flowing, small pools present, many cascades. At survey point downstream of transmission line crossing site, stream is very steep, average of 40% gradient. Channel jammed with woody debris, abundant small and large wood in channel, boulder/bedrock substrates. No fish access potential, no fish.



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro





Crossing Type	Trar	nsmission	Line	Site N	umber	TL21A			Structure No.	. 109		
Watershed Code:	No o	data				Stream Order	1					
Stream Name	Unn	amed				Stream Class	S6					
Crew	IM,	HC, JS				UTM_Zone	09	UTN	√ Northing	6004106		
Survey Date	6/30	0/2016						UTN	√ Easting	521272		
Time	10:1	12:23				Site Length (m)	100					
Channel	Oth	er				Features	None	<u>;</u>				
Mean Channel Width	(m) No da	ita	Mean We	etted Wi	dth (m)	No data	Mear	n Residual P	ool Depth (m)	No data		
Mean Gradient (%)	40		Dominate	Substr	ate	No data	Sub-	dominate Su	ıbstrate No	data		
In-stream Cover	No da	ıta	Dominan	t cover		No data	No data Sub-dominant cover No data					
Water Quality Te	mperature (Deg C)	No data	рН	No data	Conductivity (uS/	'cm)	No data	Turbidity	No data		
Riparian Vegetation						Crown Closure			No data			
Left Bank Shape		No data				Right Bank Shape	<u>)</u>		No data			
Left Bank Texture		No data				Right Bank Textu	re		No data			
Left Bank Riparian Veg	getation	Conifero	us			Right Bank Ripari	an Vege	etation	Coniferous			
Left Bank Stage		Young Fo	rest			Right Bank Stage			Young Forest			
Habitat Comments	Fish Spec	cies	N/A									
Spawning	N/A											
Rearing	N/A											
Overwintering	N/A											
Migration	N/A											
Fish Information	Historical	Fish Pres	ence N	lo data								
Fished -2015	Not visite	d	Species Cap	tured-2	015	N/A		Species	Stage-2015	N/A		
Fished -2016	No Species Captured-2016					N/A	Species Stage-2016 N/A					

Photo Comments

Barrier site, steep above and below marked site.

Site Comments

Very steep mountain stream. Water is flowing, small pools present, many cascades. Large cascade barrier at survey point downstream of transmission crossing site. 50 m long cascade jammed with woody debris, measured 42 %gradient. Abundant wood in channel, large cobble/boulder substrates. No fish access potential, no fish.



Notes:	Cover		Fish	Species	DV	Dolly yardan	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Trai	nsmission l	Line	Site Nur	mber	TL22			St	ructure	No.	117
Watershed Code:		910	-665062-2	0282			Stream Order	6					
Stream Name		We	deene Rive	er			Stream Class	S1					
Crew		IM,	NN				UTM_Zone	09	L	JTM N	lorthing	5	6002085
Survey Date		6/2	1/2015						L	JTM E	asting		521975
Time		15::	16:00				Site Length (m)	100					
Channel		Visi	ble Channe	el			Features None						
Mean Channel Wid	dth (m)	39.67	,	Mean We	tted Widt	:h (m)	32.33 Mean Residual Pool Depth (m) 1.17						1.17
Mean Gradient (%))	2		Dominate	Substrate	е	Cobbles	Sub-d	lominate	Subst	trate	Bould	ders
In-stream Cover		Abundant Dominant cover					В	Sub-d	lominant	cove	r	DP, C	V
Water Quality	Temper	rature (Deg C) 11.2 pH No da					Conductivity (uS/c	m)	18		Turbio	dity	L-Lightly turbid
Riparian Vegetation	n						Crown Closure			21	-40%		
Left Bank Shape			Sloping				Right Bank Shape			Sloping			
Left Bank Texture			Cobbles				Right Bank Texture	е		Rock			
Left Bank Riparian	Vegetati	on	Mixedwoo	od			Right Bank Riparia	n Vege	tation	Mi	ixedwoo	bc	
Left Bank Stage			Mature Fo	rest			Right Bank Stage			Ma	ature Fo	orest	
Habitat Comments	s Fi	sh Spe	cies A	O - All Salm	nonids								
Spawning	God	od - Seled	ct spawning a	reas along mar	gins, in lowe	er gradient	riffles and glides.						
Rearing	God	od - Good	d along the m	argins.									
Overwintering	Exc	ellent - E	xcellent deep	well oxygenate	ed pools.								
2 : 36													
Migration	God	od - Good	d refuge areas	along migration	on route.								
			-										
Fish Information	His	storical	Fish Prese	nce N	o data								
Fished -2015	No	No Species Captured-2015 N/A Species Sta						ge-201	5	N/A			

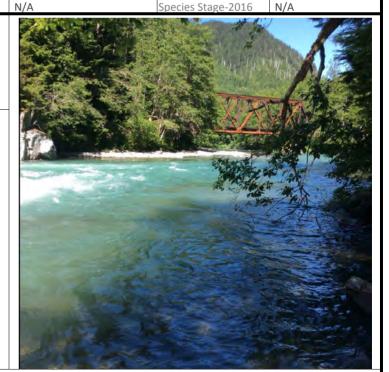
Photo Comments

Fished -2016

Just upstream of proposed crossing and looking downstream towards rail bridge.

Good to excellent quality habitat for all life stages of salmon and trout.

Not visited



Notes:	Cover		Fish S	Species	B1/	B II I	Str	eam Class	
N/A Assessed but no data to report	SWD LWD B UC DP OV	Small woody debris Large woody debris Boulder Undercut bank Deep pools Overhanging vegetation Instream vegetation	AS CC CCT CH CM CO	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon Chum salmon Coho salmon Slimy sculpin	DV L PK PL RB SA SK	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout Salmon Sockeye salmon	Fisl S1 S2 S3	> 20 m > 20 m > 5 m - 20 m 1.5 m - 5 m < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage NCD and wetlands are non-fish bearing except where noted.
	1.4	moneum vegetation	CCO	Jiiiiy Jeaipiii	TSB	Threespine stickleback			

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Transmissio	n Line	Site N	lumber	TL23			Structure	No.	121			
Watershed Code:		910-665062	-18290			Stream Order	1							
Stream Name		Unnamed				Stream Class	S3							
Crew		IM, NN				UTM_Zone	09	UTM	Northing	5	6000579			
Survey Date		6/21/2015						UTM	Easting		521038			
Time		12:16:51				Site Length (m)	100							
Channel		Visible Char	nnel			Features	Features TRB - Tributary							
Mean Channel W	idth (m)	1.89	Mean V	Vetted W	idth (m)	1.22	Mean	0.00						
Mean Gradient (%	6)	0	Domina	ate Substr	ate	Fines	Sub-d	lominate Sub	strate	Fines				
In-stream Cover		Abundant	Domina	ant cover		SWD	Sub-d	lominant cov	er	LWD,[OP, IV, OV			
Water Quality	Temper	rature (Deg C)	15.4	рН	6.9	Conductivity (uS/	cm)	24	Turbio	dity	C-Clear			
Riparian Vegetat	ion					Crown Closure		2	21-40%					
Left Bank Shape		Sloping				Right Bank Shape	!	Sloping						
Left Bank Texture	<u> </u>	Fines				Right Bank Textu	re	F	ines					
Left Bank Ripariar	n Vegetati	on Mixed w	/ood			Right Bank Ripari	an Veget	tation N	Mixedwoo	bc				
Left Bank Stage		Young F	orest			Right Bank Stage		Υ	oung For	est				
Habitat Commen	ts Fi	sh Species	AO - All Sa	almonids										
Spawning	Pod	or - Poor for all salm	nonids due to lo	ow flows, lac	k of gravels	, and likely low dissolved o	xygen. Abu	undant disconne	cted pools v	vith algae	2.			
Rearing	Pod	or - Limited by low f	lows, likely lov	v dissolved o	xygen, stag	nant disconnected pools w	ith algae.							
Overwintering	Poo	or - Limited by low f	lows and disco	onnected poo	ols.									
Migration	Poo	or - Limited by low f	lows and disco	onnected poo	ols.									
				No data										
Fish Information	His	storical Fish Pre	esence	NO data				1						
Fished -2015	Ye		Species Ca		015	NFC		Species S	tage-201	5 N	I/A			

Photo Comments

Upstream extent of survey.

Site Comments

No fish habitat. Abundant beaver dams with stagnant disconnected pools. Pools are filled with algae and are not flowing. Amphibian habitat, poor quality fish habitat. Likely low dissolved oxygen year round. No fish caught.



Notes:	Cove	r	Fish	Species	B1./	B II	Str	eam Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish	n bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	\$4	< 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeve salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmissi	on Line	Sit	e Number	TL24			Structure	e No.	123	
Watershed Code:		910-66506	2-18290			Stream Order 3						
Stream Name		Unnamed				Stream Class	S2					
Crew		NN, IM, CV	/			UTM_Zone	09	ITU	M Northin	g	6000151	
Survey Date		6/21/2015						UTI	M Easting		520695	
Time		13:40:56				Site Length (m)	100					
Channel		Visible Cha	nnel			Features	Features None					
Mean Channel Wid	lth (m)	6.83	Mear	Wetted	Width (m)	4.87	Mea	ın Residual P	ual Pool Depth (m) 0.41			
Mean Gradient (%)	1	2	Domi	nate Sub	strate	Gravels	Sub-dominate Substrate (oles		
In-stream Cover		Abundant	Domi	nant cov	er	LWD	-dominant co	over	SWD	, DP		
Water Quality	Tempe	rature (Deg C)	8.2	рН	8.1	Conductivity (uS	/cm)	13	Turbi	dity	C-Clear	
Riparian Vegetatio	n					Crown Closure			71-90%			
Left Bank Shape		Sloping	5			Right Bank Shap	е		Sloping			
Left Bank Texture		Fines				Right Bank Textu	ıre		Gravels			
Left Bank Riparian	Vegetat	ion Mixed	wood			Right Bank Ripar	ian Veg	etation	Mixedwo	od		
Left Bank Stage		Mature	e Forest			Right Bank Stage	9		Mature F	orest		
Habitat Comments	s F	ish Species	AO - All	Salmonio	ds							
Spawning	Exc	cellent - Excellent s	pawning for t	rout, abun	dant pea-sized	gravel.						
Rearing	Exc	cellent - Diverse ha	bitat types w	ith good co	ver.							
Overwintering	Go	ood - Abundant dee	p pools with	adequate v	vater flows.							
Migration	Exc	cellent - No barrier	s, nice plunge	pools belo	ow logs.							
Fish Information	Hi	storical Fish Pr	esence	SA, CO	CT, CO							
Fished -2015	No	0	Species	Capture	d-2015	N/A		Species	Stage-201	L5	N/A	
Fished -2016	No	ot visited	Species	Capture	d-2016	N/A		Species	Stage-201	16	N/A	

Photo Comments

Typical channel with gravel substrates and functional large woody debris.

Site Comments

Excellent creek for salmon and trout. Rearing and spawning excellent, embedded logs offer abundant pools and diversity.



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	Throopping stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Trans	smission	Line	Site N	umber	TL25			Structure	e No.	129	
Watershed Code:		910-6	665062-1	18290			Stream Order						
Stream Name		Little	Wedeer	ne River			Stream Class	S1					
Crew		IM, N	IN, LS				UTM_Zone	09	UTN	/ Northing	p	5998783	
Survey Date		6/20,	/2015						UTN	/I Easting		519746	
Time		09:53	3:09				Site Length (m)	Site Length (m) 200					
Channel		Visib	le Chann	el			Features	!					
Mean Channel W	idth (m	1) 42.83		Mean We	tted Wi	dth (m)	36.83 Mean Residual Pool Depth (r					0.11	
Mean Gradient (%	6)	1		Dominate	Substra	ate	Boulders	Sub-c	dominate Su	bstrate	Cobb	bles	
In-stream Cover		Abund	ant	Dominant	cover		В	Sub-dominant cover LWD,D),DP	
Water Quality	Tem	perature (D	eg C)	8.5	рН	8.3	Conductivity (uS/	cm)	25	Turbi	dity	C-Clear	
Riparian Vegetat	ion						Crown Closure			1-20%			
Left Bank Shape		S	loping				Right Bank Shape			Sloping			
Left Bank Texture	<u>.</u>	C	Cobbles				Right Bank Textur	re		Cobbles			
Left Bank Riparia	n Veget	tation N	Лixedwo	od			Right Bank Riparia	an Vege	tation	Mixedwo	od		
Left Bank Stage		N	√ature F	orest			Right Bank Stage			Mature Fo	orest		
Habitat Commen	ts	Fish Speci	es .	AO - All Salm	nonids								
Spawning		Good - Good f	for large sa	lmon such as ch	inook, mo	oderate for s	smaller salmon and trout.						
Rearing		Excellent - Rea	aring habita	at available alor	g banks.	Many fry ob	served.						
Overwintering		Good - Some	deeper poo	ols and margins	may prov	ide good ov	erwintering habitat.						
Migration		Excellent - No barriers for adults or juveniles, good flow depth.											
Fish Information	Fish Information Historical Fish Presence PK, ST, CM, CH, CC					M, CH, CC)						
Fished -2015		No		Species Capt			N/A		Species	Stage-201	15	N/A	
Fished -2016		Not visited		Species Capt	ured-20	016	N/A		Species	Stage-201	16	N/A	

Photo Comments

Upstream extent of survey, looking upstream.

Site Comments

Good quality salmon river. No migration barriers, good overwintering potential in pools and margins. Larger substrates are good spawning for chinook. Patches of smaller gravel are moderate for smaller salmon or trout. Excellent rearing for juveniles. Abundant fry observed along banks in back eddies and under large woody debris. Good micro habitat variety, riffles, small pools, runs. River forks around island downstream of crossing site.



Notes:	Cove	r	Fish	Species	DV	Dellementer	Str	eam Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish	n bearing	Non	-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5	> 3 m
	B UC	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6	< 3 m
		Undercut bank	CH Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel		
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	S4 < 1.5 m		Non-classified drainage
	OV	Overhanging vegetation	tion CO Coho salmon		SK	Sockeye salmon				and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback			bear	ing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Trar	nsmission	Line	Site N	umber	TL26			Structure	No.	148
Watershed Code:	910	-665062-0)9749			Stream Order	1				
Stream Name	Unn	amed				Stream Class	S3				
Crew	IM,	NN				UTM_Zone	09	UT	M Northing	5	5994544
Survey Date	6/19	9/2015						UT	M Easting		519482
Time	12:2	28:07				Site Length (m)	100				
Channel	Visible Channel					Features	None				
Mean Channel Width (m) 1.74 Mean Wetted Width (m)				dth (m)	0.98	Mean	Residual	Pool Depth	(m)	0.14
Mean Gradient (%)	17		Dominate Substrate			Gravels	Sub-d	lominate S	ubstrate	Cobb	oles
In-stream Cover	Abun	dant	Dominant	cover		OV	Sub-d	lominant c	over	LWD	, SWD
Water Quality Ter	mperature (re (Deg C) 9.4 pH 8.1				Conductivity (uS/o	m)	222	Turbio	dity	C-Clear
Riparian Vegetation						Crown Closure			21-40%		
Left Bank Shape		Sloping				Right Bank Shape			Sloping		
Left Bank Texture		Gravels				Right Bank Textur	е		Gravels		
Left Bank Riparian Veg	etation	Coniferou	IS			Right Bank Riparia	n Vege	tation	Coniferou	IS	
Left Bank Stage		Mature F	orest			Right Bank Stage			Mature Fo	orest	
Habitat Comments	Fish Spec	cies /	AO - All Salm	nonids							
Spawning	None - Very	few riffle-po	ol areas with gr	ravel for sp	pawning.						
Rearing	Moderate - 7	Frout rearing	habitat, likely	no salmon	access due	to small size and low flows	. Good co	ver and some	e deep pools fo	r rearin	ng.
5											
Overwintering	Poor - Trout	minimal ove	rwintering in d	eep pools.							
Migration	Poor - Trout	migration or	nly, no depth fo	r salmon.							
			1								
Fish Information	Historical	Fish Prese	ence N	lo data							
Fished -2015	Yes		Species Capt	tured-20	015	RB		Specie	s Stage-201	.5	Parr

Photo Comments

Downstream extent of the survey.

 $\label{eq:moderate} \mbox{Moderate quality habitat for young trout. Some pools offer good cover with}$ undercuts woody debris and overhanging vegetation. Some steps down to pools, poor migration potential at time of survey.

Not visited



Notes:	Cove	r	Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	L	Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	B UC DP OV	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
		Undercut bank	nk CH Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel	
		Deep pools	CM	Chum salmon	SA Salmon		S4 < 1.5 m	NCD Non-classified drainage
		Overhanging vegetation	CO Coho salmon		SK	Sockeve salmon		NCD and wetlands are non-fish
	13.7	to store and the state of	000	Climana				haaring aveant where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



									1			
Crossing Type		Transmission	Transmission Line Site Number TL27 Structure No. 149							No. 149		
Watershed Code:		910-665062	-09749			Stream Order	1					
Stream Name		Unnamed				Stream Class	S3					
Crew		IM, NN				UTM_Zone	09	UTN	√ Northing	5994139		
Survey Date		6/19/2015						UTN	√l Easting	519523		
Time		10:42:09				Site Length (m)	Site Length (m) 100					
Channel		Visible Chan	nel			Features						
Mean Channel W	idth (m) 1.67	Mean We	etted Wi	idth (m)	1.24	Meai	n Residual P	ool Depth (n	n) 0.15		
Mean Gradient (%	6)	13 Dominate Substrate Fines				Fines	Sub-	Gravels				
In-stream Cover		Abundant	Dominan	nt cover		SWD, OV	Sub-dominant cover LWD					
Water Quality	Tem	perature (Deg C)	9.5	рН	8.0	Conductivity (uS/	cm)	175	Turbidi	ty C-Clear		
Riparian Vegetat	ion					Crown Closure			41-70%			
Left Bank Shape		Sloping				Right Bank Shape			Sloping			
Left Bank Texture)	Fines				Right Bank Textur	·e		Fines			
Left Bank Riparian	n Veget	ation Coniferd	ous			Right Bank Riparia	an Vege	etation	Coniferous			
Left Bank Stage		Young F	orest			Right Bank Stage			Young Fore	st		
Habitat Commen	ts	Fish Species	AO - All Salr	monids								
Spawning		None - No appropriate	gravels for salm	ionids.								
Rearing		Poor - Poor quality hab	itat provided by	intermitte	ent channel a	at time of survey.						
Overwintering		None - No sufficiently o	deep pools, low t	flows and t	therefore lo	w dissolved oxygen.						
Migration		None - No continuous flows may prevent upstream migration for larger adults.										
Fish Information Historical Fish Presence No data												
Fished -2015		Yes	Species Cap	otured-2	015	RB		Species	Stage-2015	Parr		
Fished -2016		Not visited Species Captured-2016				N/A		Species	Stage-2016	N/A		

Photo Comments

Pool habitat looking downstream.

Site Comments

Some subsurface intermittent flows and channel. High cover available. Some isolated pools - these are the only areas that provide habitat at time of survey. Majority of creek too shallow for rearing.



Notes:		r	Fish	Species	DV	Dellermades	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	B UC	Boulder	CCT	Coastal cutthroat trout	PL Pacific Lamprey	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
		Undercut bank	CH Chinook sa	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon		Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO Coho salmon		SK Sockeye salmon			NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	Throoping stickloback		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Trar	nsmission l	Line	Site N	umber	TL28			Structure	No. 1	51
Watershed Code:	910	-665062-0	9749			Stream Order	1				
Stream Name	Unn	amed				Stream Class	S5				
Crew	IM,	NN				UTM_Zone	09	UTM	1 Northing	59	993986
Survey Date	6/19	9/2015						UTN	1 Easting	51	19571
Time	14:3	30:35				Site Length (m)	100				
Channel	Visil	ble Channe	el			Features	Features None				
Mean Channel Width (m	3.46		Mean We	tted Wid	dth (m)	2.94	2.94 Mean Residual Pool Depth (m) 1.35				
Mean Gradient (%)	5 Dominate Substrate				ite	Cobbles	Sub-do	ominate Su	bstrate	Gravels	
In-stream Cover	Abun	dant	Dominant	t cover		SWD	Sub-do	ominant co	ver	LWD, O	V
Water Quality Tem	perature (Deg C)	10.0	рН	8.1	Conductivity (uS/c	m)	81	Turbidi	ity	C-Clear
Riparian Vegetation						Crown Closure			71-90%	<u>"</u>	
Left Bank Shape		Sloping				Right Bank Shape	Sloping				
Left Bank Texture		Gravels				Right Bank Texture	9		Gravels		
Left Bank Riparian Veget	tation	Coniferou	S			Right Bank Riparia	n Vegeta	ation	Coniferous		
Left Bank Stage		Mature Fo	orest			Right Bank Stage			Mature For	rest	
Habitat Comments	Fish Spec	cies A	AO - All Saln	nonids							
Spawning	None - No sp	pawning, no f	ish access to si	ite.							
Rearing	None - No p	otential for fi	sh access to sit	te.							
0											
Overwintering	None - No p	otential for fi	sh access to sit	te.							
Migration	None - No p	otential for fi	sh access to sit	te.							
Fish Information	ormation Historical Fish Presence No data										
Fished -2015	Yes	S	pecies Cap	tured-20)15	NFC		Species	Stage-2015	N/A	A

Photo Comments

Fished -2016

Downstream extent of survey, upstream of old road.

Site Comments

Low flows and small pools. Barrier found to fish passage downstream of site. Series of steep cascades and falls. Section is approximately 16 m long with large elevation drop, estimated to be 10 m. No fish passage possible up cascades. Juvenile coastal cutthroat trout captured downstream of cascades.



Notes:	Cover		Fish Species			8.11	Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fisl	n bearing	Non-fish bearing		
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3 m		
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3 m		
	UC	JC Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3	1.5 m - 5 m	NVC No visible channel		
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	4 < 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish		
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.		

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmissio	n Line	Site N	lumber	TL29			Structure N	No. 156	
Watershed Code:		910-665062	-09749			Stream Order	1				
Stream Name		Unnamed				Stream Class	S3				
Crew		IM, NN				UTM_Zone	09	UTI	M Northing	5992999	
Survey Date		6/19/2015						UTI	M Easting	519559	
Time		16:53:53				Site Length (m)	100				
Channel		Visible Char	nel			Features	None				
Mean Channel Wid	dth (m)	1.68	68 Mean Wetted Width (1.21 Mean Residual Pool Depth (m)					
Mean Gradient (%))	16 Dominate Substrate Cobbles Sub-dom				bles Sub-dominate Substrate Gravels					
In-stream Cover		Moderate	Domina	ant cover		В	Sub-dominant cover LWD, SWD, C				UC
Water Quality	Tempe	rature (Deg C)	10.5	рН	7.9	Conductivity (uS/o	cm)	117	Turbidi	ty C-Clear	
Riparian Vegetatio	on					Crown Closure			41-70%		
Left Bank Shape		Sloping				Right Bank Shape			Sloping		
Left Bank Texture		Gravels				Right Bank Textur	е		Gravels		
Left Bank Riparian	Vegetat	ion Mixedw	ood			Right Bank Riparia	an Veget	ation	Mixedwood	b	
Left Bank Stage		Mature	Forest			Right Bank Stage			Mature For	est	
Habitat Comments	s F	ish Species	AO - All S	almonids							
Spawning	No	one - No adequate gr	avel.								
Rearing	Mo	oderate - Pool rearin	g habitat for j	uvenile trout	is available	but does not have much de	epth or are	a. Good varie	ty of other cove	er types available.	
					al all and						
Overwintering	Po	or - Possible overwii	ntering for Juv	enile trout in	snallow po	ols. Low flows and ice may p	prevent ov	erwintering ii	n most areas.		
Migration	Po	or - Poor migration	for trout, none	e for salmon,	step pools p	present with low flow depth	١.				
				I							
Fish Information	Hi	storical Fish Pre	sence	No data							
Fished -2015	Ye	es	Species C	aptured-2	015	RB Sp			Stage-2015	Parr	

Photo Comments

Fished -2016

Looking upstream from the crossing site.

Moderate rearing for small juvenile trout. Pools support trout with good cover. Large bodied fish habitat is absent. Step pool morphology throughout with low flows.

Not visited



Notes:		r	Fish	Species	DV/	Dolly varden	Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing	Non-fish bearing			
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m			
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m			
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel			
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage			
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish			
	I\/	Instroom vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted			

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmission Line Site Number TL3 Structure No. 7									o. 7
Watershed Code:		400-174068-	34330			Stream Order	2				
Stream Name		Unnamed				Stream Class	S2				
Crew		BH, IM				UTM_Zone	09	L	JTM Nor	thing	6032035
Survey Date		6/28/2015						L	JTM East	ting	523553
Time		08:59:01				Site Length (m)	100				
Channel		Visible Chanr	nel			Features	None				
Mean Channel Width	(m) 5	.45	Mean We	tted Wi	dth (m)	3.66	Mean	Residua	l Pool De	epth (m	0.38
Mean Gradient (%)	2		Dominate	Substra	ate	Gravels	Sub-d	ominate	Substra	te Fi	nes
In-stream Cover	А	bundant	Dominant	cover		OV	Sub-dominant cover LV				VD, SWD, UC
Water Quality To	emperati	ure (Deg C)	14.7	рН	7.8	Conductivity (uS/c	cm)	89	Т	urbidity	C-Clear
Riparian Vegetation						Crown Closure			41-70)%	
Left Bank Shape		Undercu	t			Right Bank Shape		Unde	ercut		
Left Bank Texture		Fines				Right Bank Texture	е		Fines	;	
Left Bank Riparian Ve	egetation	Mixedwo	ood			Right Bank Riparia	in Veget	tation	Mixe	dwood	
Left Bank Stage		Mature F	orest			Right Bank Stage			Matu	ire Fore	st
Habitat Comments	Fish	Species	AO - All Salm	nonids							
Spawning	Excelle	nt - Good gravel v	variety, riffles an	d pools w	vith gravel th	nroughout.					
Rearing	Good -	Only limited by lo	ow flow. All fish	found in	shallow poo	ls.					
Overwintering	Poor - I	Poor - Limited by low flow and limited pool depths.									
Migration	Poor - 1	Too low flow for a	adults. Low flow	depth at	pool tail ou	ts limits juveniles.					
Fish Information	Histor	rical Fish Pres	ence N	o data							
Fished -2015	Yes		Species Capt	ured-20	015	CO, DV, BL, CCT		Speci	es Stage	-2015	Fry, Parr, Juvenile,
Fished -2016	Not v	isited	Species Capt	016	N/A	Species Stage-2016 N/A				N/A	

Photo Comments

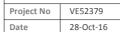
Looking upstream at the top of site.

Good fish species diversity for such a small stream with low summer flow. Habitat is very diverse with lots of cover but is flow limited in summer.



			D.1.7	B II I	Stream Class				
LWD L B E UC L DP OV O	Small woody debris AS Large woody debris CC Boulder CC' Undercut bank CH Deep pools CN Overhanging vegetation CO' Instream vegetation CC'	Sculpins CT Coastal cutthroat trout Chinook salmon Chum salmon Coho salmon	DV L PK PL RB SA SK TSB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout Salmon Sockeye salmon Threespine stickleback	S4 < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage NCD and wetlands are non-fish bearing except where noted.			

Prepared for BC Hydro





									TTTTCCTCT	
Crossing Type	Transm	ssion Line	Site I	Number	TL30			Structure No	. 157	
Watershed Code:	910-665	062-09749			Stream Order	N/A				
Stream Name	Unname	ed			Stream Class	NVC				
Crew	IM, NN,	CW			UTM_Zone	09	UTN	l Northing	5992733	
Survey Date	6/18/20	15					UTN	l Easting	519438	
Time	12:42:3	9			Site Length (m)	100				
Channel	No Visik	le Channel			Features	None	j			
Mean Channel Wid	th (m) N/A	Mea	n Wetted W	idth (m)	N/A	Mea	n Residual Po	ool Depth (m)	N/A	
Mean Gradient (%)	N/A	Dom	ninate Substr	ate	N/A	Sub-	dominate Su	ostrate N/	A	
In-stream Cover	N/A	Dom	ninant cover		N/A	Sub-	dominant co	ver N/	Α	
Water Quality	Temperature (Deg	C) N/A	рН	N/A	Conductivity (uS	/cm)	N/A	Turbidity	N/A	
Riparian Vegetatio	n	·	Ÿ		Crown Closure			N/A		
Left Bank Shape	N/A				Right Bank Shap	е	N/A			
Left Bank Texture	N/A				Right Bank Text	ıre		N/A		
Left Bank Riparian	Vegetation N/A				Right Bank Ripa	ian Vege	etation	N/A		
Left Bank Stage	N/A				Right Bank Stage					
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
Overwintering	N/A									
Migration	N/A									
Fish Information	Historical Fish		No data							
Fished -2015	No	N/A		Species :	Stage-2015	N/A				
Fished -2016	Not visited	Species	s Captured-2	2016	N/A Species Stage-2016 N/A					

Photo Comments

Upstream of site. Upstream of existing road (RD165)

No visible channel upstream of road. Small pool upstream of road, no flowing water. Mud and vegetation including skunk cabbage.



Notes:	Cover			Species	B1./	B II	Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish	n bearing	Non-fish bearing		
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m		
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6 < 3 m		
	UC	Undercut bank	CH Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel			
	DP	Deep pools	CM	Chum salmon	SA	Salmon	\$4	< 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeve salmon			NCD and wetlands are non-fish		
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.		

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Transmissio	n Line	Site N	umber	TL31			Structure No. 158			
Watershed Code:	910-665062	2-09000			Stream Order	2					
Stream Name	Unnamed				Stream Class	S2					
Crew	IM, NN, CW	i			UTM_Zone	09	UT	M Northing	5992542		
Survey Date	6/18/2015						UT	M Easting	519193		
Time	11:07:32				Site Length (m)	100					
Channel	Visible Char	nnel			Features	None			_		
Mean Channel Width (r	m) 8.67	Mean We	etted Wid	dth (m)	5.43	Mean	Residual F	Pool Depth (m)	0.37		
Mean Gradient (%)	10	Dominate	e Substra	ite	Cobbles	ulders					
In-stream Cover	Moderate	Dominan	nt cover		В	Sub-d	Sub-dominant cover DP, OV				
Water Quality Ten	nperature (Deg C)	9.1	рН	7.9	Conductivity (uS/	cm)	64	Turbidity	C-Clear		
Riparian Vegetation					Crown Closure			41-70%			
Left Bank Shape	Sloping				Right Bank Shape			Sloping			
Left Bank Texture	Boulder	r/Block			Right Bank Textur	-e		Boulder/Bloc	k		
Left Bank Riparian Vege	etation Mixedw	/ood			Right Bank Riparia	an Veget	tation	Mixedwood			
Left Bank Stage	Mature	Forest			Right Bank Stage			Mature Fores	t		
Habitat Comments	Fish Species	AO - All Salr	monids								
Spawning	Poor - Patches of grave	el for trout, no ac	ccess for sal	mon.							
Rearing	Good - Good cover, go	od habitat variet	ty, cascade	upstream, I	arge falls downstream.						
Overwintering	Poor - Few deep pools										
Migration	Poor - Cascade likely p	assable only at h	igh flows.								
Fish Information	Historical Fish Pre	esence	No data								
Fished -2015	Yes	Species Cap)15	RB	Species Stage-2015 Fry			Fry, Parr			
Fished -2016	Not visited	Species Cap	otured-20)16	N/A		N/A				

Photo Comments

Downstream extent of the survey.

Site Comments

Large series of falls downstream of site, 3 falls, 4 to 6 m tall. No access for fish up falls. Braided channel at crossing site. Good rearing trout habitat. RB captured, likely resident population upstream of falls barriers. Cascade at upstream end of site acts as partial barrier for small fish. Adults may pass during high flows.



			D.1.7	B II I	Stream Class				
LWD L B E UC L DP OV O	Small woody debris AS Large woody debris CC Boulder CC' Undercut bank CH Deep pools CN Overhanging vegetation CO' Instream vegetation CC'	Sculpins CT Coastal cutthroat trout Chinook salmon Chum salmon Coho salmon	DV L PK PL RB SA SK TSB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout Salmon Sockeye salmon Threespine stickleback	S4 < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage NCD and wetlands are non-fish bearing except where noted.			

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Trai	nsmission	Line	Site N	lumber	TL32			Structure	e No.	160	
Watershed Code:		910	-665062-	09000			Stream Order	1					
Stream Name		Unr	named				Stream Class	S6					
Crew		NN,	IM				UTM_Zone	09	UTN	Л Northin	pp	5992185	
Survey Date		5/1	1/2016						UTN	∕l Easting		519032	
Time		16:4	14:09				Site Length (m)	100					
Channel		Visi	ble chann	iel			Features	C - Ca	ascade or ch	ute			
Mean Channel W	idth (m	2.03		Mean We	tted Wi	dth (m)	1.54	Mear	n Residual P	ool Depth	(m)	0.13	
Mean Gradient (%	6)	32		Dominate	Substr	ate	Cobbles	Sub-	dominate Su	bstrate	Boul	lders	
In-stream Cover		Mode	erate	Dominant	t cover		В	Sub-	dominant co	ver	LWD), SWD, DP	
Water Quality	Tem	perature (Deg C)	8.8	рН	8.3	Conductivity (uS/	/cm)	123	Turbi	dity	C-Clear	
Riparian Vegetat	ion						Crown Closure			21-40%			
Left Bank Shape			Undercu	t			Right Bank Shape	9	Sloping				
Left Bank Texture	<u>.</u>		Cobbles				Right Bank Textu	re		Cobbles			
Left Bank Riparian	n Veget	tation	Mixedwo	ood			Right Bank Ripari	an Vege	etation	Mixedwo	od		
Left Bank Stage			Mature F	orest			Right Bank Stage		Mature Forest				
Habitat Commen	ts	Fish Spec	cies	AO - All Saln	nonids								
Spawning		None - No m	nigration to	site is possible b	ecause of	steep gradi	ent. No spawning habitat i	is available	2.				
Rearing		None - Grad	ient is too s	teep to support	rearing fis	shes.							
Overwintering		None - No a	ccess due to	gradient barrie	r and falls								
Migration		None - Too s	steep to allo	w fish access.									
Fish Information		Historical	Fish Pres	ence N	lo data								
Fished -2015		Not visited Species Captured-2015					N/A	Species Stage-2015 N/A			N/A		
Fished -2016		Yes Species Captured-2016					NFC	Species Stage-2016 N/A				N/A	

Photo Comments

Steep gradient at crossing. Small waterfall chutes.

Site Comments

Channel too steep to support fish habitat at crossing location. Crossing site was electrofished in 2016, no fish were captured. Stream was electrofished approximately 300 m downstream and captured juvenile rainbow trout.



Notes:	Cover		Fish	Fish Species		Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroom vegetation	CCG	Slimy sculpin	TCD	The second second second second		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type	Transmis	sion Line	Site N	lumber	TL33			Structure	e No.	140	
Watershed Code:	910-6650	62-09000			Stream Order	1					
Stream Name	Unname	d			Stream Class	S5					
Crew	IM, NN				UTM_Zone	09	UTN	M Northin	g	5991688	
Survey Date	5/11/201	6					UTI	Ⅵ Easting		519070	
Time	14:06:09				Site Length (m)	100					
Channel	Visible ch	annel			Features	None	<u>.</u>				
Mean Channel Width (m) 5.58	Mean	Wetted Wi	idth (m)	3.88	Mear	n Residual P	ool Depth	(m)	0.45	
Mean Gradient (%)	29	Domii	nate Substr	ate	Boulders	Sub-c	Sub-dominate Substrate Rock				
In-stream Cover	Moderate	Domii	nant cover		В	Sub-c	dominant co	over	DP		
Water Quality Te	mperature (Deg (8.2	рН	8.4	Conductivity (uS/	'cm)	15	Turbi	dity	C-Clear	
Riparian Vegetation		•			Crown Closure			1-20%			
Left Bank Shape	Slopi	ng			Right Bank Shape		Sloping				
Left Bank Texture	Rock				Right Bank Textu	re		Rock			
Left Bank Riparian Veg	etation Mixe	dwood			Right Bank Ripari	an Vege	etation	Mixedwo	od		
Left Bank Stage	Matu	re Forest			Right Bank Stage			Mature F	orest		
Habitat Comments	Fish Species	AO - All	Salmonids								
Spawning	None - Fish access	o site not possi	ble.								
Rearing	None - No potentia	I for fish access	to site.								
Overwintering	None - No potentia	I for fish access	to site.								
Migration	None - Migration blocked by barrier and high velocities immediately downstream of site.										
0 111											
Fish Information	Historical Fish	Presence	No data								
Fished -2015	Not visited	Species	Captured-2	015	N/A	Species Stage-2015		15	N/A		
Fished -2016	No	Species	Captured-2	016	N/A				N/A		

Photo Comments

Barrier cascades at upper end of survey.

Site Comments

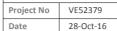
Barrier site downstream of TL33. Cascade pools downstream for ~200 m, with increasing gradient towards barrier: 100 m at 20%, 100 m at 25%. Immediately downstream of barrier, gradient is 30%. Barrier consists of a series of cascades and shallow pools. First downstream cascades is 2 m high, with 0.5 m plunge pool, 2nd cascade is 1.5 m with 0.75 m pool, third cascade is 6 m with 0.80 m pool. Downstream of barrier, habitat for fish is limited by high gradients and high velocity water flows. Excellent spawning and rearing habitat for salmonids present further down stream, closer to valley bottom.



Notes:	Cove	r	Fish	Species	DV	Dollywarden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type	Tra	nsmission	Line	Site N	lumber	TL35			Structure	No.	166
Watershed Code:	910)-665062-(09000			Stream Order	1				
Stream Name	Uni	named				Stream Class	S3				
Crew	IM,	NN				UTM_Zone	09	UTI	M Northing	5	5990813
Survey Date	5/1	.0/2016						UTI	M Easting		518874
Time	14:	28:44				Site Length (m)	100				
Channel	Visi	ible chann	el			Features	None				
Mean Channel Width (m) 2.15		Mean We	etted Wi	idth (m)	1.42	1.42 Mean Res			(m)	0.10
Mean Gradient (%)	13		Dominate	e Substra	ate	Boulders	Boulders Sub-domin			Cobb	les
In-stream Cover	Abur	ndant	Dominan	t cover		В	Sub-d	ominant co	LWD,	, SWD,IV, OV	
Water Quality Ter	mperature	(Deg C)	4.9	рН	6.4	Conductivity (uS/o	onductivity (uS/cm) 17				C-Clear
Riparian Vegetation			•		•	Crown Closure	·	41-70%			
Left Bank Shape		Sloping				Right Bank Shape		Sloping			
Left Bank Texture		Fines				Right Bank Textur	е		Fines		
Left Bank Riparian Veg	etation	Conifero	JS			Right Bank Riparia	an Veget	tation	Coniferou	S	
Left Bank Stage		Young Fo	rest			Right Bank Stage Young Fores					
Habitat Comments	Fish Spe	cies	AO - All Salr	monids							
Spawning	None - No s	pawning gra	vel bars, large s	substrates	only. Likely	no access for spawners.					
Rearing						ent during, possibly better i	n higher w	vater periods.	Abundant div	erse cov	ver, but limited depth
	and no deep	p pool habita	t. Cascades als	o present t	to limit upst	ream travel by juveniles.					
O consideration	Nana Nan			4- 144							
Overwintering	None - None, no deep pools, likely freezes to bottom.										
Migration	None - Adul	It access limit	ted by flow dep	th. During	freshet, hig	her depths may be present	but steep	gradient may	cause fast, in	npassab	le flows.
			1.								
Fish Information	Historica	l Fish Pres	ence N	lo data							
Fished -2015	Not visite	ed	Species Cap	tured-2	015	N/A		Species	Stage-201	5	N/A
	1					1				T	

Photo Comments

Fished -2016

Steep section downstream of surveyed reach (37% gradient).

Site Comments

Narrow small stream in steep rocky gully. Boulders, cobbles, present throughout, possibly indicating high flows that would remove fine particles. Upper reach is flatter and slower moving, gradient increases towards downstream end of reach. Fish access is dependent on fish access to lake outlet upstream. Habitat generally moderate to poor for small juvenile salmonids. Large fish would have trouble accessing site due to limited water depth. Downstream of site there is a short section of channel with a gradient of 37%. This steep section may be a barrier to fish passsage. Downstream fish access should be re-evaluated at a different time of year to confirm fish-bearing status.



Notes:	Cover			Species	B II I	Stream Class				
N/A Assessed but no data to report	SWD LWD B UC DP OV	Small woody debris Large woody debris Boulder Undercut bank Deep pools Overhanging vegetation Instream vegetation	AS CC CCT CH CM CO	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon Chum salmon Coho salmon Slimy sculpin	DV L PK PL RB SA SK	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout Salmon Sockeye salmon	Fisl S1 S2 S3	> 20 m > 20 m > 5 m - 20 m 1.5 m - 5 m < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage NCD and wetlands are non-fish bearing except where noted.	
	1.4	moneum vegetation	CCO	Jiiiiy Jeaipiii	TSB	Threespine stickleback				

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Transmission	n Line	Site N	lumber	TL37			Structure No	. 174
Watershed Code:	910-665062	-04593			Stream Order	N/A			
Stream Name	Unnamed				Stream Class	NVC			
Crew	IM, NN, CW				UTM_Zone	09	UT	M Northing	5988598
Survey Date	6/17/2015						UT	M Easting	518746
Time	14:52:09				Site Length (m)	100			
Channel	No Visible C	nannel			Features	None	9		
Mean Channel Width	(m) N/A	Mean W	etted Wi	idth (m)	N/A	Mea	n Residual	Pool Depth (m)	N/A
Mean Gradient (%)	N/A	Dominat	e Substr	ate	N/A	Sub-	dominate S	ubstrate N/	A
In-stream Cover	N/A	Dominar	nt cover		N/A	Sub-	dominant d	over N/	A
Water Quality Te	emperature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	N/A
Riparian Vegetation		*			Crown Closure			N/A	
Left Bank Shape	N/A				Right Bank Shape	!		N/A	
Left Bank Texture	N/A				Right Bank Textu	re			
Left Bank Riparian Veg	getation N/A				Right Bank Ripari	rian Vegetation N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A	
Habitat Comments	Fish Species	N/A							
Spawning	N/A								
Rearing	N/A								
Overwintering	N/A								
Migration	N/A								
Fish Information	Historical Fish Pre	sence	No data						
Fished -2015	Not visited	Species Cap	ptured-2	015	N/A		Specie	s Stage-2015	N/A
Fished -2016	Not visited	Species Car	ptured-2	016	N/A		Specie	s Stage-2016	N/A

Photo Comments

NVC downstream of crossing site.

Site Comments

No visible channel downstream of crossing site. No water, no flow, and no fish



Notes: Cover		•	Fish	Species	DV	Dolly varden	Stream Class			
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing S1 > 20 m	Non-fish bearing S5 > 3 m		
	LWD B	Large woody debris Boulder	CC CCT	Sculpins Coastal cutthroat trout		Pink salmon Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m		
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel		
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish hearing except where noted		

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



									MITCULE
Crossing Type	Transmission	n Line	Site N	umber	TL38			Structure No). 173
Watershed Code:	910-665062-	-04593			Stream Order	N/A			
Stream Name	Unnamed				Stream Class	NVC			
Crew	IM, NN, CW				UTM_Zone	09	ITU	M Northing	5988792
Survey Date	6/17/2015						ITU	M Easting	518552
Time	14:52:09				Site Length (m)	100			
Channel	No Visible Cl	nannel			Features	None			
Mean Channel Width ((m) N/A	Mean We	etted Wi	dth (m)	N/A	Mean	Residual P	ool Depth (m)	N/A
Mean Gradient (%)	N/A	Dominate	e Substra	ate	N/A	Sub-de	ominate Su	ubstrate N/	A
In-stream Cover	N/A	Dominan	t cover		N/A	Sub-de	ominant co	A	
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/o	cm)	N/A	Turbidity	N/A
Riparian Vegetation					Crown Closure			N/A	
Left Bank Shape	N/A				Right Bank Shape			N/A	
Left Bank Texture	N/A				Right Bank Textur	е		N/A	
Left Bank Riparian Veg	getation N/A				Right Bank Riparia	n Veget	ation	N/A	
Left Bank Stage	N/A				Right Bank Stage			N/A	
Habitat Comments	Fish Species	N/A							
Spawning	N/A								
Rearing	N/A								
Overwintering	N/A								
Migration	N/A								
Fish Information	Historical Fish Pres	sence N	No data						
Fished -2015	Not visited	Species Cap	tured-20	015	N/A		Species	Stage-2015	N/A
Fished -2016	Not visited	Species Cap	tured-20	016	N/A		Species	Stage-2016	N/A

Photo Comments

NVC downstream of crossing site.

Site Comments

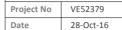
No visible channel downstream of crossing site. No water, no flow and no fish



		Cover		Fish Species		Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	There are in a set of the basel.		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type		Transmissio	n Line	Site N	lumber	er TL39 Structure No.					175	
Watershed Code:		910-665062	-04593			Stream Order	1					
Stream Name		Unnamed				Stream Class	S5					
Crew		NN, IM, CW				UTM_Zone	09	UTN	1 Northing	5	5988403	
Survey Date		6/18/2015						UTN	1 Easting		518700	
Time		16:46:59				Site Length (m)	100					
Channel		Dry Channel				Features	C - Ca	scade				
Mean Channel Wid	dth (m)	7.00	Mean Wet	tted Wi	dth (m)	-	Mean	Residual Po	ool Depth	(m)	=	
Mean Gradient (%))	30	Dominate	Substra	ate	Boulders	Sub-d	ominate Su	bstrate	Rock	(
In-stream Cover		Abundant	Dominant	cover		OV	Sub-d	ominant co	ver	LWD), SWD	
Water Quality	Temper	ature (Deg C)	No data	рН	No data	Conductivity (uS/) No data Turbi			No data		
Riparian Vegetatio	n					Crown Closure			41-70%			
Left Bank Shape		Sloping				Right Bank Shape		Sloping				
Left Bank Texture		Fines				Right Bank Textur						
Left Bank Riparian	Vegetati	on Mixedw	rood		Right Bank Riparian Vegetation Mixedwood							
Left Bank Stage		Mature	Forest			Right Bank Stage			orest			
Habitat Comments	s Fi	sh Species	AO - All Salm	onids								
Spawning	Nor	ne - No passage for	fish, no potential	migratior	or access.							
Rearing	Nor	ne - No passage for	fish, no potential	migration	or access							
Overwintering	Nor	ne - No passage for	fish, no potential	migration	or access							
Migration	Nor	ne - No passage for	fish, no potential	migratior	or access							
Fish Information	His	storical Fish Pre	sence No	o data								
Fished -2015	No	1	Species Capt	ured-20	015	N/A	Specie		Stage-201	.5	N/A	
Fished -2016	No	t visited	Species Capt	ured-20	016	N/A Species Stage-2016 N/A			N/A			

Photo Comments

Dry channel.

Site Comments

Dry channel. Stream is highly disturbed by flashy water flows. Large substrate and debris piles are present throughout. Large trees and boulders are piled throughout the channel. No passage for fish during dry periods. Flows during floods are likely too high to allow fish passage. Gradient below crossing site is high, approx 30%. Groundwater flows are likely present below large debris bed. Groundwater flows become surface flows at one 10 m long section. Channel is approx 7 m wide, deeply entrenched. Banks are steep, eroded by high flows.



Notes:	Cover		Fish	Fish Species		Dalluuardan	Stre	am Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish	bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino sticklohas	· L		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Tra	nsmission	Line	Site N	umber	per TL4/8A Structure No. 14					14	
Watershed Code:	40	0-174068-	34330			Stream Or	der	1				
Stream Name	Un	named				Stream Cla	ass	S4				
Crew	LIV	I, NN				UTM_Zon	е	09	UTN	1 Northin	5	6031790
Survey Date	6/3	15/2015							UTN	1 Easting		523570
Time	15	:20:20				Site Lengtl	h (m)	100				
Channel	Dr	y Channel				Features		None				
Mean Channel Widt	th (m) 1.41		Mean We	tted Wi	dth (m)	0.00		Mean	Residual Po	ool Depth	(m)	0.00
Mean Gradient (%)	1		Dominate	Substra	ate	Fines		Sub-d	ominate Su	bstrate	Grav	vels .
In-stream Cover	Mod	lerate	Dominant	cover		SWD		Sub-d	ominant co	ver	OV,	UC
Water Quality	Temperature	(Deg C)	No data	рН	No data	Conductivity (uS/cm)				Turbi	dity	No data
Riparian Vegetation	า					Crown Closure				71-90%		
Left Bank Shape		Undercut	t			Right Ban	k Shape			Undercut		
Left Bank Texture		Fines				Right Bank Texture Fines						
Left Bank Riparian V	egetation/	Mixedwo	ood			Right Bank Riparian Vegetation Mixedwood						
Left Bank Stage		Mature F	orest			Right Ban	k Stage			Mature F	orest	
Habitat Comments	Fish Spe	ecies	AO - All Salm	nonids								
Spawning	None - No	appropriate g	ravels.									
Rearing	Poor - Whe	en water is pro	esent in the spri	ng it may	be used by j	uveniles in the l	ower reache	25.				
Overwintering	None - No	deep pools ol	oserved.									
Migration	Poor - Migi	ration only po	ssible when wat	er presen	t during sea	sonal flooding.						
Fish Information	Historica	l Fish Pres	ence N	o data								
Fished -2015	No		Species Capt	ured-20)15	N/A			Species	Stage-201	.5	N/A
Fished -2016	Yes		Species Capt	ured-20	016	NFC			Species	Stage-201	.6	N/A

Photo Comments

View of dry channel looking downstream.

Dry channel. Seasonally flowing stream likely provides only occasional rearing and holding habitat for fish in lower reaches during wet periods. Evidence of significant water flow and scour was observed, but no water was found in the channel.



Notes:		r	Fish	Fish Species		Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Transmissio	on Line	Site No	umber	per TL40 Structure No. 181					
Watershed Code:	910-66506	2-04593			Stream Order	1				
Stream Name	Unnamed				Stream Class	S3				
Crew	NN, IM, CW	/			UTM_Zone	09	ITU	M Northing	5987242	
Survey Date	6/17/2015						ITU	M Easting	518699	
Time	12:33:15				Site Length (m)	100				
Channel	Visible Cha	nnel			Features	RO - I	Rock outcro	р		
Mean Channel Width	(m) 2.26	Mean W	etted Wid	dth (m)	1.00	Mear	n Residual P	ool Depth ((m) 0.10	
Mean Gradient (%)	12	Dominat	e Substra	te	Gravels	Sub-c	dominate Su	ubstrate	Cobbles	
In-stream Cover	Abundant	Dominar	nt cover		SWD	LWD, OV				
Water Quality T	emperature (Deg C)	11.1	рН	8.4	Conductivity (uS/c	lity C-Clear				
Riparian Vegetation					Crown Closure			>90%		
Left Bank Shape	Sloping				Right Bank Shape			Sloping		
Left Bank Texture	Rock				Right Bank Texture Boulder/Block					
Left Bank Riparian Ve	getation Mixed	vood			Right Bank Riparian Vegetation Mixedwood					
Left Bank Stage	Pole/Sa	apling			Right Bank Stage			Pole/Sapli	ng	
Habitat Comments	Fish Species	AO - All Sal	monids							
Spawning	None - No appropriat	e gravels.								
Rearing	Poor - Some rearing h	abitat, good cove	er, limited by	y flow dept	hs.					
Overwintering	None - No sufficiently	deep pools, low	flows and th	nerefore lo	w dissolved oxygen.					
Migration	Poor - Gradient range	s from 9-19%, lov	w flow depth	ns, accessib	s, accessible only to small-bodied fish.					
Fish Information	Historical Fish Pr	esence	CO							
Fished -2015	No	Species Cap	otured-20	15	N/A		Species	Stage-2015	5 N/A	
Fished -2016	Not visited	Species Cap	otured-20	16	N/A		Species	Stage-2016	6 N/A	

Photo Comments

Downstream view.

Site Comments

Small, defined stream channel with some poor-quality rearing and migrating habitat. Low water depths limit access for fish and habitat area in the channel. Abundant woody debris and overhanging vegetation enclose the stream, offering high levels of cover. Small gravel for spawning and deep pools for overwintering are absent.



Notes:			Fish	Fish Species		Dellerenden	Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing			
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m			
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m			
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel			
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage			
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish			
	IV	Instream vegetation	CCG	Slimy sculpin	TCR	Threesnine sticklehack		bearing except where noted.			

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



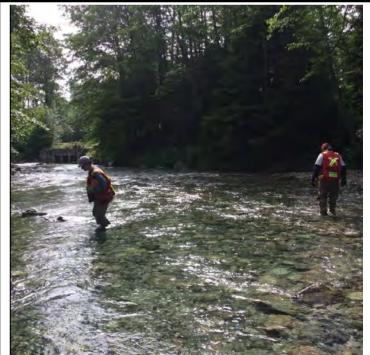
Crossing Type	Transmissio	n Line	Site Nu	ımber	per TL41 Structure No. 181						
Watershed Code:	910-665607	7			Stream Order	5					
Stream Name	Anderson C	reek			Stream Class	S2					
Crew	IM				UTM_Zone	09	UTM	l Northing	5	5985700	
Survey Date	6/17/2015						UTM	TM Easting 518780			
Time	10:34:05				Site Length (m)	Site Length (m) 100					
Channel	Visible Char	nnel			Features	EOF -	Fishway, RC	- Rock O	utcrop)	
Mean Channel Width (m)) 18.42	Mean We	etted Wid	lth (m)	14.34	Mean	Residual Po	ol Depth	(m)	0.46	
Mean Gradient (%)	1	Dominate	e Substrat	te	Cobbles	Sub-d	ominate Sul	Substrate Gra		els	
In-stream Cover	Moderate	Dominan	t cover		В	Sub-d	ominant cov	/er	DP		
Water Quality Temp	perature (Deg C)	9.9	рН	8.6	Conductivity (uS/cm) 34			Turbi	dity	C-Clear	
Riparian Vegetation					Crown Closure			21-40%			
Left Bank Shape	Vertica	I			Right Bank Shape		Sloping				
Left Bank Texture	Anthro	pogenic			Right Bank Textur	Right Bank Texture Cobbles					
Left Bank Riparian Vegeta	ation Deciduo	ous			Right Bank Riparia	nt Bank Riparian Vegetation Mixedwood					
Left Bank Stage	Young F	orest			Right Bank Stage		,	Young Fo	rest		
Habitat Comments	Fish Species	AO - All Salr	monids								
Spawning	Good - Gravel variety,	riffles and pools	with gravel	throughou	t.						
Rearing	Good - Moderate cove	er, habitat variety	'.								
Overwintering	Good - Deep pools thr	oughout, good flo	ows.								
Migration	Moderate - Falls barrio	erate - Falls barrier upstream of site, fish ladder approximately 200 m downstream of site. Likely passable only by large salmon.									
Fish Information	Historical Fish Pre	esence C	CO, CC, CH	H, PL, SK	PK, CLA, CCG						
Fished -2015	No	Species Cap	tured-20	15	N/A		Species S	Stage-201	.5	N/A	
Fished -2016	Not visited	Species Cap	tured-20	16	N/A		Species S	Stage-201	.6	N/A	

Photo Comments

Downstream extent of Anderson Creek site.

Site Comments

Good quality habitat for salmonids. Variety of habitats, including pools, riffles, back eddies. Gravel suitable for spawning throughout reach. Impassable falls upstream of site. Fish ladder located 150 m downstream of crossing site. Armored bank on left bank, some pieces of concrete slab throughout channel. Power line crosses above creek.



Notes:	Cover		Fish	Fish Species		Dellassenden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	B UC DP OV	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey Rainbow trout	S2 > 5 m - 20 m	S6 < 3 m
		Undercut bank	CH	Chinook salmon	RB		S3 1.5 m - 5 m	NVC No visible channel
		Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
		Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throoping stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Tr	ansmission I	ine	Site N	umber	TI	L42			Stru	ıcture	No.	140
Watershed Code:	91	10-665062-2	0282			St	tream Order	1					
Stream Name	Uı	nnamed				St	tream Class	S6					
Crew	IN	1, HC, WM				U	ITM_Zone	09 UTM Northing			rthing		5995839
Survey Date	7/	5/2016							UTM Easting 520098				
Time	14	1:37:56				Si	ite Length (m)	100	100				
Channel	Vi	sible channe	1				Features	None					
Mean Channel Width (m) 2.59	9	Mean We	tted Wi	dth (m)	2.1	11	Mean	Mean Residual Pool Depth (m) 0.15				
Mean Gradient (%)	15		Dominate	Substra	ate	Gr	ravels	Sub-d	ominate :	Substra	ate	Cobbl	es
In-stream Cover	Abu	ındant	Dominant	cover		LW	VD	Sub-d	ominant	cover		SWD,	OV
Water Quality Ter	mperature	e (Deg C)	No data	рН	No data	a C	Conductivity (uS/cr	m)	No data	1	Turbidi	ity	C-Clear
Riparian Vegetation						(Crown Closure			41-7	0%		
Left Bank Shape		Sloping				F	Right Bank Shape			Slopi	ing		
Left Bank Texture		Gravels				F	Right Bank Texture)		Grav	els .		
Left Bank Riparian Vege	etation	Coniferou	S			F	Right Bank Ripariar	n Veget	ation	Coni	ferous	5	
Left Bank Stage		Young For	est			F	Right Bank Stage			Youn	ng Fore	est	
Habitat Comments	Fish Sp	ecies A	O - All Salm	nonids									
Spawning	None - No	spawning, no f	sh access to si	te.									
Rearing	None - No	potential for fis	sh access to sit	e.									
Overwintering	None - No	potential for fis	sh access to sit	е.									
Migration	None - No	potential for fis	sh access to sit	е.									
Fish Information	Historic	al Fish Prese	nce N	o data									
Fished -2015	Not visi	ted S	pecies Capt	ured-20	015	N	I/A		Specie	es Stage	e-2015	5 N	N/A
Fished -2016	Yes	S	pecies Capt	ured-20	016	N	IFC		Specie	es Stage	e-2016	5 N	N/A

Photo Comments

Upstream extent of survey.

Site Comments

Stream is very nice, well defined channel. However, barrier to fish passage was identified downstream. Fishing done at crossing sites and immediately upstream of barrier, no fish captured. Fishing for 55 seconds below barrier captured 2 coastal cutthroat trout parr. No fish access above barrier site. Crossing sites upstream are non-fish bearing.



Notes:				Fish Species		Dallyyardon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throngoine sticklohook		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Transmissio	n Line	Site N	umber	TL45/ 47A.1			Structure	No.	47
Watershed Code:	No data				Stream Order	1				
Stream Name	Unnamed				Stream Class	S3				
Crew	DF, NN				UTM_Zone	09	ITU	M Northing		6021358
Survey Date	6/30/2016						ITU	M Easting		523162
Time	13:07:39				Site Length (m)	100				
Channel	Dry Channe			Features	None	None				
Mean Channel Width (m) 1.81	Mean W	dth (m)	0.29	Mean	Residual P	ool Depth ((m)	0.08	
Mean Gradient (%)	1	Dominat	e Substra	ate	Fines	Sub-do	ominate Su	ubstrate	Fines	
In-stream Cover	Abundant	Dominan	nt cover		OV	Sub-do	ominant co	over	LWD,	SWD, DP
Water Quality Ter	mperature (Deg C)	No data	рН	No data	Conductivity (uS/o	cm)	No data	Turbid	lity	No data
Riparian Vegetation		<u>'</u>			Crown Closure			41-70%		
Left Bank Shape	Sloping				Right Bank Shape			Sloping		
Left Bank Texture	Fines				Right Bank Textur	e		Fines		
Left Bank Riparian Veg	etation Mixedw	/ood			Right Bank Riparia	an Veget	ation	Mixedwoo	d	
Left Bank Stage	Young F	orest			Right Bank Stage			Young For	est	
Habitat Comments	Fish Species	AO - All Salı	monids							
Spawning	None - No gravels or co	oarse substrate.	Bed materi	al is compri	sed of fine and organic mat	terials.				
Rearing	Poor - Dry channel wit	h some small iso	lated pools	. May provid	de some rearing opportuni	ties during	higher flows.			
0										
Overwintering	None - Fish likely over	winter in beaver	impoundm	ent where t	he tributary enters anothe	r creek.				
Migration				ercourse flows into a beaver impoundment. If beaver impoundment is fish bearing then there are no othe eaver dam may create a fish barrier.						nen there are no other
	parriers. It impoundme	ent is not fish be	aring, the b	eaver dam i	nay create a fish parrier.					
Fish Information	Historical Fish Pre	esence	No data							
Fished -2015	Not visited	Species Cap	otured-20)15	N/A		Species	Stage-2015	5 N	I/A

N/A

Species Captured-2016

Photo Comments

Fished -2016

Downstream extent of the reach showing dry channel.

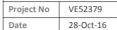
Site Comments

Watercourse converges with another tributary at a beaver impoundment. The first ten meters are wetted however the majority of the watercourse is dry. Some small isolated pools exist further upstream. The channel extends approximately 70 m upstream of the crossing site before becoming non-classified drainage. No coarse substrate found within the study area. Bed substrate comprised of organic and fine materials.



Notes:				Species	DV	Dolly yardan	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC DP	Small woody debris Large woody debris Boulder Undercut bank Deep pools	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon Chum salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m S4 < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SA SK	Salmon Sockeye salmon		NCD and wetlands are non-fish

Prepared for BC Hydro





Crossing Type	Transmission	Line	Site N	umber	TL5 /9A			Structure	No.	9
Watershed Code:	400-174068-	34330			Stream Order	1				
Stream Name	Unnamed				Stream Class	S4				
Crew	IM, NN				UTM_Zone	09	UT	M Northing	;	5031641
Survey Date	6/16/2015						UT	M Easting	Ţ	523592
Time	13:23:20				Site Length (m)	100				
Channel	Dry Channel				Features	None				
Mean Channel Width (n	n) 1.49	Mean W	etted Wid	dth (m)	0.26	Mean	Residual F	ool Depth	(m)	0.06
Mean Gradient (%)	3	Dominat	te Substra	ate	Gravels	Sub-d	ominate S	ubstrate	Fines	
In-stream Cover	Moderate	Dominan	nt cover		SWD	Sub-d	ominant c	over	LWD,	VC
Water Quality Tem	nperature (Deg C)	No data	рН	No data	Conductivity (uS/	/cm)	No data	Turbio	lity	No data
Riparian Vegetation					Crown Closure	<u>"</u>		71-90%		•
Left Bank Shape	Sloping				Right Bank Shape	9	Sloping			
Left Bank Texture	Fines				Right Bank Textu	Fines				
Left Bank Riparian Vege	etation Mixedwo	ood			Right Bank Ripari	an Veget	ation	Mixedwoo	od	
Left Bank Stage	Mature F	-orest			Right Bank Stage			Mature Fo	rest	
Habitat Comments	Fish Species	AO - All Salı	monids							
Spawning	Poor - No water during s	summer, lack o	f appropriat	te gravels.						
Rearing	Moderate - Potential sea available in June.	asonal rearing	for salmon a	and minnow	s. Good cover, but low flo	ow during s	ummer. Inter	mittent, disco	nnected p	oools only habitat
Overwintering	None - No deep pools ol	bserved.								
Migration	Poor - Seasonal creek, li	kely only holds	water durir	ng storms or	orms or during spring melt.					
Fish Information	Historical Fish Pres	ence	No data							
FISH IIIIOIIIIauon	THISTORICAL FISH FIES	iciice i	NO data							

Photo Comments

Fished -2016

Dry channel facing downstream looking towards crossing.

Mostly dry channel, small, shallow residual pools present approx every 10 m. Low flow during summer, only seasonal use during high flow periods.



Notes:			Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroom vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Trai	nsmissior	n Line	Site N	lumber	TL53				Structure	e No.	101
Watershed Code:		No	data				Stream Or	der	1				
Stream Name		Unr	named				Stream Cla	ISS	S5				
Crew		IM,	HC, JS				UTM_Zone 09			UTN	/I Northing	5	6005920
Survey Date		6/3	0/2016							UTN	/I Easting		521104
Time		12:2	28:37				Site Length	n (m)	300				
Channel		Other					Features		None				
Mean Channel W	idth (m	(m) No data Mean Wetted Width (m)					No data		Mean	Residual P	ool Depth	(m)	No data
Mean Gradient (%	6)	30 Dominate Substrate				ate	No data		Sub-d	ominate Su	bstrate	No d	lata
In-stream Cover		No da	ata	Dominant	cover		No data		Sub-d	ominant co	ver	No d	lata
Water Quality	Tem	perature ((Deg C) No data pH No data				Conductiv	ity (uS/c	m)	No data	Turbi	dity	C-Clear
Riparian Vegetat	ion							osure			No data		
Left Bank Shape			No data				Right Ban	k Shape			No data		
Left Bank Texture			No data				Right Ban	k Texture	е		No data		
Left Bank Riparian	n Veget	tation	No data				Right Ban	k Riparia	n Vege	tation	No data		
Left Bank Stage			No data				Right Ban	k Stage			No data		
Habitat Commen	ts	Fish Spe	cies	N/A									
Spawning		N/A											
Rearing		N/A											
Overwintering		N/A	N/A										
Migration		N/A											
Fish Information	h Information Historical Fish Presence No data												
Fished -2015		Not visite	ed	Species Capt	ured-20	015	N/A	Species Stage-2015 N/A			N/A		
Fished -2016	No Species Captured-2016				016	N/A	Species Stage-2016 N/A				N/A		

Photo Comments

Barrier falls and steep cascade section.

Site Comments

Assessment done at barrier site downstream of crossing site, so no channel dimensions for the actual crossing site are available. Barrier site is long (60 m) cascade pool section, with several small falls. Channel is narrow boulder bedrock chute, with an average 30% gradient. Short ~5 m sections with gradient of >50%. Falls at upstream end is 0.9 m tall, with a 0.1 m plunge pool. Not passable by juveniles or adults at any conditions. No plunge pool for adults to jump barrier falls. Juveniles not able to jump this height. Cascades section downstream is also too steep and shallow for passage. No fish potential at crossing site.



Notes:				Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD B	Small woody debris Large woody debris Boulder	AS CC CCT	Atlantic salmon Sculpins Coastal cutthroat trout	DV L PK PL	Dolly varden Lamprey Pink salmon Pacific Lamprey	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	UC DP	Undercut bank Deep pools	CH CM	Chinook salmon Chum salmon	RB SA	Rainbow trout Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV IV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Tra	nsmissior	n Line	Site N	umber	TL6	9				
Watershed Code:	400)-174068-	34330			Stream Order 1					
Stream Name	Uni	named				Stream Class	S2				
Crew	IM,	NN				UTM_Zone	09	UTN	√ Northing	5	6030749
Survey Date	6/1	5/2015						UTN	√ Easting		523564
Time	17:	14:07				Site Length (m)	100				
Channel	Vis	ble Chanı	nel			Features	BD -	Beaver dam			
Mean Channel Width	(m) 10.03	3	Mean We	etted Wi	dth (m)	1.48	Mear	n Residual P	ool Depth	(m)	0.18
Mean Gradient (%)	1		Dominat	e Substra	ate	Fines	Sub-	dominate Su	ıbstrate	Grav	rels
In-stream Cover	Abur	idant	Dominan	t cover		LWD	Sub-	dominant co	ver	SWD), OV
Water Quality To	emperature	(Deg C)	15.1	рН	8.3	Conductivity (uS,	/cm)	169	Turbio	dity	L-Lightly turbid
Riparian Vegetation						Crown Closure			41-70%		
Left Bank Shape		Sloping				Right Bank Shape	е		Sloping		
Left Bank Texture		Fines				Right Bank Textu	ire		Fines		
Left Bank Riparian Ve	getation	Mixedwo	boc			Right Bank Ripar	ian Vege	etation	Mixedwoo	od	
Left Bank Stage		Young Fo	orest			Right Bank Stage			Young For	rest	
Habitat Comments	Fish Spe	cies	AO - All Salı	monids							
Spawning	None - No a	ippropriate (gravels.								
Rearing	Poor - Some time of the		throat trout rea	aring habita	t in stream	section and in beaver por	nds upstrea	am and downst	ream. Good c	over, b	ut low flow depths at
Overwintering	Moderate -	Beaver pon	d may provide s	ome overw	vintering ha	bitat.					
Migration	Poor - Low	flow depths,	beaver dam is	barrier to la	arge-bodied	-bodied fish.					
Fish Information	Historica	l Fish Pres	sence N	No data							
Fished -2015	Yes		Species Cap	tured-20	015	CCT		Species	Stage-201	.5	Fry
Fished -2016	Not visite	h	Species Cap	tured-20	116	N/A		Species	Stage-201	6	N/A

Photo Comments

Channelized section upstream of beaver dam.

Site Comments

Large beaver dam located downstream of the crossing site. Large open water backflooded area upstream of dam, large sedge-dominated wetland located upstream of open water area. Short section (approx 50 m long) of defined channel was visible approximately 75 m upstream of the dam at the crossing site. Channel was shallow, with low flows and some deeper residual pools. Fish were captured in these deeper pools. Above the defined channel, another beaver dam and backflooded pool (24 m across) were present. Migration is likely limited in this system, with only small fish able to pass the beaver dams and shallow streams.



Notes:			Fish	Species	DV	Delluvarden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO Coho salmon		SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmissio	n Line	Site N	lumber	TL68			Structure N	No. 128
Watershed Code:		No data				Stream Order	N/A			
Stream Name		Unnamed				Stream Class	NVC			
Crew		HC, IM, WN	1			UTM_Zone	09	UT	M Northing	5998912
Survey Date		7/6/2016						UT	M Easting	520008
Time		15:03:13			Site Length (m)	100	100			
Channel		No Visible C	Channel		Features	None	9			
Mean Channel Wi	dth (m)	n (m) N/A Mean Wetted Width (m)				N/A	Mea	n Residual F	ool Depth (n	n) N/A
Mean Gradient (%)	N/A	Dominate Substrate			N/A Sub-dominate			ubstrate N	N/A
In-stream Cover		N/A	Dominan	t cover		N/A	Sub-	dominant c	over N	N/A
Water Quality	Tempe	rature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidit	ty N/A
Riparian Vegetation	on					Crown Closure			N/A	
Left Bank Shape		N/A				Right Bank Shape			N/A	
Left Bank Texture		N/A				Right Bank Textur	e e		N/A	
Left Bank Riparian	Vegetati	on N/A				Right Bank Riparia	an Vege	etation	N/A	
Left Bank Stage		N/A				Right Bank Stage			N/A	
Habitat Comment	s Fi	ish Species	N/A							
Spawning	N/A	А								
Rearing	N//	A								
Overwintering	N/A	Α								
Migration	N/A	Α								
Fish Information	His	storical Fish Pre	esence I	No data						
Fished -2015	No	ot visited	Species Cap	tured-2	015	N/A	Species Stage-2015		N/A	
Fished -2016	No)	Species Car	tured-2	016	N/A		Species	Stage-2016	N/A

Photo Comments

Taken at proposed crossing location.

Site Comments

No visible channel. This is a bog drainage, with damp sphagnum moss and skunk $% \left(1\right) =\left(1\right) \left(1\right) \left($ cabbage with few intermittent pools of 0.05 m depth. Downstream of crossing drainage is through forested habitat with no evidence of overland flow, connection with downstream appears subsurface through a 2 m high valley wall. Non-fish bearing.



Notes:			Fish	Fish Species DV Dolly varden			Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	L L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
1	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	B Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA Salmon	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO Coho salmon		SK Sockeye salmon			NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	The second secon		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Transmissio	on Line	Site N	lumber	TL69				Structure	No.	128	
Watershed Code:		No data				Stream Or	der	2					
Stream Name		Unnamed				Stream Cla	ass	Wetla	nd - Fish-be	ea			
Crew		HC, IM, WN	Л			UTM_Zone	е	09	UTN	/I Northing	7	5998891	
Survey Date		7/6/2016							UTN	/I Easting		519939	
Time		14:24:07				Site Lengtl	h (m)	150					
Channel		Wetland				Features	;	None					
Mean Channel Wi	dth (m)	No data	Mean We	etted Wi	idth (m)	15.00		Mean	Residual P	ool Depth	(m)	No data	
Mean Gradient (%	ó)	No data	Dominat	e Substra	ate	Fines		Sub-d	ominate Su	bstrate	Fine	S	
In-stream Cover		Abundant	Dominan	it cover		DP		Sub-d	ominant co	ver	LWD), IV, OV	
Water Quality	Temp	erature (Deg C)	No data	No data PH No data Conductivity (u				(Jcm) No data Turbidity L-Lightly tu					
Riparian Vegetati	on		·	Crown Closure						1-20%			
Left Bank Shape		Sloping	ng Right Bank Shape						Sloping				
Left Bank Texture		Fines				Right Ban	k Texture	9	Fines				
Left Bank Riparian	Vegeta	ation Mixed	vood			Right Ban	k Riparia	n Vege	tation	Mixedwoo	bc		
Left Bank Stage		Mature	Forest			Right Ban	k Stage			Mature Fo	orest		
Habitat Comment	ts	Fish Species	AO - All Salı	monids									
Spawning	N	None - No coarse sub	strates at crossin	g location,	spawning h	abitat is located	further dov	vnstream					
Rearing	N	Moderate - There is a	variety of cover	provided fo	or juveniles.								
Overwintering	P	Poor - There is adequ	ate depth but the	epth but there is potential for low dissolved oxygen in winter									
Migration	N	Moderate - Presence	of beaver dams o	downstrear	m that may I	t may limit migration but there are no permanent barriers.							
Fish Information	ŀ	Historical Fish Pro	esence N	No data									
Fished -2015	1	Not visited	Species Cap	tured-2	015	N/A			Species	Stage-201	5	N/A	
Fished -2016	١	/es	Species Cap	tured-2	016	СО			Species	Stage-201	6	Fry	

Photo Comments

Downstream extent of the survey looking downstream.

Site Comments

Wetland system, with wetted width of 15 m at crossing and composed of organic substrates. Beaver dams observed approximately 10 m upstream towards Bridge site 52, with flow cutting channel through. Old growth hemlock dominant forest along riparian edge with skunk cabbage, Devils club and emergent reed grasses. Yellow water lily present as in-stream vegetation. Large woody debris, water depths combined with high tannin content and undercut banks providing cover. Downstream extent of site wetland area approaches 30 m in diameter between valley walls, with large portion of wetted width hidden by emergent grasses. Fish observed feeding on surface near crossing location. No spawning due to organic substrates, poor overwintering (adequate depth, potential for low dissolved $% \left\{ 1,2,\ldots,n\right\} =0$ oxygen), moderate rearing, moderate migration. Habitat 400 m downstream becomes more channelized and contains coarse substrates covered in a thick layer of rust colored algae. Many beaver dams >5 were observed some without flow over top, however can not be ruled a permanent barrier. One coho captured $400\,$ m downstream. No permanent gradient barriers observed between fish capture and crossing site. Fish bearing stream.



					A TOTAL PROPERTY.	The second secon	100	40.00	THE PERSON NAMED IN	Control of the Contro
Notes:	Cove	•	Fish	Species	DV	Dellissenden	Stre	am Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish	bearing	Non	n-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5	
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCE	Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCE	and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threesnine sticklehack			bea	ring except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Transmissio	n Line	Site N	lumber	TL7			Structure	No.	
Watershed Code:		400-174068	-51121			Stream Order	1				
Stream Name		Unnamed				Stream Class	S4				
Crew		IM, NN				UTM_Zone	09	UTN	1 Northing	6029313	
Survey Date		6/16/2015						UTM	1 Easting	522763	
Time		11:08:59				Site Length (m)	100				
Channel		Visible Chan	nel			Features	None	9			
Mean Channel W	idth (m	1.00	Mean W	etted Wi	idth (m)	0.91	Mea	n Residual Po	ool Depth (m) 0.17	•
Mean Gradient (%	%)	6	Dominat	e Substr	ate	Fines	Sub-	dominate Su	bstrate	Gravels	
In-stream Cover		Abundant	Dominar	nt cover		OV	Sub-	LWD, SWD			
Water Quality	Tem	perature (Deg C)	10.3	рН	8.3	Conductivity (uS/	ity C-Clear				
Riparian Vegetat	ion					Crown Closure		,	41-70%		
Left Bank Shape		Sloping				Right Bank Shape	9		Sloping		
Left Bank Texture	j	Fines				Right Bank Textu	re		Fines		
Left Bank Riparian	n Veget	tation Mixedw	ood			Right Bank Ripari	ian Vege	etation	Mixedwoo	d	
Left Bank Stage		Mature	Forest			Right Bank Stage			Mature Fo	rest	
Habitat Commen	ts	Fish Species	AO - All Sal	monids							
Spawning		None - No appropriate	gravels.								
Rearing		Poor - Could provide se	easonal salmoni	d habitat.							
Overwintering		None - No deep pools.									
Migration		Poor - Low flows, only	passable by sma	all fish.							
Fish Information	on Historical Fish Presence No data										
Fished -2015		Yes	Species Cap	otured-2	015	NFC	Species Stage-2015 N/A			N/A	
Fished -2016	ed -2016 Not visited Species Captured-2016					Species Stage-2016 N/A					

Photo Comments

Densely vegetated.

Site Comments

Small channel, with low flow rate and depth. Heavily vegetated, abundant overhanging vegetation provides high cover levels. Small channel only capable of providing temporary rearing habitat for juvenile fish, no access for large-bodied fish, no overwintering, no spawning habitat.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Theoremina etialdahaale		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Trans	smission L	ine	Site N	umber	TL72			Structure	No.	141
Watershed Code:		No d	ata				Stream Order	1				
Stream Name		Unna	amed				Stream Class	NCD				
Crew		HC, V	NM, IM				UTM_Zone	09	UTI	M Northing	5	5995609
Survey Date		7/5/2	2016						UTI	M Easting		519986
Time		10:04	4:16				Site Length (m)	100				
Channel		Non-	classified	Drainage			Features	None				
Mean Channel Wie	dth (m)	0.87		Mean We	tted Wi	dth (m)	0.38	Mean Re	esidual P	ool Depth	(m)	0.10
Mean Gradient (%)	7 Dominate Substrate					Fines	Sub-don	ninate Sเ	ubstrate	Grav	rels
In-stream Cover		N/A Dominant cover					N/A	Sub-don	ninant co			
Water Quality	Temper	rature (D	Deg C)	No data	рН	No data	Conductivity (uS/c	m) N	lo data	Turbio	dity	No data
Riparian Vegetation	on		<u> </u>				Crown Closure	ï		N/A		
Left Bank Shape		S	Sloping				Right Bank Shape		Sloping			
Left Bank Texture		F	ines				Right Bank Texture	9		Fines		
Left Bank Riparian	Vegetati	ion (Coniferous	S			Right Bank Riparia	n Vegetat	ion	Mixedwoo	bo	
Left Bank Stage		Υ	oung For	est			Right Bank Stage			Young For	rest	
Habitat Comment	:s Fi	ish Speci	ies A	O - All Salm	nonids							
Spawning	N/A	Α										
Rearing	N/A	Α										
0												
Overwintering	N/A	А										
Migration	N/A	Α										
				ı								
Fish Information	His	storical F	Fish Prese	nce N	o data							
Fished -2015	No	Not visited Species Captured-2015				015	N/A Species Stage-2015 N/A				N/A	

N/A

Photo Comments

Fished -2016

Taken 40 m downstream of crossing.

Site Comments

Intermittent channel development, separated by sections of subsurface flow. Organic dominant substrates with small amounts of gravels and small amounts of water in isolated pools and little flow. When valley width increases drainage only visible due to wetland vegetation. Drainage often choked with ferns, Devils club and salmon berry. Access to fish limited due to sections of subsurface flow downstream, no drainage visible until 20 m downstream of crossing, upstream only subsurface flow with 38% gradient. Non-fish bearing.



Notes:	Cove	r	Fish	Species	DV	Delluvarden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Tra	nsmission	Line	Site N	umber	TL73			Structure	e No.	142
Watershed Code:	No	data				Stream Order	2				
Stream Name	Un	named				Stream Class	Wetlar	nd			
Crew	HC,	, IM, WM				UTM_Zone	09	UTN	1 Northing	5	5995553
Survey Date	7/5	5/2016						UTN	1 Easting		519961
Time	10:	39:12				Site Length (m)	100				
Channel		tland				Features	None				
Mean Channel Width (m) No d	ata	Mean We	tted Wi	dth (m)	No data	Mean	Residual Po	ool Depth	(m)	No data
Mean Gradient (%)	No d	ata	Dominate	Substra	ate	Fines	Sub-do	ominate Su	bstrate	No c	lata
In-stream Cover	N/A		Dominant	cover		-	Sub-do	ominant co	ver	-	
Water Quality Ter	mperature	(Deg C)	No data	рН	No data	Conductivity (uS/	cm)	No data	Turbi	dity	No data
Riparian Vegetation						Crown Closure			No data		
Left Bank Shape		No data				Right Bank Shape		No data			
Left Bank Texture		No data				Right Bank Textur	·e		No data		
Left Bank Riparian Veg	etation	No data				Right Bank Riparia	an Veget	ation	No data		
Left Bank Stage		No data				Right Bank Stage			No data		
Habitat Comments	Fish Spe	cies	N/A								
Spawning	N/A										
Rearing	N/A										
O into air .	N/A										
Overwintering	N/A										
Migration	N/A										
			ı								
Fish Information	Information Historical Fish Presence No data										
Fished -2015	Not visited Species Captured-2015				015	N/A		Species	Stage-201	.5	N/A

Photo Comments

Fished -2016

Taken at crossing site.

Site Comments

No channel development, small sections of overland flow through wetland vegetation separated by sections of subsurface flow. Organic dominant substrates with very small amounts of gravels and small amounts of water in isolated pools and little flow. When valley width increases drainage only visible due to wetland vegetation. Drainage choked with ferns, Devils club and skunk cabbage. No access for fish due to subsurface flow and lack of channel development 26% gradient. Non-fish bearing.



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD B	Small woody debris Large woody debris Boulder	AS CC CCT	Atlantic salmon Sculpins Coastal cutthroat trout	DV L PK PL	Dolly varden Lamprey Pink salmon Pacific Lamprey	Fish bearing S1 > 20 m S2 > 5 m - 20 m	Non-fish bearing S5 > 3 m S6 < 3 m
	UC DP	Undercut bank Deep pools	CH CM	Chinook salmon Chum salmon	RB SA	Rainbow trout Salmon	S3 1.5 m - 5 m S4 < 1.5 m	NVC No visible channel NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Transmission	Line	Site N	Number	TL8.1	•	St	tructure	e No.	22	
Watershed Code:		400-174068				Stream Order	5	•				
Stream Name		Lakelse River				Stream Class	S1					
Crew		IM, BH, KE, P	G, MB			UTM_Zone	09	UTM N	Northin _{	5	6028797	
Survey Date		6/27/2015						UTM E	asting		522174	
Time		11:09:07				Site Length (m)	100	•				
Channel		Visible Chann	el			Features	None					
Mean Channel Wi	dth (m)	54.67	Mean We	tted W	idth (m)	1.83	Mean Re	esidual Poo	l Depth	(m)	48.67	
Mean Gradient (%)	2	Dominate	Substr	ate	Cobbles	Sub-don	ninate Subs	trate	Grav	els	
In-stream Cover		Moderate	Dominant	cover		В	Sub-don	ninant cove	r	LWD	,DP	
Water Quality	Tempe	rature (Deg C)	15.7	рН	7.8	Conductivity (uS/o	:m) 5	50	Turbi	dity	C-Clear	
Riparian Vegetati	on					Crown Closure	·	1-20%				
Left Bank Shape		Undercut				Right Bank Shape		Slo	oping			
Left Bank Texture		Fines				Right Bank Textur	е	Fir	nes			
Left Bank Riparian	Vegetati	on Mixedwo	od			Right Bank Riparia	n Vegetat	ion M	ixedwo	od		
Left Bank Stage		Mature F	orest			Right Bank Stage		М	ature F	orest		
Habitat Comment	: s Fi	sh Species	AO - All Saln	nonids								
Spawning	Exc	ellent - Excellent spa	wning, good gra	vel variet	ty, pea size u	p to large cobble. Redd obs	erved.					
Rearing	Exc	ellent - Margin habita	its are excellent	, abunda	nt fry observ	ed, pools, back eddies, and	large woody	debris habitat	s availabl	e for fish	٦.	
Overwintering	Exc	ellent - Deep pools w	ith good flows.									
Migration	Exc	ellent - No barriers, g	ood flow depth	s, moder	ate velocities	5.						
0												

N/A

N/A

Photo Comments

Fish Information

Fished -2015

Looking upstream.

Site Comments

Excellent salmon and trout habitat, especially spawning. Large fields of gravel and cobble for spawning, redds observed. Abundant coho fry on margins using high cover. Adult trout observed under large woody debris. Freshwater mussels on margins. Somewhat limited pools, some along margins. Habitat is dominated by long shallow glide. Cover in mid channel is limited, but abundant along margins. Banks have some old growth trees.

Historical Fish Presence

Not visited

No data

Species Captured-2015

Species Captured-2016



Species Stage-2015

N/A

No	tes:	Cove	r	Fish	Species			St	ream Class	
N/A	Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fis	h bearing	Non-fish bearing
		LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m
		В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3 m
		UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3	1.5 m - 5 m	NVC No visible channel
		DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage
		OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish
		IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Access Road	d	Site N	umber	0+220			Stru	acture N	0.
Watershed Code:		No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	NC	D			
Crew		IM, NN				UTM_Zone	09	Į	JTM No	rthing	6025084
Survey Date		5/13/2016						Į	JTM Eas	sting	521772
Time		15:33:13				Site Length (m)	10	0			
Channel		Visible chan	nel			Features	CV	- Culvert			
Mean Channel Widt	:h (m)	1.04	Mean We	tted Wi	dth (m)	0.02	Me	ean Residua	al Pool D	epth (m	0.02
Mean Gradient (%)		13	ate	Gravels							
In-stream Cover		None	Dominan	cover		N/A	Sul	/A			
Water Quality	Tempera	ature (Deg C)	Conductivity (/ No data							
Riparian Vegetation	า					Crown Closure	j		21-4	0%	
Left Bank Shape		Sloping				Right Bank Sha	аре		Slop	ing	
Left Bank Texture		Fines				Right Bank Tex	kture		Fine	S	
Left Bank Riparian V	egetatio	n Mixedw	rood			Right Bank Rip	arian Ve	getation	Mixe	edwood	
Left Bank Stage		Mature	Forest			Right Bank Sta	ge		Mat	ure Fore	st
Habitat Comments	Fis	h Species	AO - All Saln	nonids							
Spawning	None	e - No access to sit	e possible, no sp	awning.							
Rearing	None	e - No access to sit	e possible.								
Overwintering	None	e - Absent, no fish	access.								
Migration	None	e - Absent, no fish									
Fish Information	Hist	torical Fish Pre									
Fished -2015	Not	Not visited Species Captured-2015				N/A		Spec	ies Stag	e-2015	N/A
Fished -2016	No	No Species Captured-2016				N/A		Spec	ies Stag	e-2016	N/A

Photo Comments

Crossing site, perched culvert.

Site Comments

Dry channel present downstream of crossing and in upstream ditch. Channel extends approximately 80 m downstream of crossing, then becomes broad and poorly defined NVC. Gradient is high (18%) downstream of culvert, then lower (10%) 30 m downstream, then nearly flat (2%) beyond 60 m downstream. Scoured channel is likely a result of high energy water flowing down steep slope from ditch and perched crossing and scouring until energy is dissipated. One small pool of standing water was observed in scoured channel, approx 65 m downstream. Downstream NVC is damp and muddy, with no standing water.

Site is located approximately 1 km upstream of a known fish passage barrier. No fish access to site currently possible. Non-fish-bearing.



Notes:	Cove	r	Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	1\/	Instroam vogetation	CCG	Slimy sculpin	TCD	There is a section of the later of the section of t		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Access Road Site Number 10+465 Structure No.									
Watershed Code:		No data				Stream Order	1	1			
Stream Name		Unnamed				Stream Class	1	NCD			
Crew		IM, NN				UTM_Zone	(09	UTM N	Vorthing	6024060
Survey Date		5/14/2016							UTM E	asting	522036
Time		12:29:12				Site Length (m)	ite Length (m) 100				
Channel		No Visible Ch		Features	Features None						
Mean Channel Wi	dth (m)	N/A	idth (m)	N/A	N/A Mean Residual Pool Depth (m)						
Mean Gradient (%)	N/A	Dominate	e Substra	ate	N/A	5	Sub-domi	nate Subs	trate N/A	A
In-stream Cover		N/A	Dominan	t cover		N/A	9	Sub-domi	A		
Water Quality	Tempei	rature (Deg C)	No data	рН	No data	Conductivity (uS/cm) No	o data	Turbidity	No data
Riparian Vegetati	on		Crown Closure				'A				
Left Bank Shape		N/A				Right Bank Sh	ape		N/	'A	
Left Bank Texture		N/A				Right Bank Te	xture		N/	'A	
Left Bank Riparian	Vegetati	on N/A				Right Bank Rip	arian '	Vegetatio			
Left Bank Stage		N/A				Right Bank Sta	age		N/	'A	
Habitat Comment	s Fi	sh Species	N/A								
Spawning	N/A	A									
Rearing	N//	A									
Overwintering	N//	A									
Migration	N/A	A									
Fish Information Historical Fish Presence No data											
Fished -2015	No	ot visited	Species Cap	tured-2	015	N/A Species Stage-2015 N/			N/A		
Fished -2016				016					N/A		

Photo Comments

Crossing site, showing the broad, undefined area downstream of the culvert.

Site Comments

Culvert crossing carries ditch drainage from steep upslope area across road and drains into broad, undefined wetland area. Wetland consists of discontinuous shallow pools with abundant Instream and overhanging vegetation. 50 m downstream, the wetland joins a small scoured channel. Channel is 2 m wide, standing water depth of 20 to 50 cm, with organic substrates and very slow flow. No alluvial substrates observed. Evidence of beaver damming on small channel. Channel is very marginal fish habitat. Appears to be upper headwater drainage for tributary stream to RD115/Site 13 stream several km downstream. There is no visible channel drainage downslope of the culvert. The channel is not fish passable due to discontinuous stagnant pools with no evidence of scouring higher flows. No fish habitat present upslope of crossing, ditch flows only. Non-fish bearing at crossing site.



Notes:	Cover		Fish	Fish Species		Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road	d	Site N	umber	1062AR_2953	Structure No.				
Watershed Code:		No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	S3				
Crew		IM, HC, JS				UTM_Zone	09	U	TM Northing	0	6007438
Survey Date		7/2/2016						U	TM Easting		521737
Time		13:14:05				Site Length (m)	e Length (m) 400				
Channel		Visible chan	inel			Features	Χ -	LWD jam			
Mean Channel Wi	dth (m)	1.80	Mean W	etted Wi	dth (m)	1.13	Me	an Residual	Pool Depth	(m)	0.13
Mean Gradient (%	ó)	6	Dominat	e Substra	ate	Gravels	Suk	Sub-dominate Substrate Cobbles			les
In-stream Cover		Moderate	Dominar	nt cover		LWD	Suk	Sub-dominant cover SWD, DP, OV			, DP, OV
Water Quality	Tempe	rature (Deg C)	11.0	рН	7.8	Conductivity (u	ıS/cm)	62	Turbi	dity	C-Clear
Riparian Vegetati	on				Crown Closure			71-90%			
Left Bank Shape		Sloping				Right Bank Sha	ре		Sloping		
Left Bank Texture		Fines				Right Bank Tex	ture		Fines		
Left Bank Riparian	Vegetat	ion Mixedw	/ood			Right Bank Rip	arian Ve	getation	Mixedwo	od	
Left Bank Stage		Young F	orest			Right Bank Sta	ge		Young For	rest	
Habitat Comment	ts F	ish Species	AO - All Sal	monids							
Spawning						g. Substrates range in si e-pools are more comm		ea gravel to larg	ge cobble. Small	er subst	rates for trout are
Rearing		oderate - Habitat are versity. Shallow pool		to low flow	w depths an	d lack of deep pools. Ca	scades ma	ıy limit juvenile	fish distributio	n. Cove	r is moderate with good
Overwintering	Ро	or - Limited deep po	ool habitat, may	be low flow	s or dissolv	ed oxygen during winte	r.				
Migration	Moderate - Many cascades may limit distribution of fish during lower flows. During high flow, adults are likely able to mo permanent barriers identified.						able to move th	nrougho	ut the system. No		
Fish Information	Hi	istorical Fish Pre	esence	No data							
Fished -2015	No	ot visited	Species Cap	otured-20	015	N/A Species St			es Stage-201	.5	N/A
Fished -2016		Yes Species Captured-2016				CCT Species Stage-2					

Photo Comments

Downstream extent of barrier search. No barriers found.

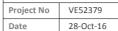
Site Comments

Stream is flowing in a defined channel with alternating riffle-pool and cascadepool morphologies. Gradients are moderate (approx 5-10%), with steeper sections with short cascades. Cascades range from 0.5 m to 1.0 m in height. Fish habitat for salmonids is generally poor-moderate. Fish captured by dip netting, other juveniles observed in adjacent pools. Three coastal cutthroat trout caught during electrofishing survey immediately downstream of crossing. Fish-bearing site.



Notes:	Cover			Species	DV	Dolly vardon	Stream Class	
N/A Assessed but no data to report	SWD LWD	Small woody debris Large woody debris Boulder	AS CC CCT	Atlantic salmon Sculpins Coastal cutthroat trout	DV L PK	Dolly varden Lamprey Pink salmon	Fish bearing S1 > 20 m S2 > 5 m - 20 m	Non-fish bearing S5 > 3 m S6 < 3 m
	UC DP	Undercut bank Deep pools	CH CM	Chinook salmon Chum salmon	PL Pacific Lamprey RB Rainbow trout SA Salmon		S3 1.5 m - 5 m S4 < 1.5 m	NVC No visible channel NCD Non-classified drainage
	OV	Overhanging vegetation	CO Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish	

Prepared for BC Hydro





Crossing Type		Access Road		Site N	umber	1062AR_2954			Structure	No.	
Watershed Code:		No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	S4				
Crew		IM, HC, JS				UTM_Zone	09	UT	M Northing		6007395
Survey Date		7/2/2016						UT	M Easting		521713
Time		16:27:51				Site Length (m)	100	100			
Channel		Visible chann	el			Features	Features None				
Mean Channel Wi	dth (m)	1.14	Mean We	etted Wi	dth (m)	0.82	Mear	Pool Depth (m)	2.38	
Mean Gradient (%	5)	18	Dominate	e Substra	ate	Cobbles	Sub-c	dominate S	ubstrate	Fines	
In-stream Cover		Abundant	Dominan	t cover		SWD, OV Sub-dominant cover				N/A	
Water Quality	Tempe	rature (Deg C)	16.1	Conductivity (uS/	14	Turbid	ity	C-Clear			
Riparian Vegetati	on					Crown Closure		71-90%			
Left Bank Shape		Sloping				Right Bank Shape	!		Vertical		
Left Bank Texture		Fines				Right Bank Textur	re		Fines		
Left Bank Riparian	Vegetat	ion Mixedwo	od			Right Bank Ripari	an Vege	egetation Mixedwood			
Left Bank Stage		Pole/Sap	ling			Right Bank Stage			Pole/Saplir	ng	
Habitat Comment	s F	ish Species	AO - All Salr	monids							
Spawning	No	one - Small gravels are	lacking in chan	inel.							
Rearing	Ро	oor - High cover with c	oarse substrate	es available	, but cascac	de pool habitat is likely limi	ting acces	s for rearing f	ish.		
Overwintering	No	one - No pools availab	le for overwinte	ering.							
Migration	Ро	oor - Woody debris and	n passage at	flows other than freshet.							
Fish Information	Hi	istorical Fish Pres	ence N	No data							
Fished -2015	No	ot visited	Species Cap	tured-2	015	N/A		Specie	s Stage-2015	5 1	N/A
Fished -2016	No	0	Species Cap	tured-2	016	N/A		Specie	s Stage-2016	5 I	N/A

Photo Comments

Taken at edge of cutblock.

Site Comments

Stream channel heavily influence by recent clear cutting from current road crossing to approximately 50 m downstream, with limited definition and overgrown by vegetation and choked its woody debris likely from mulching activities. Channel then is defined (where measurements taken) for 30 m until confluence with known fish bearing stream of site 1062AR_2954. Fish presence is possible due to lack of barriers observed in this reach, however would likely be limited to periods of high flows during freshet.



Notes:	Cover			Fish Species DV Dolly varde			Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	L	Dolly varden Lamprey	Fish bearing	Non-fish bearing			
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m			
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m			
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel			
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage			
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish			
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throughing sticklohook		bearing except where noted.			

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site N	umber	1064R_2934		Structure No.				
Watershed Code:	No data				Stream Order	N/A					
Stream Name	Unnamed				Stream Class	NVC					
Crew	IM, HC, JS				UTM_Zone	09	UT	M Northing	6008446		
Survey Date	7/3/2016						UT	M Easting	521451		
Time	12:40:24				Site Length (m) 100						
Channel	Other			Features None							
Mean Channel Width (m) N/A	Mean W	etted Wi	dth (m)	N/A	Mean R	tesidual F	ool Depth (m)	N/A		
Mean Gradient (%)	N/A	Dominat	e Substra	ate	N/A	Sub-doi	minate Si	ubstrate N/ A	1		
In-stream Cover	N/A	Dominar	nt cover		N/A Sub-dominant cover N				4		
Water Quality Ter	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/d	cm)	N/A	Turbidity	N/A		
Riparian Vegetation					Crown Closure			N/A			
Left Bank Shape	N/A				Right Bank Shape			N/A			
Left Bank Texture	N/A				Right Bank Textur	е		N/A			
Left Bank Riparian Veg	etation N/A				Right Bank Riparia	an Vegeta	tion	N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A	1									
Fish Information	Historical Fish Pres	sence I	No data								
Fished -2015	No	Species Cap	otured-20	015	N/A		Species	Stage-2015	N/A		
Fished -2016	No	Species Cap	otured-20	016	N/A		Species	Stage-2016	N/A		

Photo Comments

Crossing site downstream extent.

Site Comments

Site consists of cross-road overland flow from upslope ditch to undefined, organic dominated, disconnected pools in the forest downslope. Seepage through the road is likely responsible for the majority of cross road flows. Downstream drainage with isolated pools has no channelization, but some evidence of flooding and temporary overland flow between pools. No defined channel visible at site, no fish habitat, non-fish bearing.



Notes:	Cover			Fish Species		Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM CO	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type	Access Ro	ad	Site N	umber	1064R_2935 Structure				No.	
Watershed Code:	No data				Stream Order	1				
Stream Name	Unnamed				Stream Class	S4				
Crew	IM, HC, JS				UTM_Zone	09	UTN	√ Northing	5	6008107
Survey Date	7/3/2016						UTN	√ Easting		521520
Time	14:30:29				Site Length (m)	100	100			
Channel	Visible cha	annel			Features	None				
Mean Channel Width	(m) 0.82	Mean W	dth (m)	0.66	Mear	ool Depth	(m)	0.08		
Mean Gradient (%)	14	Dominat	te Substra	ate	Gravels	Sub-	dominate Su	ıbstrate	Fines	3
In-stream Cover	Abundant	Domina	nt cover		OV	Sub-dominant cover LWI				, SWD,IV
Water Quality Te	mperature (Deg C	10.4	7.7	Conductivity (uS/	'cm)	113	Turbio	dity	C-Clear	
Riparian Vegetation		*	•	•	Crown Closure			41-70%		
Left Bank Shape	Slopir	ng			Right Bank Shape	ò		Sloping		
Left Bank Texture	Fines				Right Bank Textu	re		Fines		
Left Bank Riparian Veg	getation Mixed	lwood			Right Bank Ripari	an Vege	egetation Mixedwood			
Left Bank Stage	Young	g Forest			Right Bank Stage			Young For	rest	
Habitat Comments	Fish Species	AO - All Sa	lmonids							
Spawning	Moderate - Small gr	avels present in pa	atches throu	ghout site.	Low water depths may lim	nit adult ac	ccess.			
Rearing	Poor - Abundant cov	ver, use limited by	flow depths	and some	small drops.					
Overwintering	None - No deep poo	ls.								
Migration	Poor - No permanen	lo permanent barriers, one steep section downstre			n of crossing, multiple sma	ll drops th	roughout, low	flow depths d	uring su	ırvey.
Fish Information	Historical Fish P	resence	No data							
Fished -2015	Not visited	Species Ca	ptured-20	015	N/A		Species	Stage-201	.5	N/A
Fished -2016	Yes	Species Ca	ptured-20	016	NFC		Species	Stage-201	.6	N/A

Photo Comments

Crossing site, showing defined channel with coarse substrates.

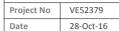
Site Comments

Stream has small, defined channel, and is fed by ditch flow from upstream roadside ditch and upstream groundwater seep. Groundwater seeps likely provide majority of ditch flow, as several were observed flowing into the ditch upslope. No barriers to fish passage were observed downstream. One 20 m long steep (28%) section 20 m downstream of the crossing may limit fish access, but it may not be a complete barrier to passage. Stream may provide rearing, spawning and migration potential. Deep pools for overwintering are absent. Electrofished downstream of crossing in limit pool habitat, no fish captured. Potential fish habitat during higher flow periods, habitat potential limited during current low flow period.



Notes:	Cover			Species	B1/	DV Delly yarden		Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fisl	n bearing	Non-fish bearing			
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3 m			
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3 m			
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3	1.5 m - 5 m	NVC No visible channel			
	DP OV	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage			
		Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish			
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.			

Prepared for BC Hydro





Crossing Type		Access Road Site Num						.064R_2937			Structur	e No.	
Watershed Code:		No	data				S	tream Order	1				
Stream Name		Unr	named				S	tream Class	NCD				
Crew		IM,	HC, JS				U	JTM_Zone	09	UTN	√ Northin	g	6007723
Survey Date		7/3	/2016							UTI	√ Easting		521458
Time		17:2	26:17				S	ite Length (m)	100				
Channel		Nor	n-classifi	ed Drainage				Features	None				
Mean Channel W	idth (m)	-		Mean W	etted W	idth (m)	-		Mean Residual Pool Depth (m)				-
Mean Gradient (%	6)	-		Dominat	e Substr	ate	Fii	nes	Sub-dominate Substrate Fines			S	
In-stream Cover		N/A		Domina	nt cover		N/	/A	Sub-dominant cover N/A				
Water Quality	Temp	erature (Deg C)	No data	рН	No data	1 (Conductivity (uS/cr	m)	No data	Turb	idity	No data
Riparian Vegetati	ion						(Crown Closure			N/A		
Left Bank Shape			Sloping				ı	Right Bank Shape			Sloping		
Left Bank Texture	!		Fines				ı	Right Bank Texture	9		Fines		
Left Bank Ripariar	n Vegeta	ation	Mixedw	/ood			ı	Right Bank Riparia	n Veget	ation	Mixedwo	od	
Left Bank Stage			Young F	orest			-	Right Bank Stage			Young Fo	rest	
Habitat Commen	ts	Fish Spe	cies	N/A									
Spawning	N	N/A											
Rearing	N	N/A											
Overwintering	N	N/A											
Migration	N/A												
Fish Information	Information Historical Fish Presence No data												
Fished -2015	r	Not visite	ed	Species Ca	otured-2	015	N/A Species Stage-2015			N/A			
Fished -2016	ı	Vo		Species Ca	otured-2	016	N/A Species Stage-2016 N/A			N/A			

Photo Comments

Crossing site.

Site Comments

Marked crossing site on 1064 road connects roadside ditch from west to roadside ditch of east side of 1064 via cross ditch. Drainage is artificial ditch, with abundant organic materials. No channel measurements recorded. Ditch flow then drains south across Br13 road. Downstream of culvert on Br13, drainage is broad, undefined wetland area with no fish potential. Drainage is approx 15 m wide, with abundant skunk cabbage, ferns, and red alder. Fish habitat is absent downstream of Br13 road, so the marked crossing site on 1064 is non-fish bearing.



Notes:	Cover			Fish Species		Dellusanden	Stream Class			
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing		
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m		
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m		
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel		
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish		
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	Thrononino etialdohaele		bearing except where noted.		

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Acc	ess Road	d	Site N	lumber	1064R_2943				Structur	e No.	
Watershed Code:		No	data				Stream Order		N/A				
Stream Name		Uni	named				Stream Class		NVC				
Crew		IM,	HC, JS				UTM_Zone		09	UTN	/I Northin	g	6007981
Survey Date		7/3	/2016							UTN	/I Easting		521500
Time		15:	19:07				Site Length (m	1)	100				
Channel		Oth	ner				Features		None				
Mean Channel W	idth (m	n) N/A		Mean W	etted W	idth (m)	N/A		Mean	Residual P	ool Depth	(m)	N/A
Mean Gradient (%	6)	N/A		Dominat	e Substr	ate	N/A		Sub-d	ominate Su	bstrate	N/A	
In-stream Cover		N/A		Dominar	it cover		N/A Sub-dominant cover N/A						
Water Quality	Tem	perature	(Deg C)	N/A	рН	N/A	Conductivity (uS/cm) N/A Turbidity N/A						N/A
Riparian Vegetati	getation						Crown Closur	e	·		N/A		•
Left Bank Shape			N/A				Right Bank Shape N/A						
Left Bank Texture	<u>.</u>		N/A				Right Bank Te	exture			N/A		
Left Bank Ripariar	n Vege	tation	N/A				Right Bank Ri	parian	n Veget	ation	N/A		
Left Bank Stage			N/A				Right Bank St	age			N/A		
Habitat Commen	ts	Fish Spe	cies	N/A									
Spawning		N/A											
Rearing		N/A											
Overwintering		N/A											
Migration	igration N/A												
Fish Information		Historica	l Fish Pre	esence	No data								
Fished -2015		No		Species Cap	tured-2	015	N/A	Species Stage-2015 N/A		N/A			
Fished -2016	Fished -2016 No Species Captured-2016					016	N/A Species Stage-2016 N/A				N/A		

Photo Comments

Downstream of crossing.

Crossing site has no overland flow or culvert crossing. Some subsurface water may seep through the road. Downstream is damp, undefined, unscoured wetland area. Upstream, roadside ditch carries water away from site to crossing site to south. No fish habitat, no fish.



Notes:	Cove	r	Fish	Species	DV	Dellerenden	Stı	ream Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fis	h bearing	Non	-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5	> 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6	< 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m		Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon				and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback			bea	ring except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type	Acces	s Road		Site N	umber	1064R_2944			Structure	e No.		
Watershed Code:	No da	ata				Stream Order	1					
Stream Name	Unna	med				Stream Class	NCD					
Crew	HC, IN	И, JS				UTM_Zone	09	UT	M Northin	g	6008208	
Survey Date	7/3/2	016						UT	M Easting		521512	
Time	13:20	:47				Site Length (m)	100					
Channel	Non-c	classifie	d Drainage			Features	None					
Mean Channel Width (r	m) 0.30		Mean We	tted Wi	dth (m)	0.30	Mean	Residual F	ool Depth	(m)	0.14	
Mean Gradient (%)	8		Dominate	Substra	ate	Fines	Sub-do	minate S	ubstrate	Fine	S	
In-stream Cover	m Cover N/A Dominant cover					N/A	Sub-do	minant c	inant cover N/A			
Water Quality Ten	nperature (De	eg C)	6.0	рН	No data	Conductivity (uS/o	m)	No data	Turbi	idity	No data	
Riparian Vegetation			*		•	Crown Closure			N/A		•	
Left Bank Shape	SI	loping				Right Bank Shape			Sloping			
Left Bank Texture	Fi	ines				Right Bank Textur	е		Fines			
Left Bank Riparian Vege	etation N	1ixedwo	ood			Right Bank Riparia	n Vegeta	ation	Mixedwo	od		
Left Bank Stage	N	1ature F	orest			Right Bank Stage			Mature F	orest		
Habitat Comments	Fish Specie	es	N/A									
Spawning	N/A											
Rearing	N/A											
Overwintering	N/A											
Migration N/A												

N/A

N/A

Photo Comments

Fish Information

Fished -2015

Fished -2016

Taken at downstream extent of survey where channel becomes undefined and spreads over a 15 m width with sections going subsurface in a fern dominated area.

Historical Fish Presence

Not visited

No

No data

Species Captured-2015

Species Captured-2016

Site Comments

Stream has intermittent channel development downstream of road crossing and flows subsurface for a section of approx 20 m then surfaces again. Temperature of 6 degrees and groundwater seeps near upstream reach suggests groundwater fed drainage. All organic substrates throughout with exception of road surface. No spawning potential. No fish access due to undefined drainage and sections of subsurface flow.



Species Stage-2015

Species Stage-2016

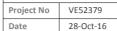
N/A

N/A

Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL	Dolly varden Lamprey Pink salmon Pacific Lamprey	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing 55 > 3 m 56 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM CO	Chum salmon Coho salmon Slimy sculpin	RB SA SK	Rainbow trout Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type	ed Code: No data						1064R-2946			Stru	ucture	No.	
Watershed Code:		No	data				Stream Order	1					
Stream Name		Unr	named				Stream Class	S4					
Crew		IM,	HC, JS				UTM_Zone	09	Į	JTM No	rthing	ī	6007893
Survey Date		7/3	/2016						Į	JTM Eas	sting		521496
Time		15:	38:04				Site Length (m)	100	0				
Channel		Visi	ble chanı	nel			Features	No	ne				
Mean Channel W	idth (m	n) 1.44		Mean We	tted Wi	dth (m)	0.97	Me	ean Residua	l Pool D	epth	(m)	0.12
Mean Gradient (%	6)	14		Dominate	Substra	ate	Gravels	Sul	b-dominate	Substra	ate	Fines	S
In-stream Cover		Mode	erate	Dominant	cover		LWD	Sul	b-dominant	dominant cover SWD, OV			, OV
Water Quality	Tem	perature (Deg C)	9.6	рН	8.0	Conductivity (us	S/cm)	cm) 61 Turbidity C-Clear				
Riparian Vegetat	ation						Crown Closure			71-9	90%		
Left Bank Shape			Vertical				Right Bank Shape Sloping						
Left Bank Texture	<u>.</u>		Fines				Right Bank Text	Right Bank Texture Fines					
Left Bank Riparian	n Vege	tation	Conifero	us			Right Bank Ripa	rian Ve	getation	Mixe	edwoo	od	
Left Bank Stage			Young Fo	orest			Right Bank Stag	е		You	ng For	est	
Habitat Commen	ts	Fish Spe	cies	AO - All Saln	nonids								
Spawning		Moderate -	Gravels dor	ninant in cascade	es and riff	le-pool habi	tat.						
Rearing		Moderate -	Cover provi	ded by overhang	ging veget	ation and w	oody debris.						
Overwintering		None - Lack of depth in pools which likely freeze to botton					dry (0.5 m max).						
Migration	Moderate - During current flows some 0.5 m steps may lim					s may limit	movement of rearing fish	but like	ly not during h	igh flows.	No bar	riers ob	oserved.
Fish Information		Historical	Fish Pres	sence N	lo data								
Fished -2015	ished -2015 Not visited Species Captured-2015					015	N/A	Species Stage-2015 N/A		N/A			
Fished -2016						016	NFC	Species Stage-2016 N/A			N/A		

Photo Comments

Taken where stream crosses road.

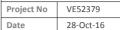
Site Comments

Ditch channel (mostly fed by ditch upstream) crosses road, flows downstream 20 m through overhanging vegetation then into a 14 m 600 mm culvert, which spans an additional abandoned road. Pond present where flow enters culvert inlet. After culvert outlet stream flows for approx 30 m under clumped large woody debris leaving stream fully covered. After woody debris pile, water flows in a step pool morphology with little cover other than tree canopy. Substrates are dominated by gravels and provide suitable spawning habitat. No barriers to fish migration observed. No fish captured during electrofishing however potential for fish presence.



Notes:	Cover		Fish	Species	DV	Dolly vardon	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinok salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m S4 < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage
	OV OV	Deep pools Overhanging vegetation	CO	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	54 (1.511)	NCD and wetlands are non-fish

Prepared for BC Hydro





Crossing Type	Access Ro	ad	Site Nu	mber	1213 R_11			Structure	No.		
Watershed Code:	No data				Stream Order	1					
Stream Name	Unnamed				Stream Class	S4					
Crew	IM, HC, JS				UTM_Zone	09	UTN	/I Northing	5	6029983	
Survey Date	6/28/201	6					UTN	/I Easting		524038	
Time	12:45:44				Site Length (m)	100					
Channel	Visible ch	annel			Features	None	j				
Mean Channel Width (m	1.23	Mean W	Vetted Wid	th (m)	5.44	Meai	n Residual P	ool Depth	(m)	0.57	
Mean Gradient (%)	2	Domina	te Substrat	te	Fines	Sub-	dominate Su	bstrate	Grave	ls	
In-stream Cover	Abundant Dominant cover Temperature (Deg C) 20.1 pH 7.6				OV	Sub-	dominant co	ver	LWD,	SWD, DP	
Water Quality Tem	perature (Deg C) 20.1	7.6	Conductivity (uS/c	m)	256	Turbio	dity	C-Clear		
Riparian Vegetation					Crown Closure		71-90%				
Left Bank Shape	Slopin	ng			Right Bank Shape						
Left Bank Texture	Fines				Right Bank Texture	е		Fines			
Left Bank Riparian Veget	tation Mixe	dwood			Right Bank Riparia	ın Vege	etation	Mixedwoo	od		
Left Bank Stage	Youn	g Forest			Right Bank Stage			Young For	rest		
Habitat Comments	Fish Species	AO - All Sa	lmonids								
Spawning	None - No spawning	g gravels, all clogg	ed with fines.								
Rearing	Poor - Abundant co	ver, but beaver da	ıms are signific	cant barrie	ers to passage. Low flow rate	es likely	limit dissolved o	oxygen.			
Overwintering	Poor - Many deep p	ools, small ground	dwater seeps I	ikely prov	ide overwintering flows						
Migration	ligration Poor - Many barriers, low flows. Fish present, so access must be po										
Fish Information	Historical Fish F	resence	No data								
Fished -2015	Not visited Species Captured-2015			15	N/A		Species Stage-2015 N/A			N/A	
Fished -2016				16	CCT	Species Stage-2016 Parr				arr	

Photo Comments

Pond site located downstream of the crossing site.

Site Comments

Stream is dominated by multiple small beaver dams. Upstream fish passage is currently limited up dams. No evidence of high flows that may dislodge a barrier. Habitat in pools is limited, as water is stagnant, with shallow depths (0.5 m) and likely low dissolved oxygen. Larger beaver dam 30 m upstream of crossing, 1.5 m high. Coastal cutthroat trout captured at crossing at downstream end of existing wood culvert. No fish observed or captured upstream, but no permanent barriers to fish passage were observed.



Notes:	Cove	r	Fish	Species	DV	Dellasseden	S	tream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fi	sh bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S:	1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH Chinook salmon	RB	Rainbow trout		S3 1.5 m - 5 m	NVC No visible channel	
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	on CO Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish	
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	The second secon			hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Code: No data				Site N	lumber	1	1218R- 2782			S	tructure	No.		
Watershed Code:		No	data				S	Stream Order	1						
Stream Name		Unr	named				S	Stream Class	NCD						
Crew		HC,	IM, JS				U	JTM_Zone	09	l	JTM N	orthing	ī	6027592	
Survey Date		7/1	/2016							ſ	JTM E	asting		521564	
Time		12:4	44:17				S	Site Length (m)	100						
Channel		Nor	n-classified	Drainage				Features	None						
Mean Channel Wid	dth (m)	1.32		Mean We	tted Wi	dth (m)	0.	.85	Mean	Residua	l Poo	Depth	(m)	0.18	
Mean Gradient (%))	3		Dominate	Substra	ate	Fi	ines	Sub-d	ominate	te Substrate Gravels				
In-stream Cover	· · · · · · · · · · · · · · · · · · ·					N,	N/A Sub-dominant cover					N/A			
Water Quality	Temper	mperature (Deg C) No data pH No da				No data	a (Conductivity (uS/cm) No data Turbidity No data							
Riparian Vegetation	1 Vegetation						(Crown Closure	·	'A					
Left Bank Shape			Sloping					Right Bank Shape Slopin							
Left Bank Texture			Fines					Right Bank Texture Fines							
Left Bank Riparian	Vegetati	on	Coniferou	S				Right Bank Ripariar	n Veget	ation	Co	niferou	S		
Left Bank Stage			Mature Fo	orest				Right Bank Stage Mature Forest							
Habitat Comments	s Fi	sh Spe	cies N	N/A											
Spawning	N/A	A													
Rearing	N/A	A													
J															
Overwintering	N/A	Ą													
Migration	N/A N/A														
Fish Information Historical Fish Presence No data															
Fished -2015 Not visited Species Captured-2015			015	N/A Species Stage-2015 N/A											

Photo Comments

Fished -2016

Showing termination of any channel development at the downstream extent of

Site Comments

Most defined channel exists at road crossing. Downstream of road intermittent channel development for 30 m then wetland habitat dominated by organic substrates starts and continues for 20 m. Drainage appears to end 20 m $\,$ downstream of wetland in a mud bottomed forest. Upstream of crossing no channel development, fine and organic substrates with vegetation growing throughout damp drainage area with a few isolated pools.



Notes:	Cover	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD B	Small woody debris Large woody debris Boulder	AS CC CCT	Atlantic salmon Sculpins Coastal cutthroat trout	DV L PK	Dolly varden Lamprey Pink salmon Pacific Lamprey	Fish bearing S1 > 20 m S2 > 5 m - 20 m	Non-fish bearing S5 > 3 m S6 < 3 m
	UC DP	Undercut bank Deep pools	CH	Chinook salmon Chum salmon	RB SA	Rainbow trout Salmon	S3 1.5 m - 5 m S4 < 1.5 m	NVC No visible channel NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access	Road		Site N	lumber	1218R 204				Structure	No	
Watershed Code		No data			JILC IV	i di i i i di	Stream Ord		3		Structure		
Stream Name		Unname					Stream Cla		S3				
Crew		DF, NN	-u				UTM Zone		09	LITA	1 Northing	ī	6026301
Survey Date		7/1/201	6				01101_20110		03		1 Easting		521832
Time		11:07:5					Site Length	(m)	300	OTIV	Lasting		J210J2
Channel		Dry Cha					Features	(111)		scade or ch	ıtο		
Mean Channel W	lidth (n	- '	IIIICI	Mean We	tted Wi	idth (m)	0.00			Residual Po		(m)	0.00
Mean Gradient (9		2		Dominate		. ,	Gravels			ominate Su		Fines	
In-stream Cover	70)	Abundan	+	Dominant		ate	SWD			ominant co		-	, OV, UC
Water Quality	Tem	perature (Deg		No data	рН	No data		ity (uS/c		No data			
Riparian Vegetat						Crown Clo		,		41-70%			
Left Bank Shape		Slop	ing				Right Bank Shape Sloping						
Left Bank Texture	2	Fine					Ŭ	Right Bank Texture Fines					
Left Bank Riparia	n Vege		edwo	od			Right Banl			tation	Mixedwoo	od	
Left Bank Stage	-0-		ng Fo	rest			Right Banl		-0-		Young For	est	
Habitat Commer	its	Fish Species		AO - All Saln	nonids			-		•			
Spawning		Poor - Small creel entering area.	k lacking	g sections of gr	ravels larg	e enough to	provide any spav	vning oppo	ortunities	. Steep gradien	t downstrear	n could	I prevent fish from
Rearing		Poor - Pools limit	ed in ar	ea near culvert.	. Channel	dry at time o	f survey. Poor m	igration do	ownstrear	n.			
Overwintering		None - Dry channel at time of survey. Lack of pool habitat.											
Migration	ligration Poor - Section downstream of 25% gradient may prevent ju					prevent juve	niles from movin	g upstrean	n.				
Fish Information Historical Fish Presence No data													
	ished -2015 Not visited Species Captured-2015					015	N1 / A		Species Stage-2015 N/A			NI / A	
Fished -2015		Not visited	- 2	species Capi	tureu-z	015	N/A			Species.	Stage-ZUI	5	IN/A

Photo Comments

Approximately 40m downstream of culvert.

Site Comments

Substrate upstream of culvert is primarily fines with some gravels. Downstream of the culvert substrate is predominantly gravels and cobbles. Some boulder downstream of the culvert. Gradient increases approximately 100 m downstream of culvert. Channel becomes more confined with more woody debris cover.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	1\/	Instroam vagatation	CCG	Slimy sculpin	TCD	There is a section of the first of the section of t		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type	Access Road		Site Num	ber	1218R_205	·	St	tructure No.		
Watershed Code:	No data				Stream Order	1				
Stream Name	Unnamed				Stream Class	NCD				
Crew	DF, NN				UTM_Zone	09	UTM N	Northing	6026525	
Survey Date	7/1/2016						UTM E	Easting	521810	
Time	12:07:51				Site Length (m)	100				
Channel	Non-classifie	d Drainage			Features	None				
Mean Channel Width (r	m) 1.18	Mean We	tted Width	(m)	0.00	Mean Resid	ual Poo	l Depth (m)	0.00	
Mean Gradient (%)					Fines	Sub-dominate Substrate Gravels				
In-stream Cover	N/A	Dominant	cover		N/A	Sub-domina	nt cove	r N/A	A	
Water Quality Ten	nperature (Deg C)	No data	pH N	lo data	Conductivity (uS/c	m) No o	lata	Turbidity	No data	
Riparian Vegetation					Crown Closure		N/	/ A		
Left Bank Shape	Sloping				Right Bank Shape		Slo	oping		
Left Bank Texture	Fines				Right Bank Texture	е	Fir	nes		
Left Bank Riparian Vege	etation Mixedwo	od			Right Bank Riparia					
Left Bank Stage	Young Fo	rest			Right Bank Stage					
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
Overwintering	N/A									
Migration	N/A									
Fish Information	Historical Fish Pres	ence N	o data							

N/A

N/A

Species Captured-2015

Species Captured-2016

Photo Comments

Fished -2015

Fished -2016

Approximately 30m downstream where the channel becomes undefined and overgrown by vegetation.

Not visited

Site Comments

A larger creek parallels the road on the upstream side. A culvert allows some water to pass underneath however the majority stays on the upstream side. Water likely only enters the culvert during high flows. A discernible channel is visible for approximately 30 m downstream of the culvert before becoming undefined. Gravel and some cobble is present near the culvert outlet.



Species Stage-2015

N/A

Notes:	Cover		Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD B	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



_									· _	1
Crossing Type		Access Road		Site N	lumber	1218R_206			Structure No).
Watershed Code:		No data				Stream Order	N/A			
Stream Name		Unnamed				Stream Class	NVC			
Crew		IM, HC, JS				UTM_Zone	09	ITU	M Northing	6027068
Survey Date		7/1/2016						UTI	VI Easting	521549
Time		14:50:51				Site Length (m)	100			
Channel		Other				Features	Non	е		
Mean Channel Wi	dth (m)	N/A	Mean W	etted W	idth (m)	N/A	Mea	n Residual P	ool Depth (m)	N/A
Mean Gradient (%	5)	N/A	Dominat	te Substr	ate	N/A	Sub-	dominate Sι	ubstrate N/	A
In-stream Cover		N/A	Domina	nt cover		N/A	Sub-	dominant co	over N/	A
Water Quality	Tempera	iture (Deg C)	N/A	рН	N/A	Conductivity (u	S/cm)	N/A	Turbidity	N/A
Riparian Vegetati	on					Crown Closure			N/A	
Left Bank Shape		N/A				Right Bank Sha	эе		N/A	
Left Bank Texture		N/A				Right Bank Text	ure		N/A	
Left Bank Riparian	Vegetatio	n N/A				Right Bank Ripa	rian Veg	etation	N/A	
Left Bank Stage		N/A				Right Bank Stag	e		N/A	
Habitat Comment	t s Fisl	h Species	N/A							
Spawning	N/A									
Rearing	N/A									
Overwintering	N/A									
Migration	N/A									
Fish Information	Hist	orical Fish Pre	sence	No data						
Fished -2015	No		Species Ca	ptured-2	015	N/A		Species	Stage-2015	N/A
								-		

Photo Comments

Downstream unscoured wetland.

Site Comments

Ditch drainage. No channel development upstream or downstream of road. Drainage ditches meet, flow across road through 400 mm 8 m long culvert then into undefined, unscoured wetland and forested area. No fish access or habitat. Non-fish bearing.



Notes:			Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin		Th		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site Number	1218R_207		Structure No).
Watershed Code:	No data			Stream Order	N/A		
Stream Name	Unnamed			Stream Class	NVC		
Crew	IM, HC, JS			UTM_Zone	09	UTM Northing	6027239
Survey Date	7/1/2016					UTM Easting	521495
Time	13:51:33			Site Length (m)	100		
Channel	Other			Features	None		
Mean Channel Width	(m) N/A	Mean We	etted Width (m)	N/A	Mean Res	idual Pool Depth (m)	N/A
Mean Gradient (%)	N/A	Dominate	e Substrate	N/A	Sub-domii	nate Substrate N/	A
In-stream Cover	N/A	Dominan	t cover	N/A	Sub-domii	nant cover N/.	A
Water Quality Te	mperature (Deg C)	N/A	pH N/A	Conductivity (uS/	/cm) N/.	A Turbidity	N/A
Riparian Vegetation				Crown Closure		N/A	
Left Bank Shape	N/A			Right Bank Shape	9	N/A	
Left Bank Texture	N/A			Right Bank Textu	re	N/A	
Left Bank Riparian Veg	getation N/A			Right Bank Ripari	ian Vegetatio	n N/A	
Left Bank Stage	N/A			Right Bank Stage		N/A	
Habitat Comments	Fish Species	N/A					
Spawning	N/A						
Rearing	N/A						
Overwintering	N/A						
Migration	N/A						
Fish Information	Historical Fish Pres	sence N	lo data				
Fished -2015	No	Species Cap	tured-2015	N/A	S	pecies Stage-2015	N/A
Fished -2016	No	Species Cap	tured-2016	N/A	S	species Stage-2016	N/A

Photo Comments

Crossing site.

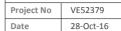
Site Comments

Ditch drainage. No channel development upstream or downstream of road. Drainage ditches meet, flow across road through 400 mm 8 m long culvert then down a 10 m long steep road embankment then undefined, unscoured wetland area. No fish access. Non-fish bearing.



Notes:	Cove	r	Fish	Species	B1./	B II	Str	eam Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish	n bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	\$4	< 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeve salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.

Prepared for BC Hydro





Crossing Type	Access Road	t	Site N	umber	1218R_208	Structure No.				
Watershed Code:	No data				Stream Order	1				
Stream Name	Unnamed				Stream Class	NCD				
Crew	IM, HC, JS				UTM_Zone	09	ITU	์ Northin	5	6027452
Survey Date	7/1/2016						ITU	√ Easting		521558
Time	13:19:53				Site Length (m)	100				
Channel	Other				Features	None				
Mean Channel Width	(m) No data	Mean We	tted Wi	dth (m)	No data	Mean	Residual P	ool Depth	(m)	No data
Mean Gradient (%)	No data	Dominate	Substr	ate	No data	Sub-d	ominate Sι	ıbstrate	No d	lata
In-stream Cover	No data	Dominant	t cover		-	Sub-d	ominant co	ver	-	
Water Quality Te	emperature (Deg C)	No data	рН	No data	Conductivity (uS/c	m)	No data	Turbi	dity	No data
Riparian Vegetation					Crown Closure			No data		
Left Bank Shape	No data	1			Right Bank Shape			No data		
Left Bank Texture	No data	1			Right Bank Texture	е		No data		
Left Bank Riparian Veg	getation No data	1			Right Bank Riparia	n Veget	tation	No data		
Left Bank Stage	No data	1			Right Bank Stage			No data		
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
Overwintering	N/A									
Migration	N/A									
Fish Information	Historical Fish Pre	esence N	lo data							
Fished -2015	Not visited	Species Cap	tured-2	015	N/A		Species	Stage-201	.5	N/A
Fished -2016	No	Species Cap	tured-2	016	N/A		Species	Stage-201	.6	N/A

Photo Comments

Downstream extent of survey, broad undefined wetland area.

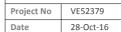
Site Comments

Ditch drainage site. Upstream area is roadside ditch. Dry at time of survey. Crossing site is 400 mm 8 m culvert. Downstream, short channelized section due to concentrated ditch flow. Drainage spreads out and becomes undefined wetland area 30 m downstream. Wetland has organic mud substrates, skunk cabbage, ferns. No fish access or habitat. Non-fish bearing.



					1	THE RESERVE	ACCUSED A SECTION OF A SECTION ASSESSMENT OF THE PARTY OF	
Notes:				Species	DV	Dellusanden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSR	Threesnine sticklehack		bearing except where noted.

Prepared for BC Hydro





Crossing Type		Access Road		Site N	lumber	1218R_210			Structure No).
Watershed Code:		No data				Stream Order	N/A			
Stream Name		Unnamed				Stream Class	NVC			
Crew		IM, HC, JS				UTM_Zone	09	UT	M Northing	6028093
Survey Date		7/1/2016						UT	M Easting	521235
Time		09:56:23				Site Length (m)	100			
Channel		Other				Features	None	9		
Mean Channel Wi	dth (m)	N/A	Mean W	etted Wi	idth (m)	N/A	Mea	n Residual	Pool Depth (m)	N/A
Mean Gradient (%)	N/A	Domina	te Substr	ate	N/A	Sub-	dominate S	substrate N/	A
In-stream Cover		N/A	Domina	nt cover		N/A	Sub-	dominant c	A	
Water Quality	Tempe	rature (Deg C)	N/A	рН	N/A	Conductivity (uS	/cm)	N/A	Turbidity	N/A
Riparian Vegetati	on					Crown Closure			N/A	
Left Bank Shape		N/A				Right Bank Shap	е		N/A	
Left Bank Texture		N/A				Right Bank Textu	ire		N/A	
Left Bank Riparian	Vegetati	ion N/A				Right Bank Ripar	ian Vege	etation	N/A	
Left Bank Stage		N/A				Right Bank Stage	<u>)</u>		N/A	
Habitat Comment	s Fi	ish Species	N/A							
Spawning	N/A	A								
Rearing	N/A	A								
Overwintering	N//	A								
Migration	N//	A								
Fish Information	His	storical Fish Pres	ence	No data						
Fished -2015	No	0	Species Ca	ptured-2	015	N/A		Specie	s Stage-2015	N/A
Fished -2016	No	0	Species Ca	ptured-2	016	N/A		Specie	s Stage-2016	N/A

Photo Comments

Crossing site, showing the absence of a scoured channel.

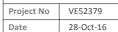
Site Comments

Site is cross road drainage culvert, carrying water from upslope ditch across road. Culvert is 500 mm 8 m corrugated steel pipe. Ditch is fed by road runoff and any upslope overland flows. No stream channel exists upstream. Downstream of crossing, drainage consists of undefined overland flow route. Flow route only visible by deposited road material and organic mud deposition. Gradient 24% downslope. No fish habitat, no fish potential.



Notes:	Cover		Fish	Species	DV.	Dellementer	Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fisl	n bearing	Non-fish bearing		
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3 m		
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6 < 3 m		
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel		
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish		
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback			bearing except where noted.		

Prepared for BC Hydro





Crossing Type	Access Road		Site N	lumber	1218R_2774			Structure No	
Watershed Code:	No data				Stream Order	N/A			
Stream Name	Unnamed				Stream Class	NVC			
Crew	IM, HC, JS				UTM_Zone	09	UT	M Northing	6027124
Survey Date	7/1/2016						UT	M Easting	521522
Time	14:22:54				Site Length (m)	100			<u>, </u>
Channel	Other				Features	None	è		
Mean Channel Width	(m) N/A	Mean W	etted Wi	dth (m)	N/A	Mea	n Residual	Pool Depth (m)	N/A
Mean Gradient (%)	N/A	Dominat	e Substra	ate	N/A	Sub-	dominate S	Substrate N/A	A
In-stream Cover	N/A	Dominan	it cover		N/A	Sub-	dominant o	over N/	A
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	N/A
Riparian Vegetation			•		Crown Closure			N/A	
Left Bank Shape	N/A				Right Bank Shape			N/A	
Left Bank Texture	N/A				Right Bank Textu	^e		N/A	
Left Bank Riparian Veg	getation N/A				Right Bank Ripari	an Vege	etation	N/A	
Left Bank Stage	N/A				Right Bank Stage			N/A	
Habitat Comments	Fish Species	N/A							
Spawning	N/A								
Rearing	N/A								
Rearing									
Overwintering	N/A								
Migration	N/A								
Fish Information	Historical Fish Pres	ence I	No data						
Fished -2015	No	Species Cap	tured-2	015	N/A		Specie	s Stage-2015	N/A
Fished -2016	No	Species Cap	tured-2	016	N/A		Specie	s Stage-2016	N/A

Photo Comments

Crossing site.

Site Comments

Ditch drainage. No channel development upstream or downstream of road. Drainage ditches meet, flow across road via cross ditch then down a 10 m long steep road embankment then undefined, unscoured wetland area. No fish access. Non-fish bearing.



Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage

NCD and wetlands are non-fish

bearing except where noted

Notes:	Cove	r	Fish	Species	DV	Dollyworden	St	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC DP OV	Small woody debris Large woody debris Boulder Undercut bank Deep pools Overhanging vegetation	AS CC CCT CH CM CO	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon Chum salmon Coho salmon	DV L PK PL RB SA	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout Salmon Sockeve salmon	S1 S2 S3	h bearing > 20 m > 5 m - 20 m 1.5 m - 5 m < 1.5 m	
	13.7		000	CI: I :					

Slimy sculpin

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site Nun	nber	1218R_2775			Structure	No.	
Watershed Code:	No data				Stream Order	1				
Stream Name	Unnamed				Stream Class	S6				
Crew	DF, NN				UTM_Zone	09	UTI	M Northing	5	6026707
Survey Date	7/1/2016						UTI	M Easting		521706
Time	14:14:14				Site Length (m)	100				
Channel	Dry Channel				Features	None				
Mean Channel Width (m) 1.20	Mean We	etted Width	n (m)	0.00	Mean	Residual P	ool Depth	(m)	0.00
Mean Gradient (%)	8	Dominate	Gravels	Sub-de	ominate Su	ubstrate	Cobb	les		
In-stream Cover	Moderate	Dominant	t cover		SWD	Sub-de	ominant co	over	LWD,	OV
Water Quality Ter	nperature (Deg C)	No data	pH N	lo data	Conductivity (uS/d	cm)	No data	Turbio	dity	No data
Riparian Vegetation			Crown Closure	•		41-70%				
Left Bank Shape	Sloping				Right Bank Shape		Sloping			
Left Bank Texture	Fines				Right Bank Textur	е		Fines		
Left Bank Riparian Vege	etation Mixedwo	od			Right Bank Riparia	n Veget	ation	Mixedwoo	od	
Left Bank Stage	Mature F	orest			Right Bank Stage			Mature Fo	orest	
Habitat Comments	Fish Species	AO - All Saln	nonids							
Spawning	None - Non-classified dr	ainage downstr	eam, fish una	ble to acc	cess site.					
Rearing	None - Dry channel. Fish	barrier downst	ream.							
			, , ,							
Overwintering	None - Dry channel. No	pools available 1	for overwinte	ring.						
Migration	None - Channel become	s non-classified	drainage dow	nstream	and is fish barrier.					
		1								
Fish Information	Historical Fish Pres	ence N	lo data							
Fished -2015	Not visited	Species Cap	5	N/A Species Stage-2015 N/A					V/A	

Photo Comments

Fished -2016

Downstream of the road crossing showing shallow banks and gravel substrate.

Approximately 150 m downstream from the road crossing the channel becomes NCD creating a fish barrier. Confirmed non-fish bearing.



Notes:	Cove	r	Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroom vegetation	CCG	Slimy sculpin	TCD	The second second second second		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site N	umber	1218R_2776			Structure No			
Watershed Code:	No data				Stream Order	N/A					
Stream Name	Unnamed				Stream Class	NVC					
Crew	IM, HC, JS				UTM_Zone	UT	M Northing	6026921			
Survey Date	7/1/2016					UTM Easting 52					
Time	15:06:06				Site Length (m)	Site Length (m) 100					
Channel	Other				Features	None	!				
Mean Channel Width	(m) N/A	Mean We	etted Wi	dth (m)	N/A	Mear	n Residual I	Pool Depth (m)	N/A		
Mean Gradient (%)	N/A	Dominate	e Substra	ate	N/A	Sub-c	dominate S	ubstrate N/	A		
In-stream Cover	N/A	Dominan	t cover		N/A	Sub-c	dominant c	over N/	A		
Water Quality Te	emperature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	N/A		
Riparian Vegetation					Crown Closure			N/A			
Left Bank Shape	N/A				Right Bank Shape			N/A			
Left Bank Texture	N/A				Right Bank Textur	e		N/A			
Left Bank Riparian Veg	getation N/A				Right Bank Riparia	an Vege	tation	N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
Fish Information	Historical Fish Pres	sence N	lo data								
Fished -2015	No	Species Cap	tured-2	015	N/A		Specie	s Stage-2015	N/A		
Fished -2016	No	016	N/A Species Stage-2016 N/A				N/A				

Photo Comments

Crossing site.

Site Comments

Ditch drainage. No channel development upstream or downstream of road. Drainage ditches meet, flow across road via cross ditch, then into a landscape depression in the forest downslope. No evidence of channelization or wetland area. No fish access. Non-fish bearing.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	There is a section of the ball of the section of th		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Acc	ess Road		Site N	umber	1218R_2777	_		Structure	No.		
Watershed Code:		No	data				Stream Order	1					
Stream Name		Unr	named				Stream Class	NCD					
Crew		DF,	NN				UTM_Zone	09	UTI	M Northing	ī	6026783	
Survey Date		7/1	/2016						UTI	M Easting		521674	
Time		15:0	09:49				Site Length (m)	100					
Channel		Non-classified Drainage					Features	Features None					
Mean Channel Wi	dth (m)) - Mean Wetted Width (m)					-	- Mean Residual Pool Depth (m) -					
Mean Gradient (%	5)	-		Dominate	Substra	ate	Fines	Sub-dor	minate Su	ubstrate	Fine	S	
In-stream Cover		N/A Dominant cover					N/A	Sub-dor	minant co	over	N/A		
Water Quality	Tempe	rature ((Deg C)	No data	рН	No data	Conductivity (uS/	cm) I	No data	Turbio	dity	No data	
Riparian Vegetati	on			<u> </u>			Crown Closure	•		N/A			
Left Bank Shape			Sloping				Right Bank Shape Slop						
Left Bank Texture			Fines				Right Bank Textur	·e		Fines	ies		
Left Bank Riparian	Vegetati	on	Mixedwo	od			Right Bank Riparia	an Vegetat	tion	Mixedwoo	od		
Left Bank Stage			Mature F	orest			Right Bank Stage			Mature Fo	rest		
Habitat Comment	s Fi	ish Spe	cies I	N/A									
Spawning	N/A	А											
Rearing	N/A	Ą											
Overwintering	N/	А											
Migration	N/	Α											
Fish Information	His	Historical Fish Presence No data											
Fished -2015	No	ot visite	ed S	Species Capt	ured-20)15	N/A		Species	Stage-201	5	N/A	
									1				

N/A

Photo Comments

Fished -2016

Downstream of the road crossing showing NCD section.

Drainage crosses over road creating a 1 m wide channel approximately 10 m $\,$ downstream from the crossing. The drainage then becomes NCD.



Notes:				Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	ı	Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	13.7	to skill a control of the first	ccc	Climana				haaring avecant whore noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type	Acce	ess Road		Site N	umber	1218R_2781			Structure	No.	
Watershed Code:	No d	lata				Stream Order	2				
Stream Name	Unna	amed				Stream Class	S4				
Crew	DF, N	NN				UTM_Zone	09	UTN	√ Northing		6026630
Survey Date	7/1/	2016						UTN	521758		
Time	13:2	8:59				Site Length (m)	200				
Channel	Dry (Channel				Features	None				
Mean Channel Width (m) 1.04		Mean We	tted Wi	dth (m)	0.00	Mean	Residual P	ool Depth	(m)	0.00
Mean Gradient (%)	9		Dominate	Substra	ate	Fines	Sub-do	ominate Su	ıbstrate	Cobb	oles
In-stream Cover	Abundant Dominant cover					OV	Sub-do	ominant co	ver	LWD	, SWD
Water Quality Ter	nperature ([Deg C)	No data	рН	No data	Conductivity (uS/c	cm)	No data	Turbio	lity	No data
Riparian Vegetation		•		•	•	Crown Closure			1-20%		
Left Bank Shape	9	Sloping				Right Bank Shape			Sloping		
Left Bank Texture	(Gravels				Right Bank Textur	е		Fines		
Left Bank Riparian Veg	etation	Coniferou	S			Right Bank Riparia	n Veget	ation	Mixedwoo	od	
Left Bank Stage		Mature Fo	orest			Right Bank Stage			Mature Fo	rest	
Habitat Comments	Fish Spec	ies A	AO - All Salm	nonids							
Spawning	None - Limite	ed by small cl	hannel size and	l lack of sr	mall gravel s	ections in the channel.					
Rearing	Poor - Dry ch	annel. Wate	rcourse likely la	acks pool I	habitat at hi	gher flows.					
Ü											
Overwintering	None - Dry channel. Limited pool habitat available even during higher flow periods.										
Migration	Poor - Dry ch	annel. Some	areas where c	hannel is I	neavily over	grown may limit distributio	n, howeve	r this likely do	es not create	a barri	ier at higher flows.
			TI.								
Fish Information	Historical	Fish Prese	ence N	o data							
Fished -2015	Not visited	d S	Species Capt	tured-20	015	N/A Species Stage-2			Stage-201	5	N/A
	Trot visited Species daptarea 2015										

N/A

Photo Comments

Fished -2016

Downstream of the crossing site, showing the typical small, dry channel with coarse substrates.

Species Captured-2016

Site Comments

Site assessed up to 200 m downstream looking for fish barriers. Channel becomes overgrown by thick vegetation and in some areas has very shallow banks. No barriers were observed. All measurements were recorded within 50 m of the road crossing. Creek flows over top of road, no culvert. Substrate downstream of the culvert is primarily fine materials with some gravels. Upstream of the culvert substrate is gravel and cobble. Creek parallels the road on the upstream side. Eroding banks observed near road.



Species Stage-2016

Notes:				Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	L	Lamprey	Fish bearing S1 > 20 m	Non-fish bearing S5 > 3 m
	LWD B	Large woody debris Boulder	CC	Sculpins Coastal cutthroat trout	PK PL	Pink salmon Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Acc	ess Road		Site N	umber	1218R_27	83			Structure	e No.	
Watershed Code:	No	data				Stream Or	der	1				
Stream Name	Unr	named				Stream Cla	ass	NCD				
Crew	IM,	HC, JE				UTM_Zon	е	09	UTI	ฟ Northin	5	6027641
Survey Date	7/1	/2016							UTI	√ Easting		521548
Time	12:	16:33				Site Lengt	h (m)	100	100			
Channel	Nor	n-classifie	ed Drainage		Features	5	None					
Mean Channel Width	(m) 1.65		Mean We	dth (m)	0.00		Mean	Residual P	ool Depth	(m)	0.00	
Mean Gradient (%)	5						Fines Sub-dominate Substrate Gravels					rels
In-stream Cover	N/A		Dominant		N/A		Sub-d	ominant co	over	N/A		
Water Quality Te	emperature (Deg C)	No data	рН	No data	Conducti	vity (uS/c	:m)	No data	Turbi	dity	No data
Riparian Vegetation				"	•	Crown Cl	osure	'		N/A		
Left Bank Shape		Sloping			Right Ban			Sloping				
Left Bank Texture		Fines				Right Bank Texture Fine						
Left Bank Riparian Ve	getation	Mixedw	ood			Right Ban	nk Riparia	n Veget	tation	Mixedwo	od	
Left Bank Stage		Young F	orest			Right Bar	nk Stage			Young Fo	rest	
Habitat Comments	Fish Spe	cies	N/A									
Spawning	N/A											
Rearing	N/A											
Our mulimborium	N/A											
Overwintering	N/A											
Migration	N/A											
			<u> </u>									
Fish Information	Historical	Fish Pre	sence N	lo data							r	
Fished -2015	Not visited Species Captured-2015				N/A Species Sta			Stage-201	.5	N/A		
Fished -2016	No Species Captured-2016				016	N/A Species Stage-2016 N/A			N/A			

Photo Comments

Upstream of crossing, undefined section between two scoured sections.

Site Comments

Crossing site is ditch to convey flow across road. No culvert present. Stream is intermittently scoured non-classified drainage. Upstream section has short scoured sections in steeper areas, with broad, undefined areas between scoured areas. Downstream has short scoured section for 30 m, before gradient lowers to 2% and drainage becomes broad, undefined damp forested area. Channel measurements are for short scoured sections only. No fish habitat or potential. No fish.



Notes:	Cove	r	Fish	Species	DV	Dellusanden	Stre	eam Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish	bearing	Non	-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5	> 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6	< 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m		Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon				and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback			bea	ring except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Acc	ess Road		Site N	lumber	1218R_2785				Structur	e No.	
Watershed Code:	No	data				Stream Order		N/A				
Stream Name	Uni	named				Stream Class		NVC				
Crew	IM,	HC, JS				UTM_Zone		09	UTI	M Northir	ıg	6027935
Survey Date	7/1	/2016							UTI	VI Easting		521310
Time	10:	18:33				Site Length (m	1)	100				
Channel	Oth	ner				Features		None				
Mean Channel Width	n (m) N/A		Mean We	etted W	idth (m)	N/A		Mean	Residual P	ool Depth	n (m)	N/A
Mean Gradient (%)	N/A	N/A Dominate Substrate						Sub-d	ominate Sι	ubstrate	N/A	
In-stream Cover	N/A	N/A Dominant cover						Sub-d	ominant co	over	N/A	
Water Quality T	emperature	(Deg C)	N/A	рН	N/A	Conductivity ((uS/cr	m)	N/A	Turb	idity	N/A
Riparian Vegetation							e			N/A		
Left Bank Shape		N/A				Right Bank Sh	ape			N/A		
Left Bank Texture		N/A				Right Bank Te	xture	<u>.</u>		N/A		
Left Bank Riparian Ve	egetation	N/A				Right Bank Rip	pariar	n Vege	ation	N/A		
Left Bank Stage		N/A				Right Bank Sta	age			N/A		
Habitat Comments	Fish Spe	cies	N/A									
Spawning	N/A											
Rearing	N/A											
Overwintering	N/A											
Migration	N/A											
Fish Information	Historica	l Fish Pre	sence N	lo data								
Fished -2015	No		Species Cap	tured-2	015	N/A			Species	Stage-20	15	N/A
Fished -2016	No Species Captured-2016				016				N/A			

Photo Comments

Crossing site.

Site Comments

Crossing site is cross-road drainage. No culvert exists. Ditch drainage crosses road in shallow drainage ditch. Upslope, ditch drainage is only water source. Slope above ditch is steep forest, with small cliffs. Downstream of crossing, road fill drops off down steep slope 52% gradient. No channelization downslope, only road fill downslope of ditch crossing. Dry forest downslope with no channel. No fish habitat, no fish potential.



Notes:	Cover	-	Fish	Species	DV	Dolly vardon	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m S4 < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage
	OV OV	Deep pools Overhanging vegetation	CO	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	34 < 1.5 III	NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road	d	Site N	lumber	1218R-2768			Structur	e No.	
Watershed Code:		No data				Stream Order	N/A				
Stream Name		Unnamed				Stream Class	NVC				
Crew		HC, IM, JS				UTM_Zone	09	U	TM Northin	g	6027182
Survey Date		7/1/2016						U	TM Easting		521508
Time		14:07:25				Site Length (m)	100				
Channel		Other				Features	None	9			
Mean Channel Wi	idth (m)	N/A	Mean W	etted Wi	idth (m)	N/A	Mea	n Residua	l Pool Depth	n (m)	N/A
Mean Gradient (%	6)	N/A Dominate Substrate			ate	N/A	Sub-	dominate	Substrate	N/A	
In-stream Cover		N/A	Dominant cover			N/A	Sub-	dominant	cover	N/A	
Water Quality	Temper	rature (Deg C)	N/A	рН	N/A	Conductivity (uS/	'cm)	N/A	Turb	idity	N/A
Riparian Vegetati	ion					Crown Closure			N/A		
Left Bank Shape		N/A				Right Bank Shape	j		N/A		
Left Bank Texture		N/A				Right Bank Textu	re		N/A		
Left Bank Ripariar	n Vegetati	ion N/A				Right Bank Ripari	an Vege	etation	N/A		
Left Bank Stage		N/A				Right Bank Stage					
Habitat Commen	ts Fi	ish Species	N/A								
Spawning	N/A	A									
Rearing	N/A	A									
Overwintering	N/A	A									
Migration	N/A	A	j								
Fish Information	His	storical Fish Pre	esence	No data							
Fished -2015	No Species Captured-2015			015	N/A	Species Stage-2015 N/A			N/A		
Fished -2016	No	No Species Captured-2016			016	N/A	Species Stage-2016 N/A				N/A

Photo Comments

Looking upstream towards the road.

Site Comments

Ditch drainage. No channel development upstream or downstream of road. Drainage ditches meet, flow across road then down a 10 m long steep road embankment then undefined, unscoured forested area. No fish access. Non-fish bearing.



Notes:	Cover		Fish	Species	DV	Dollywardon	Stream Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing	
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m	
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel	
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage	
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish	
	IV	Instream vegetation	CCG	Slimy sculpin	TCR	Threesnine sticklehack		bearing except where noted.	

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site N	lumber	1218R-2778			Structure No		
Watershed Code:	No data				Stream Order	N/A				
Stream Name	Unnamed				Stream Class	NVC				
Crew	HC, IM, JS				UTM_Zone	09	UT	M Northing	6027297	
Survey Date	7/1/2016						UT	M Easting	521489	
Time	13:40:38			Site Length (m) 100			·			
Channel	Other				Features	None	è			
Mean Channel Width	(m) N/A	Mean W	etted Wi	idth (m)	N/A	Mear	n Residual	Pool Depth (m)	N/A	
Mean Gradient (%)	Dominat	e Substr	ate	N/A	Sub-	ıb-dominate Substrate N/A				
In-stream Cover	n-stream Cover N/A Do				N/A	Sub-	Sub-dominant cover N/A			
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	N/A	
Riparian Vegetation					Crown Closure			N/A		
Left Bank Shape	N/A				Right Bank Shape			N/A		
Left Bank Texture	N/A				Right Bank Textur	re		N/A		
Left Bank Riparian Veg	getation N/A				Right Bank Ripari	an Vege	etation	N/A		
Left Bank Stage	N/A				Right Bank Stage			N/A		
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
Overwintering	N/A									
Migration	N/A									
Fish Information	Historical Fish Pres	ence I	No data							
Fished -2015	shed -2015 No Species Captured-2015			015	N/A Spe			s Stage-2015	N/A	
Fished -2016	ished -2016 No Species Captured-2016			016	N/A		Specie	s Stage-2016	N/A	

Photo Comments

Ditch drainage along road.

Site Comments

Ditch drainage. No channel development upstream or downstream of road. Drainage ditches meet, flow across road down a 10 m long steep road embankment then no drainage visible. No fish access. Non-fish bearing. No fisheries potential.



Notes:			Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throoping stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site N	lumber	1218R-2780			Structure No).	
Watershed Code:	No data				Stream Order	N/A				
Stream Name	Unnamed				Stream Class	NVC				
Crew	HC, JS, IM				UTM_Zone	09	UT	M Northing	6026840	
Survey Date	7/1/2016						UT	M Easting	521631	
Time	15:15:21				Site Length (m)	100				
Channel	Other				Features	<u>;</u>				
Mean Channel Width	ean Channel Width (m) N/A Mean Wett				N/A	Mea	n Residual F	ool Depth (m)	N/A	
Mean Gradient (%)	N/A	Dominate	e Substra	ate	N/A	Sub-	dominate Si	ubstrate N/	A	
In-stream Cover	N/A	Dominan	t cover		N/A	Sub-dominant cover			A	
Water Quality Te	ty Temperature (Deg C) N/A pH N/A				Conductivity (uS	Conductivity (uS/cm) N/A			N/A	
Riparian Vegetation	Vegetation							N/A		
Left Bank Shape	N/A				Right Bank Shape			N/A		
Left Bank Texture	N/A				Right Bank Textu	ire		N/A		
Left Bank Riparian Veg	getation N/A				Right Bank Ripar	ian Vege	etation	N/A		
Left Bank Stage	N/A				Right Bank Stage					
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
Overwintering	N/A									
Migration	N/A									
Fish Information	Historical Fish Pres	ence N	lo data							
Fished -2015	ished -2015 No Species Captured-2015			015	N/A Spec			Stage-2015	N/A	
Fished -2016	shed -2016 No Species Captured-2016			016	N/A			Stage-2016	N/A	

Photo Comments

Crossing site.

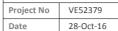
Site Comments

Ditch drainage. No channel development upstream or downstream of road. Drainage ditches meet, flow across road via cross ditch, then into a landscape depression in the forest downslope. No evidence of channelization or wetland area. No fish access. Non-fish bearing.



Notes:	Cover		Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish

Prepared for BC Hydro





									Miccici	
Crossing Type	Access Road	d	Site N	umber	13C-239			Structure No).	
Watershed Code:	No data				Stream Order	N/A				
Stream Name	Unnamed				Stream Class	NVC				
Crew	HC, IM, JS				UTM_Zone	09	UTI	M Northing	6007902	
Survey Date	7/2/2016						UTI	VI Easting	522214	
Time	09:34:01				Site Length (m)	100				
Channel	Other				Features None					
Mean Channel Width	(m) N/A	Mean W	Mean Wetted Width (m) N/A Mean				Residual P	ool Depth (m)	N/A	
Mean Gradient (%)	N/A	Dominat	e Substr	ate	N/A	minate Su	ubstrate N/	A		
In-stream Cover	N/A	Dominar	nt cover		N/A	minant co	over N/.	A		
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/o	cm)	N/A	Turbidity	N/A	
Riparian Vegetation	/egetation				Crown Closure					
Left Bank Shape	N/A				Right Bank Shape		N/A			
Left Bank Texture	N/A				Right Bank Textur	е		N/A		
Left Bank Riparian Veg	getation N/A				Right Bank Riparia	n Vegeta	ation	N/A		
Left Bank Stage	N/A				Right Bank Stage			N/A		
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
Overwintering	N/A									
Migration	N/A									
Fish Information	Historical Fish Pre	esence	No data							
Fished -2015	No	Species Cap	otured-2	015	N/A		Species	Stage-2015	N/A	
Fished -2016	ished -2016 No Species Captured-2016			016	N/A		Species	Stage-2016	N/A	

Photo Comments

View of road drainage ditch feeding culvert inlet.

Site Comments

Drainage ditch from road flows through 500 mm culvert. No defined channel downstream of culvert. Drains into steep 25% gradient forested area. Only ditch drainage channel upstream of culvert inlet. Non-fish bearing.



Notes:	Cover		Fish	Species	DV	Dollywordon	Stream Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing	
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m	
	B UC	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m	
		Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel	
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage	
	OV	Overhanging vegetation CO		O Coho salmon		Sockeye salmon		NCD and wetlands are non-fish	
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted	

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



		7									
Crossing Type		Access Road	k	Site N	lumber	BR13A(PTPL03)_77		S	tructure	No.	47
Watershed Code:	:	No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	S3				
Crew		DF, NN				UTM_Zone	09	UTM I	Northing	5	6012099
Survey Date		7/3/2016						UTM I	Easting		523018
Time		09:59:48				Site Length (m)	100				
Channel		Visible chan	inel			Features	None				
Mean Channel W	idth (m)	2.93	Mean W	etted Wi	idth (m)	1.05	Mean Residual I			(m)	0.09
Mean Gradient (%	%)	3	Domina	te Substr	ate	Fines	Sub-dor	minate Subs	trate	Grave	els
In-stream Cover		Abundant	Domina	nt cover		SWD	Sub-dor	minant cove	r	LWD,	IV, OV
Water Quality	Tempe	rature (Deg C)	C) 8.8 pH 6.4			Conductivity (uS/cm) 19			Turbi	dity	C-Clear
Riparian Vegetat	ion					Crown Closure	42	L-70%			
Left Bank Shape		Sloping				Right Bank Shape			Sloping		
Left Bank Texture	5	Fines				Right Bank Texture	9	Fi	nes		
Left Bank Riparia	n Vegetati	ion Conifer	ous			Right Bank Riparia	n Vegeta	tion Co	oniferou	IS	
Left Bank Stage		Young F	orest			Right Bank Stage		Yo	oung Fo	rest	
Habitat Commen	i ts Fi	ish Species	AO - All Sa	Imonids							
Spawning		oderate - Majority o awning opportunitie				owever some side and mid b s primarily fines.	ars immedi	ately downstre	am from t	he culve	rt may provide some
Rearing	Mo										
		oderate - Very limite	ed flow at time o	of survey. Pa	arts of chan	nel dry. High cover and pool	habitat may	/ provide rearir	ng habitat	at highe	r flows.
Overwintering		oderate - Very limite			arts of chan	nel dry. High cover and pool	habitat may	/ provide rearir	ng habitat	at highe	r flows.
Overwintering Migration	Poo	or - Limited flow lim	its overwinteri	ng areas.		nel dry. High cover and pool	habitat may	, provide rearir	ng habitat	at highe	r flows.
	Poo	or - Limited flow lim	its overwinterions of dry	ng areas.			habitat may	y provide rearir	ng habitat	at highe	r flows.
Migration	Pool His	or - Limited flow lim or - Very little flow,	its overwinterions of dry	ng areas. channel pre	vent fish pa		habitat may	y provide rearing provide rear			r flows.

Photo Comments

Downstream extent of survey, showing shallow, defined channel.

Site Comments

Upstream of the culvert a small stagnant pond without flow extends approximately 15 m. Channel is dry above the pond. Substrate in the upstream section is fine and organic materials. No gravel or cobble. The channel has cobble and gravel substrate from the culvert to approximately 25 m downstream. Some side bars and one mid gravel bar were observed in this section may provide spawning opportunities. Further downstream the channel returns to fine material substrate. A small amount of flow downstream of the culvert connects pools and provides connectivity.



Notes:	Cover		Fish	Species	DV	Dellementer	Stream Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing	
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m	
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel	
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage	
	OV	Overhanging vegetation	CO Coho salmon		SK	Sockeye salmon		NCD and wetlands are non-fish	
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	The second second set of the least		hearing except where noted	

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site Nu	ımber	ber Branch 13C_240 Structure No.				
Watershed Code:	No data				Stream Order	N/A			
Stream Name	Unnamed				Stream Class	NVC			
Crew	HC, IM, JS				UTM_Zone	09	UT	M Northing	6007878
Survey Date	7/2/2016						UT	M Easting	522217
Time	09:55:23				Site Length (m)	100			
Channel	Other				Features	None			
Mean Channel Width (m) N/A	Mean We	tted Wid	dth (m)	N/A	Mean F	Residual I	Pool Depth (m)	N/A
Mean Gradient (%)	N/A	Dominate	Substrat	te	N/A	Sub-do	minate S	ubstrate N/A	4
In-stream Cover	N/A	Dominant	cover		N/A	Sub-do	minant c	over N/A	4
Water Quality Ter	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/o	cm)	N/A	Turbidity	N/A
Riparian Vegetation					Crown Closure				
Left Bank Shape	N/A				Right Bank Shape			N/A	
Left Bank Texture	N/A				Right Bank Textur	е		N/A	
Left Bank Riparian Veg	etation N/A				Right Bank Riparia	n Vegeta	ation	N/A	
Left Bank Stage	N/A				Right Bank Stage			N/A	
Habitat Comments	Fish Species	N/A							
Spawning	N/A								
Rearing	N/A								
Overwintering	N/A								
Migration	N/A								
Fish Information	Historical Fish Pres	sence N	o data						
Fished -2015	No	Species Capt	tured-20	15	N/A		Species	s Stage-2015	N/A
Fished -2016	No	Species Capt	tured-20	16	N/A	<u> </u>	Species	s Stage-2016	N/A

Photo Comments

Crossing site looking at cross ditch.

Site Comments

Ditch drainage. Crossing is cross road drainage ditch, conveying road flow and any runoff from steep upslope areas across road. No channelization upstream or downstream. Downstream of crossing, 65% gradient slope with no channelization. Road material deposited on slope. Forested area downslope. No fish access or



Notes:	Cover		Fish	Species	DV	Dollywordon	Stream Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing	
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m	
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel	
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage	
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish	
	I\/	Instroom vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted	

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road	t	Site N	umber	Branch 13C_241	Branch 13C_241		Structure	No.		
Watershed Code:	No data				Stream Order	N/A	N/A				
Stream Name	Unnamed				Stream Class	NVC					
Crew	IM, HC, JS				UTM_Zone	09	UTI	6007852			
Survey Date	7/2/2016						UTI	522239			
Time	10:06:35				Site Length (m)	100					
Channel	Other				Features	None	<u>.</u>				
Mean Channel Width	m) N/A	Mean V	dth (m)	N/A	Mear	n Residual P	ool Depth (r	m) N/A			
Mean Gradient (%)	N/A Dominate Substra			ate	N/A	Sub-c	dominate Su	ubstrate	N/A		
In-stream Cover	N/A	Domina		N/A	Sub-c	dominant co	over	N/A			
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS	/cm)	N/A	Turbidi	ty N/A		
Riparian Vegetation			<u> </u>	•	Crown Closure			N/A	•		
Left Bank Shape	N/A				Right Bank Shape			N/A			
Left Bank Texture	Bank Texture N/A							N/A			
Left Bank Riparian Veg	t Bank Riparian Vegetation N/A					ian Vege	tation	N/A			
Left Bank Stage	N/A				Right Bank Stage	j		N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
Fish Information	Historical Fish Pre	esence	No data								
Fished -2015	No	Species Ca	ptured-20	015	N/A		Species	Stage-2015	N/A		
Fished -2016	No					Species Stage-2016 N/A					

Photo Comments

Crossing site looking upslope in ditch.

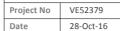
Site Comments

Ditch drainage. Crossing is cross road drainage ditch, conveying road flow and any runoff from steep upslope areas across road. No channelization upstream or downstream. Downstream of crossing, 44% gradient slope with no channelization. Road material deposited on slope. Forested area downslope. No fish access or habitat.



Notes:	Cove	Cover		Fish Species		Dellerenden	Stream Class		
N/A Assessed but no data to report	SWD	Small woody debris AS		AS Atlantic salmon		Dolly varden Lamprev	Fish bearing	Non-fish bearing	
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m	
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel	
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage	
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish	
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throoping stickloback		bearing except where noted.	

Prepared for BC Hydro





Crossing Type	Access Road		Site N	umber	Branch 13C_243		Structure No.				
Watershed Code:	No data				Stream Order	N/A					
Stream Name	Unnamed				Stream Class	NVC					
Crew	IM, HC, JS				UTM_Zone	09	UTN	6007780			
Survey Date	7/2/2016						UTM Easting 522235				
Time	10:17:01				Site Length (m)	100					
Channel	Other	Features	None								
Mean Channel Width (m	ean Channel Width (m) N/A Mean Wetted Width (m)						Residual Po	ool Depth (m)	N/A		
Mean Gradient (%)	N/A	Dominate	e Substra	ate	N/A	Sub-do	minate Su	bstrate N/A	A		
In-stream Cover	N/A	Dominan	t cover		N/A	Sub-do	minant co	ver N/A	A		
Water Quality Tem	perature (Deg C) N/A pH N/A				Conductivity (uS/	cm)	N/A	Turbidity	N/A		
Riparian Vegetation			•		Crown Closure	•	N/A				
Left Bank Shape	N/A				Right Bank Shape			N/A			
Left Bank Texture								N/A			
Left Bank Riparian Vege	tation N/A				Right Bank Riparia	an Vegeta	ation	N/A			
Left Bank Stage	N/A				Right Bank Stage	N/A					
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
	,										
Overwintering	N/A										
Migration	N/A							·			
		i									
Fish Information	Historical Fish Pres	sence N	lo data								
Fished -2015	No	Species Cap	tured-20	015	N/A Species Stage-2015 N/A				N/A		

Photo Comments

Fished -2016

Crossing site looking upslope.

Site Comments

Ditch drainage. Crossing is cross road drainage ditch, conveying road flow and any runoff from steep upslope areas across road. Logged upslope of site. No channelization upstream or downstream. Downstream of crossing, 49% gradient slope with no channelization. Road material deposited on slope. Forested area downslope. No fish access or habitat. No fish.

Species Captured-2016



Notes:	Cover		Fish	Fish Species		Dellusanden	Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish	n bearing	Non	-fish bearing	
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5	> 3 m	
	B UC	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S3	> 5 m - 20 m	NVC No visible channel	< 3 m	
		Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m			
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m		Non-classified drainage	
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon				and wetlands are non-fish	
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback			bear	ing except where noted.	

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



–									T .		
Crossing Type	Access Road		Site N	umber	Branch 13C_244			Structure No.			
Watershed Code:	No data				Stream Order	N/A					
Stream Name	Unnamed				Stream Class	NVC					
Crew	IM, HC, JS				UTM_Zone	09	UT	M Northing	6007740		
Survey Date	7/2/2016						UTM Easting 522230				
Time	10:28:50				Site Length (m)	100					
Channel	Other				Features	None)				
Mean Channel Width	an Channel Width (m) N/A Mean Wetter				N/A	Mear	n Residual	Pool Depth (m)	N/A		
Mean Gradient (%)	N/A	Dominat	e Substr	ate	N/A	Sub-c	dominate S	ubstrate N/	A		
In-stream Cover	N/A	Dominar	nt cover		N/A	Sub-o	over N/	A			
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	N/A		
Riparian Vegetation					Crown Closure			N/A			
Left Bank Shape	N/A				Right Bank Shape			N/A			
Left Bank Texture		Right Bank Textur	·e		N/A						
Left Bank Riparian Veg	getation N/A				Right Bank Riparia	an Vege	tation	N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
Fish Information	Historical Fish Pres	ence	No data								
Fished -2015	No	Species Ca _l	otured-2	015	N/A	Species		s Stage-2015	N/A		
Fished -2016	No Species Captured-2016				N/A				N/A		

Photo Comments

Crossing site looking upslope.

Road drainage. Crossing is a shallow depression on road with no cross ditch, conveying road flow and any runoff from steep upslope areas across road. No channelization upstream or downstream. Downstream of crossing, 45% gradient slope with no channelization. Forested area downslope. No fish access or habitat. No fish.



Notes:	Cover		Fish	Fish Species		Dolly varden	Stream Class		
N/A Assessed but no data to report	SWD LWD	Small woody debris Large woody debris	AS CC	Atlantic salmon	DV L PK	Lamprey Pink salmon	Fish bearing S1 > 20 m	Non-fish bearing S5 > 3 m	
	B UC DP OV	Boulder Undercut bank	CCT CH	CCT Coastal cutthroat trout CH Chinook salmon	PL RB	Pacific Lamprey Rainbow trout	S2 > 5 m - 20 m S3 1.5 m - 5 m	S6 < 3 m NVC No visible channel	
		Deep pools Overhanging vegetation	CM Chum salmon CO Coho salmon		SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish	

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road Site Number					Branch 13C_245 Struc					e No.		
Watershed Code:		No	data				Stream Order	1	N/A					
Stream Name		Uni	named				Stream Class	1	NVC					
Crew		IM,	HC, JS				UTM_Zone	(09	UTM	Northin	g	6007673	
Survey Date		7/2	/2016							522208				
Time		10:	46:25				Site Length (m)	1	100					
Channel		Oth	ner			Features	1	None						
Mean Channel Wi	n Channel Width (m) N/A Mean Wetted W				etted Wi	idth (m)	N/A	ſ	Mean R	esidual Po	ol Depth	(m)	N/A	
Mean Gradient (%	6)	N/A		Dominat	e Substr	ate	N/A	9	Sub-dor	minate Sub	strate	N/A		
In-stream Cover		N/A		Dominar	nt cover		N/A	9	Sub-dor	minant cov	er	N/A		
Water Quality	Tem	perature					Conductivity (u	uS/cm)	N/A	Turbi	idity	N/A	
Riparian Vegetati	ion			•		•	Crown Closure	•	1	N/A		•		
Left Bank Shape			N/A				Right Bank Shape			١	N/A			
Left Bank Texture	Left Bank Texture N/A						Right Bank Tex	kture		ľ	N/A			
Left Bank Ripariar	Left Bank Riparian Vegetation N/A					Right Bank Rip	arian '	Vegeta	tion N	N/A				
Left Bank Stage			N/A				Right Bank Sta		ľ	N/A				
Habitat Commen	ts	Fish Spe	cies	N/A										
Spawning		N/A												
Rearing		N/A												
Overwintering		N/A												
Migration		N/A												
Fish Information		Historica	l Fish Pre	esence	No data									
Fished -2015		No		Species Car	otured-2	015	N/A		Species Stage-2015 N/A			N/A		
Fished -2016		No Species Captured-2016					N/A					N/A		

Photo Comments

Crossing site looking upslope.

Site Comments

Road surface drainage. Crossing is cross road drainage ditch, conveying road flow and any runoff from steep upslope areas across road. No channelization upstream or downstream. Downstream of crossing water enters ditch, flows along road then off of road embankment into forest, with no channelization. Forested area downslope. No fish access or habitat. No fish.



Notes:	Cove	Cover Fi		Fish Species		Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	CO Coho salmon		Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instroom vegetation	CCG	Slimy sculpin	TCD	There is a set of the formal.		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type	Access Road		Site N	umber	Branch 13C_246		·	Structure No).		
Watershed Code:	No data				Stream Order	N/A					
Stream Name	Unnamed				Stream Class	NVC					
Crew	HC, JS, IM				UTM_Zone	09	UTI	M Northing	6007665		
Survey Date	7/2/2016						UTM Easting 522192				
Time	10:52:31				Site Length (m)	100					
Channel	Other		Features	None	!						
Mean Channel Width	ean Channel Width (m) N/A Mean Wetted Widt					Mear	n Residual P	ool Depth (m)	N/A		
Mean Gradient (%)	N/A	Dominate	e Substra	ate	N/A	Sub-c	dominate Su	ubstrate N/	A		
In-stream Cover	N/A	Dominan	t cover		N/A	Sub-c	dominant co	over N/	A		
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	N/A		
Riparian Vegetation					Crown Closure			N/A			
Left Bank Shape	N/A				Right Bank Shape			N/A			
Left Bank Texture	N/A				Right Bank Textu	re		N/A			
Left Bank Riparian Veg	getation N/A				Right Bank Ripari	an Vege	tation	N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
Fish Information	Historical Fish Pres	sence N	No data								
Fished -2015	Not visited	Species Cap	tured-20	015	N/A		Species	Stage-2015	N/A		
Fished -2016	No Species Captured-2016				N/A	Species Stage-2016 N/A			N/A		

Photo Comments

Looking at excavated road ditch.

Site Comments

Excavated ditch no natural channel development. Drains over road then along the northern road ditch to site Branch 13C-247. Non-fish bearing.



Notes: Cover **Fish Species** Stream Class N/A Assessed but no data to report Fish bearing Non-fish bearing SWD Small woody debris Atlantic salmon Lamprey S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m S5 > 3 m S6 < 3 m Large woody debris Pink salmon Coastal cutthroat trout Boulder CCT Pacific Lamprey NVC No visible channel UC Undercut bank СН Chinook salmon Rainbow trout < 1.5 m NCD Non-classified drainage DP Chum salmon Deep pools Salmon Overhanging vegetation Coho salmon NCD and wetlands are non-fish Sockeye salmon bearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Acce	ss Road		Site N	lumber	Branch 13C_247	7		St	ructure	e No.		
Watershed Code:	No d	lata				Stream Order	N/	′ A					
Stream Name	Unn	amed				Stream Class	N۱	/C					
Crew	IM, I	HC, JS				UTM_Zone	09)	UTM N	lorthin	5	6007703	
Survey Date	7/2/	2016							522162				
Time	10:5	9:59				Site Length (m)	10	100					
Channel	Othe	er				Features	No	one					
Mean Channel Width	nnel Width (m) N/A Mean Wetted Width (n				idth (m)	N/A	M	ean Resid	ual Pool	Depth	(m)	N/A	
Mean Gradient (%)	nn Gradient (%) N/A Dominate Substrate				ate	N/A	Su	b-domina	te Subst	trate	N/A		
In-stream Cover	N/A		Dominan	t cover		N/A	Su	b-domina	nt cove	r	N/A		
Water Quality Te	mperature ([Deg C)	N/A	рН	N/A	Conductivity (u	S/cm)	N/A		Turbi	dity	N/A	
Riparian Vegetation						Crown Closure	•	N/	Ά				
Left Bank Shape		N/A				Right Bank Shape				N/A			
Left Bank Texture	t Bank Texture N/A					Right Bank Text	ture		N/	A			
Left Bank Riparian Veg	Bank Riparian Vegetation N/A					Right Bank Ripa	arian Ve	egetation	N/	A			
Left Bank Stage		N/A				Right Bank Stage N/A							
Habitat Comments	Fish Spec	ies	N/A										
Spawning	N/A												
Rearing	N/A												
Overwintering	N/A												
Migration	N/A												
Fish Information	Historical	Fish Pres	ence N	lo data									
Fished -2015	No		Species Cap	tured-2	015	N/A	Speci		ecies Sta	ge-201	.5	N/A	
Fished -2016	No Species Captured-2016					N/A		Species Stage-2016 N/A					

Photo Comments

Crossing site looking upslope at ditch.

Site Comments

Ditch drainage. Crossing is cross road drainage ditch, conveying road flow and any runoff from steep upslope areas across road. No channelization upstream or downstream. Upstream area is logged and mulched. Downstream of crossing, upstream ditch joins crossing ditch and dischargees into forest with no channelization. Road material deposited on slope. Forested area downslope. No fish access or habitat. No fish.



Notes:	Cover		Fish	Fish Species		Dolly varden	Stream Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprev	Fish bearing	Non-fish bearing	
	LWD B UC DP OV	Large woody debris		PK	Pink salmon	S1 > 20 m	S5 > 3 m		
		Boulder	CCT	CII Chianalana	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m	
		Undercut bank	CH		RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel	
		Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage	
		Overhanging vegetation	CO	O Coho salmon		Sockeve salmon		NCD and wetlands are non-fish	
	13.7	to store and the state of	000	Climana				hearing except where noted	

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	A	ccess Road		Site N	lumber	Branch 13C_25	Branch 13C_257 Structure No					
Watershed Code:	N	o data				Stream Order	N.	/A				
Stream Name	U	nnamed				Stream Class	N'	VC				
Crew	H	C, IM, JS				UTM_Zone 09			JTM Northing	6007778		
Survey Date	7,	/2/2016						ı	JTM Easting	522235		
Time	10	0:18:44				Site Length (m) 10	100				
Channel	0	ther				Features	N	one				
Mean Channel Wid	dth (m) N/A	4	Mean W	etted W	idth (m)	N/A	M	ean Residua	al Pool Depth (m) N/A		
Mean Gradient (%) N/A	A	Domina	te Substr	ate	N/A	Su	ıb-dominate	Substrate N	/A		
In-stream Cover	N/A	4	Domina	nt cover		N/A	Su	ıb-dominan	t cover N	/A		
Water Quality	Temperature	e (Deg C)	N/A	рН	N/A	Conductivity ((uS/cm)	N/A	Turbidity	y N/A		
Riparian Vegetation	on					Crown Closur	е		N/A			
Left Bank Shape		N/A				Right Bank Sh	ape		N/A			
Left Bank Texture		N/A				Right Bank Te	xture		N/A			
Left Bank Riparian	Vegetation	N/A				Right Bank Rip	parian V	egetation	N/A			
Left Bank Stage		N/A				Right Bank Sta	age		N/A			
Habitat Comment	s Fish Sp	ecies	N/A									
Spawning	N/A											
Rearing	N/A											
Overwintering	N/A											
Migration	N/A											
Fish Information	Historic	al Fish Pre	sence	No data								
Fished -2015	Not visi	ted	Species Ca	ptured-2	015	N/A		Spec	ies Stage-2015	N/A		
ished -2016 No Species Captured-2016				016	N/A Species Stage-2016 N/A				-			

Photo Comments

Crossing site looking upslope.

Site Comments

No channel development upstream or downstream of road. Evidence of surface flow at a gradient of 48% present for 30m downstream of crossing then disappears into forested vegetation.



Notes:	Cover		Fish	Species	DV	Dellasseden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vagetation	CCG	Slimy sculpin	TCD	The second second second second		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Roa	ad	Site N	lumber	Branch 13C_25	9		Structure No).
Watershed Code:		No data				Stream Order	N/A	4		
Stream Name		Unnamed				Stream Class	NV	С		
Crew		IM, HC, JS				UTM_Zone 09			M Northing	6007620
Survey Date		7/2/2016						UT	M Easting	522024
Time		11:23:59				Site Length (m)	100)		
Channel		Other				Features	No	ne		
Mean Channel W	idth (m)	N/A	Mean	Wetted W	idth (m)	N/A	Me	an Residual I	Pool Depth (m)	N/A
Mean Gradient (%	6)	N/A	Domi	nate Substr	ate	N/A	Sub	o-dominate S	ubstrate N/	Ä
In-stream Cover		N/A	Domi	nant cover		N/A	Suk	o-dominant c	over N/	A
Water Quality	Temp	erature (Deg C)	N/A	рН	N/A	Conductivity (u	ıS/cm)	N/A	Turbidity	N/A
Riparian Vegetat	ion					Crown Closure			N/A	
Left Bank Shape		N/A				Right Bank Sha	ре		N/A	
Left Bank Texture	!	N/A				Right Bank Tex	ture		N/A	
Left Bank Riparian	n Vegeta	ation N/A				Right Bank Rip	arian Ve	getation	N/A	
Left Bank Stage		N/A				Right Bank Sta	ge		N/A	
Habitat Commen	ts	Fish Species	N/A							
Spawning	ľ	N/A								
Rearing	١	N/A								
Overwintering	ı	N/A								
Migration	١	N/A								
Fish Information	ŀ	Historical Fish P	resence	No data						
Fished -2015	1	No	Species	Captured-2	015	N/A		Species	Stage-2015	N/A
Fished -2016	r	No	Species	Captured-2	016	N/A			Stage-2016	N/A

Photo Comments

Crossing site.

Cross road drainage ditch. Conveys flow from upslope forest across road to logged area and forest beyond. Downstream, drainage likely joins drainage of existing culvert to north of this crossing. No channelization upstream or downstream of crossing site. No fish habitat or access. No fish.



N/A Assessed but no data to report	Cover			Fish Species		Dolly varden	Stream Class	
	SWD	Small woody debris	AS	Atlantic salmon	DV	Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	ge woody debris CC Sculpins PK Pink salmon	S1 > 20 m	S5 > 3 m			
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel	
	DP	Deep pools	CM Chum salmon SA Salmon		S4 < 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	CO Coho salmon		Sockeve salmon		NCD and wetlands are non-fish
	13.7	Instronmunantation	ccc	Climate antilain	SK			hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access F	oad		Site N	lumber	Branch 13C_26			Structur	e No.			
Watershed Code:		No data					Stream Order		N/A					
Stream Name		Unname	d				Stream Class		NVC					
Crew		IM, HC,	IS				UTM_Zone 09			UTN	/I Northin	g	6007572	
Survey Date		7/2/201	6							UTM Easting 521977				
Time		11:25:25)				Site Length (m))	100	100				
Channel		Other					Features		None					
Mean Channel Wi	dth (m)	N/A		Mean We	etted Wi	idth (m)	N/A		Mean	Residual P	ool Depth	(m)	N/A	
Mean Gradient (%	5)	N/A		Dominate	Substr	ate	N/A Sub-dominate Subst					N/A		
In-stream Cover		N/A		Dominan	t cover		N/A	N/A Sub-dominant cover						
Water Quality	Temp	erature (Deg	C)	N/A	рН	N/A	Conductivity (uS/cr	n)	N/A	Turbi	dity	N/A	
Riparian Vegetation	on						Crown Closure	е	·		N/A			
Left Bank Shape		N/A					Right Bank Sha	ape			N/A			
Left Bank Texture		N/A					Right Bank Tex	xture			N/A			
Left Bank Riparian	Vegeta	ntion N/A					Right Bank Rip	pariar	n Veget	ation	N/A			
Left Bank Stage		N/A					Right Bank Sta	age			N/A			
Habitat Comment	is	Fish Species	1	N/A										
Spawning	N	N/A												
Rearing	N	N/A												
Overwintering	N	N/A												
Migration	N	N/A												
Fish Information	ŀ	Historical Fish	Prese	ence N	lo data									
Fished -2015		Not visited		Species Cap	tured-2	015	N/A			Species	Stage-201	15	N/A	
Fished -2016						N/A Species Stage-2016 N/A			N/A					

Photo Comments

Crossing site.

 $\label{lem:constraint} \mbox{Ditch drainage. Crossing is cross road drainage ditch. No channelization upstream}$ or downstream. Road material deposited on slope. Drains into deforested cut block area down slope. At time of survey there is a small amount of visible overland flow. No fish access or habitat. No fish.



Notes:	Cover			Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroom vegetation	CCG	Slimy sculpin	TCD	There are the analysis to be a six		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access I	Road		Site N	lumber	Bra	anch 13C_2829			Structure	No.	
Watershed Code:		No data					Str	ream Order	N/A				
Stream Name		Unname	ed				Str	ream Class	NVC				
Crew		IM, HC,	JS				UT	UTM_Zone 09			M Northing		6004766
Survey Date		7/2/201	6						UTI	M Easting		521413	
Time		12:06:3	7				Sit	e Length (m)	100				
Channel		Other					F	eatures	None				
Mean Channel W	idth (m) N/A		Mean We	tted Wi	dth (m)	N/A	4	Mean	Residual P	ool Depth ((m)	N/A
Mean Gradient (%	6)	N/A		Dominate	Substr	ate	N/A	A	Sub-d	ominate Su	ubstrate	N/A	
In-stream Cover		N/A		Dominant	cover		N/A	A	Sub-d	ominant co	over	N/A	
Water Quality	Temp	perature (Deg	C)	N/A	рН	N/A	Co	onductivity (uS/c	m)	N/A	Turbid	lity	N/A
Riparian Vegetat	ion						Cı	rown Closure			N/A		
Left Bank Shape		N/A					Ri	ight Bank Shape			N/A		
Left Bank Texture	<u>.</u>	N/A					Ri	ight Bank Texture	9		N/A		
Left Bank Riparian	n Veget	ation N/A					Ri	ight Bank Riparia	n Vege	tation	N/A		
Left Bank Stage		N/A					Ri	ight Bank Stage			N/A		
Habitat Commen	ts	Fish Species	N	I/A									
Spawning		N/A											
Rearing		N/A											
Overwintering		N/A											
Migration		N/A											
Fish Information		Historical Fish	Prese	nce N	o data								
Fished -2015		No	S	pecies Capt	ured-2	015	N/	'A		Species	Stage-2015	5	N/A
Fished -2016		No	S	pecies Capt	ured-2	016	N/	Ά		Species	Stage-2016	6	N/A

Photo Comments

Crossing site.

Crossing site is cross road drainage ditch. Conveys excess flow from Branch 13C_ 2842 crossing ditch across road, into unchannelized forest, then to the drainage downstream of Branch 13C_2842. Steep slope 50% down slope of crossing site. Site is upstream of site TL20A, a marked non-fish site. No fish habitat or access. No



N/A Assessed but no data to report	Cover			Species	DV	Dolly varden	Stream Class	
	SWD	Small woody debris	AS	Atlantic salmon	ı	Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris CC Sculpins	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m	
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey Rainbow trout	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB		S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO Coho salmon		SK	Sockeye salmon		NCD and wetlands are non-fish
	13.7	to skin a series and a series at a series	CCC CI:I-:-				hearing except where noted	

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site N	umber	Branch 13C_2838			Structure No			
Watershed Code:	No data				Stream Order	N/A					
Stream Name	Unnamed				Stream Class	NVC	•				
Crew	IM, HC, JS				UTM_Zone	09	UT	M Northing	6004765		
Survey Date	7/2/2016						UT	M Easting	521411		
Time	12:15:59				Site Length (m)	100	100				
Channel	Other				Features	None					
Mean Channel Width	(m) N/A	Mean W	etted Wi	dth (m)	N/A	Mear	n Residual I	Pool Depth (m)	N/A		
Mean Gradient (%)	N/A	Dominat	e Substra	ate	N/A	Sub-c	dominate S	ubstrate N/A	A		
In-stream Cover	N/A	Dominan	nt cover		N/A	over N/	A				
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	N/A		
Riparian Vegetation					Crown Closure			N/A			
Left Bank Shape	N/A				Right Bank Shape	!		N/A			
Left Bank Texture	N/A				Right Bank Textu	re		N/A			
Left Bank Riparian Veg	getation N/A				Right Bank Ripari	an Vege	tation	N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
Fish Information	Historical Fish Pres	ence I	No data								
Fished -2015	No	Species Cap	otured-2	015	N/A		Species	Stage-2015	N/A		
Fished -2016					N/A Species Stage-2016 N/A				N/A		

Photo Comments

Crossing site.

Crossing site is cross road drainage ditch. Conveys flow from road and steep slope above crossing across road, into unchannelized clear-cut, then forest, then to the drainage downstream of Branch 13C_2842. Steep slope 70% down and up slope of crossing site. Site is upstream of site TL20A, a marked non-fish site. No fish habitat or access. No fish.



Notes:	Cover			Fish Species		Dellassenden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	There is a set of the least.		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



										THICCICI	
Crossing Type	Access Roa	d	Site Nu	ımber	Branch 13C_2842			Structure	e No.		
Watershed Code:	No data				Stream Order	1					
Stream Name	Unnamed				Stream Class	S6					
Crew	HC, IM, JS				UTM_Zone	UT	M Northing	0	6004798		
Survey Date	7/2/2016						UT	M Easting		521398	
Time	12:07:22				Site Length (m)	100					
Channel	Other				Features	None					
Mean Channel Width	(m) 1.52	dth (m)	0.00	Mean	Pool Depth	(m)	0.00				
Mean Gradient (%)	ran Gradient (%) 10 Dominate Substrate						ominate S	ubstrate	Boul	ders	
In-stream Cover	stream Cover Abundant Dominant cover					OV Sub-dominant cover					
Water Quality Te	r Quality Temperature (Deg C) No data pH No data					Conductivity (uS/cm) No data Turbidity					
Riparian Vegetation		Crown Closure	71-90%								
Left Bank Shape	Sloping	5		Right Bank Shape			Sloping				
Left Bank Texture	Fines				Right Bank Textur	e		Fines			
Left Bank Riparian Veg	getation Conifer	ous			Right Bank Riparia	an Veget	ation	Coniferou	IS		
Left Bank Stage	Young	Forest			Right Bank Stage	rest					
Habitat Comments	Fish Species	AO - All Sal	monids								
Spawning	None - No fish habita	due to lack of w	ater and pro	hibitively h	igh gradient at a known ba	rrier site d	ownstream.				
Rearing	None - No fish habita	t due to lack of w	ater and pro	hibitively h	igh gradient at a known ba	rrier site d	ownstream.				
				,							
Overwintering	None - No fish habita	t due to lack of w	ater and pro	hibitively h	igh gradient at a known ba	irrier site d	ownstream.				
Migration	None - No fish habita	lo fish habitat due to lack of water and prohibitively high gradient at a known					ownstream.				
Fish Information Historical Fish Presence No data											
Fished -2015 Not visited Species Captured-2015					N/A Species Stage-2015			N/A			
11stied -2015 Not visited Species captured-2015					1 -		-			•	

N/A

Photo Comments

Fished -2016

Taken approx 30 m downstream of road.

No

Site Comments

Site is upstream of a known barrier at site TL20A. Channel development is present downstream of road with cobble gravel substrates. Upstream of road crossing channel is filled with boulder and large woody debris. Confluence with site Branch 13C_2855 located approx 30 m downstream. Red alder dominant with western hemlock. Channel dry during time of survey. No fish access or habitat.

Species Captured-2016



Notes:	Cover		Fish	Species	D1/	B. II I	Stream Class				
N/A Assessed but no data to repor	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fis	h bearing	Non-fish bearing		
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m		
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3 m		
	UC	Undercut bank	CH	Chinook salmon	RB SA	Rainbow trout		1.5 m - 5 m	NVC No visible channel		
	DP	Deep pools	CM	Chum salmon		Salmon	S4	< 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish		
	IV	Instream vegetation	egetation CCG Slimy sculpin	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.		

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Ro	ad	Site No	umber	Branch 13C_2855			Structure	e No.	
Watershed Code:	910-6650	62-20282			Stream Order	1				
Stream Name	Unnamed				Stream Class	S6				
Crew	BH, IM				UTM_Zone	09	UTIV	Northin	5	6004810
Survey Date	6/22/2015	5				UTIV	Easting		521387	
Time	15:54:19				Site Length (m)	100				
Channel	Dry Chanr	nel			Features	CV - 0	culvert			
Mean Channel Width	(m) 1.52	Mean We	tted Wid	dth (m)	0.00	Mear	n Residual Po	ol Depth	(m)	0.00
Mean Gradient (%)	10	Dominate	Substra	ite	Cobbles	Sub-c	dominate Sul	ostrate	Boul	ders
In-stream Cover	Abundant	Dominant	cover		OV	Sub-c	dominant cov	/er	В	
Water Quality T	emperature (Deg C	No data	рН	No data	Conductivity (uS,	/cm)	No data	Turbi	dity	No data
Riparian Vegetation					Crown Closure			71-90%		
Left Bank Shape	Slopin	ıg			Right Bank Shape	9	:	Sloping		
Left Bank Texture	Fines				Right Bank Textu	re		Fines		
Left Bank Riparian Ve	getation Conife	erous			Right Bank Ripar	ian Vege	etation	Coniferou	IS	
Left Bank Stage	Young	Forest			Right Bank Stage		,	oung Fo	rest	
Habitat Comments	Fish Species	AO - All Salm	nonids							
Spawning	None - No fish habit	at due to lack of wa	ter and pro	ohibitively h	igh gradient downstream					
Rearing	None - No fish habit	at due to lack of wa	ter and pro	ohibitively h	igh gradient downstream					
Overwintering	None - No fish habit	at due to lack of wa	ter and pro	ohibitively h	igh gradient downstream					
Migration	None - No fish habit	at due to lack of wa	ter and pro	ohibitively h	igh gradient downstream					
Fish Information	Historical Fish P	resence N	o data							
Fished -2015	No	Species Capt	tured-20)15	N/A	Specie			.5	N/A
Fished -2016	Not visited	Species Capt	tured-20	16	N/A		Species S	Stage-201	.6	N/A

Photo Comments

On road looking uphill.

Site is located upstream of known barrier at TL20A crossing. Stream has water only in spring or during storm events. No fish access.



Notes: Cover **Fish Species** Stream Class Dolly varden N/A Assessed but no data to report Fish bearing Non-fish bearing SWD Small woody debris Atlantic salmon Lamprey S5 > 3 m S6 < 3 m S1 > 20 m LWD Large woody debris Pink salmon S2 > 5 m - 20 m Coastal cutthroat trout Boulder CCT Pacific Lamprey S3 1.5 m - 5 m NVC No visible channel UC Undercut bank СН Chinook salmon Rainbow trout < 1.5 m NCD Non-classified drainage DP Chum salmon Deep pools Salmon Overhanging vegetation Coho salmon NCD and wetlands are non-fish Sockeye salmon bearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site N	umber	Branch 13C-2804			Structure No			
Watershed Code:	No data				Stream Order	N/A					
Stream Name	Unnamed				Stream Class	NVC					
Crew	HC, JS, IM				UTM_Zone	UT	M Northing	6007700			
Survey Date	7/2/2016					UT	M Easting	522228			
Time	10:34:53				Site Length (m)	100					
Channel	Other				Features	None)				
Mean Channel Width	(m) N/A	Mean We	etted Wi	dth (m)	N/A	Mear	n Residual I	Pool Depth (m)	N/A		
Mean Gradient (%)	N/A	Dominate	e Substra	ate	N/A	dominate S	ubstrate N/	A			
In-stream Cover	N/A	Dominan	t cover		N/A	Sub-c	dominant c	over N/	A		
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	N/A		
Riparian Vegetation					Crown Closure			N/A			
Left Bank Shape	N/A				Right Bank Shape	!		N/A			
Left Bank Texture	N/A				Right Bank Textu	re	N/A				
Left Bank Riparian Veg	getation N/A				Right Bank Ripari	an Vege	etation	N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
Fish Information	Historical Fish Pres	ence N	No data								
Fished -2015	d -2015 No Species Captured -2015					N/A			N/A		
Fished -2016	No	016					N/A				

Photo Comments

Looking upslope at road ditch drainage.

Site Comments

No channel development upstream or downstream of road. Evidence of surface flow at a gradient of 43% present for 10m downstream of crossing then joins with drainage across road. Non-fish bearing.



Notes:	Cove		Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	ı	Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeve salmon		NCD and wetlands are non-fish
	13.7	to see a	000	Climana				haaring aveant where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Acce	ess Road		Site N	lumber	Bridge Site 17			Structure No.		
Watershed Code:		No o	data				Stream Order	1				
Stream Name		Unn	amed				Stream Class	S3				
Crew		HC,	IM, JS				UTM_Zone	09	UTN	1 Northing	6009474	
Survey Date		6/29	9/2016					UTN	1 Easting	521184		
Time		16:4	6:51				Site Length (m)	100				
Channel		Visik	ole chann	el			Features	BR - Bridg	ge			
Mean Channel Wi	idth (m)	2.96		Mean V	Wetted W	idth (m)	1.90	Mean Res	sidual Po	ool Depth (m)	0.22	
Mean Gradient (%	6)	3		Domina	ate Substr	ate	Fines	Sub-dom	inate Sul	bstrate Gra	ivels	
In-stream Cover		Abund	dant	Domina	ant cover		OV	Sub-dom	inant co	ver DP		
Water Quality	Tempe	erature (Deg C)	18.8	рН	7.5	Conductivity (uS/o	cm) 56	6	Turbidity	C-Clear	
Riparian Vegetati	ion						Crown Closure			21-40%		
Left Bank Shape			Sloping				Right Bank Shape			Undercut		
Left Bank Texture			Fines				Right Bank Textur	е	Fines			
Left Bank Ripariar	n Vegetat	tion	Deciduou	IS			Right Bank Riparia	n Vegetatio	on	Mixedwood		
Left Bank Stage			Young Fo	rest			Right Bank Stage		,	Young Forest		
Habitat Commen	ts F	ish Spec	ies	AO - All Sa	almonids							
Spawning	M	loderate - [Downstream	of bridge ne	ear confluen	ce gravels pr	esent, upstream of bridge r	no spawning h	abitat is av	ailable.		
Rearing	M	loderate - L	ow flows w	ith gravel su	bstrates dow	nstream of	bridge.					
<u> </u>												
						6						
Overwintering	Po	Poor - Depths of 0.8 m in impounded pool habitat, with low flows.										
Migration	Po	oor - Under	current cor	nditions how	ever under h	nigh flows be	eaver dams may breach and	migration wo	uld improv	e.		
					ı							
Fish Information	Н	istorical	Fish Pres	ence	No data							
Fished -2015	N	ot visite	d	Species C	aptured-2	015	N/A		Species S	Stage-2015	N/A	

Photo Comments

Fished -2016

Confluence with Lone Wolf Creek.

Yes

Site Comments

Beaver dam immediately upstream of existing bridge structure has impounded upstream habitat causing a lack of defined channel, and habitat is composed of fine and organic substrates and resembles wetland habitat. Upstream of dam wetted width is approximately 3m with valley width of 20 m. Additional dams and beaver activity present upstream. Coho observed and captured upstream and downstream of bridge structure via dip netting. Due to presence of breeding amphibians at site, electrofishing was not conducted. Fish bearing stream, despite temporary barriers. Crossing is located 20 m upstream of confluence with Lone Wolf Creek, a known fish-bearing creek.

Species Captured-2016



Species Stage-2016

Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vogetation	CCG	Slimy sculpin	TCD	The second second second second		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Roa	d	Sita N	umber	Bridge Site 18		<u>'</u>	Structure	No.	
Watershed Code:		No data	u	JILE IV	unibei	Stream Order	1		Structure	. INO.	
Stream Name		Unnamed				Stream Class	S3				coocc=
Crew		IM, HC, JS				UTM_Zone	09		√ Northing	5	6009665
Survey Date		6/29/2016							✓ Easting		520564
Time		14:55:32				Site Length (m)	300				
Channel		Visible cha	nnel			Features	BR -	- Bridge			
Mean Channel Wi	idth (m) 4.01	Mean W	etted Wi	dth (m)	2.11	Me	an Residual P	ool Depth	(m)	0.33
Mean Gradient (%	6)	3	Dominat	e Substr	ate	Gravels	Sub	-dominate Su	S		
In-stream Cover		Moderate	Dominar	nt cover	ver OV S			-dominant co	ver	LWD	,DP,UC
Water Quality	Tem	perature (Deg C)	11.6	рН	8.0	Conductivity (u	S/cm)	60	Turbio	dity	C-Clear
Riparian Vegetati	ion					Crown Closure			41-70%		
Left Bank Shape		Underd	cut			Right Bank Sha	pe		Sloping		
Left Bank Texture		Fines				Right Bank Text		Fines			
Left Bank Ripariar	n Veget	ation Mixed	wood			Right Bank Ripa	rian Veg	getation	Mixedwoo	od	
Left Bank Stage		Young	Forest			Right Bank Stag	e		Young For	est	
Habitat Commen	ts	Fish Species	AO - All Sal	monids				**************************************	М		
Spawning		Good - Abundant gra	vel, good for trou	ıt and smal	ler salmon s	pecies. Very close to We	edeene Riv	er, good access,	good flow dep	oths.	
Rearing		Excellent - Abundant of Good cover availabilit		ır and 1+ co	ho observe	d and captured. Juvenile	s observed	d rearing through	out stream be	etween	bridge and Wedeene.
Overwintering		Good - Frequent deep for adults. Wedeene I				woody debris. Good flow	vs, likely re	emains flowing all	l year round.	Likely li	mited available habitat
Migration		Good - No barriers to	fish passage obse	erved betw	een bridge a	and Wedeene. Good flow	w depths, r	may be limited at	higher flows	for larg	er bodied fish.
Fish Information		Historical Fish Pr	esence I	No data							
Fished -2015		Not visited	Species Car	otured-2	015	N/A Species Stage-20			Stage-201	5	N/A
						CO Species Sta					

Photo Comments

Upstream extent of survey, showing the well-defined channel with gravel substrates upsteram of the bridge site.

Site Comments

Stream is good quality salmonid habitat, excellent for juveniles. Abundant coho young of the year and 1+ age observed. No barriers between bridge and Wedeene River. Good habitat variety and cover variety. Typical low gradient riffle pool habitat with large woody debris creating diversity. Abundant small and large gravel, minimal cobble. Fish bearing.



Notes:	Cove	r	Fish	Species	D1./	B. II I	Stı	eam Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fis	n bearing	Non-fish	bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3	3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD No	n-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and	wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing e	except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Access Road	l	Site N	lumber	Bridge Site 37			Structure	No.	
Watershed Code:		No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	S5				
Crew		HC, IM, JS				UTM_Zone	09	UTM	Northing		6007694
Survey Date		6/30/2016						UTM	Easting		522211
Time		13:49:23				Site Length (m)	100				
Channel		Other				Features	None	9			
Mean Channel Wid	dth (m)	No data	Mean We	etted W	idth (m)	No data	Meai	n Residual Po	ol Depth ((m)	No data
Mean Gradient (%))	No data	Dominat	e Substr	ate	No data	No data Sub-domir			No da	ata
In-stream Cover		No data	Dominan	it cover		No data	Sub-	dominant cov	ver .	No da	ata
Water Quality	Tempera	ature (Deg C)	No data	рН	No data	Conductivity (uS,	/cm)	No data	Turbid	lity	No data
Riparian Vegetatio	n					Crown Closure		1	No data		
Left Bank Shape		No data				Right Bank Shape	е	1	No data		
Left Bank Texture		No data				Right Bank Textu	ire	1	No data		
Left Bank Riparian	Vegetatio	n No data				Right Bank Ripar	ian Vege	etation I	No data		
Left Bank Stage		No data				Right Bank Stage	<u>.</u>	1	No data		
Habitat Comments	s Fis	h Species	N/A								
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
Fish Information	Hist	torical Fish Pre	sence 1	No data							
Fished -2015	Not visited Species Captured-2015					N/A	Species Stage-2015 N/A			N/A	
Fished -2016	No		Species Cap	tured-2	016	N/A		-	stage-2016		N/A

Photo Comments

Crossing site. Looking upstream at existing bridge.

Site Comments

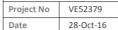
Steep (22- 25%) gradient stream with subsurface flow (dry) until approximately 30 m downstream of crossing structure. Intermittent surface flow then present downstream, surface flow upstream of bridge would only be possible during extreme high water conditions. Water velocity is likely to be high during this time due to boulder and woody debris jams and likely impassable to fish. 2 m drop barrier filled with cobble boulder and large woody debris downstream of bridge with 10 cm plunge pool. Substrates gravels cobbles, boulders, and bedrock. Entrenched with bedrock outcroppings on valley walls. Downstream of first barrier habitat is step pool with abundant cascade and waterfall. Impassable to



Notes:	Cove	r	Fish	Species	DV	Dollywarden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type	Access	Road		Site Nu	umber	.0				Structure	No.		
Watershed Code:	No dat	:a				Stream Orde	er	2					
Stream Name	Unnan	ned				Stream Class	5	Wetla	nd - Fish-be	ea			
Crew	HC, IM	, WM				UTM_Zone		09	UTN	/I Northing	5	5998891	
Survey Date	7/6/20)16							UTN	/I Easting		519939	
Time	14:24:	07				Site Length (Site Length (m) 150						
Channel	Wetlar	nd				Features	Features None						
Mean Channel Width	(m) No data		Mean We	tted Wic	dth (m)	15.00		Mean	Residual P	ool Depth	(m)	No data	
Mean Gradient (%)	No data		Dominate	Substra	te	Fines		Sub-d	ominate Su	bstrate	Fines	5	
In-stream Cover	Abundaı	nt	Dominant	cover		DP Sub-dom			ominant co	ver	LWD	, IV, OV	
Water Quality Te	emperature (De	g C)	No data	рН	No data	Conductivity	y (uS/c	m)	No data	Turbio	dity	L-Lightly turbid	
Riparian Vegetation						Crown Closu	ure			1-20%			
Left Bank Shape	Slo	ping				Right Bank S	Shape			Sloping			
Left Bank Texture	Fir	nes				Right Bank Texture				Fines			
Left Bank Riparian Veg	getation Mi	ixedwo	od			Right Bank I	Riparia	n Veget	ation	Mixedwoo	od		
Left Bank Stage	Ma	ature Fo	orest			Right Bank S	Stage			Mature Fo	orest		
Habitat Comments	Fish Species	5 A	AO - All Salm	nonids									
Spawning	None - No coar	se substra	ates at crossing	g location, s	spawning ha	abitat is located fur	rther dow	vnstream.					
Rearing	Moderate - The	ere is a va	riety of cover p	rovided fo	r juveniles.								
Overwintering	Poor - There is	adequate	depth but ther	re is potent	tial for low	dissolved oxygen in	n winter.						
Migration	Moderate - Pre	sence of I	beaver dams do	ownstream	that may li	mit migration but t	there are	no perm	anent barriers				
					,	•		•					
	Historical Fish Presence No data												
Fish Information	Historical Fis	h Prese	ence N	lo data									
Fish Information Fished -2015	Historical Fis		ence N Species Capt		15	N/A			Species	Stage-201	5	N/A	

Photo Comments

Downstream extent of the survey looking upstream.

Site Comments

Wetland system, with wetted width of 15 m at crossing and composed of organic substrates. Beaver dams observed approximately 10 m upstream, with flow cutting channel through. Old growth hemlock dominant forest along riparian edge with skunk cabbage, Devils club and emergent reed grasses. Yellow water lily present as in-stream vegetation. Large woody debris, water depths combined with high tannin content and undercut banks providing cover. Downstream of TL69 wetland area approaches 30 m in diameter between valley walls, with large portion of wetted width hidden by emergent grasses. Fish observed feeding on surface near crossing location. No spawning due to organic substrates, poor overwintering (adequate depth, potential for low dissolved oxygen), moderate rearing, moderate migration. Habitat 400 m downstream becomes more channelized and contains coarse substrates covered in a thick layer of rust colored algae. Many beaver dams >5 were observed some without flow over top, however can not be ruled a permanent barrier. One coho captured 400 m downstream. No permanent gradient barriers observed between fish capture and crossing site. Fish bearing stream.



Notes:	Cove	•	Fish	Species	DV/	Dellassadas	Str	eam Class	
N/A Assessed but no data to report	SWD LWD B UC DP OV IV	Small woody debris Large woody debris Boulder Undercut bank Deep pools Overhanging vegetation Instream vegetation	AS CC CCT CH CM CO	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon Chum salmon Coho salmon Slimy sculpin	DV L PK PL RB SA SK TSB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout Salmon Sockeye salmon Threespine stickleback	S1 S2 S3	> 20 m > 5 m - 20 m > 5 m - 5 m - 5 m - 5 m < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage NCD and wetlands are non-fish bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

 Project No
 VE52379

 Date
 28-Oct-16



Crossing Type	Access Ro	ad	Site N	lumber	C51			Structure	e No.		
Watershed Code:	No data				Stream Order	N/A					
Stream Name	Unnamed				Stream Class	NCD					
Crew	IM, NN				UTM_Zone	09	UTN	1 Northing	g 5994	041	
Survey Date	5/12/2016	j				UTN	1 Easting	5195	06		
Time	12:25:57				Site Length (m)	100					
Channel	No Visible	Channel			Features	None)				
Mean Channel Width	(m) N/A	Mean W	etted Wi	idth (m)	N/A	Mear	n Residual Po	ool Depth	(m)	N/A	
Mean Gradient (%)	N/A	Dominat	te Substra	ate	N/A	Sub-c	dominate Su	bstrate	N/A		
In-stream Cover	N/A	Domina	nt cover		N/A	Sub-c	dominant co	ver	N/A		
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (us	S/cm)	N/A	Turbi	dity N/	'A	
Riparian Vegetation		•	•		Crown Closure			N/A	*		
Left Bank Shape	N/A				Right Bank Shap	е		N/A			
Left Bank Texture	N/A				Right Bank Text	ure		N/A			
Left Bank Riparian Veg	getation N/A				Right Bank Ripa	rian Vege	etation	N/A		·	
Left Bank Stage	N/A				Right Bank Stag	е		N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
-											
O	N/A										
Overwintering	IN/A										
Migration	N/A										
Fish Information	Historical Fish P	resence	No data								
Fished -2015	Not visited	Species Ca	ptured-20	015	N/A Species Stage-			Stage-201	L5 N/A		
Fished -2016	No	Species Ca	ptured-20	016	N/A Species Stage-2016 N/A						

Photo Comments

Downstream extent of survey is non-classified drainage (<30 m in length).

Site Comments

Non continuous sections of channel with small pools. Dry sections of channel throughout. Flows very low, running subsurface in places and overland in others. Vegetated channel with small patches of alluvial sediments, dominated by organic debris, shows minimal evidence of scouring flows during freshet. Small discontinuous channelized sections up to 30 m at surveyed sites, upper and lower ends becomes undefined non-visible channel. Maximum pool depth is 15 cm, residual pool of 10 cm. Non-fish bearing due to discontinuous habitat, low flows, lack of evidence of higher flows during freshet.



					CONTRACTOR OF THE PERSON NAMED IN	THE RESIDENCE OF THE PERSON OF	THE RESERVE AND PERSONS ASSESSED FOR THE PARTY AND PARTY.	
Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Acc	ess Road		Site N	lumber	C63			Structure	No.	
Watershed Code:		No	data				Stream Order	1				
Stream Name		Uni	named				Stream Class	NCD -	Fish-beari	ng		
Crew		IM,	NN				UTM_Zone	09	ITU	M Northing		5992113
Survey Date		5/1	2/2016						UTI	M Easting		520339
Time		17:	02:11				Site Length (m)	100				
Channel		Visi	ble chanr	nel			Features	CV - C	ulvert			
Mean Channel W	idth (m	n) 0.00		Mean	Wetted Wi	idth (m)	31.67	Mean	Residual P	ool Depth (r	m)	0.54
Mean Gradient (9	%)	0		Domin	ate Substr	ate	Fines	Sub-de	ominate Su	ubstrate	Fines	
In-stream Cover		Abun	dant	Domin	ant cover		IV	IV Sub-dom			SWD,	DP, OV
Water Quality	Tem	perature	(Deg C)	16.5	рН	6.4	Conductivity (uS/o	cm)	29	Turbidi	ity	M - Moderately
Riparian Vegetat	ion						Crown Closure			21-40%		
Left Bank Shape			Sloping				Right Bank Shape	Sloping				
Left Bank Texture	9		Fines				Right Bank Textur	e		Fines		
Left Bank Riparia	n Vege	tation	Mixedwo	ood			Right Bank Riparia	an Veget	ation	Mixedwood	d	
Left Bank Stage			Mature I	Forest			Right Bank Stage			Mature For	rest	
Habitat Commen	its	Fish Spe	cies	AO - All S	almonids							
Spawning		None - No g	ravels prese	ent.								
Rearing		Poor - Possi	ble access d	uring high w	ater for juven	ile fish. Wa	ter quality is currently poor	and access	s is not possib	le. Low water n	may lea	nd to stranding.
O												
Overwintering		Poor - Beav	er pool is sh	allow with lo	w flows and I	likely low di	ssolved oxygen. Fish may be	e stranded	if overwinter	ing in pond.		
Migration		Poor - Migra	ation not cu	rrently possi	ble due to lov	v water. Pos	sible in high flow condition	s only.				
					T							
Fish Information		Historical	Fish Pres	sence	No data							
Fished -2015		Not visite	ed	Species C	Captured-2	015	Species Stage-2015 N/A				N/A	

Photo Comments

Fished -2016

Upstream extent of survey.

Site Comments

Large beaver impounded area located upstream of culvert crossing. Culvert is blocked with beaver debris and is not passing water. Beaver impounded area is very broad and shallow, with high temperature and low pH. No fish were captured with minnow traps placed in beaver pond. Suspect no fish currently present in beaver pond. Downstream consists of broad, flat, dewatered and muddy braided channels, with abundant vegetation in channels. Water is only present in discontinuous small pools. No scour observed downstream or alluvial sediments. Fish access not possible during low flows. During floods, access may be possible from downstream fish bearing streams. Habitat would be marginal during flood conditions, currently habitat is not available downstream. Seasonal fish use during high flow conditions is possible.

Species Captured-2016



Notes:	Cove		Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m S4 < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage
	OV OV	Deep pools Overhanging vegetation	CO	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	34 < 1.5 111	NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Roa	d	Site N	lumber	CX-1			Structure	e No.	
Watershed Code:		No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	S4				
Crew		IM, HC, JS				UTM_Zone	09	UTN	Л Northin	g	6031466
Survey Date		7/4/2016						UTN	∕l Easting		523629
Time		09:34:02				Site Length (m)	100				
Channel		Intermitte	nt Water in C	hannel		Features	None	!			
Mean Channel Wi	idth (m)	0.71	Mean W	etted W	idth (m)	0.26	Mear	Residual P	ool Depth	(m)	0.05
Mean Gradient (%	ó)	8	Domina	te Substr	ate	Fines	dominate Su	bstrate	Fine	S	
In-stream Cover	Abundant Dominant cover					OV Sub-domina			ver	LWD	, SWD
Water Quality	Temp	perature (Deg C) 11.9 pH 7.5				Conductivity (uS/	cm)	122	C-Clear		
Riparian Vegetati	on					Crown Closure			41-70%		
Left Bank Shape		Sloping	5			Right Bank Shape	Right Bank Shape				
Left Bank Texture		Fines				Right Bank Textu	re		Fines		
Left Bank Riparian	n Vegeta	tion Conife	rous			Right Bank Ripari	an Vege	tation	Coniferou	ıs	
Left Bank Stage		Young	Forest			Right Bank Stage			Young Fo	rest	
Habitat Comment	ts	Fish Species	AO - All Sa	lmonids							
Spawning	N	lone - No spawning	gravels, abundan	t fines.							
Rearing		oor - Currently no h	abitat due to low	water. Pos	sible for rea	iring only during high water	r if access	is possible. Sm	all habitat ar	ea avai	lable, narrow channel, no
Overwintering	N	None - No deep pools	s, small channels,	likely low 1	flows during	; winter.					
Migration	Poor - Only possible during high water periods. No access					rently. No identified barrie	rs.				
Fish Information	ŀ	Historical Fish Pr	esence	No data							
Fished -2015	N	Not visited	Species Ca	ptured-2	015	N/A Species Stage-2015 N/A		N/A			
Fished -2016	d -2016 No Species Captured-2016				016	N/A Species Stage-2016 N/A				N/A	

Photo Comments

Approximate crossing site.

Site Comments

Stream is narrow, defined channel with no flowing water. Channel is full of fallen woody debris in places, with abundant vegetation in and beside the channel. These woody debris accumulations may limit fish access during high water, but are not rated as permanent barriers. Some small residual pools are present, with depths of less than 0.1 m and widths of 0.3 to 0.2 m. Currently, no fish habitat due to low water. May offer limited rearing habitat only during high flow periods. Not fished, no sufficient water depths.



Notes:	Cove	r	Fish	Species	D1./	B. II I	Stı	eam Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fis	n bearing	Non-fish	bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3	3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD No	n-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and	wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing e	except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Access Roa	ıd	Site N	lumber	PTPL rd-2	11_2923			Structure	e No.		
Watershed Code:		No data				Stream C	Order	1					
Stream Name		Unnamed				Stream C	lass	S4					
Crew		IM, HC, JS				UTM_Zo	ne	09	UTM	Northing	5	6008959	
Survey Date		6/30/2016							UTM	Easting		522349	
Time		14:46:24				Site Leng	th (m)	100					
Channel		Dry Chann	el			Feature	es	BR - B	ridge				
Mean Channel W	idth (m	1.29	Mean We	etted Wi	idth (m)	0.00		Mean	Residual Po	ol Depth	(m)	0.00	
Mean Gradient (9	%)	7	Dominat	e Substr	ate	Fines Sub-dominate Substrate					Grav	els	
In-stream Cover	n Cover Abundant Dominant cover					SWD Sub-dominant			ominant cov	ver	LWD	, B,OV	
Water Quality	Temp	perature (Deg C) No data pH No da				Conduct	tivity (uS/c	:m)	No data	data Turbidity No data			
Riparian Vegetat	ion					Crown C	Closure		-	71-90%			
Left Bank Shape		Under	cut			Right Ba	ink Shape		9	Sloping			
Left Bank Texture	9	Fines				Right Ba	ınk Texture	е	1	ines			
Left Bank Riparia	n Veget	ation Conife	rous			Right Ba	ınk Riparia	n Veget	tation	Coniferou	IS		
Left Bank Stage		Young	Forest			Right Ba	ınk Stage		,	oung Fo	rest		
Habitat Commen	nts	Fish Species	AO - All Salı	monids									
Spawning		None - Spawning gra	vels are absent ne	ar the cros	sing. Downs	ream wetted	stream has m	nany grave	els suitable for s	pawning. C	rossing	site dry in June 2016.	
Rearing		Poor - Stream is ephe	meral, some casc	ades and d	rops are pre	sent that may	limit juvenile	access to	crossing site.				
Overwintering		None - No deep pool	s near crossing site	e.									
Migration	Poor - Limited by lack of flow depths, cascades and small fa					that may be p	artial barriers	5.					
Fish Information		Historical Fish Pr	esence	No data									
Fished -2015		Not visited	Species Cap	tured-2	015	N/A Species Stage-2015 N/			N/A				
Field and 2010	shed -2016 No Species Captured-2016				016					NI/A			

Photo Comments

Upstream extent of survey, upstream of existing bridge.

Site Comments

Channel is dry at site, with well defined channel from 30 m upstream and downstream. Above 30 m, channel becomes intermittently defined. Channel below crossing site has some small steps and cascades that may limit fish access, but are not confirmed barriers. At high flows, they may be passable by fish. Channel is dry downstream for approx 100 m, before groundwater seep feeds channel and provides flow. Downstream wetted channel supports juvenile fish. Several small salmonids were observed, including one coho fry. Crossing site may be accessible to fish during high flows. No barriers between fish bearing wetted stream and crossing site, gradient is moderate. Crossing site is likely fish bearing.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD LWD	Small woody debris Large woody debris	AS CC	Atlantic salmon	DV L PK	Dolly varden Lamprey Pink salmon	Fish bearing S1 > 20 m	Non-fish bearing S5 > 3 m
	B UC	Boulder Undercut bank	CCT	Coastal cutthroat trout Chinook salmon	PL	Pacific Lamprey	S2 > 5 m - 20 m S3 1.5 m - 5 m	S6 < 3 m NVC No visible channel
	DP	Deep pools	CM	Chum salmon	RB SA	Rainbow trout Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV IV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Acc	ess Road		Site N	lumber	PTPL rd11-2921			Structure No.		
Watershed Code:		No	data				Stream Order	1				
Stream Name		Unr	named				Stream Class	S4				
Crew		IM,	HC, JS				UTM_Zone	09	UTI	M Northing	6009131	
Survey Date		7/3	/2016						UTI	M Easting	522453	
Time		10:	31:54				Site Length (m)	150				
Channel		Visi	ble chanr	nel			Features	Features None				
Mean Channel W	idth (n	n) 1.20		Mean \	Wetted Wi	idth (m)	0.82	Mean F	Residual P	ool Depth (m)	0.14	
Mean Gradient (%	%)	9		Domina	ate Substr	ate	Fines	Fines Sub-dominate Substrate Gravels				
In-stream Cover		Abun	dant	Domina	ant cover		OV	Sub-do	D, SWD, DP			
Water Quality	Tem	perature (Deg C)	11.3	рН	7.5	Conductivity (uS/o	cm)	22	Turbidity	C-Clear	
Riparian Vegetat	ion						Crown Closure			71-90%		
eft Bank Shape			Sloping				Right Bank Shape		Undercut			
eft Bank Texture.	9		Fines				Right Bank Textur	е		Fines		
eft Bank Riparia	n Vege	tation	Conifero	us			Right Bank Riparia	ın Vegeta	ation	Coniferous		
eft Bank Stage			Young Fo	rest			Right Bank Stage			Young Forest		
Habitat Commen	its	Fish Spe	cies	AO - All S	almonids							
Spawning		None - Clea	n spawning (gravel was al	osent, abunda	ant fines clo	gged any coarse materials.	Gravel was	scarce.			
Rearing							ditions. Isolated pools were ded in pools. During high wa					
Overwintering		None - Deep	pools abse	nt, potential	low winter fl	ows.						
Migration	Poor - No barriers identified within 200 m of site. Migrat						limited by low depths curr	ently. Acces	ss likely poss	ible during high flo	w periods.	
Fish Information		Historical	Fish Pres	ence	No data							
Fished -2015		Not visite	d	Species C	aptured-2	015	5 N/A Species Stage-2015 N/A				N/A	

Photo Comments

Fished -2016

Downstream extent of sites.

Site Comments

Site consists of a small, visible channel, downstream of a clearcut and mulched road right of way. Disturbance has eliminated the channel at the crossing site, but it is visible downstream. Upstream was low gradient small channel, dominated by fines and organic debris. Water is currently low, with minimal potential fish habitat. During high water, rearing and migration may be possible for salmonids. This stream appears to be a tributary of the known fish-bearing creek located to the south east, crossed by the bridge to the south. No barriers to fish passage were identified downstream, so fish access to site is possible during high water. Electrofishing survey done downstream from crossing location, no fish caught or observed. Potentially fish-bearing seasonally.

Species Captured-2016



Notes:	Cove	r	Fish	Species	D1./	B. II I	Stı	eam Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fis	n bearing	Non-fish	bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3	3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD No	n-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and	wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing e	except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road	d	Site N	umber	RD109/ Bridge Site	44		Structure	No.	
Watershed Code:	400-174068	3-42917			Stream Order	3				
Stream Name	Unnamed				Stream Class	S3				
Crew	HC,NN				UTM_Zone	09	UT	M Northing	5	6031006
Survey Date	6/27/2016						UT	M Easting		522663
Time	17:09:11				Site Length (m)	100				
Channel	Visible char	nnel			Features	Features BR - Bridge				
Mean Channel Width (r	m) 2.33	Mean W	etted Wi	dth (m)	0.73	Mean	Residual F	ool Depth	(m)	0.08
Mean Gradient (%)	4 Dominate Substrate				Gravels	Sub-d	ominate Si	les		
In-stream Cover	er Abundant Dominant cover				OV	Sub-d	ominant co	over	LWD,	SWD
Water Quality Ten	mperature (Deg C) 13.4 pH 7.4				Conductivity (uS/o	cm)	224	Turbio	dity	C-Clear
Riparian Vegetation			•		Crown Closure			71-90%		
Left Bank Shape	Underc	ut			Right Bank Shape			Sloping		
Left Bank Texture	Fines				Right Bank Textur	е		Fines		
Left Bank Riparian Vege	etation Mixedv	vood			Right Bank Riparia	n Veget	ation	Mixedwoo	od	
Left Bank Stage	Young I	orest			Right Bank Stage			Young For	est	
Habitat Comments	Fish Species	AO - All Sal	lmonids							
Spawning	Moderate - Gravels pr	esent but not ab	oundant.							
Rearing	Poor - Little water pre	sent in isolated s	shallow poo	ls.						
Ü										
Overwintering	None - Will likely dry o	or freeze to botto	om.							
Migration	Poor - Poor connectivi	ty.								
Fish Information	Historical Fish Pre	esence	No data							
Fished -2015	ished -2015 Not visited Species Captured-2015				N/A Species Stage-2015 N/A					N/A
)15	N/A		Species	Stage-201	5 I	N/A

NFC

Species Captured-2016

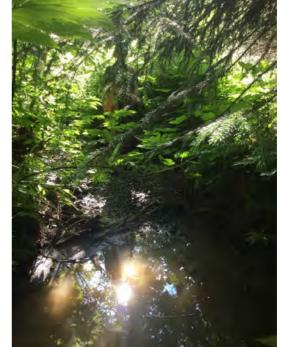
Photo Comments

Fished -2016

Downstream extent of survey.

Site Comments

Intermittent wetted areas, coarse gravels and cobbles, with fines. Diverse cover. Poor connectivity. Downstream of bridge perched culvert approx 200 m, 1 m drop on 1200 mm diameter at railway. No fish captured during sampling. Potential for fish presence in higher flows if barrier were removed.



Notes:	Cove	r	Fish	Species	DV	Dollyworden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	There are in a set of the basely		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road	b	Site N	lumber	RD110 / Rd21R_3	369		Structu	re No.		
Watershed Code:		400-174068	3-42917			Stream Order	N/A					
Stream Name		Unnamed				Stream Class	NVC					
Crew		DF, NN, IC, I	HC			UTM_Zone	09	U	TM Northi	ng	6030613	
Survey Date		6/27/2016						U	TM Easting		522395	
Time		15:52:56				Site Length (m)	100					
Channel		No Visible C	Channel			Features	None)				
Mean Channel Widt	:h (m)	N/A	Mean We	etted W	idth (m)	N/A	N/A					
Mean Gradient (%)		N/A	Dominate	ate	N/A	N/A Sub-dominate Substrate N/A						
In-stream Cover		N/A Dominant cover				N/A	Sub-c	dominant	cover	N/A		
Water Quality	Tempera	perature (Deg C) N/A pH N/A				Conductivity (uS/	'cm)	N/A Turbidity N/A				
Riparian Vegetation	า					Crown Closure			N/A			
Left Bank Shape		N/A				Right Bank Shape			N/A			
Left Bank Texture		N/A				Right Bank Textu		N/A				
Left Bank Riparian V	/egetatio	n N/A				Right Bank Ripari	an Vege	tation	N/A			
Left Bank Stage		N/A				Right Bank Stage			N/A			
Habitat Comments	Fisl	h Species	N/A									
Spawning	N/A											
Rearing	N/A											
Overwintering	N/A											
Migration	N/A											
Fish Information	Hist	torical Fish Pre	esence	lo data								
Fished -2015	Not visited Species Captured-2015					5 N/A Species Stage-2015 N/A			N/A			
Fished -2016	No		Species Cap	016	N/A Species Stage-2016 N/A				N/A			

Photo Comments

Downstream extent of survey area.

No scour or alluvial deposition. Site is a dry depression with organics substrate. No defined banks. No fisheries potential.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throughing sticklohook		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Ac	cess Road		Site N	umber	RD111 / Bridge Site							
Watershed Code:	40	0-174068-4	5826			Stream Order	2						
Stream Name	Un	named				Stream Class	S3						
Crew	NN	I, IM				UTM_Zone	09	UTN	/ Northing	5	6030070		
Survey Date	5/9	9/2016						UTN	/I Easting		522730		
Time	17	:30:39				Site Length (m)	100						
Channel	Vis	ible channe	el			Features	BR - B	ridge					
Mean Channel Width (n) 1.93 Mean Wetted Width (m					1.00	Mean	Residual Po	ool Depth	(m)	0.14		
Mean Gradient (%)					ate	Fines	Sub-d	ominate Su	bstrate	Grave	els		
In-stream Cover	Mod	lerate	Dominan	t cover		OV	Sub-d	ominant co	ver	LWD,	SWD		
Water Quality Ter	mperature	(Deg C)	8.2	рН	8.5	Conductivity (uS/d	cm)	51	Turbio	dity	C-Clear		
Riparian Vegetation						Crown Closure			41-70%				
Left Bank Shape		Sloping				Right Bank Shape			Sloping				
Left Bank Texture		Fines				Right Bank Textur	е		Fines				
Left Bank Riparian Vege	etation	Mixedwo	od			Right Bank Riparia	an Vege	tation	Mixedwo	od			
Left Bank Stage		Mature Fo	orest			Right Bank Stage			Mature Fo	orest			
Habitat Comments	Fish Spe	ecies /	AO - All Salr	nonids									
Spawning		- Moderate spanabitat is locat		ut. Low wa	ter depths	could limit access for spawr	ners. Fines	upstream of b	ridge so maiı	nly dowi	nstream is where		
Rearing	Moderate -	- Some cover e	elements benef	ficial for re	aring trout	including overhanging vege	tation, sm	nall woody debi	ris and large	woody o	lebris.		
Overwintering	None - No	deep pools ob	served.										
Migration	igration Poor - Some migration is possible although water is shallo												
Fish Information Historical Fish Presence No data													
Fished -2015					015	N/A		Species	Stage-201	.5	N/A		
Fished -2016	Yes	9	Species Cap	tured-20	016	CCT		Species	Stage-201	.6	Parr		

Photo Comments

Upstream view of bridge, showing the defined channel.

Site Comments

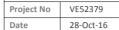
Diverse forest, species consisting of alder, hemlock, cedar, shrubs are Devils club, ferns. Overall channel comments: fairly diverse channel although shallow in places and lacking deep pools. Spawning habitat exists downstream of the bridge. Low flows at time of survey. Mature forest offers good shading and understory fills gaps in places.



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	Thrononino eticklohoek		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type		Access Road Site Number RD114 / Bridge Site							Structure No).
Watershed Code:		400-174068-	59390			Stream Order	1			
Stream Name		Unnamed				Stream Class	S5			
Crew		BH, IM				UTM_Zone	09	UTIV	1 Northing	6025902
Survey Date		6/26/2015						UTIV	1 Easting	521516
Time		14:24:31				Site Length (m) 100				
Channel		Visible Chann	nel			Features	Features C- Cascade, CV - C			Beaver dam
Mean Channel Wi	idth (m)	6.34	Mean We	etted Wi	dth (m)	2.65	Mear	n Residual Po	ool Depth (m)	0.11
Mean Gradient (%	6)	11	Dominate	e Substra	ite	Fines	Sub-c	dominate Sul	bstrate Gr	avels
In-stream Cover		Abundant	Dominan	t cover		IV	Sub-c	dominant co	ver SV	VD, OV
Water Quality	Tempe	rature (Deg C)	14.8	рН	7.6	Conductivity (uS/	cm)	59	Turbidity	L-Lightly turbid
Riparian Vegetati	ion					Crown Closure			21-40%	
Left Bank Shape		Sloping				Right Bank Shape	!		Sloping	
Left Bank Texture		Fines				Right Bank Textu	re		Fines	
Left Bank Riparian	n Vegetati	ion Mixedwo	ood			Right Bank Ripari	an Vege	tation	Mixedwood	
Left Bank Stage		Young Fo	rest			Right Bank Stage		,	Young Forest	
Habitat Comment	ts Fi	ish Species	AO - All Salr	monids						
Spawning	Pod	or - None immediatel	y above and be	low the roa	nd crossing	but gravels do exist downs	tream, aw	ay from the infl	uence of the cro	ssing.
Rearing	Pod	or - Low quality rearin	ng habitat upstr	ream and in	the immed	liate vicinity of the crossing	g due to lo	ow flow depths a	and low cover lev	els.
Overwintering	Poo	or - Limitied deep poo	ols consist of sta	agnant bea	ver pond ur	ostream and shallow pools	downstre	am.		
o con wintering				0						
Migration	Por	or - Bedrock cascades	with low flow	and high gr	adient Bar	rier cascade prevents unst	ream migr	ation		
iviigi atiUII	ligration Poor - Bedrock cascades with low flow and high gradient. E						cum migi	ucion.		
Fish Information							N/A			21/2
Fished -2015	No					N/A				N/A
Fished -2016	Ye	25	Species Cap	rured-20	JΤρ	CCT		Species S	stage-2016	Juvenile

Photo Comments

Looking upstream from bottom of site.

Site Comments

There are two bedrock chute/cascades immediately downstream of the road crossing. Gradient in the chute is high (>20%) and has two cascades each with a drop of approximately 2 m and is a barrier to upstream fish passage. Road crossing has be deactivated and one of the 2 culverts removed. Remaining culvert is high and dry and channel flows around it. Upstream of the road crossing, the habitat is very different. It is an old remnant pond created when the road was active. The culverts backed up the water and flooded the upstream channel. Now that the crossing is deactivated, the pond is gone and the habitat is dominated by fine sediments with vascular plants in a broad valley. Morphology downstream of TL10 is bedrock chute habitat for about 40 meters before flowing in a cobble gravel stream. Electrofishing and minnow trapping upstream habitat did not capture any fish. Electrofishing was conducted in the pool immediately below the barrier and a cutthroat trout was captured quickly. The stream is therefore rated as fish-bearing up to the barrier, but non-fish bearing at the crossing site and above.



Notes:	Cove	r	Fish	Species	B1./	B II	Str	eam Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish	n bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	\$4	< 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeve salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Access Road		Site N	lumber	RD115 / Site 13		Structure No.				
Watershed Code:	:	400-174068	-59390			Stream Order	3					
Stream Name		Unnamed				Stream Class	S2					
Crew		IM, NN				UTM_Zone	09	UTM	Northing	5	6022489	
Survey Date		5/14/2016						UTM	Easting		522145	
Time		10:29:27				Site Length (m)						
Channel		Visible chan	nel			Features	FSZ - Fishe	FSZ - Fisheries Sensitive Zone				
Mean Channel W	idth (m)	8.98	Mean	Wetted Wi	idth (m)	7.16	Mean Res	idual Poo	ol Depth	(m)	0.46	
Mean Gradient (%	%)	2	Domii	nate Substr	ate	Gravels	Sub-domii	nate Sub	strate	Cobb	les	
n-stream Cover		Abundant	Domii	nant cover		DP	Sub-domii	nant cov	er	LWD,	, OV, UC	
Water Quality	Tempe	erature (Deg C)	6.7	рН	8.6	Conductivity (uS/c	m) 19		Turbi	dity	C-Clear	
Riparian Vegetat	ion					Crown Closure		2	1-40%			
eft Bank Shape		Undercu	ut			Right Bank Shape		S	loping			
eft Bank Texture.	9	Gravels				Right Bank Texture	9	F	ines			
eft Bank Riparia	n Vegetat	tion Mixedw	ood			Right Bank Riparia	n Vegetatio	n N	/lixedwo	od		
eft Bank Stage		Young F	orest			Right Bank Stage		Υ	oung Fo	rest		
Habitat Commen	its F	ish Species	AO - All	Salmonids								
Spawning		cellent - Wide variet out spawning.	y of gravel si	izes, bars with	cobbles, gra	evels abundant throughout s	tream. Downst	ream fishe	ries sensitiv	e zone	has pea gravels ideal for	
Rearing						kwater side channels. Fisher different age classes. Many ju						
Overwintering	Ex	ccellent - Deep pool h	abitat abun	dant. Observed	d 1+ age clas	ss coho meaning that overwi	ntering must b	e available	in the area			
Migration	Ex	κcellent - No barrier, ε	good for dep	oths, deep pool	ls for holdin	g during migrations.						
ish Information	Н	istorical Fish Pre	sence	n/a								
ished -2015	N	0	Species	cies Captured-2015 N/A Species Stage-2015 N/A				N/A				
Fished -2016	Y	es	Species	Captured-2	016	CO	S	pecies S	tage-201	.6	Fry	

Photo Comments

Upstream extent of the survey looking downstream back towards crossing location.

Site Comments

Channel is excellent fish habitat for all life stages and for all salmon and trout species. Abundant variety of habitat types: main cobble/gravel channel, side channels with pea gravels, tributary inlets, shallow riffles-run for spawning, deep pool for holding and rearing. Good large woody debris abundance to scour deep pools. Only signs of disturbance are channel constriction at bridge abutment and elevated mid-channel bars. There is a fisheries sensitive zone present approx 70 m downstream of bridge: stream runs against bedrock and turns 90 degrees to south. At this point, channel is braided and is joined by a tributary from the north. Abundant pools with pea gravels are present here with excellent spawning for trout and rearing for all juvenile species. No electrofishing was conducted done to avoid damaging potential redds. Dip netting in pools confirmed coho presence.



Notes:	Cover	•	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	There are the area to be a let a		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road		Site Nu	ımber	RD117		Structure	No.	46		
Watershed Code:		400-174068	-59390			Stream Order	2					
Stream Name		Unnamed				Stream Class	S3					
Crew		BH, IM				UTM_Zone	09	UTI	M Northing	5	6021931	
Survey Date		6/26/2015						UTI	M Easting		522974	
Time		10:50:16				Site Length (m)	100					
Channel		Visible Chan	nel			Features	None	None				
Mean Channel Wi	idth (m)	3.48	Mean W	etted Wid	lth (m)	2.75	Mean	Residual P	ool Depth	(m)	0.17	
Mean Gradient (%	6)	1	Dominat	te Substrat	te	Fines	Sub-do	ominate Su	ubstrate	Grav	els	
In-stream Cover		Abundant	Dominar	nt cover		OV	Sub-do	ominant co	over	SWD	, DP,UC	
Water Quality	Temper	ature (Deg C)	12.4	рН	7.5	Conductivity (uS/c	m)	21	Turbio	dity	C-Clear	
Riparian Vegetati	ion					Crown Closure			41-70%			
eft Bank Shape		Undercu	ıt			Right Bank Shape			Undercut			
eft Bank Texture		Fines				Right Bank Texture	е		Fines			
Left Bank Ripariar	n Vegetati	on Mixedw	ood			Right Bank Riparia	n Vegeta	ation	Mixedwoo	od		
	n Vegetati	on Mixedw Mature				Right Bank Riparia Right Bank Stage	n Veget	ation	Mixedwoo			
Left Bank Stage	1			monids		0 1	n Veget	ation				
Left Bank Stage Habitat Commen	ts Fi	Mature sh Species	Forest AO - All Sal		l availabilit	0 1			Mature Fo	prest	oat trout spawning.	
Left Bank Stage Habitat Commen Spawning	ts Fi	Mature sh Species	Forest AO - All Sal depths currentl	y limit gravel	l availabilit	Right Bank Stage			Mature Fo	prest	oat trout spawning.	
Left Bank Stage Habitat Commen Spawning Rearing	ts Fi	Mature sh Species derate - Low water	Forest AO - All Sal depths currentl r in pools but lo	y limit gravel w flow.		Right Bank Stage y, gravels would likely be su			Mature Fo	prest	oat trout spawning.	
Left Bank Stage Habitat Commen Spawning Rearing Overwintering	ts Fi Mo Poc	Mature sh Species derate - Low water derate - Good cover	Forest AO - All Sal depths currentl r in pools but lo	y limit gravel w flow. ow dissolved		Right Bank Stage y, gravels would likely be su			Mature Fo	prest	oat trout spawning.	
Left Bank Stage Habitat Commen Spawning Rearing Overwintering Migration	ts Fi Mo Poc	Mature sh Species derate - Low water derate - Good cover	Forest AO - All Sal depths currentl r in pools but lo v pools. Likely l	y limit gravel w flow. ow dissolved		Right Bank Stage y, gravels would likely be su			Mature Fo	prest	roat trout spawning.	
Left Bank Ripariar Left Bank Stage Habitat Commen Spawning Rearing Overwintering Migration Fish Information Fished -2015	ts Fi Mo Poc	Mature sh Species derate - Low water derate - Good cover or - Shallow low flow or - Poor for adult fis	Forest AO - All Sal depths currentl r in pools but lo v pools. Likely l	y limit gravel w flow. ow dissolved ow.	oxygen in	Right Bank Stage y, gravels would likely be su		at high flow.	Mature Fo	or cutth	roat trout spawning.	

Photo Comments

Upstream from road crossing site looking upstream.

Site Comments

Channel meanders significantly more than is marked on the FWA 20k map. Red algae present throughout site, coating channel substrates.



Notes:	Cove	r	Fish	Species	D1./	B. II I	Stı	eam Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fis	n bearing	Non-fish	bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3	3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3	
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m		visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD No	n-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and	wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing e	except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Acce	ess Road		Site N	lumber				Structure	e No.	
Watershed Code:		400-	-174068-	59390			Stream Order	1				
Stream Name		Unn	amed				Stream Class	S3				
Crew		DF, 1	NN				UTM_Zone	09 UTM Northi			5	6021787
Survey Date		7/2/	2016							/I Easting		522413
Time		11:1	.6:29				Site Length (m)	100				
Channel		Visib	ole chanr	nel			Features	None				
Mean Channel W	Channel Width (m) 2.09 Mean Wet						1.58	Mean	Residual P	ool Depth	(m)	0.18
Mean Gradient (%	6)	5		Domin	ate Substr	ate	Gravels	Sub-d	ominate Su	bstrate	Cob	bles
In-stream Cover		Abund	dant	Domin	ant cover		OV	Sub-d	ominant co	ver	LWD), SWD, B, DP,UC
Water Quality	Temp	perature ([Deg C)	11.0	рН	8.2	Conductivity (uS/o	cm)	42	Turbi	dity	C-Clear
Riparian Vegetati	ion				·		Crown Closure	ï		>90%		
Left Bank Shape			Sloping				Right Bank Shape			Undercut		
Left Bank Texture	!		Fines				Right Bank Textur	е		Fines		
Left Bank Ripariar	n Vegeta	ation	Mixedwo	ood			Right Bank Riparia	n Veget	Coniferou	IS		
Left Bank Stage			Mature F	orest			Right Bank Stage Mature Forest					
Habitat Commen	ts	Fish Spec	ies	AO - All S	almonids							
Spawning					trout spawn passed the c		annel size may limit salmor awn.	n spawning	g although juv	enile coho sa	lmon c	aptured upstream
Rearing	•	Good - High o	cover and s	ome deep re	esidual pools.							
Overwintering	rwintering Moderate - Some deep pools upstream of the culvert. Plu						pool from culvert would pr	ovide ove	rwintering hab	oitat for juver	niles.	
Migration	gration Good - Culvert at road crossing may create a partial barrie culvert.						at could stop migration. Bo	th juvenile	e coho and tro	ut captured ι	upstrea	m and downstream of
Eich Information	sh Information Historical Fish Presence n/a											
ish Information Historical Fish Presence n/a												

Photo Comments

Fished -2016

Approximately 40 m downstream of culvert. Small pool with large undercut left bank

Site Comments

Open canopy upstream of culvert causes thick understory growth of Devils club, salmon berry and huckleberry that completely covers channel. Further upstream the channel opens up and cover is primarily provided by large woody debris. Downstream of culvert, less overhanging vegetation however abundant undercut banks provide cover. Hanging culvert and plunge pool at crossing.



Fry, Parr

Notes:	Cove	•	Fish	Species	DV	Dellasseden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site N	umber	RD119			Structure No.	67
Watershed Code:	910-665062	-30171			Stream Order	N/A			
Stream Name	Unnamed				Stream Class	NVC			
Crew	BH, IM				UTM_Zone	09	UTN	1 Northing	6015677
Survey Date							UTN	1 Easting	523593
Time	13:39:26				Site Length (m)	100			
Channel	No Visible C	hannel			Features	None			
Mean Channel Width	(m) N/A	Mean W	etted Wi	dth (m)	N/A	Mean R	tesidual Po	ool Depth (m)	N/A
Mean Gradient (%)	N/A	Dominat	te Substra	ate	N/A	Sub-dor	minate Su	bstrate N/A	4
In-stream Cover					N/A	Sub-dor	minant co	ver N/A	4
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/o	cm)	N/A	Turbidity	N/A
Riparian Vegetation		·	·		Crown Closure	·		N/A	
Left Bank Shape	N/A				Right Bank Shape			N/A	
Left Bank Texture	N/A				Right Bank Textur	е		N/A	
Left Bank Riparian Veg	getation N/A				Right Bank Riparia	ın Vegeta	tion	N/A	
Left Bank Stage	N/A				Right Bank Stage			N/A	
Habitat Comments	Fish Species	N/A							
Spawning	N/A								
Rearing	N/A								
Overwintering	N/A								
Migration	N/A								
Fish Information	Historical Fish Pre	sence	No data						
Fished -2015	No	Species Cap	ptured-20	015	N/A		Species :	Stage-2015	N/A
Fished -2016	No	Species Car	ptured-20	016	N/A		Species :	Stage-2016	N/A

Photo Comments

Thick vegetation, no watercourse.

Site Comments

No channel present. No culvert present.



Notes:	Cover		Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Roa	ıd	Site N	lumber	RD122			Structure No	0.			
Watershed Code:		910-66506	2-30171			Stream Order	N/A						
Stream Name		Unnamed				Stream Class	NVC						
Crew		NN, DF				UTM_Zone	09	UT	M Northing	6014909			
Survey Date		7/5/2016						UT	UTM Easting 523857				
Time		11:00:57				Site Length (m)	100						
Channel		No Visible	Channel			Features	None	9					
Mean Channel Wi	dth (m)	N/A	Mean V	Vetted W	idth (m)	N/A	Mea	n Residual F	ool Depth (m) N/A			
Mean Gradient (%	ó)	N/A	Domina	te Substr	ate	N/A	Sub-	dominate Si	ubstrate N,	/A			
In-stream Cover		N/A	Domina	nt cover		N/A	Sub-	dominant co	over N,	/A			
Water Quality	Tempe	erature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	/ N/A			
Riparian Vegetati	on					Crown Closure			N/A				
Left Bank Shape		N/A				Right Bank Shape			N/A				
Left Bank Texture		N/A				Right Bank Textur	re		N/A				
Left Bank Riparian	Vegeta	tion N/A				Right Bank Ripari	an Vege	etation	N/A				
Left Bank Stage		N/A				Right Bank Stage			N/A				
Habitat Comment	ts F	Fish Species	N/A										
Spawning	N,	/A											
Rearing	N	/A											
Overwintering	N,	/A											
Migration	N	/A											
Fish Information	Н	listorical Fish Pr	esence	No data									
Fished -2015	N	lot visited	Species Ca	ptured-2	015	N/A		Species	Stage-2015	N/A			
Fished -2016	N	lo	Species Ca	ptured-2	016	N/A		Species	Stage-2016	N/A			

Photo Comments

Upstream view of NVC.

No scour or channel. Dry depression. Some alder shrubs. Looks to be an old trail.



Notes:	Cove	r	Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	ı	Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	13.7	to skin a series and a series at a series	000	Climana				haaring aveant where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access	Road		Site N	umber	RD124			Structur	e No.	
Watershed Code:	910-665	062-2	0282			Stream Order	1				
Stream Name	Unnam	ed				Stream Class	S5				
Crew	BH, IM					UTM_Zone	09	UT	M Northin	g	6013195
Survey Date	6/25/20	15						UT	M Easting		522872
Time	09:14:2	1				Site Length (m)	100				
Channel	Visible (Channe	el			Features	BG - (Crossing, ge	eneral		
Mean Channel Width	(m) No data		Mean We	tted Wi	dth (m)	No data	Mear	n Residual F	ool Depth	n (m)	No data
Mean Gradient (%)	No data		Dominate	Substr	ate	Fines	Sub-c	dominate Si	ubstrate	Fine	S
In-stream Cover	Abundan	t	Dominant	cover		DP	Sub-c	dominant co	over	IV	
Water Quality T	emperature (Deg	C)	18.6	рН	7.0	Conductivity (uS/c	m)	22	Turb	idity	L-Lightly turbid
Riparian Vegetation						Crown Closure			0		
Left Bank Shape	Slop	oing				Right Bank Shape			Sloping		
Left Bank Texture	Fine	es				Right Bank Texture	е		Fines		
Left Bank Riparian Ve	egetation We	tland				Right Bank Riparia	ın Vege	tation	Wetland		
Left Bank Stage	Shr	ub/Hei	rb			Right Bank Stage			Shrub/He	erb	
Habitat Comments	Fish Species	A	AO - All Salm	nonids							
Spawning	None - Bog, no flo	ows, all p	oeat substrates								
Rearing	None - Bog, no fl	ows, all	peat substrate:	S							
Overwintering	None - Likely low	dissolve	ed oxygen, no fl	ows.							
Migration	None - Bog, no fl	ows, all	peat substrates	s, road is	likely barrie	, bog downstream is likely i	not fish h	abitat.			
Fish Information	Historical Fish	Prese	nce N	o data							
Fished -2015	No	S	pecies Capt	ured-2	015	N/A		Species	Stage-20:	15	N/A
Fished -2016	Yes	S	pecies Capt	ured-2	016	NFC		Species Stage-2016 N/A			N/A

Photo Comments

Downstream extent of survey looking at wet bog area.

Site Comments

Bog habitat, sphagnum moss throughout, deep peat. Approx 80 m wide bog. No fish habitat, no fish access, no fish captured. Lab tea, sphagnum moss, sundews, water lily, bog cranberry, dwarfed cedars and hemlock, sedge patches.



Notes:	Cove	r	Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	11/	Instream vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road	l	Site N	lumber	RD133 / 1064 BR_	2926		Structure	No.	
Watershed Code:		910-665062	-20282			Stream Order	1				
Stream Name		Unnamed				Stream Class	S6				
Crew		HC, IM, JS				UTM_Zone	09	UT	M Northing		6009414
Survey Date		6/30/2016						UT	M Easting		522083
Time		16:37:40				Site Length (m)					
Channel		Visible chan	nel			Features	None				
Mean Channel Wi	dth (m)	0.98	Mean We	etted Wi	idth (m)	0.67	Mean	Residual F	ool Depth (m)	0.16
Mean Gradient (%	5)	4	Dominate	e Substra	ate	Fines	Sub-d	lominate Si	ubstrate	Grave	els
In-stream Cover		Abundant	Dominan	it cover		OV	Sub-d	lominant co	over	LWD,	SWD
Water Quality	Tempe	rature (Deg C)	13.1	рН	7.9	Conductivity (uS/	cm)	17	Turbid	ity	C-Clear
Riparian Vegetati	on					Crown Closure			71-90%		
Left Bank Shape		Sloping				Right Bank Shape			Undercut		
Left Bank Texture		Fines				Right Bank Textur	e e		Fines		
Left Bank Riparian	Vegetati	on Mixedw	rood			Right Bank Riparia	an Vege	tation	Mixedwoo	d	
Left Bank Stage		Mature	Forest			Right Bank Stage			Mature Fo	rest	
Habitat Comment	ts Fi	ish Species	AO - All Salı	monids							
Spawning	No	ne - Coarse substrat	es observed only	y observed	l on road ov	erflow channel and immed	iately belo	w road. Fines	dominant.		
Rearing	Poo	or - Some shallow ar	reas present with	n abundant	t cover prov	ided by overhanging veget	ation and	woody debris.			
Overwintering	No	ne - Lack of depth, v	vith exception of	f wetland h	nabitat upst	ream of road which would	only be ac	cessible to fish	n during extrem	ne high	water events.
Migration	Poo	or - At current flows	migration would	d be restric	cted to reari	ng fish species.					
Fish Information	Hi	storical Fish Pre	sence N	No data							
Fished -2015	No	ot visited	Species Cap	tured-2	015	N/A		Species	Stage-2015	5 1	N/A
Fished -2016	Ye	S	Species Cap	tured-2	016	NFC		Species	Stage-2016	5 I	N/A

Photo Comments

Downstream extent of survey.

Site Comments

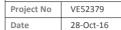
Impounded open water wetland habitat upstream of crossing location approx 10 m wide with depths greater than 1 m. Dry overflow channel present on road. Small amount of flow making path through road, potentially in buried culvert. Downstream of crossing areas of defined channel alternate with a braided non defined channel with minimal flow. Coarse substes are only associated with the road. No barriers to fish passage were observed up to 300m downstream and no obvious terrain barriers however at current flow levels migration would be limited to rearing fish. No fish captured or observed.



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throopping sticklohook		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type		Acc	ess Road		Site N	lumber	Rd135R-321			Structure	e No.	
Watershed Code:		No	data				Stream Order	1				
Stream Name		Unn	amed				Stream Class	S6				
Crew		HC,	IM, WM				UTM_Zone	09	UTM	Northin	5	5995713
Survey Date		7/5,	/2016						UTM	Easting		520864
Time		16:4	14:53				Site Length (m)	100				
Channel		Visil	ble chanr	nel			Features	FSB -				
Mean Channel W	idth (n	1.30		Mean We	etted Wi	dth (m)	1.00	Mear	n Residual Po	ol Depth	(m)	0.12
Mean Gradient (%	6)	2		Dominate	Substr	ate	Fines	Sub-	dominate Sul	strate	Fines	S
In-stream Cover		Mode	erate	Dominan	t cover		SWD, OV	Sub-c	dominant cov	ver	N/A	
Water Quality	Tem	perature (Deg C)	11.1	рН	6.7	Conductivity (uS/	cm)	37	Turbi	dity	C-Clear
Riparian Vegetat	ion						Crown Closure		-	71-90%		
Left Bank Shape			Sloping				Right Bank Shape	<u>.</u>	I	Jndercut		
Left Bank Texture	<u>.</u>		Fines				Right Bank Textu	re	- 1	ines		
Left Bank Riparian	n Vege	tation	Conifero	us			Right Bank Ripari	an Vege	etation	Coniferou	IS	
Left Bank Stage			Young Fo	orest			Right Bank Stage		,	oung Fo	rest	
Habitat Commen	ts	Fish Spec	cies	AO - All Salr	nonids							
Spawning		None - Only	organic sub	strates present	for 100 m	downsteam	and upsteam of crossing,	barrier pr	eventing access.			
Rearing		None - See s	pawning co	mments.								
Overwintering		None - See s	pawning co	mments.								
Migration		None - See s	ee spawning comments.									
Fish Information		Historical	Fish Pres	sence N	lo data							
Fished -2015		Not visite	d	Species Cap	tured-2	015	N/A S		Species S	stage-201	.5	N/A
Fished -2016		Yes		Species Cap	tured-2	016	NFC		Species S	tage-201	.6	N/A

Photo Comments

Facing downstream from the crossing site, showing a small section of defined channel.

Site Comments

Approximately 50 m upstream of road the channel loses definition and becomes a series of intermittent pools in a wetland area with ferns, sedges and hardhack. Culvert inlet is not where channel meets road, flow appears to currently be subsurface at road. Organics and fine sediment substrates with no coarse material observed for 100 m downstream of crossing. At 100 m downstream, an old road barrier is present, with only subsurface flow seeping through. Downstream of this barrier substrates are gravels cobbles and fines for 60 m then the drainage broadens into a wetland habitat with organic substrates and no defined channel. No access for fish through downstream barrier. No fish captured during electrofishing upstream or downstream of road barrier.



Notes:	Cove	•	Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	The second second second second		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	А	ccess Road		Site N	umber	RD138			Structure	e No.		
Watershed Code:	9	10-665062-	-20282			Stream Order	1					
Stream Name	L	nnamed				Stream Class	S6					
Crew	В	H, IM				UTM_Zone	09	UTIV	Northin	g	6008350	
Survey Date	6	/23/2015						UTIV	Easting		521477	
Time	1	6:24:35				Site Length (m)	100					
Channel	V	isible Chan	nel			Features	None					
Mean Channel Widt	h (m) No	data	Mean We	tted Wi	dth (m)	No data	Mean	Mean Residual Pool Depth (m) No d				
Mean Gradient (%)	25					No data	Sub-d	ominate Sul	ostrate	No d	lata	
In-stream Cover	No	data	Dominant	cover		No data	Sub-d	ominant cov	cover No data			
Water Quality	Temperatur	e (Deg C)	No data	рН	No data	Conductivity (uS/o	cm)	No data	Turbi	dity	No data	
Riparian Vegetation	l					Crown Closure			No data			
Left Bank Shape		No data				Right Bank Shape			No data			
Left Bank Texture		No data				Right Bank Textur	e		No data			
Left Bank Riparian V	egetation	No data				Right Bank Riparia	an Vege	tation	No data			
Left Bank Stage		No data				Right Bank Stage						
Habitat Comments	Fish S	pecies	AO - All Salm	nonids								
Spawning	None - To	oo steep with t	oo little flow to s	support fis	sh.							
Rearing	None - To	oo steep with t	oo little flow to s	support fis	sh.							
Overwintering	None - To	oo steep with t	oo little flow to s	support fis	sh.							
Migration	None - To	None - Too steep with too little flow to support fish.										
Fish Information	Histori	cal Fish Pres	sence N	o data								
Fished -2015	No		Species Capt	ured-20	015	N/A	Species Stage-2015		L5	N/A		
Fished -2016	Not vis	ited	Species Capt	ured-20	016	N/A		Species S	Stage-201	16	N/A	

Photo Comments

Seep at foot path.

Stream is a groundwater seep flowing in a very poorly defined channel. Mostly it flows overland and pools in depressions. Abundant red algae in channel. Steep (25%) slope at site.



Notes:	Cove	•	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD	Small woody debris Large woody debris	AS CC	Atlantic salmon Sculpins	DV L PK	Dolly varden Lamprey Pink salmon	Fish bearing S1 > 20 m	Non-fish bearing S5 > 3 m
	B UC DP	Boulder Undercut bank Deep pools	CCT CH CM	Coastal cutthroat trout Chinook salmon Chum salmon	PL RB SA	Pacific Lamprey Rainbow trout Salmon	S2 > 5 m - 20 m S3 1.5 m - 5 m S4 < 1.5 m	S6 < 3 m NVC No visible channel NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type	Access Road	d	Site N	umber	RD140			Structure I	No.	
Watershed Code:	No data				Stream Order	1				
Stream Name	Unnamed				Stream Class	S5				
Crew	IM, HC, JS				UTM_Zone	09	ITU	M Northing	6005920	
Survey Date	6/30/2016						ITU	√ Easting	521104	
Time	12:28:37				Site Length (m)	300				
Channel	Other				Features	None				
Mean Channel Width	(m) No data	Mean We	tted Wi	dth (m)	No data	Mean	Residual P	ool Depth (r	m) No d	ata
Mean Gradient (%)	30	Dominate	Substra	ate	No data	Sub-d	ominate Su	ıbstrate I	No data	
In-stream Cover	No data	Dominant	t cover		No data	Sub-d	ominant co	over I	No data	
Water Quality Te	emperature (Deg C)	No data	рН	No data	Conductivity (uS/d	cm)	No data	Turbidi	ty C-Clear	
Riparian Vegetation					Crown Closure			No data		
Left Bank Shape	No data	9			Right Bank Shape			No data		
Left Bank Texture	No data	9			Right Bank Textur	е		No data		
Left Bank Riparian Ve	getation No data	9			Right Bank Riparia	n Vege	tation	No data		
Left Bank Stage	No data	3			Right Bank Stage			No data		
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
Overwintering	N/A									
Migration	N/A									
Fish Information	Historical Fish Pre	esence N	lo data							
Fished -2015	Not visited	Species Cap	tured-20	015	N/A		Species	Stage-2015	N/A	
Fished -2016	No	Species Cap	tured-20	016	N/A		Species	Stage-2016	N/A	

Photo Comments

Barrier falls and steep cascade section.

Site Comments

Assessment done at barrier site downstream of crossing site, so no channel dimensions for the actual crossing site are available. Barrier site is long (60 m) cascade pool section, with several small falls. Channel is narrow boulder bedrock chute, with an average 30% gradient. Short ~5 m sections with gradient of >50%. Falls at upstream end is 0.9 m tall, with a 0.1 m plunge pool. Not passable by juveniles or adults at any conditions. No plunge pool for adults to jump barrier falls. Juveniles not able to jump this height. Cascades section downstream is also too steep and shallow for passage. No fish potential at crossing site.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throoping stickloback		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type		Access Road		Site N	lumber	er Rd145R_2900				e No.			
Watershed Code:		No data				Stream Order	2						
Stream Name		Unnamed				Stream Class	S4						
Crew		IM, HC, WM				UTM_Zone	09	UT	M Northing	5	5995502		
Survey Date		7/5/2016						UT	M Easting		520149		
Time		11:12:50				Site Length (m)	100	100					
Channel		Visible chann	el			Features	None	None					
Mean Channel Wi	dth (m)	1.09	Mean We	etted Wi	idth (m)	0.79	Mean Residual Pool Depth (m) 0.14						
Mean Gradient (%	5)	3	Dominate	e Substr	ate	Fines	Sub-c	dominate S	ubstrate	Grav	els		
In-stream Cover		Abundant	Dominan	t cover		OV	lominant c	over	SWD	,IV			
Water Quality	Tempe	rature (Deg C)	11.1	рН	8.1	Conductivity (uS/	cm)	163	Turbio	dity	C-Clear		
Riparian Vegetati	on					Crown Closure			21-40%				
Left Bank Shape		Sloping				Right Bank Shape		Sloping					
Left Bank Texture		Fines				Right Bank Textu	re		Fines				
Left Bank Riparian	Vegetat	ion Mixedwo	od			Right Bank Ripari	an Vege	tation	Mixedwoo	od			
Left Bank Stage		Young Fo	rest			Right Bank Stage			Young For	rest			
Habitat Comment	ts F	ish Species	AO - All Salr	monids									
Spawning	Po	oor - Small patches of	pea-sized grave	l present,	but limited l	by abundant fines through	out.						
Rearing	M	oderate - Good cover	availability, son	ne pool ha	bitat availal	ole for cover.							
Overwintering	Po	oor - No deep pools, po	ossibly low wate	er and diss	solved oxyge	en during winter.							
Migration	M	oderate - No barriers	observed, but w	vetland ha	bitat presen	nt downstream that may lin	nit salmon	id access.					
Fish Information	Hi	istorical Fish Pres	ence N	lo data									
Fished -2015	N	ot visited	015	N/A	Species Stage-2015 N/A		N/A						
Fished -2016	Ye	es	Species Cap	tured-2	016	PL	Species Stage-2016 Juvenile			Juvenile			

Photo Comments

Channel 20 m upstream of crossing site.

Site Comments

Stream at crossing site consists of a defined channel, tortuously meandering through a broad valley bottom. Channel is dominated by fines, with some small patches of gravels or cobbles. Channel banks and valley bottom is dominated by shrubs: ferns, salmon berry, Devils club. Channel is joined by a tributary approx 25 m upstream. Flow rate and volume is approximately doubled by the tributary. Crossing site appears to be a wood culvert that is passing water, but with no visible passage under the road. Habitat is generally moderate for salmonid rearing and migration, and poor to nil for spawning and overwintering. Lamprey ammocoete captured 30 m downstream of crossing. Fish access to site demonstrated by lamprey presence.



Notes:	Cover			Species	B1./	B. II I	Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fis	h bearing	Non-fish bearing		
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m		
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3 m		
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel		
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish		
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.		

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Acc	ess Road		Site N	lumber	r RD145R-2896 / Site 49 Structure No.						
Watershed Code	:	No	data		*		Stream Order	3					
Stream Name		Unr	named				Stream Class	S4					
Crew		IM,	HC, WM				UTM_Zone	09	ITU	M Northin	g	5995531	
Survey Date		7/5	/2016						UTM Easting 520175				
Time		12:5	6:27				Site Length (m)	Site Length (m) 100					
Channel		Visi	ble chanr	nel			Features	Non	е				
Mean Channel W	annel Width (m) 1.47 Mean Wet						1.06	Mea	n Residual P	ool Depth	(m)	0.19	
Mean Gradient (9	an Gradient (%) 4 Dominate						Fines	Sub-	Sub-dominate Substrate Gravels				
In-stream Cover	eam Cover Moderate Dominant of						OV	Sub-	dominant co	over	LWD), SWD	
Water Quality	Tem	Temperature (Deg C) 12.2				7.8	Conductivity (uS/cm) 64			Turbi	dity	C-Clear	
Riparian Vegetat	tion					•	Crown Closure		71-90%				
Left Bank Shape			Sloping				Right Bank Shape)		Sloping			
Left Bank Texture	е		Fines				Right Bank Textu	re		Fines			
Left Bank Riparia	n Veget	ation	Conifero	us			Right Bank Ripari	an Veg	etation	Deciduou	IS		
Left Bank Stage			Young Fo	rest			Right Bank Stage			Pole/Sapl	ling		
Habitat Commer	nts	Fish Spe	cies	AO - All Sa	almonids								
Spawning		Poor - Small	sections of	small pea gra	vels downst	ream of roa	d.						
Rearing		Moderate -	Cover provid	ded by woody	/ debris and	overhanging	g vegetation.						
Overwintering		Poor - Lack (of deep poo	l habitat, and	low flows di	uring survey	<i>'</i> .						
Migration	Moderate - No barriers observed downstream of road. Ro						itself is likely a barrier to m	nigrating t	fish further upst	ream.			
Fish Information	ı	Historical	Fish Pres	ence	No data								
Fished -2015		Not visite	d	Species Ca	aptured-2	015	N/A Species Stage-2015			15	N/A		
Fished -2016		Yes		Species Ca	aptured-2	016	DV	Species Stage-2016 Frv				Frv	

Photo Comments

Taken about 30 m upstream of culvert.

Site Comments

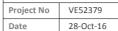
Immediately upstream of road, habitat is impounded by blocked or collapsed culvert and water appears to be draining through road material. Organic substrates and fines are dominant with some small sections of pea gravels downstream of road crossing. Approx. 30 m downstream of crossing, defined channel is broken into several channels and spreads laterally in widened valley. Dolly Varden captured downstream of road during electrofishing effort. Road appears to be a barrier as flow through is subsurface, however no electrofishing was completed upstream due to poor substrates and channel conditions.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD LWD	Small woody debris Large woody debris	AS CC	Atlantic salmon Sculpins	DV L PK	Dolly varden Lamprey Pink salmon	Fish bearing S1 > 20 m	Non-fish bearing S5 > 3 m
	B UC DP	Boulder Undercut bank Deep pools	CCT CH CM	Coastal cutthroat trout Chinook salmon Chum salmon	PL RB SA	Pacific Lamprey Rainbow trout Salmon	S2 > 5 m - 20 m S3 1.5 m - 5 m S4 < 1.5 m	S6 < 3 m NVC No visible channel NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





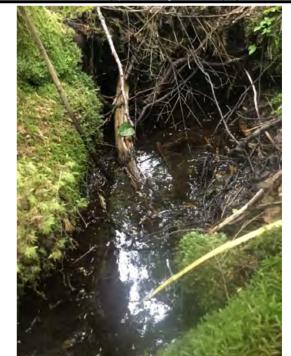
Crossing Type		Acces	s Road		Site N	lumber	er Rd147_348 Structure						
Watershed Code:		No da	ta				Stream Order	1					
Stream Name		Unnar	med				Stream Class	S4					
Crew		DF, NI	N				UTM_Zone	09	UTN	√ Northin	g	5993697	
Survey Date		7/7/2	016						UTM Easting 519580				
Time		11:01	:39				Site Length (m)	100	100				
Channel		Visible	e channe	el			Features	None	None				
Mean Channel Wid	dth (m)	1.29		Mean We	tted Wi	dth (m)	1.02	Mear	Mean Residual Pool Depth (m) 0.09				
Mean Gradient (%)					ate	Fines	Sub-c	dominate Su	S			
In-stream Cover		Abundant Dominant cove					OV	Sub-c	dominant co	over	SWD	,IV, UC	
Water Quality	Temp	erature (De	eg C)	11.6	рН	8.2	Conductivity (uS/	cm)	295	Turbidity C-Clear			
Riparian Vegetation	on						Crown Closure			41-70%			
Left Bank Shape		SI	oping				Right Bank Shape			Undercut			
Left Bank Texture		Fi	nes				Right Bank Textur	re	Fines				
Left Bank Riparian	Vegeta	ation M	lixedwo	od			Right Bank Riparia	an Vege	tation	Mixedwo	od		
Left Bank Stage		Yo	oung Foi	rest			Right Bank Stage	Right Bank Stage Young Forest					
Habitat Comment	S	Fish Specie	es A	AO - All Salm	onids								
Spawning	ľ	None - No grav	els and ve	ry small channe	el size.								
Rearing	F	Poor - Abundar	nt cover bu	ut limited pool l	nabitat. U	pstream sec	ction of study area is non-c	lassified d	rainage limitin	g habitat to s	ite cros	sing and downstream.	
Overwintering	F	Poor - Limited	pool habit	at. Fish passage	may be i	mpeded at	times of the year due to lov	w flows.					
Migration				e subterranean g low flow seas		vever overla	and flow likely during other	the wet s	eason. Drop of	0.5m within	the sur	vey area may create a	
Fish Information	ŀ	Historical Fi	sh Prese	ence N	o data								
Fished -2015	1	Not visited	9	Species Capt	ured-20	015	N/A	Species Stage-2015 N/A			N/A		
Fished -2016	١	/es	9	Species Capt	ured-20	016	NFC	Species Stage-2016 N/A			N/A		

Photo Comments

At the downstream extent of study area where channel is well defined.

Site Comments

From the centre line the watercourse flows in a defined channel downstream through wetland and coniferous vegetation. Creek is shallow and pool habitat is rare. Some sections of subsurface flow and drops (~0.5 m) may impede fish movements. Upstream of the centre line the watercourse becomes non-classified drainage. All measurements were taken in the channelized section. Bed materials are fine materials throughout study area. No coarse substrate. No fish captured. Creek changes to non-classified drainage only 5 m up of crossing, and poor channel conditions/some subsurface sections.



Notes:	Cover		Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Acc	ess Road		Site N	lumber	ber RD155 Structure No.							
Watershed Code:	910	-665062-2	0282	-		Stream Order	1						
Stream Name	Unr	named				Stream Class	S6						
Crew	IM,	HC, WM				UTM_Zone	09	UTN	1 Northing	5	5995839		
Survey Date	7/5	/2016					UTM Easting 520098						
Time	14:	37:56				Site Length (m)	ite Length (m) 100						
Channel	Visi	ble channe	el .			Features	ures None						
Mean Channel Width (n	n) 2.59		Mean We	tted Wi	dth (m)	2.11	Mean Residual Pool Depth (m) 0.15						
Mean Gradient (%)	15		Dominate	Substra	ate	Gravels	Sub-don	ninate Su	bstrate	Cobb	les		
In-stream Cover	Abun	dant	Dominant	cover		LWD	Sub-don	ninant co	ver	SWD	, OV		
Water Quality Tem	nperature (Deg C) No data pH No d					Conductivity (uS/c	m) N	lo data	Turbio	dity	C-Clear		
Riparian Vegetation		•		·		Crown Closure	ï		41-70%				
Left Bank Shape		Sloping				Right Bank Shape			Sloping				
Left Bank Texture		Gravels				Right Bank Texture	9		Gravels				
Left Bank Riparian Vege	tation	Coniferou	S			Right Bank Riparia	n Vegetat	ion	Coniferou	IS			
Left Bank Stage		Young For	est			Right Bank Stage			Young For	rest			
Habitat Comments	Fish Spe	cies A	O - All Salm	onids									
Spawning	None - No s	pawning, no f	ish access to sit	ie.									
Rearing	None - No p	otential for fis	sh access to site	e.									
0													
Overwintering	None - No p	otential for fis	sh access to site	е.									
Migration	None - No p	otential for fis	sh access to site	е.									
			ı.										
Fish Information	Historical	Fish Prese	nce N	o data									
Fished -2015	Not visite	ed S	pecies Capt	ured-20	015	N/A Species Stage-2015 N/A							

Photo Comments

Fished -2016

Upstream extent of survey.

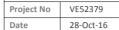
Site Comments

Stream is very nice, well defined channel. However, barrier to fish passage was identified downstream. Fishing done at crossing sites and immediately upstream of barrier, no fish captured. Fishing for 55 seconds below barrier captured 2 coastal cutthroat trout parr. No fish access above barrier site. Crossing sites upstream are non-fish bearing.



Notes:	Cove	r	Fish	Species	DV	Dellementer	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCR	Threesnine sticklehack		bearing except where noted.

Prepared for BC Hydro





Crossing Type		Access Roa	ıd	Site N	lumber	RD157			St	tructure	e No.		
Watershed Code:		910-66506	2-09749			Stream Order	1	L					
Stream Name		Unnamed				Stream Class	S	33					
Crew		IM, NN, LS				UTM_Zone	0)9	UTM N	lorthing	5	5995742	
Survey Date		6/20/2015							520618				
Time		15:16:05				Site Length (m)	Site Length (m) 100						
Channel		Visible Cha	nnel			Features	Ν	None					
Mean Channel W	idth (m)	1.68	Mean V	Vetted W	ted Width (m) 1.42			Mean Resi	dual Pool	Depth	(m)	0.25	
Mean Gradient (%	6)	2	Domina	te Substr	ate	Fines	S	Sub-dominate Substrate Gravels					
In-stream Cover		Abundant	Domina	nt cover	cover SWD			Sub-dominant cover LW				D,DP, IV, OV	
Water Quality	Temp	erature (Deg C)	13.1	рН	8.3	Conductivity (u) 17		Turbi	dity	C-Clear		
Riparian Vegetat	ion			·		Crown Closure	•	41	-70%				
Left Bank Shape		Slopin	g			Right Bank Sha		Slo	Sloping				
Left Bank Texture		Gravel	S			Right Bank Tex	ture		Gr	avels			
Left Bank Riparian	n Vegeta	ation Mixed	wood			Right Bank Ripa	arian \	Vegetatio	n Mi	ixedwo	od		
Left Bank Stage		Young	Forest			Right Bank Stag	ge		Yo	ung Fo	rest		
Habitat Commen	ts	Fish Species	AO - All Sa	lmonids									
Spawning	1	None - No gravel pat	ches of sufficient	size to sup	port spawni	ng.							
Rearing	1	Moderate - Moderat	e trout rearing, r	io salmon. L	ow flow dep	oths.							
Overwintering	ſ	Poor - Beaver dams p	rovide deep poo	ols, although	low flows a	re likely low in dissolve	d oxyge	n during win	ter.				
Migration	ı	Poor - Beaver dams I	kely make migra	tion difficul	t. Likely only	passable by small bodi	ed fish.						
Fish Information	ı	Historical Fish Pi	resence	No data									
Fished -2015	,	Yes	Species Ca	ptured-2	015	NFC	Species Stage-2015 N/A			N/A			
Fished -2016	1	Not visited	Species Ca	ptured-2	016	N/A		Species Stage-2016 N/A			N/A		

Photo Comments

Upstream of crossing.

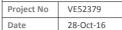
Site Comments

1 m diameter wooden open bottom culvert. 8 m culvert length. Moderate trout rearing, although none captured. Beaver dams throughout reach, possible barriers or barriers downstream. Poor migration, no spawning, poor overwintering due to low flows and low oxygen in beaver ponds.



Notes:	Cover	•	Fish	Species	DV	Dolly varden	Str	eam Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	L	Lamprey		n bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.

Prepared for BC Hydro





Crossing Type		Acce	ess Road		Site N	lumber	RD158		•	Structure	No.		
Watershed Code:			-665062-	09749			Stream Order	1				1	
Stream Name			amed				Stream Class	S2					
Crew			NN, LS				UTM Zone	09	UTI	M Northing		5995746	
Survey Date			0/2015							M Easting		520432	
Time			9:19				Site Length (m)	100					
Channel			ole Chani	nel			Features		Beaver dam				
Mean Channel W	an Channel Width (m) 6.21 Mean Wetted Width (idth (m)	5.68		n Residual P		m)	0.13	
Mean Gradient (%							Fines		dominate Su	- '	Grave	els	
In-stream Cover		Mode	rate	Dominan			SWD		dominant co		IV, O		
Water Quality	Tem	perature (I		8.9	pH 8.1 Conductivity (uS/cm)				177	Turbid		C-Clear	
Riparian Vegetati					<u> </u>	Crown Closure			1-20%		<u>'</u>		
Left Bank Shape			Sloping				Right Bank Shap	Right Bank Shape Sloping					
Left Bank Texture			Fines				Right Bank Textu	ire		Fines			
Left Bank Ripariar	n Vege	tation	Mixedwo	ood			Right Bank Ripar	ian Vege	etation	Mixedwoo	d		
Left Bank Stage		,	Young Fo	orest			Right Bank Stage	2		Young Fore	est		
Habitat Commen	ts	Fish Spec	ies	AO - All Salr	monids								
Spawning		Poor - Some	pea-sized g	gravels for rainb	ow trout.								
Rearing		Moderate - N	Moderate re	earing habitat fo	or small tro	out or salmo	n.						
1													
Overwintering		None - No de	eep pools a	vailable for trou	ıt overwin	tering.							
		None - No deep pools available for trout overwintering.											
Migration	Poor - Beaver dams downstream of crossing site limit migra					imit migrati	on potential.						
0					-								
Fish Information Historical Fish Presence No data													
Fished -2015		Yes		Species Cap	tured-2	015	RB	Species Stage-2015 Fry		Fry			
Fished -2016					N/A			Stage-2016	_	N/A			

Photo Comments

Downstream view of beaver pond.

Site Comments

Stream provides primarily rearing habitat for juvenile trout.



Notes:	Cove	r	Fish	Species	DV	Dollywarden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Acc	ess Road		Site N	lumber	RD159			S	tructure	e No.	
Watershed Code:		910	-665062-	-09749			Stream Order	2					
Stream Name		Unr	named				Stream Class	S	3				
Crew		IM,	NN				UTM_Zone	0	19	UTM N	Northing	5	5995720
Survey Date		6/2	1/2015							UTM E	asting		520969
Time		09:3	36:57				Site Length (m)	Site Length (m) 100					
Channel		Visi	ble Chan	nel			Features	N	lone				
Mean Channel W	Channel Width (m) 3.48 Mean Wetted					dth (m)	2.40	N	∕lean Res	idual Poo	l Depth	(m)	0.28
Mean Gradient (%	an Gradient (%) 1 Dominate				Substr	ate	Gravels	Sı	ub-domi	nate Subs	trate	Fine	S
In-stream Cover	eam Cover Moderate Dominant co				t cover		LWD	Sı	ub-domi	nant cove	r	SWE), OV, UC
Water Quality	lity Temperature (Deg C) 8.1 pH 8.				8.3	Conductivity (u	S/cm)	45	i	Turbio	dity	C-Clear	
Riparian Vegetat	ion						Crown Closure			41	L-70%		
Left Bank Shape			Undercu	it			Right Bank Sha	Right Bank Shape Undercut					
Left Bank Texture	<u>.</u>		Gravels				Right Bank Text	ure		Gı	ravels		
Left Bank Riparia	n Vege	tation	Mixedwo	ood			Right Bank Ripa	rian V	/egetatio	n M	ixedwo	od	
Left Bank Stage			Young Fo	orest			Right Bank Stag	e		Yo	ung For	rest	
Habitat Commen	ts	Fish Spe	cies	AO - All Saln	nonids								
Spawning		Excellent - A	bundant sp	awning for trout	t, possible	use by sma	ll salmon.						
Rearing		Excellent - A	bundant co	ver and habitat v	variety for	trout and s	almon fry and parr.						
Overwintering		Moderate - Deep pools present, but not abundant.											
Migration	Excellent - Water depths are sufficient for trout, larger saln					arger salmo	n may not be able to acc	ess due	e to flow de	pths in shall	ow section	ns.	
Fish Information Historical Fish Presence No data													
Fished -2015	ished -2015 Yes Species Captured-2015			015	RB	Species Stage-2015 Parr			Parr				
Fished -2016		Not visite	ed	Species Capt	tured-2	016	N/A		9	Species St	age-201	.6	N/A

Photo Comments

Pool located downstream from crossing site.

Site Comments

Excellent habitat for trout and small salmon, good habitat variety, diverse channel. Good undercut and large woody debris cover. Recommend clear span bridge crossing, not culvert. Good habitat directly under crossing site.



Notes:	Cove	r	Fish	Species	DV	Dollywarden	Stream	m Class		
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish be	earing	Non	-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 >	20 m	S5	> 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		5 m - 20 m	S6	< 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		5 m - 5 m		No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 <	1.5 m		Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon				and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCR	Threesnine sticklehack			bea	ring except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Roa	d	Site N	umber	RD161		·	Structure N	No.
Watershed Code:	910-66506	2-09749			Stream Order	1			
Stream Name	Unnamed				Stream Class	S3			
Crew	IM, NN				UTM_Zone	09	UTI	√ Northing	5994544
Survey Date	6/19/2015						UTI	√l Easting	519482
Time	12:28:07				Site Length (m)	100			
Channel	Visible Cha		Features	None	!				
Mean Channel Widt	h (m) 1.74	dth (m)	0.98	Mear	n Residual P	ool Depth (r	m) 0.14		
Mean Gradient (%)	17	Dominat	e Substra	ate	Gravels	Sub-c	dominate Su	ıbstrate (Cobbles
In-stream Cover	Abundant	Dominar	nt cover		OV Sub-dominant cover				LWD, SWD
Water Quality	Temperature (Deg C)	9.4	рН	8.1	Conductivity (uS/cm) 222			Turbidi	ty C-Clear
Riparian Vegetation	1				Crown Closure			21-40%	
Left Bank Shape	Sloping	3			Right Bank Shape			Sloping	
Left Bank Texture	Gravel	S			Right Bank Textur	e		Gravels	
Left Bank Riparian V	egetation Conife	rous			Right Bank Riparia	an Vege	tation	Coniferous	
Left Bank Stage	Matur	e Forest			Right Bank Stage			Mature For	est
Habitat Comments	Fish Species	AO - All Sal	monids						
Spawning	None - Very few riffle	-pool areas with	gravel for s	pawning.					
Rearing	Moderate - Trout rea	ring habitat, likely	y no salmor	access due	to small size and low flows	s. Good co	over and some	deep pools for	rearing.
Overwintering	Poor - Trout minimal	overwintering in	deep pools						
Migration	Poor - Trout migratio	n from only, no d	epth for sal	mon.					
Fish Information Historical Fish Presence No data									
Fished -2015	Yes	Species Cap	otured-20	015	RB	Species Stage-2015 Parr			Parr
Fished -2016	ished -2016 Not visited Species Captured-2016			016	N/A		Species	Stage-2016	N/A

Photo Comments

Downstream extent of the survey.

Site Comments

 $\label{eq:moderate} \mbox{Moderate quality habitat for young trout. Some pools offer good cover with}$ undercuts woody debris and overhanging vegetation. Some steps down to pools, poor migration potential at time of survey.



Notes:	Cover	-	Fish	Species	DV	Dolly vardon	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m S4 < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage
	OV OV	Deep pools Overhanging vegetation	CO	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	34 < 1.5 III	NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road Site Nun 910-665062-09749				umber	RD162			Structure	No.	
Watershed Code:	910	-665062-0	9749			Stream Order	1				
Stream Name	Unn	amed				Stream Class	S5				
Crew	IM,	NN				UTM_Zone	09	UTN	1 Northing		5993986
Survey Date	6/19	9/2015						UTN	1 Easting		519571
Time	14:3	30:35				Site Length (m)	100				
Channel	Visil	ble Channe	el			Features	Features None				
Mean Channel Width (m	nel Width (m) 3.46 Mean Wetted Width				dth (m)	2.94	Residual Po	ool Depth (m)	1.35	
Mean Gradient (%)	radient (%) 5 Dominate Substrat				ite	Cobbles	Sub-do	ominate Su	bstrate	Grave	els
In-stream Cover	n Cover Abundant Dominant cover					SWD	Sub-do	ominant co	ver	LWD,	OV
Water Quality Tem	emperature (Deg C) 10.0 pH 8.1				8.1	Conductivity (uS/c	m)	81	Turbid	ity	C-Clear
Riparian Vegetation		<u> </u>			•	Crown Closure			71-90%		•
Left Bank Shape		Sloping				Right Bank Shape		Sloping			
Left Bank Texture		Gravels				Right Bank Texture	9		Gravels		
Left Bank Riparian Veget	tation	Coniferou	S			Right Bank Riparia	n Vegeta	ation	Coniferous		
Left Bank Stage		Mature Fo	orest			Right Bank Stage			Mature Fo	rest	
Habitat Comments	Fish Spec	cies A	AO - All Saln	nonids							
Spawning	None - No sp	pawning, no f	ish access to si	ite.							
Rearing	None - No p	otential for fi	sh access to sit	te.							
0											
Overwintering	None - No p	otential for fi	sh access to sit	te.							
Migration	tion None - No potential for fish access to site.										
Fish Information	Fish Information Historical Fish Presence No data										
Fished -2015)15	NFC		Species	Stage-2015	1	N/A

Photo Comments

Fished -2016

No culvert observed.

Site Comments

Large pools on both sides of road with no fish present. No evidence of culvert. Suspect that old wooden culvert may have collapsed. Barrier found to fish passage downstream of site. Series of steep cascades and falls. Section is approx. 16 m long with large elevation drop, estimated to be 10 m. No fish passage possible up cascades. Juvenile coastal cutthroat trout captured downstream of cascades.

Species Captured-2016



Notes:	Cove	r	Fish	Species	B1./	B II	Str	eam Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish	n bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey		> 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	\$4	< 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeve salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road Site Nur					RD163			Structure	e No.		
Watershed Code:		910-66	55062-0	9749			Stream Order	1					
Stream Name		Unnan	ned				Stream Class	S3					
Crew		IM, NN	V				UTM_Zone	09	UTI	M Northin	g	5992999	
Survey Date		6/19/2	2015						UTI	M Easting		519559	
Time		16:53:	53				Site Length (m)	Site Length (m) 100					
Channel		Visible	Channe	el			Features	Features None					
Mean Channel Wid					idth (m)	1.21	1.21 Mean Residual Pool Depth (m						
Mean Gradient (%	Dominate Substrate				ate	Cobbles	Sub-	dominate Su	ubstrate	Grav	rels		
In-stream Cover		Modera	te	Dominant	cover		В	Sub-	dominant co	over	LWD	, SWD, OV, UC	
Water Quality	Temp	erature (De	g C)	10.5	рН	7.9	Conductivity (uS/	117	Turbi	dity	C-Clear		
Riparian Vegetation	on		·				Crown Closure			41-70%			
Left Bank Shape		Slo	oping				Right Bank Shape			Sloping			
Left Bank Texture		Gr	avels				Right Bank Textu	re		Gravels			
Left Bank Riparian	Vegeta	ation Mi	ixedwoo	od			Right Bank Ripari	an Vege	etation	Mixedwo	od		
Left Bank Stage		M	ature Fo	orest			Right Bank Stage			Mature F	orest		
Habitat Comment	:S	Fish Species	s A	AO - All Salm	nonids								
Spawning	1	None - No adeq	uate grav	el.									
Rearing	1	Moderate - Poo	ol rearing h	nabitat for juve	nile trout	is available	but does not have much d	epth or ar	ea. Good varie	ty of other co	over typ	es available.	
Overwintering	1	Poor - Possible (overwinte	ring for juvenil	e trout in	shallow poo	ols. Low flows and ice may	prevent o	verwintering ir	n most areas.			
Migration	1	Poor - Poor mig	ration for	trout, none for	r salmon,	step pools p	resent with low flow dept	h.					
Fish Information		Historical Fis	storical Fish Presence No data										
Fished -2015	,	Yes	S	pecies Capt	tured-2	015	RB		Species	Stage-201	L5	Parr	
Fished -2016		Not visited	S	pecies Capt	tured-2	016	N/A		Species	Stage-201	16	N/A	

Photo Comments

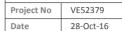
Looking upstream from the crossing site.

 $\label{lem:continuous} \mbox{Moderate rearing for small juvenile trout. Pools support trout with good cover.}$ Large bodied fish habitat is absent. Step pool morphology throughout with low flows.



Notes:	Cove	r	Fish	Species	DV/	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroom vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted

Prepared for BC Hydro





Crossing Type	Access Road		Site N	umber	RD164		·	Structure No			
Watershed Code:	910-665062-	09749			Stream Order	N/A					
Stream Name	Unnamed				Stream Class	NVC					
Crew	IM, NN, CW				UTM_Zone	09	UT	M Northing	5992733		
Survey Date	6/18/2015						UTM Easting 519438				
Time	12:42:39				Site Length (m)	100					
Channel	nel No Visible Channel				Features	None)				
Mean Channel Width	annel Width (m) N/A Mean Wetted Width				N/A	Meai	n Residual F	ool Depth (m)	N/A		
Mean Gradient (%)	N/A	Dominate	e Substr	ate	N/A	Sub-	ubstrate N/	A			
In-stream Cover	N/A	Dominan	t cover		N/A	Sub-	over N/.	A			
Water Quality Te	emperature (Deg C)	N/A	рН	N/A	,			N/A Turbidity N/A			
Riparian Vegetation					Crown Closure			N/A			
Left Bank Shape	N/A				Right Bank Shape			N/A			
Left Bank Texture	N/A				Right Bank Textur	е		N/A			
Left Bank Riparian Veg	getation N/A				Right Bank Riparia	an Vege	etation	N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
		+									
Fish Information	Historical Fish Pres		No data		T .				T .		
Fished -2015	No	Species Cap			N/A				N/A		
Fished -2016	6 Not visited Species Captured-2016			016	N/A		Species	Stage-2016	N/A		

Photo Comments

Upstream of site. Upstream of existing road (RD165).

No visible channel upstream of road. Small pool upstream of road, no flowing water. Mud and vegetation including skunk cabbage.



Notes:	Cover		Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road		Site N	lumber	RD165		St	tructure	e No.	
Watershed Code:		910-665062-	09749			Stream Order	N/A				
Stream Name		Unnamed				Stream Class	NVC				
Crew		IM, NN, CW				UTM_Zone	09	UTM N	lorthing	3	5992733
Survey Date		6/18/2015						UTM E	asting		519438
Time		12:42:39				Site Length (m)	100				
Channel		No Visible Ch	annel			Features	None				
Mean Channel Wid	dth (m)	N/A	Mean V	Vetted W	idth (m)	N/A	Mean F	Residual Pool	Depth	(m)	N/A
Mean Gradient (%)	N/A	Domina	ate Substr	ate	N/A	Sub-do	minate Subs	trate	N/A	
In-stream Cover		N/A	Domina	ant cover		N/A	Sub-do	minant cove	r	N/A	
Water Quality	Temper	ature (Deg C)	N/A	рН	N/A	Conductivity (uS/d	cm)	N/A	Turbi	dity	N/A
Riparian Vegetation	on			*	·	Crown Closure		N/	'A		
Left Bank Shape		N/A				Right Bank Shape		N/	'A		
Left Bank Texture		N/A				Right Bank Textur	e	N/	'A		
Left Bank Riparian	Vegetation	on N/A				Right Bank Riparia	an Vegeta	ition N/	'A		
Left Bank Stage		N/A				Right Bank Stage		N/	'A		
Habitat Comment	s Fi	sh Species	N/A								
Spawning	N/A	A									
Rearing	N/A	A									
Overwintering	N/A	A									
Migration	N/A	A									
Fish Information	His	storical Fish Pres	ence	No data				1			

N/A

Photo Comments

Upstream of site.

Fished -2015

Fished -2016

Site Comments

No culvert at road, no possible fish passage across road. Evidence of old wooden log structure to allow drainage. Wood is rotten and collapsed, no surface drainage possible. Subsurface seepage carries water under road. Pooled water observed upstream of road. No channel observed downstream of road.

Species Captured-2015

Species Captured-2016

No

Not visited



Species Stage-2015

N/A

Notes:	Cove	r	Fish	Species	D1/	B. II I	Stı	ream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fis	h bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Acce	ess Road		Site N	lumber	RD167			St	tructure	e No.		
Watershed Code:		910-	-665062-0	09000			Stream Order	2						
Stream Name		Unn	amed				Stream Class	S	2					
Crew		IM,	NN, CW				UTM_Zone	09	9	UTM N	lorthing	5	5992542	
Survey Date		6/18	3/2015							UTM E	asting		519193	
Time		11:0	7:32				Site Length (m)	10	00					
Channel		Visib	ole Chann	iel			Features	N	lone					
Mean Channel W	idth (n	1) 8.67		Mean We	tted Wi	dth (m)	5.43	N	∕lean Resid	lual Pool	Depth	(m)	0.37	
Mean Gradient (%	6)	10		Dominate	Substra	ate	Cobbles	Sı	ub-domina	ate Subs	Substrate Boulders			
In-stream Cover		Mode	rate	Dominant	t cover		В	Sı	ub-domina	ant cove	r	OV		
Water Quality	Tem	perature (Deg C)	9.1	рН	7.9	Conductivity (uS/cm) 64			64 Turbidity C-Clear				
Riparian Vegetat	ion						Crown Closure		41	-70%				
Left Bank Shape			Sloping				Right Bank Shape Sloping							
Left Bank Texture	<u>.</u>		Boulder/	Block			Right Bank Texture Boulder/Block							
Left Bank Riparia	n Vege	tation	Mixedwo	od			Right Bank Riparian Vegetation Mixedwood					od		
Left Bank Stage			Mature F	orest			Right Bank Stag	e		Ma	ature F	e Forest		
Habitat Commen	ts	Fish Spec	ies	AO - All Saln	nonids									
Spawning		Poor - Patch	es of gravel	for trout, no ac	cess for sa	lmon.								
Rearing		Good - Good	cover, good	d habitat variety	y, cascade	upstream, l	arge falls downstream.							
Overwintering		Poor - Few d	eep pools.											
Migration		Poor - Casca	de likely pas	sable only at hi	gh flows.									
Fish Information		Historical	Fish Pres	ence N	lo data									
Fished -2015		Yes		Species Cap	tured-20	015	RB		Sp	ecies Sta	age-201	.5	Fry, Parr	
Fished -2016		Not visite	d	Species Cap	tured-20	016	N/A		Species Stage-2016 N/A					

Photo Comments

Downstream extent of the survey.

Site Comments

Large series of falls downstream of site, 3 falls, 4 to 6 m tall. No access for fish up falls. Braided channel at crossing site. Good rearing trout habitat. RB captured, likely resident population upstream of falls barriers. Cascade at upstream end of site acts as partial barrier for small fish. Adults may pass during high flows.



Notes:	Cove	r	Fish	Species	D1/	B. II I	Stı	ream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fis	h bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon		> 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout		1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Acc	ess Road		Site N	lumber	RD168 / Site 42			Structure	e No.			
Watershed Code:		910	-665062-	09000			Stream Order	1						
Stream Name		Unr	amed				Stream Class	S6						
Crew		NN,	IM				UTM_Zone	09	UTN	1 Northing	5	5992185		
Survey Date		5/1:	1/2016						UTN	1 Easting		519032		
Time		16:4	14:09				Site Length (m)	100						
Channel		Visil	ole chann	el			Features	C - Ca	scade or ch	ute				
Mean Channel W	idth (n	1) 2.03		Mean We	tted Wi	dth (m)	1.54	Mean	Residual Po	ool Depth	(m)	0.13		
Mean Gradient (%	6)	32		Dominate	Substr	ate	Cobbles Sub-dominate Sub-			bstrate	ders			
In-stream Cover		Mode	erate	Dominan	t cover		B Sub-dominant cov			ver), SWD, DP			
Water Quality	Tem	perature (Deg C)	8.8	рН	8.3	Conductivity (uS/cm) 123			Turbidity C-Clear				
Riparian Vegetat	ion						Crown Closure		21-40%					
Left Bank Shape			Undercu	t			Right Bank Shape Slopin							
Left Bank Texture	<u>.</u>		Cobbles				Right Bank Texture Cobbles							
Left Bank Riparia	n Vege	tation	Mixedwo	od			Right Bank Riparian Vegetation Mixedwo				od	od .		
Left Bank Stage			Mature F	orest			Right Bank Stage			Mature Fo	orest			
Habitat Commen	ts	Fish Spec	cies	AO - All Saln	nonids									
Spawning		None - No m	igration to	site is possible b	ecause of	steep gradi	ent. No spawning habitat is	s available						
Rearing		None - Grad	ient is too s	eep to support	rearing fis	shes.								
Overwintering		None - No a	ccess due to	gradient barrie	r and falls									
Migration		None - Too s	teep to allo	w fish access.										
Fish Information		Historical	Fish Pres	ence N	lo data									
Fished -2015		Not visite	d	Species Cap	tured-2	015	N/A		Species	Stage-201	.5	N/A		
Fished -2016		No		Species Cap	tured-2	016	N/A		Species	Stage-201	.6	N/A		

Photo Comments

Steep section downstream of surveyed reach 37% gradient.

Site Comments

Channel too steep to support fish habitat at crossing location. Crossing site was electrofished in 2016, no fish were captured. Stream was electrofished approximately 300 m downstream and captured juvenile rainbow trout.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	1\/	Instream vegetation	CCG	Slimy sculpin	TCD	There is a section of the ball of the section of th		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



												111100101	
Crossing Type		Access Road		Site N	lumber	F	RD170			Struc	ture No.		
Watershed Code:		No data				9	Stream Order	N/A					
Stream Name		Unnamed				,	Stream Class	NVC					
Crew		DF, NN				Į	JTM_Zone	09		UTM Nort	hing	5992080	
Survey Date		7/7/2016								UTM Easti	ng	520478	
Time		13:06:09				(Site Length (m)	100					
Channel		No Visible Cl	nannel				Features	None					
Mean Channel Wi	dth (m)	N/A	Mean W	etted W	idth (m)	N	I/A	Mear	Residu	al Pool De	oth (m)	N/A	
Mean Gradient (%	5)	N/A	Dominat	e Substr	ate	N	I/A	Sub-c	lominat	e Substrat	e N/A	١	
In-stream Cover		N/A	Dominar	nt cover		Ν	I/A	Sub-c	lominan	it cover	N/A	1	
Water Quality	Temper	rature (Deg C)	N/A	рН	N/A		Conductivity (uS/ci	m)	N/A	Τι	ırbidity	N/A	
Riparian Vegetati	on						Crown Closure		N/A				
Left Bank Shape		N/A					Right Bank Shape			N/A			
Left Bank Texture		N/A					Right Bank Texture	à		N/A			
Left Bank Riparian	Vegetati	on N/A					Right Bank Riparia	n Vege	tation	N/A			
Left Bank Stage		N/A					Right Bank Stage			N/A			
Habitat Comment	ts Fi	sh Species	N/A										
Spawning	N/A	A											
Rearing	N/A	A											
Overwintering	N/A	1											
over wintering													
Migration	N/A	A											
			Ţ										
Fish Information	His	storical Fish Pre	sence I	No data									
Fished -2015	No)	Species Cap	otured-2	015	1	N/A		Spec	cies Stage-	2015	N/A	
Fished -2016	No)	Species Cap	otured-2	016	1	N/A		Spec	cies Stage-	2016	N/A	

Photo Comments

Upslope of the road.

Site Comments

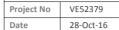
No channel, water, scour or fish habitat.



Notes:	Cove	r	Fish	Species	DV	Dollywarden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCD	Throoping stickloback		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type		Acc	ess Road		Site N	lumber	RD177			Structure	No.	
Watershed Code:		No	data				Stream Order	1				
Stream Name		Unr	named				Stream Class	S3				
Crew		IM,	NN				UTM_Zone	09	UTI	M Northing	59	990813
Survey Date		5/1	0/2016						UTI	M Easting	51	18874
Time		14:2	28:44				Site Length (m)	100				
Channel		Visi	ble chanr	nel			Features	None				
Mean Channel Wi	dth (m) 2.15		Mean \	Netted Wi	idth (m)	1.42	Mean	Residual P	ool Depth (i	m)	0.10
Mean Gradient (%	5)	13		Domina	ate Substr	ate					Cobbles	;
In-stream Cover		Abun	dant	Domina	ant cover						LWD, S\	WD,IV, OV
Water Quality	Tem	perature (Deg C)	4.9	рН	6.4	Conductivity (uS/d	cm)	17	Turbidi	ity	C-Clear
Riparian Vegetati	on						Crown Closure			41-70%		
eft Bank Shape			Sloping				Right Bank Shape			Sloping		
eft Bank Texture			Fines				Right Bank Textur	е		Fines		
Left Bank Riparian	Veget	ation	Conifero	us			Right Bank Riparia	n Veget	ation	Coniferous	;	
Left Bank Stage			Young Fo	orest			Right Bank Stage			Young Fore	est	
Habitat Comment	ts	Fish Spec	cies	AO - All S	almonids							
Spawning		None - No s	pawning gra	vel bars, larg	ge coarse sub	strates only	. Likely no access for spawn	ers.				
Rearing							ent during, possibly better i	n higher w	ater periods.	Abundant dive	rse cover,	but limited depth
		and no deep	pool habita	at. Cascades	also present t	to limit upst	ream travel by juveniles.					
2		Name Name										
Overwintering		none - none	е, по аеер р	oois, likely fr	eezes to bott	LOITI.						
Migration		None - Adul	t access limi	ted by flow o	depth. During	freshet, hig	ther depths may be present	but steep	gradient may	cause fast, imp	oassable f	lows.
					1							
Fish Information		Historical	Fish Pres	sence	No data							
Fished -2015		Not visite	d	Species C	aptured-2	015	N/A		Species	Stage-2015	N/.	A
							1					

Photo Comments

Fished -2016

Steep section downstream of surveyed reach (37% gradient).

Site Comments

Narrow small stream in steep rocky gully. Boulders, cobbles, present throughout, possibly indicating high flows that would remove fine particles. Upper reach is flatter and slower moving, gradient increases towards downstream end of reach. No barriers to passage observed in reach. Fish access is dependent on fish access to lake outlet stream upstream. Habitat generally moderate to poor for small juvenile salmonids. Large fish would have trouble accessing site due to limited water depth. Downstream of site there is a short section of channel with a gradient of 37%. This steep section may be a barrier to fish passage. Downstream fish access should be re-evaluated at a different time of year to confirm fishbearing status.

Species Captured-2016



Notes:	Cove	r	Fish	Species	DV	Dellementer	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV		Sockeye salmon		NCD and wetlands are non-fish			
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Acc	ess Road		Site N	umber	RD178				Structure	No.	
Watershed Code:	910	-665062-	04593			Stream Order		1				
Stream Name	Unr	named				Stream Class		NCD				
Crew	IM,	HC, WM				UTM_Zone		09	UTN	∕l Northing	5	5989823
Survey Date	7/7	/2016							UTN	∕l Easting		519049
Time	15:4	45:37				Site Length (n	n)	100				
Channel	Oth	er				Features		None				
Mean Channel Width (r	n) No da	ata	Mean We	tted Wi	dth (m)	No data		Mean	Residual P	ool Depth	(m)	No data
Mean Gradient (%)	No da	ata	Dominate	Substra	ate	No data		Sub-d	ominate Su	bstrate	No d	lata
In-stream Cover	N/A		Dominant	cover		-		Sub-d	ominant co	ver	-	
Water Quality Ten	nperature (Deg C)	No data	рН	No data	Conductivity	(uS/c	m)	No data	Turbio	dity	No data
Riparian Vegetation						Crown Closu	re			No data		
Left Bank Shape		No data				Right Bank Sl	hape			No data		
Left Bank Texture		No data				Right Bank Te	exture	9		No data		
Left Bank Riparian Vege	tation	No data				Right Bank Ri	iparia	n Veget	ation	No data		
Left Bank Stage		No data				Right Bank St	tage			No data		
Habitat Comments	Fish Spec	cies	N/A									
Spawning	N/A											
Rearing	N/A											
Overwintering	N/A											
Migration	N/A		1									
Fish Information	Historical	Fish Pres	ence N	o data								
Fished -2015	Not visite	d	Species Cap	tured-20	015	N/A			Species	Stage-201	.5	N/A
Fished -2016	No		Species Cap	tured-20	016	N/A			Species	Stage-201	.6	N/A

Photo Comments

Crossing site.

Crossing site is steep, dry gully, choked with fallen large woody debris. Large cobble and boulder substrates present. Drainage is steep, 38% grade at site. No fish habitat, no fish access, no fish present. Short channel segments <5m long observed through the woody debris. No measurements taken due to abundance of woody debris.



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCR	Threesnine sticklehack		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



									WITCCICI
Crossing Type	Access Ro	oad	Site N	lumber	Rd19R_193		9	Structure No.	
Watershed Code:	No data				Stream Order	1			
Stream Name	Unnamed	b			Stream Class	NVC			
Crew	DF, NN				UTM_Zone	09	UTM	Northing	6029675
Survey Date	7/6/2016	i					UTM	Easting	522768
Time	10:15:22				Site Length (m)	100			
Channel	Non-class	sified Drainage	е		Features	None			
Mean Channel Width (m) No data	Mean V	Wetted W	idth (m)	No data	Mean Res	idual Poc	ol Depth (m)	No data
Mean Gradient (%)	No data	Domina	ate Substr	ate	Fines	Sub-domii	nate Subs	strate Fine	es
In-stream Cover	N/A	Domina	ant cover		N/A	Sub-domii	nant cove	er N/A	1
Water Quality Ter	mperature (Deg C	No data	рН	No data	Conductivity (uS/c	cm) No	data	Turbidity	No data
Riparian Vegetation					Crown Closure		N	/A	
Left Bank Shape	Slopi	ng			Right Bank Shape		SI	oping	
Left Bank Texture	Fines	i			Right Bank Texture				
Left Bank Riparian Veg	etation Mixe	dwood			Right Bank Riparia	rian Vegetation Mixedwood			
Left Bank Stage	Youn	g Forest			Right Bank Stage		Y	oung Forest	
Habitat Comments	Fish Species	N/A							
Spawning	N/A								
Rearing	N/A								
Overwintering	N/A	N/A							
Migration	N/A								
Fish Information	h Information Historical Fish Presence No data								
Fished -2015	Not visited	Species C	aptured-2	015	N/A	Speci		age-2015	N/A
Fished -2016	No	Species C	aptured-2	016	N/A	Species Stage-2016 N/A			N/A

Photo Comments

From upstream of the culvert.

Site Comments

Small ditch on upstream side of road passes through 300 mm culvert to cross road. Downstream of culvert there is no channel, scour or alluvial deposits. No water, flow or fisheries potential at this location.



Notes:		r	Fish	Species	DV	Dellerenden	Stream Class				
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing			
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m			
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey Rainbow trout	S2 > 5 m - 20 m	S6 < 3 m			
	UC	Undercut bank	CH	Chinook salmon			S3 1.5 m - 5 m	NVC No visible channel			
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage			
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish			
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Throngoing sticklohook		bearing except where noted.			

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type	Access Road		Site N	lumber	Rd21R_3359			Structure	No.	
Watershed Code:	No data				Stream Order	1				
Stream Name	Unnamed				Stream Class	S3				
Crew	DF, IM, HC, N	IN			UTM_Zone	09	UT	M Northing	5	6030858
Survey Date	6/27/2016						UT	M Easting		522494
Time	16:17:25				Site Length (m)	100				
Channel	Dry Channel				Features	CV - C	Culvert			
Mean Channel Width	(m) 1.79	Mean We	tted Wi	idth (m)	0.00	Mean	Residual F	ool Depth	(m)	0.00
Mean Gradient (%)	3	Dominate	Substr	ate	Fines	Sub-d	ominate Si	ubstrate	Grave	els
In-stream Cover	None	Dominant	cover		OV	Sub-d	ominant co	over	LWD,	SWD
Water Quality Te	emperature (Deg C)	No data	рН	No data	Conductivity (uS/	cm)	No data	Turbio	dity	No data
Riparian Vegetation					Crown Closure			71-90%		
Left Bank Shape	Sloping				Right Bank Shape			Sloping		
Left Bank Texture	Fines				Right Bank Textur	re		Fines		
Left Bank Riparian Ve	getation Mixedwo	ood			Right Bank Riparia	an Vege	tation	Mixedwoo	od	
Left Bank Stage	Young Fo	orest			Right Bank Stage			Young For	est	
Habitat Comments	Fish Species	AO - All Salm	nonids							
Spawning	None - No flows or suita	able substrates.								
Rearing	Poor - May enter during	times of high flo	OW.							
Overwintering	None - No flow during s	flow during survey.								
Migration	None - Dry channel.									
Fish Information	Historical Fish Pres	storical Fish Presence No data								

N/A

N/A

Photo Comments

Fished -2015

Fished -2016

Crossing location looking downstream.

Site Comments

Upstream of crossing is defined channel for 50 m, then becomes undefined vegetated drainage upstream. Downstream is more defined channel, coarser substrates. Pooled water present in channel 75 m downstream down to railroad crossing culvert. Water trickling through perched pipe. No fish access to site currently. No water at crossing, railroad culvert is currently a barrier. Very low probability of fish access to site during high water periods.

Not visited

No

Species Captured-2015

Species Captured-2016



Species Stage-2015

N/A

N/A

Notes:			Fish	Fish Species		Delluverden	Stream Class	
N/A Assessed but no data to report	SWD LWD B	Small woody debris Large woody debris Boulder	AS CC CCT	Atlantic salmon Sculpins Coastal cutthroat trout	DV L PK PL	Dolly varden Lamprey Pink salmon Pacific Lamprey	Fish bearing S1 > 20 m S2 > 5 m - 20 m	Non-fish bearing S5 > 3 m S6 < 3 m
	UC DP	Undercut bank Deep pools	CH CM	Chinook salmon Chum salmon	RB SA	Rainbow trout Salmon	S3 1.5 m - 5 m S4 < 1.5 m	NVC No visible channel NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road	d	lumber	Rd21R_3362				Structure No).	
Watershed Code:	1	No data				Stream Order		N/A			
Stream Name	ı	Unnamed				Stream Class		NVC			
Crew		HC, NN				UTM_Zone		09	UTN	1 Northing	6030916
Survey Date	(5/27/2016							UTN	1 Easting	522537
Time		16:54:48				Site Length (m))	100			
Channel	1	No Visible C	Channel			Features		None			
Mean Channel Wid	th (m) N	/A	Mean We	etted W	idth (m)	N/A		Mean	Residual Po	ool Depth (m)	N/A
Mean Gradient (%)	N,	/A	Dominate	ate Substrate N/A Sub-dominate Substrate N/A		Ä					
In-stream Cover	N,	/A	Dominan	t cover		N/A		Sub-do	minant co	ver N/	Ä
Water Quality	Temperatu	re (Deg C)	N/A	рН	N/A	Conductivity (uS/cn	n)	N/A	Turbidity	N/A
Riparian Vegetatio	n			•		Crown Closure	9	•		N/A	
Left Bank Shape		N/A				Right Bank Sha	ape			N/A	
Left Bank Texture		N/A				Right Bank Tex	xture			N/A	
Left Bank Riparian	Vegetation	N/A				Right Bank Rip	arian	Vegeta	ation	N/A	
Left Bank Stage		N/A				Right Bank Sta	age			N/A	
Habitat Comments	Fish S	pecies	N/A								
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
Fish Information	Histor	ical Fish Pre	esence N	lo data							
Fished -2015	Not vi	sited	Species Cap	tured-2	015	N/A			Species	Stage-2015	N/A
Fished -2016	.016 No Species Captured-2016			016	N/A Species Stage-2016 N/A						

Photo Comments

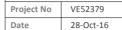
At crossing, on road. Upstream only scour hole, no channel development.

No scour, no water at time of survey. Depression area, likely collects runoff or snowmelt. No alluvial deposition/substrates.



Notes:			Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	I	Lamprev	Fish bearing	Non-fish bearing
	LWD B UC DP OV	Large woody debris	e woody debris CC Sculpins PK Pinl	Pink salmon	S1 > 20 m	S5 > 3 m		
		Boulder	CCT	Coastal cutthroat trout	PL Pacific RB Rainbo	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
		Undercut bank	CH	Chinook salmon		Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
		Deep pools	CM	Chum salmon		Salmon	S4 < 1.5 m	NCD Non-classified drainage
		Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	13.7	to skin a single contract of	000	Climana				haaring avecant whore noted

Prepared for BC Hydro





										111100101
Crossing Type	Access Roa	d	Site N	lumber	Rd21R_3363			Structure	e No.	
Watershed Code:	No data				Stream Order	1				
Stream Name	Unnamed				Stream Class	NCD				
Crew	DF, NN				UTM_Zone	09	UTM	Northing	04	6029596
Survey Date	7/6/2016						UTM	Easting		522756
Time	10:26:12				Site Length (m)	100				
Channel	Non-classif	ed Drainage	<u>;</u>		Features	None				
Mean Channel Width (m) No data	Mean W	Vetted Wi	idth (m)	No data	Mean Resid	ual Po	ol Depth	(m)	No data
Mean Gradient (%)	No data	Domina	te Substra	ate	Fines	Sub-dominate Substrate			Grav	els
In-stream Cover	N/A	Domina	nt cover		N/A	Sub-dominant cove			N/A	
Water Quality Ter	mperature (Deg C)	No data	рН	No data	Conductivity (uS/c	m) No d	ata	Turbio	dity	No data
Riparian Vegetation				•	Crown Closure		N	N/A		
Left Bank Shape	Sloping				Right Bank Shape		S	loping		
Left Bank Texture	Fines				Right Bank Texture	exture Fines				
Left Bank Riparian Veg	etation Mixedv	vood			Right Bank Riparia	an Vegetation Mixedwood				
Left Bank Stage	Young	orest			Right Bank Stage		Υ	oung For	rest	
Habitat Comments	Fish Species	N/A								
Spawning	N/A									
Rearing	N/A									
0										
Overwintering	N/A									
Migration	N/A									
		1								
Fish Information	Historical Fish Pre	esence	No data							
Fished -2015	Not visited	Species Ca	ptured-20	015	N/A	Spe	ecies S	tage-201	.5	N/A
Fished -2016	No	Species Ca			N/A	Species Stage-2016				N/A

Photo Comments

From the road showing the ditch upstream and the lack of channel development downstream.

Site Comments

Ditch on the upstream side of the road crosses the road through a low area. Downstream of the road there is channel development for approximately 5m before becoming non-classified drainage. Further downstream there is no channel development, scour or alluvial deposits. No water was present at time of survey. No fisheries potential.



							100		The second of th
Notes:	Cove	•	Fish	Species	DV	Dellementer	Str	ream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey		h bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3 m
i	B UC DP OV	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey Rainbow trout Salmon	S2	2 > 5 m - 20 m 3 1.5 m - 5 m	S6 < 3 m
		Undercut bank	CH	Chinook salmon	RB				NVC No visible channel
		Deep pools	CM	Chum salmon	SA			< 1.5 m	NCD Non-classified drainage
i		Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSR	Threesnine sticklehack			bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site N	umber	Rd21R_3364			Structure No	
Watershed Code:	No data				Stream Order	N/A			
Stream Name	Unnamed	<u>'</u>			Stream Class	NVC		·	
Crew	IM, NN				UTM_Zone	09	UTN	∕l Northing	6029497
Survey Date	5/9/2016						UTN	∕l Easting	522727
Time	16:34:26				Site Length (m)	100			
Channel	No Visible Cl	hannel			Features	None			
Mean Channel Width	(m) N/A	Mean W	etted Wi	dth (m)	N/A	Mean	Residual P	ool Depth (m)	N/A
Mean Gradient (%)	N/A	Domina	te Substra	ate	N/A	Sub-do	ominate Su	bstrate N/	A
In-stream Cover	N/A	Domina	nt cover		N/A	Sub-do	ominant co	ver N/	Α
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/o	cm)	N/A	Turbidity	N/A
Riparian Vegetation		•		•	Crown Closure	<u> </u>	N/A		
Left Bank Shape	N/A				Right Bank Shape	ape N/A			
Left Bank Texture	N/A				Right Bank Textur	re N/A			
Left Bank Riparian Veg	getation N/A				Right Bank Riparia	n Vegetation N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A	
Habitat Comments	Fish Species	N/A							
Spawning	N/A								
Rearing	N/A								
Ü									
Overwintering	N/A								
Migration	N/A								
Fish Information	Historical Fish Pres	sence	No data						
Fished -2015	No	Species Ca	ptured-20	015	N/A		Species Stage-2015		N/A
Fished -2016	No	Species Ca	ptured-20	016	N/A		Species	Stage-2016	N/A

Photo Comments

Upslope of existing access road.

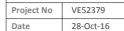
Site Comments

 $\label{eq:continuous} \mbox{Downslope of road has some small intermittent pools. Very low flow runs}$ subsurface for majority of length of the site. Dry gully again further downslope.



Notes:			Fish	Species	DV	Dolly yardan	Stream Class	N. 611		
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing \$1 > 20 m \$2 > 5 m - 20 m \$3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel		
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon	SA SK	Salmon Sockeve salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish		
	13.7	I	000	Climate		Sockeye suillion		bearing except where noted		

Prepared for BC Hydro





Crossing Type		Access Road Site Numb			Number	Rd21R_3367			Structure No	. 45
Watershed Code:		No data				Stream Order	N/A			
Stream Name		Unnamed		·		Stream Class	NVC		·	·
Crew		IM, NN				UTM_Zone	09	UT	M Northing	6029889
Survey Date		5/9/2016						UT	M Easting	522775
Time		17:18:28				Site Length (m)	100			
Channel		No Visible Ch	nannel			Features	None			
Mean Channel Wid	dth (m)	N/A	Mean	Wetted W	idth (m)	N/A	Mean	Residual F	ool Depth (m)	N/A
Mean Gradient (%))	N/A	Domin	ate Substr	ate	N/A	Sub-do	minate Si	ubstrate N/	A
In-stream Cover		N/A	Domin	ant cover		N/A	Sub-do	minant co	over N/	A
Water Quality	Temper	rature (Deg C)	N/A	рН	N/A	Conductivity (uS/o	cm)	N/A	Turbidity	N/A
Riparian Vegetatio	on					Crown Closure		N/A		
Left Bank Shape		N/A				Right Bank Shape			N/A	
Left Bank Texture		N/A				Right Bank Textur	e		N/A	
Left Bank Riparian	Vegetati	on N/A				Right Bank Riparia	an Vegetation N/A			
Left Bank Stage		N/A				Right Bank Stage			N/A	
Habitat Comments	s Fi	sh Species	N/A							
Spawning	N/A	A								
Rearing	N/A	1								
Overwintering	N/A									
Overwintering	IN/F	\								
Migration	N/A	A								
				i						
Fish Information	His	storical Fish Pres	sence	No data						
Fished -2015	No Species Captured-2015			015	N/A		Species	Stage-2015	N/A	
Fished -2016	No	1	Species Captured-2016			N/A Species Stage-2016 N/A				N/A

Photo Comments

Looking upstream from cross drainage ditch carrying ditch flows across track and down steep slope.

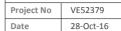
Site Comments

Cross drainage ditch carrying ditch flows across track and down steep slope. Slope downstream of crossing is > 45%. Joins larger creek approx 40 m downslope. Some short intermittent scoured sections. No water, too steep for fish.



Notes:	Cove	r	Fish	Species	DV	Dellassenden	Stream Class			
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing		
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m		
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m		
	UC	Undercut bank	CH	Chinook salmon	RB	B Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel		
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage		
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish		
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	Throoping sticklohook		bearing except where noted.		

Prepared for BC Hydro





Crossing Type	Access Road		Site N	lumber	Rd21R_3370	. 19					
Watershed Code:	No data				Stream Order	N/A	N/A				
Stream Name	Unnamed				Stream Class	NVC	NVC				
Crew	IM, NN				UTM_Zone	09	UT	M Northing	6029767		
Survey Date	5/9/2016						UT	M Easting	522758		
Time	17:06:59				Site Length (m)	100					
Channel	No Visible Ch	nannel			Features	None	е				
Mean Channel Width	(m) N/A	Mean W	etted Wi	dth (m)	N/A	Mea	n Residual	Pool Depth (m)	N/A		
Mean Gradient (%)	N/A	Dominat	e Substra	ate	N/A	Sub-	dominate S	ubstrate N/	A		
In-stream Cover	-stream Cover N/A Domina				N/A	Sub-	dominant d	over N/	A		
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/	cm)	N/A	Turbidity	N/A		
Riparian Vegetation					Crown Closure			N/A			
Left Bank Shape	N/A				Right Bank Shape	!		N/A			
Left Bank Texture	N/A				Right Bank Textu	re		N/A			
Left Bank Riparian Veg	getation N/A				Right Bank Ripari	an Vege	etation	N/A			
Left Bank Stage	N/A				Right Bank Stage			N/A			
Habitat Comments	Fish Species	N/A									
Spawning	N/A										
Rearing	N/A										
Overwintering	N/A										
Migration	N/A										
Fish Information	Historical Fish Pres	sence I	No data								
Fished -2015	No	Species Cap	otured-2	015	N/A		Specie	s Stage-2015	N/A		
Fished -2016	hed -2016 No Species Captured-2016				N/A		Specie	s Stage-2016	N/A		

Photo Comments

Cross road drainage ditch, fed by ditches on upslope side of road. No natural channel observed upstream of crossing site.

Site Comments

No water, no fish, and steep slope.



Notes:	Cove	r	Fish	Species	DV	Dellassenden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road	d	Site N	lumber	Rd21R_3372		Structure	No.			
Watershed Code:		No data				Stream Order	1					
Stream Name		Unnamed				Stream Class	NCD	NCD				
Crew		DF, NN				UTM_Zone	09	UTN	1 Northing	5	6029686	
Survey Date		7/6/2016						UTN	1 Easting		522753	
Time		10:05:14				Site Length (m)	100					
Channel		Non-classifi	ed Drainage			Features	None					
Mean Channel Widt	:h (m)	No data	Mean We	etted Wi	idth (m)	No data	Mean	Residual Po	ool Depth	(m)	No data	
Mean Gradient (%)		No data Dominate Substrate				Fines	Sub-de	ominate Su	bstrate	Grave	els	
In-stream Cover		N/A Dominant cover				N/A	Sub-do	ominant co	ver	N/A		
Water Quality	Tempera	ature (Deg C)	No data	рН	No data	Conductivity (uS/d	cm)	No data	Turbio	dity	No data	
Riparian Vegetation	า					Crown Closure			N/A			
Left Bank Shape		Sloping				Right Bank Shape			Sloping			
Left Bank Texture		Fines				Right Bank Textur	е		Fines			
Left Bank Riparian V	egetatic/	on Conifer	ous			Right Bank Riparia	an Veget	ation	Mixedwoo	bc		
Left Bank Stage		Mature	Forest			Right Bank Stage			Mature Fo	orest		
Habitat Comments	Fis	sh Species	N/A									
Spawning	N/A											
Rearing	N/A											
Overwintering	N/A											
Migration	N/A	N/A										
Fish Information	His	torical Fish Pre	esence N	lo data								
Fished -2015	Not	Not visited Species Captured-2015				N/A	A Species Stage-		Stage-201	5	N/A	
Fished -2016	No		Species Cap	tured-2	016	N/A	Species Stage-2016 N/A			N/A		

Photo Comments

From the road crossing looking downstream.

Site Comments

Small ditch crossing the road. Upstream of the road the channel runs in the roadside ditch for approximately 30m. Downstream the channel disappears into an open forest floor. No channel development, alluvial deposits or fisheries potential.



Notes:	Cove	r	Fish	Species	DV	Dollywarden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



											111100101	
Crossing Type		Access Road		Site N	umber	Rd21R_3373			Structure	No.		
Watershed Code:		No data				Stream Order	1					
Stream Name		Unnamed				Stream Class	NCD					
Crew		DF, NN				UTM_Zone	09 UTM Northing				6030030	
Survey Date		7/6/2016						UTI	M Easting		522746	
Time		09:37:40				Site Length (m)	100					
Channel		Non-classified	d Drainage			Features	None	None				
Mean Channel Wid	dth (m)	No data	Mean We	tted Wi	dth (m)	No data	Mean F	Mean Residual Pool Depth (m) No data				
Mean Gradient (%)	No data Dominate Substrate				Fines	Sub-do	minate Sເ	ubstrate	Fines		
In-stream Cover		N/A Dominant cover				N/A	Sub-do	minant co	over	N/A		
Water Quality	Temper	rature (Deg C) No data pH No data				Conductivity (uS/c	m)	No data	Turbid	lity	No data	
Riparian Vegetation	on					Crown Closure			N/A			
Left Bank Shape		Sloping				Right Bank Shape			Sloping			
Left Bank Texture		Fines				Right Bank Texture	9		Fines			
Left Bank Riparian	Vegetatio	on Mixedwo	od			Right Bank Riparia	n Vegeta	tion	Mixedwoo	d		
Left Bank Stage		Mature F	orest			Right Bank Stage			Mature Fo	rest		
Habitat Comment	s Fi	sh Species	N/A									
Spawning	N/A	A										
Rearing	N/A	A										
Overwintering	N/A	4										
8												
Migration	N/A	A										
0												
Fish Information	His	storical Fish Pres	ence N	lo data								
Fished -2015	Not visited Species Captured-2015)15	N/A	Species Stage-2015 N/A			N/A		
Fished -2016	No					N/A	Species Stage-2016 N/A				N/A	
									_			

Photo Comments

From road at the crossing location looking upstream.

Small ditch crossing the road. No defined channel upstream or downstream of the $\,$ road. No alluvial deposits or continuous channel. Only gravel or cobble is at the road crossing. No fisheries potential.



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CO	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

 Project No
 VE52379

 Date
 28-Oct-16



Crossing Type	Acc	ess Road		Site N	lumber	Rd-24r216			Structur	e No.		
Watershed Code:	No	data				Stream Order	N/A	N/A				
Stream Name	Uni	named				Stream Class	NVC					
Crew	HC,	IM, JS				UTM_Zone	09	UTI	M Northin	g	6028102	
Survey Date	7/1	/2016						UTM Easting 521534				
Time	10:	58:21				Site Length (m)	100					
Channel	Oth	ner				Features	None)				
Mean Channel Width	n (m) N/A		Mean We	tted Wi	idth (m)	N/A	n Residual P	ool Depth	(m)	N/A		
Mean Gradient (%)	N/A	N/A Dominate Substrate				N/A	Sub-	dominate Su	ubstrate	N/A		
In-stream Cover	over N/A Dominant cover					N/A	Sub-	dominant co	over	N/A		
Water Quality T	emperature	ature (Deg C) N/A pH N/A				Conductivity (uS/	'cm)	N/A	Turb	idity	N/A	
Riparian Vegetation			·			Crown Closure			N/A			
Left Bank Shape		N/A				Right Bank Shape	3		N/A			
Left Bank Texture		N/A				Right Bank Textu	re		N/A			
Left Bank Riparian Ve	egetation	N/A				Right Bank Ripari	an Vege	etation	N/A			
Left Bank Stage		N/A				Right Bank Stage	Right Bank Stage N/A					
Habitat Comments	Fish Spe	cies	N/A									
Spawning	N/A											
Rearing	N/A											
Overwintering	N/A											
Migration	N/A											
Fish Information	Historica	l Fish Pre	sence N	lo data								
Fished -2015	shed -2015 No Species Captured-2015				015	N/A Species Stage-2015 N/A			N/A			
Fished -2016 No Species Captured-2016				016	N/A Species Stage-2016 N/A				N/A			

Photo Comments

Drainage downslope of the culvert site. No channelization.

Site Comments

Road drainage ditch feeds into culvert inlet. Upstream of inlet steep forested slope. Downstream of outlet dry drainage ditch through mixed wood forest. Nonfish bearing. Feeds into wetland habitat assessed as non-fish bearing.



Notes: Cover **Fish Species** Stream Class N/A Assessed but no data to report Fish bearing Non-fish bearing SWD Small woody debris Atlantic salmon Lamprey S5 > 3 m S6 < 3 m S1 > 20 m Large woody debris Pink salmon S2 > 5 m - 20 m Boulder CCT Coastal cutthroat trout Pacific Lamprey S3 1.5 m - 5 m NVC No visible channel UC Undercut bank CH Chinook salmon Rainbow trout < 1.5 m NCD Non-classified drainage DP Chum salmon Deep pools Salmon Overhanging vegetation Coho salmon NCD and wetlands are non-fish Sockeye salmon bearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Acce	ess Road		Site N	umber	Rd6R_2356 Struct					No.	
Watershed Code:	No d	lata				St	tream Order	1				
Stream Name	Unn	amed				Si	tream Class	S3				
Crew	DF, 1	NN				U	JTM_Zone	09	UTN	/ Northing		6032330
Survey Date	6/28	3/2016							UTN	/I Easting		523633
Time	17:5	0:54				Si	ite Length (m)	100	·			
Channel	Dry Channel						Features	CV - Cu	llvert			
Mean Channel Width (m	n) 1.60 Mean Wetted Width (m)						02	Mean F	Residual Po	ool Depth (m)	0.03
Mean Gradient (%)	4 Dominate Substrate						nes	Sub-do	minate Su	bstrate	Fines	
In-stream Cover	Moderate Dominant cover					LV	VD	Sub-do	minant co	ver	SWD,	OV
Water Quality Temp	nperature (Deg C) No data pH No da				No data	a (Conductivity (uS/cr	m)	No data	Turbid	ity	No data
Riparian Vegetation				'	•	(Crown Closure	•		71-90%		
Left Bank Shape	1	Vertical				F	Right Bank Shape Undercut					
Left Bank Texture		Fines				F	Right Bank Texture Fines					
Left Bank Riparian Veget	ation	Coniferou	S			F	Right Bank Riparian Vegetation Mixedwood					
Left Bank Stage		Mature Fo	orest			F	Right Bank Stage Mature Forest					
Habitat Comments	Fish Spec	ies A	AO - All Salm	nonids								
Spawning	None - No cle	ean gravels p	resent.									
Rearing	Poor - Drv ch	annel. Mav r	provide habitat	during his	gher flows.							
Rearing	, .	, ,			5							
Overwintering	None - No wa	ater in deep	pools for overw	vintering.								
Migration	Poor - Dry channel at time of survey however there were r						barriers observed and a	access may	y be possible	at high flows.		
Fish Information	Historical Fish Presence No data											
Fished -2015	Not visited	d S	pecies Capt	ured-20	015	N/A Species Stage-2015 N/A			N/A			

N/A

Photo Comments

Fished -2016

Upstream extent of study area. Shows limited channel development.

Site Comments

Stream has poor channel development upstream of the culvert. Below culvert the channel becomes more confined and has a steeper gradient. Mostly dry channel with some small isolated pools at the downstream extent not connected by overland flow. Stream may contain fish habitat at high-flow conditions.

Species Captured-2016



Notes:	Cover	•	Fish	Species	D) /	Dellusanden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Thrononino etialdohand		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Acc	ess Road	d	Site N	lumber	Rd6R_2357				Structur	e No.	
Watershed Code:		No	data				Stream Order		N/A				
Stream Name		Uni	named				Stream Class		NVC				
Crew		IM,	HC, JS				UTM_Zone		09	UTI	M Northin	g	6032295
Survey Date		7/4	/2016							UTI	M Easting		523653
Time		13:	51:58				Site Length (m	n)	100				
Channel		Oth	ner				Features		None				
Mean Channel Wi	idth (n	n) N/A		Mean W	etted W	idth (m)	N/A		Mean	Residual P	ool Depth	(m)	N/A
Mean Gradient (%	6)	N/A Dominate Substrate					N/A						·
In-stream Cover							N/A		Sub-d	ominant co	over	N/A	
Water Quality	Tem	perature (Deg C) N/A pH N/A					Conductivity	(uS/cı	m)	N/A	Turb	idity	N/A
Riparian Vegetati	ion						Crown Closus	re	'		N/A		
Left Bank Shape			N/A				Right Bank Shape N/A						
Left Bank Texture			N/A				Right Bank Te	exture	j		N/A		
Left Bank Ripariar	n Vege	tation	N/A				Right Bank Ri	iparia	n Veget	ation	N/A		
Left Bank Stage			N/A				Right Bank Stage N/A						
Habitat Commen	ts	Fish Spe	cies	N/A									
Spawning		N/A											
Rearing		N/A											
Overwintering		N/A											
Migration		N/A											
Fish Information	ation Historical Fish Presence No data												
Fished -2015		Not visite		Species Cap	tured-2	015	N/A	N/A Species Stage-2015 N/A		N/A			
Fished -2016						016	N/A Species Stage-2016 N/A						

Photo Comments

Marked crossing site.

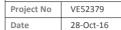
Site Comments

Site consists of an upslope ditch drainage that collects upslope runoff, then drains to the west to join the drainage at site Rd6r 2356, upstream of that marked crossing site. No cross road drainage was identified at site Rd6R_2357. No culvert or overland flow evidence can be found at this site. Downstream has no channel development or evidence of flowing water. It is a local landscape depression, with no fish potential or fish habitat. Non-fish bearing.



Notes:	Cove	r	Fish	Species	DV	Dellermades	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	Throoping stickloback		bearing except where noted.

Prepared for BC Hydro





							THICCICI		
Crossing Type	Access Road		Site Number	Rd74R_2801		Structure No).		
Watershed Code:	No data			Stream Order	1				
Stream Name	Unnamed			Stream Class	NVC				
Crew	DF, NN			UTM_Zone	09	UTM Northing	6013037		
Survey Date	7/2/2016					UTM Easting	522925		
Time	14:30:41			Site Length (m)	100				
Channel	Non-classifie	ed Drainage		Features	None				
Mean Channel Width	(m) No data	Mean Wett	ed Width (m)	No data	Mean Resid	ual Pool Depth (m)	No data		
Mean Gradient (%)	No data	Dominate S	Substrate	Fines	Sub-domina	te Substrate Fin	ies		
In-stream Cover	N/A	Dominant o	cover	N/A	Sub-domina	nt cover N/.	A		
Water Quality Te	mperature (Deg C)	No data	pH No data	Conductivity (uS/c	m) No d	ata Turbidity	No data		
Riparian Vegetation			·	Crown Closure	*	N/A			
Left Bank Shape	Sloping			Right Bank Shape		Sloping			
Left Bank Texture	Fines			Right Bank Texture	e	Fines			
Left Bank Riparian Veg	getation Mixedwo	ood		Right Bank Riparia	n Vegetation	Mixedwood			
Left Bank Stage	Young Fo	orest		Right Bank Stage		Young Forest			
Habitat Comments	Fish Species	N/A							
Spawning	N/A								
Rearing	N/A								
	21/2								
Overwintering	N/A								
Migration	N/A								
Fish Information	Historical Fish Pres	sence No	data						
Fished -2015	hed -2015 Not visited Species Captured-2015			N/A	Species Stage-2015 N/A				
Fished -2016	hed -2016 No Species Captured-2016				Species Stage-2016 N/A				

Photo Comments

From road showing ditch crossing but no channel upstream or downstream.

Site Comments

Shallow ditch crossing over the road. No defined channel upstream or downstream. Gravels present on ditch on road but no coarse substrate upstream or downstream. No scour, flow or continuous channel.



Notes:	Cove	•	Fish	Species	DV	Dellerenden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	There are in a set of the basely		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access F	Road		Site Number Rd74r_328					Structure No).
Watershed Code:	No data					Stream Order	1			
Stream Name	Unname	ed	·			Stream Class	NCD			<u> </u>
Crew	NN, JR,	DF				UTM_Zone	09	UTN	Л Northing	6013083
Survey Date	7/2/201	16						UTN	∕l Easting	522880
Time	14:47:0	8				Site Length (m)	100			
Channel	Non-cla	ssified [Orainage			Features	None			
Mean Channel Width	(m) No data		Mean We	tted Wi	dth (m)	No data	Mean	Residual P	ool Depth (m)	No data
Mean Gradient (%)	No data		Dominate	Substra	ate	Fines	Sub-do	ominate Su	bstrate Fir	nes
In-stream Cover	N/A		Dominant	ant cover N/A			Sub-do	ominant co	ver N/	'A
Water Quality Te	ter Quality Temperature (Deg C)				No data	Conductivity (uS/o	cm)	No data	Turbidity	No data
Riparian Vegetation						Crown Closure			N/A	
Left Bank Shape	Slop	oing				Right Bank Shape	Sloping			
Left Bank Texture	Fine	es		Right Bank			е			
Left Bank Riparian Veg	getation Mix	edwood	d	Right Bank Riparia			n Vegeta	ation	Mixedwood	
Left Bank Stage	You	ng Fore	st	Right Bank Stage					Young Forest	:
Habitat Comments	Fish Species	N/	/A							
Spawning	N/A									
Rearing	N/A									
-										
O	N/A									
Overwintering	IN/A									
Migration	N/A									
Fish Information	Historical Fish Presence No data									
Fished -2015	Not visited Species Captured-2015			015	N/A S _K			Stage-2015	N/A	
Fished -2016	No					N/A				N/A

Photo Comments

Downslope view.

Site Comments

Short section of channel, some isolated water, 10 m section of scour with some alluvials. Set traps initially but further investigation shows no continuous channel > 100m. Water about 40 cm deep in places, channel is 1-2 m wide. Alder forest thick understory near wet NCD . Salmon berry, club, elderberry etc.



Notes:	Cove	r	Fish	Species	DV	Dolly yordon	Stream Class	
N/A Assessed but no data to report	SWD LWD B	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL	Dolly varden Lamprey Pink salmon Pacific Lamprey	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing SS > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM CO	Chum salmon Coho salmon Slimy sculpin	RB SA SK	Rainbow trout Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road	d	Site N	lumber	Site 30			Structure N	lo.		
Watershed Code:	No data				Stream Order	1					
Stream Name	Unnamed				Stream Class	S2					
Crew	NN, IM				UTM_Zone	09	UTN	/I Northing	5993223		
Survey Date	5/12/2016						UTN	/I Easting	521193		
Time	15:39:23				Site Length (m)	150					
Channel	Visible char	inel			Features	CV - C	Culvert				
Mean Channel Widt	h (m) 9.45	Mean We	etted Wi	dth (m)	6.42	6.42 Mean Resi			n) 0.71		
Mean Gradient (%)	1	Dominate	e Substra	ate	Gravels	Sub-d	lominate Su	bstrate C	Cobbles		
In-stream Cover	Abundant	Dominan	t cover		DP, IV	Sub-d	lominant co	ver S	WD, OV		
Water Quality	Temperature (Deg C)	8.5	рН	7.4	Conductivity (uS/o	60	Turbidit	cy C-Clear			
Riparian Vegetation	1				Crown Closure			21-40%			
Left Bank Shape	Sloping				Right Bank Shape		Sloping				
Left Bank Texture	Fines				Right Bank Texture			Fines			
Left Bank Riparian V	egetation Mixedw	/ood			Right Bank Riparia	an Vege	tation	Mixedwood			
Left Bank Stage	Mature	Forest			Right Bank Stage			Mature Fore	est		
Habitat Comments	Fish Species	AO - All Salr	monids								
Spawning	Good - Critical back ch	annel spawning h	nabitat for	coho and lil	sely other species.						
Rearing	Excellent - Good rearin	ng habitat. Groun	dwater sp	rings observ	ed. Abundant cover eleme	nts for all	life stages.				
Overwintering	Good - Deep pools exi	st and likely good	l year-rour	nd flows due	to groundwater springs.						
Migration	Moderate - Migration	ossing. Two	of the three culverts are co	rushed, bu	it the 800 mm	culvert is intact	and allows fish passage.				
Fish Information	Historical Fish Pre	esence N	lo data								
Fished -2015					N/A		Species	Stage-2015	N/A		
Fished -2016	Yes						Species	Stage-2016	Fry, Adult		

Photo Comments

Typical channel downstream of the crossing site, facing downstream.

Site Comments

Back-channel habitat offers excellent rearing for young salmon and trout. Abundant coho and threespine stickleback observed and captured in the channel upstream and downstream of the crossing site. Three culverts are present at the crossing site. Two are crushed, but the largest (800 mm diameter) culvert is intact and allows fish passage at higher flow periods.



Notes:	Cove	r	Fish	Species	DV/	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD	Small woody debris Large woody debris Boulder	AS CC	Atlantic salmon Sculpins Coastal cutthroat trout	DV L PK	Dolly varden Lamprey Pink salmon	Fish bearing S1 > 20 m S2 > 5 m - 20 m	Non-fish bearing S5 > 3 m S6 < 3 m
	UC DP	Undercut bank Deep pools	CH	Chinook salmon Chum salmon	PL RB SA	Pacific Lamprey Rainbow trout Salmon	S3 1.5 m - 5 m S4 < 1.5 m	NVC No visible channel NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Acc	ess Road		Site N	lumber	Site 39			Structure No	Ο.	
Watershed Code:		No	data				Stream Order	1				
Stream Name		Unr	named				Stream Class	S3				
Crew		IM,	HC, WM				UTM_Zone	09	UTN	M Northing	5990481	
Survey Date		7/7	/2016						UTN	M Easting	518737	
Time		13:2	26:13				Site Length (m)	100				
Channel		Visi	ble chanr	nel			Features	Features None				
Mean Channel Wi	dth (m	1.93		Mean	Wetted Wi	idth (m)	1.33	Mean F	Residual P	ool Depth (m)	0.18	
Mean Gradient (%	5)	5		Domin	ate Substr	ate	Gravels	Sub-do	minate Su	ubstrate Co	obbles	
In-stream Cover		Abun	dant	Domin	ant cover		OV	Sub-do	minant co	over LV	VD, SWD,IV	
Water Quality	Quality Temperature (Deg C) 1				рН	7.6	Conductivity (uS/o	Conductivity (uS/cm) 64			C-Clear	
Riparian Vegetati	on				·	•	Crown Closure	*		21-40%		
Left Bank Shape			Sloping				Right Bank Shape		Sloping			
Left Bank Texture			Fines			Right Bank Texture				Fines		
Left Bank Riparian	Veget	tation	Conifero	us			Right Bank Riparian Vegetation			Coniferous		
Left Bank Stage			Young Fo	rest			Right Bank Stage		Young Forest	t		
Habitat Comment	ts	Fish Spe	cies	AO - All S	almonids							
Spawning		Moderate -	Some spawi	ning gravels	present in sm	all pockets t	throughout stream.					
Rearing		Good - Abur	ndant cover,	good chann	el diversity, g	ood flow de	epths. Limited by cascades.					
Overwintering		Poor - Limite	ea aeep poo	is in channe	i. Lake upstre	am may pro	vide overwintering opportu	inities if acc	essible durin	ig nigh flows.		
Migration		Moderate -	Barriers ide	ntified includ	de downstrea	m waterfall,	and cascade section.					
					ı							
Fish Information		Historical	Fish Pres	ence	No data							
Fished -2015		Not visite	d	Species C	Captured-2	015	N/A		Species	Stage-2015	N/A	

NFC

Photo Comments

Fished -2016

Subsurface flow site in overflow channel.

Yes

Site Comments

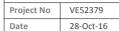
Site has a flowing defined channel in a steep-walled valley, with a moderately high gradient. Site is outlet stream for lake, located upstream of a barrier waterfall. Site has diverse habitat, with pools, riffles, cascades. Abundant cover, mostly provided by overhanging vegetation. Coarse substrates at downstream end of site, becoming more fine upstream. Moderate to good quality stream for salmonids, if a resident population is present in the lake. Upstream of site, stream becomes intermittently defined and wider. Upstream, 60 m downstream of lake, stream flows subsurface. Water flows from under a defined overflow channel from the lake. Currently no fish access to site from lake, although presence of scoured channel indicates that water may periodically flow at high water. Electrofishing done at crossing site, no fish captured or observed.

Species Captured-2016



Notes:	Cove	r	Fish	Species	DV	Dolly varden	Stream Cla	ass	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing		Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m		S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m -		S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m -		NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	1	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish
	I\/	Instroom vegetation	CCG	Slimy sculpin	TCD	There is a section of the first of the section of t			hearing except where noted

Prepared for BC Hydro





Crossing Type	Access Road	d	Site N	lumber	Site 40		St	ructure No.	
Watershed Code:	910-665062	2-04593			Stream Order	N/A			
Stream Name	Unnamed				Stream Class	NVC			
Crew	IM, NN, CW	1			UTM_Zone	09	UTM N	orthing	5988906
Survey Date	6/17/2015					UTM Easting			518552
Time	14:52:09				Site Length (m)				
Channel	No Visible C	Channel			Features	None			
Mean Channel Width	m) N/A	Mean W	etted Wi	idth (m)	N/A	Mean Re	esidual Pool	Depth (m)	N/A
Mean Gradient (%)	N/A	Domina	te Substra	ate	N/A	Sub-don	ninate Subst	rate N/A	١
In-stream Cover	N/A	Domina	nt cover		N/A	Sub-don	ninant cover	N/A	\
Water Quality Te	mperature (Deg C)	N/A	рН	N/A	Conductivity (uS/o	cm) N	N/A	Turbidity	N/A
Riparian Vegetation			•	•	Crown Closure	•	N/	A	
Left Bank Shape	N/A				Right Bank Shape				
Left Bank Texture	N/A				Right Bank Textur	N/A			
Left Bank Riparian Veg	etation N/A				Right Bank Riparia	n Vegetat	ion N/	A	
Left Bank Stage	N/A			Right Bank Stage			N/	A	
Habitat Comments	Fish Species	N/A							
Spawning	N/A								
Rearing	N/A								
	21/2								
Overwintering	N/A								
Migration	N/A								
		1							
Fish Information	Historical Fish Pre	esence	No data						
Fished -2015	Not visited Species Captured-2015				N/A		Species Sta	ge-2015	N/A
Fished -2016	Not visited	Species Ca	ptured-20	016	N/A	Species Stage-2016 N/A			

Photo Comments

NVC downstream of crossing site.

Site Comments

No visible channel downstream of crossing sites TL38 and TL37. No water, no flow, and no fish habitat, therefore no habitat at road site.



Notes:	Cove	•	Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Lamprey	Fish bearing S1 > 20 m	Non-fish bearing S5 > 3 m
	LWD B	Large woody debris Boulder	CC CCT	Sculpins Coastal cutthroat trout	PK PL	Pink salmon Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Acce	ess Road		Site N	umber	Site 45		Structure	e No.		
Watershed Code:	400-	-174068-5	9390			Stream Order	3				
Stream Name	Unn	amed				Stream Class	S2				
Crew	DF, I	NN				UTM_Zone	09	UT	M Northing	5	6022340
Survey Date	6/29	9/2016						UT	M Easting		522711
Time	16:3	6:53				Site Length (m)	100				
Channel	Visik	ole channe	el			Features	Features None				
Mean Channel Width (m) 10.13		Mean W	etted Wi	dth (m)	6.72	Mean	Residual F	ool Depth	(m)	0.33
Mean Gradient (%)	lean Gradient (%)			te Substra	ate	Gravels	Sub-d	lominate S	ubstrate	Cobl	bles
In-stream Cover	n-stream Cover Abundant			nt cover		LWD	Sub-d	lominant c	over	SWD), B, DP, OV
Water Quality Ter	ter Quality Temperature (Deg C)				7.6	Conductivity (uS/o	cm)	25	Turbi	dity	C-Clear
Riparian Vegetation					•	Crown Closure			21-40%		
Left Bank Shape		Undercut				Right Bank Shape		Vertical			
Left Bank Texture		Fines				Right Bank Textur	Right Bank Texture				
Left Bank Riparian Veg	etation	Mixedwoo	od			Right Bank Riparia	Right Bank Riparian Vegetation			od	
Left Bank Stage		Mature Fo	orest			Right Bank Stage	Right Bank Stage				
Habitat Comments	Fish Spec	ies A	AO - All Sal	monids							
Spawning	Excellent - Ra	ange of subst	rate sizes av	ailable for di	ifferent spe	cies. Good riffle and pool ha	abitat.				
Rearing	Excellent - Hi	igh amount c	of cover. Goo	d riffle/pool	habitat.						
Overwintering	Good - Good	overwinter	for iuveniles.	Adults likely	v move to d	eeper waters.					
	Good - Good overwinter for juveniles. Adults likely move										
Migration	Good - No barriers observed. Dry channel further upstrea										
0 111	·										
Fish Information	formation Historical Fish Presence N/A										
Fished -2015	Not visited	d S	Species Ca	ptured-20	015	N/A Species S			Stage-201	.5	N/A
	1					· ·		-			•

CO

Photo Comments

Fished -2016

Upstream of bridge crossing location.

Side and mid bars observed throughout study area. Fish observed throughout study area. Creek has good riffle/pool habitat. High cover diversity.

Species Captured-2016



Notes:	Cove	r	Fish	Species	D1/	B. II I	St	ream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fis	h bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1	> 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2	> 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3	1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4	< 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon			NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TSB	Threespine stickleback			bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road Site Number Site 50								Structure	No.	
Watershed Code:		910-	-665062-0	9749			Stream Order	1				
Stream Name		Unn	amed				Stream Class	S3				
Crew		IM,	NN				UTM_Zone	09	U ⁻	TM Northing	7	5993044
Survey Date		6/19	9/2015						U ⁻	TM Easting		519496
Time		16:5	3:53				Site Length (m)	100				
Channel		Visib	ole Chann	el			Features	None				
Mean Channel Wid	dth (m)	1.68		Mean \	Wetted Wi	dth (m)	1.21	Mean Residual Pool Depth (m) 0.15				
Mean Gradient (%)	16		Dominate Substrate			Cobbles	Sub-d	ominate S	Substrate	Grav	vels
In-stream Cover		Moderate			ant cover		В	Sub-d	ominant (cover	LWD), SWD, OV, UC
Water Quality	Tempe	perature (Deg C) 10.5 pH 7.9				7.9	Conductivity (uS/o	cm)	117	Turbio	dity	C-Clear
Riparian Vegetation	on			•	•	•	Crown Closure	<u>'</u>	41-70%		·	
Left Bank Shape			Sloping				Right Bank Shape		Sloping			
Left Bank Texture			Gravels				Right Bank Texture			Gravels		
Left Bank Riparian	Vegetat	ion	Mixedwo	od			Right Bank Riparia	an Veget	tation	Mixedwoo	od	
Left Bank Stage			Mature F	orest			Right Bank Stage			Mature Fo	orest	
Habitat Comment	s F	ish Spec	cies	AO - All S	almonids							
Spawning	No	ne - No ac	dequate grav	rel.								
Rearing	Mo	oderate - F	Pool rearing	habitat for j	juvenile trout	is available	but does not have much de	epth or are	ea. Good var	iety of other co	ver typ	es available.
5												
										_		
Overwintering	Po	Poor - Possible overwintering for juvenile trout in shallow pools. Low flows and ice may prevent overwintering in most areas.										
Migration	Po	or - Poor r	migration for	r trout, none	e for salmon,	step pools p	resent with low flow depth	٦.				
Fish Information	Hi	storical	Fish Prese	ence	No data							
Fished -2015	Ye	Yes Species Captured-2015 RB Species Stage-2015 Parr								Parr		
		Yes Species Captured-20										

Photo Comments

Fished -2016

Looking downstream from the crossing site.

 $\label{lem:continuous} \mbox{Moderate rearing for small juvenile trout. Pools support trout with good cover.}$ Large bodied fish habitat is absent. Step pool morphology throughout with low flows.

Not visited

Species Captured-2016



Notes:	Cove	r	Fish	Species	DV.	Dellermades	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Acc	ess Road		Site N	lumber	Sta 0+562			Structure	No.	
Watershed Code:		No	data				Stream Order	1				
Stream Name		Unn	amed				Stream Class	NCD				
Crew		IM,	NN				UTM_Zone	09	ITU	M Northing		6025308
Survey Date		5/13	3/2016						UTI	M Easting		521658
Time		13:5	51:38				Site Length (m)	120				
Channel		Visil	ble chanr	nel			Features	BD - B	Beaver dam			
Mean Channel Wi	dth (m)	7.05		Mean \	Wetted W	idth (m)	6.72	Mean	Residual P	ool Depth (ı	m)	0.62
Mean Gradient (%	5)	0		Domina	ate Substr	ate	Fines	Sub-d	ominate Su	ubstrate	Fines	
In-stream Cover		Abun	dant	Domina	ant cover		IV	Sub-d	ominant co	over	LWD,	SWD, DP, OV
Water Quality	Temp	erature (Deg C)	11.5	рН	7.5	Conductivity (uS/o	cm)	32	Turbidi	ity	C-Clear
Riparian Vegetatio	on			·			Crown Closure	•		41-70%		
Left Bank Shape			Sloping				Right Bank Shape		Sloping			
Left Bank Texture			Fines				Right Bank Textur	e		Fines		
Left Bank Riparian	Vegeta	ation	Conifero	us			Right Bank Riparia	an Veget	tation	Coniferous	6	
Left Bank Stage			Mature F	orest			Right Bank Stage			Mature For	rest	
Habitat Comment	ts	Fish Spec	cies	AO - All Sa	almonids							
Spawning	L	None - No a	ccess to site	possible.								
Rearing	١	None - No a	ccess to site	possible.								
0												
Overwintering	ľ	None - No a	ccess to site	possible.								
Migration	١	None - No a	ccess to site	possible.								
					i							
Fish Information	ŀ	Historical	Fish Pres	sence	No data							
Fished -2015	1	Not visite	d	Species C	aptured-2	015	N/A Sp			Species Stage-2015 N/A		
							· ·		-			*

NFC

Photo Comments

Fished -2016

Broad floodplain with muddy wet areas, central narrow channel carrying flow currently. Isolated pools in sections.

Species Captured-2016

Site Comments

Crossing site is located upstream of a barrier site found approximately 1 km downstream. Crossing is therefore rated as non-fish-bearing. Crossing is partially blocked at culvert inlet by beaver sticks, but is passing some water. Large deep pond is located upstream of blocked culvert, with abundant instream vegetation, mosses, algae. Amphibians abundant in pool, but no fish observed or captured during minnow trapping and electrofishing. Downstream channel section consists of small, minimally scoured channels and discontinuous pools. Multiple dewatered sections act as a barrier for fish passage. No fish access to site, non-fish-bearing.



Notes:	Cove	r	Fish	Species	DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCR	Threesnine sticklehack		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



						_						
Crossing Type	Acces	s Road		Site N	umber	S	ta 0+856			Structure	No.	
Watershed Code:	No da	ta				S	tream Order	1				·
Stream Name	Unnar	ned				S	tream Class	NVC				
Crew	IM, NI	V				U	JTM_Zone	09	U	ΓM Northing	5	6025681
Survey Date	5/13/2	2016							U	TM Easting		521594
Time	12:57	:39				S	ite Length (m)	100				
Channel	No Vis	sible Cha	annel	•			Features	None	•			
Mean Channel Width	(m) N/A		Mean We	etted Wi	dth (m)	N,	/A	Mean F	Residual	Pool Depth	(m)	N/A
Mean Gradient (%)	N/A		Dominate	e Substra	ate	N,	/A	Sub-do	minate S	Substrate	N/A	
In-stream Cover	N/A		Dominan	t cover			/A		minant (N/A	
Water Quality Te	emperature (De	eg C)	No data	рН	No data	a (Conductivity (uS/c	m)	No data	Turbio	dity	No data
Riparian Vegetation						(Crown Closure			N/A		
Left Bank Shape	N,	/A					Right Bank Shape			N/A		
Left Bank Texture	N,	/A					Right Bank Texture	9		N/A		
Left Bank Riparian Ve	getation N,	/A				I	Right Bank Riparia	n Vegeta	tion	N/A		
Left Bank Stage	N	/A					Right Bank Stage			N/A		
Habitat Comments	Fish Specie	s I	N/A	•				•	•			
Spawning	N/A											
Rearing	N/A											
Our musicate via a	N/A											
Overwintering	N/A											
Migration	N/A											
Fish Information	Historical Fi	sh Prese	ence N	lo data								
Fished -2015	No	9	Species Cap	tured-20	015	Ν	I/A		Specie	s Stage-201	5	N/A

Photo Comments

Fished -2016

Downstream undefined damp area.

Site Comments

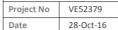
No channel is present at crossing. Actual crossing site is sta 0+854. Culvert is 400 mm approx 6 m long corrugated steel pipe. Inlet is elevated above ditch bottom. Ditch located adjacent to road immediately upslope. Location confirmed by presence of flagged sta 0+854. Upslope of roadside ditch is very steep, approx 80-100%. Downstream of site has a low, broad, and undefined damp area with skunk cabbage and ferns. One small pool with stagnant water was observed 20 m downstream of crossing. No scour or channelization observed in this area. Possibly the very top of a drainage. No fish habitat or access potential at any time of year.

Species Captured-2016



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro





Crossing Type	Acce	ess Road		Site Nu	umber	Sta 7+640				Structure	No.	
Watershed Code:	No d	lata				Stream Or	der	1				
Stream Name	Unna	amed				Stream Cla	ass	S6				
Crew	IM, N	NN				UTM_Zon	е	09	UTN	/ Northing	5	6021624
Survey Date	5/14	/2016							UTN	/I Easting		522546
Time	09:4	8:56				Site Lengtl	h (m)	100				
Channel	Visib	le channe	el			Features	;	CV - Cı	ulvert			
Mean Channel Width (m	0.38		Mean Wet	tted Wid	dth (m)	0.00		Mean	Residual Po	ool Depth	(m)	0.00
Mean Gradient (%)	56		Dominate	Substra	ite	Gravels		Sub-do	ominate Su	bstrate	Cobb	oles
In-stream Cover	None		Dominant	cover		N/A		Sub-do	ominant co	ver	N/A	
Water Quality Tem	nperature (Deg C) No data pH No			No data	Conductiv	vity (uS/c	m)	No data	Turbio	dity	No data	
Riparian Vegetation						Crown Clo	Crown Closure 7					
Left Bank Shape	Sloping					Right Bank Shape Slop						
Left Bank Texture	(Gravels				Right Ban	k Texture	9		Cobbles		
Left Bank Riparian Veget	tation I	Mixedwoo	od			Right Ban	k Riparia	n Veget	ation	Mixedwoo	od	
Left Bank Stage		Mature Fo	orest			Right Ban	k Stage			Mature Fo	orest	
Habitat Comments	Fish Spec	ies A	AO - All Salm	onids								
Spawning	None - No fis	h access.										
Rearing	None - No fis	h access.										
Overwintering	None - No fis	h access.										
Migration	None - No fish access.											
Fish Information	n Historical Fish Presence No data											
Fished -2015	Not visited Species Captured-2015)15	N/A		Species Stage-2015 N/A				

Photo Comments

Fished -2016

50 m downslope of culvert, where steep slope channel becomes less well-defined.

Species Captured-2016

Site Comments

Culvert drains upslope ditch across road. Slope below outlet is very steep, approx 58%. Incised channel present for approx 50 m downslope of outlet. Beyond 50 m, stream becomes broad and undefined with no visible channel. Channel measurements are for 50 m section of channel between pipe outlet and undefined area downslope. Above culvert, only the roadside ditch is present, approx 1 m wide, 0.5 m deep.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV/	Instream vegetation	CCG	Slimy sculnin	TCD	Throospino stickloback		bearing except where noted.

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Acces	s Road		Site N	lumber	Wedeene FSR 2	2800			Structure	e No.		
Watershed Code:		No da	ata				Stream Order		N/A					
Stream Name		Unna	med				Stream Class		NVC					
Crew		IM, H	C, WM				UTM_Zone		09	UTM	Northin	pp	5995529	
Survey Date		7/6/2	2016							UTM	Easting		521095	
Time		11:52	2:11				Site Length (m)		100					
Channel		Other	r				Features		None					
Mean Channel Wi	dth (m)	N/A		Mean W	etted Wi	idth (m)	N/A		Mean I	Residual Po	ol Depth	(m)	N/A	
Mean Gradient (%)	N/A		Dominat	e Substr	ate	N/A		Sub-do	minate Sul	ninate Substrate N/A			
In-stream Cover		N/A		Dominar	nt cover		N/A	Sub-do	minant cov	nant cover N/A				
Water Quality	Temp	erature (D	eg C)	N/A	рН	N/A	Conductivity (u	uS/cm	1)	N/A	Turbi	dity	N/A	
Riparian Vegetation	an Vegetation						Crown Closure	<u>:</u>		1	N/A			
Left Bank Shape	k Shape N/A						Right Bank Shape N/A							
Left Bank Texture		N	I/A				Right Bank Tex	ture		1	N/A			
Left Bank Riparian	Vegeta	ntion N	I/A				Right Bank Rip	arian	Vegeta	ation I	N/A			
Left Bank Stage		N	I/A				Right Bank Sta	ge			N/A			
Habitat Comment	:s	Fish Specie	es	N/A										
Spawning	N	I/A												
Rearing	N	I/A												
Overwintering	N	I/A												
Migration	N	I/A												
Fish Information	F	Historical F	ish Pres	sence I	No data									
Fished -2015	N	No		Species Car	otured-2	015	N/A			Species S	stage-201	15	N/A	
Fished -2016											N/A			

Photo Comments

Downstream of crossing site.

Site Comments

Crossing site consists of a downstream wetland area in a clearcut patch. No culvert could be found at the crossing site. Upstream drainage consists of ditch flow only, that drains to the south to a different culvert site. Drainage is a local depression in the wetland area with an undefined, muddy bottomed area. No water present. Further downstream, the drainage enters a forest. Overland flow evidence is visible, between low areas where water could pool. No evidence of channelization, no scour, no deposition. No fish habitat, non-fish bearing.



Notes:	Cover		Fish	Species	DV	Dolly varden	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Chum salmon Coho salmon	SA SK	Salmon Sockeye salmon	S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Access Road		Site N	lumber	Wedeene FSR_2	122		St	ructure No).	
Watershed Code:		No data				Stream Order		1				
Stream Name		Unnamed				Stream Class		S4				
Crew		DF, NN				UTM_Zone	(09	UTM N	lorthing	6009773	<u> </u>
Survey Date		7/6/2016							UTM E	asting	520501	
Time		16:30:00				Site Length (m)		100				
Channel		Visible chani	nel			Features		None				
Mean Channel Wi	idth (m)	0.96	Mean We	etted Wi	idth (m)	0.58		Mean Res	idual Pool	Depth (m)	0.0	4
Mean Gradient (%	6)	4	Dominate	e Substr	ate	Fines		Sub-domi	nate Subst	bstrate Gravels		
In-stream Cover		Abundant	Dominan	it cover		OV		Sub-domi	nant cove	r LW		
Water Quality	Tempe	rature (Deg C)	10.0	рН	8.2	Conductivity (u	Sub-dominant cover LWD, SWD ity (uS/cm) 67 Turbidity C-Clea					
Riparian Vegetati	on					Crown Closure			41	-70%		
Left Bank Shape		Sloping				Right Bank Sha	ре					
Left Bank Texture		Fines				Right Bank Tex	ture					
Left Bank Ripariar	n Vegetati	ion Mixedwe	ood			Right Bank Ripa	arian	Vegetatio	n M i	xedwood		
Left Bank Stage		Mature	Forest			Right Bank Sta	ge		Ma	ature Fores	st	
Habitat Commen	ts Fi	ish Species	AO - All Salr	monids								
Spawning	Poo	or - Limited by small	channel size and	d limited g	ravel availak	oility within the study ar	rea. On	nly coarse sub	ostrate is fou	nd near the ro	oad.	
Rearing	Mo	oderate - Limited poo	ol habitat howev	er high co	ver and clos	e proximity to the Wed	eene R	River.				
Overwintering	Pod	or - Dry channel 40m	Limited pool	habitat. Only suitable f	for juve	eniles.						
Migration	n Moderate - No barriers observed. Dry channel further ups					am may limit accessibili	ty to ha	abitat during	low flow per	riods.		
Fish Information	His	storical Fish Pres										
Fished -2015	No	ot visited	Species Cap	tured-2	015	N/A		S	pecies Sta	ge-2015	N/A	
Fished -2016	Ye	es	Species Cap	tured-2	016	СО			pecies Sta		Fry	

Photo Comments

Upstream extent of surveyed area. Dry channel with isolated pools.

Site Comments

Channel flows alongside road in the ditch for approximately 35m. Channel is overgrown by shrubs and had gravel/cobble substrate. Further upstream the channel turns into the forest and becomes dry with isolated pools. Substrate here is entirely fine materials. Watercourse picks up some gravel from the road which is present just downstream of the culvert. Further downstream the bed material is primarily sand. Overhanging vegetation is the dominant cover throughout the study area. Watercourse discharges into the Wedeene river approximately 100m downstream of the culvert.



Notes:	Cover		Fish S	Species	B1/	B II I	Str	eam Class	
N/A Assessed but no data to report	SWD LWD B UC DP OV	Small woody debris Large woody debris Boulder Undercut bank Deep pools Overhanging vegetation Instream vegetation	AS CC CCT CH CM CO	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon Chum salmon Coho salmon Slimy sculpin	DV L PK PL RB SA SK	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout Salmon Sockeye salmon	Fisl S1 S2 S3	n bearing > 20 m > 5 m - 20 m 1.5 m - 5 m < 1.5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel NCD Non-classified drainage NCD and wetlands are non-fish bearing except where noted.
	1.4	moneum vegetation	CCO	Jiiiiy Jeaipiii	TSB	Threespine stickleback			

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

 Project No
 VE52379

 Date
 28-Oct-16



Crossing Type		Access Roa	d	Site N	lumber	Wedeene FSR_13	1		Structur	e No.		
Watershed Code:		No data				Stream Order	1					
Stream Name		Unammed				Stream Class	S3					
Crew		DF, NN				UTM_Zone	09	UTIV	1 Northin	g	6008077	
Survey Date		7/7/2016						UTN	1 Easting		520275	
Time		14:39:04				Site Length (m)	100					
Channel		Visible cha	nnel			Features	None)				
Mean Channel Wi	dth (m)	1.74	Mean We	etted W	idth (m)	1.06	Meai	n Residual Po	ool Depth	(m)	0.15	
Mean Gradient (%	5)	1	Dominate	e Substr	ate	Fines	Sub-	dominate Su	nate Substrate Gravels			
In-stream Cover		Abundant	Dominan	t cover		OV	Sub-	dominant co	cover SWD,IV			
Water Quality	Temp	erature (Deg C)	9.8	рН	7.8	Conductivity (uS/	C-Clear					
Riparian Vegetati	on					Crown Closure			41-70%			
Left Bank Shape		Sloping	Ţ.			Right Bank Shape	9	Undercut				
Left Bank Texture		Fines				Right Bank Textu	re	Fines				
Left Bank Riparian	Vegeta	ation Decidu	ous			Right Bank Ripari	an Vege	etation	Mixedwo	od		
Left Bank Stage		Young	Forest			Right Bank Stage			Young Fo	rest		
Habitat Comment	ts	Fish Species	AO - All Salr	nonids								
Spawning	F	Poor - No gravels. Sub	strates are prima	rily fine m	aterials.							
Rearing	(Good - Abundant cov	er and close proxi	mity to the	e Wedeene	River. Limited pool habitat						
Overwintering	N	Moderate - Shallow c	hannel and limited	d pool hab	itat. Only su	iitable for juveniles.						
Migration	Good - Connectivity may be limited in low flow seasons as					allow areas may go dry. No	o other ba	rriers observed.				
Fish Information	n Historical Fish Presence No data											
Fished -2015	Not visited Species Captured-2015					N/A		Species :	Stage-201	15	N/A	
Fished -2016	r	No Species Captured-2016				UNK		Species :	Stage-201	16	Unknown	

Photo Comments

Downstream extent where the channel widens and is filled with algae.

Site Comments

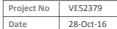
Upstream of the culvert the watercourse is isolated shallow pools that runs parallel to the road in the ditch. A wetland area drains into the channel that may provide fish habitat during high flow seasons. Some cobble and gravel substrate in the ditch but fine materials found elsewhere. Downstream of the culvert, the channel widens and flows over fine material substrate. High amount of algae growth in the wetted area provides abundant cover for fish. Multiple juvenile fish observed downstream of the culvert.



Notes:	Cove	r	Fish	Species	DV	Dolly yordon	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	The second secon		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type		Access Road		Site N	lumber	Wedeene FSR_150 Structure No.					
Watershed Code:		No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	S4				
Crew		DF, NN				UTM_Zone	09	UTIV	l Northing		6005435
Survey Date		7/4/2016						UTIV	l Easting		520435
Time		12:41:22				Site Length (m) 100					
Channel		Visible chan	nel			Features	None				
Mean Channel Wi	dth (m)	1.41	Mean We	etted Wi	idth (m)	0.93	Mean F	Residual Po	ol Depth	(m)	0.12
Mean Gradient (%	(a)	6	Dominate	e Substra	ate	Gravels	Sub-do	minate Sul	ostrate	Fines	
In-stream Cover		Abundant	Dominan	t cover		OV	Sub-do	minant co	/er	LWD,	SWD, DP
Water Quality	Tempe	rature (Deg C)	11.7	рН	7.9	Conductivity (uS/d	37	Turbio	lity	C-Clear	
Riparian Vegetati	on					Crown Closure			41-70%		
Left Bank Shape		Sloping				Right Bank Shape			Undercut		
Left Bank Texture		Fines				Right Bank Textur	е	ines			
Left Bank Ripariar	vegetati	on Mixedw	ood			Right Bank Riparia	n Vegeta	ation	Mixedwoo	od	
Left Bank Stage		Young F	orest			Right Bank Stage		,	Young For	est	
Habitat Commen	ts Fi	ish Species	AO - All Salr	monids							
Spawning	Go	od - Small channel, h	nowever good pe	ea-sized gr	avels for sp	awning both in channel and	on side bar	s that are like	ly wetted du	ring hig	her flow seasons.
Rearing	Go	od - Pools found dov	vnstream of culv	ert provid	e good rear	ing habitat. Abundant cover	r.				
Overwintering	Mo	oderate - Small chani	nel size with limi	ted deep p	oools. Only	overwintering potential for	juveniles.				
Migration	Go	od - No barriers with	nin study area.								
Fish Information	Hi	storical Fish Pre	sence N	No data							
Fished -2015		ot visited	Species Cap	tured-2	015	N/A Spec			Stage-201	5	N/A
Fished -2016	Ye	S	Species Cap	tured-2	016	NFC Species Stage-2016 N/A				6	N/A

Photo Comments

Downstream of culvert showing riffle pool habitat.

Site Comments

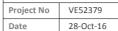
Channel flows in an irregular wandering pattern downstream of the culvert with multiple side bars. Cover in this area is provided mainly by overhanging vegetation and small woody debris. Upstream of the culvert the channel flows in the ditch parallel to the road for approximately 50m. This section is straight and heavily overgrown by shrub species (trees cleared for road ROW). Further upstream the channel turns into the forest where the gradient increases and the morphology changes. Gradient measured to 30% however step pool morphology may still allow fish passage. This section is confined and the substrates consist of gravels and cobbles.



Notes:	Cove	r	Fish	Species	DV	Delluverden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprev	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	IV	Instream vegetation	CCG	Slimy sculpin	TCD	Throospino stickloback		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro





Crossing Type		Access Roa	ad	Site N	umber	Wedeene FSR_174 Structure No.					
Watershed Code:		No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	S3				
Crew		DF, NN				UTM_Zone	09	UTN	/I Northing	6	5001828
Survey Date		7/3/2016						UTN	∕l Easting	5	20685
Time		15:40:26				Site Length (m)	Site Length (m) 100				
Channel		Visible cha	innel			Features	None	9			
Mean Channel Wi	dth (m)	1.61	Mean V	Vetted Wi	dth (m)	1.29	Mea	n Residual P	ool Depth (m	1)	0.11
Mean Gradient (%	5)	3	Domina	ate Substra	ate	Gravels	Sub-	Sub-dominate Substrate			
In-stream Cover		Abundant	Domina	ant cover		OV	Sub-	dominant co	ver S	WD, E	3, DP, IV
Water Quality	Tempe	rature (Deg C)	10.7	рН	7.1	Conductivity (uS	61	Turbidit	У	C-Clear	
Riparian Vegetati	on					Crown Closure			41-70%		
Left Bank Shape		Slopin	g			Right Bank Shap	е		Sloping		
Left Bank Texture		Fines				Right Bank Texture			Fines		
Left Bank Riparian	Vegetati	ion Mixed	wood			Right Bank Ripai	ian Vege	etation	Mixedwood		
Left Bank Stage		Young	Forest			Right Bank Stage	9		Young Fores	st	
Habitat Comment	ts F	ish Species	AO - All Sa	almonids							
Spawning		or - Gravels only fo aterials.	ound below culv	ert. High amo	ount of sedir	mentation likely from roa	d crossing	creating a thin I	ayer of fine mat	erials c	on top of coarse
Rearing	Mo	oderate - Some po	ol habitat. High a	amount of co	ver.						
Overwintering	Mo	oderate - Lack of d	eep pool habitat	however flo	ws likely ma	intained year round. Onl	y suitable t	or juveniles.			
Migration	Go	ood - Culvert and ro	oad crossing may	y be a barrier	. No other b	arriers observed.					
Fish Information	Hi	storical Fish Pr	resence	No data							
	NI.	and the second	Cnasias Ca	anturad 20	24.5	21/2		Cnasias	Stage-2015	NI	/ •
Fished -2015	IVC	ot visited	Species Ca	aptureu-zi	J15	N/A		species	31age-2015	IN,	/A

Photo Comments

Downstream extent of study area.

to be through the ground. May be a barrier.

Site Comments

Watercourse characteristics upstream and downstream vary considerably. Upstream - small, unconfined, uniform channel with little pool habitat. Substrate is primarily fines and gravels. A small wetland 20 m wide by 30 m long is just upstream of the culvert. Good cover among wetland sedges. Downstream - confined channel with slightly larger gradient. Substrate is gravel, cobble and boulder. More riffle/pool habitat. Gravel substrate dominant because it is present upstream and downstream. Fines is subdominant because of high amounts upstream of the culvert and moderate amounts below. Cobble and boulder are common downstream but not found upstream.

Creek crossing underneath road has two culverts though majority of flow appears



Notes:	Cove	•	Fish	Species	DV	Dellerenden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	There are in a set of the fee of		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type	Access Road		Site N	umber	Wedeene FSR_27	93		Structure No		
Watershed Code:	No data				Stream Order	1				
Stream Name	Unnamed				Stream Class	S4				
Crew	DF, NN				UTM_Zone	09	ITU	√ Northing	6011645	
Survey Date	7/3/2016						UTI	√ Easting	522493	
Time	12:00:09				Site Length (m)	100				
Channel	Dry Channe	l			Features None					
Mean Channel Width	(m) 1.31	Mean We	etted Wi	dth (m)	0.29	Mear	n Residual P	ool Depth (m)	0.04	
Mean Gradient (%)	7	Dominate	e Substra	ate	Fines	Sub-c	dominate Su	ıbstrate Gr a	avels	
In-stream Cover	Abundant	Dominan	t cover		SWD	Sub-dominant			/D, OV	
Water Quality Te	emperature (Deg C)	No data	рН	No data	Conductivity (uS/	cm)	No data	Turbidity	No data	
Riparian Vegetation					Crown Closure			71-90%		
Left Bank Shape	Sloping				Right Bank Shape			Sloping		
Left Bank Texture	Fines				Right Bank Textu	re	Fines			
Left Bank Riparian Ve	getation Conifer	ous			Right Bank Ripari	an Vege	etation	Coniferous		
Left Bank Stage	Young F	orest			Right Bank Stage	t				
Habitat Comments	Fish Species	AO - All Salr	nonids							
Spawning	Poor - Poor connectivit	ry to salmonid-be	earing stre	ams. Only gr	avel/cobble substrate is fr	om the ro	oad bed fill.			
Rearing	Poor - Channel become	es non-classified	drainage u	pstream of o	culvert. Some areas may h	ave pools	at higher flows	5.		
Overwintering	None - Dry or very shall	llow channel.								
Migration	Poor - Poor connectivit	y between shallo	ow pools. I	Ory channel	upstream.					
Fish Information	Historical Fish Pre	sence N	lo data							
Fished -2015	Not visited	Species Cap	tured-2	015	N/A		Species	Stage-2015	N/A	
Fished -2016	No	Species Cap	tured-2	016	N/A	Species Stage-2016 N/A				

Photo Comments

Near the confluence of a slightly larger creek. Upstream photo shows woody debris filling/covering the channel.

Site Comments

Defined channel from culvert to another drainage approximately 40 m downstream from culvert. This section of channel is filled with woody debris from spacing which has collapsed into the channel. Channel is mostly dry with limited flow near the confluence. Upstream of the culvert there is 30m of defined channel before the drainage becomes a non-classified drainage. Some gravel and cobble likely from the road creates one side bar. Otherwise, the channel substrate is comprised of fine materials.



Notes:	Cove	r	Fish	Species	DV	Dellerenden	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculnin	TCD	Theoremina sticklohook		bearing except where noted.

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



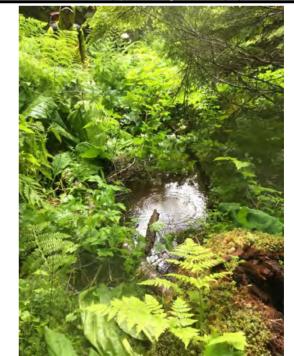
Crossing Type		Access Roa	nd	Site N	Number	Wedeene FSR_2796			Structure	e No.	
Watershed Code:		910-66506	2-20282			Stream Order	2				
Stream Name		Unnamed				Stream Class	S3				
Crew		DF, NN				UTM_Zone	09	UTIV	1 Northing	5	6011321
Survey Date		7/2/2016				UTM Ea					522025
Time		15:50:45				Site Length (m) 100					
Channel		Visible cha	nnel			Features	C - C	ascade or chi	ute		
Mean Channel Wid	dth (m)	1.59	Mean	Wetted W	idth (m)	0.94	Mea	n Residual Po	ool Depth	(m)	0.11
Mean Gradient (%)	11	Domii	nate Substr	ate	Fines	Sub-	dominate Sul	bstrate	Fines	S
In-stream Cover		Abundant	Domii	nant cover		OV	dominant co	ver	LWD	, SWD, UC	
Water Quality	Temp	erature (Deg C)	6.9	рН	6.5	Conductivity (uS/	/cm)	20	Turbi	dity	C-Clear
Riparian Vegetation	on					Crown Closure			71-90%		
Left Bank Shape		Slopin	g			Right Bank Shape			Sloping		
Left Bank Texture		Fines				Right Bank Texture Fines					
Left Bank Riparian	Vegeta	tion Conife	rous			Right Bank Ripari	Right Bank Riparian Vegetation Coniferous				
Left Bank Stage		Young	Forest			Right Bank Stage Young Forest					
Habitat Comment	s	Fish Species	AO - All	Salmonids							
Spawning	N	lone - No coarse all	ıvial substrate	S.							
Rearing	Р	Poor - Many drops o	nce section of	stream survey	red. Some de	eep pools and overhanghir	ıg vegetati	ion provides cov	er.		
Overwintering	P	oor - Only a few po	ols that may p	rovide overwii	ntering habit	tat.					
Migration	P	oor - Beaver dam a	nd many drops	ranging from	0.8 to 2 m v	vould greatly decrease abi	lity for juv	eniles to migrate	e upstream.		
Fish Information	H	Historical Fish P	esence	No data							
Fished -2015	ed -2015 Not visited Species Captured-2015					N/A		Species S	Stage-201	.5	N/A
Fished -2016	Υ	'es	Species	Captured-2	016	NFC					N/A

Photo Comments

Downstream view of channel downstream of road.

Site Comments

Creek assessed up to 200 m checking for fish barriers. A beaver dam and several small drops were observed. Downstream of the culvert the channel is confined with steep valley walls. Upstream the valley walls are much lower and the creek is occasionally confined. Trees cut down for spacing are discarded into the creek completely covering the channel. Small beaver dam upstream of the culvert impounds a small amount of water. Upstream of this the channel is completely dry.



Notes:	Cove	•	Fish	Species	DV	Dellassadas	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instroam vegetation	CCG	Slimy sculpin	TCD	There are the area to be a set of the least of the second		hearing except where noted

Prepared for BC Hydro

Project No VE52379 Date 28-Oct-16



Crossing Type		Access Road	1	Site N	lumber	Wedeene FSR_279	7	St	ructure No		
Watershed Code:		No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	NCD				
Crew		NN, JR, DF				UTM_Zone	09	UTM N	lorthing	6011599	
Survey Date		7/3/2016						UTM E	522464		
Time		12:50:42				Site Length (m)	100				
Channel		Non-classifi	ed Drainage	j		Features	None				
Mean Channel Wi	dth (m)	No data	Mean V	Vetted W	idth (m)	No data	Mean Resi	No data			
Mean Gradient (%	5)	No data	Domina	te Substr	ate	Fines	Sub-domin	ate Subst	trate Fin	es	
In-stream Cover		N/A	Domina	nt cover		N/A	Sub-domin	ant cover	r N/	A	
Water Quality	Temper	rature (Deg C)	No data	рН	No data	Conductivity (uS/c	m) No	data	Turbidity	No data	
Riparian Vegetati	on	,				Crown Closure		A			
Left Bank Shape		Sloping				Right Bank Shape		Slo	Sloping		
Left Bank Texture		Fines				Right Bank Texture	9	Fin	ies		
Left Bank Riparian	Vegetati	on Conifer	ous			Right Bank Riparia	n Vegetatio	n Co	niferous		
Left Bank Stage		Young F	orest			Right Bank Stage		Yo	ung Forest		
Habitat Comment	ts Fi	sh Species	N/A								
Spawning	N/A	A									
Rearing	N/A	A									
Overwintering	N/A	A									
Migration	N/A	A									
Fish Information	His	storical Fish Pre	sence	No data							
Fished -2015	No	t visited	Species Ca	ptured-2	015	N/A	Species Stage-2015 N/A		N/A		
Fished -2016	No)	Species Ca	ptured-2	016	N/A Species Stage-2016			ge-2016	N/A	

Photo Comments

Downstream view just below culvert.

Site Comments

No scour, alluvials, and no continuous channel, some pockets of water.



Notes:	Cove	•	Fish	Species	DV	Dellassadas	Stream Class	
N/A Assessed but no data to report	SWD	Small woody debris	AS	Atlantic salmon	DV L	Dolly varden Lamprey	Fish bearing	Non-fish bearing
	LWD	Large woody debris	CC	Sculpins	PK	Pink salmon	S1 > 20 m	S5 > 3 m
	В	Boulder	CCT	Coastal cutthroat trout	PL	Pacific Lamprey	S2 > 5 m - 20 m	S6 < 3 m
	UC	Undercut bank	CH	Chinook salmon	RB	Rainbow trout	S3 1.5 m - 5 m	NVC No visible channel
	DP	Deep pools	CM	Chum salmon	SA	Salmon	S4 < 1.5 m	NCD Non-classified drainage
	OV	Overhanging vegetation	CO	Coho salmon	SK	Sockeye salmon		NCD and wetlands are non-fish
	I\/	Instream vegetation	CCG	Slimy sculpin	TCD	There are the area to be a set of the least of the second		hearing except where noted

Freshwater Fish and Fish Habitat Catalog

Prepared for BC Hydro

Project No VE52379

Date 28-Oct-16



Crossing Type		Access Road		Site N	umber	Wedeene FSR_287	73		Structur	e No.	
Watershed Code:		No data				Stream Order	1				
Stream Name		Unnamed				Stream Class	NCD				
Crew		DF, NN				UTM_Zone	09	UTI	M Northin	g	6000539
Survey Date		7/3/2016						UTI	M Easting		520515
Time		13:58:48				Site Length (m)	100				
Channel		Visible chan	nel			Features	None	9			
Mean Channel Wi	idth (m)	0.91	Mean \	Wetted Wi	dth (m)	0.58	Meai	n Residual P	ool Depth	(m)	0.09
Mean Gradient (%	ó)	2	Domina	ate Substra	ate	Gravels	Sub-	dominate Sι	ubstrate	Fines	
In-stream Cover		Abundant	Domina	ant cover		OV	Sub-	dominant co	over	SWD	
Water Quality	Temper	ature (Deg C)	12.9	рН	6.7	Conductivity (uS/	cm)	19	Turbi	dity	C-Clear
Riparian Vegetati	on					Crown Closure			1-20%		
Left Bank Shape		Sloping				Right Bank Shape			Sloping		
Left Bank Texture		Fines				Right Bank Texture Fines					
Left Bank Riparian	n Vegetati	on Conifer	us			Right Bank Riparia	an Vege	etation	Mixedwo	od	
Left Bank Stage		Young F	orest			Right Bank Stage			Young Fo	rest	
Habitat Comment	ts Fi	sh Species	AO - All S	almonids							
Spawning	Nor	ne - Fish barrier dow	nstream wou	uld prevent fis	h from ent	ering area. Small channel siz	ze and lac	ck of pool habit	at for holdin	g.	
Rearing	Nor	ne - Fish barrier dow	nstream. Sm	all channel wi	th shallow	depths. Dry in areas.					
Overwintering	Nor	ne - Lack of depth ar	nd barrier dov	wnstream.							
Migration	Nor	ne - Migration barrie	er downstrear	m.							
Fish Information	His	storical Fish Pre	sence	No data							
Fished -2015	No	t visited	Species C	aptured-20	015	N/A	Species Stage-2015 N/A			N/A	
Fished -2016	Yes	s	Species C	aptured-20	016	NFC	Species Stage-2016 N/A				N/A

Photo Comments

Non-classified drainge section approximately 50 m downstream from the culvert. Water flow subterranean and over land without scour or alluvial deposits.

Site Comments

Trees cleared on the upstream side of the culvert for about 30 m. Thick growth of shrubs in this area completely hides the channel.

50 m downstream the channel becomes dry, then widens and then becomes undefined. Flow upstream becomes subsurface flow. Subsurface flows extend approx 29 m before flowing at the surface again. Surface flow is over organic materials without defined banks or scour (non-classified drainage). This section extends at least another 30 m. The non-classified drainage and subsurface flow creates a fish barrier for all species. No fish captured.



Notes:	Cover		Fish Species		DV	Dollywordon	Stream Class	
N/A Assessed but no data to report	SWD LWD B UC	Small woody debris Large woody debris Boulder Undercut bank	AS CC CCT CH	Atlantic salmon Sculpins Coastal cutthroat trout Chinook salmon	DV L PK PL RB	Dolly varden Lamprey Pink salmon Pacific Lamprey Rainbow trout Salmon Sockeye salmon	Fish bearing S1 > 20 m S2 > 5 m - 20 m S3 1.5 m - 5 m	Non-fish bearing S5 > 3 m S6 < 3 m NVC No visible channel
	DP OV	Deep pools Overhanging vegetation	CM	Coho salmon	SA SK		S4 < 1.5 m	NCD Non-classified drainage NCD and wetlands are non-fish hearing except where noted

PREPARED FOR BC HYDRO

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
TERRACE – KITIMAT TRANSMISSION PROJECT
ENVIRONMENTAL AND SOCIO-ECONOMIC EFFECTS REPORT

Appendix B.3

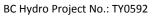
Fish Capture Data



Site Number	Canadaa Cambuunad		Fork ler	ngth (ı	mm)	Weight (g)			
	Species Captured	n	Mean	SE	Range	n	Mean	SE	Range
TL2	RB	2	126	36	84 - 167	2	27.9	16.9	8.2 - 47.7
	ССТ	1	75	-	-	1	4.4	-	-
TL3	СО	5	40	1	37 - 43	5	1.0	0.1	
	DV	2	30	2	28 - 32	2	0.6	0.2	0.4-0.8
	L	1	113	-	-	1	3.0	-	-
	ССТ	1	106	-	-	1	117.0	-	-
TL6	ССТ	2	63	0	63.0	1	3.7	-	-
TL17	СО	22	39	1	34 - 48	7	1.2	0.6	0.4 - 4.6
	DV	6	38	8	27 - 80	2	2.4	2.1	0.3 - 4.5
	ССТ	2	134	66	68 - 200	1	3.5	-	-
TL19	ССТ	4	84	15	54 - 121	3	8.8	3.3	3.3 - 14.6
	СО	5	44	3	34 - 50	4	1.1	0.3	0.5 - 1.9
TL26	RB	2	99	5	94 - 104	2	12.5	1.8	10.7 - 14.3
TL27	RB	1	96	1	-	1	10.9	-	-
TL29	RB	1	105	-	-	1	12.5	-	-
TL31	RB	3	83	14	38 - 110	3	7.9	4.1	2.6 - 16.1
TL32	UNK	1	40	-	-	0	-	-	-
RD158	RB	2	66.0	1.0	65 - 67	2	3.8	0.2	3.6 - 3.9
RD159	RB	3	91.7	3.3	87 - 98	1	3.7	-	-

Species: L = lamprey, CO = coho salmon, CCT = coastal cutthroat trout, DV = Dolly Varden, RB = rainbow trout

Notes: mm = millimetres, g = grams, n = number, SE = standard error



Amec Foster Wheeler Project No.: VE52379

01 March 2016

