Tikwalus Project

Alexandra Bridge Attraction and RV Campground on Highway 1

Conceptual Design & Feasibility Assessment Report

Prepared for:

Spuzzum First Nation
36500 Main Road
Spuzzum, BC V0K 2S1

August 2020

Wedler Engineering LLP
201 – 9300 Nowell Street
Chilliwack, BC V2P 4V7

August 11, 2020

File Ref: C20-5714/A

Spuzzum First Nation
36500 Main Road
Spuzzum, BC V0K 2S1

Attention: Chief James Hobart
Crystal Hatzidimitriou, Band Administrator

Reference: Tikwalus Project - Alexandra Bridge Attraction and RV Campground on Highway 1 Conceptual Design & Feasibility Assessment

INTRODUCTION

Spuzzum First Nation is contemplating a RV Campground and Historic Interpretive Nodes Centre in conjunction with the potential restoration and preservation of the Alexandra Bridge by the Province in cooperation with Spuzzum First Nation, New Pathways to Gold, BC Parks, Heritage Branch and MOTI. Proposed ancillary works to support tourism and the historical value for the bridge include Hwy 1 upgrades, parking upgrades, safe pedestrian crossings, interpretive center and trail/pathway access.

The proposed RV Campground will consist of 50 RV sites, 10 fully furnished cabins, walk in tenting sites and an amenity building including a swimming pool. A new access is proposed from the day parking area at the current gravel pit, see *Appendix A* for Wedler Engineering plans.

This report addresses the conceptual servicing and construction budget estimates for the associated civil works.

SITE DESCRIPTION

Alexandra Bridge and the area for the proposed ancillary and RV Campground works are within the current area of Alexandra Bridge Provincial Park. Limited parking exists off of the west side of Hwy 1 with no controlled access point. Anderson River Forest Service Road (FSR) intersects Highway 1 on the east side just north of this parking area with a Ministry of Transportation and Infrastructure (MOTI) gravel storage area adjacent to the north. Farther south and just north of the Highway 1 Bridge across the Fraser River there are 2 access areas to the east which lead into a large wooded bench area. There are no dedicated turn lanes through the area and the posted speed on Highway 1 is 100 km/h. The CN Rail runs along the east side of the Fraser River with the CP Rail along the west side.

Current access to the Old Alexandra Bridge is via a remaining section of the Old Cariboo Highway accessed by foot from the parking area. Pedestrians must cross the CN Rail at an uncontrolled grade level crossing.

Anderson River FSR supports residents, BC Hydro, backcountry recreation, and forestry activities. Previous gravel extraction has occurred just a few hundred meters off the highway, leaving a large usable flat area.

PROPOSED WORKS

The proposed ancillary works to support tourism in conjunction with the restoration and preservation works for the Old Alexandra Bridge consists of:

- Highway upgrades with left turn lanes to the parking
- Anderson River FSR upgrades, paved
- Day parking with controlled access, gravel surface
- Washroom Facilities
- Highway and Railway pedestrian underpass crossings
- Interpretive center
- Trails and paths with information stops

With expected significant visitor increases, the main concern is to create a suitable parking area with controlled access and safe pedestrian access to the Bridge, Interpretive Center and pathway system. This is achieved by using the Anderson River FSR access in conjunction with widening for a left turn lane off of Highway 1 and creating parking spaces in the old gravel extraction area. A pedestrian underpass will allow for safe access from the day parking area to the Bridge and amenities. This improved access will also provide access to the RV Campground via a new access road. These works will effectively eliminate the multiple small access points through the area for safe vehicle movement.

The proposed RV Campground is situated on the wooded bench area south of the proposed day parking area on the east side of Highway 1. The details and proposed servicing consist of the following:

- Access Road from the upgraded Anderson River FSR, paved
- Onsite access roads, gravel
- 50 RV sites serviced with power and water
- 10 fully furnished cabins with power, water and sewer
- Amenity building with full washroom facilities and a swimming pool
- Walk in tent sites

PROPOSED SERVICING

Highway 1 and Anderson River FSR upgrades would be to MOTI specifications, the balance of access roads and parking areas to be to Master Municipal Construction Documents (MMCD) specifications. All detailed design works to be completed under the direction of a professional civil engineer.

Sanitary flows will be handled with standard septic tank and field systems, one at the day use parking washroom and one at the RV Campground. A Feasibility Assessment has been provided by Arden Consulting in *Appendix B* and final designs and testing would be conducted with the detailed design process.

Water is expected to be available from wells, one for the day use parking washroom and one at the RV Campground. Well exploration by a professional hydrogeologist will follow as a detailed design process with the expectation water to be available at approximately 60-70m depth if not higher, subject to subsurface materials encountered.

There is a significant overhead hydro transmission line along Highway 1. Separate power feeds for the day use parking area and the RV Campground are expected to be available from this line via separate service poles and underground dip service for the RV Campground portion. Further analysis and coordination with BC Hydro will be completed by an electrical engineer through detailed design process.

CONSTRUCTION BUDGET ESTIMATE

The estimate is included in *Appendix C* and should be considered as a high level Class C construction budget estimate. The costs are based on local knowledge and typical industry unit rates. Revisions and updates should be expected through the application, detailed design and approvals processes.

DESIGN CRITERIA

Detailed design drawings would need to be prepared to MOTI specifications for construction for road widening, geometry and intersection works.

All detailed designs for MOTI must be completed by a professional engineer and all construction must be to MOTI standards and specifications with review and certification by a professional engineer.

All other roadworks and servicing will be completed under the guidance of the Master Municipal Construction Documents (MMCD).

NEXT STEPS

We would understand there to be further funding requests by Spuzzum to move to the detailed design stage in conjunction with the entire proposed project. Meetings and coordination with MOTI, Parks, Forestry and other applicable regulatory agencies for applications and approvals would be required. A site investigation and report by a geotechnical engineer would need to be completed to confirm / support the civil detailed design, construction methodology and MOTI acceptance.

CONCLUSION

This report was prepared for Spuzzum First Nation in support for the preparation of the business / feasibility case and further funding application process and approvals for next steps. We trust that the information contained herein is suitable and sufficient to support further process.

If you have any questions or require further information, please do not hesitate to contact the undersigned.

Yours truly,
Wedler Engineering LLP

Per:

Glen Darychuk,
Project Manager
gdarychuk@wedler.com

Reviewed by:

Kelly Kerr, P.Eng.
Partner

cc: Mel Wooley, Land Strategies

Enclosures:

Appendix A	Wedler Engineering drawings:	C20-5714/B-D01 – Concept Servicing Plan Overall C20-5714/B-D02 – Sanitary and Hydro C20-5714/B-D03 – Water
Appendix B	Feasibility Assessment dated June 26, 2020 by Arden Consulting Engineers Ltd. On-Site Wastewater Treatment System Tikwalus Project, Spuzzum BC	
Appendix C	High Level Class C Construction Cost Estimate/Budget	

APPENDIX A

Wedler Drawings:

C20-5714/B-D01 – Concept Servicing Plan Overall
C20-5714/B-D02 – Sanitary and Hydro
C20-5714/B-D03 – Water

APPENDIX B

Feasibility Assessment, Arden Consulting Engineers Ltd.

APPENDIX C

Tikwalus Budget Construction Estimate

APPENDIX A

Wedler Drawings:

C20-5714/B-D01 – Concept Servicing Plan Overall
C20-5714/B-D02 – Sanitary and Hydro
C20-5714/B-D03 – Water

HWY 1

PROP HWY 1 WIDENING FOR LEFT TURN LANE

PEDESTRIAN CROSSING UNDER HIGHWAY

FUTURE RAILWAY CROSSING AND TRAIL

INTERPRETIVE CENTER

OLD CARIBOO HIGHWAY

PEDESTRIAN CROSSING UNDER RAILWAY

ALEXANDRA BRIDGE

BC HYDRO O/H LINE AND POLE

SERVICE ROAD

ANDERSON RIVER MAINLINE (FSR)

DAY PARKING AREA

FACILITIES WILL INCLUDE:

- WATER WELL
- POWER
- SEPTIC TANK AND FIELD FOR WASHROOM BUILDING

RV CAMPGROUND

ROADS	
HIGHWAY TO CAMPGROUND ENTRANCE	= 210m
CAMPGROUND ENTRANCE TO RV PARK	= 315m
RV PARK INTERNAL	= 905m
DAY PARKING ENTRANCE	= 25m
DAY PARKING	= 6615m²

SERVICES	
SANITARY SEWER (100mm/150mm DIAMETER PVC)	= 100m/205m (c/w 4ø MANHOLES)
WATER MAIN (75mm DIAMETER HDPE DR17)	= 850m
BC HYDRO O/H LINE (c/w 2 POLES)	= 80m
BC HYDRO U/G LINE	= 850m
SEPTIC TANK AND DRAINAGE FIELD	= 8ø 3m x 70m INFILTRATION BEDS FOR TYPE 1 SYSTEM
WATER WELL	
RV WATER AND HYDRO SERVICES	= 50 (NOT SHOWN)
CABIN SANITARY, WATER, AND HYDRO SERVICES	= 10 (NOT SHOWN)

ENTRANCE OFFICE

EXISTING ACCESS POINTS TO BE TO BE DECOMMISSIONED

RV SITE (TYP)

BC HYDRO U/G LINE

WATER MAIN

BC HYDRO O/H LINE AND POLE

AMENITY BUILDING

CABIN (TYP)

WALK IN TENT SITE (TYP)

SEPTIC TANK AND DRAINAGE FIELD

100mm ø SAN SEWER SERVICING AMENITY BUILDING

WATER WELL

150mm ø SAN SEWER SERVICING CABINS

HWY 1

CP RAIL

CN RAIL

FRASER RIVER

LEGAL:

BM/
TBM:

REV	DESCRIPTION	YYYY-MM-DD	BY
A	ISSUED FOR REPORT	2020-08-06	KEG

REV	DESCRIPTION	YYYY-MM-DD	BY

PROJ. MGR.	GWD
DESIGN/DRAWN	PJS
PEER REVIEWED	CHWK
HORIZ. SCALE	1:1500
VERT. SCALE	–

WEDLER ENGINEERING

www.wedler.com

THE WEDLER GROUP
- Abbotsford 1.604.746.0300
- Chilliwack 1.604.792.0651
- Courtenay 1.250.334.3263
- Surrey 1.604.588.1919

SPUZZUM FIRST NATIONS

TIKWALUS RV PARK

ALEXANDRA BRIDGE, BC

CONCEPT SERVICING PLAN – OVERALL

DRAWING NO. C20-5714/B-D01 | OF –3–

LOCAL GOVERNMENT FILE –

PHASE | REVISION .A.

K:\57005799\C20-5714B – Spuzzum Tikwalus Project\Design\– Current Drawing Files\C20-5714b – Pln – Tikwalus Civil.dwg 2020/8/06 01:45:43 PM KGieseler

PROGRESS PRINT - NOT FOR CONSTRUCTION

HWY 1

PROP HWY 1 WIDENING FOR LEFT TURN LANE

PEDESTRIAN CROSSING UNDER HIGHWAY

FUTURE RAILWAY CROSSING AND TRAIL

INTERPRETIVE CENTER

OLD CARIBOO HIGHWAY

PEDESTRIAN CROSSING UNDER RAILWAY

ALEXANDRA BRIDGE

BC HYDRO O/H LINE AND POLE

SERVICE ROAD

ANDERSON RIVER MAINLINE (FSR)

DAY PARKING AREA

FACILITIES WILL INCLUDE:

- WATER WELL
- POWER
- SEPTIC TANK AND FIELD FOR WASHROOM BUILDING

RV CAMPGROUND

ROADS	
HIGHWAY TO CAMPGROUND ENTRANCE	= 210m
CAMPGROUND ENTRANCE TO RV PARK	= 315m
RV PARK INTERNAL	= 905m
DAY PARKING ENTRANCE	= 25m
DAY PARKING	= 6615m²

SERVICES	
SANITARY SEWER (100mm/150mm DIAMETER PVC)	= 100m/205m (c/w 4ø MANHOLES)
WATER MAIN (75mm DIAMETER HDPE DR17)	= 850m
BC HYDRO O/H LINE (c/w 2 POLES)	= 80m
BC HYDRO U/G LINE	= 850m
SEPTIC TANK AND DRAINAGE FIELD	= 8ø 3m x 70m INFILTRATION BEDS FOR TYPE 1 SYSTEM
WATER WELL	
RV WATER AND HYDRO SERVICES	= 50 (NOT SHOWN)
CABIN SANITARY, WATER, AND HYDRO SERVICES	= 10 (NOT SHOWN)

ENTRANCE OFFICE

EXISTING ACCESS POINTS TO BE TO BE DECOMMISSIONED

RV SITE (TYP)

BC HYDRO U/G LINE

BC HYDRO O/H LINE AND POLE

AMENITY BUILDING

CABIN (TYP)

WALK IN TENT SITE (TYP)

SEPTIC TANK AND DRAINAGE FIELD

100mm ø SAN SEWER SERVICING AMENITY BUILDING

150mm ø SAN SEWER SERVICING CABINS

CP RAIL

CN RAIL

FRASER RIVER

HWY 1

K:\57005799\C20-5714B - Spuzzum Tikwalus Project\Design\- Current Drawing Files\C20-5714b - Pln - Tikwalus Civil.dwg 2020/8/06 01:47:23 PM KGieseler

LEGAL:

BM/
TBM:

REV	DESCRIPTION	YYYY-MM-DD	BY
A	ISSUED FOR REPORT	2020-08-06	KEG

REV	DESCRIPTION	YYYY-MM-DD	BY

PROJ. MGR.	GWD
DESIGN/DRAWN	PJS
PEER REVIEWED	CHWK
HORIZ. SCALE	1:1500
VERT. SCALE	-

WEDLER ENGINEERING

www.wedler.com

THE WEDLER GROUP
- Abbotsford 1.604.746.0300
- Chilliwack 1.604.792.0651
- Courtenay 1.250.334.3263
- Surrey 1.604.588.1919

SPUZZUM FIRST NATIONS

TIKWALUS RV PARK

ALEXANDRA BRIDGE, BC

CONCEPT SERVICING PLAN – SAN & HYDRO

DRAWING NO. C20-5714/B-D02 | OF -3-

LOCAL GOVERNMENT FILE –

PHASE | REVISION .A.

PROGRESS PRINT - NOT FOR CONSTRUCTION

HWY 1

PROP HWY 1 WIDENING FOR LEFT TURN LANE

PEDESTRIAN CROSSING UNDER HIGHWAY

FUTURE RAILWAY CROSSING AND TRAIL

INTERPRETIVE CENTER

OLD CARIBOO HIGHWAY

PEDESTRIAN CROSSING UNDER RAILWAY

ALEXANDRA BRIDGE

SERVICE ROAD

ANDERSON RIVER MAINLINE (FSR)

DAY PARKING AREA

FACILITIES WILL INCLUDE:

- WATER WELL
- POWER
- SEPTIC TANK AND FIELD FOR WASHROOM BUILDING

RV CAMPGROUND

ROADS	
HIGHWAY TO CAMPGROUND ENTRANCE	= 210m
CAMPGROUND ENTRANCE TO RV PARK	= 315m
RV PARK INTERNAL	= 905m
DAY PARKING ENTRANCE	= 25m
DAY PARKING	= 6615m²
SERVICES	
SANITARY SEWER (100mm/150mm DIAMETER PVC)	= 100m/205m (c/w 4# MANHOLES)
WATER MAIN (75mm DIAMETER HDPE DR17)	= 850m
BC HYDRO O/H LINE (c/w 2 POLES)	= 80m
BC HYDRO U/G LINE	= 850m
SEPTIC TANK AND DRAINAGE FIELD	= 8# 3m x 70m INFILTRATION BEDS FOR TYPE 1 SYSTEM
WATER WELL	
RV WATER AND HYDRO SERVICES	= 50 (NOT SHOWN)
CABIN SANITARY, WATER, AND HYDRO SERVICES	= 10 (NOT SHOWN)

ENTRANCE OFFICE

EXISTING ACCESS POINTS TO BE TO BE DECOMMISSIONED

RV SITE (TYP)

WATER MAIN

AMENITY BUILDING

CABIN (TYP)

WALK IN TENT SITE (TYP)

WATER WELL

CP RAIL

CN RAIL

FRASER RIVER

HWY 1

K:\57005799\C20-5714B - Spuzzum Tikwalus Project\Design\- Current Drawing Files\C20-5714b - Pln - Tikwalus Civil.dwg 2020/8/06 01:48:18 PM KGieseler

LEGAL:

BM/
TBM:

REV	DESCRIPTION	YYYY-MM-DD	BY
A	ISSUED FOR REPORT	2020-08-06	KEG

REV	DESCRIPTION	YYYY-MM-DD	BY

PROJ. MGR.	GWD
DESIGN/DRAWN	PJS
PEER REVIEWED	CHWK
HORIZ. SCALE	1:1500
VERT. SCALE	-

WEDLER ENGINEERING

www.wedler.com

THE WEDLER GROUP
- Abbotsford 1.604.746.0300
- Chilliwack 1.604.792.0651
- Courtenay 1.250.334.3263
- Surrey 1.604.588.1919

SPUZZUM FIRST NATIONS

TIKWALUS RV PARK

ALEXANDRA BRIDGE, BC

CONCEPT SERVICING PLAN – WATER

DRAWING NO. C20-5714/B-D03 | OF -3-

LOCAL GOVERNMENT FILE: –

PHASE | REVISION: .A.

APPENDIX B

Feasibility Assessment, Arden Consulting Engineers Ltd.

ARDEN CONSULTING ENGINEERS LTD.

June 26, 2020 File 20-49

Wedler Engineering LLP
201-9300 Nowell Street
Chilliwack, BC
V2P 4V7

Attention: Glen Darychuck

RE: Feasibility Assessment for Proposed On-Site Wastewater Treatment System Tikwalus Project, Spuzzum BC

Further to your request, Arden Consulting Engineers Ltd. (ACE) has completed a desk top study for onsite wastewater treatment for the aforementioned project. The purpose of the study is to assess the parcel's ability to support an onsite wastewater treatment system for a proposed Recreational Vehicle (RV) park development. The parcel lies within the Spuzzum First Nation (IR #1) and as such Sewage Disposal will be governed by First Nation's Health Authority (FNHA).

The study was completed without the benefit of a subsurface investigation or site reconnaissance to determine soil depth, presence/absence of restrictive layer, soil permeability and site constraints. For the purpose of the study, the following characteristics were assumed:

- Depth of native permeable soil above the seasonal high water table exceeds 2m
- Percolation rate of 4-7.5 minutes per inch or faster

A detailed subsurface investigation would need to be performed in order to ascertain the above assumptions. Should the assumptions prove to be incorrect, then the required areas presented will need to be revised to reflect actual site conditions. ACE has completed numerous projects on IR #1 and as such is familiar with the subsurface conditions in the vicinity of the project.

BACKGROUND

It is our understanding that you wish to develop an RV Park with 50 sites, nine cabins and a central washroom with showers. The cabins are assumed to single room with occupancy for two people.

The corresponding design sewage flow rate is calculated in Table A below:

28049 Myrtle Ave, Abbotsford, BC V4X 2P5 Phone: (604) 807-1712 Fax: (604) 626-4980
www.arden-engineering.com

Table A – Estimated Design Daily Sewage Flow

Item	units	# of units	Flow per unit (L)	Flow (L/day)
RV Pad	site	50	170	8,500
Cabin	Occupants	9	450	4,050
Total				***12,550***

Based on a theoretical discharge volume of 12,500 Lpd, the discharge would be administered by FNHA. For discharges less than 22,7000 Lpd the FNHA typically applies the *Sewerage System Regulation* (SSR) and accompanying Standard Practice Manual (SPM).

OPTIONS FOR EFFLUENT DISPERSAL

Wastewater generated by RV parks is typically higher strength then wastewater generated by a typical residential development. Based on our experience with other RV projects, organic strength, measured as BOD_5, is estimated to be on the order of 800mg/L. This is approximately 4 times higher than residential strength wastewater. Accordingly, secondary treatment is typically applied to reduce the strength. If secondary treatment is not applied, then the organic loading rate, in addition to the hydraulic loading rate, should be considered in the design and sizing of the dispersal area.

We have calculated the approximate area required for the dispersal field based on Type 1 and Type 2 effluent with percolation rates of 4-7.5 minutes per inch and assuming the dispersal area is level with no site constraints. Type 1 effluent utilizes only a septic tank as treatment whereas Type 2 effluent is treated by a sewage treatment system to achieve the following standards:

- Biochemical Oxygen Demand (BOD_5) < 45mg/L
- Total Suspended Solids (TSS) <45 mg/L.

The above information is summarized below in Table B.

Table B– Estimated Area Required based on Effluent Type

Area required Type 1 (m2)	Area required Type 2 (m2)
1670 8 x (3m x 70m)	210 (3m x 70m)

Note that 3m spacing would be required between each of the eight 3m x 70m long infiltration beds, required for a Type 1 system, to allow construction traffic to move between adjacent beds. The maximum allowable bed width under the SPM is 3m.

It is noted that the areas presented above are preliminary. Further detailed permeability analysis and test pitting would be required in the subject area to accurately and defensibly establish the HLR and design flow rate for this area.

FURTHER STEPS

A site reconnaissance to evaluate the physical features, subsurface conditions and topography would be required to substantiate the assumptions made. This would also include permeability testing.

CLOSURE

This letter has been prepared by ACE exclusively for Wedler Engineering LLP and is intended to provide an assessment of the parcel's ability to accommodate a future septic system. The conclusions made in this report reflect ACE's best judgement in light of the information available at the time of testing. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. ACE accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this letter.

The findings and conclusions documented in this report have been prepared for specific application to this site and have been developed in a manner consistent with that class of care normally exercised by septic design professionals currently practicing under similar conditions in the area.

We trust that this provides the information you currently require. If you have any questions or require comment, please feel free to contact the undersigned.

Yours truly,

ARDEN CONSULTING ENGINEERS LTD.

PER:

Rob Arden, P.Eng.

APPENDIX C

Tikwalus Budget Construction Estimate

C20-5714/A
30-Jul-20

Tikwalus Budget Construction Estimate

ITEM		QUANTITY	PRICE	ESTIMATED COST
Ancillary				
Highway intersection	m	450	$ 1,666.67	$ 750,000.00
Highway to day parking	m	210	$ 1,000.00	$ 210,000.00
Day parking	m²	6615	$ 15.00	$ 99,225.00
Highway pedestrian underpass (within widening)	m	30	$ 15,000.00	$ 450,000.00
CNR pedestrian underpass	m	10	$ 20,000.00	$ 200,000.00
Utilities to washroom - well	ls	1	$ 15,000.00	$ 15,000.00
Utilities to washroom - septic	ls	1	$ 20,000.00	$ 20,000.00
Power for washroom (service pole & dip)	ls	1	$ 15,000.00	$ 15,000.00
West side service road	m	500	$ 150.00	$ 75,000.00
Washroom building				
Trail network				
Signs				
Total				**$ 1,834,225.00**
RV Site				
The access road from day parking	m	315	$ 1,000.00	$ 315,000.00
Onsite RV roads	m	905	$ 600.00	$ 543,000.00
RV pad sites	ea	50	$ 500.00	$ 25,000.00
Under ground power	m	850	$ 250.00	$ 212,500.00
well	ls	1	$ 15,000.00	$ 15,000.00
water reservoir/storage	ls	1	$ 15,000.00	$ 15,000.00
Watermain 75mm	m	850	$ 100.00	$ 85,000.00
Sanitary 150mm	m	205	$ 150.00	$ 30,750.00
Sanitary 100mm	m	100	$ 100.00	$ 10,000.00
Site power (service pole & dip)	ls	1	$ 15,000.00	$ 15,000.00
RV services	ea	50	$ 1,000.00	$ 50,000.00
Cabin services	ea	10	$ 750.00	$ 7,500.00
Septic field & tank	ls	1	$ 40,000.00	$ 40,000.00
Total				**$ 1,363,750.00**