Active Transportation Bridge, Mamquam Blind Channel Crown Land Tenure Management Plan

Prepared for:
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1 Background

1.1 Project Overview

Please accept this Management Plan, prepared by Cascade Environmental Resource Group Ltd. (Cascade), acting as an agent for the District of Squamish (DoS) supporting an application for a Crown land tenure right of way for a pedestrian active transport (AT) bridge that crosses the Mamquam Blind Channel (MBC) in Squamish, BC. The AT bridge will link the currently under construction Redbridge mixed residential and commercial development located at lots 1500 and 1606 Scott Crescent Road and downtown Squamish active transport trail system. Further the AT bridge will provide a safe route from Highway 99 bridge linking residents of other residential areas of Squamish south of MBC including Valleycliffe, Hospital Hill and Squamish Nation's 24 to the east and south.

The dimensions of the AT bridge are approximately 75 m in length by 5 m in width.

The AT bridge will be constructed by the developer Kingswood Crescent Developments and owned and operated by the District of Squamish (The Applicant). The AT bridge location was approved for construction by DoS Council in 2023 and is a requirement of the developer's Land Development Agreement (LDA) with the DoS. The full LDA has been uploaded with the application as a resolution of Municipal Council endorsing the application. Section 13 and ID#1 of "Schedule C- Amenity Benefit Package" of the LDA document list details of this AT bridge.

1.2 Investigative Work

The AT bridge has been planned as part of the Redbridge development since preliminary designs in 2014. Bridge design and location has been amended over the years from environmental study to reduce environmental impacts on the MBC. The first designs of the AT bridge considered a mid-channel crossing with a bridge consisting of numerous piles to span the channel. Construction of numerous piles in a section of the channel that had not been previously impacted led to a design change for a free spanning bridge structure. The free spanning bridge structure was utilized parallel to the existing highway bridge crossing to minimize disturbance to riparian areas and provide a location with the shortest span to meet engineering requirements. The crossing location provided an area that had been previously disturbed from the existing highway bridge and right of way servicing in the upland south landing. Table 1 below outlines environmental investigative work completed for the AT bridge.

Table 1: Investigative work completed in relation to the AT bridge

Activity	Brief Description of Activity	Status	Comments/Milestones
Preliminary Environmental Assessment was conducted for the site to the south of the municipal easement that straddles Scott Crescent in Squamish, BC (2014).	Identify environmentally valuable resources (EVRs) on or near (i.e. within 100 m of) the site and, if present, to determine the potential impacts as a result of the proposed development.	Complete	N/A

Activity	Brief Description of Activity	Status	Comments/Milestones
Preliminary Bio-Inventory Assessment (BIA) of the area where a proposed footbridge will be constructed, as well as to make recommendations for bridge construction and summarize regulatory requirements of the project (2019).	Identify EVRs on or near (i.e. within 100 m of) the site and, if present, to determine the potential impacts as a result of the proposed development.	Complete	N/A
An assessment of foreshore conditions on the southern MBC was conducted by Cascade (2018).	Four cross sections were established along the length of the foreshore with the upslope extent at the top of bank and the downslope extent being as far as the surveyors could walk into the MBC. Each cross section was then divided into areas having similar slope, substrate and vegetation, and information on these attributes was collected to describe each area.	Complete	The high water mark of the MBC was determined to be the Higher High Water Large Tide (HHWLT) level, which is the average of the highest high water levels over each of the 19 previous years and has been determined to be 2.05 m (geodetic) along the MBC south of the Highway 99 bridge.
Riparian Areas Regulation (RAR) Assessment for Scott Crescent Development (2018).	RAR assessment is completed as per Development Permit Area 1 (DoS).	Complete	N/A

Activity	Brief Description of Activity	Status	Comments/Milestones
Preliminary Environmental Assessment, Scott Crescent, Squamish, BC (2023).	Update to the Preliminary Environmental Assessment (PEA) conducted in 2014 by Cascade.	Complete	A review of data collected during the 2014 PEA was conducted to determine where any information needed to be updated. Updated items included: • Hydrology and aquatic environment • Terrestrial Ecosystem Mapping and vegetation association • Incorporated the DoS Sensitive Ecosystems Inventory data • New field observations for birds, reptiles, and amphibians • Updated tables of potential plant and wildlife species at risk • Fish sampling and water quality data of all watercourses Further information discussed in the current document includes the identification of additional EVRs. A desktop search was conducted prior to visiting the site to determine whether there were any EVRs in the study area (i.e. the subject property and a 100 m buffer beyond). This included a review of the DoS Sensitive Ecosystems Inventory data.

1.3 First Nations

The AT bridge location is located within the traditional territories of several First Nations as displayed in the provincial Contacts for First Nation Consultation Areas online tool (BC Gov, 2023). First Nations with interests in the area are presented in Table 2.

Table 2: First Nation traditional territories in which the Crown land tenure for the AT Bridge overlaps.

• Squamish Nation • Musqueam First Nation • Tsleil-Waututh Nation • Snuneymuxw First Nation

The project team will be initiating consultation with all First Nations listed with interests in the project area to provide comment on the proposed AT bridge.

Squamish Nation

The Squamish Nation was contacted on July 7th 2023, via the Squamish Nation Connect Portal to provide initial development designs of the AT bridge. Sebastien Blanchette of Squamish Nation commented that due to the elevated archaeological potential in the area, works should be treated with great care, and an archaeological assessment is advised for any works expanding around the channel. The project team provided Squamish Nation with the archeological assessment report conducted by Gordon Mohs for the Redbridge development and the "South Site" where the AT landing in the south is proposed.

Sebastien Blanchette requested that the Squamish Nation would like to review any environmental management plans for these proposed works and the project team responded that once plans have been produced, they will provide the documents for review.

The project team will continue to collaborate with the Squamish Nation throughout the permitting process of the pedestrian AT bridge.

Table 3: Summary of Engagement with Squamish Nation.

Date	Method of Communication	Summary
July 7th 2023	Squamish Nation Connect Referral Portal	Project team provided Squamish Nation with initial alignment and design of the pedestrian AT bridge for preliminary comments on the location before finalization of design. Correspondence continued until August 31st.

2 Location

2.1 General Description

The proposed AT bridge will span the MBC between the Redbridge residential development at lots 1500 and 1606 Scott Crescent Road parallel and on the east side of Highway 99 bridge.

The proposed Crown land tenure area is located above the channel bed of the MBC and under the jurisdiction of the province and designated unsurveyed Crown land. The proposed Crown land tenure overlaps an untitled provincial foreshore lot on the north side of the channel. Legal description of the untitled provincial water lot is provided below.

Untitled provincial water lot overlapping the proposed tenure area for the pedestrian AT bridge:

Parcel Identification Number (PIN): 7282700

Legal Description: DISTRICT LOT 6234, GROUP 1, NEW WESTMINSTER DIST.

The upland parcels in which the AT bridge landings are adjacent to the Crown tenure application area include Municipal lands and a right of way for servicing in the south. The upland parcel in the north includes a municipal right of way for the Rose Park Trail within the private commercial lands of the Squamish Adventure Inn (PID 014-831-139). The owners of the private lot for the Squamish Adventure Inn have been contacted for the proposed construction of the pedestrian bridge.

The DOS is applying for a Crown land tenure that will encompass the pedestrian AT bridge footprint that occupies the Crown land area above the channel bed of the MBC and within the untitled provincial water lot for a total area of 0.056 ha (Map 2).

2.2 Location Justification

The proposed AT bridge is required at this location because there is currently no safe, direct active transportation connection from the south of the MBC to the north MBC and downtown Squamish from residential areas. The bridge is needed to serve the Redbridge community as well as residents located directly to the east of the MBC including Valleycliffe, Hospital Hill and Squamish Nation's 24 to the east and south.

In the absence of a safe, active transportation connection, residents from the above communities who require pedestrian access to downtown are forced to walk via Highway 99. Sidewalks along Highway 99 are narrow close to traffic and do not allow two way bicycle traffic to pass. The AT bridge will be 4m in width to allow safe AT travel in both directions. The proposed AT bridge will also resolve seasonal concerns to the existing highway sidewalk that cannot be cleared of snow in the winter for access. The bridge width has been designed to accommodate DoS snow clearing equipment.

As such, an AT bridge is required in this location to facilitate a safe, direct, and accessible connection to Downtown Squamish for residents of multiple communities on the east side of the MBC.

2.3 Seasonal Expectation of Proposed Use

The following provides a timeline on when the project will be using Crown land for the AT bridge. Appropriate least risk timing windows for the MBC for in water works is proposed from September 15th – January 31.

Table 4: Seasonal Expectation of use for the AT Bridge

Construction/Operations	Brief Description	Season/Timing	Comments
Construction (In-water) of north abutment	In-water construction of the proposed AT bridge will consist of infill works on the north abutment, and placement of deck.	In-water construction is proposed from September 15th – January 31 during the timing window of least risk for the MBC and Howe Sound area.	
Construction (Above Water) placement of steel truss and deck and, construction of southern abutment and trail on the south side.	Construction of elements of AT bridge above the water.	Above water construction will occur once in water construction has been completed between February- August.	Above water construction will be monitored to ensure minimal impact to fish and fish habitat.
Revegetation of Riparian and foreshore area	Replanting of disturbed riparian areas and foreshore areas with native plants as part of the compensation requirements.	Revegetation will take place in spring or early fall depending on construction finish date.	Early spring or fall provides the best season for replanting.
Operations	Normal bridge operations once complete	Year round	The AT bridge is proposed to operate year-round, providing safe access during all seasons.

2.4 Historical Use

The proposed AT bridge southern abutment location of the MBC, for which a Crown Land Tenure is being applied, was thought to be previously utilized for forestry operation and log sorting as per aerial picture from 1981 (Figure 1). The aerial picture displays structures within the channel. Historical use in the northern abutment is unclear. The MBC has been historically used to sort, dump and store logs from forestry operations. Portions of the Channel have been dredged previously and portions of the Channel have been filled.

Figure 1: Aerial photo from 1989 of the subject area displaying structures within the southern abutment area of the AT bridge likely used for log handling and sorting.

GIS Cartographer: Oliver Chew
Date: *2023-11-29*
CERG File #: 333-01-07
Projection: NAD 1983 UTM Zone 10N

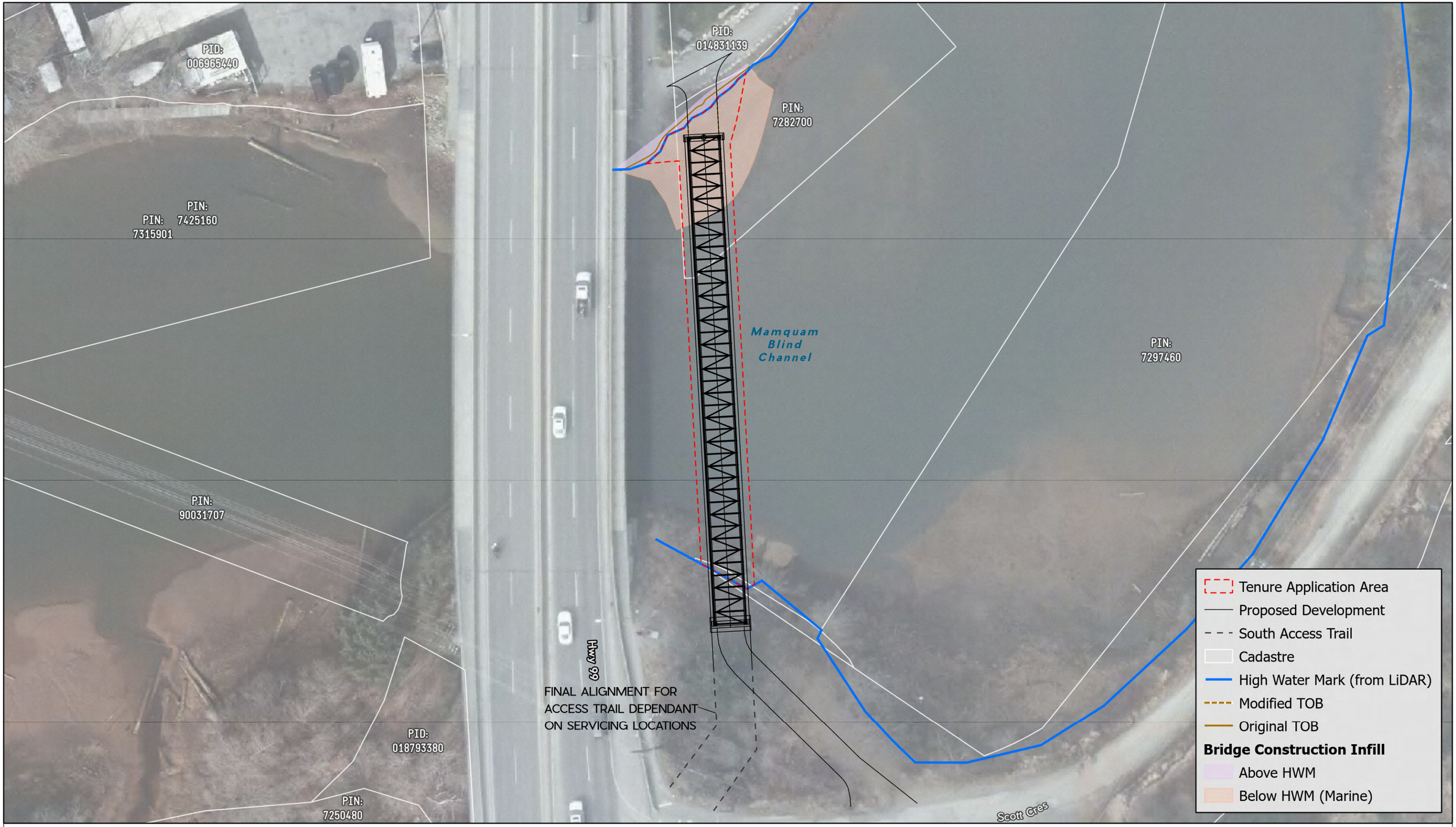
CASCADE ENVIRONMENTAL
RESOURCE GROUP LTD

N

0 0.5 1 2 3 4
Kilometers

Map 1 - Location

1500/1573/1583/1606 Scott Cres
Squamish
British Columbia



GIS Cartographer: Oliver Chew
Date: *2024-07-17*
CERG File #: 333-01-07
Projection: NAD 1983 UTM Zone 10N

CASCADE ENVIRONMENTAL
RESOURCE GROUP LTD

N

0 5 10 20 30 40
Meters

Map 2 - Site Plan

1500/1573/1583/1606 Scott Cres
Squamish
British Columbia

3 Existing Infrastructure and Land Conditions

3.1 Existing Conditions

Existing conditions of the proposed Crown land tenure for the AT bridge are summarized in this document. A more detailed environmental description has been provided in the DFO *Fisheries Act* Authorization and the *Water Sustainability Act* permit applications for the structure.

The proposed Crown land tenure area for the AT bridge currently consists of the foreshore channel of the MBC. Foreshore intertidal assessments were conducted in support of the environmental permitting for the bridge. Below is a description of the southern and northern foreshore areas in which the Crown land application area is being applied for.

Southern Foreshore Area

The southern foreshore area consists of bedrock with a slope of 17° (31%) and no vegetation (Photo 1). The MBC bend below the high water mark of the bedrock, stays wetted during tidal influences and is classed as sub-tidal habitat in this area.

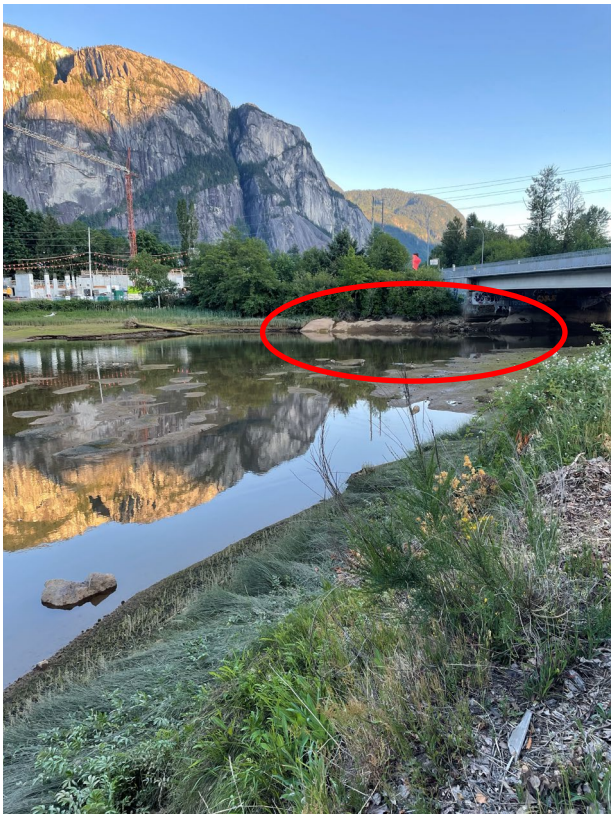


Photo 1: South landing area of Crown land application adjacent to the highway 99 bridge. June 11, 2023

Northern Foreshore Area

The northern foreshore area in the crown tenure area consisted of an 18.5 m length intertidal area from the low water mark to the high water mark measured at a 2.89 m low tide. The low intertidal band had a slope angle of 9% a length of 5.7 m and the substrate consisted mainly of fines with lesser amounts of gravel and cobble. An unspeciated grass species was identified in the lower band and bark debris was observed. The mid intertidal band had a slope gradient of 7% and a length of 5.2 m and consisted of fines with small amounts of cobble. Common mare's tail (*Hippuris vulgaris*) and an unspeciated grass was observed. The high intertidal area consisted of 31% slope angle and was 7.6 m in length to the high water mark. The substrate was composed completely of fines. Wood debris and leaf litter was observed on the surface. Vegetation was dominated by Lyngbye sedge (*Carex lyngbyei*) with lesser amounts of common mare's tail.

No motile or sessile animals were observed in the transects for the northern foreshore area.

Photo 2: Looking across to the northern foreshore area from the south bank. November 24, 2023

Photo 3: Looking at northern foreshore area from northern bank. November 24, 2023

North Upland AT Bridge Landing Area

The northern upland area is composed of a disturbed site with an existing DoS trail (Rose Park Trail) that is located parallel to the shoreline. Low shrub and invasive plant species occupy the majority of the land cover with one black cottonwood tree within the AT bridge alignment. Signs of vegetation cutting, and removal were observed in the area likely for maintenance of the trail and highway bridge. Riparian vegetation observed in the north upland landing areas are included in Table 5 below.

Table 5: Riparian vegetation recorded in the proposed north landing area of the AT Bridge

Layer	Common Name	Scientific Name
Tree	Black cottonwood	*Populus balsamifera*
Shrubs	Western redcedar	*Thuja plicata*
	*Scotch broom	*Cytisus scoparius*
	*Common Burdock	*Arctium minus*
	Cutleaf blackberry	*Rubus laciniatus*
	Pacific ninebark	*Physocarpus capitatus*
	*Himalayan blackberry	*Rubus armeniacus*
Herbs	Grass species	

*Denotes invasive species

South Upland AT Bridge Landing Area

The existing upland land conditions of the proposed south AT bridge landing area adjacent to the Crown land tenure area consist of a shrub and young forest vegetation. The specific species are detailed in the Table 4 below. The area had been continually disturbed by vegetation removal due to an existing servicing corridor. Water and sewer pipes are located below surface and hydro poles and lines above ground.

Table 6: Riparian vegetation recorded in the South landing area

Layer	Common Name	Scientific Name
Trees	Bigleaf maple	*Acer macrophyllum*
	Black cottonwood	*Populus balsamifera*
	Douglas-fir	*Pseudotsuga douglasii*
	Red alder	*Alnus rubra*
Shrubs	*English holly	*Ilex aquifolium*
	Hardhack	*Spiraea douglasii*
	Sikta willow	*Salix sitchensis*
	Thimbleberry	*Rubus parviflorus*
	Baldhip rose	*Rosa gymnocarpa*
	Pacific ninebark	*Physocarpus capitatus*
	*Himalayan blackberry	*Rubus armeniacus*
Herbs	Sword fern	*Polystichum munitum*

*Denotes invasive species

3.1.1 Existing Infrastructure

There is currently no existing infrastructure within the proposed Crown land tenure area for the AT bridge. Adjacent infrastructure to the Crown land area is the Highway 99 bridge over the MBC to the west of the proposed tenure area.

A DoS Trail (Rose Park Trail) exists in the northern landing area in which the proposed bridge will connect. The southern landing area adjacent to the crown land tenure area consists of a servicing right of way with existing water and sanitary pipes below surface and above ground hydro lines and poles.

3.2 Proposed Infrastructure

Details of new infrastructure proposed in the Crown land tenure for the AT bridge are detailed below:

Table 7: Proposed infrastructure for the AT bridge

Facility/ Infrastructure/ Process	Construction Methods/Materials	Construction Schedule	Long term planning
AT Bridge	The northern abutment area will be infilled with clean structural fill and riprap to provide foundational support. One 600mm diameter steel pipe pile will support the north abutment and driven by an impact driver. The south abutment will be a cast-in-place reinforced concrete spread footing foundation on bedrock. The proposed method is to pre-assemble the steel truss in an area to the south of the bridge off the east side of highway 99, between the highway and the Redbridge development. The bridge truss will be moved and placed from the highway 99 bridge. Two cranes will be used to lift and place the bridge with one sitting on a crane pad north of the structure and the other south of the structure. Timber deck will be installed using bolts and screw upon completion of truss.	In-water construction for infill of the northern abutment is proposed from September 15th – January 31 during the timing window of least risk for the MBC and Howe Sound area. Above water construction will occur once in water construction has been completed between February- August.	Once constructed, the AT bridge will be dedicated to the DoS which will own, maintain and operate the bridge.

3.2.1 AT Bridge Construction Methodology

Infill and Riprap Installation:

Infill into the channel at the north abutment will be made up of clean structural fill and lined with clean riprap rock to prevent erosion.

Pile Installation:

One 600mm diameter steel pipe pile will support the north abutment. The grade will be raised to the underside of the new abutment, with access constructed for the piling equipment via the existing paved multi-use path from the north.

The pile will be driven by means of excavator mounted piling equipment, or a conventional piling rig, to refusal in bedrock at a depth of approximately 17m. The pile will then be partially cleaned drilled out, a reinforcing cage will be installed, and the pile infilled with concrete.

Substructure Construction:

The south abutment will be a cast-in-place reinforced concrete spread footing foundation on bedrock. The north abutment will be a cast-in-place reinforced concrete pile cap cast on top of the pile.

Superstructure Construction:

The proposed method is to pre-assemble the steel truss in an area to the south of the bridge off the east side of highway 99, between the highway and the Redbridge development. The structural steel truss will arrive to site in separate segments and will be connected using both welded and bolted connections. The truss will be coated with a 3-coat epoxy paint system.

The bridge truss will be moved and placed in one nighttime partial closure of the highway 99 bridge, which will be coordinated with the BC Ministry of Transport and Infrastructure (MoTI). The steel bridge will be transported on self steering dollies onto the northbound traffic lanes of Hwy 99 bridge parallel to its final alignment. Two cranes will be used to lift and place the bridge with one sitting on a crane pad north of the structure and the other south of the structure.

Once the bridge truss is installed the timber deck will be installed using bolts and screw.

A site plan for the bridge can be seen in Map 2. Engineered drawings can be found in the Appendix of this document.

3.4 Access

Access to the construction of the AT bridge will be by existing roads in the area as listed below. Access to the AT bridge after construction will by the extension of the existing DoS active transport trails located in the northern and southern landing areas of the bridge.

Table 8: Access points to the AT bridge during construction

Roadway/ Proposed Connection	Existing Road Classification	Road Permittee Information and Road Use Agreements	Traffic Volume for Construction and Operational Phases	Mitigation of Traffic Effects
Scott Crescent Road on the south landing	Arterial	n/a	Traffic volume during the construction phase will be marginal with approximately 8-10 vehicular trips generated per day for material deliveries, trades, etc. During operational phases the proposed pedestrian bridge is not anticipated to generate any additional vehicular traffic.	n/a
River Road on the north landing and Rose Park trail to gain access to the area.	Arterial	n/a	Traffic volume during the construction phase will be marginal with approximately 8-10 vehicular trips generated per day for material deliveries, trades, etc. During operational phases the proposed pedestrian bridge is not anticipated to generate any additional vehicular traffic	n/a

3.5 Utility Requirements

Construction

Temporary power and water requirements during construction will be sourced from the Redbridge development site in the southern landing area for the AT bridge construction.

Completion

No utility requirements are required for the bridge upon completion of the project.

3.5.1 List of Authorizations

The AT bridge will also receive permitting authorizations through the *Water Sustainability Act*, *Fisheries Act and Navigable Waters Act.*

Table 9: Table of Predicted Authorizations

Authorization Required	Statute/Regulation	Status	Prerequisites
WSA Section 11 approval	*Water Sustainability Act*	Applying in conjunction of the Crown land tenure application	Crown land tenure
DFO Fisheries Act Authorization	*Fisheries Act*	Applying in conjunction of the Crown land tenure application	Crown land tenure
Navigable Waters Act notification	*Navigable Waters Act*	Applying in conjunction of the Crown land tenure application	Crown land tenure

4 Environmental Land Conditions

4.1 Land Impacts

4.1.1 Vegetation Removal and Impacts

No timber located on crown land is to be removed for the project. Timber removal will occur on upland property to provide trail access to the AT bridge.

Vegetation will be removed within the proposed Crown land tenure foreshore area of the northern landing of the AT bridge consisting of lyngbye sedge, common hares tail and grass sp.

4.1.1.1 Mitigation Measures

- Vegetation will be retained wherever possible during construction of the northern landing area, and southern landing area.
- Project boundaries will be delineated in the field to prevent unnecessary vegetation removal.
- Constructed riprap slopes within the foreshore area of the northern AT bridge will be revegetated with native vegetation upon completion of the project.
- Existing Rose Park trails, roads, and servicing right of ways have been used in design to reduce impacts from access to the area.
- Clearing of vegetation that supports nesting of species protected under the *Migratory Birds Convention Act* will take place outside the bird breeding and fledging period (March 1 – August 31). If vegetation clearing is required within this period:
    - nest surveys will be conducted to determine whether there are any active nests of species protected under the Migratory Birds Convention Act in any trees, shrubs buildings, or other structures.
    - Clearing and demolition activities will commence within 24 to 28 hours of the bird nest survey.
    - If any active nests are found, they shall be left undisturbed until young have fledge and left the nest. A QEP will confirm that the nest is not occupied by a species protected at that time of year under applicable legislation.

4.1.2 Soil Disturbance

Minimal ground disturbance is proposed for the in-water area in the bed of the MBC. Foreshore infill using riprap placement will occur on the northern landing site, however riprap will be placed by machinery from the shore and soil disturbance will be minimized.

4.1.2.1 Mitigation Measures

- Foreshore infill works for the northern landing area will be completed when the works area is dry during lower tides whenever possible.
- Machinery will be operated from the shore and avoided in the intertidal area whenever possible.

4.1.3 Backshore Riparian Encroachment

No riparian encroachment will occur on Crown land. However, backshore marine riparian vegetation will be impacted to construct the access and landings of the bridge.

The area is not subject to the *Riparian Areas Protection Regulation* as it is marine and tidally influenced, however, applications under the WSA and *Fisheries Act* are being submitted for the riparian removal.

4.1.4 Pesticides and Herbicides

No pesticides or herbicides will be used for construction or maintenance in the project.

4.2 Atmospheric Impact

4.2.1 Sound, Odour, Gas, or Fuel Emissions

Oduor, gas or fuel emissions are not anticipated to disturb wildlife or nearby residents.

Sounds impacts have been considered during pile driving activities for the steel pile in the northern landing. The following mitigation measures have been considered to reduce underwater noise.

4.2.1.1 Sound Mitigation Measures

- Pile driving activities for the northern steel pile will not occur in the wet to reduce noise impacts to the marine environment. The northern abutment area will be infilled and the pile driving activities will occur in the dry outside of the high-water mark.

4.3 Hydrology

The project will not result in change to local drainage or result in potential flooding.

4.4 Fish and Wildlife Habitat

4.4.1 Disturbance to Fish/wildlife and Fish/wildlife habitat

The construction of the AT bridge will result in disturbance of intertidal habitat within crown land for the northern abutment infill and riparian habitat on the upland parcels for trail construction access.

Applications under the WSA and *Fisheries Act* are being submitted for the intertidal habitat impact and applicable offsetting.

4.4.1.1 Mitigation Measures

- All in water works for the infill of the northern landing is proposed from September 15th – January 31 during the timing window of least risk for the MBC and Howe Sound area for fish species.

- Infill work will be conducted during low tides wherever possible to reduce impact to fish species during construction. If works, do occur instream a silt curtain will be positioned around the works area and area salvaged for fish to provide fish isolation of the area.
- The project team is seeking approvals through DFO and the WSA and permit applications and applications include a component of habitat compensation for disturbed intertidal habitat and riparian vegetation.

4.4.2 Sediment and Erosion

Sediment increase could occur for the project during foreshore infill for the north landing.

4.4.2.1 Mitigation Measures

An erosion and sediment control plan will be produced for the project to reduce the release of sediment into the MBC during construction of the AT bridge.

Infill of foreshore will occur during low tides using riprap to create a berm on the outer permitter of the infill area to minimize sediment release. Once the berm is created the area behind the riprap berm will be infilled.

A silt curtain will be used if infill works occur when the works area is wetted.

4.4.3 Water Diversion

The project will not require water diversion.

4.4.4 Species at Risk

Construction activity for the project will not threaten or endanger species at risk.

5 Socio-Community

5.1 Land Use

The proposed Crown land tenure area is not currently in a natural state as it is the foreshore area of the MBC. To the south of the AT bridge landing area is the partially complete Redbridge development which will be used for residential and commercial purposes on completion. To the north of the bridge landing area is the DoS public trail (Rose Park trail) which the bridge will connect to and the commercial private lands for the Squamish Adventure Inn/hostel.

5.1.1 Land Management Plans and Regional Growth Strategies

The project team is not aware of any land use plans or strategies that could restrict land use of the AT bridge in its proposed location.

As the DoS the local municipality, is the applicant for the AT bridge there are no conflicts from a local government zoning level.

5.2 Socio- Community Conditions

5.2.1 Adjacent Users or Communities and Public Access

The AT bridge will not restrict public access to the area and provides the public a safe alternative to the highway bridge to access Squamish using other transport means alternative to a car.

5.2.2 Impact on Existing Services

The project will not increase demand on any existing local services including, fire protection, health facilities or emergency services.

6 References

BC Government, 2023. Contacts for First Nation Consultation Areas. Web tool. https://www2.gov.bc.ca/gov/content/data/geographic-data-services/land-use/contacts-for-first-nation-consultation-areas

7 Appendix

Appendix 1: AT Bridge Engineered Drawings

SQUAMISH

HARDWIRED *for* ADVENTURE

DISTRICT OF SQUAMISH

MAMQUAM BLIND CHANNEL REDBRIDGE PEDESTRIAN BRIDGE

Project Number:

KINGSWOOD PROPERTIES

BASIS

NOT FOR CONSTRUCTION

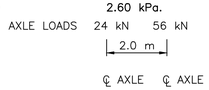
DRAFT

FILE PATH: P:\0052 – KCD Mamquam Channel Ped Bridge\400 Drawings\04 – Drawings\00 – Cover Page.dwg

GENERAL NOTES:

1. DESIGN SPECIFICATIONS: CAN/CSA–S6–19.

2. LIVE LOADS:
   - PEDESTRIAN/MUP LOAD 2.60 kPa.
   - MAINTENANCE VEHICLE:



3. SNOW LOAD 0.60 kPa.

4. WIND LOAD 1/50 YEAR REFERENCE 0.56 kPa.

5. DESIGN TEMPERATURE RANGE: –20°C MIN/+45°C MAX.

PILE NOTES:

1. STEEL PIPE PILES SHALL CONFORM TO ASTM SPECIFICATION A252 GRADE 3.

2. PILES TO BE INSTALLED TO TIP ELEVATIONS SHOWN ON THE DRAWINGS OR TO SUCH ELEVATIONS AS MAY BE INSTRUCTED BY THE OWNER'S REPRESENTATIVE.

3. THE LENGTH OF PILE SUPPLIED SHALL BE SUFFICIENT TO ENSURE THERE IS NO DAMAGED MATERIAL BELOW THE CUT OFF. DAMAGED MATERIAL AT THE PILE HEAD SHALL BE CUT OFF.

4. ALL WELDING SHALL BE IN ACCORDANCE WITH CSA W59–M, LATEST EDITION.

CONCRETE NOTES:

1. ALL CONCRETE SHALL CONFORM TO CAN/CSA–A23.1 EXPOSURE CLASS F2 AND SHALL HAVE AIR ENTRAINMENT OF 6% ± 2% AND A MINIMUM COMPRESSIVE STRENGTH OF 30 MPa AT 28 DAYS. CONCRETE TO HAVE A SLUMP OF 80 ± 20 mm AT TIME OF PLACEMENT.

2. ALL EXPOSED EDGES OF CONCRETE TO BE CHAMFERED 20 mm.

3. CONCRETE SHALL BE CURED AND PROTECTED IN ACCORDANCE WITH CAN/CSA–A23.1.

4. REINFORCING STEEL SHALL CONFORM TO CAN/CSA–G30.18 GRADE 400R.

5. WELDING OF REINFORCING STEEL IS NOT PERMITTED.

6. CONCRETE COVER TO REINFORCING STEEL:
   FACES EXPOSED TO EARTH = 70 mm
   ALL OTHER FACES = 55 mm UNLESS NOTED OTHERWISE.

7. LAP SPLICES SHALL BE STAGGERED WITH MINIMUM LAP LENGTH AS FOLLOWS:

BAR SIZE	ALL BARS EXCEPT TOP BARS	ACTUAL PILE TIP EL.
10M	340	480
15M	480	680
20M	590	820
25M	900	1260
* HORIZONTAL REINFORCMENT WITH MORE THAN 300 mm OF CONCRETE CAST BELOW BARS		

ANCHOR BOLT NOTES:

1. ANCHOR BOLTS SHALL CONFORM TO ASTM SPECIFICATION A307.

2. ANCHOR BOLT ASSEMBLIES SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE TO ASTM A123 M.

STRUCTURAL STEEL NOTES:

1. ALL STRUCTURAL STEEL AND PLATE SHALL COMPLY TO CSA G40.21M, GRADE 350W, HSS SHALL COMPLY TO G7021M GRADE 350W CLASS C.

2. ALL WELDING SHALL BE IN ACCORDANCE WITH W59, LATEST EDITION. ALL WELDING SHALL BE VISUALLY INSPECTED.

3. SHEAR CONNECTORS SHALL CONFORM TO ASTM 108, GRADE 1020.

4. STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE MINISTRY OF TRANSPORTATION AND HIGHWAYS 2020 STANDARD SPECIFICATIONS SECTION 421.

5. ALL STEEL WORK IS SHOP PRIMED AND PAINTED IN ACCORDANCE WITH THE MINISTRY OF TRANSPORTATION AND HIGHWAYS 2020 STANDARD SPECIFICATIONS.

6. FINISH COAT PAINT COLOUR TO BE SHERWIN WILLIAMS COLLECTION "SW 2839 ROYCROFT COPPER RED".

7. ALL BOLTS SHALL BE ⅞"ø, ASTM A325 TYPE 3 c/w NUTS AND WASHERS WITH THREADS EXCLUDED FROM SHEAR PLANE, UNLESS NOTED OTHERWISE.

8. ALL SPLICE CONNECTIONS SHALL BE SHOP ASSEMBLED.

9. BEAM SPLICE FAYING SURFACE TO BE BLASTED CLEAN AND COATED WITH PRIMER TO MEET THE REQUIREMENTS FOR CLASS "B" SURFACE.

TIMBER NOTES:

1. ALL TIMBER DECKING, STRINGERS AND FLOOR BEAMS SHALL BE ROUGH SAWN CEDAR GRADE NO. 2 OR BETTER IN ACCORDANCE WITH CSA 0141. ALTERNATIVELY ROUGH SAWN DOUGLAS FIR–LARCH GRADE NO. 2 OR BETTER, TREATED MAY BE USED IN PLACE OF CEDAR.

2. LAG BOLTS CONNECTING DECK TO CROSS BEAMS SHALL BE HOT DIP GALVANIZED C/W WASHER AND HEX NUT.

DRAWING LIST

NOT FOR CONSTRUCTION

DRAFT

REVISION	DESCRIPTION OF REVISION	DATE (YYYY–MM–DD)	DRAWN	DESIGNED	CHECKED	APPROVED
1	RE–ISSUED FOR PERMITTING	2024–07–12	M.B.	J.D.	T.W.	B.H.
0	ISSUED FOR PERMITTING	2023–11–30	M.B.	J.D.	T.W.	B.H.

ORIGINAL ISSUE	
DRAWN:	M.BRIDDEN
DESIGNED:	J.DEKKER
CHECKED:	T.WANG
APPROVED:	B.HAMERSLEY

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA, STATEMENTS, CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

CLIENT: KINGSWOOD PROPERTIES; SQUAMISH HARDWIRED for ADVENTURE; BASIS

PROJECT: MAMQUAM PEDESTRIAN BRIDGE

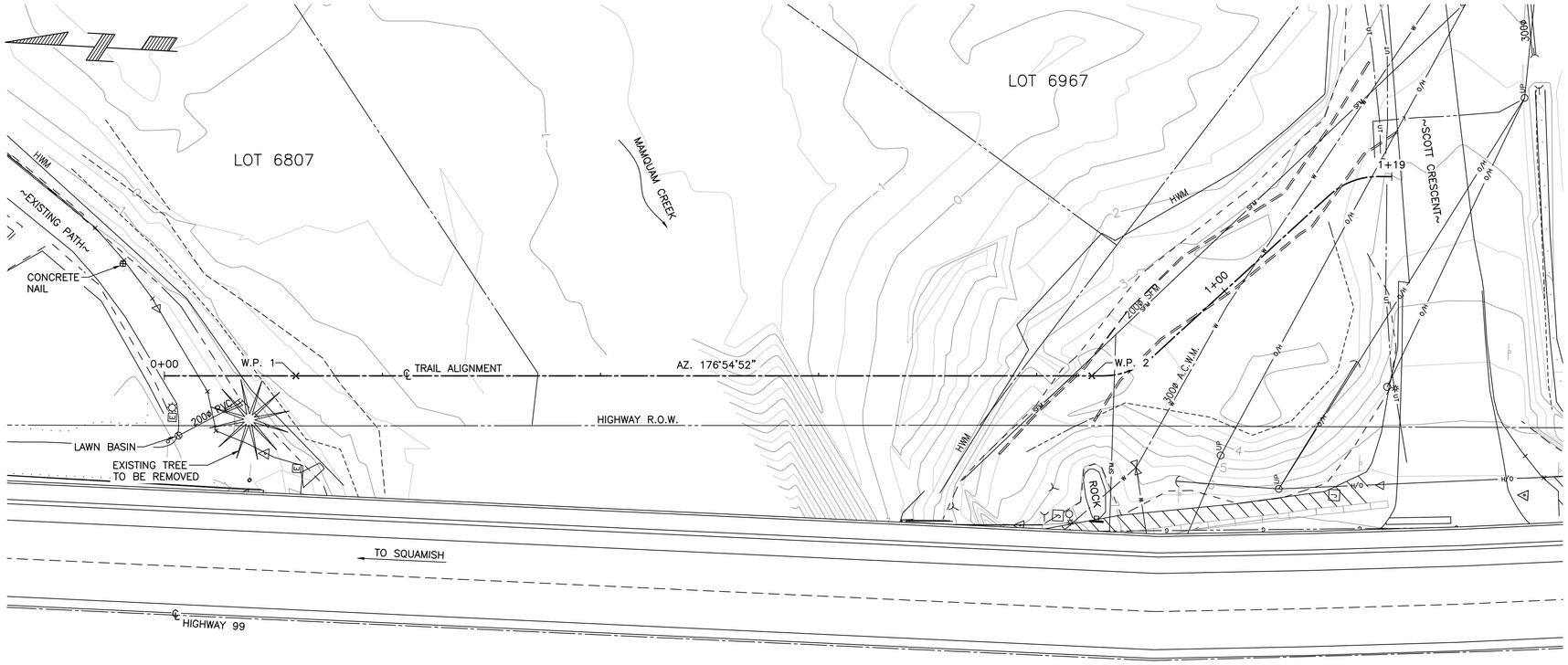
TITLE: GENERAL NOTES

SCALE	PROJECT NO.	DWG. NO.	REV.
AS NOTED	0052	01	1

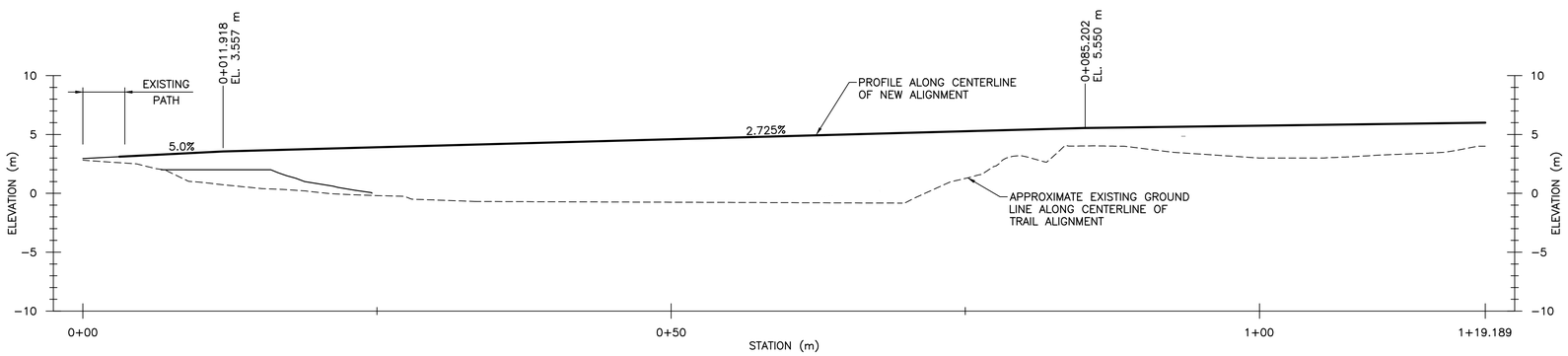
CANCEL PRINTS BEARING PREVIOUS REVISION

DWG–0–L

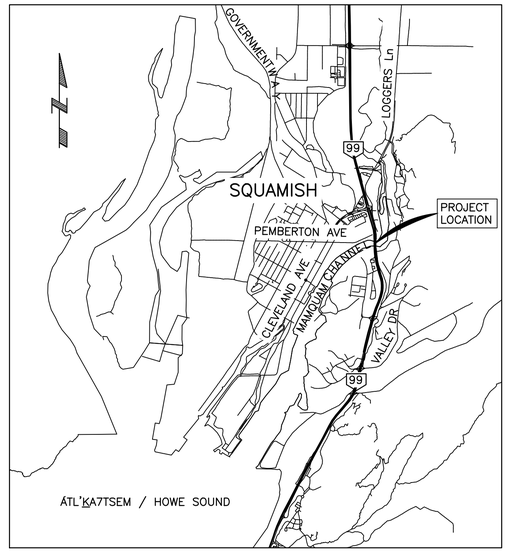
FILE PATH: P:\0052 – KCD Mamquam Channel Ped Bridge\400 Drawings\04 – Drawings\01 – General Notes.dwg



PLAN
SCALE 1:250



PROFILE ALONG CENTERLINE OF TRAIL ALIGNMENT
SCALE 1:250



LOCATION PLAN
N.T.S.

WORK POINT TABLE			
WORK POINT	NORTHING	EASTING	ELEVATION
W.P. 1	5607728.369	689797.574	3.560
W.P. 2	5607655.475	689801.503	5.000

LEGEND:

- TOP OF BANK
- BOTTOM OF BANK
- STORM CULVERT
- EXISTING STREET LIGHT
- JUNCTION BOX
- SFM — EXISTING SANITARY FORCEMAIN
- W — 300ø WATER MAIN
- HUB – TRAVERSE
- SIGN
- O/H — OVERHEAD UTILITIES
- UT — MISCELLANEOUS UNDERGROUND UTILITIES

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 01.
2. SURVEY BY: R.F. BINNIE & ASSOCIATES.
3. DATUM: GEODETIC
4. BENCHMARKS:
5. FOR BOREHOLE DATA SEE DRAWINGS

NOT FOR CONSTRUCTION

DRAFT

DRAWING REVISIONS						
REVISION	DESCRIPTION OF REVISION	DATE (YYYY-MM-DD)	DRAWN	DESIGNED	CHECKED	APPROVED
1	RE-ISSUED FOR PERMITTING	2024-07-12	M.B.	J.D.	T.W.	B.H.
0	ISSUED FOR PERMITTING	2023-11-30	J.B.	J.D.	T.W.	B.H.

ORIGINAL ISSUE	
DRAWN:	J.BEAUREGARD
DESIGNED:	J.DEKKER
CHECKED:	T.WANG
APPROVED:	B.HAMERSLEY

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA, STATEMENTS, CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

CLIENT: KINGSWOOD PROPERTIES; SQUAMISH HARDWIRED for ADVENTURE

BASIS

PROJECT: MAMQUAM PEDESTRIAN BRIDGE

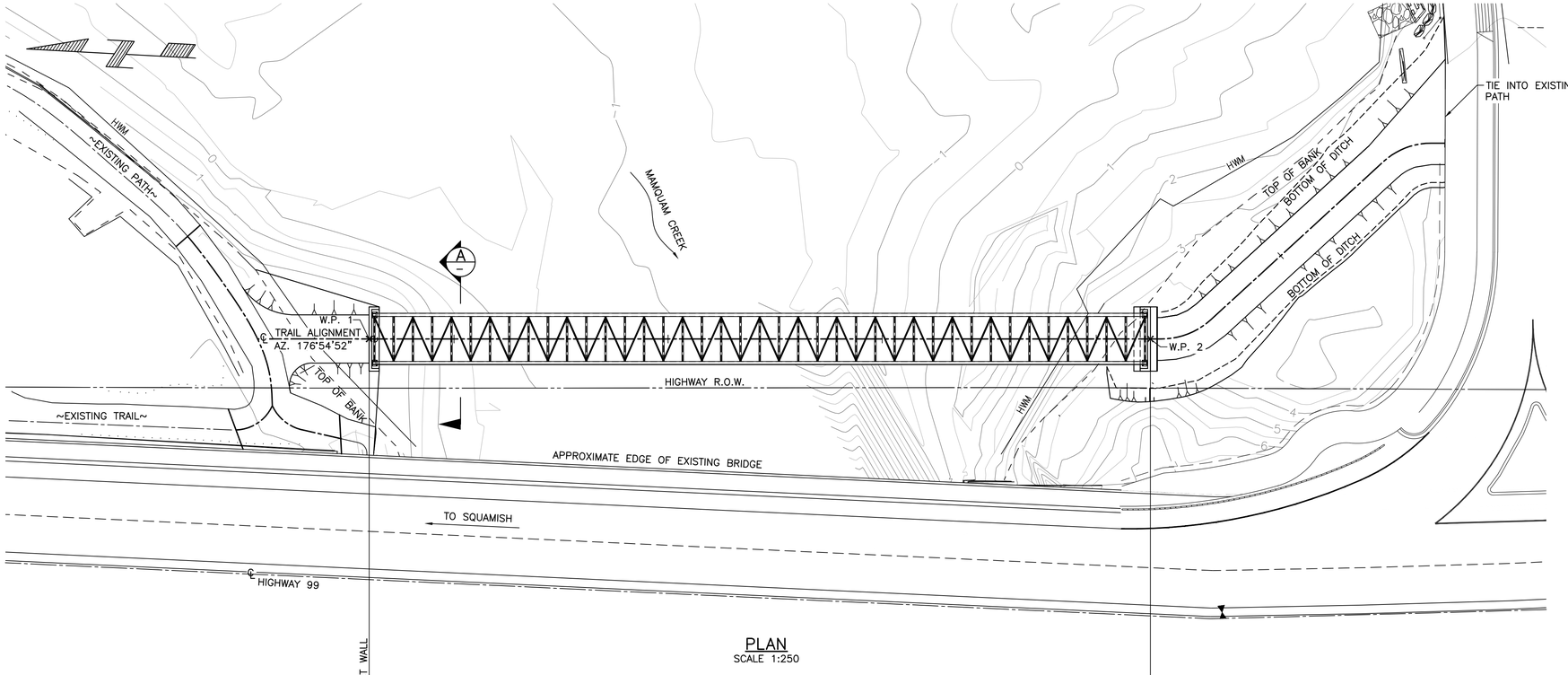
TITLE: REDBRIDGE SITE PLAN

SCALE	PROJECT NO.	DWG. NO.	REV.
AS NOTED	0052	02	1

CANCEL PRINTS BEARING PREVIOUS REVISION

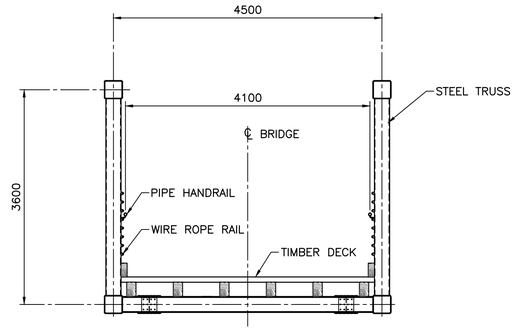
DWG-D-L

FILE PATH: \\192.168.88.8\Project\0052 - KCD Mamquam Channel Ped Bridge\400 Drawings\04 - Drawings\02 - Site Plan.dwg



PLAN
SCALE 1:250

ELEVATION
SCALE 1:250



SECTION A
SCALE 1:50

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 01.

NOT FOR CONSTRUCTION

DRAFT

REVISION	DESCRIPTION OF REVISION	DATE (YYYY-MM-DD)	DRAWN	DESIGNED	CHECKED	APPROVED
1	RE-ISSUED FOR PERMITTING	2024-07-12	M.B.	J.D.	T.W.	B.H.
0	ISSUED FOR PERMITTING	2023-11-30	J.B.	J.D.	T.W.	B.H.

ORIGINAL ISSUE	
DRAWN:	J.BEAUREGARD
DESIGNED:	J.DEKKER
CHECKED:	T.WANG
APPROVED:	B.HAMERSLEY

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CLIENT: KINGSWOOD PROPERTIES; SQUAMISH HARDWIRED for ADVENTURE

BASIS

PROJECT: MAMQUAM PEDESTRIAN BRIDGE

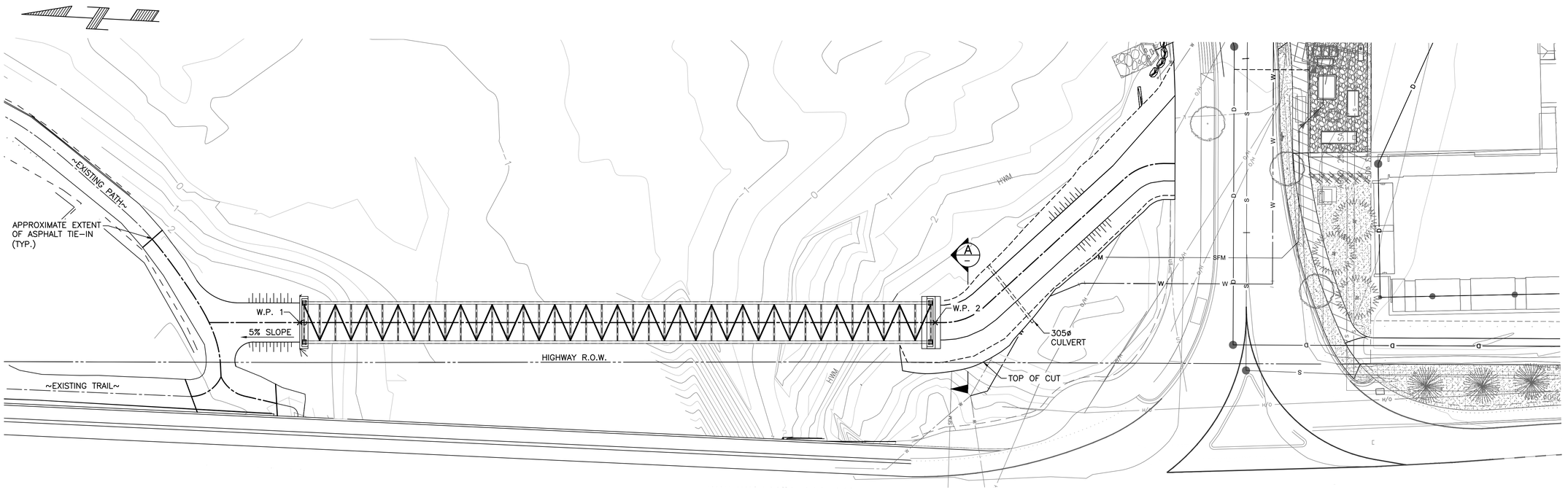
TITLE: REDBRIDGE GENERAL ARRANGEMENT

SCALE	PROJECT NO.	DWG. NO.	REV.
AS NOTED	0052	03	1

CANCEL PRINTS BEARING PREVIOUS REVISION

DWG-D-L

FILE PATH: P:\0052 - KCD Mamquam Channel Ped Bridge\400 Drawings\04 - Drawings\03 - General Arrangement.dwg



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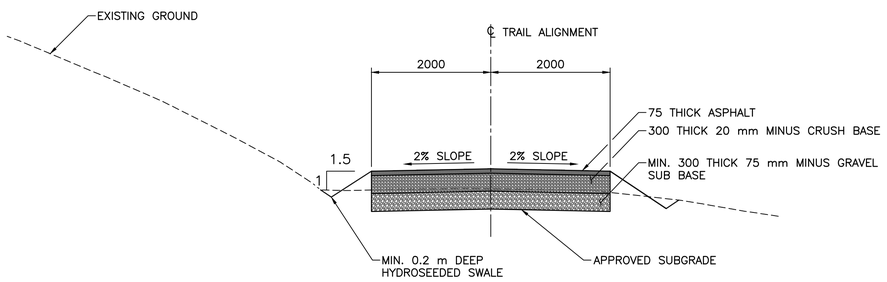

SECTION A–
SCALE 1:50

NOT FOR CONSTRUCTION

DRAFT

REVISION	DESCRIPTION OF REVISION	DATE (YYYY–MM–DD)	DRAWN	DESIGNED	CHECKED	APPROVED
1	RE–ISSUED FOR PERMITTING	2024–07–12	M.B.	J.D.	T.W.	B.H.
0	ISSUED FOR PERMITTING	2023–11–30	K.V.	J.D.	T.W.	B.H.

DRAWING REVISIONS

ORIGINAL ISSUE	
DRAWN:	K.VANDERVEEN
DESIGNED:	J.DEKKER
CHECKED:	T.WANG
APPROVED:	B.HAMERSLEY

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CLIENT
KINGSWOOD PROPERTIES
SQUAMISH HARDWIRED for ADVENTURE

BASIS

PROJECT
MAMQUAM PEDESTRIAN BRIDGE

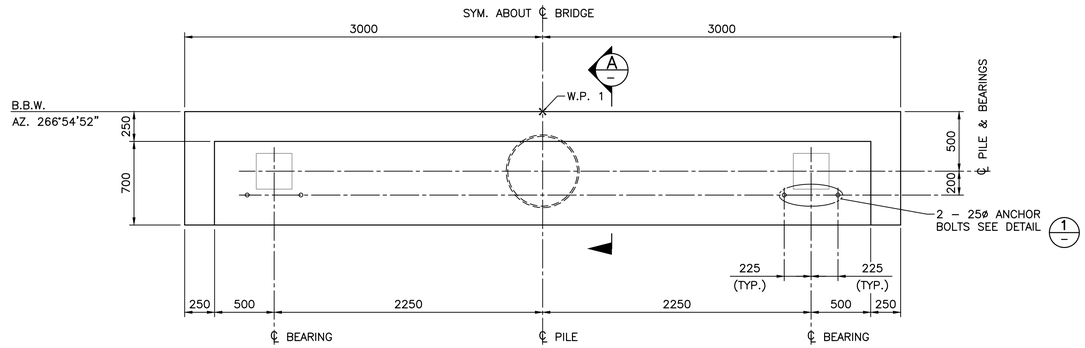
TITLE
REDBRIDGE
SITE GRADING

SCALE	PROJECT NO.	DWG. NO.	REV.
AS NOTED	0052	04	1

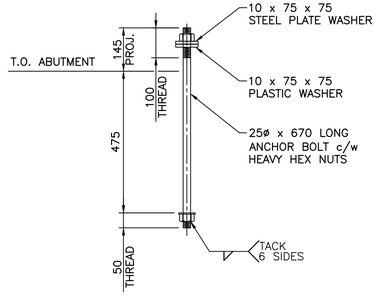
DWG–D–L

CANCEL PRINTS BEARING PREVIOUS REVISION

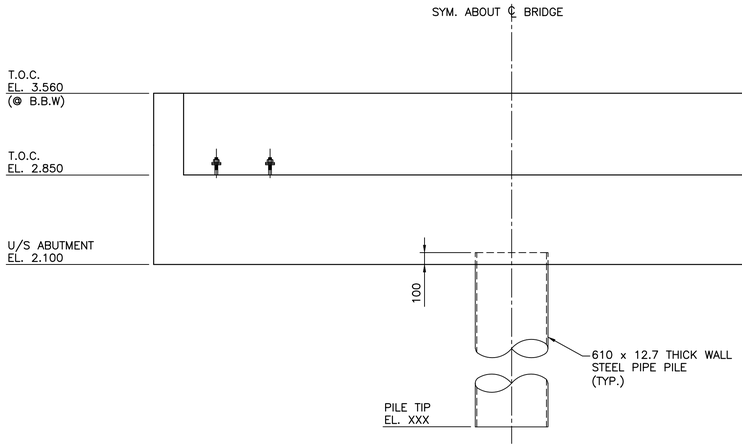
FILE PATH: P:\0052 – KCD Mamquam Channel Ped Bridge\400 Drawings\04 – Drawings\04 – Site Grading.dwg



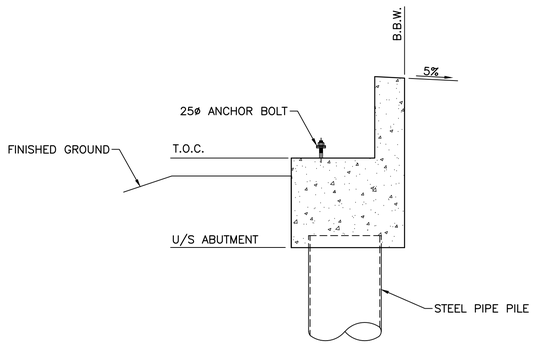
PLAN
SCALE 1:25



TYPICAL ANCHOR BOLT DETAIL 1/– 1/07
SCALE 1:10



ELEVATION
SCALE 1:25



SECTION A/–
SCALE 1:25

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 01.

PILE LOADS FACTORED (ULS)		PILE LOADS UNFACTORED (SLS)	
DEAD LOAD:	kN	DEAD LOAD:	kN
LIVE LOAD:	kN	LIVE LOAD:	kN
TOTAL:	kN	TOTAL:	kN

PILE ELEVATION TABLE		
PILE LOCATION	DESIGN PILE TIP EL.	ACTUAL PILE TIP EL.
NORTH ABUTMENT		

NOT FOR CONSTRUCTION

DRAFT

DRAWING REVISIONS						
1	RE–ISSUED FOR PERMITTING	2024–07–12	M.B.	J.D.	T.W.	B.H.
0	ISSUED FOR PERMITTING	2023–11–30	J.B.	J.D.	T.W.	B.H.
REVISION	DESCRIPTION OF REVISION	DATE (YYYY–MM–DD)	DRAWN	DESIGNED	CHECKED	APPROVED

ORIGINAL ISSUE	
DRAWN:	J.BEAUREGARD
DESIGNED:	J.DEKKER
CHECKED:	T.WANG
APPROVED:	B.HAMERSLEY

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA, STATEMENTS, CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

CLIENT: KINGSWOOD PROPERTIES; SQUAMISH HARDWIRED for ADVENTURE

BASIS

PROJECT: MAMQUAM CHANNEL PEDESTRIAN BRIDGE

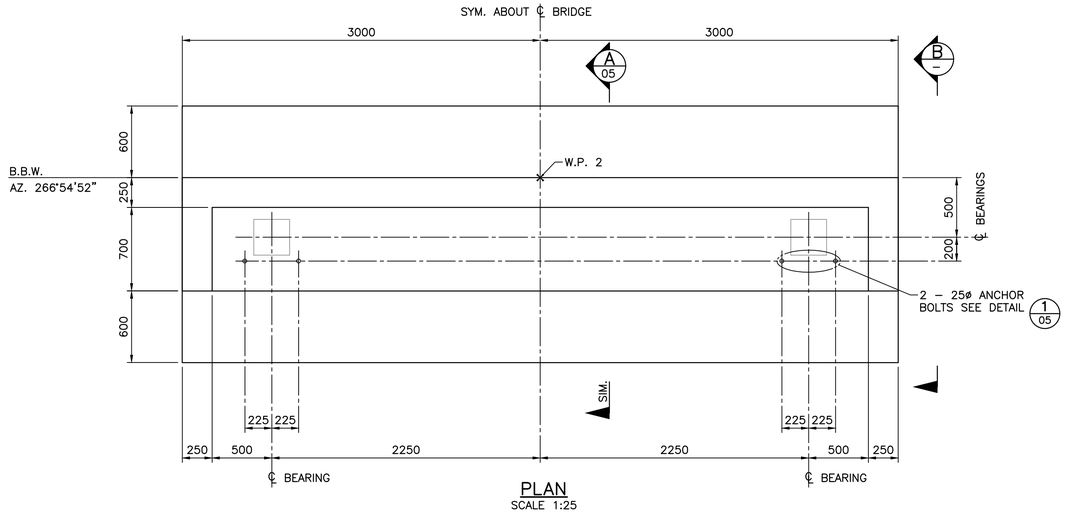
TITLE: REDBRIDGE NORTH ABUTMENT DETAILS

SCALE	PROJECT NO.	DWG. NO.	REV.
AS NOTED	0052	05	1

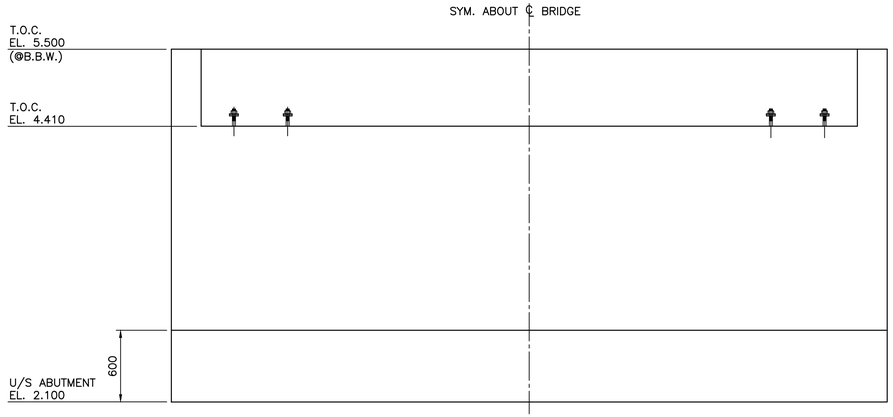
CANCEL PRINTS BEARING PREVIOUS REVISION

DWG–D–L

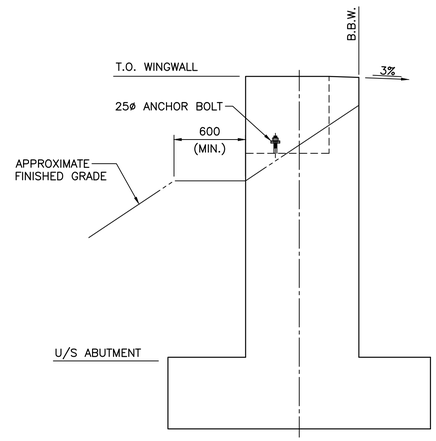
FILE PATH: P:\0052 – KCD Mamquam Channel Ped Bridge\400 Drawings\04 – Drawings\05 to 08 – Abutment.dwg



PLAN
SCALE 1:25



ELEVATION
SCALE 1:25



SECTION B –
SCALE 1:25

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 01.

NOT FOR CONSTRUCTION

DRAFT

DRAWING REVISIONS							ORIGINAL ISSUE	
							DRAWN:	J.BEAUREGARD
							DESIGNED:	J.DEKKER
							CHECKED:	T.WANG
							APPROVED:	B.HAMERSLEY
1	RE–ISSUED FOR PERMITTING	2024–07–12	M.B.	J.D.	T.W.	B.H.		
0	ISSUED FOR PERMITTING	2023–11–30	J.B.	J.D.	T.W.	B.H.		
REVISION	DESCRIPTION OF REVISION	DATE (YYYY–MM–DD)	DRAWN	DESIGNED	CHECKED	APPROVED		

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CLIENT

KINGSWOOD PROPERTIES

SQUAMISH HARDWIRED for ADVENTURE

BASIS

PROJECT
MAMQUAM CHANNEL PEDESTRIAN BRIDGE

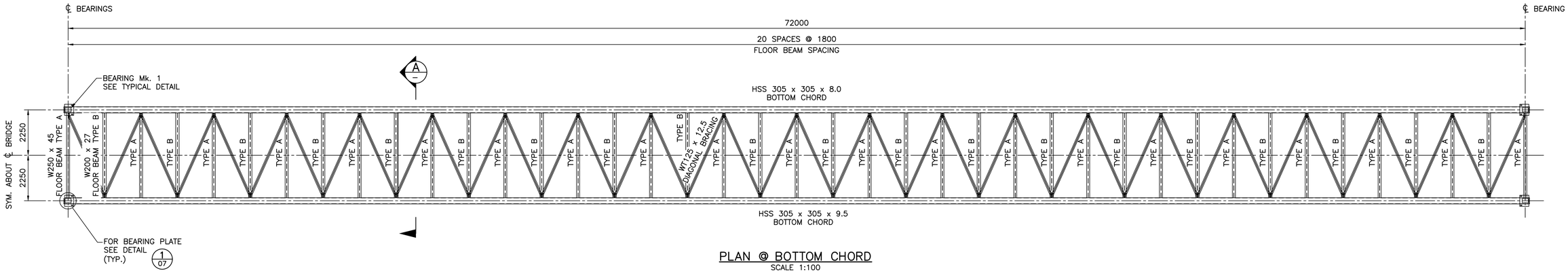
TITLE
REDBRIDGE
SOUTH ABUTMENT
DETAILS

SCALE	PROJECT NO.	DWG. NO.	REV.
AS NOTED	0052	07	1

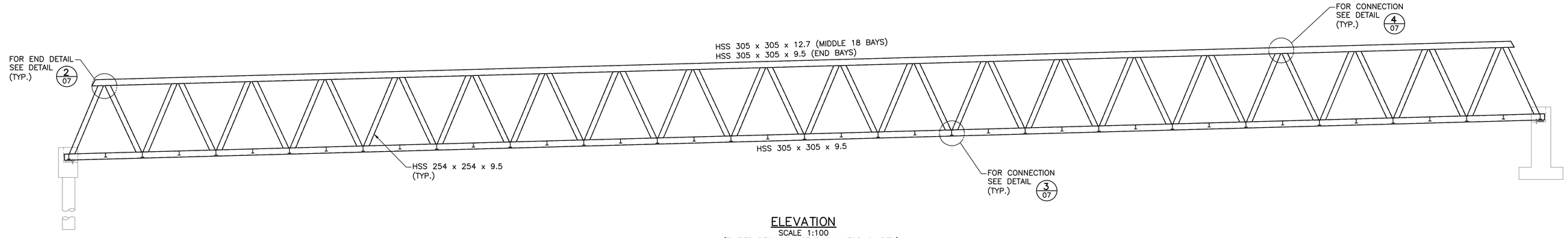
CANCEL PRINTS BEARING PREVIOUS REVISION

DWG–D–L

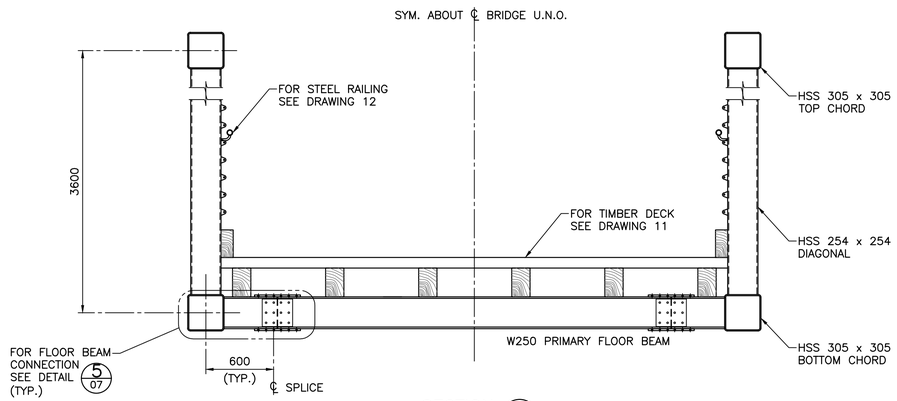
FILE PATH: P:\0052 – KCD Mamquam Channel Ped Bridge\400 Drawings\04 – Drawings\05 to 08 – Abutment.dwg



PLAN @ BOTTOM CHORD
SCALE 1:100



ELEVATION
SCALE 1:100
(TIMBER DECKING NOT SHOWN FOR CLARITY)



SECTION A
SCALE 1:25

NOT FOR CONSTRUCTION

DRAFT

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 01.

REVISION	DESCRIPTION OF REVISION	DATE (YYYY-MM-DD)	DRAWN	DESIGNED	CHECKED	APPROVED
1	RE-ISSUED FOR PERMITTING	2024-07-12	M.B.	J.D.	T.W.	B.H.
0	ISSUED FOR PERMITTING	2023-11-30	K.V.	J.D.	T.W.	B.H.

ORIGINAL ISSUE	
DRAWN:	K.VANDERVEEN
DESIGNED:	J.DEKKER
CHECKED:	T.WANG
APPROVED:	B.HAMERSLEY

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CLIENT: KINGSWOOD PROPERTIES; SQUAMISH HARDWIRED for ADVENTURE

BASIS

PROJECT: MAMQUAM CHANNEL PEDESTRIAN BRIDGE

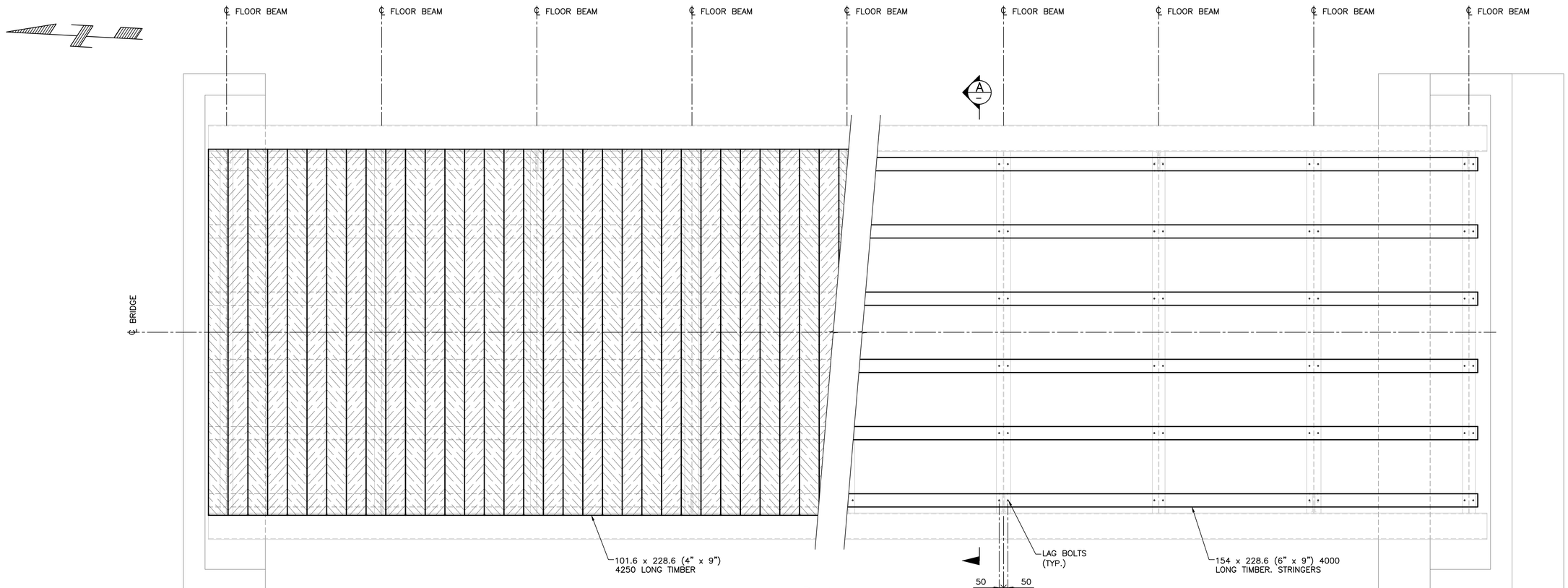
TITLE: REDBRIDGE
STEEL TRUSS DETAILS
SHEET 1

SCALE	PROJECT NO.	DWG. NO.	REV.
AS NOTED	0052	09	1

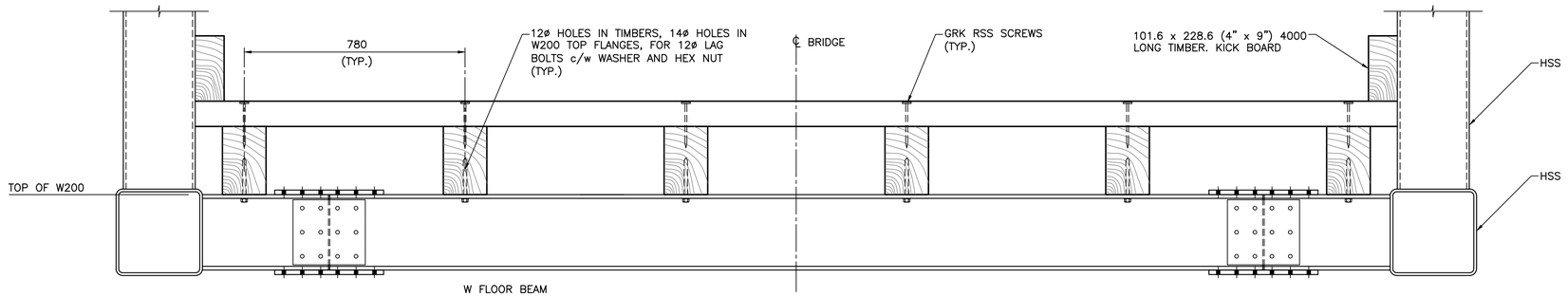
DWG-D-L

CANCEL PRINTS BEARING PREVIOUS REVISION

FILE PATH: P:\0052 - KCD Mamquam Channel Ped Bridge\400 Drawings\04 - Drawings\09 - Truss Details - Sheet 1.dwg



PLAN
SCALE: 1:25



SECTION A
SCALE 1:10

NOT FOR CONSTRUCTION

DRAFT

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 01.

REVISION	DESCRIPTION OF REVISION	DATE (YYYY-MM-DD)	DRAWN	DESIGNED	CHECKED	APPROVED
1	RE-ISSUED FOR PERMITTING	2024-07-12	M.B.	J.D.	T.W.	B.H.
0	ISSUED FOR PERMITTING	2023-11-30	J.B.	J.D.	T.W.	B.H.

ORIGINAL ISSUE

DRAWN:	J.BEAUREGARD
DESIGNED:	J.DEKKER
CHECKED:	T.WANG
APPROVED:	B.HAMERSLEY

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CLIENT: KINGSWOOD PROPERTIES; SQUAMISH HARDWIRED for ADVENTURE

BASIS

PROJECT: MAMQUAM CHANNEL PEDESTRIAN BRIDGE

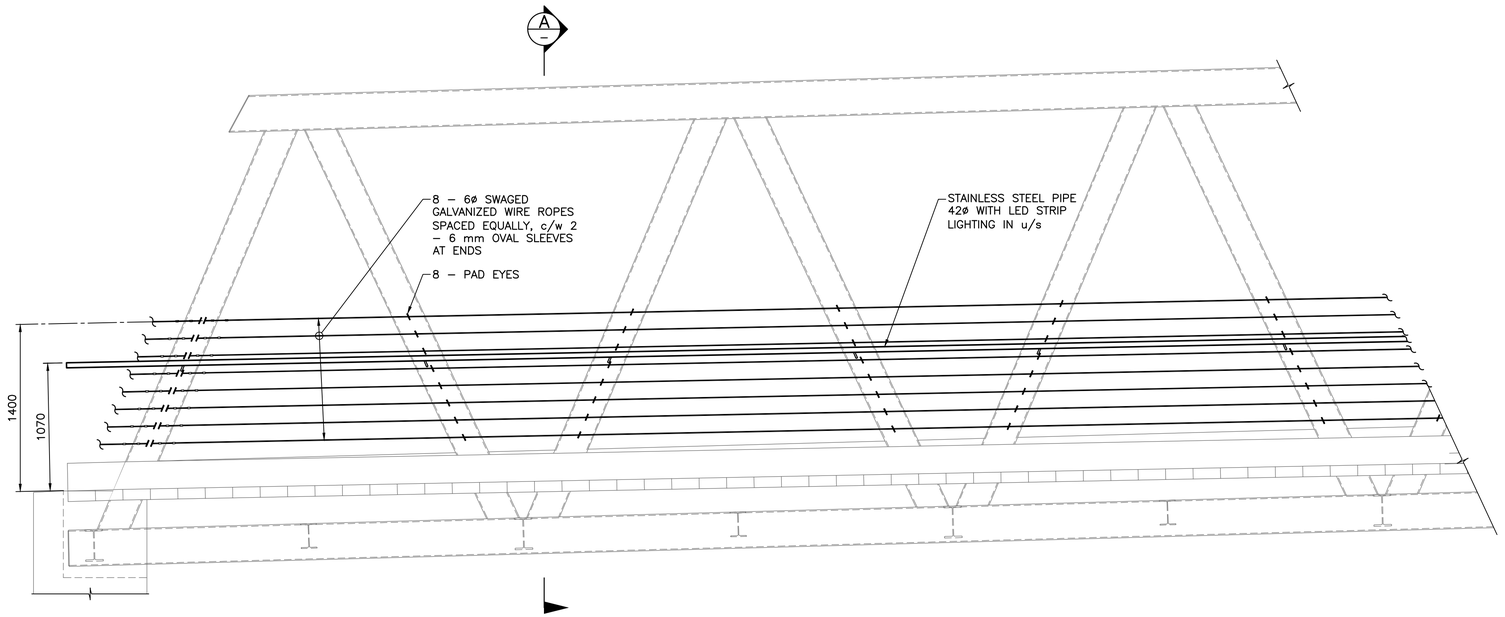
TITLE: REDBRIDGE DECK DETAILS

SCALE	PROJECT NO.	DWG. NO.	REV.
AS NOTED	0052	11	1

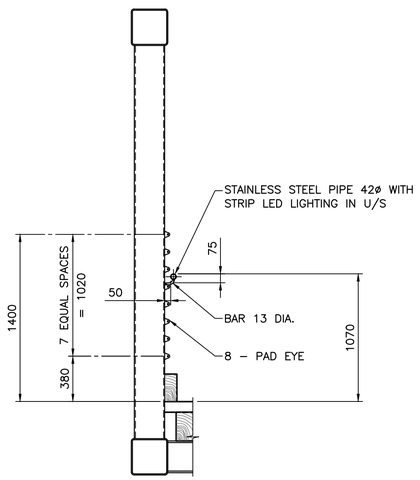
DWG-D-L

CANCEL PRINTS BEARING PREVIOUS REVISION

FILE PATH: P:\0052 - KCD Mamquam Channel Ped Bridge\400 Drawings\04 - Drawings\11 - Deck Details.dwg



TYPICAL RAILING ELEVATION
SCALE: 1:25
(39 SEGMENTS TOTAL)



SECTION A–A
SCALE 1:25

NOTES:

1. FOR GENERAL NOTES SEE DRAWING 01.

NOT FOR CONSTRUCTION

DRAFT

REVISION	DESCRIPTION OF REVISION	DATE (YYYY-MM-DD)	DRAWN	DESIGNED	CHECKED	APPROVED
1	RE-ISSUED FOR PERMITTING	2024-07-12	M.B.	J.D.	T.W.	B.H
0	ISSUED FOR PERMITTING	2023-11-30	J.B.	J.D.	T.W.	B.H.

ORIGINAL ISSUE	
DRAWN:	J.BEAUREGARD
DESIGNED:	J.DEKKER
CHECKED:	T.WANG
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CLIENT: KINGSWOOD PROPERTIES; SQUAMISH HARDWIRED for ADVENTURE

BASIS

PROJECT: MAMQUAM CHANNEL PEDESTRIAN BRIDGE

TITLE: REDBRIDGE RAILING DETAILS

SCALE	PROJECT NO.	DWG. NO.	REV.
AS NOTED	0052	12	1

CANCEL PRINTS BEARING PREVIOUS REVISION

DWG-D-L

FILE PATH: P:\0052 – KCD Mamquam Channel Ped Bridge\400 Drawings\04 – Drawings\12 – Railing Details.dwg