PART 1 OF SCHEDULE 5

CONSTRUCTION OUTPUT SPECIFICATIONS

1. INTRODUCTION

The Construction Output Specifications outline the minimum standards and requirements for the design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning and in no way limit the responsibility of the Concessionaire to perform timely, full, complete, safe and reliable Undertakings. The Construction Output Specifications shall be considered as minimum provisions and the Concessionaire is expected to enhance these as it sees appropriate. The Concessionaire shall make its own determination of the required factors of safety in these Construction Output Specifications but in no case shall factors of safety be less than those stated herein.

In addressing the Construction Output Specifications, the Concessionaire shall consider only the use of proven and demonstrated technologies, methods and materials.

Stationing used in this document is taken from the Province's Design.

The Concessionaire shall be responsible for meeting the Construction Output Specifications with respect to any Off-site Works.

The Concessionaire shall be responsible for providing all design, construction, completion and testing services for the Project from the approximate midpoint of the curve between the Campbell Road intersection and the existing maintenance building to east of the Abbott Street intersection, i.e., Station 26+60.00 to Station 45+77.00 including, but not limited to:

(a) engineering;

(b) construction;

(c) project and construction management;

(d) safety management;

(e) environmental management;

(f) quality management;

(g) risk management;

(h) traffic management;

(i) corridor management;

(j) aesthetics; and

(k) testing and commissioning.

The Concessionaire shall be responsible for the Decommissioning of the Existing Bridge. Decommissioning of the Existing Bridge includes demolition, removal and disposal of the Existing Bridge, remediation of the east approach causeway and construction of lake bed impact habitat compensation on the west approach causeway in an environmentally acceptable manner consistent with the requirements of any Governmental Authority and in accordance with the Project Schedule and this Agreement.

2. SCHEDULING

The Works Schedule shall show the order in which the Concessionaire proposes to carry out the design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning, along with the projected starting and completion times for major phases of the design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning, and the date for completion of all aspects of the design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning, which shall be no later than the dates listed in the Project Schedule. The Works Schedule shall be consistent in all respects with all other provisions of these Construction Output Specifications and Section 12 [Schedule] of the Concession Agreement.

The Works Schedule shall include milestone dates indicating all activities and providing sufficient time for the Review Procedure in the submission of each report, plan and written description required in these Construction Output Specifications and Part 2 of Schedule 15 [Reports] to be submitted to the Province.

The Concessionaire shall allow sufficient time, not less than 20 Working Days, in the Works Schedule for each of the first submissions of the Management Plans to be reviewed by the Province prior to the commencement of the design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning, save that the Decommissioning Plan is required six months prior to the start of Decommissioning.

The Works Schedule shall be submitted in both the following formats:

(a) a critical path network diagram which shall, as a minimum, include all the activities listed below, logically linking them to show the manner in which the Works shall be designed and constructed. The construction activities shall be further subdivided into major areas within the Site, also as shown below; and

(b) a bar chart derived from the network diagram, listing all of the same activities by major area, and showing graphically the length of time needed for each activity.

The Works Schedule shall show:

(a) project initiation;

(b) milestones associated with Management Plans and Reports;

(c) agency submissions and anticipated approvals;

(d) design schedule;

(i) site investigations;

(ii) off-site works;

(iii) geotechnical;

(iv) structural;

(v) roadway;

(vi) electrical;

(vii) signing;

(viii) landscaping;

(ix) environmental;

(x) Utilities Relocation co-ordination;

(e) construction schedule;

(i) mobilization;

(ii) off-site works;

(iii) pedestrian underpass;

(iv) substructure;

- piling;
- preload and foundation;
- piers;
- abutments;

(v) superstructure;

- elevated structures;
- deck;

(vi) floating structure;

- pontoons;
- anchors;
- installation;

(vii) preload removal;

(viii) grade construction;

(ix) signing;

(x) granular and sub-base materials production and placement;

(xi) pavement removal;

(xii) paving;

(xiii) utilities;

(xiv) electrical;

(xv) commissioning and testing of the Works;

(xvi) Substantial Completion;

(xvii) design related to the Decommissioning, the Decommissioning and the removal or relocation of all Ancillary Structures;

(xviii) landscaping;

(xix) clean-up and construction demobilization; and

(xx) construction deliverables.

In addition, the Works Schedule shall be expanded in detailed sub schedules based on major construction areas.

3. DESIGN AND CONSTRUCTION REQUIREMENTS

The New Highway shall be designed and constructed to provide for a safe and reliable two-way crossing of the Okanagan Lake for car, bus, truck, pedestrian, cyclist and specific permit traffic.

On placing the New Crossing into service, the Existing Bridge shall be Decommissioned and its approaches and all Ancillary Structures decommissioned and re-commissioned for park use and environmental betterment as appropriate.

3.1 Design Safety Performance

The New Highway must meet or exceed the "Design Safety Performance" threshold level that is estimated for the Province's Design. The threshold for the safety performance is based on the traffic volume levels and several design parameters that are associated with the Province's Design. The techniques to evaluate safety performance allow for a systematic and objective evaluation of the relative impact of several traffic and design parameters. Changes in traffic volume and design parameters assumed by the Concessionaire may affect the expected safety performance and these changes can be evaluated using the methodology outlined in the de Leur Consulting Ltd. documentation included in the Disclosed Data.

The Concessionaire shall retain an independent audit team to carry out a road safety audit on the proposed design in accordance with the Ministry's Transportation Road Safety Audit (RSA) Policy (Technical Circular T-02/04). Road Safety Audits shall be performed at the following stages: initial submission of preliminary design, 60% design submission, 100% design submission and pre-opening stages. The Concessionaire shall provide the Province with the results of the audit and identify how the issues raised by the audit are to be addressed.

3.2 Climate and Seismicity

The Concessionaire shall make its own determination of the impact of climate and seismicity on the New Highway. The Concessionaire shall design the New Highway with the full consideration of all environmental, climatic and seismic factors which may occur.

The Concessionaire shall install, in a location approved by the Province an anemometer, as specified in section 2.3.2 of the Local Area Specifications.

3.3 Service Life and Durability

The New Crossing shall have a minimum design life of 75 years based on the application of preventative maintenance procedures, but without the requirement for main structural component replacement. Main structural components such as foundations, piers, abutments, superstructure, and decks, shall have an expected service life of 75 years and shall not require significant repairs during the service life.

Design life is defined in CAN/CSA–S6-00 as a period of time specified by the Ministry during which the structure is intended to remain in service. Service life is defined in CAN/CSA-S6-00

as the period of time during which the structure performs its design function without unforeseen costs of maintenance and repair.

Some components of the New Crossing may need significant repair or total replacement during the service life of the New Crossing. Unless otherwise noted, the service life of such components shall be consistent with Clause C2.4.1 of S6.1-00, Commentary on CAN/CSA-S6-00, Canadian Highway Bridge Design Code.

Design calculations for corrosion allowances shall use 100 years as the intended service life.

For each surface which is exposed to soil or which is at the interface with the water table, the Concessionaire shall determine its corrosion mitigation approach by a specific analysis by a corrosion specialist. If the mechanism to address corrosion is to add thickness, the following are the minimum acceptable design losses:

Galvanization loss = 15 micrometres/year for first two years

4 micrometres/year for subsequent years until zinc depletion

Carbon steel loss = 12 micrometres/ year

The following systems are not approved for use in the New Crossing. The list below does not constitute a complete list of non-approved products:

- stay-in-place steel decking and formwork
- steel grid decking
- induced current cathodic protection system
- bridge deck heating systems
- timber components except densification piling under water
- proprietary composite steel/concrete girders
- wire faced wall systems

In addition, unbonded tendons are not permitted in bridge, culvert or wall structures.

3.3.1 Concrete Deck Structure

The deck structure shall have a minimum service life of 75 years. If the wearing surface is monolithic with the structural deck, the design shall allow for milling and application of a concrete overlay. If a concrete overlay is used to form the wearing surface, the minimum design life of the concrete overlay shall be 40 years.

Deck concrete shall comply with the durability requirements of CAN/CSA-S6-00.

The design shall be such that the actual post-construction maximum crack width shall be limited to 0.20 mm at the surface of the structural deck. Maximum crack width shall be defined as the mean plus 1.27 standard deviations determined from at least 10 measurements spaced approximately 150 mm apart along a single crack. Wider cracks shall be effectively sealed to prevent entry of water and chlorides.

The service life of the deck concrete shall be evaluated using the ACI Life 365 prediction model, Version 1.1. This software model may be found at http://www.silicafume.org/specifiers-lifecycle.html. The following input data shall be used:

(a) Exposure - Urban Highway Bridge, Kelowna.

(b) Maximum surface chloride concentration = 0.68% by weight of concrete at 35 years.

(c) Service life shall be defined as the time to onset of corrosion, as determined by the ACI Life 365 prediction model, Version 1.1 plus six years.

The design of all open deck joints shall include provisions to collect and flush storm water, debris and snow melt runoff and divert it away from the concrete and structural steel supporting structure.

3.3.2 Pontoon Concrete (if applicable)

Pontoon concrete shall comply with the durability requirements of CAN/CSA-S6-00. Top slabs of pontoons which directly support the roadway surface shall be deck concrete and are subject to the requirements for deck concrete in accordance with section 3.3.1 above.

Minimum concrete covers and tolerances to steel reinforcement shall comply with CAN/CSA-S6-00. The following deviations from CAN/CSA-S6-00 are acceptable to the Province. However, the Concessionaire shall satisfy itself as to the adequacy of any deviations in its design and shall accept full responsibility for the effects of these deviations.

(a) Exterior Surfaces except Roadway Slabs: 40 mm + 8 mm, -2 mm

(b) Interior Surfaces: 30 mm + 8 mm, -2 mm

The design shall be such that the actual post-construction maximum crack width at either face shall be limited to 0.20 mm. Maximum crack width shall be defined as the mean plus 1.27 standard deviations determined from at least 10 measurements spaced approximately 150 mm apart along a single crack. Wider cracks shall be effectively sealed to prevent leakage.

The Concessionaire shall obtain concrete of maximum density and the completed work shall be watertight and without leaks, cracks or defects. For this purpose, a leak shall be defined as any interior surface which shows dampness.

3.3.3 Sources of Aggregate

The Concessionaire shall submit prior to starting construction a statement from the concrete supplier identifying the proposed source of aggregate and certifying that the proposed aggregate/cement combination shall not produce deleterious expansion due to alkali-aggregate reaction. This statement shall be substantiated by recent test results, to the satisfaction of the Province.

3.3.4 Structural Steel

For structural steel, the following requirements shall be followed:

- Superstructure members (excluding bracing) is to be 350 AT, Category 3 steel
- Bracing members of 300W or 350W steel is to be coated for corrosion resistance
- Superstructure members located within a distance of 1.5h (where h is the overall depth of the superstructure) of all deck joints or within 1.5h from the end of the superstructure is to be coated for increased corrosion resistance
- The structural steel/concrete interfaces are to be detailed such that no rust staining of the concrete occurs

Structural steel bracing is preferred to be 350A steel but may be 300W, 350W, 350A or 350 AT steel.

Access to steel girders for inspection purposes is to be incorporated into the design, including where appropriate, devices to enable inspectors to walk along all girders and tie-off safely in accordance with the most recent requirements of the Workers Compensation Board Regulations.

Tie-off devices are to be galvanized and designed such that the devices require a minimum level of maintenance and inspection. Tie-off devices are to be 1.5m above the bottom flange. No slack on the tie-off device is permitted. Access to the girders by the general public is to be blocked by ending the tie-off devices at some distance from the abutments, forcing the use of a ladder and by providing locking devices on any hatches which give access from the deck level.

3.4 Existing Anchors

3.4.1 Subject to the provisions of Section 17.1 [Anchor Defects] of the Concession Agreement and the provisions set out below, the Concessionaire shall be responsible for any use it chooses to make of the existing anchors, chains and cables.

3.4.2 The existing anchorage system consists of the anchors, the anchor chains, the lower link bars, the lower anchor cables, the upper link bar, the upper anchor cables and the cable attachments to the pontoons.

3.4.3 The existing anchorage system may be used to support the New Crossing and the Existing Bridge until construction is complete. Upon completion, the Existing Bridge will be decommissioned and the existing anchorage system, from the anchors to the upper link bar, may be reused to support the New Crossing. New cable pendants will be provided between the upper link bar and the pontoon anchor gallery.

3.4.4 The existing anchorage system shall be checked against the following criteria:

- The design strength of the existing cable adjustment device is 890 kN.
- The specified breaking strength of the anchor cable is 2850 kN.
- The existing anchors were test loaded in 1986, as shown in Table O:

TABLE O: Anchor Test Loads – October and November 1986

Existing Pontoon	Anchor	Test Load (kN)
A	N	1225
	S	1400
B	N	1200
	S	1310
C	N	1135
	S	1155
D	N	980
	S	1155
E	N	980
	S	1155
F	N	980
	S	1155

Existing Pontoon	Anchor	Test Load (kN)
FF	N	980
	S	1155
EE	N	980
	S	1155
DD	N	980
	S	1155
CC	N	980
	S	1155
BB	N	1135
	S	1335
AA	N	1200
	S	1425

3.4.5 The Province's Design was prepared on the basis of the loads set out in the following Table P

TABLE P

New Pontoon	**Existing Pontoon**	**Anchor**	**Calculated Load (kN)**
	A	N	
		S	
	B	N	

		S	
1	C	N S	993 950
2	D	N S	855 859
3	E	N S	773 793
4	F	N S	759 776
5	FF	N S	716 770
6	EE	N S	676 763
7	DD	N S	671 756
8	CC	N S	671 743
9	BB	N S	657 719
10	AA	N S	646 714
11		N S	777 982

12		N S	776 986

Notes:

1 Loads are expected maximums derived from 100yr storm for completed structure and 25yr storm during construction.

2 Cable loads include 500kN pretension.

3.4.6 If the Concessionaire's Calculated Service Loads for any of the anchors are more than 120% of the loads set out in Table P, the Concessionaire shall notify the Province's Representative of its Calculated Service Loads. The Parties shall work together to establish why the Calculated Service Loads are different and to establish which are correct on the basis of the Province's Design. If the Parties cannot agree on the correct Calculated Service Loads, they shall refer the matter to the Disputes Resolution Procedure. For greater certainty the Parties agree that nothing in this Section shall relieve the Concessionaire in any way from its responsibility for the design and construction of the Works and the Decommissioning.

3.4.7 The Concessionaire may at its sole cost carry out a test on any of the anchors to establish that its load capacity achieves the Calculated Service Load with an appropriate safety factor, provided that the maximum load imposed on any anchor shall not exceed 1550 kN. Any such test must be carried out in accordance with Good Industry Practice and in particular the Concessionaire shall take all reasonable care to ensure the safety of the Existing Bridge, including having at the Site all necessary equipment and materials to reinstate the anchors if an anchor fails.

3.4.8 Before carrying out any test under Section 3.4.7, the Concessionaire shall submit to the Province's Representative in accordance with the Review Procedure a load test plan, setting out the equipment and procedures to be used, the proposed test values and duration of the load, the procedures for ensuring the safety of the Existing Bridge, including strengthening of any cable adjustment device and the procedures, equipment and materials to be used if an anchor fails.

3.4.9 The Province will monitor and adjust the anchor tensions to maintain the pre-stress in the anchor cables during the Original Service Period when both the Existing Bridge and the New Crossing are attached together at levels sufficient to maintain the theoretically calculated construction anchor loads at or below the theoretically calculated long term service loads. The objective being that proof loading of the anchors for values in excess of 140% of the theoretical calculated long term service load will not be required. In no case will the pre-stress be reduced below 250 kN. In the event that a reduction below this

value would have been determined to be necessary, the Concessionaire shall adjust its design and/or construction procedures to remove this requirement.

3.5 Design Speed

The design speed for the New Highway shall be as noted in Table 1.

TABLE 1: Design Speed

Segment	**Design Speed**
Station 26+60.00 to 43+25.00	60 km/hr
Station 43+25.00 to 45+77.00	50 km/hr

3.6 Roadway Design

The roadway design shall provide a divided traffic flow with a minimum of five lanes of traffic; three traveling to the west and two traveling to the east, together with a single 3.0 meter minimum clear width, sidewalk for pedestrians and cyclists on either the north or south side of the crossing. It is also acceptable to install sidewalks on both sides of the crossing, providing each sidewalk has a minimum clear width which complies with the TAC Geometric Design Guide for Canadian Roads (1999) guidelines for the projected usage by cyclists and pedestrians.

The roadway design shall provide uninterrupted traffic flow and exclude bascule, lift, swing span bridge or any movable bridge operation. As a minimum, the Province's standards for median barriers and divided highways as given in the B.C. Supplement to TAC Geometric Design Guide, 2001 Edition, Section 600, shall be achieved.

The roadway designers are to use Good Industry Practice in determining when criteria above this minimum should be applied to enhance features such as safety, drivability, mobility and aesthetics.

The design must safely meet driver expectations consistent with the use of Highway 97.

Access must be maintained and coordinated with the City of Kelowna and Eastside Works Contractor(s) at Abbott Street at all times during the Contract Period.

The Province's Design deviates from the TAC Geometric Design Guide for Canadian Roads and from the B.C. Supplement to TAC Geometric Design Guide, 2001 Edition, in a number of areas. The majority of the deviations are a result of geometric constraints associated with the available construction right of way.

Table 2 indicates the minimum roadway design criteria that shall be accepted. Where the stated criterion is less than the standard guidelines, the standard guideline is shown in brackets. The deviations noted are considered by the Province to be acceptable for the service specified. However, the Concessionaire shall satisfy itself as to the adequacy of any deviations from the standard guidelines in its design and shall accept full responsibility for the effects of these deviations.

TABLE 2: Design Criteria

Criteria	**Station 26+60.00 to 28+40.00**	**Station 28+40.00 to 43+25.00**	**Station 43+25.00 to 45+77.00**
Classification	UAD	UAD	UAD
Minimum Radius	130m	130m	90m
Minimum K Factor	C:8 S:9 [C:13 S:17]	C:8 S:9 [C:13 S:17]	C:8 S:6 [C:8 S:12]
Maximum Grade	6% on L line	6% on L line	6% on L line
Maximum Superelevation	6% Intersections 4%	6%	6% Intersections 4%
Minimum Stopping Sight Distance (Crest or Sag)	85m	85m	65m
Decision Sight Distance	115m [170-230m]	115m [170-230m]	110m [140-190m]
Lane Width	3.6m	3.6m	3.6m
Outside Shoulder Width	2.0m	0.6m	0.6m
Inside Shoulder Width	1.0m	0.6m	0.6m
Median Width	1.8m to 2.6m	1.8m to 4.6m	Varies to 7.10m

Criteria	**Station 26+60.00 to 28+40.00**	**Station 28+40.00 to 43+25.00**	**Station 43+25.00 to 45+77.00**
ROW Width (Minimum)	Utilize existing	N/A	3.0m Outside Toe on North side and 2.0m Outside Toe on South side
Design Vehicle	WB-20	WB-20	WB-20

The minimum roadway cross-section required for the New Crossing is shown on Drawing No. CS-1 included in Appendix 1.

The minimum roadway cross-section for the Approach Roadways is shown on Drawing No. CS-2 included in Appendix 1.

3.6.1 Abbott Street Intersection

A signalized intersection is required at Abbott Street. The intersection shall be designed to accommodate the design vehicle turning template shown on Drawing No. A-TURN 2, included in Appendix 1. The intersection must also accommodate pedestrians and cyclists. It shall be comprised of the following:

(a) A dedicated right turn lane, two dedicated left turn lanes, and two through lanes for eastbound Highway 97 traffic.

(b) One shared through and right turn lane, two through lanes, and no left turn lane for westbound Highway 97 traffic.

(c) Two dedicated right turn lanes for southbound Abbott Street approach with no left turn or through movements.

(d) One dedicated right turn lane for northbound Abbott Street approach with no left turn or through traffic lanes.

(e) Pedestrian actuated crossing on the east side of the intersection coordinated with the left turn signal phase.

3.7 [not used]

3.8 Pavement Design Criteria

The pavement structural design is to follow applicable sections of the following documents and the design criteria in this section 3.8:

AASHTO (1993) *Guide for Design of Pavement Structures*

Technical Circular T-01/04 *Pavement Structure Design Guidelines*

3.8.1 Design Methodology

The following design criteria and input parameters are to be used in conjunction with the AASHTO *Guide for Design for Pavement Structures*:

Asphalt Pavements

Minimum Analysis Period 25 years

Reliability R = 85%

Standard Deviation So = 0.45

Pavement Serviceability Index (PSI):

Initial Serviceability Index pi = 4.2

Terminal Serviceability Index pt = 2.5

Portland Cement Concrete (PCC) Pavements

Minimum Analysis Period 30 years

Reliability R – 90%

Standard Deviation So = 0.35

Pavement Serviceability Index (PSI):

Initial Serviceability Index pi = 4.5

Terminal Serviceability Index pt = 2.5

3.9 Geotechnical Design

Geotechnical investigation has been done at the Existing Bridge site and is summarized in a two-volume report by MacLeod Geotechnical contained in the Disclosed Data. Also, Dr. Peter Byrne has prepared an additional analysis in "1000 Year Return Period Seismic Loading and Estimated Soil Lateral Displacement" which is contained in the Disclosed Data.

The Concessionaire shall conduct any geotechnical investigations it requires to perform its obligations under the Concession Agreement. The Concessionaire shall be responsible for all aspects and adequacy, without limitation, of the geotechnical design.

3.9.1 Scope of Geotechnical Design Report

The Concessionaire shall:

(a) Examine and assess all geotechnical information, designs and reports provided to establish the extent of geotechnical work required for the Project.

(b) Identify all geotechnical investigation, review, assessment and design (including subsurface investigation, laboratory tests, pavement condition surveys, pavement evaluation, slope stability analyses, foundation design, settlement evaluation, seismic stability evaluation, geoenvironmental site assessment and other geotechnical work) required to complete the detailed design.

(c) Undertake geotechnical investigation using state of the practice methods and equipment required in order to provide a detailed geotechnical design supporting the Concessionaire's detailed New Highway design, roadway, drainage and structural design process, components of which would be expected to encompass, but not be limited to: drill holes, test pits, in-situ testing, sampling, identification, classification, mapping, laboratory testing and evaluation of data along the proposed alignments to establish or identify:

(i) extent, types and properties of soils and rocks;

(ii) stripping depth for removal of organic and unsuitable material, a total volume estimate of stripping quantities listed station to station and grubbing requirements;

(iii) use of excavated cut materials with estimated shrink and swell factors;

(iv) foundation design including seismic evaluation and design;

(v) potential settlement and stability analysis, monitoring and remediation measures;

(vi) surcharge, instrumentation and special construction techniques to ensure a safe design. Identify specific location (x, y & z), monitoring schedule and data collection requirements of any instrumentation required for monitoring during construction. (e.g. piezometers, settlement plates, slope indicators, extensometers). Detailed installation procedures for special construction techniques (e.g. EPS);

(vii) soil and rock slope and retaining structure design to provide stability under static and earthquake loading for the design life of the Works;

(viii) surface/groundwater/drainage/erosion/siltation/acid rock drainage issues, monitoring and remediation measures;

(ix) specific recommendations to address ditch depth and width, rockfall and snow catchment, subsurface drainage requirements and side slope seepage problems to prevent erosion of slope faces;

(x) geosynthetics specifications, if being recommended for construction of the Works, with detailed installation procedures;

(xi) special foundation requirements; and

(xii) pavement structure design.

NOTE 1: Classification and identification of soils is to be done according to Ministry standards using the Modified Unified Soils Classification System as outlined in the current Ministry "Manual of Test Procedures, Soils and Aggregate".

NOTE 2: All test hole, test pit and seismic line locations must be surveyed and shown on the design drawings.

3.9.2 Geotechnical Design Criteria

The geotechnical design shall conform to the applicable sections of the documents listed in section 5.2 of this Part 1 of Schedule 5.

3.9.2.1 Seismic Design

Seismic design shall be in accordance with Ministry Technical Circular T-2/92, February 14, 1992 "Seismic Design and Rehabilitation Criteria" and the amendment dated March 11, 1994 with the following modifications:

- The most current versions of the AASHTO and National Building Code of Canada documents shall be used.

- The site specific zonal acceleration ratios shall be obtained from the Geological Survey of Canada.

- The first paragraph of Clause 2.3.1.3 "Performance Criteria for New Facilities" shall be revised to the following:

  "Class I Facilities will remain open to emergency vehicles immediately after the design 1 in 475 year return period earthquake and will not suffer sudden loss of load carrying capacity at the 1 in 1000 year earthquake."

The New Crossing and the Permanent Works shall be considered as "Class I Facilities" when applying Technical Circular T-2/92. In addition, the seismic design for the New Crossing shall meet the requirements given in section 5.6 in Part 1 of Schedule 5.

Dynamic displacements, post earthquake displacements, and liquefaction of soils shall be evaluated and addressed by the design.

The 1000-year return period large earthquake event shall take into account both near field and far field earthquake events. The predicted soil movements for the 1000-year return period large earthquake event shall be determined using a 2 dimensional dynamic finite-element or finite-difference time-history method of analysis. A minimum of 5 spectrum-compatible time histories shall be used.

The Concessionaire shall install strong motion seismograph instrumentation as specified in the Local Area Specifications.

3.9.2.2 Soil Slope and Rock Slope Design

The Concessionaire shall conduct state of the practice field investigation to satisfy design requirements; an overall stability assessment; and provide a cut/fill slope design including any support measures that may be necessary to ensure stability for the design life of the Works.

The rock cut design shall include a practical ditch design based on geometric criteria proposed for the Works. Recommendations for the rock cut at the detailed design stage shall be based on a site specific assessment and shall take priority over the requirements outlined in Technical Bulletin GM2001 Rock Slope Design. The rockfall containment strategies outlined in this Technical Bulletin may be incorporated in the detailed design, if the site specific stability assessment allows.

Where the failure of a slope would affect highway operation (i.e. failure envelope encroaches the paved surface, failure causes lane closures for repairs or failure necessitates excessive maintenance):

(a) The minimum factor of safety for slope stability under static conditions shall be 1.5 for soil slopes and 1.3 for rock slopes.

(b) The factor of safety for existing (already constructed) soil and rock slopes under pseudo-static seismic analysis shall not be less than 1.

(c) The factor of safety for planned new soil and rock slopes under pseudo-static seismic analysis shall not be less than 1.1.

3.9.2.2.1 Riprap Quality

Riprap shall meet the quality requirements in the following table:

Test	Requirement
Absorption	Not more than 2.0 percent

Test	Requirement
(ASTM C127)	
Abrasion, 500 revolutions (ASTM C535)	Not more than 20.0 percent loss
Magnesium Sulphate Soundness, 5 cycles (ASTM C88)	Not more than 15.0 percent loss
Petrographic Examination	Absence of weakness or materials that could result in significant stone alteration and reduction in durability
Durability (ASTM D3744)	No index less than 35
Bulk specified gravity (saturated surface dry, ASTM C127)	Not less than 2.65
Weathering (freezing and thawing), 12 cycles (AASHTO T103)	Not more than 10% loss

The results of these tests shall be submitted to the Province's Representative at least 2 weeks prior to riprap installation.

3.9.2.3 Foundation Design

(a) Shallow Foundations:

The minimum factor of safety against bearing capacity failure under static conditions; against sliding under static loading and overturning under static loading shall be 3.0, 1.5 and 2.0 respectively. The factor of safety against failure under seismic loads shall not be less than 1.1.

(b) Deep Foundations:

The minimum factor of safety (FoS) against failure under static conditions shall be as follows:

FoS = 4 for design based on SPT results

FoS = 3 for design based on CPT results

FoS = 1.8 for design based on full scale static load test results

FoS = 2 for design based on full scale test pile dynamic analysis and signal matching.

The above factor of safety values may not be reduced at the design stage on the basis of an intention for an eventual field test.

(c) The minimum factor of safety against failure under seismic conditions, with due consideration of softening which may occur, shall not be less than 1.1.

3.9.2.4 Settlement Analysis

Settlement analysis of structures/embankments shall be performed. Foundations shall be designed such that differential settlement between adjacent footings is limited to the amount tolerated by the structural design.

Embankment settlement shall be predicted, and surcharging/overbuilding and special construction requirements evaluated.

3.9.2.5 Retaining Wall Design

3.9.2.5.1 General

Geotechnical design shall follow the allowable stress method outlined in the AASHTO Standard Specifications for Highway Bridges, section 5, Retaining Walls. Structural design of retaining walls is to be performed using the limit state design approach of CAN/CSA-S6-00.

Slope angles steeper than 45 degrees shall be designed as walls.

3.9.2.5.2 Wall Types

Only concrete walls or walls with concrete facing (precast or cast in place) shall be used.

Walls with dry cast concrete block facings or wire facing shall not be used.

Retaining wall systems shall show a proven track record of successful use on past projects with similar design and exposure conditions to those of the Project. Documentation which clearly demonstrates that the wall system has a proven track`1 record is to be submitted to the Province before the start of design. Proven track record of documentation is not required for the following wall systems:

- Cast-in-place reinforced concrete walls
- Wall systems listed in the Ministry's Recognized Products List as proven products under "Proprietary Structures".

Retaining walls shall also meet the aesthetic and landscaping criteria in the Construction Output Specifications.

The tops of walls shall be finished in a straight-line segments, to provide an aesthetically pleasing appearance, and tops of Mechanically Stabilized Earth (MSE) walls shall have a cast-in place concrete coping.

Only the MSE wall systems listed under the heading "Proprietary Structures - Bridge Abutments" in the latest edition of the Ministry's Recognized Products List can be considered acceptable MSE wall systems for bridge abutments.

3.9.2.6 Mechanically Stabilized Earth (MSE) Wall Design – External Stability

The following factors of safety shall be used for external stability of MSE wall design:

Condition	**Minimum factor of safety**
Bearing Capacity	2.5
Sliding	1.5
Overturning	2.0
Global Stability	1.5

The minimum pseudo static factor of safety under seismic analysis shall be 1.1.

The maximum equivalent to vertical height of MSE walls shall be:

- 5 metres for walls with extensible reinforcements and
- 12 metres for walls with inextensible reinforcements.

The equivalent to vertical height is shown in Figure 1. In Figure 1, reinforced zones refer to those zones reinforced with geosynthetics.

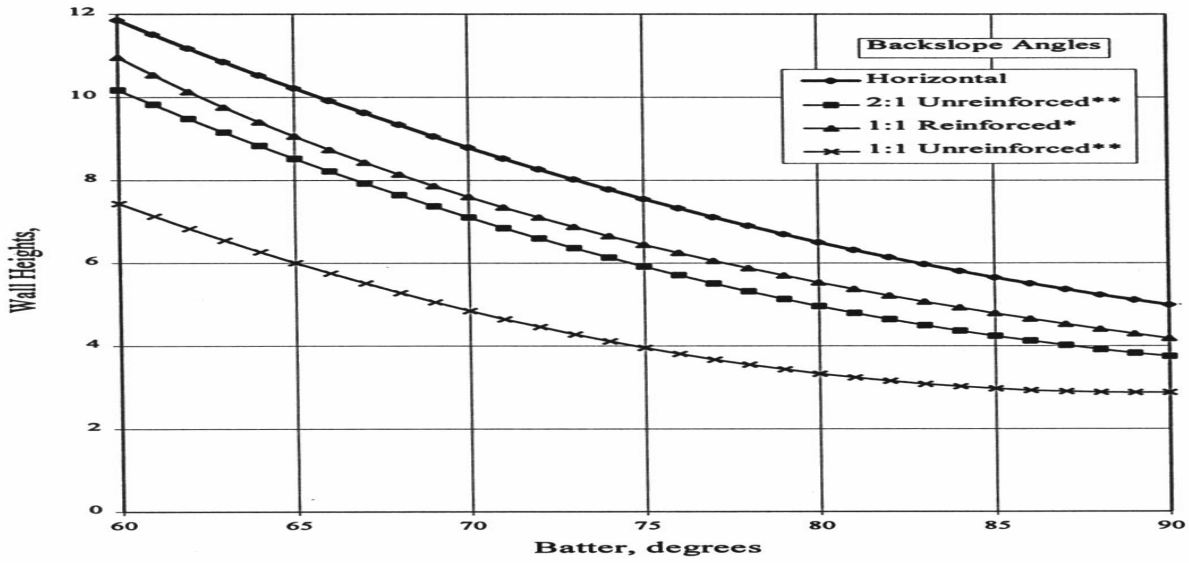


Figure 1: Equivalent to Vertical Height

The definition of wall height, batter and backslope for MSE wall design is shown in Figure 2.

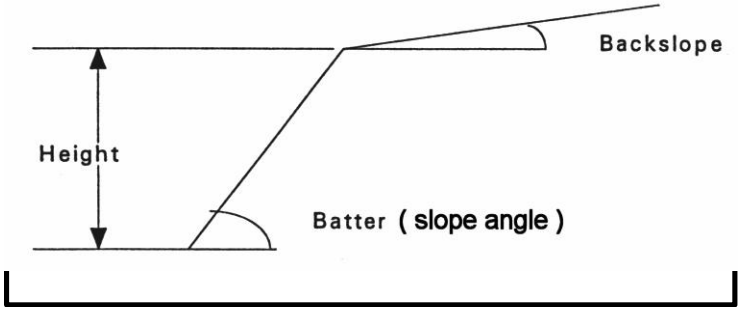


Figure 2. Definition of Wall Height, Batter and Backslope

Note: A list of proprietary walls and geosynthetic materials is provided in the Ministry's "Recognized Products List". (under R in http://www.th.gov.bc.ca/siteindex.htm)

3.9.2.7 Polymeric Reinforcement Specification for MSE Wall Design – Internal Stability

(1) The factor of safety for Polymeric Reinforcement Pullout is 1.5

(2) The allowable reinforcement tension Ta shall be the lesser of the following two determinations:

$$T_{al} = \frac{T_l}{FD*FC*FS}$$

$$T_a s = \frac{T_w}{FD * FC}$$

Where: T_l is $\frac{T_{ult}}{FScrp}$

T_{ult} is the ultimate tensile strength (kN/m) as per ASTM D6637-01

FS_{CRP} is the Partial factor of safety for Creep

T_w is the Tensile Strength at 5% Strain (kN/m) as per ASTM D6637-01 or GRI GG1

FC is the Partial factor of safety for Construction Damage

FD is the Durability Partial factor of safety for Environmental and ageing losses

FS is the Partial factor of safety for Uncertainties

And the partial factors of safety are determined by reference to Table 3.

Table 3: Uniaxial Geogrid Specifications Revised February 2004

Partial factors of safety

Polymer Type	With Testing and Mill Certificates				
	FS_{CRP}	FC Sand	FC Gravel	FD	FS*
HDPE	Min. 3.1	Min. 1.15	Min. 1.25	Min. 1.1	1.5
Polyester Acrylic Coated	Min. 2.0	Min. 1.15	Min. 1.25	Min. 1.1	1.5
Polyester PVC Coated	Min. 2.0	Min. 1.15	Min. 1.25	Min. 1.1	1.5
Polypropylene	Min. 4.0	Min.1.15	Min.1.25	Min. 1.1	1.5

* Reference AASHTO Standard Specifications for Highway Bridges 17th Edition 2002 Pg. 158 Note: For instantaneous loads lasting less than 60 seconds, creep can be ignored i.e. FS_{CRP} =1.0

3.9.2.8 Corrosion rates for Steel Reinforcement in MSE walls

Since accelerated corrosion of the reinforcements could cause sudden and catastrophic failure of reinforced soil structures, additional corrosion allowance in addition to those specified in AASHTO shall be made for walls exposed to corrosive environment (e.g. de-icing salts). Criteria for evaluating potential corrosion losses are given in U.S. Department of Transportation Federal Highway Administration Publication No. FHWA-RD-89-186 December 1990 entitled Durability/Corrosion of Soil Reinforced Structures.

3.10 Marine Traffic

3.10.1 Navigation Channel

The New Crossing shall provide for a marine traffic navigation channel with the following minimum clearances:

(a) Air Draft: 18 m clearance above High Water Level;

(b) Water Draft: 4 m below Low Water Level;

(c) Channel Width: 44 m.

Transport Canada has been consulted with regard to the proposed navigation channel and has given an informal indication that the proposed navigation channel is acceptable to it. Final approval of Transport Canada for navigation clearances, channel design and temporary works is the responsibility of the Concessionaire. The *Navigable Waters Protection Act*, R.S. 1985, c. N-22, Navigable Waters Bridges Regulations, C.R.C., c. 1231 made pursuant to the *Navigable Waters Protection Act*, and the Collision Regulations, C.R.C., c. 1416 made pursuant to the *Canada Shipping Act*, R.S., c. S-9, s. 1 must be followed to the satisfaction of Transport Canada.

The Concessionaire shall be responsible for application to Transport Canada for approval of any temporary closure of the existing navigation channel required to complete the Works and the Decommissioning. Transport Canada has provided the Province with an informal approval for closure of the existing navigation channel between October 15 and April 15 of a given year in which the closure is required to complete the Works and the Decommissioning. The Concessionaire shall be responsible for communication with marine stakeholder groups as described in Part 4 of Schedule 17 to facilitate notification of this closure. Upon further application by the Concessionaire, subject to input from the marine user groups, Transport

Canada has indicated a willingness to the Province, to consider an extension to this closure window should unforeseen circumstances during construction warrant such an extension.

The New Crossing shall be designed to meet the vessel collision requirements of CAN/CSA S6-00 for a Class I bridge classification. The design for vessel collision shall be based on vessels currently, or periodically expected to be, operating on Okanagan Lake.

For navigation channel purposes, the lake levels, as published by the Hydrographic Service of Canada on Chart 3052, are:

(a) High Water Level (HWL): 342.52 m (geodetic);

(b) Mean Water Level (MWL): 341.92 m (geodetic);

(c) Low Water Level (LWL): 341.32 m (geodetic).

During construction of the New Highway and Decommissioning, the full navigation channel of the Existing Bridge or the New Crossing must be kept in service to allow passage of marine traffic between April 15 and October 15 each year. Closures, as approved by Transport Canada, are available outside the April 15 to October 15 period.

Any construction materials, temporary works or equipment shall be marked with navigation lights, high visibility materials and paints to ensure vessel operators can observe any impediment or restriction to navigation to the satisfaction of Transport Canada. Warning signs and public notification of closures to marine users shall be placed on the existing west and east main piers warning vessel operators of the construction, to the satisfaction of Transport Canada.

3.10.2 Wave Climate

The Concessionaire shall address in its design, including mitigation measures, the effect on adjacent facilities of changes in wave climate generated by either wind or vessels resulting from the construction of the New Highway and the relocation of the navigation channel.

3.11 Pedestrian and Cyclist Access

The Approach Roadways shall provide for pedestrian and cyclist access to the New Crossing. Access at the east end of the New Crossing shall tie in with the existing promenade walkways within Kelowna City Park and also provide a pedestrian and cyclist pathway along each side of the Concession Highway extending from the pedestrian and cyclist underpass to the sidewalks at Abbott Street. The New Highway shall provide for the free and safe passage of pedestrians and cyclists.

The New Highway shall provide a pedestrian and cyclist underpass, with a minimum cross section dimensions per the Province's Design, through the east approach to the New Crossing that allows for continuity of the City of Kelowna's cycle path network, to the reasonable satisfaction of the City.

A drawing showing the arrangement of the existing pedestrian and cyclist paths in Kelowna City Park is included in the Disclosed Data. The pedestrian and cyclist paths shall be a minimum width of 3m and shall be in accordance with the BC Supplement to TAC Geometric Design Guide for Canadian Roads and the TAC Geometric Design Guide for Canadian Roads.

At the east approach roadway, safe access to both sides of Highway 97 shall be provided for pedestrians and cyclists. At the west approach roadway, safe pedestrian and cyclist access to both sides of Highway 97 shall be provided to connect to the sidewalks on the MOT Section Works.

The existing pedestrian underpass beneath the east approach roadway may be taken out of service from November through March of any given year during the Original Service Period only and shall be demolished as part of Decommissioning. Adequate signage and public advertisement, to the reasonable satisfaction of the Province's Representative and the City of Kelowna, must accompany any closure of the underpass.

Sidewalks and adjoining pathways shall be rerouted as necessary for the continuous, uninterrupted free and safe passage of pedestrians and cyclists along the existing path network and across the Existing Bridge and its approaches during the construction of the New Highway and across the New Crossing and its approaches during the Decommissioning of the Existing Bridge, unless specifically approved by the Province's Representative.

3.12 Drainage

The Approach Roadways and New Crossing shall contain provisions for drainage and direction of storm water, debris wave splash and snow melt runoff from the roadway and pedestrian walkway surfaces. The drainage collection system shall be designed in accordance with the rainfall intensity curves and ponding criteria as outlined in section 3.13 below. The drainage collection system for roadways elevated above Okanagan Lake by supporting structures/pontoons shall be designed such that runoff is directed into Okanagan Lake without coming into contact with the supporting structures/pontoons.

The runoff collected from the Approach Roadways shall be directed into the City of Kelowna storm water collection system on the east side, and into a new storm water collection and treatment system on the westside to be provided by the Concessionaire as part of the Works. The new storm water collection and treatment system for the west approach to the New Crossing shall accommodate the runoff from the MOT Section as required, and shall be designed in accordance with environmental approvals and regulations.

The roadway and pedestrian walkway surfaces on the New Crossing shall be protected with wave walls or other suitable measure to prevent wave overtopping and excessive spray onto the roadway and pedestrian walkway surfaces during design events.

3.13 Drainage Design Criteria

The design of the drainage collection system for the Approach Roadways and New Crossing shall be in accordance with CAN/CSA S6-00 and Table 1010A in the BC Supplement to TAC Geometric Design Guide for Canadian Roads except as noted below.

Rainfall Intensity Curves

To the Kelowna Airport Rainfall Intensity Curves, produced by Atmosphere Canada, with the 10 year return period curve increased by 10%.

Ponding Criteria Bridge Roadway

To a maximum of 1.8 metres beyond the parapet face or 1.2 metres beyond the lane line. The limits of the New Crossing for purposes of ponding criteria only shall be the east and west abutment.

Ponding Criteria Approach Roadway

To a maximum of 1.2 metres beyond the barrier face or curb edge.

Ponding Criteria Sidewalk

To a maximum of 1.0 metre beyond the face of the parapet.

Sidewalk Drainage

The sidewalks along the New Crossing, from the east abutment to the west abutment shall be false graded to drain back to the parapet and shall not be directed over the outboard edge of the sidewalk.

3.14 Lighting and Electrical

3.14.1 Lighting

The New Highway shall be signed and illuminated in accordance with current Ministry standards as described in the Electrical and Traffic Engineering Manual and Technical Bulletins.

Roadway lighting shall be provided over the full length of the Concession Highway. Roadway lighting levels are a minimum of 17 lux over the New Crossing roadway. The lighting levels may be reduced to 13 lux through Kelowna City Park from Abbott Street to the east end of the lake crossing. Lighting levels shall be calculated in accordance with the Electrical and Traffic Engineering Manual and Technical Bulletins.

If a floating pontoon structure is used for the New Crossing:

(a) Interior pontoon lighting shall be in accordance with WCB requirements.

(b) The conduit systems shall be designed to allow for the constant movement of the floating structure.

(c) The Concessionaire shall make provisions for a power distribution system that shall accommodate maintenance requirements.

Aviation, navigation and warning markers and lights and signing shall be provided in accordance with Transport Canada regulations and requirements. All lighting shall be easily accessible for maintenance (i.e. swivel brackets or walkways).

The pedestrian and cyclist access to the New Highway from the existing promenade walkways of Kelowna City Park and from the west approach roadway shall include provision for lighting that is protected from vandalism and results in illumination consistent with IES (Illumination Engineering Society) guidelines.

3.14.2 Communications, Camera and Traveller Information

In addition to the other conduits required to be installed as referenced in this Schedule 5, Part 1, the Concessionaire shall install at least two 50 mm minimum diameter conduits the entire length of the structure. This conduit system shall be contained within the parapet and have junction boxes facing the sidewalk. A 32 mm minimum diameter conduit shall connect each luminaire pole and anchor gallery to a junction box for the two 50 mm communication conduit system.

Provisions for cameras on luminaire poles shall be made at a spacing of approximately 400m over the length of the New Highway. Design luminaire/camera poles and associated extensions shall be such that the total deflection at the indicated camera height above the ground is less than 50 mm when subjected to wind speeds of 65km/h and less than 125mm when subjected to wind speeds of 125 km/h.

The Concessionaire shall provide a closed circuit television system capable of providing snapshot images every 90 seconds to the Ministry website, and also capable of providing a time/date stamped video record of the entire New Highway for the purpose of auditing the Concessionaire's records used in calculation of Performance Payments.

The cameras shall monitor the New Crossing as well as each approach over the full extent of the Concession project limits.

Permanent automated vehicle detection stations shall be installed at the Measurement Point. Vehicle detection shall be on an uninterrupted basis 24 hours per day, 7 days per week to meet the requirements of Part 7 of Schedule 10 [Monitoring and Measurement] of the Concession Agreement. Manual and pneumatic vehicle detection systems are not acceptable. Vehicle detection data shall be available in an agreed electronic format.

3.15 Utilities

The Concessionaire shall be fully responsible for the co-ordination of all Utilities pursuant to Section 28 [Utilities] of the Concession Agreement.

3.16 Work by Others

Work may be performed by others within or near the Site. This work may include, but is not limited to, work by the following Persons:

(a) BC Hydro;

(b) Terasen Gas;

(c) Fortis BC (formerly Aquila Networks Canada) (formerly West Kootenay Power);

(d) Telus;

(e) Shaw Cable;

(f) City of Kelowna;

(g) Governmental Authority;

(h) Westbank First Nation; and

(i) the Province or its Representatives or contactors.

The Concessionaire shall lead the co-ordination of the construction work and all other activities with the overlap of the scope of the MOT Section Works, Works pursuant to the Kelowna Agreement and the Causeway Fill and Preload Contract. The Concessionaire shall co-operate fully with the reasonable requirements of others working on Concession Highway Land and co-ordinate its construction work and all other activities accordingly.

3.17 Floating Structure

If the Concessionaire provides a floating structure as part of the New Crossing, the following requirements shall be met:

(a) The floating portions of the New Crossing shall be designed as hollow pontoons to facilitate inspection and maintenance of the entire interior of the pontoon hull. Watertight hatches, access doors and access catwalks shall be provided to facilitate access and maintenance. All points of access shall be in accordance with all Laws and Regulations, including, without limitation, the requirements of the WCB and conventional practice as considered necessary to ensure worker safety in a confined space environment. The Concessionaire's design shall either support the use of openings, doors or other entry means that permits unrestricted

access for rescue and therefore would NOT constitute the subsequent construction of a confined space or, if a confined space is created by design and as per WCB definition, a confined space entry and rescue program must be instituted and implemented as a deliverable and a rescue agreement with local authorities must be on file.

(b) Pontoon interiors shall be subdivided into watertight compartments to restrict flooding. In the event of a leak, an accidental breach of an exterior wall or other similar occurrence which allows water inundation, the flooding of the pontoon shall not result in loadings in the pontoon sufficient to cause structural damage prior to necessary remedial action being taken.

(c) The design shall consider the possible flooding scenario in which the point of accidental breach is at a dividing wall, allowing water ingress to watertight compartments on both sides of that wall.

3.18 Barriers, Parapets and Railings

With respect to barrier and parapet shape and configuration, the Concessionaire shall conform to standards as outlined in the Ministry Manual of Bridge Standards and Procedures, Standard Drawings and the Standard Specifications.

The Concessionaire shall be responsible for the design of all barriers, parapets and railings in accordance with the requirements of CAN/CSA-S6-00 and BC Supplement to TAC Geometric Design Guide for Canadian Roads.

Any removal of existing barriers shall be identified by appropriate Z-178 temporary warning signs (Barrier Removed for xx km).

Railings for pedestrian and cyclist must comply with MoT Technical Bulletin TS03001.

Any areas on the structures requiring regular inspections shall have railings and/or fall protection, as required to meet WCB requirements, to facilitate the simple and safe inspection of components.

3.19 Decommissioning

The Existing Bridge must remain in service until after the Substantial Completion Date.

The demolition, disassembly and removal of the Existing Bridge and causeway shall satisfy all Environmental Laws and requirements of Relevant Authorities and Utility Suppliers. The Concessionaire shall submit to the Province for review a Decommissioning Plan for the Existing Bridge.

The Existing Bridge and appurtenances shall be demolished and removed including but not limited to: the west abutment, the west transition span, the entire floating portion, the east

transition span, both lift span steel towers above the concrete pier cap including all mechanical components and counterweights, both lift span concrete piers, the lift span, the east approach span, the east abutment and the pedestrian and cyclist tunnel, stairway and pathways at the east approach.

The lift span piers shall be demolished in whole or in part to the satisfaction of the Relevant Authorities and to ensure the safety of the New Crossing and the boating public. The Concessionaire should be aware that the lift span piers are buoyant structures and the Decommissioning Plan shall be required to provide ballast or other negative buoyancy to ensure pier stability.

The existing west approach causeway and east approach shall be decommissioned at all locations where the existing roadway is not incorporated into the new alignment. This shall include removal of: all asphalt, all concrete, all roadside barriers, all median works, all drainage components, all electrical works and lighting, all signage and the existing maintenance building. The Concessionaire is responsible for restoration of the existing west and east approach causeway as defined in section 4 of this Schedule 5, Part 1. The extent and details of this restoration are shown on the Province's Design Dwg. Nos. 1458-190, 1458-191, 1458-192, 1458-193 and 1458-194.

The demolition and New Crossing erection plans must address anchor capacity if the new floating structure and the existing floating structure are to be connected by common anchors.

3.20 Overhead Clearances

Minimum vertical clearance is to be 5.0 m over all paved surfaces, including an on- or off-ramps that pass underneath. The minimum vertical clearance is to be increased to 5.5 m for pedestrian and cyclist bridges, sign bridges, and other light weight structures spanning the highway. The minimum vertical clearance must be maintained throughout the life of the structure to account for such conditions as long-term settlement of supports and superstructure deflection and pavement overlays.

3.21 Bearings

Bearings must be designed for easy maintenance, inspection and replacement. Bearing replacement procedure, including jacking locations and jacking loads, is to be shown on the bridge drawings.

4. ENVIRONMENTAL MANAGEMENT

The Concessionaire shall provide to the Province an Environmental Protection Plan and shall ensure that the protection and maintenance of the environment is achieved in all aspects of the Project and complies with the Environmental Protection Plan. The Province has obtained the Initial DFO Authorization.

This general obligation and the Environmental Protection Plan shall include but is not limited to:

(a) identifying and assessing the potential environmental impacts of the design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning through its own study and in consultation with environmental Relevant Authorities and other interested parties;

(b) notifying the various Relevant Authorities having jurisdiction over the Project and obtaining and complying with the terms and conditions of all Laws and Regulations and specific permits and approvals provided by the Relevant Authorities;

(c) designing, constructing, and carrying out post-construction monitoring of mitigation or habitat compensation measures, including but not limited to the willow spurs on the west approach causeway, or both as required by the environmental Relevant Authorities; and

(d) such additional measures the Concessionaire deems appropriate to protect and maintain the environment.

Except as otherwise provided for in the Agreement, the Concessionaire is responsible for obtaining all additional required environmental permits, amendments to the existing environmental authorizations, approvals and new authorizations, except for the Initial DFO Authorization, prior to commencing construction. These must provide for all aspects of the Project including construction of the Project Facilities and operation of the New Highway and all required staging and ancillary sites such as graving docks. Permits must also address the Decommissioning and the construction of all environmental compensation works.

The Concessionaire shall develop all environmental plans, documents and operations required by Relevant Authorities and shall submit them to the Relevant Authorities, and which will include but not necessarily be limited to the Environmental Protection Plan (EPP), or an environmental management plan and sedimentation drainage management plan per Standard Specification SS 165, an environmental monitoring program and all required habitat compensation drawings and specifications. The Environmental Protection Plan should, at a minimum, address the environmental issues identified in the document entitled "OK Lake Bridge Project, Environmental Protection Plan – Aquatic Resources and Associated Habitat", (Coast River, March, 2002) as contained in the Disclosed Data. Specific environmental protection measures and procedures that shall be incorporated into the design, construction and operations of all Works must be documented in the Environmental Protection Plan.

The design of the New Highway must recognize that regulations and standards may vary in the future and must strive to incorporate flexibility to accommodate future requirements wherever reasonable and feasible.

The Concessionaire shall copy the Province on all correspondence to and from all Relevant Authorities.

4.1 Noise

The New Highway and Decommissioning of the Existing Bridge shall be designed, constructed and demolished in a manner which maintains noise levels outside the Site, compliant with Central Okanagan Regional District and City of Kelowna bylaws throughout the 24 hour day, even where the relevant work is carried on outside of the City of Kelowna limits but in such case assuming normal course and necessary variances to such bylaws would be obtained and apply.

Construction activity may result in increased noise levels. The Concessionaire shall pay particular attention to Standard Specifications Subsection 165.16.

The Province's Representative may monitor construction related noise levels periodically throughout the construction period and audit the Concessionaire's Noise Mitigation Plan.

The Concessionaire shall develop, submit to the Province's Representative and implement a Noise Mitigation Plan to reduce noise levels related to the operation of construction equipment and related activities. The Concessionaire shall consult with local governments and residential communities concerning noise issues and communicate its Noise Mitigation Plan to the public in accordance with the Communications Plan. Additionally, the Concessionaire shall update the plan to ensure its continued effectiveness for the duration of the construction period. The Noise Mitigation Plan shall include, but not be limited to the following:

(a) scheduling of certain activities, where practical, to reduce disturbance to neighbouring residential communities and the Bear Creek Provincial Park as applicable;

(b) physical measures to be employed to reduce the noise emanating from equipment; and

(c) measures that shall be used to notify the public when noise mitigation is not possible.

4.2 East Approach Landscaping

The Site and Adjacent Areas outside of the roadway cross-section shall be suitably landscaped to be consistent with the adjacent properties, and responsive to the requirements of the City of Kelowna Parks Department. The extent, concepts and details of the landscaping shown on the Province's Design Dwg. Nos. 7584-107, 7584-108, 7584-109, 7584-110 and 7584-111, shall form the basis for any landscaping required by the Concessionaire as part of its design. The Concessionaire shall cooperate with the City of Kelowna and be responsible for the installation of any landscaping on said drawings that is outside the Site.

Landscaping shall be carried out in accordance with the Ministry's Manual of Aesthetic Design Practices. All landscape vegetation installed within the Site shall be maintained to the more stringent of the requirements of the Local Area Specifications for Okanagan Lake Bridge Concession or the City of Kelowna.

4.3 West Approach Habitat Compensation

The extent, concepts and details of the habitat compensation shown on Province's Design Dwg. Nos. 1458-190, 1458-191, 1458-192, 1458-193 and 1458-194, for the west approach, shall form the basis for any habitat compensation required by the Concessionaire as part of its design.

The restoration described herein is applicable to the Province's Design. The Concessionaire shall be responsible for incorporating into its design mitigation and habitat compensation for its proposed works including the lake bed in-fill caused by the MOT Section Works. All restoration shall be developed and implemented with the approval of Governmental Authorities.

Landscaping shall be carried out in accordance with the Ministry's Manual of Aesthetic Design Practices. All landscape vegetation installed shall be maintained to the more stringent of the requirements of the Local Area Specifications for Okanagan Lake Bridge Concession or the relevant Government Authorities.

4.4 Aesthetics

The Existing Bridge is located in a highly focal area in a very prominent and important tourist area. The structure is highly visible from the approaches, the adjacent park, business and residential lands, and from recreational activities on the water. The New Crossing shall be a landmark facility for a great many years. Accordingly, the New Crossing and all related approaches shall be designed and constructed to be aesthetically pleasing, consistent with the Ministry's Manual of Aesthetic Design Practice, local environment and community interests and the concepts discussed as shown in the Concessionaire's Proposal Extracts.

5. TECHNICAL DESIGN CRITERIA

The Concessionaire's performance of the design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning shall at all times be measured on an end results basis. Use of the Standard Specifications or any other Ministry documents, as a source of work methods and materials selection, does not in any way diminish or limit the Concessionaire's responsibility for the end results.

The provisions of the following technical requirements, design codes and standards shall be considered as minimum provisions and the Concessionaire is expected to enhance these as it sees appropriate.

The Concessionaire's design shall be based on proven methods and materials which have been demonstrated to be successfully applied for this application.

Where the provisions of more than one requirement, design code or standard are applicable, the most stringent provisions shall apply.

5.1 Technical Requirements

The design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning shall conform to the following technical requirements:

(a) Quality Management System Requirements for Highway Concessions;

(b) Highway Maintenance Specifications;

(c) Highway Corridor Management Specifications;

(d) Highway Asset Preservation Performance Measures;

(e) Local Area Specifications for Okanagan Lake Crossing Concession;

(f) Reporting Specifications for Highway Concessions; and

(g) Okanagan Lake Bridge Operations and Maintenance Manual sections titled "Maintenance Records (Book 1, section 2.9)", "Routine Maintenance and Repair Services (Book 2, sections 1.3, 2.3, 3.3, 4.3 and 5.3)" and the "Detailed Corrective Performance Specifications (Book 2, sections 1.4, 2.4, 3.4 and 4.4)".

5.2 Codes and Standards

The design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning shall conform to the latest edition or revision (as at the Commencement Date) of the following codes and standards:

(a) CAN/CSA-S6-00, Canadian Highway Bridge Design Code;

(b) Transportation Association of Canada (TAC), Geometric Design Guide for Canadian Roads (1999);

(c) Ministry B.C. Supplement to TAC Geometric Design Guide 2001 Edition including all Ministry Technical Bulletins;

(d) CAN/CSA-C22.1-02, Canadian Electrical Code, Part 1, 2002, as adopted by the Province;

(e) Ministry Electrical and Traffic Engineering Manual – Guidelines for the Design of Lighting, Signal and Sign Installations (December 2003);

(f) Ministry Manual of Standard Traffic Signs and Pavement Markings (September 2000);

(g) Ministry Traffic Sign Catalogue (2003);

(h) Service and Attraction Sign Manual - A Directional Signing Program for Tourist Services, Facilities, and Attractions (January 1995); and

(i) US Army Corps of Engineers, Shore Protection Manual – Volume I and II, 1984.

The geotechnical design shall conform to applicable sections of the following documents:

(a) Ministry Technical Circular T-2/92, February 14, 1992 "Seismic Design and Rehabilitation Criteria" and the amendment dated March 11, 1994;

(b) Publication No. FHWA-SA-97-076 "Geotechnical Engineering Circular No. 3 - Design Guidance: Geotechnical Earthquake Engineering for Highways" – Vol. I and II, May 1997;

(c) AASHTO, "the Standard Specifications for Highway Bridges", Seventeenth Edition, 2002;

(d) Ministry Technical Circular T-10/99, August 31, 1999 "Foundation Design";

(e) Technical Bulletin GM2001 Rock Slope Design; and

(f) Proceedings of the National Center for Earthquake Engineering Workshop on Evaluation of Liquefaction Resistance of Soils, Jan. 5-6, 1996.

The latest edition or revision (as at the Commencement Date) of the following manuals, as a minimum, shall also be used as reference. The Concessionaire shall advise the Province immediately of deviations that are materially different from the manuals, guidelines, standards and specifications used as references. The Province may require the Concessionaire to provide sufficient information regarding the suitability of the materially different methods or materials to demonstrate to the satisfaction of the Province that the materially different methods or materials are proven and appropriate technology that is likely to achieve the intended end result.

(a) Ministry Electrical and Signing Material Standards Manual (Vols 1 and 2, 2003);

(b) TAC Illumination of Isolated Rural Intersections;

(c) Ministry Pedestrian Crossing Control Manual for B.C. (2nd edition, 1994);

(d) TRB Highway Capacity Manual (2000);

(e) TAC Manual of Uniform Traffic Control Devices (1998);

(f) Ministry Manual of Bridge Standards and Procedures;

(g) PTI Recommendations for Stay-Cable Design, Testing and Installation;

(h) the Standard Specifications for Highway Construction, Volumes 1 and 2, 2004;

(i) Ministry Traffic Control Manual for Work on Roadways;

(j) Ministry Traffic Management Guidelines for Work on Roadways;

(k) Ministry of Transportation and Highways Cycling Guide April 2000;

(l) MoT Recognized Products List; and

(m) Okanagan Lake Bridge Operations and Maintenance Manual excluding sections titled "Maintenance Records (Book 1, section 2.9)", "Routine Maintenance and Repair Services (Book 2, sections 1.3, 2.3, 3.3, 4.3 and 5.3)" and the "Detailed Corrective Performance Specifications (Book 2, sections 1.4, 2.4, 3.4 and 4.4).

5.3 Units of Measurement

The metric system (SI) shall be used for all dimensions on project drawings, shop drawings, material data sheets and in all documents for the Project.

5.4 Project Datum and Grid

Geodetic datum is the project datum and UTM NAD 83 (Universal Transverse Mercator, North American Datum) ground level co-ordinates are the project grid. It is noted that there is a survey inaccuracy in information shown on the Province's Design drawings between the east and west sides of Okanagan Lake.

The Concessionaire is responsible for the determination of all survey information.

5.5 Drafting Standards

Project drawings shall conform to the Ministry's drafting standards as outlined in the Manual of Bridge Standards and Procedures and the B.C. Supplement to TAC Geometric Design Guide 2001 Edition, Section 1200.

Electrical drawings shall conform to the drafting standards outlined in the latest version of the Electrical and Traffic Engineering Manual.

5.6 Load Factors and Load Combinations

Load factors and load combinations for bridges shall be in accordance with CAN/CSA-S6-00.

The New Crossing shall be designed to withstand environmental loads generated by a 100 year return period event; wind, wave and ice. The Concessionaire shall be responsible for the determination of all environmental loads.

Seismic design for the New Crossing structure (including abutments and abutment wing walls) shall be in accordance with CAN/CSA-S6-00. For seismic design purposes, the New Crossing structure shall be designated as follows (per CAN/CSA-S6-00 terminology):

- importance category: emergency-route bridge
- seismic performance zone: 2
- structure type: irregular bridge

In this section:

"zonal acceleration ratio, A" means the peak horizontal ground acceleration as most recently stated by the Geological Survey of Canada for the site

"design earthquake" means a seismic event having a probability of exceedance of 10% in 50 years

In addition to the CAN/CSA-S6-00 requirements for an emergency-route bridge, the New Crossing structure shall accommodate the predicted soil movements resulting from the 1000-year return period large earthquake event without collapse. The 1000-year return period large earthquake event shall take into account both near field and far field earthquake events. The predicted soil movements for the 1000-year return period large earthquake event shall be determined using a 2 dimensional dynamic finite-element or finite-difference time-history method of analysis. A minimum of 5 spectrum-compatible time histories shall be used.

If a floating structure is used for the New Crossing, displacements and dynamic motions under prevailing environmental and seismic conditions shall be provided for in the structural design of the New Crossing and in the structural design of the individual components of the New Crossing. Without limiting the generality of this requirement, the effects of temperature variations, winds, waves, ice, and seismic are to be considered during design. The New Crossing shall remain in service without limitation during all design events.

If a floating structure is used for the New Crossing, the Concessionaire shall conduct its own investigations and analyses to determine appropriate loads, load factors and load combinations. Because the load combinations specified in CAN/CSA-S6-00 do not include all loads acting on a floating structure, the Concessionaire shall develop an expanded table of load combinations. During the engineering of the Province's Design, a table of load combinations suitable for use with CAN/CSA-S6-88 was developed and is available as a reference in the Disclosed Data. The Concessionaire shall develop its own table of load combinations suitable for design of the New Crossing using CAN/CSA-S6-00.

A future dead load allowance of 1.2 kilonewtons per square meter shall be included for roadways on non-floating structures.

5.7 Special Permit Traffic

The Province is developing Highway 97 as a heavy haul provincial route capable of routinely accommodating 85-tonne permit vehicles. The Province requires that the New Highway

configuration be capable of carrying the vehicle shown in Figure 4 according to the requirements of CAN/CSA-S6-00, Clause 14.8.2.4 with the highway rated as Class A.

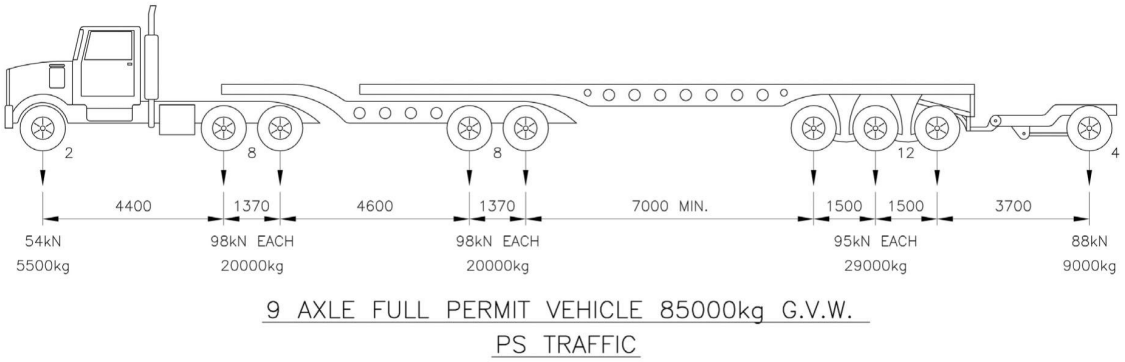


FIGURE 4: 85 Tonne GVW Special Permit Vehicle

6. SAFETY MANAGEMENT

The Concessionaire shall submit a Risk and Safety Management Plan based upon the application of a proven program, associated systems and relevant procedures for the design, construction, completion, commissioning and testing of the Works as well as the design and completion of the Decommissioning.

6.1 Hazard Identification & Assessment, Risk Control and Emergency Response Program

The Risk and Safety Management Plan shall outline the methods for identifying and assessing potential hazards and controlling risks which can be reasonably expected to occur on a project of this type. It shall clearly outline the

- stage of the project,
- expected hazards and exposure, subsequent risks and potential options for control,
- scope of proposed and planned risk control activities,
- levels of resources committed to control efforts, and
- associated follow-up requirements such as re-assessment including intervals, remedial activities, and similar related efforts,

and shall consider and put in place an Emergency Response Program and associated systems to respond to and resolve reasonably foreseeable emergency situations including, but not limited to:

- collisions, spills and fires, resulting from marine users impacting structures and components at water level
- collisions or incidents involving pedestrian and cyclist traffic at road level, including the trail network underpass
- dangerous good spills at marine and road levels
- electrical failure
- extreme natural event, including, but not limited to seismic, icing, ice on lake, ice/wind effects on the lake, snow loading, high winds forces
- large vehicle accidents or collisions and multi-vehicle accidents at road level
- structural, floatation or crane failures or similar operational incident resulting in extended and/or complete traffic lane closures
- any combination of the above and/or operational incidents resulting in the response to and rescue of, provision of first aid to, and evacuation and transportation of injured persons

6.2 Engineering and Design Safety Program

The Risk and Safety Management Plan shall have an Engineering and Design Safety Program and associated systems which shall include the Concessionaire's approach to incorporating the safety of all persons and resources in the design of the Project including, but not limited to:

(a) construction, demolition, operations and maintenance personnel;

(b) users and Marine Users; and

(c) other interested or impacted parties;

6.3 Occupational Health & Safety Program

As part of the Risk and Safety Management Plan, the Concessionaire shall produce and implement an occupational health and safety program in accordance with the regulatory requirements of the Workers' Compensation Board (WCB) of British Columbia, Section 9 [Health and Safety] of the Concession Agreement and section 135 of the Standard Specifications for Highway Construction, 2004. The occupational health and safety program shall describe the Concessionaire's approach to safety during the design, construction and demolition of the Project Facilities and shall provide a basis for the Concessionaire's program for the subsequent operation and maintenance stage of the agreement.

Construction and Demolition Phase

The construction and demolition management team shall be charged with individual and detailed and documented safety responsibilities. An Occupational Health and Safety Program section focused on construction and demolition shall outline the Concessionaire's approach to ensure that occupational safety shall be a risk control priority during these Project stages and shall include, but be not limited to the following reasonably expected high risk control programs:

- fall protection and its plans or training involving guardrails, personal protective equipment and in conjunction with the use of cranes, lift/boom trucks and powered elevated work platforms, ladders, scaffolds and swing stages;
- confined space entry program and plans, procedures, training, air quality monitoring systems and rescue, as required;
- lockouts against inadvertent activation of energies inherent in electrical, rigged components (static), mechanical and other of sources that may put persons in harm's way;
- equipment operation and maintenance safety including barges, hoists, cranes and other heavy duty equipment focusing on protective structures, safeguarding, appropriate labels, manuals and inspection logs, and proper procedure;
- hazardous Substances, including all personal protective equipment programs, material safety data sheets, appropriate training and in particular respiratory and environmental protection against silica dust and other respirable air contaminants, as applicable;
- excavation and trenching and related engineering, shoring or benching practices;
- work on or over water, provision of personal protective equipment, rescue equipment and associated training;
- working alone or in isolation, including an appropriate communications component;
- demolition practices, including containment, personal hygiene and decontamination practices; and
- emergency and rescue procedures and drills as per the Risk and Safety Management Plan.

7. RISK MANAGEMENT PLAN

The Concessionaire shall submit a Risk Management Plan based upon the application of a proven program and associated procedures for the design, construction, completion, commissioning and testing of the Works and the design and completion of the Decommissioning. The Risk Management Plan shall outline the methods for identifying and controlling risks which can be expected to occur on a project of this type. It shall clearly outline the scope of the activities, level of resources committed and associated activities.

8. [NOT USED]

9. PROJECT DOCUMENTATION AND DRAWING DELIVERABLES

During the design, construction, operations and maintenance of the Existing Bridge and Project Facilities, the Concessionaire shall submit sufficient documentation and drawing Deliverables to allow the Province to:

(a) understand the status of the Project;

(b) review the Concessionaire's adherence to the Construction Output Specifications; and

(c) confirm that the Project shall be, and is being, delivered in all material aspects, as described by the Concessionaire's Proposal Extracts and in accordance with the Technical Requirements.

Within one month of the execution of the Concession Agreement, the Concessionaire shall establish an appropriately secure "ftp" site to allow the Province to access Project documentation and drawing Deliverables. The Concessionaire shall maximize the electronic submission of Project documentation and drawing Deliverables. All project documentation and drawing Deliverables shall be in both electronic (pdf) and full size and reduced size (11"x17") hardcopy format (to scale), unless otherwise noted. For each submission required in this Agreement, five full size and five reduced size (11" x 17") hard copies of the drawings shall be required; five hard copies of all other documents shall be required, unless otherwise noted.

The Concessionaire shall assign its documentation and drawing deliverables numbers as assigned by the Province.

9.1 Design and Construction

The Province shall carry out compliance reviews during the Project design development in accordance with the Review Procedure. These reviews shall include all design disciplines.

During the preparation of the detailed design for the New Crossing and prior to the formal submittal of the completed design in accordance with the Design and Certification Procedure the Concessionaire and the Province's Representative will establish and maintain a communication

protocol to allow the Concessionaire to describe to the Province the design during development, how the design is compliant with the Technical Requirements, and potentially where in the interests of quality or schedule or economy the Technical Requirements could be or are required to be modified. The protocol will also provide for the Province's Representative to convey to the Concessionaire where it believes the Concessionaire's design is or may not be in compliance with the Technical Requirements, to comment on aspects of the design which it believes may or will affect quality or schedule or economy, or to request additional design development to demonstrate the adequacy of the design.

The Concessionaire and the Province's Representative will designate a technical team of senior specialists who will meet at regular intervals during the design period, not exceeding every two weeks, to review the design progress and to discuss any issues raised by either party. The objective of the meetings will be to resolve either parties' concerns through a free exchange of technical information in a collegial manner.

Should the technical teams identify issues which, after being fully discussed over a 10 Working Day period, they believe cannot be mutually accepted, they will refer the issue to the senior executives of the Concessionaire's and their design team, the Province's Representative and the Ministry.

In the event that the senior executives, after meeting to review the issue(s) believe that they will be unable to achieve a mutual understanding, they will seek additional guidance on the matter from an experienced professional mutually agreed to have expert knowledge of the particular subject in question. The senior executives shall take this additional information into consideration in evaluating the issue further with the objective of reaching a mutually acceptable understanding.

Both parties will work in good faith through the above informal design review procedure with the common objective of achieving a mutually acceptable design prior to formal submissions under the Design and Certification Procedure. Neither the Concessionaire or the Province's Representative are obligated through the above procedure to agree.

The above process is to be informal and does not replace or modify the requirements of Part 3 of Schedule 5 [Design and Certification Procedure] or Schedule 16 [Disputes Resolution Procedure].

The Concessionaire shall organize and hold review meetings in Vancouver with the Province and external agencies no later than two weeks following each of the 30%, 60%, 90% and 100% progress report submissions.

The meetings shall be arranged and chaired by the Concessionaire. The Concessionaire shall prepare and distribute minutes of the meetings within two days of such meetings.

The Concessionaire shall prepare all drawings and submittals required by external regulatory agencies and other interested agencies, including but not limited to, the Ministry, the Ministry of

Water, Land and Air Protection, Transport Canada, Fisheries and Oceans Canada and Utility Suppliers.

The Concessionaire shall submit monthly updated Project design criteria for each discipline until the 60% progress review meeting. A record version of the Project design criteria shall be required as part of the 100% design submission.

The Concessionaire shall submit design drawings, design criteria, design folders and record documents for all the following disciplines; roadway, structural, geotechnical and electrical. Typical documentation requirements for all design drawing submissions and design folders are outlined in section 9.1.1 Roadway Engineering, unless noted otherwise. The Concessionaire shall prepare a Deliverables Plan including, but not limited to, all design drawings, design criteria, design folders, record drawings, design calculations and reports to be submitted in accordance with this Agreement, and each scheduled delivery date.

9.1.1 Roadway Engineering

9.1.1.1 Design Drawings Submissions

The Concessionaire shall present drawings to the Province for compliance review in accordance with the Review Procedure. Reviews of the roadway engineering design shall be required at the 30%, 60%, 90% and 100% complete stage. These drawings shall build on the content and detail of the preliminary drawings and reports included in the Concessionaire's Proposal Extracts and shall be in a format consistent with the Ministry's B.C. Supplement to TAC Geometric Design Guide 2001 Edition.

The design drawing submissions shall be in accordance with the Ministry's B.C. Supplement to TAC Geometric Design Guide 2001 Edition. In addition to these requirements the following information shall be provided for the 30%, 60%, 90% and 100% progress report submissions:

(a) electrical plans which shall show:

(i) traffic signal pole layouts and controller locations;

(ii) service locations;

(iii) luminaire layout and wattages;

(iv) signs requiring illumination;

(v) location of traffic count stations; and

(vi) camera locations;

(b) traffic management plans, graphically showing each construction stage and the accommodation of traffic during construction, to confirm the viability of the proposed sequencing;

(c) noise attenuation plans, showing the location and type of noise barriers along with the appropriate cross-section details (if required);

(d) documentation related to the safety audit (at applicable stages, including all safety audit reports and design team responses to the reports);

(e) landscape plans, showing the location and types of vegetation, location of underground automatic irrigation systems; and

(f) design criteria document for the Project Criteria at the 30% submission and a completed criteria document at the 100% submission.

The Concessionaire shall be responsible for obtaining all Permits, Licences and Approvals. Documentation of all Permits, Licences and Approvals shall be submitted to the Province as part of the 100% submission.

9.1.1.2 Design Folders

The Concessionaire shall prepare design folders for the 100% submission, which shall have indexes and sectional dividers. They shall contain pertinent correspondence and shall be arranged in chronological order by subject matter. The folders shall include design calculations and backup information for the areas outlined above. As an example, the roadway design folders shall include, but not be limited to, a copy of all approvals, design reports, correspondence, and calculations such as, barrier requirements, drainage, traffic analysis, etc.

9.1.2 Structural Engineering

Design folders are required for all structural engineering. During the 30% and 60% reviews, the Concessionaire shall provide a table of maximum bending moments, maximum axial forces and maximum shear values at critical locations for all primary load carrying members and, if applicable, floating pontoon sections.

9.1.2.1 New Crossing

The Concessionaire shall submit to the Province progress reports at the 30%, 60%, 90% and 100% complete stages for compliance review in accordance with the Review Procedure, for the New Crossing. These reports shall build on the content and detail of the preliminary drawings and reports included in the Concessionaire's Proposal Extracts.

The Concessionaire shall submit five copies of a progress report to the Province's Representative when the New Crossing design is at the 30% and 60% complete stage. The 30% and 60% progress reports shall contain the following:

(a) an outline of the design codes, design criteria, parameters, and philosophies;

(b) description of the structure including span configuration, retaining walls, substructure, superstructure, articulation system, seismic load path, seismic restraints and seismic detailing;

(c) preliminary geotechnical recommendations including a description of geotechnical and groundwater issues;

(d) description of maintenance and aesthetics considerations;

(e) general arrangement and preliminary substructure and superstructure drawings (11" x 17");

(f) description of computer models used for analysis and design;

(g) proposed construction sequencing including deck placement procedure; and

(h) draft of any specifications required for construction of the structure.

The Concessionaire shall submit five copies of a progress report to the the Province's Representative when the bridge design is at the 90% complete stage. The 90% progress report shall contain the following:

(a) full size and reduced size (11" x 17") of all design drawings;

(b) geotechnical report for the structure;

(c) resolution of all the Province's review comments from the 60% progress report;

(d) specifications for construction of the structure; and

(e) design criteria document.

The Concessionaire shall submit five copies of the final 100% design to the Province's Representative. The final 100% design shall be signed and sealed by the Designer and include:

(a) full size and reduced size (11" X 17") of all design drawings. One set to be reproducible;

(b) geotechnical report for the structure;

(c) resolution of all previous Province reviews;

(d) specifications for the construction of the structure;

(e) a neat, bound, indexed set of design calculations for the bridge structure initialed by both the Designer and the Checking Team [Defined in Schedule 5, Part 3];

(f) final design criteria document; and

(g) New Crossing Operations and Maintenance manual.

9.1.2.2 Non-Standard Poles and Sign Support Structures

The Concessionaire shall submit five copies of a conceptual design report for all non-standard sign support structures and non-standard poles prior to commencing detailed design. The report shall contain the following:

(a) conceptual drawings for the support system and foundations; and

(b) description of design codes, design criteria, parameters and philosophies.

The Concessionaire shall submit five copies of full size drawings at the 100% completion stage for all non-standard sign support structures and non-standard poles, including foundations.

9.1.2.3 Retaining Walls

The Concessionaire shall submit progress reports at the 30%, 60%, 90% and 100% complete stages for compliance review in accordance with the Review Procedure, for each retaining wall.

The Concessionaire shall submit five copies of a progress report to the Province's Representative at the stage when the design is 30% and 60% complete. These progress reports shall contain the following:

(a) an outline of the design codes, design criteria, parameters, and philosophies;

(b) description of the wall system, its components, and drainage requirements;

(c) drawings on 11" x 17" paper (folded into the report) showing the plan view, the elevation view, and a typical cross-section of the wall;

(d) preliminary geotechnical recommendations including a description of geotechnical and ground water issues;

(e) description of aesthetic and maintenance considerations;

(f) description of computer models used for analysis and design; and

(g) a clear description of the seismic design methodology.

The Concessionaire shall submit five copies of a progress report at the 90% completion stage. The 90% progress report shall contain the following:

(a) final geotechnical report for the walls;

(b) full size and reduced size (11' x 17") completed drawings;

(c) a neat, bound, indexed set of design calculations initialled by both the Designer and the Checking Team; and

(d) design criteria document.

The Concessionaire shall submit to the Province's Representative the final, full-size, completed reproducible plans. These drawings shall be signed and sealed by the Designer.

9.1.3 Geotechnical Engineering (see Geotechnical Design Criteria, section 3.8.2 above)

The Concessionaire shall submit five copies of a geotechnical progress report for the roadway alignment and structures to the Province's Representative at the stage when the geotechnical design requirements are 30% and 60% complete for compliance review in accordance with the Review Procedure. The 30% and 60% progress reports shall contain, but not be limited to, the following:

(a) preliminary recommendations for allowable vertical and horizontal loads and acceptable foundation systems for the structures including comments on possible differential settlements and estimated overall settlements;

(b) a summary of any subsurface investigation that has been completed. The summary shall also include drill summary logs drafted in the Ministry format;

(c) reduced size (11" x 17") drawings showing the road alignment in plan and section with drill hole locations shown on the plan and simplified summary logs shown on the profile;

(d) an outline of the design codes, design criteria, parameters, and philosophies;

(e) any changes to the design or layout of the concept since previous submissions;

(f) description of computer models used for analysis and design; and

(g) a summary report detailing the site specific seismic design criteria, foundation performance, steel structure interaction analysis, future damage assessment under the design event and remediation expectations in the event that the design event occurs.

The 30% and 60% submissions shall be coordinated with the 30% and 60% submissions for roadway and structural engineering. Design loads, ultimate capacities and details of pile splices for tips will be indicated on foundation drawings.

The Concessionaire shall submit five copies of a geotechnical design progress report to the Province's Representative at the 100% completion stage. The 100% progress report shall contain, but not be limited to, the following:

(a) any additional work that has been completed since the 60% progress report;

(b) a summary of any subsurface investigation that has been completed. The summary shall also include drill summary logs drafted in the Ministry format;

(c) reduced size (11" x 17") drawings showing the road alignment in plan and section with drill hole locations shown on the plan and simplified summary logs shown on the profile. Design notes are to be shown along the bottom of the drawing indicating surficial material, stripping depths, heights of cuts or fills along centre line as well as left and right of centre line, slope angles left and right of centre line, S.G.S.B. thickness and any additional construction notes as conditions change along the alignment. The 100% geotechnical progress report for the structures is to have reduced size (11" x 17") drawings showing the New Crossing structures - general arrangements in plan and profile, with drill locations shown in plan, and simplified summary logs shown in profile;

(d) final recommendations for foundation systems, allowable loads, settlement and differential settlement predictions; and

(e) final design criteria document.

The 100% submission shall be co-ordinated with the 90% submissions for roadway and structural engineering.

The Concessionaire shall submit to the Province's Representative a neat, bound, indexed set of design calculations for any geotechnical design completed for this Project in a minimum number of volumes, initialled by both the Designer and the Checking Team. The design calculations shall be submitted with the 100% progress report. The design calculations shall be retained by the Province for record purposes only.

The Concessionaire shall submit to the Province's Representative final, full size, completed, reproducible drawings for the geotechnical design. These drawings shall be signed and sealed by the Designer.

The Concessionaire shall submit to the Province for the Province's records:

(a) copies of all final versions of drawings; and

(b) copies of all test results, and other Quality Control and Quality Assurance reports and information.

9.1.4 Electrical Design Reports

The Concessionaire shall provide to the Province's Representative for compliance review in accordance with the Review Procedure 30%, 60%, 90% and 100% design reports that, as a minimum, provide the following information:

(a) design illuminance levels for each road section;

(b) luminaire pattern and spacing for each road section;

(c) roadway luminaire type and mounting height for each road section;

(d) a completed draft copy of the traffic engineering check sheet;

(e) isolux evaluation of stray light impact to adjoining properties, particularly residential; and

(f) details of any non-standard electrical component.

The minimum requirements for drawings to accompany the design report are as follows:

(a) New Crossing deck luminaire layouts;

(b) functional design of the traffic signal(s) showing controller and pole placement;

(c) points of power supply;

(d) locations where sign luminaires shall be required; and

(e) locations of, and power requirements for components other than signals, signs and luminaires.

10. RECORDS AND REPORTS

10.1 Record Drawings

The Concessionaire shall supply record drawings and other documents, including but not limited to:

(a) design plans;

(b) typical cross sections;

(c) supplemental drawings;

(d) geometrics and laning;

(e) profiles;

(f) traffic control detour drawings;

(g) signing plans showing all signs such as information, guide, service/attraction, regulatory and warning signs;

(h) pavement marking plans;

(i) underground utility plans;

(j) landscape plans on the east abutment;

(k) environmental remediation and habitat compensation plans on the west approach causeway;

(l) final record cross-section plans and material types on all roadways;

(m) hydrologic and hydraulic calculations, drawings, maps, etc;

(n) all Quality Control and Quality Assurance folders showing test data and location;

(o) CAiCE project archive file containing the as-constructed roadway model.

(p) all final record electrical plans including wiring, conduit placement and illumination levels for all signs, signals, luminaires and other electrical works;

(q) all final documentation on the road safety audit; and

(r) those drawings and other documents referred to in Sections 10.1, 10.2 and 10.3.

Copies of the original AutoCAD design drawing disks are to be used and amended as required to reflect the actual constructed roadway template and amenities (Utilities, sidewalks, curbs, concrete roadside barriers, etc.) at Completion. The original design drawings shall not be amended in any way. The drawing numbers shall remain the same as the originals for storage and retrieval purposes. Record documents shall be stand-alone documents and contain all of the original information except that which has been changed by the construction revisions.

The drawings shall be drafted in the format and to the standards of the original design drawings and plotted on standard mylar drawing sheets with waterproof ink (see B.C. Supplement to TAC Geometric Design Guide 2001 Edition for standards).

Each item or area on the drawing that has been changed from the original design shall have an eight millimetre triangle adjacent to the area of the change with the number of the change inscribed within the triangle. The same number shall be shown cross referenced in a "Construction Revisions" block with a description of the change beside it. The triangle shall be drawn with the apex of the triangle pointing towards the change.

The Concessionaire shall sign and date each drawing when completed.

The record drawings shall be signed and sealed by the original Designer to verify the drawings represent the original design with all design revisions added. The record drawings shall also be signed and sealed by the Designer or other professional engineer registered in British Columbia to verify that the Works have been constructed and that the Decommissioning has been performed in accordance with the design drawings, including all revisions. The Quality Manager will provide written confirmation to the Province with the record drawings that, to the best of the knowledge of the Quality Manager having acted in accordance with Good Industry Practice (including making inquiries), all relevant Quality Documents have been complied with in the construction of the Works and the Decommissioning.

The signed drawings shall be forwarded to the Province's Representative for review and comment in accordance with the Review Procedure. The mylar drawings shall be accompanied by the AutoCAD.DWG format disk and a disk containing the terrain model in ASCII file.

This process is not intended to preclude continuous liaison between the Province's Representative and the Designer during construction about design or construction problems.

The Concessionaire shall liaise with the Province's Representative and external agencies as required during the design and/or construction and provide the Province's Representative with copies of all formal communications with and submissions to external agencies.

After completion of the construction phase, when no further changes are to be made to the drawings, record drawings and documentation shall be distributed and filed.

10.2 New Crossing Record Documents

Without prejudice to the generality of the provisions of Section 10.1, the Concessionaire shall submit to the Province's Representative after construction of the New Crossing, a set of record documents for the New Crossing in accordance with the requirements of Section 10.1, including:

(a) copies of all final versions of shop drawings;

(b) copies of all test results, mill certificates, and other Quality Control and Quality Assurance monitoring reports and information;

(c) copies of all geotechnical engineering reports and investigation results;

(d) daily construction diary;

(e) a complete log of all concrete placement summaries on a Concrete Inspection Report (Form H-47);

(f) a complete driving record for all piling installed submitted on a full size drawing;

(g) a complete record of the as constructed deck concrete data. Submit on full size drawings. The drawings shall include:

(i) "As Constructed" deck profiles at 3 metre intervals along the centerline of the roadway and at 0.3 metre offset from parapet lines. The elevations shall be referenced to a permanent benchmark;

(ii) a table of actual elevations shall be produced and the difference from the design grade shall be plotted for each line;

(iii) a sketch of the deck showing the direction and extent of each day's placement of concrete;

(iv) concrete mix design and adjustments;

(v) tabulation of the deck concrete data including:

(a) load number;

(b) volume of concrete per load;

(c) cumulative volume of deck pour;

(d) time start and end of discharge per load;

(e) concrete and air temperature per load;

(f) slump per load;

(g) air content per load;

(h) concrete unit weight;

(i) placement location per load;

(j) concrete cylinder strengths; and

(k) any changes in conditions or other remarks related to the deck placement; and

(h) design folder of design calculations for construction revisions.

10.3 Retaining Wall Record Documents

Without prejudice to the generality of the foregoing provisions of Section 10.1, the Concessionaire shall submit to the Province's Representative, after construction of the walls, a set of record drawings in accordance with the requirements of Section 10.1, including:

(a) copies of all final versions of shop drawings;

(b) copies of all test results, mill certificates, and other Quality Control and Quality Assurance monitoring reports and information; and

(c) copies of all geotechnical and ground water engineering reports and investigation results.

10.4 Construction Completion Report

Prior to the Completion Date, the Concessionaire shall provide three sets of supporting details (Construction Completion Report) as a record document to the Province's Representative. The Construction Completion Report shall include certification(s) signed by a professional engineer, lawfully registered to perform work in the Province of British Columbia, stating that the Construction was completed generally in conformance with the design and specifications and in accordance with all applicable Laws and Regulations and the Concession Agreement. The narrative portion of the Construction Completion Report should be about 20 pages in length.

The Construction Completion Report shall include, but not be limited to, the following items:

(a) TITLE PAGE;

(b) TABLE OF CONTENTS;

(c) EXECUTIVE SUMMARY:

(i) Name of Designer;

(ii) Project Map;

(iii) Scope of Project;

(iv) Type of Work;

(v) Working Conditions;

(vi) Handling of Traffic;

(vii) Summary of Major Issues Affecting the Project;

(d) PROFESSIONAL ENGINEERS CERTIFICATION OF CONSTRUCTION;

(e) CONCESSIONAIRE:

(i) List of Subcontractors;

(ii) List of Workers and Major Equipment (Including Subcontractors);

(f) WORK METHODOLOGY:

(i) Construction Methods (unique or special);

(ii) Major Field Revisions (comments on design revisions during construction);

(iii) Materials Encountered;

(g) CONSTRUCTION PROGRESS HISTORY:

(i) Date Work Started;

(ii) Date of Substantial Completion;

(iii) Date Work Completed and Completion Certificate;

(iv) Original and As-Built Construction Schedule;

(v) Key Dates (such as start of specific tasks, etc.);

(vi) Reasons for any Work Stoppage;

(viii) Items Affecting Schedule (Weather, R/W purchase, etc);

(h) MATERIAL TESTING:

(i) List of Types of Testing and Numbers;

(i) SPECIAL CONSTRUCTION ITEMS;

(j) ENVIRONMENTAL IMPACT;

(k) LANDSCAPING;

(l) PHOTOGRAPH INDEX:

(i) The emphasis is on the "Before" and "After", Original Terrain, Construction and "Final" colour photographs. One copy of all available photos is required, mounted in photo albums, labelled and dated, plus

electronic files (max. 400). Electronic files of photos preferred with approximately 20 prints in report.

10.5 Design and Construction Phase Monthly Report

On the first Monday of each month until Completion, the Concessionaire shall submit Monthly Progress Reports including but not limited to:

(a) project safety report including all health and safety documents, including but not limited to, safety activities, minutes of meetings, copies of reports of safety inspections and investigations, and any order, claim form, notice or correspondence received by the Concessionaire from the WCB or sent to the WCB by the Concessionaire;

(b) quality report including a summary of the status of all quality management activities completed in the preceding month, identifying all test and inspection results indicative of the substandard work and identifying all apparent failures to comply with the Quality Management System.

(c) work completed in the past month;

(d) work planned in the current month;

(e) Concessionaire's list of unresolved information requirements from the Province;

(f) any issues or concerns that could impact the Project and their resolution;

(g) deliverables schedule, drawing progress lists and project schedules, updated to reflect progress to date; and

(h) any other reporting per the Construction Output Specifications.

11. DEFINITIONS

In this Part 1 of Schedule 5:

(a) "Ancillary Structures" means all structures and equipment associated with the Existing Bridge including but not limited to roadways, sidewalks, paths, existing pedestrian underpass, luminaires, roadway embankment, existing utilities to be relocated, etc.

(b) "Approach Roadways" means all roadways, sidewalks, pedestrian and cyclist accesses, retaining walls, luminaires, landscaping and supporting structures between station 26+60.00 to the east abutment and between the west abutment to station 45+77.00;

(c) "Design Safety Performance" means the design safety performance derived from the report prepared by de Leur Consulting Ltd dated March 2004 and entitled "Okanagan Lake Bridge: Quantifying the Safety Performance of the 'Existing' Design and 'Base' Design" and found in Section 5.3.6 of the Data Room;

(d) "Decommissioning Plan" means the plan developed by the Concessionaire describing the engineering, process, techniques and schedules for the Decommissioning which impact the adjacent property and New Crossing, including but not limited to the investigation of, and plan to deal with, environmental and safety concerns;

(e) "Electrical and Traffic Engineering Manual" means the Electrical and Traffic Engineering Manual as contained in the Disclosed Data;

(f) "Environmental Protection Plan" means the document that provides a detailed description of the measures that are to be implemented before, during or following the construction of the New Highway and the Decommissioning to minimize the impacts of construction on natural resources and the environment of the area;

(g) "Noise Impact Study" means the Noise Impact Study as contained in the Disclosed Data;

(h) "Noise Mitigation Plan" means the plan developed by the Concessionaire to measure, manage, control and eliminate noise levels during the Enhanced Service Period and Original Service Period;

(i) "Okanagan Lake Bridge Operations and Maintenance Manual" means the manual for the operation and maintenance of the Existing Bridge included in the Disclosed Data;

(j) "Quality Assurance" means the planned and systematic activities implemented in the quality system to provide adequate confidence that an entity will fulfill requirements for quality; and

(k) "Quality Control" means operational techniques and activities that are used to fulfill requirements for quality.

12. WFN EMPLOYMENT INCENTIVE

12.1 General

The Concessionaire is encouraged to employ and to facilitate the employment of WFN labour in carrying out the works for the project.

The opportunity is available for the Concessionaire to earn a WFN Employment Incentive.

12.2 Definitions

Eligible Equipment means equipment that is charged out at a minimum hourly rate of $50.00 per hour or more as defined in the Ministry's Equipment Rental Guide.

Equipment Hour means a paid hour of work performed in carrying out the Works or the Decommissioning by an owner/operator of equipment employed by the Concessionaire or the Contractor or any of their subcontractors under the Concession Agreement.

Person Hour means a paid hour of work performed in carrying out the Works or the Decommissioning by an employee or servant of the Concessionaire or the Contractor or any of their subcontractors under the Concession Agreement

WFN Employment Incentive means the premium amount that is payable to the Concessionaire for the total Person Hours worked in carrying out the Works or the Decommissioning by WFN labour and the total Equipment Hours worked by WFN labour.

12.3 WNF Concessionaire Employment Incentive Requirements

(a) Subject to the terms of this Agreement, the Province will pay the Concessionaire a WFN Employment Incentive of **DELETED** per hour for each Person Hour worked in carrying out the Works or the Decommissioning by WFN labour and **DELETED** per hour for each Equipment Hour worked by Eligible Equipment on the Site or the Graving Dock Site by WFN labour. A WFN Employment Incentive payment will be made for each hour, so that an Equipment Hour will not also be eligible as a Person Hour and vice versa.

(b) If the Concessionaire wishes to apply for the WNN Employment Incentive, the Concessionaire shall submit to the Province's Representative, in connection with the preparation of the completion documents, a statement from a certified general accountant certifying the following:

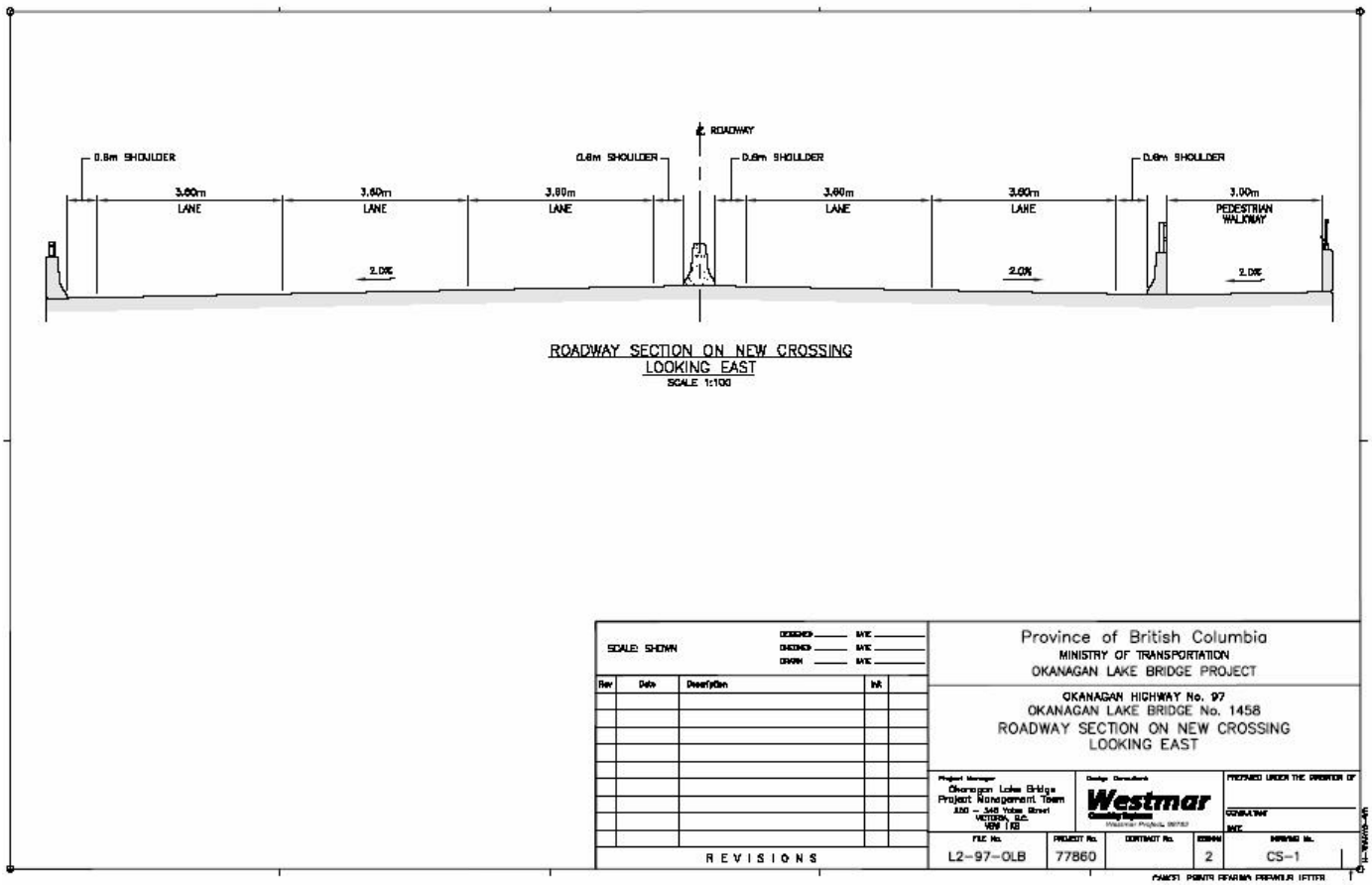
(i) the total number of Person Hours worked in carrying out the Works or the Decommissioning by WFN labour;

(ii) the total number of Equipment Hours worked in carrying out the Works or the Decommissioning by WFN labour;

(iii) supporting documentation demonstrating, to the satisfaction of the Province, the persons or companies employed in connection with this WFN Employment Incentive and the particulars as to the Person Hours or Equipment Hours worked on the Site or the Graving Dock Site.

(c) In no event will the aggregate amount payable by applying the WFN Employment Incentive under this clause exceed **DELETED**

APPENDIX 1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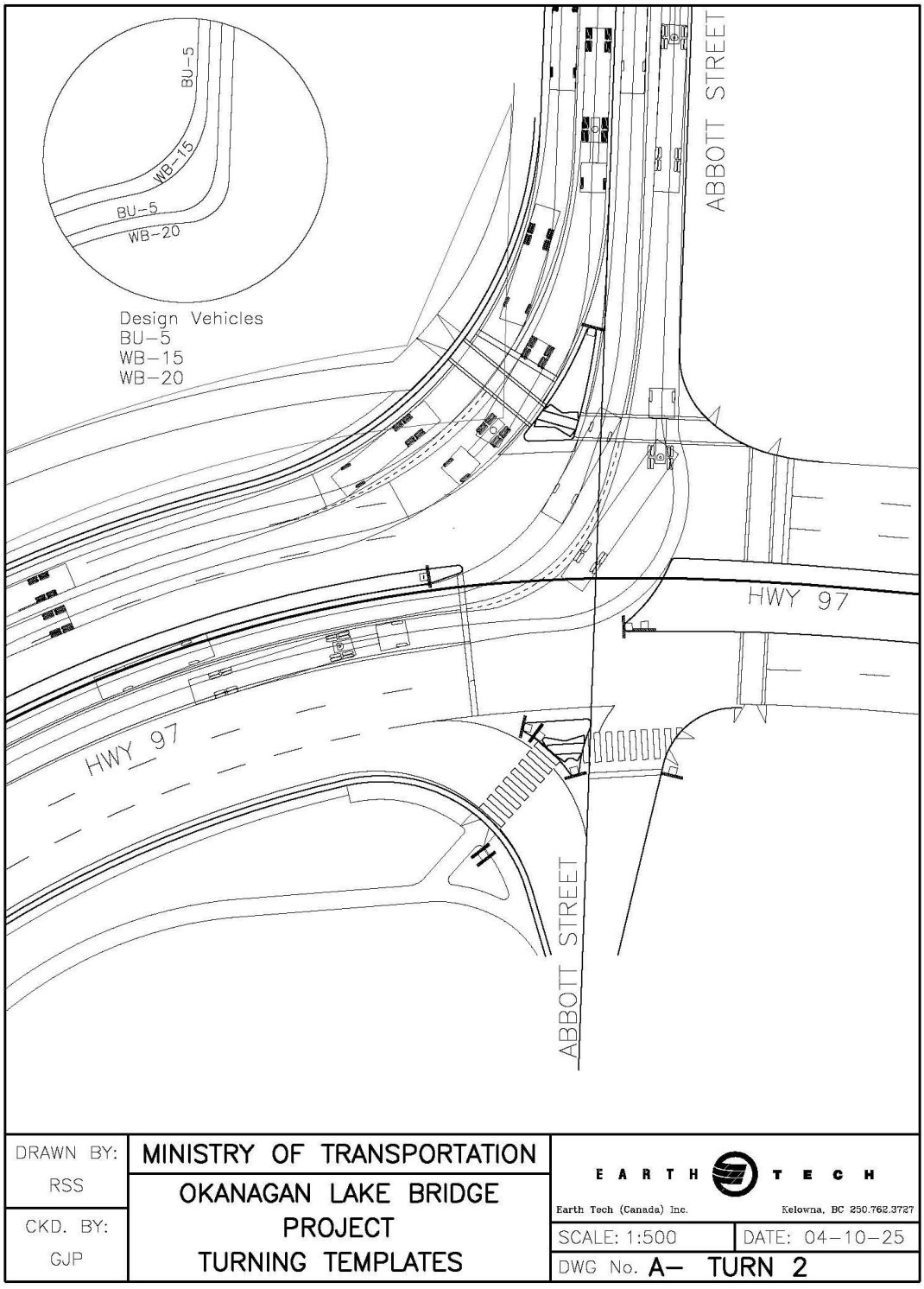
0.6m SHOULDER
0.6m SHOULDER
0.8m SHOULDER
3.60m LANE
3.60m LANE
3.80m LANE
3.60m LANE
3.60m LANE
3.00m PEDESTRIAN WALKWAY
2.0%
2.0%
2.0%
ROADWAY SECTION ON NEW CROSSING
LOOKING EAST
SCALE 1:100
SCALE: SHOWN
DESIGNED DATE
DRAWN DATE
CHECKED DATE
Rev Date Description Init
REVISIONS
Province of British Columbia
MINISTRY OF TRANSPORTATION
OKANAGAN LAKE BRIDGE PROJECT
OKANAGAN HIGHWAY No. 97
OKANAGAN LAKE BRIDGE No. 1458
ROADWAY SECTION ON NEW CROSSING
LOOKING EAST
Okanagan Lake Bridge Project Management Team
Westmar
FILE No. L2-97-OLB
PROJECT No. 77860
CONTRACT No.
SHEET 2
DRAWING No. CS-1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WB-15
BU-5
WB-20
Design Vehicles
BU-5
WB-15
WB-20
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HWY 97
HWY 97
ABBOTT STREET
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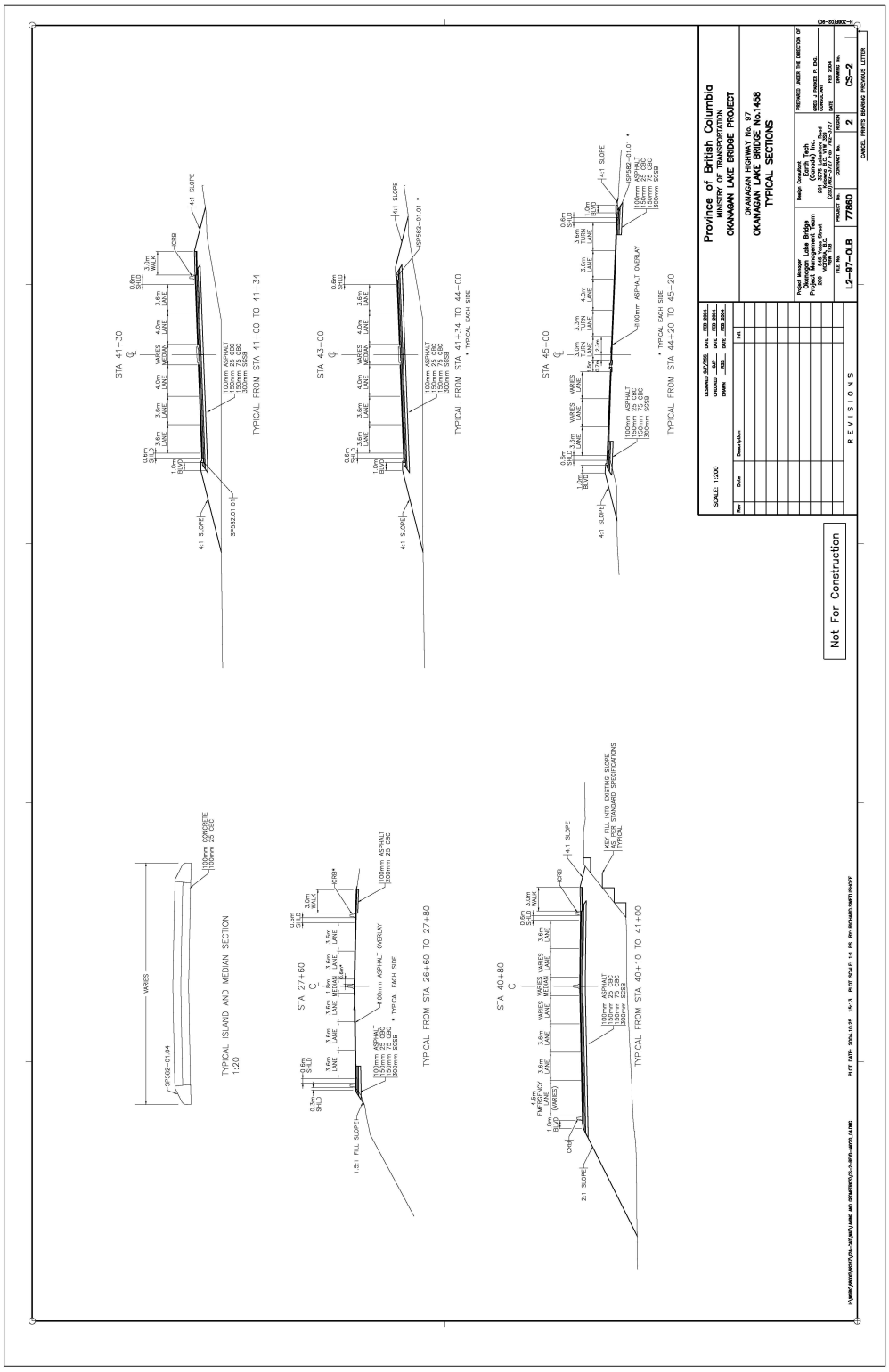
DRAWN BY: RSS
CKD. BY: GJP
MINISTRY OF TRANSPORTATION
OKANAGAN LAKE BRIDGE PROJECT
TURNING TEMPLATES
EARTH TECH
Earth Tech (Canada) Inc.
Kelowna, BC 250.762.3727
SCALE: 1:500
DATE: 04-10-25
DWG No. A- TURN 2


Province of British Columbia
MINISTRY OF TRANSPORTATION
OKANAGAN LAKE BRIDGE PROJECT
OKANAGAN HIGHWAY No. 97
OKANAGAN LAKE BRIDGE No.1458
TYPICAL SECTIONS
SCALE: 1:200
L2-97-OLB
77880
CS-2
REVISIONS
Not For Construction
TYPICAL ISLAND AND MEDIAN SECTION
1:20
TYPICAL FROM STA 41+00 TO 41+34
TYPICAL FROM STA 41+34 TO 44+00
TYPICAL FROM STA 44+20 TO 45+20
TYPICAL FROM STA 26+60 TO 27+80
TYPICAL FROM STA 40+10 TO 41+00