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Village of Lions Bay

Final Report

Bridge Load Capacity Evalution

April, 2018

ISL Engineering and Land Services

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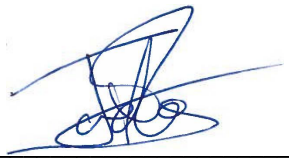
Prepared By:



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Executive Summary

ISL Engineering and Land Services Ltd. was retained by the Village of Lions Bay to carry out a load capacity evaluation of the eight (8) Village owned bridges within its municipal boundaries. Six (6) bridges that cross Alberta Creek were constructed in 1986. The construction date of two (2) bridges across Harvey Creek are unknown. The bridges live load conditions were examined using the CL 625 loading in travel lanes as required by the Canadian Highway Bridge Design Code (CAN/CSA S6-14).

This report describes the evaluation assumptions, criteria and methodology, and summarizes the Live Load Capacity Factor (LLCF) results in tables for all eight bridges. LLCF values greater than 1.0 indicate the sufficient capacity to support the applied loads. The findings show that bridge B6 Bayview Road Bridge over Alberta Creek has insufficient capacity in the timber decking to carry the live load models under consideration, with a minimum LLCF of 0.63 due to moment. ISL recommends a reduced vehicle load of 22t be posted on this bridge. The remaining seven bridges have LLCF values greater than one (1.0) and have sufficient capacity to carry the live load models under consideration.

1.0 Background

1.1 Terms of Conditions

In September 2017, the Village of Lions Bay (Village) commissioned ISL Engineering Ltd. to evaluate the main structural components of eight (8) Village owned bridges to the requirements of Canadian Highway Bridge Design Code (CHBDC) CSA-S6-14.

The evaluation consists of the following:

- Evaluate main structural components in accordance with Canadian Highway Bridge Design Code (CHBDC) CAN/CSA S6-14 Section 14 using Ultimate Limit States methods, and with the relevant provisions of MoT Bridge Standards and Procedures Manual Volume 1 Supplement to the CHBDC S6-14 (October 2016).
- Evaluate precast concrete box stringer shear and moment capacity (Bridges 1,2,3,4,5,7).
- Evaluate cast-in-place concrete slab shear and moment capacity (Bridge 8).
- Evaluate structural steel girder shear and moment capacity (Bridge 6).
- Evaluate timber beam shear and moment capacity (Bridge 6).
- Apply load reductions applied in accordance with CHBDC Table 14.3 and 14.4.
- Consider all structures to be one design lanes wide except for Bridges 4 & 5, which are two design lanes wide.
- Use a sophisticated method of analysis for this structure using finite element modeling of the structure.
- Use Inspection Category INSP3 – ISL inspected all critical components.
- Rating of concrete decks is not required as they are not a critical member.
- Fatigue analysis is not required for the concrete structures.

1.2 Analysis

ISL has used a sophisticated method of analysis to determine the lateral load distribution to various stringer lines as recommended by CHBDC Clause 14.11.3. Based upon this analysis, the following recommendations were made:

- Multiple lane loading shall be in accordance with Clause 14.9.4.
- “Other highway traffic” shall be based on CL1-625 loading as specified in Clause 14.9.4.3.
- The number of design lanes shall be the number of current operating lanes as per Clause 14.9.4.1.
- All load combinations shall include modification factors for multi-lane loading in accordance with Cl. 14.9.4.2 and Clause 14.9.4.3.

For single lane bridges, the load cases investigated can be summarized as follows:

- CL1-625 loading travelling down the centerline off the bridge
- CL1-625 loading travelling adjacent to the curb, with full sidewalk loading

For two lane bridges, the load cases investigated can be summarized as follows:

- CL1-625 loading in one design lane with no other traffic on the bridge
- CL1-625 loading in both design lanes (the combination of the CL1-625 truck and lane loading were used in both directions to capture the worst influence)

All directions and traffic combinations were investigated during the analysis.

1.3 Bridge Descriptions and Condition Inspections

The eight (8) bridges included in the load capacity evaluation are listed in Table 1.3. A map showing the location of the bridges is shown on Figure 1

Table 1.1: Village of Lions Bay Bridges

B1. Lions Bay Avenue Bridge over Harvey Creek
B2. Isleview Place Bridge over Alberta Creek (Lower)
B3. Isleview Place Bridge over Alberta Creek (Upper)
B4. Cross Creek Road Bridge over Harvey Creek
B5. Bayview Road Bridge over Alberta Creek
B6. Bayview Road Bridge (Driveway Access) over Alberta Creek
B7. Bayview Place Bridge over Alberta Creek
B8. Lions Bay Avenue Bridge over Alberta Creek (Driveway Access)

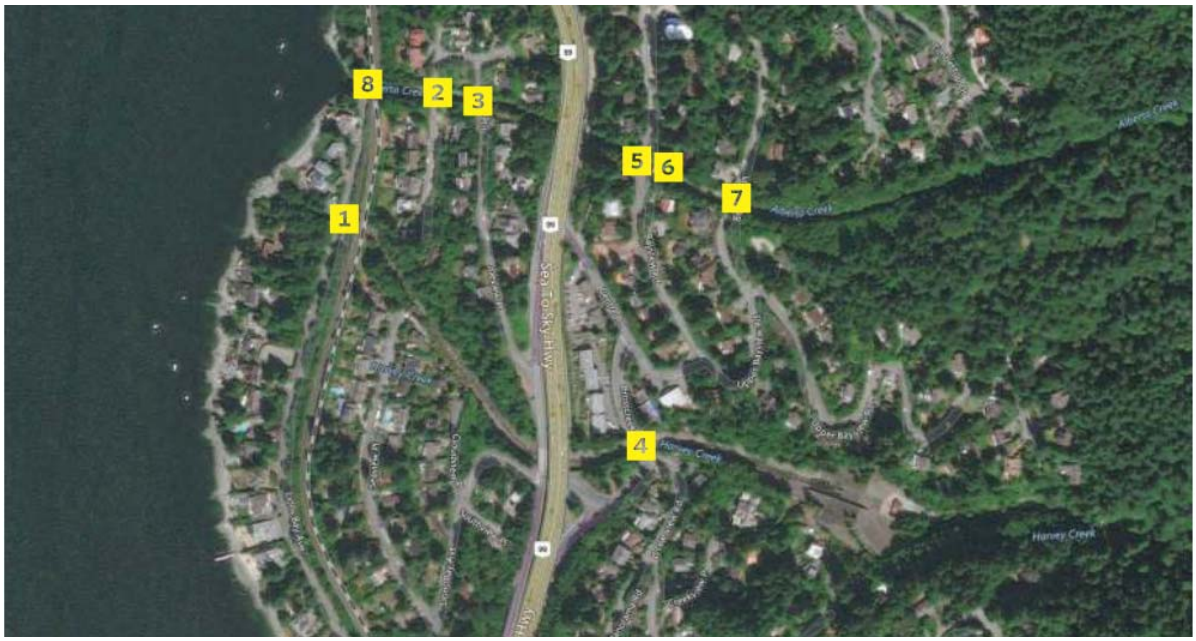


Figure 1: Location of Village of Lions Bay bridges

The posted speed limit on roads within the municipality is 40km/h. Bridge drawings were available for the bridges crossing Alberta Creek. For the bridges crossing Harvey Creek, standard precast box stringers of the era were assumed for this analysis.

Descriptions of each bridge and a summary of the 2017 inspection findings are detailed below.

1.3.1 B1 – Lions Bay Avenue Bridge over Harvey Creek

The Lions Bay Avenue Bridge over Harvey Creek was constructed in 1985. The bridge spans 18.9m across Harvey Creek and is a 3-span continuous structure with cast in place concrete deck with asphalt wearing surface, CIP concrete beams and pier columns. The concrete beams are 600mm wide by 750mm deep. Timber railings with steel angle posts are installed on each side of the bridge. There are 200mm diameter (casing) piping installed on both sides of the bridge hung 500mm below the concrete deck.

Photos of the bridge and sketches of the layout or general arrangement of the bridge and cross section are shown below.

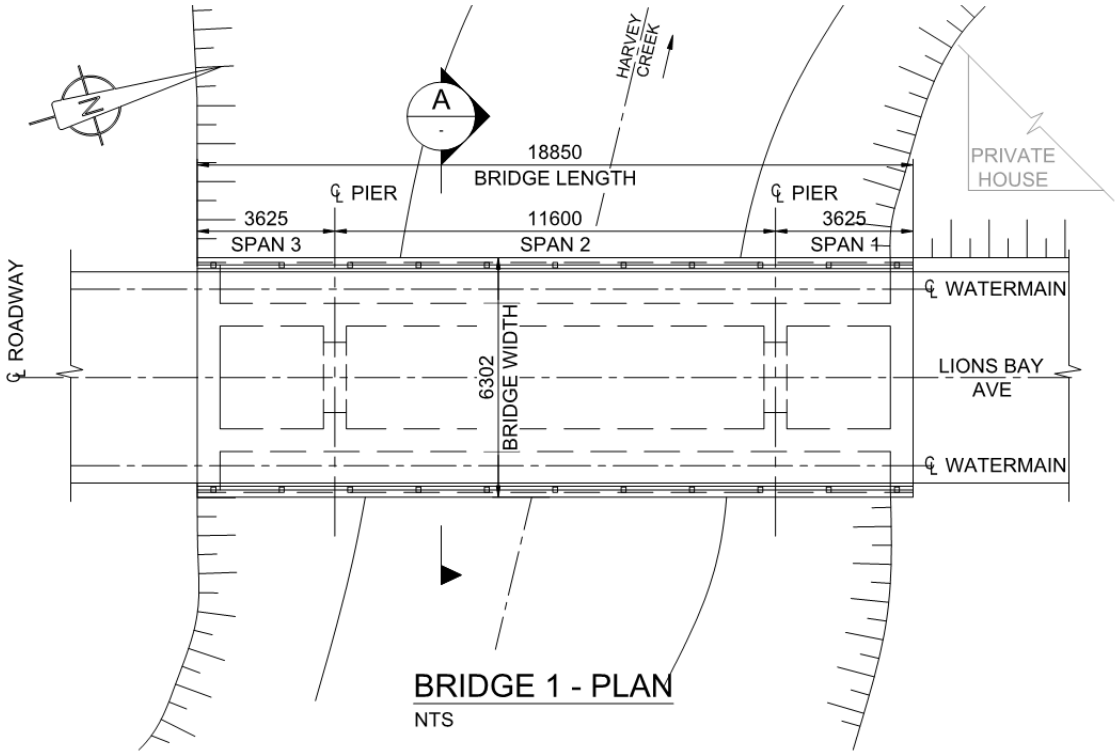


Figure 2: Lions Bay Avenue Bridge Over Harvey Creek – Plan

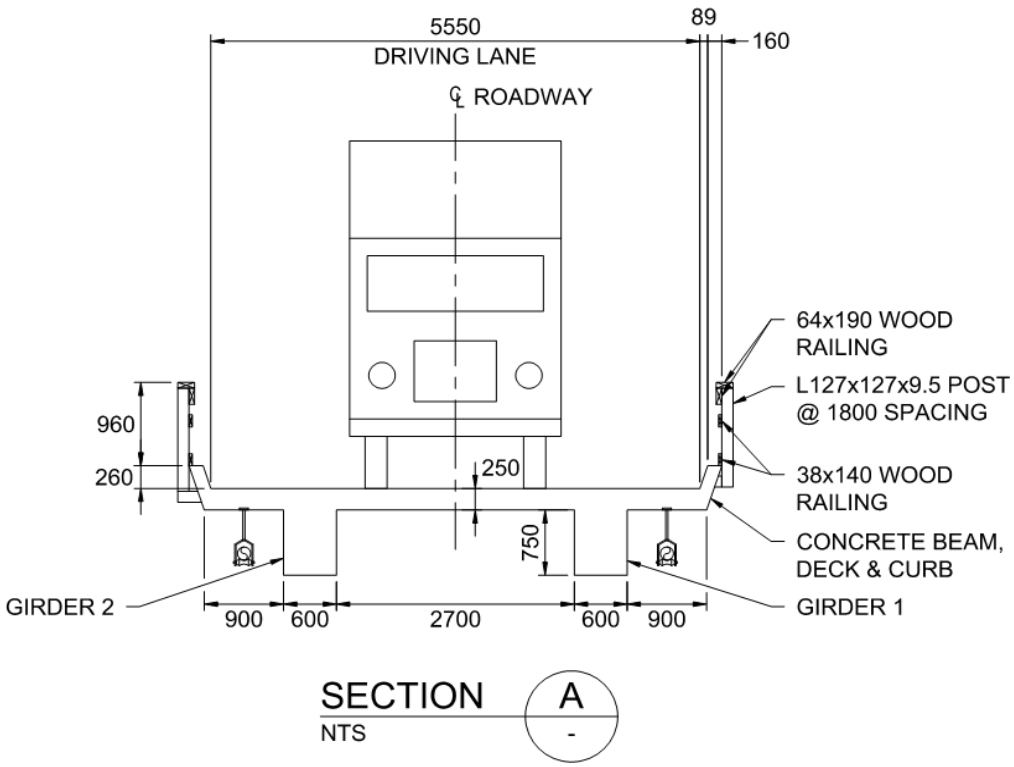


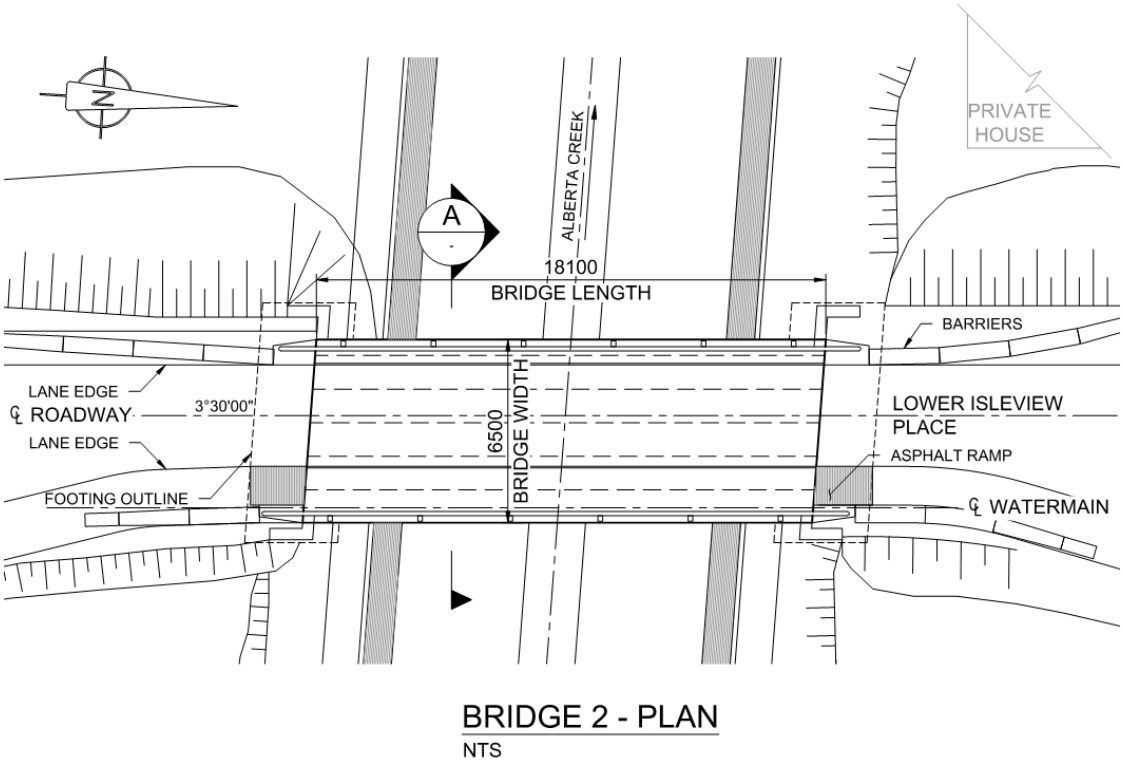
Figure 3: Lions Bay Avenue Bridge Over Harvey Creek – Section

The 2017 inspection showed that the bridge superstructure was in generally good condition. There was minor delamination and spalling on the deck soffit and girders. However, there is evidence of severe scour at the abutments. The railings are in good condition with some localized corrosion in the posts. The timber railings have minor splits and checks throughout. Minor delamination was found at the NE end of the concrete curb. Based on the condition of the bridge, no reduction in capacity of the concrete beams were assumed in the analysis.

1.3.2 B2 – Isleview Place Bridge over Alberta Creek (Lower Creek)

The Lower Isleview Place Bridge over Alberta Creek was constructed in 1986. The bridge is a single span (18m) structure with 3.6m roadway and 900mm wide curb on the west side and a 2000mm wide sidewalk on the east side. The bridge has a 6.8% grade sloping down from the North abutment as well as a 2% East to West crossfall. The bridge consists of four precast concrete box stringers with cast in place concrete curb, sidewalk and abutments. The precast girders are 1194mm wide by 700mm deep. Aluminum railings are installed on each side of the bridge. A 150mm diameter pipe is hung underneath the sidewalk.

Photos of the bridge and sketches of the layout or general arrangement of the bridge and cross section are shown below.



BRIDGE 2 - PLAN
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Figure 4: Isleview Place Bridge over Alberta Creek (Lower) – Plan

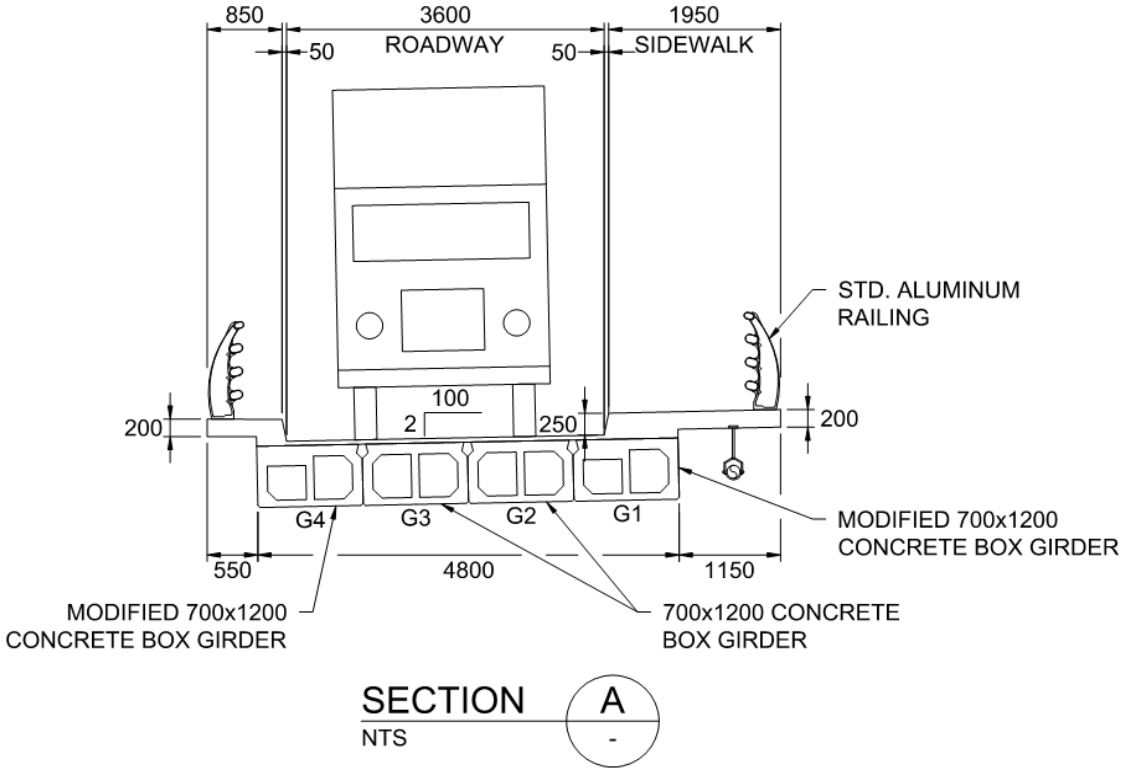


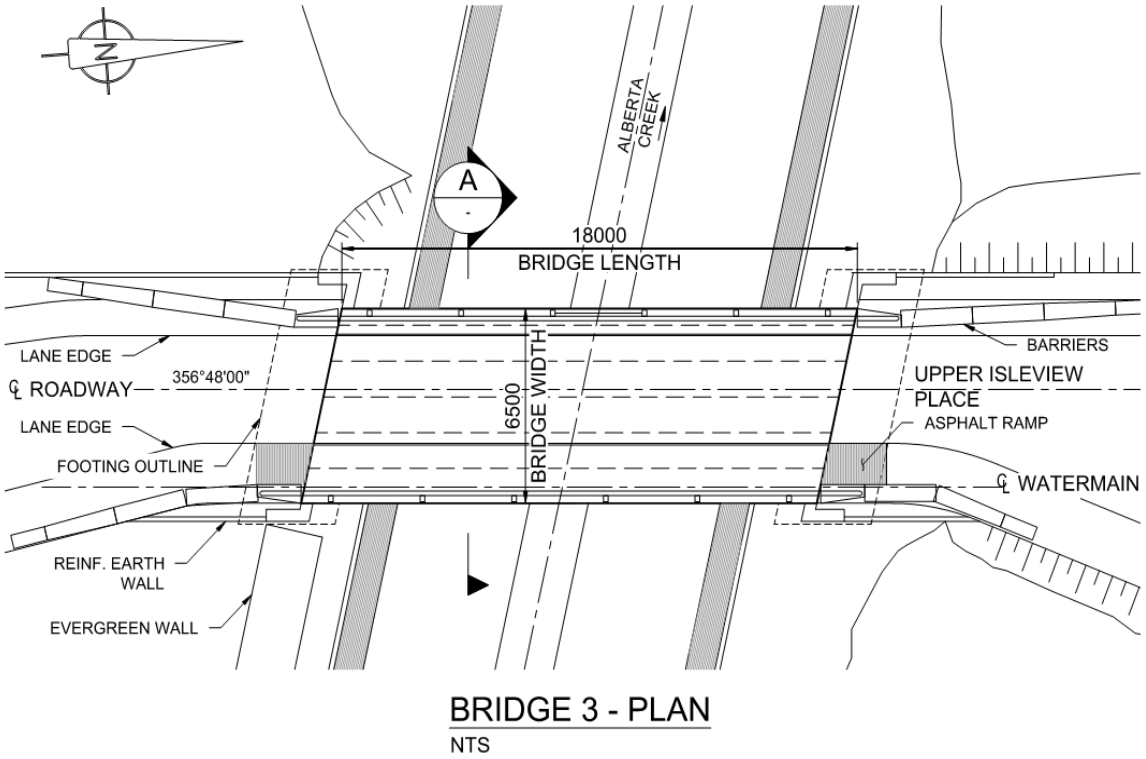
Figure 5: Isleview Place Bridge over Alberta Creek (Lower) – Section

The 2017 inspection showed that the bridge is in good condition. No defects were noted on the precast girders. No evidence of scour was noted. Light scaling and minor spalling was noted on the asphalt wearing surface. There are transverse cracks with efflorescence on the underside of the sidewalk and curb. The railings are in good condition but with some rusty and loose bolts. There is vegetation growth in the channel. Based on the condition of the bridge, no reduction in capacity of the precast concrete box girders were assumed in the analysis.

1.3.3 B3 – Isleview Place Bridge over Alberta Creek (Upper Creek)

The Upper Isleview Place Bridge over Alberta Creek is similar to the Lower Isleview Place Bridge and was constructed in 1986. The bridge is a single span (18m) structure with a 3.6m roadway, a 900mm wide curb on the west side, and a 2000mm wide sidewalk on the east side. The bridge has a 5.5% grade sloping down from the South abutment as well as a 2% East to West crossfall. The bridge consists of four precast concrete box stringers with cast in place concrete curb, sidewalk and abutments. The precast girders are 1194mm wide by 700mm deep. Aluminum railings are installed on each side of the bridge. A 150mm diameter pipe is hung underneath the sidewalk.

Photos of the bridge and sketches of the layout or general arrangement of the bridge and cross section are shown below.



BRIDGE 3 - PLAN
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Figure 6: Isleview Place Bridge over Alberta Creek (Upper) – Plan

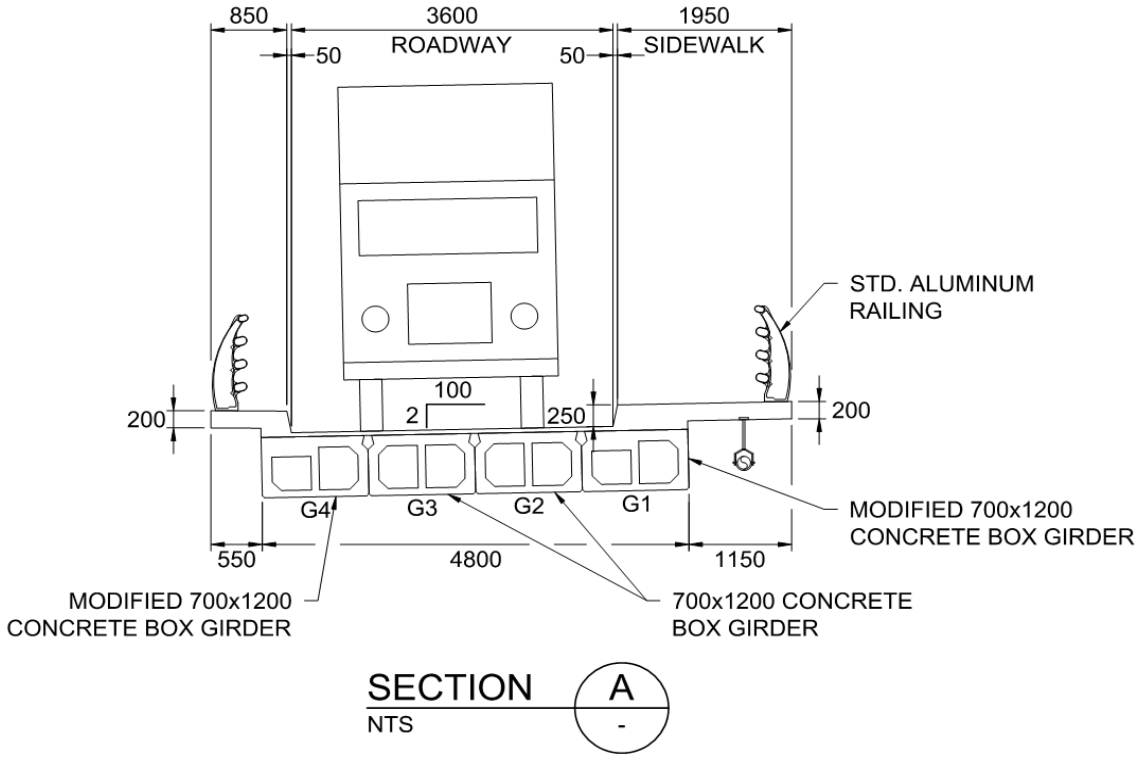


Figure 7: Isleview Place Bridge over Alberta Creek (Upper) – Section

The 2017 inspection showed that the bridge is in good condition. Light spalling was noted on precast girders G1 and G3. There are signs of active leaking between the precast girders at the South end. Minor scour was noted in front of the abutments. Light scaling and minor spalling was noted on the concrete deck and curbs. There are transverse cracks with efflorescence on the underside of the sidewalk and curb. The aluminum railings (four rail type) are in good condition but with some rusty or missing bolts. There is vegetation growth in the channel. Based on the condition of the bridge, no reduction in capacity of the precast concrete box girders were assumed in the analysis.

1.3.4 B4 – Cross Creek Road Bridge over Harvey Creek

The Cross Creek Road Bridge over Harvey Creek was constructed in 1986. The bridge is a single span (20m) structure with a 7.4m roadway, a 850mm wide curb on the east side, and a 1950mm wide sidewalk on the west side. The bridge consists of eight precast concrete box stringers with cast in place concrete curb, sidewalk and abutments. The precast girders are 1194mm wide by 700mm deep. Aluminum railings are installed on each side of the bridge. A 300mm diameter (casing) pipe is suspended under the curb on the East side.

Photos of the bridge and sketches of the layout or general arrangement of the bridge and cross section are shown below.

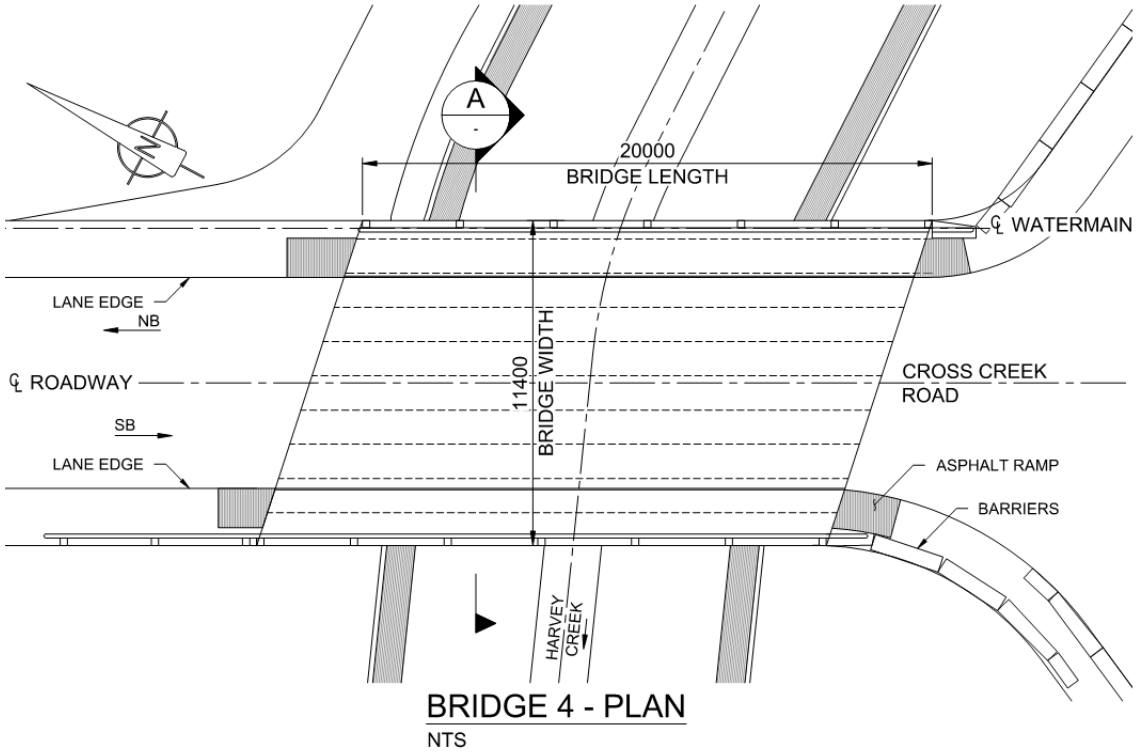


Figure 8: Cross Creek Road Bridge over Harvey Creek – Plan

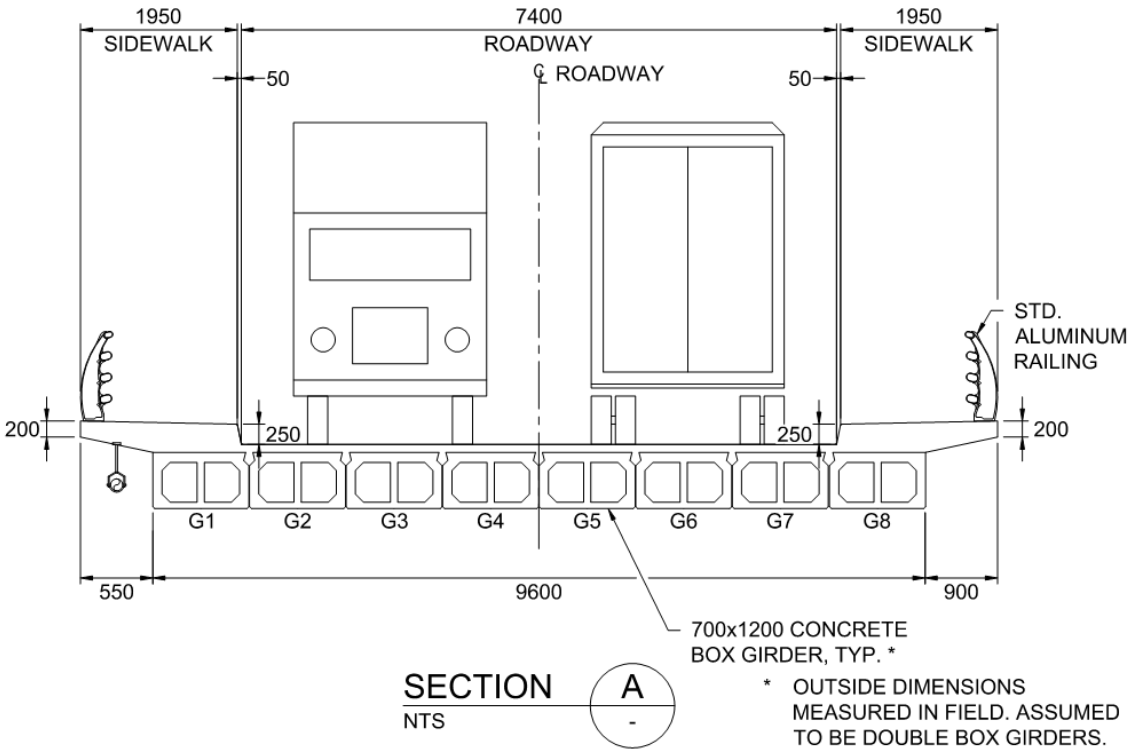


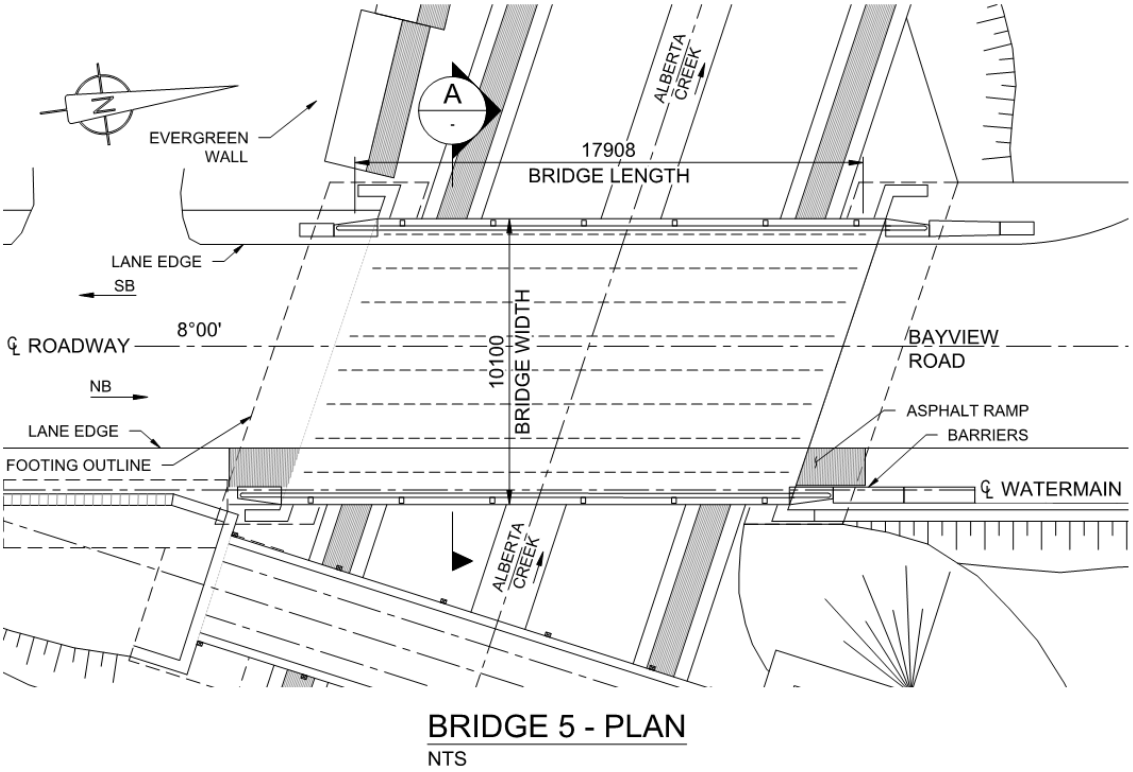
Figure 9: Cross Creek Road Bridge over Harvey Creek – Section

The 2017 inspection showed that the bridge in good condition. Light spalling was noted on precast girders. In addition, there was evidence of leaking between girders G5 and G6, G7 and G8 and at the south end of all girders. There was no evidence of scour. Light scaling and hairline cracks were visible on the abutments and wing walls, with severe delamination at the south abutment under girder G6. There are transverse cracks with efflorescence on the underside of the sidewalk and curb. A 2mm wide crack is visible along the length of the bridge in the asphalt wearing surface, corresponding to water stains on the girder below. The four rail aluminum railings are in good condition. There is vegetation growth in the channel. Based on the condition of the bridge, no reduction in capacity of the precast concrete box girders were assumed in the analysis.

1.3.5 B5 – Bayview Road Bridge over Alberta Creek

The Bayview Road Bridge over Alberta Creek was constructed in 1986. The bridge is a single span (18m) structure with a 7.2m roadway, a 900mm wide curb on the west side, and a 2000mm wide sidewalk on the east side. The bridge has an 8.98% grade sloping down from the South abutment as well as a 2% East to West crossfall. The bridge consists of seven precast concrete box stringers with cast in place concrete curb, sidewalk and abutments. The precast girders are 1194mm wide by 700mm deep. Aluminum railings are installed on each side of the bridge. A 150mm diameter pipe is hung underneath the sidewalk.

Photos of the bridge and sketches of the layout or general arrangement of the bridge and cross section are shown below.



BRIDGE 5 - PLAN
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Figure 10: Bayview Road Bridge over Alberta Creek – Plan

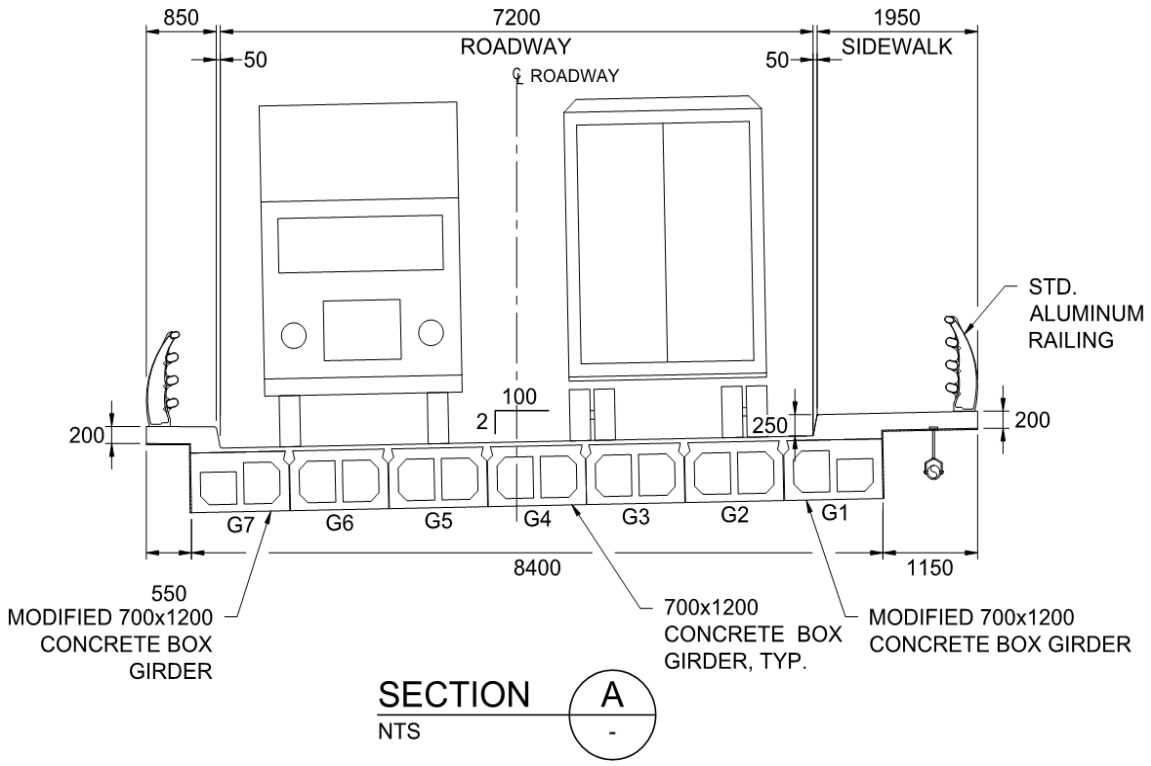


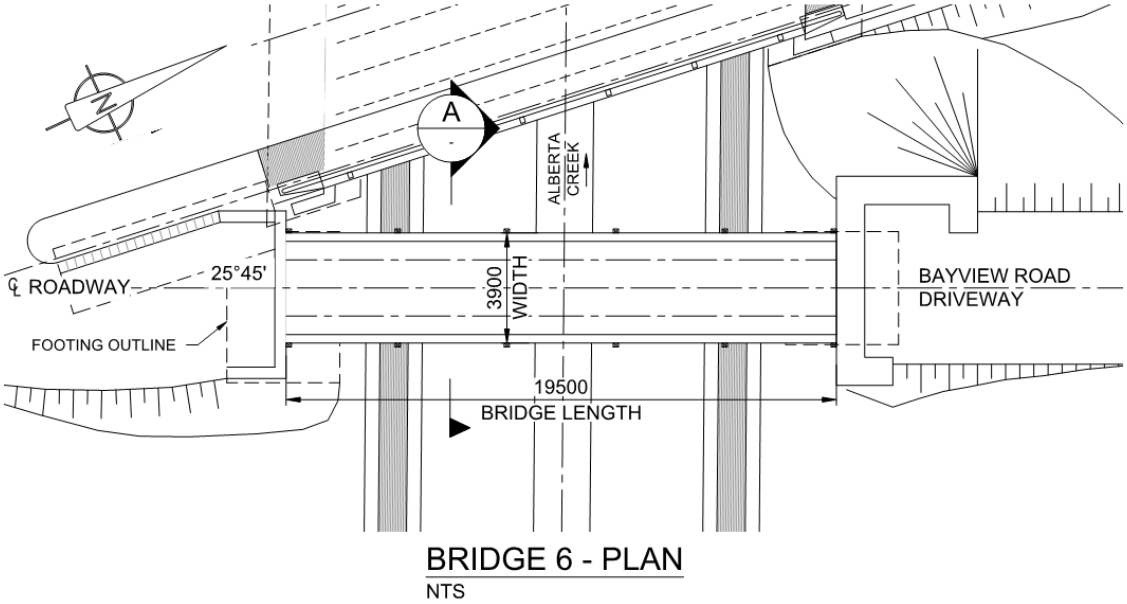
Figure 11: Bayview Road Bridge over Alberta Creek – Section

The 2017 inspection showed that the bridge in good condition. There was evidence of leaking between girders G3 and G4 and G5 and G6. There was no evidence of scour. Light scaling and hairline cracks were visible on the abutments and wing walls. There are transverse cracks with efflorescence on the underside of the sidewalk. Light scaling and hairline cracks are on the concrete deck. The aluminum railings (four rail type) are in good condition. There is vegetation growth in the channel. Based on the condition of the bridge, no reduction in capacity of the precast concrete box girders were assumed in the analysis.

1.3.6 B6 – Bayview Road Bridge over Alberta Creek (Driveway)

The Bayview Road Bridge over Alberta Creek was constructed in 1986. The bridge is a single span (19.5m) structure with a 4.06m roadway and 203mm wide curbs on each side. The bridge consists of two steel welded wide flange (WWF) girders with treated Douglas Fir deck ties and planking. The bridge is supported on cast in place concrete abutments. The WWF are 1067mm deep with 305mm wide flanges. The deck beams are 203mm wide by 381mm deep. The timber decking is 89mm thick. Timber railings are installed on each side of the bridge.

Photos of the bridge and sketches of the layout or general arrangement of the bridge and cross section are shown below.



BRIDGE 6 - PLAN
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Figure 12: Bayview Road Bridge over Alberta Creek (Driveway) – Plan

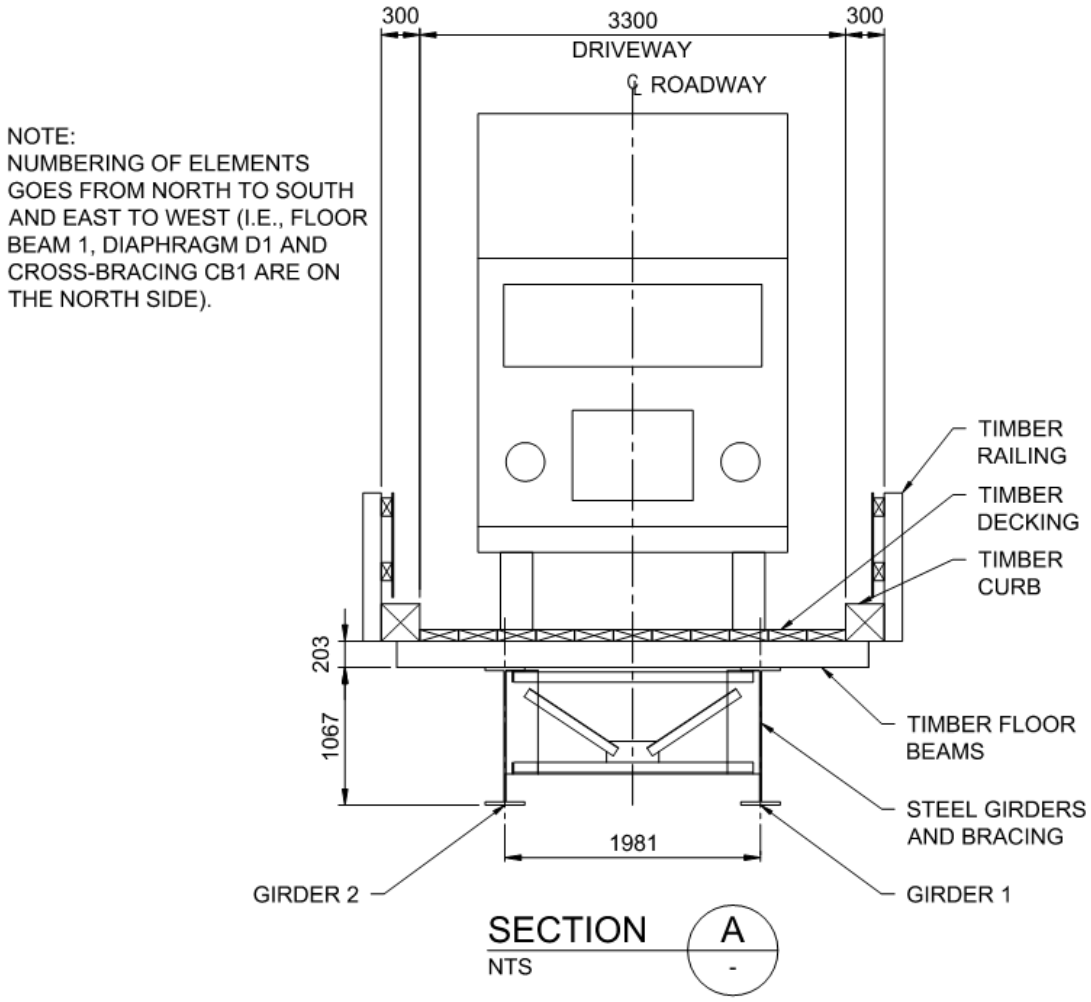

Figure 13: Bayview Road Bridge over Alberta Creek (Driveway) – Section

The 2017 inspection showed that the bridge in fair to good condition. There is medium corrosion on the girder flanges resulting in less than 7% section loss. Light corrosion was found on the girder webs. Medium corrosion was evident on the bracing and diaphragm members. Damage (probably occurred during erection) was noted on some diaphragms and cross bracings. Splitting and rot was found in the treated timber ties and caps. There was no evidence of scour. There is vegetation growth in the channel. Light scaling and hairline cracks were visible on the abutments. There are minor checks and splits on the timber deck and wheel guard. The railings are in poor condition with crushing, decay and splits noted on the posts. Based on the condition of the steel girders, no reduction in capacity was assumed in the analysis. Due to the amount of rot in the timber ties, a reduction of 20% of the timber tie capacity was used in the analysis.

1.3.7 B7 – Bayview Place Bridge over Alberta Creek

The Bayview Place Bridge over Alberta Creek was constructed in 1986. The bridge is a single span (18m) structure with a 3.6m roadway, a 900mm wide curb on the west side, and a 2000mm wide sidewalk on the east side. The bridge has a 5.5% grade sloping down from the North abutment as well as a 2% East to West crossfall. The bridge consists of four precast concrete box stringers with cast in place concrete curb, sidewalk and abutments. The precast girders are 1194mm wide by 700mm deep. Aluminum railings (four rail type) are installed on each side of the bridge. A 150mm diameter pipe is hung underneath the sidewalk.

Photos of the bridge and sketches of the layout or general arrangement of the bridge and cross section are shown below.

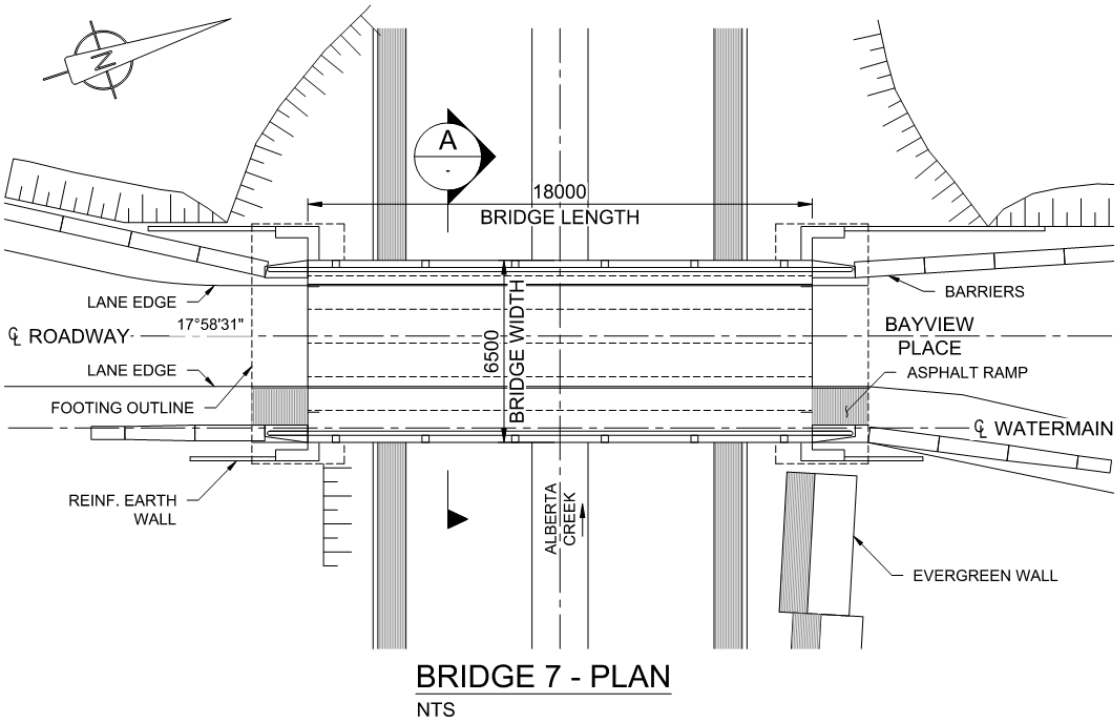

Figure 14: Bayview Place Bridge over Alberta Creek – Plan

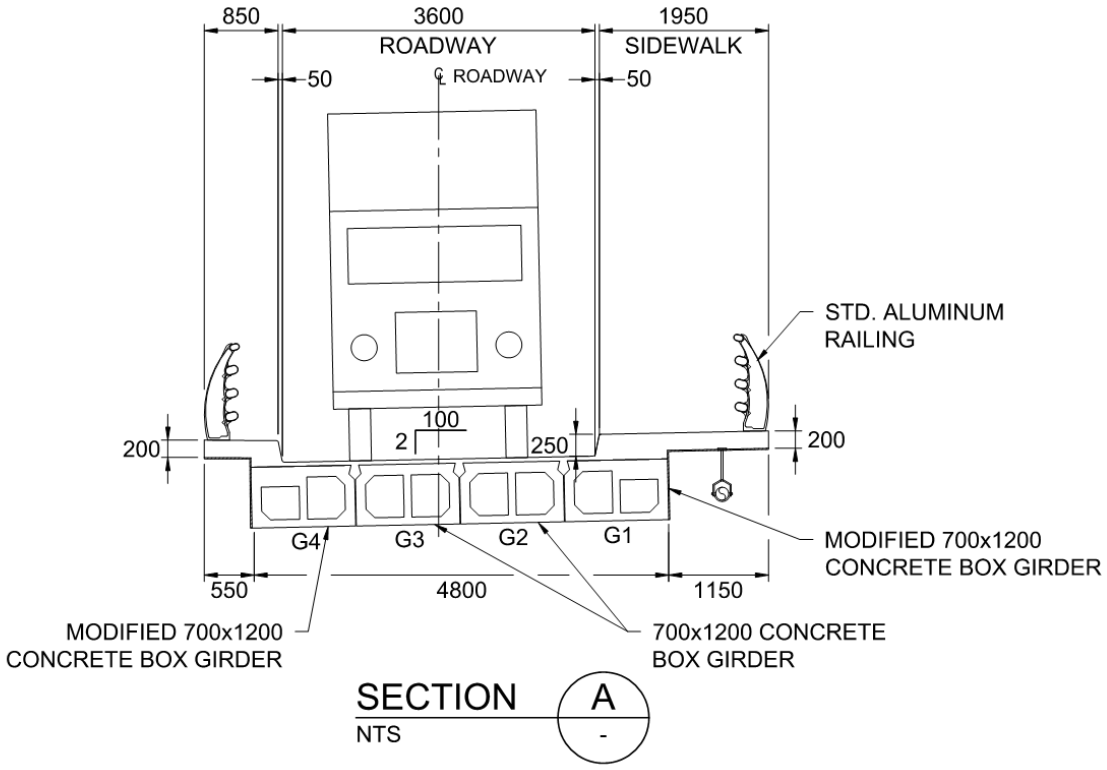

Figure 15: Bayview Place Bridge over Alberta Creek – Section

The 2017 inspection showed that the bridge in good condition. Light spalling was noted on precast girder G1. Splitting and rot was found in the timber floor beams and caps. There was no evidence of scour. There is vegetation growth in the channel. Light scaling and hairline cracks were visible on the abutments with severe delamination under girder G4 at the North abutment. There is minor spalling of the concrete deck. There are transverse cracks with efflorescence on the underside of the sidewalk. Light scaling and hairline cracks exist on the concrete deck. The railings are in good condition. Based on the condition of the bridge, no reduction in capacity was assumed in the analysis.

1.3.8 B8 – Lions Bay Avenue Bridge over Alberta Creek (Driveway)

The Lions Bay Avenue Bridge over Alberta Creek was constructed in 1986. The bridge is a single span (15.35m) structure with a 3m roadway and 300mm guardrails on each side. The main superstructure consists of four precast concrete sections welded together into one single trapezoidal precast concrete beam topped with a cast-in-place concrete overlay and timber railing. The substructure consists of cast-in-place abutments and wing walls. The trapezoidal precast beam varies in depth from 600mm deep in the middle to 150mm deep at the edges. The precast segments vary from 600mm to 1200mm wide in width. Timber railings are installed on each side of the bridge. A 19mm diameter copper water service with 75mm insulation is connected to the underside of the trapezoidal precast concrete beam 500mm from the East edge.

Photos of the bridge and sketches of the layout or general arrangement of the bridge and cross section are shown below.

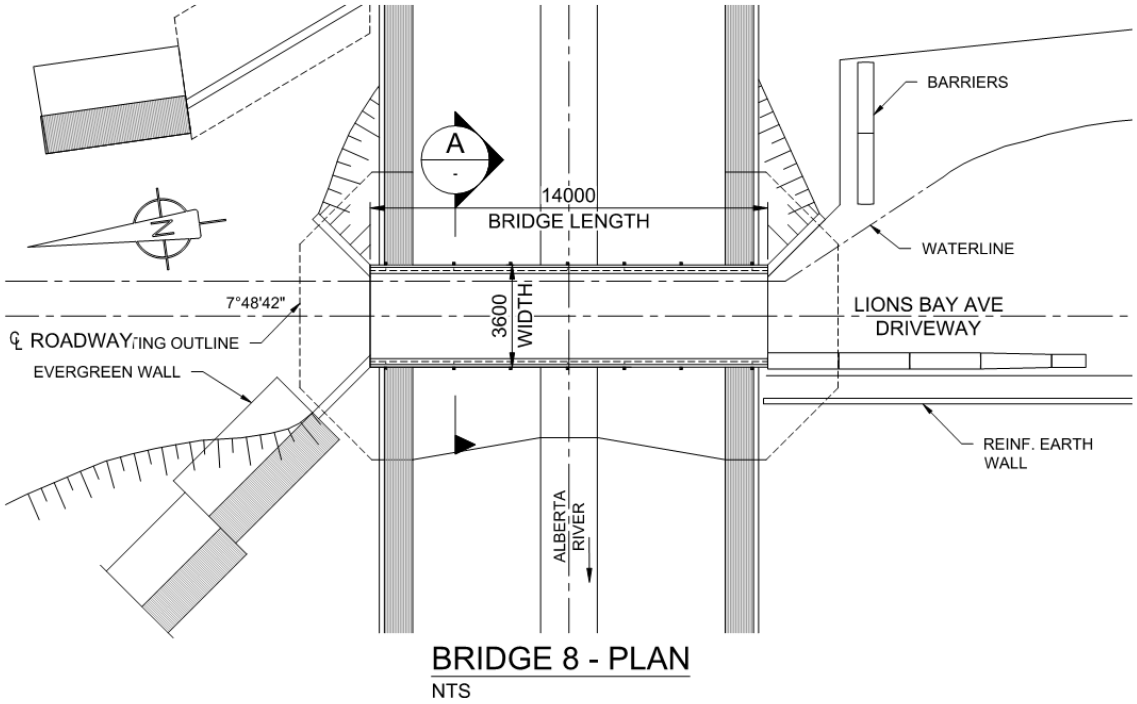

Figure 16: Lions Bay Avenue Bridge over Alberta Creek (Driveway) – Plan

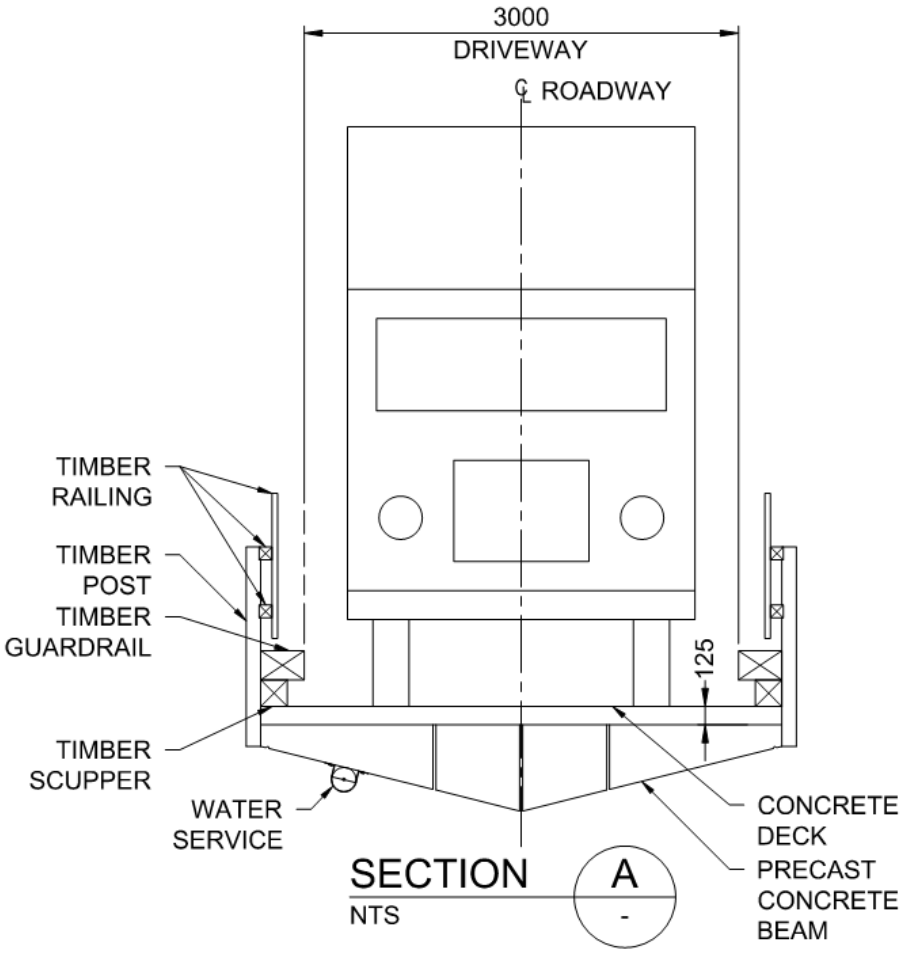

Figure 17: Lions Bay Avenue Bridge over Alberta Creek (Driveway) – Section

Due to access issues, visual inspection of the girders and abutments were limited. Light scaling and hairline cracks were observed on the concrete deck. The wheel guard and railings are in poor condition due to splitting with signs of heavy decay. Until further inspection is complete, no reduction in capacity of the precast girders are assumed in the analysis.

2.0 Evaluation

The bridged were evaluated in accordance with Canadian Highway Bridge Design Code CAN/CSA S6-14 Section 14 using the Ultimate Limit State Methods. Fatigue Limit States were not considered. Relevant provisions of the BC MoT Supplement to the CHBDC S6-14 were incorporated as appropriate.
Inspection Level INSP3 was used for all but one of the inspected bridges. INSP1 was used for bridge B8 Lions Bay Avenue Bridge over Alberta Creek as a detailed visual inspection was not completed on this bridge. The structure was assigned Highway Class C for this evaluation due to its low volume (100-100 average daily traffic per lane, 50-250 average daily truck traffic per lane).

2.1 Target Reliability Index

The target reliability index, β was determined from CHBDC Clause 14.12 for normal traffic, and is characterized by failure mode type. The failure mode of the critical element is described in the following paragraphs.

System behavior category is dependent on element failure: S1 for total collapse, S2 where failure will not lead to total collapse and S3 for local failure. Element behavior category describes element failure mode: E1 for sudden loss of capacity, E2 for sudden loss of capacity with some post-failure capacity and E3 for gradual failure. Evaluation of the members is classified as: INSP1 for non inspectable components, INSP2 for inspected by others but to the satisfaction of the evaluator and INSP3 where the evaluator directed the inspection.

All bridges except bridges B6 and B8 are multi-stringer composite structural systems, stringer failure will probably not lead to total collapse, and therefore Category S2 was selected for system behavior. S1 was selected for bridge B6 and B8. The bridge drawings show the shear reinforcement in the stringers so Category E2 was selected for box girders in shear and Category E3 for moment.

The target reliability index (β), system behavior, element behavior, inspection level and span type for each structure's critical components are shown in Table 2.1.

Table 2.1: Target Reliability Index (β)

Bridge	Behaviour Category	β
B1. Lions Bay Avenue Bridge over Harvey Creek	Girder Shear: S2, E2, INSP3 Girder Moment: S2, E3, INSP3	3.00 2.75
B2. Isleview Place Bridge over Alberta Creek (Lower)	Girder Shear: S2, E2, INSP3 Girder Moment: S2, E3, INSP3	3.00 2.75
B3. Isleview Place Bridge over Alberta Creek (Upper)	Girder Shear: S2, E2, INSP3 Girder Moment: S2, E3, INSP3	3.00 2.75
B4. Cross Creek Road Bridge over Harvey Creek	Girder Shear: S2, E2, INSP3 Girder Moment: S2, E3, INSP3	3.00 2.75
B5. Bayview Road Bridge over Alberta Creek	Girder Shear: S2, E2, INSP3 Girder Moment: S2, E3, INSP3	3.00 2.75
B6. Bayview Road Bridge (Driveway Access) over Alberta Creek	Steel Girder Shear: S1, E3, INSP3 Steel Girder Moment: S1, E3, INSP3 Timber Beam Shear: S3, E3, INSP3 Timber Beam Moment: S3, E1, INSP3	3.25 3.25 2.50 3.25
B7. Bayview Place Bridge over Alberta Creek	Girder Shear: S2, E2, INSP3 Girder Moment: S2, E3, INSP3	3.00 2.75
B8. Lions Bay Avenue Bridge over Alberta Creek (Driveway Access)	Girder Shear: S1, E2, INSP1 Girder Moment: S1, E3, INSP1	3.75 3.50

2.2 Permanent Loads: Dead Loads

The permanent dead loads of each superstructure includes the deck, barriers, stringers and existing wearing surface with an allowance for an additional future topping. These loads were distributed to the stringers based on tributary width. The unit weights used to calculate the dead loads were as follows:

- Cast-in-place concrete = 24 kN/m^3
- Precast Concrete = 25 kN/m^3
- Steel = 77 kN/m^3
- Asphalt = 23.5 kN/m^3
- Douglas Fir Timber = 7.86 kN/m^3

The dead load factors were classified in accordance to CHBDC Clause 14.13.2.1 and Table 14.7.

Table 2.2: Dead Load Factors

Dead Load Category	Factor β = 2.50	Factor β = 2.75	Factor β = 3.00	Factor β = 3.25	Factor β = 3.50	Factor β = 3.75	Comments
D1	1.05	1.06	1.07	1.08	1.09	1.10	Precast stringers, cast-in-place concrete (excluding deck) and precast parapets.
D2	1.10	1.12	1.14	1.16	1.18	1.20	Cast-in-place concrete deck Includes non-structural components.
D3	1.25	1.30	1.35	1.40	1.45	1.50	Existing asphalt wearing surface

2.3 Transitory Loads: Live Load Vehicles

The live load vehicles used in the evaluation were the CL1-625 vehicle described in CSA S6-14.

The live loading for each vehicle consisted of the specified vehicle loading with 100% of the dynamic load allowance (40 km/h vehicle speed) specified in Clause 3.8.4.5.3, or the associated lane loading with no dynamic load allowance, with the worst case governing. The associated lane loading for each specified vehicle was made up of a 7 kN/m lane load (Highway Class C) in combination with 80% of the CL1-625 truck as per CHDBC Clause 14.9.

The live load factors below were taken from CHBDC Clause 14.13.3 and Tables 14.8 and 14.13.

Table 2.3: Live Load Factors

Loading	Factor β = 2.50	Factor β = 2.75	Factor β = 3.00	Factor β = 3.25	Factor β = 3.50	Factor β = 3.75	Comments
Normal	1.35	1.42	1.49	1.56	1.63	1.70	Table 14.8 (Sophisticated analysis, All spans)

2.4 Selection of Critical Members for Load Rating

Each bridge was reviewed to determine which members are deemed critical for the purposes of load rating. The structural components, selected as either critical or not critical, are described below. Non-critical items are excluded from evaluation.

1. Stringers: All stringers are considered critical for load rating and were evaluated for moment and shear.
2. Timber Ties: Ties are considered critical for load rating and were evaluated for moment and shear.
3. Timber Planking: The timber deck was not considered critical for load rating and was not evaluated.
4. Concrete Piers and Abutments: The substructure was not considered critical for load rating and was not evaluated.

2.5 Method of Analysis

A sophisticated or grillage method was used to establish the lateral distribution of the live loads. The grillage analysis typically displayed significant reductions for both shear and moment demands on bridge girders when compared to the simplified distribution methods.

The analysis was completed using the structural analysis software package SAFI. The precast concrete box girders were checked using ISL design spreadsheets and Concise Beam V4.6 (Black Mint).

2.6 Live Load Lateral Distribution

Each bridge was analyzed based on the roadway width for that bridge. For fully loaded bridges with two physical lanes, a lane reduction factor of 0.85 was used in accordance with CHBDC Table 14.3 for Highway Class C.

The vehicle load effects were derived by placement of the vehicle at various locations. As described in CHBDC S6-14, the centre-to-centre wheel lines of the design vehicles used in the evaluation were taken as 1.8m. For the lane load case, the uniformly distributed load was assumed to occupy a width of 3.0 m centered with respect to the accompanying reduced truck.

2.7 Member Resistances

The Village provided as-built drawings for bridges crossing Alberta Creek. For bridge B4 crossing Harvey Creek, reinforcing shop drawings for the girders were available and compared to the standard precast box girder used in during the time of construction. Drawings for the cast-in-place concrete beams of Bridge B1 were not available. ISL analyzed the bridge for the 1986 design vehicle (MS200-77) and reinforced the beam to resist the applied loads.

The girder resistances were calculated based on material properties and geometry shown on the drawings. The referenced drawing are included in **Appendix A**. The following material properties were used in the calculations:

- Precast Concrete:
  - Concrete box stringers specified 45 MPa compressive strength at 28 days
  - Cast-in-place concrete specified at 25 MPa compressive strength at 8 days
- Prestressing Strands:
  - Concrete box stringers specified 1860 MPa tensile strength
- Cast-in-place Concrete:
  - Cast-in-place concrete specified at 25 MPa compressive strength at 8 days
  - If not specified - used 15 MPa yield strength as per Clause 14.7.4.3
- Reinforcing Steel:
  - 400 MPa yield strength
  - If not specified - used 300 MPa yield strength as per Table 14.2

- Structural Steel:
  - Not specified - used 250 MPa yield strength as per Table 14.1
- Timber (Douglas Fir No.2):
  - Not specified - used 6.0 MPa bending stress
  - Not specified - used 1.1 MPa shear stress

Resistance calculations were based on CHBDC S6-14 and MoTI's Supplement to S6-14 as applicable. The calculation of shear resistance is described further in Section 2.8.

Shear and moment capacities were calculated for each live load case evaluated. The maximum moments occur at mid-span of the bridge girders. The maximum shear occurs at the girder supports. The precast concrete box girder moment capacity was calculating using Concise Beam. The shear resistance for concrete members were evaluated using the process described is Section 2.8.

For components that show no signs of defects or deterioration, the factored resistance as calculated in accordance with Clause 14.14.1 shall be multiplied by the resistance adjustment factors, U, from Table 14.15. The resistance factor for timber floor beams on bridge B6 was reduced by 20% to account for the loss due to rot. The resistance factors are noted in the following table:

Table 2.7: Resistance Adjustment Factors

Resistance Category	Description	Resistance Factor
Reinforced Concrete ($\rho < 0.4\rho_b$)	Bending Moment	1.02
Reinforced Concrete	Shear	1.05
Prestressed Concrete ($\omega_p < 0.15$)	Bending Moment	1.01
Structural Steel	Bending Moment (yield)	1.06
Structural Steel	Shear (stocky web)	1.02
Timber	Bending Moment	0.80
Timber	Shear	0.80

2.8 Live Load Capacity Factors (LLCF) Tables

The member sections for which the LLCF was calculated are shown in Table 2.8. The maximum moments and shears were calculated at the locations of the worst influence along the channel stringer, calculated from the West abutment.

In general, the live load capacity factors were calculated based on CHBDC Clause 14.15.

$$LLCF = \frac{U \cdot \phi R - \sum DL_f}{\sum LL_f}$$

Where DL_f = factored dead load = $\Sigma\alpha_D D$
LL_f = factored live load including DLA = $\Sigma\alpha_L L(1+DLA)$
ϕR = factored resistance

Bridge Information:
Name: Bridge 01 - Lions Bay Avenue over Harvey Creek
Construction:
Bridge Type: Cast-in-place concrete stringers with CIP concrete deck
Number of Stringers: 2 - 911x508 deep CIP concrete stringers
Span Arrangement: 3 span continuous (3.6m-11.6m-3.6m) 11.60 m
Highway Class: A=1;B=2;C&D=3 3 2 Lane
Speed =60km/hr
11/22/201 Revisited: January 5, 2018

ISL Engineering and Land Services

Table No. 2.8A Capacity Table

Normal Traffic (BCL-625)

Element Description / Evaluation location along span	Critical Distance (mm)	Effect	Units	VEHICULAR TRAVEL Lane 1 NB	Lane 2 SB	Member Type	Target Reliability Index, β: Behaviour System	Element	Insp. Level	β	Dead Loads: Unfactored D1	D2	D3	Factors D1	D2	D3	Factored D1	D2	D3	Total Factored DL	LIVE LOAD CONTRIBUTIONS: Lat. Dist. Category	Span Type	Vehicle Type NB1	SB1	Unfactored LL NB &SB		Lane Factors T13.3 NB &SB		DLA NB &SB		α_L NB &SB		Factored LL	Total Factored DL + LL	Resistance: ϕ^*Rn	Adjust. Fact. U	Live Load Capacity Factor LLCF	Quality Ma Evaluator
BCL625 - 2 lanes loaded	1000	Shear	kN	CL1-625	CL1-625	Concrete	S2	E2	INSP3	3.00	59	3	0	1.07	1.14	0.00	63	3	0	66.6	Sophist.	Other	Normal	Normal	-360		0.85	0.85	0.3	0.3	1.49	1.49	-593.5	-1243	1243	1.05	2.21	JCT
BCL625 - 2 lanes loaded	1000	Moment at Vs	kN	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	30	2	0	1.06	1.12	0.00	32	2	0	33.8	Sophist.	Other	Normal	Normal	-324		0.85	0.85	0.3	0.3	1.42	1.42	-509.1	-1090	-2996	1.02	2.21	JCT
BCL625 - 2 lanes loaded	4650	Shear	kN	CL1-625	CL1-625	Concrete	S2	E2	INSP3	3.00	283	14	0	1.07	1.14	0.00	303	16	0	319.6	Sophist.	Other	Normal	Normal	538		0.85	0.85	0.3	0.3	1.49	1.49	885.2	1609	1609	1.05	1.46	JCT
BCL625 - 2 lanes loaded	4650	Moment at Vs	kN	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	-354	-18	0	1.06	1.12	0.00	-375	-20	0	-395.2	Sophist.	Other	Normal	Normal	-518		0.85	0.85	0.3	0.3	1.42	1.42	-812.9	-1580	-2996	1.02	1.46	JCT
BCL625 - 2 lanes loaded	3650	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	-393	-20	0	1.06	1.12	0.00	-417	-22	0	-439.3	Sophist.	Other	Normal	Normal	917		0.85	0.85	0.3	0.3	1.42	1.42	1438.1	2178	-2996	1.02	1.82	JCT
BCL625 - 2 lanes loaded	9450	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	556	58	0	1.06	1.12	0.00	589	65	0	654.7	Sophist.	Other	Normal	Normal	917		0.85	0.85	0.3	0.3	1.42	1.42	1438.1	2093	2744	1.02	1.49	JCT
																																				Min LLCF Total	1.46	

Notes:
1. Load rating according to CSA - S6-14 (as per Section 14)
2. Evaluation procedure: ULS method (as per Clause 14.5.2.2)
3. Highway Class C with Design Speed 60km/h
4. Dead Loads as defined by 14.8.2
5. Inspection Level 3 (INSP3) used for all load cases
6. Normal Traffic (BCL1-625)
7. Critical distance taken from North abutment
8 Target reliability index from Table 14.5 have not been increased due to Clause 14.12.5
9 Dead load factors from Table 14.7
10 Live load factors from Table 14.8 for normal traffic
11 Resistance adjustment factors from Table 14.15
12 Resistance Factors: Concrete = 0.75, Rebar = 0.90
13 Material properties used to calculate resistances are as follows:

Name	Date
D.R.Estey	1/5/18
J. Tong	1/5/18

Material	Strength	Reference	
concrete	15 MPa	S6-14	
steel	300 MPa	S6-14	

Bridge Information:
Name: Bridge 02 - Isleview Place over Alberta Creek (Lower,
Construction:
Bridge Type: Precast concrete box girders
Number of Stringers: 4 - 1200x700 deep CIP concrete box stringers (MK700\18\14.3 deg RT
Span Arrangement: Simply Supported· 18.15 m
Highway Class: A=1;B=2;C&D=3 3 1 Lane
Speed =60km/hr
Skew Factor (Cl. 5.6.5.2): 1.32
November 22, 2017 Revisited: January 5, 2018

Table No. 2.8B Capacity Table

Normal Traffic (BCL-625)

Element Description / Evaluation location along span	Critical Distance (mm)	Effect	Units	VEHICULAR TRAVEL: Lane 1 NB	VEHICULAR TRAVEL: SWLL	Member Type	Target Reliability Index, β: Behaviour System	Target Reliability Index, β: Behaviour Element	Target Reliability Index, β: Insp. Level	β	Dead Loads: Unfactored D1	Unfactored D2	Unfactored D3	Factors D1	Factors D2	Factors D3	Factored D1	Factored D2	Factored D3	Total Factored DL	Lat. Dist. Category	Span Type	LIVE LOAD CONTRIBUTIONS: Vehicle Type NB1	Vehicle Type SB1	Unfactored LL NB1	Unfactored LL SW LL	Lane Factors NB1	Lane Factors SB1	DLA NB1	DLA SB1	α_L NB1	α_L SB1	Factored LL	Total Factored DL + LL	Resistance ϕ^*Rn	Adjust. Fact. U	Live Load Capacity Factor LLCF	Quality Ma Evaluator
Exterior Stringer 4 - CL-625 next to SW	769	Shear	kN	CL1-625	SW LL	Concrete	S2	E2	INSP3	3.00	167	82	17	1.07	1.14	1.35	179	93	23	294.8	Sophist.	Other	Normal	Normal	111	28	1.00	1.00	0.3	0.0	1.49	1.49	256.1	1322	1322	1.05	4.01	JCT
Exterior Stringer 4 - CL-625 next to SW	769	Moment	kN-m	CL1-625	SW LL	Concrete	S2	E3	INSP3	2.75	101	51	10	1.06	1.12	1.30	107	57	14	177.1	Sophist.	Other	Normal	Normal	85	23	1.00	1.00	0.3	0.0	1.42	1.42	190.4	367	2274	1.01	4.01	JCT
Exterior Stringer 4 - CL-625 next to SW	9000	Moment	kN-m	CL1-625	SW LL	Concrete	S2	E3	INSP3	2.75	642	284	60	1.06	1.12	1.30	680	318	78	1076.3	Sophist.	Other	Normal	Normal	634	105	1.00	1.00	0.3	0.0	1.42	1.42	1318.7	2395	3935	1.01	2.20	JCT
Exterior Stringer 1 - CL-625 next to curb	769	Shear	kN	CL1-625 OC		Concrete	S2	E2	INSP3	3.00	79	29	6	1.07	1.14	1.35	85	33	8	126.1	Sophist.	Other	Normal	Normal	96	6	1.00	1.00	0.3	0.3	1.49	1.49	198.6	1345	1345	1.05	6.14	JCT
Exterior Stringer 1 - CL-625 next to curb	769	Moment	kN-m	CL1-625 OC		Concrete	S2	E3	INSP3	2.75	49	17	3	1.06	1.12	1.30	52	19	4	76.1	Sophist.	Other	Normal	Normal	74	5	1.00	1.00	0.3	0.3	1.42	1.42	145.5	222	1564	1.01	6.14	JCT
Exterior Stringer 1 - CL-625 next to curb	7624	Moment	kN-m	CL1-625 OC		Concrete	S2	E3	INSP3	2.75	370	68	6	1.06	1.12	1.30	392	76	8	476.2	Sophist.	Other	Normal	Normal	518	38	1.00	1.00	0.3	0.3	1.42	1.42	1025.5	1502	2528	1.01	2.03	JCT
Interior Stringer 2 -Off center load	769	Shear	kN	CL1-625 OC		Concrete	S2	E2	INSP3	3.00	81	28	6	1.07	1.14	1.35	87	32	8	126.5	Sophist.	Other	Normal	Normal	68	6	1.00	1.00	0.3	0.3	1.49	1.49	143.9	1345	1345	1.05	8.46	JCT
Interior Stringer 2 -Off center load	769	Moment	kN-m	CL1-625 OC		Concrete	S2	E3	INSP3	2.75	50	8	4	1.06	1.12	1.30	53	9	5	66.7	Sophist.	Other	Normal	Normal	52	5	1.00	1.00	0.3	0.3	1.42	1.42	105.4	172	1564	1.01	8.46	JCT
Interior Stringer 2 -Off center load	7624	Moment	kN-m	CL1-625 OC		Concrete	S2	E3	INSP3	2.75	269	111	26	1.06	1.12	1.30	285	124	34	443.4	Sophist.	Other	Normal	Normal	321	38	1.00	1.00	0.3	0.3	1.42	1.42	663.0	1106	2528	1.01	3.18	JCT
Interior Stringer 3- centered load	769	Shear	kN	CL1-625		Concrete	S2	E2	INSP3	3.00	131	50	14	1.07	1.14	1.35	140	57	18	215.6	Sophist.	Other	Normal	Normal	67	8	1.00	1.00	0.3	0.3	1.49	1.49	144.3	1345	1345	1.05	7.83	JCT
Interior Stringer 3- centered load	769	Moment	kN-m	CL1-625		Concrete	S2	E3	INSP3	2.75	80	3	9	1.06	1.12	1.30	85	3	11	99.0	Sophist.	Other	Normal	Normal	51	6	1.00	1.00	0.3	0.3	1.42	1.42	105.7	205	2069	1.01	7.83	JCT
Interior Stringer 3- centered load	9000	Moment	kN-m	CL1-625		Concrete	S2	E3	INSP3	2.75	486	182	43	1.06	1.12	1.30	515	204	56	774.6	Sophist.	Other	Normal	Normal	321	44	1.00	1.00	0.3	0.3	1.42	1.42	673.9	1448	3199	1.01	3.64	JCT
																																					Min LLCF	
																																				Total	**2.03**

Notes:
1. Load rating according to CSA - S6-14 (as per Section 14)
2. Evaluation procedure: ULS method (as per Clause 14.5.2.2)
3. Highway Class C with Design Speed 60km/h
4. Dead Loads as defined by 14.8.2
5. Inspection Level 3 (INSP3) used for all load cases
6. Normal Traffic (CL1-625)
7. Critical distance taken from North abutment
8. Target reliability index from Table 14.5 have not been increased due to Clause 14.12.5
9. Dead load factors from Table 14.7
10. Live load factors from Table 14.8 for normal traffic
11. Resistance adjustment factors from Table 14.15
12. Resistance Factors: Concrete = 0.75, Rebar = 0.90
13. Material properties used to calculate resistances are as follows:

Material	Strength	Reference
concrete	35 MPa	drawing
steel	230 MPA	S6-14
Precast	45 MPa	drawing

Name	Date
D.R.Estey	1/5/18
J. Tong	1/5/18

Bridge Information:
Name: Bridge 03 - Isleview Place over Alberta Creek (Upper)
Construction:
Bridge Type: Precast concrete box girders
Number of Stringers: 7 - 1200x700 -12.3 degree RTPrecast concrete box stringers
Span Arrangement: Simply Supported- 18.00 m
Highway Class: A=1;B=2;C&D=3 3 1 Lane
Speed =60km/hr
Skew Factor (Cl. 5.6.5.2): 1.25
November 22, 2017 Revisited: January 5, 2018

ISL Engineering and Land Services

Table No. 2.8C Capacity Table

Normal Traffic (BCL-625)

Element Description / Evaluation location along span	Critical Distance (mm)	Effect	Units	VEHICULAR TRAVEL: Lane 1 NB	VEHICULAR TRAVEL: SWLL	Member Type	Target Reliability Index, β: Behaviour: System	Behaviour: Element	Insp. Level	β	Dead Loads: Unfactored: D1	Unfactored: D2	Unfactored: D3	Factors: D1	Factors: D2	Factors: D3	Factored: D1	Factored: D2	Factored: D3	Total Factored DL	LIVE LOAD CONTRIBUTIONS: Lat. Dist. Category	Span Type	Vehicle Type: NB1	Vehicle Type: SB1	Unfactored LL: NB1	Unfactored LL: SB1	Lane Factors: NB1	Lane Factors: SB1	DLA: NB1	DLA: SB1	α_c: EB1	α_c: NB1	Factored LL	Total Factored DL + LL	Resistance: ϕ*Rn	Resistance: Adjust. Fact. U	Live Load Capacity Factor LLCF	Quality Ma Evaluator
Exterior Girder 3 SW - CL625NB+SWLL	769	Shear	kN	CL1-625	SWLL	Concrete	S2	E2	INSP3	3.00	158	77	16	1.07	1.14	1.35	169	88	22	279.2	Sophist.	Other	Normal	Normal	111	28	1.00	1.00	0.3		1.49	1.49	256.1	1726	1726	1.05	5.65	JCT
Exterior Girder 3 SW - CL625NB+SWLL	769	Moment	kN-m	CL1-625	SWLL	Concrete	S2	E3	INSP3	2.75	101	51	10	1.06	1.12	1.30	107	57	14	177.1	Sophist.	Other	Normal	Normal	85	23	1.00	1.00	0.3		1.42	1.42	190.4	367	2274	1.01	5.65	JCT
Exterior Girder 3 SW - CL625NB+SWLL	8260	Moment	kN-m	CL1-625	SWLL	Concrete	S2	E3	INSP3	2.75	642	284	60	1.06	1.12	1.30	680	318	78	1076.3	Sophist.	Other	Normal	Normal	634	118	1.00	1.00	0.3		1.42	1.42	1337.3	2414	3935	1.01	2.17	JCT
Exterior Girder2 Curb - CL625NB+CL625SB	769	Shear	kN	CL1-625		Concrete	S2	E2	INSP3	3.00	75	27	6	1.07	1.14	1.35	81	31	8	119.4	Sophist.	Other	Normal	Normal	44		1.00	1.00	0.3	0.3	1.49	1.49	85.4	1168	1168	1.05	12.28	JCT
Exterior Girder2 Curb - CL625NB+CL625SB	769	Moment	kN-m	CL1-625		Concrete	S2	E3	INSP3	2.75	49	17	3	1.06	1.12	1.30	52	19	4	76.1	Sophist.	Other	Normal	Normal	34		1.00	1.00	0.3	0.3	1.42	1.42	62.6	139	2069	1.01	12.28	JCT
Exterior Girder2 Curb - CL625NB+CL625SB	8850	Moment	kN-m	CL1-625		Concrete	S2	E3	INSP3	2.75	370	68	6	1.06	1.12	1.30	392	76	8	476.2	Sophist.	Other	Normal	Normal	277		1.00	1.00	0.3	0.3	1.42	1.42	511.2	987	3199	1.01	5.39	JCT
Interior Girder - CL625NB+CL625SB	769	Shear	kN	CL1-625		Concrete	S2	E2	INSP3	3.00	124	47	13	1.07	1.14	1.35	133	54	17	204.1	Sophist.	Other	Normal	Normal	104		1.00	1.00	0.3	0.3	1.49	1.49	202.0	1755	1755	1.05	7.68	JCT
Interior Girder - CL625NB+CL625SB	769	Moment	kN-m	CL1-625		Concrete	S2	E3	INSP3	2.75	80	30	9	1.06	1.12	1.30	85	34	11	130.0	Sophist.	Other	Normal	Normal	80		1.00	1.00	0.3	0.3	1.42	1.42	148.0	278	1557	1.01	7.68	JCT
Interior Girder - CL625NB+CL625SB	8555	Moment	kN-m	CL1-625		Concrete	S2	E3	INSP3	2.75	534	136	51	1.06	1.12	1.30	566	152	67	785.1	Sophist.	Other	Normal	Normal	481	0	1.00	1.00	0.3	0.3	1.42	1.42	887.9	1673	2528	1.01	1.99	JCT
																																					Min LLCF Total	1.99	

Notes:
1. Load rating according to CSA - S6-14 (as per Section 14)
2. Evaluation procedure: ULS method (as per Clause 14.5.2.2)
3. Highway Class C with Design Speed 60km/h
4. Dead Loads as defined by 14.8.2
5. Inspection Level 3 (INSP3) used for all load cases
6. Normal Traffic (CL1-625)
7. Critical distance taken from North abutment
8. Target reliability index from Table 14.5 have not been increased due to Clause 14.12.5
9. Dead load factors from Table 14.7
10. Live load factors from Table 14.8 for normal traffic
11. Resistance adjustment factors from Table 14.15
12. Resistance Factors: Concrete = 0.75, Rebar = 0.90
13. Material properties used to calculate resistances are as follows:

Material	Strength	Reference
concrete	34.5 MPa	drawing
steel	230 MPA	S6-114

Name	Date
D.R.Estey	1/5/18
J. Tong	1/5/18

Bridge Information:
Name: Bridge 04 - Cross Creek Road over Harvey Creek
Construction:
Bridge Type: Precast Double-celled concrete box Stringers
Number of Stringers: 8 - 1200x700 deep CIP concrete box stringers
Span Arrangement: Simply Supported 20.00 m
Highway Class: A=1;B=2;C&D=3 3 2 Lane
Speed =60km/hr
November 22, 2017 Revisited: January 5, 2018

Table No. 2.8D Capacity Table

Normal Traffic (BCL-625)

Element Description / Evaluation location along span	Critical Distance (mm)	Effect	Units	VEHICULAR TRAVEL Lane 1 NB	Lane 2 SB	Member Type	Target Reliability Index, β: Behaviour System	Behaviour Element	Insp. Level	β	Dead Loads: Unfactored D1	D2	D3	Factors D1	D2	D3	Factored D1	D2	D3	Total Factored DL	Lat. Dist. Category	Span Type	LIVE LOAD CONTRIBUTIONS: Vehicle Type NB1	SB1	Unfactored LL NB1	SB1	Lane Factors NB1	SB1	DLA NB1	SB1	α_L NB1	SB1	Factored LL	Total Factored DL + LL	Resistance ϕ*Rn	Adjust. Fact. U	Live Load Capacity Factor LLCF	Quality Ma Evaluator
Exterior Girder - CL625NB+CL625SB	769	Shear	kN	CL1-625	CL1-625	Concrete	S2	E2	INSP3	3.00	112	107	20	1.07	1.14	1.35	120	122	27	268.1	Sophist.	Other	Normal	Normal	103	6	0.85	0.85	0.3	0.3	1.49	1.49	178.3	1812	1812	1.05	8.66	JCT
Exterior Girder - CL625NB+CL625SB	769	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	78	74	18	1.06	1.12	1.30	82	83	24	188.4	Sophist.	Other	Normal	Normal	79	4	0.85	0.85	0.3	0.3	1.42	1.42	130.7	319	2270	1.01	8.66	JCT
Exterior Girder - CL625NB+CL625SB	8372	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	483	175	23	1.06	1.12	1.30	512	196	30	737.9	Sophist.	Other	Normal	Normal	306	183	0.85	0.85	0.3	0.3	1.42	1.42	767.8	1506	3935	1.01	4.22	JCT
Interior Girder 4 - CL625NB+CL625SB	769	Shear	kN	CL1-625	CL1-625	Concrete	S2	E2	INSP3	3.00	92	25	3	1.07	1.14	1.35	98	28	4	130.0	Sophist.	Other	Normal	Normal	51	105	0.85	0.85	0.3	0.3	1.49	1.49	257.0	1812	1631	1.05	6.55	JCT
Interior Girder 4- CL625NB+CL625SB	769	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	74	19	2	1.06	1.12	1.30	78	22	3	102.4	Sophist.	Other	Normal	Normal	39	89	0.85	0.85	0.3	0.3	1.42	1.42	200.4	303	1832	1.01	6.55	JCT
Interior Girder 4 - CL625NB+CL625SB	10580	Moment	kN-m	CL1-625	CL1-625 centered	Concrete	S2	E3	INSP3	2.75	488	173	23	1.06	1.12	1.30	517	194	30	740.7	Sophist.	Other	Normal	Normal	249	301	0.85	0.85	0.3	0.3	1.42	1.42	863.5	1604	2815	1.01	2.43	JCT
																																				Min LLCF Total	2.43	

Notes:
1. Load rating according to CSA - S6-14 (as per Section 14)
2. Evaluation procedure: ULS method (as per Clause 14.5.2.2)
3. Highway Class C with Design Speed 60km/h
4. Dead Loads as defined by 14.8.2
5. Inspection Level 3 (INSP3) used for all load cases
6. Normal Traffic (CL1-625)
7. Critical distance taken from North abutment

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8 Target reliability index from Table 14.5 have not been increased due to Clause 14.12.5
9 Dead load factors from Table 14.7
10 Live load factors from Table 14.8 for normal traffic
11 Resistance adjustment factors from Table 14.15
12 Resistance Factors: Concrete = 0.75, Rebar = 0.90
13 Material properties used to calculate resistances are as follows:

550 156

Material	Strength	Reference
concrete	45 MPa	drawings
steel	300 MPa	S6-14

Name	Date
D.R.Estey	1/5/18
J. Tong	1/5/18

Bridge Information:
Name: Bridge 05 - Bayview Road Bridge
Construction:
Bridge Type: Precast concrete box Stringers
Number of Stringers: 7 - 1200x700 deep 18.25 degrees RT Precast concrete box stringers (MK700\18\18.25 deg RT)
Span Arrangement: Simply Supported 18.00 m
Highway Class: A=1;B=2;C&D=3 3 2 Lane
Speed =60km/hr
Skew Factor (Cl. 5.6.5.2): 1.45
November 22, 2017 Revisited: January 5, 2018

ISL Engineering and Land Services

Table No. 2.8E Capacity Table

Normal Traffic (BCL-625)

Element Description / Evaluation location along span	Critical Distance (mm)	Effect	Units	VEHICULAR TRAVEL Lane 1 NB	VEHICULAR TRAVEL Lane 2 SB	Member Type	Target Reliability Index, β: Behaviour System	Behaviour Element	Insp. Level	β	Dead Loads: Unfactored D1	Unfactored D2	Unfactored D3	Factors D1	Factors D2	Factors D3	Factored D1	Factored D2	Factored D3	Total Factored DL	Lat. Dist. Category	Span Type	LIVE LOAD CONTRIBUTIONS: Vehicle Type NB1	Vehicle Type SB1	Unfactored LL NB1	Unfactored LL SB1	Lane Factors NB1	Lane Factors SB1	DLA NB1	DLA SB1	α_c EB1	α_c NB1	Factored LL	Total Factored DL + LL	Resistance ϕ*Rn	Adjust. Fact. U	Live Load Capacity Factor LLCF	Quality Ma Evaluator
Exterior Girder 7 SW - CL625NB+CL625SB	769	Shear	kN	CL1-625	CL1-625	Concrete	S2	E2	INSP3	3.00	170	107	18	1.07	1.14	1.35	182	122	24	327.7	Sophist.	Other	Normal	Normal	5	58	0.85	0.85	0.3	0.3	1.49	1.49	103.3	1726	1726	1.05	13.53	JCT
Exterior Girder 7 SW - CL625NB+CL625SB	769	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	94	60	10	1.06	1.12	1.30	99	67	13	179.3	Sophist.	Other	Normal	Normal	4	44	0.85	0.85	0.3	0.3	1.42	1.42	75.7	255	2274	1.01	13.53	JCT
Exterior Girder 7 SW - CL625NB+CL625SB	8260	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	356	335	63	1.06	1.12	1.30	377	375	81	833.9	Sophist.	Other	Normal	Normal	73	270	0.85	0.85	0.3	0.3	1.42	1.42	538.0	1372	3935	1.01	5.84	JCT
Exterior Girder 1 Curb - CL625NB+CL625SB	769	Shear	kN	CL1-625	CL1-625	Concrete	S2	E2	INSP3	3.00	113	20	1	1.07	1.14	1.35	121	22	2	145.1	Sophist.	Other	Normal	Normal	44	20	0.85	0.85	0.3	0.3	1.49	1.49	105.8	1168	1168	1.05	9.66	JCT
Exterior Girder 1 Curb - CL625NB+CL625SB	769	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	63	11	1	1.06	1.12	1.30	67	12	1	80.0	Sophist.	Other	Normal	Normal	34	16	0.85	0.85	0.3	0.3	1.42	1.42	77.5	157	2069	1.01	9.66	JCT
Exterior Girder 1 Curb - CL625NB+CL625SB	8850	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	370	68	6	1.06	1.12	1.30	392	76	8	476.2	Sophist.	Other	Normal	Normal	277	289	0.85	0.85	0.3	0.3	1.42	1.42	888.3	1364	3199	1.01	3.10	JCT
Interior Girder - CL625NB+CL625SB	769	Shear	kN	CL1-625	CL1-625	Concrete	S2	E2	INSP3	3.00	153	42	17	1.07	1.14	1.35	164	48	23	233.9	Sophist.	Other	Normal	Normal	104	5	0.85	0.85	0.3	0.3	1.49	1.49	179.9	1755	1755	1.05	8.45	JCT
Interior Girder - CL625NB+CL625SB	769	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	84	23	10	1.06	1.12	1.30	89	26	12	128.1	Sophist.	Other	Normal	Normal	80	4	0.85	0.85	0.3	0.3	1.42	1.42	132.1	260	1557	1.01	8.45	JCT
Interior Girder - CL625NB+CL625SB	8555	Moment	kN-m	CL1-625	CL1-625	Concrete	S2	E3	INSP3	2.75	534	136	51	1.06	1.12	1.30	566	152	67	785.1	Sophist.	Other	Normal	Normal	28	565	0.85	0.85	0.3	0.3	1.42	1.42	930.4	1716	2528	1.01	1.90	JCT
																																					Min LLCF Total	1.90	

Notes:
1. Load rating according to CSA - S6-14 (as per Section 14)
2. Evaluation procedure: ULS method (as per Clause 14.5.2.2)
3. Highway Class C with Design Speed 60km/h
4. Dead Loads as defined by 14.8.2
5. Inspection Level 3 (INSP3) used for all load cases
6. Normal Traffic (CL1-625)
7. Critical distance taken from North abutment
8. Target reliability index from Table 14.5 have not been increased due to Clause 14.12.5
9. Dead load factors from Table 14.7
10. Live load factors from Table 14.8 for normal traffic
11. Resistance adjustment factors from Table 14.15
12. Resistance Factors: Concrete = 0.75, Rebar = 0.90
13. Material properties used to calculate resistances are as follows:

Material	Strength	Reference
concrete	34.5 MPa	drawing
steel	230 MPA	S6-114

Name	Date
D.R.Estey	1/5/18
J. Tong	1/5/18

Bridge Information:
Name: Bridge 06 - Bayview Road over Alberta Creek (Driveway Access)
Construction:
Bridge Type: Steel grider with timber floor beams and timber deck
Number of Stringers: 2 - 1070mm deep steel girders
Span Arrangement: 20m single span
Highway Class: C - Local roadway - 60 km/hr
November 22, 2017 Revisited: January 5, 2018

ISL Engineering and Land Services

Table No. 2.8F Capacity Table

Normal Traffic (BCL-625)

Element Description / Evaluation location along span	Critical Distance (mm)	Effect	Units	VEHICULAR TRAVEL: Lane 1 NB		Member Type	Target Reliability Index, β: Behaviour: System	Behaviour: Element	Insp. Level	β	Dead Loads: Unfactored: D1	Unfactored: D2	Unfactored: D3	Factors: D1	Factors: D2	Factors: D3	Factored: D1	Factored: D2	Factored: D3	Total Factored DL	Lat. Dist. Category	Span Type	LIVE LOAD CONTRIBUTIONS: Vehicle Type		Unfactored LL		Lane Factors		DLA		α_L		Factored LL	Total Factored DL + LL	Resistance: ϕ^*Rn	Resistance: Adjust. Fact. U	Live Load Capacity Factor LLCF	Quality Ma Evaluator
STEEL GIRDER	500	Shear	kN	CL1-625		steel	S1	E3	INSP3	3.25	23	30	0	1.08	1.16	0.00	25	35	0	60.1	Sophist.	Other	Normal	Normal	230		1.00	0.00	0.250	0.250	1.56	1.56	448.3	2249	2205	1.02	4.88	JCT
STEEL GIRDER	10489	Moment	kN-m	CL1-625		steel	S1	E3	INSP3	3.25	116	153	0	1.08	1.16	0.00	125	178	0	302.6	Sophist.	Other	Normal	Normal	974		1.00	0.00	0.250	0.250	1.56	1.56	1683.8	1986	2992	1.06	1.70	JCT
TIMBER TIES	838	Moment	kN	CL1-625		timber	S3	E3	INSP3	2.50	0			0.00	0.00	0.00	0	0	0	0.0	Sophist.	Other	Normal	Normal	10		1.00	0.00	0.280	0.280	1.35	1.35	18.1	18.1	14	0.80	0.63	JCT
TIMBER TIES	838	Moment	kN-m	CL1-625		timber	S3	E1	INSP3	2.50	0			0.00	0.00	0.00	0	0	0	0.0	Sophist.	Other	Normal	Normal	14		1.00	0.00	0.280	0.280	1.35	1.35	24.0	24.0	77	0.80	2.56	JCT

Min LLCF Total **0.63**

Timber deck Governs

Reduce to 22t Only

Notes:
1. Load rating according to CSA - S6-14 (as per Section 14)
2. Evaluation procedure: ULS method (as per Clause 14.5.2.2)
3. Highway Class C with Design Speed 60km/h
4. Dead Loads as defined by 14.8.2
5. Inspection Level 2 (INSP2) used for all load cases
6. Normal Traffic (CL1-625)
7. Critical distance taken from North abutment
8 Target reliability index from Table 14.5 have not been increased due to Clause 14.12.5
9 Dead load factors from Table 14.7
10 Live load factors from Table 14.8 for normal traffic
11 Resistance adjustment factors from Table 14.15
12 Resistance Factors: Concrete = 0.75, Rebar = 0.90
13 Material properties used to calculate resistances are as follows:

Name	Date
D.R.Estey	1/5/18
J. Tong	1/5/18

Material	Strength	Reference
concrete	34.5 MPa	drawing
steel	230 MPa	S6-14
Timber	6 MPa	fbu
	1.1 MPa	fvu
	4.7 MPa	fqu

Bridge Information:
Name: Bridge 07 - Bayview Place over Alberta Creek
Construction:
Bridge Type: Precast concrete box girders
Number of Stringers: 4 - 1200x700 deep CIP concrete box stringers
Span Arrangement: Simply Supported 18.00 m
Highway Class: A=1;B=2;C&D=3 3 1 Lane
Speed =60km/hr
Skew Factor (Cl. 5.6.5.2): 1
November 22, 2017 Revisited: January 5, 2018

Table No. 2.8G Capacity Table

Normal Traffic (BCL-625)

Element Description / Evaluation location along span	Critical Distance (mm)	Effect	Units	VEHICULAR TRAVEL: Lane 1 NB	VEHICULAR TRAVEL: SWLL	Member Type	Target Reliability Index, β: Behaviour System	Behaviour Element	Insp. Level	β	Dead Loads: Unfactored D1	Unfactored D2	Unfactored D3	Factors D1	Factors D2	Factors D3	Factored D1	Factored D2	Factored D3	Total Factored DL	LIVE LOAD CONTRIBUTIONS: Lat. Dist. Category	Span Type	Vehicle Type NB1	Vehicle Type SB1	Unfactored LL NB1	Unfactored LL SW LL	Lane Factors NB1	Lane Factors SB1	DLA NB1	DLA SB1	α_L NB1	α_L SB1	Factored LL	Total Factored DL + LL	Resistance ϕ^*Rn	Resistance Adjust. Fact. U	Live Load Capacity Factor LLCF	Quality Ma Evaluator
Exterior Stringer 4 - CL-625 next to SW	769	Shear	kN	CL1-625	SW LL	Concrete	S2	E2	INSP3	3.00	152	71	14	1.07	1.14	1.35	162	81	19	262.1	Sophist.	Other	Normal	Normal	111	28	1.00	1.00	0.3	0.0	1.49	1.49	256.1	1322	1322	1.05	4.14	JCT
Exterior Stringer 4 - CL-625 next to SW	769	Moment	kN-m	CL1-625	SW LL	Concrete	S2	E3	INSP3	2.75	120	58	11	1.06	1.12	1.30	127	65	15	206.6	Sophist.	Other	Normal	Normal	85	23	1.00	1.00	0.3	0.0	1.42	1.42	190.4	397	2274	1.01	4.14	JCT
Exterior Stringer 4 - CL-625 next to SW	9000	Moment	kN-m	CL1-625	SW LL	Concrete	S2	E3	INSP3	2.75	759	322	65	1.06	1.12	1.30	805	360	84	1248.8	Sophist.	Other	Normal	Normal	814	136	1.00	1.00	0.3	0.3	1.42	1.42	1754.1	3003	3935	1.01	1.55	JCT
Exterior Stringer 1 - CL-625 next to curb	769	Shear	kN	CL1-625 OC		Concrete	S2	E2	INSP3	3.00	99	38	10	1.07	1.14	1.35	106	43	14	163.3	Sophist.	Other	Normal	Normal	96	6	1.00	1.00	0.3	0.3	1.49	1.49	198.6	1322	1322	1.05	5.84	JCT
Exterior Stringer 1 - CL-625 next to curb	769	Moment	kN-m	CL1-625 OC		Concrete	S2	E3	INSP3	2.75	80	38	9	1.06	1.12	1.30	85	43	11	138.2	Sophist.	Other	Normal	Normal	74	5	1.00	1.00	0.3	0.3	1.42	1.42	145.5	284	1564	1.01	5.84	JCT
Exterior Stringer 1 - CL-625 next to curb	7624	Moment	kN-m	CL1-625 OC		Concrete	S2	E3	INSP3	2.75	486	182	43	1.06	1.12	1.30	515	204	56	774.6	Sophist.	Other	Normal	Normal	518	38	1.00	1.00	0.3	0.3	1.42	1.42	1025.5	1800	2528	1.01	1.73	JCT
Interior Stringer 2 -Off center load	769	Shear	kN	CL1-625 OC		Concrete	S2	E2	INSP3	3.00	61	21	5	1.07	1.14	1.35	66	24	6	95.8	Sophist.	Other	Normal	Normal	68	6	1.00	1.00	0.3	0.3	1.49	1.49	143.9	1322	1322	1.05	8.52	JCT
Interior Stringer 2 -Off center load	769	Moment	kN-m	CL1-625 OC		Concrete	S2	E3	INSP3	2.75	50	8	4	1.06	1.12	1.30	53	9	5	66.7	Sophist.	Other	Normal	Normal	52	5	1.00	1.00	0.3	0.3	1.42	1.42	105.4	172	1564	1.01	8.52	JCT
Interior Stringer 2 -Off center load	7624	Moment	kN-m	CL1-625 OC		Concrete	S2	E3	INSP3	2.75	283	111	25	1.06	1.12	1.30	300	124	33	456.2	Sophist.	Other	Normal	Normal	321	38	1.00	1.00	0.3	0.3	1.42	1.42	663.0	1119	2528	1.01	3.16	JCT
Interior Stringer 3- centered load	769	Shear	kN	CL1-625		Concrete	S2	E2	INSP3	3.00	99	38	10	1.07	1.14	1.35	106	43	14	163.3	Sophist.	Other	Normal	Normal	67	8	1.00	1.00	0.3	0.3	1.49	1.49	144.3	1322	1322	1.05	8.03	JCT
Interior Stringer 3- centered load	769	Moment	kN-m	CL1-625		Concrete	S2	E3	INSP3	2.75	80	38	9	1.06	1.12	1.30	85	43	11	138.2	Sophist.	Other	Normal	Normal	51	6	1.00	1.00	0.3	0.3	1.42	1.42	105.7	244	2069	1.01	8.03	JCT
Interior Stringer 3- centered load	9000	Moment	kN-m	CL1-625		Concrete	S2	E3	INSP3	2.75	264	115	26	1.06	1.12	1.30	280	129	34	442.4	Sophist.	Other	Normal	Normal	328	44	1.00	1.00	0.3	0.3	1.42	1.42	686.1	1129	3199	1.01	4.06	JCT
																																					Min LLCF	
																																				Total	1.55

Notes:
1. Load rating according to CSA - S6-14 (as per Section 14)
2. Evaluation procedure: ULS method (as per Clause 14.5.2.2)
3. Highway Class C with Design Speed 60km/h
4. Dead Loads as defined by 14.8.2
5. Inspection Level 3 (INSP3) used for all load cases
6. Normal Traffic (CL1-625)
7. Critical distance taken from North abutment
8. Target reliability index from Table 14.5 have not been increased due to Clause 14.12.5
9. Dead load factors from Table 14.7
10. Live load factors from Table 14.8 for normal traffic
11. Resistance adjustment factors from Table 14.15
12. Resistance Factors: Concrete = 0.75, Rebar = 0.90
13. Material properties used to calculate resistances are as follows:

Material	Strength	Reference	
concrete	25 MPa	drawing	
steel	250 MPa	S6-14	
Precast	45 MPa	drawing	

Name	Date
D.R.Estey	1/5/18
J. Tong	1/5/18

Bridge Information:
Name: Bridge 08 - Lions Bay Avenue over Alberta Creek (Driveway Access)
Construction:
Bridge Type: Cast-in-place concrete slab
Number of Stringers: 725 deep tapered CIP concrete slab
Span Arrangement: Simply Supported· 13.35 m
Highway Class: A=1;B=2;C&D=3 3 1 Lane
Speed =60km/hr
November 22, 2017 Revisited: January 5, 2018

ISL Engineering and Land Services

Table No. 2.8H Capacity Table

Normal Traffic (BCL-625)

Element Description	Critical Distance	Effect	Units	VEHICULAR TRAVEL		Member Type	Target Reliability Index, β				Dead Loads									Total Factored	LIVE LOAD CONTRIBUTIONS												Total Factored	Resistance		Live Load Capacity Factor	Quality Ma Evaluator
							Behaviour		Insp.		Unfactored			Factors			Factored				Lat. Dist.	Span	Vehicle Type		Unfactored LL		Lane Factors T13.3		DLA		α_L		Factored				
Evaluation location along span	(mm)			Lane 1 NB	Lane 2 SB		System	Element	Level	β	D1	D2	D3	D1	D2	D3	D1	D2	D3	DL	Category	Type	NB1	SB1	NB1	SB1	NB1	SB1	NB1	SB1	NB1	SB1	LL	DL + LL	ϕ^*Rn	Adjust. Fact. U	LLCF	
CL-625 centre of lane	810	Shear	kN	CL1-625		Concrete	S1	E2	INSP1	3.75	189	72	0	1.10	1.20	0.00	208	86	0	293.7	Sophist.	Other	Normal	Normal	393		1.00	1.00	0.3	0.3	1.70	1.70	867.9	1610	1610	1.05	1.52	JCT
CL625 centre of lane	810	Moment	kN-m	CL1-625		Concrete	S1	E3	INSP1	3.50	163	62	0	1.09	1.18	0.00	178	73	0	251.3	Sophist.	Other	Normal	Normal	318		1.00	1.00	0.3	0.3	1.63	1.63	674.1	925	2168	1.02	1.52	JCT
CL625 centre of lane	6750	Moment	kN-m	CL1-625		Concrete	S1	E3	INSP1	3.50	708	269	0	1.09	1.18	0.00	772	318	0	1089.4	Sophist.	Other	Normal	Normal	954		1.00	1.00	0.3	0.3	1.63	1.63	2021.5	3111	3826	1.02	1.39	JCT
																																		Min LLCF Total		1.39	

Notes:
1. Load rating according to CSA - S6-14 (as per Section 14)
2. Evaluation procedure: ULS method (as per Clause 14.5.2.2)
3. Highway Class C with Design Speed 60km/h
4. Dead Loads as defined by 14.8.2
5. Inspection Level 1 (INSP1) used for all load cases
6. Normal Traffic (CL1-625)
7. Critical distance taken from North abutment
8. Target reliability index from Table 14.5 have not been increased due to Clause 14.12.5
9. Dead load factors from Table 14.7
10. Live load factors from Table 14.8 for normal traffic
11. Resistance adjustment factors from Table 14.15
12. Resistance Factors: Concrete = 0.75, Rebar = 0.90
13. Material properties used to calculate resistances are as follows:

Material	Strength	Reference	
concrete	27.5 MPa	drawing (class A)	
steel	400 MPa	drawing	

Name	Date
D.R.Estey	1/5/18
J. Tong	1/5/18

For the shear resistance of concrete beams, however, the calculation of the LLCF is an iterative process.

Using the following equations,

$V_f = \alpha_D V_{DL} + LLCF(\alpha_L V_{LL})$
$M_f = \alpha_D M_{DL} + LLCF(\alpha_L M_{LL})$

The LLCF is calculated when V_r converges to the value of V_f given above.

A summary of the calculations for the live load capacity factors are contained in the tables, in the form of spreadsheets, at the end of this section for each bridge. The results shown in the table are for the flow of vehicles in one direction in their respective lanes.

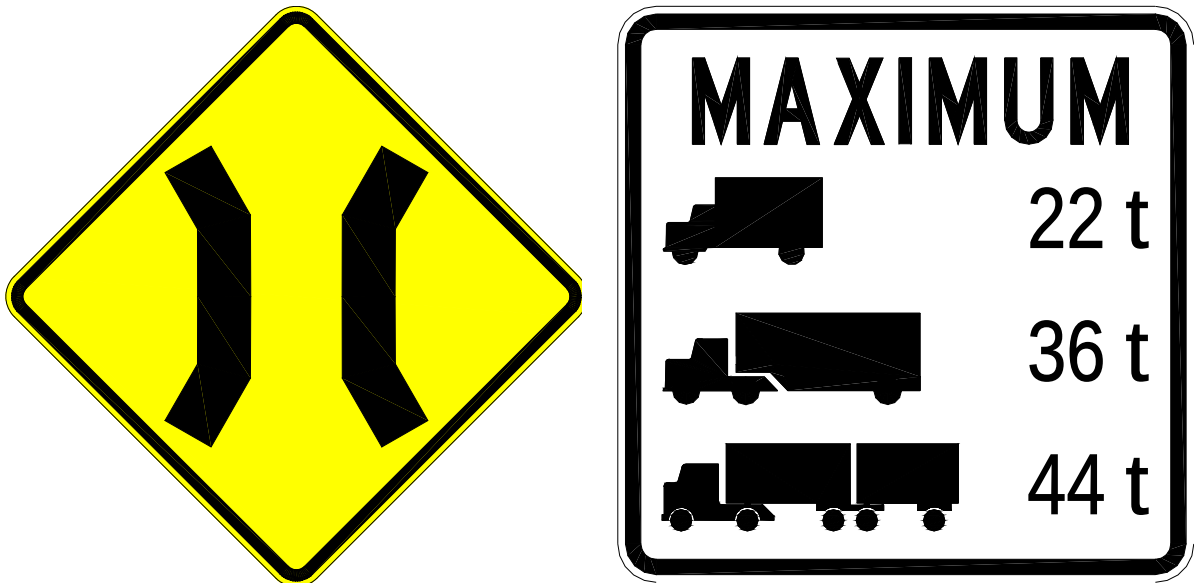
3.0 Summary and Conclusions

Full load ratings were performed for eight Village owned bridges within its municipal boundaries in accordance with CAN/CSA S6-14 Canadian Highway Bridge Design Code. The bridge load ratings were performed for normal CL1-625 vehicle loads.
Minimum values from the analysis of the structural members (precast concrete box girders, precast trapezoidal beams, cast-in-place concrete beams, steel WWF girders and timber floor beams) are tabulated below. Live Load Capacity Factors (LLCF) values less than one indicate a failure, while LLCF less than 1.1 is considered an unfavorable results, where Level 2 analysis would be recommended. Values listed are for each force effect type (e.g. shear, bending) at a critical section. As noted in Section 2.8, the results are for direction flow of the traffic lane.

Table 3.0: Governing LLCF Results

Bridge	Element Description	LLCF	Pass or Fail	Comment
B1. Lions Bay Avenue Bridge over Harvey Creek	Girder (Flexure) Girder (Shear)	1.49 1.46	Pass Pass	Moment at x = 9450mm Shear at x = 4650mm
B2. Isleview Place Bridge over Alberta Creek (Lower)	Girder (Flexure) Girder (Shear)	2.03 4.01	Pass Pass	Exterior girder at x = 7624mm Exterior girder x = 769mm
B3. Isleview Place Bridge over Alberta Creek (Upper)	Girder (Flexure) Girder (Shear)	1.99 5.65	Pass Pass	Interior girder at x = 8555mm Exterior girder x = 769mm
B4. Cross Creek Road Bridge over Harvey Creek	Girder (Flexure) Girder (Shear)	2.43 6.55	Pass Pass	Interior girder at x = 10580 Interior girder at x = 769mm
B5. Bayview Road Bridge over Alberta Creek	Girder (Flexure) Girder (Shear)	1.90 8.45	Pass Pass	Interior girder at x = 8555mm Interior girder at x = 769mm
B6. Bayview Road Bridge (Driveway Access) over Alberta Creek	Steel (Flexure) Steel (Shear) Timber (Flexure) Timber (Shear)	1.70 4.88 0.63 2.56	Pass Pass Fail Pass	Girder moment at x = 10489mm Girder shear at x = 500mm Tie moment at x = 838mm Tie shear at x = 838mm
B7. Bayview Place Bridge over Alberta Creek	Girder (Flexure) Girder (Shear)	1.55 4.14	Pass Pass	Interior girder at x = 9000mm Exterior girder at x = 769mm
B8. Lions Bay Avenue Bridge over Alberta Creek (Driveway Access)	Girder (Flexure) Girder (Shear)	1.39 1.52	Pass Pass	Moment at x = 6750mm Shear at x = 810mm

The LLCF for the precast concrete stringers, reinforced concrete girders and steel girders have LLCF values over 1.0 for both bending and shear, indicating sufficient capacity to carry the live loads considered. The timber ties have an LLCF of 0.63 in bending, indicating insufficient capacity to carry the CL1-625. This is due to the reduced adjustment factor based on the splitting and rotting of the timber. As such, ISL recommends that bridge B6 Bayview Road Bridge over Alberta Creek has a reduced vehicle load of 22t. An example of the signage is shown below. Since this bridge is a driveway access to private property, the reduced load rating should not impede access for the residents.


MAXIMUM
22 t
36 t
44 t

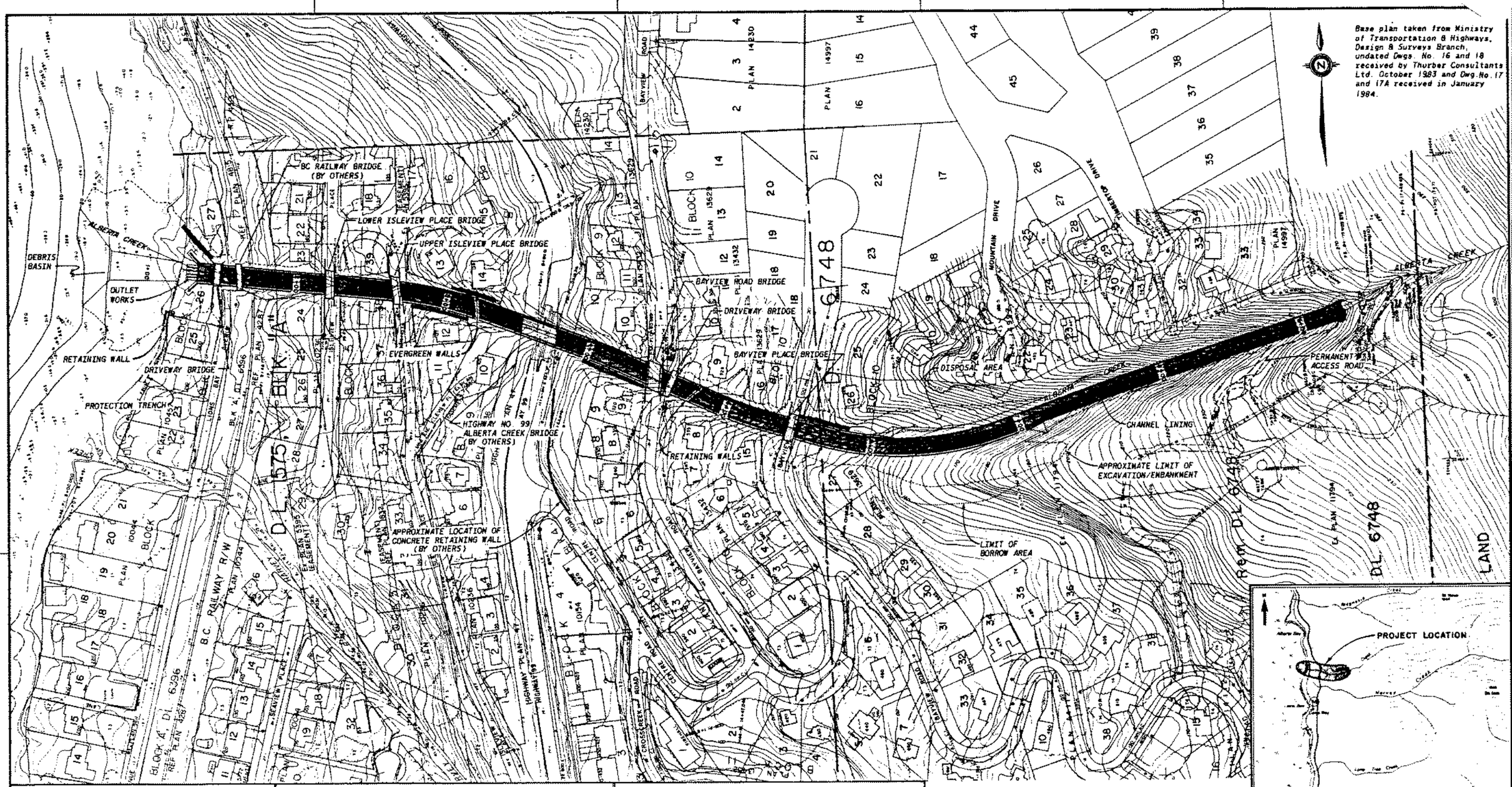
4.0 References

1. CAN/CSA S6-14 Canadian Highway Bridge Design Code and Commentary
2. MoT Bridge Standards and Procedures Manual Volume 1 Supplement to the CHBDC S6-14, October 2016.

Appendix A

Bridge Drawings

Base plan taken from Ministry of Transportation & Highways, Design & Surveys Branch, undated Dwgs. No. 16 and 18 received by Thurber Consultants Ltd. October 1983 and Dwg.No.17 and 17A received in January 1984.



LIST OF DRAWINGS

R1-161-20	GENERAL SITE PLAN & DRAWING INDEX	
R1-161-21[B]	RIGHT OF WAY PLAN SHEET 1 of 6	
R1-161-22[B]	RIGHT OF WAY PLAN SHEET 2 of 6	
R1-161-23[C]	RIGHT OF WAY PLAN SHEET 3 of 6	
R1-161-24[A]	RIGHT OF WAY PLAN SHEET 4 of 6	
R1-161-25[A]	RIGHT OF WAY PLAN SHEET 5 of 6	
R1-161-26	RIGHT OF WAY PLAN SHEET 6 of 6	
R1-161-27	CHANNELIZATION SURVEY CONTROL	
R1-161-28	DETAILED CHANNELIZATION LAYOUT	STA. 0+55 - 2+40
R1-161-29	DETAILED CHANNELIZATION LAYOUT	STA. 2+40 - 4+20
R1-161-30	DETAILED CHANNELIZATION LAYOUT	STA. 4+20 - 6+00
R1-161-31	DETAILED CHANNELIZATION LAYOUT	STA. 6+00 - 7+60
R1-161-32	DETAILED CHANNELIZATION LAYOUT	STA. 7+60 - 9+40
R1-161-33	DEBRIS BASIN DETAILS	
R1-161-34	CHANNELIZATION CROSS SECTIONS	STA. 0+60 - 1+20
R1-161-35	CHANNELIZATION CROSS SECTIONS	STA. 1+40 - 2+00
R1-161-36	CHANNELIZATION CROSS SECTIONS	STA. 2+20 - 2+60
R1-161-37	CHANNELIZATION CROSS SECTIONS	STA. 3+00 - 3+60
R1-161-38	CHANNELIZATION CROSS SECTIONS	STA. 3+80 - 4+40
R1-161-39	CHANNELIZATION CROSS SECTIONS	STA. 4+60 - 5+20
R1-161-40	CHANNELIZATION CROSS SECTIONS	STA. 5+40 - 6+00
R1-161-41	CHANNELIZATION CROSS SECTIONS	STA. 6+20 - 6+40
R1-161-42	CHANNELIZATION CROSS SECTIONS	STA. 6+60 - 6+80
R1-161-43	CHANNELIZATION CROSS SECTIONS	STA. 7+00 - 7+40
R1-161-44	CHANNELIZATION CROSS SECTIONS	STA. 7+60 - 8+00
R1-161-45	CHANNELIZATION CROSS SECTIONS	STA. 8+20 - 8+60
R1-161-46	CHANNELIZATION CROSS SECTIONS	STA. 8+80 - 9+20

R1-161-50	RETAINING WALLS & CHANNEL LINING GENERAL ARRANGEMENT	
R1-161-51	RETAINING WALLS & CHANNEL LINING PLAN & PROFILE	1+25 TO 3+00
R1-161-52	RETAINING WALLS & CHANNEL LINING PLAN & PROFILE	3+00 TO 4+75
R1-161-53	RETAINING WALLS & CHANNEL LINING PLAN & PROFILE	4+75 TO 6+60
R1-161-54	RETAINING WALLS & CHANNEL LINING PLAN & PROFILE	6+60 TO 8+50
R1-161-55	RETAINING WALLS & CHANNEL LINING PLAN & PROFILE	8+50 TO 9+28
R1-161-56	OUTLET WORKS	GENERAL ARRANGEMENT
R1-161-57	OUTLET WORKS	STRUCTURAL DETAILS SHEET 1
R1-161-58	OUTLET WORKS	STRUCTURAL DETAILS SHEET 2
R1-161-59[A]	LIONS BAY AVE. DRIVEWAY BRIDGE	GENERAL ARRANGEMENT
R1-161-60	LIONS BAY AVE. DRIVEWAY BRIDGE	SUPERSTRUCTURE
R1-161-61[A]	EVERGREEN RETAINING WALL RIGHT BANK AT CHANNEL OUTLET	
R1-161-62[A]	RETAINING WALL SOUTH OF OUTLET	
R1-161-63	CHANNEL RETAINING WALLS	PRECAST PANEL LAYOUT & INSTALLATION
R1-161-64[A]	CHANNEL RETAINING WALLS	PRECAST PANEL DETAILS
R1-161-65[A]	CHANNEL RETAINING WALLS	END WALL TRANSITION DETAILS
R1-161-66[A]	CHANNEL LINING WITH RETAINING WALLS	LAYOUT & REINFORCING DETAILS
R1-161-67[A]	CHANNEL LINING WITHOUT RETAINING WALLS	LAYOUT & REINFORCING DETAILS
R1-161-68[A]	CHANNEL LINING	TYPICAL DEADMEN ANCHOR
R1-161-69[A]	EVERGREEN RETAINING WALL, LEFT BANK	STA 2+74.1 - 3+10.8
R1-161-70[A]	EVERGREEN RETAINING WALL, RIGHT BANK	STA 3+01.8 - 3+35.5
R1-161-71[A]	EVERGREEN RETAINING WALL, LEFT BANK	STA 3+92.5 - 4+43.5
R1-161-72[A]	EVERGREEN RETAINING WALL, RIGHT BANK	STA 5+48.7 - 5+84.7
R1-161-73[A]	EVERGREEN RETAINING WALL FOOTINGS AND END CLOSURES	
R1-161-74[A]	FENCING AND MISCELLANEOUS DETAILS	
R1-161-80	LOWER ISLEVIEW PLACE BRIDGE	GENERAL ARRANGEMENTS
R1-161-81	LOWER ISLEVIEW PLACE BRIDGE	ABUTMENT DETAILS
R1-161-82	LOWER ISLEVIEW PLACE BRIDGE	SUPERSTRUCTURE DETAILS
R1-161-83	LOWER ISLEVIEW PLACE BRIDGE	BOX GIRDER DETAILS
R1-161-84	LOWER ISLEVIEW PLACE BRIDGE	APPROACH WORKS

R1-161-90[A]	UPPER ISLEVIEW PLACE BRIDGE	GENERAL ARRANGEMENTS
R1-161-91	UPPER ISLEVIEW PLACE BRIDGE	ABUTMENT DETAILS
R1-161-92	UPPER ISLEVIEW PLACE BRIDGE	SUPERSTRUCTURE DETAILS
R1-161-93	UPPER ISLEVIEW PLACE BRIDGE	BOX GIRDER DETAILS
R1-161-94	UPPER ISLEVIEW PLACE BRIDGE	APPROACH WORKS
R1-161-100	BAYVIEW ROAD BRIDGE	GENERAL ARRANGEMENT
R1-161-101	BAYVIEW ROAD BRIDGE	ABUTMENT DETAILS
R1-161-102	BAYVIEW ROAD BRIDGE	SUPERSTRUCTURE DETAILS
R1-161-103	BAYVIEW ROAD BRIDGE	BOX GIRDER DETAILS
R1-161-104[A]	BAYVIEW ROAD BRIDGE	APPROACH WORKS
R1-161-110[A]	BAYVIEW PLACE BRIDGE	GENERAL ARRANGEMENT
R1-161-111	BAYVIEW PLACE BRIDGE	ABUTMENT DETAILS
R1-161-112	BAYVIEW PLACE BRIDGE	SUPERSTRUCTURE DETAILS
R1-161-113	BAYVIEW PLACE BRIDGE	BOX GIRDER DETAILS
R1-161-114[A]	BAYVIEW PLACE BRIDGE	APPROACH WORKS
R1-161-120	BAYVIEW ROAD DRIVEWAY BRIDGE	SUPERSTRUCTURE
R1-161-121	BAYVIEW ROAD DRIVEWAY BRIDGE	ABUTMENT DETAILS
R1-161-125	SUBDIVISION BRIDGES	MISCELLANEOUS DETAILS SHEET 1
R1-161-126[A]	SUBDIVISION BRIDGES	MISCELLANEOUS DETAILS SHEET 2

REINFORCED EARTH WALLS

R1-161-130[C]	BAYVIEW PL & BAYVIEW RD BRIDGES	PLANS, SECTION, DETAILS
R1-161-131[B]	LOWER & UPPER ISLVIEW PL BRIDGES	PLANS, SECTION, DETAILS
R1-161-132[C]	BAYVIEW PL & BAYVIEW RD BRIDGES	FRONT FACE ELEVATIONS
R1-161-133[B]	LOWER ISLEVIEW PL BRIDGE	FRONT FACE ELEVATIONS
R1-161-134[B]	UPPER ISLEVIEW PL BRIDGE	FRONT FACE ELEVATIONS
R1-161-135[B]	LIONS BAY AVENUE	PLAN, SECTION, DETAIL & ELEVATION

D	
C	
B	
A	

REVISIONS

THURBER CONSULTANTS LTD. Geotechnical Engineers
DATE JAN. 1986 | Drawing No. 15-3-39-30

KER, PRIESTMAN & ASSOCIATES LTD. consulting engineers
DATE | APPROVED | DWG NO

SCALE 1:1250 (10 0 50 100m)

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

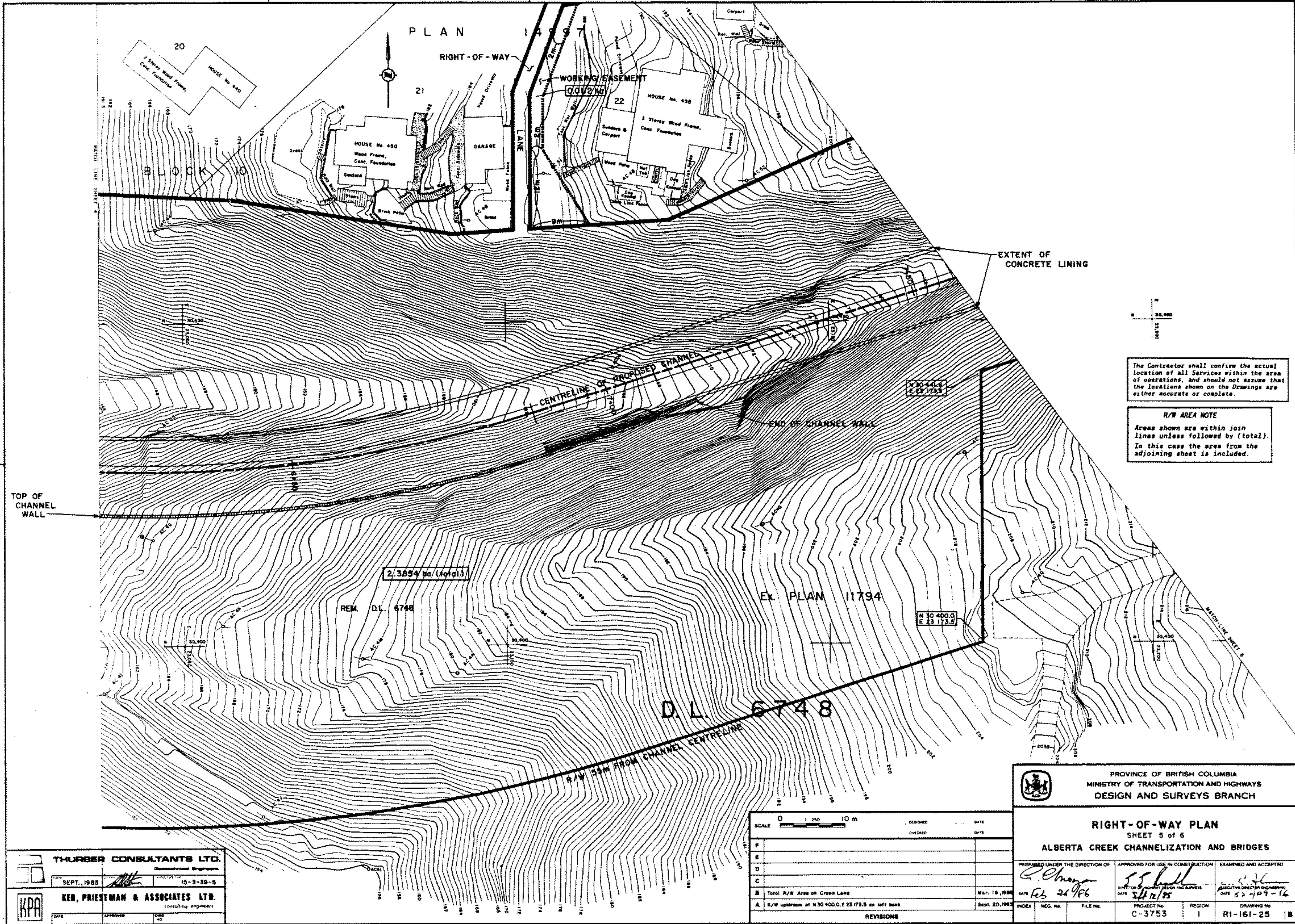
GENERAL SITE PLAN & DRAWING INDEX

ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 26/86	DIRECTOR OF HIGHWAY DESIGN AND SURVEYS DATE Feb 28/86	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-04

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
			C-3753	1	RI-161-20

CANCEL PRINTS BEARING EARLIER LETTER



PLAN 14907
RIGHT-OF-WAY
WORKING EASEMENT
0.0012 ha
LANE
20
21
22
HOUSE No. 440
2 Storey Wood Frame, Conc. Foundation
HOUSE No. 450
Wood Frame, Conc. Foundation
Sundeck
GARAGE
HOUSE No. 458
2 Storey Wood Frame, Conc. Foundation
Sundeck & Carport
Carport
BLOCK 10
EXTENT OF CONCRETE LINING
CENTRELINE OF PROPOSED CHANNEL
END OF CHANNEL WALL
TOP OF CHANNEL WALL
The Contractor shall confirm the actual location of all Services within the area of operations, and should not assume that the locations shown on the Drawings are either accurate or complete.
R/W AREA NOTE
Areas shown are within join lines unless followed by (total).
In this case the area from the adjoining sheet is included.
N 30 441.6
E 23 173.5
N 30 400.0
E 23 173.5
2.3854 ha (total)
REM. D.L. 6748
Ex. PLAN 11794
D.L. 6748
R/W 35m FROM CHANNEL CENTRELINE
MATCH LINE SHEET 6
SCALE 0 1:250 10 m
DESIGNED
CHECKED
DATE
B Total R/W Area on Crook Lane Mar. 19, 1986
A R/W upstream of N 30 400.0, E 23 173.5 on left bank Sept. 20, 1985
REVISIONS
THURBER CONSULTANTS LTD.
Geotechnical Engineers
SEPT., 1985
15-3-39-5
KER, PRIESTMAN & ASSOCIATES LTD.
consulting engineers
PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH
RIGHT-OF-WAY PLAN
SHEET 5 of 6
ALBERTA CREEK CHANNELIZATION AND BRIDGES
PREPARED UNDER THE DIRECTION OF
APPROVED FOR USE IN CONSTRUCTION
EXAMINED AND ACCEPTED
DATE Feb 26/86
DIRECTOR OF HIGHWAY DESIGN AND SURVEYS
DATE 86 /02/05
EXECUTIVE DIRECTOR ENGINEERING
DATE 86 /04 /16
INDEX NEG. No. FILE No.
PROJECT No C-3753
REGION I
DRAWING No R1-161-25 B
CANCEL PRINTS BEARING EARLIER LETTER

R/W AREA NOTE

Areas shown are within join lines unless followed by (total). In this case the area from the adjoining sheet is included.

The Contractor shall confirm the actual location of all Services within the area of operations, and should not assume that the locations shown on the Drawings are either accurate or complete.

THURBER CONSULTANTS LTD.
Geotechnical Engineers
SEPT., 1985 | 15-3-39-6

KER, PRIESTMAN & ASSOCIATES LTD.
consulting engineers

SCALE 0 1:250 10 m

	REVISIONS	
F		
E		
D		
C		
B	R/W & Working Easement Lot 32 and Working Easement Lot 33	June 10, 1986
A	R/W Area on Crown Land	Mar. 19, 1986

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

RIGHT-OF-WAY PLAN
SHEET 6 of 6

ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
Date Feb 26/86	Director of Highway Design and Surveys, Date Sept 23/85	Executive Director Engineering, Date 85-09-23

INDEX	NEG No	FILE No.	PROJECT No	REGION	DRAWING No
			C-3753	1	RI-161-26 B

CANCEL PRINTS BEARING EARLIER LETTER

N30 562.127
E22 587.704
C_L Channel Sta. 1+47.000

N30 545.767
E22 706.483
C_L Channel Sta. 2+66.900

N30 542.400
E22 731.500

N30 530.870
E22 760.173

N30 546.600
E22 700.883

N30 504.039
E22 826.899

N30 500.500
E22 835.700

N30 496.304
E22 844.208

N30 639.272
E23 006.485

℄ RAD 200m
Δ = 8° 16' 35"
Lc = 28.889m

N30 626.873
E23 044.702

N30 460.500
E23 183.000

N30 459.071
E23 178.418

N30 461.752
E23 187.633

N30 435.941
E23 104.240

℄ RAD 200m
Δ = 35° 17' 39"
Lc = 123.201m

N30 501.532
E23 334.867

N30 563.912
E22 574.694

N30 436.635
E22 982.981

N30 417.000
E23 043.500

N30 220.406
E23 252.841

N30 443.019
E22 963.303
C_L Channel Sta. 5+44.300

N30 449.034
E22 944.764

N30 453.500
E22 931.000

N30 459.900
E22 918.023

N30 552.002
E22 661.512
C_L Channel Sta. 2+21.500

℄ RAD 250m
Δ = 14° 05' 38"
Lc = 61.497m

℄ RAD 250m
Δ = 4° 20' 46"
Lc = 18.963m

℄ RAD 250m
Δ = 2° 11' 58"
Lc = 9.597m

N30 481.383
E22 874.462
C_L Channel Sta. 4+47.350

N30 476.142
E22 885.090
C_L Channel Sta. 4+59.200

N30 298.920
E22 666.930

N30 272.089
E22 733.629

PLAN

DETAIL BASIN LAYOUT
SCALE 1:750

CENTRELINE PROFILE

NOTES:
1. All elevations are in metres based on Geodetic Datum.
2. Co-ordinates based on UTM.
3. Layout control to be provided by MOTH.
4. All dimensions shown on this dwg. are in metres.

The Contractor shall confirm the actual location of all Services within the area of operations, and should not assume that the locations shown on the Drawings are either accurate or complete.

D	
C	
B	
A	

REVISIONS

THURBER CONSULTANTS LTD.
Geotechnical Engineers
JAN. 1986 — 15-3-39-10

KPA — KEN, PRIESTMAN & ASSOCIATES LTD.
consulting engineers
DATE | APPROVED | DWG NO.

SCALE 1:1250

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

CHANNELIZATION SURVEY CONTROL

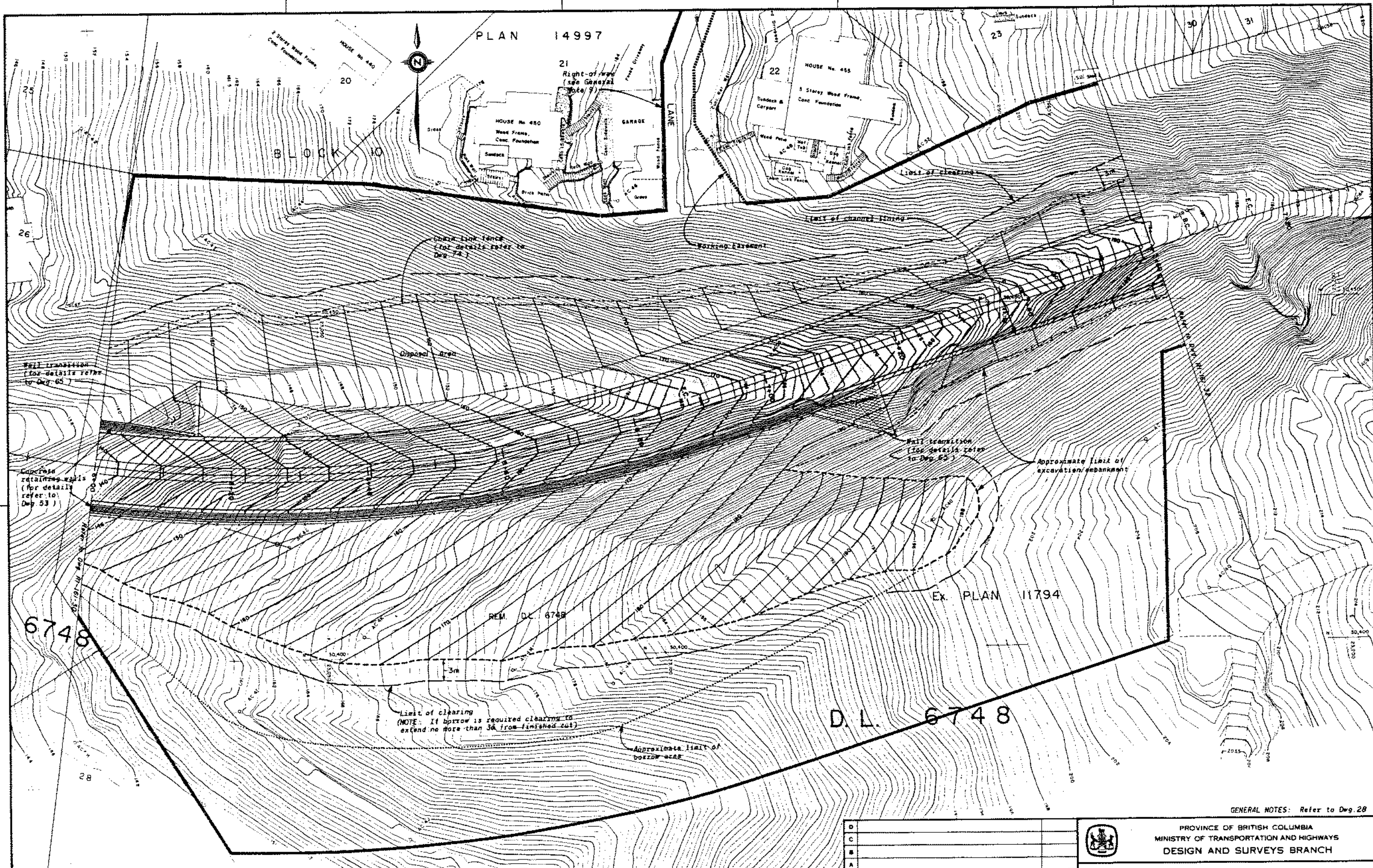
ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 26/86	DIRECTOR OF HIGHWAY DESIGN AND SURVEYS DATE Feb 28/86	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-01

INDEX	REG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
			C-3753	1	RI-161-27

CANCEL PRINTS BEARING EARLIER LETTER

FORM H 306 H



GENERAL NOTES: Refer to Dwg.28

D		
C		
B		
A		

REVISIONS

THURBER CONSULTANTS LTD. Geotechnical Engineers

DATE JAN. 1986 — DRAWING No. 15-3-39-14

KER, PRIESTMAN & ASSOCIATES LTD. consulting engineers

DATE — APPROVED — DWG. NO.

SCALE 1:250 — 5 0 5 10 15m

The Contractor shall confirm the actual location of all Services within the area of operations, and should not assume that the locations shown on the Drawings are either accurate or complete.

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

DETAILED CHANNELIZATION LAYOUT
STA. 6+00 - 7+60
ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 26/86	DIRECTOR OF HIGHWAY DESIGN AND SURVEYS DATE Feb 28/86	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-01

INDEX	NEG. No	FILE No	PROJECT No.	REGION	DRAWING No.
			C-3753	1	R1-161-31

CANCEL PRINTS BEARING EARLIER LETTER

PLAN 14997

BLOCK 10

LANE

23
445 MOUNTAIN DRIVE
2 Story Wood Frame
Conc Foundation

30

31
470 TIMBERTOP DRIVE
2 Story Wood Frame
Conc Foundation

32
405 TIMBERTOP DRIVE
2 Story Wood Frame
Conc Foundation

33

Working Easement

Right-of-way (see General Note 9)

Limit of channel lining

For details at end of channel lining refer to Dwg. 56.

SEE INSET BOTTOM LEFT

Chain link fence (for details refer to Dwg. 74)

Limit of clearing

Approximate limit of excavation/embankment

Concrete retaining wall (for details refer to Dwg. 55)

DOUBLE GATE

Approximate extent of exposed rock

Permanent Access Road

REM. D.L. 6748

Ex PLAN 11794

Existing ground

Permanent Access Road

Stabilized Slope (refer to Specs. Sec. 5)

3500

TYPICAL SECTION A
1:250

GENERAL NOTES: Refer to Dwg. 28

PLAN 14997

ALBERTA CREEK

Right-of-way

Permanent Access Road

INSET
SCALE 1:1000

The Contractor shall confirm the actual location of all Services within the area of operations, and should not assume that the locations shown on the Drawings are either accurate or complete.

D	
C	
B	
A	

REVISIONS

THURBER CONSULTANTS LTD.
Geotechnical Engineers
DATE JAN. 1986 DRAWING No. 15-3-39-15

KER, PRIESTMAN & ASSOCIATES LTD.
consulting engineers
DATE APPROVED DWG No

SCALE 1:250 5 0 5 10 15m

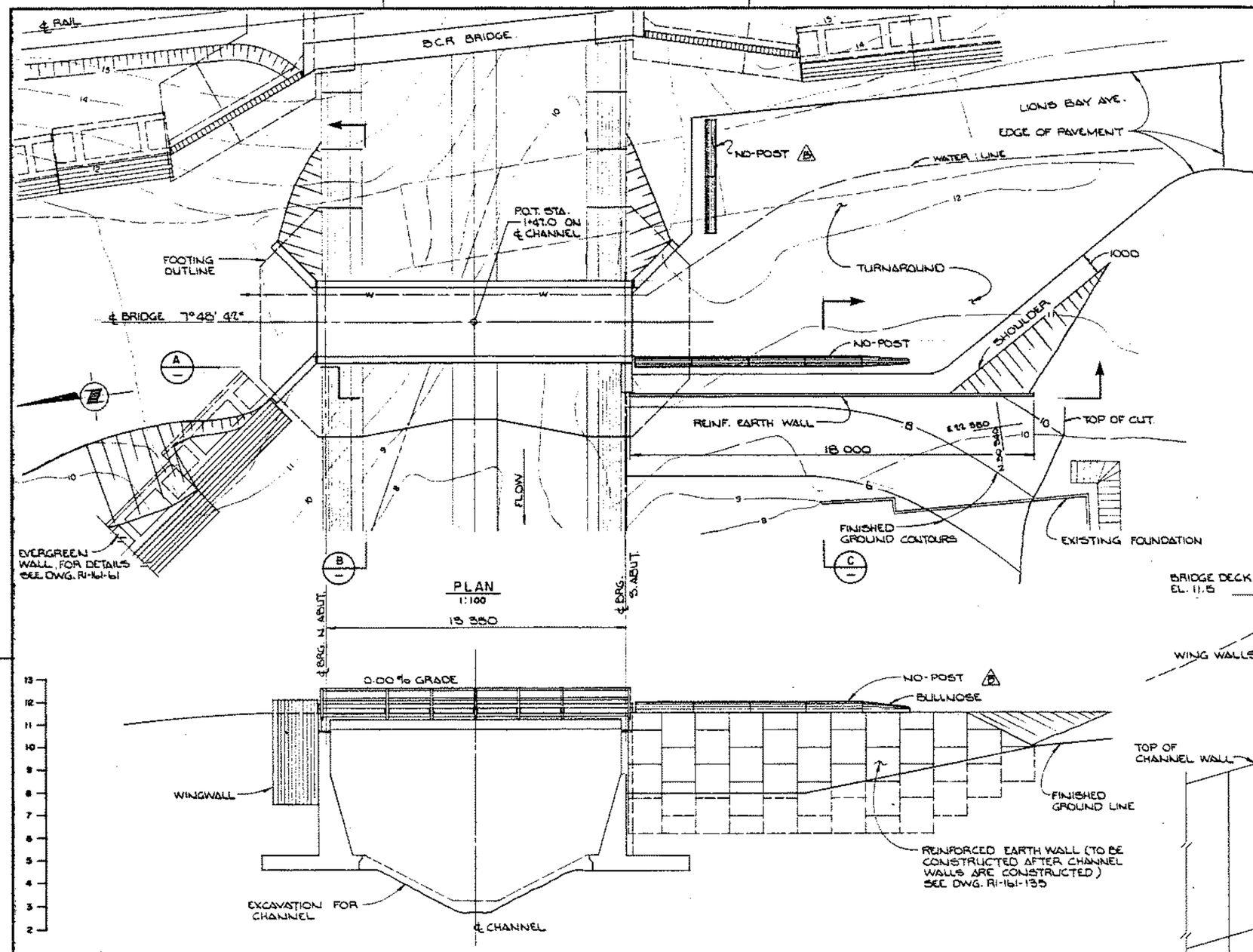
PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

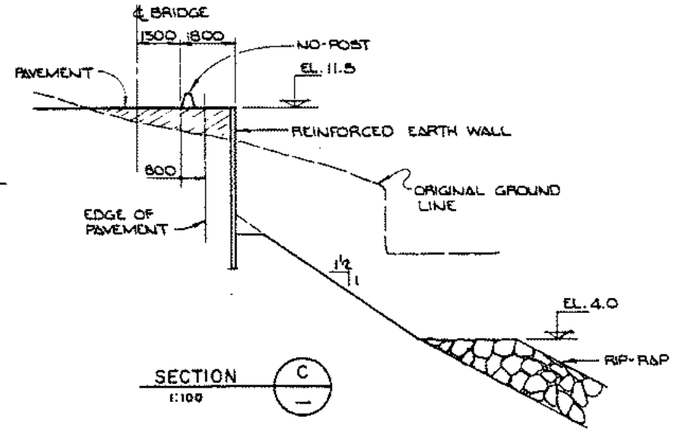
DETAILED CHANNELIZATION LAYOUT
STA. 7+60 - 9+40
ALBERTA CREEK CHANNELIZATION AND BRIDGES

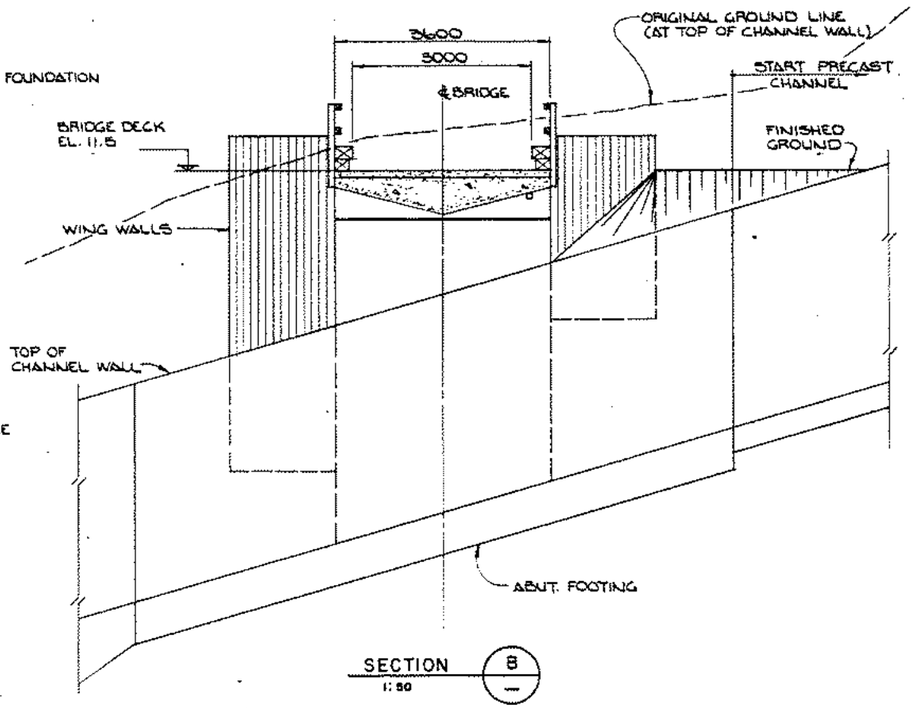
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 26/88	DIRECTOR OF HIGHWAY DESIGN AND SURVEYS DATE Feb 28/88	EXECUTIVE DIRECTOR ENGINEERING DATE 1988-03-01

INDEX	REG. No /	FILE No	PROJECT No	REGION	DRAWING No.
			C-3753	1	RI-161-32

CANCEL PRINTS BEARING EARLIER LETTER







NO-POST TYPE OMITTED JD
PROPERTY LINES REMOVED & UPDATED, UNITS REV JD
REVISIONS

THURBER CONSULTANTS LTD.
CONSULTING ENGINEERS

ALEX FRIEDMAN & ASSOCIATES LTD.
CONSULTING ENGINEERS

JAN. 1986 25283-59

AS NOTED

The Contractor shall confirm the actual location of all Services within the area of operations, and should not assume that the locations shown on the Drawings are either accurate or complete

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

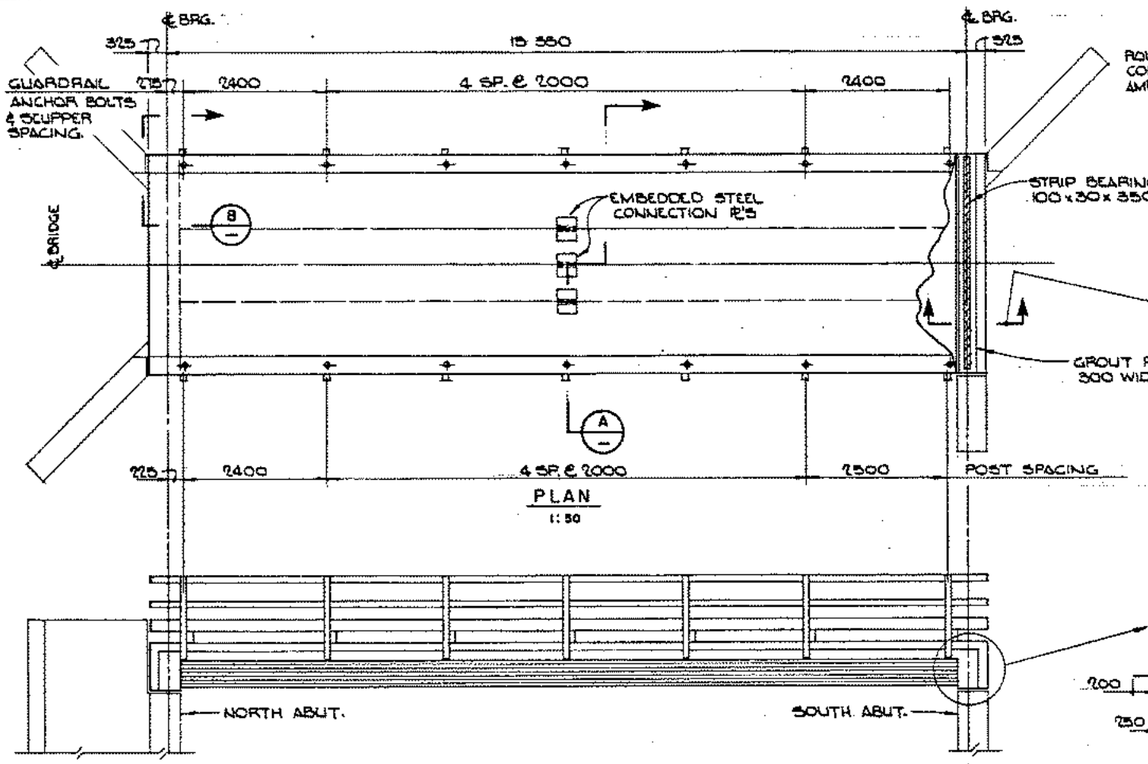
LIONS BAY AVE. DRIVEWAY BRIDGE GENERAL ARRANGEMENT

ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86-03-03	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

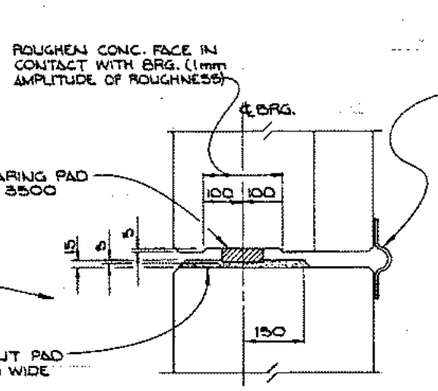
INDEX	NEG. NO	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-59 (B)

CANCEL PRINTS BEARING EARLIER LETTER



PLAN
1:50

ELEVATION
1:50



BEARING DETAILS
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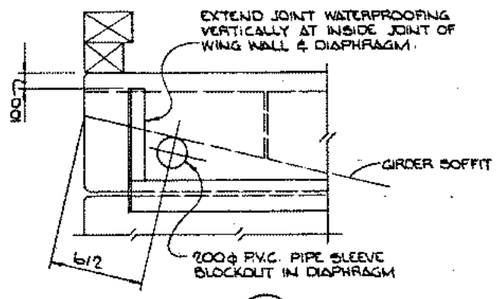
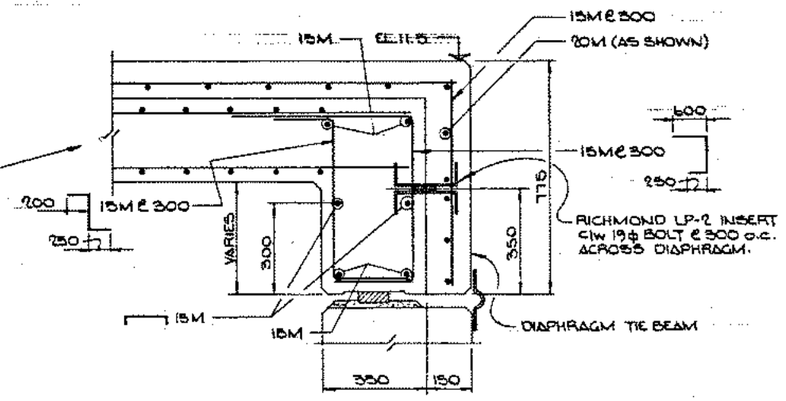
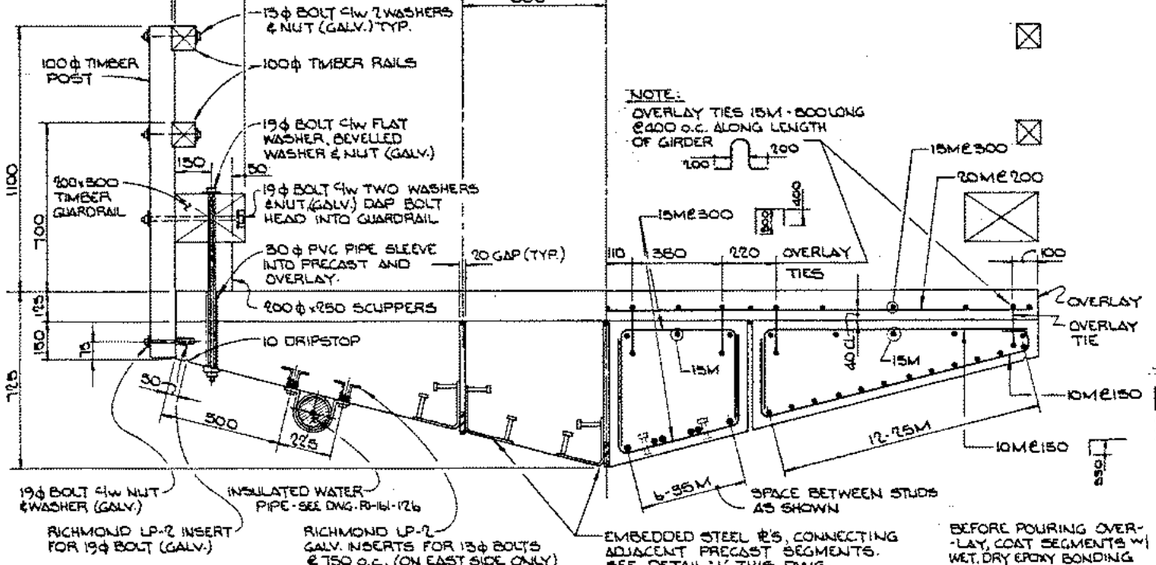


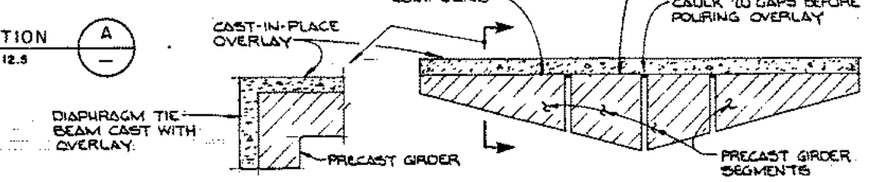
SECTION B
1:20



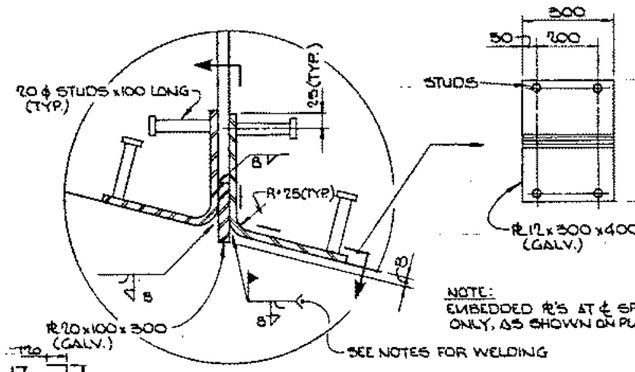
TYP. END DIAPHRAGM DETAILS
1:10



SECTION A
1:12.5



BRIDGE SECTION SCHEMATIC N.T.S.



NOTE:
EMBEDDED PL'S AT ℄ SPAN ONLY, AS SHOWN ON PLAN.

DETAIL 1 — EMBEDDED STEEL CONNECTION PL'S
1:5

NOTES:

1. DESIGN CODE IS CSA CAN3-S6-M78.
2. DESIGN LIVE LOAD IS MS200.
3. CONCRETE FOR PRECAST GIRDER SEGMENTS AND CAST-IN-PLACE OVERLAY AND DIAPHRAGM TIE BEAM SHALL BE CLASS A. SEE SPECIFICATIONS.
4. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CSA G30.12M GRADE 400.
5. GROUT SHALL BE NON-SHRINK, NON-METALLIC TYPE, 28 DAY MINIMUM COMPRESSIVE STRENGTH 25 MPa.
6. EMBEDDED STEEL AND ANCHOR BOLTS TO CONFORM TO CSA G40.21M 260W.
7. ALL EMBEDDED STEEL AND ANCHOR BOLTS SHALL BE GALVANIZED. WEIGHT OF GALVANIZING TO BE 610 gm/m² SPELTER COATING.
8. TIMBER GUARDRAILS, RAILS, POSTS AND SCUPPERS ON BRIDGE SHALL BE DOUGLAS FIR NO. 1 PRESERVED BY CCA WOLMANIZED TREATMENT, 6.4 kg/m³ RETENTION.
9. TIMBER SHALL BE CUT AND BANDED BEFORE TREATMENT. ALL HOLES IN TIMBER THAT ARE FIELD DRILLED SHALL BE GIVEN TWO COATS OF WOLMAN END-CUT LIBERALLY APPLIED.
10. BEFORE FIELD WELDING, GALVANIZED EMBEDDED STEEL CONNECTION PLATES SHALL BE CLEANED TO BARE METAL AND DRY IN VICINITY OF FIELD WELDS. AFTER FIELD WELDING, STEEL SURFACES STRIPPED OF GALVANIZING SHALL BE GIVEN TWO COATS OF GALVACON.
11. EMBEDDED STEEL CONNECTION PLATES SHALL BE FIELD WELDED BEFORE POURING OVERLAY AND DIAPHRAGM TIE BEAM.
12. BEARINGS SHALL BE PLAIN RUBBER PADS, DUROMETER 60.
13. LAP OF REINFORCING BARS FOR SPLICES SHALL BE 40 x BAR DIAMETER. SPLICES ARE TO BE STAGGERED.
14. REINFORCEMENT COVER SHALL BE IN ACCORDANCE WITH DESIGN CODE.
15. EXPOSED EDGES TO BE CHAMFERED 20 mm UNLESS NOTED OTHERWISE.

REVISIONS	
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THURBER CONSULTANTS LTD.
Geotechnical Engineers
DATE

KPA — KEN. PRIESTMAN & ASSOCIATES LTD.
Consulting Engineers
DATE JAN. 1986 APPROVED 25283-60
SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

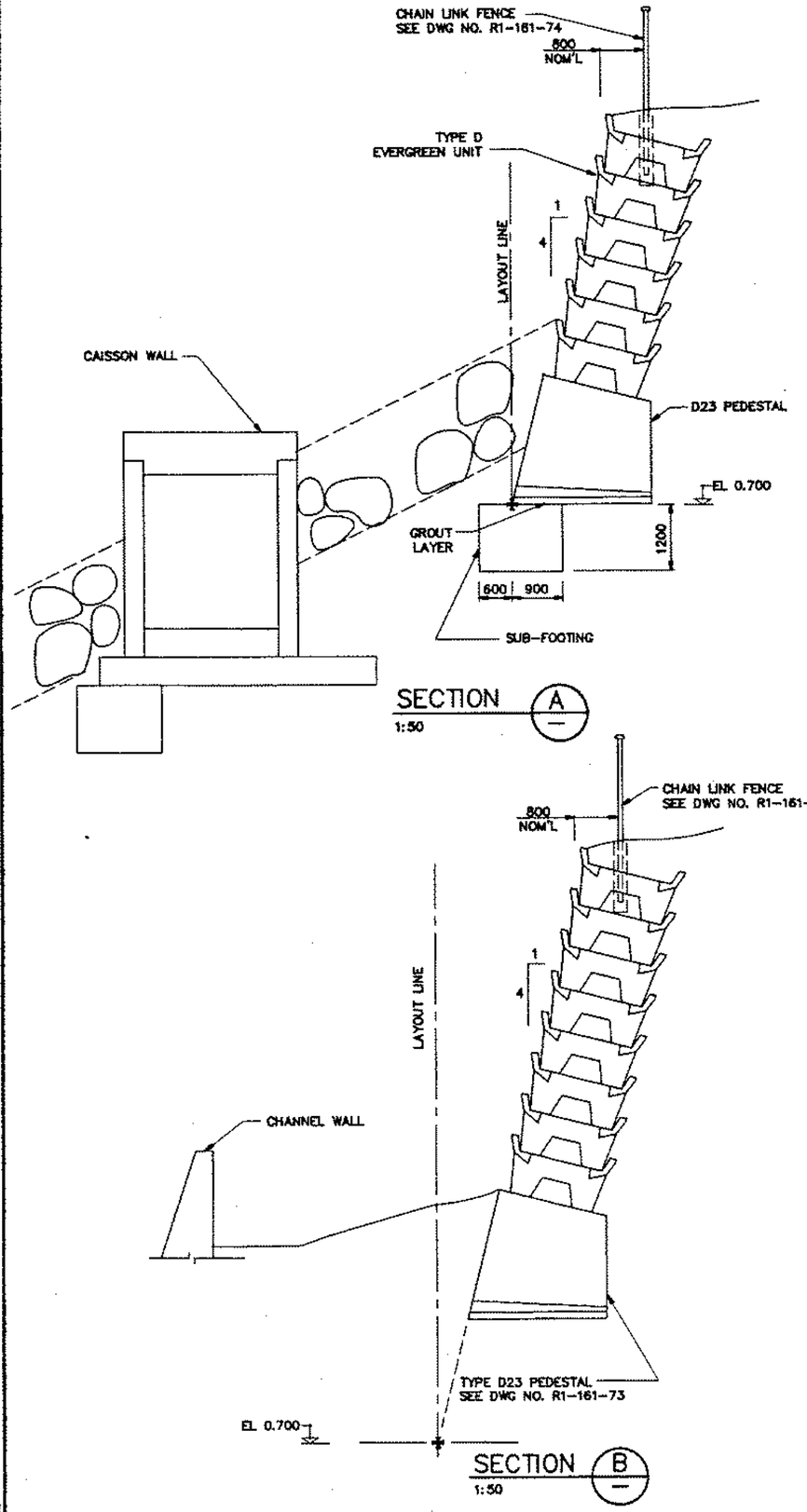
LIONS BAY AVE. DRIVEWAY BRIDGE
SUPERSTRUCTURE DETAILS

ALBERTA CREEK CHANNELIZATION AND BRIDGES

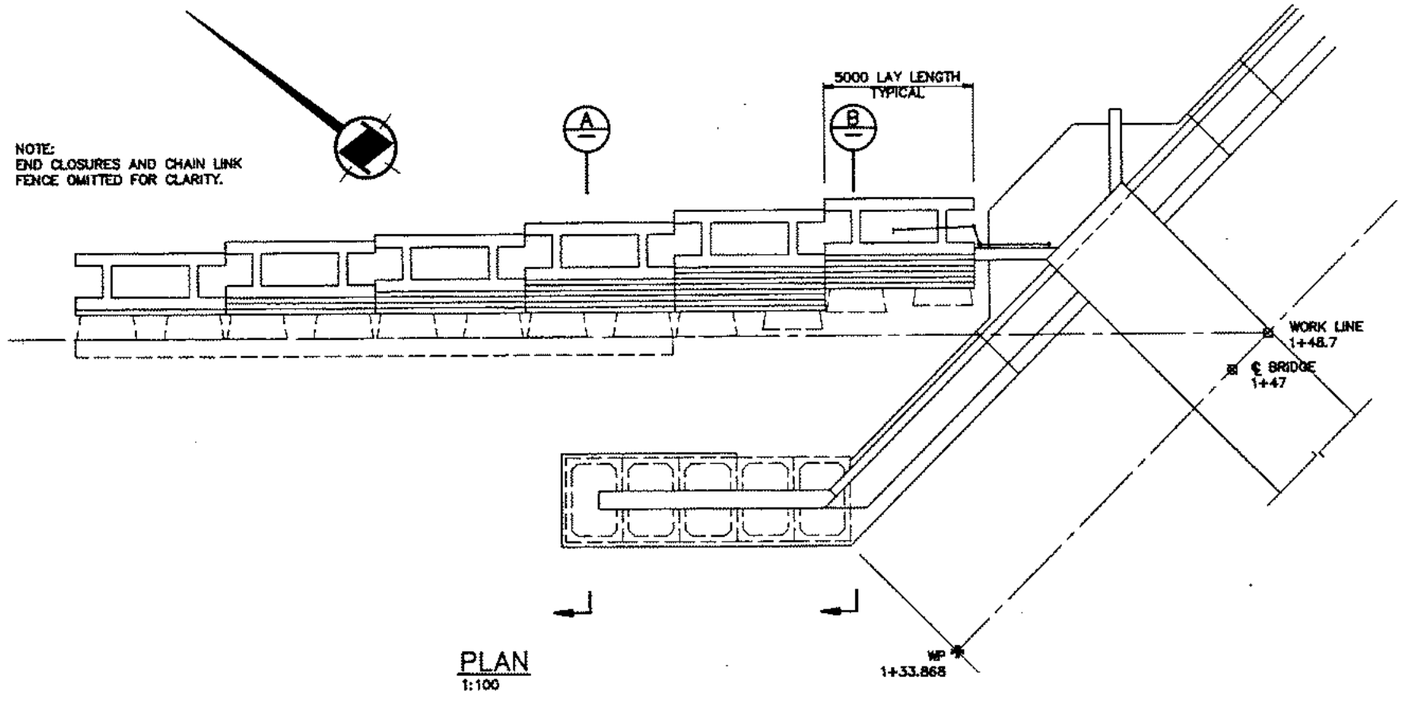
PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
C.E. Maya	K.G. Schaan	M.G. Elston
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86.05.23	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-05-23

INDEX	NEG. No.	P.E. No.	PROJECT No.	REGION	DRAWING No.
					RI-161-60

CANCEL PRINTS BEARING EARLIER LETTER

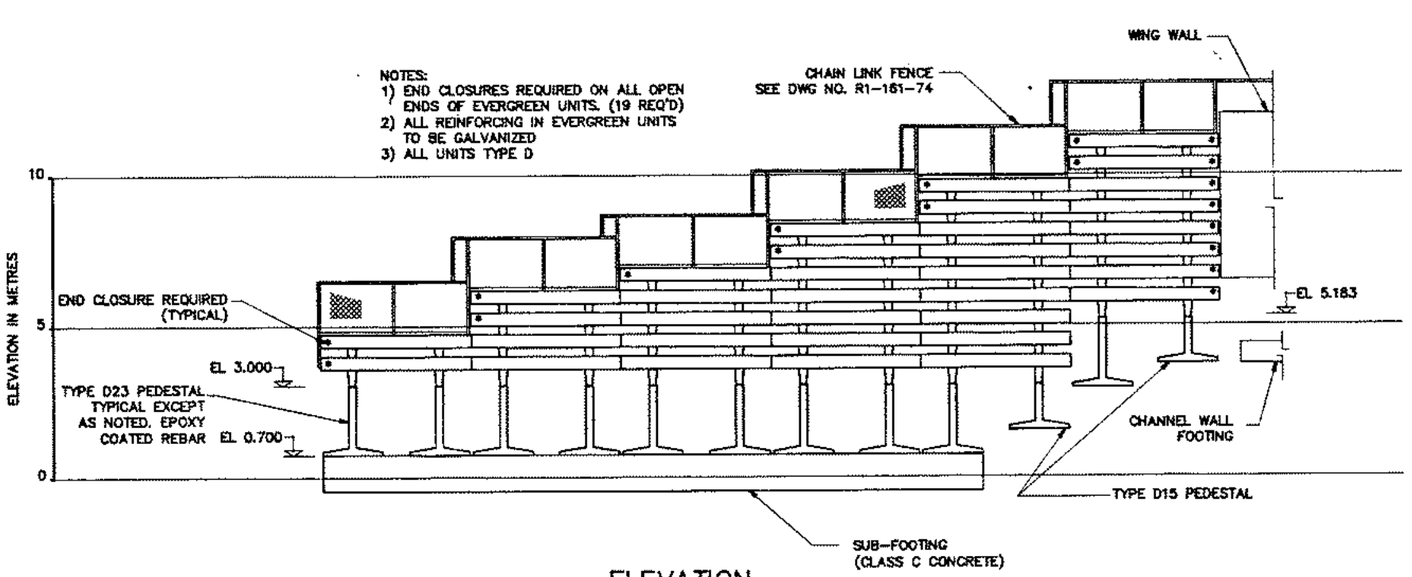


SECTION A
1:50



PLAN
1:100

SECTION B
1:50



ELEVATION
1:100

D	
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A	FENCE CHANGED TO CHAIN LINK

REVISIONS

THURBER CONSULTANTS LTD.
Consulting Engineers

KER, PRIESTMAN & ASSOCIATES LTD.
Consulting Engineers

DATE FEB 1986 DRAWN JB CHKD 25283-61

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

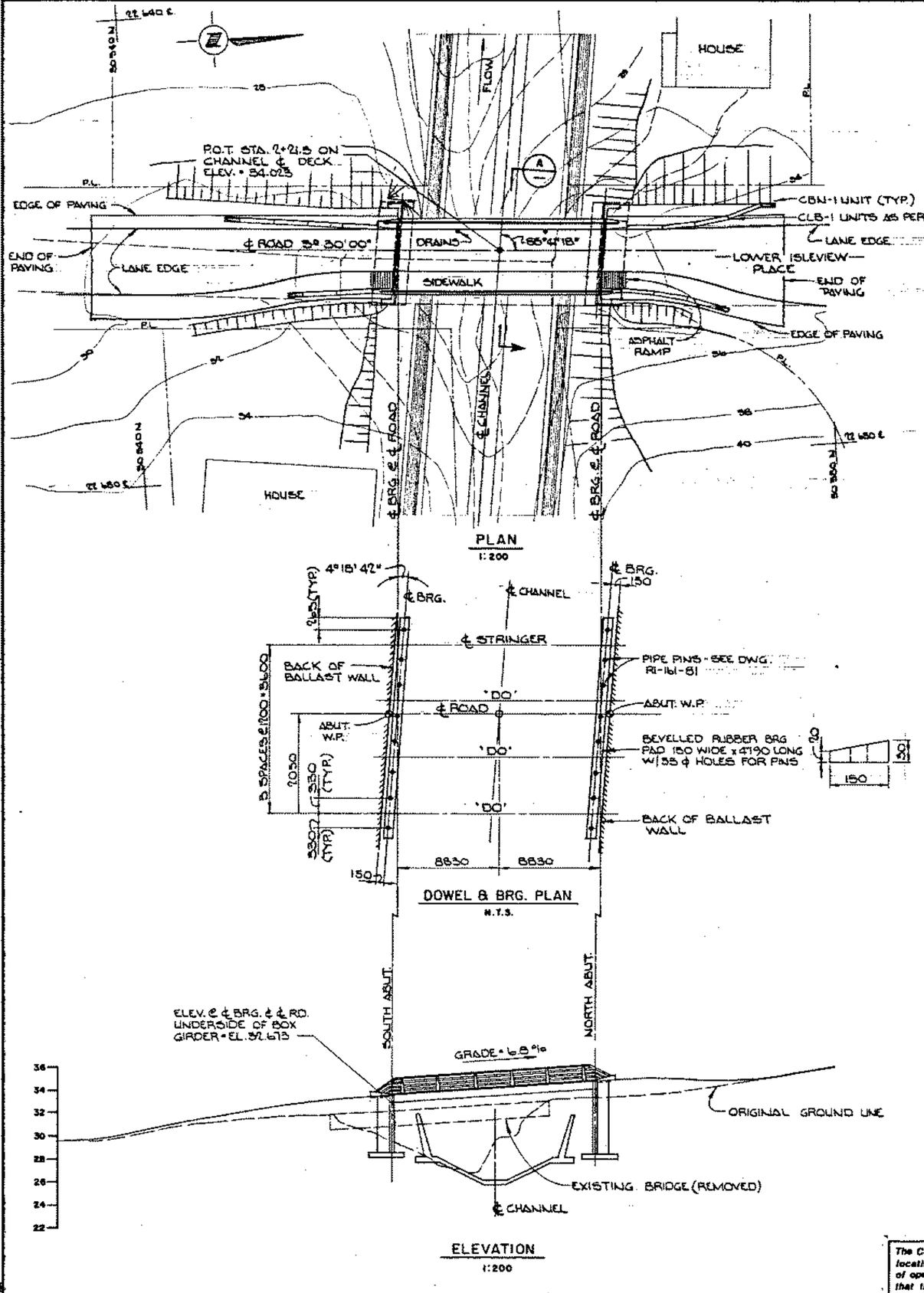
EVERGREEN RETAINING WALL
RIGHT BANK AT CHANNEL OUTLET
ALBERTA CREEK CHANNELIZATION AND BRIDGES

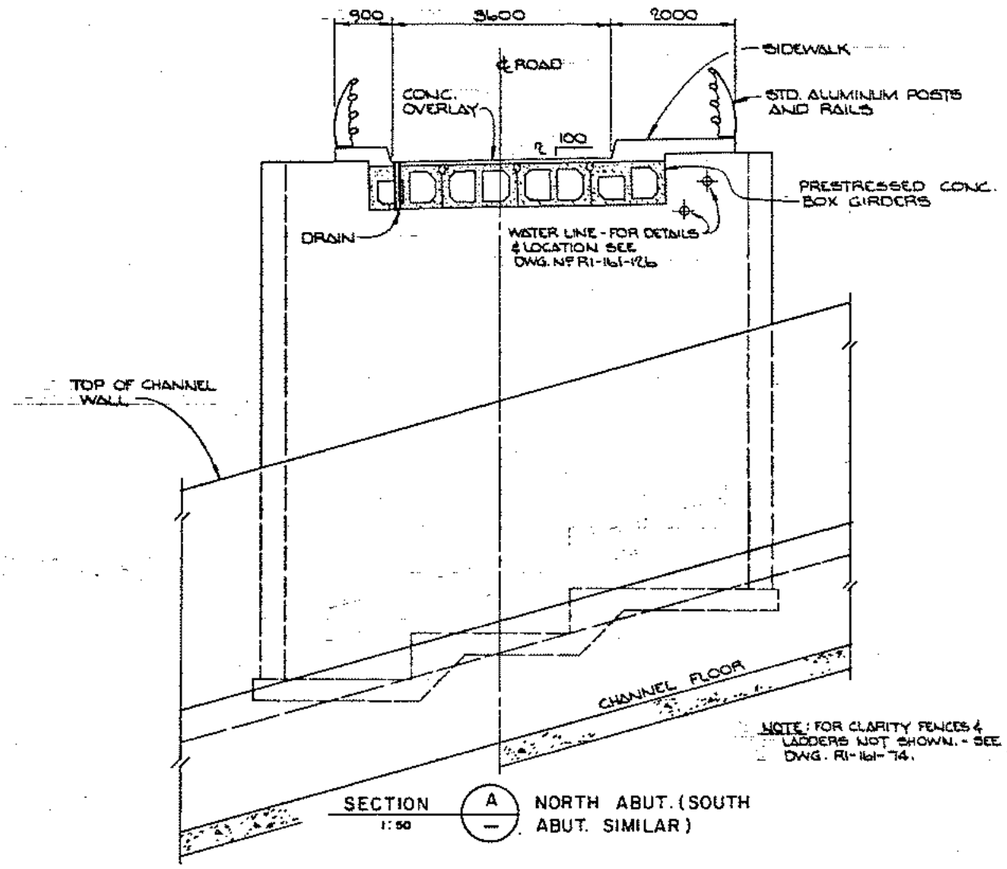
PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF HIGHWAY DESIGN AND SURVEYS DATE Feb 28/86	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-01

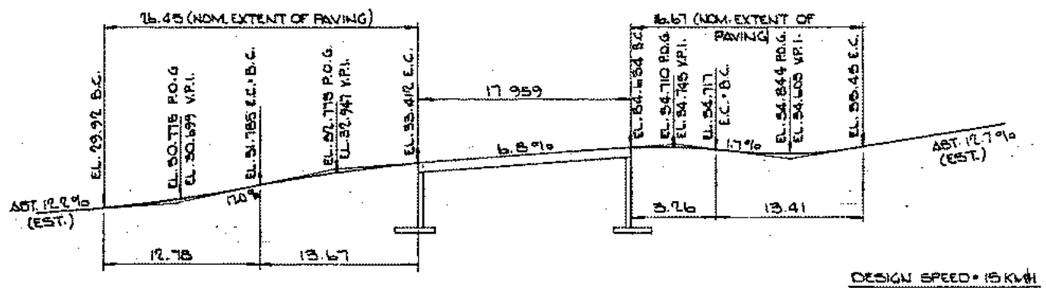
INDEX	NEG No.	FILE No.	PROJECT No.	REGION	DRAWING No.
			C-3753	1	R1-161-61 |A

CANCEL PRINTS BEARING EARLIER LETTER

FORM 11302 H







VERTICAL CURVE DIAGRAM
N.T.S.

The Contractor shall confirm the actual location of all Services within the area of operations, and should not assume that the locations shown on the Drawings are either accurate or complete

REVISIONS	
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TRANSTECH CONSULTANTS LTD.
Transportation Engineers

KPA KER, PRIESTMAN & ASSOCIATES LTD.
consulting engineers
DATE JAN. 1986 PROJECT 25283-80
SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

LOWER ISLEVIEW BRIDGE
GENERAL ARRANGEMENT

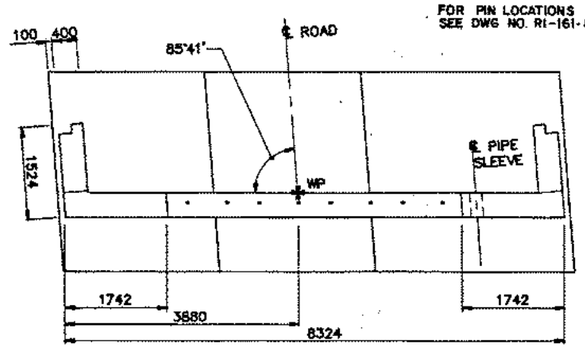
ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	Executive Director Administration DATE 1986-03-03

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-80

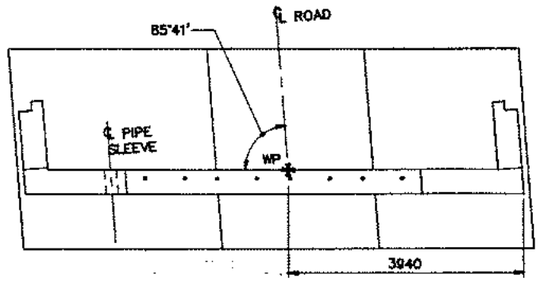
CANCEL PRINTS BEARING EARLIER LETTER

FORM H.556.H



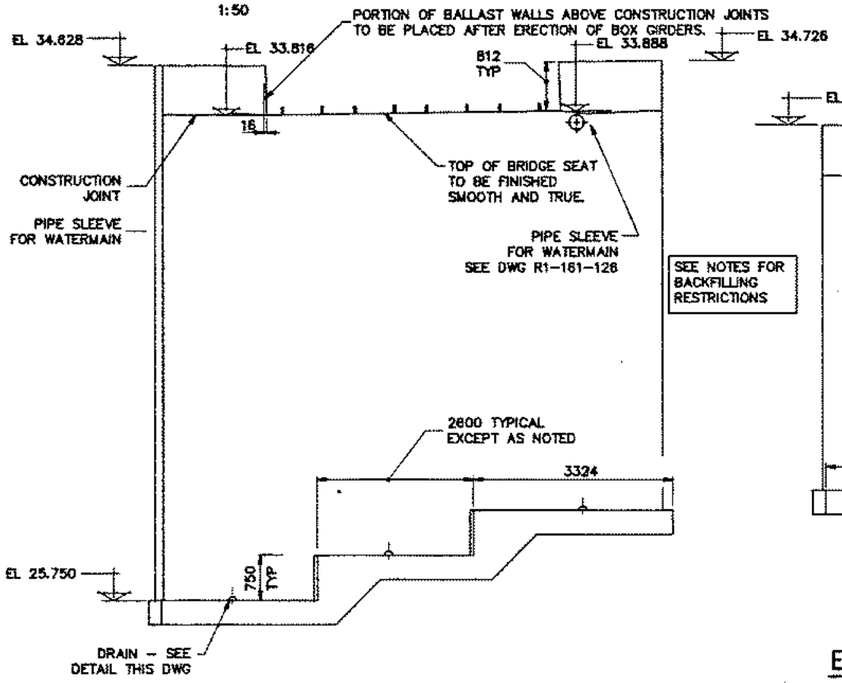
PLAN – NORTH ABUTMENT

1:50



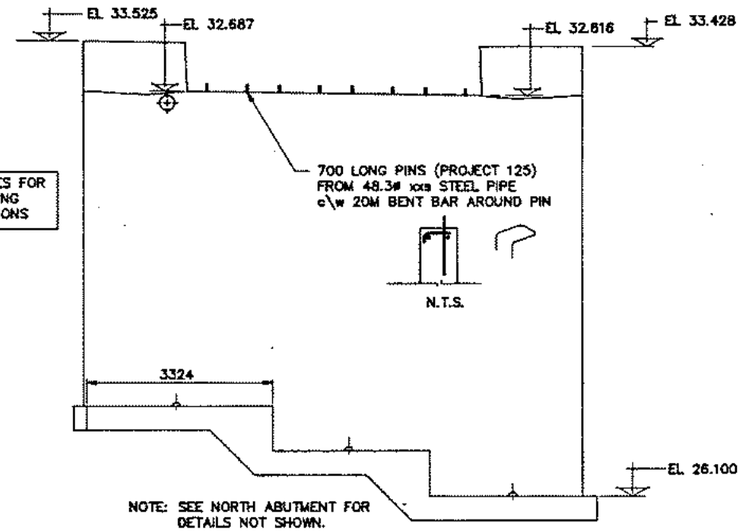
PLAN – SOUTH ABUTMENT

1:50



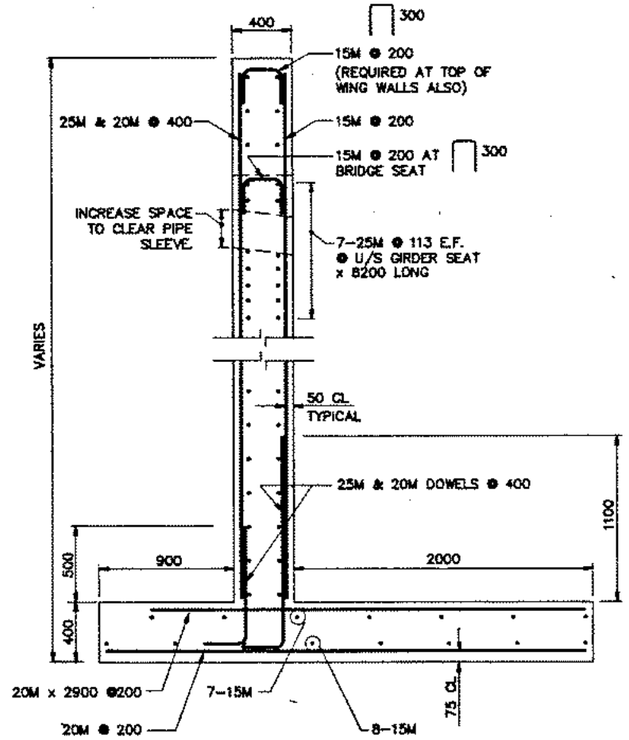
ELEVATION – NORTH ABUTMENT

1:50



ELEVATION – SOUTH ABUTMENT

1:50

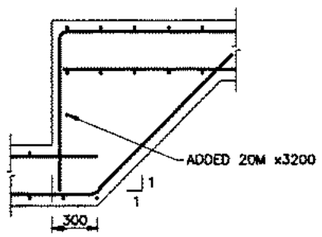


TYPICAL ABUTMENT SECTION

1:20

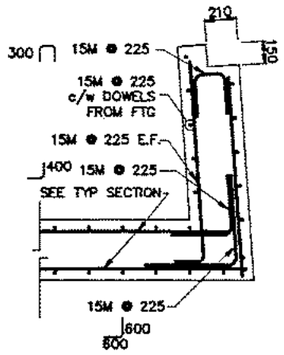
NOTES

1) ALL CONCRETE TO BE CLASS "A" (25 MPa) EXCEPT AS NOTED.
2) EXPOSED EDGES TO BE CHAMFERED 25 EXCEPT AS NOTED.
3) REINFORCING STEEL TO CONFORM TO C.S.A. SPECIFICATION G30.12M GRADE 400.
4) REINFORCING STEEL TO HAVE 50 MINIMUM COVER EXCEPT AS NOTED.
5) LAP OF BARS FOR SPLICES TO BE 40 x "d" EXCEPT AS NOTED. SPLICES TO BE STAGGERED.
6) FOOTINGS TO BE CARRIED DOWN TO ELEVATIONS SHOWN OR TO SUCH LOWER ELEVATIONS AS MAY BE ORDERED BY THE ENGINEER.
7) ABUTMENT WALLS TO BE BACKFILLED AND COMPACTED TO A MAXIMUM OF 3.0m ABOVE TOP OF FOOTING PRIOR TO PLACING BOX GIRDERS AND GROUTING PINS.
8) AFTER BOX GIRDERS ARE IN PLACE, BACKFILL LEVELS BEHIND NORTH AND SOUTH ABUTMENTS MUST NOT DIFFER IN ELEVATION BY MORE THAN 1.25m DURING BACKFILLING AND COMPACTION.

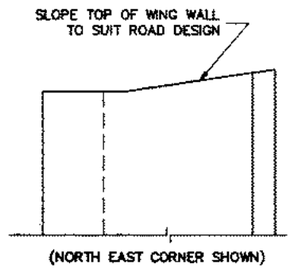


STEP FOOTING DETAIL

1:20



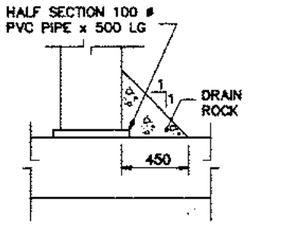
PLAN



END ELEVATION

WING WALL DETAIL

1:20



DRAIN PIPE DETAIL

1:20

REVISIONS

THURBER CONSULTANTS LTD.
Geotechnical Engineers

KPA — KER, PRIESTMAN & ASSOCIATES LTD.
Consulting Engineers
DATE JAN 1985 — DWG 25283-81

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

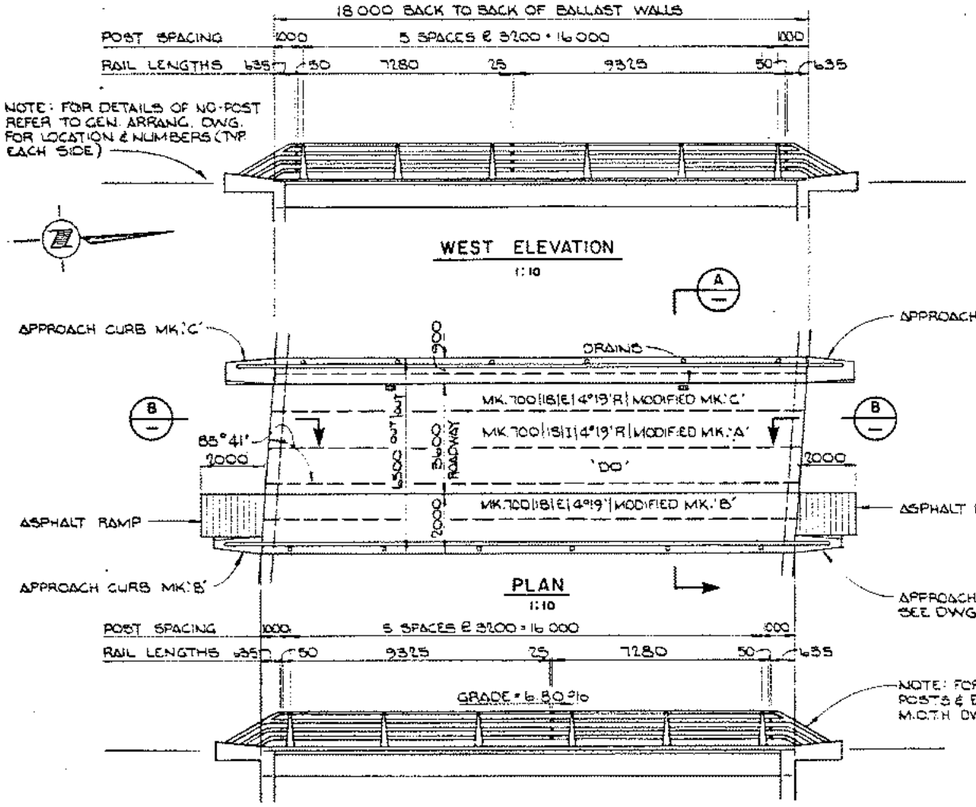
LOWER ISLEVIEW PLACE BRIDGE

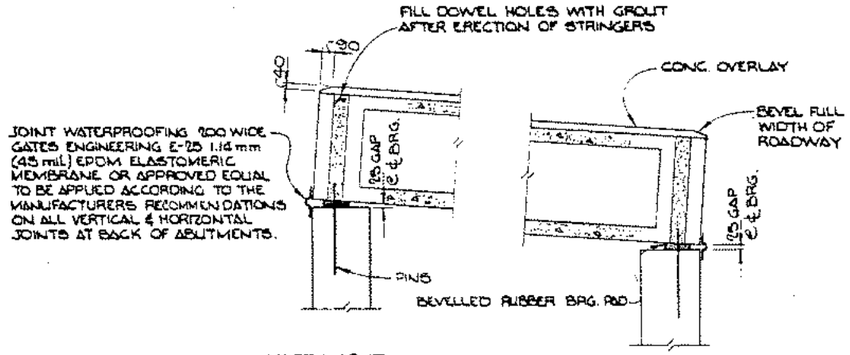
ABUTMENTS
ALBERTA CREEK CHANNELIZATION AND BRIDGES

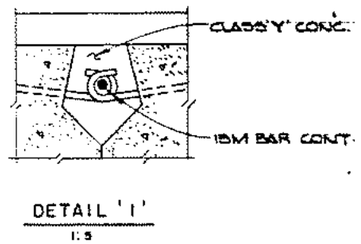
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE Feb 19 87	EXECUTIVE DIRECTOR OF ENGINEERING DATE 1986-03-03

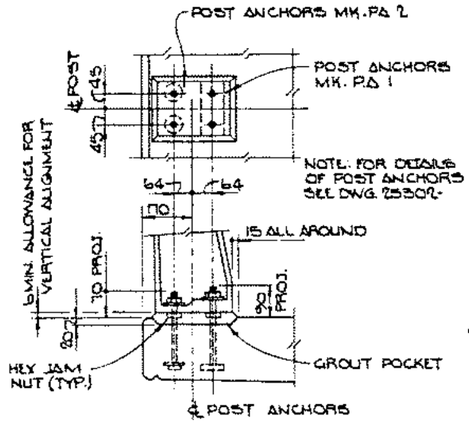
INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					R1-161-81

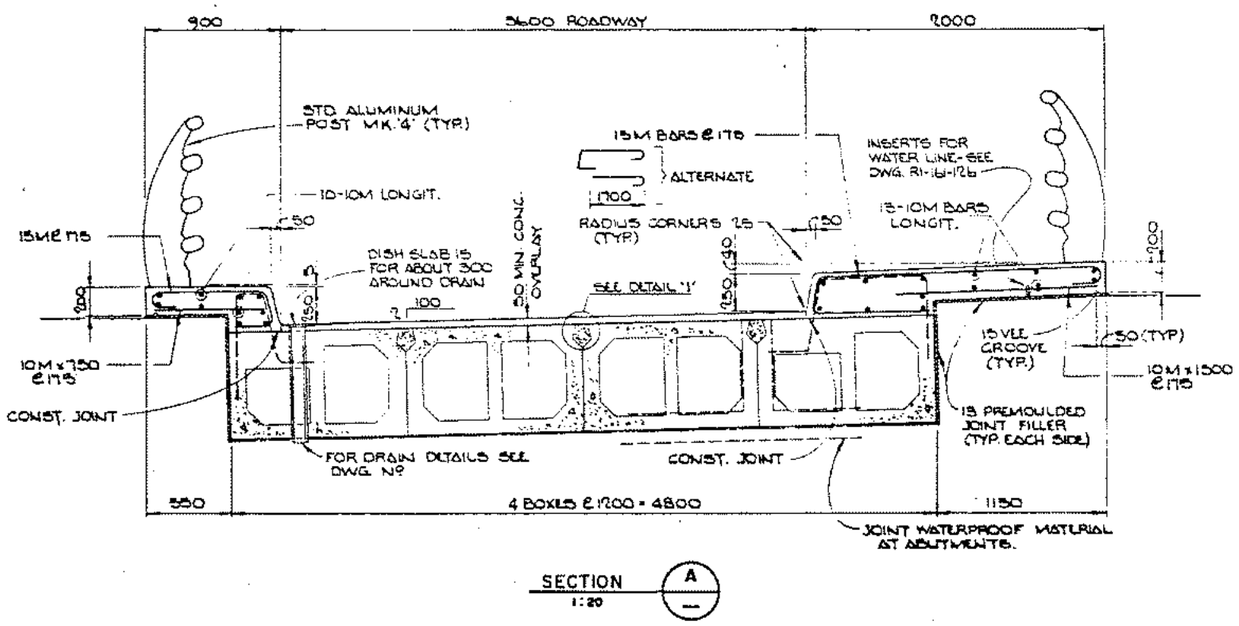
CANCEL PRINTS BEARING EARLIER LETTER











NOTES:
1. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH C.S.A. SPECIFICATIONS G30.12M GRADE 400
2. REBAR TO HAVE MIN. 50 COVER, EXCEPT WHERE NOTED
3. LAP OF BARS FOR SPLICES TO BE 40 x 'd', SPLICES TO BE STAGGERED
4. CONCRETE TO BE CLASS 'A' EXCEPT AS NOTED
5. SHEAR KEYS TO BE FILLED WITH CLASS 'Y' CONCRETE.
6. SCREEDS FOR DECK CONCRETE SHALL BE SET TO GIVE A UNIFORM GRADE FROM END TO END OF THE BRIDGE AND TO ACCOMODATE HOGGING OF THE STRINGERS WHICH IS TO BE MEASURED IN THE FIELD.
7. DOWEL HOLES TO BE FILLED WITH SAND-CEMENT GROUT AS SHOWN.
8. EXPOSED EDGES TO BE CHAMFERED 15, EXCEPT AS NOTED.
9. SWAB UNDERSIDE OF POSTS WITH AN ALKALI RESISTANT BITUMINOUS PAINT & COAT ANCHOR BOLTS WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND PRIOR TO INSTALLATION.
10. FOR DETAILS OF STRINGERS SEE DWG. Nº
11. CURBS & SIDEWALKS TO BE FORMED TO SUIT 'SITE PLAN' HIGHWAY ALIGNMENT & PLACED AFTER ROADWAY OVERLAY IS SET.

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REVISIONS

THURBER CONSULTANTS LTD.

KER, PRIESTMAN & ASSOCIATES LTD.

JAN. 1986

20283-82

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

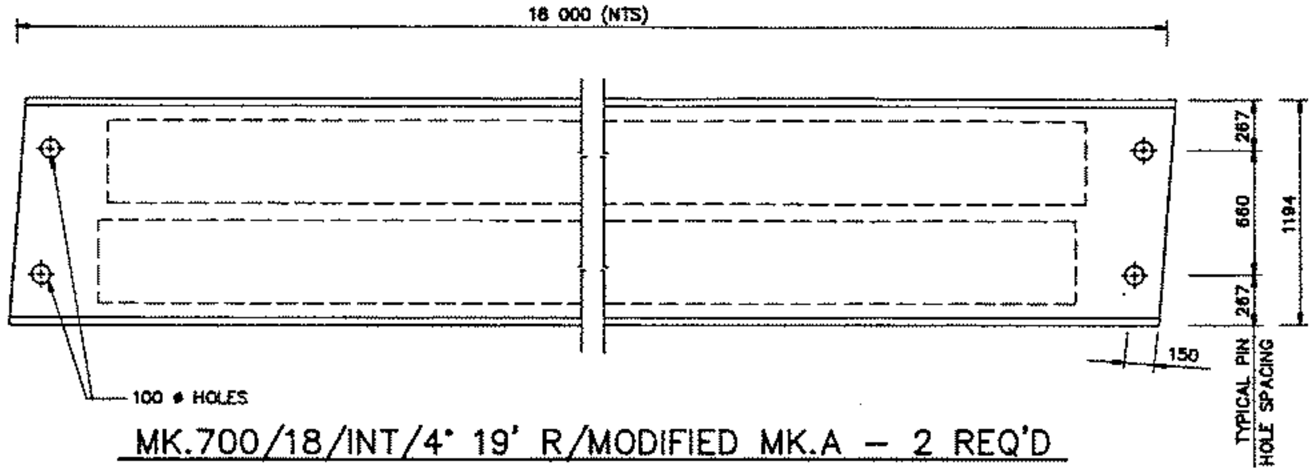
LOWER ISLEVIEW BRIDGE
SUPERSTRUCTURE DETAILS

ALBERTA CREEK CHANNELIZATION AND BRIDGES

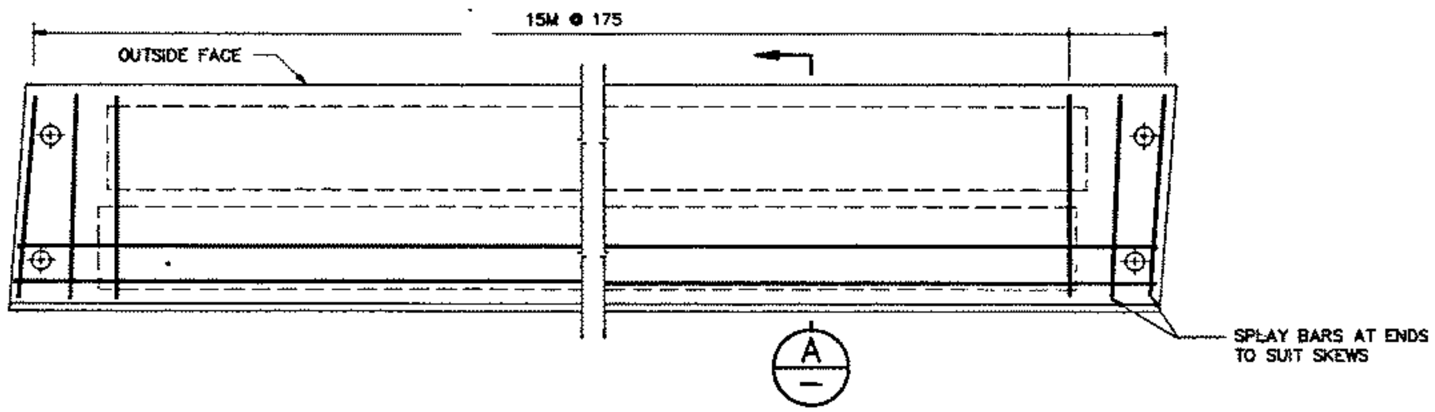
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	DEPUTY DIRECTOR (ENGINEERING) DATE 1986-03-03

INDEX	MECL No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-82

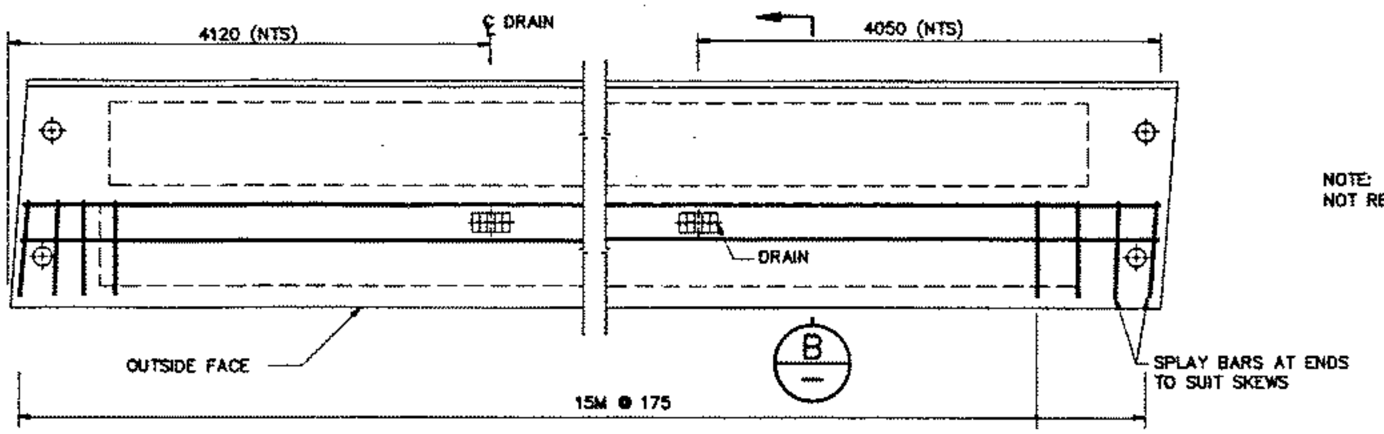
CANCEL PRINTS BEARING EARLIER LETTER



MK.700/18/INT/4' 19' R/MODIFIED MK.A – 2 REQ'D

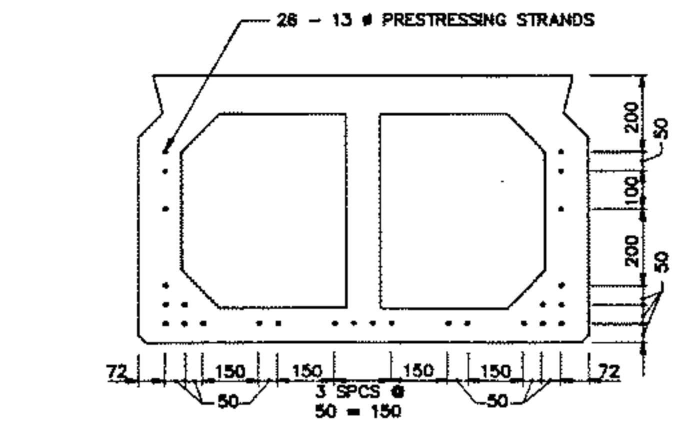


MK.700/18/EXT/4' 19' R/MODIFIED MK.B – 1 REQ'D

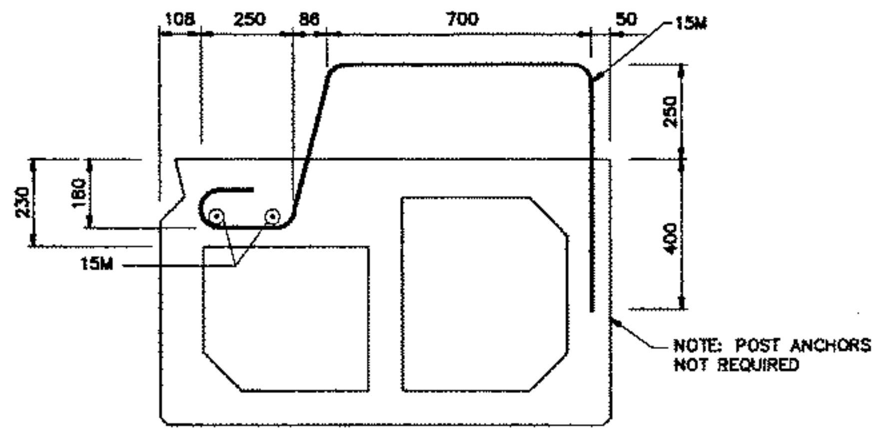


MK.700/18/EXT/4' 19' R/MODIFIED MK.C – 1 REQ'D

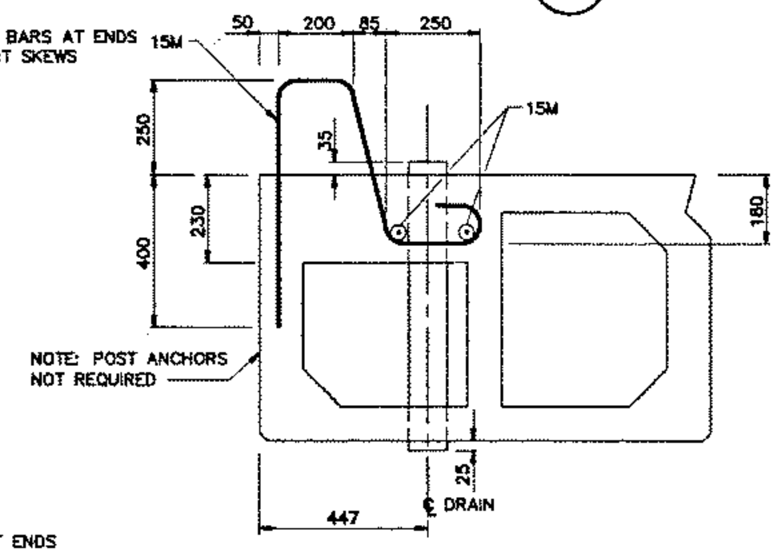
1:20



TYPICAL SECTION – STRAND SPACING

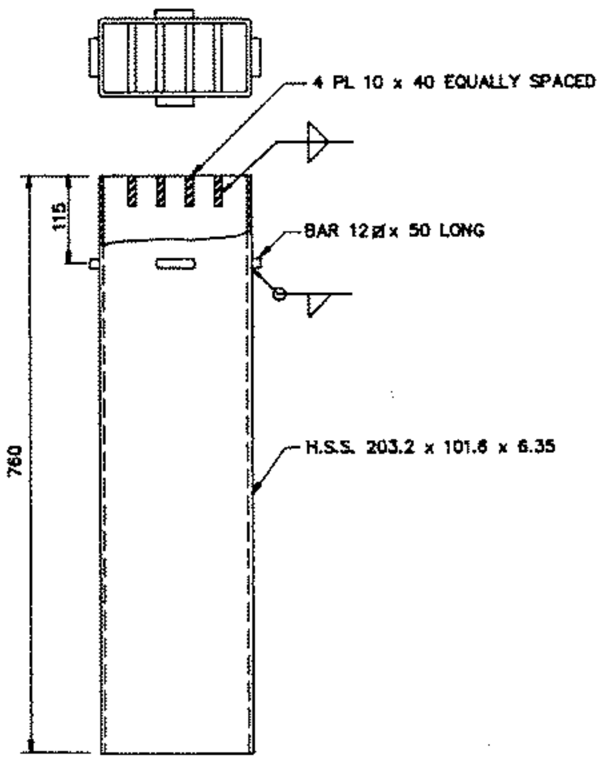


SECTION A



SECTION B

1:10



DRAIN DETAIL 2 REQ'D

(ESTIMATED MASS = 22 kg EACH)

1:5

NOTES

1) FOR "GENERAL NOTES", DETAILS, MESH REINFORCING, AND BLOCK–OUT HOOKS, SEE STD DWG NO. 2309–39.

2) STEELWORK FOR DRAIN TO CONFORM TO C.S.A.SPECIFICATION G40.21 – M81 (230 G)

3) DRAIN TO BE GALVANIZED AFTER FABRICATION. WEIGHT OF GALVANIZING TO BE 610 g/m² SPELTER COATING.

4) THE MINIMUM COMPRESSIVE CONCRETE STRENGTH SHALL BE:
34 MPa AT RELEASE
45 MPa AT 28 DAYS

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REVISIONS	

THURBER CONSULTANTS LTD.

KER, PRIESTMAN & ASSOCIATES LTD.

DATE JAN 1986 — 25283–83

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

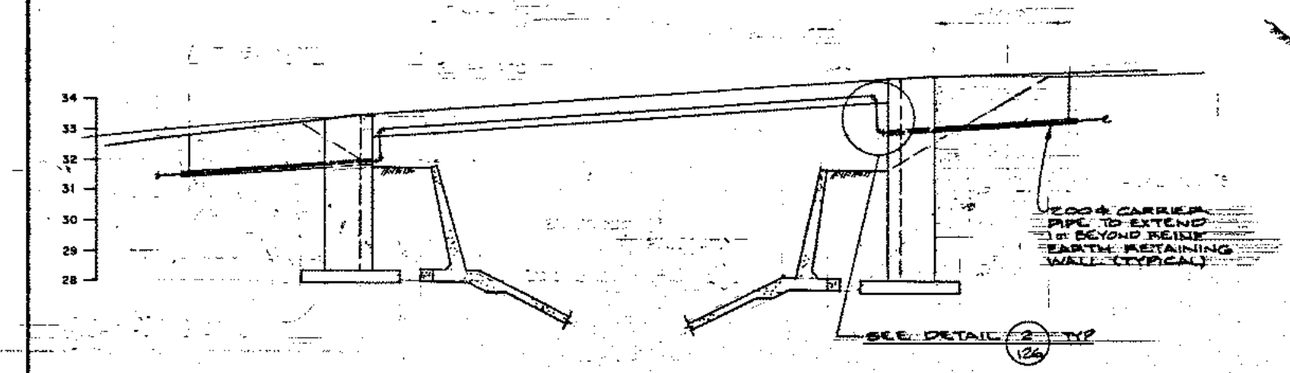
LOWER ISLEVIEW PLACE BRIDGE

BOX GIRDER DETAILS
ALBERTA CREEK CHANNELIZATION AND BRIDGES

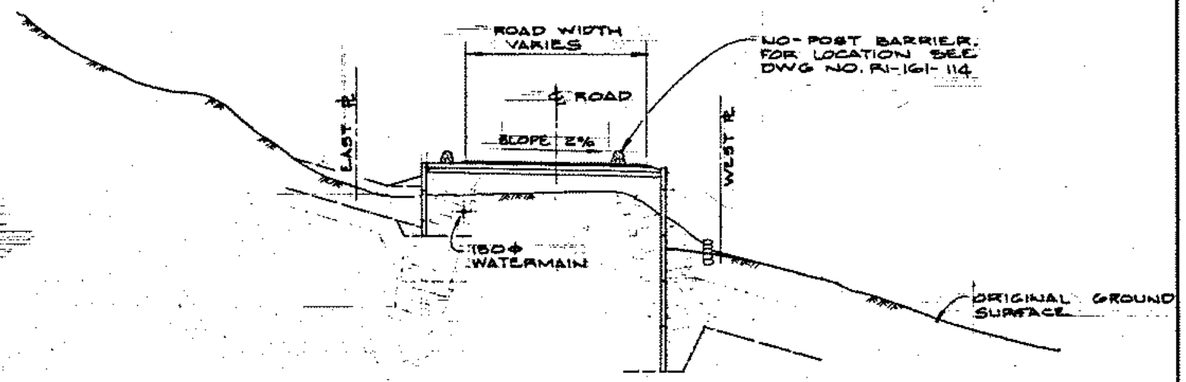
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING, DATE 86.03.03	DATE 1986-03-03

INDEX	NEG. No	FILE No.	PROJECT No	REGION	DRAWING No.
					R1-161-83

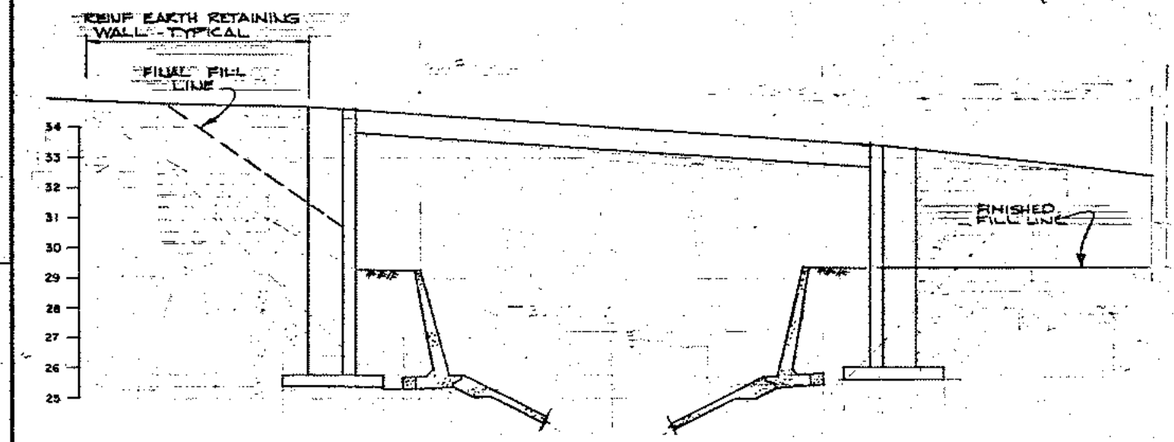
CANCEL PRINTS BEARING EARLIER LETTER



SECTION A
1:100



SECTION C
1:100



SECTION B
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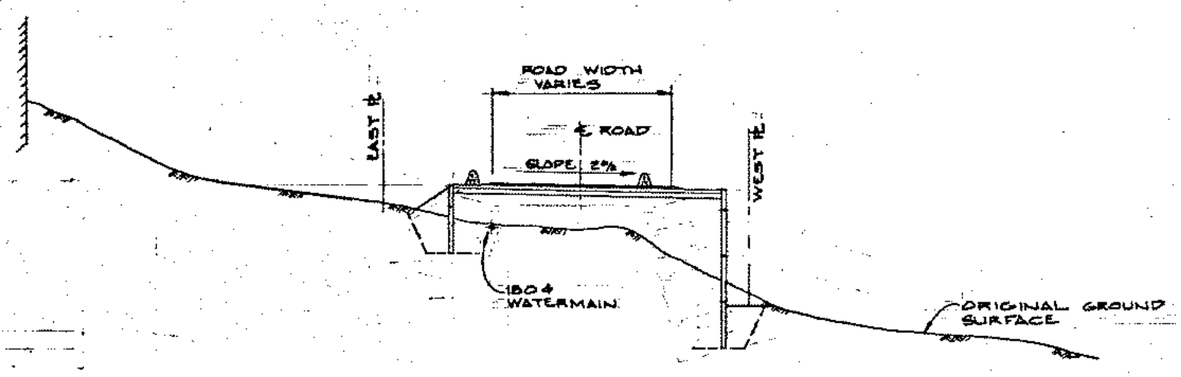
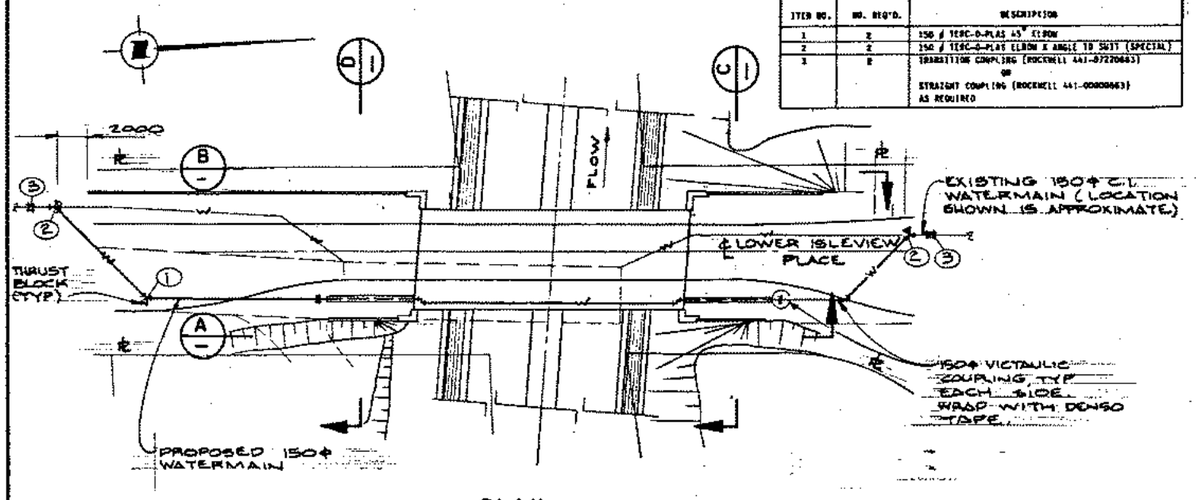


SECTION D
1:100

SCHEDULE OF FITTINGS		
ITEM NO.	NO. REQ'D.	DESCRIPTION
1	2	150 ϕ TERC-O-PLAS 45° ELBOW
2	2	150 ϕ TERC-O-PLAS ELBOW X ANGLE TO SUIT (SPECIAL)
3	8	TRANSITION COUPLING (ROCKWELL 441-07270683) OR STRAIGHT COUPLING (ROCKWELL 441-00000063) AS REQUIRED



PLAN
1:200

REVISIONS			

THURBER CONSULTANTS LTD.
Geotechnical Engineers

KER, FRIESTMAN & ASSOCIATES LTD.
Consulting Engineers

DATE JAN 1986 | DRAWN | DESIGN | 25283-64

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

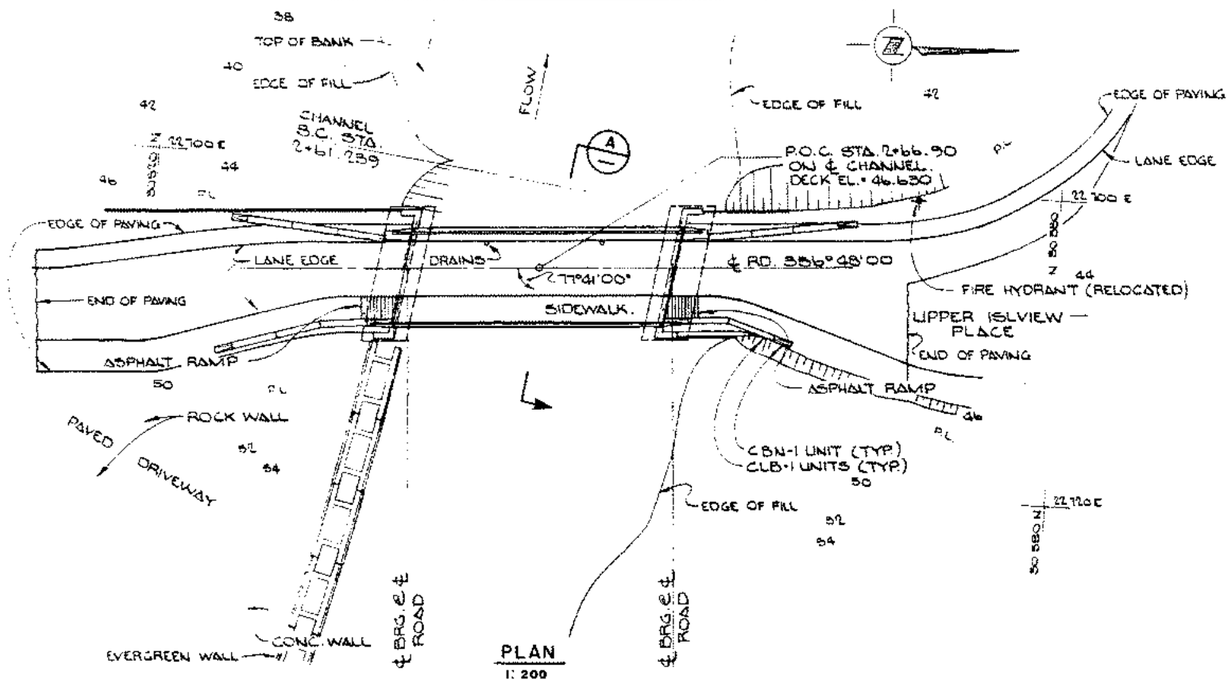
LOWER ISLEVIEW BRIDGE
APPROACH WORKS
ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

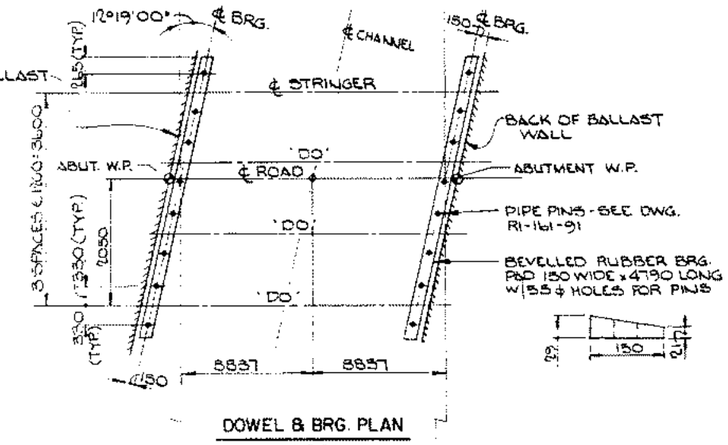
INDEX	NEGL. NO.	FILE No	PROJECT No	REGION	DRAWING No.
-					RI-161-84

CANCEL PRINTS BEARING EARLIER LETTER

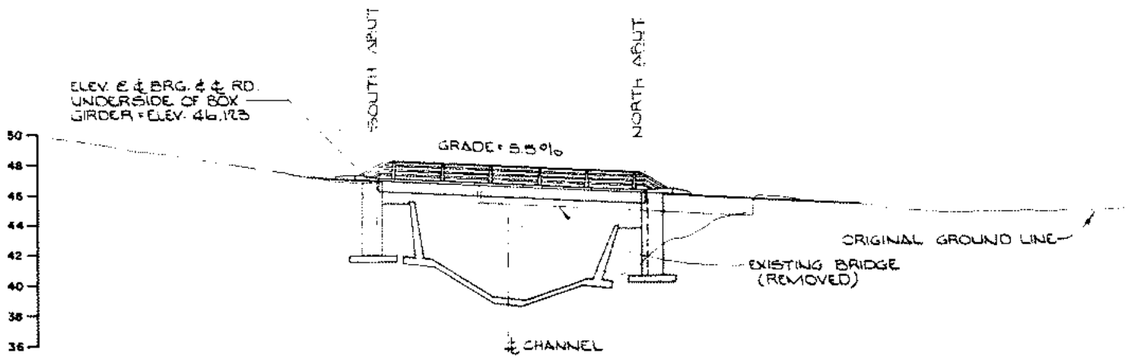
FORM H 3381



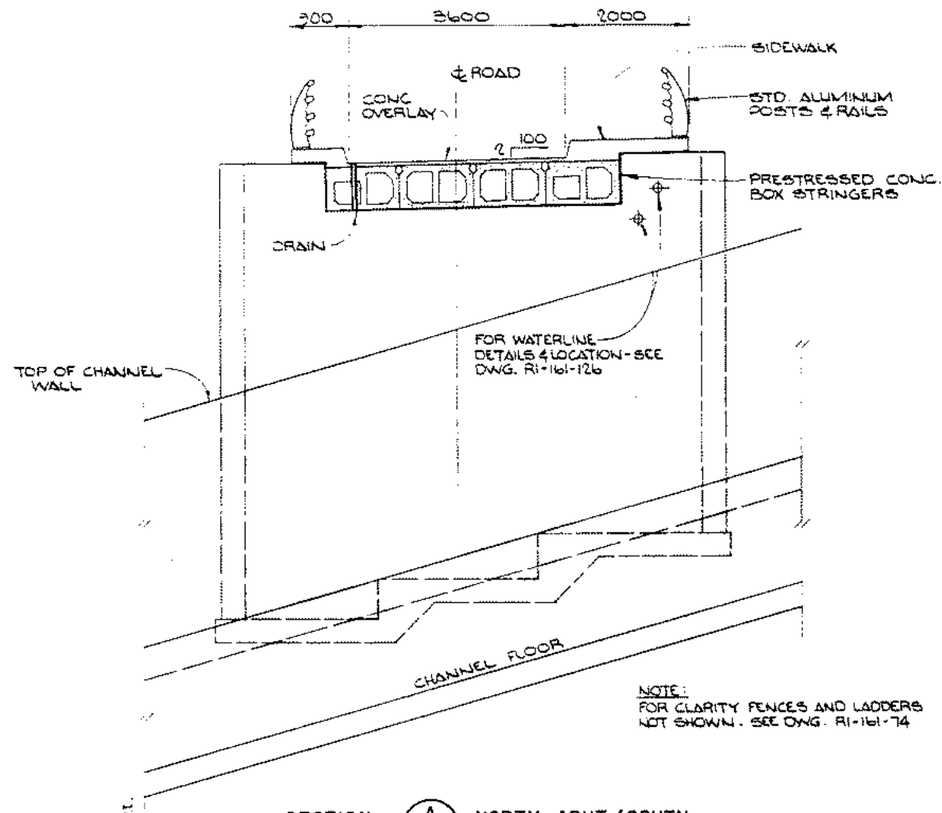
PLAN
1: 200



DOWEL & BRG. PLAN
N.T.S.

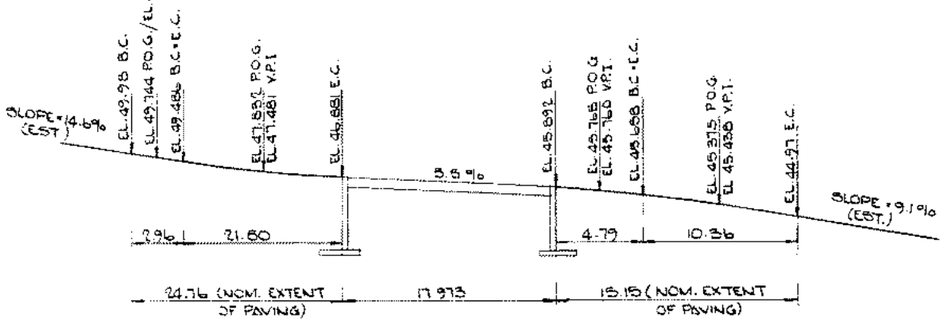


ELEVATION
1: 200



NOTE:
FOR CLARITY FENCES AND LADDERS NOT SHOWN. SEE DWG. RI-161-74

SECTION (A) NORTH ABUT. (SOUTH ABUT. SIMILAR)
1: 50



DESIGN SPEED = 90 KM/H
DESIGN SPEED = 50 KM/H

VERTICAL CURVE DIAGRAM
N.T.S.

EVERGREEN WALL UNITS

The Contractor shall confirm the actual location of all Services within the area of operations, and should not assume that the locations shown on the Drawings are either accurate or complete

JAN. 1986 25283-90

AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

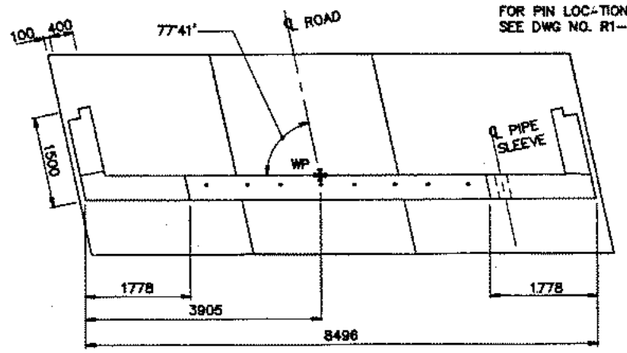
UPPER ISLEVIEW BRIDGE GENERAL ARRANGEMENT

ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE	DIRECTOR OF BRIDGE ENGINEERING DATE	M.G. Elston EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

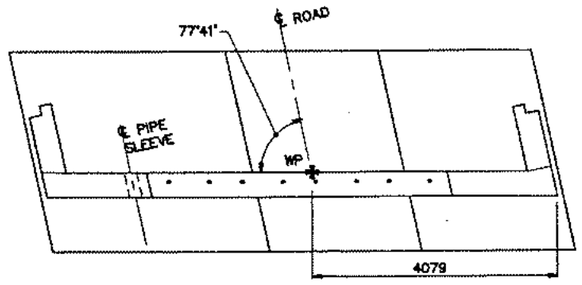
INDEX	NEG. NO.	FILE NO.	PROJECT No.	REGION	DRAWING No.
					RI-161-90 |A

CANCEL PRINTS BEARING EARLIER LETTER



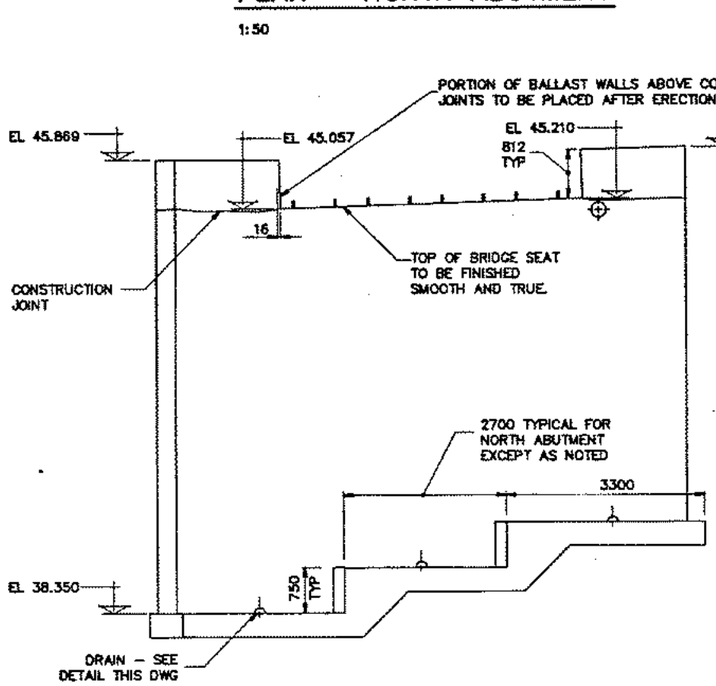
PLAN – NORTH ABUTMENT

1:50



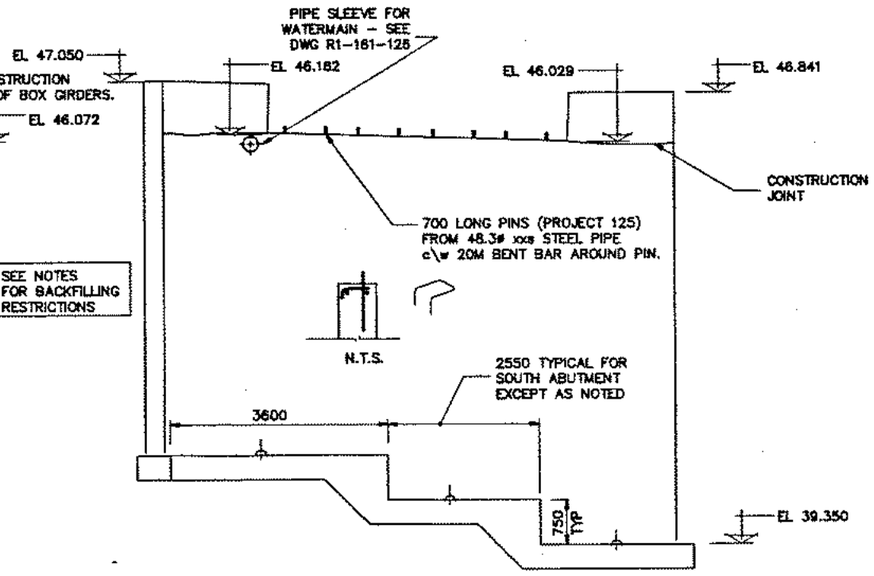
PLAN – SOUTH ABUTMENT

1:50



ELEVATION – NORTH ABUTMENT

1:50

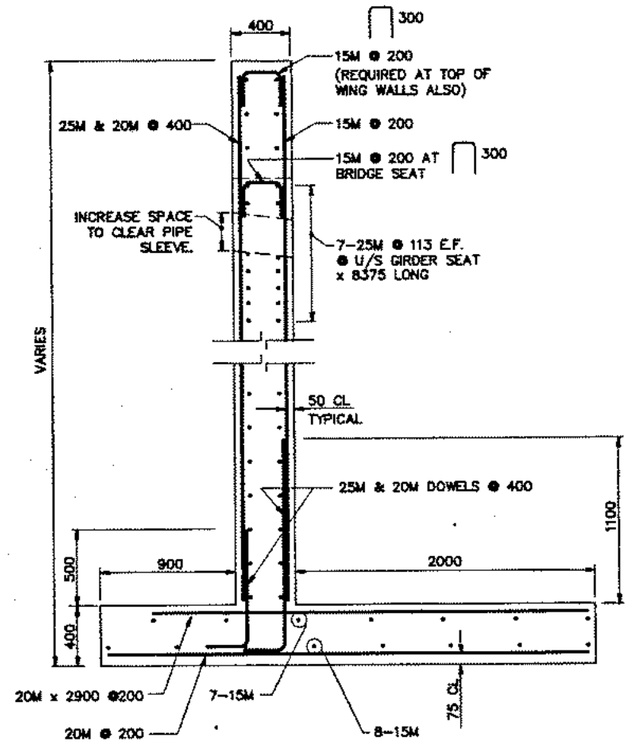


NOTE: SEE NORTH ABUTMENT FOR DETAILS NOT SHOWN.

ELEVATION – SOUTH ABUTMENT

1:50

SEE NOTES FOR BACKFILLING RESTRICTIONS

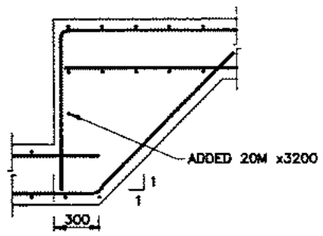


TYPICAL ABUTMENT SECTION

1:20

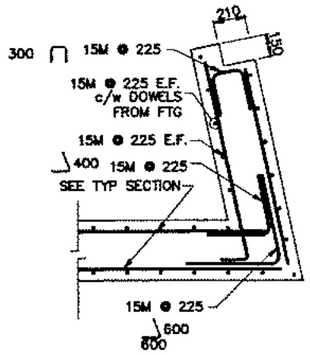
NOTES

1) ALL CONCRETE TO BE CLASS "A" (25 MPa) EXCEPT AS NOTED.
2) EXPOSED EDGES TO BE CHAMFERED 25 EXCEPT AS NOTED.
3) REINFORCING STEEL TO CONFORM TO C.S.A. SPECIFICATION G30.12M GRADE 400.
4) REINFORCING STEEL TO HAVE 50 MINIMUM COVER EXCEPT AS NOTED.
5) LAP OF BARS FOR SPLICES TO BE 40 x "d" EXCEPT AS NOTED. SPLICES TO BE STAGGERED.
6) FOOTINGS TO BE CARRIED DOWN TO ELEVATIONS SHOWN OR TO SUCH LOWER ELEVATIONS AS MAY BE ORDERED BY THE ENGINEER.
7) ABUTMENT WALLS TO BE BACKFILLED AND COMPACTED TO A MAXIMUM OF 3.0m ABOVE TOP OF FOOTING PRIOR TO PLACING BOX GIRDERS AND GROUTING PINS.
8) AFTER BOX GIRDERS ARE IN PLACE, BACKFILL LEVELS BEHIND NORTH AND SOUTH ABUTMENTS MUST NOT DIFFER IN ELEVATION BY MORE THAN 1.25m DURING BACKFILLING AND COMPACTION.

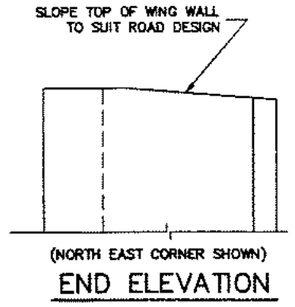


STEP FOOTING DETAIL

1:20



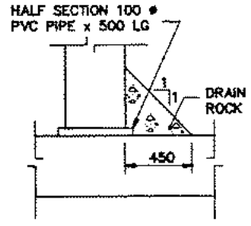
PLAN



END ELEVATION

WING WALL DETAIL

1:20



DRAIN PIPE DETAIL

1:20

D	
C	
B	
A	

REVISIONS

THURBER CONSULTANTS LTD.

KER, PRIESTMAN & ASSOCIATES LTD.

DATE JAN 1986 DRAWN JOB No. 25283-91

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

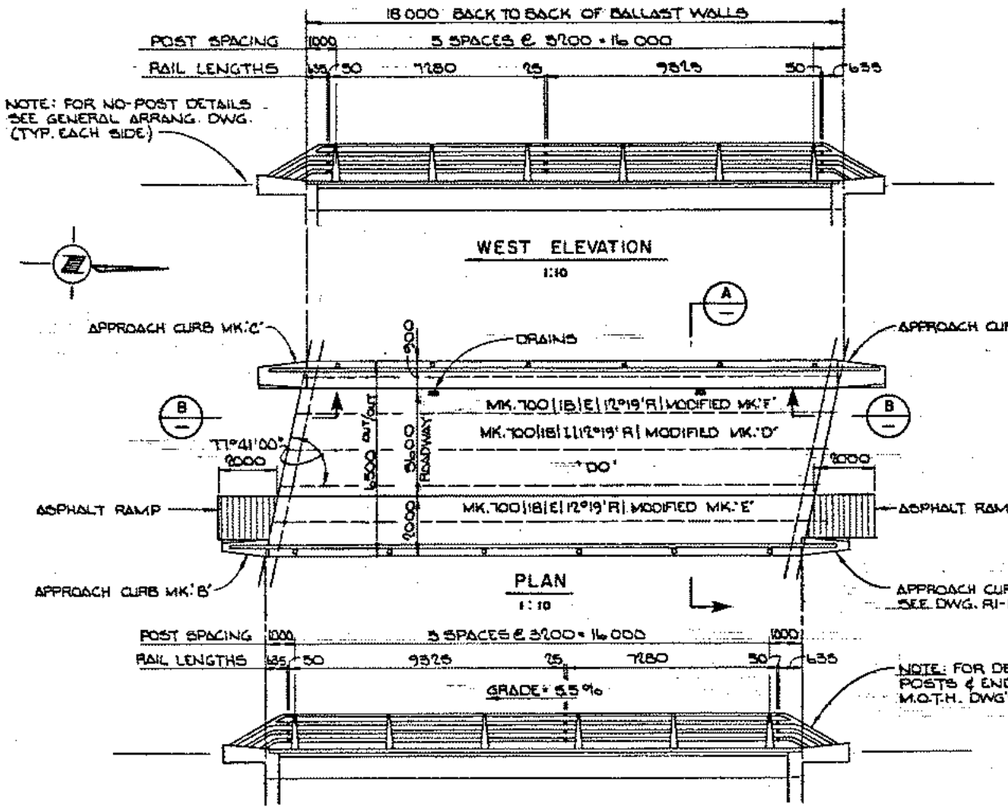
UPPER ISLEVIEW PLACE BRIDGE

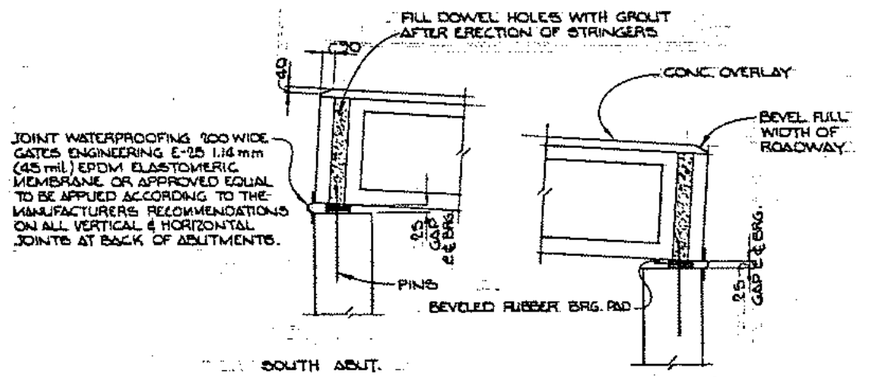
ABUTMENTS
ALBERTA CREEK CHANNELIZATION AND BRIDGES

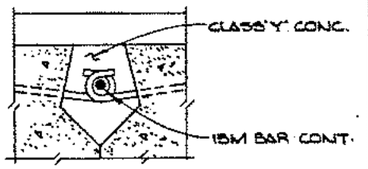
PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	STRUCTURE DIRECTOR ENGINEERING DATE 1986-03-03

INDEX	NSQ No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					R1-161-91

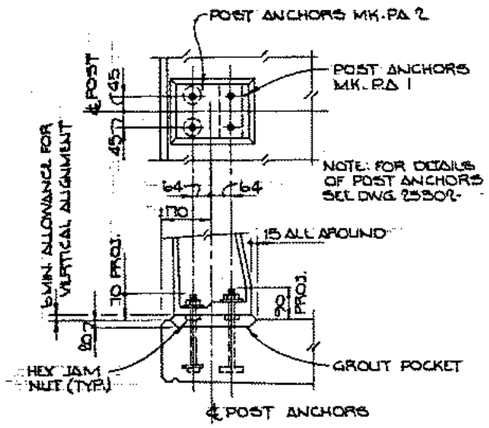
CANCEL PRINTS BEARING EARLIER LETTER





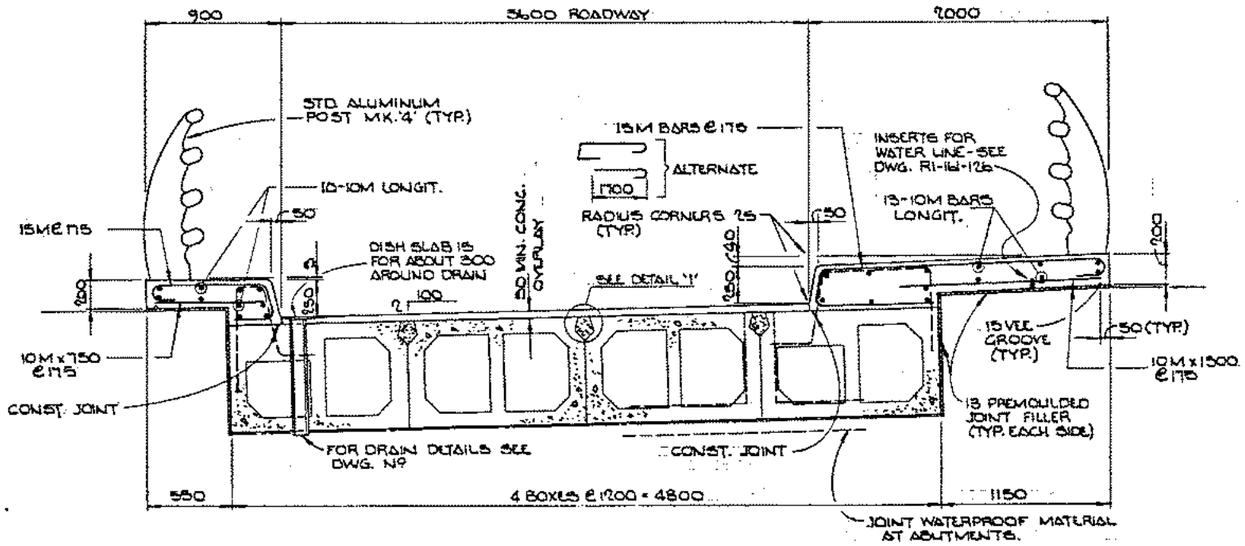


DETAIL 'I'
1:5



POST ANCHOR SETTING DETAILS
1:10

NOTES:
1. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH C.S.A. SPECIFICATIONS G 30.12M GRADE 400.
2. REBAR TO HAVE MIN. 50 COVER, EXCEPT WHERE NOTED.
3. LAP OF BARS FOR SPLICES TO BE 40 x d', SPLICES TO BE STAGGERED.
4. CONCRETE TO BE CLASS 'A' EXCEPT AS NOTED.
5. SHEAR KEYS TO BE FILLED WITH CLASS 'Y' CONCRETE.
6. SCREEDS FOR DECK CONCRETE SHALL BE SET TO GIVE A UNIFORM GRADE FROM END TO END OF THE BRIDGE AND TO ACCOMODATE HOGGING OF THE STRINGERS WHICH IS TO BE MEASURED IN THE FIELD.
7. DOWEL HOLES TO BE FILLED WITH SAND-CEMENT GROUT AS SHOWN.
8. EXPOSED EDGES TO BE CHAMFERED 15, EXCEPT AS NOTED.
9. SWAB UNDERSIDE OF POSTS WITH AN ALKALI RESISTANT BITUMINOUS PAINT & COAT ANCHOR BOLTS WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND PRIOR TO INSTALLATION.
10. FOR DETAILS OF STRINGERS SEE DWG. N°
11. CURBS & SIDEWALKS TO BE FORMED TO SUIT 'SITE PLAN' HIGHWAY ALIGNMENT & PLACED AFTER ROADWAY OVERLAY IS SET.



SECTION
1:20
A

D	
C	
B	
A	
REVISIONS	

THURBER CONSULTANTS LTD.
Consulting Engineers

KER, PRIESTMAN & ASSOCIATES LTD.
Consulting Engineers
DATE JAN. 1986 DRAWN 25283-92

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

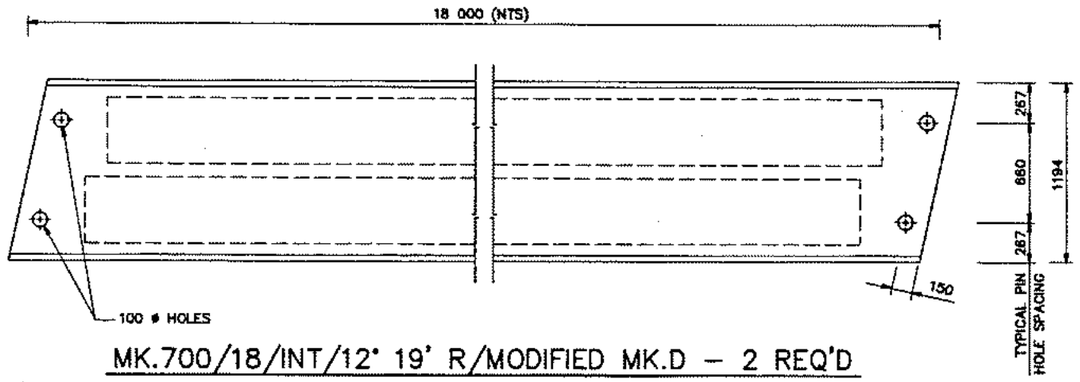
UPPER ISLEVIEW BRIDGE
SUPERSTRUCTURE DETAILS

ALBERTA CREEK CHANNELIZATION AND BRIDGES

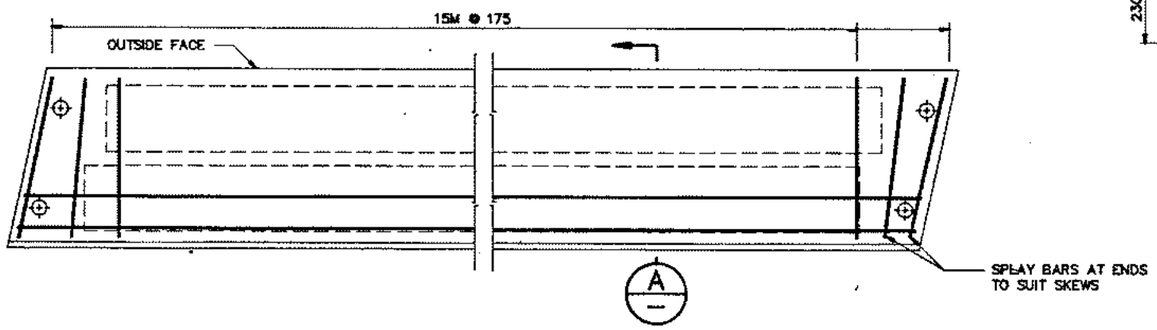
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
P.E. Morgan	DIRECTOR OF BRIDGE ENGINEERING	EXECUTIVE DIRECTOR ENGINEERING
DATE Feb 27/86	DATE 86.03.03	DATE 1986-03-03

INDEX	REGL No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					R1-161-92

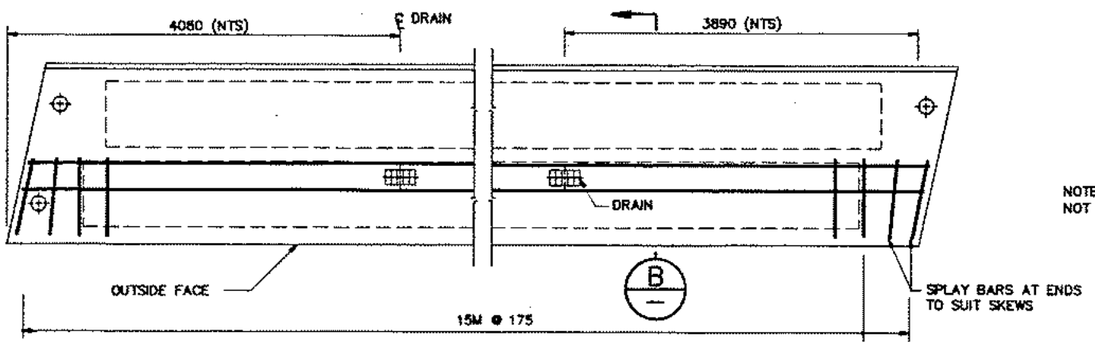
CANCEL PRINTS BEARING EARLIER LETTER



MK.700/18/INT/12° 19' R/MODIFIED MK.D – 2 REQ'D

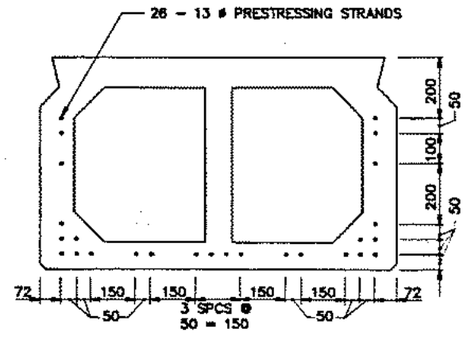


MK.700/18/EXT/12° 19' R/MODIFIED MK.E – 1 REQ'D

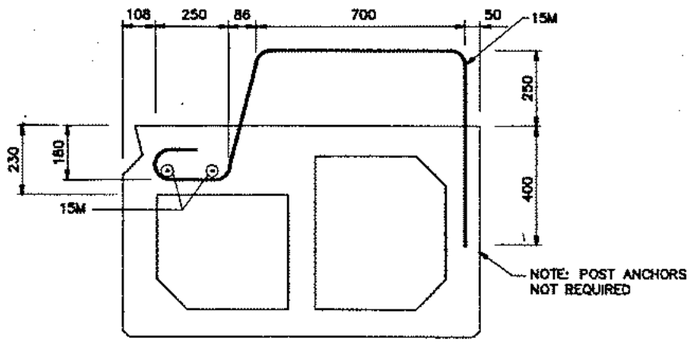


MK.700/18/EXT/12° 19' R/MODIFIED MK.F – 1 REQ'D

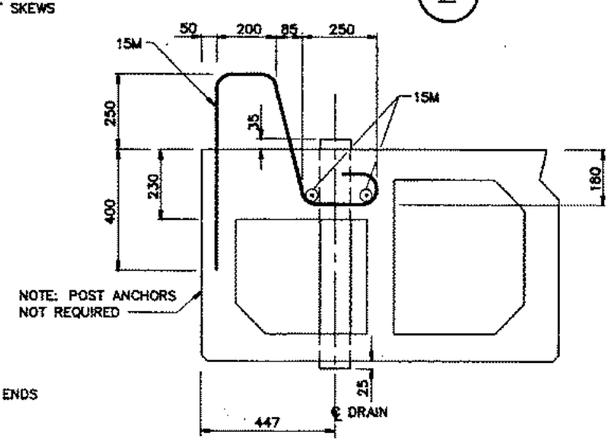
1:20



TYPICAL SECTION – STRAND SPACING

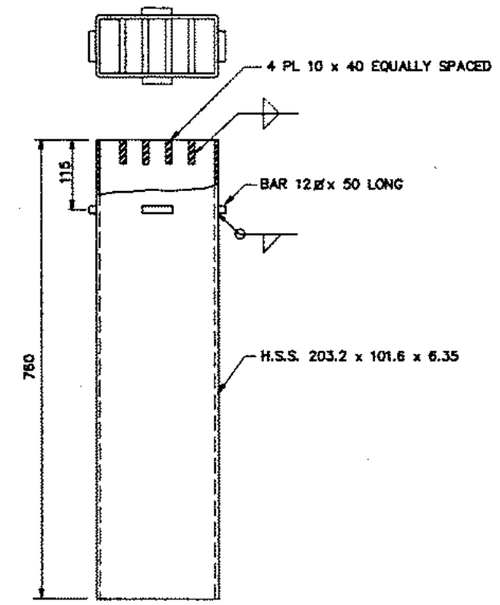


SECTION A



SECTION B

1:10



DRAIN DETAIL 2 REQ'D

(ESTIMATED MASS = 22 kg EACH)

1:5

NOTES

1) FOR "GENERAL NOTES", DETAILS, MESH REINFORCING, AND BLOCK-OUT HOOKS, SEE STD DWG NO. 2309-39.

2) STEELWORK FOR DRAIN TO CONFORM TO C.S.A. SPECIFICATION G40.21 – M81 (230 G)

3) DRAIN TO BE GALVANIZED AFTER FABRICATION. WEIGHT OF GALVANIZING TO BE 610 g/m² SPELTER COATING.

4) THE MINIMUM COMPRESSIVE CONCRETE STRENGTH SHALL BE:
34 MPa AT RELEASE
45 MPa AT 28 DAYS

REVISIONS			
D			
C			
B			
A			

THURBER CONSULTANTS LTD.

KPA — KER, PRIESTMAN & ASSOCIATES LTD.

DATE JAN 1996 — DESIGNED — DRAWN — CHECKED — 25283-93

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

UPPER ISLEVIEW PLACE BRIDGE

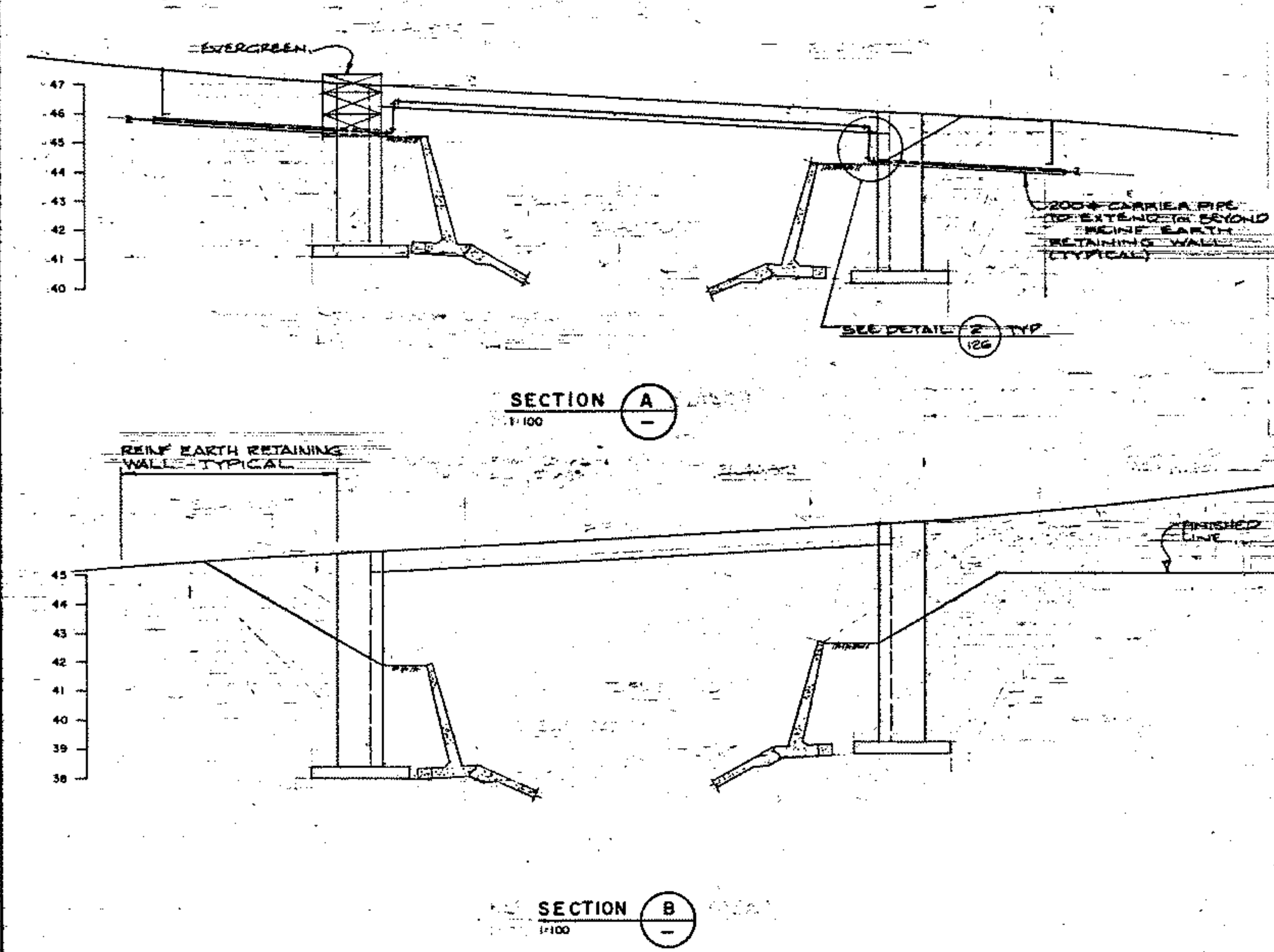
BOX GIRDER DETAILS
ALBERTA CREEK CHANNELIZATION AND BRIDGES

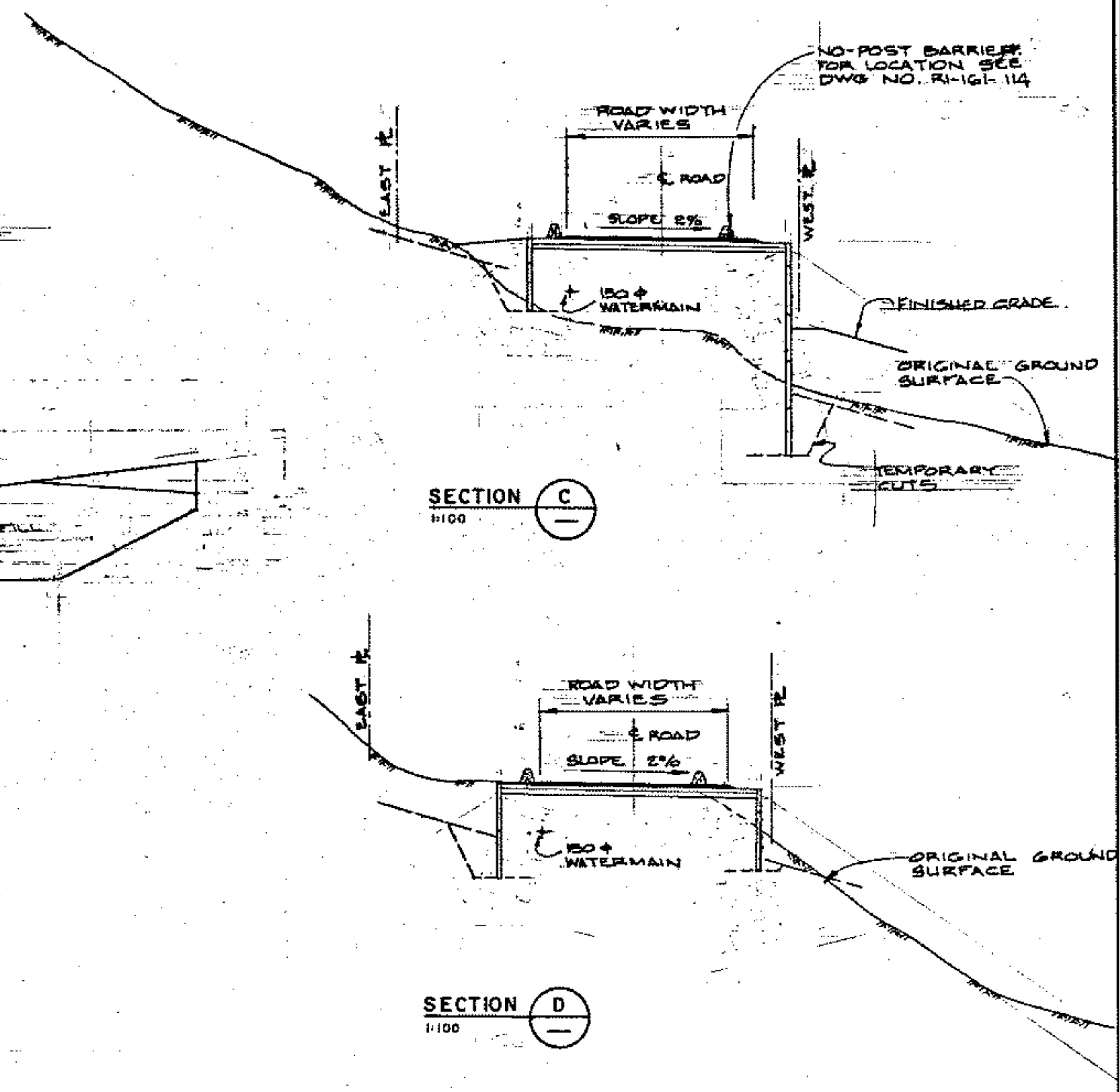
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 27/96	DIRECTOR OF BRIDGE ENGINEERING DATE 96.03.05	EXECUTIVE DIRECTOR ENGINEERING DATE 1996-03-05

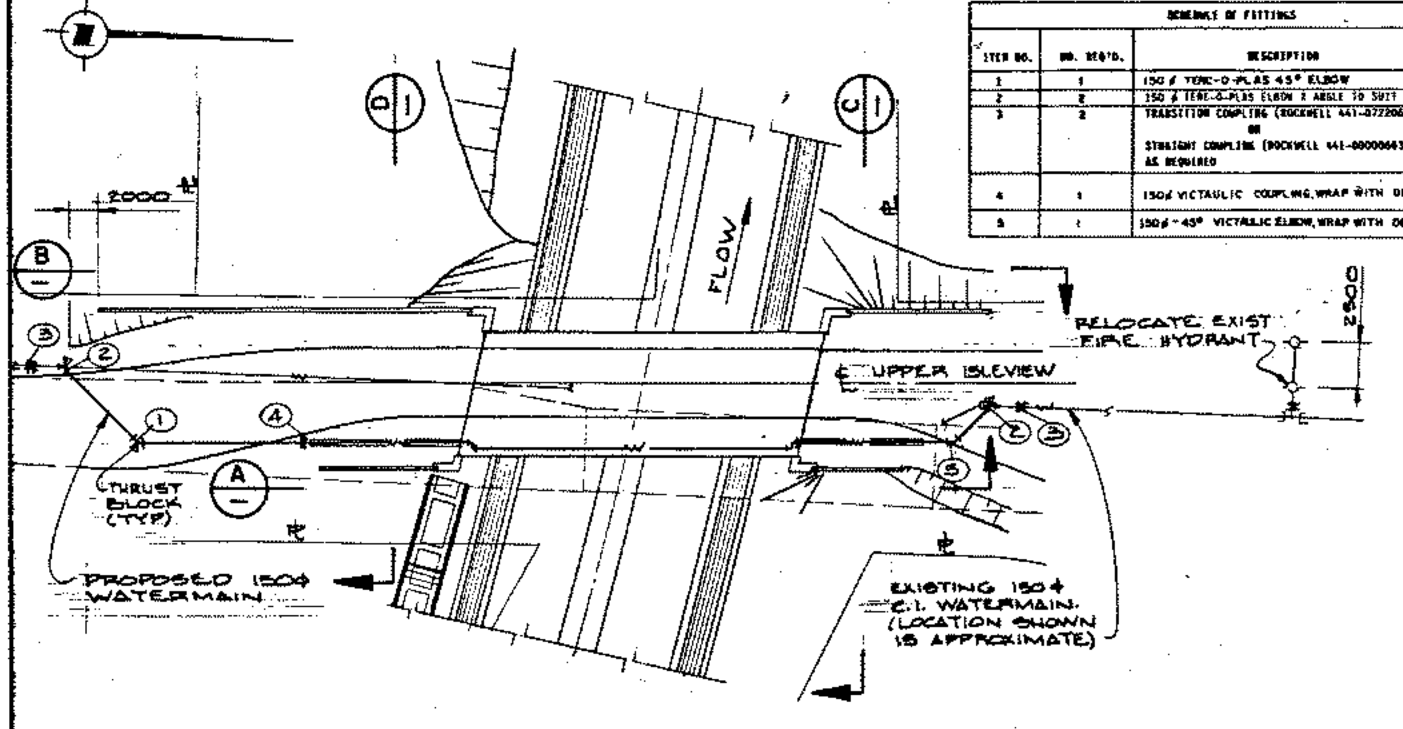
INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-93

CANCEL PRINTS BEARING EARLIER LETTER

FORM H 2069







PLAN
1:200

SCHEDULE OF FITTINGS		
ITEM NO.	NO. REQ'D.	DESCRIPTION
1	1	150 φ TERC-O-PLAS 45° ELBOW
2	2	150 φ TERC-O-PLAS ELBOW X ANGLE TO SUIT (SPECIAL)
3	2	TRANSITION COUPLING (ROCKWELL 441-07220663) OR STRAIGHT COUPLING (ROCKWELL 441-00000663) AS REQUIRED
4	1	150φ VICTAULIC COUPLING, WRAP WITH DENSO TAPE
5	1	150φ - 45° VICTAULIC ELBOW, WRAP WITH DENSO TAPE

D	
C	
B	
A	

REVISIONS

THURBER CONSULTANTS LTD.

AER, PRIESTMAN & ASSOCIATES LTD.
DATE JAN 1986 — 25283-05

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

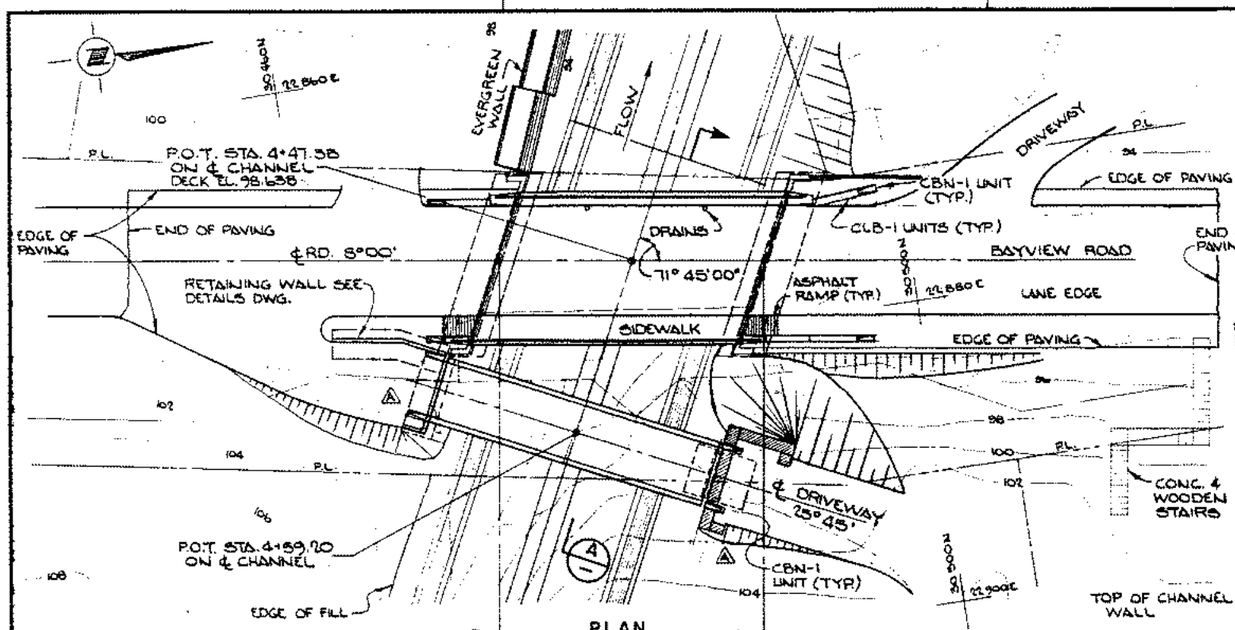
UPPER ISLEVIEW BRIDGE APPROACH WORKS

ALBERTA CREEK CHANNELIZATION AND BRIDGES

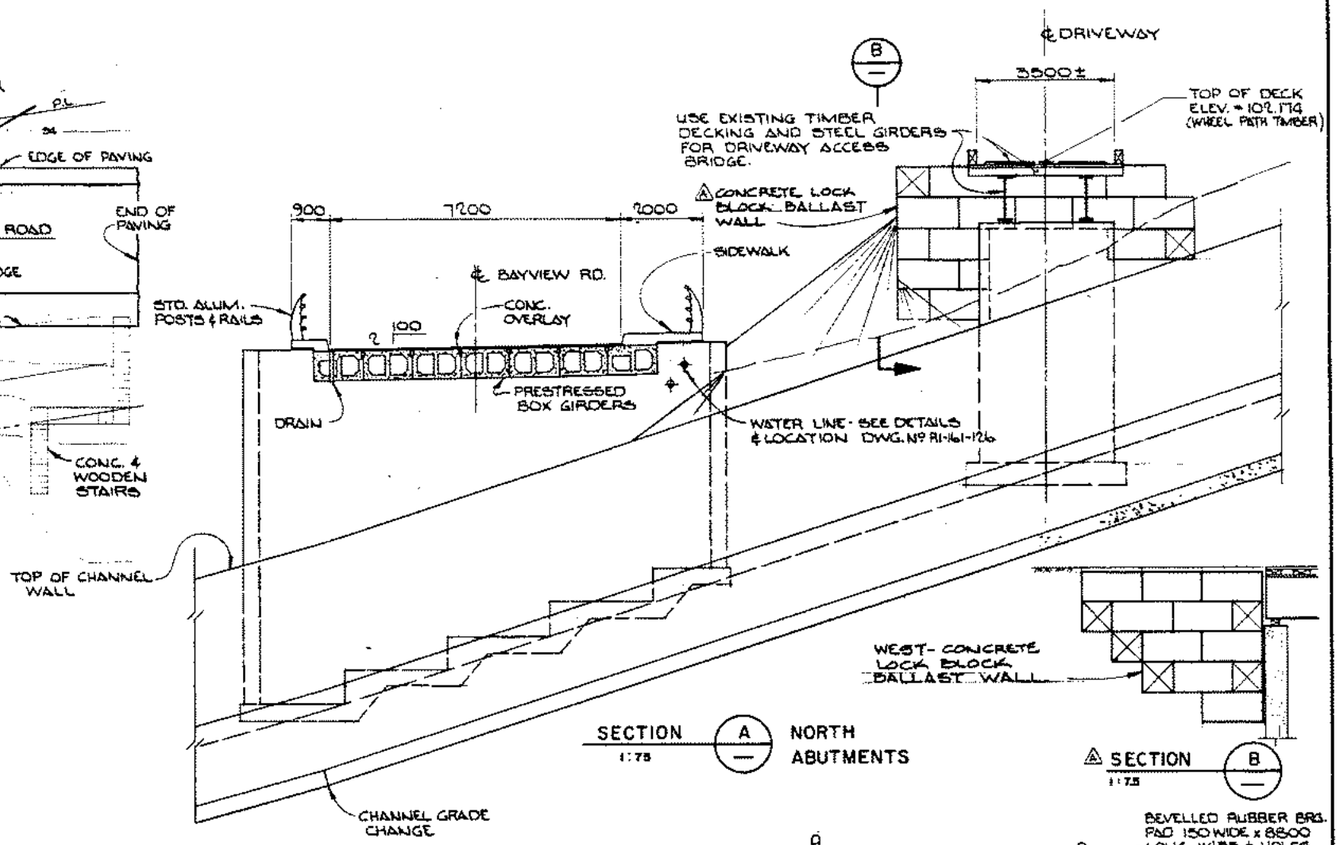
PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	M.G. Elston EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI - 161 - 94

CANCEL PRINTS BEARING EARLIER LETTER

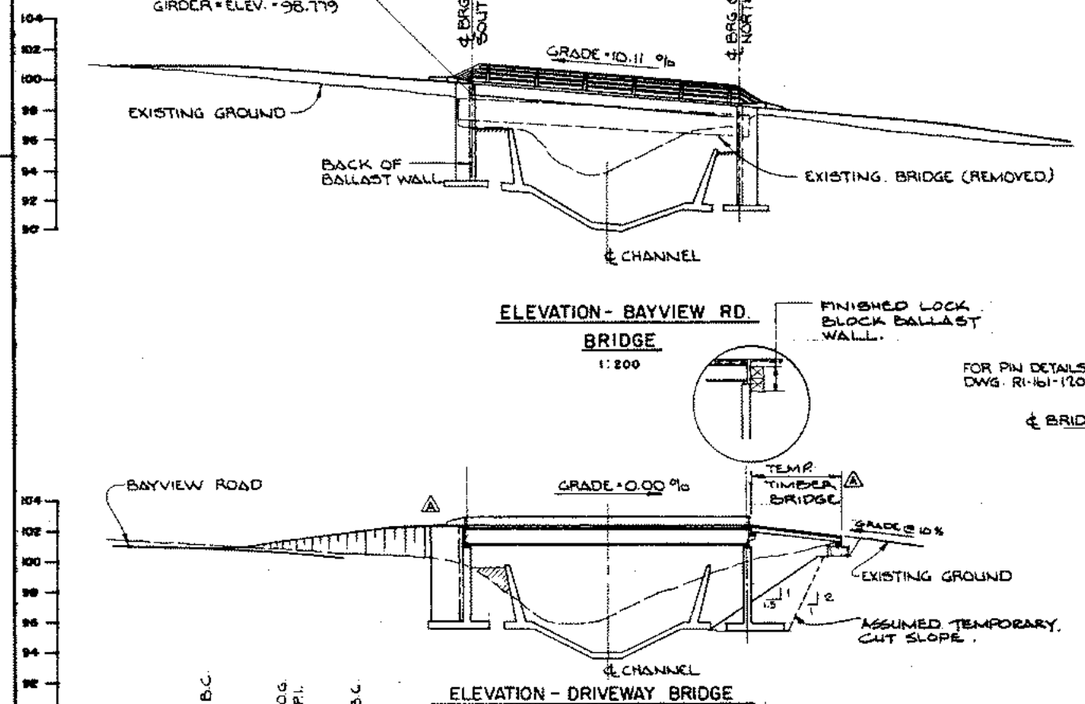


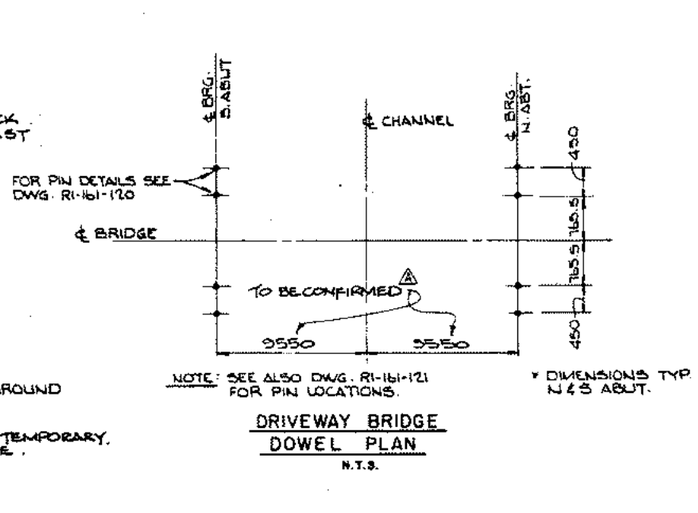
PLAN
1:200

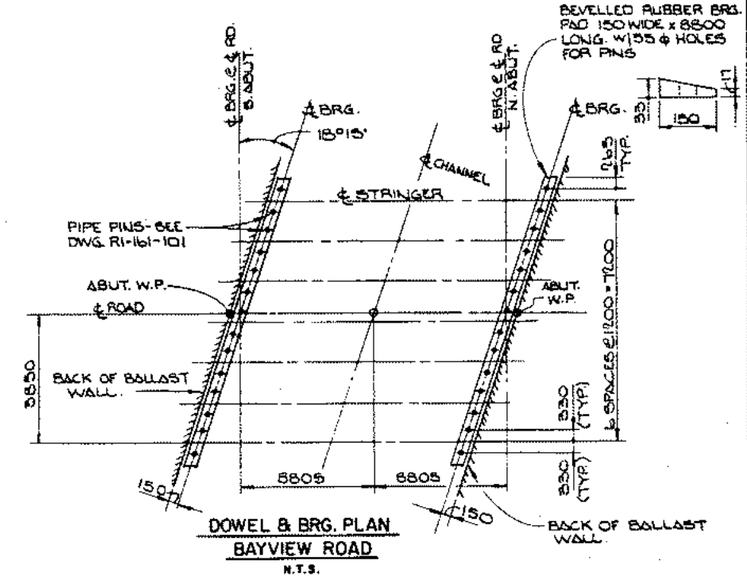


SECTION A — NORTH ABUTMENTS
1:75

SECTION B
1:75







N & S ABUTMENT REDESIGN oct.86

...SULTANTS LTD.

JAN. 1986 — 25283-100

AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

BAYVIEW ROAD BRIDGE GENERAL ARRANGEMENT

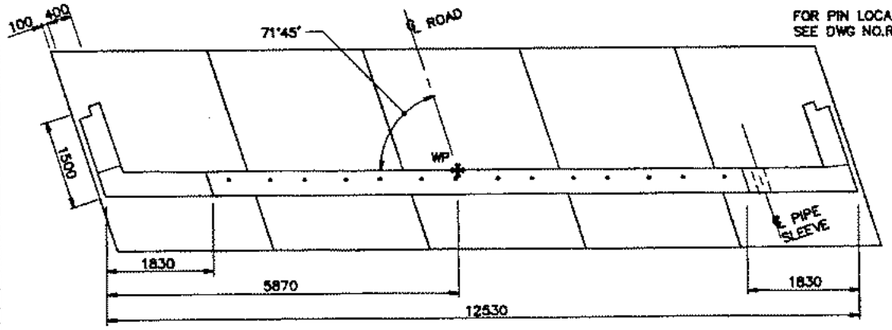
ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 2/87	DIRECTOR OF BRIDGE ENGINEERING DATE Feb. 11, 87	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

INDEX	NEO No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-100 1A

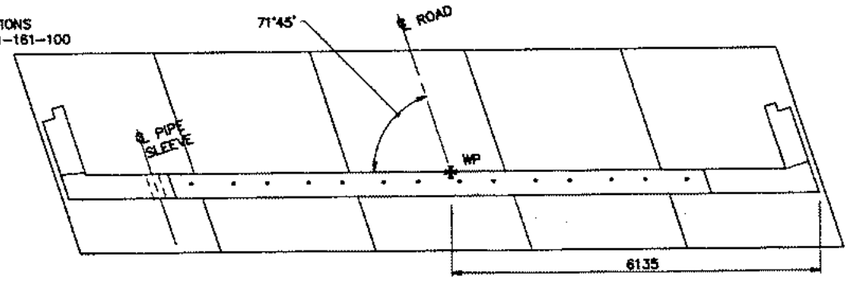
CANCEL PRINTS BEARING EARLIER LETTER

FORM 1-3061



PLAN – NORTH ABUTMENT

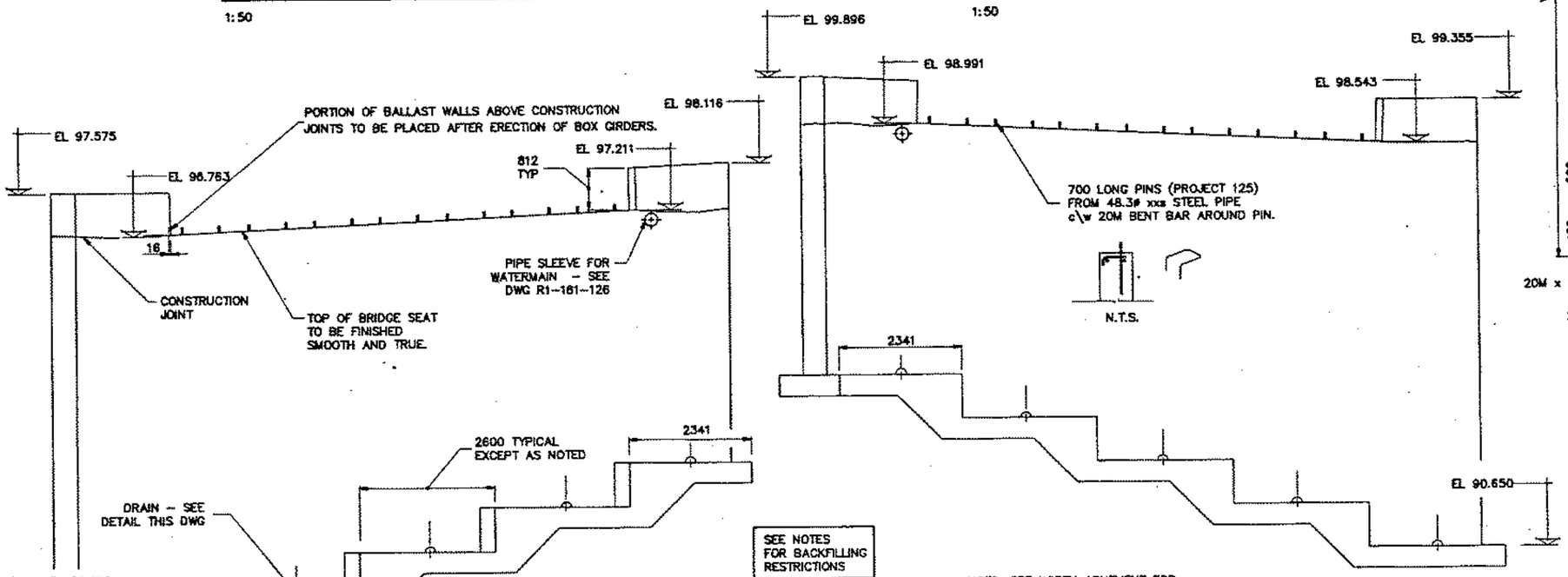
1:50



PLAN – SOUTH ABUTMENT

1:50

FOR PIN LOCATIONS SEE DWG NO.R1-161-100



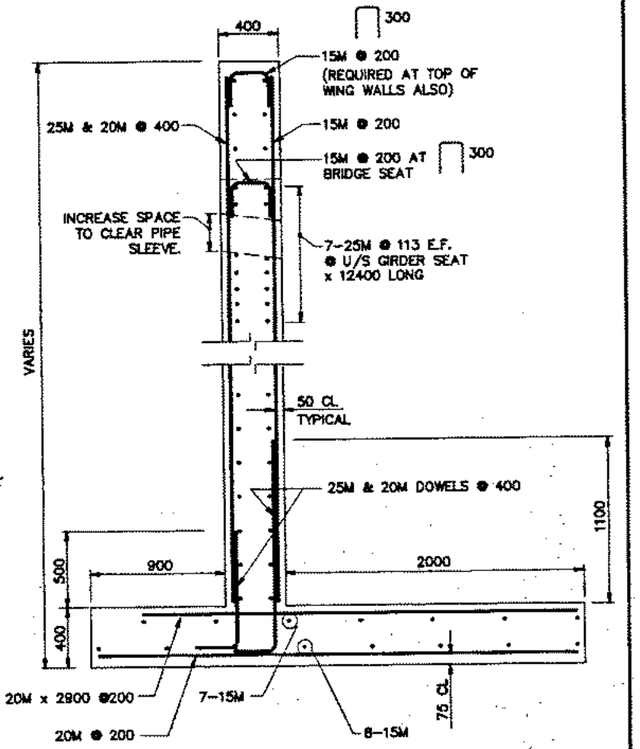
ELEVATION – NORTH ABUTMENT

1:50

NOTE: SEE NORTH ABUTMENT FOR DETAILS NOT SHOWN.

ELEVATION – SOUTH ABUTMENT

1:50

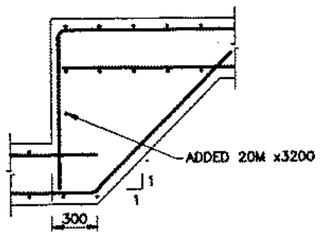


TYPICAL ABUTMENT SECTION

1:20

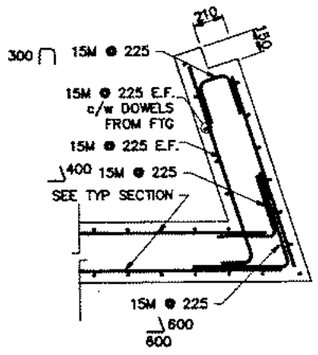
NOTES

1) ALL CONCRETE TO BE CLASS "A" (25 MPa) EXCEPT AS NOTED.
2) EXPOSED EDGES TO BE CHAMFERED 25 EXCEPT AS NOTED.
3) REINFORCING STEEL TO CONFORM TO C.S.A. SPECIFICATION G30.12M GRADE 400.
4) REINFORCING STEEL TO HAVE 50 MINIMUM COVER EXCEPT AS NOTED.
5) LAP OF BARS FOR SPLICES TO BE 40 x "d" EXCEPT AS NOTED. SPLICES TO BE STAGGERED.
6) FOOTINGS TO BE CARRIED DOWN TO ELEVATIONS SHOWN OR TO SUCH LOWER ELEVATIONS AS MAY BE ORDERED BY THE ENGINEER.
7) ABUTMENT WALLS TO BE BACKFILLED AND COMPACTED TO A MAXIMUM OF 3.0m ABOVE TOP OF FOOTING PRIOR TO PLACING BOX GIRDERS AND GROUTING PINS.
8) AFTER BOX GIRDERS ARE IN PLACE, BACKFILL LEVELS BEHIND NORTH AND SOUTH ABUTMENTS MUST NOT DIFFER IN ELEVATION BY MORE THAN 1.25m DURING BACKFILLING AND COMPACTION.



STEP FOOTING DETAIL

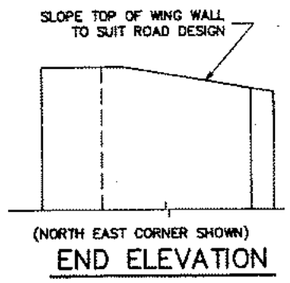
1:20



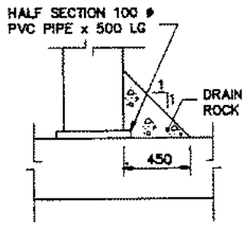
PLAN

WING WALL DETAIL

1:20



END ELEVATION



DRAIN PIPE DETAIL

1:20

REVISIONS
D
C
B
A

THURBER CONSULTANTS LTD.

KER, PRIESTMAN & ASSOCIATES LTD.

DATE JAN 1986 | JOB No. 25283-101

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

BAYVIEW ROAD BRIDGE

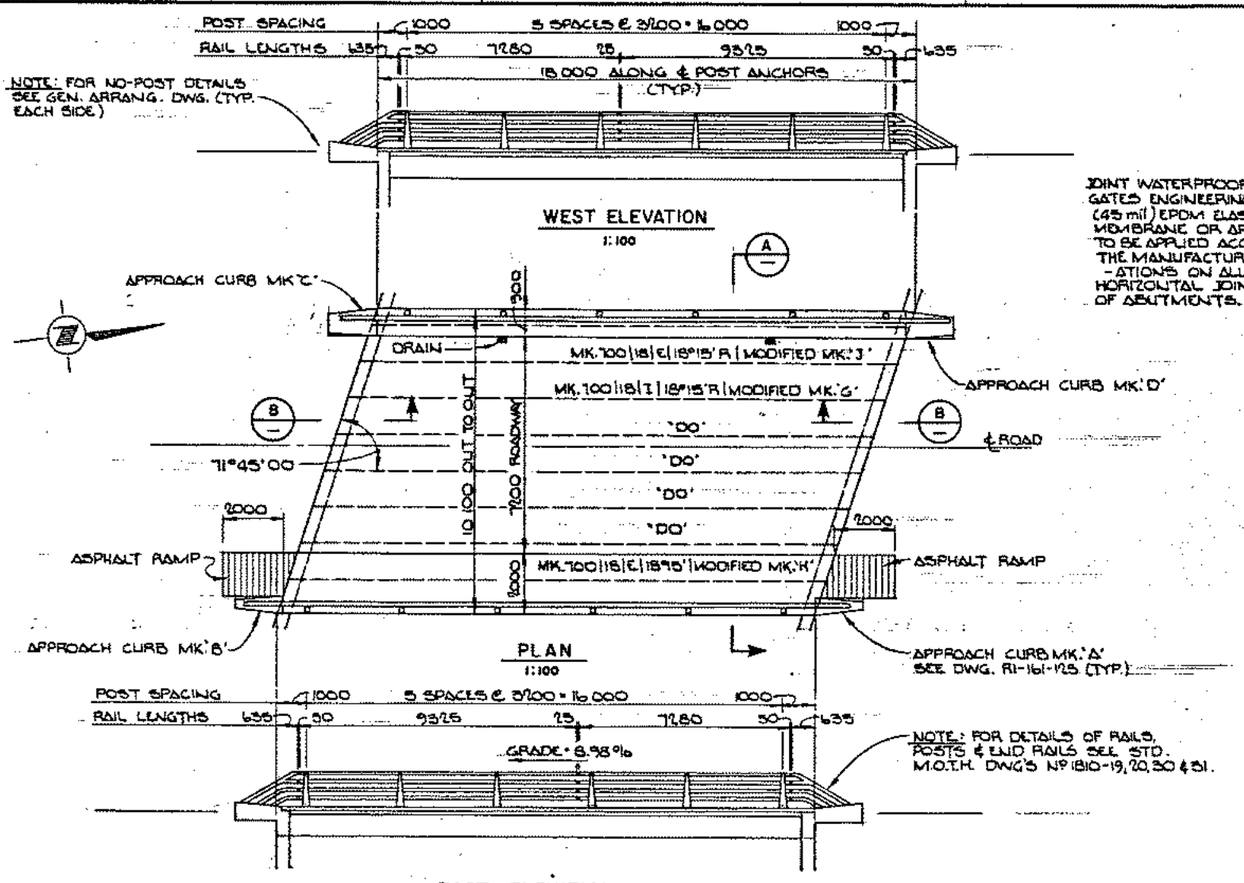
ABUTMENTS
ALBERTA CREEK CHANNELIZATION AND BRIDGES

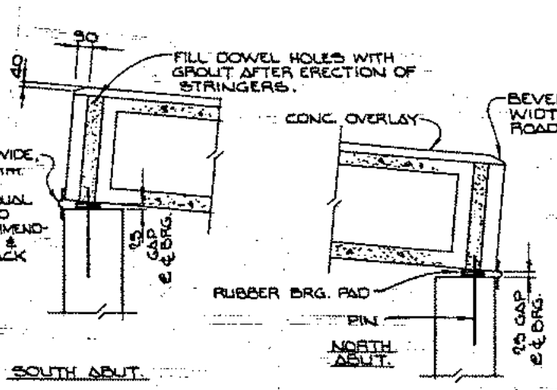
PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

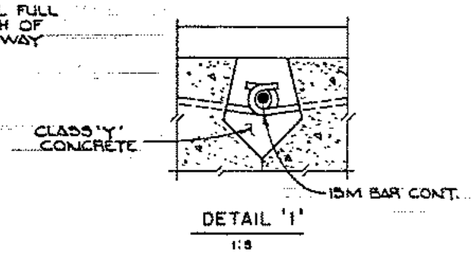
INDEX	NEG. No.	FILE No.	PROJECT No	REGION	DRAWING No
					R1-161-101

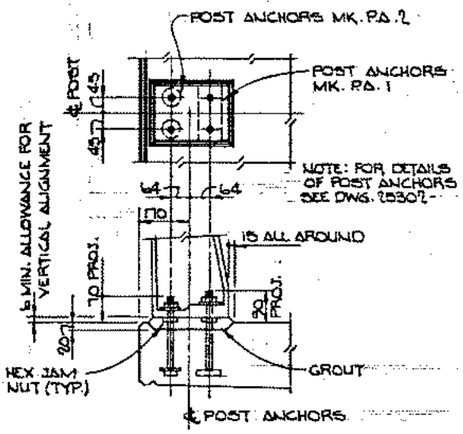
CANCEL PRINTS BEARING EARLIER LETTER

FORM H 1008 H

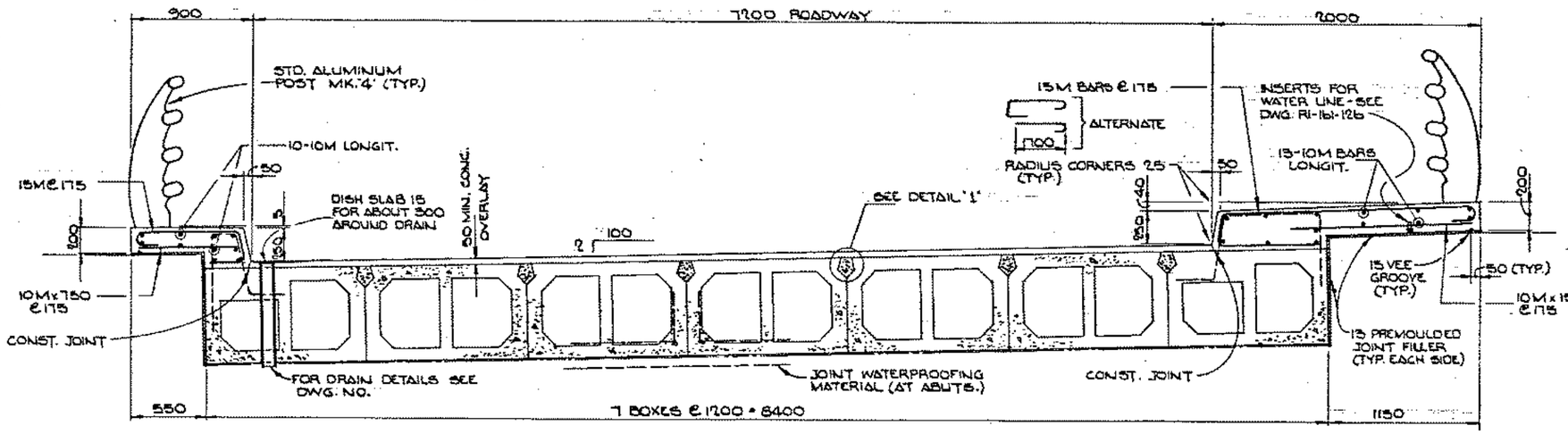








POST ANCHOR SETTING DETAILS - 1:10



SECTION A
1:20

NOTES:
1. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH C.S.A. SPECIFICATION G30.12M GRADE 400
2. REBAR TO HAVE MIN. 50 COVER EXCEPT WHERE NOTED.
3. LAP OF BARS FOR SPLICES TO BE 40 x d', SPLICES TO STAGGERED
4. CONCRETE TO BE CLASS 'A' EXCEPT AS NOTED.
5. SHEAR KEYS TO BE FILLED WITH CLASS 'Y' CONCRETE
6. SCREEDS FOR DECK CONCRETE SHALL BE SET TO GIVE A UNIFORM GRADE FROM END TO END OF THE BRIDGE AND TO ACCOMODATE HOGGING OF THE STRINGERS WHICH IS TO BE MEASURED IN THE FIELD.
7. DOWEL HOLES TO BE FILLED WITH SAND-CEMENT GROUT AS SHOWN.
8. EXPOSED EDGES TO BE CHAMFERED 15, EXCEPT AS NOTED.
9. SWAB UNDERSIDE OF POSTS WITH AN ALKALI RESISTANT BITUMINOUS PAINT & COAT ANCHOR BOLTS WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND PRIOR TO INSTALLATION.
10. FOR DETAILS OF STRINGERS SEE DWG. Nº
11. CURBS & SIDEWALKS TO BE FORMED TO SUIT 'SITE PLAN' HIGHWAY ALIGNMENT & PLACED AFTER ROADWAY OVERLAY IS SET.

REVISIONS			
D			
C			
B			
A			

THURBER CONSULTANTS LTD. Geotechnical Engineers

KER, PRIESTMAN & ASSOCIATES LTD. Consulting Engineers

DATE JAN. 1986 | APPROVED | JOB No. 25283-102

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

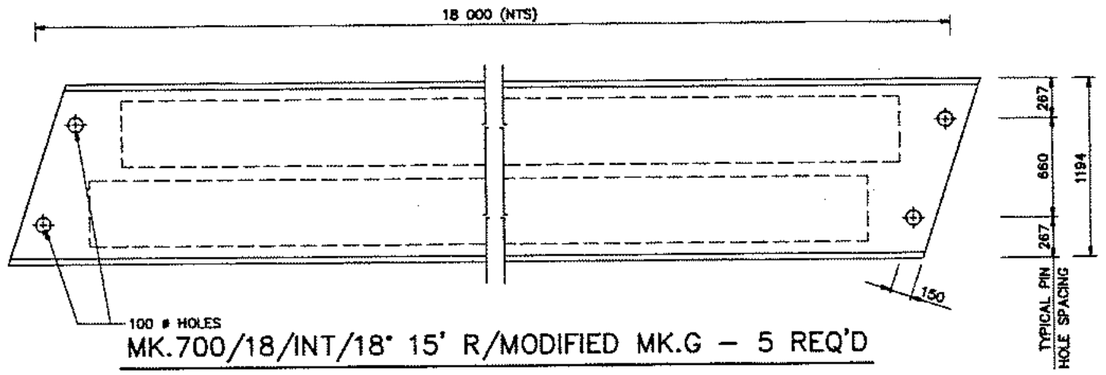
BAYVIEW ROAD BRIDGE
SUPERSTRUCTURE DETAILS

ALBERTA CREEK CHANNELIZATION AND BRIDGES

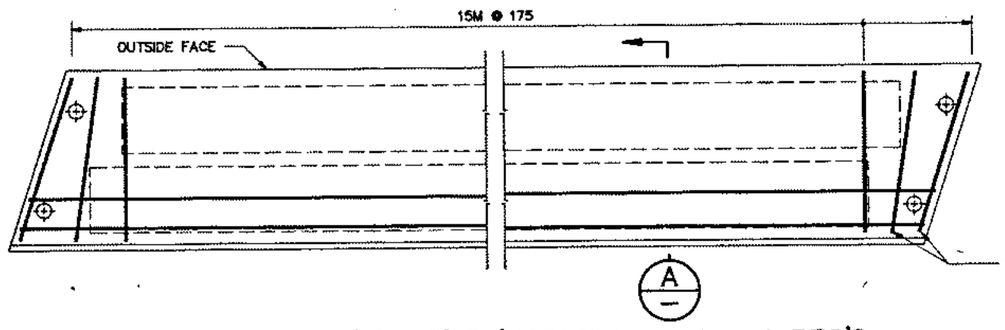
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86.05.05	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-05-05

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-102

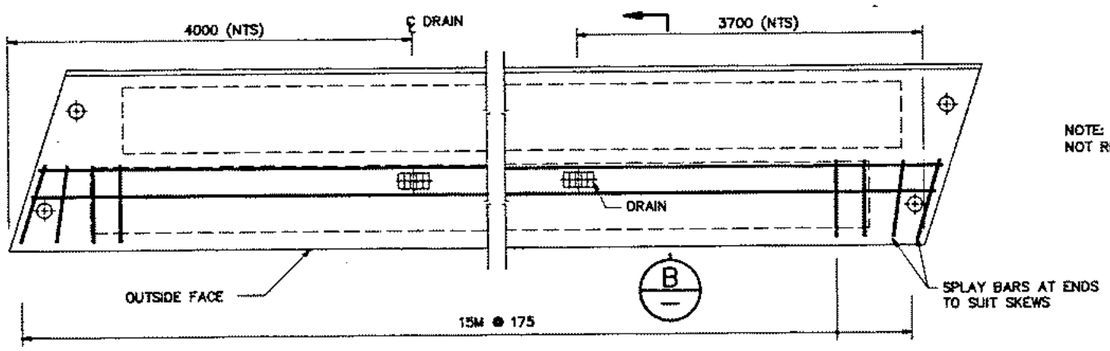
CANCEL PRINTS BEARING EARLIER LETTER



MK.700/18/INT/18° 15' R/MODIFIED MK.G – 5 REQ'D

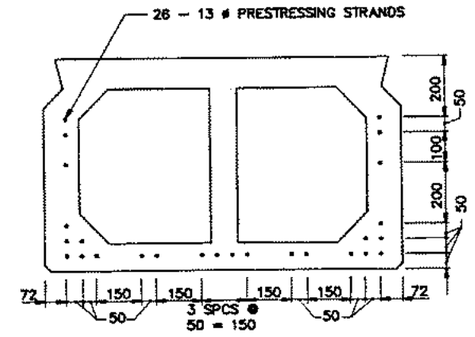


MK.700/18/EXT/18° 15' R/MODIFIED MK.H – 1 REQ'D

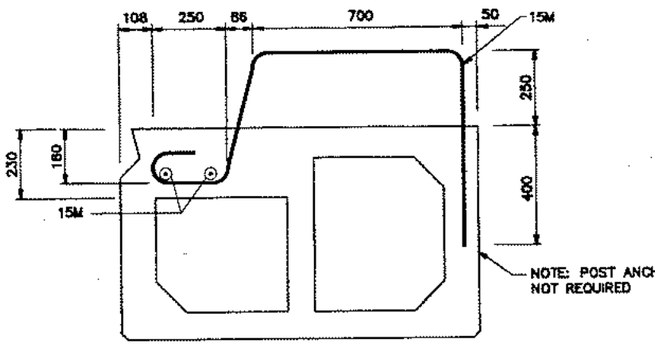


MK.700/18/EXT/18° 15' R/MODIFIED MK.J – 1 REQ'D

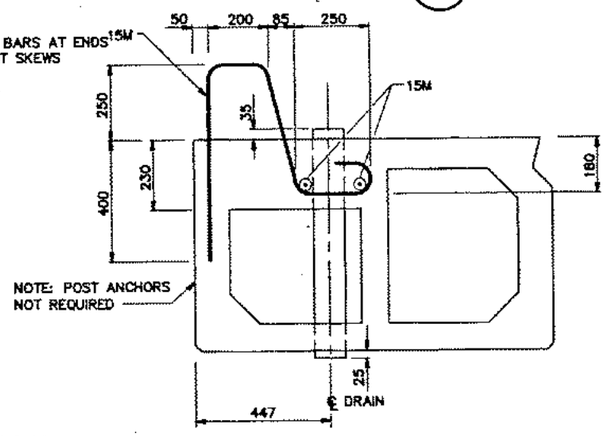
1:20



TYPICAL SECTION – STRAND SPACING

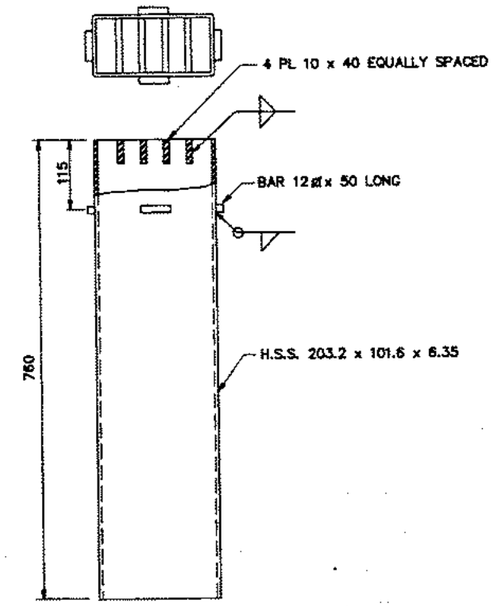


SECTION A



SECTION B

1:10



DRAIN DETAIL 2 REQ'D

(ESTIMATED MASS = 22 kg EACH)

1:5

NOTES

1) FOR "GENERAL NOTES", DETAILS, MESH REINFORCING, AND BLOCK-OUT HOOKS, SEE STD DWG NO. 2309-39.

2) STEELWORK FOR DRAIN TO CONFORM TO C.S.A. SPECIFICATION G40.21 – M81 (230 G)

3) DRAIN TO BE GALVANIZED AFTER FABRICATION. WEIGHT OF GALVANIZING TO BE 610 g/m² SPELTER COATING.

4) THE MINIMUM COMPRESSIVE CONCRETE STRENGTH SHALL BE:
34 MPa AT RELEASE
45 MPa AT 28 DAYS

D	
C	
B	
A	
REVISIONS	

THURBER CONSULTANTS LTD.
Consulting Engineers

KER, PRIESTMAN & ASSOCIATES LTD.
Consulting engineers

DATE JAN 1986 | DRAWING No. 25283-103

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

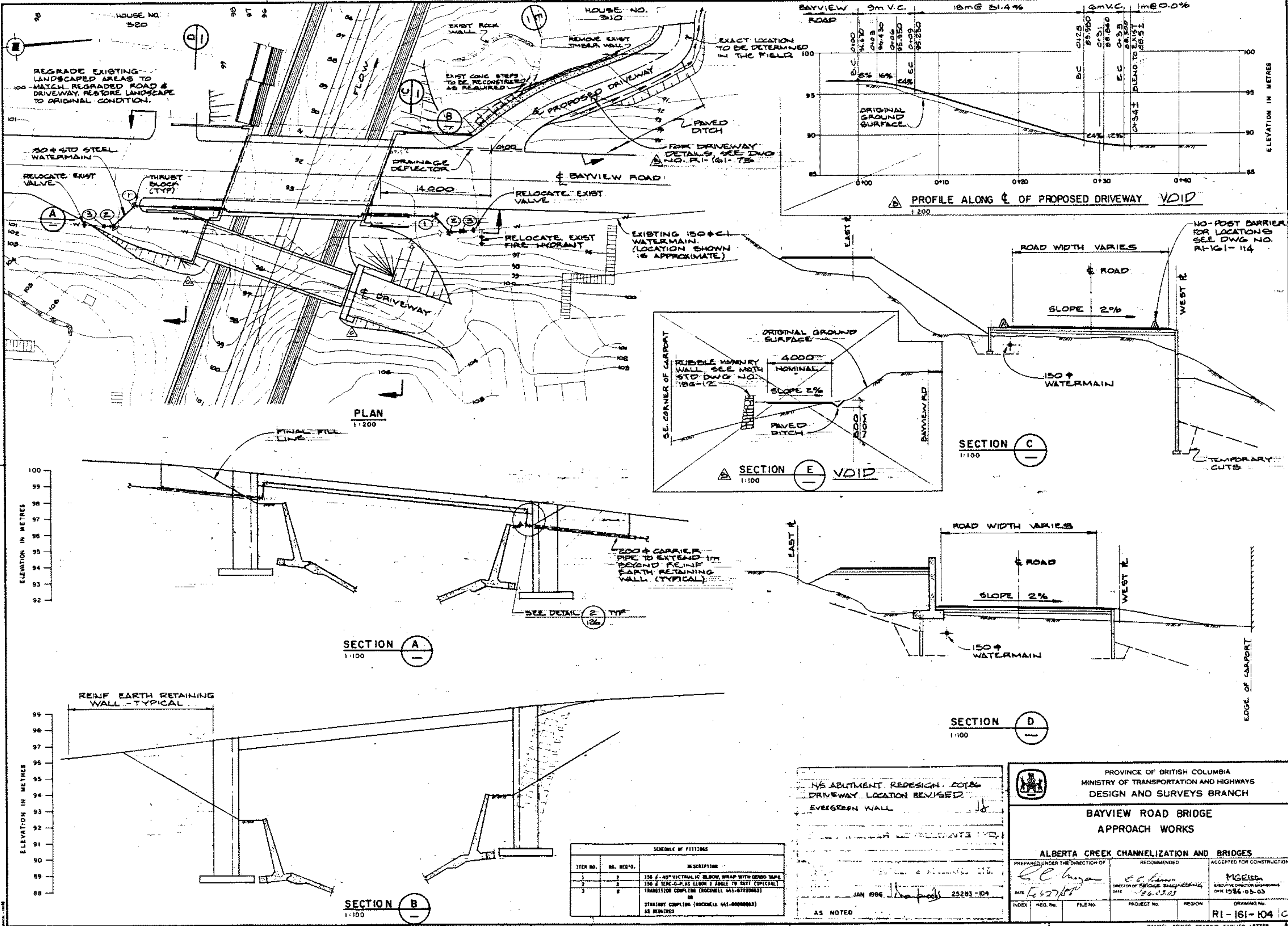
BAYVIEW ROAD BRIDGE

BOX GIRDER DETAILS
ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE 1986/02/07	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-103

CANCEL PRINTS BEARING EARLIER LETTER


HOUSE NO. 320
HOUSE NO. 310
REGRADE EXISTING LANDSCAPED AREAS TO MATCH REGRADED ROAD & DRIVEWAY. RESTORE LANDSCAPE TO ORIGINAL CONDITION.
EXIST ROCK WALL
REMOVE EXIST TIMBER WALL
EXACT LOCATION TO BE DETERMINED IN THE FIELD
EXIST CONC STEPS TO BE RECONSTRUCTED AS REQUIRED
FLOW
℄ PROPOSED DRIVEWAY
PAVED DITCH
FOR DRIVEWAY DETAILS, SEE DWG NO. R1-161-75
150 φ STD STEEL WATERMAIN
RELOCATE EXIST VALVE
THRUST BLOCK (TYP)
DRAINAGE DEFLECTOR
℄ BAYVIEW ROAD
14000
RELOCATE EXIST VALVE
RELOCATE EXIST FIRE HYDRANT
EXISTING 150 φ C.I. WATERMAIN. (LOCATION SHOWN IS APPROXIMATE)
℄ DRIVEWAY
PLAN
1:200
BAYVIEW ROAD
9m V.C.
18m @ 31.4%
6m V.C.
1m @ 0.0%
ORIGINAL GROUND SURFACE
ELEVATION IN METRES
PROFILE ALONG ℄ OF PROPOSED DRIVEWAY VOID
1:200
NO-POST BARRIER FOR LOCATIONS SEE DWG NO. R1-161-114
ROAD WIDTH VARIES
℄ ROAD
SLOPE 2%
EAST ℄
WEST ℄
150 φ WATERMAIN
TEMPORARY CUTS
SECTION C
1:100
ORIGINAL GROUND SURFACE
4000 NOMINAL
RUBBLE MASONRY WALL SEE MOTH STD DWG NO. 186-12
SLOPE 2%
S.E. CORNER OF CARPORT
PAVED DITCH
BAYVIEW RD
SECTION E VOID
1:100
FINAL FILL LINE
200 φ CARRIER PIPE TO EXTEND 1m BEYOND REINF EARTH RETAINING WALL (TYPICAL)
SEE DETAIL 2/126 TYP
SECTION A
1:100
ROAD WIDTH VARIES
℄ ROAD
SLOPE 2%
150 φ WATERMAIN
EDGE OF CARPORT
SECTION D
1:100
REINF EARTH RETAINING WALL - TYPICAL
SECTION B
1:100
N/S ABUTMENT REDESIGN OCT 86
DRIVEWAY LOCATION REVISED
EVERGREEN WALL
JAN 1986
25283-104
AS NOTED

SCHEDULE OF FITTINGS

ITEM NO.	NO. REQ'D.	DESCRIPTION
1	2	150 φ - 45° VICTAULIC ELBOW, WRAP WITH DENSO TAPE
2	2	150 φ TERC-O-PLAS ELBOW & ANGLE TO SUIT (SPECIAL)
3	2	TRANSITION COUPLING (ROCKWELL 441-[illegible]) OR STRAIGHT COUPLING (ROCKWELL 441-[illegible]) AS REQUIRED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

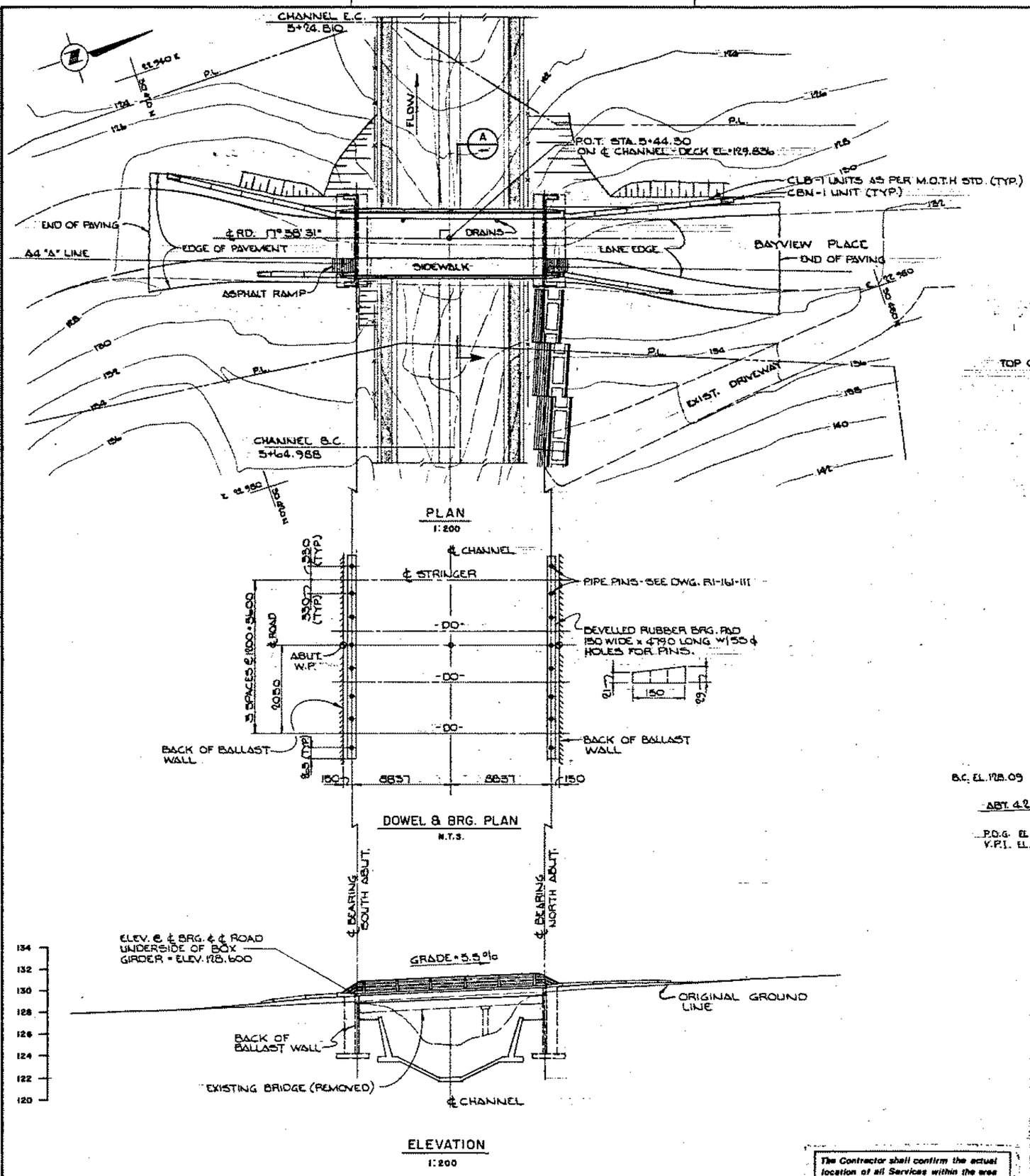
BAYVIEW ROAD BRIDGE APPROACH WORKS

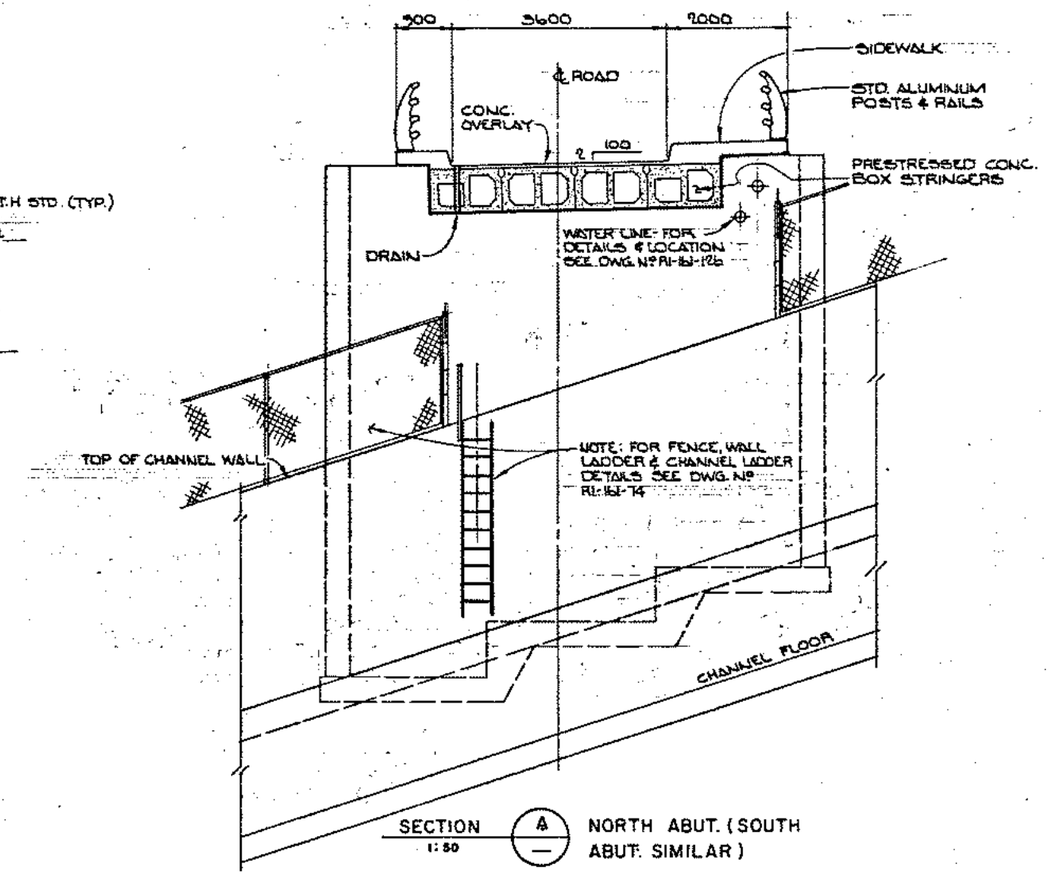
ALBERTA CREEK CHANNELIZATION AND BRIDGES

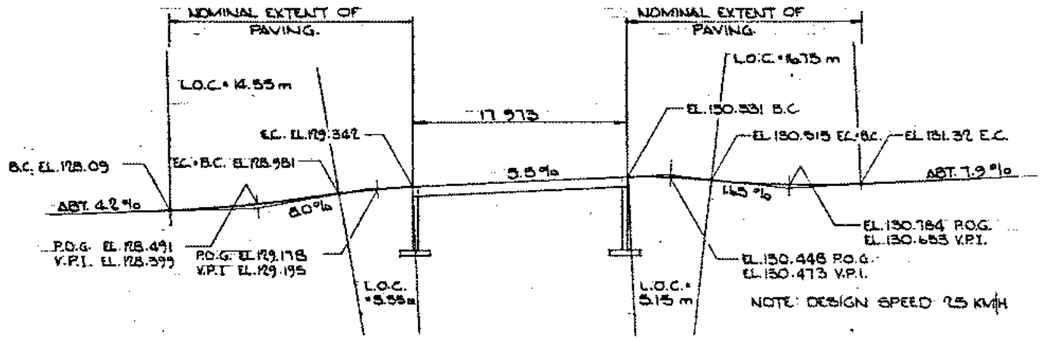
PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE 86/03/03	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	M. GELSTON EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					R1-161-104 C

CANCEL PRINTS BEARING EARLIER LETTER







VERTICAL CURVE DIAGRAM
N.T.S.

The Contractor shall confirm the actual location of all Services within the area of operations, and should not assume that the locations shown on the Drawings are either accurate or complete

A EVERGREEN WALL
REVISIONS

THURBER CONSULTANTS LTD.

B.A., HUESTIS & ASSOCIATES LTD.

JAN. 1986 — Drawing 25283-110

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

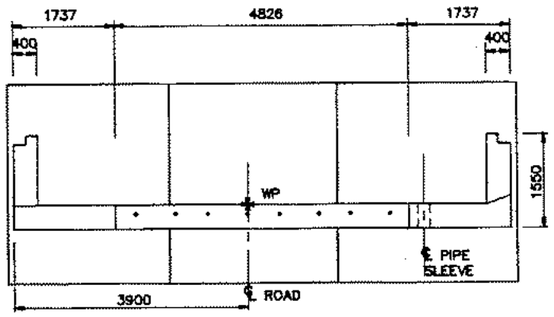
BAYVIEW PLACE BRIDGE
GENERAL ARRANGEMENT

ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 27/86	DIRECTOR OF HIGHWAY OPERATIONS DATE 86.03.03	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-110 A

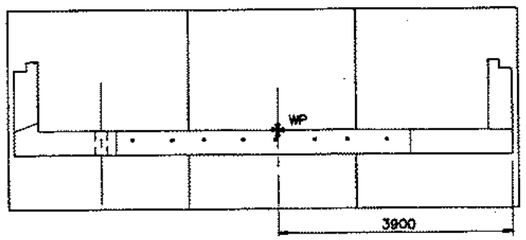
CANCEL PRINTS BEARING EARLIER LETTER



FOR PIN LOCATIONS
SEE DWG NO. R1-161-110

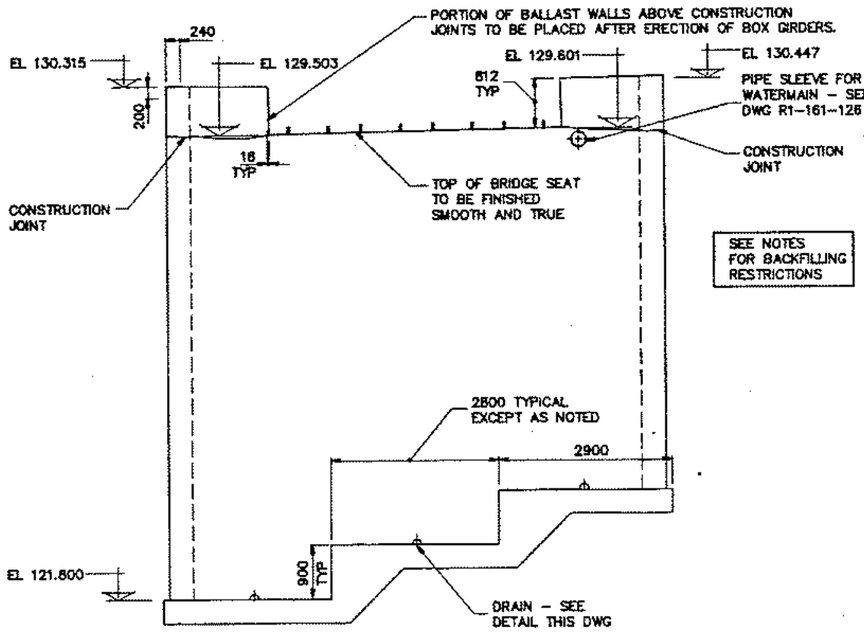
PLAN – NORTH ABUTMENT

1:50



PLAN – SOUTH ABUTMENT

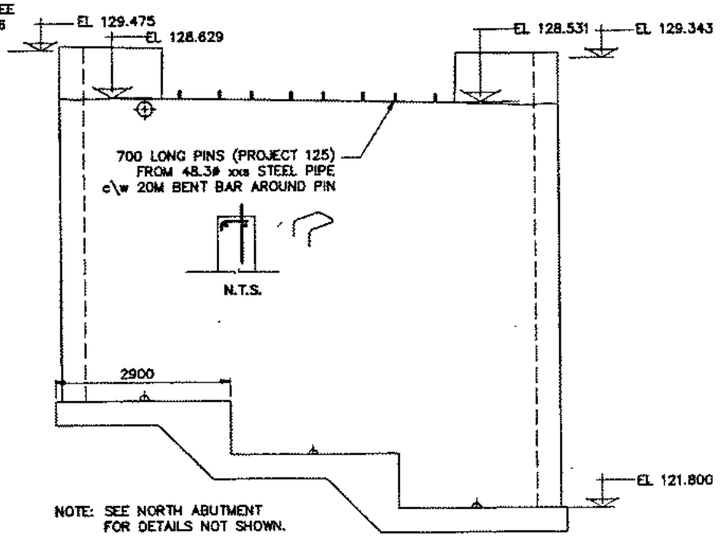
1:50



SEE NOTES FOR BACKFILLING RESTRICTIONS

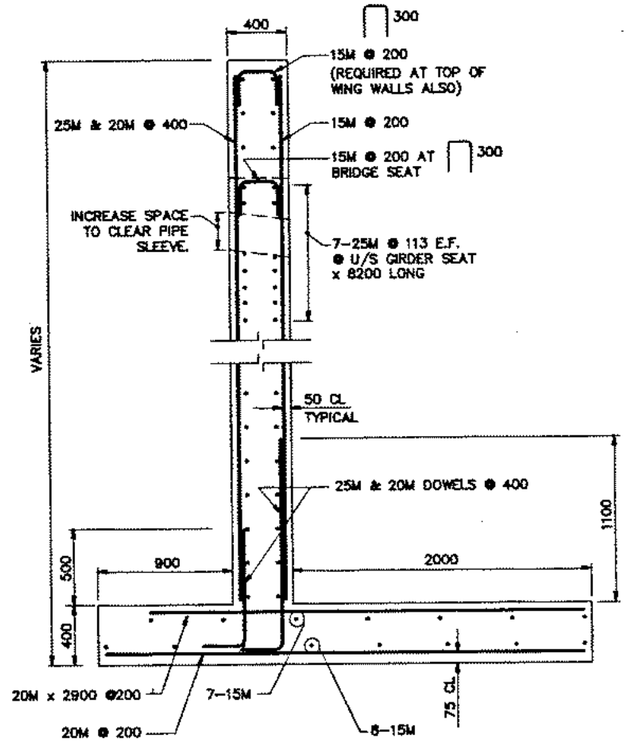
ELEVATION – NORTH ABUTMENT

1:50



ELEVATION – SOUTH ABUTMENT

1:50

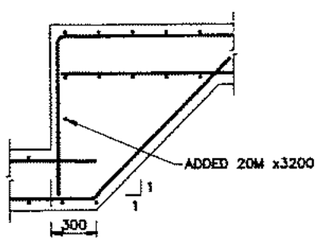


TYPICAL ABUTMENT SECTION

1:20

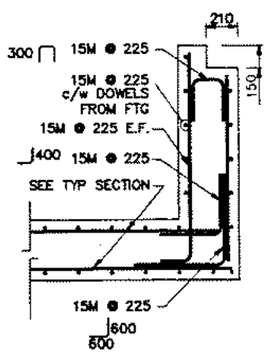
NOTES

1) ALL CONCRETE TO BE CLASS "A" (25 MPa) EXCEPT AS NOTED.
2) EXPOSED EDGES TO BE CHAMFERED 25 EXCEPT AS NOTED.
3) REINFORCING STEEL TO CONFORM TO C.S.A. SPECIFICATION G30.12M GRADE 400.
4) REINFORCING STEEL TO HAVE 50 MINIMUM COVER EXCEPT AS NOTED.
5) LAP OF BARS FOR SPLICES TO BE 40 x "d" EXCEPT AS NOTED. SPLICES TO BE STAGGERED.
6) FOOTINGS TO BE CARRIED DOWN TO ELEVATIONS SHOWN OR TO SUCH LOWER ELEVATIONS AS MAY BE ORDERED BY THE ENGINEER.
7) ABUTMENT WALLS TO BE BACKFILLED AND COMPACTED TO A MAXIMUM OF 3.0m ABOVE TOP OF FOOTING PRIOR TO PLACING BOX GIRDERS AND GROUTING PINS.
8) AFTER BOX GIRDERS ARE IN PLACE, BACKFILL LEVELS BEHIND NORTH AND SOUTH ABUTMENTS MUST NOT DIFFER IN ELEVATION BY MORE THAN 1.25m DURING BACKFILLING AND COMPACTION.

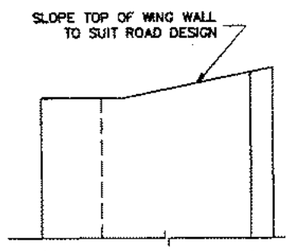


STEP FOOTING DETAIL

1:20



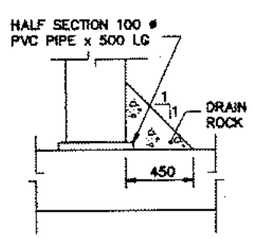
PLAN



END ELEVATION

WING WALL DETAIL

1:20



DRAIN PIPE DETAIL

1:20

D	
C	
B	
A	

REVISIONS

THURBER CONSULTANTS LTD.

KER, PRIESTMAN & ASSOCIATES LTD.

DRAWN JAN 1986 CHECKED PROJECT No. 25265-111

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

BAYVIEW PLACE BRIDGE

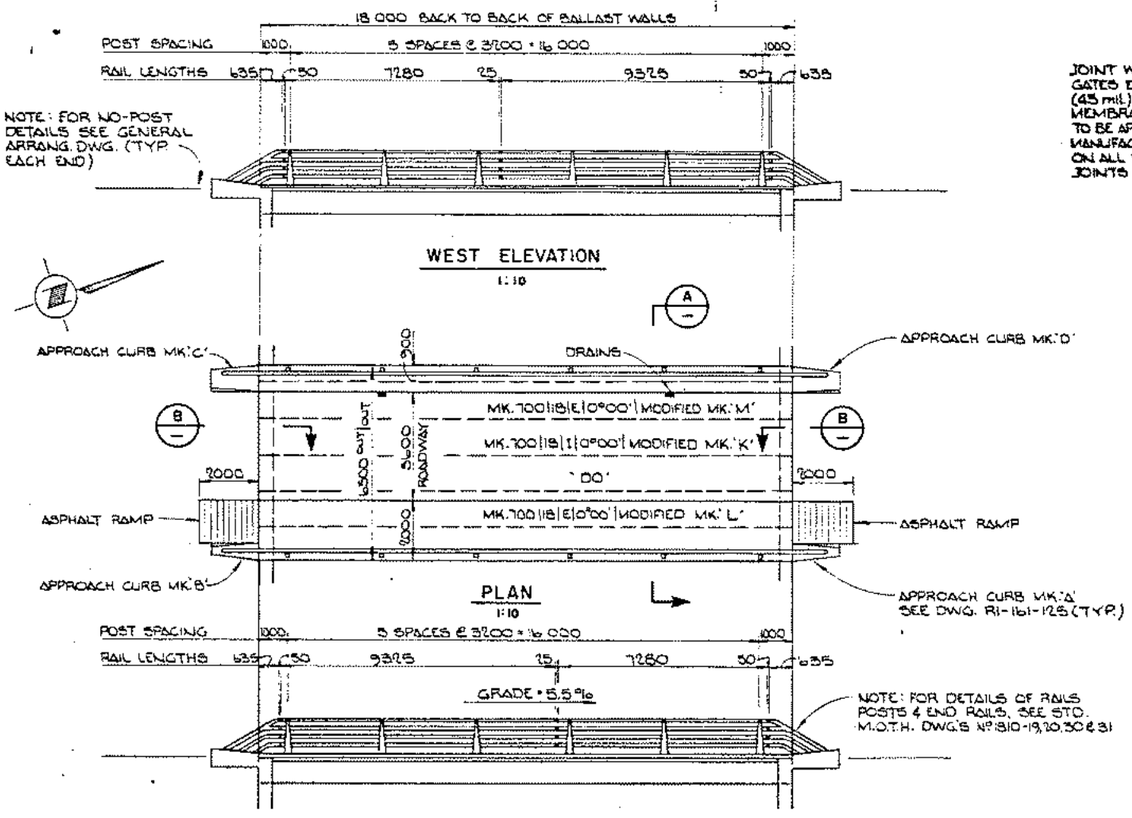
ABUTMENTS
ALBERTA CREEK CHANNELIZATION AND BRIDGES

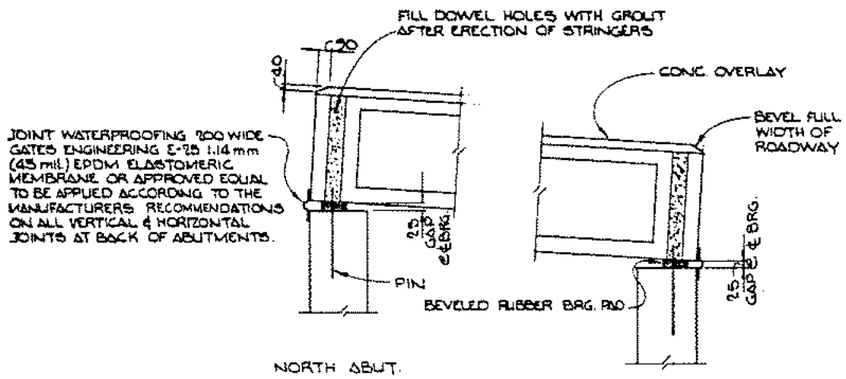
PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF SPECIAL ENGINEERING DATE 86.03.03	DISTRICT DIRECTOR ENGINEERING DATE 1986-05-03

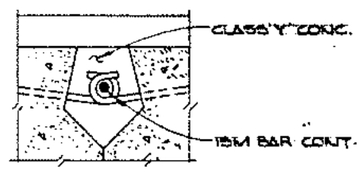
INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					R1-161-111

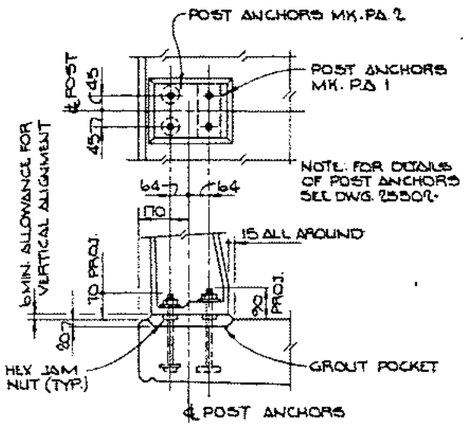
CANCEL PRINTS BEARING EARLIER LETTER

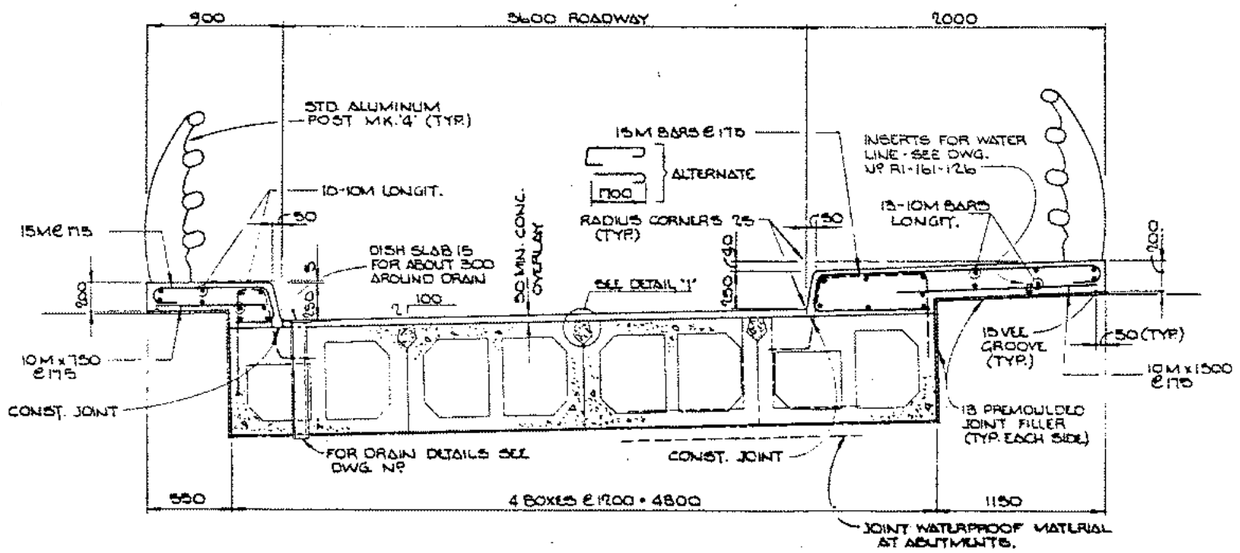
FORM H308H











NOTES:
1. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH C.S.A. SPECIFICATIONS G30.12M GRADE 400
2. REBAR TO HAVE MIN. 50 COVER EXCEPT WHERE NOTED
3. LAP OF BARS FOR SPLICES TO BE 40xd', SPLICES TO BE STAGGERED
4. CONCRETE TO BE CLASS 'A' EXCEPT AS NOTED.
5. SHEAR KEYS TO BE FILLED WITH CLASS 'Y' CONCRETE.
6. SCREEDS FOR DECK CONCRETE SHALL BE SET TO GIVE A UNIFORM GRADE FROM END TO END OF THE BRIDGE AND TO ACCOMODATE HOGGING OF THE STRINGERS WHICH IS TO BE MEASURED IN THE FIELD.
7. DOWEL HOLES TO BE FILLED WITH SAND-CEMENT GROUT AS SHOWN.
8. EXPOSED EDGES TO BE CHAMFERED 15, EXCEPT AS NOTED.
9. SWAB UNDERSIDE OF POSTS WITH AN ALKALI RESISTANT BITUMINOUS PAINT & COAT ANCHOR BOLTS WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND PRIOR TO INSTALLATION.
10. FOR DETAILS OF STRINGERS SEE DWG. Nº
11. CURBS & SIDEWALKS TO BE FORMED TO SUIT 'STL PLAN' HIGHWAY ALIGNMENT & PLACED AFTER ROADWAY OVERLAY IS SET.

REVISIONS	
D	
C	
B	
A	

THURBER CONSULTANTS LTD. Structural Engineers

KER, PRIESTMAN & ASSOCIATES LTD. Consulting Engineers

JAN. 1986 — 25263-112

SCALE: AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

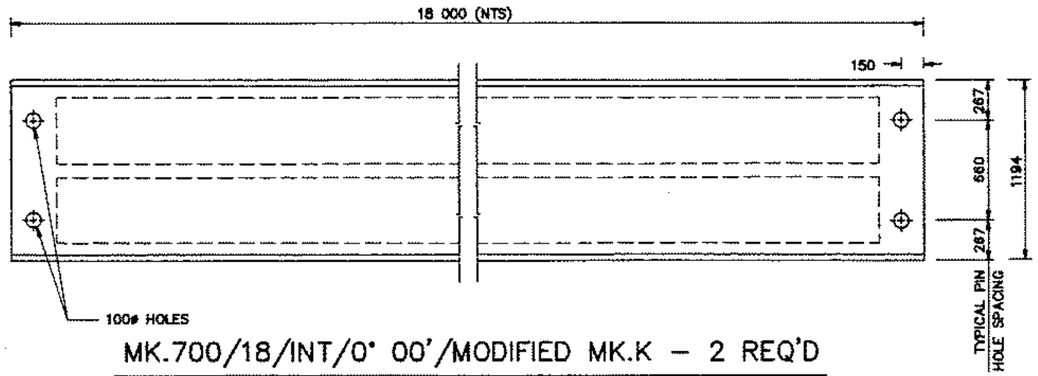
BAYVIEW PLACE BRIDGE
SUPERSTRUCTURE DETAILS

ALBERTA CREEK CHANNELIZATION AND BRIDGES

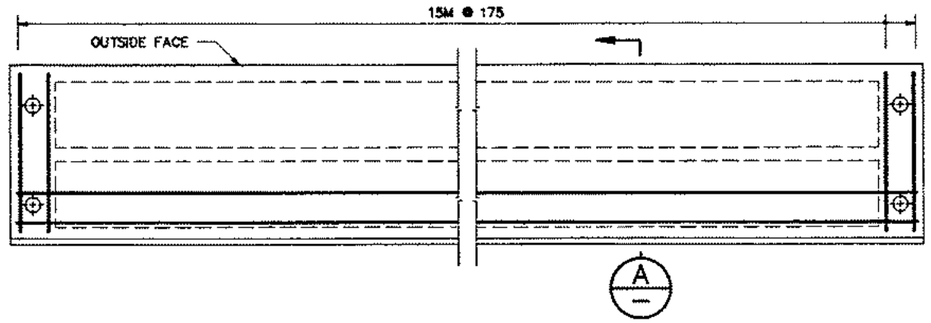
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86-03-05	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-05

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					R1-161-112

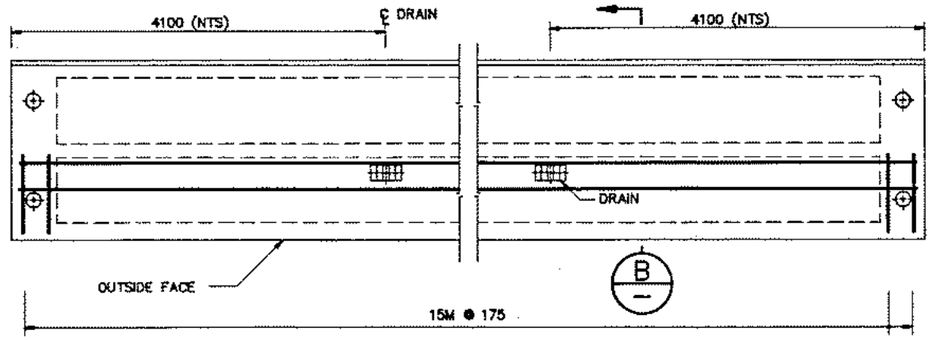
CANCEL PRINTS BEARING EARLIER LETTER



MK.700/18/INT/0° 00'/MODIFIED MK.K – 2 REQ'D

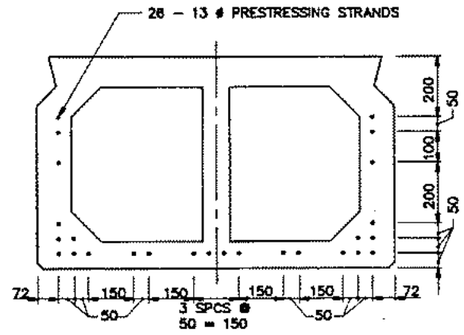


MK.700/18/EXT/0° 00'/MODIFIED MK.L – 1 REQ'D

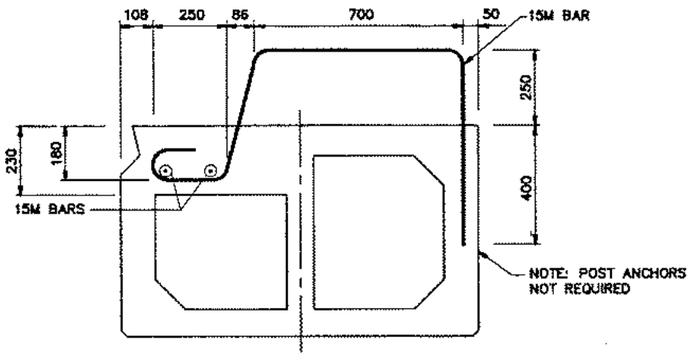


MK.700/18/EXT/0° 00'/MODIFIED MK.M – 1 REQ'D

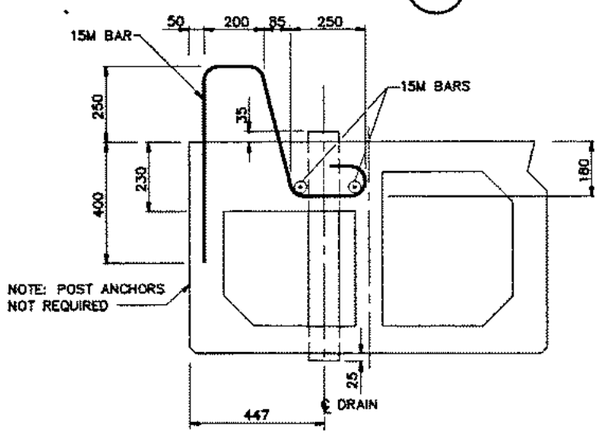
1:20



TYPICAL SECTION – STRAND SPACING

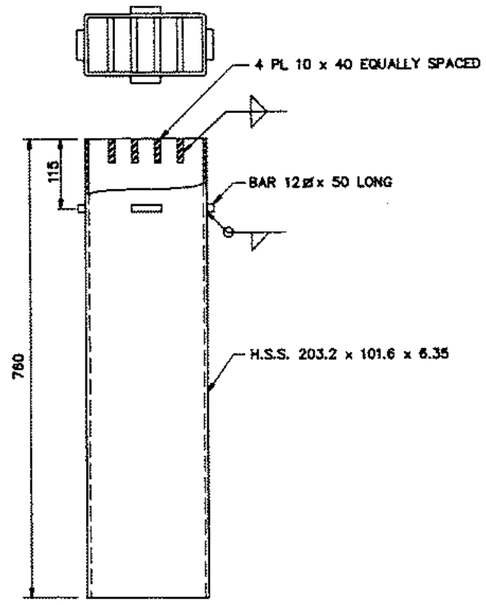


SECTION A



SECTION B

1:10



DRAIN DETAIL 2 REQ'D

(ESTIMATED MASS = 22 kg EACH)

1:5

NOTES

1) FOR "GENERAL NOTES", DETAILS, MESH REINFORCING, AND BLOCK-OUT HOOKS, SEE STD DWG NO. 2309-39.

2) STEELWORK FOR DRAIN TO CONFORM TO C.S.A. SPECIFICATION G40.21 – M81 (230 G)

3) DRAIN TO BE GALVANIZED AFTER FABRICATION. WEIGHT OF GALVANIZING TO BE 610 g/m² SPELTER COATING.

4) THE MINIMUM COMPRESSIVE CONCRETE STRENGTH SHALL BE:
34 MPa AT RELEASE
45 MPa AT 28 DAYS

REVISIONS			
D			
C			
B			
A			

THURBER CONSULTANTS LTD. Consulting Engineers

KER, PRIESTMAN & ASSOCIATES LTD. Consulting engineers

DATE JAN 1986 APPROVED 25283-113

SCALE AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

BAYVIEW PLACE BRIDGE

BOX GIRDER DETAILS

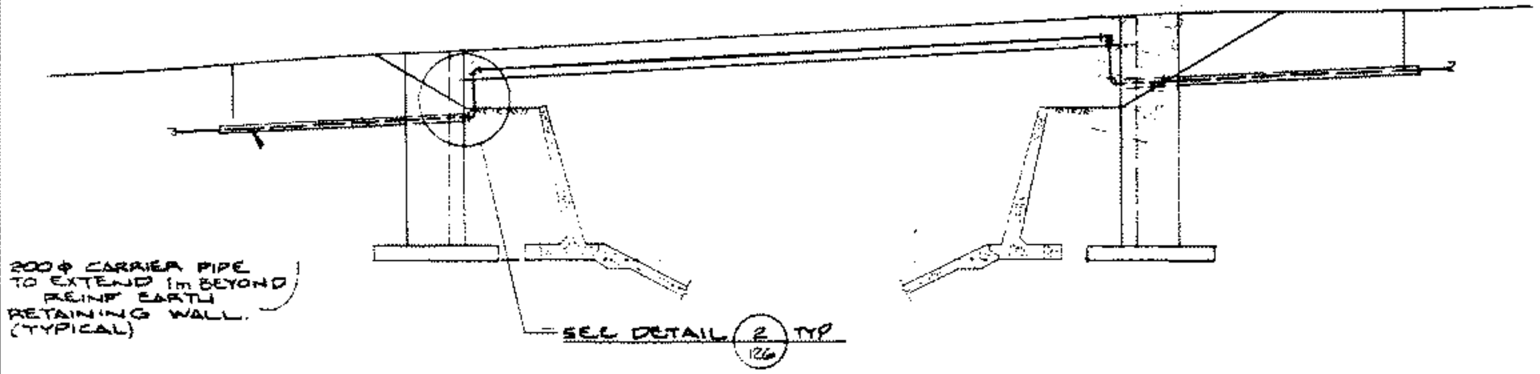
ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 1986-03-03	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

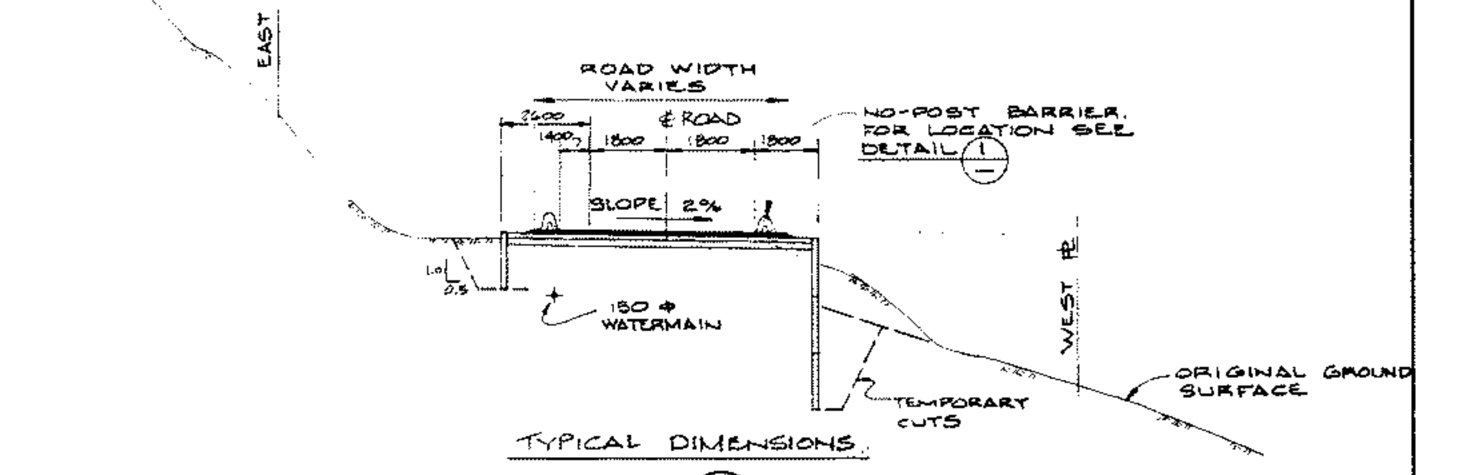
INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-16-113

CANCEL PRINTS BEARING EARLIER LETTER

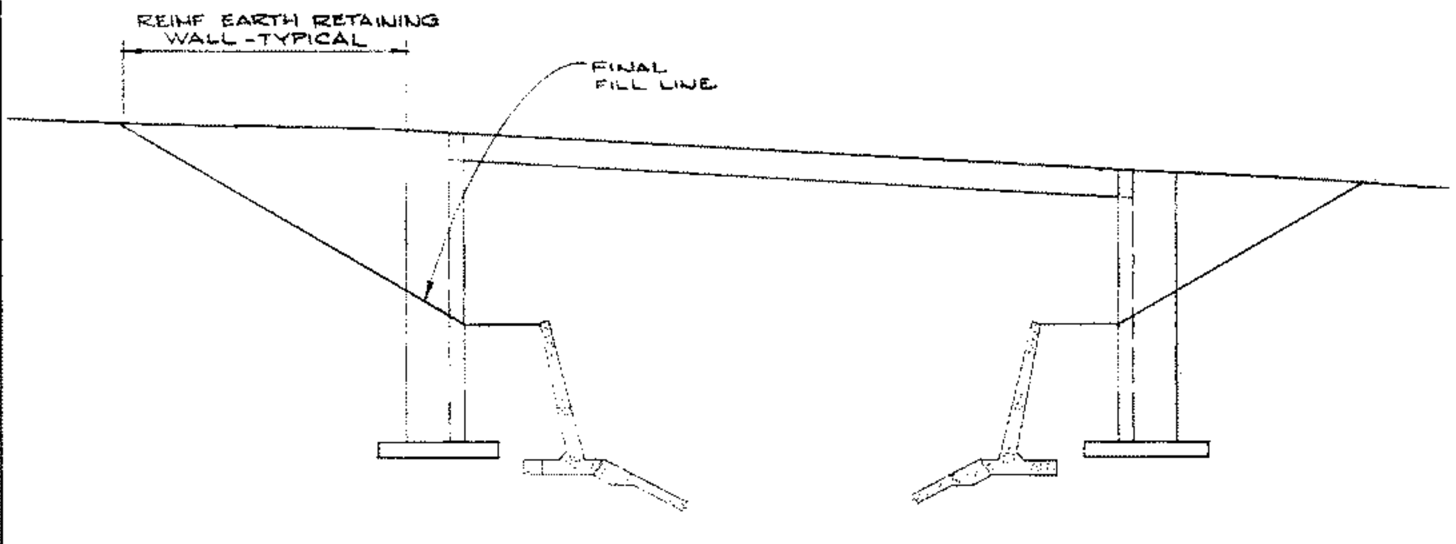
FORM 3-3361 H



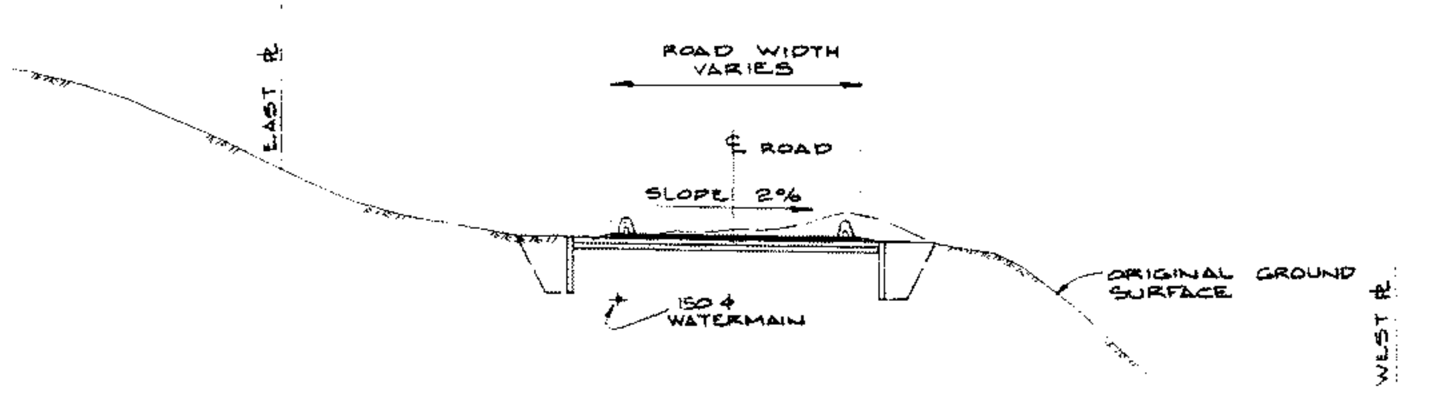
SECTION A
1:100



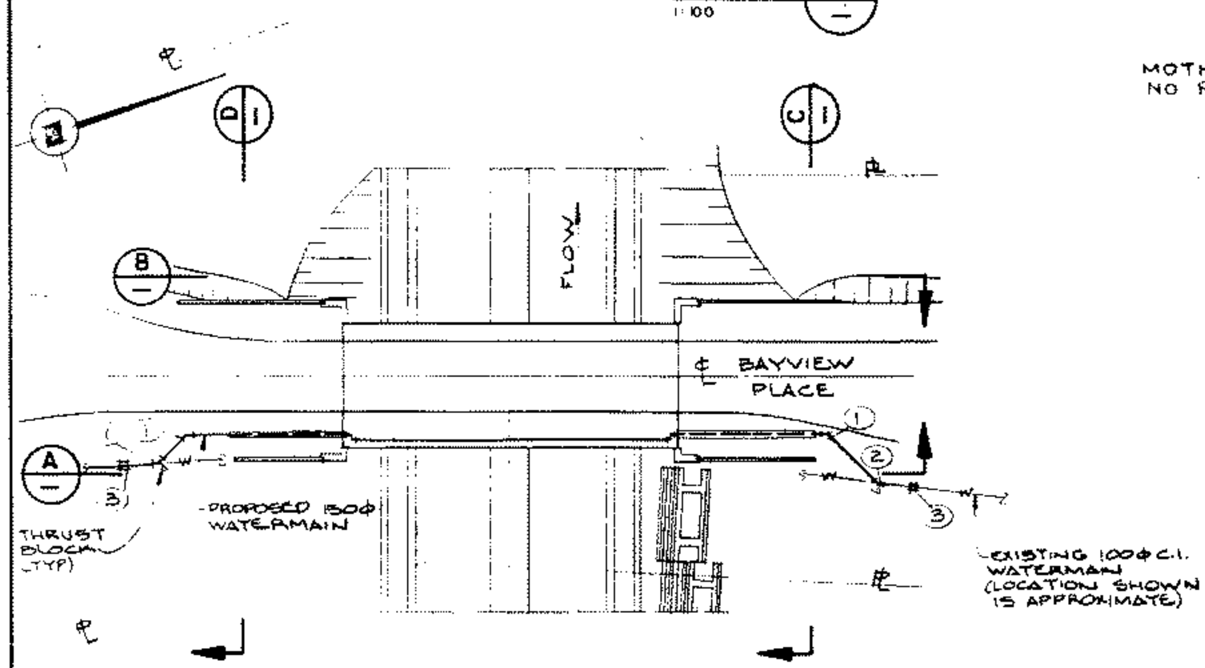
SECTION C
1:100



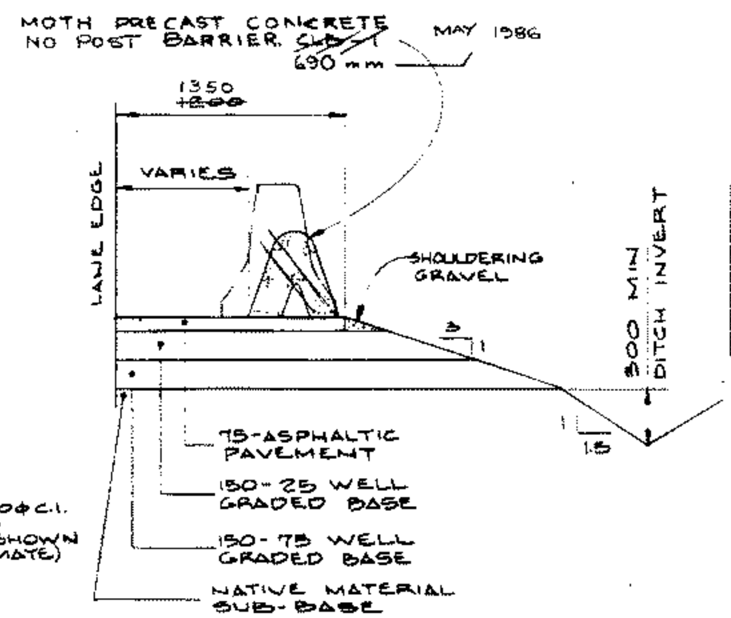
SECTION B
1:100



SECTION D
1:100



PLAN
1:200



DETAIL 1 TYPICAL ROADSIDE BARRIER INSTALLATION & ROAD CONSTRUCTION
1:20

SCHEDULE OF FITTINGS		
ITEM NO.	NO. REQ'D.	DESCRIPTION
1	3	150φ 45° VICTAULIC ELBOW, WRAP WITH DENSO TAPE
2	2	150 φ TERC-O-PLAS ELBOW X ANGLE TO SUIT (SPECIAL)
3	2	TRANSITION COUPLING (ROCKWELL 441-07220463) OR STRAIGHT COUPLING (ROCKWELL 441-00000463) AS REQUIRED

TYPICAL ROADSIDE BARRIER EVERGREEN WALL

JAN 1986 25283 - 114

AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

BAYVIEW PLACE BRIDGE APPROACH WORKS

ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE	DIRECTOR OF BRIDGE ENGINEERING DATE	M G Elston EXECUTIVE DIRECTOR ENGINEERING DATE 1986.03.03

INDEX	NEG No	FILE No.	PROJECT No	REGION	DRAWING No
					R1-161-114 B

CANCEL PRINTS BEARING EARLIER LETTER

FORM H308 H

91-5509-257

NOTES

Wood

1. Construction to be of Number 2 Douglas Fir or better, in accordance with CSA 086.
2. Nailing
   a) Stringers laminated with 2 rows of 175 mm spikes at 400 mm on centre
   b) Deck planks attached to stringers with 3 - 80 mm nails at each stringer (12 per plank)
   c) Wheel-path planks attached with 3 rows of 80 mm nails at 235 mm on centre (typical each plank)
   d) All other joints nailed with 1 nail per 50 mm width of board.

"TEMPORARY BRIDGE MAXIMUM LOAD CAPACITY"

3500 Kilos

N & S ABUTMENT REDESIGN, TEMPORARY BRIDGE ADDED. OCT/86

JAN 1986 25283-120

AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

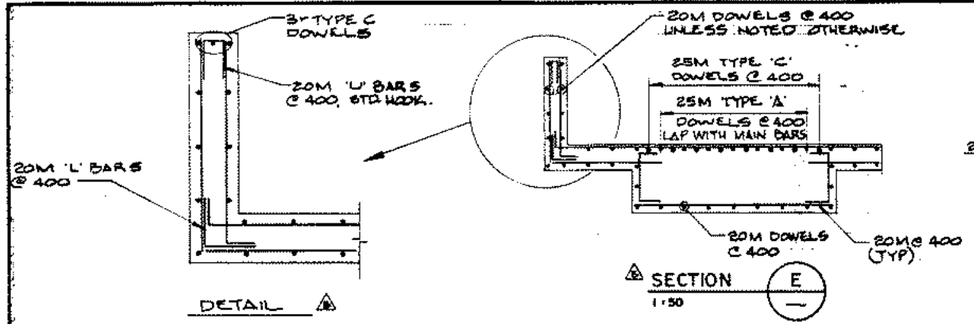
BAYVIEW ROAD DRIVEWAY BRIDGE
SUBSTRUCTURE

ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	M.G. Elston EXECUTIVE DIRECTOR ENGINEERING DATE 1986.03.03

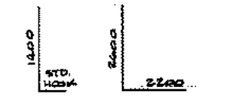
INDEX	NEG No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-120 A

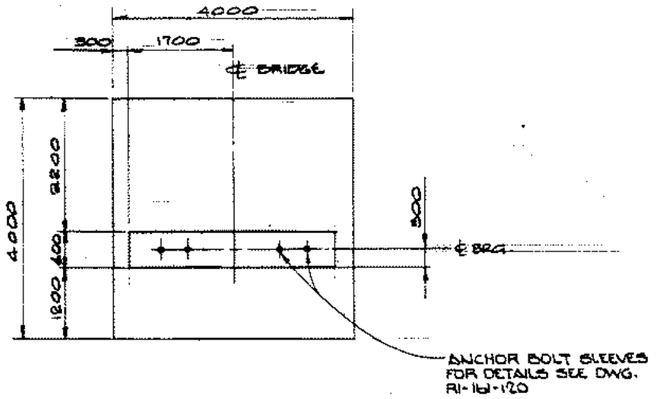
CANCEL PRINTS BEARING EARLIER LETTER



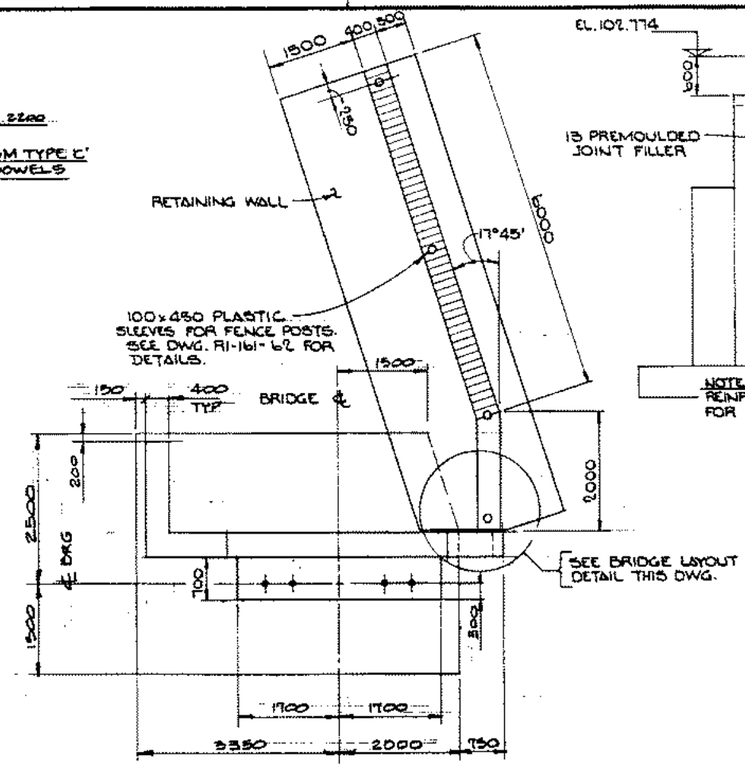
DETAIL ⚠

⚠ SECTION E
1:50

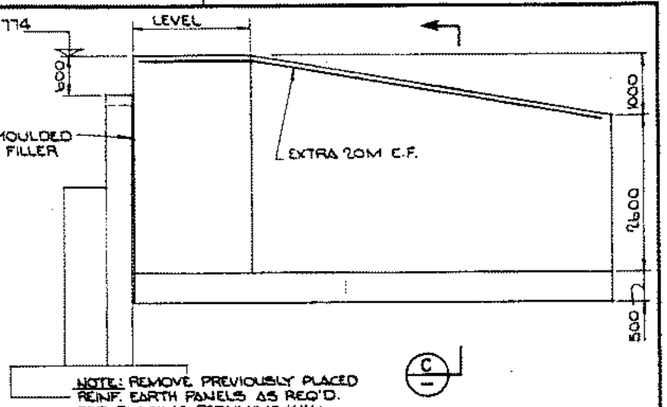




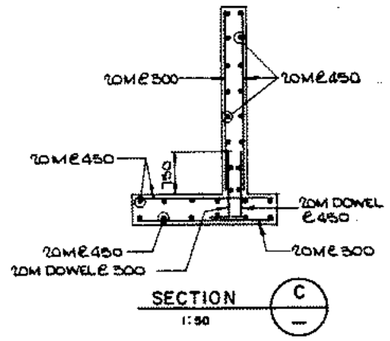
⚠ PLAN - NORTH ABUTMENT
1:50



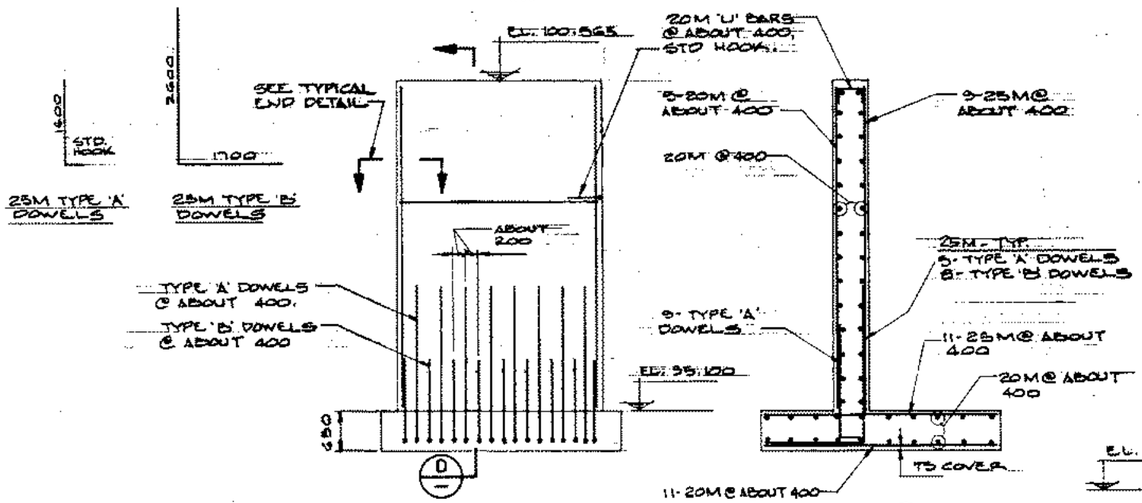
PLAN - SOUTH ABUTMENT ⚠
1:50



SIDE ELEVATION - RETAINING WALL
1:50

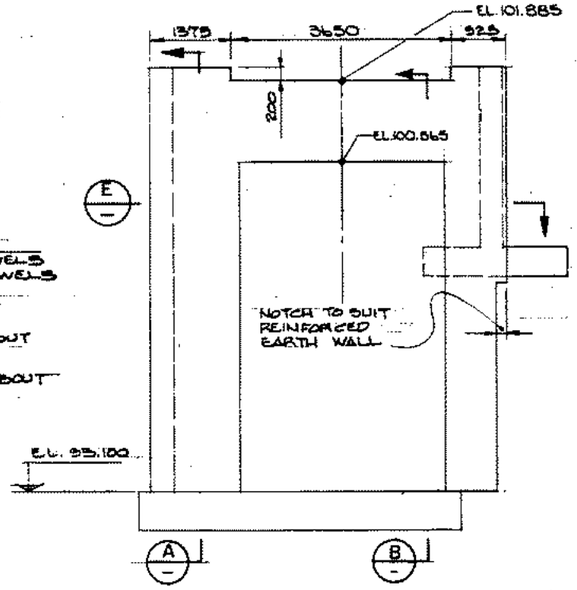


SECTION C
1:50

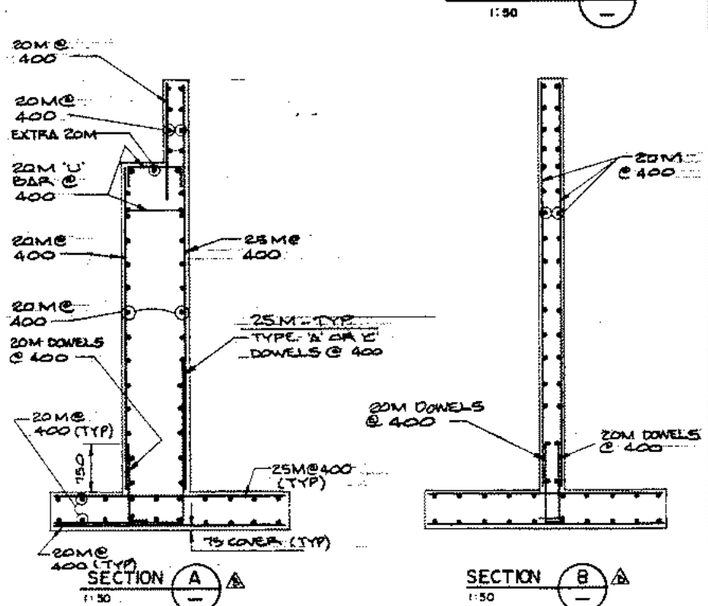


ELEVATION ⚠
1:50

SECTION D ⚠
1:50

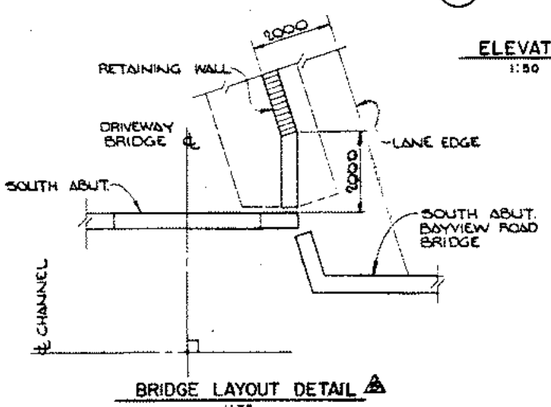


ELEVATION ⚠
1:50

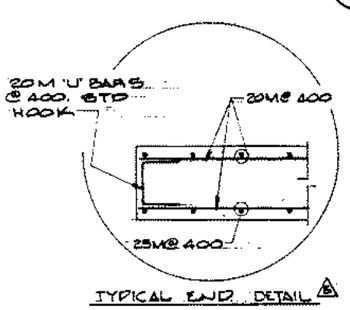


SECTION A ⚠
1:50

SECTION B ⚠
1:50



BRIDGE LAYOUT DETAIL ⚠
1:75



TYPICAL END DETAIL ⚠

NOTES:
1) ALL CONC. TO BE CLASS 'A' EXCEPT AS NOTED.
2) EXPOSED EDGES TO BE CHAMFERED 25
3) REINFORCING STEEL TO CONFORM TO CSA. SPEC. G30.12M GRADE 400
4) REINFORCING STEEL TO HAVE MIN. 50 COVER EXCEPT AS NOTED.
5) LAP OF BARS FOR SPLICES TO BE 40 x'd' EXCEPT AS NOTED, SPLICES TO BE STAGGERED.

N & S ABUTMENT REDESIGN
ABUTMENT BASE LOWERED

THURBER CONSULTANTS LTD.

JAN. 1986 — 23283-121

AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

BAYVIEW ROAD DRIVEWAY BRIDGE
ABUTMENT DETAILS

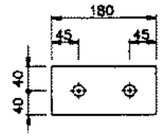
ALBERTA CREEK CHANNELIZATION AND BRIDGES

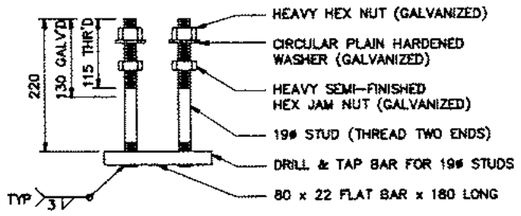
PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF ENGINEERING DATE 86.03.07	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-05-03

INDEX	REG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
					RI-161-121

CANCEL PRINTS BEARING EARLIER LETTER

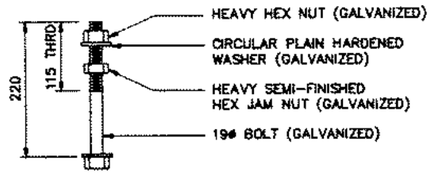
FORM H1068





MARK PA1 (ONE REQ'D PER POST)

ESTIMATED MASS = 4.0 kg EACH



MARK PA2 (2 REQ'D PER POST)

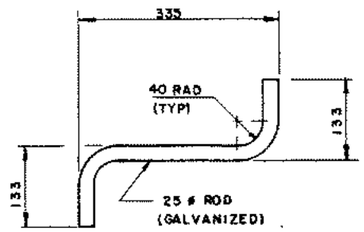
ESTIMATED MASS = 0.8 kg EACH

NOTES

1) STUDS, BOLTS, NUTS (EXCEPT JAM NUTS), & WASHERS TO CONFORM TO A.S.T.M. SPECIFICATION A325. BAR TO CONFORM TO C.S.A. SPECIFICATION G40.21M 260W.

DETAIL OF POST ANCHORS

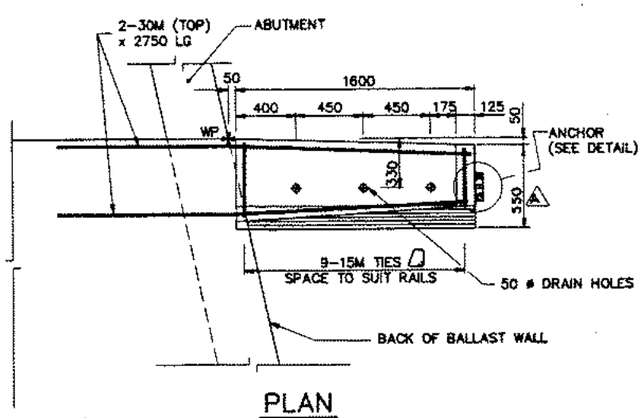
1:5



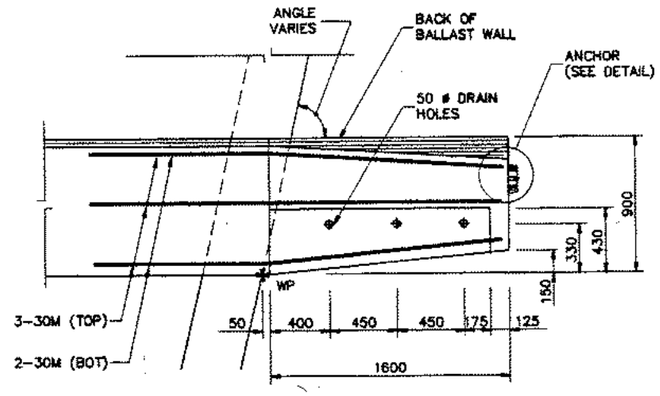
NOTE
MATERIAL TO CONFORM TO CSA SPEC G40.21M 230G

TYPICAL HOOK DETAIL A

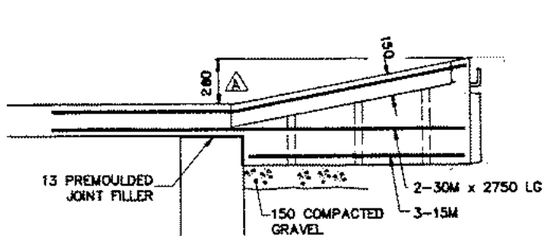
1:5

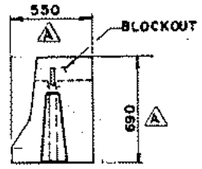


PLAN

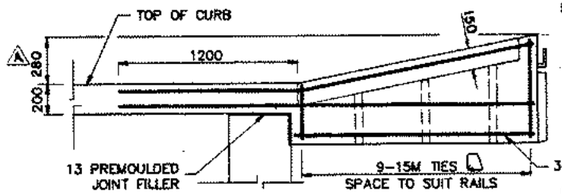


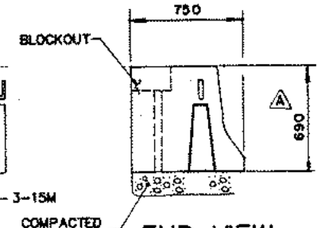
PLAN





END VIEW

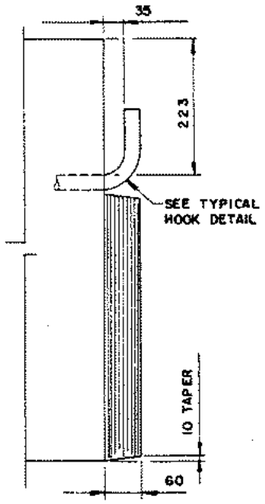




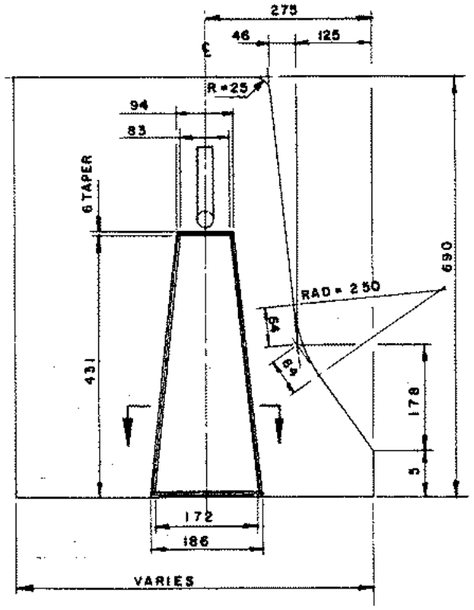
END VIEW

RIGHT HAND APPROACH CURB – MK.B
LEFT HAND APPROACH CURB – MK.A (OPP HAND)

1:20



SIDE VIEW

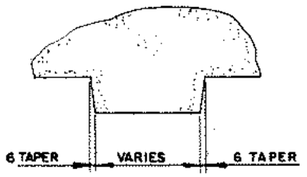


TYPICAL END VIEW DETAIL A

1:5

LEFT HAND APPROACH CURB – MK.C
RIGHT HAND APPROACH CURB – MK.D (OPP HAND)

1:20



TYPICAL SECTION

1 APPROACH CURBS TO SUIT 490 NO. POST. JB
REVISIONS

THURBER CONSULTANTS LTD.

KER, PRIESTMAN & ASSOCIATES LTD.

DATE JAN 1986 25283-125

AS NOTED

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

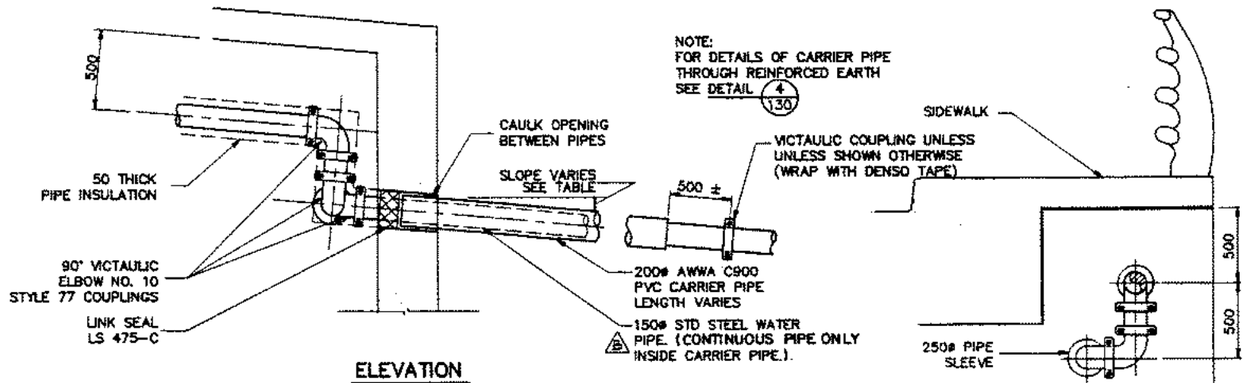
SUBDIVISION BRIDGES
MISCELLANEOUS DETAILS SHEET 1
ALBERTA CREEK CHANNELIZATION AND BRIDGES

PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE	EXECUTIVE DIRECTOR ENGINEERING DATE 1986.03.03

INDEX	NEG No	FILE No.	PROJECT No	REGION	DRAWING No.
					RI-161-125 A

CANCEL PRINTS BEARING EARLIER LETTER

FORM H3061

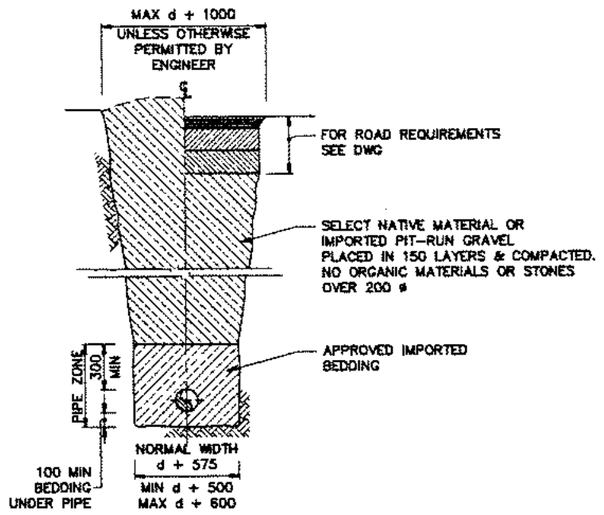


ELEVATION

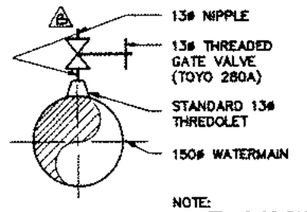
END ELEVATION
1:20

	SLOPE OF CARRIER PIPE	
BRIDGE	SOUTH ABUTMENT	NORTH ABUTMENT
BAYVIEW PL	7.0%	0%
BAYVIEW RD	8.5%	13.5%
UPPER ISLEVIEW	6.0%	7.5%
LOWER ISLEVIEW	13.5%	2.5%

DETAIL (2) TYPICAL ABUTMENT PIPE SLEEVE
1:20

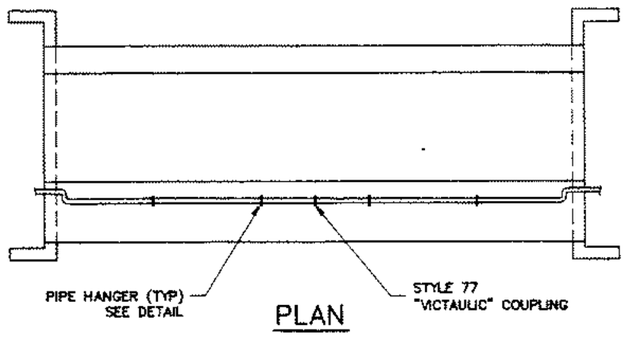


TYPICAL TRENCH SECTION
1:20

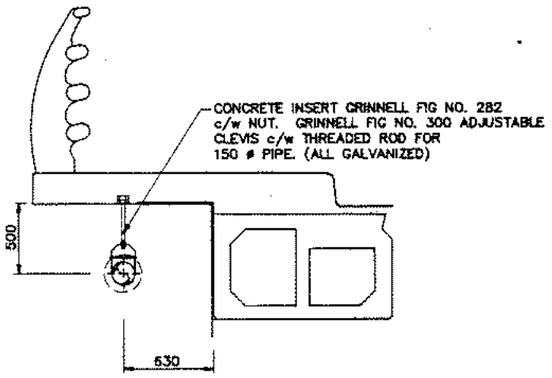


NOTE:
LOCATE AIR RELEASE ASSEMBLY AT HIGH POINT OF WATER LINE UNDER BRIDGE.

AIR RELEASE ASSEMBLY
1:5



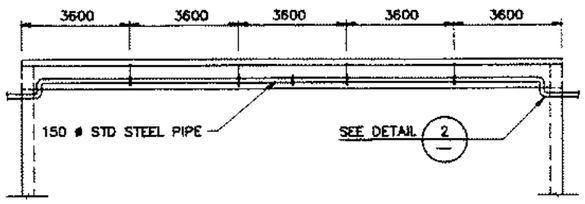
PLAN



PIPE HANGER DETAIL
1:20

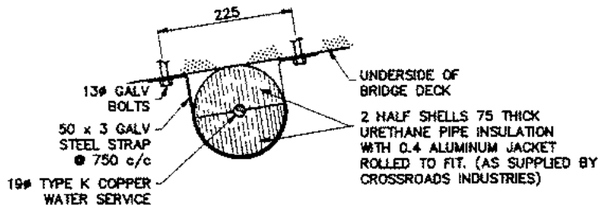
NOTES

1) ALL CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 25 MPa.
2) ALL STEEL PIPE SHALL BE COAL TAR ENAMEL LINED AND COATED WITH HOT APPLIED COAL TAR ENAMEL TO AWWA C203.
3) ALL EXPOSED PIPE TO BE INSULATED WITH URETHANE PIPE COVERING AND 0.4mm (.016") ALUMINUM JACKET. INSULATION THICKNESS – 150ø PIPE 50mm
19ø PIPE 75mm
4) THRUST BLOCKS TO BE PLACED ON WELL COMPACTED GRAVEL BASE.



SECTION

TYPICAL BRIDGE CROSSING
1:100



DETAIL (1) WATER SERVICE TO 320 LIONS BAY AVE
1:5

PIPING DETAILS REVISED JB
SIDEWALK JB
REVISIONS

THURBER CONSULTANTS LTD.

KERR, WOOD, LEIDAL & ASSOCIATES LTD.

JAN 1986 25283-126

AS NOTED

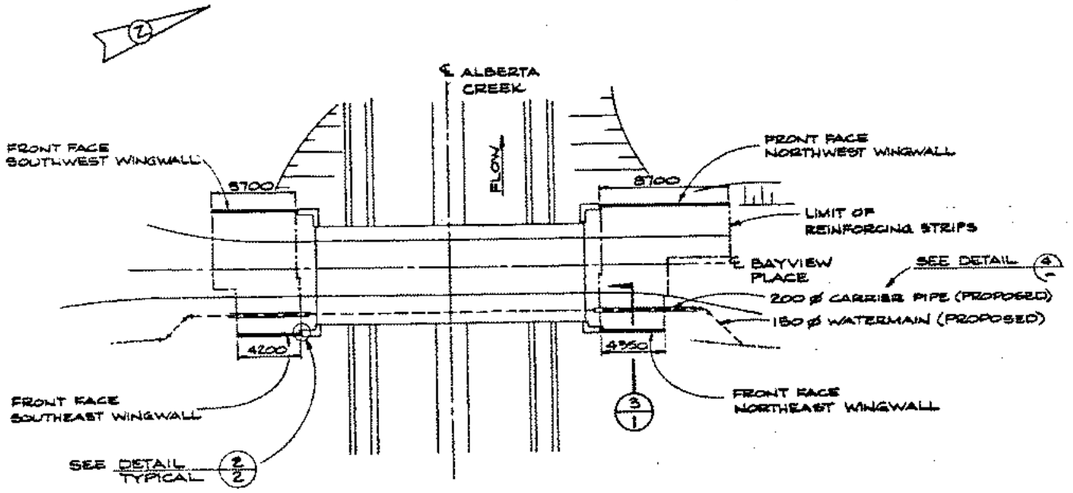
PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

SUBDIVISION BRIDGES
MISCELLANEOUS DETAILS SHEET 2
ALBERTA CREEK CHANNELIZATION AND BRIDGES

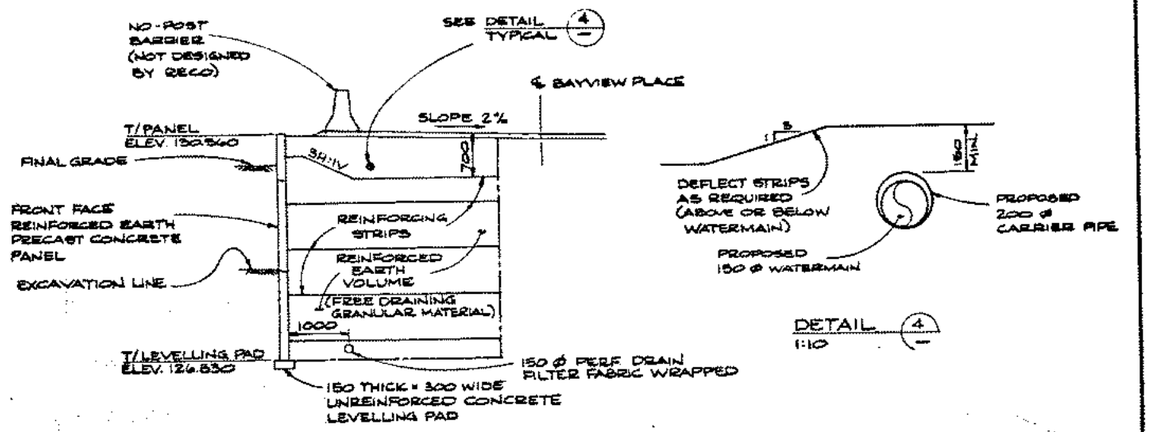
PREPARED UNDER THE DIRECTION OF	RECOMMENDED	ACCEPTED FOR CONSTRUCTION
DATE Feb 27/86	DIRECTOR OF BRIDGE ENGINEERING DATE 86.03.03	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-03

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING NO.
					RI-161-126 B

CANCEL PRINTS BEARING EARLIER LETTER



PLAN - BAYVIEW PLACE
1:200



SECTION 3/1,3
1:50

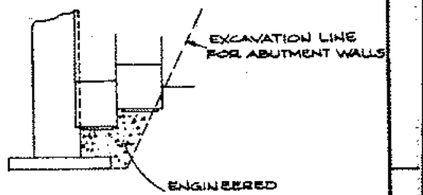
DETAIL 4/-
1:10

NOTES:

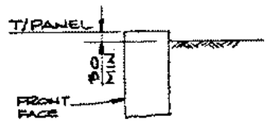
1. ALL DIMENSIONS ARE IN MILLIMETRES; ELEVATIONS ARE IN METRES.
2. ALL PANELS SHOWN ON ELEVATIONS ARE TYPE 'A4' UNLESS NOTED OTHERWISE.
3. TOTAL AREAS:

		PANEL THICKNESS
BAYVIEW PLACE -	94.098 m²	- 140 mm
BAYVIEW ROAD -	111.032 m²	- 140 mm
LOWER ISLEVIEW PLACE -	167.980 m²	- 140 mm
UPPER ISLEVIEW PLACE -	162.857 m²	- 140 mm
LION'S BAY AVENUE -	79.985 m²	- 180 mm
GRAND TOTAL	605.952 m²	

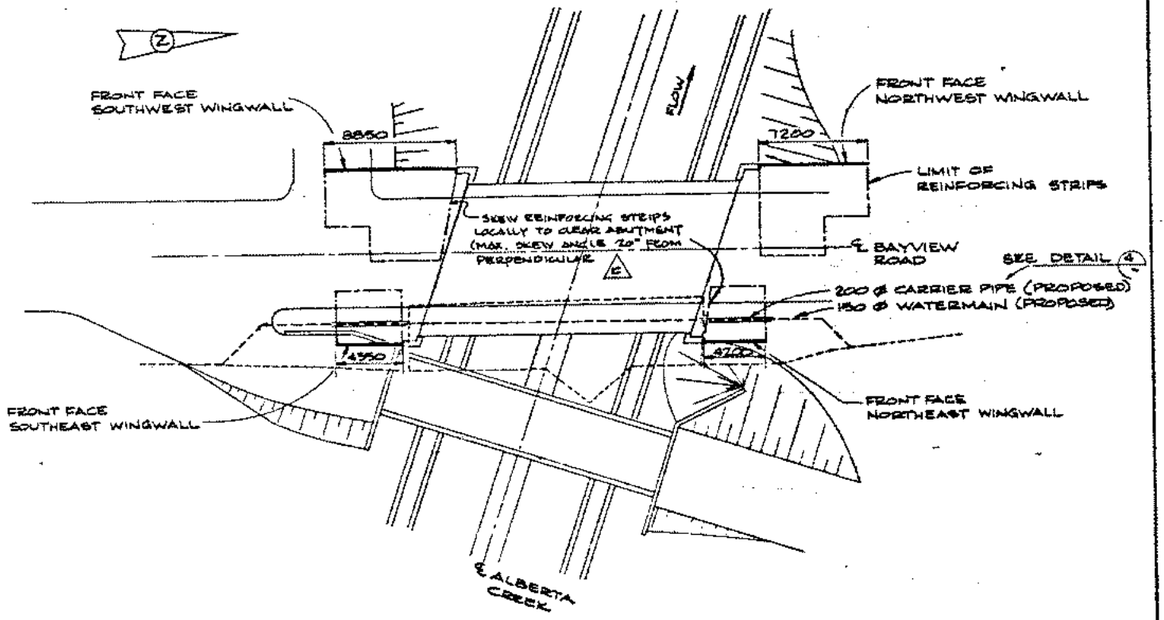
4. LOADS: i) TRAFFIC 12.5 kPa (MS 250)
   ii) SEISMIC ZONE 3 (N.B.C. - 1980)
5. APPLIED BEARING PRESSURES AS SHOWN ON ELEVATIONS AND OVERALL GLOBAL STABILITY ARE TO BE REVIEWED BY THE GEOTECHNICAL ENGINEER.
6. ALL MATERIAL IMMEDIATELY UNDER THE REINFORCED EARTH VOLUME IS TO BE FILTER GRADED.
7. REFERENCE DRAWINGS:
   KER PRIESTMAN AND ASSOCIATES LTD
   - DWG NO. 25302-SK14 LIONS BAY AVENUE BRIDGE
   25302-SK15 LOWER ISLEVIEW BRIDGE
   25302-SK16 UPPER ISLEVIEW BRIDGE
   25302-SK17 BAYVIEW ROAD BRIDGE
   25302-SK18 BAYVIEW PLACE BRIDGE
   25302-SK19 GENERAL ARRANGEMENT
   - ELEVATION CALCULATIONS DATED JAN 9/86
8. OUTLETS OF DRAIN PIPE ARE TO BE PLACED AS DIRECTED BY ENGINEER.
9. NUMBER IN BRACKETS AFTER PANEL TYPE INDICATES NUMBER OF TIE STRIPS PER PANEL.
10. ALL REINFORCING STRIPS ARE 60 mm x 5 mm.
11. ABOVE NOTES APPLY TO DRAWINGS 85456-1 TO 85456-6.



ENGINEERED FILL DETAIL
1:100
(THIS DETAIL APPLIES TO ALL R/E RETAINING WALLS)



TOP OF PANEL DETAIL (TYP)
1:10



PLAN - BAYVIEW ROAD
1:200

SCALE AS SHOWN	DESIGNED BB	DATE June 86	
	CHECKED	DATE	
F			
E			
D			
C	ISSUED FOR CONSTRUCTION	DEC 1986	
B	STRIPS SKEWED - BAYVIEW ROAD	29 JAN 1986	
A	ISSUED FOR TENDER	17 JAN 1986	
	REVISIONS		

Reinforced Earth Company Ltd.
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PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

ALBERTA CREEK CHANNELIZATION
BAYVIEW PLACE AND BAYVIEW ROAD BRIDGES
REINFORCED EARTH RETAINING WALLS
PLANS, SECTION, DETAILS

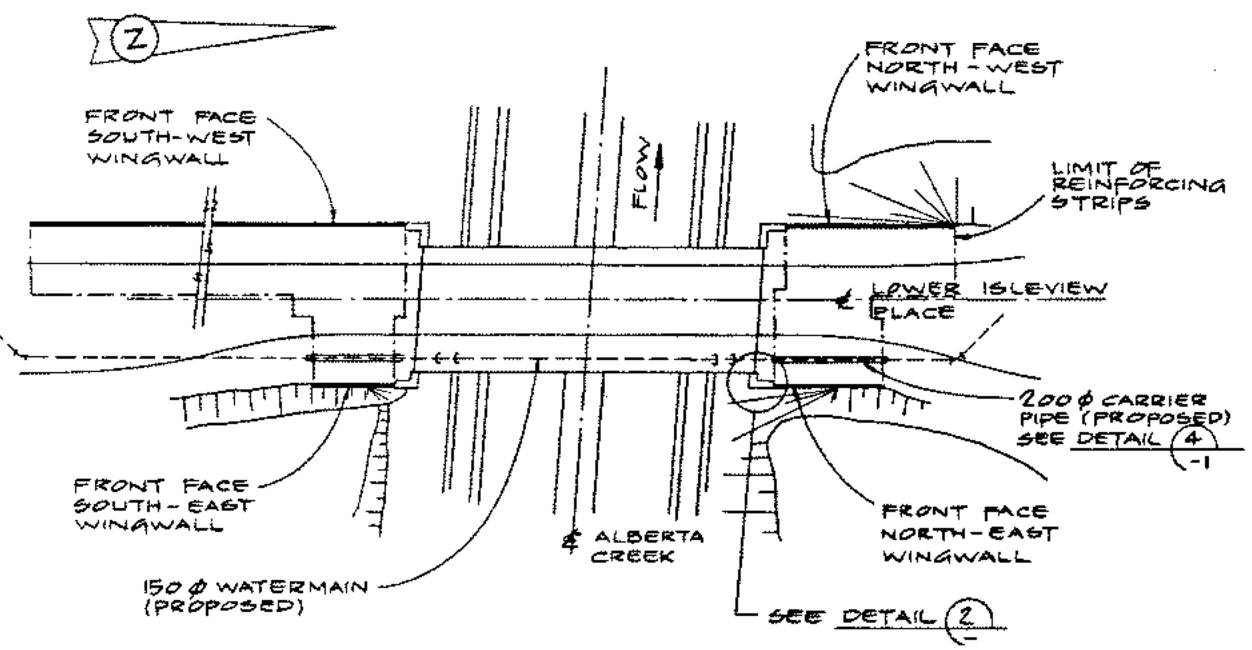
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE	DIRECTOR OF HIGHWAY DESIGN AND SURVEYS DATE Feb 27/86	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-01

INDEX	REG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
			C-3753	1	RI-161-130 |C

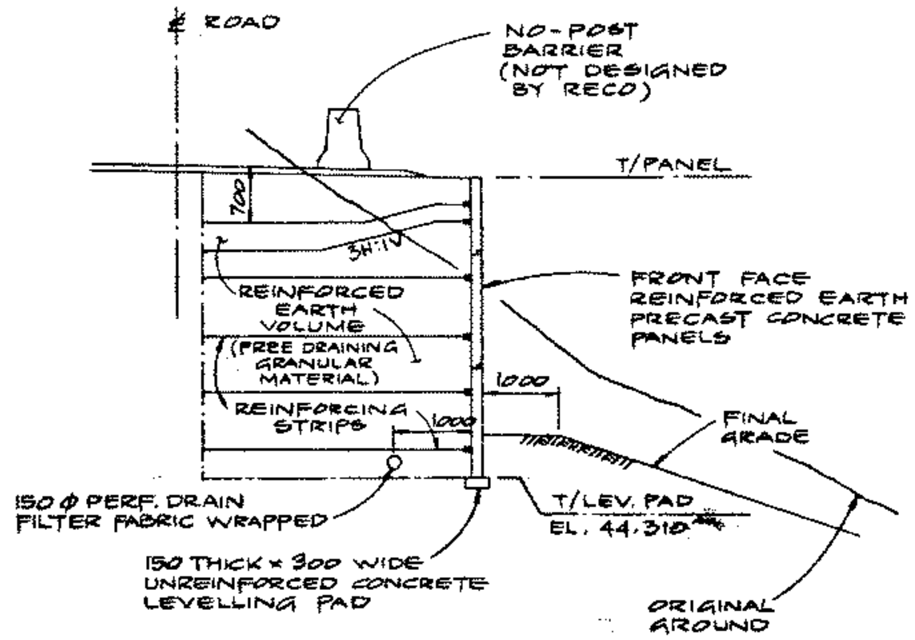
CANCEL PRINTS BEARING EARLIER LETTER

85456-1

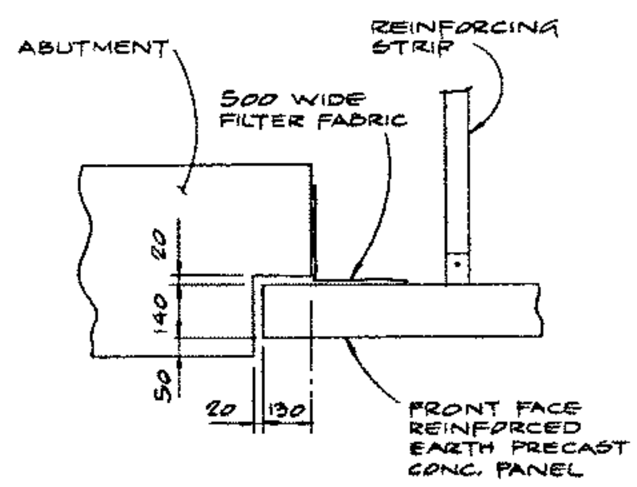
FORM 1.2061.4



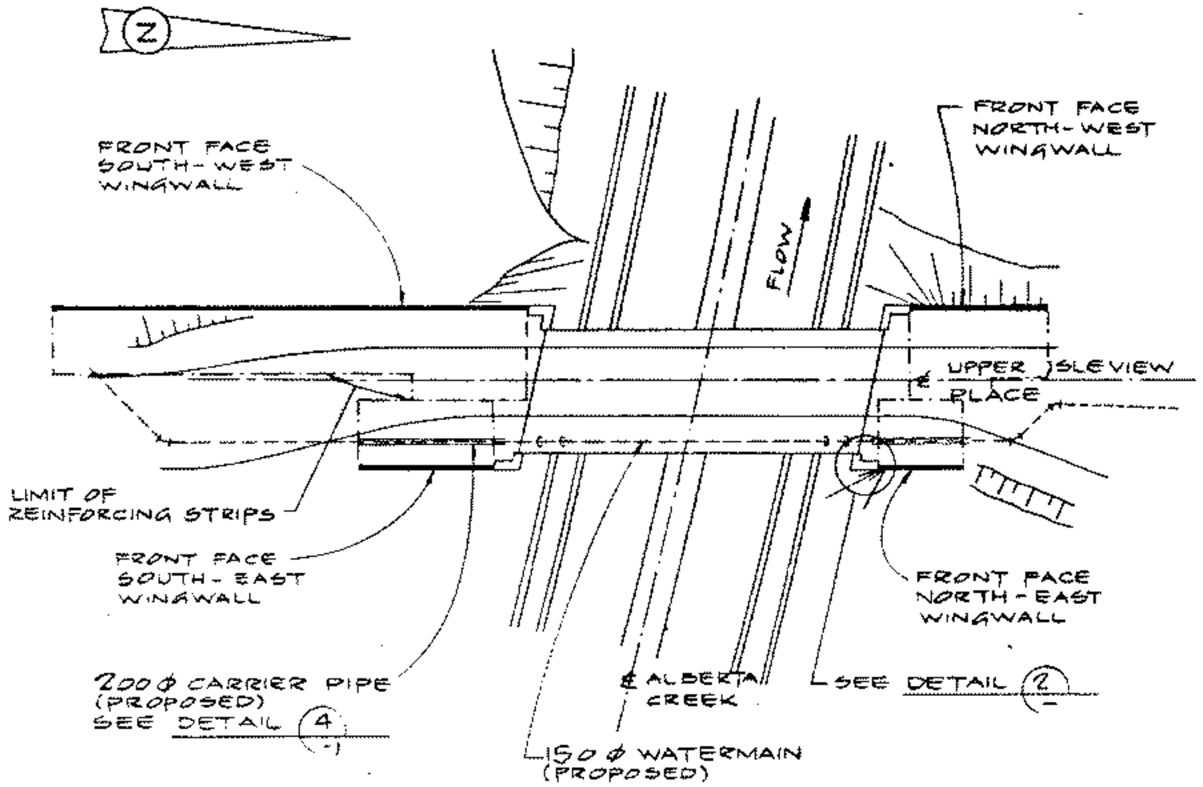
PLAN
LOWER ISLEVIEW PLACE BRIDGE
1:200



SECTION 1 -5
1:50



TYPICAL
DETAIL 2 -
1:10



PLAN
UPPER ISLEVIEW PLACE BRIDGE
1:200

Reinforced Earth Company Ltd.
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PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

ALBERTA CREEK CHANNELIZATION
LOWER AND UPPER ISLEVIEW PLACE BRIDGES
REINFORCED EARTH RETAINING WALLS
PLANS, SECTION, DETAILS

SCALE AS SHOWN — DESIGNED BC — DATE JAN 86

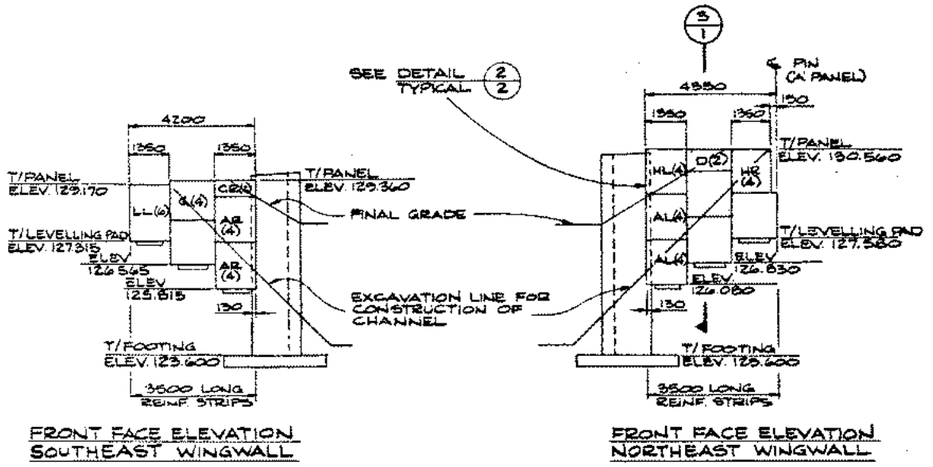
	REVISIONS	DATE
F		
E		
D		
C		
B	ISSUED FOR CONSTRUCTION	12 FEB 1986
A	ISSUED FOR TENDER	17 JAN 1986

PREPARED UNDER THE DIRECTION OF — APPROVED FOR USE IN CONSTRUCTION — DIRECTOR OF HIGHWAY DESIGN AND SURVEYS — DATE Feb 27/86 — EXAMINED AND ACCEPTED MGElder — EXECUTIVE DIRECTOR ENGINEERING — DATE 1986-03-01

INDEX	NEG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
			C-3753	1	RI-161-131 B

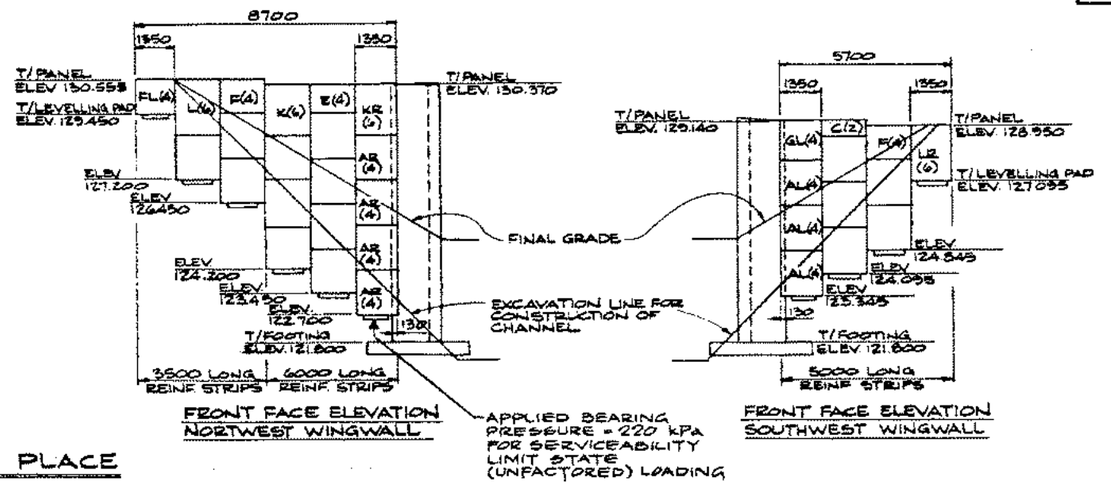
CANCEL PRINTS BEARING EARLIER LETTER

85456-2



FRONT FACE ELEVATION
SOUTHEAST WINGWALL

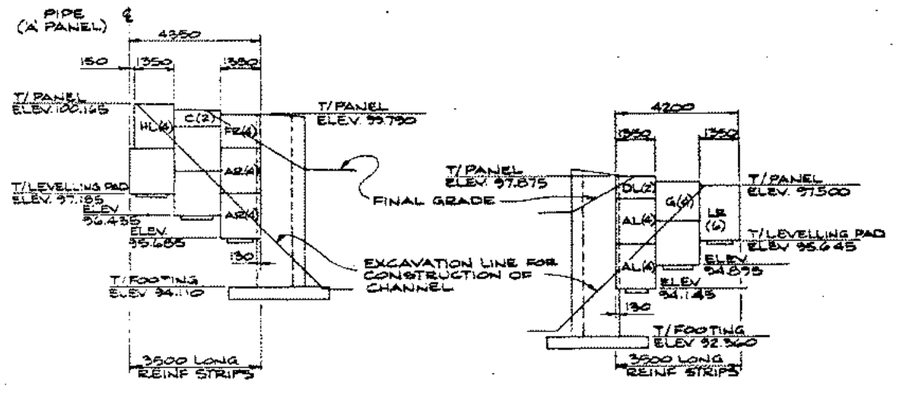
FRONT FACE ELEVATION
NORTHEAST WINGWALL



FRONT FACE ELEVATION
NORTWEST WINGWALL

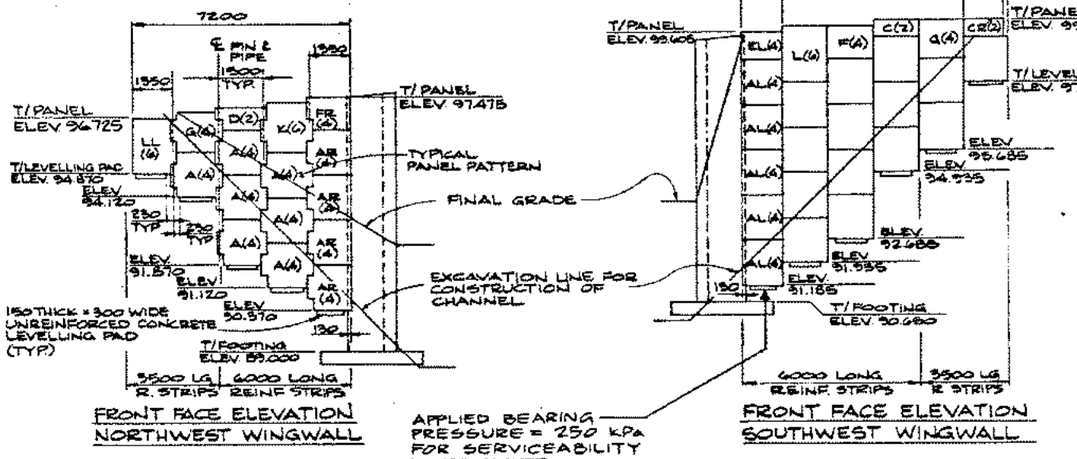
FRONT FACE ELEVATION
SOUTHWEST WINGWALL

BAYVIEW PLACE



FRONT FACE ELEVATION
SOUTHEAST WINGWALL

FRONT FACE ELEVATION
NORTHEAST WINGWALL



FRONT FACE ELEVATION
NORTHWEST WINGWALL

FRONT FACE ELEVATION
SOUTHWEST WINGWALL

BAYVIEW ROAD

PANEL SCHEDULE - BAYVIEW PLACE, BAYVIEW ROAD, LOWER ISLEVIEW PLACE AND UPPER ISLEVIEW PLACE

TOTAL AREA - 526.007 m² 140 mm THICK PANELS

NO. OF TIE STRIPS/PANEL	PANEL TYPE A	B	C	D	E	F	G	H	K	L	AL	AR	CL	CR	DL	EL	FL	FR	GL	HL	HR	KR	LL	LR
(2)		11	4	3									1	3	3									
(4)	118				5	5	7	1			25	22				2	1	2	1	5	2			
(6)									5	2												3	3	4
AREA/PANEL SQ. METRES	1.250	1.250	0.617	1.085	1.380	1.690	1.943	2.220	2.505	2.782	2.025	2.025	0.736	0.736	0.986	1.242	1.492	1.492	1.748	1.998	1.998	2.255	2.504	2.504

NO OF TIE STRIPS/PANEL	PANEL TYPE CS	CS1	CS2	DS	DS1	DS2	DS3	DS4	DS5	ES	ES1	FS	FS1	FS2	GS	GS1	GS2	GS3	GS4	GS5	HS	KS	KS1	KS2	KS3	KS4	KS5	KS6	LS	L61	L62
(2)	1	1	1	1	1	1	1	1	1																					
(4)										1	1	1	1	1	1	1	1	1	1	1	1										
(6)																						1	1	1	1	1	1	1	1	1	1
AREA/PANEL SQ METRES	0.488	0.713	0.470	0.854	0.854	0.737	0.626	0.901	0.917	1.247	1.111	1.421	1.181	1.364	1.665	1.520	1.511	1.595	1.714	1.893	1.934	2.177	2.503	2.264	2.105	2.501	2.345	2.164	2.568	2.537	2.753

REINFORCING STRIP SCHEDULE - BAYVIEW PLACE, BAYVIEW ROAD, LOWER ISLEVIEW PLACE & UPPER ISLEVIEW PLACE

SIZE	LENGTH (mm) 3500	5000	6000
60 mm × 5 mm	564	238	252

SCALE 1:100 DESIGNED BR DATE Jan 86 CHECKED ____ DATE ____

	REVISIONS	
F		
E		
D		
C	ISSUED FOR CONSTRUCTION	12 FEB 1986
B	ELEVATIONS REVISED	27 JAN 1986
A	ISSUED FOR TENDER	17 JAN 1986

Reinforced Earth Company Ltd.
190 Attwell Drive, Suite 501
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(416) 674-1818

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

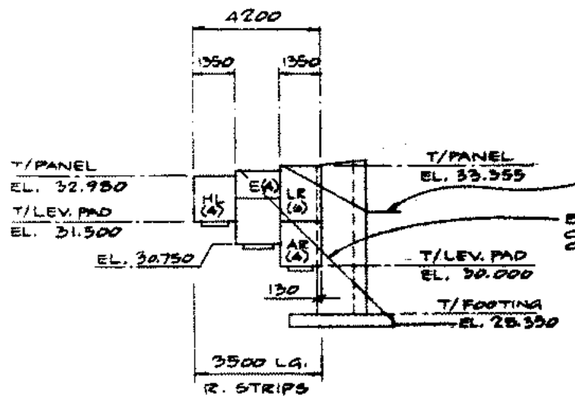
ALBERTA CREEK CHANNELIZATION
BAYVIEW PLACE AND BAYVIEW ROAD BRIDGES
REINFORCED EARTH RETAINING WALLS
FRONT FACE ELEVATIONS

PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE	DIRECTOR OF HIGHWAY DESIGN AND SURVEYS DATE Feb 29/86	EXECUTIVE DIRECTOR ENGINEERING DATE Feb 86-03-01

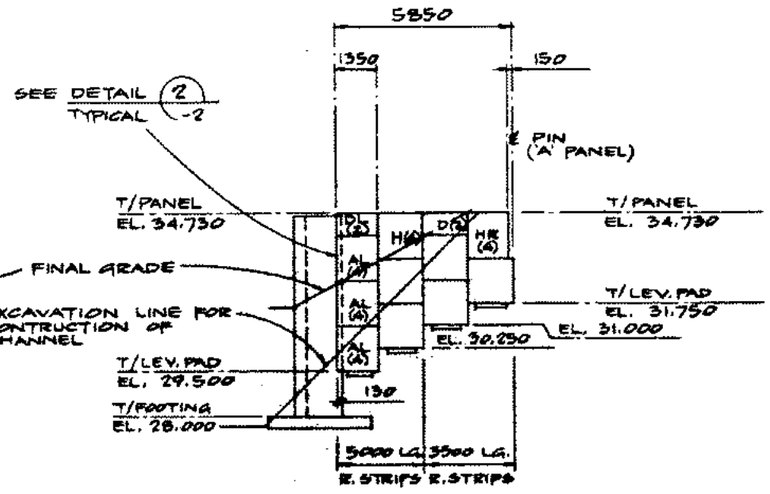
INDEX	MSG. No.	FILE No.	PROJECT No.	REGION	DRAWING No.
			C-3753	1	RI-161-132 C

CANCEL PRINTS BEARING EARLIER LETTER

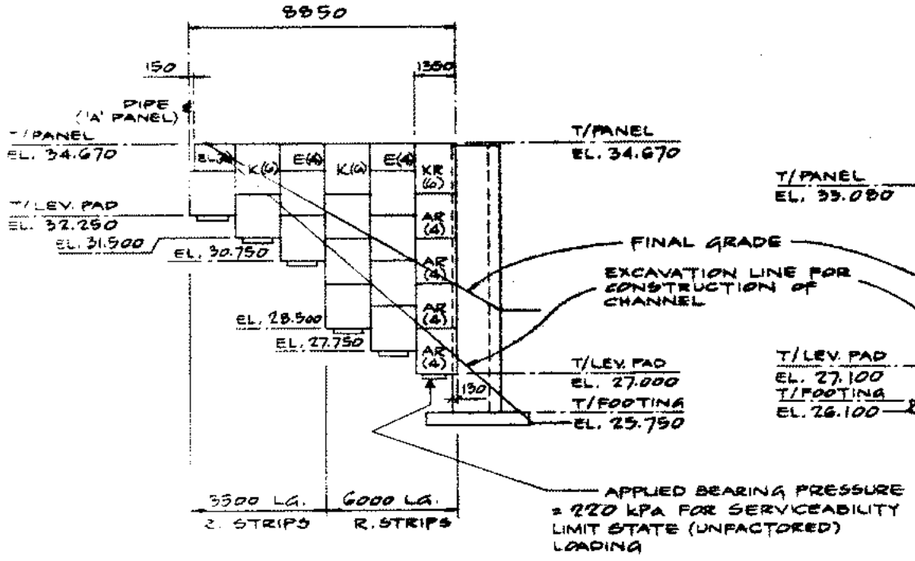
85456-5



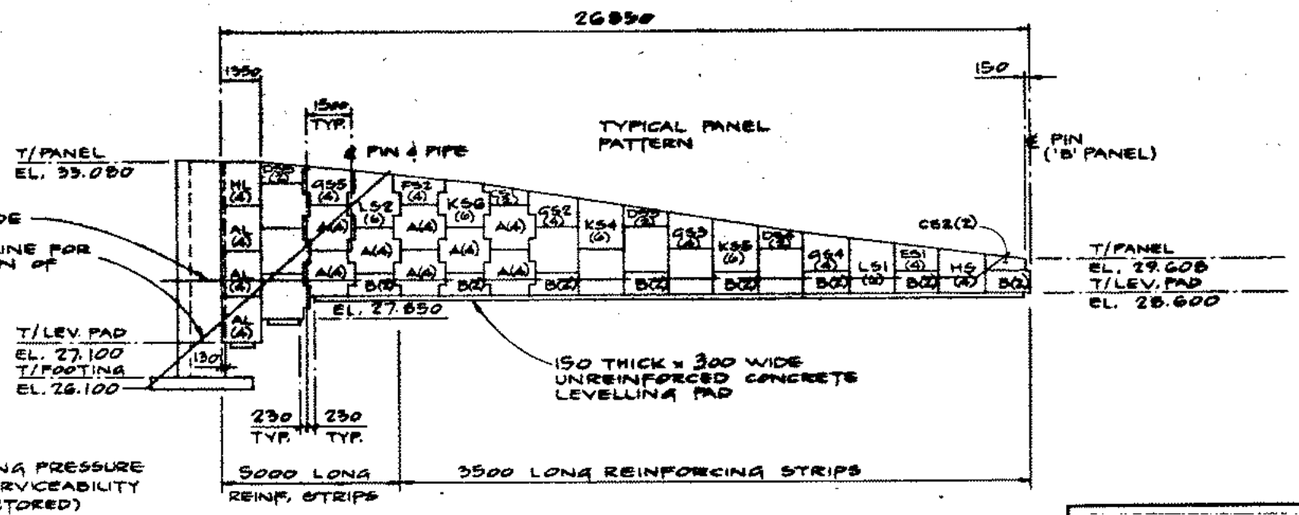
SOUTH-EAST WINGWALL
FRONT FACE ELEVATION



NORTH-EAST WINGWALL
FRONT FACE ELEVATION



NORTH-WEST WINGWALL
FRONT FACE ELEVATION



SOUTH-WEST WINGWALL
FRONT FACE ELEVATION

SCALE 1:100 — DESIGNED BB DATE Jan 86 — CHECKED — DATE

F		
E		
D		
C		
B	ISSUED FOR CONSTRUCTION	12 FEB 1986
A	ISSUED FOR TENDER	17 JAN 1986
	REVISIONS	

Reinforced Earth Company Ltd.
190 Attwell Drive, Suite 501
Rexdale, Ontario M9W 6H8
(416) 674-1610

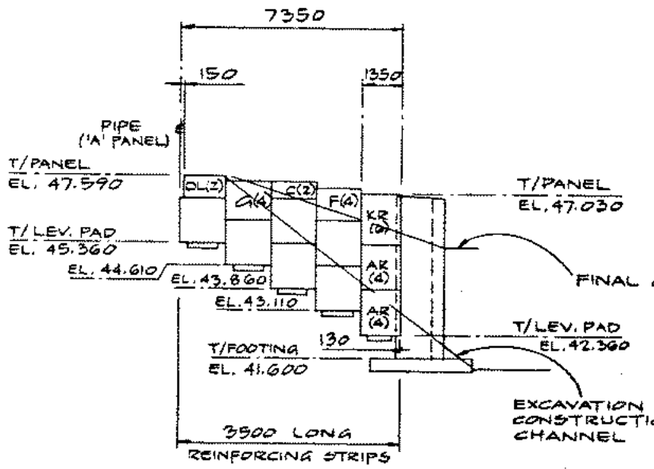
PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

ALBERTA CREEK CHANNELIZATION
LOWER ISLEVIEW PLACE BRIDGE
REINFORCED EARTH RETAINING WALLS
FRONT FACE ELEVATIONS

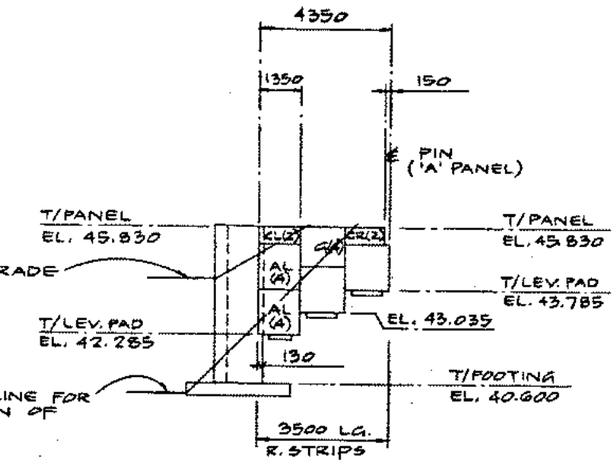
PREPARED UNDER THE DIRECTION OF	APPROVED FOR USE IN CONSTRUCTION	EXAMINED AND ACCEPTED
DATE	DIRECTOR OF HIGHWAY DESIGN AND SURVEYS DATE Feb 28/86	EXECUTIVE DIRECTOR ENGINEERING DATE 1986-03-01

INDEX	INFO. No.	FILE No.	PROJECT No.	REVISION	DRAWING No.
			C-3753	1	RI-161-133

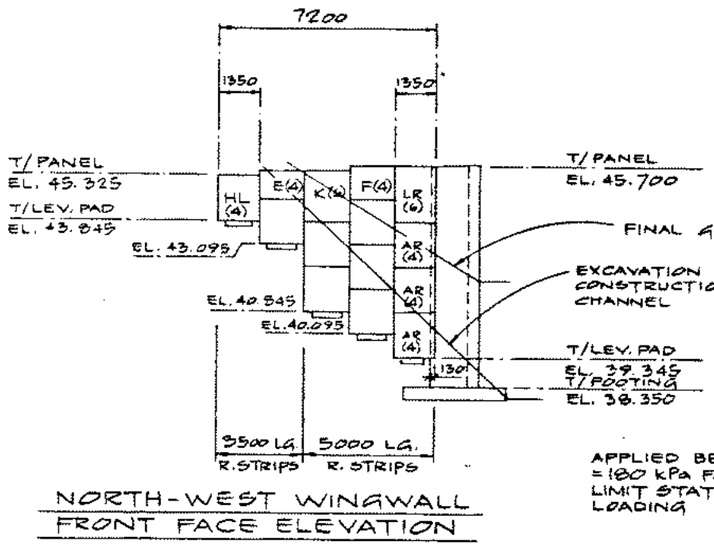
CANCEL PRINTS BEARING EARLIER LETTER



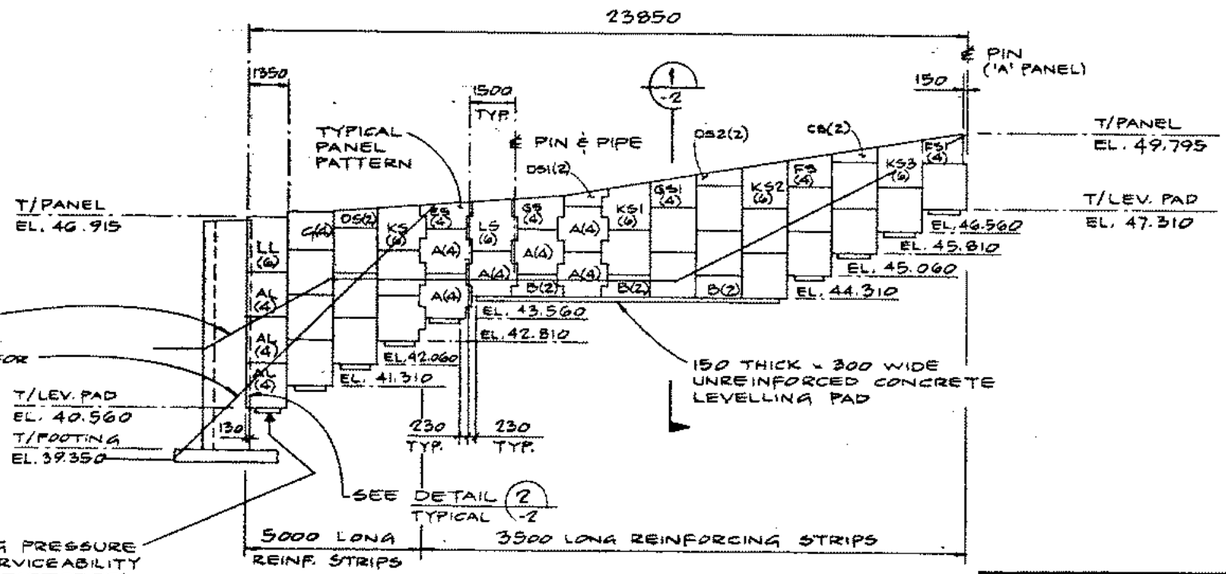
SOUTH-EAST WINGWALL
FRONT FACE ELEVATION



NORTH-EAST WINGWALL
FRONT FACE ELEVATION



NORTH-WEST WINGWALL
FRONT FACE ELEVATION



SOUTH-WEST WINGWALL
FRONT FACE ELEVATION

Reinforced Earth Company Ltd.
190 Attwell Drive, Suite 501
Rexdale, Ontario M9W 6H8
(416) 674-1818

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

SCALE 1:100 — DESIGNED BB DATE Jun 86 — CHECKED — DATE

F		
E		
D		
C		
B	ISSUED FOR CONSTRUCTION	12 FEB. 1988
A	ISSUED FOR TENDER	17 JAN. 1986

REVISIONS

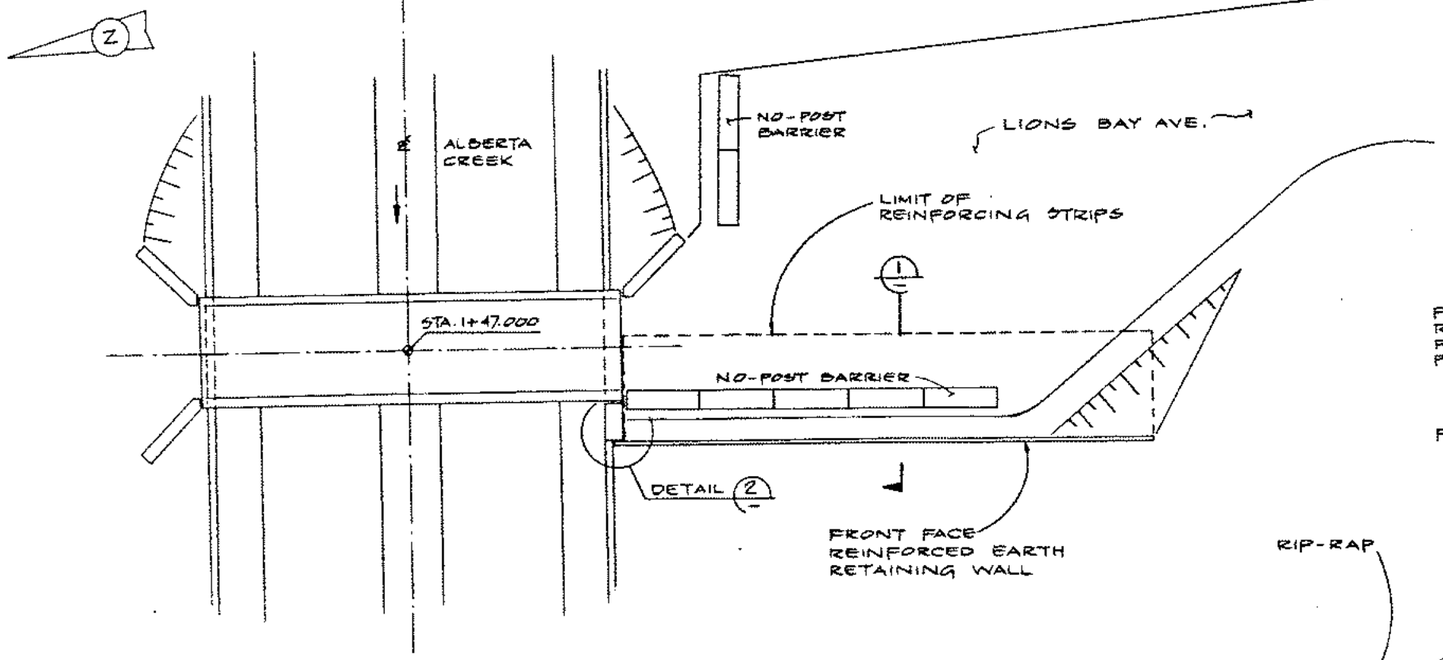
ALBERTA CREEK CHANNELIZATION
UPPER ISLEVIEW PLACE BRIDGE
REINFORCED EARTH RETAINING WALLS
FRONT FACE ELEVATIONS

PREPARED UNDER THE DIRECTION OF — DATE
APPROVED FOR USE IN CONSTRUCTION — DIRECTOR OF HIGHWAY DESIGN AND SURVEYS — DATE Feb 28/88
EXAMINED AND ACCEPTED — EXECUTIVE DIRECTOR ENGINEERING — DATE 1986-05-01

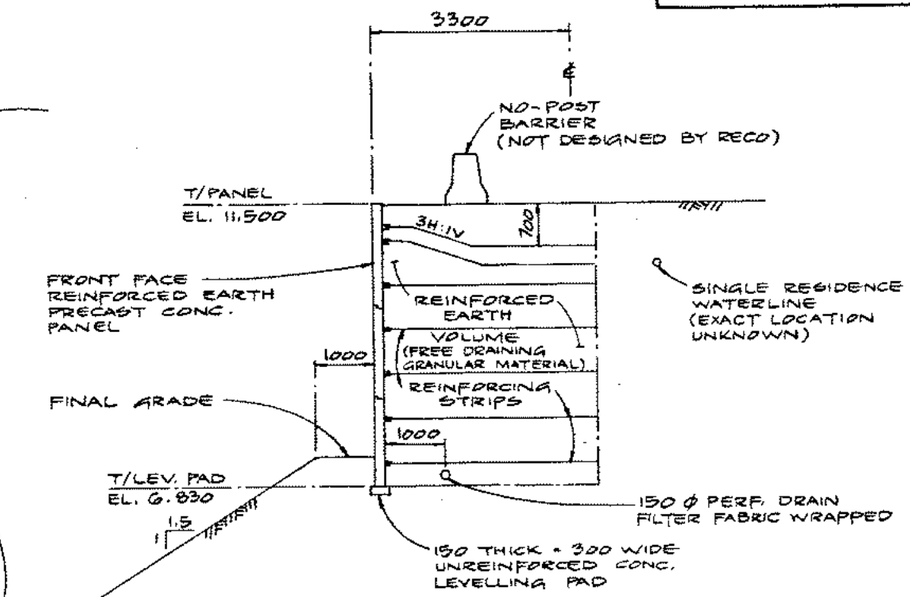
INDEX | NEG. No. | FILE No.
PROJECT No. C-3753 | REGION 1 | DRAWING No. RI-161-134 B

CANCEL PRINTS BEARING EARLIER LETTER

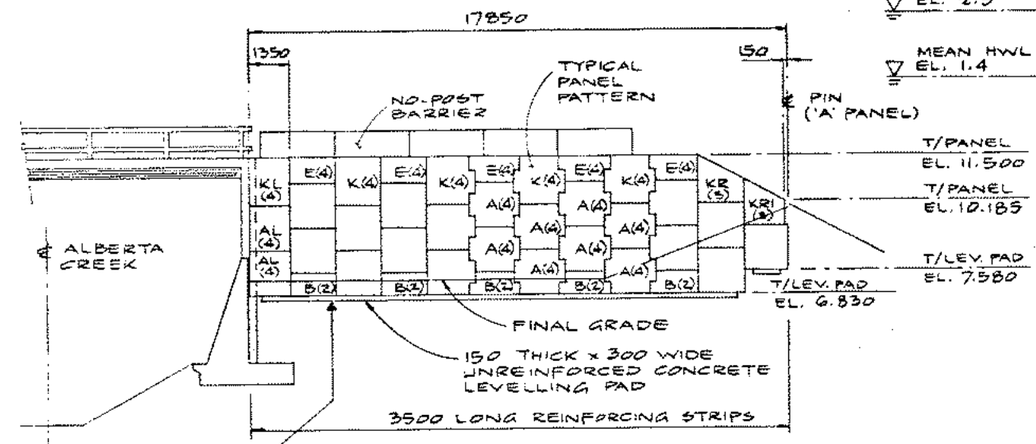
85456-5



PLAN
1:100

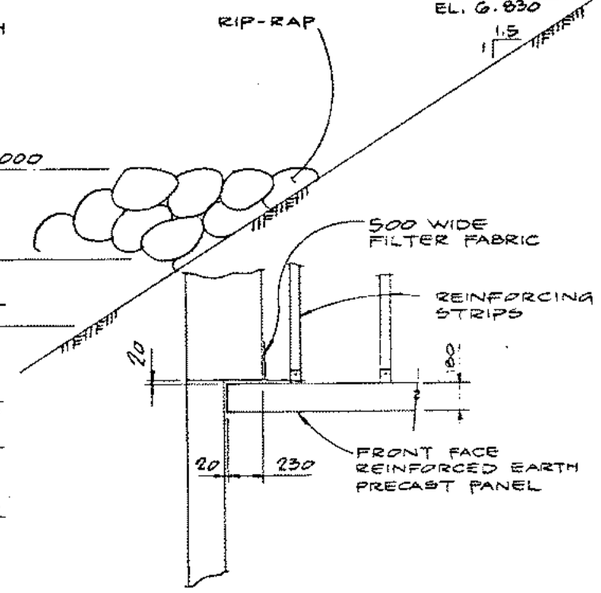


SECTION 1
1:50



FRONT FACE ELEVATION
1:100

APPLIED BEARING PRESSURE = 140 kPa FOR SERVICEABILITY LIMIT STATE (UNFACTORED) LOADING



DETAIL 2
1:20

NOTES:

1. THIS REINFORCED EARTH WALL IS TO BE CONSTRUCTED AFTER THE CHANNEL WALLS ARE CONSTRUCTED.

PANEL SCHEDULE — LIONS BAY AVENUE BRIDGE
TOTAL AREA = 79.985 m²
150 mm THICK PANELS

NO. OF PINS/PANEL	PANEL TYPE							
	A	B	E	K	AL	KL	KR	KR1
(2)		5						
(3)								
(4)	2		5	4	2			
AREA/PANEL (m²)	2.250	1.125	1.980	2.305	2.025	2.255	2.012	1.873

REINFORCING STRIP SCHEDULE - LIONS BAY AVENUE BRIDGE

SIZE	LENGTH (mm)		
	3500	3000	4000
60mm x 5mm	148	—	—

SCALE AS SHOWN	DESIGNED	DATE
	DRAWN	
F		
E		
D		
C		
B	ISSUED FOR CONSTRUCTION	FEB. 1988
A	ISSUED FOR TENDER	17 JAN. 1988
REVISIONS		

Reinforced Earth Company Ltd.
190 Attwell Drive Suite 501
Rexdale, Ontario M9W 6H8
(416) 674-1818

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION AND HIGHWAYS
DESIGN AND SURVEYS BRANCH

ALBERTA CREEK CHANNELIZATION
LIONS BAY AVENUE BRIDGE
REINFORCED EARTH RETAINING WALL

PREPARED UNDER THE DIRECTION OF
APPROVED FOR USE IN CONSTRUCTION — DIRECTOR OF HIGHWAY DESIGN AND SURVEYS — DATE Feb 29/88
EXAMINED AND ACCEPTED — DATE 1988-03-01

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CANCEL PRINTS BEARING EARLIER LETTER