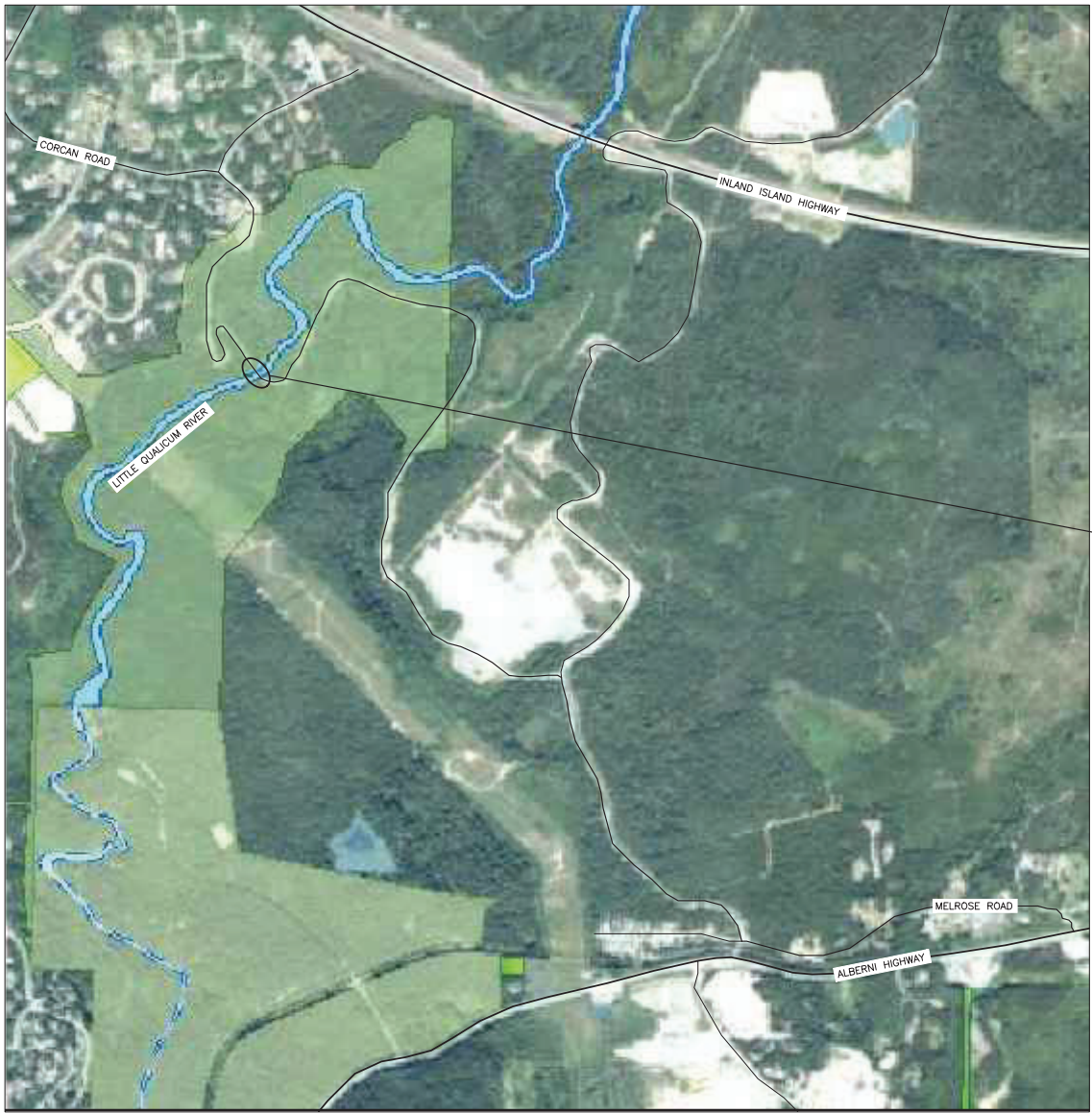


File: H:\Projects\0837-053 Little Qualicum River Bridge Replacement\045 Drawings\Active\0837-053 S00.dwg Plot Time: Jan 11, 2019 12:51pm User: Plunghy  
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# LITTLE QUALICUM RIVER PEDESTRIAN BRIDGE



## DRAWING LIST

DRAWING NUMBER	DESCRIPTION
0837-053 S00	COVER SHEET, KEY PLAN AND DRAWING LIST
0837-053 S01	GENERAL NOTES - SHEET 1
0837-053 S02	GENERAL NOTES - SHEET 2
0837-053 S03	EXISTING SITE PLAN
0837-053 S04	GENERAL ARRANGEMENT
0837-053 S05	ENVIRONMENTAL MITIGATION PLAN
0837-053 S06	CAST IN PLACE ABUTMENTS
0837-053 S07	STEEL GIRDERS - SHEET 1
0837-053 S08	STEEL GIRDERS - SHEET 1
0837-053 S09	CONCRETE BRIDGE DECK AND REMOVABLE BOLLARD
0837-053 S10	GUARDRAILS



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HEROLD PROJECT NO.  
0837-053





ARCHITECTURAL 0 34" = 1'-0" 11-19 12:35 PM User: Pinar Unlutopcu File: \\N:\projects\0837-053 Little Qualicum River Ped Bridge - Revisions\0837-053 081-052.dwg Plot Date: 11-19-2018 12:35 PM User: Pinar Unlutopcu

PILE FOUNDATIONS: STEEL PIPE

- REFER TO THE GEOTECHNICAL REPORT PREPARED BY EBA TETRATECH. FILE # VGE003532-01
- STEEL PILES SHALL CONFORM TO ASTM A252, GRADE 2 OR BETTER. SPLICES AND SEAMS SHALL BE FABRICATED WITH FULL PENETRATION BUTT WELDS IN ACCORDANCE WITH CSA W59. MILL CERTIFICATES FOR THE PILE MATERIAL SHALL BE SUBMITTED TO THE ENGINEER. PREVIOUSLY USED PIPE WILL NOT BE ACCEPTED.
- REINFORCING STEEL SHALL MEET THE REQUIREMENTS OF CSA A23.1 AND CAN/CSA-G30.18 FOR GRADE 400 REINFORCING.
- CAST-IN-PLACE CONCRETE AND CONSTITUENT MATERIALS FOR PILE FILL SHALL MEET THE REQUIREMENTS OF CSA A23.1. THE COMPRESSIVE STRENGTH OF CONCRETE f'c SHALL BE DETERMINED BY TESTING AS SPECIFIED IN CSA A23.1 AND CSA A23.2. CONCRETE COMPRESSIVE STRENGTH IS SPECIFIED ON THE STRUCTURAL DRAWINGS.
- PILES SHALL BE INSTALLED IN THE LOCATIONS SHOWN ON THE STRUCTURAL DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR LAYOUT OF THE PILES. WHERE CONCRETE OR OTHER OBSTRUCTIONS ARE ENCOUNTERED THEY SHALL BE REMOVED.
- PILE DRIVING EQUIPMENT SHALL BE SUFFICIENT TO DELIVER FORCE TO DRIVE THE PILE TO END BEARING PRACTICAL REFUSAL ON THE DENSE NATIVE SANDS AND GRAVEL OR TILL AS PER THE GEOTECHNICAL REPORT HEREIN ATTACHED. THE GEOTECHNICAL ENGINEER WILL ESTABLISH THE FINAL TIP ELEVATIONS BASED ON THE DESIGN LOADS, RESISTANCE TO PILE DRIVING, PILE TYPE AND METHOD OF DRIVING.
- THE CONTRACTOR IS TO SUBMIT WITH THE BID THE METHOD OF INSTALLATION COMPLETE WITH THE METHOD OF CERTIFYING ACCEPTANCE THAT THE PILE MEETS THE ULS LOAD CRITERIA OF 675kN PER PILE. THE ACCEPTANCE CRITERIA ARE DISCUSSED IN THE GEOTECHNICAL REPORT.
- DROP HAMMER AND DIESEL HAMMER ARE CONSIDERED ACCEPTABLE METHODS. VIBRATORY METHODS ARE NOT ACCEPTABLE FOR THIS PROJECT EXCEPT FOR USE IN EXTRACTION, IF REQUIRED.
- ALL PILES SHALL BE DRIVEN TO DEPTHS INDICATED IN THE GEOTECHNICAL REPORT TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.
- MAXIMUM TOLERANCES FROM THE LOCATIONS SHOWN ON THE DRAWINGS SHALL BE 75mm IN ANY DIRECTION AT THE POINT OF CUT-OFF AS INDICATED ON THE DRAWINGS. MAXIMUM DEVIATION FROM PLUMB BELOW THE GROUND LINE IS 5mm PER METRE.
- PILES SHALL BE DRIVEN OPEN ENDED, UNLESS SPECIFIED OTHERWISE, TO PRACTICAL REFUSAL. ADJACENT PILES ARE TO BE MONITORED FOR UPLIFT DUE TO THE DRIVING PROCEDURE AND ARE TO BE RE-DRIVEN TO REFUSAL UPLIFT OCCURS. ONCE THE PILE IS ACCEPTED BY THE GEOTECHNICAL ENGINEER IT IS TO BE CLEANED OUT OF ALL SOIL MATERIAL AND WATER TO THE BOTTOM. THE AREA AROUND THE PILE IS TO BE EXCAVATED TO THE LEVEL INDICATED ON THE DRAWINGS. REINFORCEMENT IS TO BE PLACED AS SHOWN ON THE DRAWINGS AND THE PILE FILLED WITH CONCRETE IN ACCORDANCE WITH CSA A23.1. DEWATERING AND CONTROL OF WATER DURING THE FILLING PROCESS IS THE RESPONSIBILITY OF THE CONTRACTOR.
- THE TOP OF THE PILES SHALL BE PROTECTED BY A SUITABLE DRIVING CAP TO PREVENT DAMAGE TO THE PILES. PILES SHALL BE DRIVEN WITHOUT EXCESSIVE DEFORMATION TO THEIR HEADS. SUFFICIENT LENGTH OF PILE ABOVE CUT-OFF SHALL BE ALLOWED SO THAT NO PART OF THE HEAD OF THE PILE DAMAGED DURING INSTALLATION REMAINS IN THE WORK. DAMAGED PILES SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
- ANY PILE SO DAMAGED AS TO BE UNFIT FOR THE USE FOR WHICH IT WAS INTENDED, AND ANY PILE WHICH CANNOT BE BROUGHT WITHIN TOLERANCE FOR LOCATION WILL BE REJECTED. A REJECTED PILE SHALL BE RETRACTED AND REPLACED BY A NEW PILE. WHERE A PILE CANNOT BE RETRACTED OR THE GEOTECHNICAL ENGINEER DOES NOT APPROVE THE RETRACTION, THEN A NEW PILE IS TO BE DRIVEN IN A LOCATION AS DIRECTED BY THE STRUCTURAL ENGINEER OF RECORD. ALL COSTS ASSOCIATED WITH REJECTED PILES SHALL BE PAID BY THE CONTRACTOR WITH NO ADDITIONAL COSTS TO THE OWNER.
- ALL STEEL PIPE PILES SHALL BE CUT-OFF AT THE ELEVATION INDICATED, REINFORCED AND CONCRETE FILLED AND TEMPORARILY PROTECTED BY EFFECTIVE MEANS. REINFORCING STEEL PROTRUDING FROM THE TOP OF THE PILE IS TO BE FLAGGED FOR VISIBILITY REASONS.
- PILES ARE EXPECTED TO BE SPLICED NO MORE THAN ONCE PER PILE AND THE BID PRICE IS TO INCLUDE A SINGLE SPLICE. WHEN CONDITIONS OCCUR WHERE AN EXTRA SPLICE IS REQUIRED, PILING SHALL BE SPLICED A MAXIMUM OF TWICE PER PILE. THE MINIMUM LENGTH OF PILE BETWEEN SPLICES SHALL BE 8 METRES. PILING SHALL BE ALIGNED PLUMB AND STRAIGHT END TO END. ALL WELDS SHALL BE PRE-QUALIFIED FULL PENETRATION BUTT WELDS IN ACCORDANCE WITH CSA W59 AND THE CANADIAN WELDING BUREAU. WELDS AND WELDING PROCESSES SHALL BE PROTECTED FROM ENVIRONMENTAL ELEMENTS IN ACCORDANCE WITH THE BEST TRADE PRACTICE. PREHEAT AND INTERPASS TEMPERATURES ARE TO MEET STANDARDS SPECIFIED THEREIN FOR COLD WEATHER FIELD WELDING. WELDING SHALL BE DONE BY WELDING FIRMS QUALIFIED AS CSA W47.1 DIVISION 2.1 OR BETTER. THE CONTRACTOR SHALL PRODUCE EVIDENCE THAT ALL WELDING OPERATORS ARE CURRENTLY QUALIFIED TO THE STANDARDS HEREIN REQUIRED. SUBMIT SHOP DRAWINGS SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA SHOWING WELDED SPLICE DETAILS.

MECHANICAL AND ADHESIVE ANCHORS

- ALL ANCHORS ARE TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
- ALL ANCHORS ARE TO BE THE ADHESIVE TYPE. MECHANICAL ANCHORS ARE ONLY TO BE USED WHEN SPECIFICALLY CALLED-UP ON THE DRAWINGS. SUBSTITUTIONS MUST BE APPROVED BY THE PROJECT ENGINEER PRIOR TO USE.
- UNLESS NOTED OTHERWISE ADHESIVE ANCHORS SHALL BE HILTI 'HAS-E' OR 'HIT-Z' ROD. REFER TO DRAWINGS FOR ANCHOR LOCATIONS, SIZES, CENTRES AND EMBEDMENT LENGTH.

USE HILTI HIT-HY200 WHEN:  
A QUICK CURE IS REQUIRED,  
CONDITIONS ARE DRY,  
HOLES ARE HAMMER DRILLED,  
HOLES ARE NOT OVER-SIZED,  
BASE MATERIAL TEMPERATURE IS ABOVE MINUS 10° CELCIUS.

USE HILTI HIT-RE500-V3 WHEN:  
EXTENDED WORKING TIME IS REQUIRED AND CURE TIME IS NOT CRITICAL,  
HOLES ARE DRILLED USING DIAMOND CORE, PNEUMATIC OR HAMMER DRILLS,  
DEEP EMBEDMENT IS SPECIFIED,  
THE APPLICATION IS UNDERWATER, OR  
HOLES ARE OVERSIZED.
- REFER TO DRAWINGS FOR MECHANICAL ANCHOR LOCATIONS, SIZES, CENTRES AND EMBEDMENT LENGTH.
- HOLES FOR MECHANICAL ANCHORS SHALL BE CLEANED OUT WITH HIGH PRESSURE AIR OR BRUSH PRIOR TO ANCHOR INSTALLATION.
- INSTALLERS OF HILTI PRODUCTS SHALL HAVE RECEIVED TRAINING BY HILTI (CANADA) CORP. IN THE USE OF THE SPECIFIED PRODUCTS. THE GENERAL CONTRACTOR SHALL PROVIDE THE DESIGN ENGINEER WITH A LETTER STATING THAT THIS TRAINING HAS BEEN COMPLETED.

STRUCTURAL STEEL

- ALL STEEL WORK SHALL BE IN ACCORDANCE WITH CSA-S6, THE STANDARD SPECIFICATIONS AND THE REVIEWED SHOP DRAWINGS.
- THE STEEL FABRICATOR SHALL SUBMIT SHOP DRAWINGS AS SPECIFIED UNDER SUBMITTALS TO THE PROJECT ENGINEER FOR REVIEW PRIOR TO FABRICATION. SHOP DRAWINGS SHALL INDICATE ALL DETAILS, FASTENERS, MATERIAL SPECIFICATIONS, FINISHES AND DESIGN LOADS.
- A COPY OF THE FABRICATOR'S CANADIAN WELDING BUREAU CERTIFICATES SHALL BE INCLUDED WITH THE SHOP DRAWING SUBMISSION.
- ALL WELDING SHALL BE IN ACCORDANCE WITH CSA W59 AND SHALL BE PERFORMED BY FABRICATORS QUALIFIED BY THE CANADIAN WELDING BUREAU UNDER CSA W55.3. FABRICATING SHOP TO HAVE A MINIMUM DIVISION 2.1 CERTIFICATION BY THE CANADIAN WELDING BUREAU TO THE REQUIREMENTS OF CSA W47.1 AND CSA W55.3 FOR RESISTANCE WELDING OF STRUCTURAL COMPONENTS. THE FABRICATOR SHALL SUBMIT PROOF OF CERTIFICATION PRIOR TO START OF WORK.
- ALL WELDING ELECTRODES SHALL CONFORM TO CSA W48.
- CONNECTIONS NOT DETAILED ON THE STRUCTURAL DRAWINGS SHALL BE DESIGNED FOR THE LOADS INDICATED ON THE DRAWINGS. UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWINGS CONNECTION DETAILS ARE SCHEMATIC ONLY AND FINAL CONNECTION CONFIGURATION IS THE RESPONSIBILITY OF THE FABRICATOR. USE A MINIMUM OF 2-M20 (3/4") A325 BOLTS PER CONNECTION. CONNECTIONS DESIGNED BY THE CONTRACTOR SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA. CONNECTIONS SHALL BE DESIGNED TO CSA-S16-09 TO RESIST FORCES, MOMENTS AND SHEARS INDICATED ON THE PLANS. IN INSTANCES OF NON-COMPLIANCE THE FABRICATOR SHALL BE RESPONSIBLE FOR ADDITIONAL COSTS ASSOCIATED WITH ACHIEVING COMPLIANCE WITH THE STANDARD.
- CONNECTIONS DETAILED ON THESE STRUCTURAL DRAWINGS SHALL BE FABRICATED AND ERECTED AS SHOWN. ALTERNATIVES MAY BE CONSIDERED AT THE SOLE DISCRETION OF THE STRUCTURAL ENGINEER OF RECORD BUT MUST BE PRE-APPROVED BY SAME. WHERE AN ALTERNATIVE IS APPROVED IT SHALL BE AT NO ADDITIONAL COST TO THE OWNER AND SHALL NOT NEGATIVELY IMPACT THE CONSTRUCTION SCHEDULE.
- FABRICATOR SHALL INCREASE WELD SIZES TO ACCOMMODATE SLOT WIDTHS SO THAT LEG SIZE AS SPECIFIED IS FULLY ON STEEL CONNECTION ELEMENT. FINAL WELD SIZE TO BE SHOWN ON THE SHOP DRAWINGS.
- BOLTS AND ANCHOR RODS SHALL BE LONG ENOUGH THAT THE END OF THE BOLT OR ROD IS OUTSIDE THE FACE OF THE NUT.
- ALL WELDED, HEADED STUDS, AND WELDED DEFORMED BAR ANCHORS SHALL BE INSTALLED AS PER THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS IN ACCORDANCE WITH CSA W55.3.
- DO NOT FIELD BURN BASE PLATE HOLES OR CONNECTION BOLT HOLES UNLESS APPROVED IN WRITING BY THE ENGINEER. NO FIELD CUTTING OR ALTERATION OF STRUCTURAL MEMBERS IS TO OCCUR WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER
- IF ANCHOR BOLTS ARE MISPLACED OR BOLT HOLES MISALIGNED, INFORM THE ENGINEER.
- PROVIDE STRUCTURAL STEEL TO CSA G40.20/G40.21 OR ASTM A992 WITH THE FOLLOWING GRADES:

STEEL GIRDERS  
ITEMS WELDED DIRECTLY TO GIRDERS  
ITEMS IDENTIFIED AS FRACTURE CRITICAL  
PIPE RAILINGS  
WIDE FLANGE SECTIONS  
CHANNELS AND ANGLES  
HSS SECTIONS  
MISCELLANEOUS STEEL PLATES  
STUDS

350A  
350A  
350AT CATEGORY 2 OR BETTER  
240W (35W) TO ASTM A53, GALVANIZED  
350W (50W) OR ASTM A992/A992M-11, GALV.  
300A, OR 300W (44W) GALV  
350W (50W) CLASS 'C', GALV  
300W (44W)  
ASTM A108, GRADE 1020
- BOLT SIZING SHALL BE AS NOTED ON DRAWINGS AND DETAILS. PROVIDE BOLTS TO CSA G40.21 WITH THE FOLLOWING GRADES:

ERECTION BOLTS TO ASTM A325-10  
FINAL BOLTED CONNECTIONS; ASTM A325 UNLESS NOTED OTHERWISE  
ANCHOR RODS SHALL MEET THE REQUIREMENTS OF ASTM F1554, GRADE 105 OR A193 B7 (105 ksi YIELD STRENGTH) AND SHALL BE HOT DIPPED GALVANIZED PER ASTM A153 OR ZINC PLATED PER ASTM B695.
- ALL BOLTS USED IN CONNECTIONS SHALL BE PRE-TENSIONED AND HAVE SURFACES OF CLASS 'A' OR BETTER.
- THE CONTRACTOR SHALL PROVIDE SEAL WELDED CLOSURE PLATES AT ALL OPEN ENDS OF EXTERIOR HSS SECTIONS. PLATE THICKNESS SHALL BE A MINIMUM OF 6 mm (1/4") UNLESS NOTED OTHERWISE. PROVIDE 9.5 DIA DRAIN HOLE AT LOW END OF ALL HSS PIECES

WELDING INSPECTIONS

- ALL INSPECTIONS SHALL BE PERFORMED BY A COMPANY CERTIFIED TO CSA W178.1 AND EMPLOYING FIELD INSPECTORS CERTIFIED TO CSA W178.2. BOTH SHALL BE CERTIFIED FOR THE RELEVANT CLASS OF INSPECTION. INSPECTION PROCEDURES SHALL BE AS OUTLINED BELOW.
- ALL CP TENSION WELDS SHALL BE TESTED BY A THIRD PARTY WELDING INSPECTOR ENGAGED BY CONTRACTOR USING NON-DESTRUCTIVE MEANS (X-RAY OR ULTRASONIC). PROVIDE TEST REPORTS UPON REQUEST.
- ALL WELDS ARE TO BE VISUALLY INSPECTED BY CONTRACTOR OR BY CERTIFIED THIRD PARTY ENGAGED BY CONTRACTOR. PROVIDE WRITTEN REPORTS UPON REQUEST.
- AT IT'S DISRETION, OWNER MAY ENGAGE A THIRD PARTY WELD INSPECTOR (OWNER'S REPRESENTATIVE) TO PERFORM PERIODIC VISUAL REVIEW OF WELDS OR INDEPENDANT NON-DESTRUCTIVE TESTING, PER THE STANDARD SPECIFICATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING INSPECTIONS AND PROVIDING SUITABLE AND SAFE ACCESS TO THE WORK BEING INSPECTED.
- ALL FAILURES IDENTIFIED BY THE TESTING AND INSPECTIONS SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE. COST OF ADDITIONAL TESTING TO CONFIRM CONFORMANCE WITH SPECIFICATIONS SHALL BE BORNE BY THE CONTRACTOR.
- SUBMIT ALL TEST REPORTS TO THE STRUCTURAL ENGINEER FOR REVIEW. DO NOT COVER MEMBERS AND THEIR CONNECTIONS WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER.

REINFORCING STEEL

- REINFORCING STEEL SHALL BE DEFORMED STEEL 400 GRADE AND SHALL CONFORM TO CAN/CSA-G30.18
- WELDABLE LOW ALLOY DEFORMED STEEL REINFORCING BARS, GRADE 400W, SHALL CONFORM TO CAN/CSA-G30.18. MILL CERTIFICATES SHALL BE SUPPLIED TO THE STRUCTURAL ENGINEER FOR ALL WELDABLE REINFORCING STEEL USED IN THE PROJECT.
- WELDED WIRE FABRIC, DEFORMED, SHALL CONFORM ASTM A497.
- WELDING OF REINFORCING STEEL SHALL CONFORM TO CSA W186 "WELDING OF REINFORCING BARS IN REINFORCED CONCRETE CONSTRUCTION". WELDING OF REINFORCING SHALL BE ALLOWED ONLY AS NOTED ON PLANS. WHERE WELDING OF REINFORCING IS REQUIRED MILL CERTIFICATES FOR WELDABLE REINFORCING SHALL BE PROVIDED PRIOR TO WELDING. WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER IS REQUIRED FOR ANY ADDITIONAL WELDING.
- ALL REINFORCING BARS SHALL BE TIED SECURELY TO PREVENT DISPLACEMENT.
- UNLESS NOTED OTHERWISE ON PLANS, LAP LENGTHS FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

REINFORCING BAR LAP LENGTHS						
CONCRETE MPa	BAR SIZE					
	10M	15M	20M	25M	30M	35M
30	355 (14")	510 (20")	710 (28")	1065 (42")	1295 (51")	1500 (59")
35	330 (13")	480 (19")	660 (26")	990 (39")	1195 (47")	1395 (55")
40	305 (12")	455 (18")	610 (24")	940 (37")	1120 (44")	1320 (52")
45	280 (11")	430 (17")	560 (22")	890 (35")	1040 (41")	1245 (49")
NOTES: 1. MULTIPLY VALUES BY 1.3 FOR HORIZONTAL REINFORCEMENT PLACED IN SUCH A WAY THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE SPLICE. 2. MULTIPLY VALUES BY 1.5 FOR EPOXY COATED REINFORCEMENT WITH CLEAR COVER LESS THAN 3 BAR DIAMETERS OR BAR SPACING LESS THAN 7 BAR DIAMETERS. 3. MULTIPLY VALUES BY 1.2 FOR ALL EPOXY COATED REINFORCEMENT OTHER THAN IN 2. ABOVE.						

- NO SPLICES OTHER THAN THOSE NOTED ON THE DRAWINGS ARE PERMITTED WITHOUT WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER.
- WHERE CONCRETE SURFACES ARE TO BE EXPOSED ONLY NON-CORROSIVE TYPE REINFORCING CHAIRS SHALL BE USED TO SUPPORT THE REINFORCING STEEL.
- DOWELS ARE TO BE TIED IN PLACE PRIOR TO POURING CONCRETE - "WET DOWELING" OF ANY REINFORCING STEEL IS NOT PERMITTED WITHOUT THE WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.
- HOOKS ON ALL TIES SHALL BE BENT AT LEAST 135° AND HAVE A MINIMUM LEG OF 6 TIMES THE TIE BAR DIAMETER.
- PROVIDE CORNER BARS TO MATCH HORIZONTAL WALL REINFORCEMENT.
- ALL BARS SHALL BE BENT AT TEMPERATURES GREATER THAN 10°C.
- NO BARS WHICH ARE PARTIALLY EMBEDDED IN CONCRETE SHALL BE FIELD BENT EXCEPT AS SHOWN ON THE DRAWINGS OR APPROVED IN WRITING BY THE PROJECT STRUCTURAL ENGINEER.

CAST-IN-PLACE CONCRETE

- HEL-014
- ALL CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF CAN/CSA A23.1-09 AND A23.2-09.
  - CONCRETE MIXES, AGGREGATES AND CEMENTITIOUS MATERIALS, INCLUDING PORTLAND CEMENT AND PORTLAND LESTONE CEMENT, SHALL CONFORM TO CAN/CSA A23.1-09 AND A23.2-09 AND CAN/CSA-A3000-08 AND SHALL HAVE THE FOLLOWING PROPERTIES BASED UPON PERFORMANCE CRITERIA PROPORTIONING:

CLASS	28 DAY STRENGTH	MAX. AGG. SIZE	SLUMP	AIR CONTENT	EXPOSURE	CEMENT TYPE
ABUTMENTS & PILE FILL	30MPa	19 mm (¾")	80mm ±20	4-7%	F-2	GU
BRIDGE DECK	45 MPa	19 mm (¾")	80mm ±20	4-7%	F-2	GU
  - PORTLAND LESTONE CEMENT (PLC) SHALL MEET THE REQUIREMENTS OF CSA A3000 FOR LESTONE CEMENTS.
  - CONCRETE TESTING SHALL BE CARRIED OUT BY A THIRD PARTY TESTING FIRM ENGAGED BY THE CONTRACTOR AND PAID FOR BY THE OWNER AND SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1-09 AND A23.2-09. THE MINIMUM NUMBER OF TESTS PERFORMED SHALL BE AS PER CSA A23.2-09. ADDITIONAL TESTING SHALL BE PERFORMED AT THE DIRECTION OF THE STRUCTURAL ENGINEER. CONTRACTOR SHALL PROVIDE TESTING AGENCY WITH ADEQUATE NOTICE TO PROVIDE TESTING AS REQUIRED.
  - CHAMFER ALL EXPOSED EDGES OF CONCRETE WITH A 19mm (3/4") CHAMFER UNLESS NOTED OTHERWISE.
  - CONCRETE FINISHES SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1-09 AND AS FOLLOWS UNLESS NOTED OTHERWISE:

U/S DECK; SIDES OF DECK CONCRETE BARRIERS TOP OF DECK;	STEEL FORM STEEL FORM STEEL FORM BROOM FINISH
---	--
  - ALL CONCRETE CURING SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1-09. SPECIAL PRECAUTIONS SHALL BE TAKEN PER CSA A23.1 FOR PLACING AND CURING CONCRETE AT OR ABOVE 27° C AND AT OR BELOW 5° C.
  - UNLESS NOTED OTHERWISE, OR REQUIRED FOR FIRE RESISTANCE RATING, ALL REINFORCING STEEL SHALL HAVE THE FOLLOWING CLEAR COVER DISTANCES:

CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	75 mm
BRIDGE DECK U.N.O.	35 mm

\* IN ADDITION, COVER MUST BE AT LEAST 1.0x THE BAR DIAMETER FOR INTERIOR EXPOSURE, AND 1.5x THE BAR DIAMETER FOR EXTERIOR EXPOSURE
  - CONTROL JOINTS SHALL BE PROVIDED IN BOTH DIRECTIONS IN ALL SLABS-ON-GRADE AT A MAXIMUM SPACING OF 3660mm (12'-0") FOR UNREINFORCED SLABS AND 6100mm (20'-0") FOR REINFORCED SLABS, UNLESS NOTED OTHERWISE ON DRAWINGS.
  - JOINT FILLER SHALL BE INSTALLED IN ALL EXPANSION AND CONSTRUCTION JOINTS.
  - EMBEDDED PLATES AND ANCHOR BOLTS FOR STRUCTURAL STEEL SHALL BE SECURELY TIED OR FASTENED IN PLACE PRIOR TO POURING CONCRETE. ALL ANCHOR BOLTS SHALL BE LAID OUT USING A TEMPLATE. "WET DOWELING" OF ANCHOR BOLTS AND EMBEDDED PLATES IS NOT PERMITTED.

ISSUED FOR REVIEW

NOT FOR  
CONSTRUCTION

ISSUES						SUB CONSULTANT	DRAFTED PHU	DRAFTING REVIEW	DESIGNED SJS	DESIGN REVIEW	<div><div><div>HEROLD ENGINEERING</div><div>3701 Shenton Rd., Nanaimo, BC V9T 2H1 Tel: 250-751-8558 Fax: 250-751-8559 Email: mail@heroldengineering.com</div></div></div>	ENGINEERS SEAL	GENERAL NOTES SHEET 2	LITTLE QUALICUM RIVER PEDESTRIAN BRIDGE 6300 HAMMOND BAY ROAD NANAIMO BC V9T 6N2 REGIONAL DISTRICT OF NANAIMO	HEL PROJECT No. 0837-053	CLIENT DWG. No. N/A	SCALE AS SHOWN	PERMIT No. N/A	HEL DRAWING No. S02	REVISION B
No.	DATE	ISSUED FOR	No.	DATE	ISSUED FOR															
A	2018.11.09	CLIENT REVIEW																		
B	2019.01.11	CLIENT REVIEW																		
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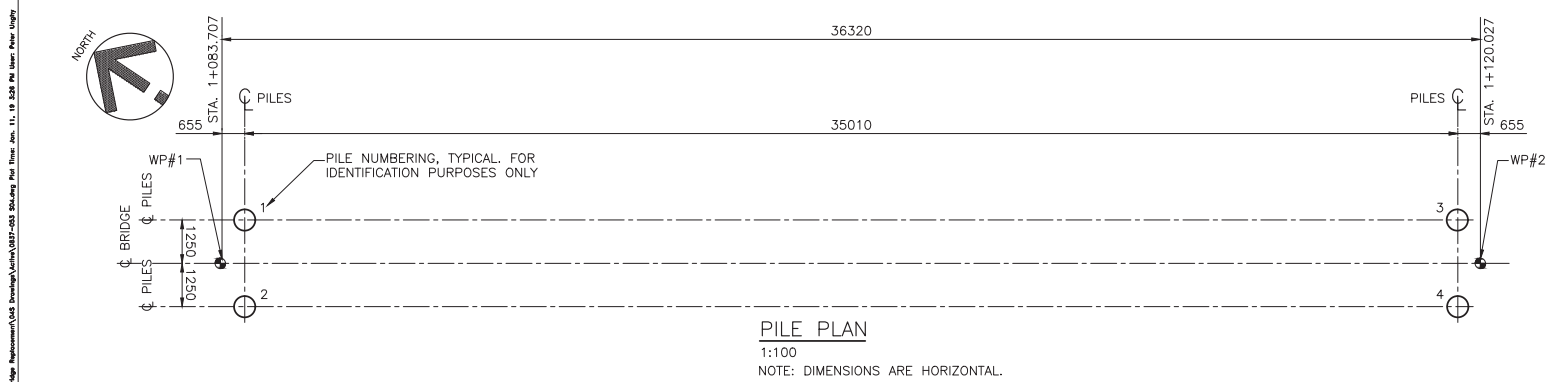
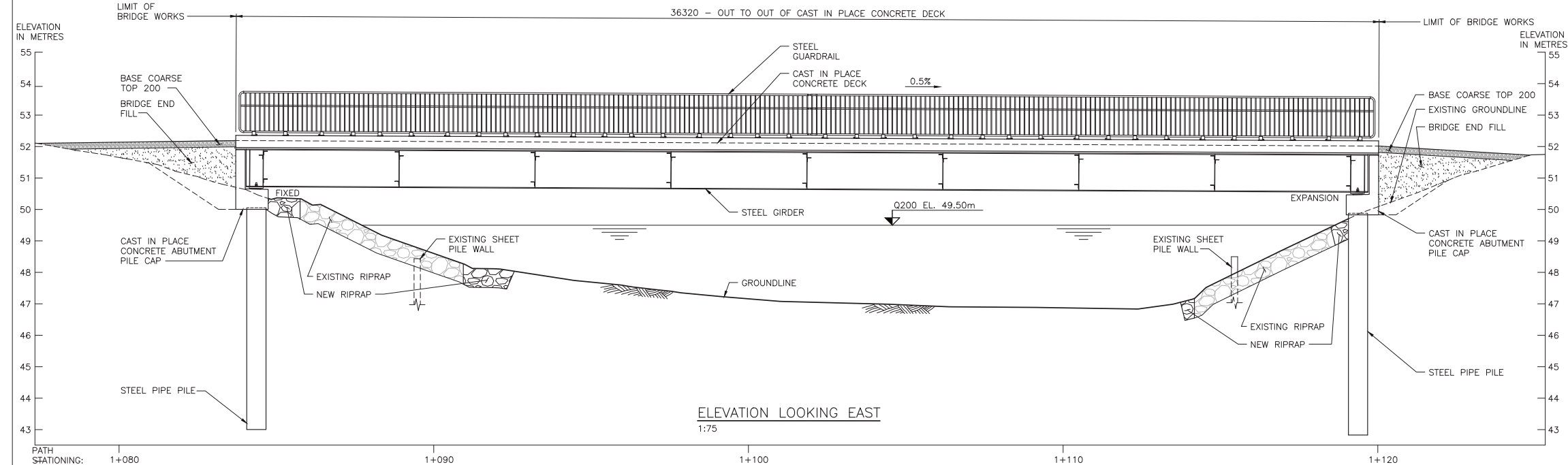
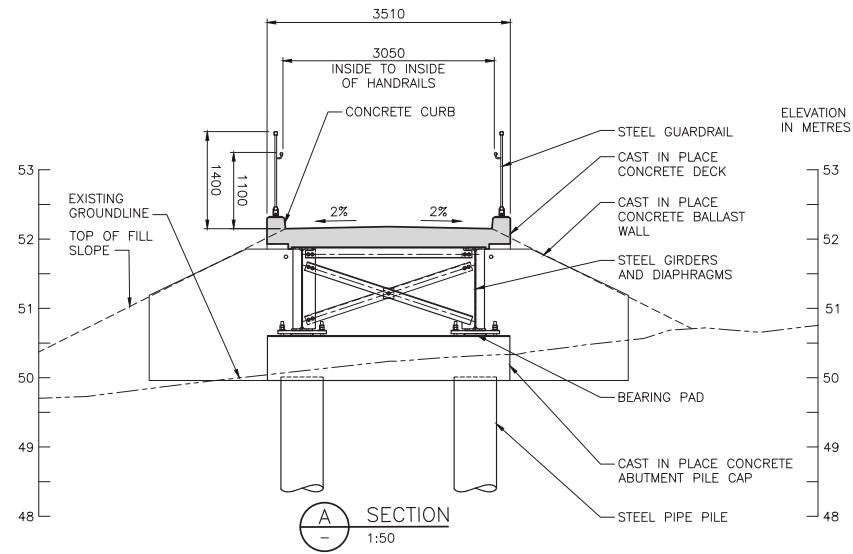
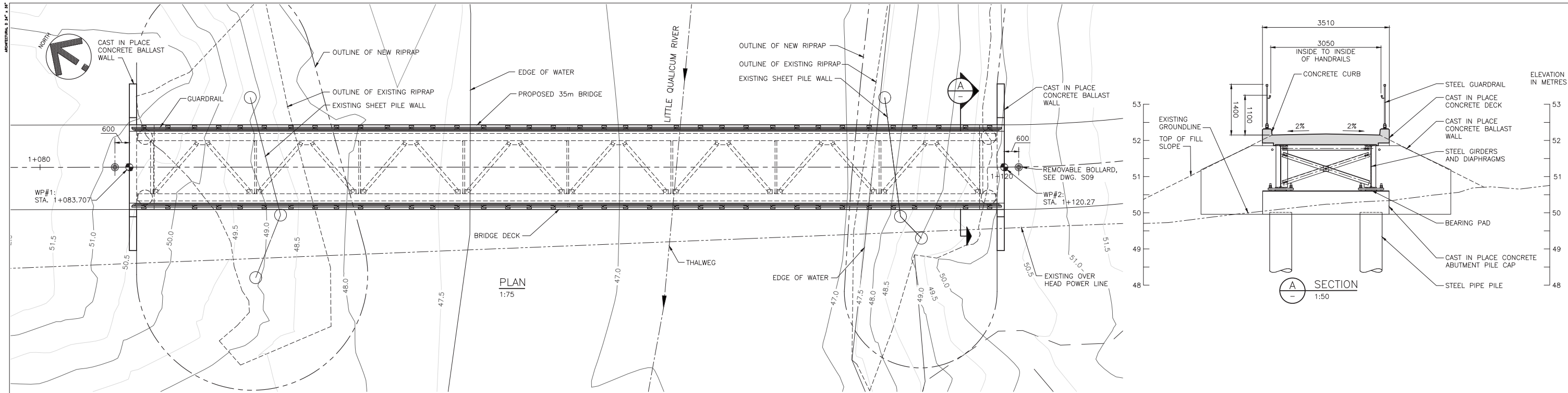
DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



1. FOR GENERAL NOTES, SEE DWG. S01 AND S02.
2. THE LEGAL FABRIC IS COMPILED FROM OFFICIAL SOURCES (LTSa, CLSR, CLR, ETC AS APPLICABLE). PLANS ARE CALCULATED AND ALIGNED TO BEST FIT FIELD TIED IP/MON'S. UNLESS OTHERWISE NOTED, THE BOUNDARIES SHOULD BE ACCURATE TO ACCEPTED STANDARDS AND USED ACCORDINGLY.

ISSUES										SUB CONSULTANT		DRAFTED PHU		 3701 Shenton Rd, Nanaimo, BC V9T 2H1 Tel: 250-751-8558 Fax: 250-751-8559 Email: mail@heroldengineering.com		ENGINEERS SEAL		EXISTING SITE PLAN		LITTLE QUALICUM RIVER PEDESTRIAN BRIDGE  6300 HAMMOND BAY ROAD NANAIMO BC V9T 6N2 REGIONAL DISTRICT OF NANAIMO		HEL PROJECT No. 0837-053		CLIENT DWG. No. N/A			
No.		DATE		ISSUED FOR		No.		DATE														ISSUED FOR		SCALE AS SHOWN		PERMIT No. N/A	
A		2018.11.09		CLIENT REVIEW																							
B		2019.01.11		CLIENT REVIEW																							
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PILE LIST							
STRUCTURE	PILE #	SIZE: OUTSIDE DIAMETER AND WALL THICKNESS (mm)	CUT-OFF EL. (METRES)	ESTIMATED TIP EL. (METRES)	ADDITIONAL ALLOWANCE	ESTIMATED TOTAL LENGTH OF PILE (METRES)	AS BUILT LENGTH (METRES)
NORTH ABUTMENT	1	610 x 13	50.055	43.005	3.0	11.000	--
	2	610 x 13	50.055	43.005	3.0	11.000	--
SOUTH ABUTMENT	3	610 x 13	49.879	42.829	3.0	11.000	--
	4	610 x 13	49.879	42.829	3.0	11.000	--

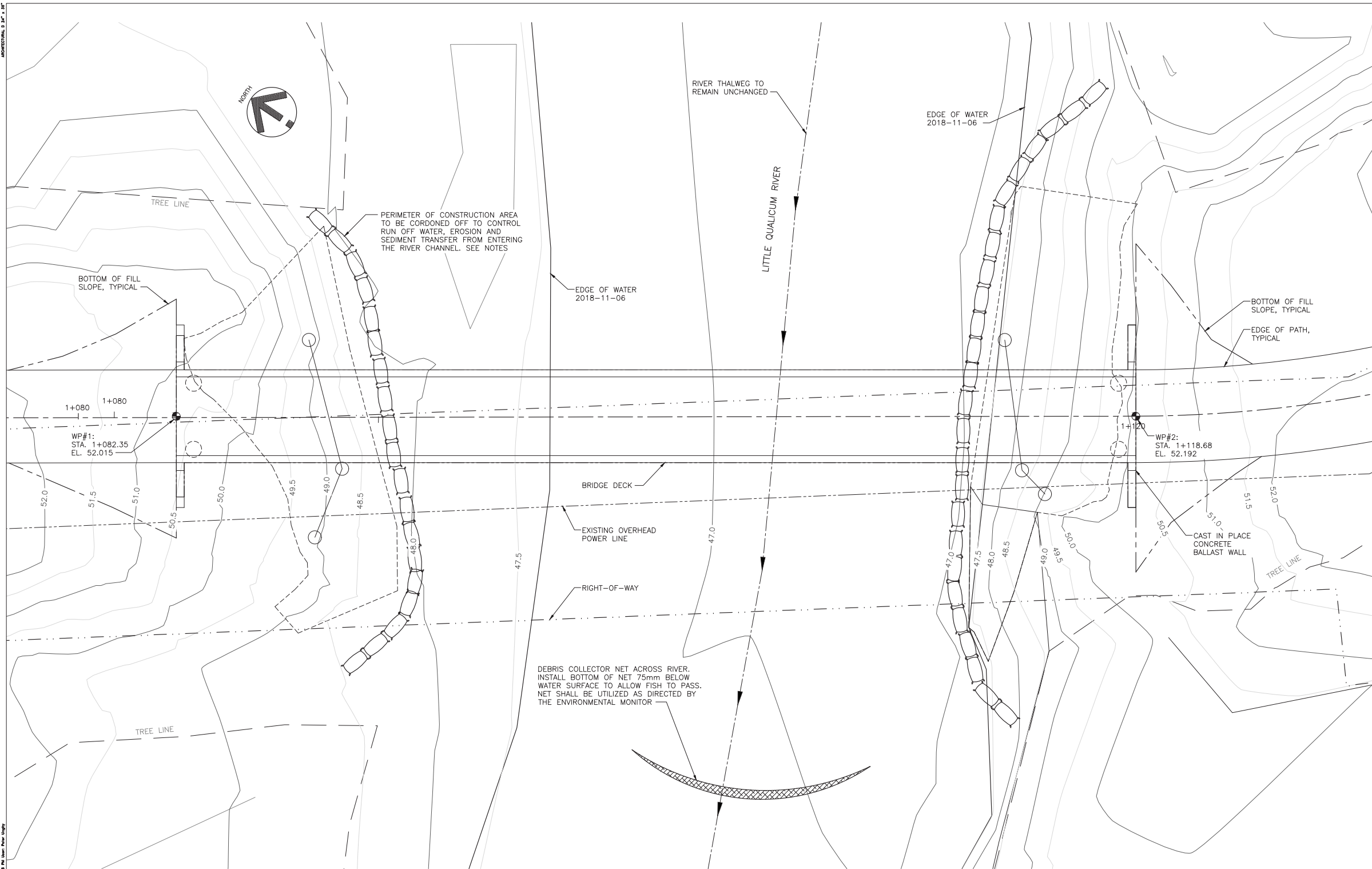
NOTE: FOR PILE TO PILE CAP CONNECTION, SEE DWG. S08

ISSUED FOR REVIEW

NOT FOR CONSTRUCTION

- NOTES:
- FOR GENERAL NOTES, SEE DWG. S01 AND S02.
  - WORKPOINTS (WP) ARE CENTRELINE OF BRIDGE/PATH, END OF CAST IN PLACE DECK.

ISSUES						SUB CONSULTANT	ENGINEERS SEAL	GENERAL ARRANGEMENT	LITTLE QUALICUM RIVER PEDESTRIAN BRIDGE  6300 HAMMOND BAY ROAD NANAIMO BC V9T 6N2 REGIONAL DISTRICT OF NANAIMO	HEL PROJECT No. 0837-053		CLIENT DWG. No. N/A	
No.	DATE	ISSUED FOR	No.	DATE	ISSUED FOR					SCALE AS SHOWN		PERMIT No. N/A	
A	2018.11.09	CLIENT REVIEW											
B	2019.01.11	CLIENT REVIEW											
File: \\N:\Projects\0837-053_Little Qualicum River Pedestrian Bridge.dwg © Copyright reserved. This drawing remains the exclusive property of Herold Engineering Limited and may not be reused or reproduced without written consent of Herold Engineering Limited.										HEL DRAWING No. <b>S04</b>		REVISION B	



ENVIRONMENTAL MITIGATION PLAN  
1:75

NOTES:

ENVIRONMENTAL CONSTRUCTION REQUIREMENTS

- FOR GENERAL NOTES, SEE DWG. 0837-053 S01 AND 0837-053 S02.
- PERFORM WORKS IN ACCORDANCE WITH B.C. M.O.T.I. SS 165.
- ENVIRONMENTAL WORK PROCEDURES, TIMING, AND SPECIAL PRECAUTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND LIMITATIONS OF THE FEDERAL DEPARTMENT OF FISHERIES AND OCEANS (D.F.O.), AND THE PROVINCIAL MINISTRY OF FORESTS, LANDS, NATURAL RESOURCE OPERATIONS AND RURAL DEVELOPMENT.
- SECTION 11 NOTIFICATION UNDER THE BC WATER SUSTAINABILITY ACT AND IS THE RDN'S RESPONSIBILITY.
- EROSION AND SEDIMENT CONTROL FOR THIS PROJECT WILL BE AS OUTLINED IN THE FISHERIES AND OCEANS CANADA & MINISTRY OF WATER, LAND AND AIR PROTECTION (MWLAP) GUIDELINES, ENTITLED:
  - "LAND DEVELOPMENT GUIDELINES FOR THE PROTECTION OF AQUATIC HABITAT, SEPTEMBER 1993"
  - "ENVIRONMENTAL OBJECTIVES, BEST MANAGEMENT PRACTICES AND REQUIREMENTS FOR LAND DEVELOPMENT" - VANCOUVER ISLAND REGION, MARCH 2001
  - "ENVIRONMENTAL BEST MANAGEMENT PRACTICES FOR URBAN AND RURAL LAND DEVELOPMENT IN BRITISH COLUMBIA, JUNE 2004"
  - "EROSION AND SEDIMENT CONTROL GUIDELINE" BY THE CITY OF NANAIMO. IT IS INCUMBENT UPON THE CONTRACTOR TO ACQUIRE THESE GUIDELINES AND FOLLOW THE REQUIREMENTS THEREIN.
- ALL TREES WITHIN THE BRIDGE ALIGNMENT AND ANY TREES ADJACENT TO THE BRIDGE ALIGNMENT THAT ARE IN DANGER OF FALLING ARE TO BE FELLED AND REMOVED PRIOR TO APRIL 1. ANY TREE REMOVAL WORKS AFTER MARCH 1 SHALL BE PRECEDED BY A BIRD NEST SURVEY TO VERIFY THE ABSENCE OF EARLY NESTING SPECIES. TREE REMOVAL WORKS MUST AVOID DISTURBANCE TO THE RIVER CHANNEL AND BANKS - ADDITIONAL PRECAUTIONS MAY BE NEEDED TO ENSURE BANKS ARE NOT DISTURBED BY FALLING, BUCKING AND PERSONNEL ACCESS. ALL LOGS AND BRANCHES ARE TO BE COLLECTED AND REMOVED FROM THE SITE.
- PRIOR TO AND DURING CONSTRUCTION, THE CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR CONTROLLING RUN-OFF WATER, EROSION AND SEDIMENT TRANSFER BY UTILIZING SUCH MEASURES AS CONSTRUCTION OF INTERCEPTOR DITCHES, SAND BAGS, SILT FENCES, HAY BALE STRUCTURES, SEDIMENT CONTROL PONDS, SEDIMENT TRAPS, STAGED GRAVEL FILTERS, OR OTHER METHODS HE MAY DEEM NECESSARY TO PREVENT DISCHARGE OF SEDIMENT INTO WATER COURSES. AN EROSION AND SEDIMENT CONTROL PLAN SHALL BE SUBMITTED FOR THE ENGINEER'S APPROVAL PRIOR TO CONSTRUCTION.
- UNLESS NOTED OTHERWISE, ALL TREES AND ROOTS SHALL BE PRESERVED WHERE POSSIBLE. ALL DISTURBED AREAS TO BE RESEED WITH NATIVE GRASS MIX. ANY SHRUBS REMOVED MUST BE REPLACED AND THE AREA IS TO BE COVERED IN STRAW MULCH UPON COMPLETION.
- ENVIRONMENTAL MONITOR SHALL BE PROVIDED BY THE REGIONAL DISTRICT OF NANAIMO.
- WITH THE EXCEPTION OF THE TREE REMOVAL WORKS, WHICH SHALL OCCUR PRIOR TO THE SONGBIRD BREEDING PERIOD, ALL BRIDGE CONSTRUCTION WILL OCCUR DURING THE REDUCED RISK TIMING WINDOW FOR VANCOUVER ISLAND (JUNE 15 THROUGH SEPTEMBER 15TH).
- ALL MACHINERY TO BE CLEAN, FREE OF LEAKS AND IN GOOD MECHANICAL CONDITION.
- REFUELLING OF ALL MACHINES TO BE DONE OUTSIDE OF THE 30 METER SETBACK.
- AS CEMENT AND CONCRETE ARE TOXIC TO AQUATIC ORGANISMS, ESPECIALLY FISH. ALL CONCRETE WORK MUST BE ISOLATED FROM WATER FOR A MINIMUM OF 48 HOURS. ALL EQUIPMENT SHALL BE CLEANED OFF SITE AWAY FROM STORM DRAINS.
- THE CONSULTANT AND CITY ASSUME NO RESPONSIBILITY FOR DAMAGES RESULTING FROM IMPROPER EROSION AND SEDIMENT CONTROL MEASURES UNDERTAKEN BY THE CONTRACTOR.
- SUBMIT ENVIRONMENTAL MITIGATION PLAN AT PRE-CONSTRUCTION MEETING.

ISSUED FOR REVIEW

NOT FOR  
CONSTRUCTION

ISSUES					
No.	DATE	ISSUED FOR	No.	DATE	ISSUED FOR
A	2019.01.09	CO-ORDINATION			
B	2019.01.11	CLIENT REVIEW			

SUB CONSULTANT

DRAFTED
PHU
DRAFTING REVIEW
DESIGNED
SJS
DESIGN REVIEW

HEROLD  
ENGINEERING

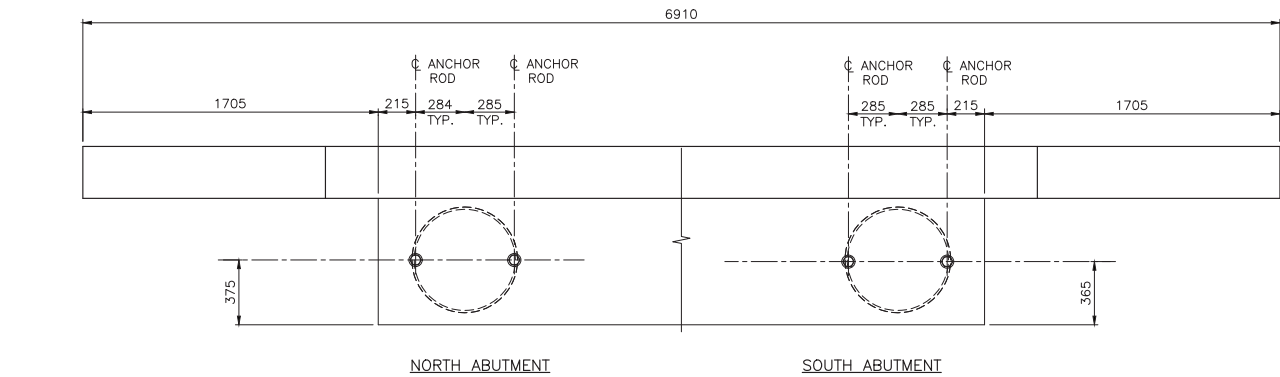
3701 Shenton Rd., Nanaimo, BC V9T 2H1  
Tel: 250-751-8558 Fax: 250-751-8559  
Email: mail@heroldengineering.com

ENGINEERS SEAL

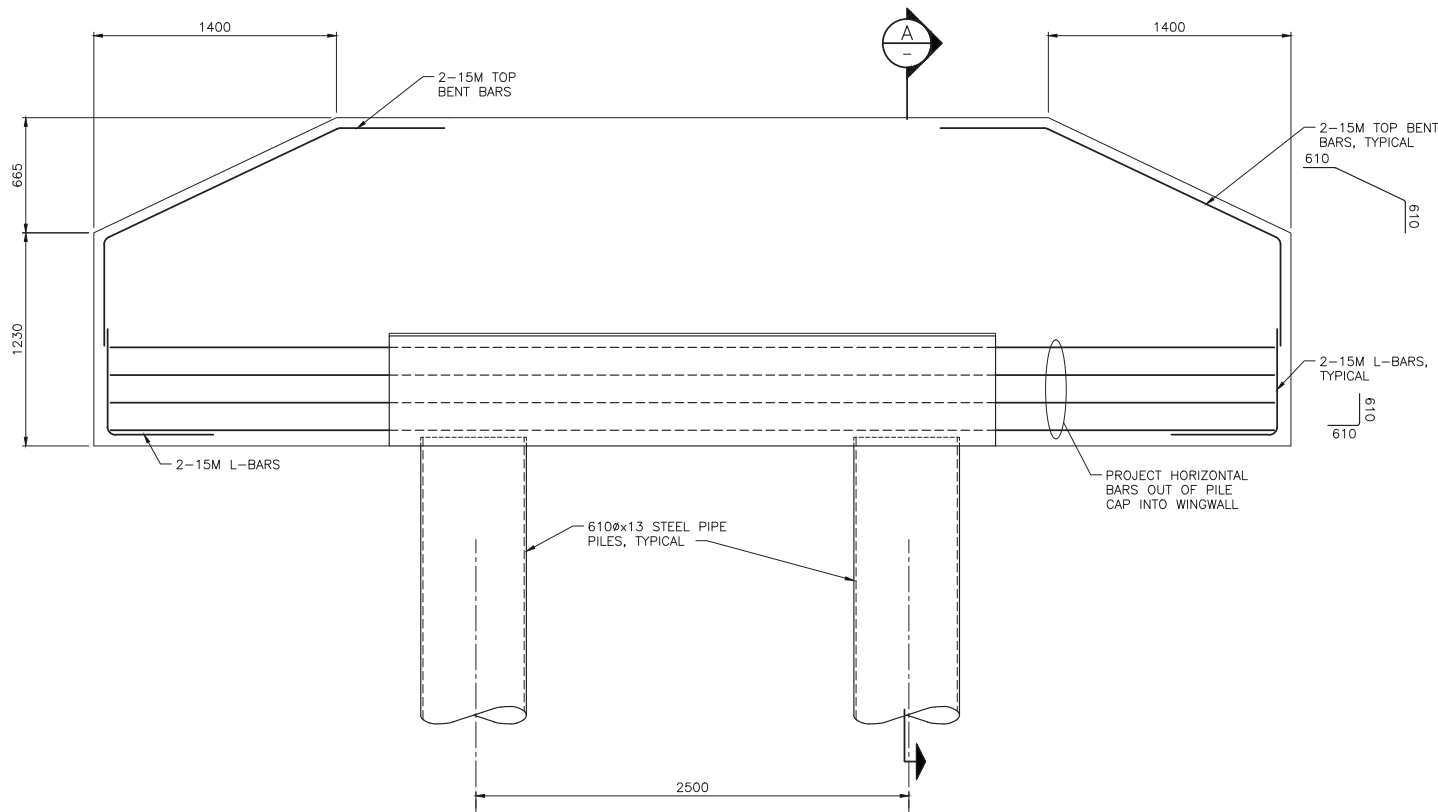
ENVIRONMENTAL MITIGATION PLAN

LITTLE QUALICUM RIVER  
PEDESTRIAN BRIDGE  
6300 HAMMOND BAY ROAD NANAIMO BC V9T 6N2  
REGIONAL DISTRICT OF NANAIMO

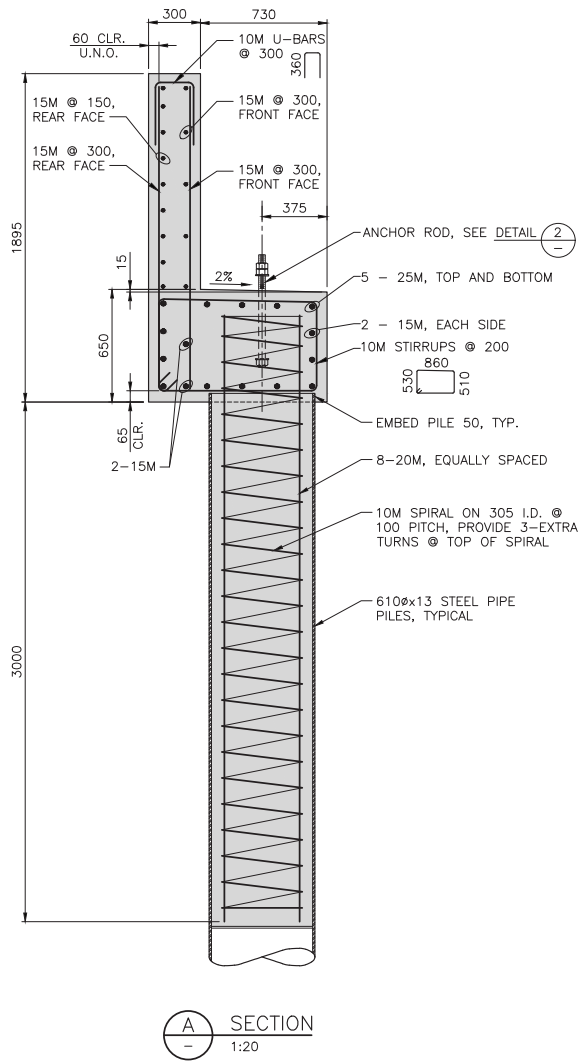
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SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. <b>S04</b>	REVISION B



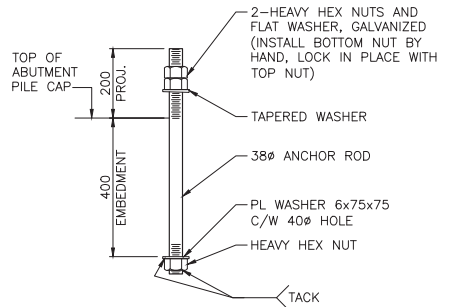
PLAN - ABUTMENT  
1:20



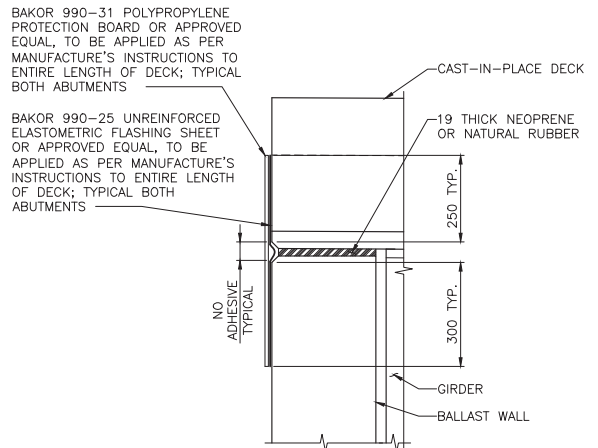
FRONT ELEVATION - ABUTMENT  
1:20  
NOTE: TYPICAL REINFORCEMENT NOT SHOWN FOR CLARITY.



SECTION  
1:20



DETAIL  
1:10  
NOTE: 4--REQUIRED FOR EACH ABUTMENT PILE CAP.



JOINT WATERPROOFING DETAIL  
1:10

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NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01 AND S02.

ISSUES						SUB CONSULTANT
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A	2018.11.09	CLIENT REVIEW				
B	2019.01.11	CLIENT REVIEW				

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SJS

DESIGN REVIEW

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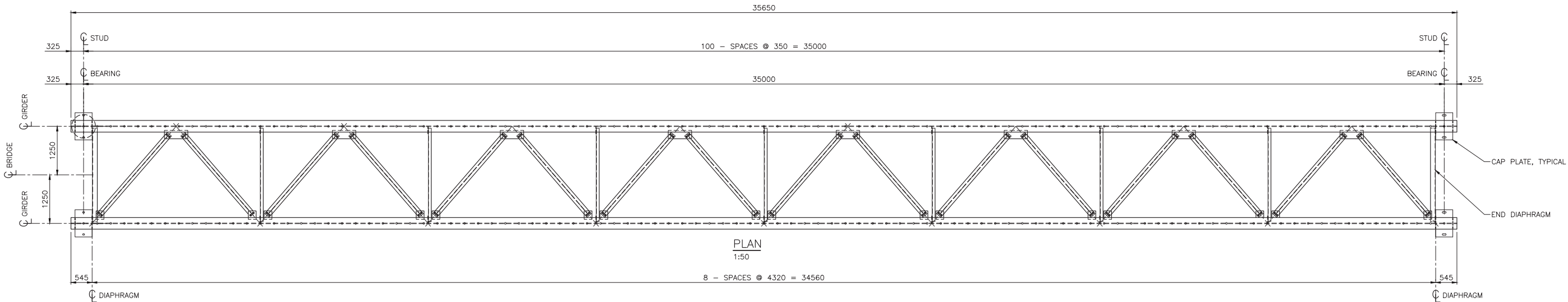
3701 Shenton Rd, Nanaimo, BC V9T 2H1  
Tel: 250-751-8558 Fax: 250-751-8559  
Email: mail@heroldengineering.com

ENGINEERS SEAL

CAST IN PLACE  
ABUTMENTS

LITTLE QUALICUM RIVER  
PEDESTRIAN BRIDGE  
6300 HAMMOND BAY ROAD NANAIMO BC V9T 6N2  
REGIONAL DISTRICT OF NANAIMO

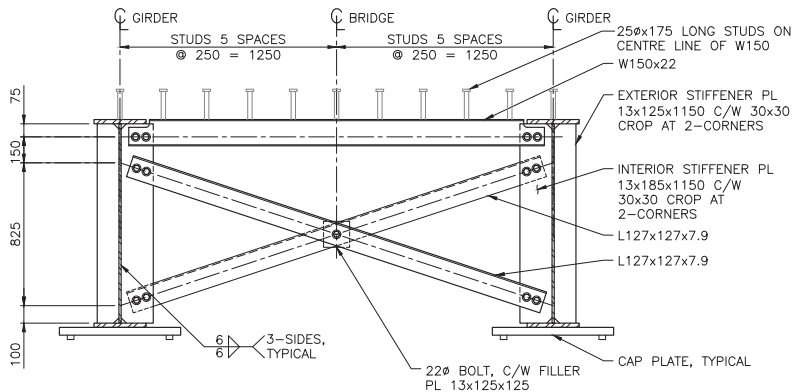
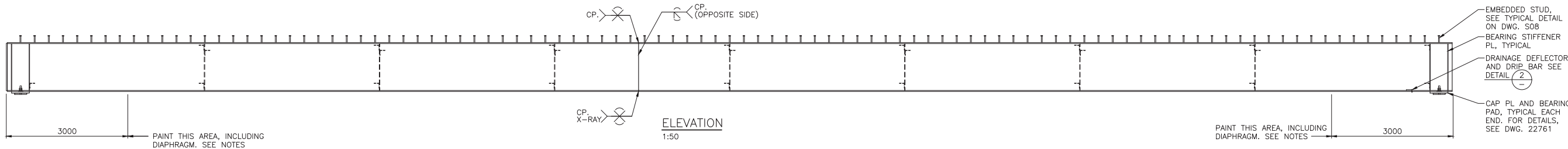
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SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. <b>S06</b>	REVISION B



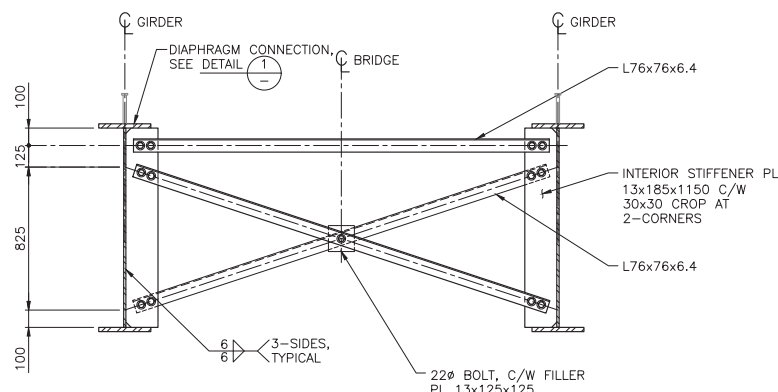
FABRICATE GIRDERS AS FRACTURE CRITICAL MEMBERS. TENSION FLANGE TO BE CHARPY TESTED TO CATEGORY 2.

FIXED END OF BRIDGE

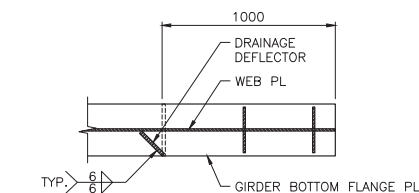
EXPANSION END OF BRIDGE



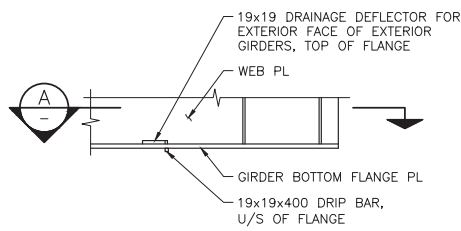
SECTION - DIAPHRAGM AT END  
1:20  
NOTE: 2-REQUIRED.



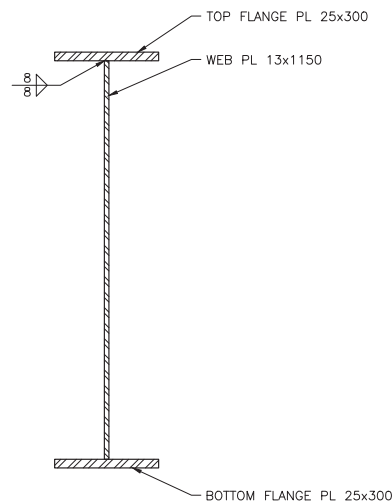
SECTION - INTERMEDIATE DIAPHRAGM  
1:20  
NOTE: 7-REQUIRED.



SECTION A  
1:20



DETAIL 2  
1:20



SECTION - GIRDER  
1:10

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NOTES:

- FOR GENERAL NOTES, SEE DWG. S01 AND S02.
- ALL STEELWORK NEXT TO ABUTMENTS AS INDICATED ON DRAWINGS TO BE PAINTED PER SPECIFICATIONS EXCEPT TOP FLANGE OF DIAPHRAGM, TOP FLANGE OF GIRDERS AND CONNECTION FAYING SURFACES. COLOUR OF PAINT TO MATCH WEATHERED STEEL SURFACE.

ISSUES					
No.	DATE	ISSUED FOR	No.	DATE	ISSUED FOR
A	2018.11.09	CLIENT REVIEW			
B	2019.01.11	CLIENT REVIEW			

SUB CONSULTANT	

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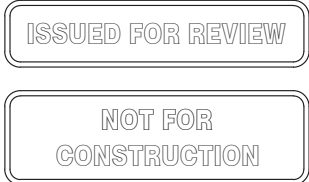
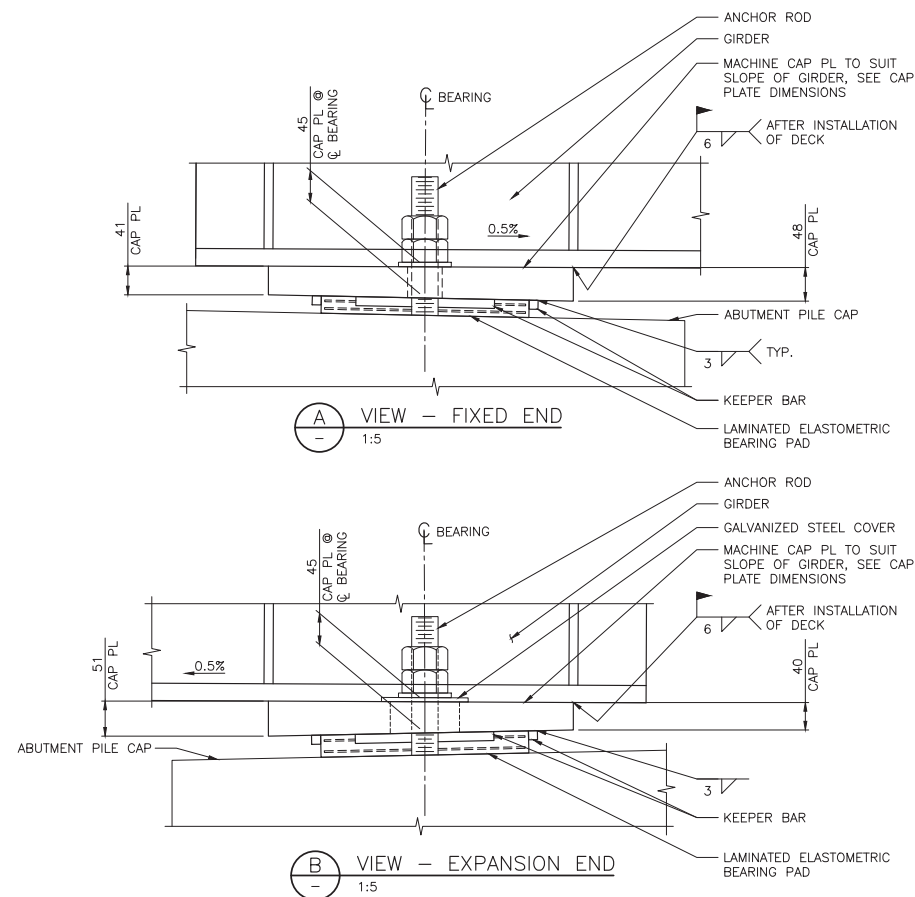
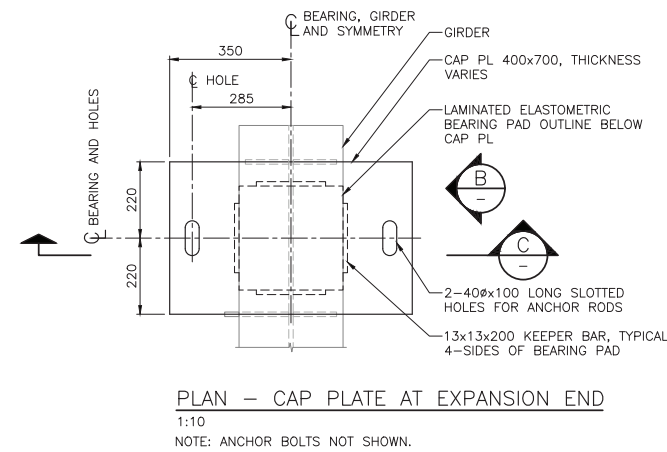
ENGINEERS SEAL

STEEL GIRDERS  
- SHEET 1

LITTLE QUALICUM RIVER  
PEDESTRIAN BRIDGE  
6300 HAMMOND BAY ROAD NANAIMO BC V9T 6N2  
REGIONAL DISTRICT OF NANAIMO

HEL PROJECT No. 0837-053	CLIENT DWG. No. N/A
SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. <b>S07</b>	REVISION B



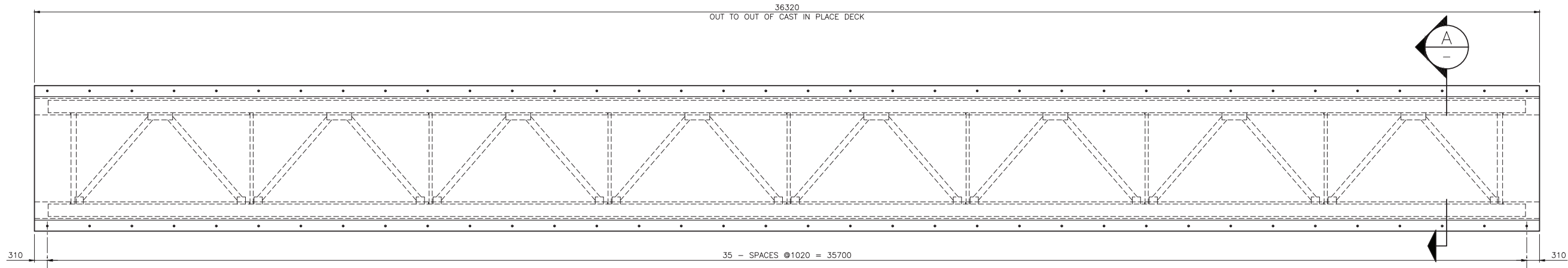


SUB CONSULTANT		

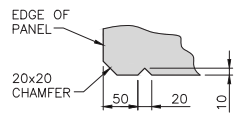
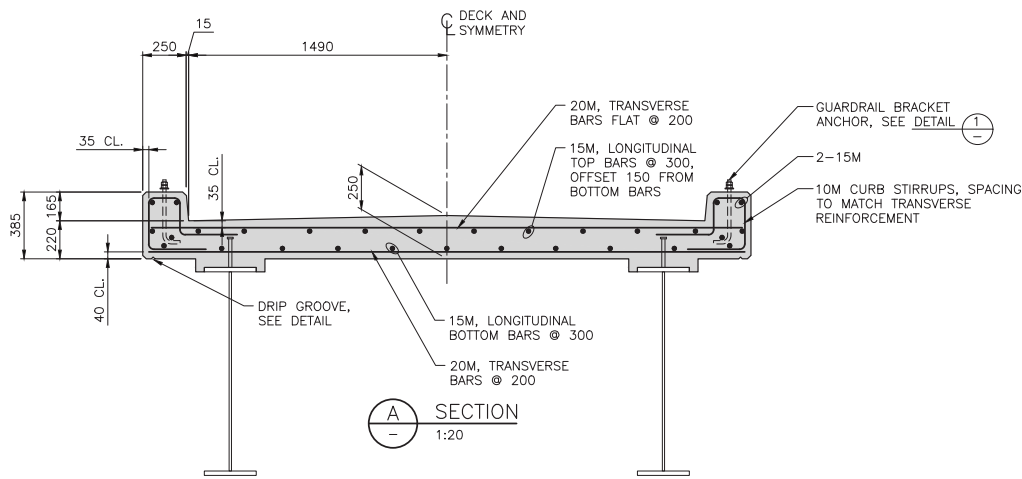
ENGINEERS SEAL

STEEL GIRDERS  
- SHEET 2

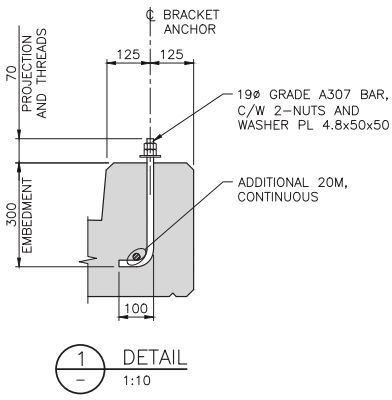
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SCALE AS SHOWN	PERMIT No. N/A
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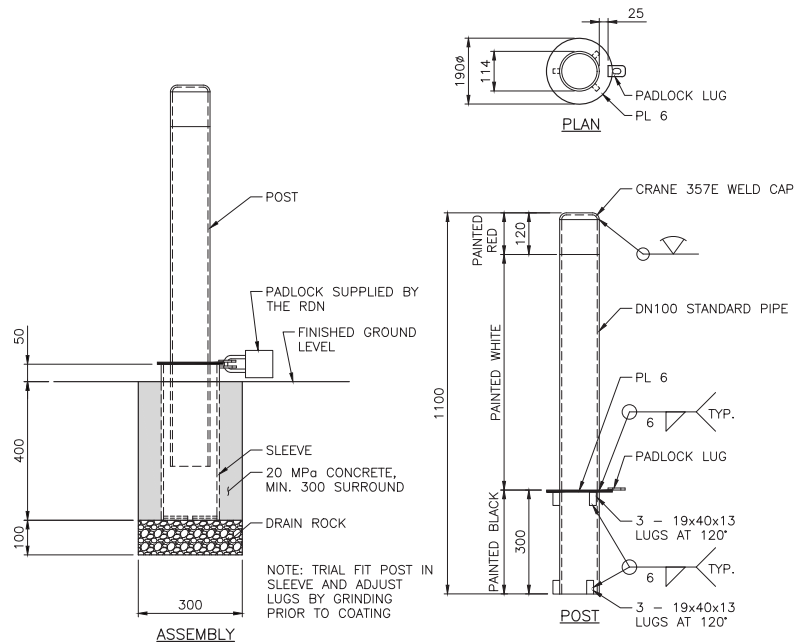
PLAN - CAST-IN-PLACE DECK GENERAL ARRANGEMENT  
1:50



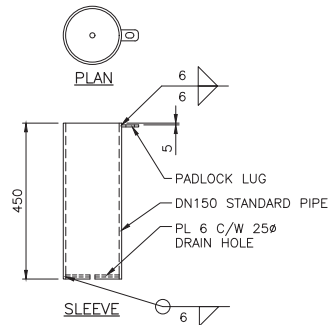
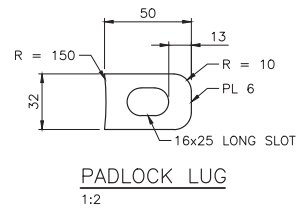
DETAIL - DRIP GROOVE  
1:5  
NOTE: REINFORCEMENT NOT SHOWN.



DETAIL 1:10  
NOTE: STANDARD REINFORCEMENT NOT SHOWN.



TYPICAL DETAIL - REMOVABLE BOLLARD  
1:10  
NOTE: 2 - REQUIRED, 1 AT EACH END OF BRIDGE



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NOTES:

- FOR GENERAL NOTES, SEE DWG. S01 AND S02.

ISSUES						SUB CONSULTANT
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A	2018.11.09	CLIENT REVIEW				
B	2019.01.11	CLIENT REVIEW				

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Tel: 250-751-8558 Fax: 250-751-8559

Email: mail@heroldengineering.com

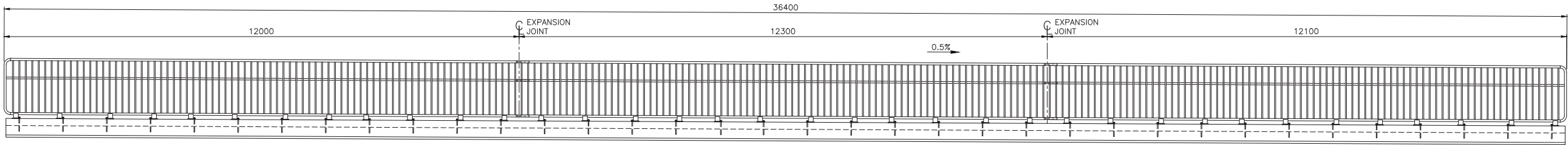
ENGINEERS SEAL

CONCRETE BRIDGE  
DECK AND  
REMOVABLE  
BOLLARD

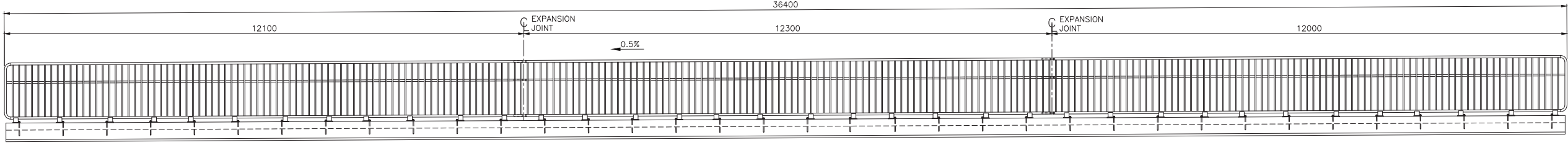
LITTLE QUALICUM RIVER  
PEDESTRIAN BRIDGE  
6300 HAMMOND BAY ROAD NANAIMO BC V9T 6N2  
REGIONAL DISTRICT OF NANAIMO

HEL PROJECT No. 0837-053	CLIENT DWG. No. N/A
SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. S09	REVISION B

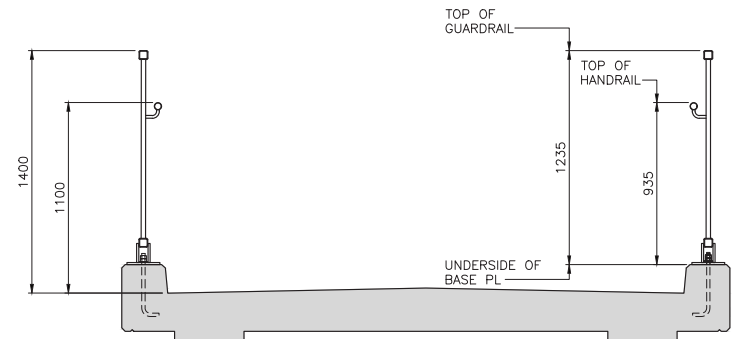
DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



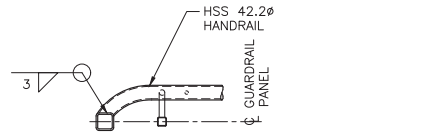
ELEVATION LOOKING EAST  
1:50



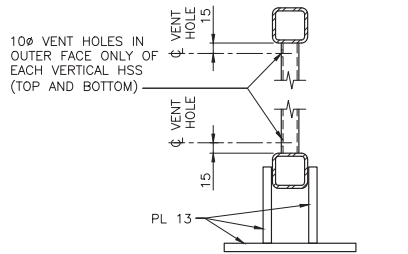
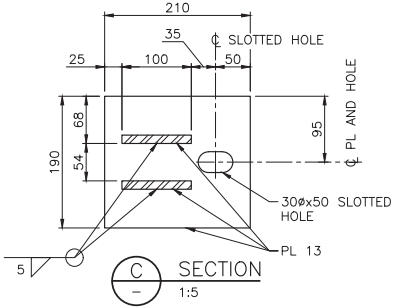
ELEVATION LOOKING WEST  
1:50



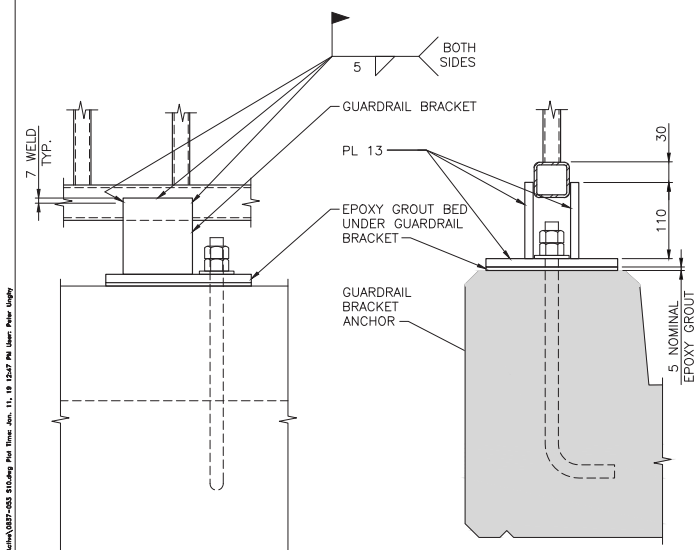
TYPICAL SECTION - BRIDGE DECK  
1:20



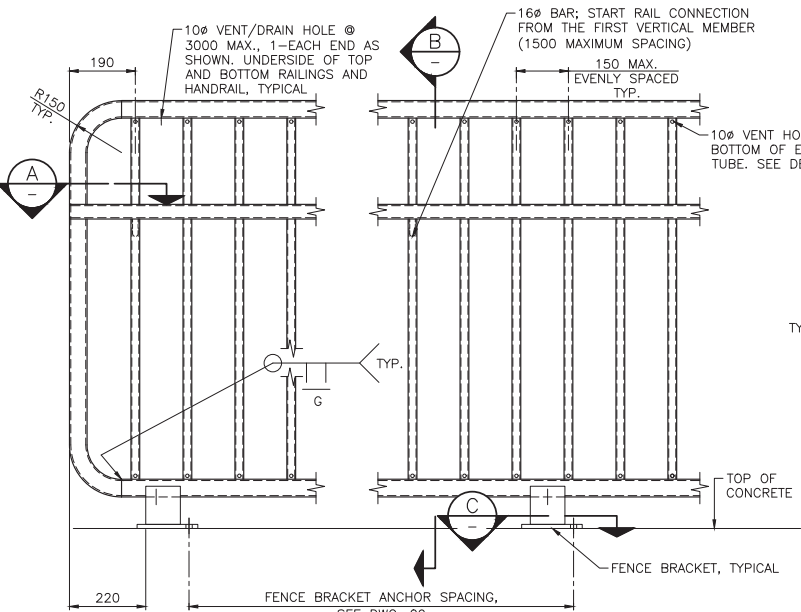
SECTION - HANDRAIL TERMINATION  
1:10  
NOTE: HANDRAIL TERMINATION AT END OF PANEL IS TYPICAL FOR ALL PANELS.



DETAIL - VENT HOLE  
1:5

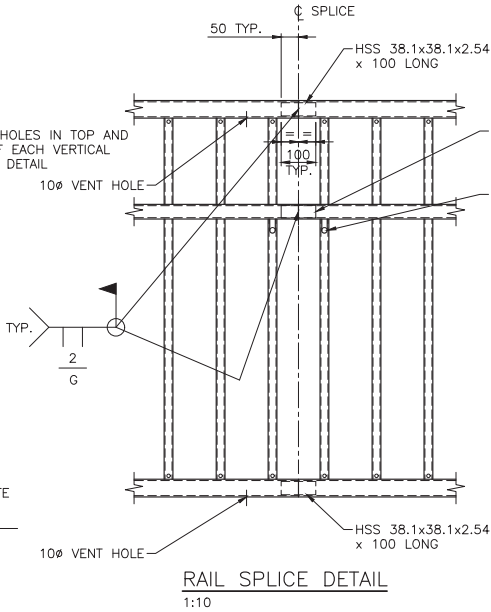


DETAIL - GUARDRAIL BRACKET  
1:5

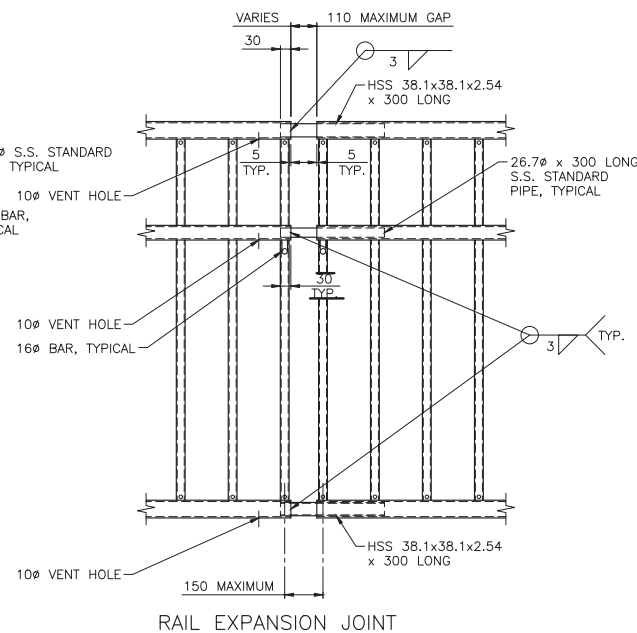


END DETAIL  
1:10

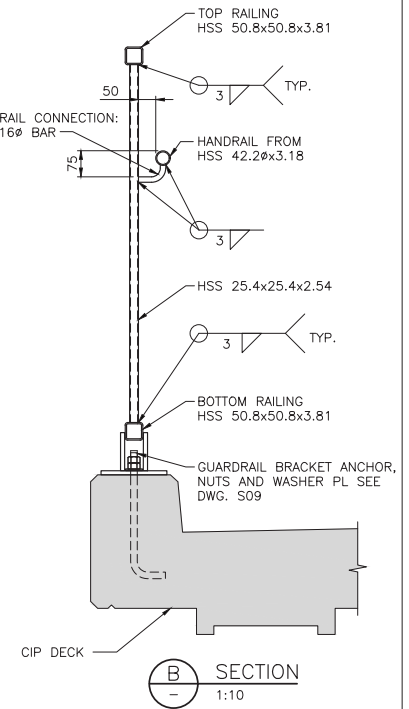
TYPICAL DETAIL  
1:10



RAIL SPLICE DETAIL  
1:10



RAIL EXPANSION JOINT  
1:10  
NOTE: RAILING EXPANSION JOINT TO BE LOCATED AT 30 METRES MAXIMUM SPACING.



- NOTES:
- FOR GENERAL NOTES, SEE DWG. S01 AND S02.
  - GUARDRAILS SHALL BE COATED WITH A DUPLEX SYSTEM CONSISTING OF MANUFACTURER'S STANDARD BLACK POWDER COATING OVER HOT DIP GALVANIZING AS FOLLOWS:
  - HOT DIP GALVANIZE IN ACCORDANCE WITH ASTM A123 AND DO NOT WATER OR CHROMATE QUENCH.
  - REMOVE ALL DRAINAGE SPIKES AND SURFACE DEFECTS.
  - POWDER COATING CONTRACTOR IS RESPONSIBLE FOR INSPECTING THE GALVANIZED MATERIAL AT THE GALVANIZING SHOP PRIOR TO SHIPMENT, BASED ON REQUIREMENTS GIVEN IN ASTM A123.
  - PREPARE GALVANIZED PIECES FOR POWDER COATING IN ACCORDANCE WITH ASTM D7803.
  - POWDER-COAT WITHIN 48 HOURS OF GALVANIZING. DO NOT GET SURFACES WET. DO NOT LEAVE OUTSIDE.
  - KEEP THE SURFACE CLEAN. DO NOT TRANSPORT UNCOVERED LOADS. DIESEL FUMES WILL CONTAMINATE SURFACE.
  - IF SURFACE CONTAMINATION HAS OCCURRED, CLEAN SURFACE WITH PROPRIETARY SOLVENT/DETERGENT DESIGNED FOR PRE-CLEANING, PRIOR TO POWDER-COATING.
  - USE SWEEP BLASTING OR ZINC PHOSPHATE PRE-TREATMENT.
  - PRE-HEAT WORK PRIOR TO POWDER APPLICATION.
  - USE DEGASSING GRADE POLYESTER POWDER ONLY.
  - CHECK FOR CORRECT CURING BY SOLVENT TESTING. ADJUST PRE-HEAT AND LINE SPEED TO ENSURE FULL CURE.
  - PROVIDE 10 YEAR RUST THROUGH WARRANTEE. INCLUDE TERMS AND CONDITIONS OF WARRANTEE IN BID.

ISSUED FOR REVIEW

NOT FOR  
CONSTRUCTION

ISSUES					
No.	DATE	ISSUED FOR	No.	DATE	ISSUED FOR
A	2019.01.11	CLIENT REVIEW			

SUB CONSULTANT	

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DESIGN REVIEW

**HEROLD ENGINEERING**

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Tel: 250-751-8558 Fax: 250-751-8559  
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ENGINEERS SEAL

GUARDRAILS

LITTLE QUALICUM RIVER  
PEDESTRIAN BRIDGE  
6300 HAMMOND BAY ROAD NANAIMO BC V9T 6N2  
REGIONAL DISTRICT OF NANAIMO

HEL PROJECT No. 0837-053	CLIENT DWG. No. N/A
SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. <b>S10</b>	REVISION A