



Ministry of Forests,
Lands, Natural
Resource Operations
and Rural Development

ENGINEERING BRANCH

STANDARD BRIDGE DRAWINGS:

ALL-STEEL PORTABLE BRIDGE

DRAWING SCHEDULE			
DRAWING NUMBER	DRAWING TITLE	REV.	DATE
STD-EC-091-01	GENERAL NOTES	0	JANUARY 2022
STD-EC-091-02	GENERAL ARRANGEMENT	0	JANUARY 2022
STD-EC-091-03	STRUCTURAL DETAILS - SHEET 1	0	JANUARY 2022
STD-EC-091-04	STRUCTURAL DETAILS - SHEET 2	0	JANUARY 2022
STD-EC-091-05	DECK WIDENING PLATE DETAILS	0	JANUARY 2022

- 1.1 THESE CONCEPTUAL STANDARD DRAWINGS APPLY TO THE DESIGN OF SIMPLE SPAN SINGLE LANE ALL-STEEL PORTABLE BRIDGES. THEY PROVIDE AND ILLUSTRATE MINIMUM STANDARD DESIGN GUIDELINES AND DETAILS.
- 1.2 VARIATION FROM THESE CONCEPTUAL STANDARD DRAWINGS MAY BE ACCEPTABLE IN CERTAIN SITUATIONS. THE PROFESSIONAL OF RECORD AND / OR COORDINATING REGISTERED PROFESSIONAL SHALL DOCUMENT ALL VARIATIONS FOR APPROVAL BY THE MINISTRY ENGINEER.
- 1.3 WHERE CODES, STANDARDS, GUIDELINES OR OTHER DOCUMENTS ARE REFERENCED, THE MOST RECENT VERSION APPLIES UNLESS SPECIFICALLY STATED OTHERWISE.
- 1.4 DEFINITIONS:
 - 1.4.1 MINISTRY REFERS TO BRITISH COLUMBIA MINISTRY OF FORESTS, LANDS, NATURAL RESOURCE OPERATIONS AND RURAL DEVELOPMENT.
 - 1.4.2 STRUCTURAL DESIGN ENGINEER REFERS TO A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA, EXPERIENCED IN THE DESIGN OF ALL-STEEL PORTABLE BRIDGES AND IS RESPONSIBLE FOR THE STRUCTURAL DESIGN OF A BRIDGE IN CONFORMANCE WITH THESE DRAWINGS AND THE PROJECT SPECIFICATIONS.
 - 1.4.3 MINISTRY ENGINEER REFERS TO A PROFESSIONAL ENGINEER DESIGNATED BY THE MINISTRY.
 - 1.4.4 COORDINATING REGISTERED PROFESSIONAL (CRP) REFERS TO THE INDIVIDUAL RESPONSIBLE FOR PLANNING AND COORDINATING ALL PROFESSIONAL SERVICES FOR THE CROSSING PROJECT IN ACCORDANCE WITH THE EGBC AND ABCFP "PROFESSIONAL SERVICES IN THE FOREST SECTOR - CROSSINGS" GUIDELINES.
 - 1.4.5 PROFESSIONAL OF RECORD (POR) REFERS TO A PROFESSIONAL ENGINEER OR A FOREST PROFESSIONAL RESPONSIBLE FOR THE DESIGN OF THE CROSSING IN ACCORDANCE WITH THE EGBC AND ABCFP "PROFESSIONAL SERVICES IN THE FOREST SECTOR - CROSSINGS" GUIDELINES.
- 1.5 THE STRUCTURAL DESIGN ENGINEER SHALL CARRY OUT THE STRUCTURAL DESIGN OF ALL BRIDGE COMPONENTS. A DOCUMENTED INDEPENDENT REVIEW OF STRUCTURAL DESIGNS (IF REQUIRED) IN ACCORDANCE WITH THE GUIDELINES PUBLISHED BY ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA (EGBC) CALLED "DOCUMENTED INDEPENDENT REVIEW OF STRUCTURAL DESIGNS" SHALL BE KEPT ON FILE, AND UPON REQUEST BE PROVIDED TO THE MINISTRY.
- 1.6 THE STRUCTURAL DESIGN ENGINEER SHALL INCLUDE NOTES ON THE DESIGN DRAWINGS TO ADDRESS THE FOLLOWING:
 - 1.6.1 THE REQUIREMENT FOR FIELD REVIEWS DURING BRIDGE MATERIALS FABRICATION, IN ACCORDANCE WITH THE EGBC AND MINISTRY GUIDELINES.
 - 1.6.2 DESIGNED LIFTING CONFIGURATIONS.
 - 1.6.3 A COORDINATING REGISTERED PROFESSIONAL MUST OVERSEE THE DEVELOPMENT OF THE GENERAL ARRANGEMENT DESIGN DRAWINGS AND FIELD REVIEWS FOR THE INSTALLATION OF THE ALL-STEEL PORTABLE BRIDGE IN ACCORDANCE WITH EGBC AND ABCFP "PROFESSIONAL SERVICES IN THE FOREST SECTOR - CROSSINGS" GUIDELINES.
 - 1.6.4 PRIOR TO INSTALLING AN ALL-STEEL PORTABLE BRIDGE, A QUALIFIED PERSON TAKING OVERALL RESPONSIBILITY FOR THE FIELD INSTALLATION, SHALL INSPECT THE BRIDGE, TO CONFIRM AND DOCUMENT THAT THERE IS NO DAMAGE OR DETERIORATION THAT MAY COMPROMISE THE BRIDGE'S STRUCTURAL INTEGRITY OR INTENDED USE.
 - 1.6.5 THE BRIDGE DECK WEARING SURFACE REQUIRES REGULAR REPAIR OR MAINTENANCE TO ENSURE ADEQUATE SKID RESISTANCE. IF THE WEARING SURFACE DOES NOT PROVIDE ADEQUATE SKID RESISTANCE, IT SHOULD BE REPAIRED PRIOR TO USE.

DESIGN TRAFFIC LOAD	STANDARD DECK WIDTH (mm)
BCL-625, L-100	4260
L-150, L-165	4860

- 4.1 DESIGN LIFE: 45 YEARS.
- 4.2 DESIGN CODE: CSA S6 CANADIAN HIGHWAY BRIDGE DESIGN CODE AS MODIFIED IN THIS STANDARD DRAWING PACKAGE.
- 4.3 MINISTRY STANDARDS:
 - 4.3.1 MINISTRY STANDARD BRIDGE DRAWINGS.
 - 4.3.2 MINISTRY BRIDGE GUIDELINES, STANDARDS AND SPECIFICATIONS (BGSS).
 - 4.3.3 MINISTRY ENGINEERING MANUAL.
- 4.4 DESIGN TRAFFIC LOAD:

- 4.6.2 NUMBER OF CYCLES:
 - 500 000 FOR SPANS > 12 m.
 - 1 000 000 FOR SPANS ≤ 12 m.
- 4.6.3 LIMIT THE CALCULATED FLS STRESS RANGE (fsr) IN THE WEB/ BOTTOM FLANGE TO THAT SPECIFIED FOR A DETAIL CATEGORY C. (TO ACCOUNT FOR USE OF TABS (AS SHOWN ON THE STANDARD DRAWINGS) THAT SUPPORT THE BOTTOM FLANGE DURING FABRICATION BUT REMAIN A PART OF THE PERMANENT STRUCTURE).
- 4.7 LIVE LOAD DEFLECTION:
 - 4.7.1 MAXIMUM LIVE LOAD DEFLECTION = SPAN/350.
 - 4.7.2 WHERE USING THE L-165 DESIGN TRAFFIC LOAD, CALCULATE THE DEFLECTION USING THE L-150 DESIGN TRAFFIC LOAD.
 - 4.7.3 THE DESIGN TRAFFIC LOAD SHALL BE ONE TRUCK ONLY CENTERED ON THE BRIDGE. THE LANE LOAD SHALL NOT BE CONSIDERED.
 - 4.7.4 LATERAL WHEEL DISTRIBUTION: 50% - 50%.
- 4.8 BEARING PLATE:
 - 4.8.1 DESIGN BEARING PLATE TO ALLOW BRIDGE TO BE SUPPORTED ON FULL LENGTH DOUGLAS FIR TIMBER SILL, GRADE NO.2 OR BETTER.
 - 4.8.2 MIN. SILL WIDTH = 400 mm
- 4.9 WEB INCLINATION:
 - 4.9.1 MAXIMUM WEB INCLINATION 1H:2.5V UNLESS APPROVED BY MINISTRY ENGINEER.
- 4.10 GUARDRAILS:
 - 4.10.1 GUARDRAILS HAVE BEEN DESIGNED TO MEET THE CRITERIA FOR CONTAINMENT LEVEL CL-1 OR CL-3 AS DEFINED BY THE MINISTRY. GUARDRAILS HAVE NOT BEEN DESIGNED TO CONTAIN ERRANT VEHICLES.
- 4.11 WELDING:
 - 4.11.1 WELD SYMBOLS SHOWN INDICATE APPROVED WELD TYPES. WELD SIZE TO BE DETERMINED BY STRUCTURAL DESIGN ENGINEER

5.1 STRUCTURAL STEEL PLATE:

- CAN/ CSA-G40.21M.
- DECK, FLANGES AND WEB PLATES: GRADE 350AT CATEGORY 3.

- OTHER STEEL PLATE: GRADE 350A.

5.2 RAILS AND POSTS:

- CAN/ CSA-G40.21M GRADE 350W OR 350A.
- ASTM A500 GRADE C OR A847.

5.3 BOLTS: ASTM F3125 GRADE A325 TYPE 3, U.N.O.

5.4 STEEL FABRICATION:

5.4.1 FABRICATOR TO BE CERTIFIED TO DIVISION 1 OR 2 IN ACCORDANCE WITH CSA W47.1.

5.4.2 FABRICATE ALL-STEEL PORTABLE BRIDGES AS PRIMARY TENSION MEMBERS IN ACCORDANCE WITH CSA S6. STEEL PLATES FOR BOTTOM FLANGES AND WEBS SHALL CONFORM TO THE REQUIREMENTS FOR PRIMARY TENSION MEMBERS IN ACCORDANCE WITH CSA S6 EXCEPT THAT CHARPY V-NOTCH TESTING RESULTS ARE ONLY REQUIRED ON A PER HEAT FREQUENCY.

5.4.3 COMPLETE ALL WELDS IN ACCORDANCE WITH CSA W59. WELD METAL SHALL MEET THE CVN TOUGHNESS REQUIREMENTS OF CSA S6 FOR PRIMARY TENSION MEMBERS FOR A MINIMUM SERVICE TEMPERATURE OF $< -40^{\circ}\text{C}$.

5.4.4 COMPLETE WELD INSPECTION IN ACCORDANCE WITH CSA W59.

5.4.5 ALL BUTT WELDS ON THE FLANGE, WEB AND DECK SHALL BE RADIOGRAPHIC OR ULTRASONIC TESTED IN ACCORDANCE WITH CSA W59.

5.4.6 THE WELDING PROCEDURE DATA SHEETS, AS PER CSA W47.1, SHALL BE AVAILABLE FOR REVIEW PRIOR TO FABRICATION.

5.4.7 WEB TO FLANGE WELDS SHALL BE MADE BY MACHINE OR AUTOMATIC WELDING USING SUBMERGED ARC WELDING, FLUX-CORED ARC WELDING OR METAL-CORE ARC WELDING. WEB TO FLANGE WEB WELDS SHALL GENERALLY BE MADE AS CONTINUOUS, UNINTERRUPTED AND UNIFORM WELDS WITHOUT ABNORMALITIES.

5.4.8 WHERE WELDS REQUIRE REPAIR, THEY MAY BE REPAIRED USING A SEMI-AUTOMATIC OR MANUAL PROCESS IN ACCORDANCE WITH CSA W59. THE REPAIRED WELD SHALL BLEND SMOOTHLY WITH THE ADJACENT WELDS.

5.4.9 FIELD WELDING OF PRIMARY BRIDGE COMPONENTS IS NOT PERMITTED.

5.5 DECK COATING:

5.5.1 TOP OF BRIDGE DECK SHALL BE SANDBLASTED TO SSPC-SP6 AND COATED WITH AMERLOCK 400 (OR EQUIVALENT AS APPROVED BY THE MINISTRY ENGINEER) WITH 16 GRIT SAND TO PROVIDE ANTI-SKID WEARING SURFACE.

5.5.2 THE MINISTRY MAY APPROVE ALTERNATE FRICTION RESISTANT COATINGS.

5.6 GUARDRAIL POST AND RAIL COATING:

5.6.1 PAINT GUARDRAIL POST AND RAILS IN ACCORDANCE WITH MINISTRY STEEL GUARDRAIL COMPONENT PAINT STANDARD.

5.6.2 COLOUR: SAFETY YELLOW.

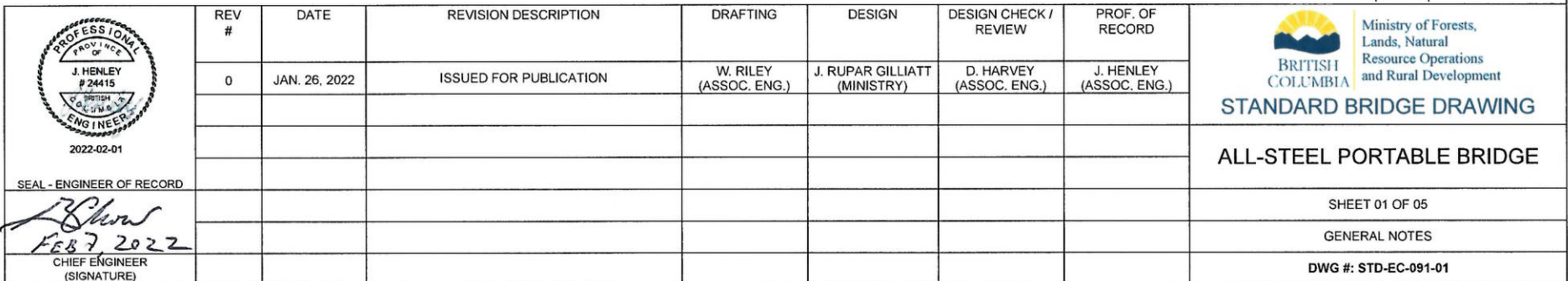
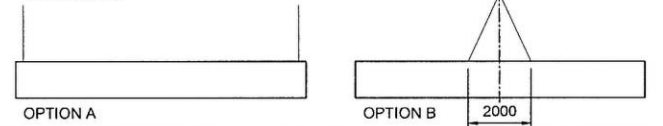
5.7 DECK WIDENING PLATE :

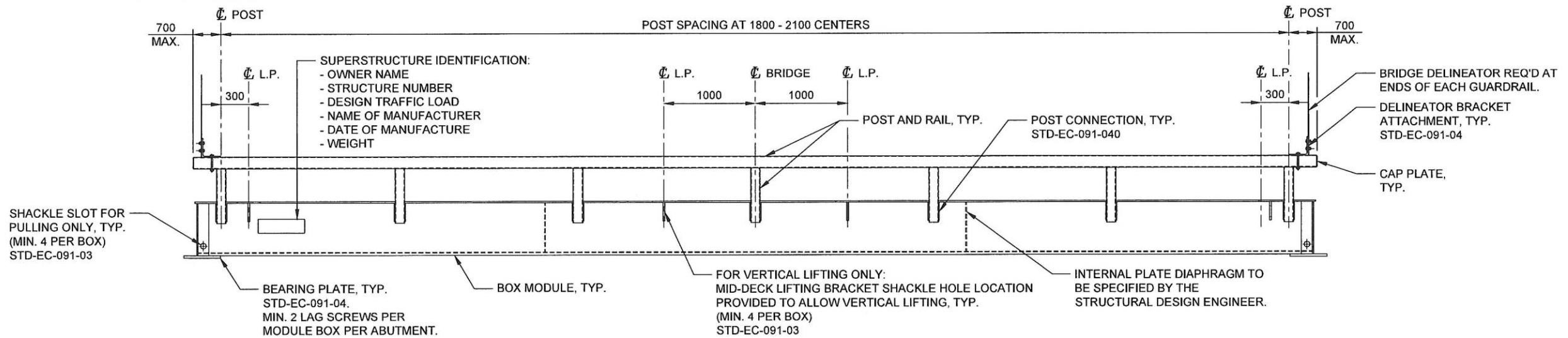
5.7.1 DECK WIDENING PLATES SHALL BE PAINTED SAFETY YELLOW.

5.7.2 DECK WIDENING PLATES DESIGNED FOR A NON-TRAFFICKED AREA SHALL BE CLEARLY MARKED AS "NO VEHICLE LOADING".

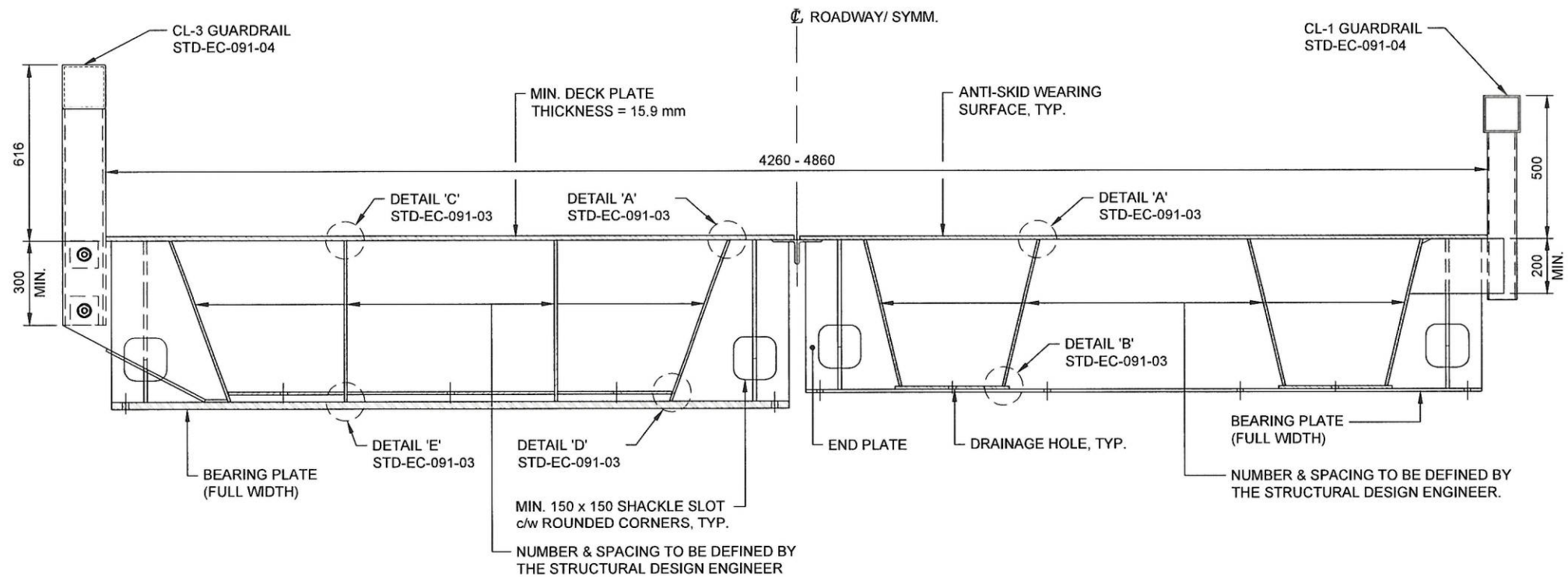
5.7.3 DECK WIDENING PLATES DESIGN TO ACCOMMODATE TRAFFIC LOADS SHALL BE CLEARLY MARKED WITH THE DESIGN LOAD E.G. BCL-625, L100, L150 OR L165.

- 6.1 CONTRACTOR TO TAKE SUITABLE PRECAUTIONS TO PREVENT DAMAGE TO THE ALL-STEEL PORTABLE BRIDGE DURING INSTALLATION.
- 6.2 ONLY LOW-IMPACT LIFTS ARE PERMITTED. ANGLE OF LIFT MUST NOT EXCEED 30 DEGREES FROM VERTICAL.
- 6.3 THE FOLLOWING FIGURES ILLUSTRATE ANTICIPATED VERTICAL LIFTING SCENARIOS:





ELEVATION 1:50 L.P. - DENOTES LIFTING POINT.



ALTERNATE #1: TYPICAL SINGLE BOX MODULE

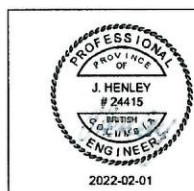
(MIN. NO. INTERNAL WEBS=2)
(MAX. SPAN=24 m)

ALTERNATE #2: TYPICAL TWIN BOX MODULE

(MAX. SPAN=20 m)

TYPICAL CROSS SECTION

1:20

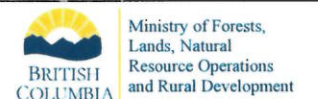


SEAL - ENGINEER OF RECORD

J. Henley
FEB 7 2022
CHIEF ENGINEER
(SIGNATURE)

PERMIT TO PRACTICE
ASSOCIATED ENGINEERING (B.C.) LTD.
PERMIT NUMBER: 1000163
Engineers & Geoscientists BC

REV #	DATE	REVISION DESCRIPTION	DRAFTING	DESIGN	DESIGN CHECK / REVIEW	PROF. OF RECORD
0	JAN. 26, 2022	ISSUED FOR PUBLICATION	W. RILEY (ASSOC. ENG.)	J. RUPAR GILLIATT (MINISTRY)	J. HENLEY (ASSOC. ENG.)	J. HENLEY (ASSOC. ENG.)



STANDARD BRIDGE DRAWING

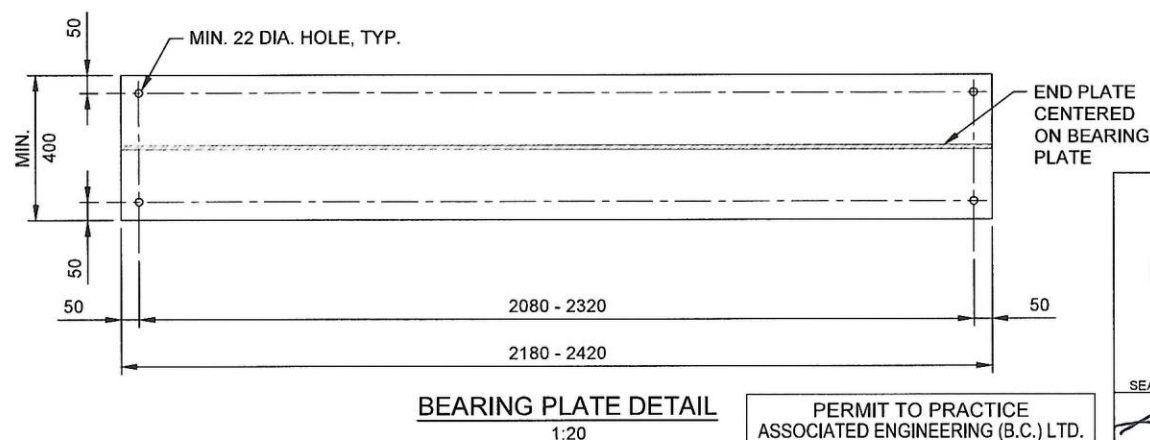
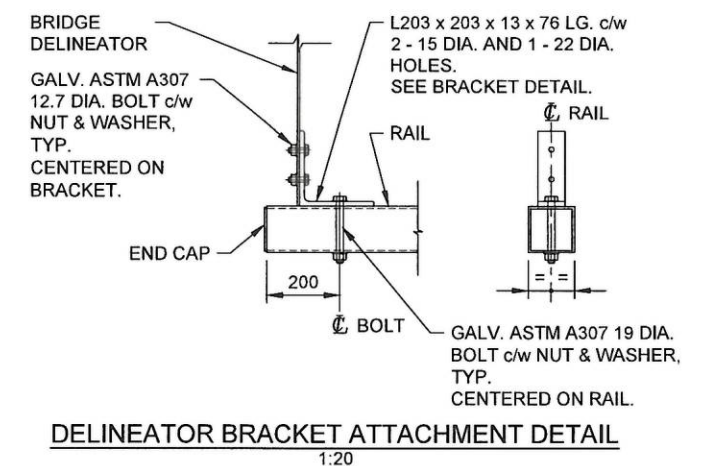
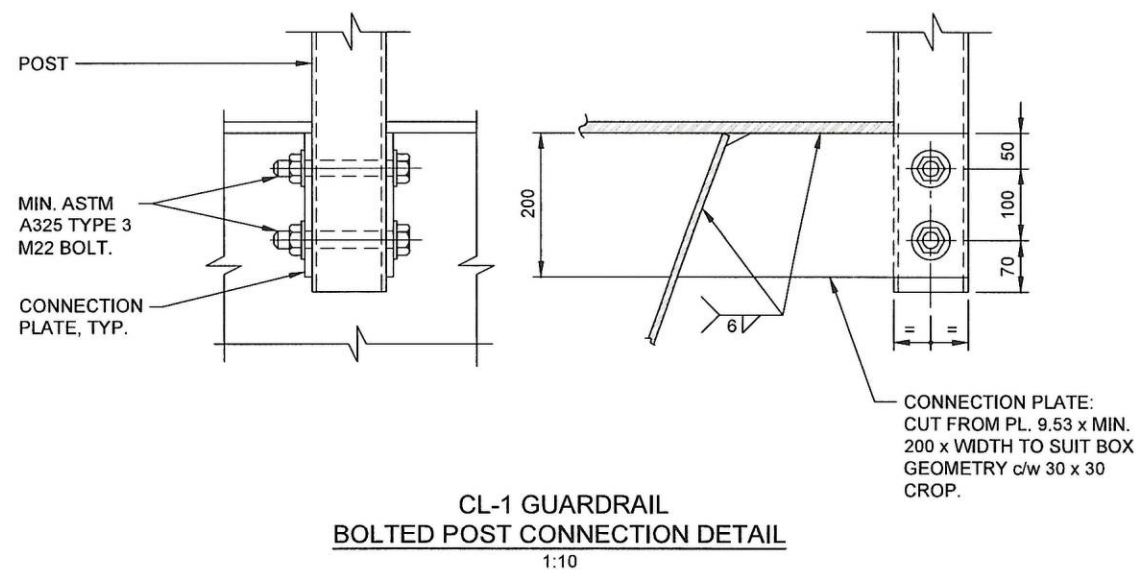
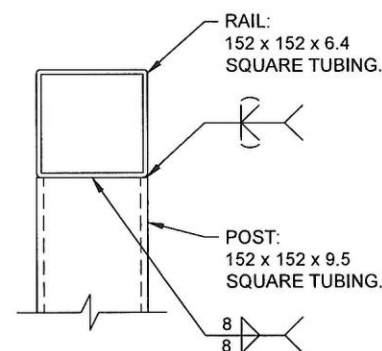
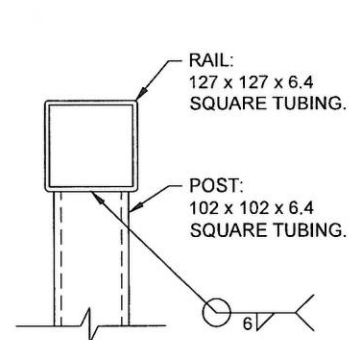
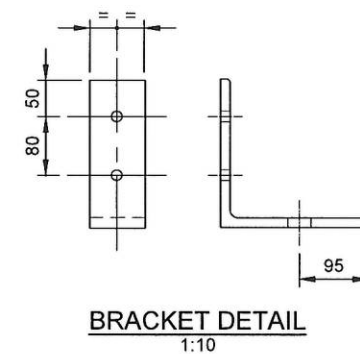
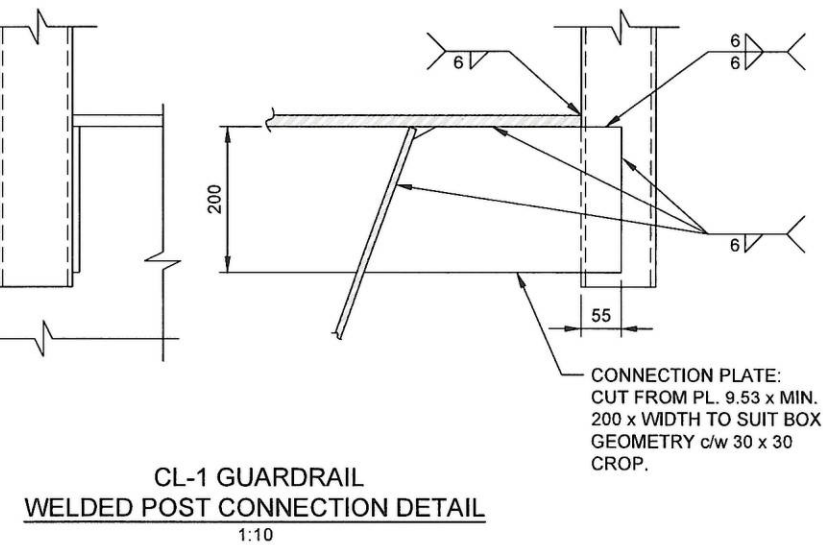
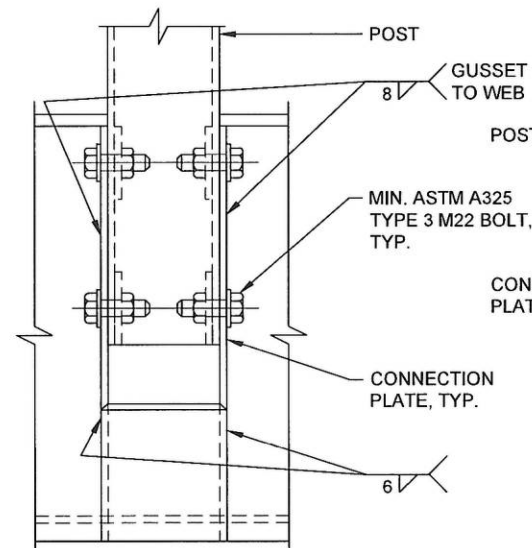
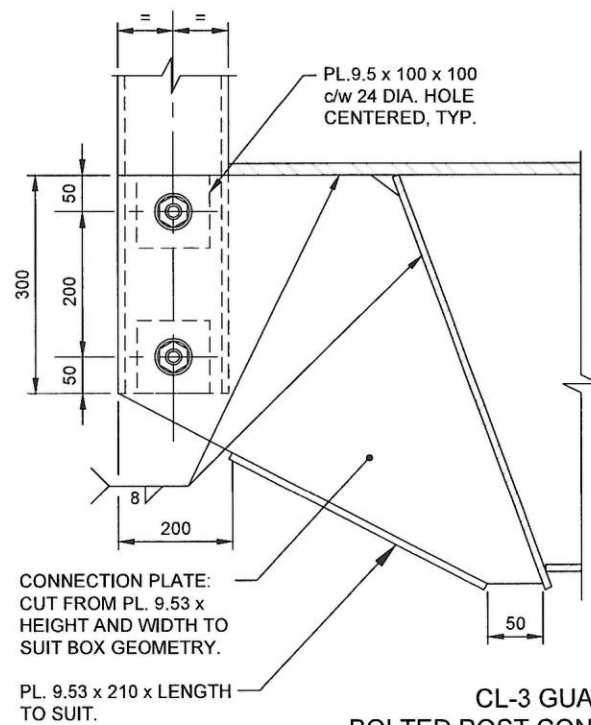
ALL-STEEL PORTABLE BRIDGE

SHEET 02 OF 05

GENERAL ARRANGEMENT

DWG #: STD-EC-091-02

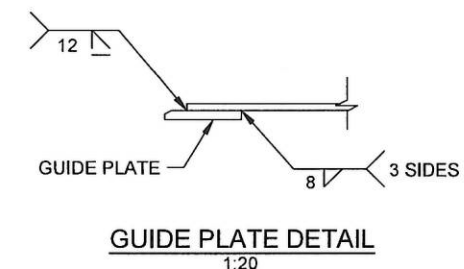
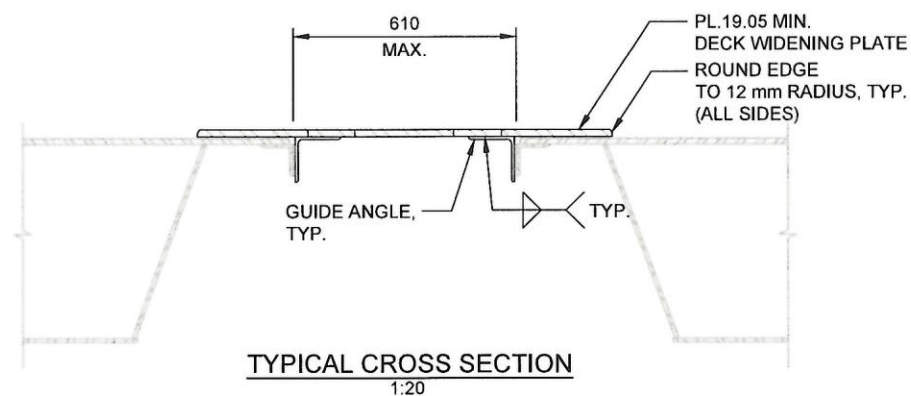
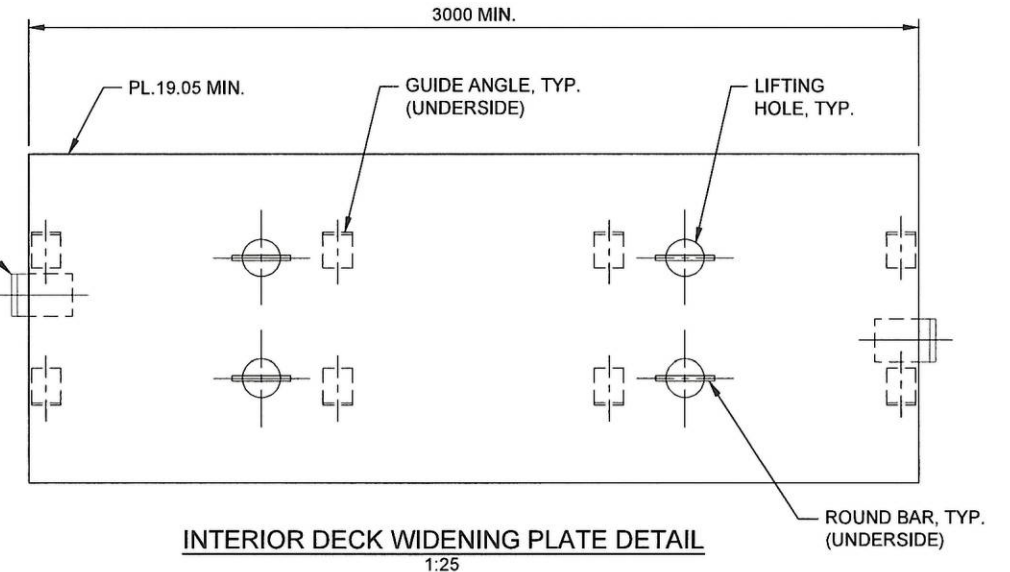
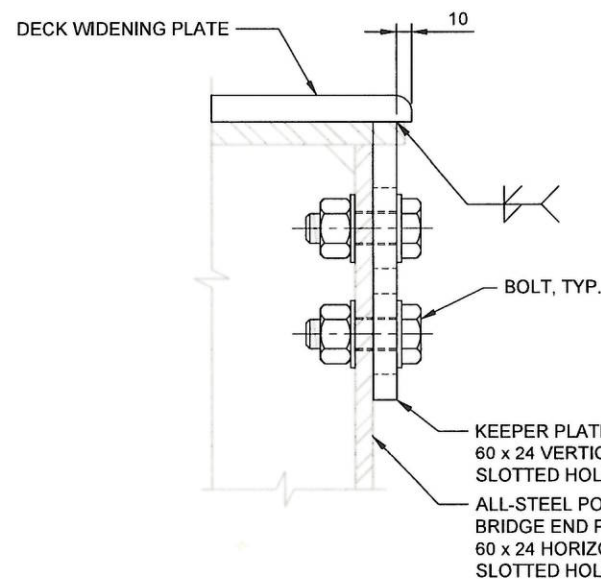
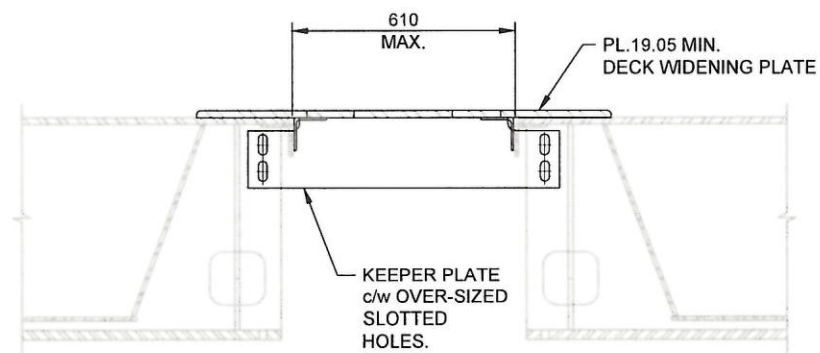
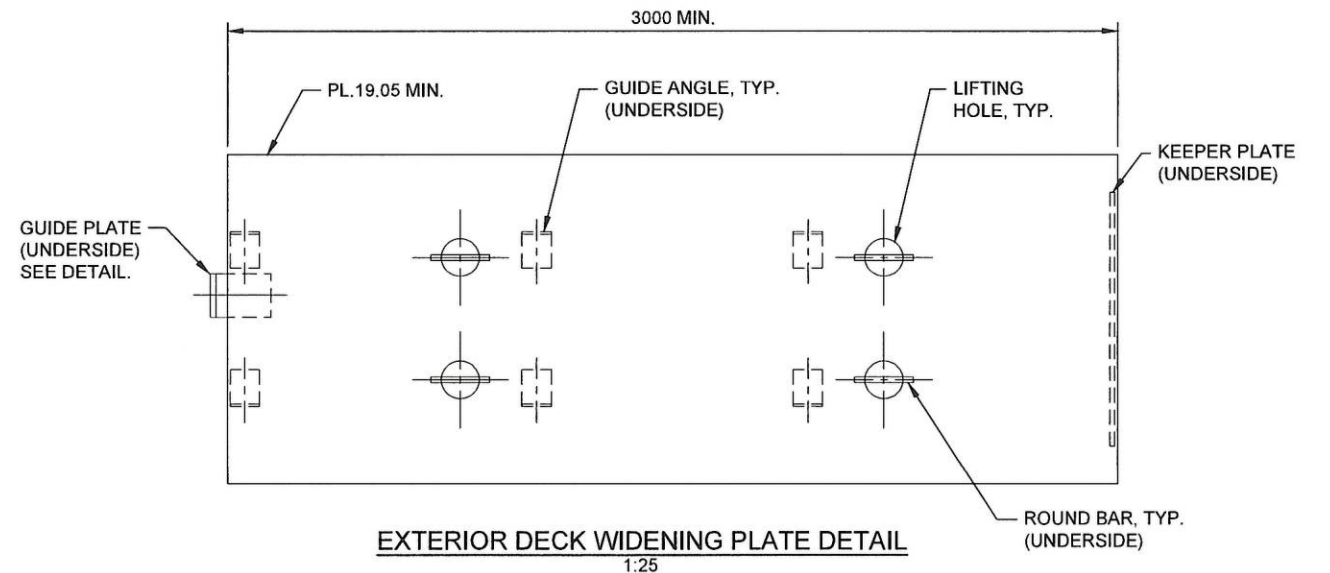
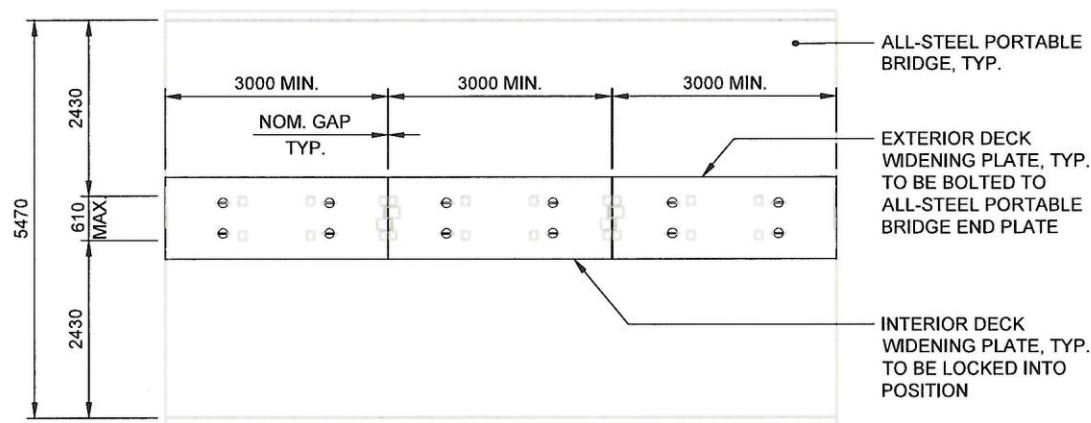
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FEB 7, 2022
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ALL-STEEL PORTABLE BRIDGE

SHEET 05 OF 05

DECK WIDENING PLATE DETAILS

DWG #: STD-EC-091-05