1 GENERAL

1.1 THESE STANDARD DRAWINGS APPLY ONLY TO THE DESIGN AND SUPPLY OF SIMPLE SPAN, SINGLE LANE BRIDGE SUBSTRUCTURES. THE STANDARD DRAWINGS PROVIDE DESIGN GUIDELINES AND STANDARD DETAILS.

1.2 VARIATIONS FROM THE STANDARD DESIGN REQUIREMENTS MAY BE ACCEPTABLE IN CERTAIN SITUATIONS. ALL SUCH VARIATIONS SHALL BE DOCUMENTED AND REQUIRE APPROVAL FROM FLNR PRIOR TO USE.

1.3 A PROFESSIONAL ENGINEER REGISTERED TO PRACTICE IN THE PROVINCE OF BRITISH COLUMBIA SHALL DESIGN ALL BRIDGE COMPONENTS.

1.4 DEFINITIONS
- ENGINEER:
  - A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA EXPERIENCED IN THE DESIGN OF STEEL AND CONCRETE BRIDGES, WHO IS RESPONSIBLE FOR THE DETAILED STRUCTURAL DESIGN OF A BRIDGE IN CONFORMANCE WITH THESE DRAWINGS
- FLNR:
  - A PROFESSIONAL ENGINEER DESIGNATED BY THE MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS (FLNR).

1.5 APPLICABLE OVERALL BRIDGE LENGTH (OUT-TO-OUT):
- OVERALL BRIDGE GIRDER LENGTHS GREATER THAN 40m (130') FOR STEEL BRIDGES AND 15m (50') FOR CONCRETE BRIDGES, OR CONTINUOUS MULTI-SPAN BRIDGES WILL REQUIRE SPECIAL INVESTIGATION. DETAILS TO BE APPROVED BY FLNR PRIOR TO USE.

1.6 STANDARD DECK WIDTHS
- THE FOLLOWING TABLE SPECIFIES STANDARD DECK WIDTHS FOR THE DESIGNATED DESIGN VEHICLES.

DESIGN VEHICLE	STANDARD DECK WIDTH (mm)
BCL-625, L100	4268
L150, L165	4876

- THESE STANDARD DRAWINGS ARE BASED ON THESE STANDARD DECK WIDTHS.

1.7 STANDARD GIRDER AND COLUMN SPACING
- THE FOLLOWING TABLE SPECIFIES STANDARD GIRDER AND COLUMN / FOOTING SPACING.

DECK WIDTH mm(ft)	STANDARD COLUMN SPACING (mm) (PERPENDICULAR TO BRIDGE)
4268 (14')	3000
4876 (16')	3600
5486 (18')	4200

1.8 COMPONENT WEIGHTS
- PRECAST CONCRETE COMPONENT WEIGHTS SUCH AS BASE SLAB, BALLAST WALL, CAP AND FOOTINGS, SHALL BE SPECIFIED ON THE DESIGN DRAWINGS.

1.9 DRAWINGS INCORPORATING ENGINEERED DETAILS APPLY TO STANDARD WIDTH SQUARE BRIDGES ONLY.

1.10 ACCOMMODATE GRADES IN EXCESS OF 2% WITH A BEVEL PLATE OR SLOPED CAP BEAM.

1.11 ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.

1.12 ENGINEER SHOULD PROVIDE A LAYOUT TABLE ON THE SHOP DRAWINGS FOR FOOTING LOCATION ON SKEWED BRIDGES.

1.13 FLNR PROJECT SPECIFICATIONS WILL TAKE PRECEDENCE OVER THE STANDARD DRAWINGS.

1.14 BEARING:
- FOR SPAN LESS THAN OR EQUAL TO 40m (130'), DEFORMATION AND TRANSLATION CAN BE ACCOMMODATED AS DETAILED IN THE STANDARD DRAWINGS.
- FOR SPAN GREATER THAN 40m (130'), ENGINEER TO DESIGN BEARINGS TO ACCOMMODATE DEFORMATION AND TRANSLATIONS.

2 DESIGN

2.1 DESIGN LIFE:
- BRIDGE DESIGN LIFE: 45 YEARS

2.2 DESIGN CODE AND FLNR REFERENCE STANDARDS:
- CAN/CSA-S6-06 C/W S6S1-10, S6S2-11 AND S6S3-13 (CSA-S6)
- FLNR BRIDGE DESIGN AND CONSTRUCTION MANUAL
- FLNR INTERIM BRIDGE DESIGN GUIDELINES

2.3 DESIGN VEHICLES
- REFER TO FLNR STANDARD DRAWINGS STD-EC-000-01 TO -02
- THE DESIGN DRAWINGS SHOULD CLEARLY SPECIFY THE DESIGN VEHICLE THAT WAS USED FOR THE BRIDGE DESIGN.

2.4 MULTI-LANE LOADING
- WHERE A BRIDGE IS ABLE TO SIMULTANEOUSLY SUPPORT MORE THAN ONE LANE OF TRAFFIC, THE ENGINEER SHOULD SEEK CLARIFICATION FROM FLNR ON HOW TO ACCOUNT FOR MULTI-LANE LOADING.

2.5 DYNAMIC LOAD ALLOWANCE:
- DYNAMIC LOAD ALLOWANCE SHALL BE APPLIED IN ACCORDANCE WITH CAN/CSA-S6 AND FLNR STANDARD DRAWINGS STD-EC-000-01 TO -02

2.6 STANDARD CONCRETE COVER:
- THE FOLLOWING ARE THE STANDARD CONCRETE COVERS, UNLESS NOTED OTHERWISE:
  - CONCRETE FOOTING, ALL FACES 35 MM
  - CONCRETE BALLAST WALL 35 MM
  - CONCRETE CAP (ALL AROUND) 35 MM

2.7 BEARINGS:
- MAXIMUM AVERAGE PRESSURE ON PLAIN ELASTOMERIC BEARING NOT TO EXCEED 4.5 MPA AT SLS COMBINATION 1, INCLUDING DYNAMIC LOAD ALLOWANCE.
- WHERE LAMINATED BEARING PADS ARE USED, THEY SHOULD INCORPORATE A MINIMUM OF TWO REINFORCING PLATES AS SHOWN ON THE STANDARD DRAWINGS.

3 MATERIALS AND FABRICATION

3.1 STRUCTURAL STEEL FOR SUBSTRUCTURE:
- CONFORM TO CAN/CSA-G40.21M, GRADE AS FOLLOWS
  - PLATES: GRADE 350A
  - SECTIONS (EXCEPT COLUMN BRACING): GRADE 350A
  - COLUMN BRACING, INCLUDING BASE PLATES, GUSSETS & SECTIONS, (PAINTED) GRADE 300W
  - HP SECTIONS: (PAINTED) GRADE 300W
  - ANY REQUIRED VARIATION REQUIRES FLNR APPROVAL.

3.2 STEEL PIPE
- CONFORM TO ASTM A252 GRADE 2 OR BETTER.

3.3 WELDING
- ALL WELDS TO BE COMPLETED IN ACCORDANCE WITH CSA W59.
- MINIMUM 6 mm FILLET WELD, U.N.O.

3.4 STEEL SUBSTRUCTURE FABRICATION CERTIFICATION
- STEEL CAP: FABRICATOR TO BE CERTIFIED FOR DIVISION 1 OR 2 IN ACCORDANCE WITH CSA W47.1
- OTHER STEEL COMPONENTS: FABRICATOR TO BE CERTIFIED FOR DIVISION 1, 2 OR 3 IN ACCORDANCE WITH CSA W47.1

3.5 FIELD WELDING:
- BY COMPANY CERTIFIED TO CSA W47.1 DIVISION 1, 2 OR 3

3.6 STRUCTURAL BOLTS:
- CONFORM TO ASTM A325 TYPE 3 M22 U.N.O. INSTALL IN ACCORDANCE WITH CAN/CSA-S6

3.7 ANCHOR BOLTS:
- CONFORM TO ASTM A193 GRADE B7 THREADED ROD AS INDICATED IN DRAWINGS.
- CONFORM TO ASTM A307 GRADE B GALV. AS INDICATED IN DRAWINGS

3.8 STUDS:
- CONFORM TO CSA W59 APPENDIX H FOR TYPE A AND B STUDS
- ASTM A108 GRADE 1015, 1018 OR 1020

3.9 PAINTING:
- COAT STEEL SUBSTRUCTURE INCLUDING BASE PLATES AND ANCHOR BOLTS WITH ONE COAT XYMAX MONOGUARD OR APPROVED EQUAL PRIOR TO BACKFILLING.

3.10 GALVANIZING:
- ALL ITEMS SPECIFIED AS GALVANIZED ARE TO BE HOT DIP GALVANIZED TO CSA G164

3.11 REINFORCING:
- TO CAN/CSA G30.18M GRADE 400R
- REINFORCING STEEL MUST NOT BE WELDED OR TACK WELDED

3.12 GROUT:
- GROUT TARGET TRAFFIC PATCH (FINE) TO BE INSTALLED ACCORDING TO MANUFACTURERS INSTRUCTIONS. EQUIVALENT PRODUCTS MUST BE APPROVED BY FLNR PRIOR TO USE.

3.13 PRECAST CONCRETE:
- CSA A23.1 EXPOSURE CLASS C1, F'C = 35 MPA @ 28 DAYS
- PRECAST CONCRETE TO BE FABRICATED IN ACCORDANCE WITH CSA A23.4, COMPANIES MUST BE CERTIFIED BY THE CANADIAN STANDARD ASSOCIATION (CSA), OR THE CANADIAN PRECAST / PRESTRESSED CONCRETE INSTITUTE (CPCI)
- FABRICATION TOLERANCES TO CAN/CSA-A23.4
- ALL CORNERS C/W 20X20 CHAMFER U.N.O. ON THE APPLICABLE STANDARD DRAWING.

3.14 PRECAST CONCRETE UNREINFORCED INTERLOCKING BLOCKS:
- MIN. f'c = 20 MPa @ 28 DAYS TO CAN/CSA A23.1 AND A23.4
- BLOCKS SHALL BE CAST MONOLITHICALLY, NO COLD JOINTS ALLOWED.
- ALL EXPOSED SURFACES SHALL HAVE A SMOOTH FINISH CONFORMING TO CSA CAN3-A23.4-00 SECTION 24.2.5 GRADE A. THE FINISH MUST NOT BE HONEYCOMBED.
- BLOCKS SIZE MUST BE 750MM x 750MM x 1500MM LONG, PROVIDED WITH SHEAR KEY.
- DIMENSIONAL TOLERANCE MUST BE ± 20 MM FOR LENGTH, WIDTH AND HEIGHT AND THE BLOCKS SHALL BE REASONABLY SQUARE, WITH THE DIAGONALS WITHIN A TOLERANCE OF ± 15 MM OF EACH OTHER.
- TOP AND BOTTOM SURFACES MUST BE FLAT TO A TOLERANCE OF ± 3 mm UNDER 600mm STRAIGHT EDGE.
- CONCRETE SHALL BE AIR ENTRAINED 4-7% TO PROTECT THE SURFACE FROM FREEZE THAW DEGRADATION.
- EACH BLOCK MUST CONTAIN A SATISFACTORY EMBEDDED LIFTING DEVICE.
- INTERLOCK PATTERN AND GEOMETRY MUST BE APPROVED BY THE MINISTRY.
- EDGED SHALL BE CHAMFERED.
- BEFORE A NEW SUPPLIER IS APPROVED TO SUPPLY CONCRETE BLOCKS TO THE FLNR FOR BRIDGE PROJECTS, THE FLNR SHALL INSPECT THE SUPPLIER'S OPERATION AND A SAMPLE OF THEIR PRODUCT FOR CONFORMANCE TO THE ABOVE SPECIFICATIONS.

3.15 BEARINGS:
- TO CAN/CSA-S6: OZONE RESISTING NATURAL RUBBER, (NATURAL POLYISOPRENE)
- LAMINATED BEARING REINFORCING STEEL PLATE: CAN/CSA-G40.21M, GRADE 300W

3.16 DOWEL BLOCKOUT:
- GALVANIZED CORRUGATED METAL STAY-IN-PLACE BLOCK-OUT FORMS

4 TRANSPORTATION AND ERECTION OF BRIDGES

4.1 SUPPORT PRECAST AND STEEL COMPONENTS IN SUCH A WAY THAT THEY SUSTAIN NO DAMAGE DURING TRANSPORTATION.

4.2 LIFTING DEVICES:
- ALL PRECAST COMPONENTS (EXCEPT UNREINFORCED INTERLOCKING CONCRETE BLOCKS) MUST UTILIZE BURKE LIFTING INSERTS (OR PRE-APPROVED EQUIVALENT) AS LIFTING DEVICES. FILL RECESS AFTER INSTALLATION USING GROUT OR ASPHALT.
- ENGINEER TO DESIGN LIFTING INSERTS TO FACILITATE LIFTING USING FOUR EQUAL LENGTH SLINGS/CHAINS.
- ONLY LOW IMPACT LIFTS ARE PERMITTED. ANGLE OF LIFT MUST NOT EXCEED 30 DEGREES FROM VERTICAL.

5 CERTIFICATION AND QUALITY CONTROL

5.1 PROVIDE CONCRETE TEST RESULTS BY AN APPROVED TESTING LABORATORY FOR ALL PRECAST CONCRETE COMPONENTS, EXCEPT FOR INTERLOCKING BLOCK.

5.2 PROVIDE MILL CERTIFICATES FOR ALL STEEL INCORPORATED INTO THE STRUCTURE.

5.3 CERTIFICATION TO CSA STANDARD FOR STEEL AND PRECAST CONCRETE MANUFACTURE MUST BE IN EFFECT AT THE TIME OF OPENING THE TENDERS AND ALSO THROUGHOUT THE PERIOD OF MANUFACTURE.

5.4 TEST RESULTS FOR STEEL:
- MILL TEST CERTIFICATES OF STRUCTURAL STEEL PLATES PLATES AND SECTIONS.
- ANY RADIOGRAPHIC OR ULTRASONIC TEST REPORTS.

5.5 TEST RESULTS FOR CONCRETE:
- FORMWORK RELEASE CONCRETE COMPRESSIVE STRENGTH TEST RESULTS.
- 7 DAY CONCRETE COMPRESSIVE STRENGTH REST RESULT.
- 28 DAY CONCRETE COMPRESSIVE STRENGTH REST RESULT.

5.6 IN-PLANT QUALITY ASSURANCE INSPECTION:
- ALL BRIDGE MATERIALS MUST CONFORM TO THE CURRENT MINISTRY STANDARDS AND SHALL NOT BE ACCEPTABLE WITHOUT IN-PLANT INSPECTION BY THE MINISTRY'S IN-PLANT QUALITY ASSURANCE INSPECTION AGENCY.

ASSUME NOT TO SCALE

NOT FOR CONSTRUCTION

DESIGN ENGINEER

PROFESSIONAL SEAL

0 2 4 6 8 10 meters

0 20 40 mm

BAR LENGTH IS 40mm ON ORIGINAL.

SCALE AS SHOWN

Checked JULIEN HENLEY Date 14/04/01

Drawn ERFUN FARJOO Date 14/04/01

Rev	Date	DESCRIPTION	Init
1	15/03/31	REVISED NOTES	

REVISIONS

BRITISH COLUMBIA

Ministry of Forests, Lands and Natural Resource Operations

ENGINEERING BRANCH

STANDARD BRIDGE DRAWING

DRAWING TITLE: GENERAL NOTES

DESIGNED BY: HELEN DU, P.ENG.

APPROVED BY:

COORDINATING REGISTERED PROFESSIONAL:

FLNR ENGINEER:

FILE No.

DRAWING No. STD-EC-050-01 | 1

CANCEL PRINTS BEARING PREVIOUS LETTER