1.0 GENERAL

- This concept Dwg. illustrates the minimum Ministry of Forests, Lands, Natural Resource Operations and Rural Development (Ministry) standard for approach barriers where approach barriers are specified for a Forest Service Road (FSR) Bridge site.

- The two barrier options on this Dwg. are not physically anchored into the approach roadway fill and are not physically connected to the bridge guardrails. These options reflect minimum standards providing visual guidance and will provide some limited resistance to vehicle impacts. They are not crash tested and have not been engineered to resist specified vehicle impact forces.

- Anchored and connected Ministry approach barrier concepts can be found on Ministry standard DWGs STD-EC-010-15 & 16 "Anchored/Connected Bridge Approach Barrier Concepts."

- This drawing is for reference for the bridge general arrangement engineer in producing project specific design drawings for which they take full responsibility. This professional engineer shall be registered to practice in British Columbia.

- The bridge general arrangement engineer shall determine, and incorporate into their design, the appropriate Ministry standard bridge approach barrier concept for a specific site based on an assessment of the bridge characteristics, road alignment, vehicle usage, site conditions, and other factors as appropriate. The general arrangement design shall include the site specific approach road geometry and appropriate fills, pullouts and paving as well as the detailed approach barrier requirements (including types, widths, and positions).

- The bridge general arrangement engineer shall include a note on their drawings to address the requirement for field reviews consistent with the guidelines published by engineers and geoscientists British Columbia called, "Documented Field Reviews During Implementation or Construction."

- All dimensions are nominal.

- Further guidance and considerations related to selection and use of FSR Bridge approach barriers are provided in the following Ministry documents:

  - "Guidance for selecting bridge barrier containment level and determining need for bridge approach barriers on FSRs.", and
  - "Considerations for use of Ministry standard drawings STD-EC-010-15 & STD-EC-010-15 A6 Bridge approach barriers for FSR bridges."

2.0 MATERIALS & INSTALLATION

- Barriers shall be placed on a level, and compact granular base with minimal anticipated settlement in relation to the bridge ends. Specifications for the base shall be determined by the bridge general arrangement engineer, including required compaction of fills, and field inspections during construction.

- Materials and fabrication of precast reinforced concrete barriers (CRB-H, CTB-1E, CBN-N, and other barrier types if rejoct) shall be in accordance with the BC MINISTRY STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION Section 4.1A "Precast Reinforced Concrete Barriers."

- If lines of concrete barriers longer than those shown on this drawing are necessary, concrete pieces connecting to CRB-H pieces will be rejoct. If roadway surface drainage is rejoct through a longer line of concrete barriers, a CDB-E barrier (together with erosion control measures) may be specified.

- If not stated otherwise by the Ministry, concrete barriers rather than log barriers shall be used.

- If specified by the Ministry for a particular site, log approach barriers may be used in place of the concrete barriers shown on this plan and elev on this Dwg. Any proposed alternate equivalent method of log buttressing must be agreed to by a professional engineer for approval consideration by the Ministry on a site specific basis.

- Alternate equivalent method of log buttressing must be agreed to by a professional engineer for approval consideration by the Ministry on a site specific basis.

3.0 APPROACH ROAD GEOMETRY

- Through a longer line of concrete barriers, a CDB-E barrier (together with erosion control measures) may be specified.

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MATERIALS

GENERAL

2

BY P.ENG.

TOP EDGE OF TYP. DIST. TO WHERE REQ'D.)

DELINEATOR

300 MAX

ELEV.

NOTE: ONLY LAYOUT OPTION 1 REQUIRES A GAP FILLING TIMBER

BASE BLOCKS WITH 1/2 KEY & 1/2 FLAT TOP - 1:50

NOTE: ONLY LAYOUT OPTION 1 REQUIRES A GAP FILLING TIMBER

SECTION 1: CONC. LAYOUT - OPTION 1

BASE BLOCKS WITH 1/2 KEY & 1/2 FLAT TOP - 1:50

NOTE: ONLY LAYOUT OPTION 1 REQUIRES A GAP FILLING TIMBER

SECTION 2: CONC. LAYOUT - OPTION 2

ALL BLOCKS WITH 2 KEYS - 1:50

ASSUME NOT TO SCALE

NOT FOR CONSTRUCTION

NOTES

1.0 GENERAL

- THE PROFESSIONAL ENGINEER RESPONSIBLE FOR PRESCRIBING MINISTRY STANDARD BRIDGE APPROACH BARRIERS, AS SHOWN ON THESE DRAWINGS, MUST EVALUATE THE SUITABILITY OF THEIR USE BASED ON AN ASSESSMENT OF THE SPECIFIC BRIDGE CHARACTERISTICS, ROAD ALIGNMENT AND SITE CONDITIONS.

- WHERE THESE DRAWINGS SHOW CONNECTION BETWEEN BRIDGE GUARDRAIL AND APPROACH BARRIER, THEY SHOULD BE READ TOGETHER WITH STD-EC-010-02 "STANDARD BRIDGE GUARDRAIL-HSS RAIL CL-3", OR STD-EC-010-03 "STANDARD BRIDGE GUARDRILL-HSS RAIL CL-3", OR STD-EC-010-06 "STANDARD HSS GUARDRAIL FOR PRECAST CONCRETE SLAB BRIDGES CL-3".

- PROFESSIONAL ENGINEERS SHALL REFER TO THE MINISTRY’S APPROACH BARRIER GUIDELINES IN RELATION TO USE OF THESE DRAWINGS.

2.0 MATERIALS

- HSS: FY MIN. 345MPa, CSA G40.21M OR ASTM A500 GRADE C

- PLATE: FY MIN. 300W OR 350W, CSA G40.21M

- BOLTS: ASTM A325

- VERTICAL THROUGH RODS: ASTM A615 GR75 THREADED BAR, C/W NUTS TO MATCH STRENGTH AND THREAD TYPE

- UNTHREADED ROUND BAR: ASTM A36

- NUTS, ASTM A563, UNLESS NOTED OTHERWISE (UNO)

- STANDARD WASHERS: ASTM F844, UNO

- OVERSIZED PLATE WASHERS: MILD STEEL (I.D. > BOLT DIAMETER)

- ALL EXPOSED STEEL MATERIALS, INCLUDING HARDWARE, SHALL BE GALVANIZED TO CSA G164, MIN. 650 g/m², OR ASTM A123, UNLESS OTHER COATING SPECIFICATIONS ARE PROVIDED BY THE MINISTRY.

- ALL STEEL TO BE GALVANIZED SHALL MEET CHEMICAL COMPOSITION RECOMMENDATIONS AS SPECIFIED BY THE AMERICAN GALVANIZERS ASSOCIATION (https://www.galvanizeit.org/) TO ENSURE AGAINST EMBRITTLEMENT.

- CONCRETE BLOCKS AND CONCRETE ROADSIDE BARRIERS (CRB) IN ACCORDANCE WITH THE MINISTRY "BRIDGE COMPONENT CONCRETE STANDARD":


  - TOP KEYS & BOT. KEY VOOIDS OF CONC. BLOCKS, PLUS BOLT KEY VOOIDS OF MODIFIED CRB-E, WILL VARY ACCORDING TO SUPPLIER. INTERLOCK PATTERN & GEOMETRY MUST BE APPROVED BY THE MINISTRY.

  - MIN. FILLET WELD SIZE=4mm UNO

  - BOLT HOLE DIAMETERS: 2mm > BOLT DIAMETER, UNO

  - NUTS SHALL BE SNUG-TIGHTENED (THE CONDITION THAT BRINGS THE PLIES INTO FIRM CONTACT COMMONLY ATTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH, OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH).

- BASE CONCRETE BLOCKS AND THE BARRIERS CONNECTED TO THEM SHALL BE PlACEd ON A COMPETENT, FIRM AND LEVEL GRANULAR BASE WITH MINIMAL ANTICIPATED SETTLEMENT IN RELATION TO THE BRIDGE END. SPECIFICATIONS FOR THE BASE SHALL BE DETERMINED BY THE PROFESSIONAL ENGINEER, INCLUDING REQUIRED COMPACTION OF FILLS AND FIELD INSPECTIONS DURING CONSTRUCTION.

- THE SUPPLIER OF MATERIALS (CONTRACTOR) SHALL ENSURE THAT ALL COMPONENTS WILL ASSEMBLE ACCURATELY AND EFFICIENTLY.