

GENERAL NOTES

GENERAL

- THESE DRAWINGS LRS-1001 TO LRS-1014 INCLUDE FOUR BRIDGE ARRANGEMENTS FOR SINGLE LANE AND TWO LANE BRIDGES ON LOW VOLUME ROADS IN SPAN LENGTHS OF 18.684 m AND 24.400 m. THE DRAWINGS SHALL BE USED IN ACCORDANCE WITH THE "LOCAL ROAD BRIDGE DESIGN GUIDELINES" PROVIDED BY ALBERTA TRANSPORTATION FOR SITES MEETING THE FOLLOWING CONDITIONS:
  - LOW TRAFFIC VOLUME MEETING THE REQUIREMENTS OF THE "LOCAL ROAD BRIDGE DESIGN GUIDELINES".
  - GRAVEL ROADS WITH NO DE-ICING SALT EXPOSURE.
  - HORIZONTAL ALIGNMENT IS TANGENT ACROSS THE BRIDGE.
  - SMALL STREAMS WITH MINIMAL RISK OF ABUTMENT SCOURING AS DETERMINED BY A HYDROTECHNICAL ASSESSMENT.
- THE USERS OF THESE STANDARD DRAWINGS SHALL PROVIDE A SITE SPECIFIC GENERAL LAYOUT DRAWING TO SHOW:
  - BRIDGE LOCATION MAP
  - BRIDGE GENERAL ARRANGEMENT IN PLAN AND ELEVATION
  - BRIDGE SPAN AND CLEAR ROADWAY WIDTH
  - STREAM CHARACTERISTICS
  - ROADWAY ALIGNMENT, PROFILE AND STATIONING
  - FILL/CUT LIMITS
  - BRIDGERAIL AND APPROACH GUARDRAIL LAYOUT
  - SCOUR PROTECTION WORKS
- A RECORD DRAWING REVISION OF THE GENERAL LAYOUT SHALL RECORD ANY CHANGES MADE DURING CONSTRUCTION AND SHALL PROVIDE ACTUAL PILE PENETRATION INFORMATION FOR EACH PILE.
- ALL REFERENCES TO STANDARD DRAWINGS AND THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION SHALL REFER TO THE LATEST REVISION.
- IN THE EVENT THERE IS A DISCREPANCY BETWEEN THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION, DRAWING S-1424, OR DRAWING S-1653, AND THESE STANDARD DRAWINGS, THE DETAILS ON THESE DRAWINGS SHALL GOVERN.
- ALL DIMENSIONS ARE GIVEN IN MILLIMETRES UNLESS NOTED OTHERWISE.

GEOTECHNICAL CONSIDERATIONS

- IT IS THE RESPONSIBILITY OF THE USER OF THESE DRAWINGS TO OBTAIN A SITE SPECIFIC GEOTECHNICAL INVESTIGATION.
- THE SITE SPECIFIC GEOTECHNICAL INVESTIGATION SHALL BE COMPLETED BY A QUALIFIED PROFESSIONAL GEOTECHNICAL ENGINEER TO ESTABLISH THE SUITABILITY OF THE DESIGN ASSUMPTIONS STATED ON THESE STANDARD DRAWINGS, TO PROVIDE SUPPLEMENTARY INFORMATION AND DESIGN ADJUSTMENTS WHERE REQUIRED, AND TO AVOID UNEXPECTED COSTS DUE TO COMPLICATIONS DURING CONSTRUCTION. A PROFESSIONAL GEOTECHNICAL ENGINEER SHALL ALSO DETERMINE THE APPROXIMATE PILE TIP ELEVATIONS BASED ON THE LOADING REQUIREMENTS IDENTIFIED IN THE STANDARD DRAWINGS. COMPLICATIONS COULD ARISE FROM, BUT ARE NOT LIMITED TO THE FOLLOWING CONDITIONS - THE PRESENCE AND EXTENT OF BOULDERS OR THICK GRAVEL LAYERS, HARD OR SOFT FORMATIONS, WATER TABLES, ARTESIAN CONDITIONS AND OTHER VARIABLES. THESE CONDITIONS COULD SIGNIFICANTLY IMPACT THE CONSTRUCTION OF THE SUBSTRUCTURE AND ITS PERFORMANCE AND STRENGTH REQUIREMENTS IF NOT IDENTIFIED AND ADDRESSED.

HYDROTECHNICAL CONSIDERATIONS

- IT IS THE RESPONSIBILITY OF OTHERS USING THESE DRAWINGS TO COMPLETE A SITE SPECIFIC HYDROTECHNICAL ASSESSMENT BY A QUALIFIED PROFESSIONAL ENGINEER WITH HYDROTECHNICAL EXPERTISE IN ACCORDANCE WITH THE "LOCAL ROAD BRIDGE DESIGN GUIDELINES". THE ASSESSMENT SHALL ESTABLISH POTENTIAL ISSUES WITH STREAM FLOW CHARACTERISTICS, HYDRAULIC CAPACITY, STREAM STABILITY, SCOUR MITIGATION AND RIPRAP REQUIREMENTS TO DETERMINE THE SUITABILITY OF THE DESIGN ASSUMPTIONS LISTED ON THESE DRAWINGS, AND SUPPLEMENT THE DRAWINGS WHERE REQUIRED.

DESIGN

- DESIGN SPECIFICATION: CAN/CSA S6-06 INCLUDING SUPPLEMENTS 1, 2 AND 3, UNLESS NOTED OTHERWISE
- DESIGN LIVE LOAD: CL-800, HIGHWAY CLASS C FOR FATIGUE, PL-1 (TL2) BRIDGERAIL COLLISION LOAD
- DEAD LOAD: ABUTMENT, GIRDER, PRECAST CONCRETE DECK AND BACKWALL, AND BRIDGERAIL SELF WEIGHT
- EARTH PRESSURE: THE FOLLOWING LIMITING ASSUMPTIONS WERE USED FOR THE DESIGN AND THESE DRAWINGS SHALL NOT BE USED WITHOUT APPROPRIATE MODIFICATIONS WHEN ACTUAL SITE CONDITIONS RESULT IN MORE SEVERE LOAD EFFECTS OR LESS EFFECTIVE RESISTANCE.
  - UNIT WEIGHT OF SOIL,  $\gamma$  = 22 kN/m<sup>3</sup>
  - GRANULAR FILL FRICTION ANGLE,  $\phi$  = 32°
  - COEFFICIENT AT REST,  $k_0$  = 0.47
  - COEFFICIENT OF ACTIVE PRESSURE,  $k_a$  = 0.30
  - COEFFICIENT OF PASSIVE PRESSURE,  $k_p$  = 2.10
- SKREW: THIS DESIGN IS LIMITED TO SQUARE BRIDGES ONLY.
- ABUTMENT DESIGN: ABUTMENTS ARE DESIGNED AS INTEGRAL ABUTMENTS WITH A PINNED CONNECTION BETWEEN THE GIRDER ENDS AND THE ABUTMENT CAP. THE GIRDERS ARE DESIGNED TO ACT AS STRUTS BETWEEN THE TOPS OF THE ABUTMENTS.
- PLAIN ELASTOMERIC BEARING PADS HAVE BEEN DESIGNED TO THE REQUIREMENTS OF SECTION 14.6.7 METHOD A OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 2012.
- THERMAL:
  - MAXIMUM MEAN EFFECTIVE GIRDER TEMPERATURE = 50°C
  - MINIMUM MEAN EFFECTIVE GIRDER TEMPERATURE = -44°C
  - THE ABOVE ARE EXTREME TEMPERATURES THROUGHOUT THE PROVINCE. THE RESULTING THERMAL MOVEMENT AT THE BRIDGE ENDS IS LESS THAN 12 mm FOR THE BRIDGE SPANS INCLUDED IN THESE DRAWINGS.
- SEISMIC:  $Z_a$  =1,  $A$ =0.05,  $Z_v$  = 1,  $V$ =0.05
- WIND: HOURLY MEAN WIND PRESSURE (50 YR) = 1.02 kPa
- WATER LOADS: NOT CONSIDERED
- ICE LOADS: NOT CONSIDERED
- VESSEL AND VEHICLE COLLISION: NOT CONSIDERED

PROPOSED CONSTRUCTION SEQUENCE

- DRIVE STEEL H-PILES.
- CUT TOP OF H-PILES TO REQUIRED ELEVATIONS.
- INSTALL AND WELD STEEL PILE CAP ON H-PILES.
- INSTALL SPCS BACKWALL, WINGWALLS AND FILTER FABRIC.
- SECURE WINGWALL H-PILES TO ANCHOR H-PILES (FOR HIGH BACKWALL ABUTMENTS ONLY).
- PLACE GIRDERS ON SOLE PLATES. SOLE PLATES ARE SHOP INSTALLED ON TOP OF THE STEEL PILE CAPS COMPLETE WITH THE BEARING PADS, AND BEARING BASE PLATES.
- INSTALL INTERMEDIATE AND ABUTMENT JACKING DIAPHRAGMS. TIGHTEN DIAPHRAGM BOLTS FINGER TIGHT. DO NOT TORQUE BOLTS.
- LEVEL TOP OF GIRDERS AT THE ABUTMENTS USING GALVANIZED SHIM PLATES IF REQUIRED.
- TORQUE THE ABUTMENT DIAPHRAGM BOLTS AFTER THE TOP FLANGES OF THE GIRDERS ARE LEVELLED AT THE ABUTMENTS.
- FIELD DRILL HOLES IN SOLE PLATE THROUGH THE SHOP DRILLED HOLES IN GIRDER BOTTOM FLANGES.
- BOLT THE GIRDER BOTTOM FLANGES TO THE SOLE PLATES.
- BACKFILL MAY BEGIN AT BOTH ABUTMENTS SIMULTANEOUSLY.
- ALIGN AND BOLT THE PRECAST CONCRETE BACKWALL PANELS TO THE GIRDER ENDS.
- WELD THE PRECAST CONCRETE BACKWALL PANEL EMBEDDED STEEL PLATES TO THE GIRDER ENDS.
- ERECT A PRECAST CONCRETE DECK PANEL NEAR MIDSPAN TO LEVEL THE GIRDERS.
- TORQUE ALL INTERMEDIATE DIAPHRAGM BOLTS.
- COMPLETE THE INSTALLATION OF ALL PRECAST CONCRETE DECK PANELS.
- GROUT TRANSVERSE SHEAR KEYS, STUD POCKETS AND HORIZONTAL JOINTS BETWEEN THE END DECK PANEL AND BACKWALL.
- INSTALL PL-1 BRIDGERAIL AND APPROACH RAILS, AND COMPLETE ALL REMAINING ITEMS.

ABUTMENTS

GENERAL

- THE CONTRACTOR SHALL MEET THE FOLLOWING SECTIONS OF THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION:
  - SECTION 1.1 - GENERAL (EXCAVATION)
  - SECTION 1.2 - CLEARING
  - SECTION 1.5.1 - GENERAL (COFFERDAMS, DIKES AND BERMS)
  - SECTION 1.5.5 - PUMPING OF WATER
  - SECTION 1.5.6 - REMOVAL OF COFFERDAMS, DIKES AND BERMS
  - SECTION 1.6 - INSPECTION OF EXCAVATION
  - SECTION 2 - BACKFILL
  - SECTION 3.2.1 - STEEL H-PILING (MATERIALS)
  - SECTION 3.3 - HANDLING (H-PILES)
  - SECTION 3.4.1 - EQUIPMENT AND DRIVING METHODS
  - SECTION 3.4.2 - PILE CAPACITY
  - SECTION 3.4.3 - STEEL PILES
  - SECTION 3.4.3.1 - STEEL PILE SPLICES (REFERS TO SECTION 13.4.1)
  - SECTION 3.4.3.2 - TESTING BY CONTRACTOR (WELDED PILE SPLICES)
  - SECTION 3.4.5 - DEFECTIVE PILES
  - SECTION 6 - STRUCTURAL STEEL
  - SECTION 8.1 - GENERAL (BRIDGE BEARINGS)
  - SECTION 8.3 - SUPPLY AND FABRICATION
  - SECTION 10 - HEAVY ROCK RIPRAP
  - SECTION 13.2 - FABRICATION AND INSTALLATION
  - SECTION 13.3 - HANDLING GALVANIZED STEEL
  - SECTION 13.4.1 - FIELD WELDING OF STRUCTURAL MEMBERS
  - SECTION 18.2 - SUPPLY AND FABRICATION (CSP AND SPCSP STRUCTURES)
- ALL GALVANIZING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A123/123M AND ASTM F2329.

STEEL PILES AND PILE CAP

- PILE SPACING SHALL BE MEASURED AT THE UNDERSIDE OF THE STEEL PILE CAP.
- ABUTMENT PILE LOADS:

BRIDGE SPAN (mm)	18 684	24 400
SLS PERMANENT (kN)	75	110
SLS EXTREME (SLS1) (kN)	260	300
ULS PERMANENT (kN)	85	120
ULS EXTREME (ULS1) (kN)	440	505

- LOAD BEARING PILES SHALL BE DRIVEN TO THE SLS EXTREME ABUTMENT PILE LOAD VALUES USING THE BEARING FORMULA SPECIFIED IN SECTION 3.4.2. OF THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- ALL LOAD BEARING PILES (HIGH BACKWALL AND SPILL THROUGH) SHALL PENETRATE AT LEAST 7 m BELOW STREAMBED.
- PILES SHALL BE DRIVEN WITH A DRIVING FRAME TO ENSURE PROPER PILE ALIGNMENT.
- WHEN REQUIRED, PILE FIELD SPLICES SHALL BE MADE IN ACCORDANCE WITH STANDARD DRAWING S-1415.

- ALL WELDING SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF AWS D1.5 AND THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION. FIELD WELDING SHALL BE CARRIED OUT IN ACCORDANCE WITH SECTION 13.4.1 OF THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- STEEL PILES AND PILE CAPS SHALL MEET THE REQUIREMENTS OF CSA STANDARD G40.21 GRADE 350W.
- LOAD BEARING PILES, WINGWALL PILES AND PILE CAPS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION. PILE GALVANIZING MAY BE OMITTED FROM PILE SURFACES LOCATED MORE THAN 1000 mm BELOW GROUNDLINE.
- ALL GALVANIZING DAMAGED BY FIELD WELDING GALVANIZED MATERIAL FOR THE PILES AND PILE CAP SHALL BE METALIZED ACCORDING TO ASTM A780 METHOD A3.
- THREADED ANCHOR RODS FOR WINGWALL PILES SHALL MEET THE REQUIREMENTS OF ASTM A615M GRADE 517 (= 75 ksi) WITH ROLLED THREADS AND SHALL BE HOT-DIP GALVANIZED.
- BEARING PADS, BASE PLATES AND SOLE PLATES SHALL BE SHOP INSTALLED ON TOP OF PILE CAPS.

BEARING PADS AND SOLE PLATES

- ELASTOMERIC BEARING PADS SHALL BE 60 DUROMETER HARDNESS SHORE A. THEY SHALL CONFORM TO THE REQUIREMENTS OF AASHTO LOW TEMPERATURE GRADE 5 AND MEET THE PHYSICAL AND LOW TEMPERATURE BRITTLENESS REQUIREMENTS LISTED IN TABLE 1 AND SECTION 8.8.4 OF AASHTO M251-06.
- THE TOP SURFACES OF THE SOLE PLATES SHALL BE TAPERED TO MATCH THE DESIGN ROAD GRADE. SOLE PLATES SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
- THE TOP SURFACES OF THE SOLE PLATES SHALL BE MACHINED TO A SURFACE FINISH OF 6.4  $\mu$ m AND A FLATNESS TOLERANCE OF 0.001 X BEARING DIMENSION.
- BOLTS CONNECTING THE GALVANIZED SOLE PLATES TO THE WEATHERING STEEL GIRDER BOTTOM FLANGE SHALL BE 22 mm DIAMETER HIGH STRENGTH BOLTS MEETING THE REQUIREMENTS OF ASTM A325M HOT-DIP GALVANIZED.
- ANCHOR RODS BETWEEN THE SOLE PLATE AND PILE CAP SHALL BE ASTM A193 GRADE B7 (Fy = 720 MPa) HOT-DIP GALVANIZED. GALVANIZING SHALL STRICTLY FOLLOW THE FOLLOWING PROCEDURE:
  - BRUSH BLAST ANCHOR BOLTS TO REMOVE MILL SCALE AND OIL AFTER THREADING ENDS.
  - FLASH PICKLING NOT TO EXCEED 5 MINUTES.
  - QUICK DRY PRIOR TO HOT-DIP GALVANIZING (DO NOT STORE IN FLUX OR ACID RINSE)
- NUTS FOR ANCHOR RODS SHALL BE HEAVY HEX NUT ASTM A563 GRADE DH GALVANIZED AND LUBRICATED. WASHERS SHALL BE HARDENED ASTM F436 GALVANIZED.

SPCS

- STRUCTURAL PLATE CORRUGATED STEEL (SPCS) USED FOR BACKWALL PANELS SHALL MEET THE REQUIREMENTS OF CSA STANDARD G401.
- DAMAGED GALVANIZING FROM COLD CUTTING, FIELD DRILLING AND ABRASIONS OF SPCS AND GALVANIZED PILES, SHALL BE REPAIRED IN ACCORDANCE WITH ASTM A780 METHOD A2 :REPAIR USING PAINTS CONTAINING ZINC DUST.
- STRUCTURAL PLATE CORRUGATED STEEL (SPCS) PLATES SHALL BE ARRANGED SO THAT NO VERTICAL SEAMS INTERFERE WITH PILE LOCATIONS.
- ALL BOLTED SEAMS SHALL BE PROPERLY LAPPED AND PLATES SHALL BE IN CONTACT FOR THE FULL LENGTH AND HEIGHT OF THE LAP. THE BOLTS IN THE VALLEY OF EACH SEAM SHALL BE NEAREST TO THE VISIBLE EDGE OF THE PLATE.
- SPCS SEAMS SHALL BE CONNECTED WITH THREE BOLTS PER CORRUGATION.
- ALL BOLTS FOR CONNECTING TO SPCS SHALL BE 19 mm DIAMETER GALVANIZED CULVERT BOLTS WITH CUPPED SHOULDERS AND SATISFY THE REQUIREMENTS OF ASTM A449.
- BOLTS SHALL BE TORQUED TO NOT LESS THAN 200 Nm BUT NOT MORE THAN 340 Nm.

EXCAVATION AND BACKFILL

- THREADED ANCHOR ROD SLACK SHALL BE TAKEN OUT PRIOR TO BACKFILLING.
- BACKFILLING OPERATIONS SHALL NOT BEGIN UNTIL GIRDER ERECTION IS COMPLETE AND THE GIRDERS ARE FULLY CONNECTED TO THE PILE CAPS. THE BACKFILL ELEVATIONS SHALL NOT BE HIGHER THAN 300 mm BELOW THE BOTTOM OF THE PILE CAP UNTIL THE PRECAST CONCRETE BACKWALL AND DECK PANELS HAVE BEEN INSTALLED AND GROUTED IN PLACE.
- BACKFILL OPERATIONS SHALL START AT BOTH ABUTMENTS SIMULTANEOUSLY AND THE BACKFILL SURFACE ELEVATION SHALL NOT DIFFER BY MORE THAN 300 mm BETWEEN ABUTMENTS AT ANY STAGE OF THE OPERATION.
- IF IT IS NECESSARY TO PARTIALLY BACKFILL PRIOR TO INSTALLING THE WINGWALL ANCHOR PILES OR GIRDERS, THE CONTRACTOR SHALL PROVIDE A RESTRAINT SYSTEM AND MONITOR WALL DEFLECTIONS WITH ADEQUATE INSTRUMENTATION DURING BACKFILLING.
- THE CONTRACTOR SHALL MAINTAIN OVERALL BACKWALL STABILITY, LIMIT PILE DEFLECTIONS DURING BACKFILLING AND CONTROL PILE CAP MOVEMENT TO ENSURE PROPER GIRDER INSTALLATION AND PROPER CONNECTION TO THE PILE CAPS.
- PILE DEFLECTIONS SHALL BE LIMITED SO THAT THE CENTERLINE GIRDER BEARING STIFFENERS ARE NO MORE THAN 25 mm FROM CENTERLINE OF PILE CAP OR PILES.
- BACKFILL SHALL BE PLACED IN SUCH A MANNER AS TO AVOID ANY DAMAGE OR MIS-ALIGNMENT OF THE SPCS PANELS. BACKFILL COMPACTION SHALL BE PERFORMED SUCH THAT EQUIPMENT MOVES PARALLEL TO THE SPCS PANELS. ONLY HAND OPERATED POWER TAMPERS AND VIBRATORS SHALL BE USED FOR COMPACTION WITHIN 1000 mm OF THE SPCS PANELS. AT THE END OF EACH DAY'S WORK, THE CONTRACTOR SHALL ENSURE ANY POTENTIAL RUN-OFF SHALL BE DIRECTED AWAY FROM THE SPCS PANELS. IN ADDITION, THE CONTRACTOR SHALL NOT PERMIT ANY SURFACE RUN-OFF FROM ADJACENT AREAS TO ENTER THE ABUTMENT CONSTRUCTION AREA.

HEAVY ROCK RIPRAP

- THE CLASS AND DEPTH OF THE HEAVY ROCK RIPRAP SHALL BE DETERMINED BY THE SITE SPECIFIC HYDROTECHNICAL ASSESSMENT.
- NON-WOVEN GEOTEXTILE FILTER FABRIC SHALL BE PLACED UNDER ALL HEAVY ROCK RIPRAP.

<div>PERMIT TO PRACTICE AECOM Canada Ltd. Signature: <i>Bob Ramsay</i> Date: <i>Feb 9, 2015</i> PERMIT NUMBER: P10450 The Association of Professional Engineers, Geologists and Geophysicists of Alberta.</div>	<div>DESIGNER RICHARD LEE  DATE: <i>Feb. 9, 2015</i></div>	<div>CHECKER ROBERT JOHN RAY  DATE: <i>Feb 9, 2015</i></div>	<div>     </div>	<div>REV DATE</div>	<div>REVISION</div>	<div>BY DATE <i>FEB 18/15</i></div>	<div>RECOMMENDED DIRECTOR BRIDGE ENGINEERING <i>D Williamson</i></div> <div>APPROVED EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Mark Dahl</i></div>	<div>Alberta Transportation</div> <div>LOW VOLUME STANDARD BRIDGE PRECAST CONCRETE PANELS ON STEEL GIRDERS GENERAL NOTES - SHEET 1</div>	<div>AT BARCODE</div>	<div>DATE 2015-01-19</div>	<div>SHEET 1 OF 14</div>	<div>DRAWING LRS-1001</div>
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GIRDERS

GENERAL

- THE CONTRACTOR SHALL MEET THE FOLLOWING SECTIONS OF THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION.  
SECTION 6 – ALL REQUIREMENTS FOR STRUCTURAL STEEL
- DEAD LOADS (PER GIRDER):

SPAN AND LANE CONFIGURATION		18 684 1 LANE	24 400 2 LANE	18 684 1 LANE	24 400 2 LANE
GIRDER (INCLUDING DIAPHRAGMS)	kN/m	3.0	3.0	3.3	3.3
PRECAST CONCRETE DECK PANELS	kN/m	13.8	16.9	13.8	16.9
PL–1 BARRIERS	kN/m	0.4	0.3	0.4	0.3

- GIRDER END REACTIONS AND JACKING LOADS:

SPAN AND LANE CONFIGURATION		18 684 1 LANE	24 400 2 LANE	18 684 1 LANE	24 400 2 LANE
SLS1 PERMANENT	kN	155	185	205	245
ULS1 PERMANENT	kN	175	205	230	270
SLS1 EXTREME	kN	590	700	690	820
ULS1 EXTREME	kN	990	1180	1140	1360

MATERIALS

- ALL STEEL FOR GIRDER FLANGES, WEBS, STIFFENERS AND ANY DETAIL MATERIAL WELDED TO THE GIRDERS SHALL CONFORM TO CSA G40.21M–350 AT CATEGORY 3.
- ALL SHEAR STUDS SHALL CONFORM TO THE CHEMICAL REQUIREMENTS OF ASTM STANDARD A108, GRADES 1015, 1018 OR 1020. IN ADDITION THEY SHALL MEET THE MECHANICAL PROPERTIES SPECIFIED IN THE CURRENT AWS SPECIFICATION D1.5 TABLE 7.1 FOR TYPE B STUDS.
- INTERMEDIATE AND ABUTMENT JACKING DIAPHRAGMS SHALL BE CSA G40.21M–350A.
- SOLE PLATES SHALL CONFORM TO CSA G40.21M–350W AND BE HOT–DIP GALVANIZED.
- ALL BOLTED CONNECTIONS SHALL BE MADE WITH 22 mm DIAMETER HIGH STRENGTH BOLTS CONFORMING TO ASTM A325M TYPE 3 UNLESS NOTED OTHERWISE. WEATHERING PROPERTIES AND COLOUR OF BOLTS SHALL MATCH THE JOINED STEEL. APPROVAL OF BOLTS TO BE USED SHALL BE OBTAINED FROM THE CONSULTANT BEFORE ANY BOLTS ARE PLACED.
- THE ESTIMATED MASS OF THE SUPERSTRUCTURE STEEL (GIRDERS, DIAPHRAGMS, BUT NOT BEARINGS, STUDS OR BOLTS):

SPAN AND LANE CONFIGURATION		18 684 1 LANE	18 684 2 LANE	24 400 1 LANE	24 400 2 LANE
ESTIMATED MASS	kg	1155	1735	1645	2465

\*THESE ESTIMATES ARE FOR DEPARTMENT USE ONLY AND THE DEPARTMENT ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY OR USE BY OTHERS.

FABRICATION

- ALL DIMENSIONS ARE CORRECT AT 20°C AND GIRDER LENGTHS ARE MEASURED ALONG THE BOTTOM FLANGE.
- GIRDERS SHALL MEET THE CAMBER REQUIREMENTS AS SHOWN ON DRAWINGS LRS–1009 AND LRS–1010.
- ALL WELDING SHALL CONFORM TO THE CURRENT AWS SPECIFICATION D1.5.
- ALL STIFFENER TO WEB FILLET WELDS SHALL BE MADE BY AN APPROVED SEMI OR FULLY AUTOMATIC SUBMERGED ARC PROCESS.
- ALL FLANGE TO WEB FILLET WELDS SHALL BE MADE BY AN APPROVED FULLY AUTOMATIC SUBMERGED ARC PROCESS.
- ALL WELD METAL DEPOSITS SHALL HAVE A CHARPY V NOTCH IMPACT STRENGTH OF AT LEAST 27 JOULES AT –30°C. ALL WELD METAL DEPOSITS SHALL BE SUBJECT TO THE APPROVAL OF THE CONSULTANT AND SHALL PRODUCE BOTH THE CORROSION RESISTANCE AND THE COLOR PROPERTIES OF THE BASE METAL.
- ALL BOLT HOLES SHALL BE DRILLED 2 mm LARGER THAN THE SPECIFIED BOLT DIAMETER UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- ALL STEEL SHALL BE BLAST CLEANED AFTER FABRICATION. THE BOTTOM FLANGE SHALL BE PRIME COATED (BOTTOM, TOP AND EDGES) WITH AN APPROVED ORGANIC ZINC EPOXY PRIMER MEETING THE REQUIREMENTS OF A CLASS B COATING. THE COATING SHALL EXTEND FROM THE GIRDER END BY 1000 mm.
- THE FAYING SURFACES OF ALL BOLTED CONNECTIONS SHALL BE BLAST CLEANED SURFACES WITH CLASS B COATING. THE MEAN SLIP COEFFICIENT FOR CLASS B SHALL BE 0.5 MINIMUM.
- THE BOTTOMS OF THE GIRDER FLANGES AT THE BEARING LOCATIONS AND THE TOPS OF THE SOLE PLATES SHALL BE MACHINED TO A SURFACE FINISH OF 6.4 µm AND A FLATNESS TOLERANCE OF 0.001 x BEARING DIMENSION.

GIRDER ERECTION

- GIRDERS SHALL BE ADEQUATELY SUPPORTED BY TEMPORARY BRACES TO ENSURE THAT NO DAMAGE IS CAUSED BY HANDLING AT ANY TIME.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE MEANS OF MAINTAINING THE STABILITY OF THE GIRDERS IN CORRECT ALIGNMENT UNTIL THE PRECAST CONCRETE DECK PANELS ARE PLACED AND GROUTED.
- THE CONTRACTOR SHALL MAKE SURE THAT THE GIRDER TOPS ARE LEVEL AND AT THE SAME ELEVATION AT THE ABUTMENTS. PROVIDE 1 mm THICK GALVANIZED STEEL SHIMS BETWEEN THE SOLE PLATE AND THE GIRDER BOTTOM FLANGE IF NECESSARY.
- BOLT TIGHTENING SHALL BE BY THE TURN–OF–NUT METHOD IN ACCORDANCE WITH SECTION 6.3.2.6 OF THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION.

BRIDGE JACKING

- FOR FUTURE BEARING REPLACEMENT, THE GIRDERS SHALL BE RAISED USING ONE JACK PER GIRDER AT THE JACKING STIFFENER LOCATIONS OF THE ABUTMENT JACKING DIAPHRAGMS. THE CONTRACTOR SHALL TAKE FULL RESPONSIBILITY TO CARRY OUT SAFE AND PROPER JACKING PROCEDURES AND TRAFFIC CONTROL.
- ALL GIRDER LINES SHALL BE JACKED SIMULTANEOUSLY TO A MAXIMUM HEIGHT OF 3 mm.

PRECAST CONCRETE DECK AND BACKWALL PANELS

GENERAL

- THE CONTRACTOR SHALL MEET THE FOLLOWING SECTIONS OF THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION:  
SECTION 5.2.1 – PLAIN REINFORCING STEEL  
SECTION 5.3 – MATERIAL PRODUCTION AND TESTING  
SECTION 5.4 – FABRICATION  
SECTION 5.5 – SHIPPING, HANDLING AND STORAGE  
SECTION 5.6 – PLACING AND FASTENING  
SECTION 5.7 – SPLICING  
SECTION 7 – ALL REQUIREMENTS FOR PRECAST CONCRETE UNITS EXCEPT PRESTRESSING IS NOT REQUIRED.

MATERIALS

- ALL REINFORCING STEEL SHALL BE PLAIN REINFORCING STEEL CONFORMING TO CAN/CSA–G30.18, GRADE 400.
- HEADED REINFORCEMENT SHALL MEET THE REQUIREMENTS OF ASTM A970/970M WITH CLASS HA HEADS EXCEPT THE BARS SHALL BE MANUFACTURED FROM CAN/CSA–G30.18 GRADE 400W DEFORMED BARS.
- MINIMUM CONCRETE 28 DAYS COMPRESSIVE STRENGTH: 45 MPa
- REINFORCING DOWELS SHALL CONFORM TO THE REQUIREMENTS OF CSA G40.21M GRADE 300W AND SHALL BE HOT–DIPPED GALVANIZED AFTER FABRICATION.
- ALL PLATE STEEL AND STRUCTURAL SHAPES SHALL CONFORM TO CSA G40.21 GRADE 350W UNLESS OTHERWISE SPECIFIED.
- GROUT FOR DECK PANEL STUD POCKETS, LIFTING HOOK POCKETS AND TRANSVERSE SHEAR KEYS SHALL BE AN ALBERTA TRANSPORTATION APPROVED MAGNESIUM PHOSPHATE BASED GROUT INSTALLED IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS.
- STUD POCKET GROUT SHALL BE EXTENDED WITH SMALL AGGREGATES IN ACCORDANCE WITH MANUFACTURER’S SPECIFICATIONS.
- GROUT FOR THE DOWEL HOLES AND HORIZONTAL GAPS BETWEEN THE END DECK PANELS AND THE PRECAST CONCRETE BACKWALLS SHALL BE AN ALBERTA TRANSPORTATION APPROVED FLOWABLE NON–SHRINK GROUT.
- ALL MAGNESIUM PHOSPHATE BASED GROUT AND FLOWABLE NON–SHRINK GROUT SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 45 MPa.
- SHEAR STUDS FOR EMBEDDED STEEL PLATES IN BACKWALL PANELS SHALL CONFORM TO THE CHEMICAL REQUIREMENTS OF ASTM STANDARD A108, GRADES 1015, 1018, OR 1020. IN ADDITION, THEY SHALL MEET THE MECHANICAL PROPERTIES SPECIFIED IN THE CURRENT AWS SPECIFICATION D1.5 TABLE 7.1 FOR TYPE B STUDS.
- ANCHOR RODS FOR ATTACHING THE BACKWALL PANELS TO THE GIRDER ENDS AND BRIDGERAIL POST ANCHOR RODS SHALL BE ASTM A193 GRADE B7 (Fy = 720 MPa) AND HOT–DIP GALVANIZED. GALVANIZING SHALL STRICTLY FOLLOW THE FOLLOWING PROCEDURE:  
– BRUSH BLAST ANCHOR BOLTS TO REMOVE MILL SCALE AND OIL AFTER THREADING ENDS.  
– FLASH PICKLING NOT TO EXCEED 5 MINUTES.  
– QUICK DRY PRIOR TO HOT–DIP GALVANIZING (DO NOT STORE IN FLUX OR ACID RINSE)

FABRICATION AND CONSTRUCTION

- THE EXPOSED TOP RUNNING SURFACE OF THE PRECAST CONCRETE DECK PANELS SHALL HAVE A CLASS 5 FINISH AND ALL FORMED FACES SHALL HAVE A CLASS 1 FINISH IN ACCORDANCE WITH SECTION 7 OF THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- THE PRECAST CONCRETE BACKWALL EXPOSED SURFACES SHALL HAVE A CLASS 4 FINISH AND ALL FORMED FACES SHALL HAVE A CLASS 1 FINISH IN ACCORDANCE WITH SECTION 7 OF THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION.
- ALL EXPOSED CONCRETE CORNERS EXCLUDING THE STUD POCKETS, TRANSVERSE JOINTS AND TOP EDGES OF BACKWALL PANELS, SHALL HAVE A 20 mm CHAMFER OR FILLET UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- REINFORCING STEEL SHALL HAVE A 50 mm CLEAR COVER UNLESS NOTED OTHERWISE.
- PRECAST CONCRETE DECK PANELS SHALL BE CAST IN A METAL FORM.
- THE MAXIMUM DIMENSIONAL DEVIATION FOR PRECAST CONCRETE DECK PANELS FROM THE DIMENSIONS SHOWN ON THE DRAWINGS SHALL NOT EXCEED THE FOLLOWING:  
– LENGTH (MEASURED PERPENDICULAR TO THE GIRDER LINES): ±5 mm  
– WIDTH (MEASURED PARALLEL TO THE GIRDER LINES): ±5 mm  
– THICKNESS: +5, –3 mm  
– MAXIMUM DIFFERENCE IN PLAN VIEW DIAGONAL DIMENSIONS (SQUARENESS) OF RECTANGULAR PANELS: 10 mm  
– LOCATION OF REINFORCING STEEL PROJECTING OUT OF UNITS: +5, –0 mm
- DEVIATION FROM STRAIGHTNESS OF PANEL EDGES ALONG THE TRANSVERSE JOINT BETWEEN ADJACENT PANELS SHALL NOT EXCEED 1.5 mm PER METRE LENGTH.
- DEVIATIONS FROM STRAIGHTNESS OF THE TOP SURFACE OR SOFFIT SHALL NOT EXCEED 3 mm WHEN CHECKED WITH A 3000 mm STRAIGHT EDGE PLACED IN ANY DIRECTION.
- THE MAXIMUM DEVIATION OF ANY PANEL CORNER FROM A PLANE FORMED BY THE REMAINING 3 CORNERS SHALL BE NO GREATER THAN 5 mm.
- PROVISIONS FOR LIFTING AND HANDLING ARE THE RESPONSIBILITY OF THE CONTRACTOR, WHO SHALL ENSURE THAT THE DESIGN IS ADEQUATE FOR ALL STAGES OF THE ERECTION PROCEDURE.
- AFTER THE PRECAST CONCRETE DECK PANELS OR PRECAST CONCRETE BACKWALL PANELS HAVE BEEN ERECTED, LIFTING HOOKS SHALL BE CUT OFF FLUSH WITH THE BOTTOM OF THE POCKET.
- ADJUST REINFORCEMENT WHERE REQUIRED TO CLEAR GIRDER STUD POCKETS, BRIDGERAIL POST ANCHORS AND LIFTING HOOK ASSEMBLIES.
- ALL SURFACES THAT WILL BE IN CONTACT WITH MAGNESIUM PHOSTPHATE BASED GROUT OR FLOWABLE NON–SHRINK GROUT SHALL BE INTENTIONALLY ROUGHENED BY HEAVY SANDBLASTING. THIS INCLUDES THE TRANSVERSE DECK PANEL JOINTS, THE STUD POCKETS AND THE HORIZONTAL JOINT BETWEEN THE END DECK PANELS AND THE BACKWALL PANELS.
- THE FABRICATOR’S NAME, YEAR OF MANUFACTURE AND SERIAL NUMBER SHALL BE CAST INTO THE UNDERSIDE OF EACH DECK PANEL IN 50 mm LETTERS APPROXIMATELY 2000 mm FROM THE DECK PANEL EDGE. FOR THE PRECAST CONCRETE BACKWALL PANEL, THEY SHALL BE CAST ON THE EXPOSED FACE.
- GROUTING FOR TRANSVERSE SHEAR KEYS SHALL START FROM THE OUTSIDE EDGES TOWARDS CENTERLINE ROADWAY.
- GROUTING FOR THE 50 mm DIAMETER GROUT HOLES AND THE HORIZONTAL JOINT BETWEEN THE END DECK PANELS AND THE BACKWALL PANELS SHALL START FROM THE OUTSIDE EDGES AND PROGRESS TOWARDS CENTRELINE ROADWAY. GROUTING SHALL PROCEED FROM HOLE TO HOLE, MAKING SURE THAT GROUT CAN BE OBSERVED IN A HOLE FROM A PREVIOUSLY GROUTED HOLE PRIOR TO PROGRESSING TO FILL THE NEXT ADJACENT HOLE. REINFORCING DOWELS SHALL BE INSTALLED IN HOLES PRIOR TO GROUTING.
- THE TOP SURFACE OF THE GROUT IN STUD POCKETS, TRANSVERSE SHEAR KEYS, LIFTING HOOK POCKETS AND DOWEL HOLES SHALL BE FLUSH WITH THE TOP EDGES OF THE PANELS.
- GROUT IN ANY LOCATION SHALL BE TOPPED UP AFTER GROUT HAS SETTLED.
- ALL GROUT SHALL BE PLACED AND CURED ACCORDING TO MANUFACTURER SPECIFICATIONS.

REINFORCEMENT

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FOURTH CANADIAN EDITION 2004, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.

ERECTION

- IT IS THE CONTRACTOR’S RESPONSIBILITY TO DETERMINE THE LIFTING HOOK LOCATIONS.
- DECK PANELS SHALL BE MAINTAINED LEVEL DURING HANDLING AND LIFTING FORCES SHALL BE VERTICAL AT ALL TIMES.
- SEE PROPOSED CONSTRUCTION SEQUENCE NOTES ON DWG LRS–1001 FOR THE INSTALLATION PROCEDURE FOR THE DECK PANELS AND THE BACKWALL PANELS.

MISCELLANEOUS IRON

- ALL MISCELLANEOUS IRON SHALL MEET THE REQUIREMENTS OF SECTION 13, MISCELLANEOUS IRON, OF THE STANDARD SPECIFICATIONS FOR BRIDGE CONSTRUCTION.

<div>PERMIT TO PRACTICE AECOM Canada Ltd. Signature: <i>Bob Ramsey</i> Date: <i>Feb 9, 2015</i> PERMIT NUMBER: P10450 The Association of Professional Engineers, Geologists and Geophysicists of Alberta.</div>	<div>DESIGNER  DATE: <i>Feb. 9, 2015</i></div>	<div>CHECKER  DATE: <i>Feb. 9, 2015</i></div>						RECOMMENDED DIRECTOR BRIDGE ENGINEERING  <i>D. Williamson</i>	<div><i>Alberta</i> Transportation <b>LOW VOLUME STANDARD BRIDGE PRECAST CONCRETE PANELS ON STEEL GIRDERS GENERAL NOTES – SHEET 2</b></div>			
			REV	DATE	REVISION	BY	DATE	APPROVED EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH  <i>Mark Dahl</i> <i>FEB. 18/15</i>	AT BARCODE	DATE 2015–01–19	SHEET 2 OF 14	DRAWING <b>LRS–1002</b>







DRAWING

HIGHWAY

CONTRACT

DESCRIPTION

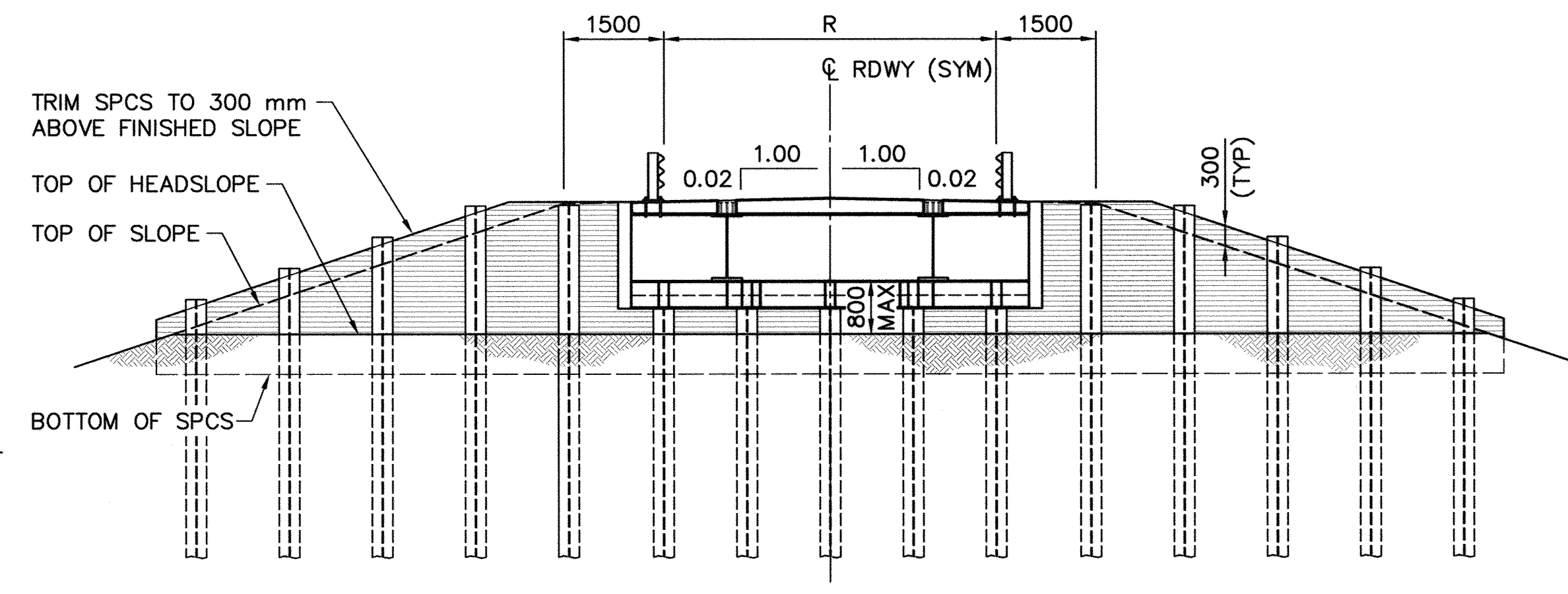
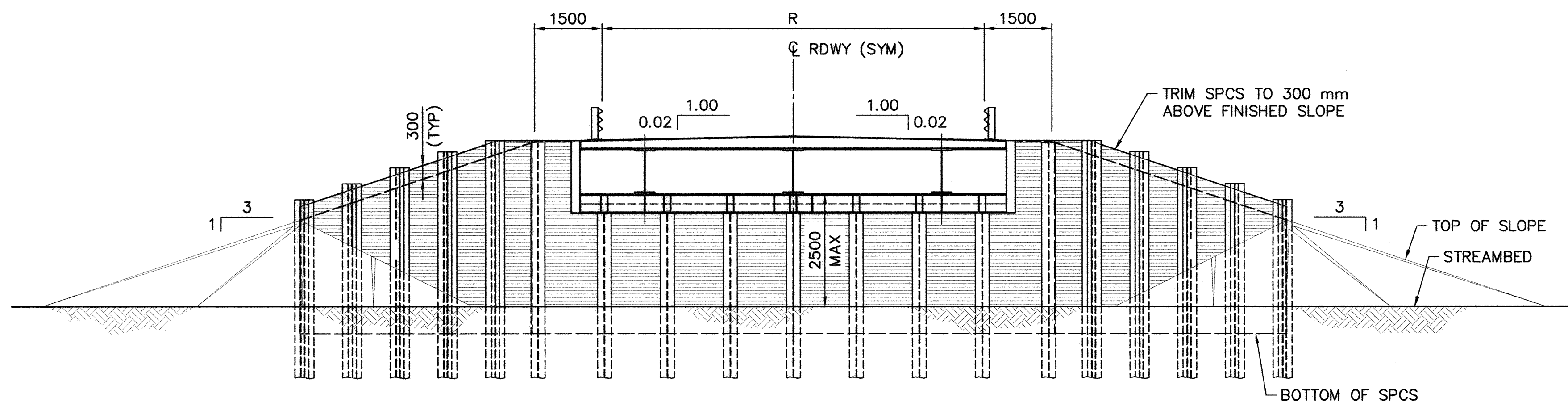
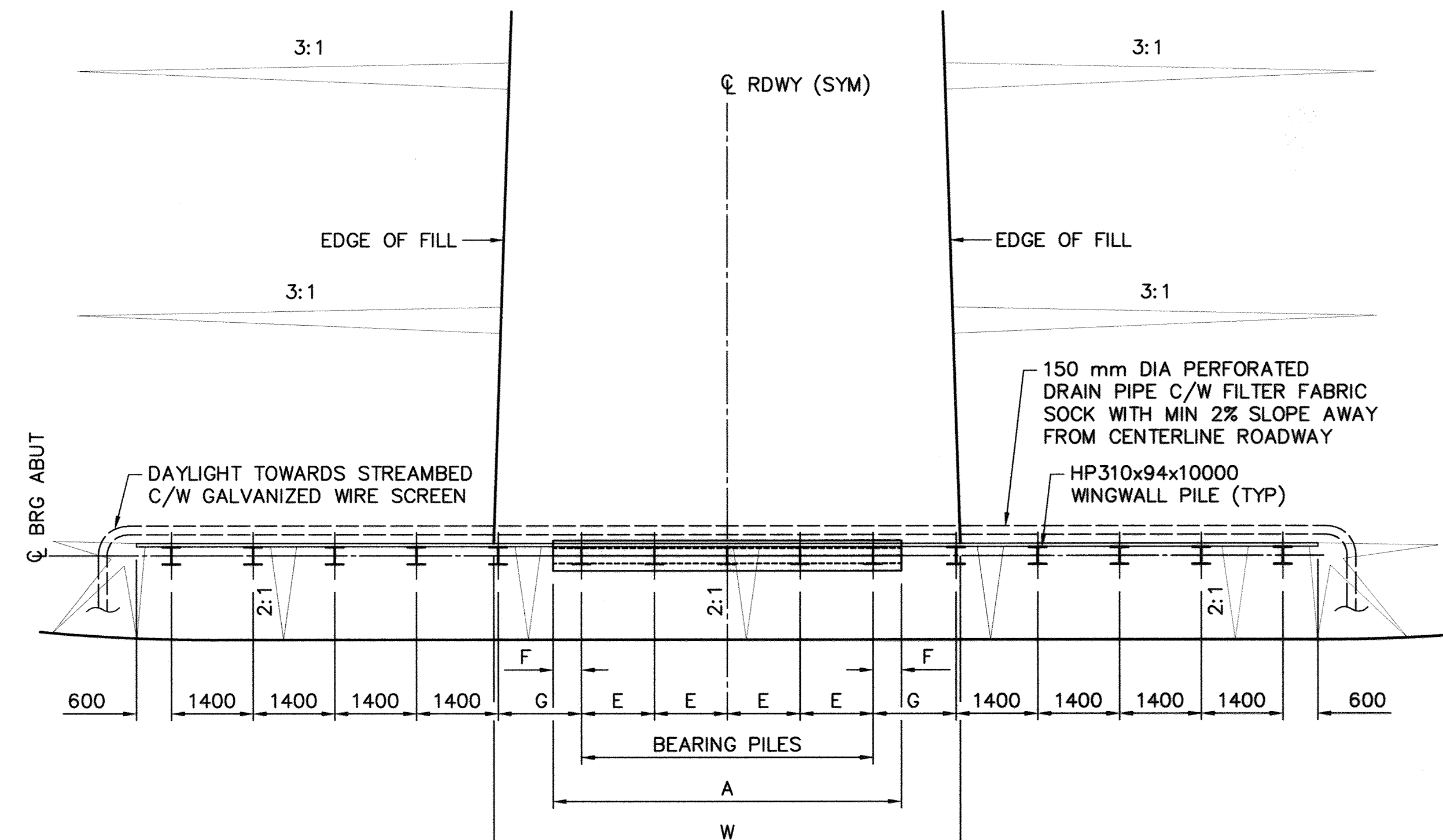
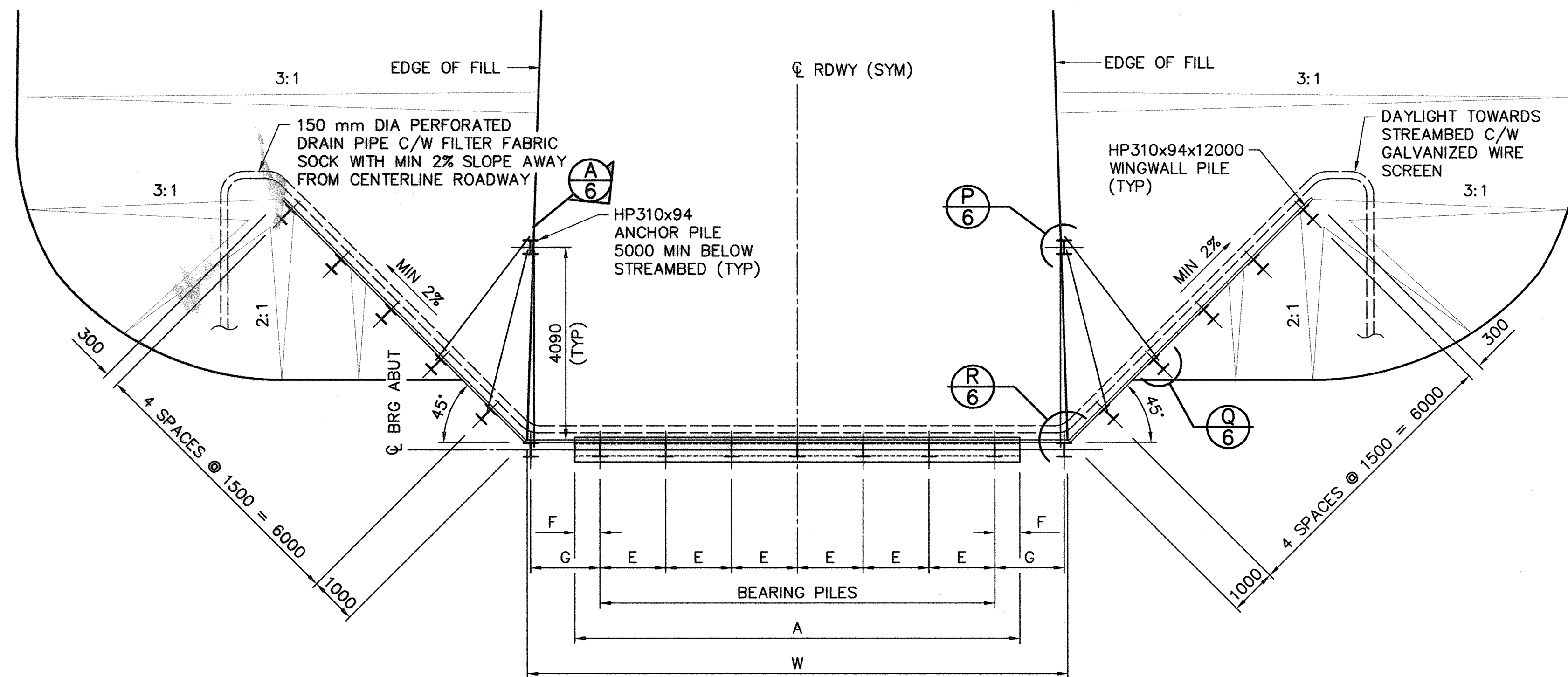
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DEPARTMENT BAR CODE



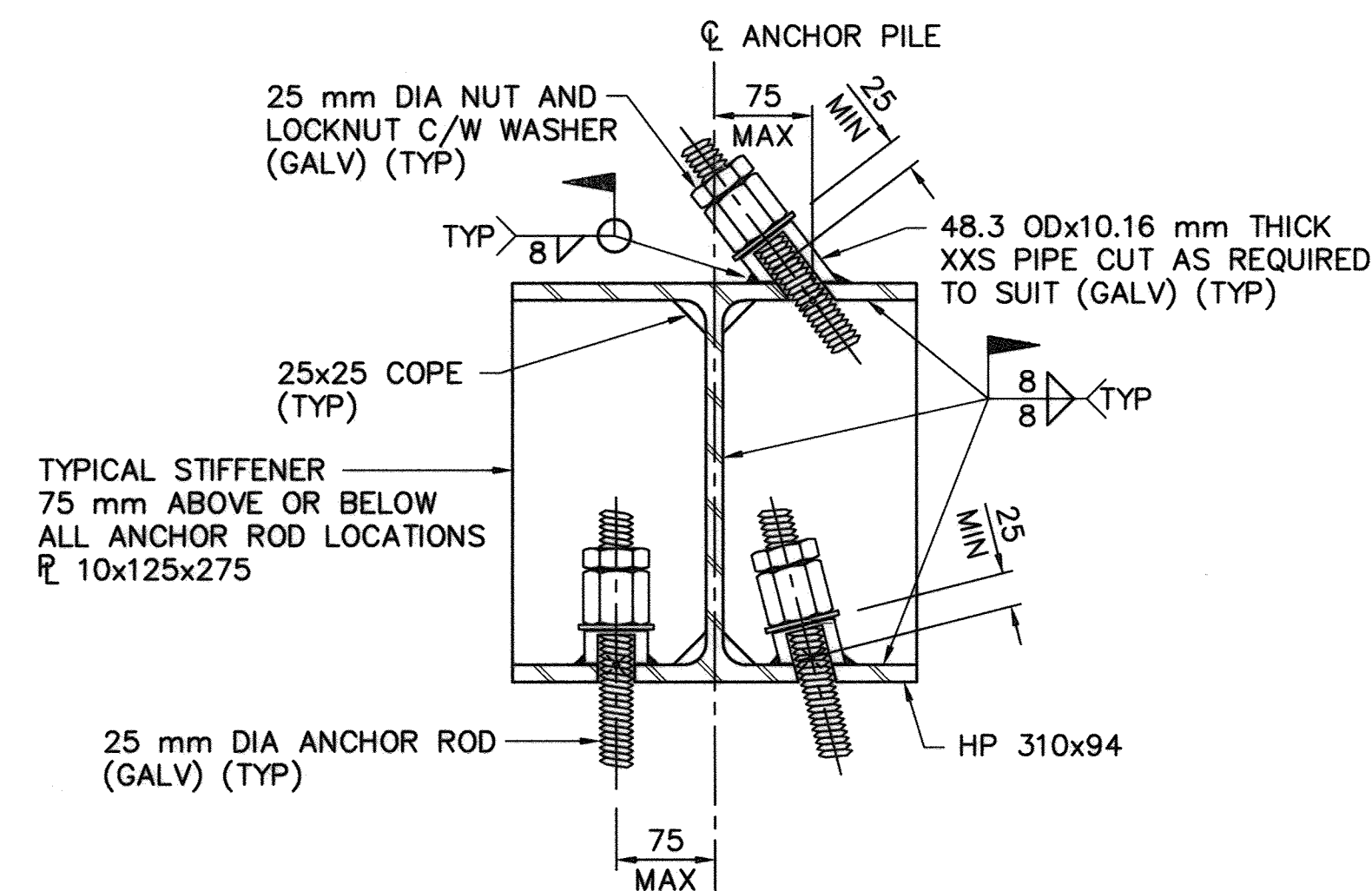
DATA TABLE			
NUMBER OF LANES	N	1 LANE	2 LANES
BRIDGE SPAN LENGTH	L	18 684	24 400
CLEAR ROADWAY	R	5 000	8 500
DECK WIDTH/PILE CAP LENGTH	A	5 970	9 470
NUMBER OF BEARING PILES		5	7
BEARING PILE SPACING	E	1 250	1 400
PILE CAP END DISTANCE	F	485	535
SPCS BACKWALL END PILE SPACING	G	1 426	1 476
SPCS BACKWALL WIDTH	W	8 000	11 500

<b>PERMIT TO PRACTICE</b> AECOM Canada Ltd. Signature: <i>Bob Ramsey</i> Date: <i>Feb. 9, 2015</i> <b>PERMIT NUMBER: P10450</b> The Association of Professional Engineers, Geologists and Geophysicists of Alberta.	<b>DESIGNER</b>  DATE: <i>Feb. 9, 2015</i>	<b>CHECKER</b>  DATE: <i>Feb. 18, 2015</i>	<table><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>REV</td><td>DATE</td><td>REVISION</td><td>BY</td></tr></table>	△				△				△				△				△				△				REV	DATE	REVISION	BY	<table><tr><td><b>RECOMMENDED</b> DIRECTOR BRIDGE ENGINEERING <i>D. Williamson</i></td><td rowspan="2"><b>APPROVED</b> EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Amel Dal...</i></td></tr><tr><td>DATE: <i>FEB. 18/15</i></td></tr></table>	<b>RECOMMENDED</b> DIRECTOR BRIDGE ENGINEERING <i>D. Williamson</i>	<b>APPROVED</b> EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Amel Dal...</i>	DATE: <i>FEB. 18/15</i>	<b>Alberta Transportation</b> <b>LOW VOLUME STANDARD BRIDGE</b> <b>PRECAST CONCRETE PANELS</b> <b>ON STEEL GIRDERS</b> <b>STEEL ABUTMENTS - SHEET 1</b> AT BARCODE: <i>2015-01-19</i> SHEET: <i>4 OF 14</i> DRAWING: <b>LRS-1004</b>
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<b>RECOMMENDED</b> DIRECTOR BRIDGE ENGINEERING <i>D. Williamson</i>	<b>APPROVED</b> EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Amel Dal...</i>																																			
DATE: <i>FEB. 18/15</i>																																				

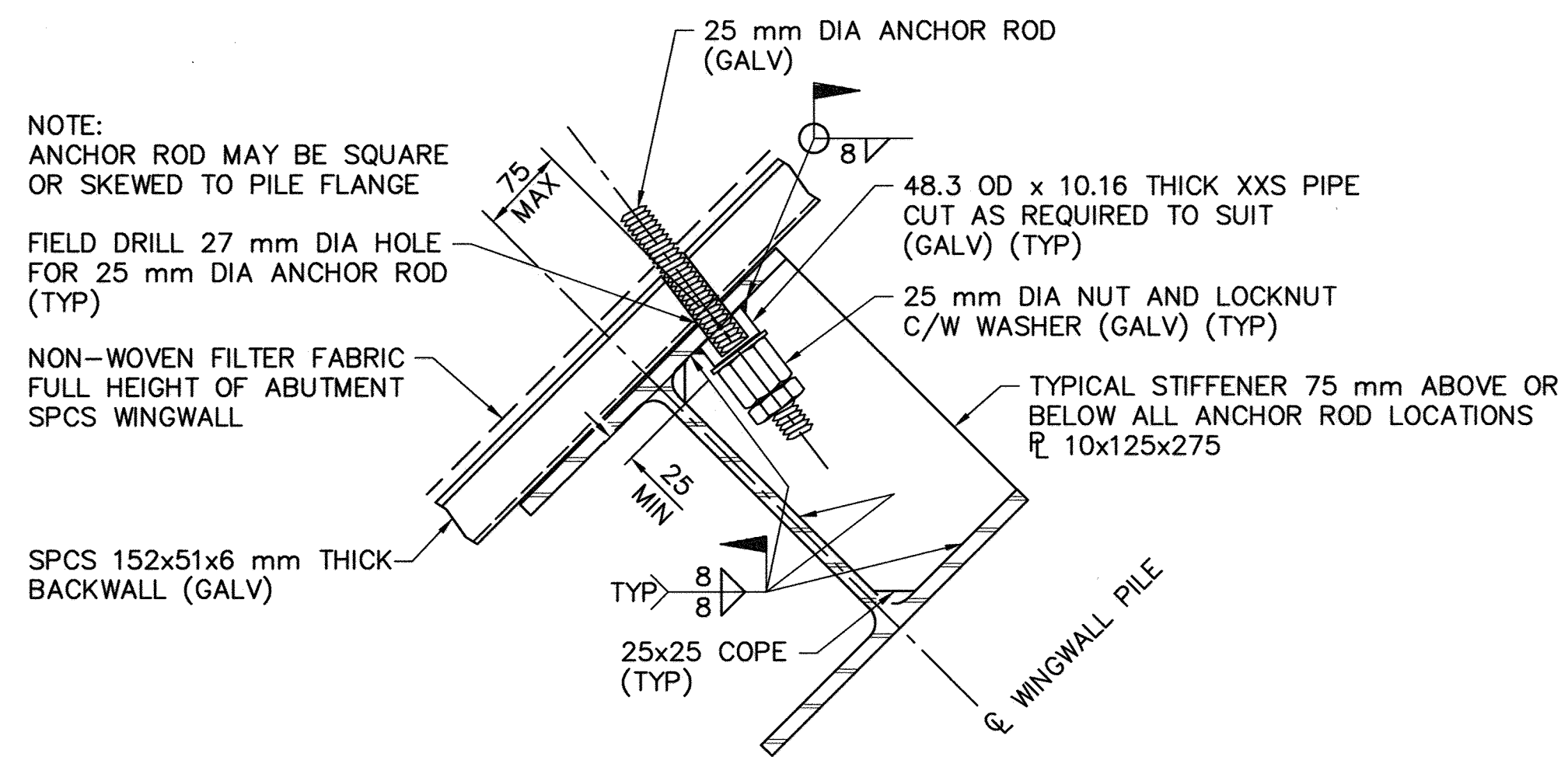








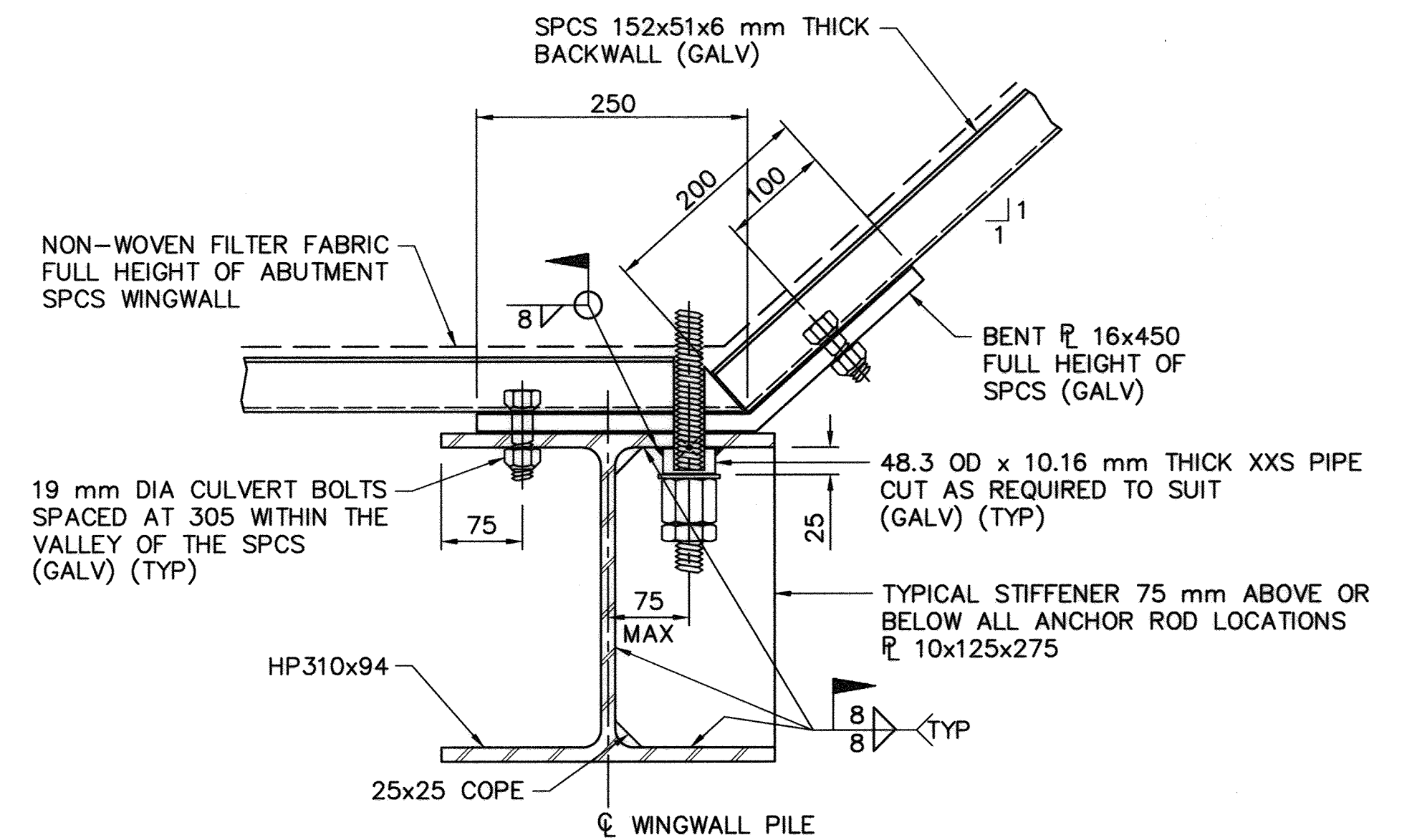
**DETAIL - ANCHOR PILE**



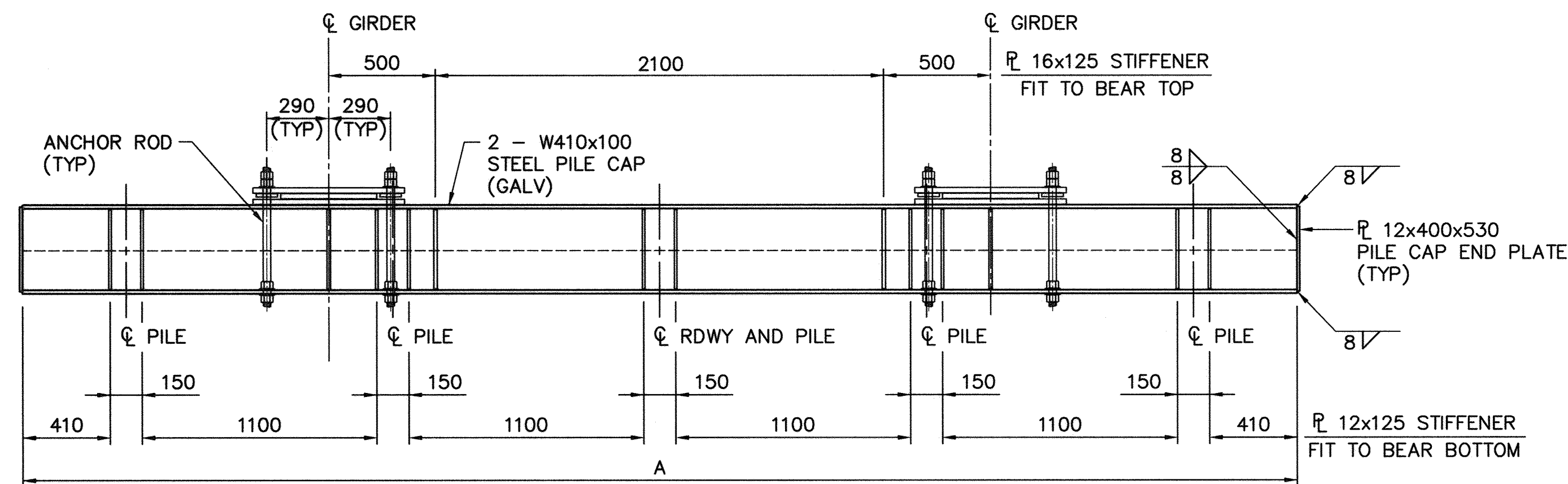
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**DETAIL — WINGWALL PILE**

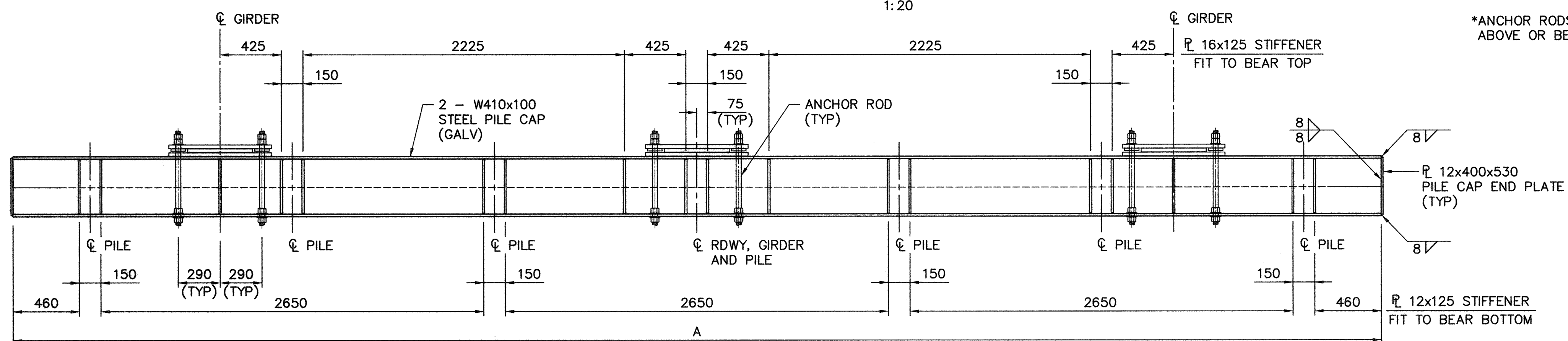
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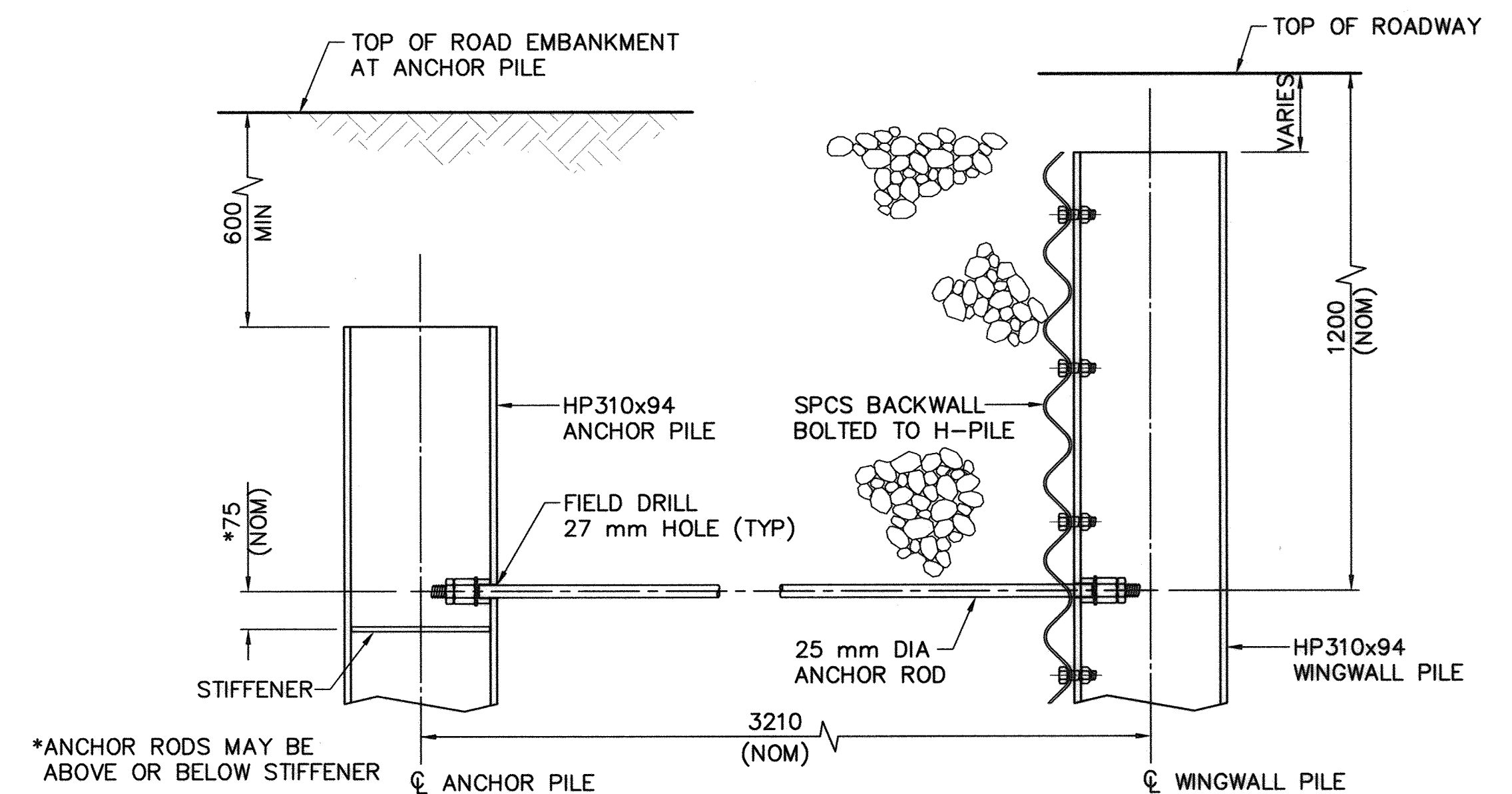
DETAIL - CORNER PILE



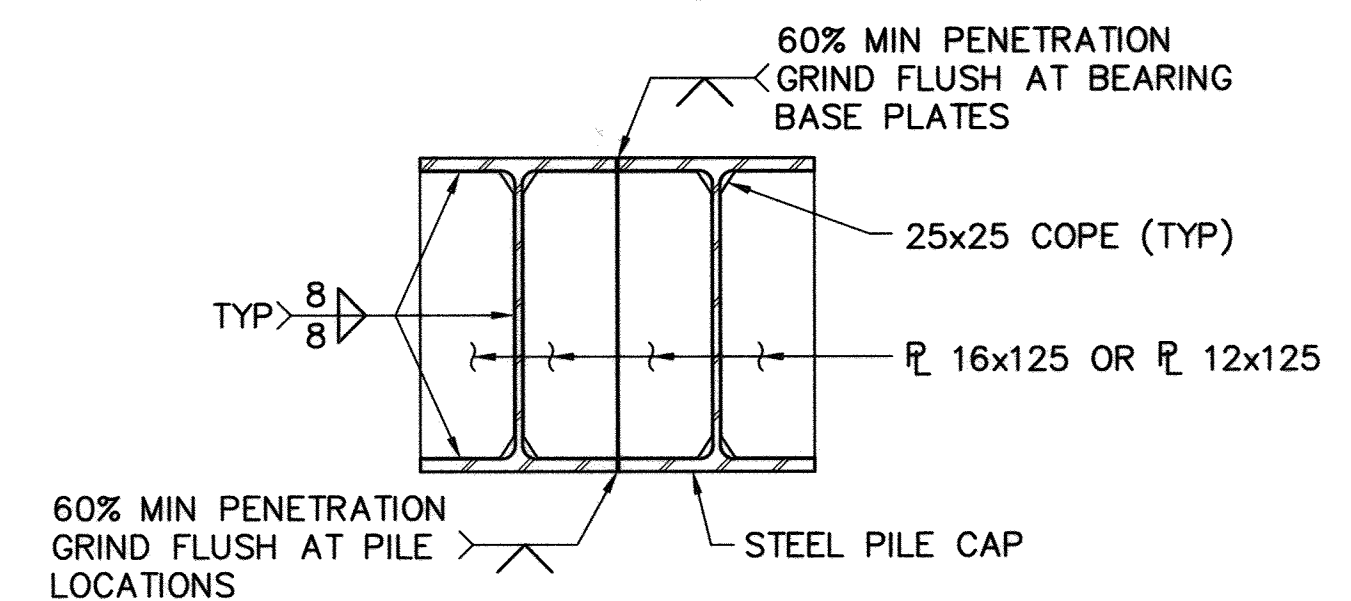
### 1-LANE STEEL PILE CAP DETAIL













## 2-LANE STEEL PILE CAP DETAIL



SECTION  
A  
4 1:10



### STIFFENER DETAIL

<b>PERMIT TO PRACTICE</b> AECOM Canada Ltd. Signature: <u><i>Bob Romano</i></u> Date: <u>Feb. 9, 2015</u> <b>PERMIT NUMBER: P10450</b> The Association of Professional Engineers, Geologists and Geophysicists of Alberta.	 DESIGNER DATE: <u>Feb. 9, 2015</u>	 CHECKER DATE: <u>Feb. 9, 2015</u>	        REV      DATE      REVISION      BY	RECOMMENDED DIRECTOR BRIDGE ENGINEERING <u><i>D. Williamson</i></u>	<b>Alberta</b> Transportation <b>LOW VOLUME STANDARD BRIDGE</b> <b>PRECAST CONCRETE PANELS</b> <b>ON STEEL GIRDERS</b> <b>STEEL ABUTMENTS - SHEET 3</b>			
				APPROVED EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <u><i>Archie Doherty</i></u> DATE: <u>FEB. 18/15</u>	AT BARCODE	DATE 2015-01-19	SHEET 6 OF 14	DRAWING <b>LR5-1006</b>

DRAWING

HIGHWAY

CONTRACT

DESCRIPTION

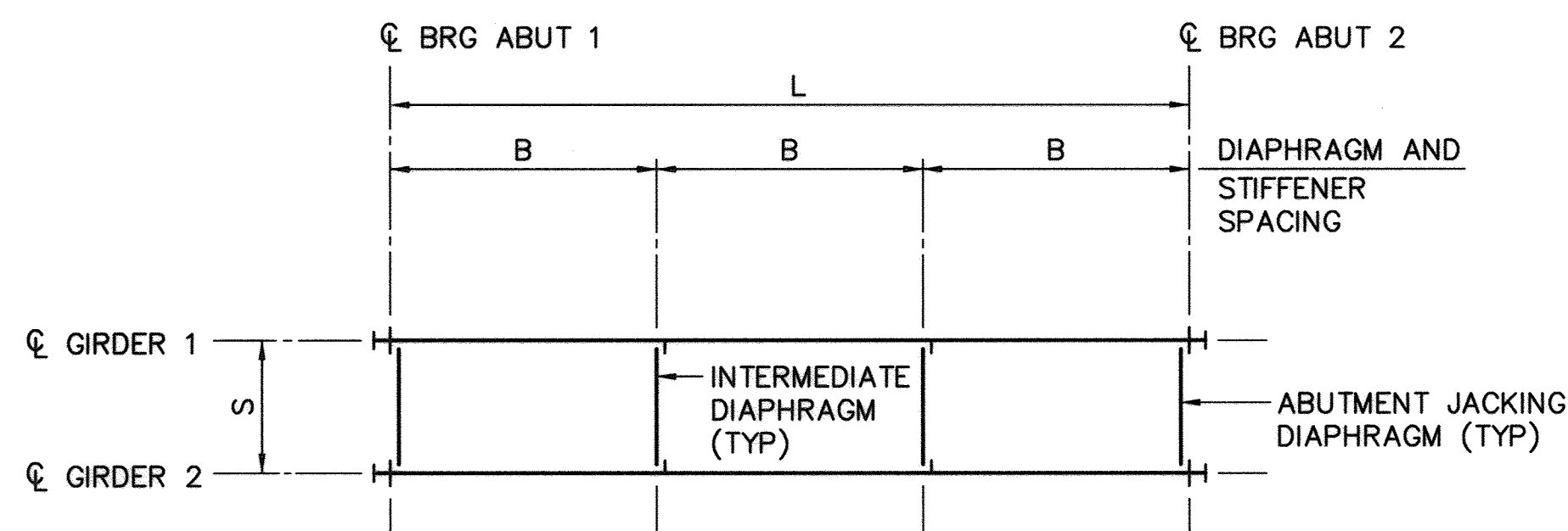
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DATE

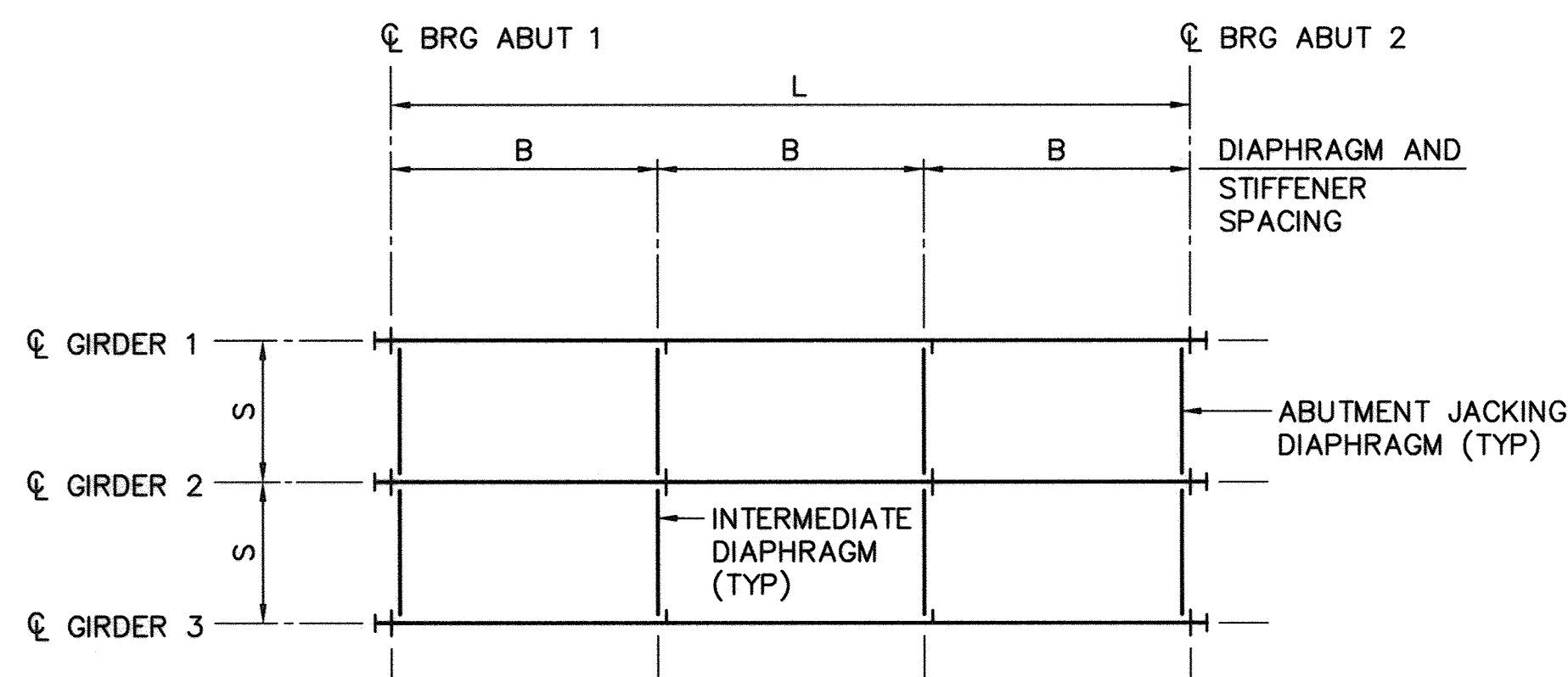
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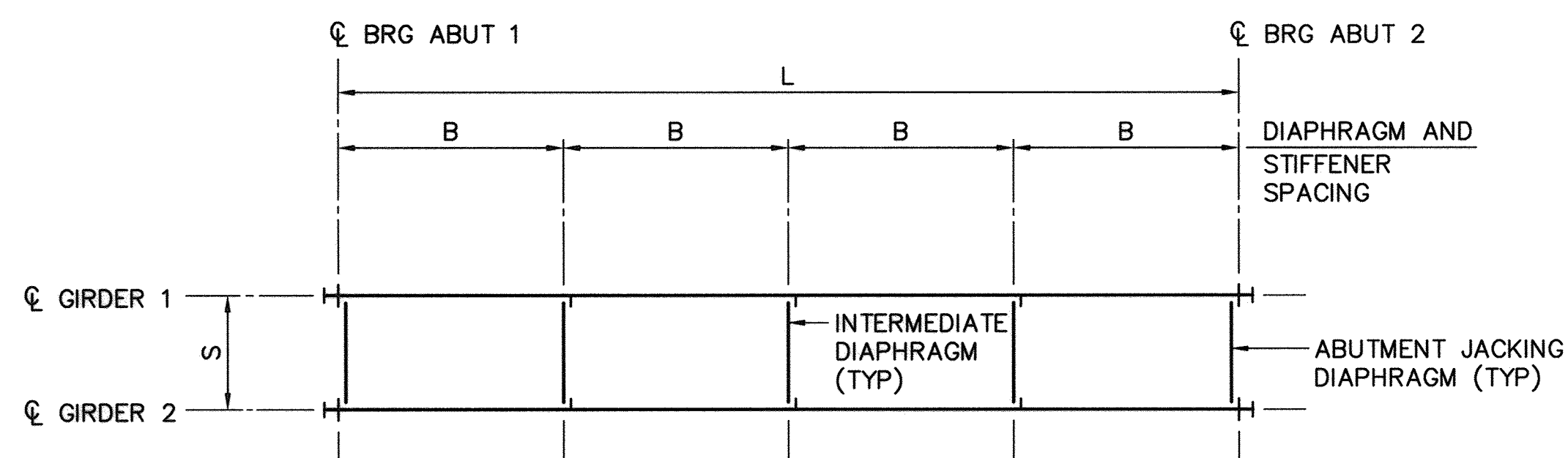
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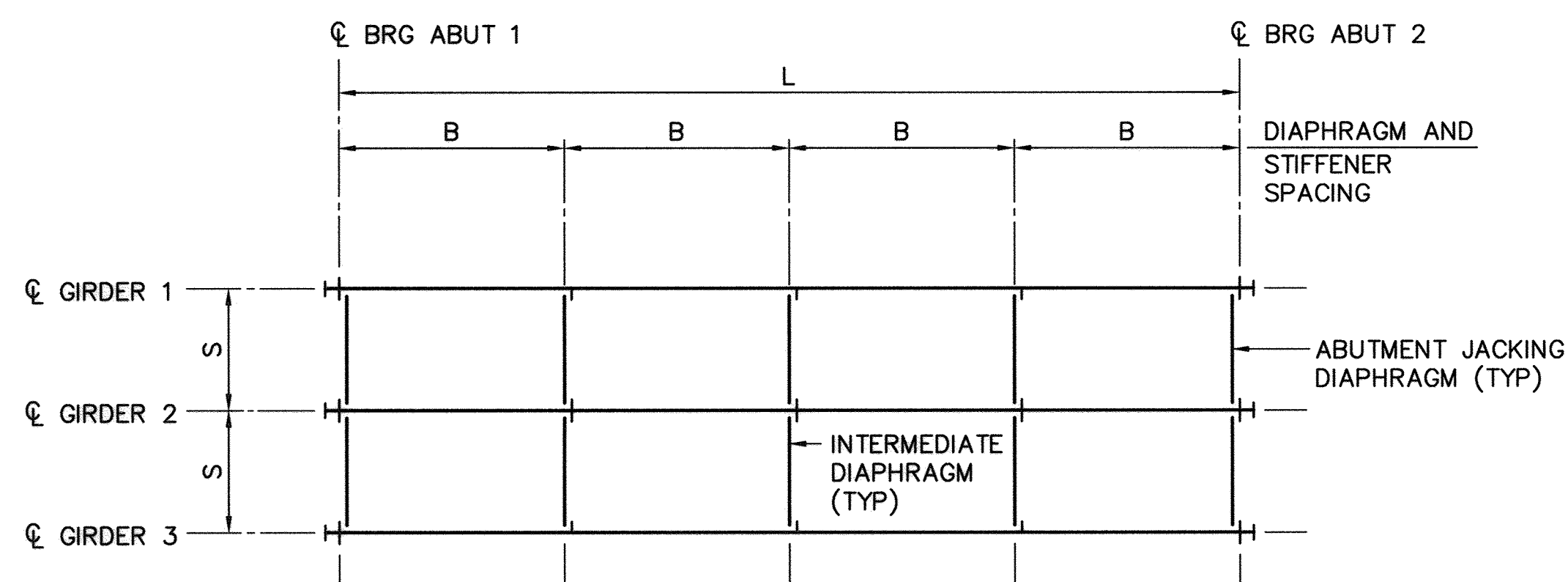
1-LANE 18 684 SPAN



2-LANE 18 684 SPAN



1-LANE 24 400 SPAN

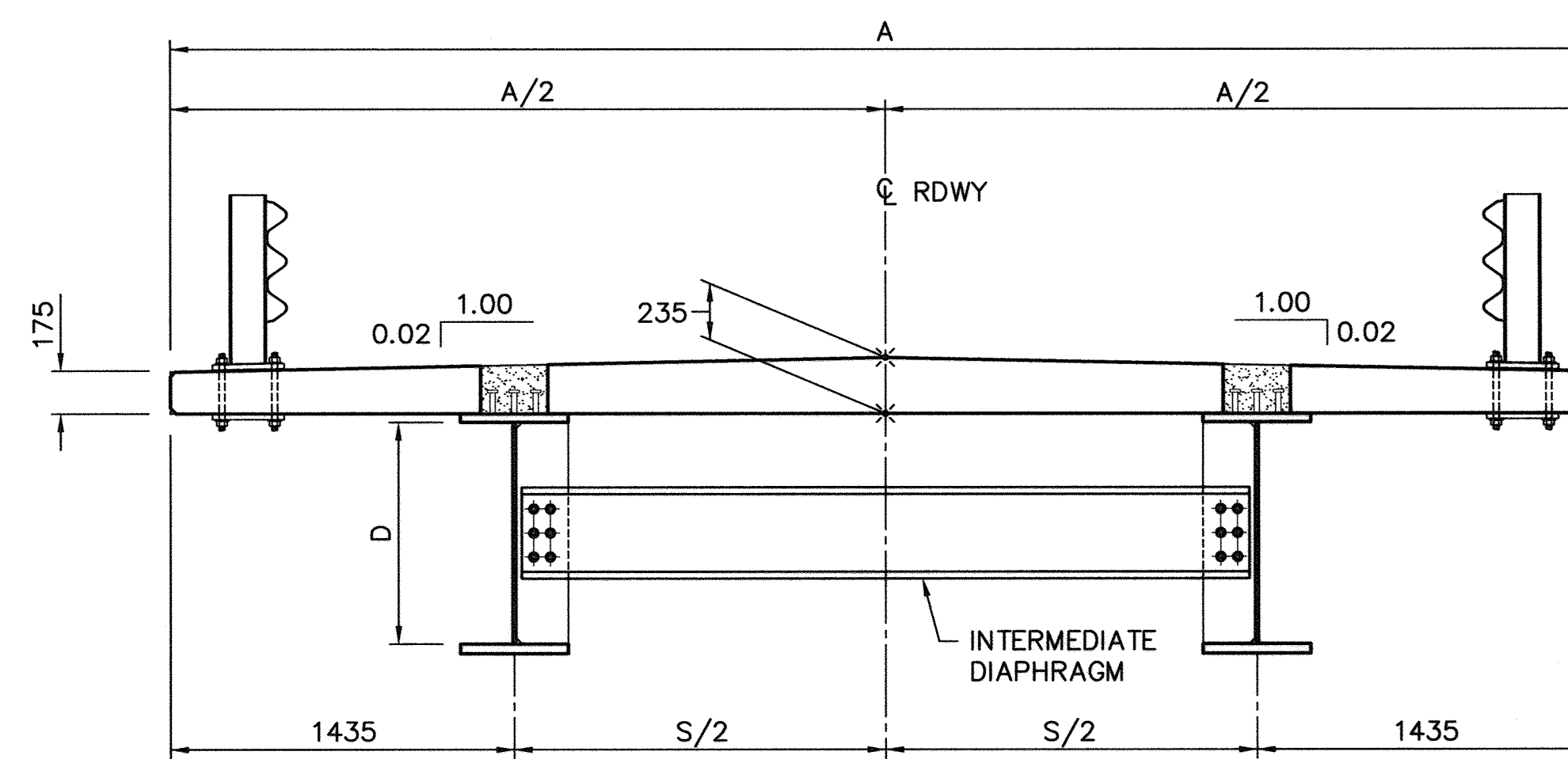


2-LANE 24 400 SPAN

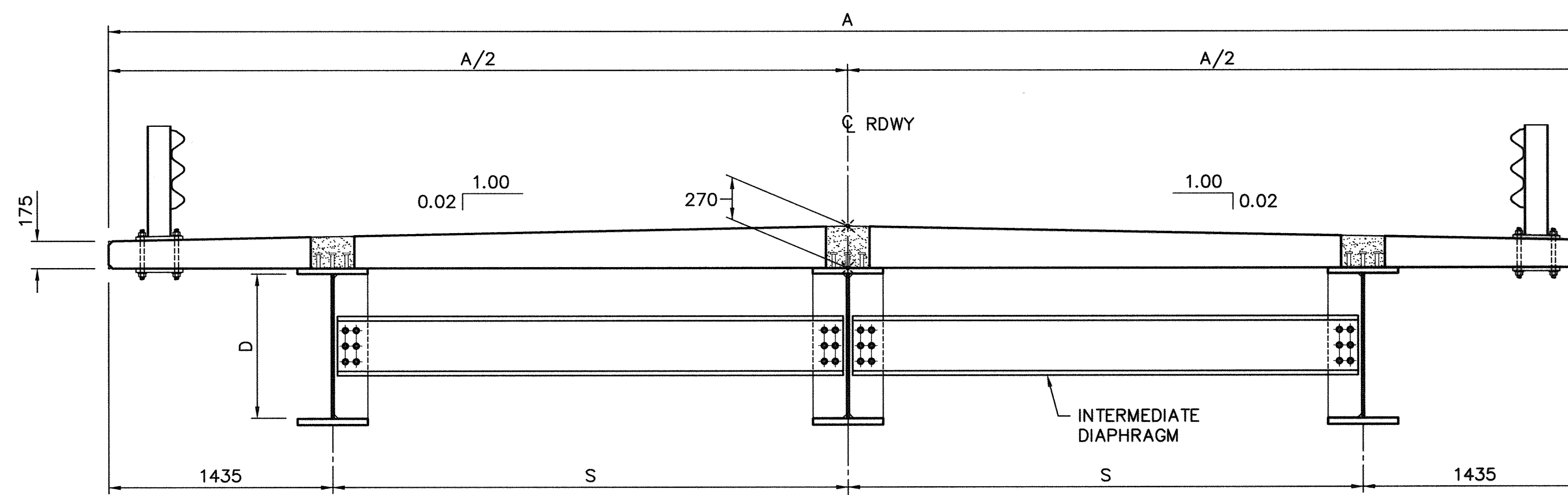
GIRDER AND DIAPHRAGM LAYOUT

1:150

DATA TABLE					
SPAN	L	18 684		24 400	
NUMBER OF LANES		1 LANE	2 LANES	1 LANE	2 LANES
DECK WIDTH	A	5970	9470	5970	9470
GIRDER SPACING	S	3100	3300	3100	3300
WEB HEIGHT	D	635		935	
INTERMEDIATE DIAPHRAGM SPACING	B	6228		6100	
INTERMEDIATE DIAPHRAGM TYPE		C310x31		C310x31	
ABUTMENT JACKING DIAPHRAGM TYPE		W460x144		W530x165	
CONCRETE BACKWALL HEIGHT	C	750		1050	



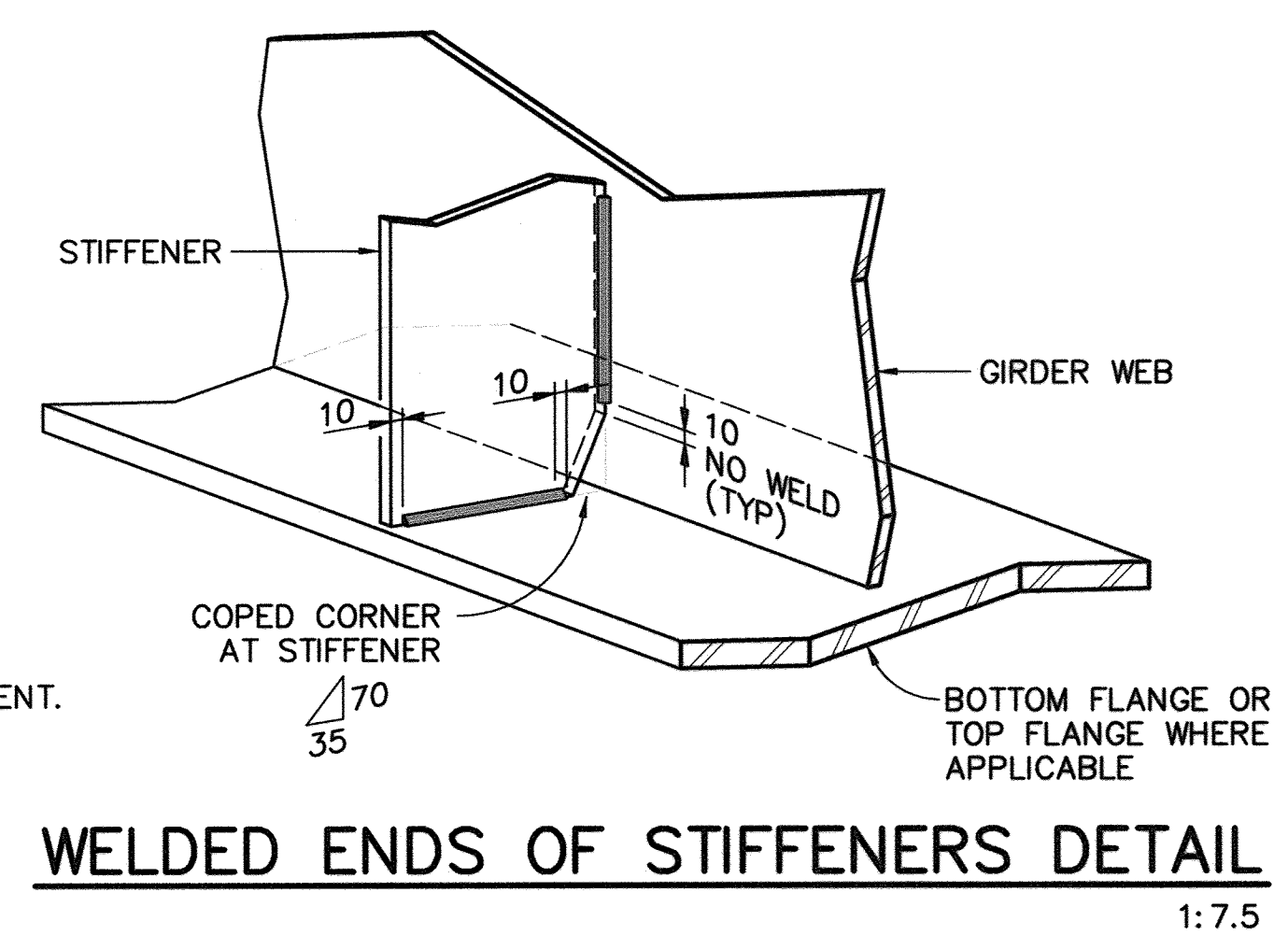
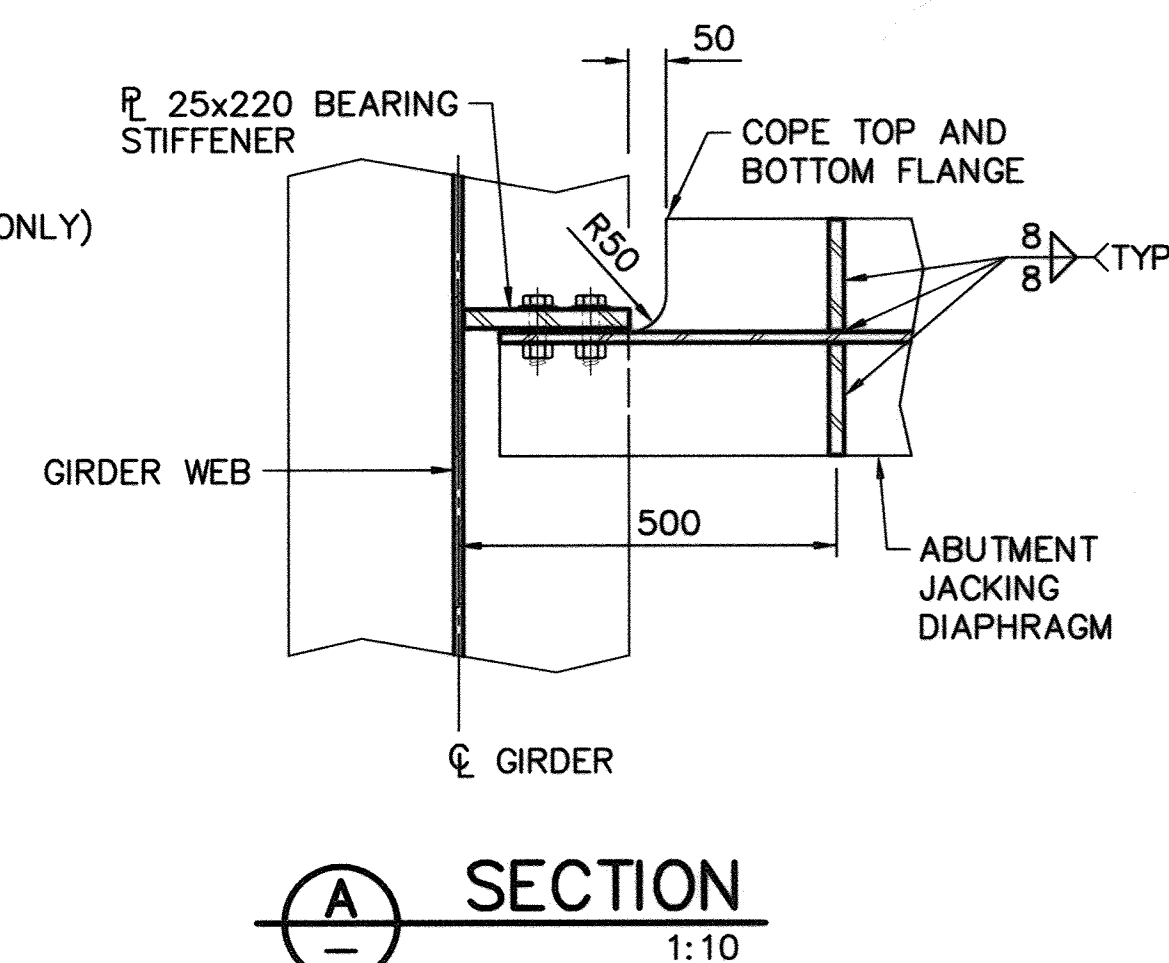
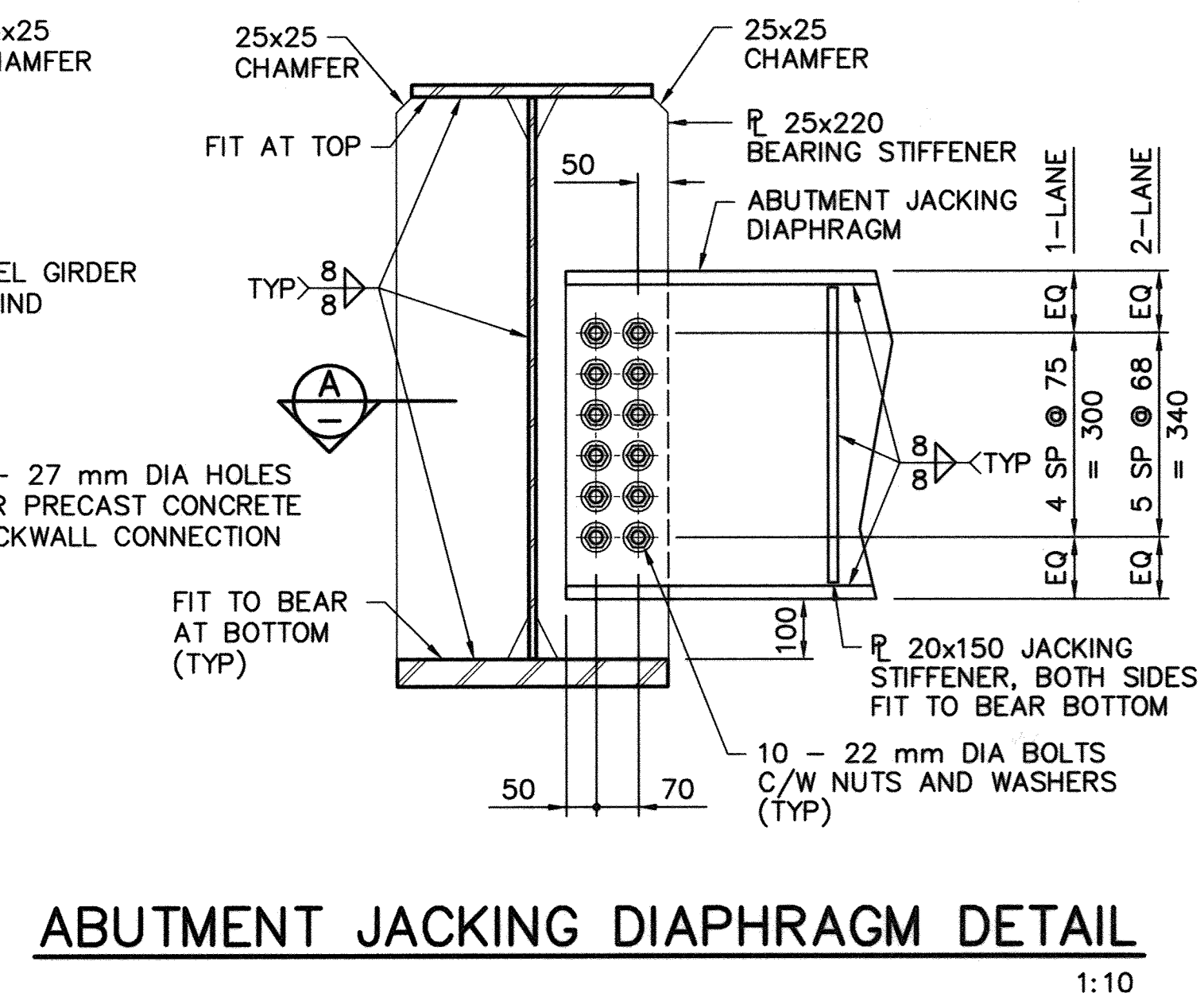
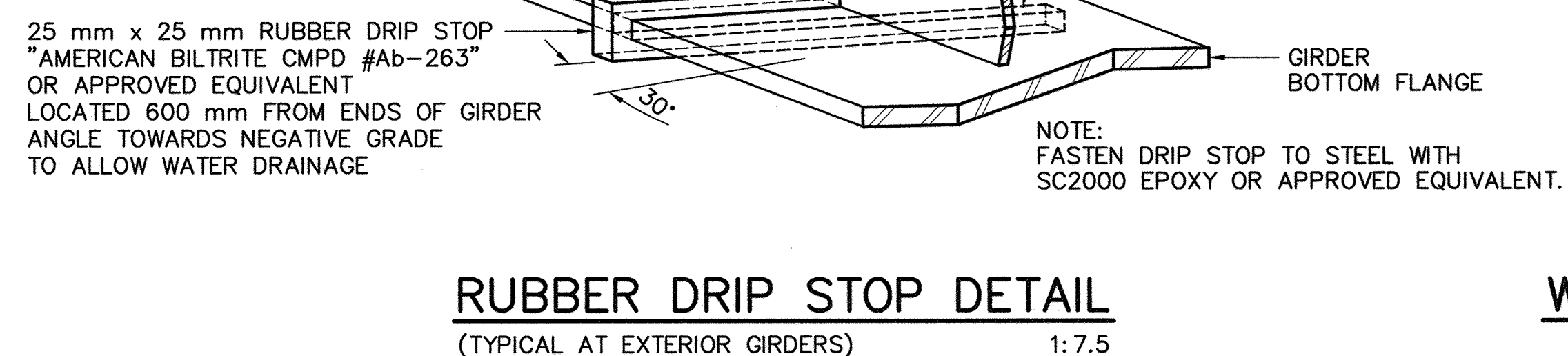
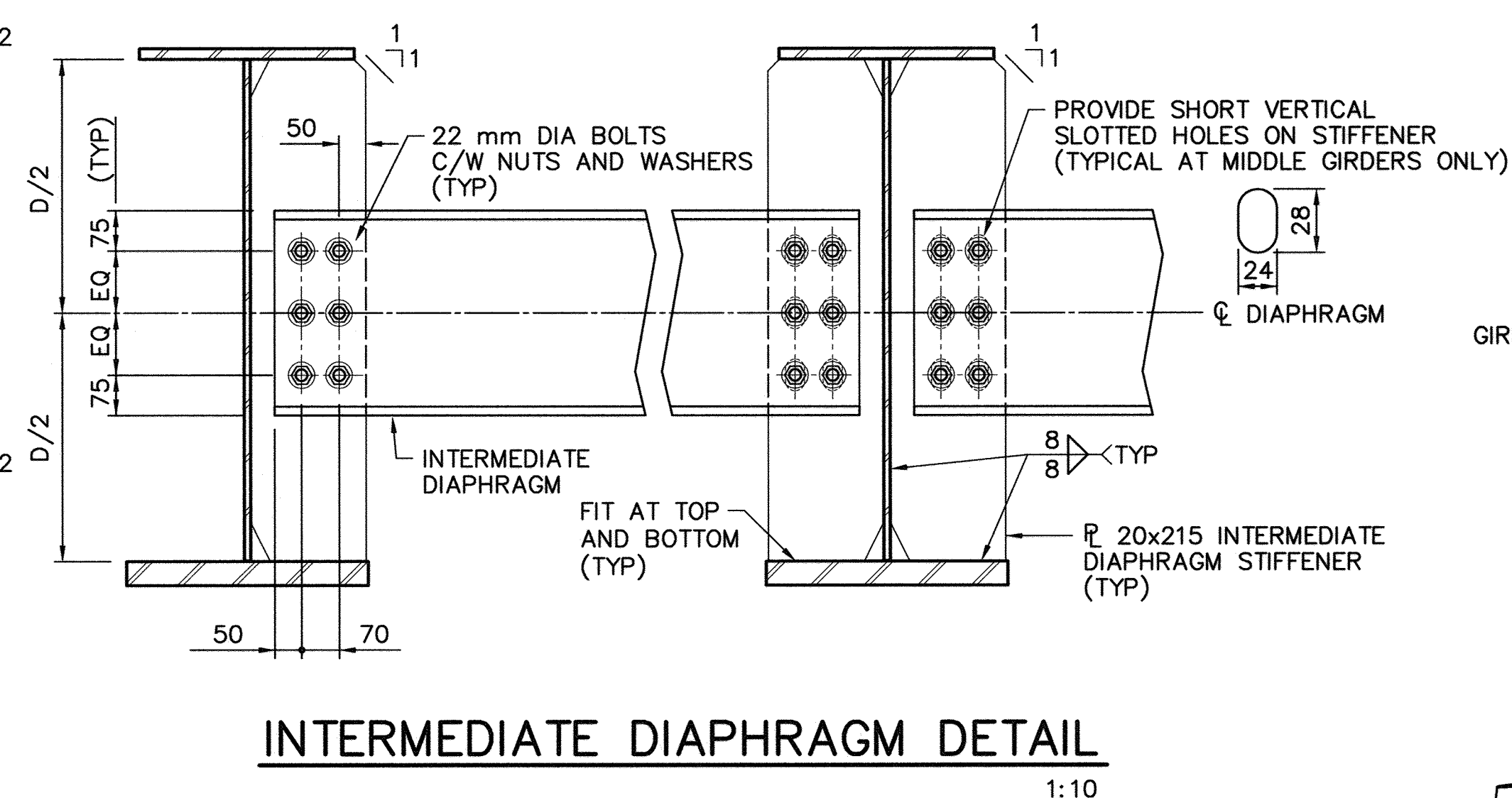
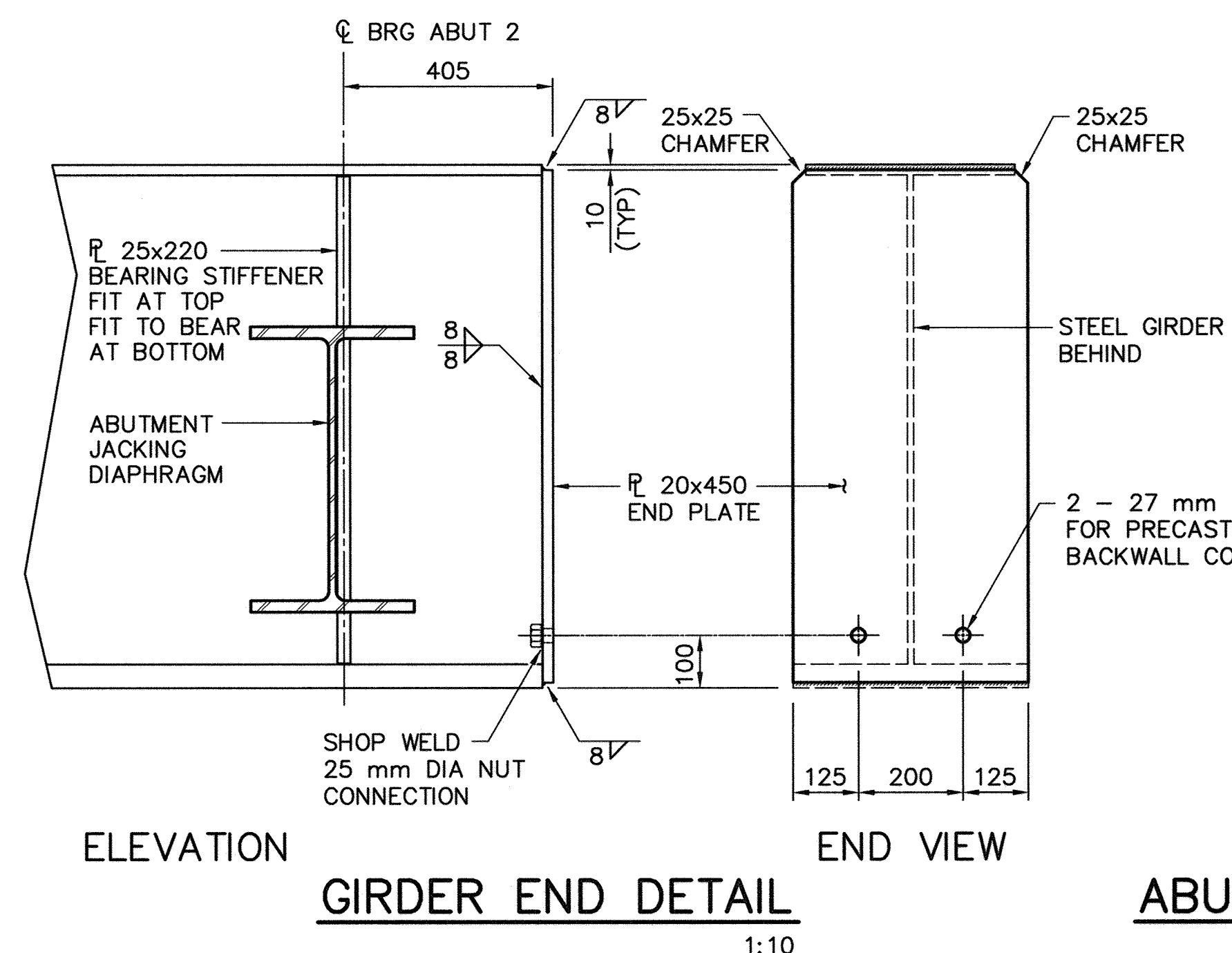
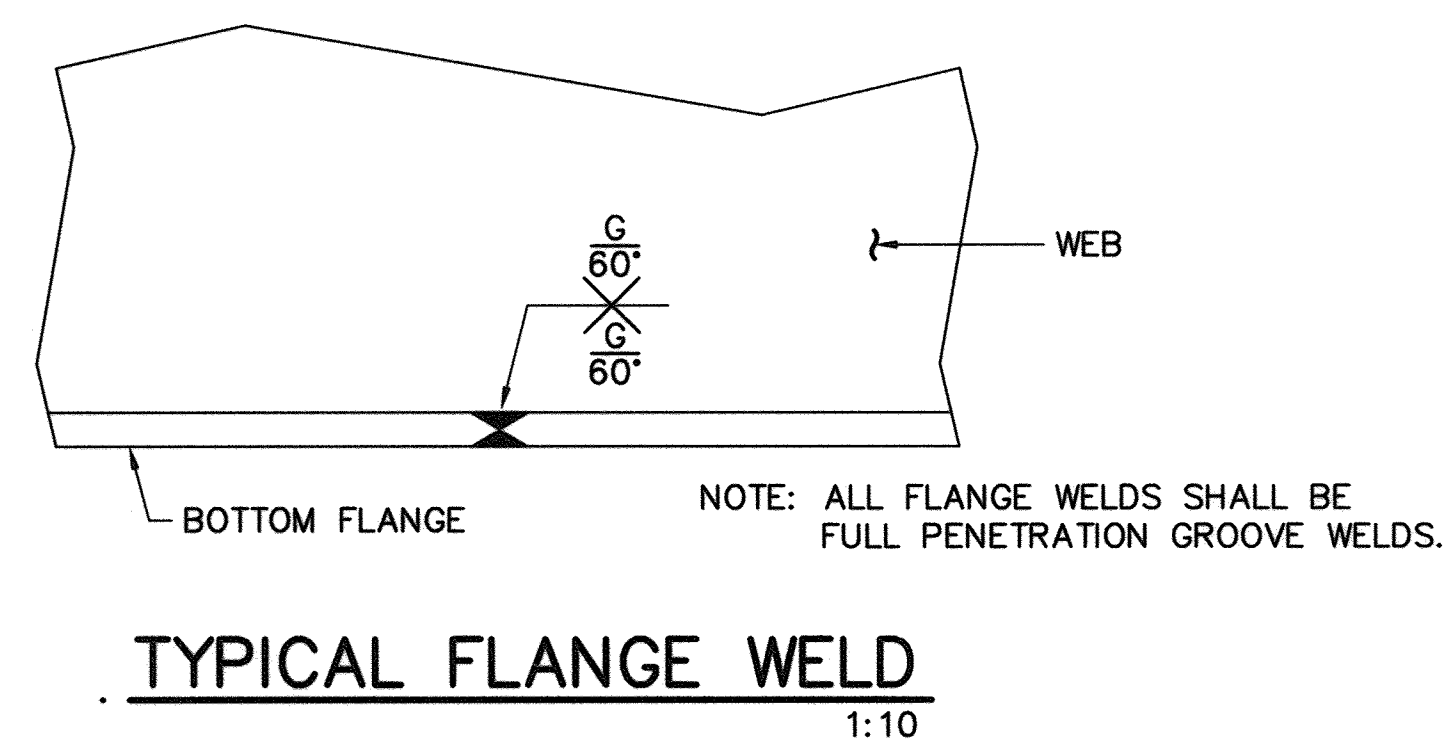
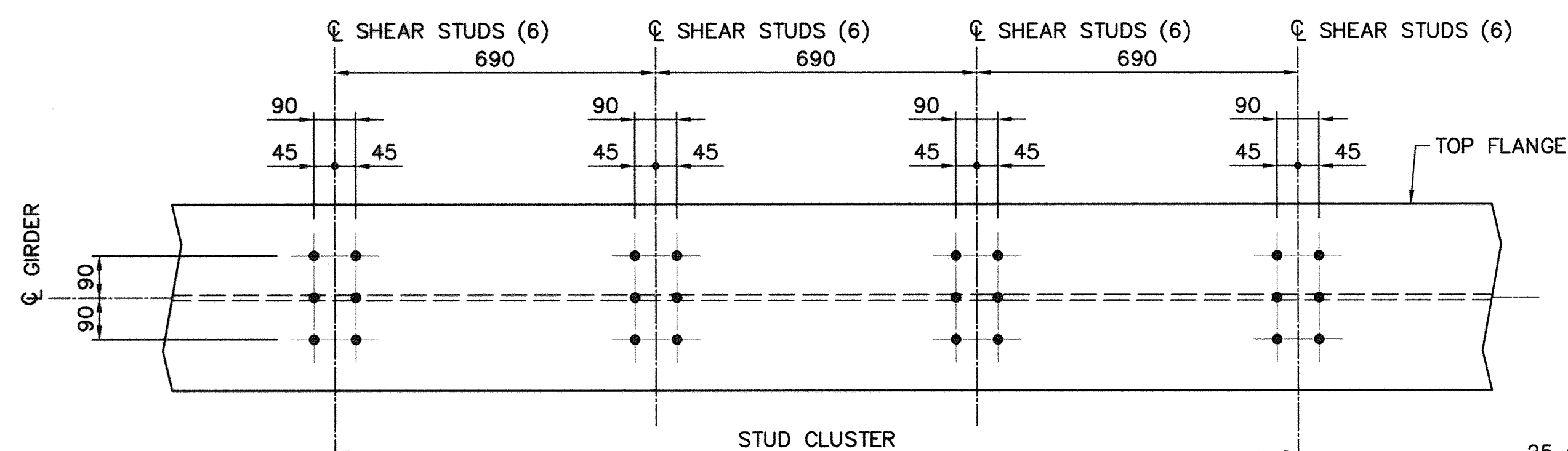
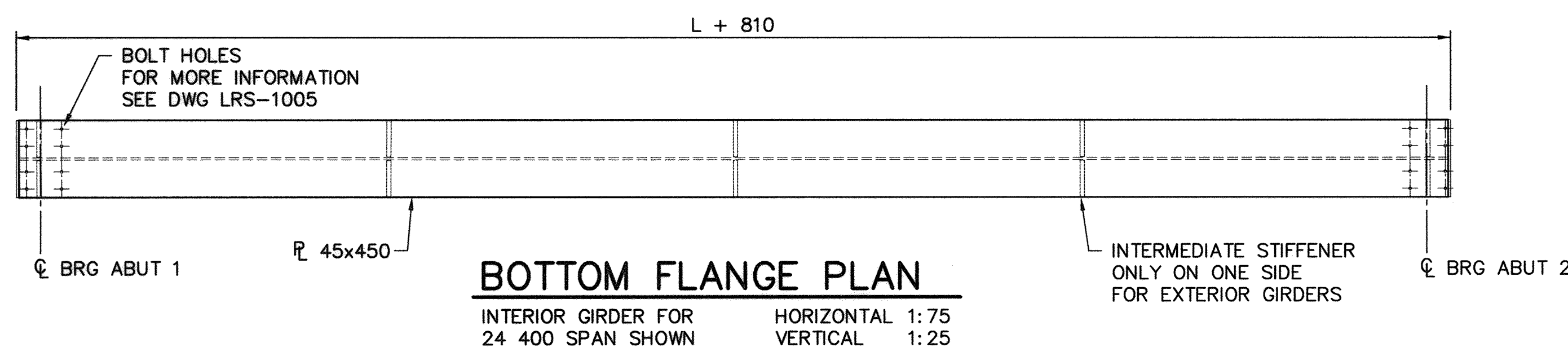
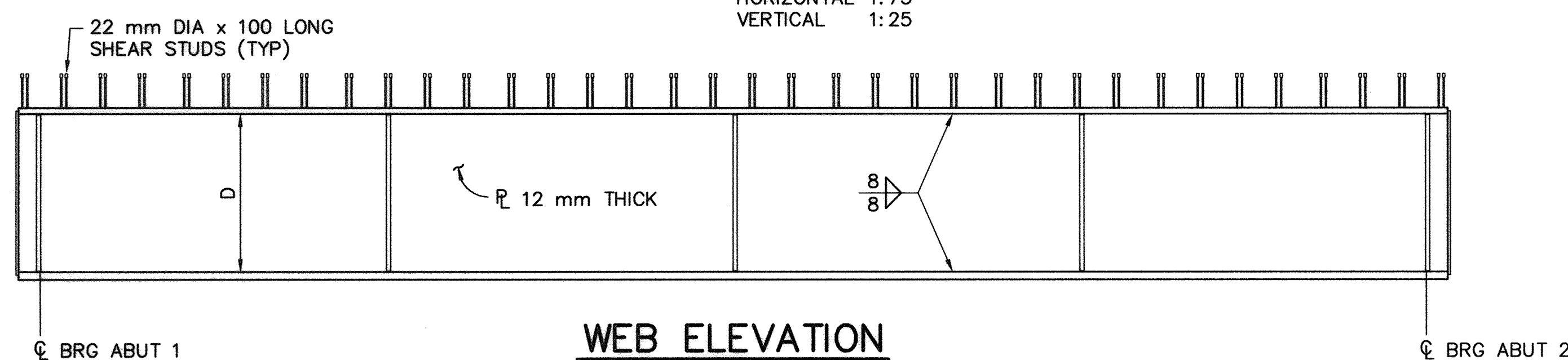
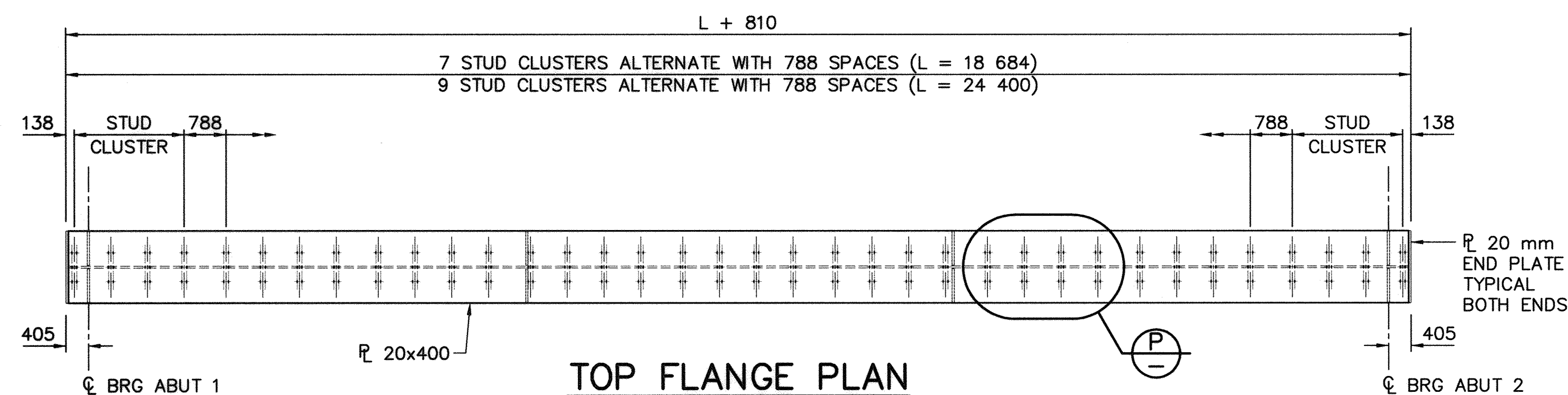
1-LANE BRIDGE SECTION  
1:25





2-LANE BRIDGE SECTION  
1:25

<b>PERMIT TO PRACTICE</b> AECOM Canada Ltd. Signature: <i>Bob Ramsey</i> Date: <i>Feb 9, 2015</i> PERMIT NUMBER: P10450 The Association of Professional Engineers, Geologists and Geophysicists of Alberta.	<b>DESIGNER</b> RICHARD LEE PROFESSIONAL ENGINEER - ALBERTA DATE: <i>FEB. 9, 2015</i>	<b>CHECKER</b> ROBERT JOHN RAY PROFESSIONAL ENGINEER - ALBERTA DATE: <i>FEB. 9, 2015</i>	<table><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>REV</td><td>DATE</td><td>REVISION</td><td>BY</td></tr></table>	△				△				△				△				△				△				REV	DATE	REVISION	BY	<b>RECOMMENDED</b> DIRECTOR BRIDGE ENGINEERING <i>D. Williamson</i> <b>APPROVED</b> EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Josh Del...</i> DATE: <i>FEB. 18/15</i>	<b>Alberta Transportation</b> <b>LOW VOLUME STANDARD BRIDGE</b> <b>PRECAST CONCRETE PANELS</b> <b>ON STEEL GIRDERS</b> <b>GIRDER LAYOUT</b> AT BARCODE: <table><tr><td>DATE</td><td>SHEET</td><td>DRAWING</td></tr><tr><td>2015-01-19</td><td>7 OF 14</td><td>LRS-1007</td></tr></table>	DATE	SHEET	DRAWING	2015-01-19	7 OF 14	LRS-1007
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<div> <div> <div>PERMIT TO PRACTICE</div> <div>AECOM Canada Ltd.</div> </div> <div> <div>Signature: <i>Bob Romano</i></div> <div>Date: <i>Feb 9 2015</i></div> </div> <div> <div>PERMIT NUMBER: P10450</div> <div>The Association of Professional Engineers, Geologists and Geophysicists of Alberta.</div> </div> </div>	<div> <div>DESIGNER</div> <div>  </div> <div> <div>DATE</div> <div><i>FEB. 9, 2015</i></div> </div> </div>	<div> <div>CHECKER</div> <div>  </div> <div> <div>DATE</div> <div><i>Feb 11 2015</i></div> </div> </div>	<table border="1"> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td></tr> <tr><td>REV</td><td>DATE</td><td>REVISION</td><td>BY</td></tr> </table>																					REV	DATE	REVISION	BY	<div> <div>RECOMMENDED</div> <div>DIRECTOR BRIDGE ENGINEERING</div> <div><i>D Williamson</i></div> <div>APPROVED</div> <div>EXECUTIVE DIRECTOR</div> <div>TECHNICAL STANDARDS BRANCH</div> <div><i>Hugh Dal</i></div> <div>DATE <i>FEB. 18/15</i></div> </div>	<div> <div>Alberta Transportation</div> <div>LOW VOLUME STANDARD BRIDGE</div> <div>PRECAST CONCRETE PANELS</div> <div>ON STEEL GIRDERS</div> <div>GIRDER DETAILS</div> </div>
REV	DATE	REVISION	BY																										
				<div> <div>AT BARCODE</div> <div>DATE</div> <div>SHEET</div> <div>DRAWING</div> </div>	<div> <div>2015-01-19</div> <div>8 OF 14</div> <div>LRS-1008</div> </div>																								



DRAWING

HIGHWAY

CONTRACT

DESCRIPTION

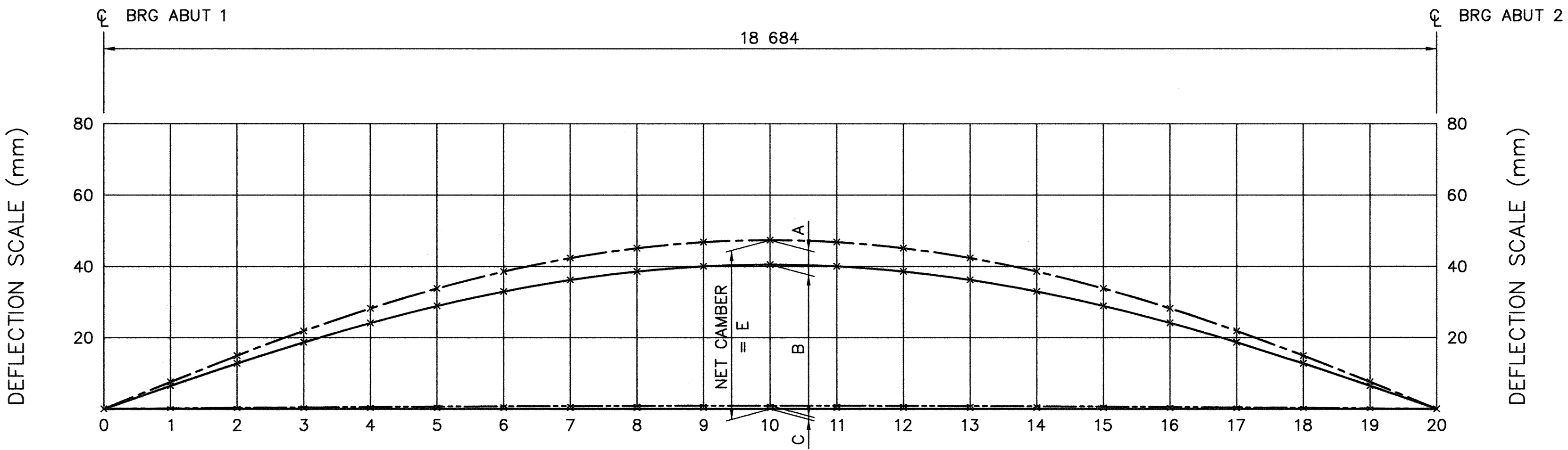
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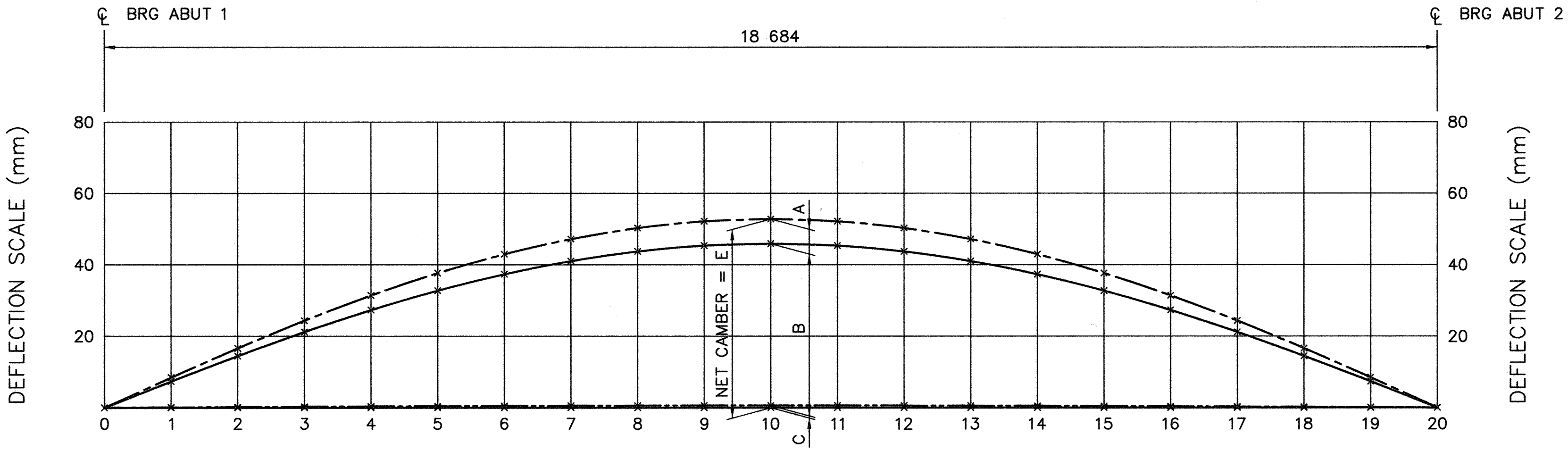


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A	DL GIRDERS	0	1	2	3	4	5	6	6	7	7	7	7	7	6	6	5	4	3	2	1	0
B	DL DECK	0	6	12	18	24	28	32	35	38	39	40	39	38	35	32	28	24	18	12	6	0
C	SDL	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
D	VERTICAL GRADE*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	NET CAMBER	0	7	14	21	29	34	39	42	46	47	48	47	46	42	39	34	29	21	14	7	0

CAMBER DIAGRAM FOR 18 684 SPAN, 1-LANE BRIDGE

HORIZONTAL 1:50  
VERTICAL 1:5

\*CAMBER DIAGRAM TO BE ADJUSTED ON SITE SPECIFIC DRAWINGS TO INCLUDE THE VERTICAL GRADE



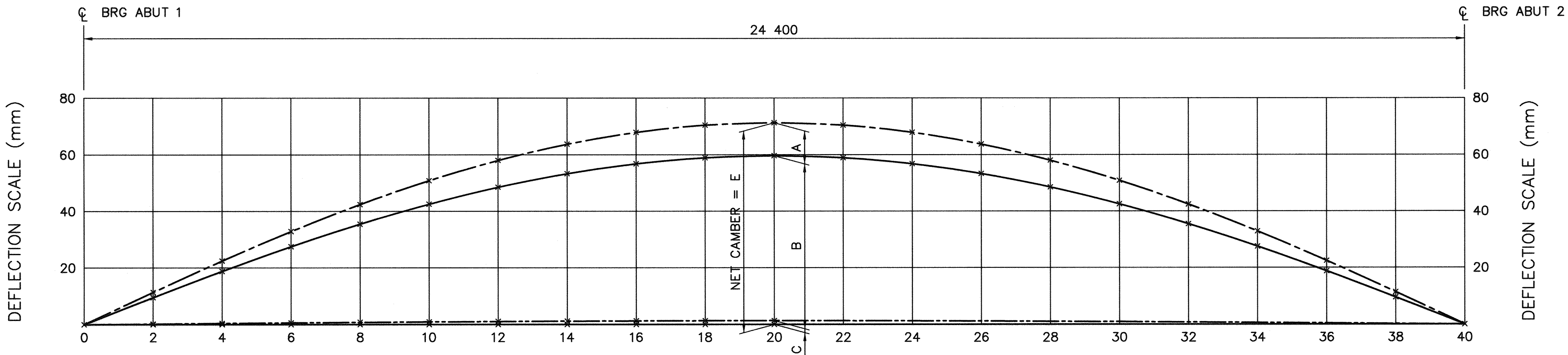
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	LOCATION	0	934	1868	2803	3737	4671	5605	6539	7474	8408	9342	10276	11210	12145	13079	14013	14947	15881	16816	17750	18684
A	DL GIRDERS	0	1	2	3	4	5	6	6	7	7	7	7	7	6	6	5	4	3	2	1	0
B	DL DECK	0	7	14	21	27	32	37	41	43	45	45	45	43	41	37	32	27	21	14	7	0
C	SDL	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0
D	VERTICAL GRADE*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	NET CAMBER	0	8	16	24	31	37	43	48	51	53	53	53	51	48	43	37	31	24	16	8	0

CAMBER DIAGRAM FOR 18 684 SPAN, 2-LANE BRIDGE

HORIZONTAL 1:50  
VERTICAL 1:5

<p>PERMIT TO PRACTICE AECOM Canada Ltd. Signature: <i>Bob Ramsey</i> Date: <i>Feb. 9, 2015</i> PERMIT NUMBER: P10450 The Association of Professional Engineers, Geologists and Geophysicists of Alberta.</p>	<p>DESIGNER RICHARD LEE FEB. 9, 2015</p>	<p>CHECKER ROBERT JOHN RYAN FEB. 11, 2015</p>	<table><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>△</td><td></td><td></td><td></td></tr><tr><td>REV</td><td>DATE</td><td>REVISION</td><td>BY</td></tr></table>	△				△				△				△				△				△				REV	DATE	REVISION	BY	<p>RECOMMENDED DIRECTOR BRIDGE ENGINEERING <i>D. Williamson</i></p> <p>APPROVED EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Mark Jaki</i> DATE: <i>FEB. 18/15</i></p>	<p>Alberta Transportation</p> <p>LOW VOLUME STANDARD BRIDGE PRECAST CONCRETE PANELS ON STEEL GIRDERS GIRDER CAMBER DIAGRAMS - SHEET 1</p> <table><tr><td>AT BARCODE</td><td>DATE 2015-01-19</td><td>SHEET 9 OF 14</td><td>DRAWING LRS-1009</td></tr></table>	AT BARCODE	DATE 2015-01-19	SHEET 9 OF 14	DRAWING LRS-1009
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REV	DATE	REVISION	BY																																		
AT BARCODE	DATE 2015-01-19	SHEET 9 OF 14	DRAWING LRS-1009																																		



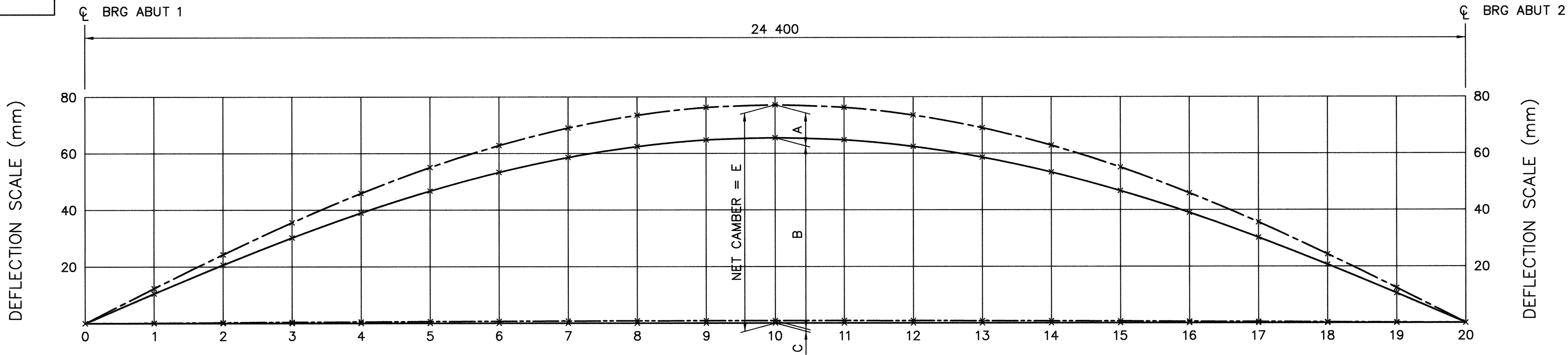


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	LOCATION	0	1220	2440	3660	4880	6100	7320	8540	9760	10980	12200	13420	14640	15860	17080	18300	19520	20740	21960	23180	24400
A	DL GIRDERS	0	2	4	5	7	8	9	10	11	12	12	12	11	10	9	8	7	5	4	2	0
B	DL DECK	0	9	18	27	35	42	47	52	56	58	58	58	56	52	47	42	35	27	18	9	0
C	SDL	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
D	VERTICAL GRADE*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	NET CAMBER	0	11	22	32	42	51	57	63	68	71	71	71	68	63	57	51	42	32	22	11	0

CAMBER DIAGRAM FOR 24 400 SPAN, 1-LANE BRIDGE

HORIZONTAL 1:50  
VERTICAL 1:5

\*CAMBER DIAGRAM TO BE ADJUSTED ON SITE SPECIFIC DRAWINGS TO INCLUDE THE VERTICAL GRADE



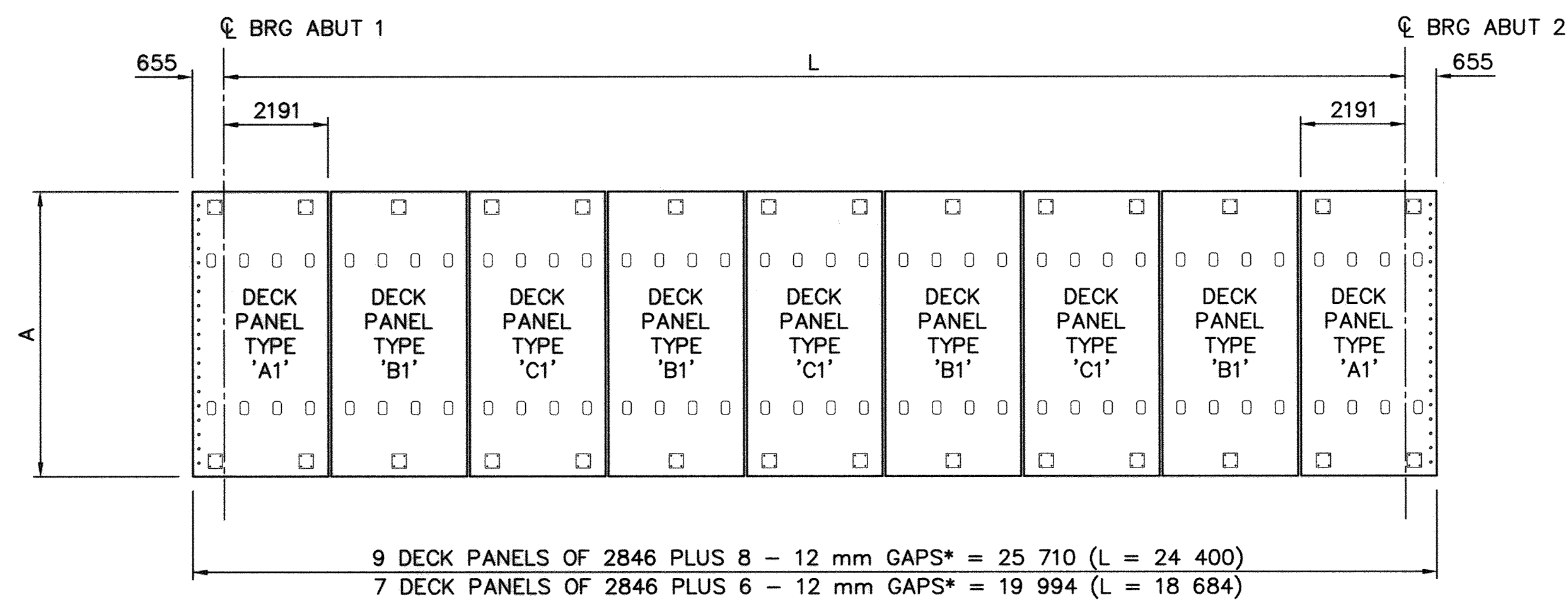
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	LOCATION	0	1220	2440	3660	4880	6100	7320	8540	9760	10980	12200	13420	14640	15860	17080	18300	19520	20740	21960	23180	24400
A	DL GIRDERS	0	2	4	5	7	8	9	10	11	12	12	12	11	10	9	8	7	5	4	2	0
B	DL DECK	0	10	20	30	38	46	53	58	62	64	65	64	62	58	53	46	38	30	20	10	0
C	SDL	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
D	VERTICAL GRADE*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	NET CAMBER	0	12	24	35	46	55	63	69	74	77	78	77	74	69	63	55	46	35	24	12	0

CAMBER DIAGRAM FOR 24 400 SPAN, 2-LANE BRIDGE

HORIZONTAL 1:50  
VERTICAL 1:5

<p>PERMIT TO PRACTICE AECOM Canada Ltd. Signature: <i>Bob Ramsey</i> Date: <i>Feb. 9, 2015</i> PERMIT NUMBER: P10450 The Association of Professional Engineers, Geologists and Geophysicists of Alberta.</p>	<p>DESIGNER PROFESSIONAL ENGINEER ALBERTA RICHARD LEE DATE: <i>FEB. 9, 2015</i></p>	<p>CHECKER PROFESSIONAL ENGINEER ALBERTA ROBERT JOHN RAY DATE: <i>FEB. 11, 2015</i></p>	<table><tr><td>REV</td><td>DATE</td><td>REVISION</td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></table>	REV	DATE	REVISION																<p>RECOMMENDED DIRECTOR BRIDGE ENGINEERING <i>D. Williamson</i> APPROVED EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Michael</i> DATE: <i>FEB. 18/15</i></p>	<p>Alberta Transportation</p> <p>LOW VOLUME STANDARD BRIDGE PRECAST CONCRETE PANELS ON STEEL GIRDERS GIRDER CAMBER DIAGRAMS – SHEET 2</p> <table><tr><td>AT BARCODE</td><td>DATE 2015-01-19</td><td>SHEET 10 OF 14</td><td>DRAWING LRS-1010</td></tr></table>	AT BARCODE	DATE 2015-01-19	SHEET 10 OF 14	DRAWING LRS-1010
REV	DATE	REVISION																									
AT BARCODE	DATE 2015-01-19	SHEET 10 OF 14	DRAWING LRS-1010																								

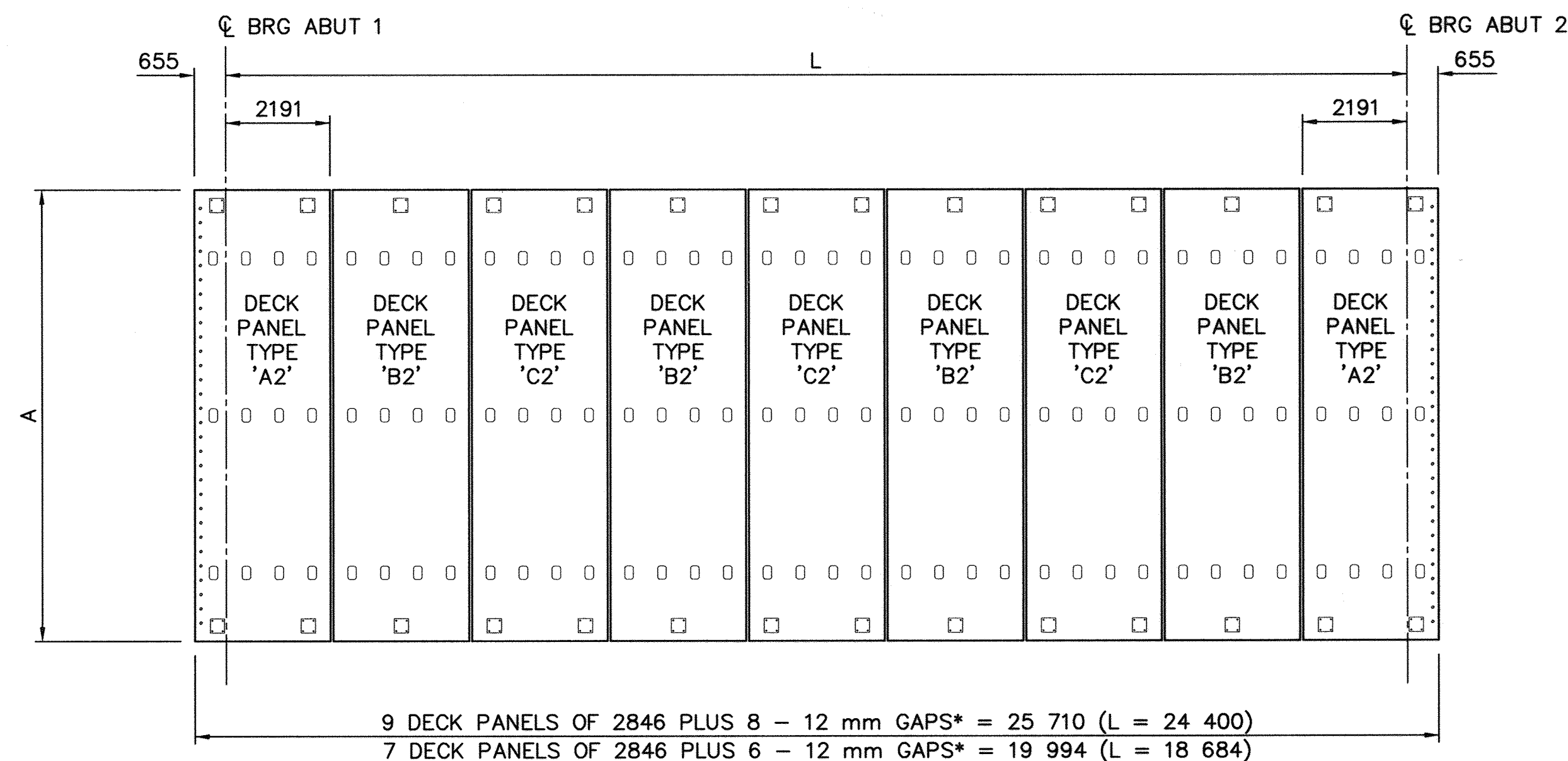




### 1-LANE DECK PANEL LAYOUT

9 PANEL LAYOUT SHOWN.  
7 PANEL LAYOUT SIMILAR

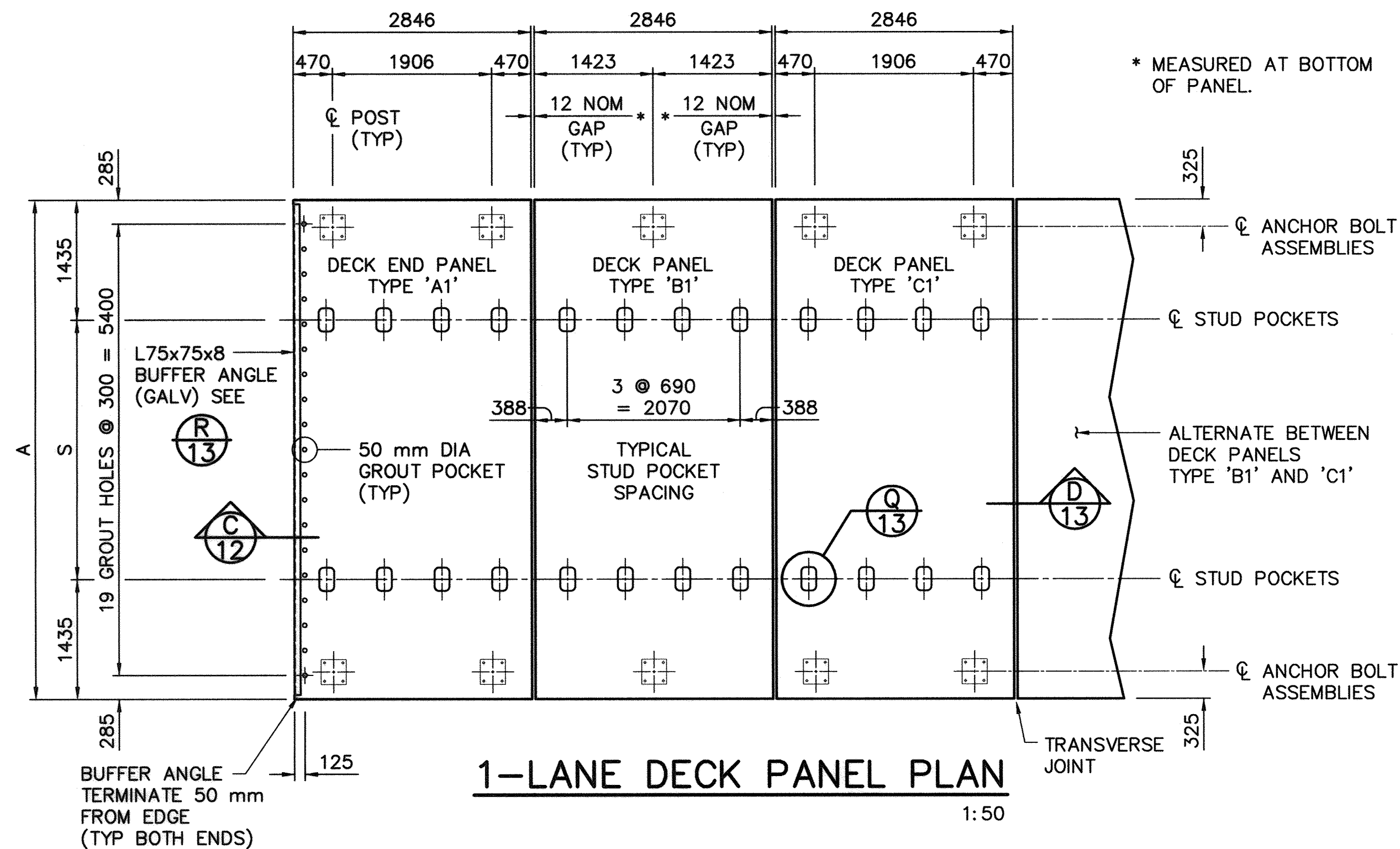
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### 2-LANE DECK PANEL LAYOUT

9 PANEL LAYOUT SHOWN.  
7 PANEL LAYOUT SIMILAR

1:100

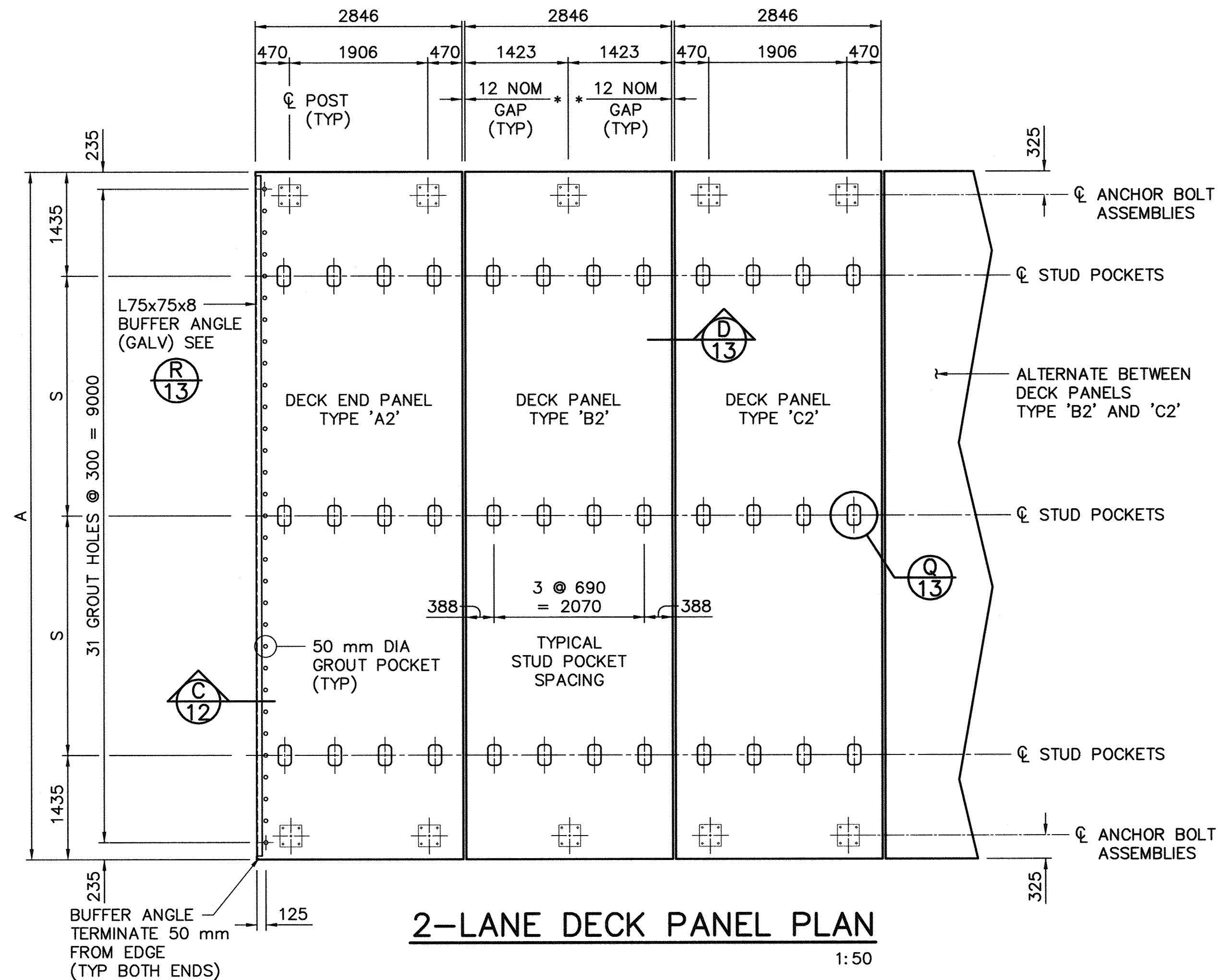


### 1-LANE DECK PANEL PLAN

1:50

### NUMBER OF DECK PANELS

	SPAN		L	18 684	24 400
	DECK WIDTH	A			
1-LANE	DECK PANEL TYPE 'A1'		2		2
	DECK PANEL TYPE 'B1'		3		4
	DECK PANEL TYPE 'C1'		2		3
	DECK WIDTH	A			
2-LANE	DECK PANEL TYPE 'A2'		2		2
	DECK PANEL TYPE 'B2'		3		4
	DECK PANEL TYPE 'C2'		2		3
	DECK WIDTH	A			



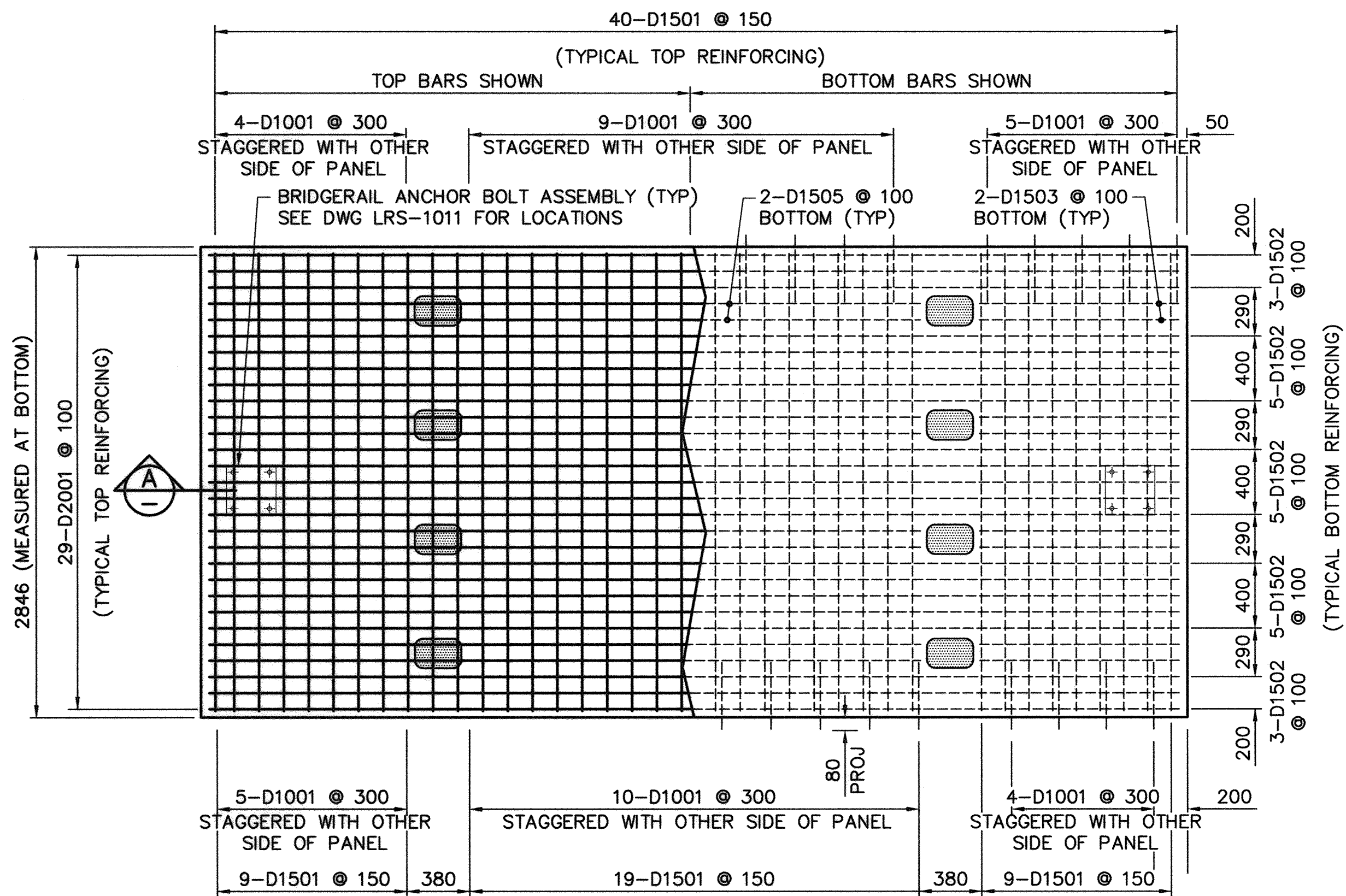
### 2-LANE DECK PANEL PLAN

1:50

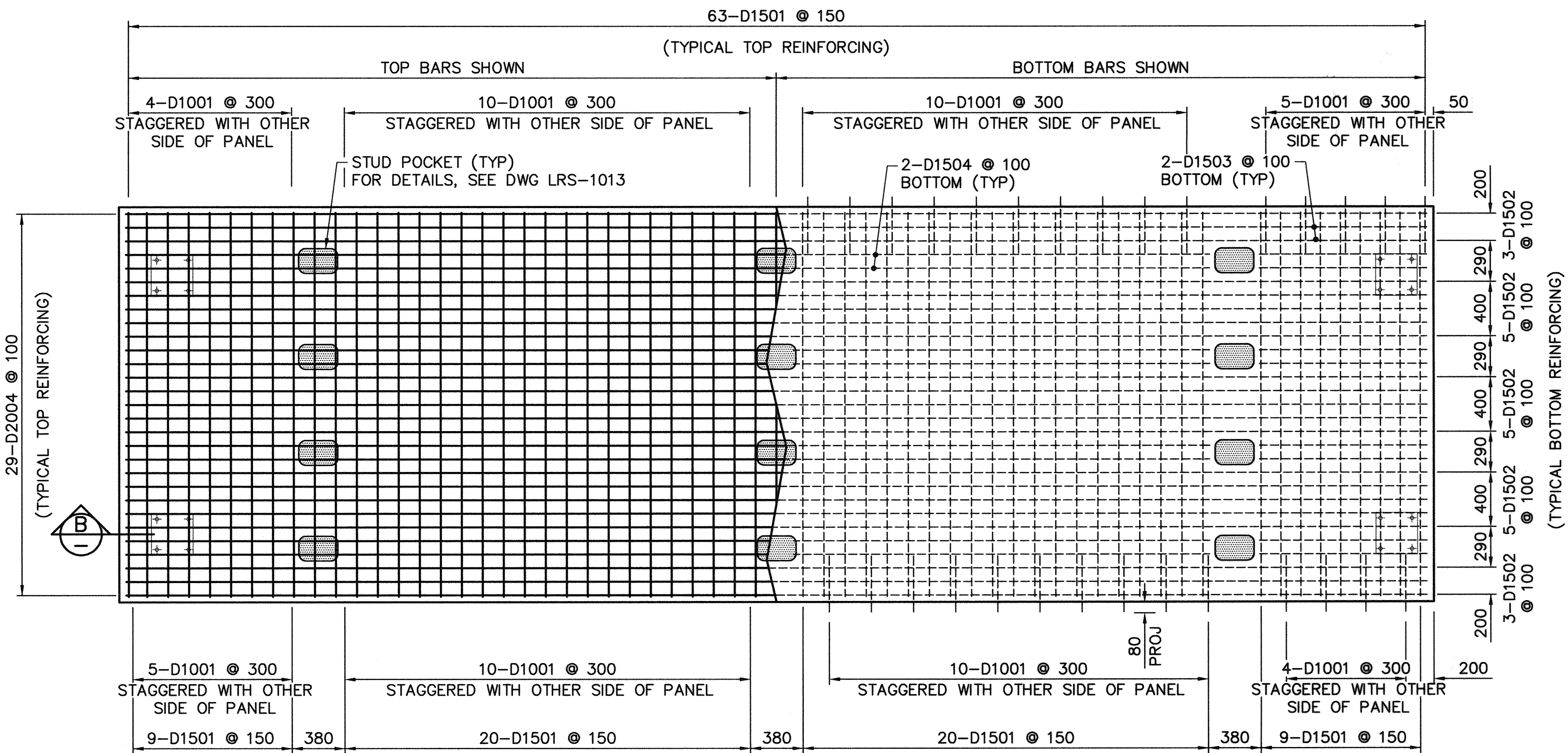
<b>PERMIT TO PRACTICE</b> AECOM Canada Ltd. Signature: <i>Bob Romano</i> Date: <i>Feb 9, 2015</i> <b>PERMIT NUMBER: P10450</b> The Association of Professional Engineers, Geologists and Geophysicists of Alberta.	<b>DESIGNER</b> <b>RICHARD LEE</b> PROFESSIONAL ENGINEER - ALBERTA DATE: <i>Feb. 9, 2015</i>	<b>CHECKER</b> <b>PROFESSOR JOHN R. BERRY</b> PROFESSIONAL ENGINEER - ALBERTA DATE: <i>Feb. 9, 2015</i>	REV	DATE	REVISION	BY	DATE	RECOMMENDED DIRECTOR BRIDGE ENGINEERING <i>D. Williamson</i>	APPROVED EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Michael</i> DATE: <i>FEB. 18, 15</i>	<b>Alberta Transportation</b> <b>LOW VOLUME STANDARD BRIDGE</b> <b>PRECAST CONCRETE PANELS</b> <b>ON STEEL GIRDERS</b> <b>DECK - SHEET 1</b>	AT BARCODE	DATE 2015-01-19	SHEET 11 OF 14	DRAWING LRS-1011



DRAWING  
HIGHWAY  
CONTRACT  
DESCRIPTION  
PHOTO  
DATE  
BY  
SURVEYED  
DEPARTMENT BAR CODE

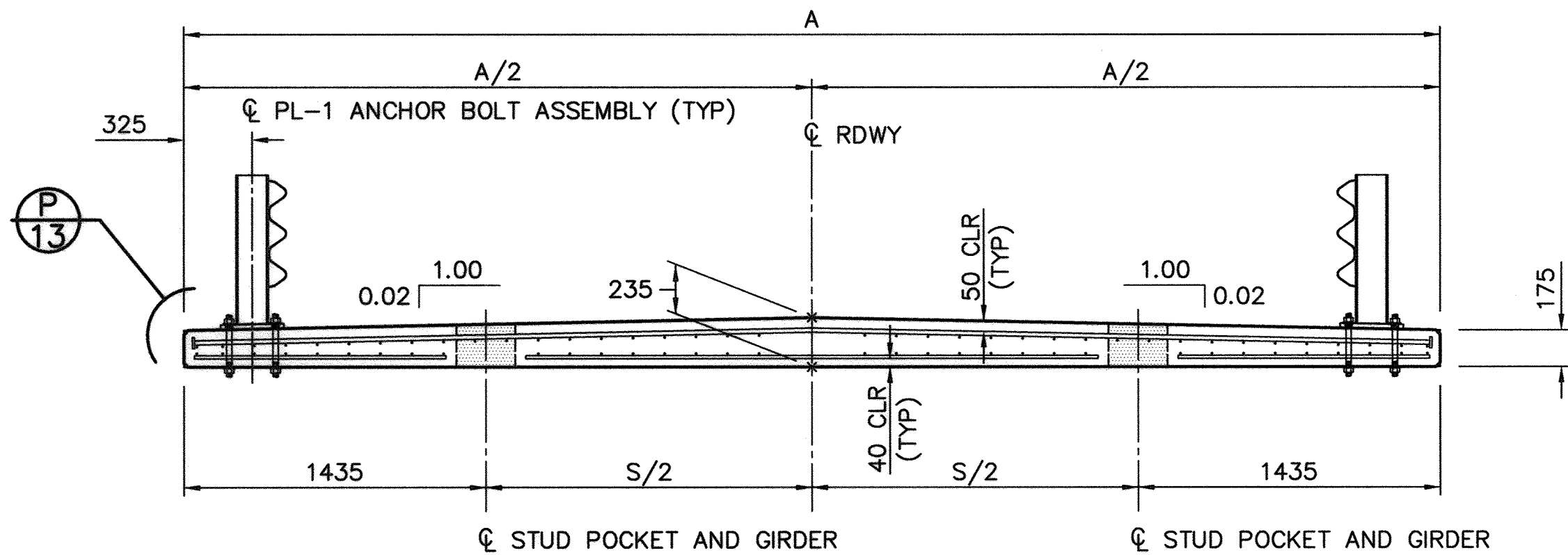


1-LANE BRIDGE  
PANEL TYPE B1 SHOWN  
PANEL TYPE A1 AND C1 SIMILAR

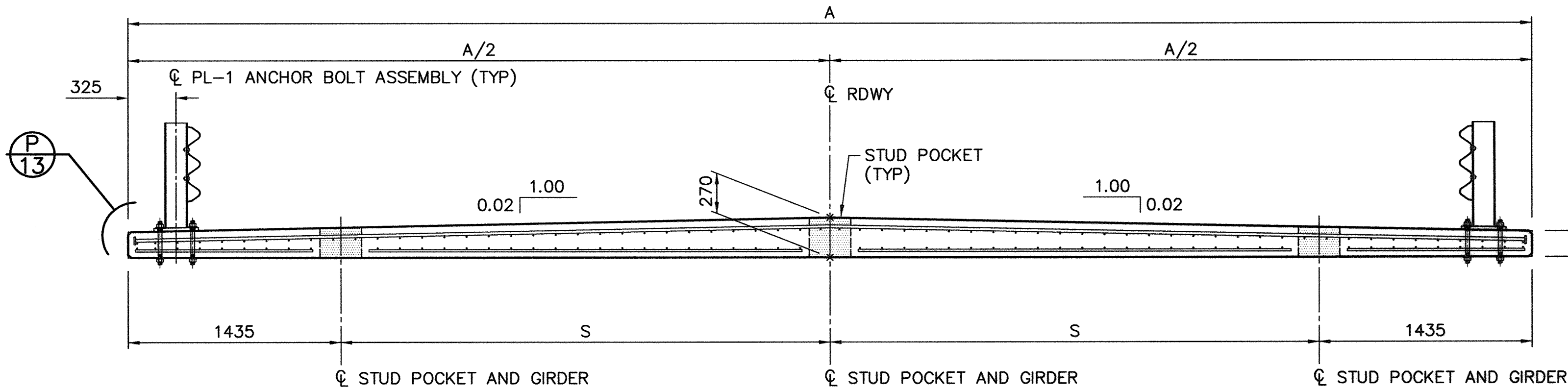


2-LANE BRIDGE  
PANEL TYPE C2 SHOWN  
PANEL TYPE A2 AND B2 SIMILAR

DECK PANEL REINFORCING LAYOUT  
1:25



1-LANE BRIDGE SECTION  
1:25

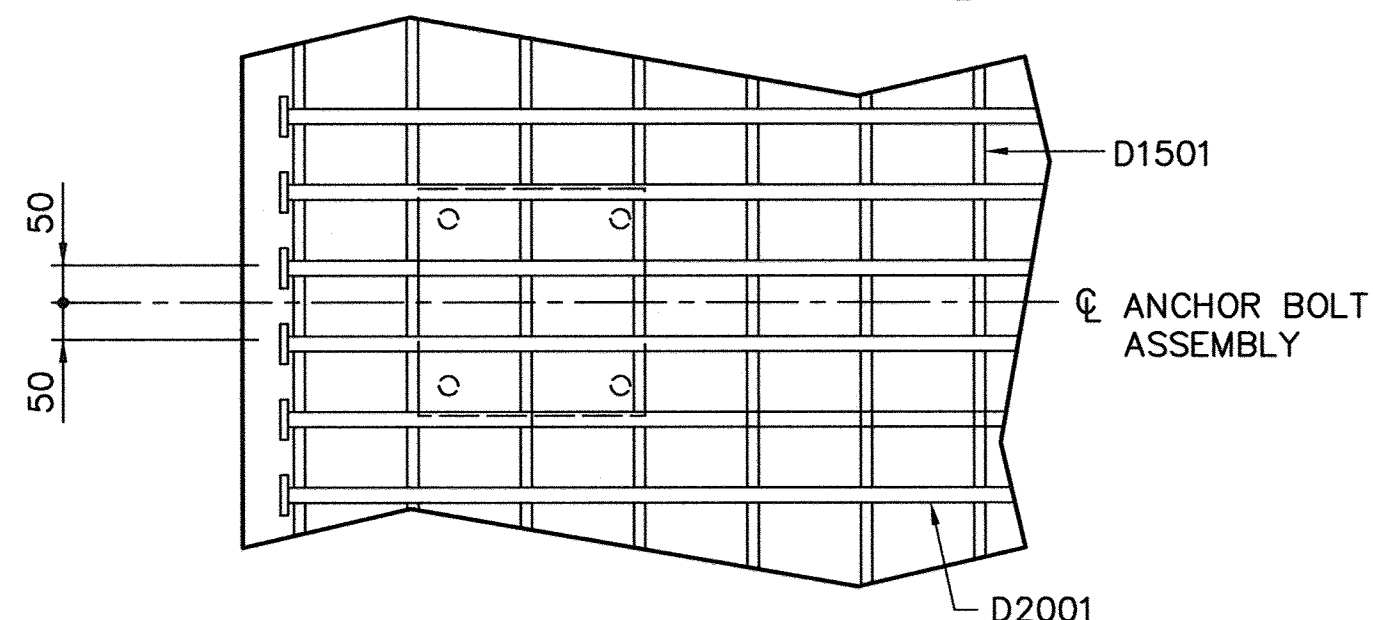
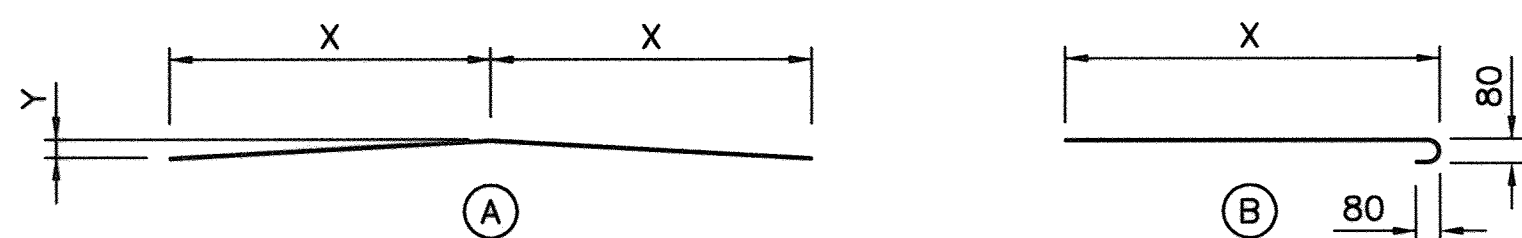


2-LANE BRIDGE SECTION  
1:25

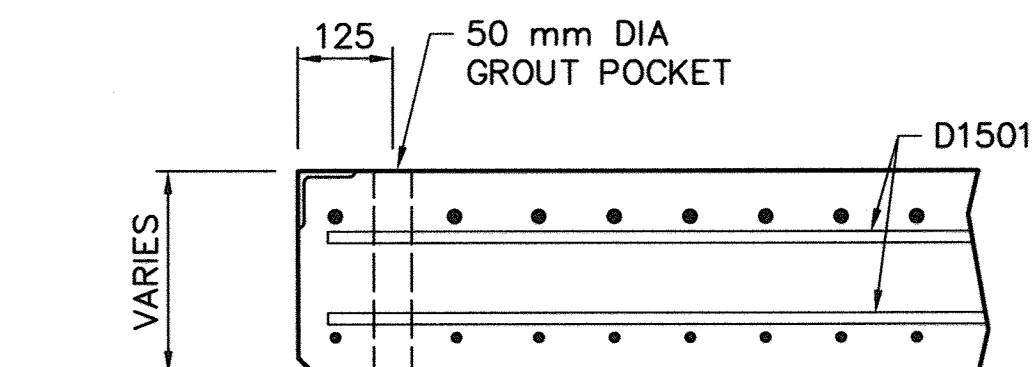
BAR LIST (PER PRECAST CONCRETE DECK PANEL)

			1-LANE				2-LANE			
MARK	SIZE	TYPE	X	Y	QTY	LENGTH	X	Y	QTY	LENGTH
D1001*	10M	B	300	-	37	430	300	-	58	430
D1501	15M	STR	2746	-	77	2746	2746	-	121	2746
D1502	15M	STR	5870	-	21	5870	9370	-	21	9370
D1503	15M	STR	1195	-	16	1195	1195	-	16	1195
D1504	15M	STR	-	-	-	-	2930	-	16	2930
D1505	15M	STR	2730	-	8	2730	-	-	-	-
D2001**	20M	A	2935	59	29	5871	4685	94	29	9372

\*HALF QUANTITY FOR END PANELS  
\*\*HEADED END AT BOTH ENDS OF THE BAR



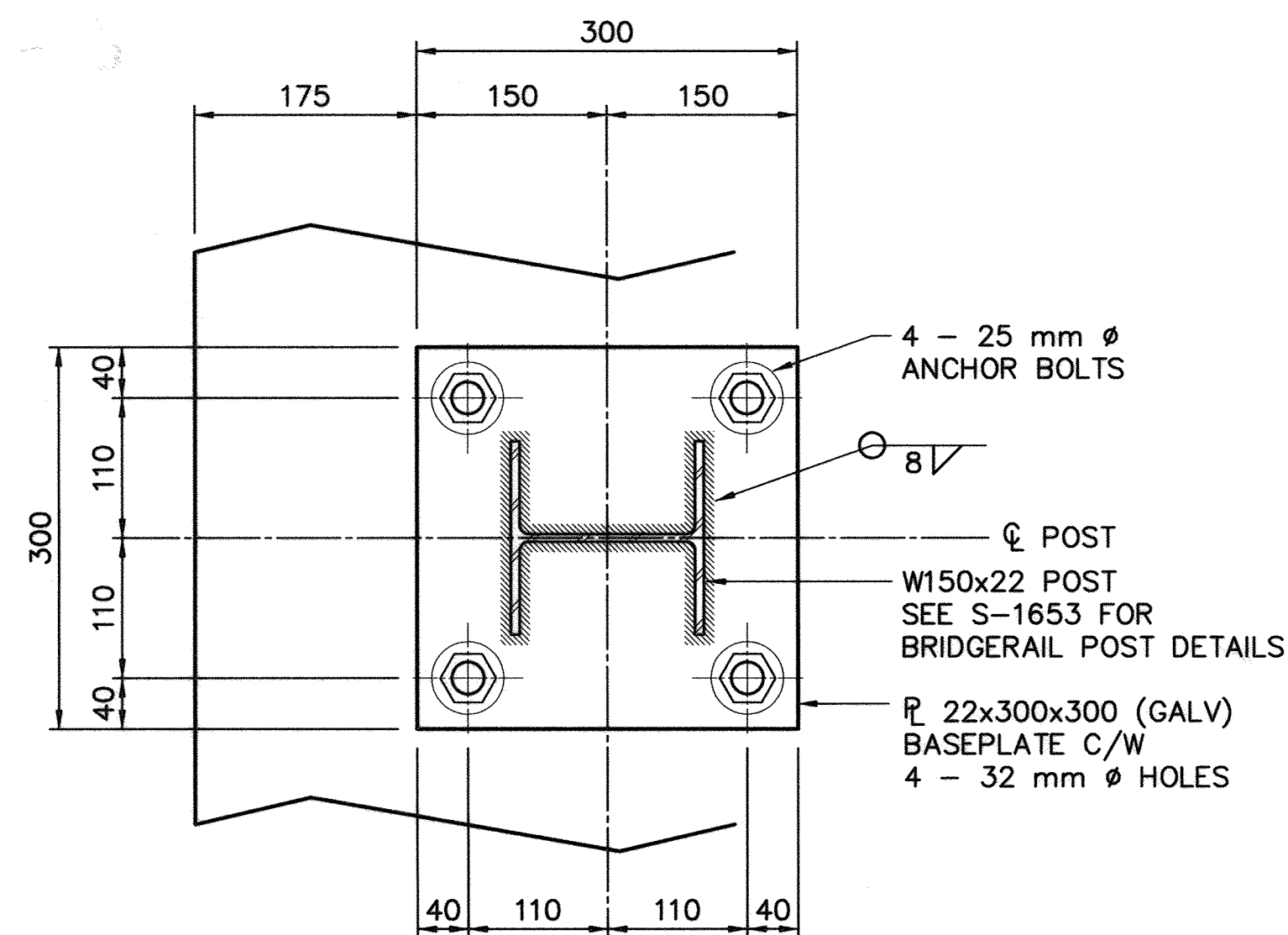
REINFORCING PLACEMENT  
AROUND ANCHOR POST ASSEMBLY  
1:10



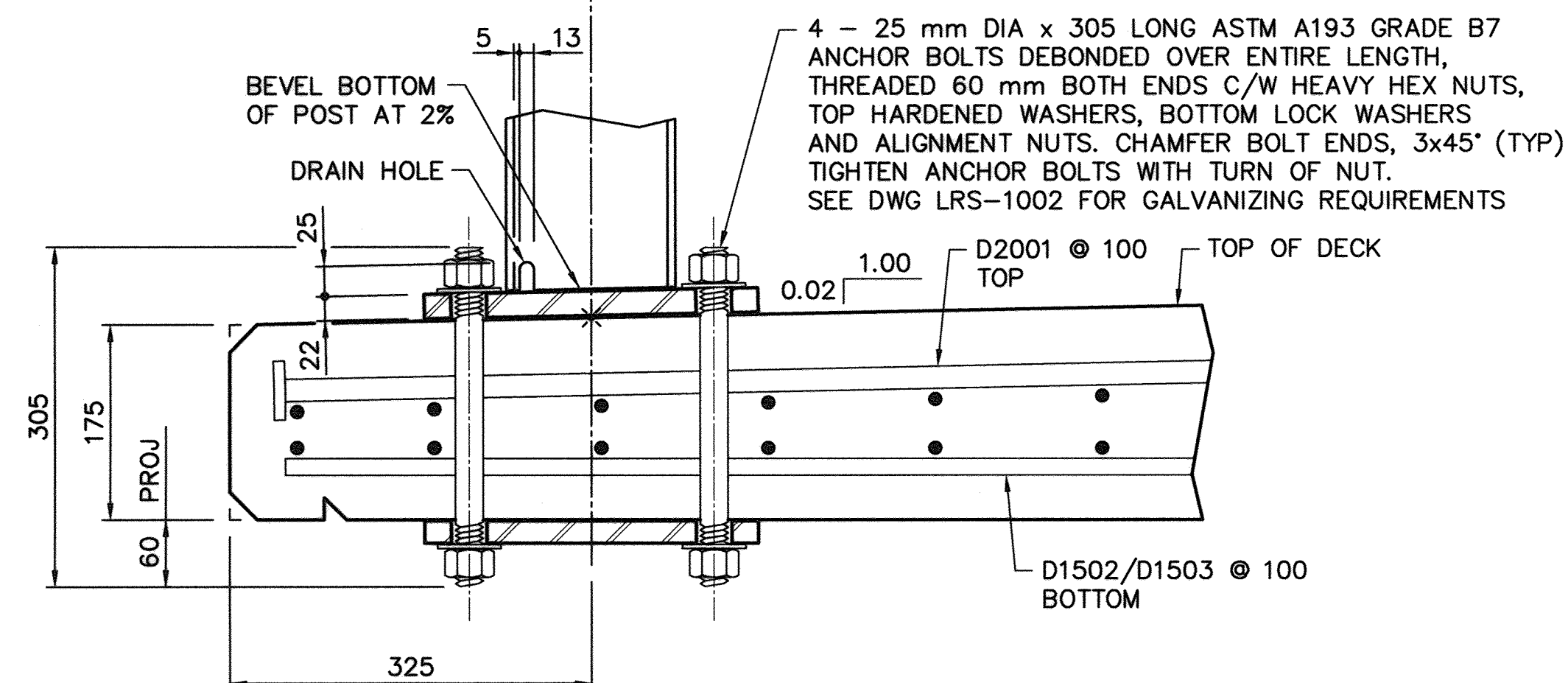
DETAIL FOR PANELS A1/A2  
1:10

PERMIT TO PRACTICE AECOM Canada Ltd. Signature: <i>Bob Ramsey</i> Date: <i>Feb. 9, 2015</i> PERMIT NUMBER: P10450 The Association of Professional Engineers, Geologists and Geophysicists of Alberta.	DESIGNER RICHARD LEE PROFESSIONAL ENGINEER ALBERTA DATE: <i>Feb. 9, 2015</i>	CHECKER ROBERT JOHN RYAN PROFESSIONAL ENGINEER ALBERTA DATE: <i>Feb. 9, 2015</i>	RECOMMENDED DIRECTOR BRIDGE ENGINEERING <i>Williamson</i>	APPROVED EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Michael</i>	AT BARCODE	DATE 2015-01-19	SHEET 12 OF 14	DRAWING LRS-1012
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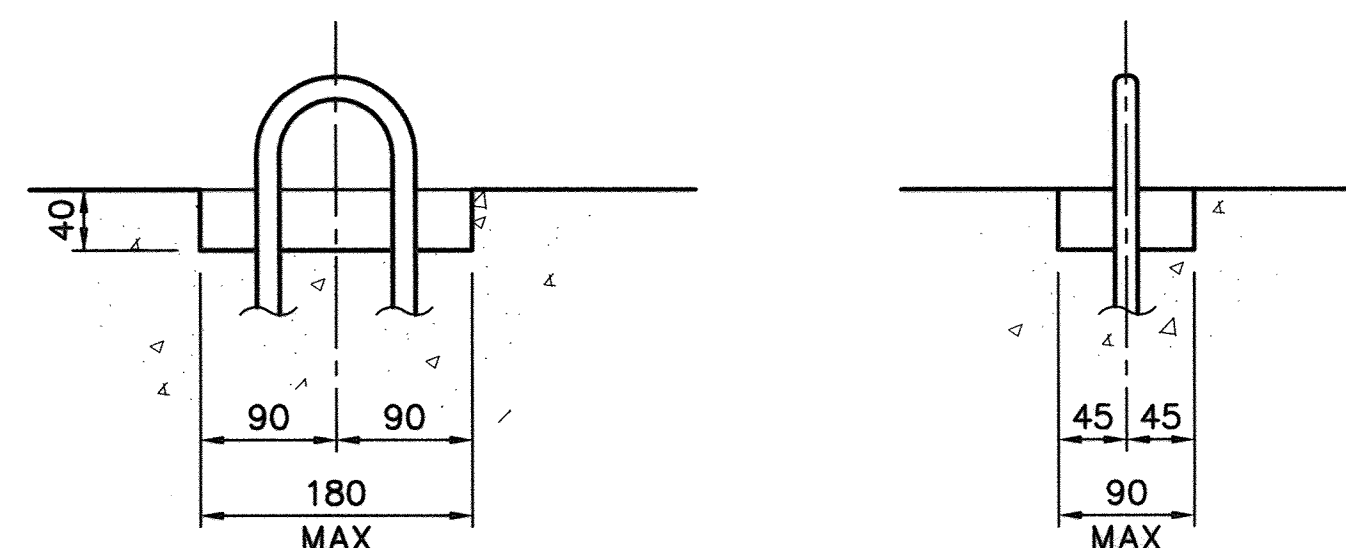
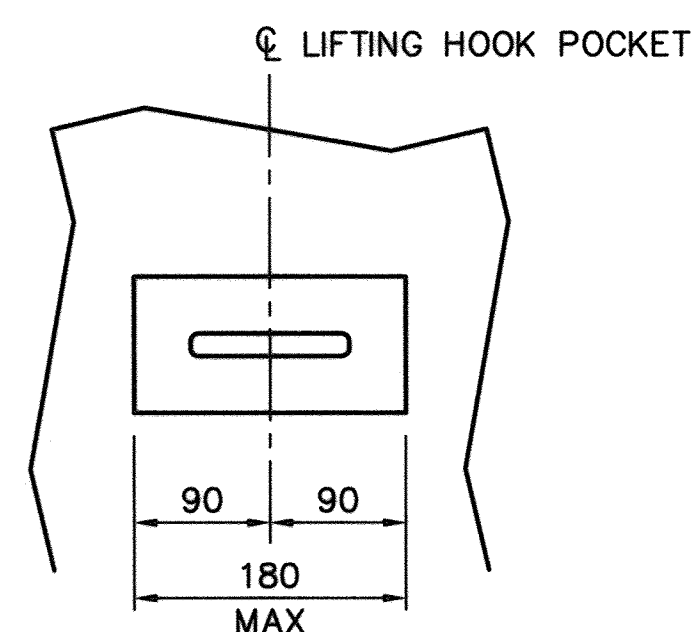




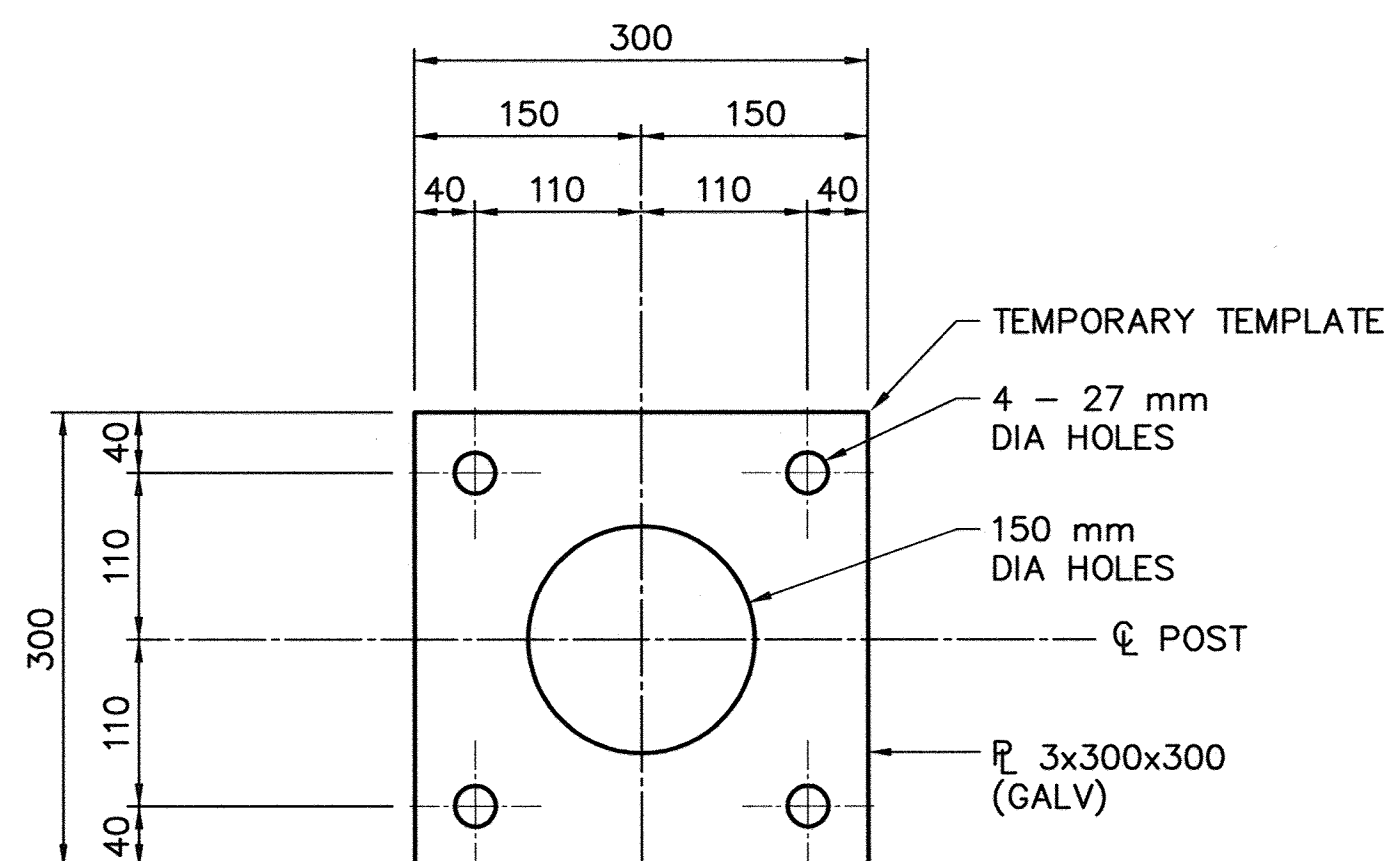
$\phi$  POST AND  
ANCHOR BOLT ASSEMBLY



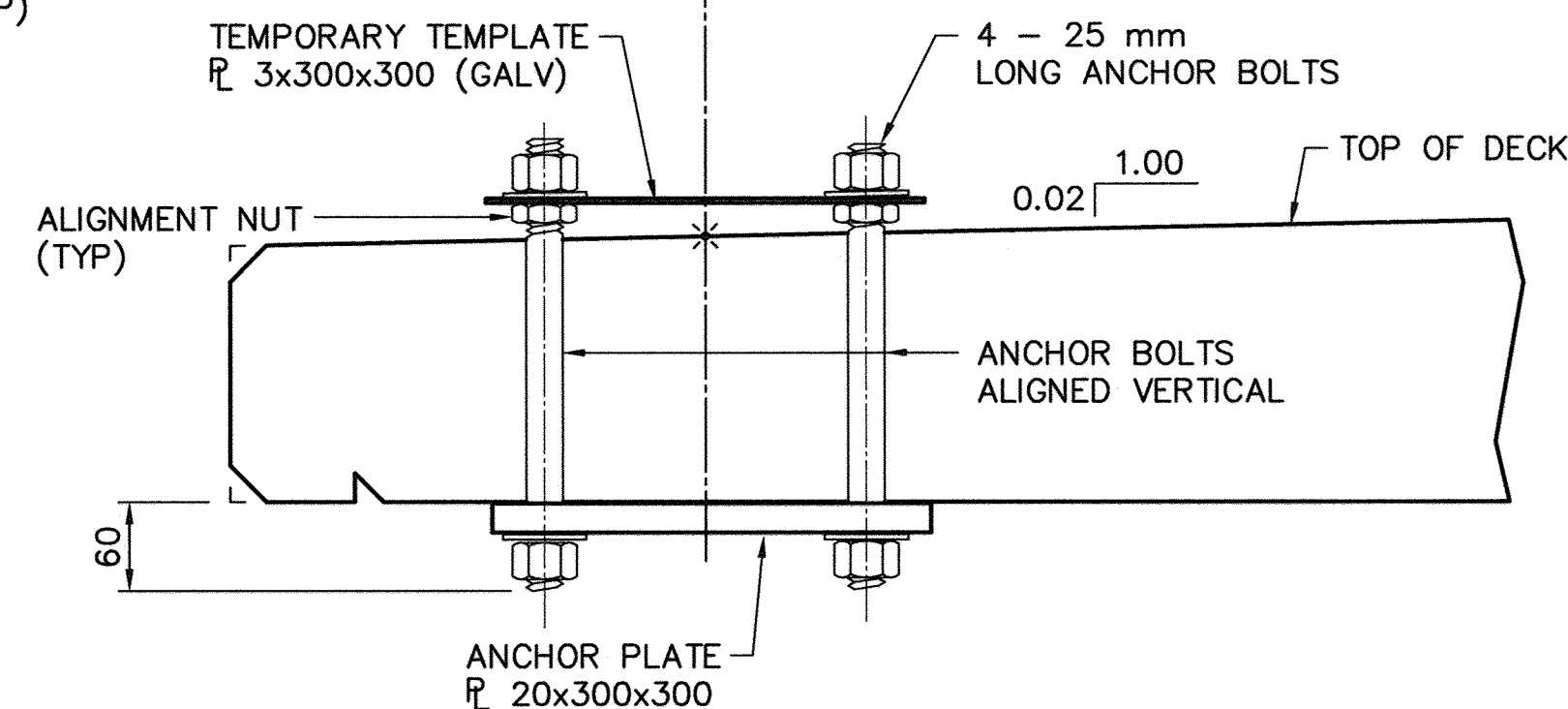
**P12** ANCHOR BOLT ASSEMBLY DETAIL  
1:5



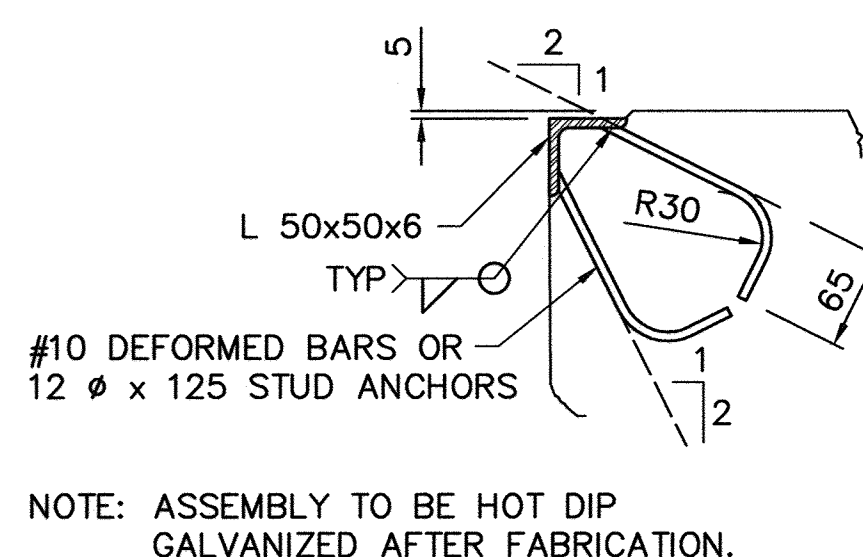
TYPICAL LIFTING HOOK POCKET DETAIL  
1:5



$\phi$  POST AND  
ANCHOR ROD ASSEMBLY

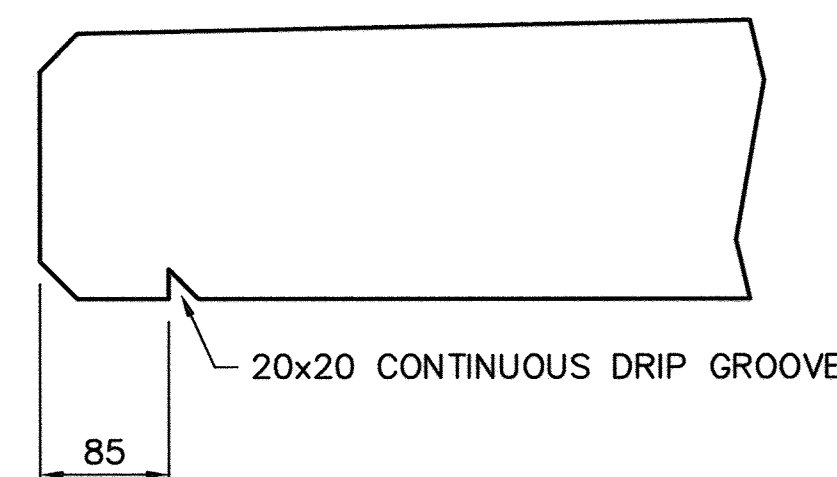


ANCHOR PLATE AND  
TEMPORARY TEMPLATE DETAIL  
NOTE: TEMPORARY TEMPLATE AND ALIGNMENT NUTS  
TO BE REMOVED AFTER CONCRETE HAS SET. 1:5

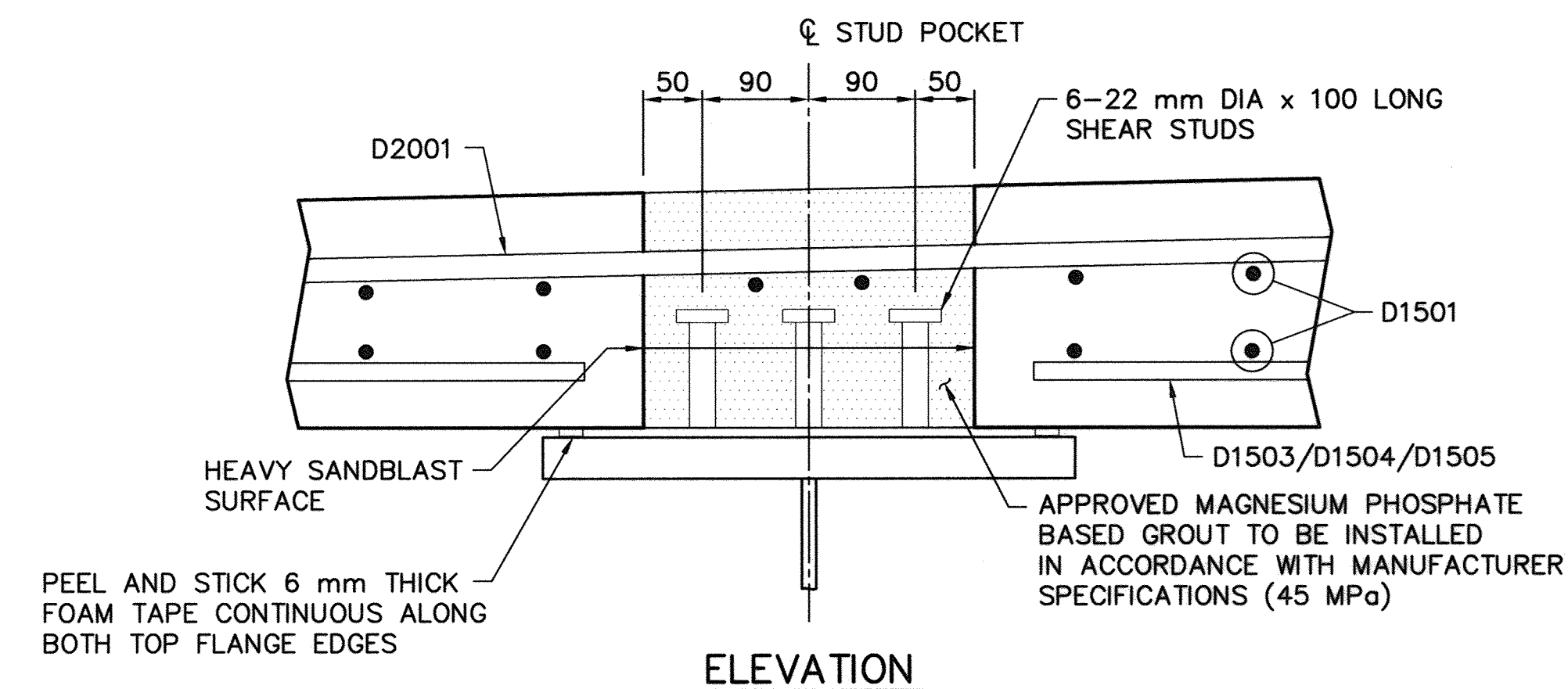
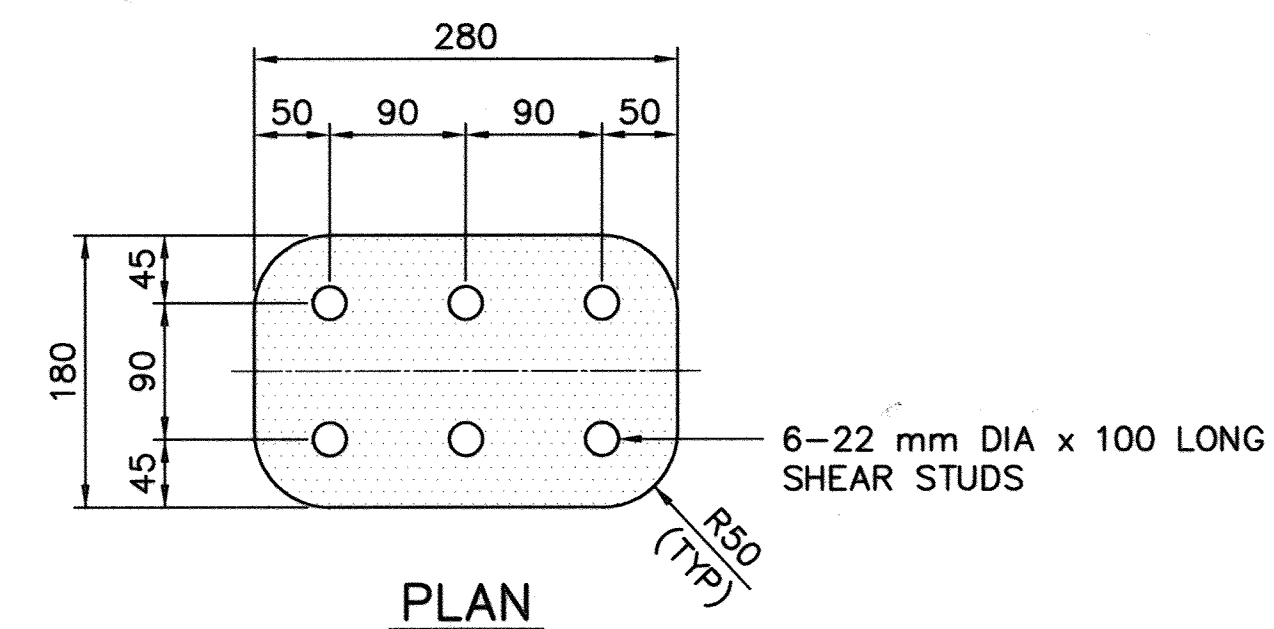


NOTE: ASSEMBLY TO BE HOT DIP  
GALVANIZED AFTER FABRICATION.

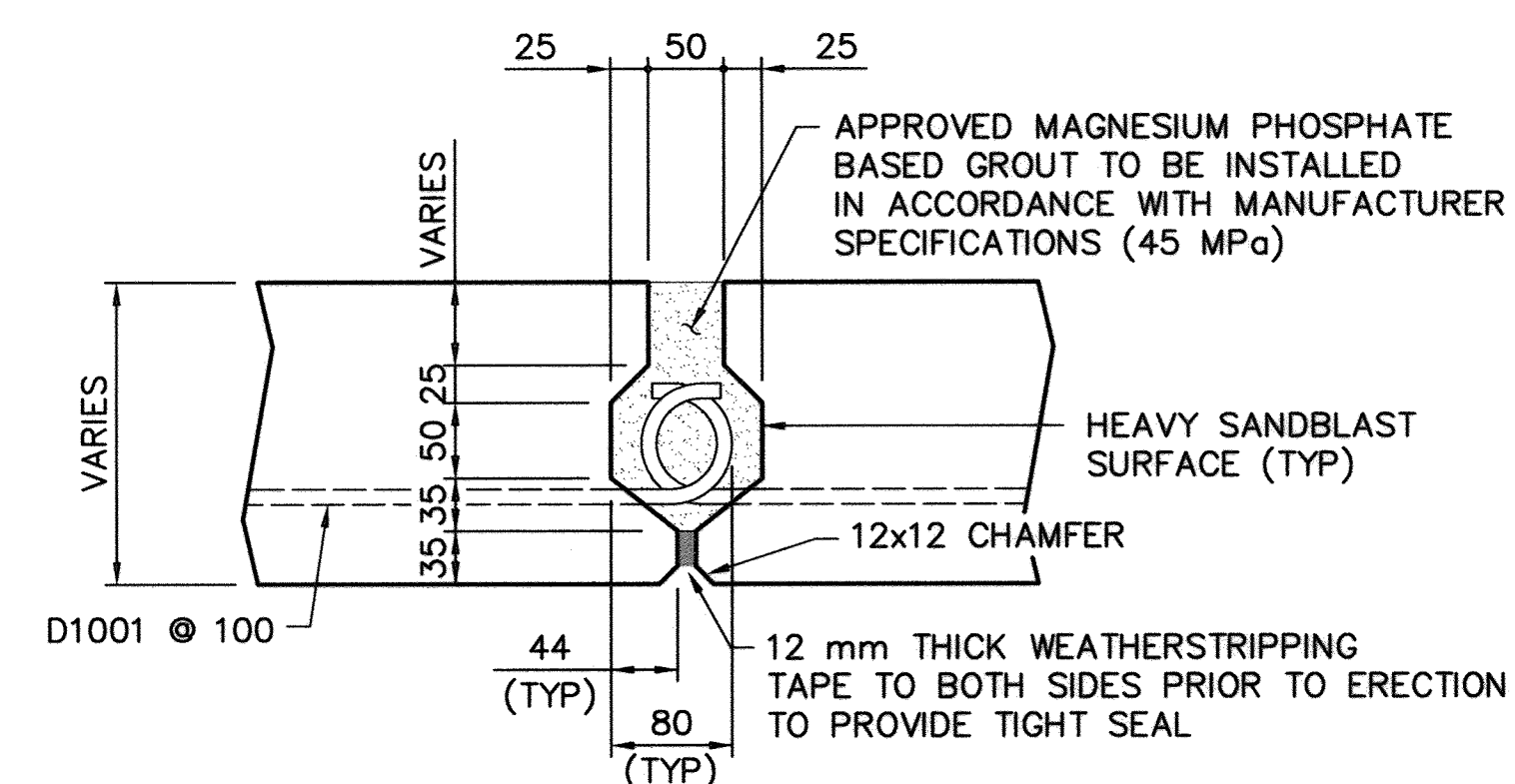
**R11** BUFFER ANGLE DETAIL  
1:5



TYPICAL DRIP GROOVE DETAIL  
1:5



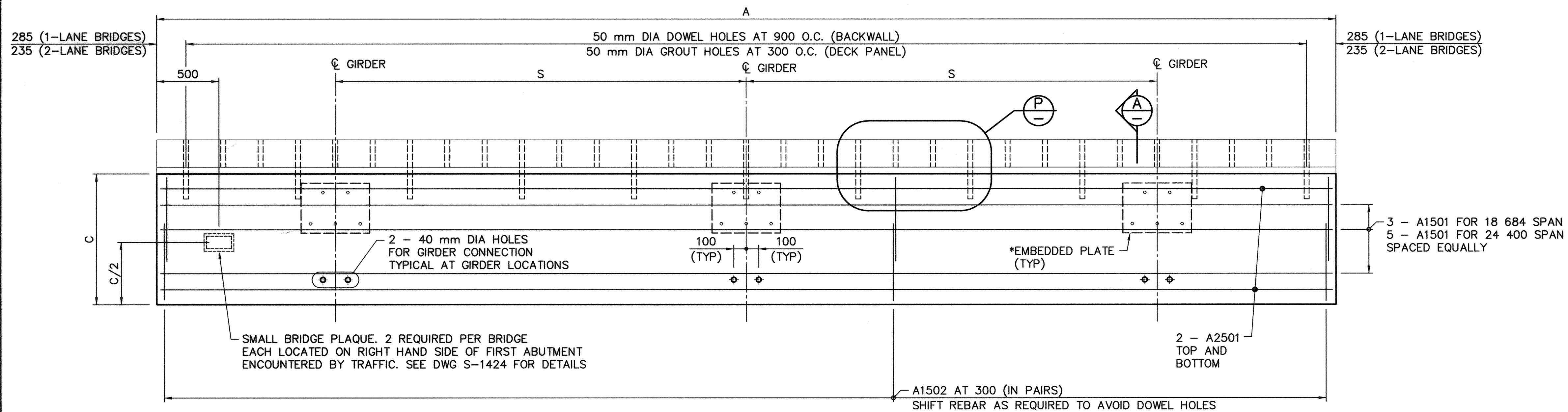
**Q11** STUD POCKET DETAIL  
1:5



TRANSVERSE  
DECK PANEL JOINT SECTION  
**D11** 1:5

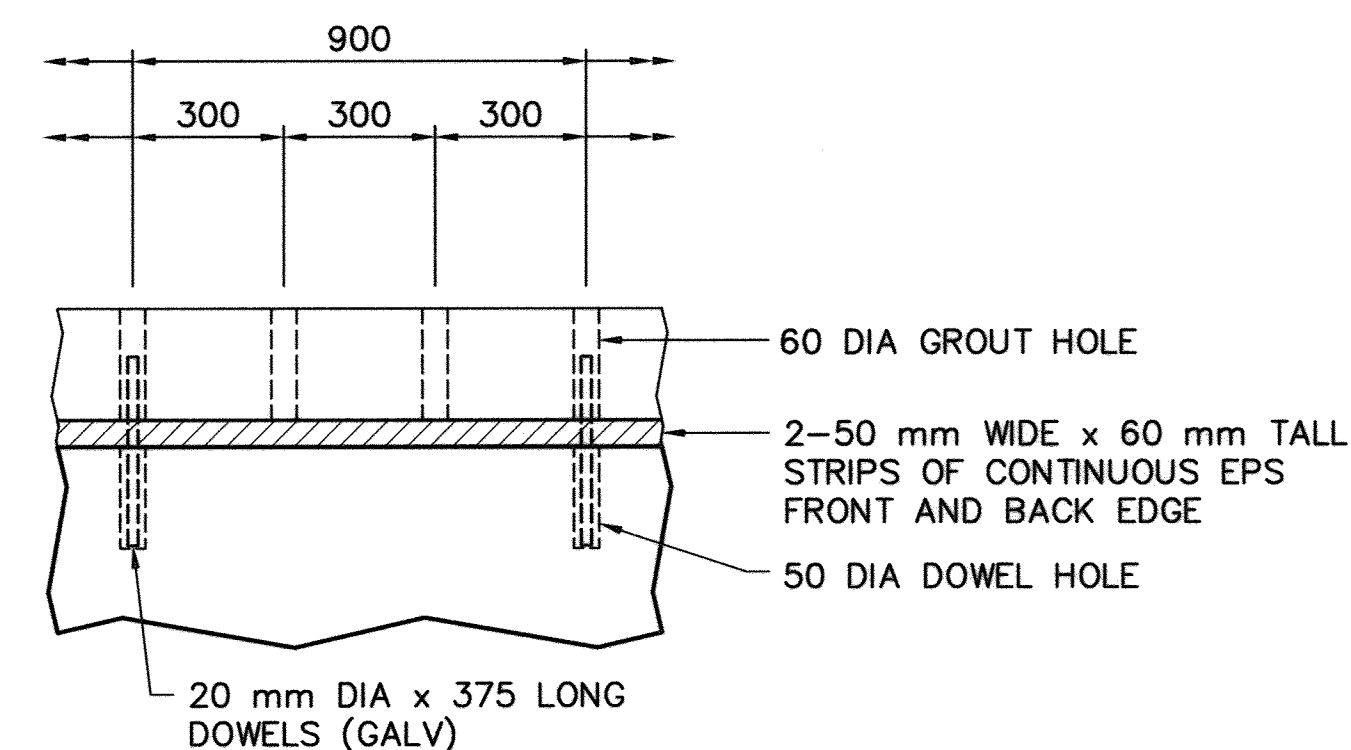
<p>PERMIT TO PRACTICE AECOM Canada Ltd.</p> <p>Signature: <i>Bob Ramsey</i> Date: <i>Feb. 9, 2015</i></p> <p>PERMIT NUMBER: P10450 The Association of Professional Engineers, Geologists and Geophysicists of Alberta.</p>	<p>DESIGNER</p> <p><i>RICHARD LEE</i></p> <p>PROFESSIONAL ENGINEER ALBERTA</p> <p>DATE: <i>FEB. 9, 2015</i></p>	<p>CHECKER</p> <p><i>ROBERT JOHN R...</i></p> <p>PROFESSIONAL ENGINEER ALBERTA</p> <p>DATE: <i>Feb. 9, 2015</i></p>	<p>REV</p> <p>DATE</p> <p>REVISION</p>	<p>BY</p> <p>DATE</p> <p>REVISION</p>	<p>RECOMMENDED DIRECTOR BRIDGE ENGINEERING</p> <p><i>D. Williamson</i></p> <p>APPROVED EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH</p> <p><i>Mark J...</i></p> <p>DATE: <i>FEB. 18/15</i></p>	<p>Alberta Transportation</p> <p>LOW VOLUME STANDARD BRIDGE PRECAST CONCRETE PANELS ON STEEL GIRDERS DECK - SHEET 3</p> <p>AT BARCODE</p> <p>DATE: 2015-01-19</p> <p>SHEET: 13 OF 14</p> <p>DRAWING: LRS-1013</p>
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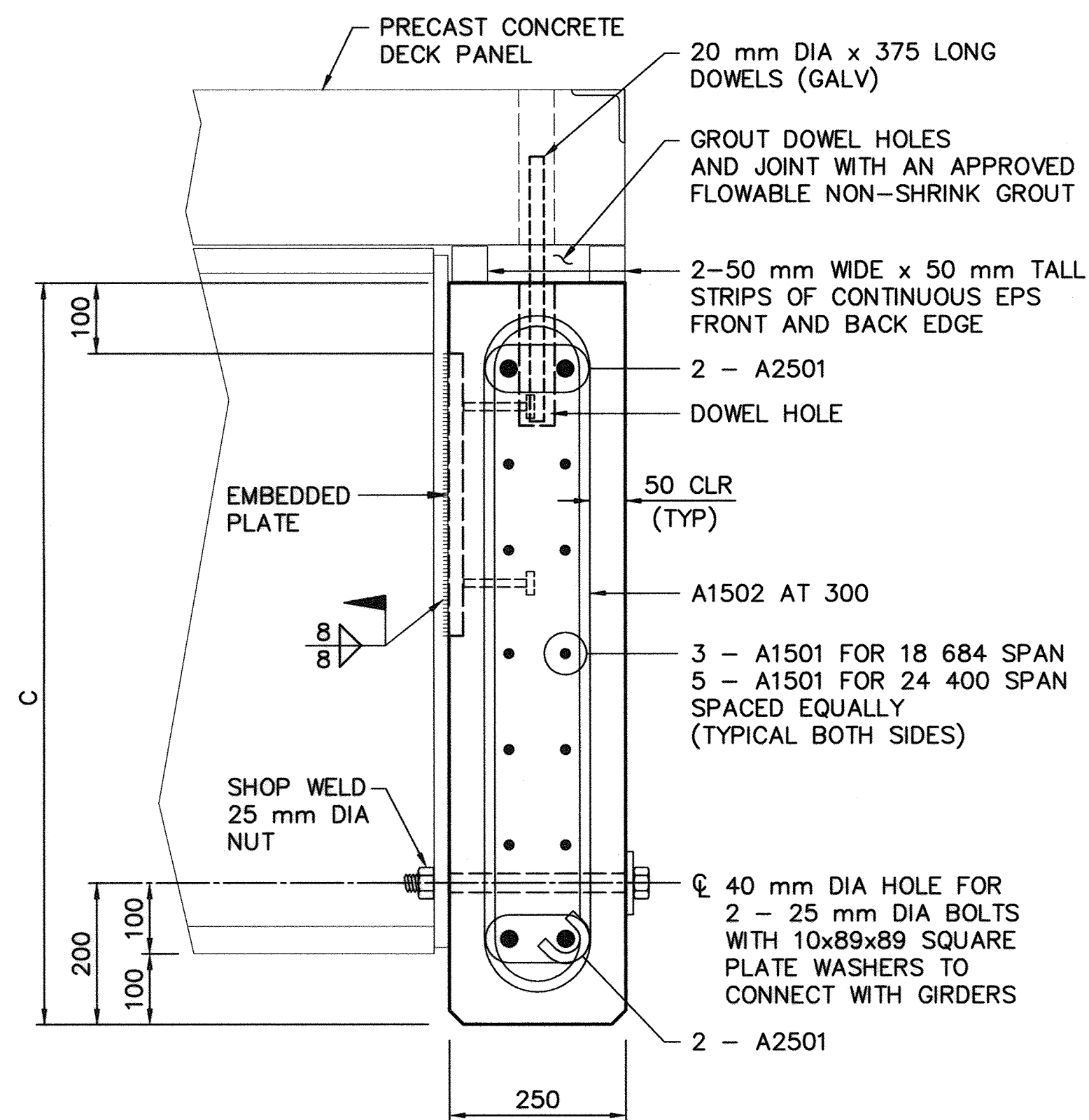
**BACKWALL ELEVATION**

2-LANE CONFIGURATION SHOWN 1:20  
1-LANE CONFIGURATION SIMILAR

\*NOTE: 2 EMBEDDED PLATES REQUIRED FOR 1-LANE BRIDGE  
3 EMBEDDED PLATES REQUIRED FOR 2-LANE BRIDGE



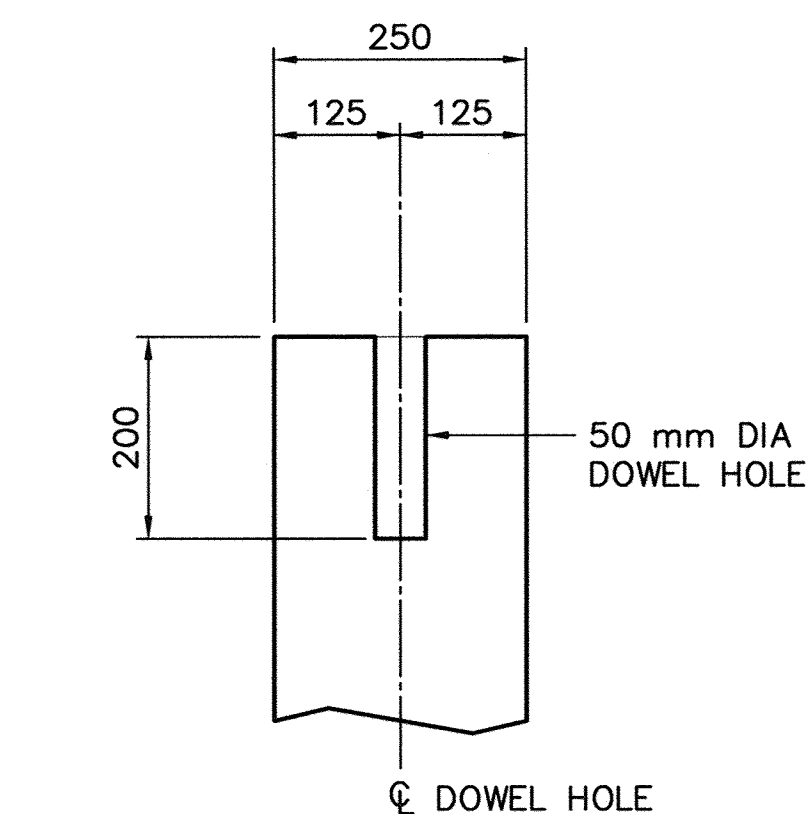
**DETAIL**  
1:15



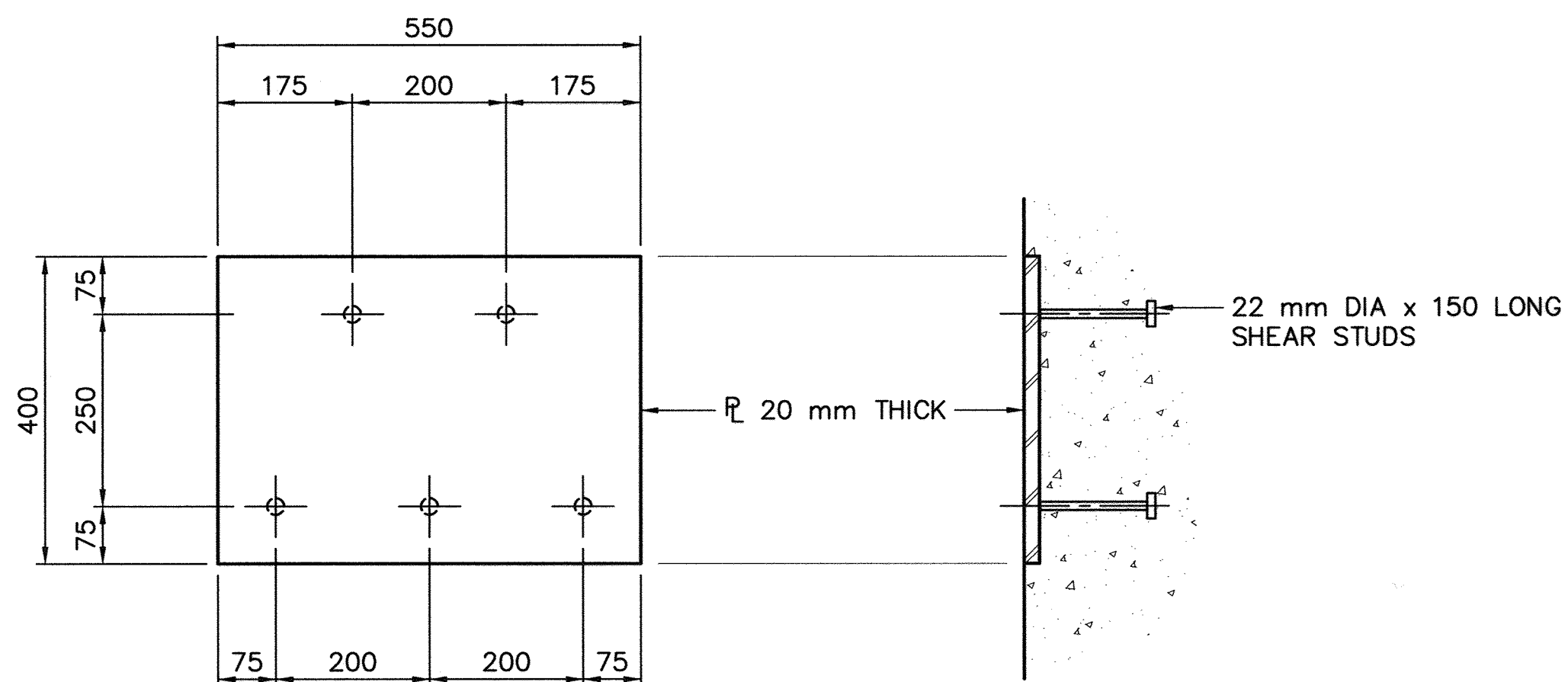
**SECTION**  
1:7.5

**NOTE**

- FOR LETTERED DIMENSIONS, SEE DWG LRS-1007

**DOWEL HOLE DETAIL**

1:7.5



ELEVATION

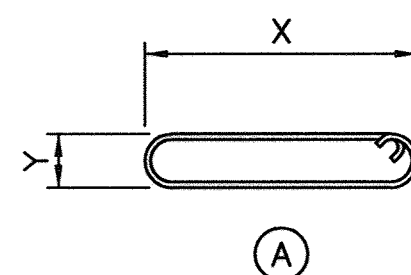
SECTION

**EMBEDDED PLATE DETAIL**

1:7.5

**BAR LIST (PER PRECAST CONCRETE BACKWALL PANEL)**

SPAN			18 684 (1-LANE)				18 684 (2-LANE)				24 400 (1-LANE)				24 400 (2-LANE)			
MARK	SIZE	TYPE	X	Y	QTY	LENGTH	X	Y	QTY	LENGTH	X	Y	QTY	LENGTH	X	Y	QTY	LENGTH
A1501	15M	STR	5870	—	6	5870	9370	—	6	9370	5870	—	10	5870	9370	—	10	9370
A1502	15M	A	650	150	20	1880	650	150	32	1880	950	150	20	2368	950	150	32	2480
A2501	25M	STR	5870	—	4	5870	9370	—	4	9370	5870	—	4	5870	9370	—	4	9370



<b>PERMIT TO PRACTICE</b> AECOM Canada Ltd. Signature: <i>Richard Lee</i> Date: <i>Feb 9, 2015</i> PERMIT NUMBER: P10450 The Association of Professional Engineers, Geologists and Geophysicists of Alberta.	<b>DESIGNER</b> RICHARD LEE PROFESSIONAL ENGINEER ALBERTA DATE: <i>Feb 9, 2015</i>	<b>CHECKER</b> PROFESSIONAL ENGINEER ALBERTA DATE: <i>Feb 9, 2015</i>	REV	DATE	REVISION	BY	DATE	<b>RECOMMENDED</b> DIRECTOR BRIDGE ENGINEERING <i>D. Williamson</i>	<b>APPROVED</b> EXECUTIVE DIRECTOR TECHNICAL STANDARDS BRANCH <i>Mohd Jali</i> DATE: <i>FEB 18/15</i>	<b>Alberta Transportation</b> <b>LOW VOLUME STANDARD BRIDGE</b> <b>PRECAST CONCRETE PANELS</b> <b>ON STEEL GIRDERS</b> <b>PRECAST CONCRETE BACKWALL</b>	AT BARCODE	DATE 2015-01-19	SHEET 14 OF 14	DRAWING <b>LRS-1014</b>
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