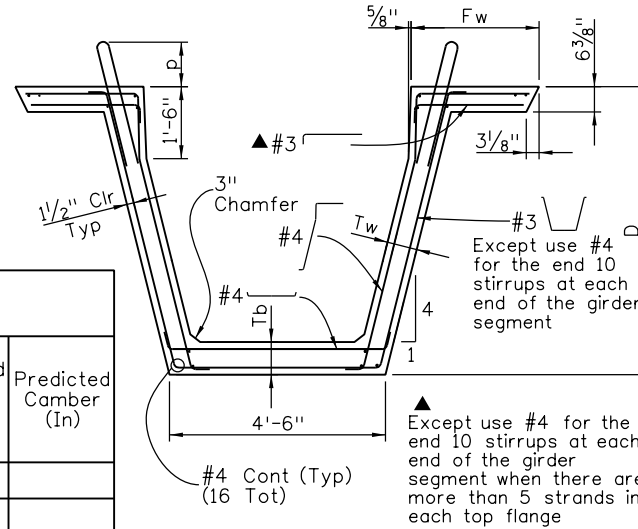
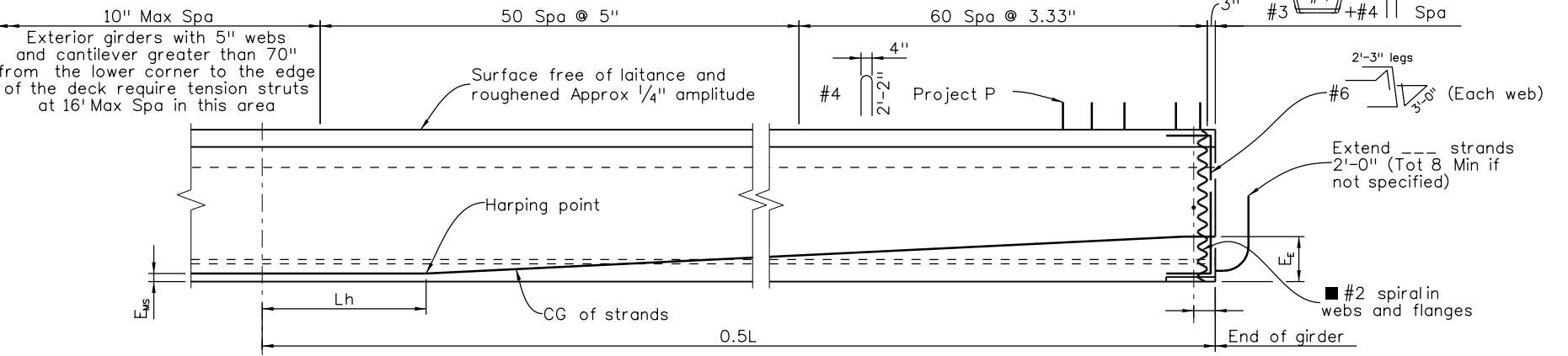
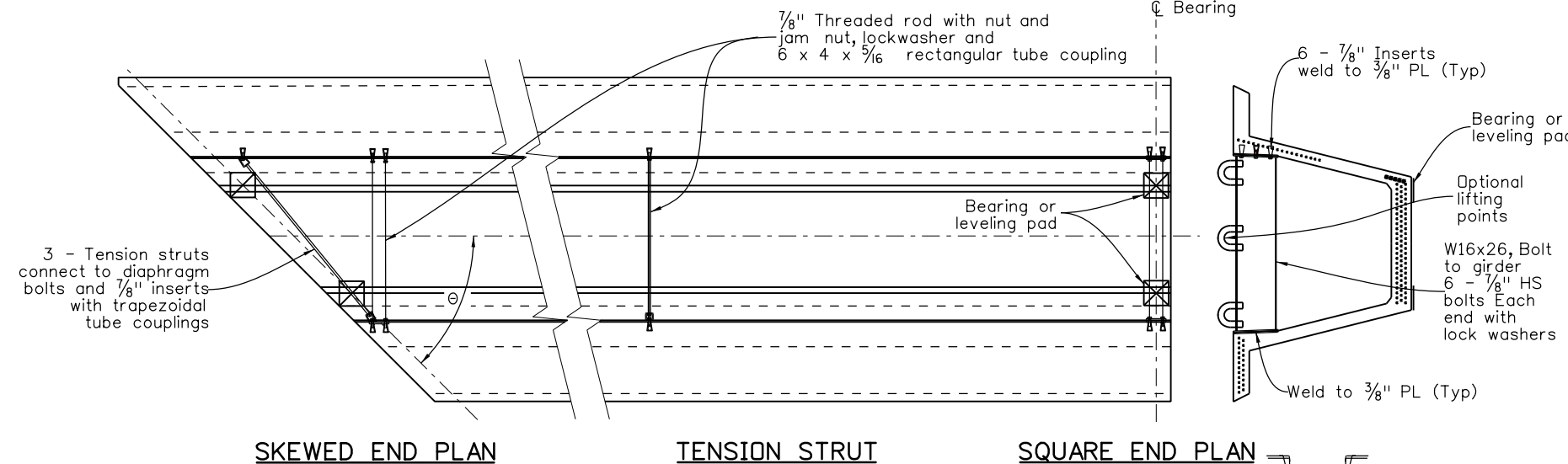


NOTES:

- All work necessary to fabricate and install the integral parts of the girder (including the internal diaphragms, if any, and leveling pads), as shown on the plans, shall be included in the bid price for Item 618, Prestressed Concrete U with a pay unit of LF measured by the dimension L.
- When approved by the Engineer, a minimum of tack welding will be permitted on ASTM A706 uncoated reinforcing steel.
- Reinforcing projecting from the top of the girder and reinforcing within eight feet of an expansion device in the bridge deck shall be epoxy coated. Damaged coating on girder reinforcing need not be repaired. The minimum cover for reinforcing steels is 1".
- At girder ends not embedded in concrete diaphragms, cut strands off 1" below the surface of the concrete and finish with an approved epoxy grout. At girder ends embedded in concrete diaphragms, cut strands to project 3", except as shown. Do not make cosmetic repairs (damage less than 1/2" deep) to the parts of the girders embedded in concrete.
- Use low relaxation strands meeting the requirements of ASTM A416 Grade 270. The minimum clear distance between groups or individual strands shall be 2.3(ds) but not less than 1/4". The minimum cover for prestressing steels is 1/2".
- A minimum of two harping points shall be used per girder. Harped strands shall be well distributed at the girder ends, starting within 4" of the top of the girder and distributed such that there is no space between strands greater than 1'-0" at the end of the girder. As an alternate the Contractor may place #4 x 10'-0" in the sides of the end of the web parallel to the harped strands such that there is no space greater than 1'-0".
- Concrete shall be Class PS. Entrained air is not required for girder concrete.
- End diaphragms shall be installed prior to transfer on all girders unless otherwise noted. All permanent diaphragms not embedded in concrete shall be galvanized.
- Use minimum bend radius for formwork sheeting at all corners except as noted.
- Predicted camber is the camber for the girder alone at 90 days. The Contractor shall limit the camber to a value not to deviate from the predicted camber by more than $(0.0005 \times L + 0.5")$ at the time of the deck pour by weighting, scheduling fabrication, post tensioning, changing storage support points, or other means and must report to the Engineer values of camber which exceed the predicted camber plus this tolerance. Remedial measures, as approved by the Engineer, shall be taken if the predicted camber plus the allowed tolerance is exceeded. The approved remedial measures shall be free of any adverse impact. The costs associated with all remedial measures shall be borne by the Contractor.
- Dimensional tolerances for precast U-girders shall be those tolerances specified in MNL-135 as shown for I-girders with the following exceptions: Flange widths and widths between flanges $\pm 1/16"$ /Ft width, $\pm 1/4"$ minimum. Variation from specified plan end squareness or skew, $\pm 1/8"$ /Ft width of each flange or overall width.
- When a girder is shown with both a harped design and a debonded design for a girder, the choice of designs is the contractor's option. If only a harped or a debonded design or a combination design is shown, that design shall be used with no contractor option or redesign. When used, debonding shall extend in uniformly varying lengths to 3 Ft before the harping point shown, but not closer than 17 Ft to the center of the span.

As* = Minimum area of the prestressing steel
 ds = Nominal strand diameter, 0.6" UNO
 fs' = Ultimate strength of the prestressing steel
 Fj = Jacking force per girder
 Ff = Final force per girder after all losses
 f'ci = Required concrete strength at release of prestress force
 f'c = Required concrete strength at 28 days of age
 L = Length of girder along the grade of the girder
 Δ = deflection at centerline of span due to cast-in-place slab, diaphragms, asphalt, curbs, rails, and walks
 P = Projection. 6" in the middle 1/2 of the member varying to the specified haunch at the bearing plus 4"
 θ = Bridge bent angle

Designer & Detailer: Provide appropriate design data.
 If practical, provide equivalent alternate designs, one harped and one debonded. The designs should be such that the predicted cambers of the two designs are within 0.5" of each other. Do not increase the number of girders or exceed the policy for concrete strengths to accommodate alternate designs. The girder dimensions should preferably be chosen from the standard depths (48", 60", 72", 84", & 96"), web thicknesses (5", 7.5", & 10"), and bottom flange thicknesses (6.35" & 8.1").
 Adjust the .0005 part of the tolerance for camber for shallow length to depth ratios. For segment length to depth ratios greater than 25, the .0005 should be replaced on the worksheet by the designer by the formula: $F'c \cdot (S / (2500 \cdot D))^2$ where F'c is the initial or final strength in KSI whichever is higher, required by the girder stresses, but not less than 5 KSI, and the design should accommodate that magnitude variation.



D20 wires may be used in lieu of #4.
 2 - D20 wires may be used in lieu of #6.
 D11 or W10.9 wires may be used in lieu of #3.
 W5 wires may be used in lieu of #2.
 Lightly tensioned strand is an alternate for #4 Cont.

■ The Contractor may submit an alternate cross tie arrangement, at the end of the web, for approval by the Engineer.

GIRDER SCHEDULE

Span No	Girder Letter	L (Ft)	Fw (In)	D (In)	θ (Deg)	Tw (In)	Tb (In)	Lh (Ft)	As* In ²	Debond Strands (percent)	E _E (In)	E _{MS} (In)	F _j (Kip)	F _f (Kip)	Concrete Strength		Δ (In)	Predicted Release Camber (In)	Predicted Camber (In)	
															f'ci (psi)	f'c (psi)				
						5	8.1	14												

Revision Dates	4/02	9/02	2/06	3/07	10/13	3/23
(Preliminary Stage Only)						

INITIALS	DESIGN	DATE	DETAIL	DATE	QUANTITY	DATE
By						
Checked By						

All seals for this set of drawings are applied to the cover page(s)	Print Date: \$DATE\$	Sheet Revisions			Colorado Department of Transportation				As Constructed		Project No./Code			
	File Name: Sheet_B-618-U.dgn	Date:	Comments	Init.	2829 West Howard Place, 3rd Floor Denver, CO 80204 Phone: 303-512-4079 FAX: 303-757-9197				No Revisions:		PRESTRESSED CONCRETE U			
Horiz. Scale: Not to Scale Vert. Scale: As Noted	Unit Information	Unit Leader Initials							Revised:		Designer: XXXXXXXX	Structure Numbers	X-XX-XX	Project Number
					Void:		Detailer: XXXXXXXX	Subset Sheets: BXX of XXX	X-XX-XX	Code				
							Sheet Subset: BRIDGE			Sheet Number				