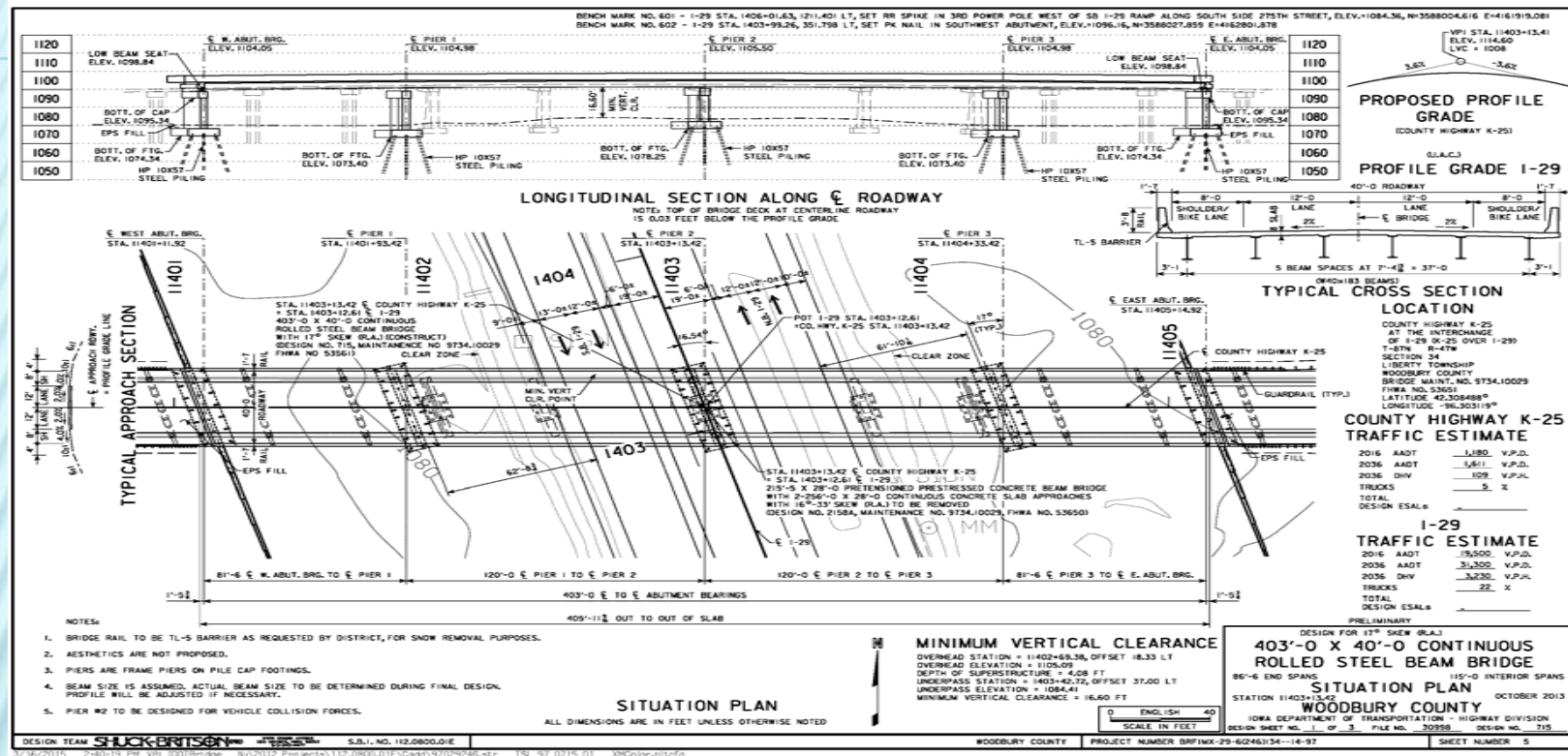


I-29 SALIX INTERCHANGE

Woodbury County Design # 715

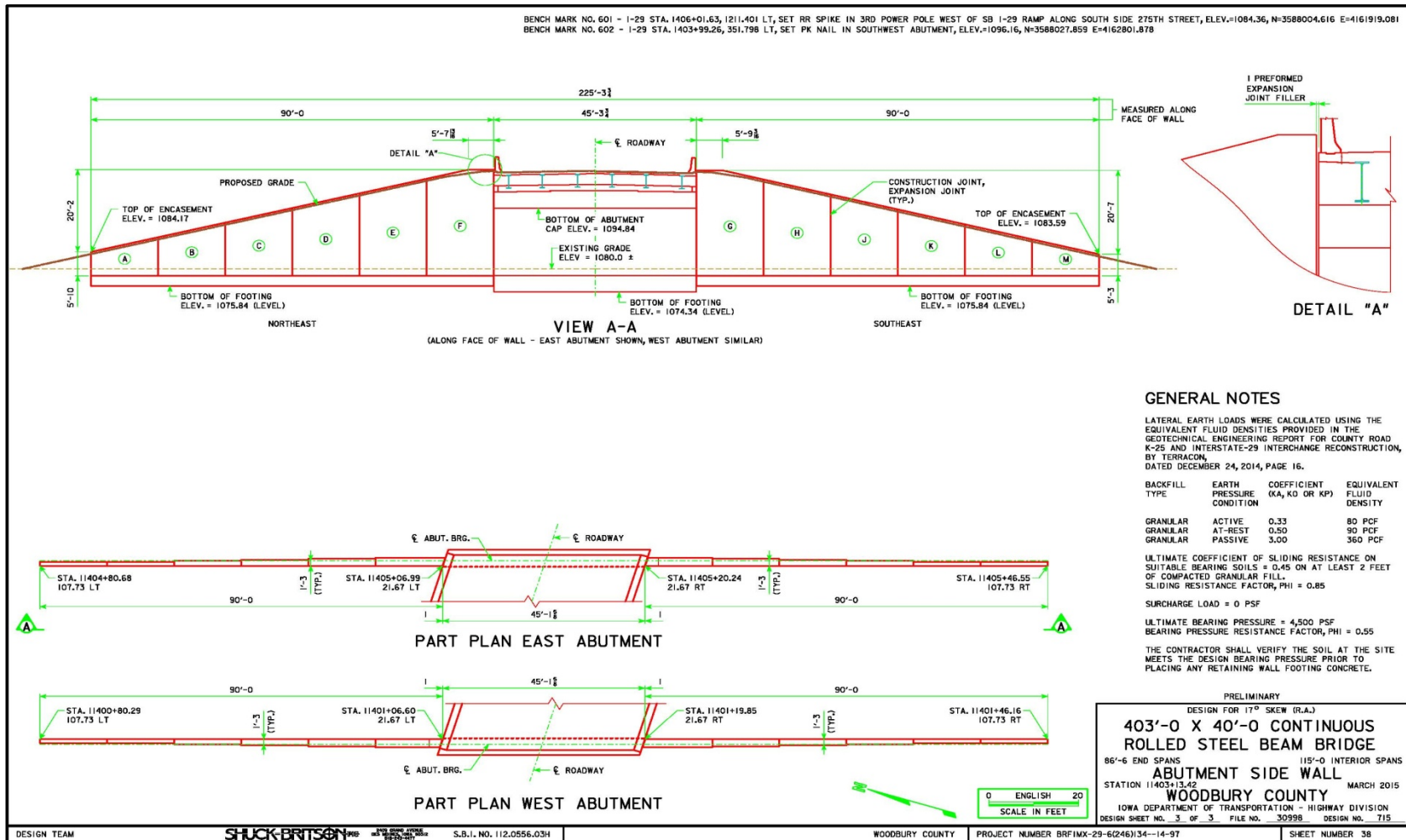
BRFIMX-29-6(246)134- -14-97

PROJECT BACKGROUND

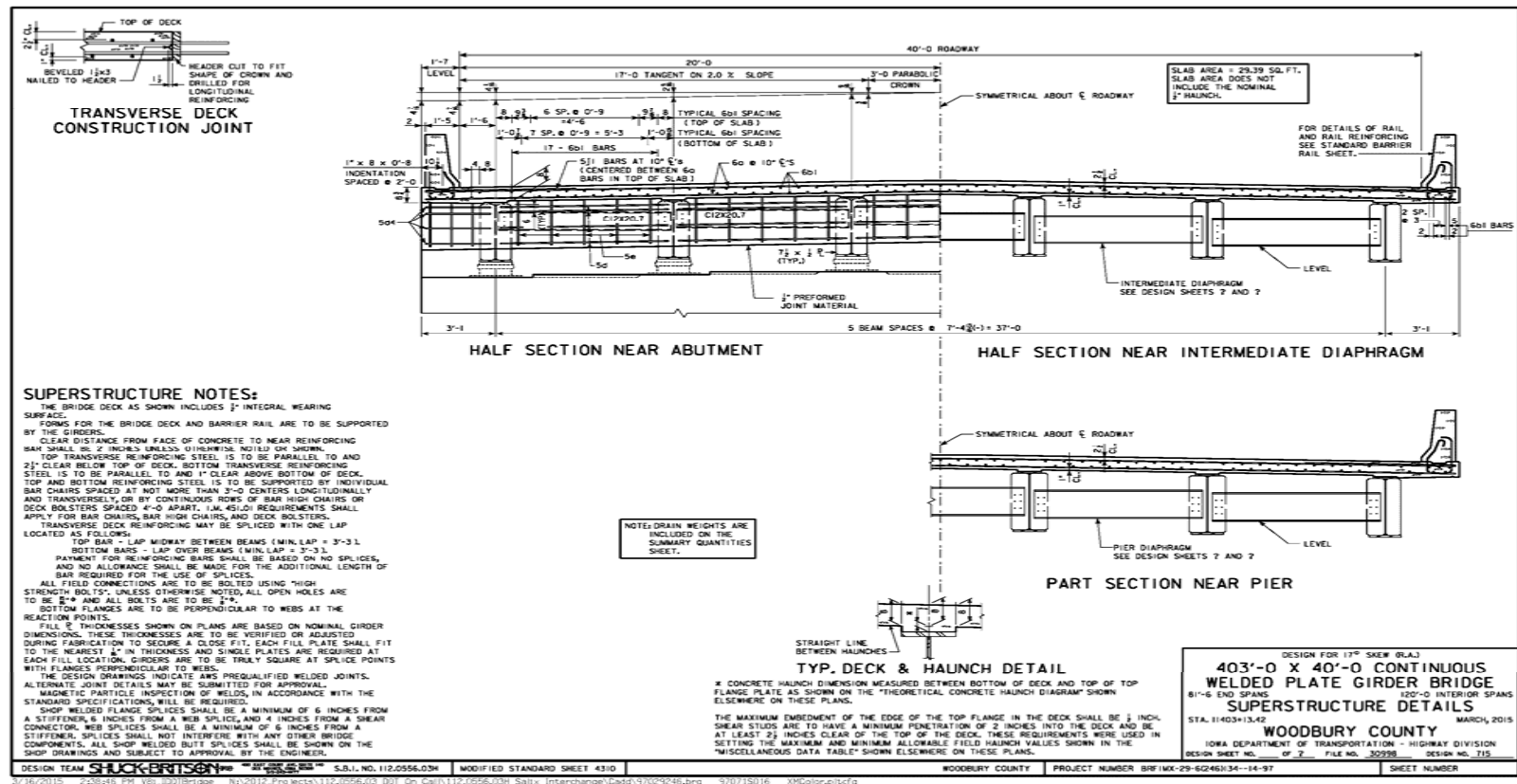


- Poor soils
- Structure length/ approach embankment length
- Steel superstructure to control weight
- Initially rolled beams, changed to CWPG per DOT request

PROJECT BACKGROUND

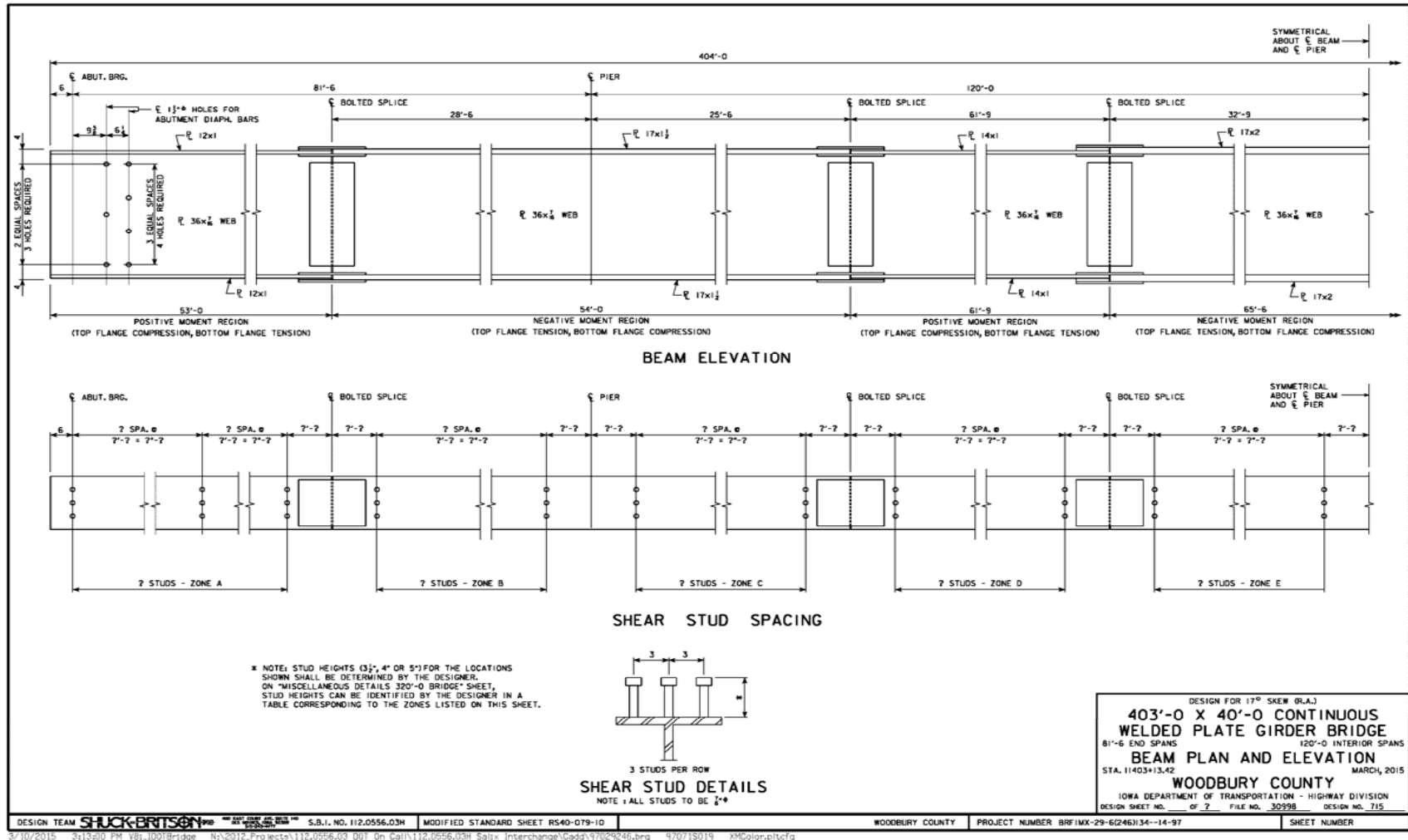


INITIAL GIRDER DESIGN / ANALYSIS

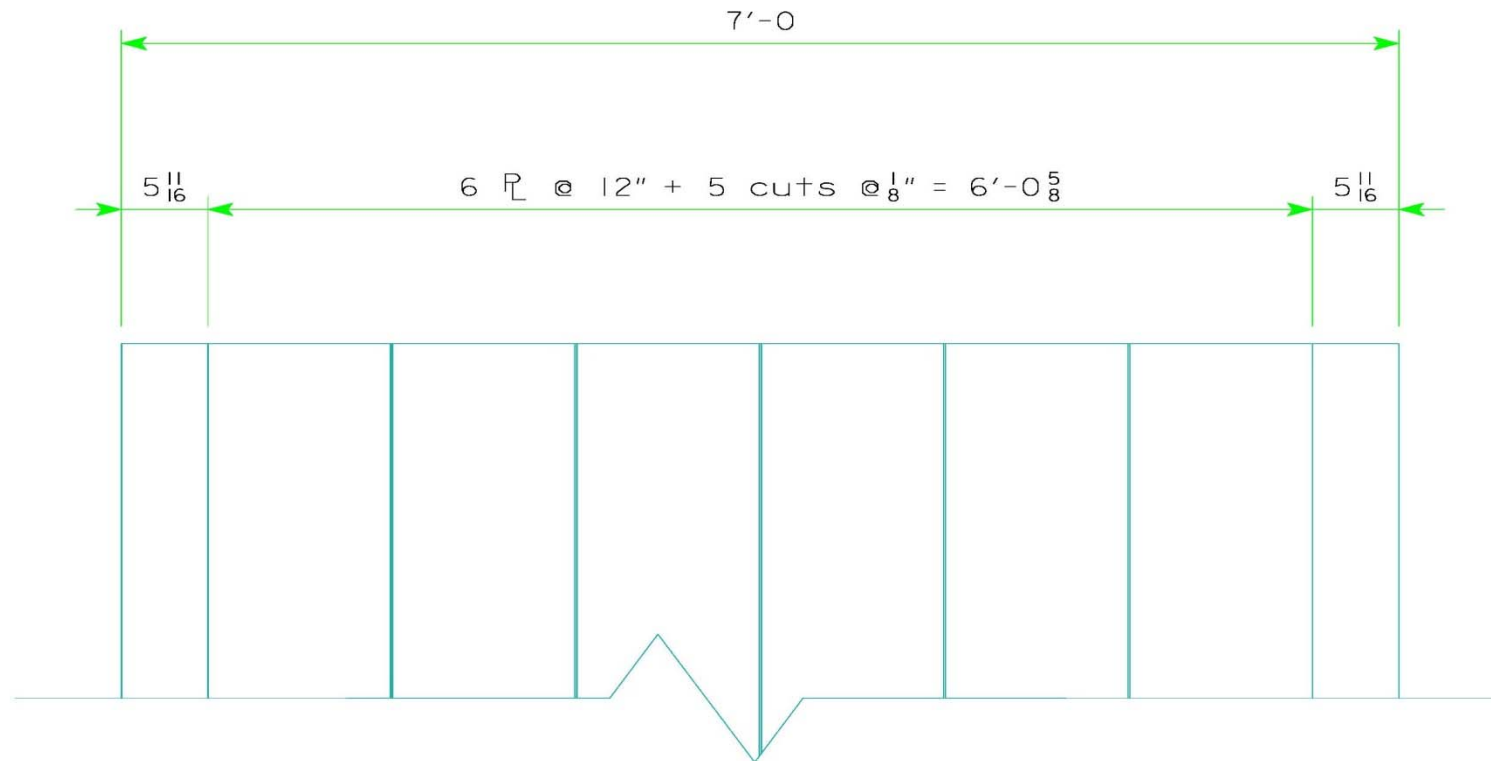


- Maintain same girder depth
- Assume unstiffened web
- Minimize required plate thicknesses
- Analysis based on strength / fatigue values for A709 Grade 50
- Maximize yield from standard plate widths / lengths

INITIAL GIRDER DESIGN / ANALYSIS

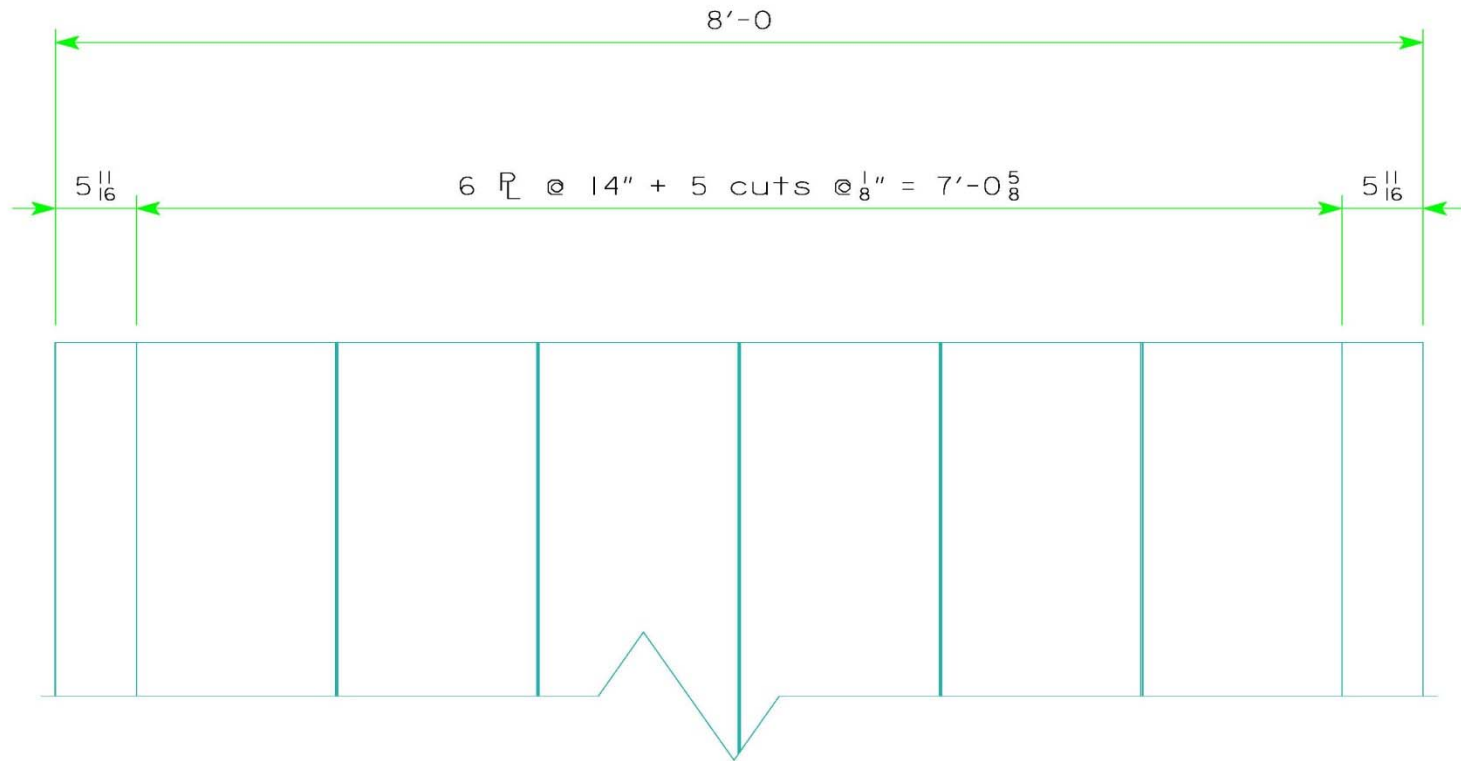


INITIAL GIRDER DESIGN / ANALYSIS



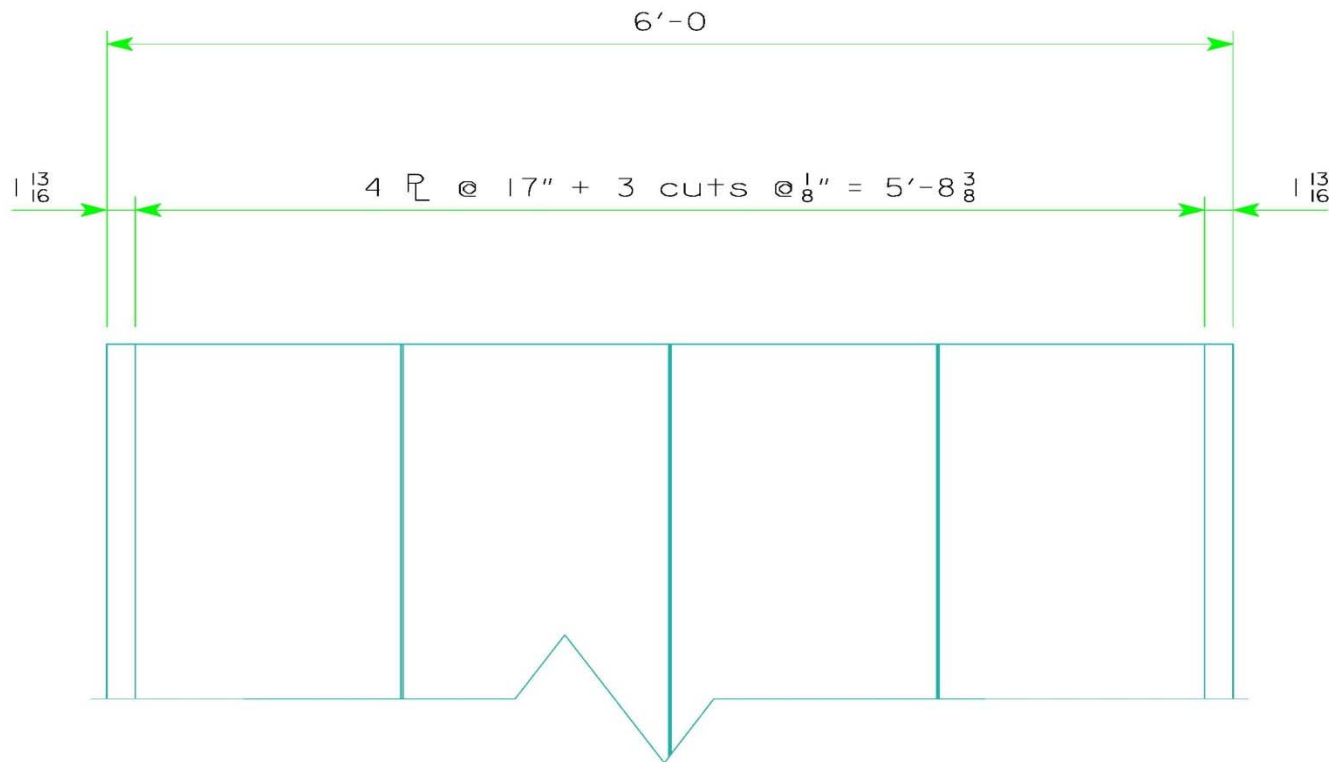
1" x 84" R WITH 12" R WIDTH
(NEED 12 - R 12" X 1" X 53'-0 (SPAN 1))
(NEED 12 - R 12" X 1" X 53'-0 (SPAN 4))

INITIAL GIRDER DESIGN / ANALYSIS



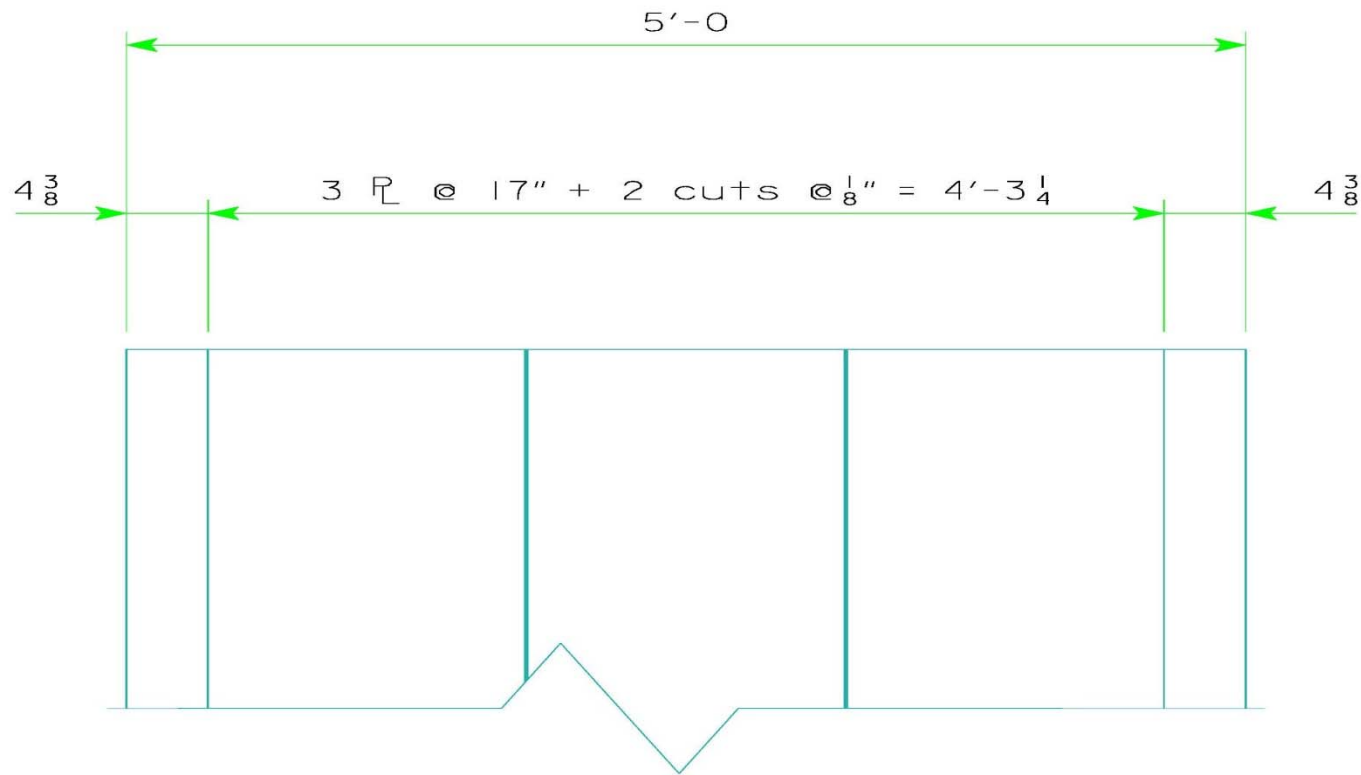
1" x 96" R WITH 14" R WIDTH
(NEED 12 - R 14" X 1" X 61'-9 (SPAN 2))
(NEED 12 - R 14" X 1" X 61'-9 (SPAN 3))

INITIAL GIRDER DESIGN / ANALYSIS



1 1/2" x 72" R WITH 17" R WIDTH
 (NEED 12 - R 17" X 1 1/2" X 54'-0 (PIER 1))
 (NEED 12 - R 17" X 1 1/2" X 54'-0 (PIER 3))

INITIAL GIRDER DESIGN / ANALYSIS



2" x 60" R WITH 17" R WIDTH
(NEED 12 - R 17" X 2" X 65'-6 (PIER 2))

INITIAL GIRDER DESIGN / ANALYSIS

PRELIMINARY GIRDER DESIGN / ANALYSIS

		SPAN 1	PIER 1	SPAN 2	PIER 2
FLANGE PLATE	top	12 X 1	17 X 1 1/2	14 X 1	17 X 2
	bott	12 X 1	17 X 1 1/2	14 X 1	17 X 2
CONSTRUCTIBILITY PERFORMANCE RATIO	top	0.81	NA	0.87	NA
	bott	0.67	NA	0.72	NA
STRENGTH PERFORMANCE RATIO		0.72	0.99	0.89	0.99
SERVICE PERFORMANCE RATIO	top	0.21	0.94	0.29	0.94
	bott	0.75	0.94	0.91	0.94
FATIGUE II RATIO (at diaphragm stiffener)	top	0.04	0.39	0.06	0.30
	bott	0.51	0.39	0.55	0.30

DISCUSSION ITEMS FOR DESIGN COMPLETION

- × Strength design values
 - + Confirm same allowable values as A709 Grade 50

DISCUSSION ITEMS FOR DESIGN COMPLETION

- × Fatigue design values
 - + Confirm same allowable values as A709 Grade 50
 - + Welded connections
 - × Web/flange connection – Category B – 16 ksi
 - × Bolted connections (splices) – Category B – 16 ksi
 - × Diaphragm stiffener locations – Category C' – 12 ksi
 - × Shear studs – Category C – 10 ksi

DISCUSSION ITEMS FOR DESIGN COMPLETION

- × Bolted splice connections
 - + Galvanic corrosion between A325 bolts/A1010 Grade 50 plate
 - + Slip critical connections (slip coefficient values?)
 - × Not currently covered by AASHTO/AISC Specifications

DISCUSSION ITEMS FOR DESIGN COMPLETION

- × Headed studs/welded connection for composite action
 - + Strength value
 - + Fatigue value
 - + Per Nelson Stud Welding, testing should be conducted with A1010 plates:
 - × Mild steel studs
 - × Stainless steel studs

DISCUSSION ITEMS FOR DESIGN COMPLETION

- ✖ Material for diaphragm stiffener connection plates
- ✖ Material for sole plates welded to bottom flanges
- ✖ Diaphragm material and bolts (match standards?)

DISCUSSION ITEMS FOR DESIGN COMPLETION

- × Developmental specifications?
 - + Material handling requirements
 - + Welding procedures/specifications?
 - + Material or weld testing requirements

QUESTIONS?