



KYTC – Kentucky Transportation Cabinet

Date: January 11, 2015



U.S. Department of Transportation
Federal Highway Administration



TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

KY – 6 over Stewarts Creek

Reasons For Using ABC

- **Bridge & Superstructure Replacements**
- **Urban - High Traffic Volumes**
- **Rural Areas – Substandard or Non Existent Detours**

KY's ABC Experience

Harlan County – KY 219 over Wallins Creek



KY's ABC Experience



KY's ABC Experience



KY's ABC Experience



KY's ABC Experience



KY's ABC Experience



KY's ABC Experience



KY's ABC Experience



KY's ABC Experience



KY – 6 over Stewarts Creek

Selecting Kentucky's SHRP2 Project

Knox County, KY 6 over Stewart's Creek

- Short Single Span
- Use Rolled Steel Girders
- Duplex Coating System
 - Galvanizing
 - Painting
- Concrete Protection
 - Stains
 - Deck Sealers

KY-6 Existing Structures

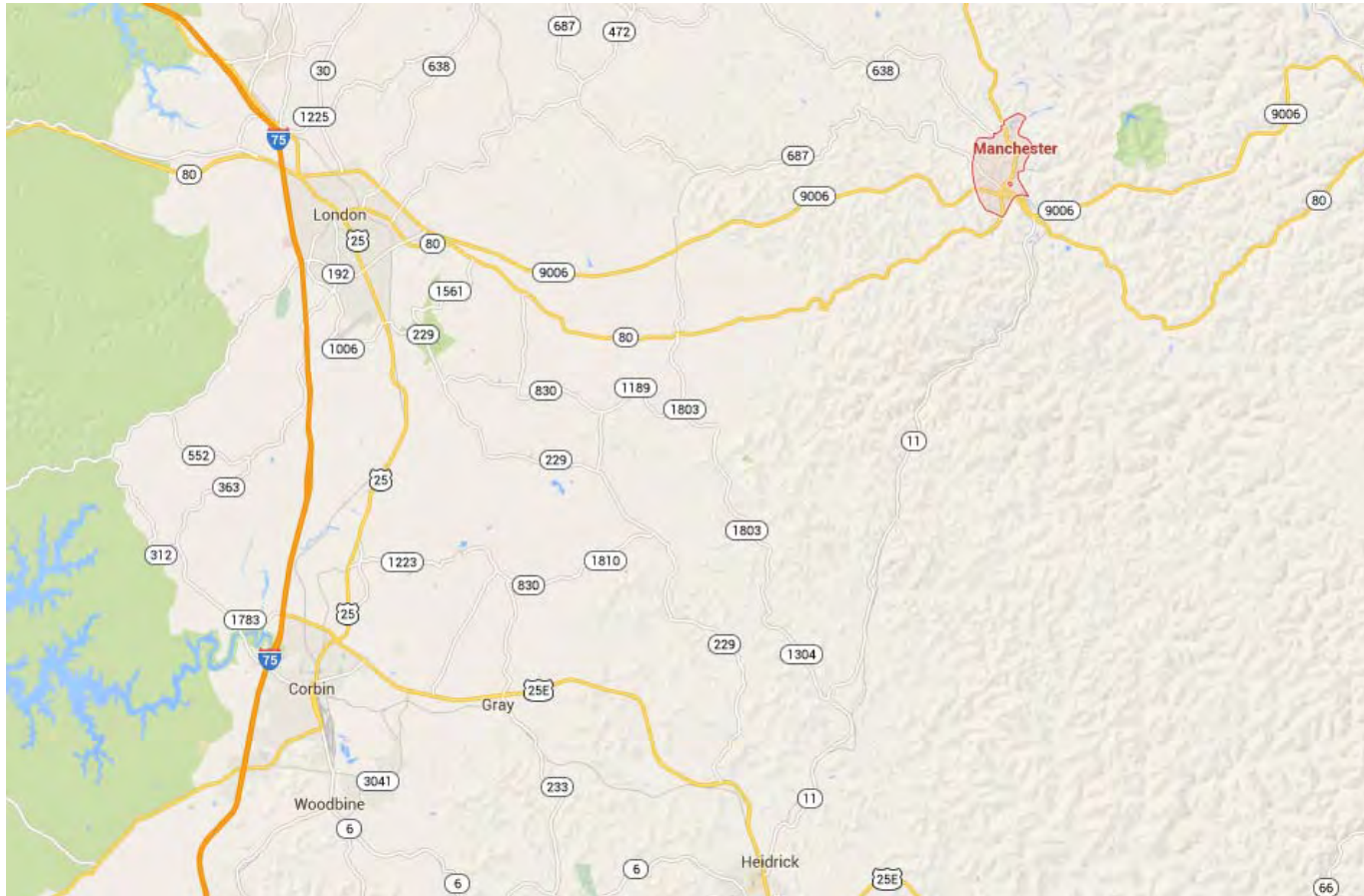
Lynn Camp Creek



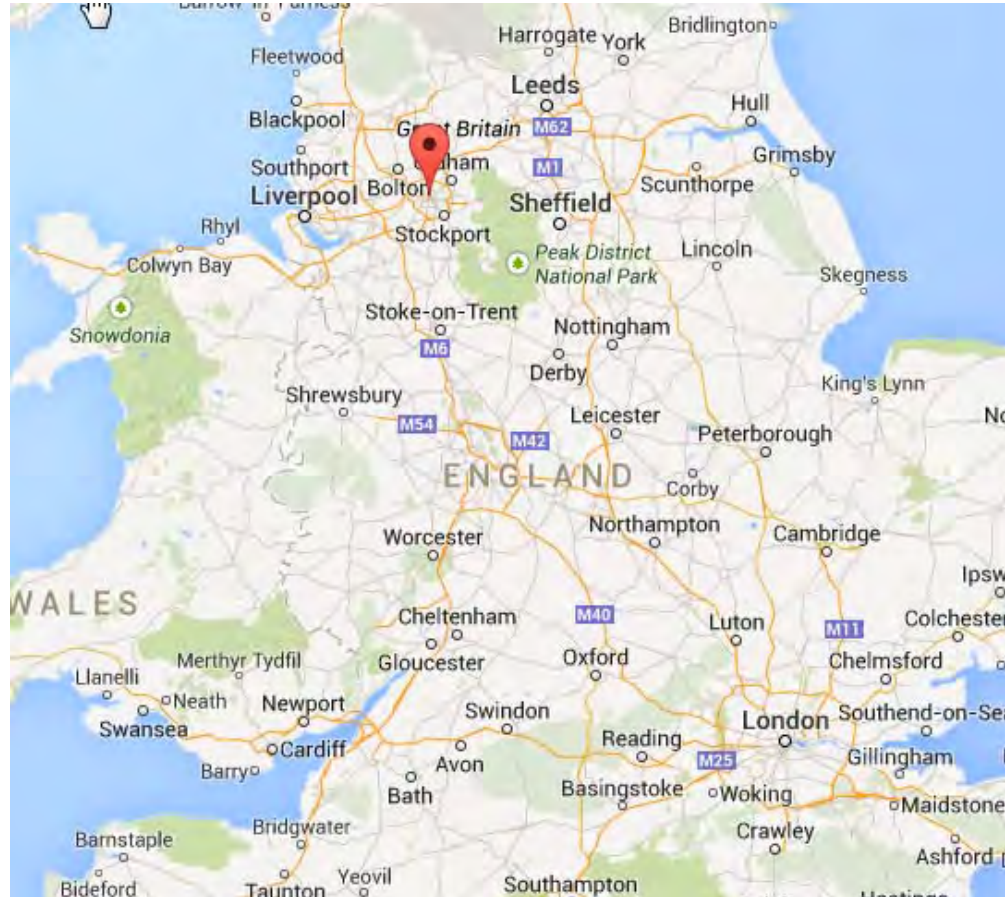
Stewarts Creek



KYTC Highway District 11



Manchester ???



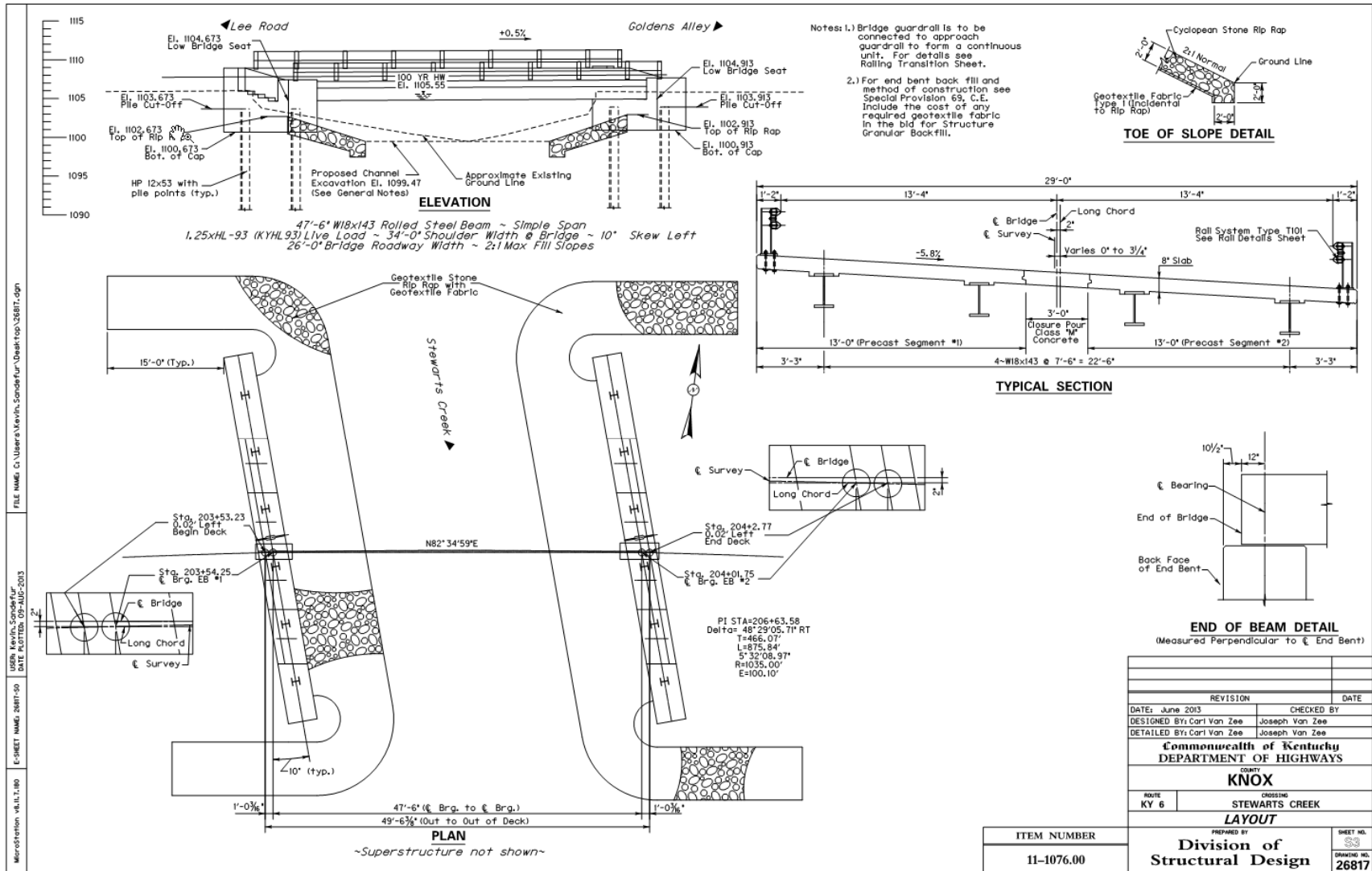
Corbin, KY



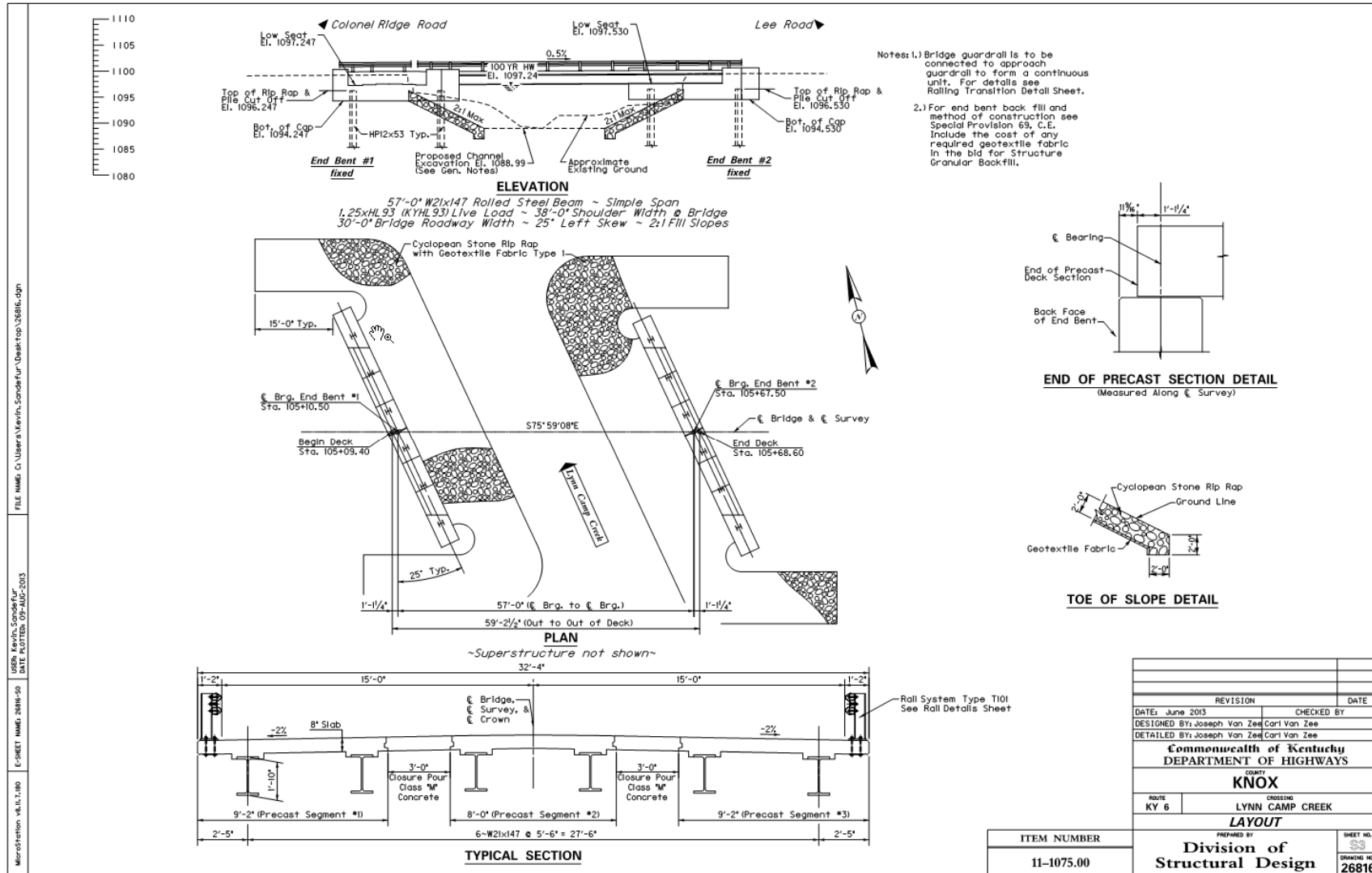
Corbin, KY



Stewarts Creek Bridge Layout



Lynn Camp Creek Bridge Layout



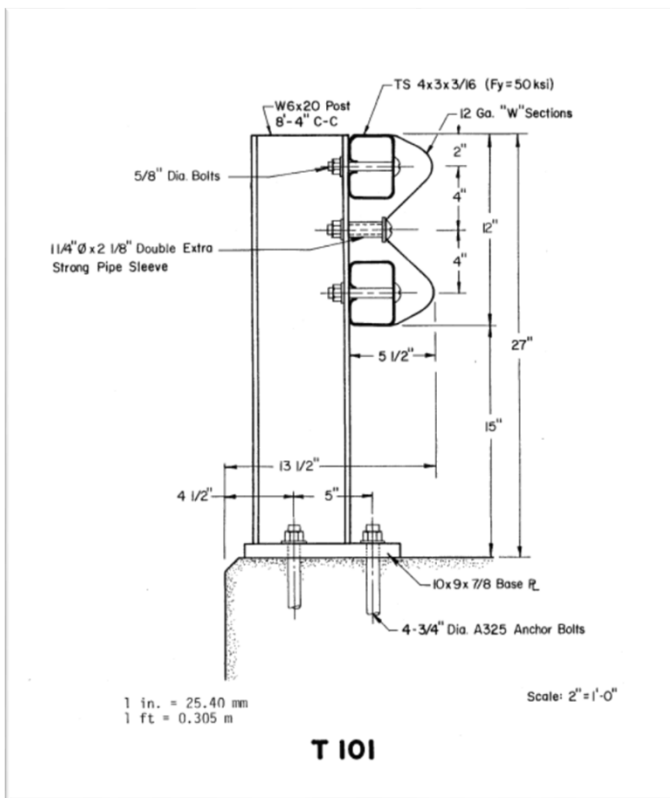
KYTC's SHRP2 Bridges - Design

Design Decisions

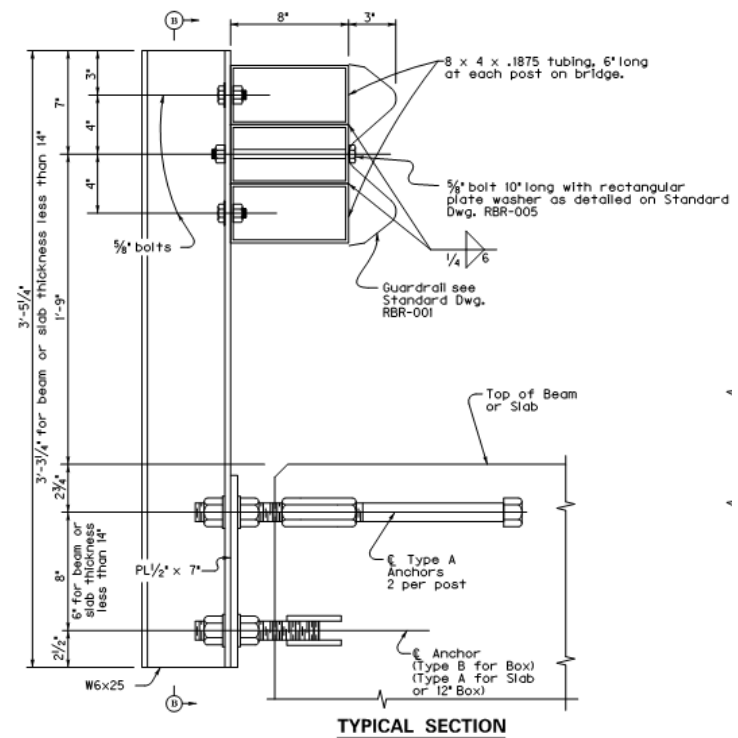
- Limited Time
- Slipped Letting From July 2013 to August 2013
- Diversions
- Epoxy Coated Rebar in Stewarts Creek Bridge
- Galvanized Rebar in Lynn Camp Creek Bridge

KYTC's SHRP2 Bridges - Design

Texas T101 Rail



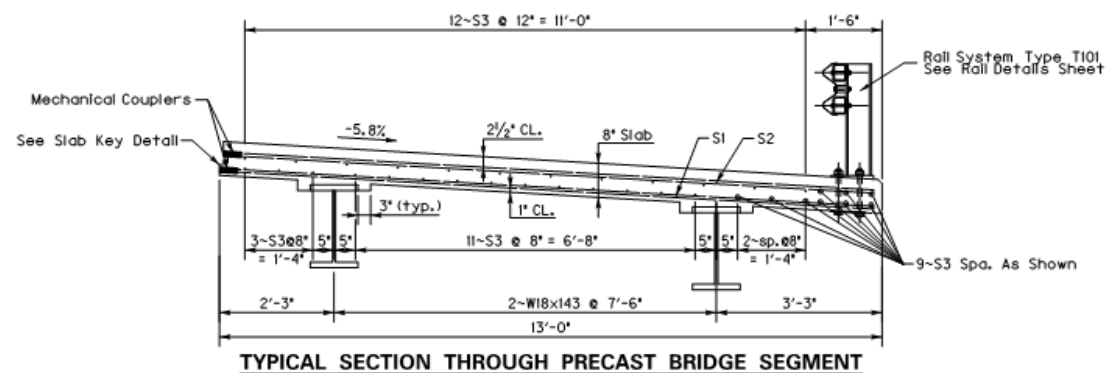
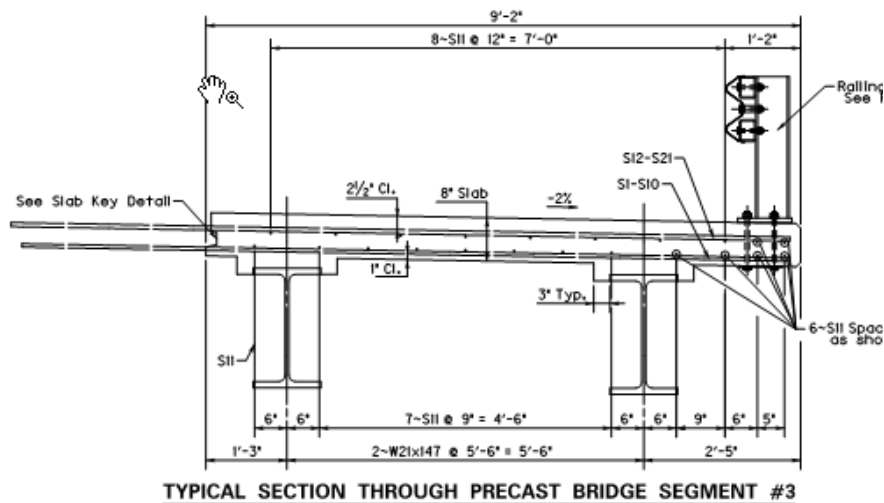
KY Type II Rail



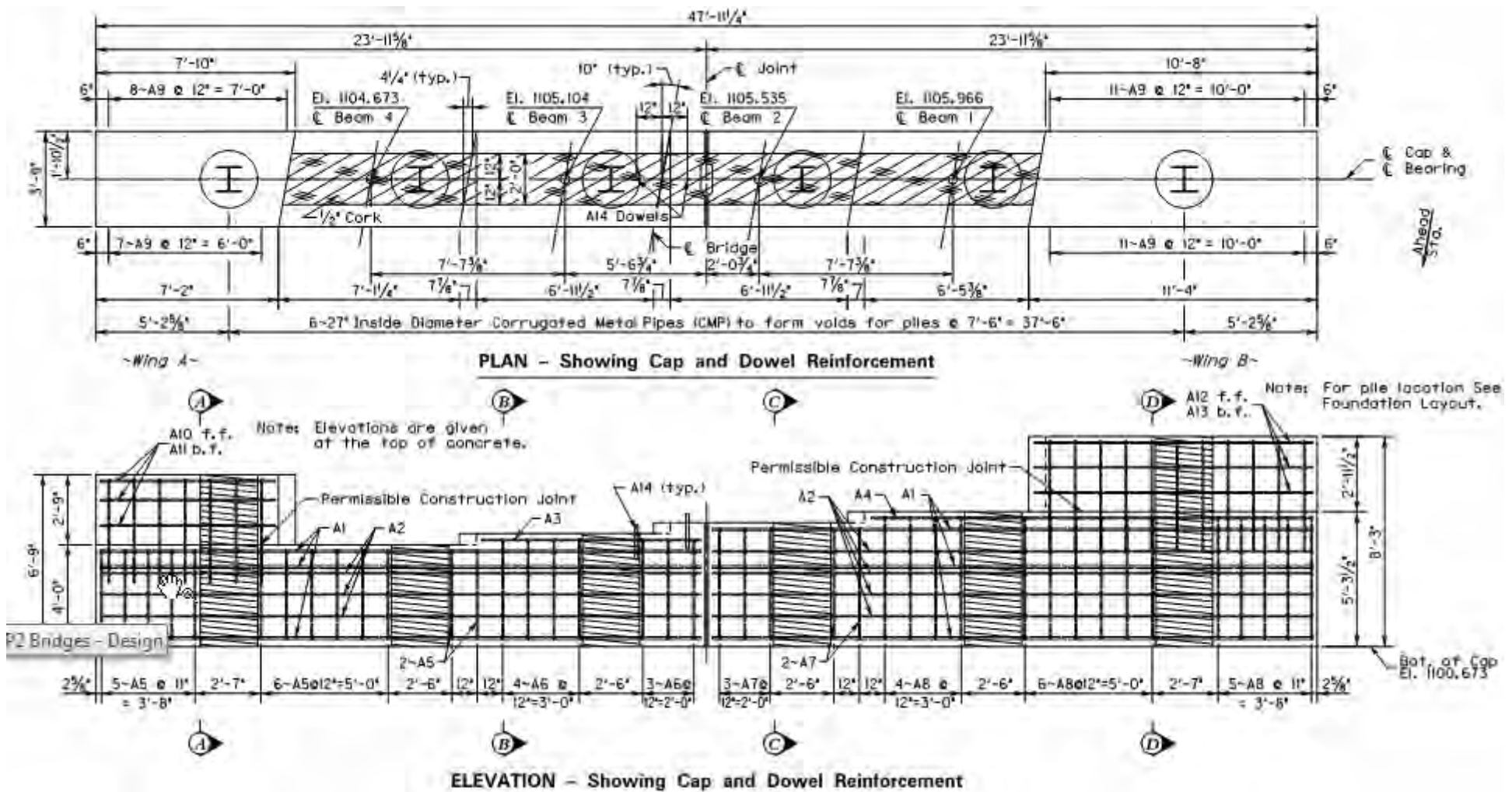
KYTC's SHRP2 Bridges - Design

Design Decisions

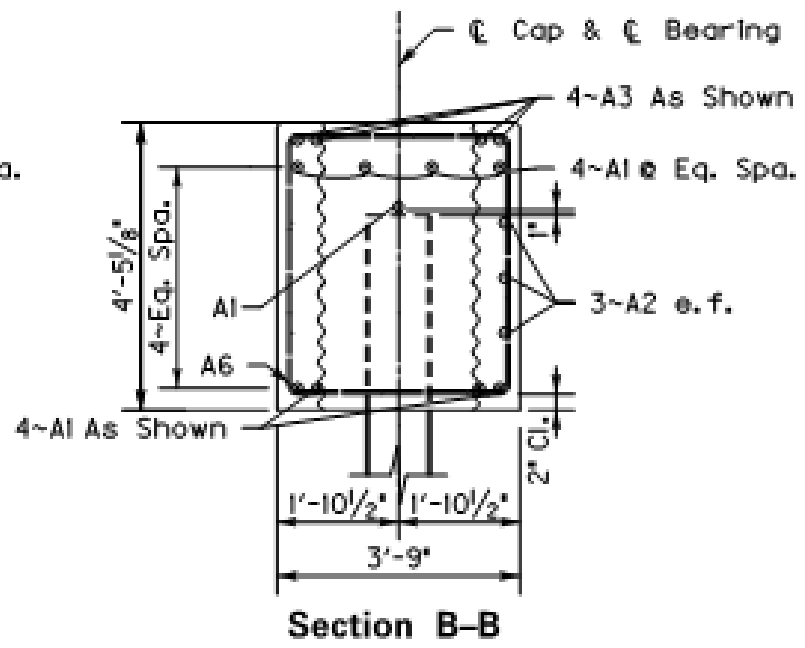
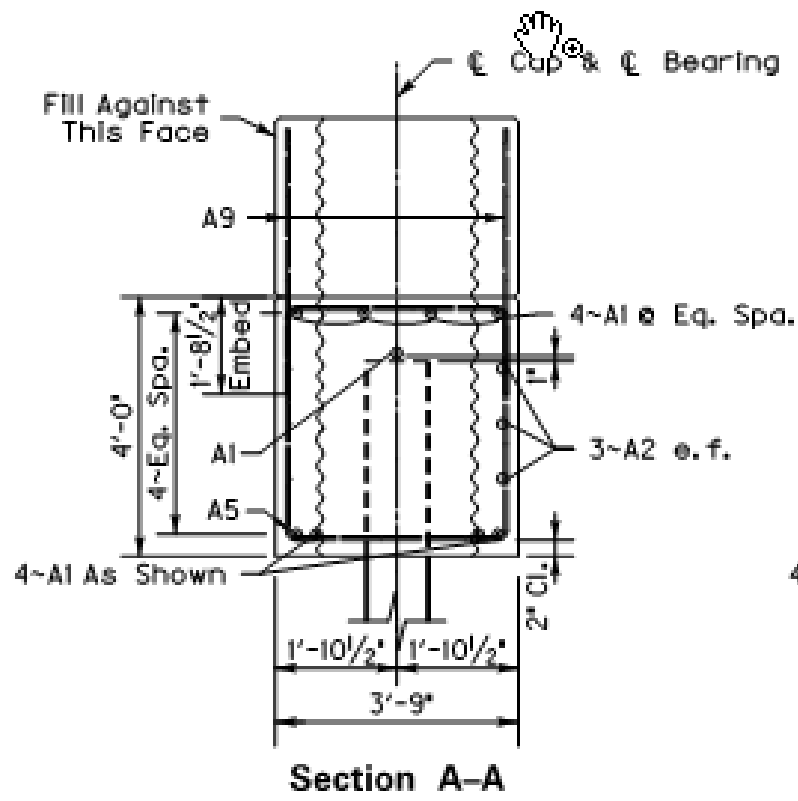
- Class M High Early Strength Concrete
- Conventional Lap Splices at Lynn Camp Creek with Galv. Rebar
- Mechanical Couplers at Stewarts Creek with Epoxy Rebar
- Skewed Transverse Rebar at Stewarts Creek Bridge



KYTC's SHRP2 Bridges - Design



KYTC's SHRP2 Bridges - Design



KYTC's SHRP2 Bridges - Design

Special Notes

- Kentucky Transportation Center, KTC
 - Ted Hopwood
 - Bob Meade
- A + B Bidding
 - 'A' – Normal Bid prices
 - 'B' – Days to complete x \$10,000
- Galvanization
- Preparation for Painting
- Deck Sealing and Concrete Staining
- Scheduling and various others

KYTC's SHRP2 Bridges - Construction

Letting - August 16, 2013

Call #: 202 **Contract ID:** 131203 **Results Status:** Awarded to KAY & KAY CONTRACTING LLC on 8/29/2013

County: KNOX **Project Description:** WOODBINE-BARBOURVILLE ROAD (KY 6)

Project: 061GR13D003BRZ

Road: WOODBINE-BARBOURVILLE ROAD (KY 6)

Engineer's Estimate: \$2,120,900.70

BUSH & BURCHETT INC	\$2,890,692.85
KAY & KAY CONTRACTING LLC	\$2,334,000.00

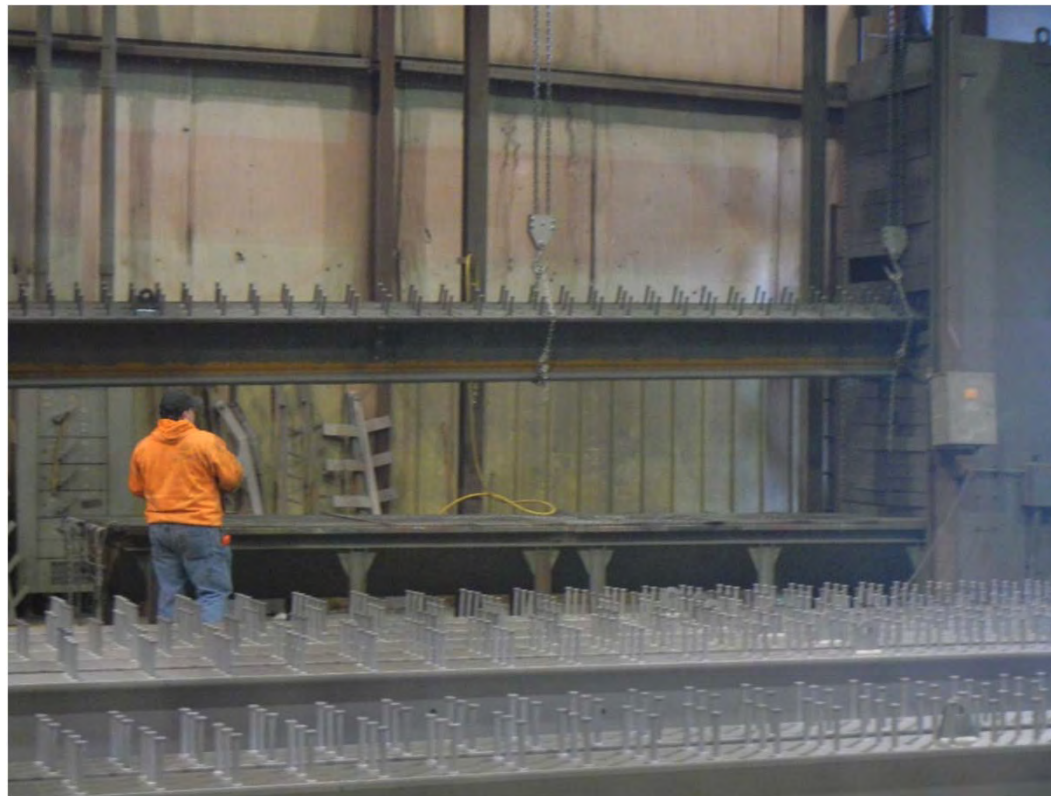
KYTC's SHRP2 Bridges - Construction

Bridge Only Costs

- **Stewarts Creek Bridge**
 - Bid \$498,269.80
 - Estimate \$356,733.00
- **Lynn Camp Creek Bridge**
 - Bid \$614,969.00
 - Estimate \$478,181.80

KYTC's SHRP2 Bridges - Construction

Beam Fabrication



KYTC's SHRP2 Bridges - Construction

AZZ, Nashville



KYTC's SHRP2 Bridges - Construction



KYTC's SHRP2 Bridges - Construction



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KYTC's SHRP2 Bridges - Construction



KYTC's SHRP2 Bridges - Construction

Galvanizing Weathering Process

- Zinc Oxides
- Zinc Hydroxides
- Zinc Carbonates
- ASTM D6386

KYTC's SHRP2 Bridges - Construction



KYTC's SHRP2 Bridges - Construction



KYTC's SHRP2 Bridges - Construction

Lynn Camp Creek Bridge



KYTC's SHRP2 Bridges - Construction

Stewarts Creek Bridge



KYTC's SHRP2 Bridges - Construction



KYTC's SHRP2 Bridges - Construction



KYTC's SHRP2 Bridges - Construction



KYTC's SHRP2 Bridges - Construction



KYTC's SHRP2 Bridges - Construction

Dist. 11 Knox Co.
Stewards Creek
Bridge Replacement

KYTC's SHRP2 Bridges - Construction

Time Savings over Conventional Construction ???



KYTC's SHRP2 Bridges

Lessons Learned

- Decide Early to Use ABC
- Avoid Diversions
- Waive Precast Precertification Requirements
- Galvanization Issues
 - Blast Clean Structural Steels to SSPC SP 10
 - Specify Si and P Content

KYTC's SHRP2 Bridges – Lessons Learned

	Cold rolled steel	Hot rolled steel
Si+P < 0,03	<p>Acceptable surface finish in most cases. Thickness according to standard. Shiny coating.</p> <p>If the appearance of the galvanized surface is very important, the following expression should be used :</p> <p style="text-align: center;">Si < 0,03 and Si+2,5P < 0,04</p>	<p>Acceptable surface finish in most cases. Thickness according to standard. Shiny coating.</p> <p>If the appearance of the galvanized surface is very important, the following expression should be used :</p> <p style="text-align: center;">Si < 0,02 and Si+2,5P < 0,09</p>
$0,03 < Si+P \leq 0,14$	Not suitable	Not suitable
$0,15 \leq Si \leq 0,21$	<p>Thicker coatings than in standard.</p> <p>Internal oxidation may change reactivity.</p>	Thicker coatings than in standard.
$0,22 \leq Si \leq 0,28$	<p>Significant thicker coatings than in standard.</p> <p>Grey appearance.</p>	<p>Significant thicker coatings than in standard.</p> <p>Grey appearance.</p>
$0,29 \leq Si \leq 0,35$	<p>Thick coatings that may be brittle.</p> <p>Grey appearance.</p>	<p>Thick coatings that may be brittle.</p> <p>Grey appearance.</p>

KYTC's SHRP2 Bridges

Lessons Learned

- Decide Early to Use ABC
- Avoid Diversions
- Waive Precast Precertification Requirements
- Galvanization Issues
 - Blast Clean Structural Steels to SSPC SP 10
 - Specify Si and P Content
 - Pre-Heating
 - Chromate Quenching of Rebar
 - Price of Galvanized Rebar
- Closure Pour Connection Details
 - Time
 - Price

KYTC's SHRP2 Bridges

Lessons Learned – Things that worked well.

- Contractor who was accepting of ABC methods.
- Willing partners at the D-11 office
- Size of Precast Pieces
- Contractor's concern for fit-up
- Fabrication and construction monitoring assistance from KTC

KYTC's SHRP2 Bridges

