



Construction Pre-Bid Meeting Lake Barkley Bridge Replacement

US 68/KY 80 Bridge over Lake Barkley

Trigg County

Contract ID 14-1279

Letting Date: December 19, 2014



December 2, 2014





Department of Highways Key Project Personnel

- **Steve Waddle, PE**
 - State Highway Engineer
- **Mike McGregor, PE**
 - D01-Chief District Engineer
- **Chris Kuntz, PE**
 - D01-Project Development
- **Blake Beyer**
 - D01-Environmental
- **Diana Radcliffe, PE**
 - Division of Construction Procurement
- **Ryan Griffith, PE**
 - Division of Construction
- **Mark Hite, PE**
 - Division of Structures
- **Darrin Beckett, PE**
 - Geotechnical Branch
- **Ryan Gossom, PE**
 - Construction Liaison
- **Kyle Poat, PE**
 - D01- Branch Manager for Project Delivery & Preservation
- **Michael Oliver, PE**
 - D01-Construction, Section Supervisor
- **David Waldner, PE**
 - Division of Environmental Analysis
- **Austin Hart, EIT**
 - D01-Construction





US68/Ky80 over Lake Barkley Pre-Bid Meeting Agenda

- Project Overview
- DBE
- Permits
- Environmental Commitments
- Geotechnical & Foundations
- Bridge Structures
- Updates in Bid Documents
- Schedule
- Q&A



KYTC Construction Procurement

December 19 Project Related Information

- <http://transportation.ky.gov/Construction-Procurement>

The screenshot shows the KYTC Transportation Cabinet website. The header includes the KYTC logo, navigation links (CITIZENS, BUSINESS, PROGRAMS & SERVICES, NEWS & EVENTS, MAPS, ASSISTANCE, ABOUT US), and a search bar. The main content area is titled 'Letting Details : 12/19/2014'. Under 'Proposal Information', 'Project Related Information' is highlighted with a red box. Under 'Publications', there are links for 'NOTICE TO CONTRACTORS', 'QUALIFICATIONS FOR BIDDERS', 'Bid Item Quantity Index', 'MATERIAL LISTING', and 'Bidder Registration Form'. A 'Contact Info' sidebar on the right provides contact details for the Division of Construction Procurement. A 'Resources' sidebar lists various documents and forms available on the site.

KENTUCKY TRANSPORTATION CABINET

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Home > Construction Procurement

Letting Details : 12/19/2014

Proposal Information

- Letting Results
- Letting Specific Bulletins
- Project Related Information**
- Proposals
- Questions and Answers
- Submit a Question

Publications

- NOTICE TO CONTRACTORS
- QUALIFICATIONS FOR BIDDERS
- Bid Item Quantity Index
- MATERIAL LISTING
- Bidder Registration Form

Contact Info

Division of Construction Procurement
Kentucky Transportation Cabinet
200 Mero Street
Frankfort, KY 40622
Phone: (502) 564-3500
Fax: (502) 564-7299
Comments or Suggestions
Map it

Resources

- Electronic Planroom
- Bid Express
- Required Affidavit
- Certified Payroll Form
- Expedite Software
- Unit Bid Tabulations
- Anticipated Earnings Schedule
- Prequalification Information
- Prequalified Contractors List
- Work Items Listing
- Construction Procurement Policy Manual
- eForms Library
- Average Unit Bid Prices
- Asphalt Price Index
- Project Archives



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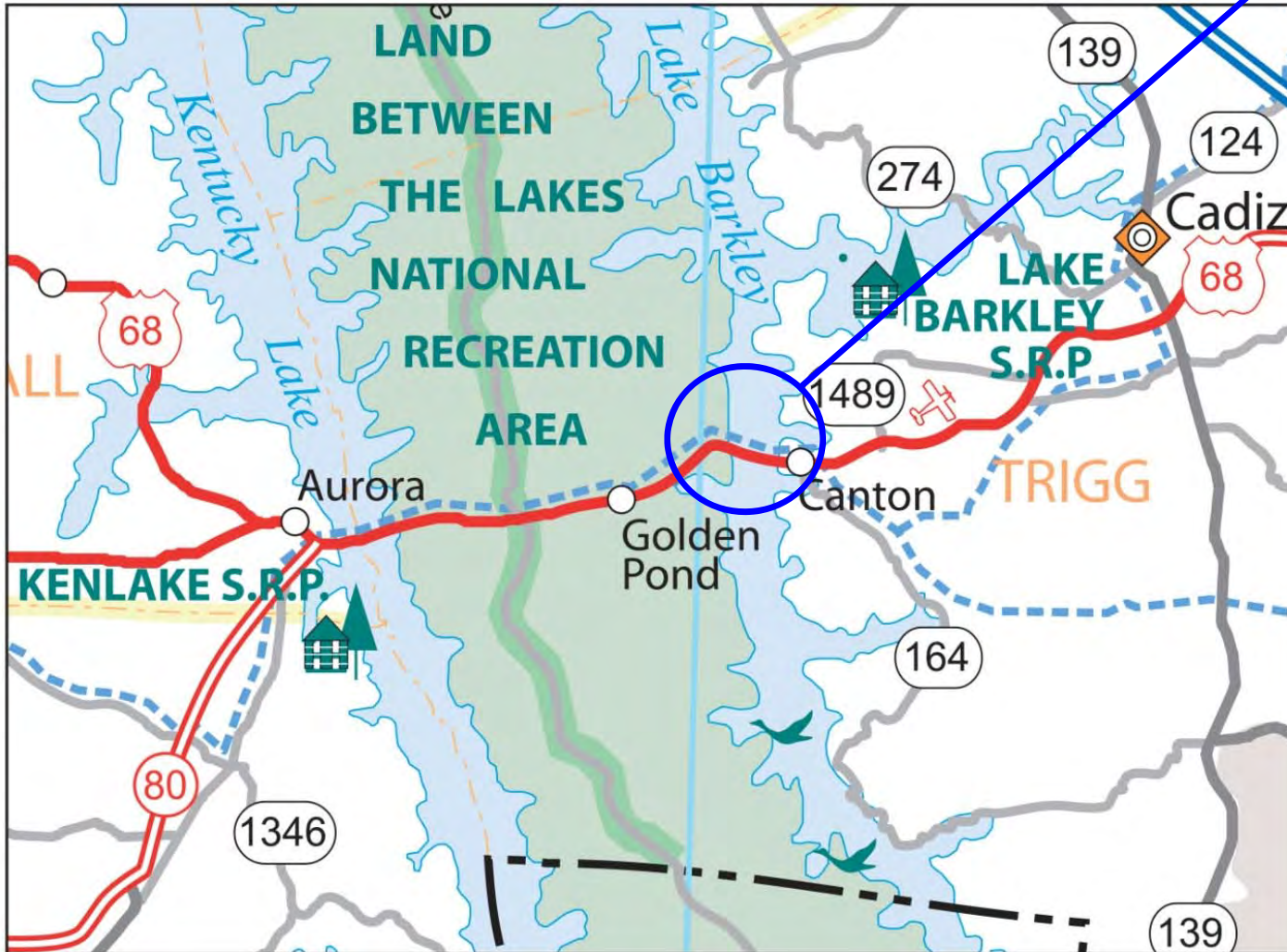
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11/21/2014		US 68 Bridge over Lake Barkley - December 19, 2014 Letting - DRAFT Geotechnical Report Body NEW
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This Project part of the larger US68/KY80 Corridor



A Corridor FONSI was prepared



Existing Henry Lawrence Bridge Aerial Photo



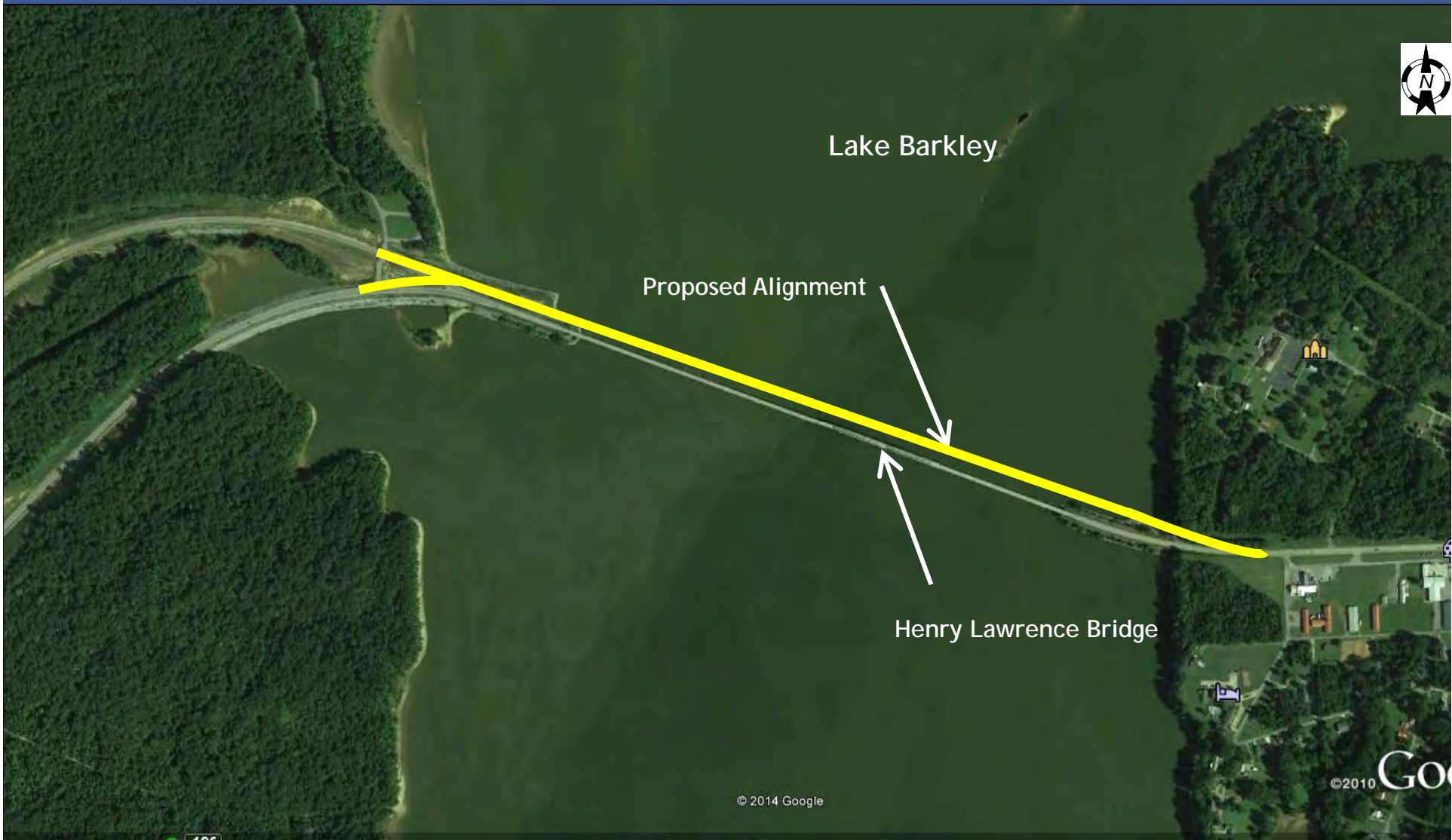
December 2, 2014



Proposed Lake Barkley Bridge Rendering



Project Alignment

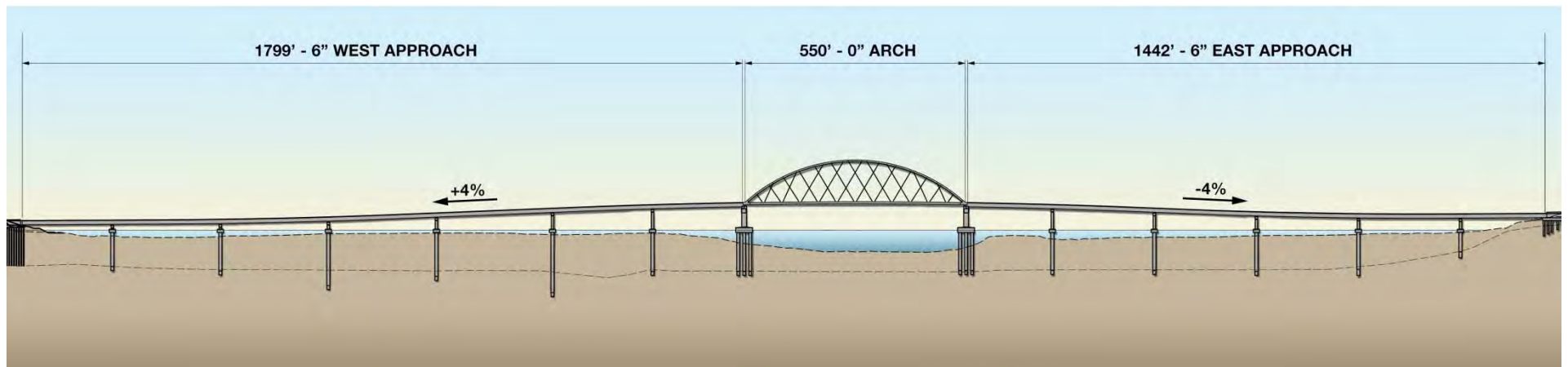


Lake Barkley Bridge

3805 feet long (End Bent to End Bent)

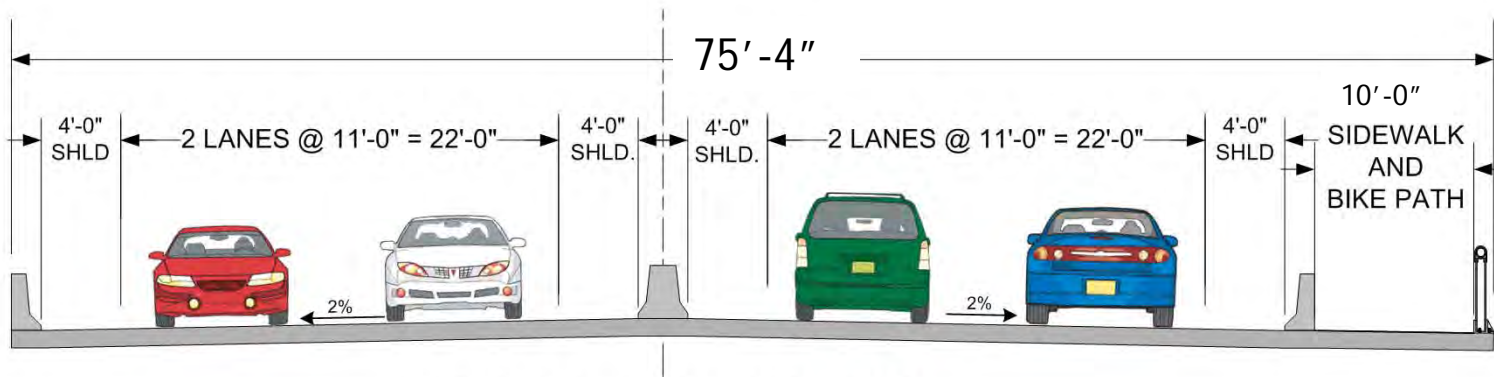
Three units (West, Main, East)

14 spans (7 - 1 - 6)



SHEET NO. S015

Typical Cross Section



TYPICAL SECTION



Special Notes

TRIGG COUNTY
NHPP BRO 0801 (101)
TRIGG COUNTY

Contract ID: 141279
Page 18 of 318
ContractID: 14-1279

SPECIAL NOTES FOR LAKE BARKLEY BRIDGE PROJECT SCHEDULED FOR DECEMBER 19, 2014 LETTING

SPECIAL NOTES (BRIDGE):

FOR DRILLED SHAFTS
FOR NON-DESTRUCTIVE TESTING IN DRILLED SHAFTS
FOR VIBRATION MONITORING
FOR STEEL ERECTION – ARCH SPAN
FOR STEEL ERECTION – APPROACH SPANS
FOR STAINLESS STEEL REINFORCEMENT
FOR BRIDGE STRAND HANGERS
FOR DISK BEARINGS
FOR LCE SEISMIC ISOLATION BEARINGS (TYPES A & B)
FOR VISCOUS DAMPERS
FOR FINGER EXPANSION JOINT
FOR MODULAR EXPANSION JOINT
FOR LIGHTING PROTECTION SYSTEM
FOR DECORATIVE FENCE PANEL
FOR INSTALL – DUCT BANK
FOR SHOP DRAWINGS & WELDING PROCEDURES
(6U) FOR STRUCTURAL MASS CONCRETE
(6J) FOR NON-EPOXY ADHESIVES

SPECIAL PROVISIONS (BRIDGE):

(69) FOR EMBANKMENT AT BRIDGE END BENT STRUCTURES

SPECIAL NOTES (GENERAL):

FOR HELPER BOAT
FOR REMOVAL OF EXISTING BRIDGE
FOR CONSTRUCTION TRAILER
FOR WEB CAMERA CONSTRUCTION MONITORING SYSTEM
FOR CPM SCHEDULING
FOR PROJECT INSPECTION BOAT
FOR CONSTRUCTION ACCESS
FOR ENGINEERING-RELATED CONSULTING SERVICES
FOR INTERMEDIATE MILESTONES
FOR AVIATION CONSTRUCTION PERMITS
FOR MAINTAINING EXISTING BRIDGE

Index of Special Notes
Lake Barkley Bridge Construction

11/7/14
Page 1 of 1

ALSO SEE:

- Bridge Plans
- Roadway Plans
- General Notes
- Related Info on website



US68/Ky80 over Lake Barkley DBE Program

- 8% Goal
- Details in the proposal
- Early Submittal of paperwork
to help expedite Award



Cumberland River Basin USACE Jurisdiction





Status of Permits

Approved

- KDOW Water Quality Certification (401)
- US Coast Guard Bridge Permit

Pending

- USACE (404)
 - Draft Permit is Posted for Information
 - Approval is anticipated soon after Bid
 - Does not include waste sites

Not Initiated

- FAA/KAZC
 - Not needed for permanent structure
 - Contractor's responsibility for temp. equip.

- See Special Notes on Sheets R2J - R2K
 - Mitigation of Impacts to Threatened & Endangered Species
 - Osprey Nests





Environmental Commitments

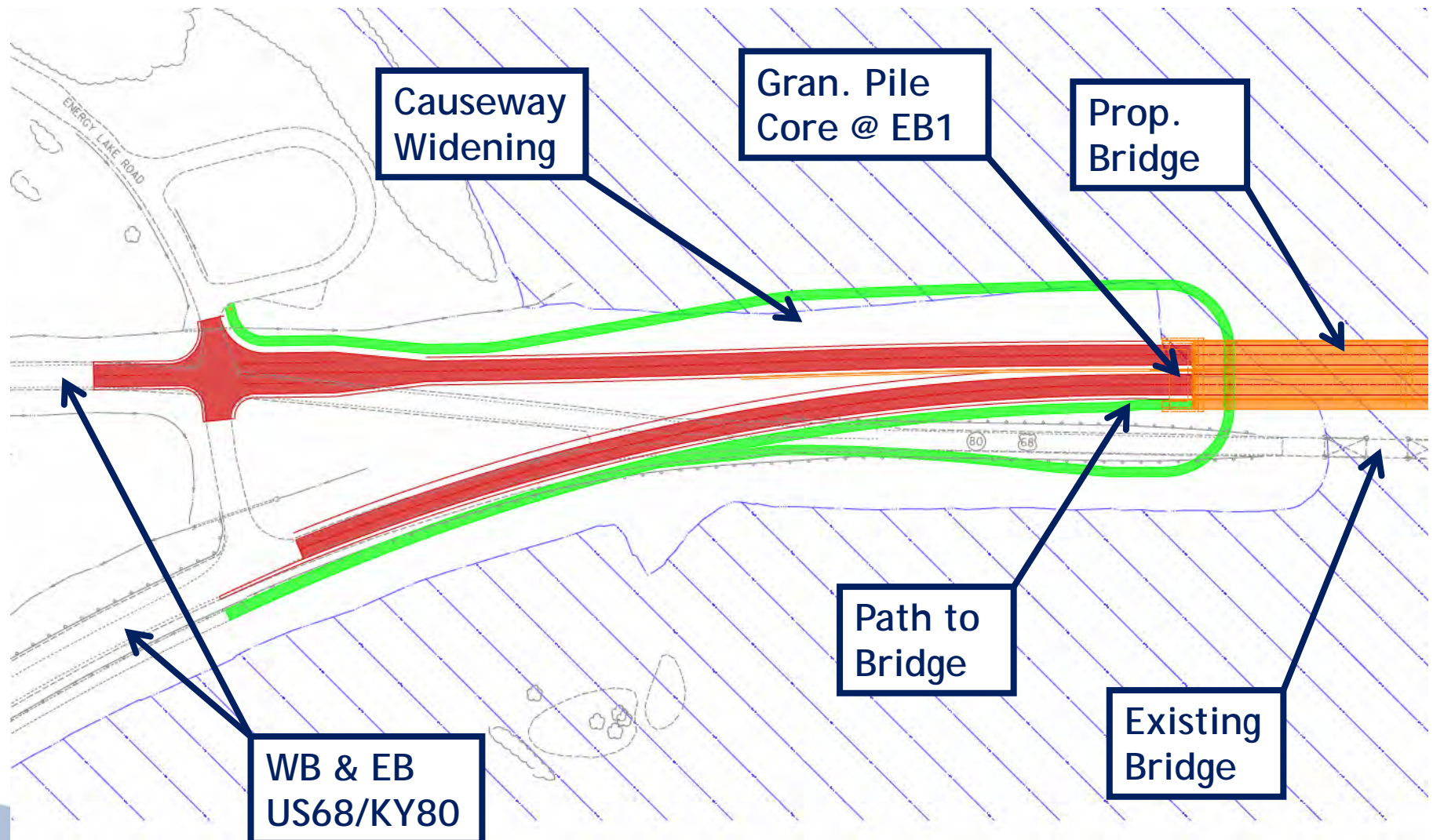
- See Special Notes on Sheets R2J - R2K
 - Seasonal Restrictions
 - Demolition of Existing Bridge Deck
 - Work Hour Restrictions
 - Tree Removal
 - Archeology Potential
 - Start Early on Excavation of East Approach to avoid delay in Open to Traffic



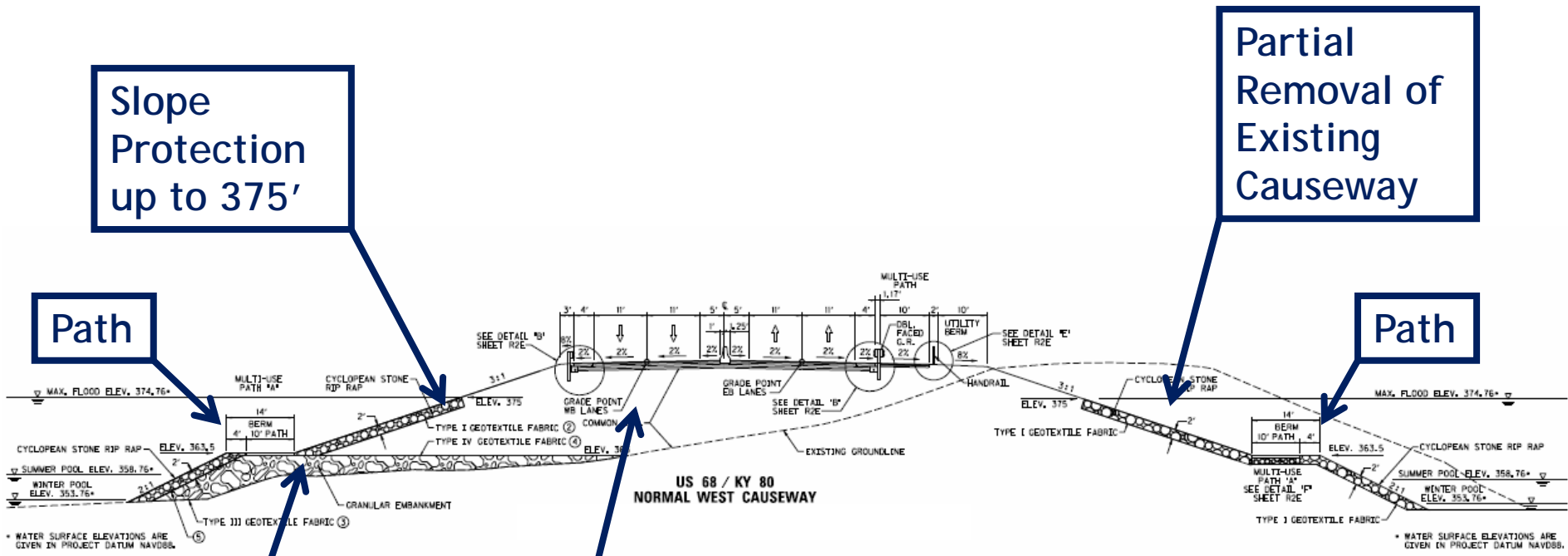
USACE Permit Requirements

- Balance of Material in Lake
 - Fill material was offset with partial removal of existing causeways.
- Dredging for Construction Access in Shallow Water
 - Impact area in Lake included in 404/401 permit applications

Roadway - West Approach



Roadway - West Approach



Slope Protection up to 375'

Partial Removal of Existing Causeway

Path

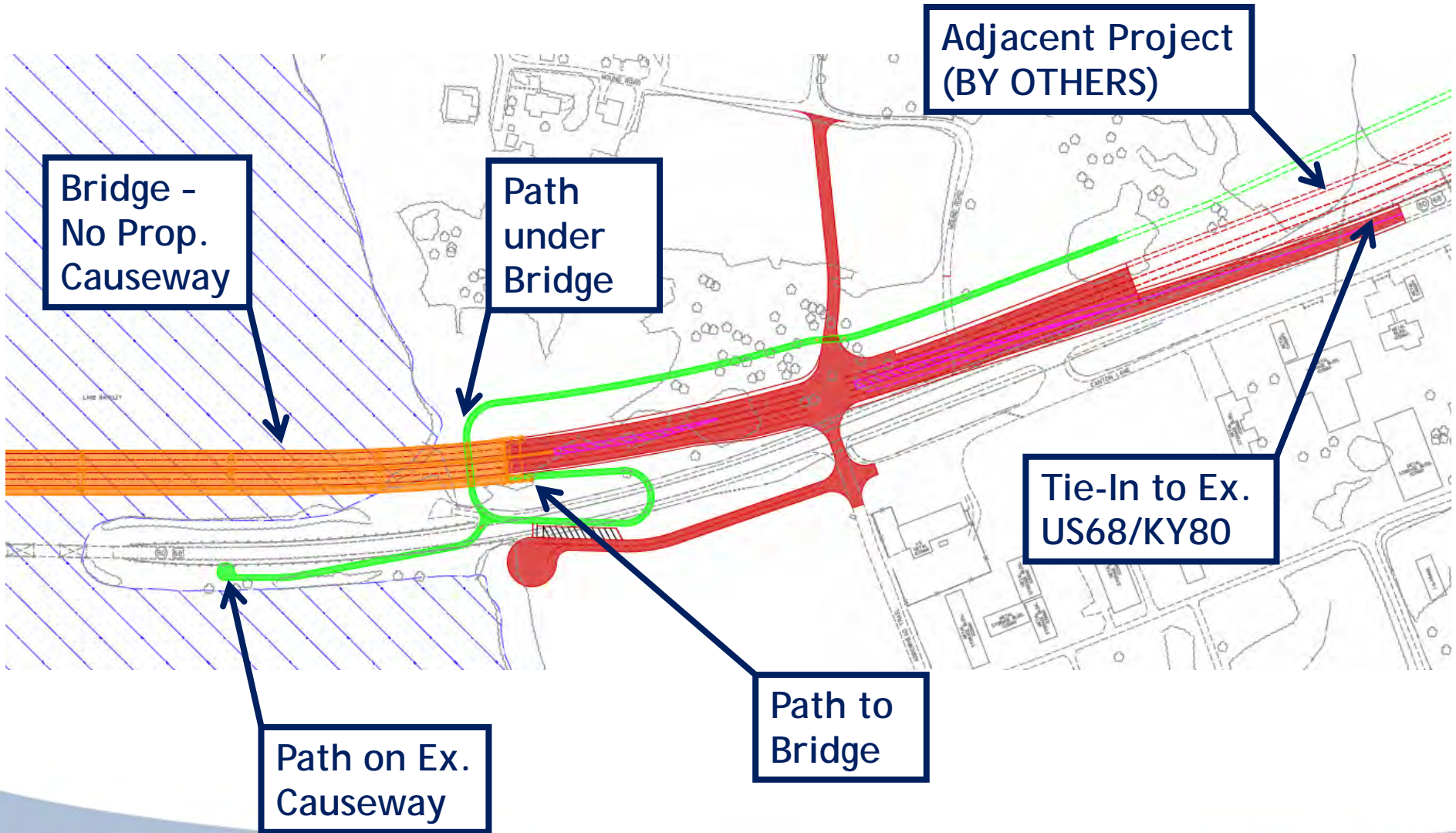
Path

Granular Emb. up to 363'

Common Emb. above 363'

- See Geotechnical Notes sheets for Embankment Specifications
- Lake Elevations:
 - Winter Pool = 354'
 - Summer Pool = 359'
 - Max. Flood = 375'

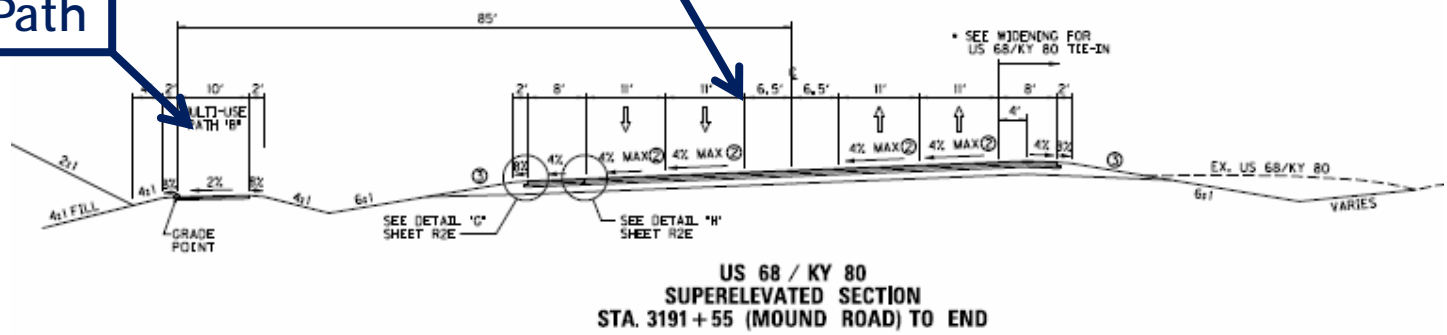
Roadway - East Approach



Roadway - East Approach

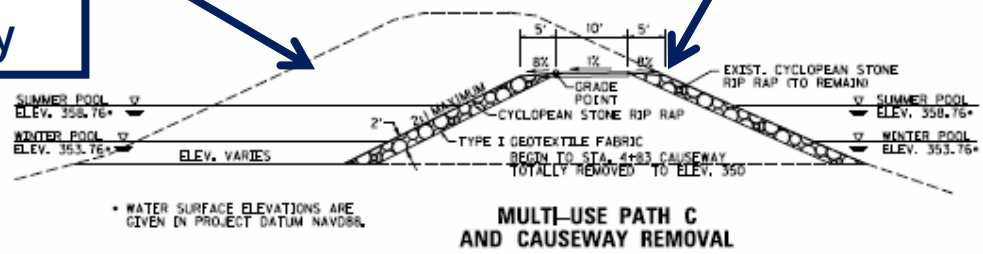
4-Lanes w/
Flush Median

Path



Partial
Removal of
Existing
Causeway

Path



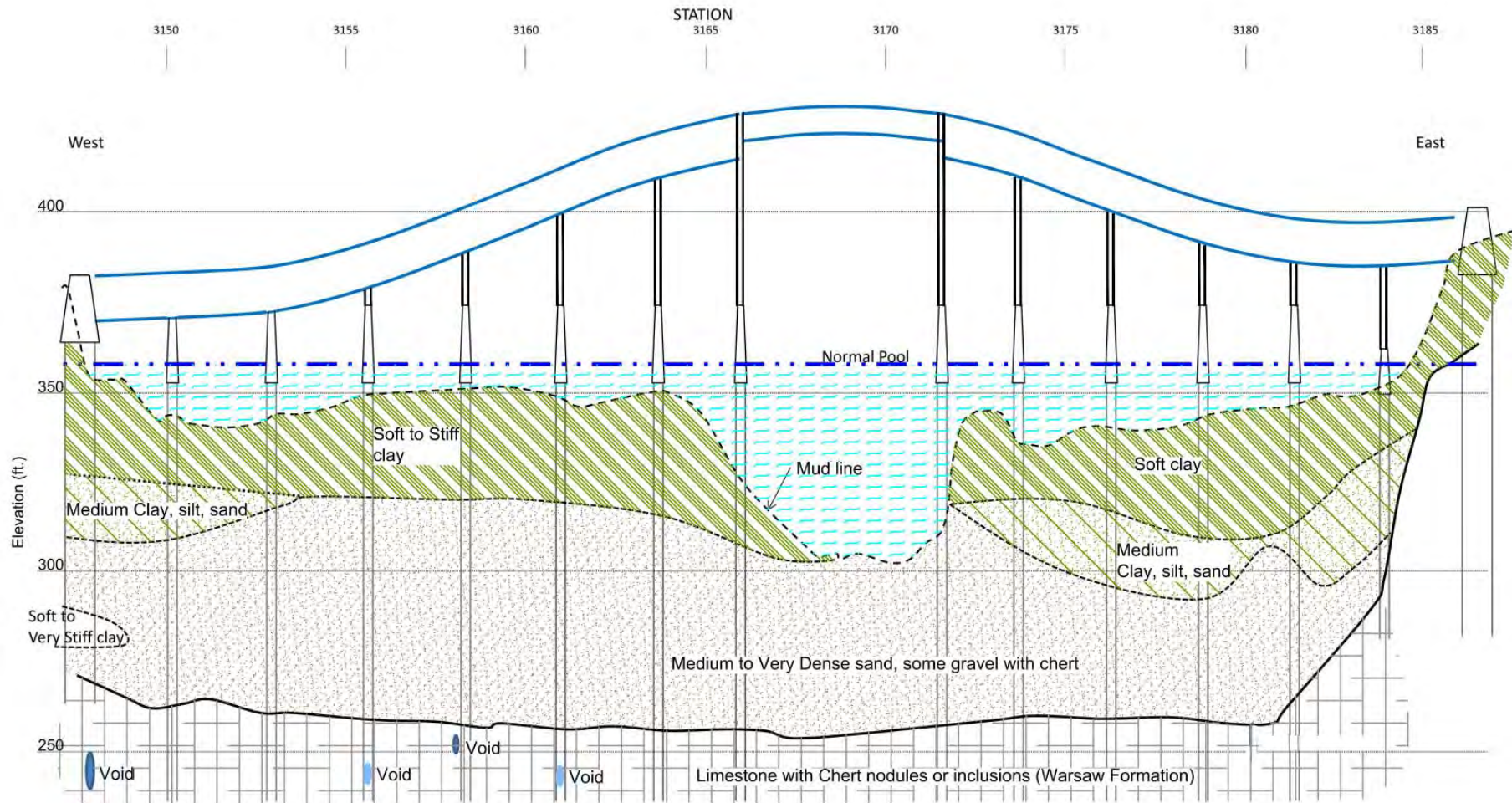


Geotechnical Considerations

- a) Subsurface Conditions
- b) Foundation Types
- c) Special Notes
- d) Unique Contract Requirements
- e) Recent Project-Related Information

Geotechnical Considerations - Subsurface Conditions

Generalized Profile





Geotechnical Considerations - Subsurface Conditions

Bridge Pier and End Bent 1 Profile

- 56 to 107 feet soil
- 6 to 30 feet of cohesive soil
- 39 to 77 feet of granular soil
- Underlain by limestone bedrock with chert inclusions

End Bent 2 Profile

- 4 to 26 feet cohesive soil
- Underlain by limestone bedrock with chert inclusions



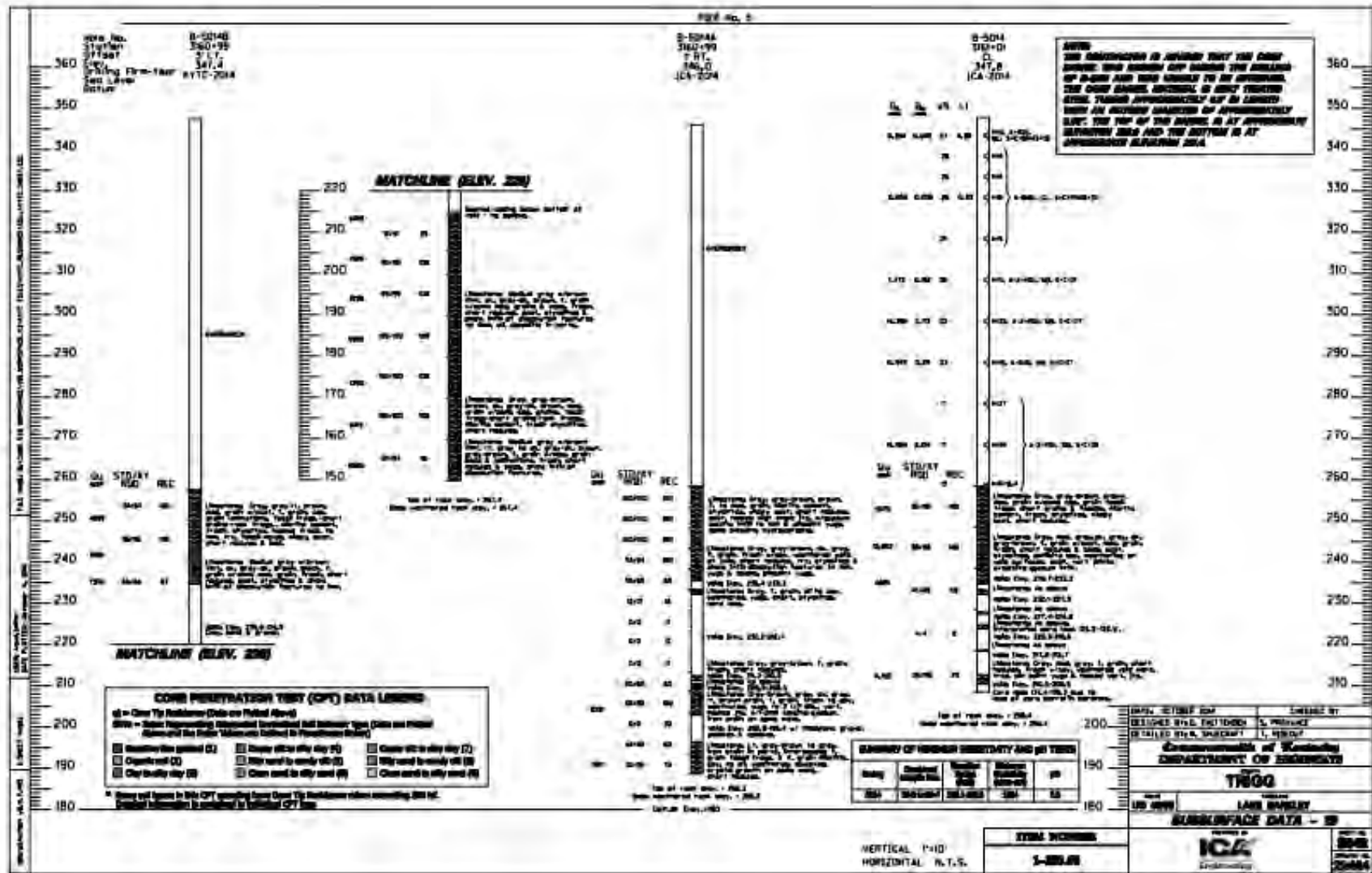
Geotechnical Considerations - Subsurface Conditions

Limestone Bedrock

- Unconfined compressive strength 3,300 to 32,000 psi, Avg=12,000 psi
- Chert inclusions very hard, previously required reverse circulation drilling methods at nearby site
- Karst - Predominantly west portion of site and far east portion
- End Bent 1, Piers 3 to 5, and End Bent 2
- Voids/cavities clay, sand and cobble filled, possibly some water filled
- Cavities 0.1 to about 19.5 feet thick
- Located between 1 to 62 feet below top of bedrock
- Lost exploratory drilling tools in 3 borings and are noted on Subsurface Data Sheets
- Large encountered cavities resulted in relocating Pier 5 from its original proposed location

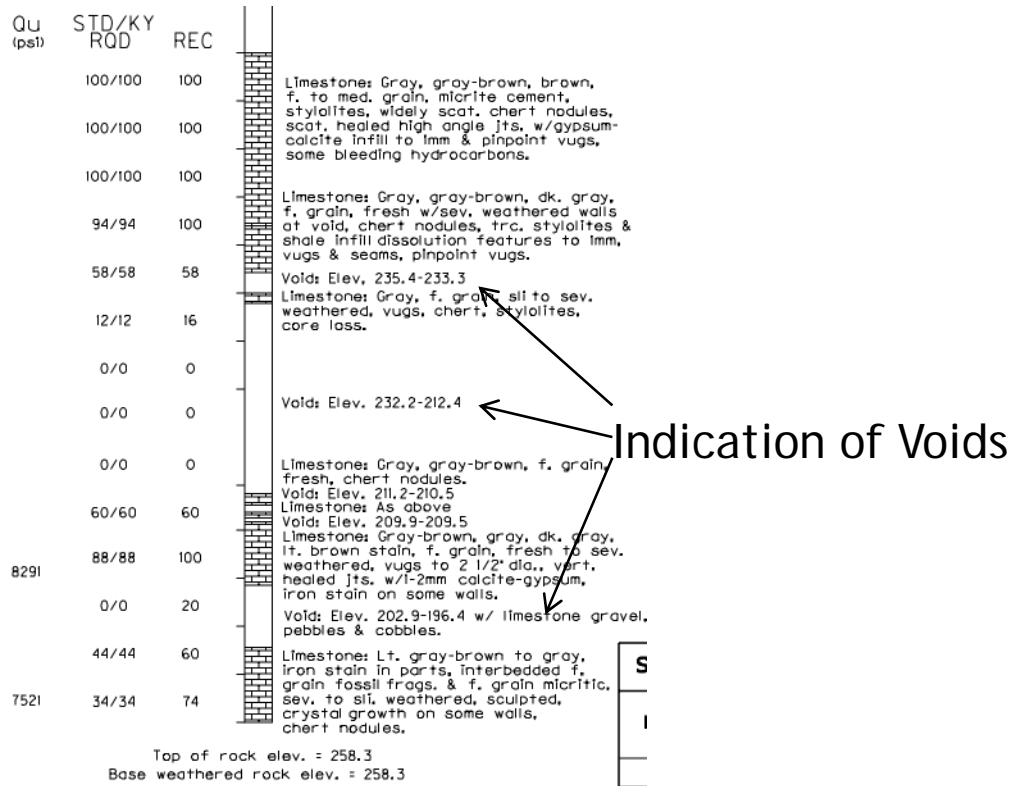


Geotechnical Considerations - Subsurface Conditions





Geotechnical Considerations - Subsurface Conditions



NOTE:
THE CONTRACTOR IS ADVISED THAT THE CASING ADVANCER WAS LOST DURING THE DRILLING OF B-5006 AND WAS UNABLE TO BE RETRIEVED. THE CASING ADVANCER MATERIAL IS HEAT TREATED SQUARE STEEL APPROXIMATELY 0.2'X0.2'X1.5' IN LENGTH. THE TOP OF THE CASING ADVANCER IS AT APPROXIMATE ELEVATION 289.3.

Lost Tool Note B5006

NOTE:
THE CONTRACTOR IS ADVISED THAT THE CORE BARREL WAS BROKEN OFF DURING THE DRILLING OF B-5066 AND WAS UNABLE TO BE RETRIEVED. THE CORE BARREL MATERIAL IS HEAT TREATED STEEL TUBING, APPROXIMATELY 12.0' IN LENGTH WITH 2-12 INCH REAMING SHELLS (1 HARDENED WITH DIAMONDS, 1 HARDENED WITH CARBIDE) AND A SERIES 8 HOLE PRODUCTS DIAMOND CORE BIT. INSIDE THE CORE BARREL IS A SECTION OF HARDENED STEEL INNER BARREL APPROXIMATELY 10.0' IN LENGTH THAT WAS ALSO NOT RETRIEVED. THE TOP OF THE BARREL IS AT APPROXIMATE ELEVATION 371.1 AND THE BOTTOM IS AT APPROXIMATE ELEVATION 359.1.

Lost Tool Note B5066

Note: 2014 Borings (5000 series), the last 1 or 2 digits refers to the planned drilled shaft number (e.g. B5006 is associated with Shaft 6 and B5066 is associated with Shaft 66)



Geotechnical Considerations - Bridge Foundations

Foundation Type - Drilled Shaft Foundations

End Bent 2

- 48-inch diameter in soil, 42-inch diameter rock socket
- Permanent steel casing to bedrock
- 17 drilled shafts

Approach Spans (11 piers)

- 84-inch-diameter in soil, 78-inch diameter rock socket
- Permanent steel casing to bedrock
- 3 drilled shafts per bridge pier

Main Span (2 piers)

- 72-inch-diameter in soil, 66-inch diameter in rock socket
- Permanent steel casing to bedrock
- 10 drilled shafts per bridge pier



Geotechnical Considerations - Bridge Foundations

Foundation Type - Driven Pile Foundations

End Bent 1

- HP14x89 driven steel end bearing piles
- Driven to practical refusal on limestone bedrock
- 90 piles in the structure
- Granular Pile Core
- Foundation soil settlement monitoring prior to driving piles, two telltales to be installed after installation of granular embankment



Geotechnical Considerations - Special Notes

Foundation Special Notes

- Special Note for Drilled Shafts
- Special Note for Non-Destructive Testing in Drilled Shafts
- Special Note for Vibration Monitoring



Geotechnical Considerations - Special Notes

Special Notes for Drilled Shafts - Submittals

- Drilled shaft supervisor experience and qualifications
- Subsurface Exploration Plan - Rock Core Borings
- Drilled shaft installation plan including remediation of cavities
- Concrete trial mix reports
- Drilled shaft preconstruction meeting
- Revised Cavity Remediation Plan(s)
 - Potentially revise after subsurface exploration
 - Potentially revise after technique drilled shaft construction
 - Potentially revise during production drilled shaft construction

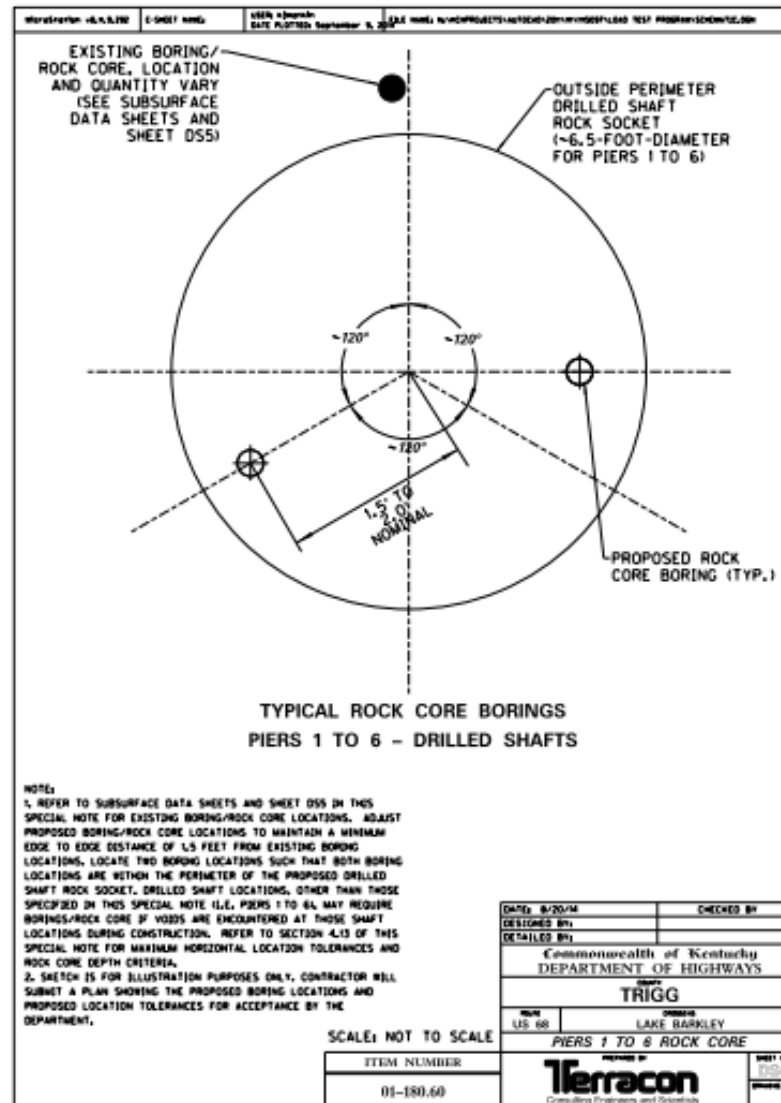


Geotechnical Considerations - Special Notes

Subsurface Exploration

- Additional borings required during construction
- 2 borings per each drilled shaft at Piers 1 to 6
- Further explore depth, thickness and plan extent of cavities/voids
- Shaft 54, End Bent 2 - 1 boring since could not access location during design phase
- Upon completion, may need to:
 - Revise drilled shaft tip elevations
 - Revise drilled shaft quantities
 - Potentially revise Contractor's cavity remediation plan

Geotechnical Considerations - Special Notes





Geotechnical Considerations - Special Notes

Cavity Remediation

- 2 potential remediation methods presented
- Voids less than approximately 1 foot thick - Cavity Stabilization
 - Excavate past cavity
 - Fill socket and cavities with concrete
 - Redrill the concrete and then continue rock socket
- Voids greater than 1 foot thick - Shaft Remediation
 - Excavate rock until cavity encountered
 - Advance steel casing through cavity and seal at bottom of cavity
 - Excavate rock socket below cavity to design tip elevation
 - Likely requires temporary steel casing in soil
 - May require concrete/grout placement and redrilling in void to re-establish drilling fluid circulation



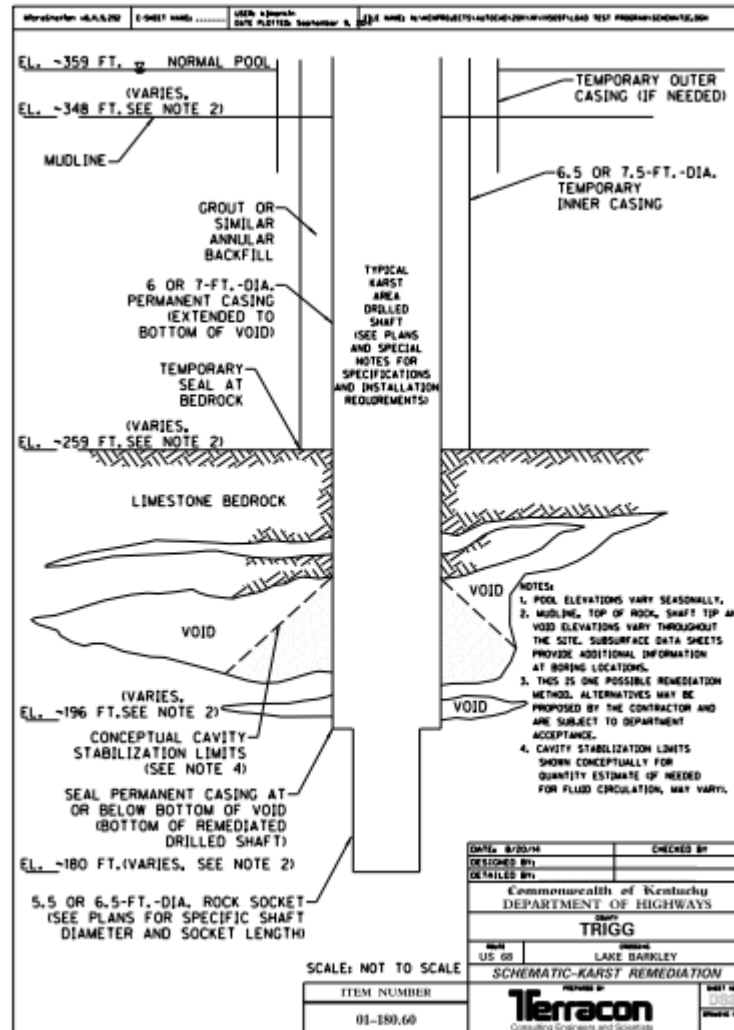
Geotechnical Considerations - Special Notes

Cavity Remediation (cont'd)

- 3 cases:
 - Cavities encountered in design-phase borings
 - Cavities encountered in construction-phase borings
 - Cavities during construction not in design- or construction-phase borings



Geotechnical Considerations - Special Notes





Geotechnical Considerations - Special Notes

Two Technique Shafts Planned

- One at Station 3181+00, Centerline
 - Successfully install prior to installation of any drilled shafts
 - Subjected to same non-destructive testing as production shafts
 - Revise installation methods of production drilled shafts, if required
- One at Station 3160+79, Centerline
 - Successfully install prior to installation of any drilled shafts at Bridge Piers 1 to 6
 - Subjected to same non-destructive testing as production shafts
 - Test of proposed cavity remediation plan
 - May need to revise cavity remediation plan upon completion of this technique shaft



Geotechnical Considerations - Special Notes

Inspection of Shafts

- Special Note for Drilled Shafts
 - Access to top of shafts for inspection purposes
 - SID (Shaft Inspection Device) for bottom cleanliness and any vertical karst features at shaft bottom in Bridge Pier drilled shafts
 - Scratcher/feeler bar for cavities in rock socket sidewalls of End Bent 2 drilled shafts
 - These items are incidental to drilled shaft excavation pay items
- Special Note for Non-Destructive Testing in Drilled Shafts
 - Sonar Caliper Testing used to detect cavities, evaluate verticality, and provide a profile of the rock socket.
 - Crosshole Sonic Logging used to evaluate the integrity of the drilled shafts within the reinforcing cage
 - Thermal Integrity Profiling used to further evaluate the integrity of the drilled shafts within the reinforcing cage and to the edge of the shafts
 - These items are separate pay items in addition to the drilled shaft installation



Geotechnical Considerations - Unique Contract Requirements

- Rock core borings required during construction
- Required to inspect the rock core from the 2014 design-phase borings (5000 series borings) prior to beginning drilled shaft construction
- Remediation of cavities/voids or stabilization of cavities/ voids in drilled shaft bedrock excavation required
- Two technique drilled shafts



Geotechnical Considerations - Unique Contract Requirements

- Both CSL and TIP testing in drilled shafts
- Vibration Monitoring on existing Henry R. Lawrence Bridge
- Settlement monitoring at End Bent 1



Geotechnical Project -Related Information Posted

Since the October 21, 2014 Contractor's Information Meeting, several items have been posted to the Project Related Information page on the KYTC Construction Procurement website for the December 19, 2014 Letting.

transportation.ky.gov/Construction-Procurement/Pages/project-information.aspx?letting=12/19/2014

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Geotechnical Project -Related Information Posted

- Test Boring Logs (Driller's logs and Geologist logs) and CPT Sounding logs from 1997, 1999, 2010, 2011 and 2014 exploration programs.
- Selected Geotechnical Correspondence - mainly design recommendations for foundation design
- Draft body (text only) of the geotechnical report. Entire geotechnical report and appendices will be posted in the near future (goal is to have it posted by December 8th)



Marine Drilled Shafts Pre-Qualification Work Item

- Required for Prime Contractor or Subcontractor to Construct Drilled Shafts at Piers 1-13
- **STRONGLY** recommend getting pre-qualified prior to bidding
- KYTC Division of Construction Procurement

<http://transportation.ky.gov/Construction-Procurement/Pages/Prequalification.aspx>



Marine Drilled Shafts Pre-Qualification Work Item

- Pre-Qualification Requirements for Company and Personnel
- Minimum 10 years experience in drilled shaft and/or heavy marine construction (Need personnel with min. 5 years supervisory experience).
- Minimum 2 projects in last 10 years installing marine drilled shafts in water 20 ft. or deeper with total drilled shaft lengths 40 ft. or deeper.
- Minimum 2 projects in the last 10 years constructing minimum 5 ft. diameter, minimum 10 ft. long rock sockets. At least 1 of these in marine environment.
- At least 1 project in the last 10 years constructing rock socket drilled shafts in Karst bedrock.
- NOTE: Special Note for Drilled Shafts Requires:
 - Supervisory Personnel with karst remediation experience similar this project
 - Project Engineer requirements (may use consultant)



Exploration Drilling Pre-Qualification

- Drilling Consultants are Required to be Pre-Qualified for Geotechnical Drilling Services
- KYTC Division of Professional Services
<http://transportation.ky.gov/Professional-Services/Pages/Prequalified-Firms.aspx>
- NOTE: Project-Specific Drilling Supervisor Requirements Section 2.3 of the Special Note for Drilled Shafts



Rock Core Viewing Logistics

- Call Geotech Branch at 502-564-2374 (8:00 - 4:30 Eastern) at least two business days in advance.
 - One day notice for Wednesday 10/22/14 & Thursday 10/23/14
 - May wish to come 12/1 or 12/2 in conjunction with Pre-Bid Meeting
 - Cores will be available for viewing up through letting date 12/19/14
- Cores are stored in rented warehouse space at the Frankfort Christian Academy. We have maps available.
- Somebody will meet you at the warehouse at the time of your appointment.
- Sign the sign-in sheet at the warehouse.



Maintain Existing Bridge Through Contract until Demo

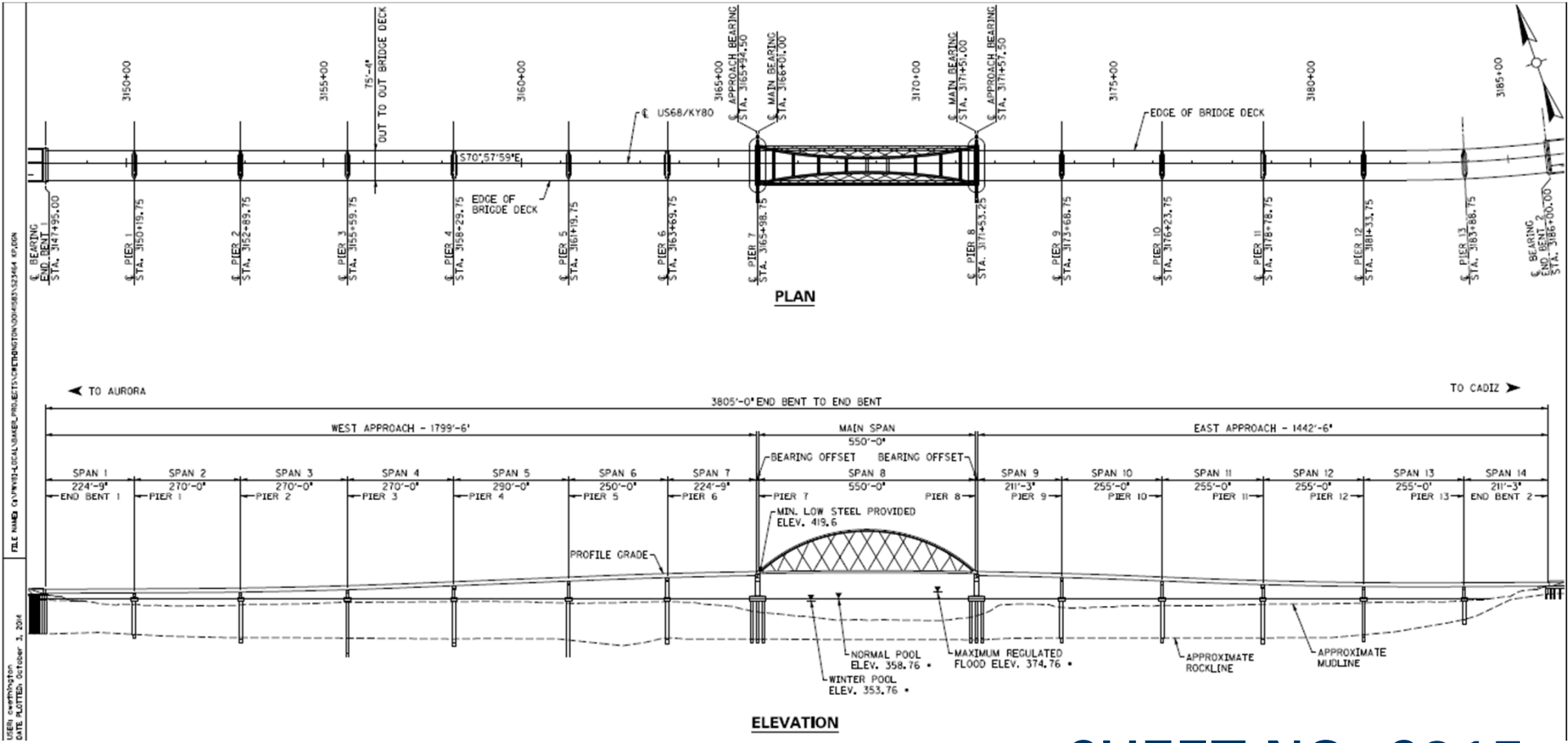


See Special Note
For Maintaining Existing
Bridge

December 2, 2014



Bridge Approach Spans



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 DATE PLOTTED: October 3, 2014

SHEET NO. S015



Approach Bridges

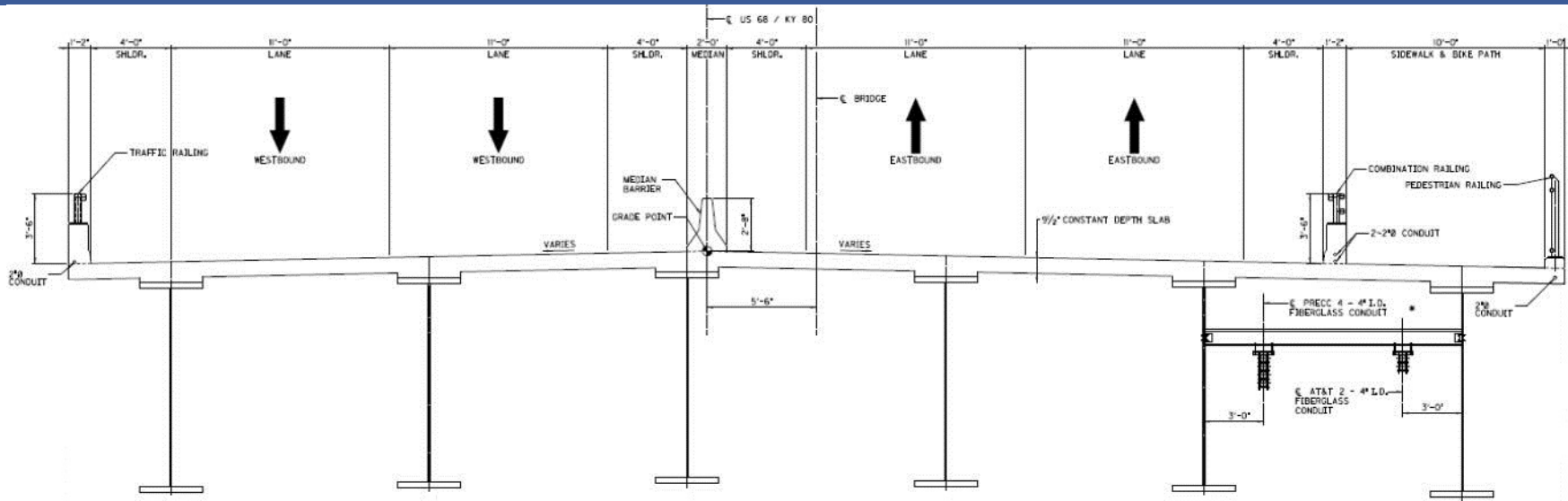
- a) Type and Size
- b) Typical Section
- c) Substructure
- d) Unique Features



Approach Bridges- Type and Size

- Welded Steel Plate Girder Superstructure
8' -6" web depth
- 7-Span (1799' -6") West Approach
290' -0" maximum span length
- 6-Span (1442' -6") East Approach
255' -0" maximum span length
Horizontal curve

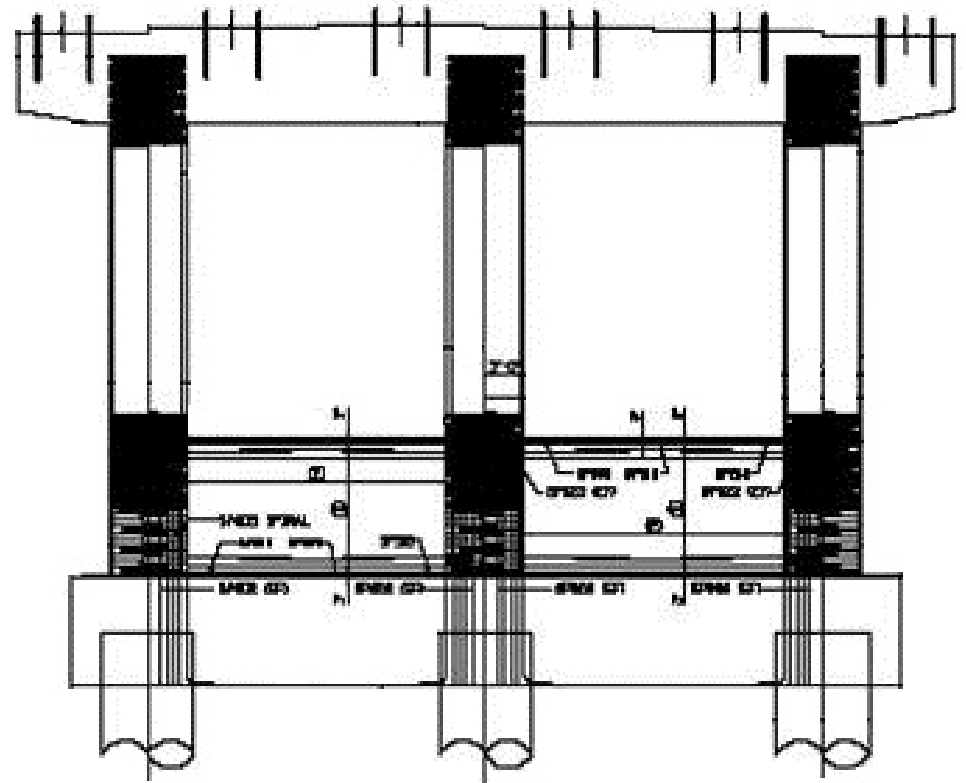
Approach Bridges- Typical Section



9 1/2" cast-in-place slab
6 girders spaced @ 13'-0"
5'-2" overhangs
Utility ducts & 4 platforms

Approach Bridges- Substructure

- Barge impact
10' webwall on column piers
3 wall piers
- Seismic detailing
No splice zones
Spiral provisions
ASTM A706



Approach Bridges- Unique Features

- Seismic Dampers
- Disc Expansion Bearings
- Utility Platforms
- Sidewalk manhole access
- Stainless Steel Inspection Rail





Bridge Features Utility Ductbanks

- AT&T - Two 4" diameter Ducts
- PRECC - Four 4" diameter Ducts

SHEET NOs. S261, S262, S343, and S344

- Manholes Through Multi-Use Path to Access Platforms SHEET Nos. S343, and S344



Bridge Features Combo. Barrier & Ped. Railing





Bridge Features Path Delineation Lighting



Bridge Features *Pedestrian Railing*

- Iconic Image reflecting LBL
- Every 12th Pedestrian Railing Panel
- Seven Variations (Fishing, Camping, Birds of Prey, etc.)

SHEET Nos. S338, S339, S340

See Special Note:
DECORATIVE FENCE PANEL





Main Span Basket-handle Tied Arch



Main Span Concrete three-column Piers



Main Span Basket-handle Tied Arch

Steel Fabrication

- H-Section Rib and Bracing
- Uniformity in fastener sizing,
 - Almost 100% 1" ϕ - A325 bolts
- Minimized welding
- Max Gr 70W plate thickness 2"
- Fracture Critical Members
 - Tie Girder, Knuckle and Floorbeams
- Uniformity in plate thicknesses



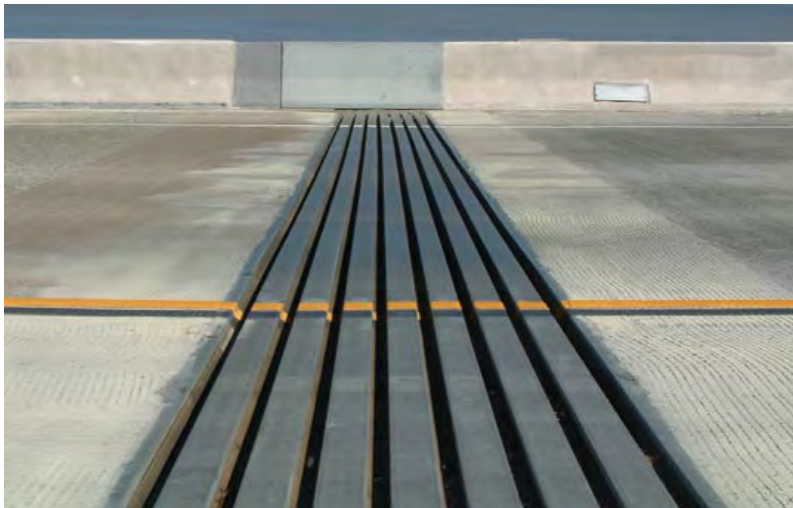


Main Span Arch Rib Feature Lighting



Main Span Unique Features

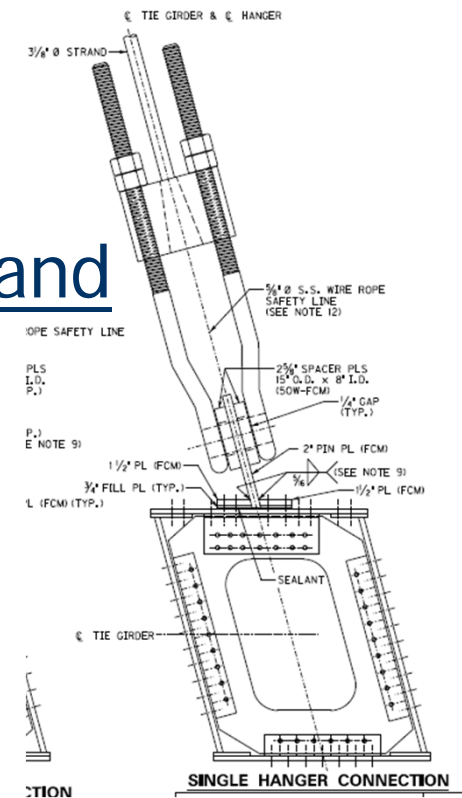
Modular Exp. Joints



Seismic Isolation Bearings

- Owner Provided
- Contractor Install

Bridge Strand Hangers



Stainless steel reinforcing bars

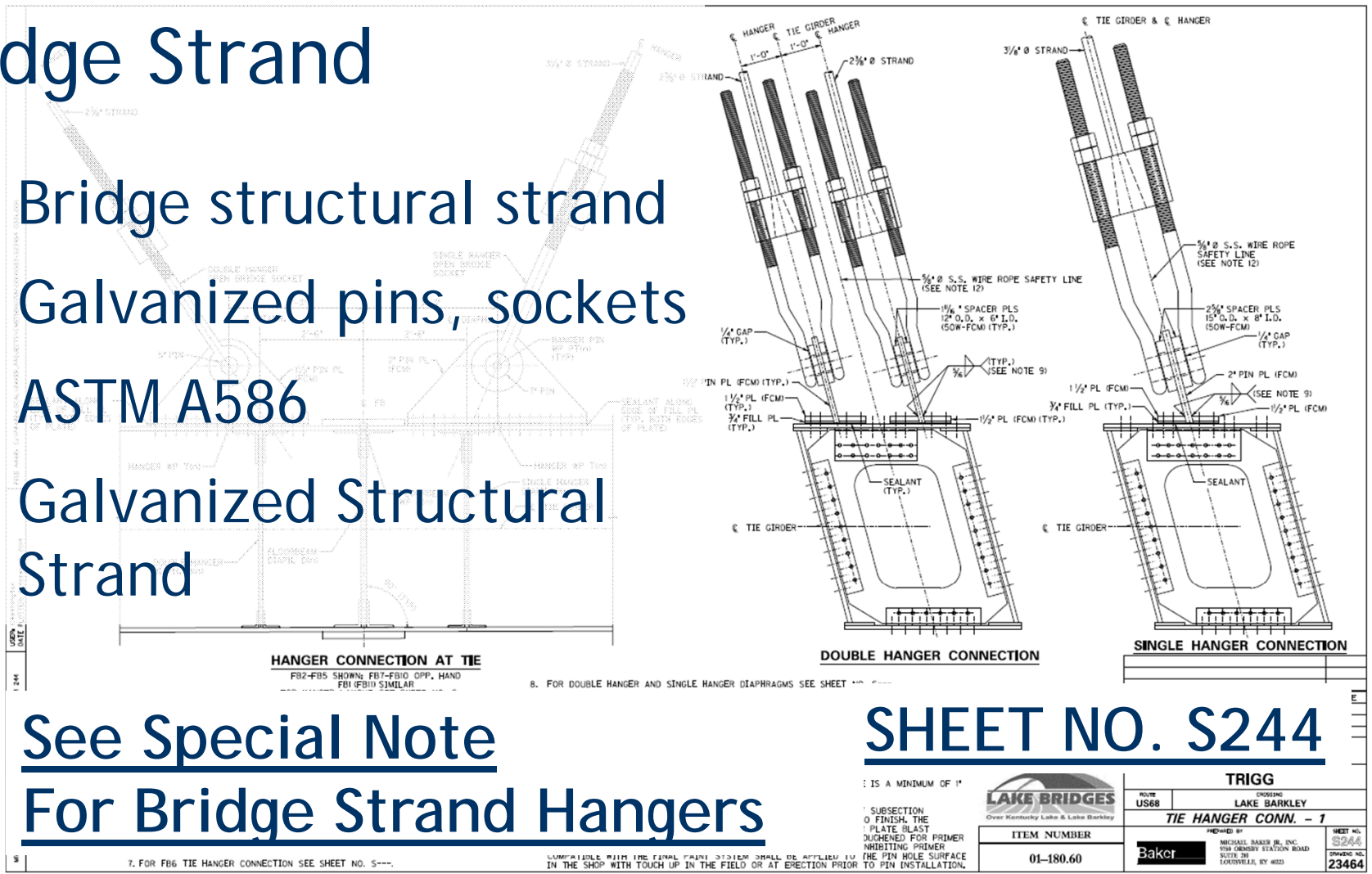
- top mat of slab and barrier

See: Special Notes

Main Span Basket-handle Tied Arch

Bridge Strand

- Bridge structural strand
- Galvanized pins, sockets
- ASTM A586
- Galvanized Structural Strand

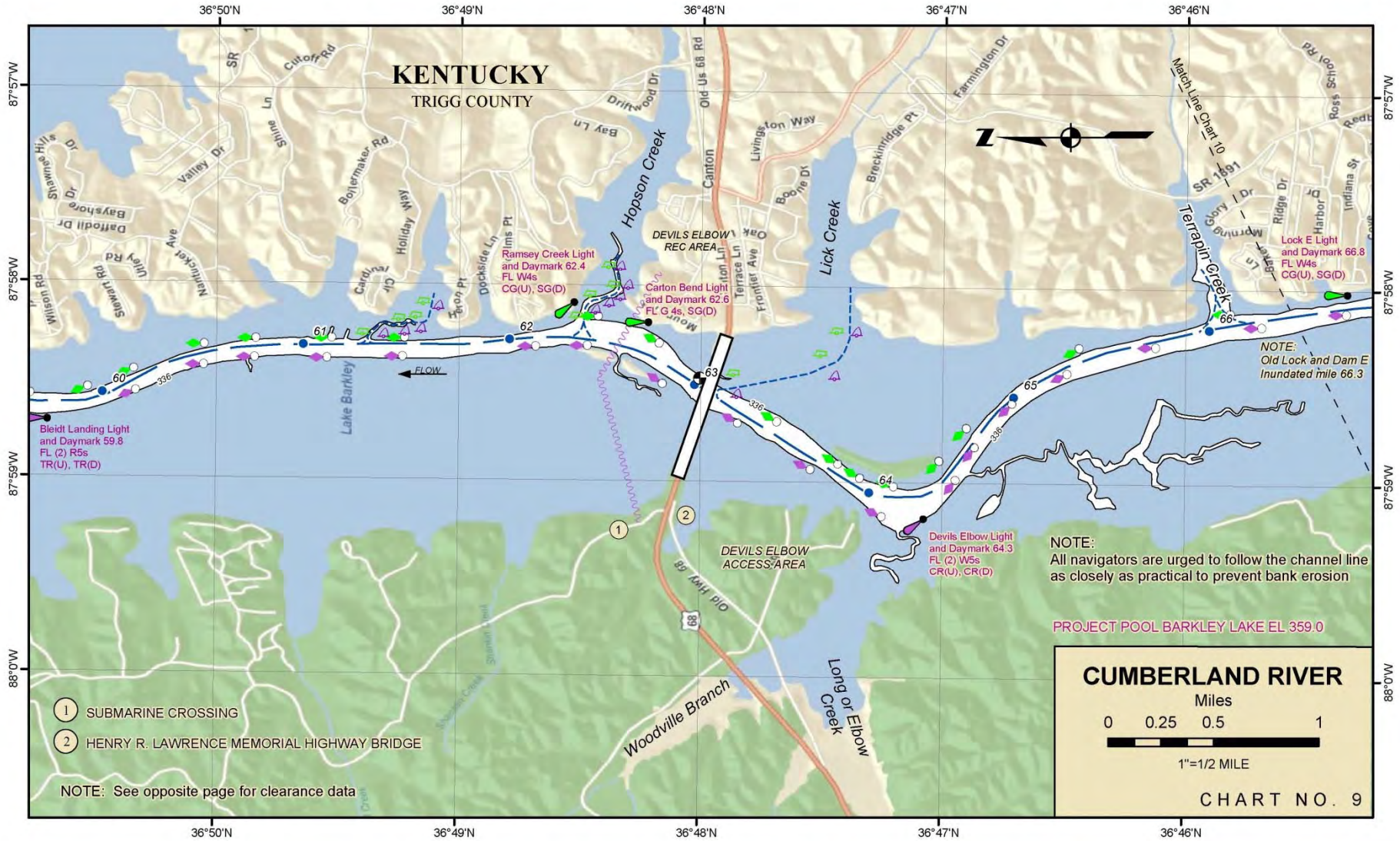


See Special Note
For Bridge Strand Hangers

SHEET NO. S244

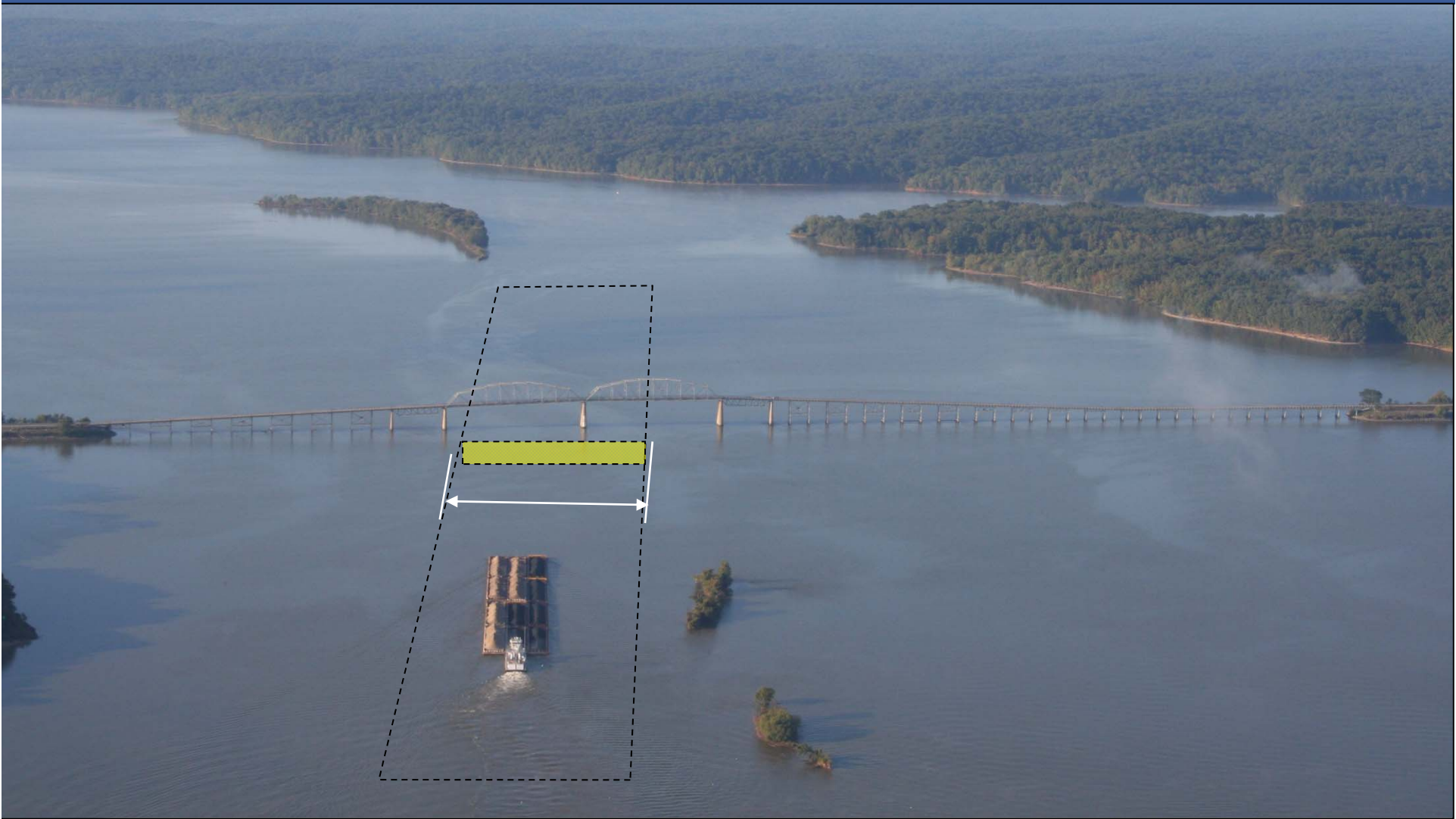


Lake Barkley Navigation Channel





Lake Barkley Navigation Channel - Ultimate





Coast Guard Construction Submittals

USCG Conditions are issued based on review of their Plan. (see BRIDGE PERMIT)

Cofferdam Submittal

- USCG will require Helper Boat During Main Pier Foundation Construction

Falsework Submittal, Construction Submittal & Demolition Submittal

- Helper Boat required depending on impacts to navigation

Removal of Exist. Bridge Environmental Constraints

- Contractor to sweep starting nests from entire bridge.
- No disturbance to Osprey Nest with Eggs.



December 2, 2014





Removal of Exist. Bridge Environmental Constraints

- Demolition of concrete bridge deck is restricted performed when Grey Bats are not present.
- No disturbance to Osprey Nest with Eggs. Contractor to sweep starting nests from entire bridge.
- Remove all demolished material. No Debris left on lake bed.

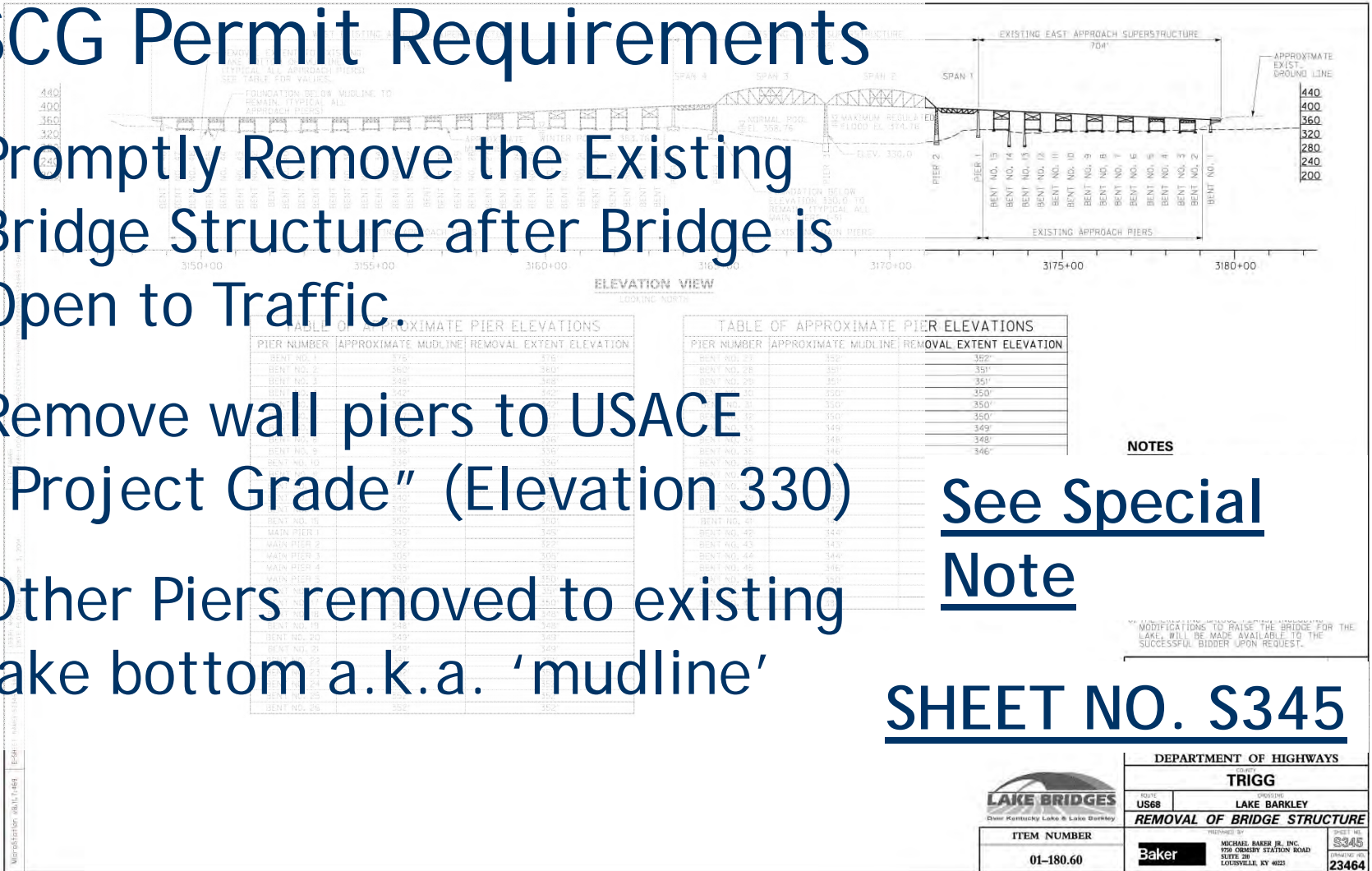


Removal of Bridge Exist. Henry Lawrence Bridge

USCG Permit Requirements

- Promptly Remove the Existing Bridge Structure after Bridge is Open to Traffic.
- Remove wall piers to USACE "Project Grade" (Elevation 330)
- Other Piers removed to existing lake bottom a.k.a. 'mudline'

STAGE I - 00% SUBMITTAL NOT FOR CONSTRUCTION





Contract ID: 14-1279 Construction Schedule

<http://transportation.ky.gov/Construction-Procurement>

- Bids Let
December 19, 2014
- Notice of Award(Anticipated)
March, 2015
- New Bridge Open to Traffic(Milestone)
October 31, 2017
- Project Completion (including Demo)
September 30, 2018





Contract ID: 14-1279

Project Objectives

- Honor Environmental Commitments.
- Improve Commercial Navigation Clearance.
- Maintain Worker, Navigation and Public Safety.
- Enduring Structure for Future Generations.
- Upgraded US68/Ky80 Corridor.



- <http://transportation.ky.gov/Construction-Procurement>



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Letting Details : 12/19/2014

Proposal Information

- Letting Results
- Letting Specific Bulletins
- Project Related Information
- Proposals
- Questions and Answers
- Submit a Question**

Publications

- NOTICE TO CONTRACTORS
- QUALIFICATIONS FOR BIDDERS
- Bid Item Quantity Index
- MATERIAL LISTING
- Bidder Registration Form

Addendum History (by Date)

There are no items to show in this view of the "Proposals" document library.

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[Comments or Suggestions](#)
[Map it](#)

Resources

- [Electronic Planroom](#)
- [Bid Express](#)
- [Required Affidavit](#)
- [Certified Payroll Form](#)
- [Expedite Software](#)
- [Unit Bid Tabulations](#)
- [Anticipated Earnings Schedule](#)
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