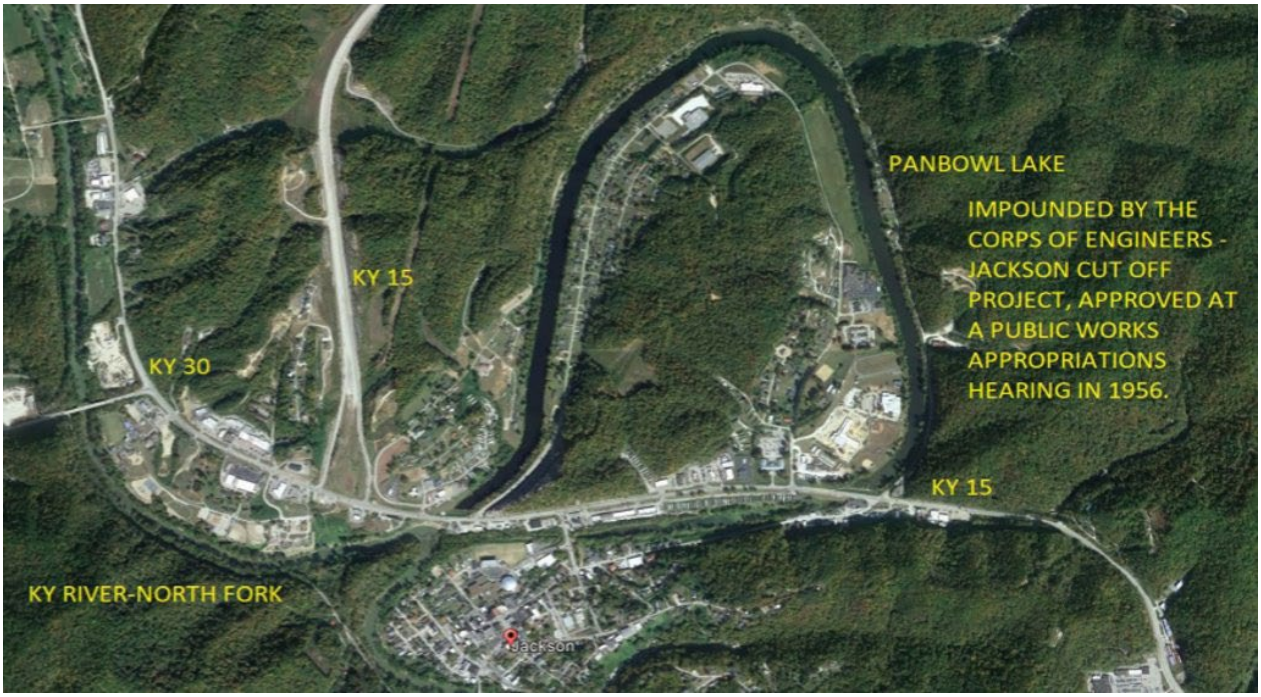
Value Engineering Study

Report – Final



Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

VE Number 202305

Study Dates: November 27-December 1, 2023

KENTUCKY TRANSPORTATION CABINET

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Disclaimer

The information contained in this report summarizes the professional opinions of the Value Team members expressed during the Value Study. These opinions were based on the information provided to the Value Team at the time of the Study. This information may develop further as the project continues, and new data may become available after this report is submitted. Evaluation on how this new information may affect the value proposals and findings contained in this report must be considered when using its content to judge their feasibility or any decisions are made about them.

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PART I

VE Study Results and Proposals

Section

1

Executive Summary

1.1 Value Engineering Study Results

VALUE ENGINEERING STUDY RESULTS SUMMARY				
	Project Name: KY 15, Breathitt County Major Widening			
	Project Location: Breathitt County, Kentucky			
	District or Division: District 10		**Item No.:** 10-376.00	
	Value Study Dates:	November 27 – December 1, 2023	**Value Study Hours:**	32
	Value Study Timing:	Final Design Phase	**Current Budget:**	$47M, including Roadway, ROW and In-lieu Fees

ACCEPTED RESULTS					
	Reliability: Impact on the robustness and service life of the value study subject	Maintained		**Functionality:** Impact on the performance and/or quality of the value study subject	Improved
	Operations & Maintenance: Impact on the robustness and service life of the value study subject	Improved		**Schedule Savings**	Improved

PROJECT OVERVIEW

This project involves construction of improvements that includes widening KY 15 to facilitate completing safety improvements to the earth dams; adding a lane in each direction on KY 15; adding a sidewalk and shared use path along KY 15; and replacing the flap gate structure and installing a new additional sluice gate under Washington Avenue.

The project is due to be let in February 2024 and construction is anticipated to be completed over three seasons. The overall project budget is $47M, including Roadway, ROW and In-lieu Fees; and partially funded through a RAISE Grant of $21M.

VALUE STUDY BENEFITS

The value engineering (VE) team, having reviewed the documents and received the in-briefing presentation by the project team, began to see their opportunity was to contribute both quantitative and qualitative suggestions and improvements to the design that would improve the value of this project through improved function. While the VE team was able to pursue cost savings and/or achieve savings through suggested changes, the real focus of the team was to enhance the quality that was already taking shape in the current design. The VE team had the benefit of providing a new set of lenses in trying to find additional enhancements to the design of the project, as they are not burdened by the history of the project. The VE team could see the project with a fresh perspective, and the value proposals are offered as creative contributions to an excellent design effort that has brought the project to this point. In all cases, the focus was to search for opportunities that will enhance the functionality of the transportation infrastructure while reducing the resources required to build, operate, and maintain it.

It is important to note that this value effort was conducted at the Final Design Phase with the project scheduled to let in February 2024, so the VE team was cognizant that any significant design changes were not feasible, and the effort had a constructability focus.

ACCEPTED RECOMMENDATIONS

Key Value Proposals

- MW-02 Consider making all the culvert wing walls the same thickness for ease of constructability and formwork
- MW-03 Verify that the right-of-way is adequate for cofferdam and segmental pipe installation
- MC-02 Review cost estimate
- MI-11 Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)

In addition to the Value Proposals presented, a review of the Cost Estimate and Maintenance of Traffic Phasing Plan were performed.

1.2 Value Study Background

A Value Engineering (VE) study was conducted on the Final Design Phase documents for the **KY 15, Breathitt County Major Widening**, for the Kentucky Transportation Cabinet (KYTC) on November 30-December 1, 2023. The following VE study background includes discussion on project purpose and need, project/workshop constraints, workshop focus (objectives), and value study highlights. This section is intended as a high-level review.

1.2.1 Project Purpose and Need

A project's "Need" is an identified transportation deficiency or problem, and its "Purpose" is the set of objectives that will be met to address the transportation deficiency. A reasonable solution or range of solutions is developed and evaluated based on these objectives. This project's Purpose and Need are defined below and are excerpted from project documents that were provided to the VE team.

The KY 15 corridor is a vital arterial route into the Appalachian region of Kentucky. In the project area, KY 15 has a three-lane rural section that carries a variety of users through the City of Jackson with access to local roads and businesses. It has higher than average crash occurrences for a facility of this type. Capacity analyses show that it is functioning at level of service (LOS) E, near full capacity. No pedestrian accommodations exist through the majority of this section despite regular pedestrian usage.

LOS is a qualitative measure that describes traffic conditions based on measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. It is rated on an A to F scale by density, with A Representing free-flow conditions through F representing oversaturated conditions with highly congested delays.

The **purpose of this project** is to provide a safer and more efficient corridor for all user types.

The **needs for the project** are based on the highway capacity, crash trends, and pedestrian usage.

- **Congested Traffic Operation:** Recent traffic counts show 12,250 to 13,860 vpd using the KY 15 corridor through the City of Jackson. The 2013 study showed KY 15 operating at LOS E through the project area. Four signalized intersections exist on KY 15 within the 1.15-mile-long corridor contributing to stop and go traffic operations. The 2017 DNA study cites the current volume-to-service flow as 0.89 to 0.96, indicating the corridor is approaching its available capacity. Traffic microsimulation modeling completed in 2019 shows the corridor operates at LOS E during the PM peak hour with commercial access points at BP Station, Hardees, Little Caesars and Valero operating at LOS E or F.
- **Crash Trends:** During the 5-year period from February 1st, 2013 to January 31st, 2018, 177 crashes were reported along mainline KY 15, including 52 crashes resulting in injuries. One fatality was reported during this time period. KABCO Ratings were K (Fatal)=1; A (Incapacitating Injury/Severe)=1; B (Non-incapacitating)=12; C (Possible)=39 and O (None Detected)=124. Predominant crash types include rear ends (46%) and angle collisions (25%). Nearly 63% of the corridor exhibits an above average crash concentration and includes two high crash locations, at the Jett Drive and Washington Avenue signalized intersections.
- **Pedestrian Usage:** City of Jackson residents regularly walk or bike along KY 15 even though no dedicated pedestrian or bike facilities exist. High unemployment, a distressed economy with high poverty levels, and lack of other transportation options are likely contributors to high pedestrian usage. In addition, Census estimates show 48% of Breathitt County households have access to zero or one vehicles, necessitating other travel modes.

1.2.2 Value Study Objectives

The workshop objectives were reviewed at the start of the workshop as follows:

- Apply solid Value Methodology (VM) principles to review project for value (function/resources) improvements
- Eliminate Risks
    - Maintenance of Traffic (MOT) - phased in line with construction of culverts
    - Maintenance of Water (MOW) - construction of culverts
    - Phased utility relocations (underground water, sewer, gas)
    - Earthwork handling
- Review lane width on approach roads - opportunities to reduce from 11' to 10'
- Review ditch bench - opportunities to reduce from 20' to 4'-10'Review H&H implications

1.2.3 Project/Workshop Constraints

For most VE studies, there are restrictions on some parameters of a solution (e.g., laws, standards, market demand, policies, resources, commitments made, etc.). These restrictions are called constraints and can be real or perceived. VE can be an effective tool for turning perceived constraints into opportunities for value improvement.

The following constraints were identified at the in-brief meeting on Monday, November 27, 2023:

- Do not change alignment
- Drainage has been established

1.2.4 Value Study Highlights

Key information was discovered during the various phases of the value methodology, including:

- **Preparation** - Value team review of project documents resulted in Key Issue Memos documenting issues, observations, risks, questions, and targets of opportunity for the value study; these were then shared across all disciplines. This initial effort went a long way toward preparing the VE team to be engaged throughout the workshop.
- **Information** – During the in-brief presentation with the project team, workshop objectives (the focus for the value study) were discussed, and key performance attributes were identified and defined. Also discussed were potential risks (threats) to performance, schedule, and cost. A cost model was also reviewed with a focus on 80% of the costs found in 20% of the items (Pareto). **See Appendix B, Project Analysis.**
- **Function Analysis / Creativity** – Key functions were identified and later, selected by the VE team that proved useful in Creativity, including "Improve Non-Vehicular-Mobility," "Maintain Water (MOW - during construction)," "Convey Stormwater," "Maintain Traffic (MOT during construction)," "Optimize Template (Widen or Reduce)," "Move Excavation," "Avoid Conflict," "Manage Construction." **See Appendix C, Function Analysis and Appendix D, Idea List, and Idea Evaluation.**
- **Evaluation** – Using the previously identified/defined performance criteria and a value rubric, the VE team scored ideas that were believed to optimize value for the project. **See Appendix D, Idea List, and Idea Evaluation.**

- **Development** – During the development of the value proposals, the VE team completed workbooks that included narrative, performance impacts, sketches, and costs. **See Section 2, Summary Results and Individual Proposals.**
- **Presentation** – The out-brief presentation was conducted on December 1, 2023, wherein summary results and key findings were presented for discussion. A copy of the out-brief presentation is provided as part of the study deliverables.
- **Post-Workshop** - Following the out-brief presentation, the VE team completed their team review of value proposals and resolved comments. Because of the advanced timing of the project, Preliminary Draft Deliverables were made available to the project team following the out-brief which included:
    - Recording of out-brief presentation
    - Out-brief presentation slides
    - Summary table of all value proposals
    - Preliminary draft workbooks of all developed ideas

  In addition, draft deliverables were prepared, including Value Study Report, Preliminary Determination Form, and Value Study Summary Results.

- **Implementation** – After the November 2023 value study concluded, KYTC met to discuss and document their preliminary determination of the developed ideas. A summary of the Value Engineering recommendations/design suggestions and KYTC's decisions regarding these recommendations appears in Section 2.2 of this report (Table of Value Proposals – Preliminary Determination).

Section

2

VE Study Results and Proposals

2.1 Introduction

The VE team brainstormed 64 ideas. A total of 16 ideas were identified for further development into Value Proposals (9) or Design Suggestions (7). Their detailed development information can be found under "**Individual Value Proposals**" later in this section. Also, ten Design Comments were identified and are listed in this section so they can be considered in the next phase of design development. The following table tallies and describes each category.

Table 2-1: Classification of Brainstormed Ideas into Value Proposals

Proposal Type	Description	Development Status in this Report	Number of Proposals
Value Proposals	Proposals that avoid or add cost for the initial or first cost of the project being studied.	Developed into write-ups	9
Design Suggestions	Proposals that do not have any cost impact (Design Suggestions) or could not be costed during the study.	Developed into write-ups	7
Design Comments	Recommendations derived from observations made during the VE team's review of the project documents and/or during the Creativity Phase and scored as a "DC" during the Evaluation Phase. These may be considered by the project design team in the next phase of design development.	No write-up is needed	10

It is important to reiterate that the definition of value is as follows:

$$\text{Value} = \frac{\text{Function Performance}}{\text{Resources}}$$

Understanding Function Performance is key in the evaluation and later recommendation of an idea to become a Value Proposal. By definition, a Value Proposal may either decrease or increase the initial cost of the project under study (noted as the "Resources" denominator in the formula), but it is expected to improve some elements of the project performance (the numerator), therefore improving the value of the project. To objectively understand this, performance criteria for this project were developed with the VE team. These were used to both evaluate and develop the creative ideas and are detailed under **Performance Evaluations** in Appendix B: Project Analysis later in this report.

2.2 Table of Value Proposals

The following table lists the disposition of all proposals that were developed as part of the value study. Please note that both quantitative proposals and qualitative proposals are included in the table. The table includes the Value Proposal (VP) Number, Value Proposal Title, and Initial Cost Avoid (Add), Life-cycle Cost Avoid (Add), and Total Cost Avoid (Add) for each developed proposal.

The last column, Preliminary Decision Rationale, documents the justification of the decision to accept or reject the value proposal.

Table 2-2: Summary of VE Study Results

Idea No.	Idea Title	Score	Redesign Effort	Reliability: Impact on the robustness and service life of the value study subject	Functionality: Impact on the performance and/or quality of the value study subject	O&M: Impact on the robustness and service life of the value study subject	Schedule Impact	Initial Cost Avoidance / (Cost Add)	PRELIMINARY DECISION: Accept Or Reject**	PRELIMINARY DECISION: Rationale**
IN	**Improve Non-Vehicular-Mobility**									
IN-02	Consider expanding shared use path up to Main Street	4	Less than one week	Improved	Improved	Degraded	Maintained	($16,000)	Reject	EA Partners showed a typical cross section at the east Dam where there is currently a proposed guardrail. Adding a shared use path along this section and adding a 5-foot clearance to the guard rail would take some of the east Dam slope protection into the existing backwater channel or outside of ROW. The Design team also noted that with the high embankment and 2:1 slope adjacent to a shared use path would warrant adding protection for cyclists. Guardrail is lower than the required 42-inch-high bicycle railing. Adding bicycle railing in front of the guardrail was seen as a risk that could compromise the effective operation of the guardrail.
MW	**Maintain Water (MOW - during construction)**									
MW-01	Simplify inlet and outlet structures to shorten construction duration	DS	Extensive redesign effort; potential to turn over to Contractor to perform modifications	Maintained	Maintained	Maintained	Improved	N/A	Reject	The location of the sluice gate and flap gate has been developed with consideration given to construction, maintenance, operation and flood defense.
MW-02	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork	DS	Moderate redesign effort	Maintained	Improved	Maintained	Maintained	N/A	Accept	Wall thickness and additional reinforcement for hydrostatic pressures seen as advantageous to the design and construction of the structures.
MW-03	Verify that the right-of-way is adequate for cofferdam and segmental pipe installation	DS	N/A - VE Team verification	Maintained	Maintained	Maintained	Maintained	N/A	Accept	The project team believes there is sufficient ROW to construct 10 x 10 culvert.
MW-04	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place	DS	Extensive redesign effort; potential to turn over to Contractor to perform modifications	Maintained	Maintained	Maintained	Improved	N/A	Reject	Cast-in-place is the KYTC preferred culvert construction unless constructability considerations present reasons to consider prefabricated culvert structures. Use of precast elements for the riser structure would pose design, construction and maintenance challenges at the interfaces between precast elements when considering the hydraulic loading pressures from flood events.
MW-08	Evaluate alternatives to safeloading existing 6'x6' culvert across KY 15 at Main Street	4	VE Team does not anticipate this will require redesign effort	Maintained	Maintained	Maintained	Maintained	$88,000	Reject	The existing 6x6 culvert is to be abandoned. The design team proposed safe loading. The VE suggested the use of pneumatic backstowing. The design team suggest pneumatic backstowing is a process/method used primarily for abandoning elements of mineworkings. Geotechnical team suggest the pneumatic backstowing alternate method for abandoning the culvert would not be applicable in this situation and the proposed safe loading would be a more suitable and reliable approach.

Idea No.	Idea Title	Score	Redesign Effort	Reliability: Impact on the robustness and service life of the value study subject	Functionality: Impact on the performance and/or quality of the value study subject	O&M: Impact on the robustness and service life of the value study subject	Schedule Impact	Initial Cost Avoidance / (Cost Add)	PRELIMINARY DECISION: Accept Or Reject**	PRELIMINARY DECISION: Rationale**
MW-10	Investigate changing box culvert across Main Street to a pipe	4	Moderate redesign effort	Maintained	Maintained	Maintained	Improved	$830,000	Reject	The Design team believe the construction of a RCBC in this situation will afford the project with a structure that would have a longer design life and easier ongoing cleaning/maintenance. A box culvert would also be less susceptible to the implications of flooding and standing water within the backwater channel resulting from flood events within the Panbowl Lake watershed. Maintaining the capacity of the outflow from the bank box DBI was an important consideration to the district during design development.
MT	**Maintain Traffic (MOT during construction)**									
MT-07	Review the MOT phasing plan	DS	N/A - VE Team review	Maintained	Maintained	Maintained	Maintained	N/A	(See Comments)	**MT-07** incorporated a number of sub comments which have been reviewed and commented on below: **MT-01: Review haul route for east end of project -** The design team noted that the proposed MOT phasing allows material to be hauled along KY 15 within the proposed widening areas from east to west of the project. ***Design Team Decision:*** *No change to MOT Phasing required.* **MT-02: Review haul route for Washington Avenue/south side of Project -** Hauling material to south of KY 15, to the channel and west Dam will require a means and method working from the contractor. It is noted that the school operates as an entrance off Washington Avenue for school pickup/drop off, but parent leave from the back of the school property towards Jackson. Flag crossing and coned lanes from KY 15 to Bobcat Lane could be utilized outside of school hours. Proposed MOT phasing also allows access for material to be hauled from east to west on the south side of KY 15 with usual consideration given to maintaining business accesses and signalized intersections. ***Design Team Decision:*** *No change to MOT Phasing required.* **MT-03: Review haul route for the waste area -** A waste site has been identified and during phase 2 design it was proposed to haul off road and along the rear of properties adjacent to Panbowl Road. During ROW negotiation, it became clear the property owners would not allow this therefore the haul route would be along Panbowl Road. The design team also recognize that the contractor could propose their own waste site by negotiating with other land owners. ***Design Team Decision:*** *No change to MOT Phasing proposed.* **MT-04: Review Washington Avenue closure and secant wall construction** & **MT-06: Extend the duration of the allowable closure to construct box culvert elements, secant wall, and roadway widening between Bobcat Lane and KY 15 -** Closure of Washington Avenue is for the construction of concrete pavement and is expected to be undertaken during the school summer break. Secant wall construction would extend for a longer period (est 5

Idea No.	Idea Title	Score	Redesign Effort	Reliability: Impact on the robustness and service life of the value study subject	Functionality: Impact on the performance and/or quality of the value study subject	O&M: Impact on the robustness and service life of the value study subject	Schedule Impact	Initial Cost Avoidance / (Cost Add)	PRELIMINARY DECISION: Accept Or Reject**	PRELIMINARY DECISION: Rationale**
										month) and temporary widening and reduced lane widths on Washington avenue will be used to maintain traffic on Washington Avenue and access to the school. RCBC work would not impact Washington Avenue beyond a short-term lane closure for material delivery or concrete delivery. ***Design Team Decision:*** *No change to MOT Phasing proposed.* **MT-08: Send haul trucks on Panbowl Road to east dam area in lieu of KY 15 -** Using Panbowl Road to the east dam would mean material would be hauled using road trucks possibly increasing earthworks costs. ***Design Team Decision:*** *No change to MOT Phasing proposed.* **AC-01: Verify that there are no utility conflicts with MOT and/or construction phasing -** Nesbitt Engineering are developing underground utility relocations based on the project MOT phasing. ***Design Team Decision:*** *Recommendation has been met.* **MC-05: Review project for buildability -** The project has undergone an independent constructability review. ***Design Team Decision:*** *Recommendation has been met.*
OT	**Optimize Template (Widen or Reduce)**									
OT-01	Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate	4	Minor modifications	Maintained	Maintained	Improved	Maintained	$26,000	Reject	KY 1812 should not be reduced. 55 mph requires 11’ min lanes. It was recognized that other proposed routes could be reduced from 11’ to 10’. It is noted that KY 3068 is a short length and has a turn lane. The design team considers the benefits of the additional lane width for maintenance of traffic for lake embankment maintenance outweighs the value of a small monetary savings.
OT-03	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.	4	Potentially a week or so redesign effort	Improved	Maintained	Maintained	Degraded	$96,000	Reject	The proposed ditch is a geotechnical required fall bench for the cut along KY 15. While this may be possible to be reduced, a reduction to 4’ would not be considered feasible. It is also noted that if shale is required to be removed from the ditch/fall bench then maintenance staff would need a wider ditch to access with machinery to clean the ditch. It is also noted that the additional geotechnical investigation, which was not done during the design phase as the property owner denied access, will be completed during construction. Reducing the ditch width at this time may be premature depending on the outcome of the remaining geotechnical investigation.
OT-06	Shift Sta. 509+50 to Sta. 518+00 south to match existing edge of pavement	4	Does not require significant redesign effort	Maintained	Maintained	Degraded	Maintained	($40,000)	Reject	The Design team believes this should be “shift to the south” due to the orientation of the plan sheets. The Design Team notes that during design the disturbed limit of KY15 was at the top of the existing east dam after adding the C&G and sidewalk. The alignment was established with this consideration. Following the recent floods of Panbowl Lake and the KY River, the east dam embankment was identified as requiring slope protection which was added to the proposed KY 15 widening project and the existing slopes required adjusting closer to a 2.5:1 slope.

Idea No.	Idea Title	Score	Redesign Effort	Reliability: Impact on the robustness and service life of the value study subject	Functionality: Impact on the performance and/or quality of the value study subject	O&M: Impact on the robustness and service life of the value study subject	Schedule Impact	Initial Cost Avoidance / (Cost Add)	PRELIMINARY DECISION: Accept Or Reject**	PRELIMINARY DECISION: Rationale**
ME	**Move Excavation**									
ME-01	Designer or KYTC to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 555	DS	N/A	Improved	Improved	Improved	Degraded	N/A	Reject	(Please refer to comments on Proposal **OT-03**)
MC	**Manage Construction**									
MC-02	Review cost estimate	4	None	Improved	Maintained	Maintained	Maintained	($364,000)	Accept	The Design Team considers the roadway excavation rate of $12 to still be applicable. It was also noted that a 15% contingency is still being used due to supply chain and material cost increases outside of estimator rates.
MI	**Miscellaneous**									
MI-06	Extend sidewalk or shared use path from Main Street to beginning on the left side	4	Simple - not more than a day	Improved	Improved	Degraded	Maintained	($17,000)	Reject (Defer to a future project)	This project has connectivity to the bank parking lot and pedestrians would still have possible access to the east albeit not on a dedicated sidewalk. The addition of sidewalks to the south of KY 15 and east of Mainstreet will be reviewed following the construction of this project and could be incorporated in the future. It was also noted that if a sidewalk would be constructed then this should be done in such a way as to be compatible to the long term desire to extend the 4 lanes on KY 15 to the east.
MI-08	Review value add vs cost of upgrading all sidewalks to shared use paths	4	Minor design revisions	Maintained	Improved	Degraded	Maintained	($149,000)	Reject (Defer to a future project)	There are challenges along the section near Hardees with the possible need for a bicycle railing behind a shared use path. This would stop pedestrian access from the sidewalk to the businesses along this corridor. Also the challenge of extending the shared use path from Jett Drive to Main Street has previously been discussed. It is noted that the fall bench at the base of the Washington Avenue cut has been designed from the back of berm so an 8' shared use path could be constructed in the future without the need to widen this fall bench as the fall bench could be measured from the back of sidewalk. It is noted that the design team had discussed the possibility of extending the shared use path along KY 15 but during design development it was decided that if this is done then it would be done in the future if Jackson developed trails or leisure activities around Panbowl lake. The design team did not think this was the appropriate time to include it within this project.
MI-11	Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)	DS	Small impact to redesign	Improved	Maintained	Improved	Maintained	($10,000)	Accept	Typical section will be developed to help communicate the intent of the geotechnical notes. Similar to the detailed typical sections for the channel and west dam. Settlement platforms will also be included within the proposed geotechnical notes and recommendations.

2.3 Design Comments

Design comments represent another category of recommendations as a result of the review of the project documents and subsequent Key Issue Memos (KIM), work that was accomplished by the VE team in preparation for the workshop. In addition, during the brainstorming process (Creativity Phase), some ideas were later determined (Evaluation Phase) to also be design comments and, as such, are included on the list below.

The following table summarizes all those findings the VE team identified during the preparation and performance of the VE study that are stand-alone comments for the project design team to consider in the next phase of design development. They should be considered self-explanatory and do not require a formal response to accept or reject.

Table 2-3: Design Comments

Idea No.	Idea Title
CS-02	The reinforcement on the northwest wall opening on Drawing No. 28745 is less than required by ACI 318-19 8.5.4. LRFD does not cover this detail well
CS-04	Add an access ladder inside the inlet structure at Washington Avenue for maintenance access
CS-05	Consider standby pumps during construction; modify MOT note to include this language
CS-06	Give the Contractor the ability to shutdown Washington Avenue for flooding events during construction of culvert structures
CS-07	Add a backup system to open the gate in the event of mechanical failure
MT-05	Include in specifications language to allow for Washington Avenue closures during flooding event
OT-04	Steepen Lakeside Drive to decrease fill in the Panbowl area
MC-01	Review construction schedule NOTE: The VE team reviewed the project schedule that was provided in the Grant. There was not sufficient detail to perform a thorough review. It is further noted that the Contractor will be providing a construction schedule for KYTC review.
MI-09	12' Radius on Entrance at Rt Sta. 535+90 is less than the normal 25' used at a minimum throughout. If a wider entrance is to compensate, then stripe island to provide direction and separation in the entrance.
MI-10	15'/10' radii at entrance Lt. Station 560+15 is less than the 25' used throughout on the mainline

2.4 Individual Value Proposals

The following pages detail the Value Proposals developed as part of the study by the VE team; each proposal includes the following information:

- Unique Identifying Number (XX-##)
- Creative Idea Title
- Function Identification
- Associated Ideas
- Value Proposal Synopsis – A brief statement summarizing the proposal's value proposition
- Cost Avoidance (or Cost Add) – Estimated cost avoidance or cost add (a positive number indicates a reduction in cost and a negative number indicates an increase in cost)
- Schedule Savings (improved, maintained, degraded) – Time savings anticipated to result from the proposal
- Qualitative Benefits (improved, maintained, degraded)
    - Reliability – Impact on the robustness and service life of the VE study subject
    - Operations & Maintenance – Impact on future and long-term operations and maintenance related to the VE study subject
    - Functionality – Impact on the performance and/or quality of the VE study subject
- Baseline Concept Description – Brief description of the baseline concept (Stage II, 30% design) that would be changed by the relevant value proposal
- Value Proposal Description – Brief summary of the value proposal relative to the baseline concept
- Advantages and Disadvantages – Bulleted list of potential benefits and drawbacks of the value proposal
- Discussion and Justification – Justification, including technical considerations, cost considerations, project management considerations, stakeholder acceptance, implementation considerations
- Performance Impacts – Impact of the value proposal on the performance criteria (see Appendix B for a description of each performance criteria)
- Out-brief Presentation Comments & Response – Addresses any comments or feedback received during the out-brief presentation
- Sketches and Diagrams – To assist the reader in visualizing how the proposal differs from the baseline concept
- Cost Estimates (initial and O&M costs, where applicable) – Supports cost avoidance / cost add, including any assumptions and calculations

The costs used are those provided by KYTC and the design team. Where the VE team has offered alternate costs, they are provided for information only, reflective of the short duration of the Value Engineering Study and should be evaluated by the KYTC and the design team. Value Proposals are provided for their evaluation and implementation exclusively by KYTC and the design team.

VALUE PROPOSAL

IN-02

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider expanding shared use path up to Main Street
FUNCTION	**Improve Non-Vehicular-Mobility**

VALUE PROPOSAL SYNOPSIS:

Change the sidewalk from Main Street to Jett Drive, about Lt. Sta. 511+50 to Lt. Sta. 520+40, to an 8' Shared Use Path using the 3' utility strip between the curb and sidewalk as was done on the current proposed Shared Use Path. This would allow bicyclist as well as pedestrians to have connectivity with the restaurants, Walgreens, gas station, etc., at the beginning of the project.

Reliability	**Improved**	**Functionality**	**Improved**	$	**Initial Cost Avoidance (Add)**
O&M	**Degraded**	**Schedule Impact**	**Maintained**		**($16,000)**

BASELINE CONCEPT:

Main Street to Jett Drive, about Lt. Sta. 511+50 to Lt. Sta. 520+40 has proposed a 5' wide sidewalk.

VALUE PROPOSAL:

Connect the proposed 8' Shared Use Path that ends at Jett Drive to Main Street by widening the proposed 5' sidewalk. Increase the width of the proposed 5' sidewalk to an 8' Shared Use Path. This provides a more protected/defined travel mode for bicyclist, keeping them from either riding on the current proposed sidewalk, or in the roadway. This will help to accommodate the 48% of households with zero to one car.

ADVANTAGES:	**DISADVANTAGES:**
● Connects bicycle usage with destination points, Ie. bank, Walgreens, gas station, restaurant, etc.	● Eliminates utility strip
● Keeps bicyclist out of roadway	● Additional future potential maintenance cost
● Meets part of the Purpose and Need for the Project for not non-motorized users	●
● Connectivity for non-motorized vehicles is completed within the project limits	●
●	●

$ **COST SUMMARY**	**Initial Costs**	**O&M Costs**	**Total Life Cycle Cost**
BASELINE CONCEPT:	$668,000	$0	$668,000
VALUE PROPOSAL:	$684,000	$0	$684,000
TOTAL (Baseline less Proposed)	($16,000)	$0	($16,000)
			ADD COST

VALUE PROPOSAL

IN-02

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider expanding shared use path up to Main Street

DISCUSSION & JUSTIFICATION:

• Technical Considerations: Change about 890' of the sidewalk from Main Street to Jett Drive, about Lt. Sta. 511+50 to Lt. Sta. 520+40, to an 8' Shared Use Path using the 3' utility strip between the curb and sidewalk as was done on the current proposed Shared Use Path. This would allow bicyclist as well as pedestrians to have connectivity with the restaurants, Walgreens, gas station, etc., at the beginning of the project. Follow the design of the current Shared Use Path where the additional 3' comes from using the 3' utility strip, this recommendation also would use the current proposed 3' utility strip

• Cost Considerations: There will be some additional cost.

• Schedule Impacts / Project Management Considerations: This change should be rather simple and would mostly likely be completed in a less than a week by remodeling the Shared Use Path, editing the typical sections as shown on the attached sketch, and editing the cross sections as shown on the attached sketch.

• Risk Considerations: Adding this Shared Use Path removes risk associated with the reality of putting bicyclist either into the roadway or riding on the sidewalk with pedestrians, which is not supposed to be done.

• Stakeholder Acceptance: This additional path will help to fully accommodate the area to the best the project can provide for non-motorized users meeting the Purpose and Need.

• Implementation Considerations: Might be advisable to share with the utility companies so that they know the utility strip will have the Shared Use Path on it.

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

IN-02

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

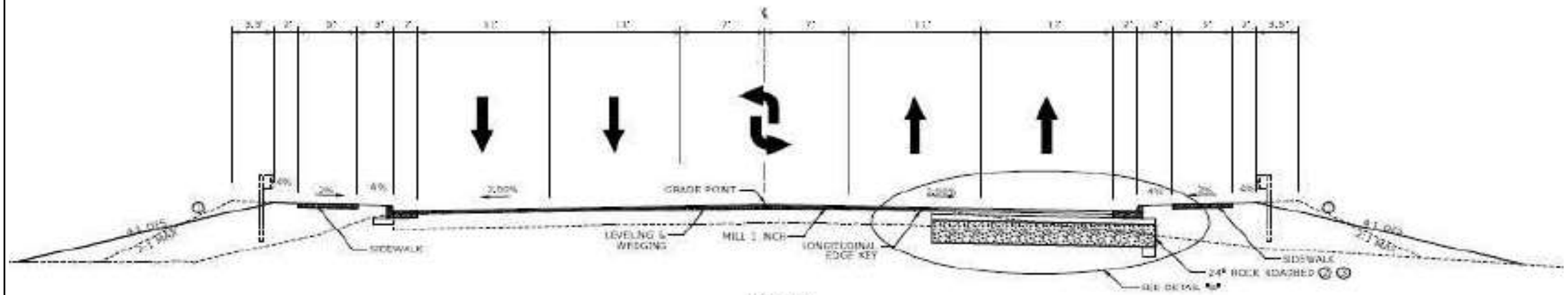
TITLE	Consider expanding shared use path up to Main Street

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No Change	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No Change	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Degraded
Justification for Impact Score	Increases maintenance with increase in facility width.	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score	No Change	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Improved
Justification for Impact Score	Environmental impacts for business, recreation, etc., would be increased with better connectivity for Non-motorized users.	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	Schedule should not change as this work is minor.	
Risk	An assessment of the identified risks of the project.	Improved
Justification for Impact Score	Removes risk associated with not providing bicyclist a facility forcing them into the road.	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No Change	

TITLE	Consider expanding shared use path up to Main Street

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

IN-02

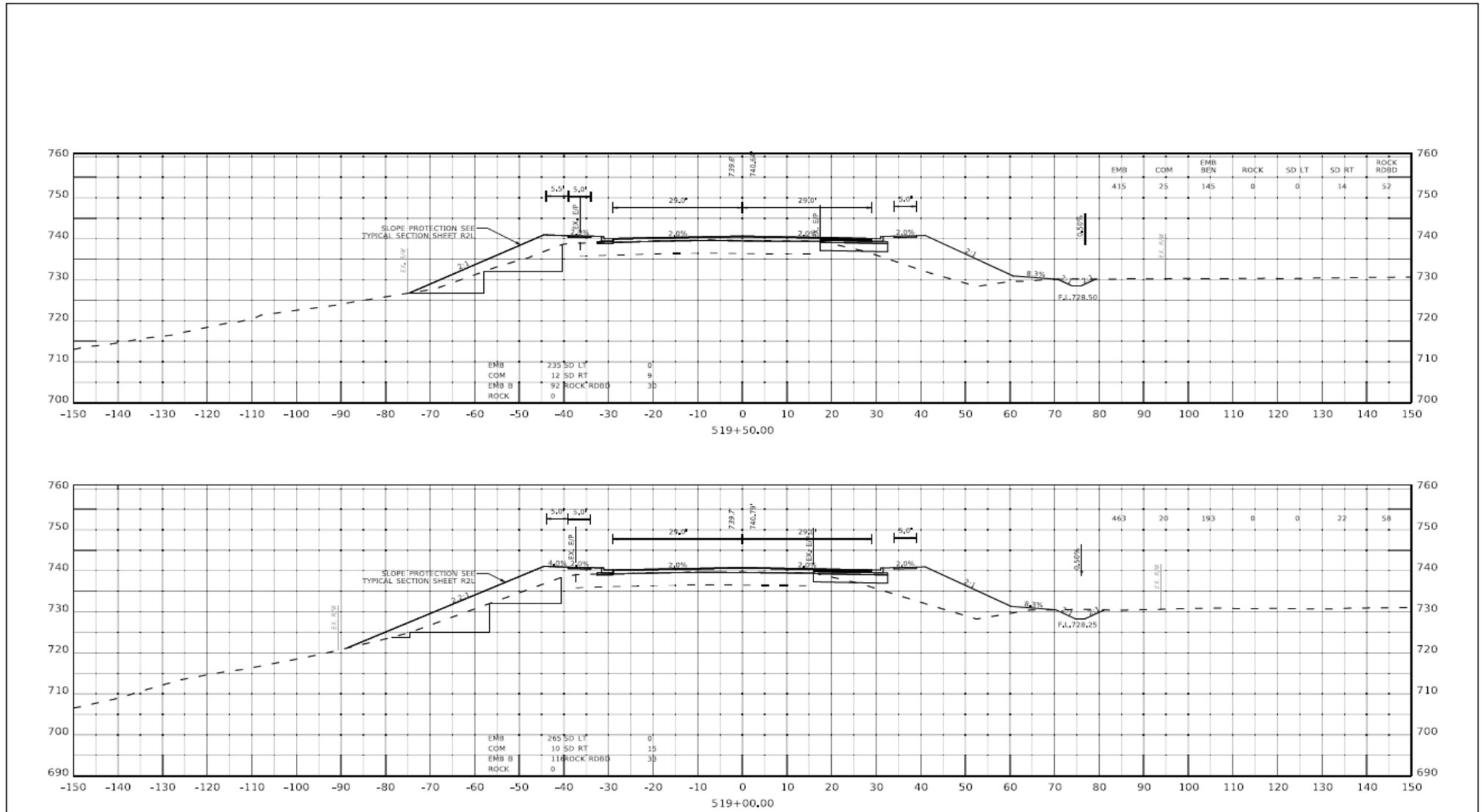
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider expanding shared use path up to Main Street

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

IN-02

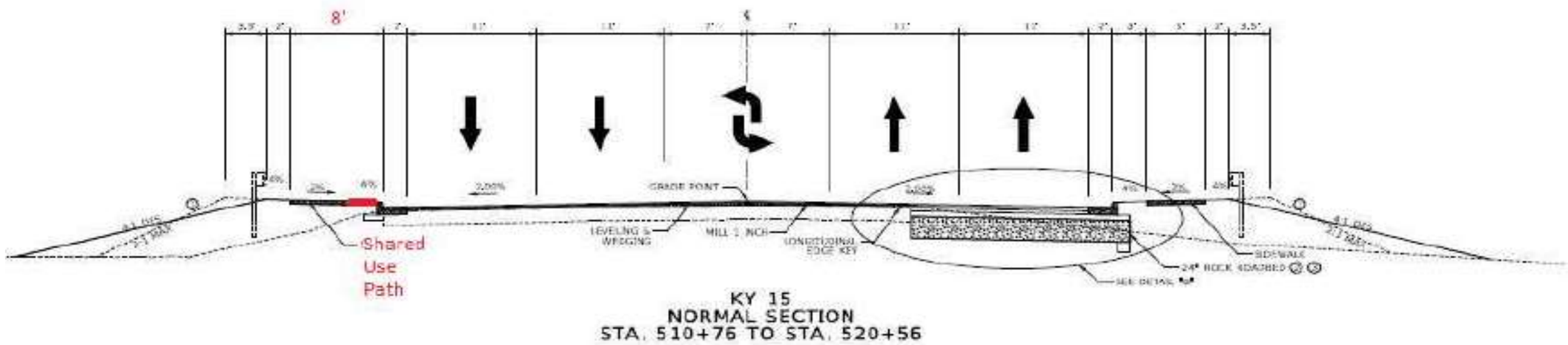
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider expanding shared use path up to Main Street

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

IN-02

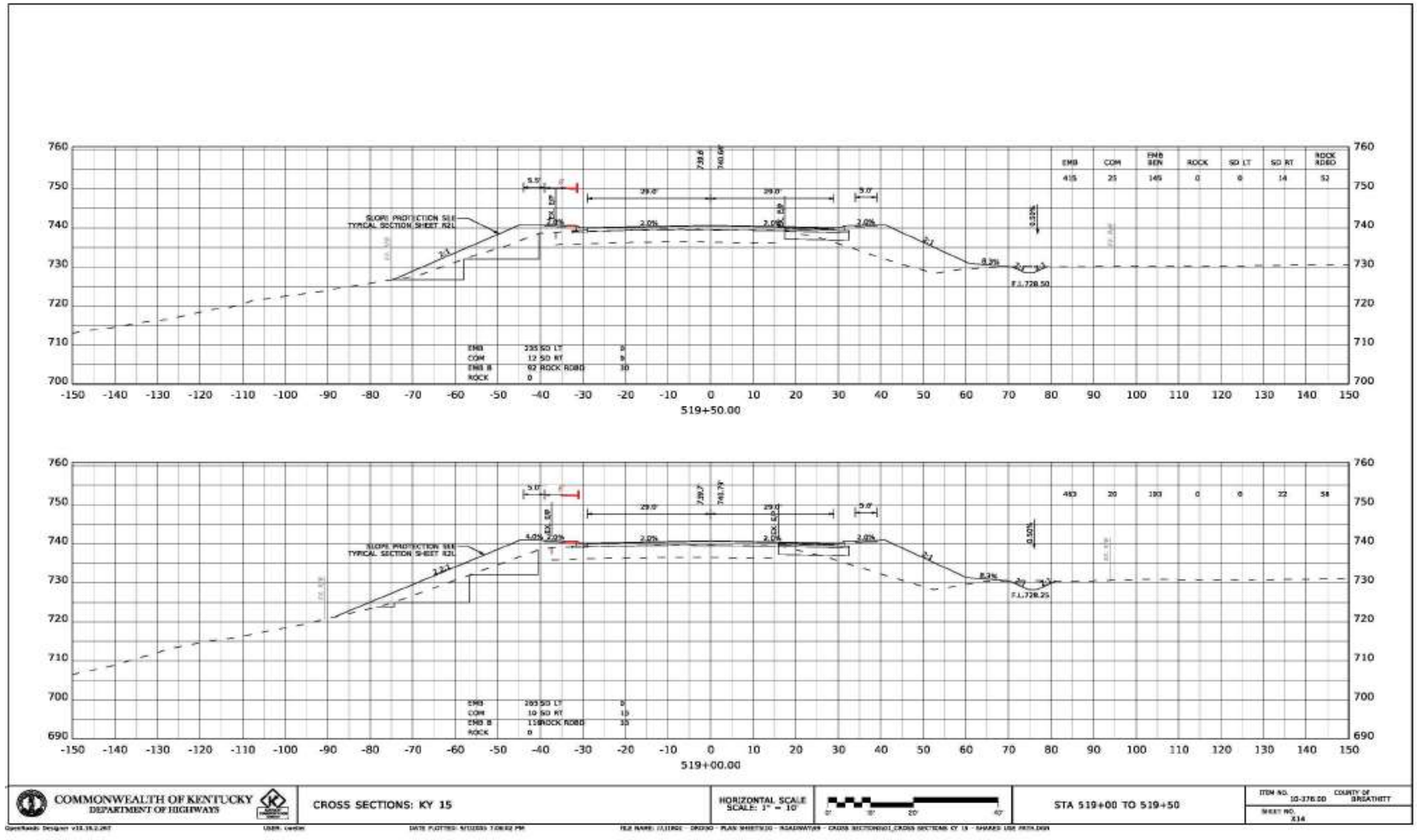
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider expanding shared use path up to Main Street

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

IN-02

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider expanding shared use path up to Main Street
Assumptions & Calculations	The increase in quanitites is for the additional width to be added.

DESIGN ELEMENT	**BASELINE CONCEPT**				**VALUE PROPOSAL**		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Sidewalk-4in Concrete	SY	7,682	$43	$330,172	7,978	$43	$342,894
Crushed Stone Base	Ton	10,295	$33	$337,779	10,397	$33	$341,126
TOTAL				$668,000			$684,000
						Impact to Initial Cost (Baseline Less Proposed)	**($16,000)**

Note: Total costs are rounded to the nearest thousand dollars.

ADD COST

VALUE PROPOSAL

MW-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration
FUNCTION	**Maintain Water**
ASSOCIATED IDEAS	MW-05: Use precast for all inlet and outlet structures MW-06: Use precast for pipe cradles

VALUE PROPOSAL SYNOPSIS:

Using accelerated construction techniques with precast concrete, will reduce the duration of shoring and dewatering methods during the construction of the inlet and outlet structures. This will reduce the risk of flooding during construction and could reduce the overall cost of these structures.

Reliability	**Maintained**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**
O&M	**Maintained**	**Schedule Impact**	**Improved**	**$0**

BASELINE CONCEPT:

All flood control structures on this project (inlets and outlet) are large cast-in-place concrete structures that will take a significant time to build using shoring and dewatering methods.

VALUE PROPOSAL DESCRIPTION:

Use precast concrete and accelerated construction techniques to reduce the construction time while shoring and dewatering methods are in place. This should reduce the amount of time it takes to install these structures while dewatering methods are in place.

ADVANTAGES:	DISADVANTAGES:
● Reduces construction time with dewatering methods in place	● Additional design with limited time in schedule
● Reduces risk of flooding with dewatering methods in place	● Slightly more complex construction practices
●	● Larger crane to set pieces
●	● Shipping large precast sections
●	●
●	●
●	●

DESIGN SUGGESTION

VALUE PROPOSAL

MW-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

DISCUSSION & JUSTIFICATION:

A large risk of this project is building the flood controlling structures with the use of shoring and dewatering methods while controlling the water levels during any storm events. Minimizing the time that dewatering methods are in place will reduce project risk and could result in a cost savings. This cost savings is difficult for a designer to capture since it is a savings of time and risk. This can only truly be captured by the contractor so a cost estimate was not performed.

The inlet and outlet structures will take a significant amount of time to build. One way to construct these structures faster, while the dewatering methods are in place, is to build them with precast concrete.

Since the plans are nearly complete on this project, redesigning and detailing these structures in a short amount of time as precast concrete structures would be difficult. At minimum, a note could be placed in the plans allowing the contractor to convert the structure to precast. This note would require the contractor to hire an engineer licensed in Kentucky to design the precast structure. Additionally an Alternate Estimate of Quantities for this precast option could be added. The cast-in-place quantities would be removed and a bid item for the Precast Concrete Inlet would be added. See the sketch page for an example. This allows the contractor the option and they can place a bid for these items. However it is difficult to bid something that is not designed and turns this structure into a design build project.

If there was more time the design team could redesign this structures as precast concrete and show both options in the plans. A few things to consider with the precast concrete structure.

Panbowl Lake Riser Structure Inlet

- The structure is too big to be a single precast piece.

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

TITLE	Simplify inlet and outlet structures to shorten construction duration

DISCUSSION & JUSTIFICATION: (cont.)

Panbowl Lake Riser Structure Inet Continued:

- Riser box could be precast as 2 separate pieces on site and combined in place with a closer pour. This would require a crane capable of moving approximately 275kips.
- To connect the bottom of the slab to rock, voids could be left in the bottom slab and at each of these voids the rock could be drilled and rebar grouted from the rock to the top of the slab. A sealer slab would be recommended in the bottom of the riser box similar to a bridge overlay in segmental bridge construction.
- An additional method to reduce the piece weight would be to cast the walls and footing separately in sections small enough for a crane to handle and join them with closure pours as needed.

Washington Avenue Inlet
- Discussed separately in MW-04

Washington Avenue Outlet
- The structure could be precast on site and set in place, but would require a crane capable of moving approximately 305kips.
- An additional method to reduce the piece weight would be to cast the walls and footing separately in sections small enough for a crane to handle and join them with closure pours as needed.

Concrete Cradles on 96” I.D. HDPE Pipe
- Precast the pipe cradles in 5ft sections to match strap spacing.
- Combine cradles with post-tensioning rods similar to how prestressed concrete adjacent box beams on a skew are connected in KYTC Standard Drawing BDP-004-04.
- This option could be added to the plans with a small amount of changes.

Overall
- The contractor can elect to cast the sections on site or at a precast plant. Casting them on site allows their crew to do the work and make the revenue along with eliminating the shipping concerns.
- Determine size of each precast piece by weight. Assume a reasonably sized crane can set these pieces in place. If the piece is too heavy the savings will be absorbed by the cost of a large crane.

Implementation of the precast concrete structures should be similar to the construction of a precast concrete culvert, with the exception to the complexity and weight of the pieces.

VALUE PROPOSAL

MW-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No perceived impact.	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No perceived impact.	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Maintained
Justification for Impact Score	No perceived impact.	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Improved
Justification for Impact Score	Reduces time with shoring and dewatering methods in place reduces the risk of flooding during construction.	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No perceived impact.	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	No perceived impact.	
Risk	An assessment of the identified risks of the project.	Improved
Justification for Impact Score	Reduces time with shoring and dewatering methods in place reduces the risk of flooding during construction.	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No perceived impact.	

VALUE PROPOSAL

MW-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT

N

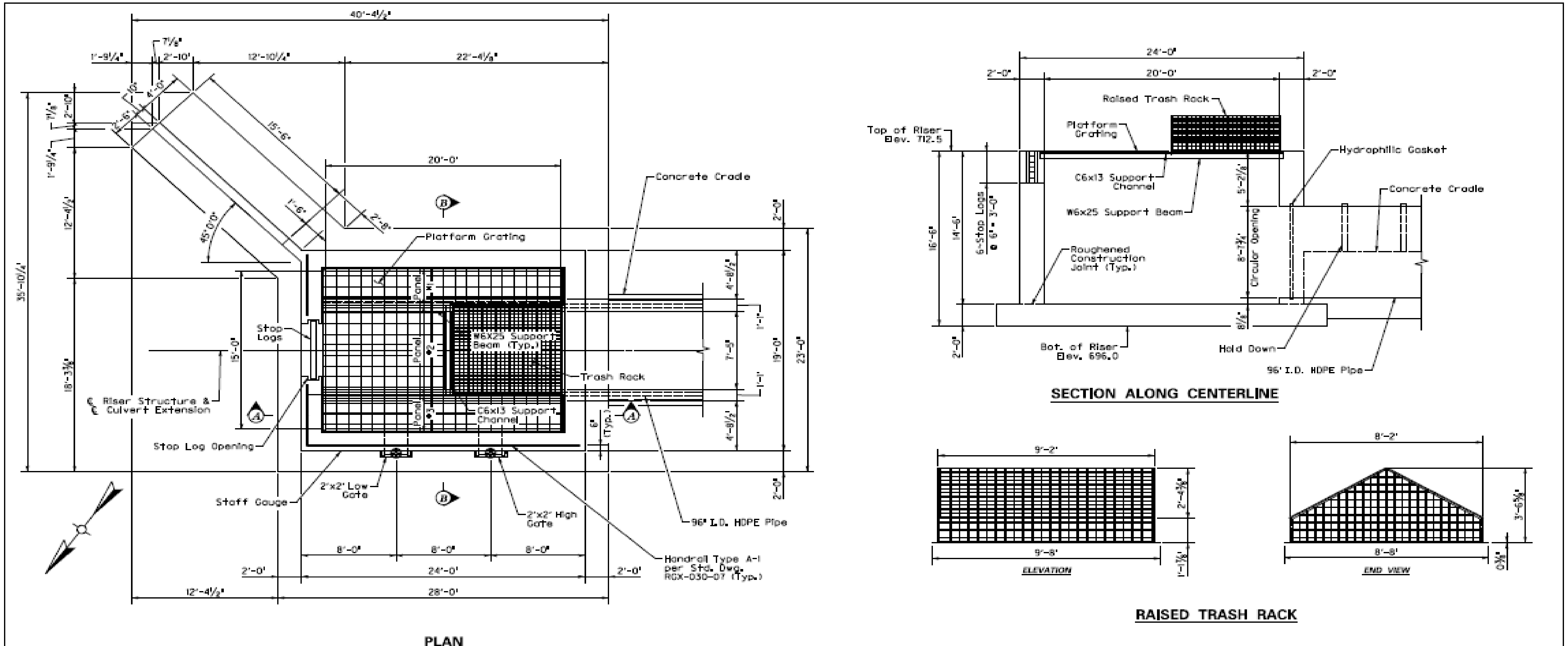
Example of Estimate of Quantities Table in the current plans

ESTIMATE OF QUANTITIES

BID ITEM CODE	08100	08150	20465EC	08003	08002	08037	24786EN	24583EC	26207ED	24550EC	26203EC	26202EC	26201EC	21321NC	24798ED	08160	20478ND	26198ED	02611	02612	02700	26197EC	02231	50003	25086EC	24886EC	24884ED	24843EC	26213EC	26212EC	40130	XXXXX	XXXXX	XXXXX	XXXXX
BID ITEM	Concrete Class "A"	Steel Reinforcement	Clean Culvert	Foundation Preparation	Structure Excavation, Solid Rock	Cofferdam	HDPE Pipe	HDPE Pipe Liner	Secant Shafts	Vibration Monitoring	Secant Shaft Concrete Cores	Water Pressure Tests in Cores (Single Packer)	24-Hour Falling Head Permeability Tests in Cores	CSL Testing (4 Tubes)	Drop In Grate	Structural Steel ①	Manhole Frame and Lid, Type 2	Trash Rack	Handrail Type A-1	Handrail Type A-2	Sand	AASHTO #89 Stone	Structure Granular Backfill	Electrical	Automated Slide Gate	Flap Gate	Permanent Steel Casing	Vibrating Wire Piezometer	Soil Grouting	Secant Shaft with Lightweight Concrete	Rotating Beacon and Pole	Vibrating Wire Data Logger (4-Channel)	Water Level Sensor	Pressure Testing of Soil Grouting	CCTV Soil Grouting Inspection
UNIT	C.Y.	LBS.	L.S.	L.S.	C.Y.	L.S.	L.F.	L.F.	L.F.	L.S.	EACH	EACH	EACH	EACH	EACH	L.S.	EACH	S.F.	L.F.	L.F.	Tons	Tons	C.Y.	L.S.	EACH	EACH	L.F.	EACH	LS	L.F.	EACH	EACH	EACH	EACH	EACH
Inlet Extension	371.5	40398			38	1	52	99							1			77		58	333	156	78	1		1	12				1				
Outlet Extension	180.4	14371			30	1	59	109									1		46		324	167	104		1								1		
Secant Shaft Wall									3542		4	2	3	3														8	1	237		1		1	1
																				1															
BRIDGE TOTALS	551.9	54769	1	1	68	2	111	208	3542	1	4	2	3	3	1	1	1	77	46	58	657	323	182	1	1	1	12	8	1	237	1	1	1	1	1

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



NOTES:

1. Platform grating to be 11W4 2"X3/16" SER GAL grating by Vulcraft/Nucor, or approved equal. Lifting lugs and clips shall be included per the manufacturer's recommendations. Grating may be installed in three seperate panels as shown.

2. Grating support wide-flange beams and angles shall be ASTM A992 and A36 steel respectively. All support beams and angles shall be hot-dip galvanized per ASTM A153.

3. Any conflict between handrail post and sleeve with gate guides or wall steel reinforcement shall be communicated to the Engineer of Record.

4. See Std. Dwg. RGX-030-07 for handrail detail. Actual diameter of aluminum pipe sleeve may be revised, up to 1/8", to accomodate fit up with post and availability of material from suppliers.

5. Provisions shall be made for installing a hydrophilic gasket around the HDPE pipe where it protrudes through the riser wall in accordance with the manufacturer's recommendations. Dimensions for the HDPE pipe opening are based on an assumed outer pipe diameter of 103.8 inches. Should the outer diameter of the supplied pipe differ from this, adjustments shall be made in the field.

6. Contractor shall provide a fiberglass water level staff gauge (Seco/Crain or approved equal) with 1 foot whole elevation markers and 1/10 foot intermediate tick marks mounted to the exterior corner of the riser structure and extending above the handrail on top of the structure. Mounting hardware shall be stainless steel or aluminum per manufacturer's recommendations. Gauge shall extend from elevation 705 to elevation 717 (12 feet) and shall be marked to correspond to those elevations. Gauge size shall be such that the indicator marking are visible from the shoreline. Gauge shall be considered incidental to the unit price bid for Concrete Class "A".

7. See RISER STRUCTURE (4 OF 4) Sheet for Sections A-A & B-B.

8. See EXTENSION DETAILS Sheets for HDPE Pipe, Concrete Cradle, and Hold Down details.

9. See RISER STRUCTURE WINGWALL Sheet for wingwall details.

10. Contractor shall provide seperate drainage grates on the riser structure as shown. Flat Platform grating shall be used to facilitate access to the stop logs and gates. Trash Rack shall be used to prevent large debris from clogging the grating during a design storm event.

11. Trash Rack to be LPK-96108 96"x108" Peaked Roof Trash Rack by J.R. Hoe, or approved equal. Trash rack shall be stainless steel or galvanized.

12. Trash Rack shall be attached to the support beams per the manufacturer's recommendations.

13. Continuous PVC waterstop shall be provided at all construction joints shown for the Riser Structure, as well as any additional construction joints required by the contractor. Waterstops shall be considered incidental to the unit price bid for Concrete Class "A".

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

REVISION	DATE

PREPARED BY HDR

DATE: November, 2023	CHECKED BY
DESIGNED BY: A. Singhal	P. Giannaros
DETAILED BY: R. Richardson	A. Singhal

RISER STRUCTURE (1 OF 4)
CROSSING: MILLER BRANCH

ROUTE	ITEM NO.	COUNTY OF
KY 15	10-376.00	BREATHITT
	SHEET NO. S5	DRAWING NUMBER 28745

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VALUE PROPOSAL

MW-01

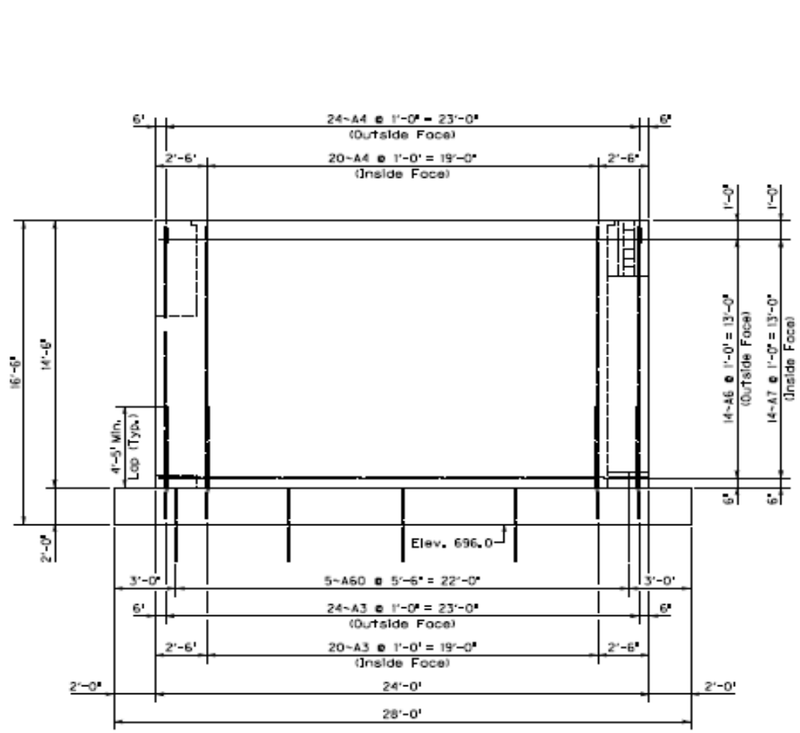
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



SOUTHEAST WALL ELEVATION

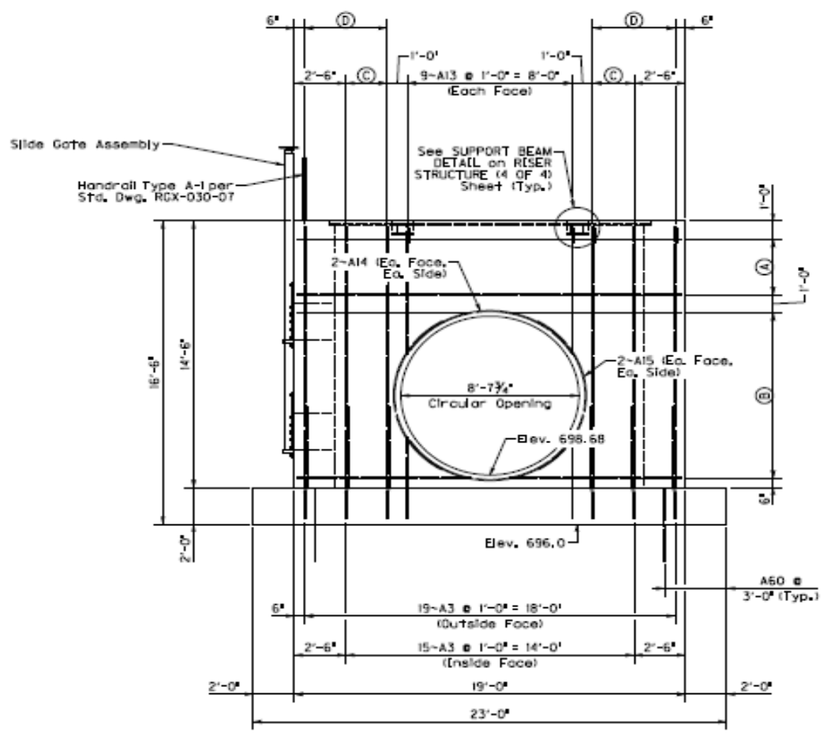
HDPE Pipe, Concrete Cradle, & Wingwall not shown for clarity

Ⓐ 4~A8 @ 1'-0" = 3'-0" (Outside Face)
4~A9 @ 1'-0" = 3'-0" (Inside Face)

Ⓑ 10~A11 @ 1'-0" = 9'-0" (Outside Face)
10~A12 @ 1'-0" = 9'-0" (Inside Face)

Ⓒ 3~A4 @ 1'-0" = 2'-0" (Inside Face)

Ⓓ 5~A4 @ 1'-0" = 4'-0" (Outside Face)



SOUTHWEST WALL ELEVATION

NOTES:

1. Field cut A3, A11, A12, & A13 bars as necessary to maintain 3" clear around HDPE Pipe opening.
2. Field cut A4 bars to maintain 2" clear around beam supports.
3. See INLET WINGWALL DETAILS Sheet for wingwall reinforcement details.
4. Dowel bars may be omitted if the bottom slab is keyed into bedrock and/or is monolithic with the mass concrete.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

REVISION	DATE

PREPARED BY: HDR

DATE: November, 2023	CHECKED BY
DESIGNED BY: A. Singhal	P. Giannaros
DETAILED BY: R. Richardson	A. Singhal

RISER STRUCTURE (2 OF 4)
CROSSING: MILLER BRANCH

ROUTE	ITEM NO.	COUNTY OF
KY 15	10-376.00	BREATHITT
	SHEET NO. S6	DRAWING NUMBER 28745

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VALUE PROPOSAL

MW-01

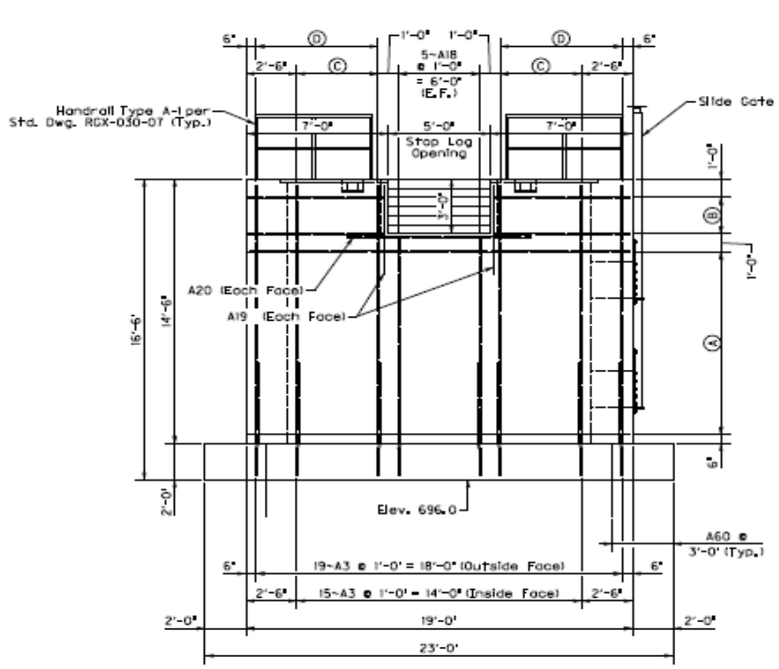
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

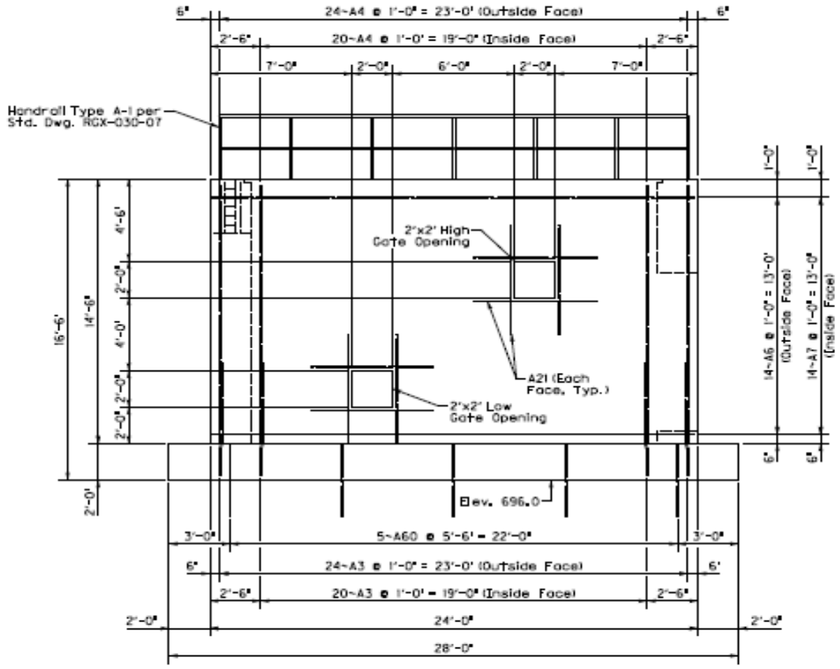
TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



NORTHEAST WALL ELEVATION

Wingwall reinforcing not shown for clarity.



NORTHWEST WALL ELEVATION

HDPE Pipe concrete cradle not shown for clarity.
Wingwall reinforcing not shown for clarity.
Gates, including side guides and actuator, not shown for clarity.

Ⓐ 11~A8 @ 1'-0" = 10'-0" (Outside Face)
11~A9 @ 1'-0" = 10'-0" (Inside Face)

Ⓑ 3~A16 @ 1'-0" = 2'-0" (Outside Face)
3~A17 @ 1'-0" = 2'-0" (Inside Face)

Ⓒ 5~A4 @ 1'-0" = 4'-0" (Inside Face)

Ⓓ 7~A4 @ 1'-0" = 6'-0" (Outside Face)

NOTES:

1. Stop logs to be designed and supplied by the Contractor in accordance with the Special Note for Stop Logs. Stop log frame to be embedded into riser structure wall or mounted to wall opening, as required.
2. Stainless Steel Low Gate and High Gate shall be supplied by the Contractor in accordance with the Special Note for Control Gates. Contractor is responsible for design of gate guides and any other support required at the gate invert. Any potential conflict with embedded thimbles and/or concrete anchors required for installation of the gate with wall steel reinforcing shall be communicated to the Engineer of Record.
3. Field cut A4, A6, & A7 bars as necessary to maintain 2" clear around gate openings.
4. Field cut A4 bars to maintain 2" clear around beam supports.
5. See INLET WINGWALL DETAILS Sheet for wingwall reinforcement details.
6. Dowel bars may be omitted if the bottom slab is keyed into bedrock and/or is monolithic with the mass concrete.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

REVISION	DATE

PREPARED BY: HDR

DATE: November, 2023	CHECKED BY
DESIGNED BY: A. Singhal	P. Giannaros
DETAILED BY: R. Richardson	A. Singhal

RISER STRUCTURE (3 OF 4)

CROSSING: MILLER BRANCH

ROUTE	ITEM NO.	COUNTY OF
KY 15	10-376.00	BREATHITT
	SHEET NO. S7	DRAWING NUMBER 28745

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VALUE PROPOSAL

MW-01

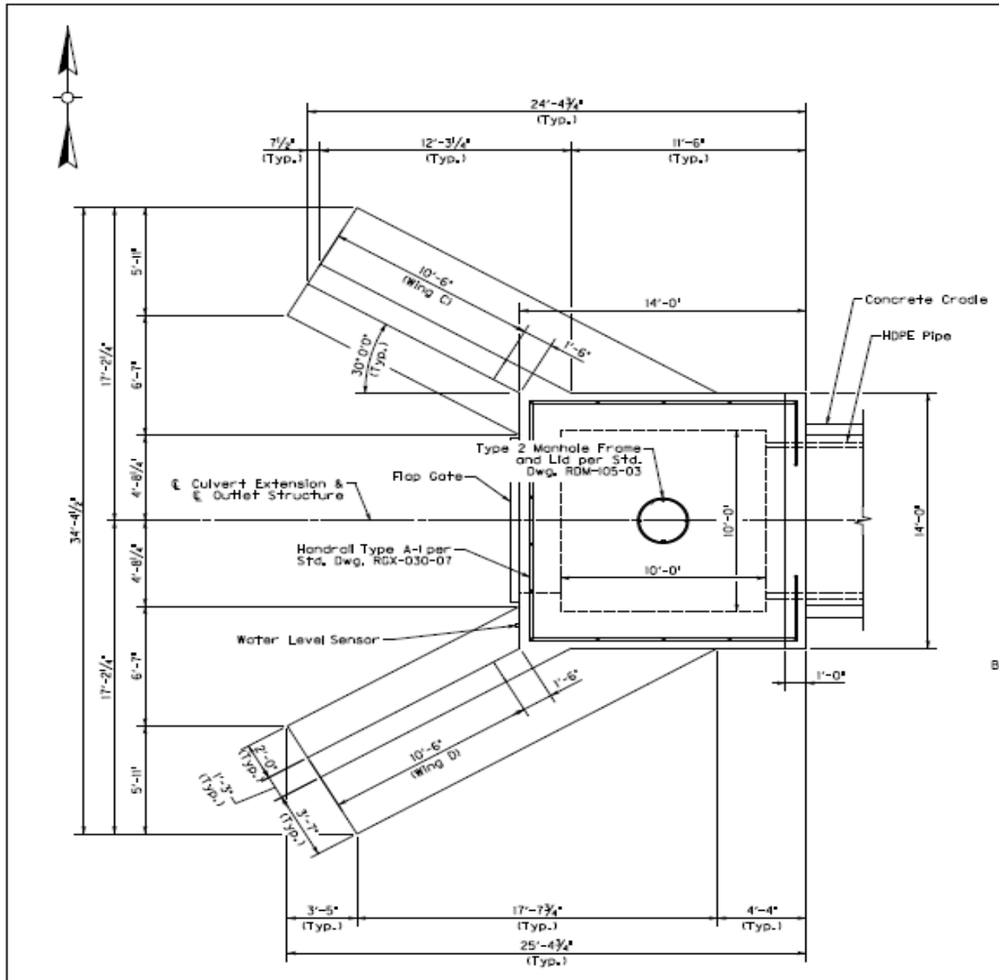
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

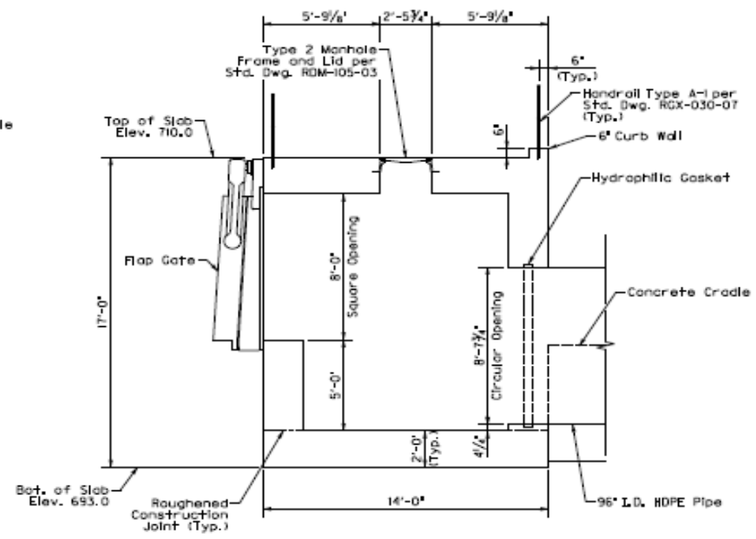
Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



PLAN



SECTION ALONG CENTERLINE

Wingwall not shown for clarity

NOTES:

1. See EXTENSION DETAILS Sheets for HDPE Pipe, Hold Down Straps, and Concrete Cradle details.
2. See Std. Dwg. RGX-030-07 for additional handrail details. Actual diameter of pipe sleeve may be revised up to ⅛" to accomodate fit up with post and availability of material from suppliers.
3. Any conflicts between the handrail post and wall reinforcement shall be communicated to the Engineer of Record.
4. See Std. Dwg. RDM-105-03 for additional manhole frame and lid details.
5. Provisions shall be made for installing a hydrophilic gasket around the HDPE pipe where it protrudes through the wall in accordance with the manufacturer's recommendations.
6. Dimensions for the HDPE pipe opening are based on an assumed outer pipe diameter of 103.8 inches. Should the outer diameter of the supplied pipe differ from this, adjustments shall be made in the field to accomodate this.
7. Flapgate shall accomodate a 8'x8' opening, have a pair of lifting lugs that can be used for holding the gate open during routine maintenance, and shall be supplied by the contractor in accordance with the Project Specifications.
8. See OUTLET WINGWALL DETAILS Sheet for wingwall details.
9. A Water Level Sensor shall be installed on the face of the Outlet Structure in accordance with the Special Note for Control Gates, and shall be connected to the Rotating Beacon to be installed on top of the Inlet Structure.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

REVISION	DATE

PREPARED BY: HDR

DATE: November, 2023	CHECKED BY:
DESIGNED BY: A. Singhal	P. Glenmore
DETAILED BY: A. Cole	A. Singhal

OUTLET STRUCTURE (1 OF 3)

CROSSING: MILLER BRANCH

ROUTE: WASHINGTON AVE.

ITEM NO.: 10-376.00

SHEET NO.: S12

COUNTY OF: BREATHITT

DRAWING NUMBER: 28747

MicroStation v8.11.9.919 | USER: ACOLE | DATE PLOTTED: 11/7/2023 | FILE NAME: d:\pwworking\acole\d0163188\M01528747_S12.dgn

VALUE PROPOSAL

MW-01

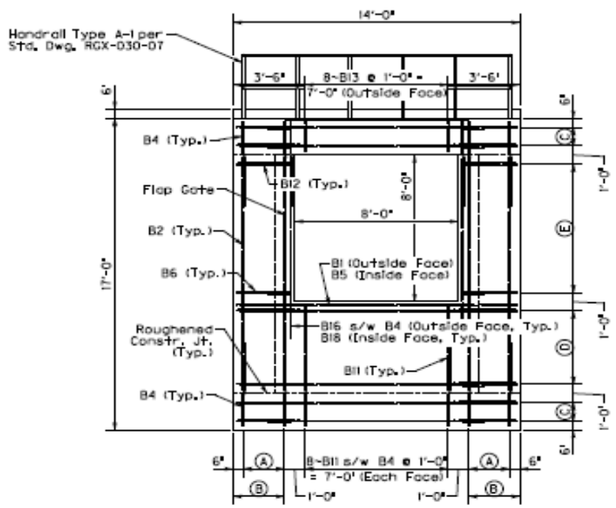
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

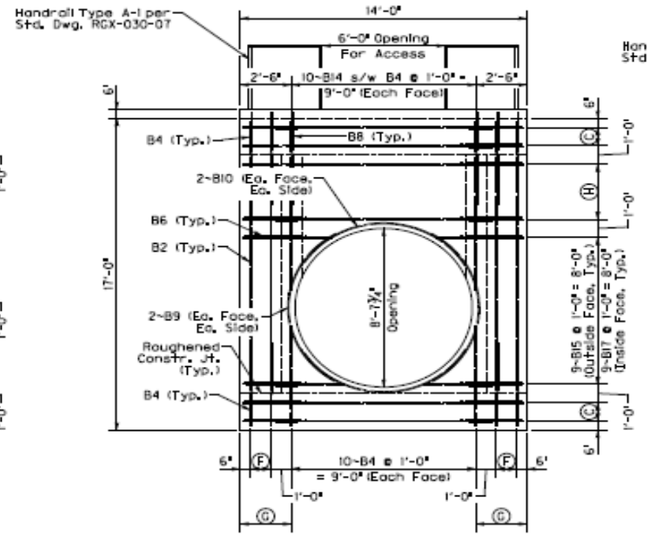
TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



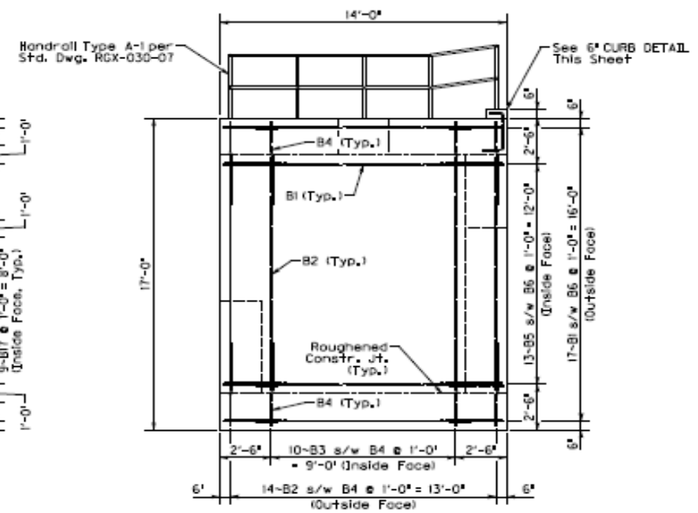
WEST WALL

Outside face shown



EAST WALL

Outside face shown



SOUTH WALL

Outside face shown
North wall opposite
Wingwall not shown for clarity

Ⓐ 3~B2 s/w B4 @ 1'-0" = 2'-0" (Outside Face)

Ⓑ 1~B3 @ 2'-0" (Inside Face)

Ⓒ 2~B1 s/w B6 @ 1'-0" = 1'-0" (Outside Face)

Ⓓ 5~B1 s/w B6 @ 1'-0" = 4'-0" (Outside Face)
5~B5 @ 1'-0" = 4'-0" (Inside Face)

Ⓔ 8~B12 s/w B6 @ 1'-0" = 7'-0" (Outside Face, Typ.)
8~B19 @ 1'-0" = 7'-0" (Inside Face, Typ.)

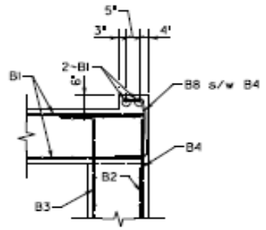
Ⓕ 2~B2 s/w B4 @ 1'-0" = 1'-0" (Outside Face)

Ⓖ 1~B3 @ 2'-0" (Inside Face)

Ⓗ 4~B1 s/w B6 @ 1'-0" = 3'-0" (Outside Face)
4~B5 @ 1'-0" = 3'-0" (Inside Face)

NOTES:

1. See OUTLET WINGWALL DETAILS Sheet for wingwall reinforcement details.
2. Field cut B4, B5, B6, B14, B15, & B17 bars as necessary to maintain 3" clear around HDPE Pipe opening.
3. Field cut B6 bars as necessary to maintain 2" clear around flap gate opening.
4. Field cut B1 bars as necessary to maintain 2" clear around manhole frame.



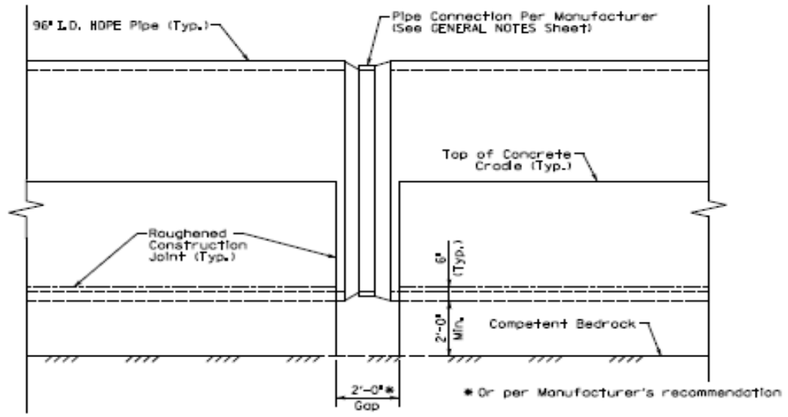
6" CURB DETAIL

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS	REVISION	DATE	PREPARED BY HDR	DATE: November, 2023	CHECKED BY	OUTLET STRUCTURE (3 OF 3)	ROUTE	ITEM NO.	COUNTY OF
				DESIGNED BY: A. Singhal	P. Giannaros	CROSSING	WASHINGTON AVE.	10-376.00	BREATHITT
				DETAILED BY: A. Cole	A. Singhal	MILLER BRANCH		SHEET NO. S14	DRAWING NUMBER 28747

MicroStation V8.11.9.819 | USER: ACOLE | DATE PLOTTED: 11/7/2023 | FILE NAME: d:\pwworking\west01\d0188494\S28747_S14.dgn

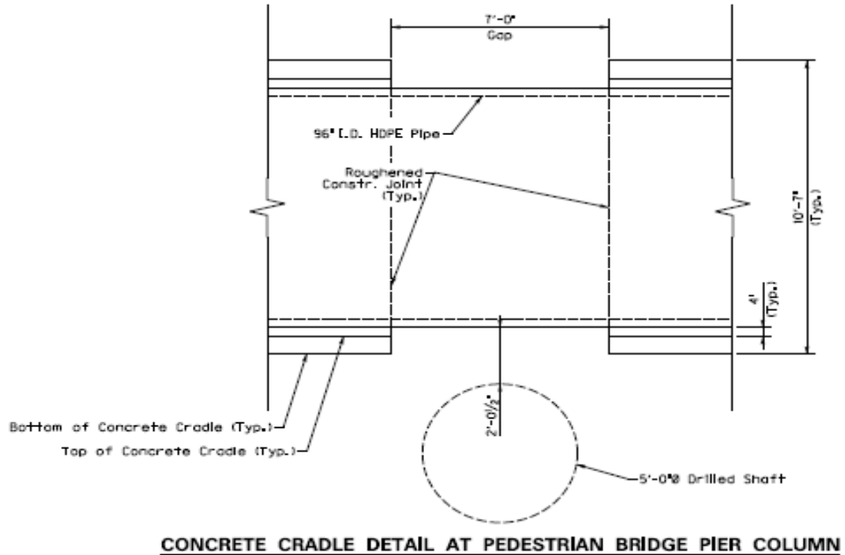
TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



CONCRETE CRADLE TYPICAL DETAIL AT PIPE JOINTS

Holddown hardware not shown for clarity.

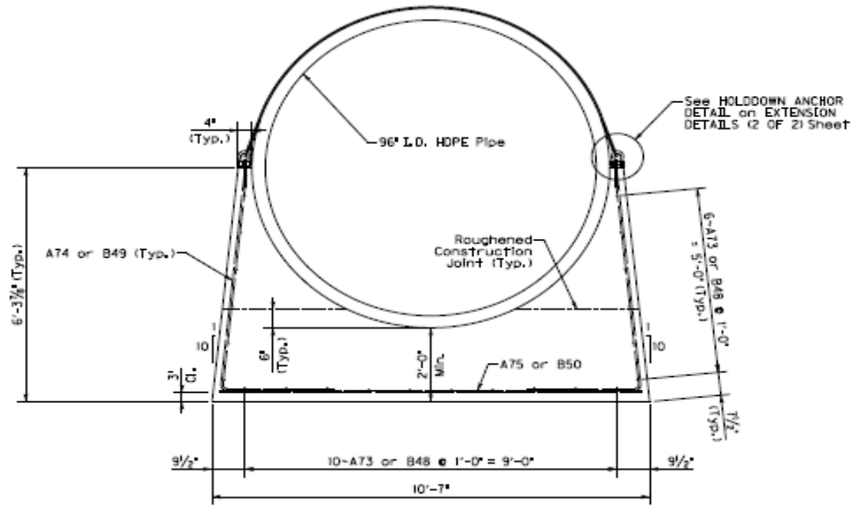


CONCRETE CRADLE DETAIL AT PEDESTRIAN BRIDGE PIER COLUMN

Holddown hardware not shown for clarity.

NOTES:

1. Pipe connections shall not be permitted within the temporary unsupported span at the Drilled Shaft location.
2. See Drawing Number 28746 for Drilled Shaft details.
3. Clear distance between HDPE Pipe and Drilled Shaft is based on an assumed outer pipe diameter of 103.8 inches.
4. Field cut bars as needed to accommodate required gaps in the Concrete Cradle.
5. At each pipe joint, provide a gap in the cradle as shown to facilitate sealing each joint per the manufacturer's recommendations. Contractor shall ensure that each pipe joint connection is watertight. Cast and backfill gap in Concrete Cradle with Concrete Class 'A' after the HDPE Pipe connection is completed. Contractor to determine the number and location of pipe joints in the field.
6. The Contractor shall provide a permanent 7'-0" gap in the cradle as shown to protect the drilled shaft for the Pedestrian Bridge. No pipe joints shall be allowed within the 7'-0" cradle gap at the drilled shaft location. This gap does not need to be backfilled with Concrete Class 'A'.
7. Contractor shall provide ½" Cork Expansion Material at each end of the Concrete Cradle between the cradle concrete and the existing culvert concrete or the proposed hydraulic structures concrete. All costs related to cork shall be considered incidental to the unit price bid for Concrete Class 'A'.



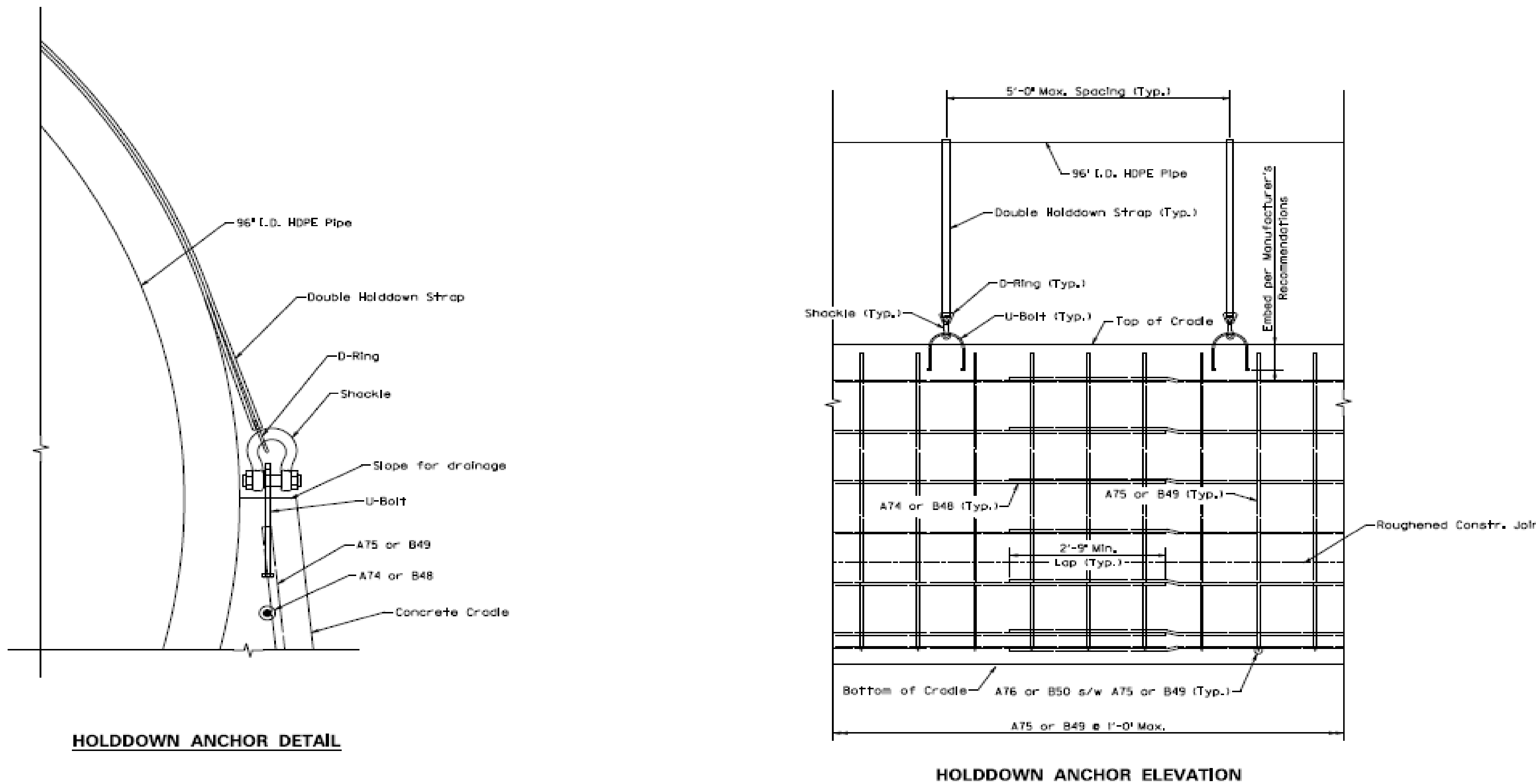
CONCRETE CRADLE SECTION

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS	REVISION	DATE	PREPARED BY	DATE: November, 2023	CHECKED BY	EXTENSION DETAILS (1 OF 2)	ROUTE	ITEM NO.	COUNTY OF
			HDR	DESIGNED BY: A. Cole	E. Farlan	CROSSING	WASHINGTON AVE.	10-376.00	BREATHITT
				DETAILED BY: A. Cole	T. Swiderman	MILLER BRANCH		SHEET NO. S16	DRAWING NUMBER 28747

MicroStation v8.11.8.819 | USER: ACOLE | DATE PLOTTED: 11/7/2023 | FILE NAME: d:\pwworking\acole01\d0188494\l0528747_S16.dgn

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



NOTES:

1. Rebar may adjusted to avoid interference with anchor assembly hardware. However in no case shall the maximum spacing of reinforcement in the Concrete Cradle exceed 12 inches. Additional bars may be required to accommodate this.

2. Straps shall be polyester webbing. All anchor assembly hardware shall be able to resist a safe working load of 10,000 pounds.

3. If changes to the anchorage system are proposed by the Contractor, submit the changes to the Engineer of Record for approval.

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS	REVISION	DATE	PREPARED BY HDR	DATE: November, 2023 / DESIGNED BY: A. Cole / DETAILED BY: A. Cole	CHECKED BY: E. Farlan / T. Swiderman	EXTENSION DETAILS (2 OF 2) / CROSSING: MILLER BRANCH	ROUTE: WASHINGTON AVE.	ITEM NO. 10-376.00 / SHEET NO. S17	COUNTY OF BREATHITT / DRAWING NUMBER 28747

MicroStation v8.11.9.919 USER: ACOLE DATE PLOTTED: 11/7/2023

VALUE PROPOSAL

MW-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: VALUE PROPOSAL

Example 1 of an Estimate of Quantities Table showing an alternate in the bid.

ESTIMATE OF QUANTITIES

	BID ITEM CODE	08151	08001	08002	08020	02998	03299	08033	08051	08095	08160	08170	25028ED	23859EC	02604	24596EN	02603		Hollow Column Alternate 08100	Hollow Column Alternate 08104	Hollow Column Alternate 08150	H – Column Alternate 08100	H – Column Alternate 08104	H – Column Alternate 08150
	BID ITEM	Steel Reinforcement, Epoxy Coated	Structure Excavation, Common (6)(8)(9)	Structure Excavation, Solid Rock (8)	Crushed Aggregate Slope Protection (3)	Masonry Coating	Armored Edge for Concrete	Test Piles	Piles – Steel HP 14x89	Pile Points 14"	Structural Steel (1)	Shear Connectors (2)	Rail System Single Slope 40 Inch	Finger Expansion Joint	Fabric Geotextile Class 1A (4)	Granular Backfill (4)	Fabric Geotextile Class 2 (4)		Concrete Class "A" (5)	Concrete Class "AA" (7)	Steel Reinforcement	Concrete Class "A" (5)	Concrete Class "AA" (7)	Steel Reinforcement
	UNIT	LBS.	C.Y.	C.Y.	Tons	S.Y.	L.F.	L.F.	L.F.	Each	L.S.	L.S.	L.F.	L.F.	S.Y.	C.Y.	S.Y.		C.Y.	C.Y.	LBS.	C.Y.	C.Y.	LBS.
Substructure	ABUTMENT 1	24320			757	51	48	37	734	22				48	2225	563	451		208	50		208	50	
	PIER #1		45	878		187													717		124065	717		124065
	PIER #2		342	1153		187													1041		225805	555	394	324254
	PIER #3		439	1443		187													1041		225805	555	394	324254
	PIER #4		86	302		180													427		79953	427		79953
	PIER #5		920	4792		180		82	1945	25									514		84618	514		84618
	ABUTMENT 2	24806	150	945	535	51	48	19	414	22				48	2240	579	458		212	50		212	50	
	Superstructure	673468				2117					1	1	2643							1892			1892	
	BRIDGE TOTALS	722594	1982	9513	1292	3140	96	138	3093	69	1	1	2643	96	4465	1142	909		4160	1992	740246	3188	2780	937144

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: VALUE PROPOSAL

Example 2 of an Estimate of Quantities Table showing an alternate in the bid.

QUANTITIES – 8′ x 4′ REINF. CONCRETE CULVERT

BID ITEM CODE	ITEM	UNIT	QUANTITY
08100	CLASS 'A' CONCRETE	Cu Yds	61
08150	STEEL REINFORCEMENT	Lbs	5901
08003	FOUNDATION PREPARATION	LS	1
02484	CHANNEL LINING CLASS III	TON	361
02602	FABRIC-GEOTEXTILE CLASS 1	SY	300
02555	CONCRETE CLASS B	Cu Yds	17

QUANTITIES – 8′ x 4′ PRECAST CULVERT ALTERNATE

BID ITEM CODE	ITEM	UNIT	QUANTITY
08100	CLASS 'A' CONCRETE	Cu Yds	15
08150	STEEL REINFORCEMENT	Lbs	1053
20092ES611	PRECAST CONCRETE BOX CULVERT	LF	51
08003	FOUNDATION PREPARATION	LS	1
02484	CHANNEL LINING CLASS III	TON	361
02602	FABRIC-GEOTEXTILE CLASS 1	SY	300
02555	CONCRETE CLASS B	Cu Yds	17

QUANTITIES – 84″ DIAMETER PIPE CULVERT ALTERNATE

BID ITEM CODE	ITEM	UNIT	QUANTITY
08100	CLASS 'A' CONCRETE	Cu Yds	29
08150	STEEL REINFORCEMENT	Lbs	2390
00476	CULVERT PIPE 84 IN	LF	43
08003	FOUNDATION PREPARATION	LS	1
02484	CHANNEL LINING CLASS III	TON	365
02602	FABRIC-GEOTEXTILE CLASS 1	SY	303
02555	CONCRETE CLASS B	Cu Yds	17

QUANTITIES – 84″ EQUIV. PIPE ARCH ALTERNATE

BID ITEM CODE	ITEM	UNIT	QUANTITY
08100	CLASS 'A' CONCRETE	Cu Yds	16
08150	STEEL REINFORCEMENT	Lbs	1076
00506	CULVERT PIPE 84 IN EQUIV.	LF	49
08003	FOUNDATION PREPARATION	LS	1
02484	CHANNEL LINING CLASS III	TON	363
02602	FABRIC-GEOTEXTILE CLASS 1	SY	301
02555	CONCRETE CLASS B	Cu Yds	17

VALUE PROPOSAL

MW-01

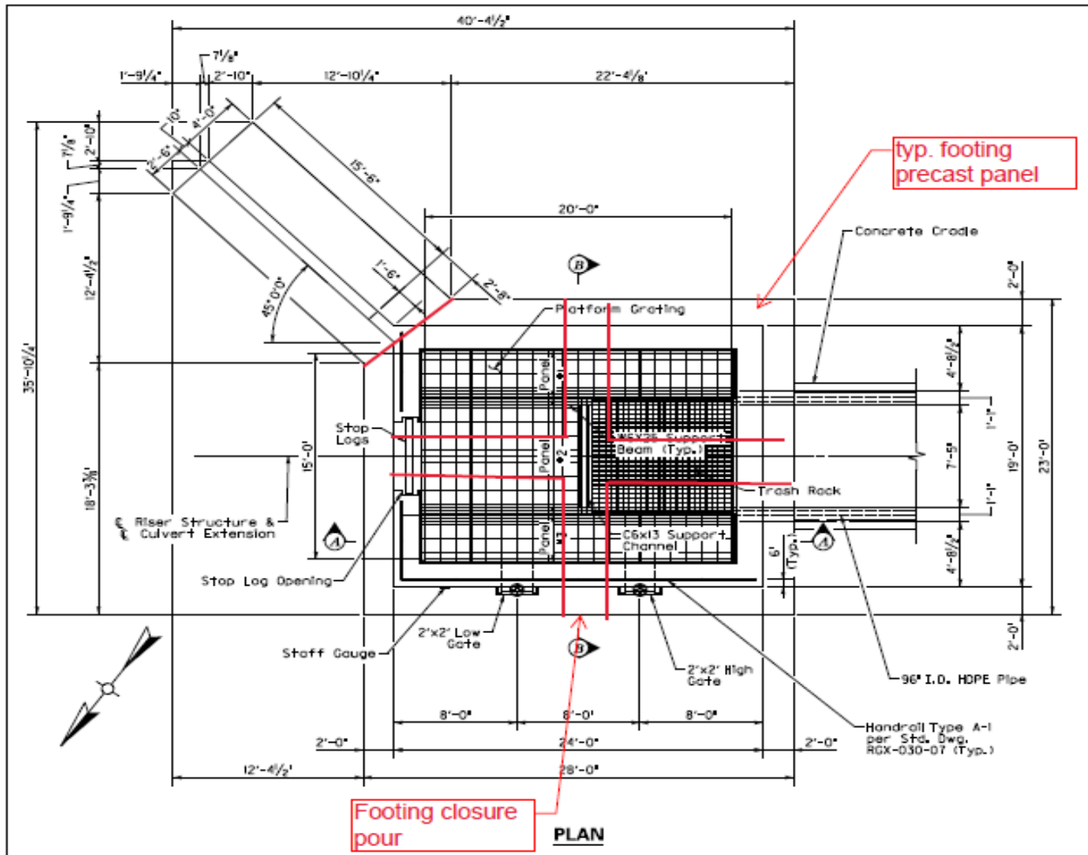
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

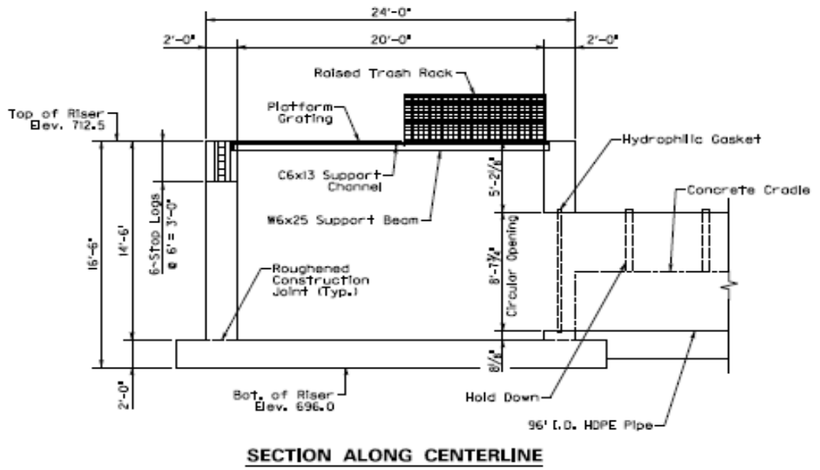
Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

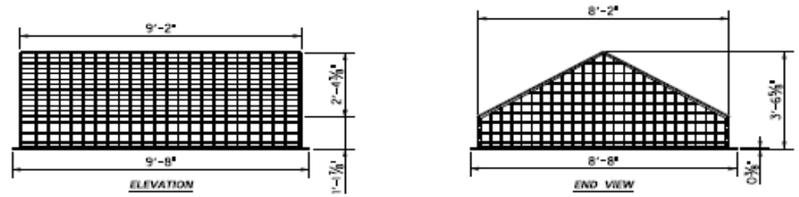
SKETCH/DIAGRAM: VALUE PROPOSAL



PLAN



SECTION ALONG CENTERLINE



RAISED TRASH RACK

NOTES:

1. Platform grating to be WW4 2"X3/16" SER GAL grating by Vulcraft/Nucor, or approved equal. Lifting lugs and clips shall be included per the manufacturer's recommendations. Grating may be installed in three seperate panels as shown.

2. Grating support wide-flange beams and angles shall be ASTM A992 and A36 steel respectively. All support beams and angles shall be hot-dip galvanized per ASTM A153.

3. Any conflict between handrail post and sleeve with gate guides or wall steel reinforcement shall be communicated to the Engineer of Record.

4. See Std. Dwg. RGX-030-07 for handrail detail. Actual diameter of aluminum pipe sleeve may be revised, up to 1/8", to accomodate fit up with post and availability of material from suppliers.

5. Provisions shall be made for installing a hydrophilic gasket around the HDPE pipe where it protrudes through the riser wall in accordance with the manufacturer's recommendations. Dimensions for the HDPE pipe opening are based on an assumed outer pipe diameter of 103.8 inches. Should the outer diameter of the supplied pipe differ from this, adjustments shall be made in the field.

6. Contractor shall provide a fiberglass water level staff gauge (Seco/Crain or approved equal) with 1 foot whole elevation markers and 1/10 foot intermediate tick marks mounted to the exterior corner of the riser structure and extending above the handrail on top of the structure. Mounting hardware shall be stainless steel or aluminum per manufacturer's recommendations. Gauge shall extend from elevation 705 to elevation 717 (12 feet) and shall be marked to correspond to those elevations. Gauge size shall be such that the indicator marking are visible from the shoreline. Gauge shall be considered incidental to the unit price bid for Concrete Class 'A'.

7. See RISER STRUCTURE (4 OF 4) Sheet for Sections A-A & B-B.

8. See EXTENSION DETAILS Sheets for HDPE Pipe, Concrete Cradle, and Hold Down details.

9. See RISER STRUCTURE WINGWALL Sheet for wingwall details.

10. Contractor shall provide seperate drainage grates on the riser structure as shown. Flat Platform grating shall be used to facilitate access to the stop logs and gates. Trash Rack shall be used to prevent large debris from clogging the grating during a design storm event.

11. Trash Rack to be LPK-96108 96"x108" Peaked Roof Trash Rack by J.R. Hoe, or approved equal. Trash rack shall be stainless steel or galvanized.

12. Trash Rack shall be attached to the support beams per the manufacturer's recommendations.

13. Continuous PVC waterstop shall be provided at all construction joints shown for the Riser Structure, as well as any additional construction joints required by the contractor. Waterstops shall be considered incidental to the unit price bid for Concrete Class 'A'.

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS	REVISION	DATE	PREPARED BY: FDR	DATE: November, 2023	CHECKED BY	RISER STRUCTURE (1 OF 4)	ROUTE	ITEM NO.	COUNTY OF
				DESIGNED BY: A. Singhal	P. Giannaros	CROSSING: MILLER BRANCH	KY 15	10-376.00	BREATHITT
				DETAILED BY: R. Richardson	A. Singhal			SHEET NO. S5	DRAWING NUMBER 28745

MicroStation V8.11.9.919 | USER: ACOLE | DATE PLOTTED: 11/7/2023 | FILE NAME: d:\pwworking\acole01\d0188486\S28745_S5\dgn

VALUE PROPOSAL

MW-01

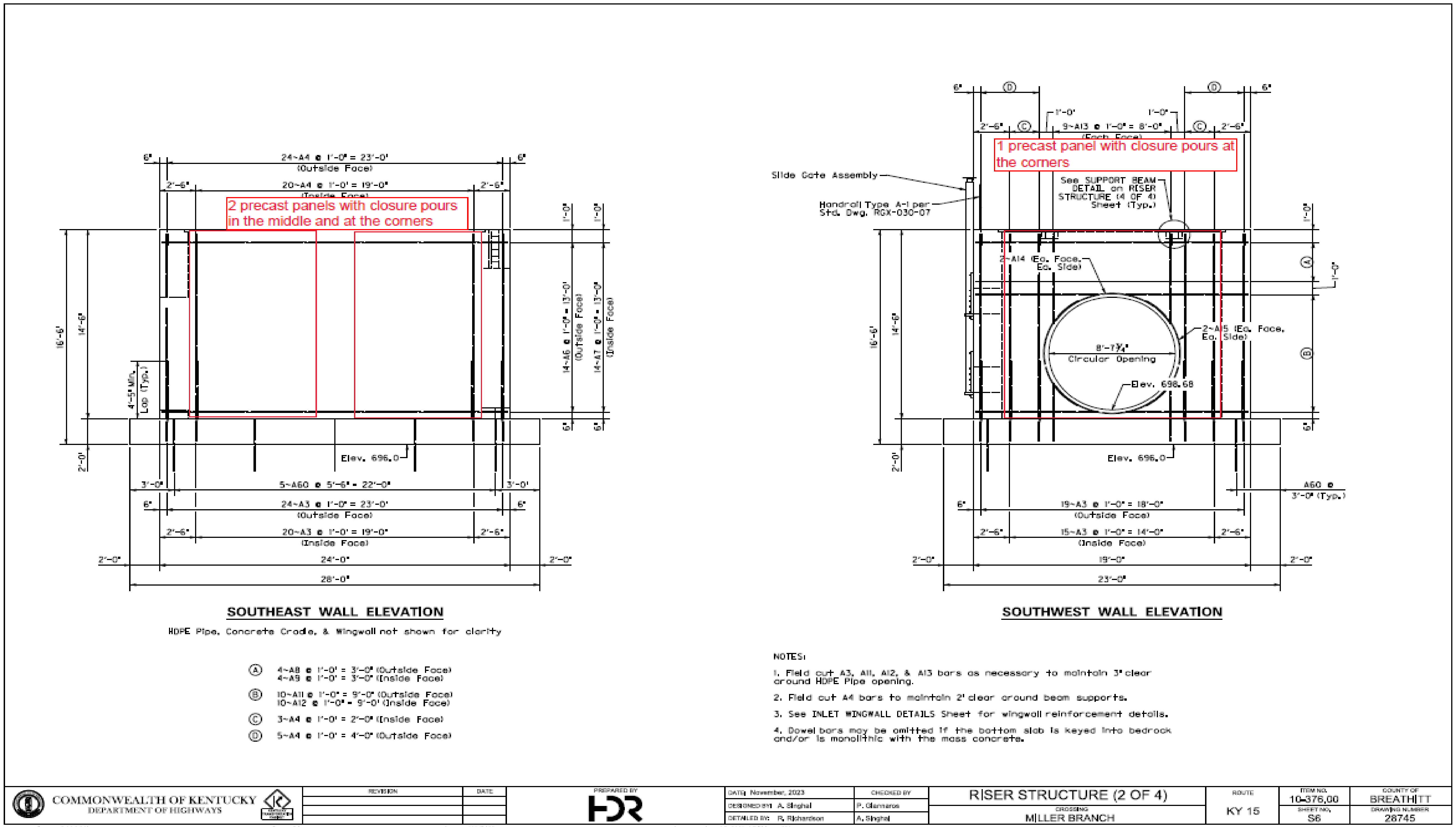
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: VALUE PROPOSAL



2 precast panels with closure pours in the middle and at the corners
1 precast panel with closure pours at the corners
SOUTHEAST WALL ELEVATION
HDPE Pipe, Concrete Cradle, & Wingwall not shown for clarity
SOUTHWEST WALL ELEVATION
Slide Gate Assembly
8'-7¾" Circular Opening
Elev. 696.68
Elev. 696.0
NOTES:
1. Field cut A3, A11, A12, & A13 bars as necessary to maintain 3" clear around HDPE Pipe opening.
2. Field cut A4 bars to maintain 2" clear around beam supports.
3. See INLET WINGWALL DETAILS Sheet for wingwall reinforcement details.
4. Dowel bars may be omitted if the bottom slab is keyed into bedrock and/or is monolithic with the mass concrete.
COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS
RISER STRUCTURE (2 OF 4)
MILLER BRANCH
KY 15
10-376.00
BREATHITT
S6
28745

VALUE PROPOSAL

MW-01

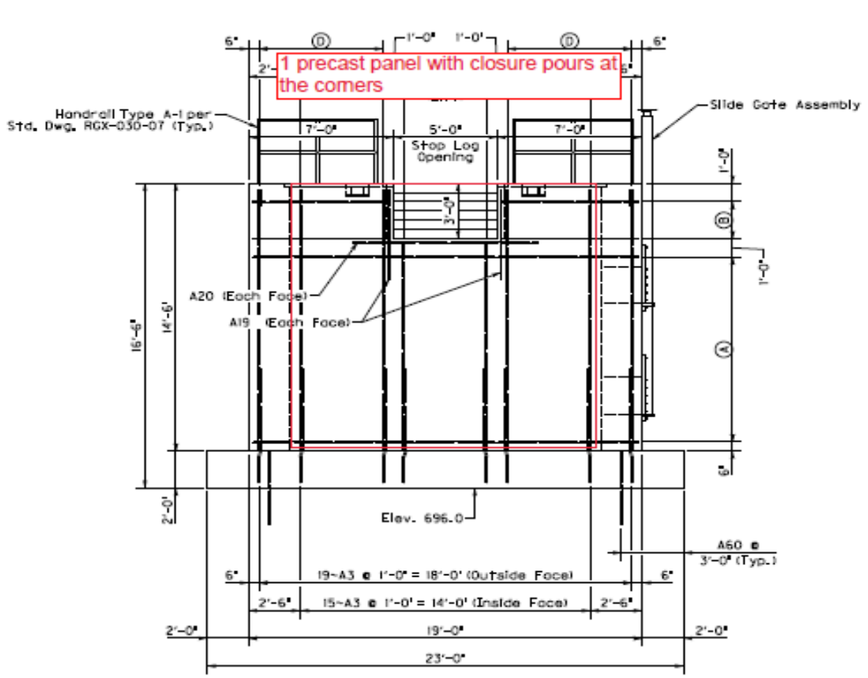
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

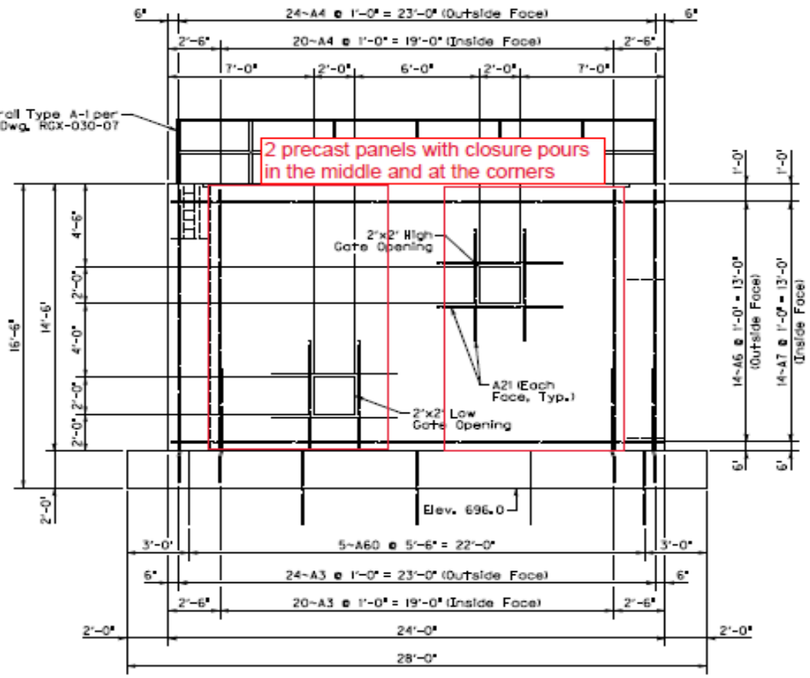
TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: VALUE PROPOSAL



NORTHEAST WALL ELEVATION

Wingwall reinforcing not shown for clarity.



NORTHWEST WALL ELEVATION

HDPE Pipe concrete cradle not shown for clarity.
Wingwall reinforcing not shown for clarity.
Gates, including side guides and actuator, not shown for clarity.

Ⓐ 11~A8 @ 1'-0" = 10'-0" (Outside Face)
11~A9 @ 1'-0" = 10'-0" (Inside Face)

Ⓑ 3~A16 @ 1'-0" = 2'-0" (Outside Face)
3~A17 @ 1'-0" = 2'-0" (Inside Face)

Ⓒ 5~A4 @ 1'-0" = 4'-0" (Inside Face)

Ⓓ 7~A4 @ 1'-0" = 6'-0" (Outside Face)

NOTES:

1. Stop logs to be designed and supplied by the Contractor in accordance with the Special Note for Stop Logs. Stop log frame to be embedded into riser structure wall or mounted to wall opening, as required.
2. Stainless Steel Low Gate and High Gate shall be supplied by the Contractor in accordance with the Special Note for Control Gates. Contractor is responsible for design of gate guides and any other support required at the gate invert. Any potential conflict with embedded thimbles and/or concrete anchors required for installation of the gate with wall steel reinforcing shall be communicated to the Engineer of Record.
3. Field cut A4, A6, & A7 bars as necessary to maintain 2" clear around gate openings.
4. Field cut A4 bars to maintain 2' clear around beam supports.
5. See INLET WINGWALL DETAILS Sheet for wingwall reinforcement details.
6. Dowel bars may be omitted if the bottom slab is keyed into bedrock and/or is monolithic with the mass concrete.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

REVISION	DATE

PREPARED BY: HDR

DATE: November, 2023	CHECKED BY:
DESIGNED BY: A. Singhal	P. Giannaros
DETAILED BY: R. Richardson	A. Singhal

RISER STRUCTURE (3 OF 4)
CROSSING: MILLER BRANCH

ROUTE	ITEM NO.	COUNTY OF
KY 15	10-376.00	BREATHITT
	SHEET NO. S7	DRAWING NUMBER 28745

MicroStation v8.11.9.819 | USER: ACOLE | DATE PLOTTED: 11/7/2023 | FILE NAME: d:\pwworking\acole01\d0188466\528745_007.dgn

VALUE PROPOSAL

MW-01

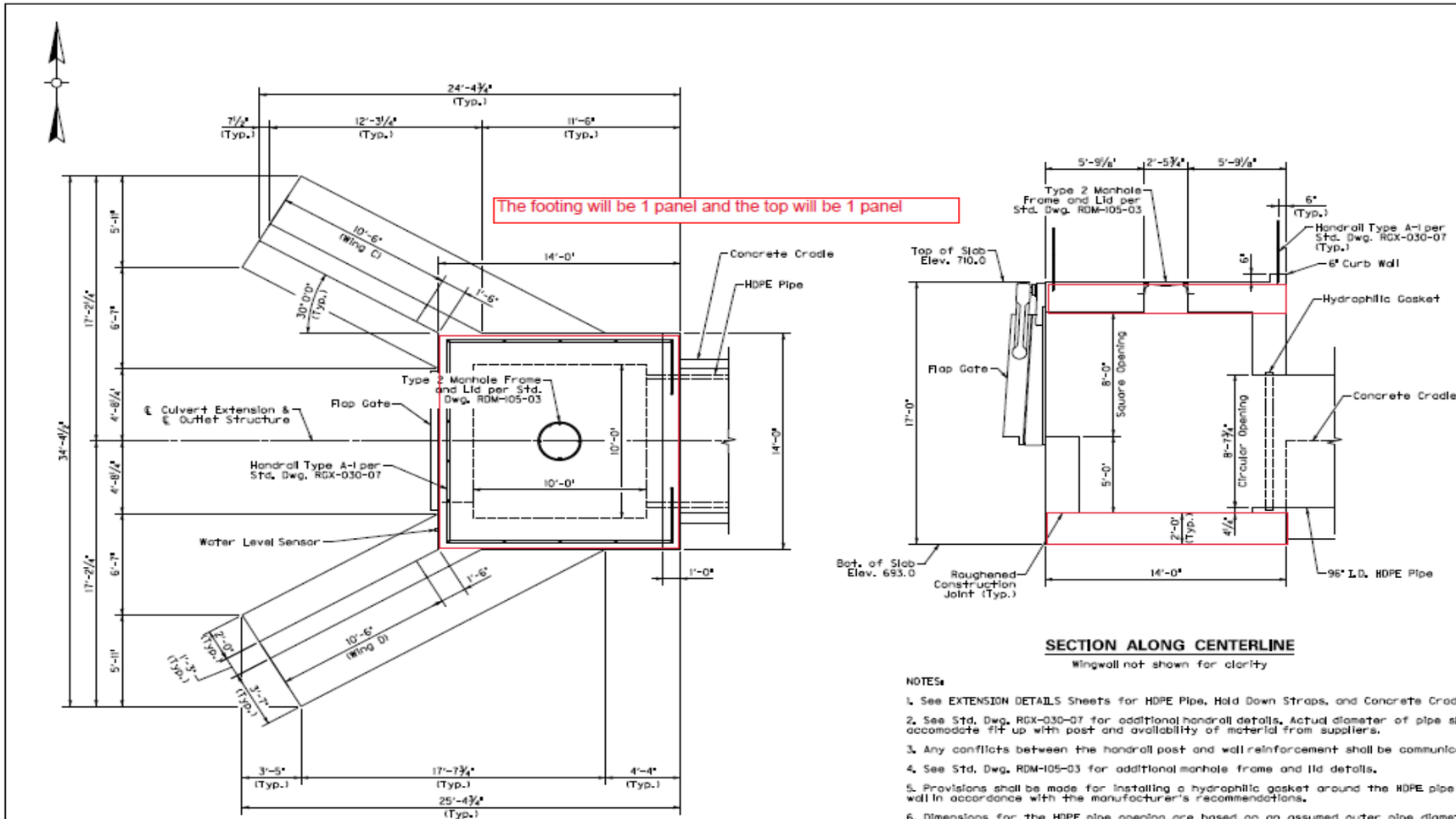
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: VALUE PROPOSAL



PLAN

SECTION ALONG CENTERLINE

Wingwall not shown for clarity

NOTES:

1. See EXTENSION DETAILS Sheets for HDPE Pipe, Hold Down Straps, and Concrete Cradle details.
2. See Std. Dwg. RGX-030-07 for additional handrail details. Actual diameter of pipe sleeve may be revised up to ⅛" to accomodate fit up with post and availability of material from suppliers.
3. Any conflicts between the handrail post and wall reinforcement shall be communicated to the Engineer of Record.
4. See Std. Dwg. RDM-105-03 for additional manhole frame and lid details.
5. Provisions shall be made for installing a hydrophilic gasket around the HDPE pipe where it protrudes through the wall in accordance with the manufacturer's recommendations.
6. Dimensions for the HDPE pipe opening are based on an assumed outer pipe diameter of 103.8 inches. Should the outer diameter of the supplied pipe differ from this, adjustments shall be made in the field to accomodate this.
7. Flapgate shall accomodate a 8'x8' opening, have a pair of lifting lugs that can be used for holding the gate open during routine maintenance, and shall be supplied by the contractor in accordance with the Project Specifications.
8. See OUTLET WINGWALL DETAILS Sheet for wingwall details.
9. A Water Level Sensor shall be installed on the face of the Outlet Structure in accordance with the Special Note for Control Gates, and shall be connected to the Rotating Beacon to be installed on top of the Inlet Structure.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

REVISION	DATE

PREPARED BY: HDR

DATE: November, 2023	CHECKED BY:
DESIGNED BY: A. Singhal	P. Glamaras
DETAILED BY: A. Cole	A. Singhal

OUTLET STRUCTURE (1 OF 3)

CROSSING: MILLER BRANCH

ROUTE: WASHINGTON AVE.

ITEM NO.	COUNTY OF
10-376.00	BREATHITT
SHEET NO. S12	DRAWING NUMBER 28747

MicroStation v8.11.9.819 | USER: ACOLE | DATE PLOTTED: 11/7/2023 | FILE NAME: d:\pwworking\hqeast01\d0188494\l528747_S12.dgn

VALUE PROPOSAL

MW-01

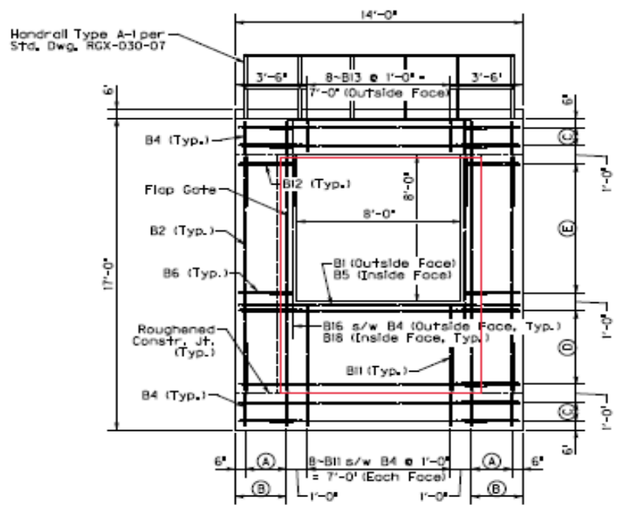
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

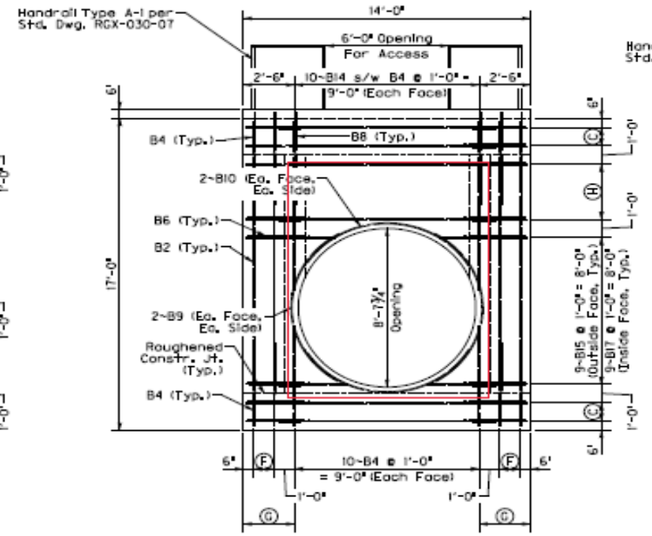
TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: VALUE PROPOSAL



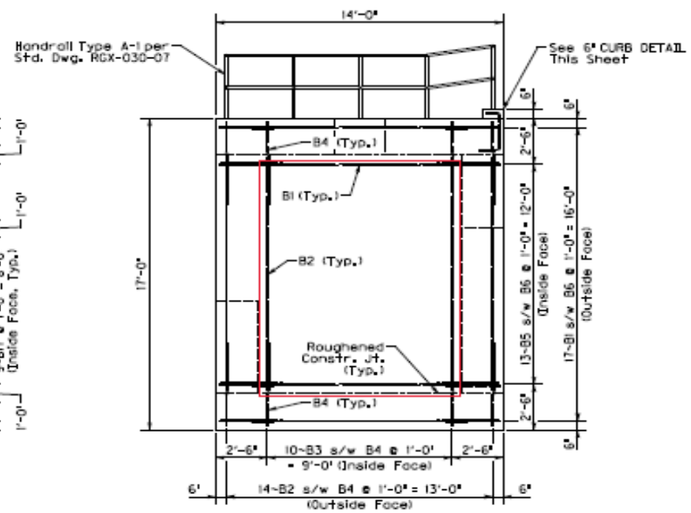
WEST WALL

Outside face shown



EAST WALL

Outside face shown



SOUTH WALL

Outside face shown
North wall opposite
Wingwall not shown for clarity

Each face will be one panel with closure pours at the corners

Ⓐ 3-B2 s/w B4 @ 1'-0" = 2'-0" (Outside Face)

Ⓑ 1-B3 @ 2'-0" (Inside Face)

Ⓒ 2-B1 s/w B6 @ 1'-0" = 1'-0" (Outside Face)

Ⓓ 5-B1 s/w B6 @ 1'-0" = 4'-0" (Outside Face)
5-B5 @ 1'-0" = 4'-0" (Inside Face)

Ⓔ 8-B12 s/w B6 @ 1'-0" = 7'-0" (Outside Face, Typ.)
8-B19 @ 1'-0" = 7'-0" (Inside Face, Typ.)

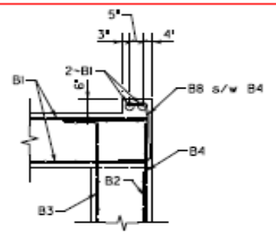
Ⓕ 2-B2 s/w B4 @ 1'-0" = 1'-0" (Outside Face)

Ⓖ 1-B3 @ 2'-0" (Inside Face)

Ⓗ 4-B1 s/w B6 @ 1'-0" = 3'-0" (Outside Face)
4-B5 @ 1'-0" = 3'-0" (Inside Face)

NOTES:

1. See OUTLET WINGWALL DETAILS Sheet for wingwall reinforcement details.
2. Field cut B4, B5, B6, B14, B15, & B17 bars as necessary to maintain 3" clear around HDPE Pipe opening.
3. Field cut B6 bars as necessary to maintain 2" clear around flap gate opening.
4. Field cut B1 bars as necessary to maintain 2" clear around manhole frame.



6" CURB DETAIL

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS	REVISION	DATE	PREPARED BY HDR	DATE: November, 2023	CHECKED BY	OUTLET STRUCTURE (3 OF 3)	ROUTE: WASHINGTON AVE.	ITEM NO.: 10-376.00	COUNTY OF: BREATHITT
				DESIGNED BY: A. Singhal	P. Clemares	CROSSING: MILLER BRANCH		SHEET NO.: S14	DRAWING NUMBER: 28747
				DETAILED BY: A. Cole	A. Singhal				

MicroStation v8.11.9.919 | USER: ACOLE | DATE PLOTTED: 11/7/2023 | FILE NAME: d:\pwworking\acole\d0163788\d0526747_S14.dgn

VALUE PROPOSAL

MW-01

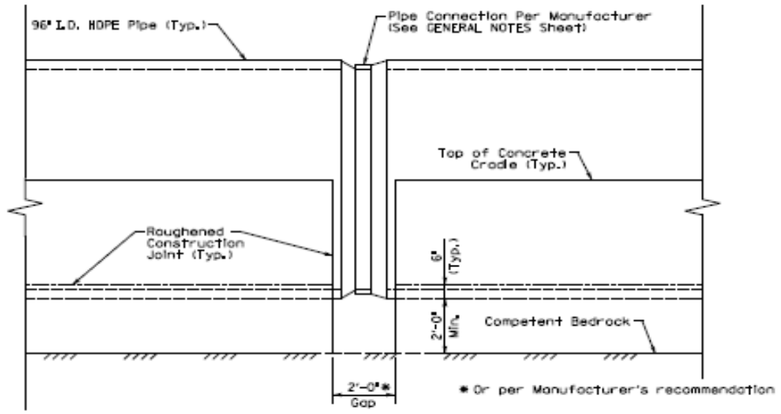
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

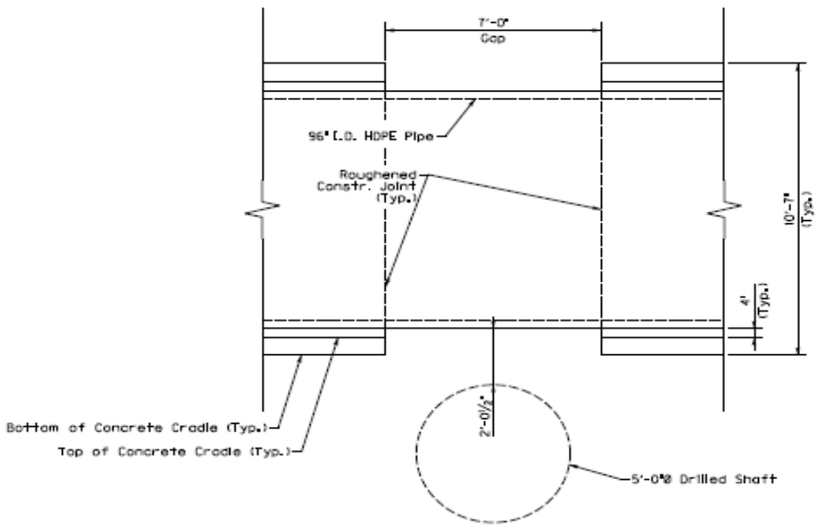
TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: VALUE PROPOSAL



CONCRETE CRADLE TYPICAL DETAIL AT PIPE JOINTS

Holddown hardware not shown for clarity.

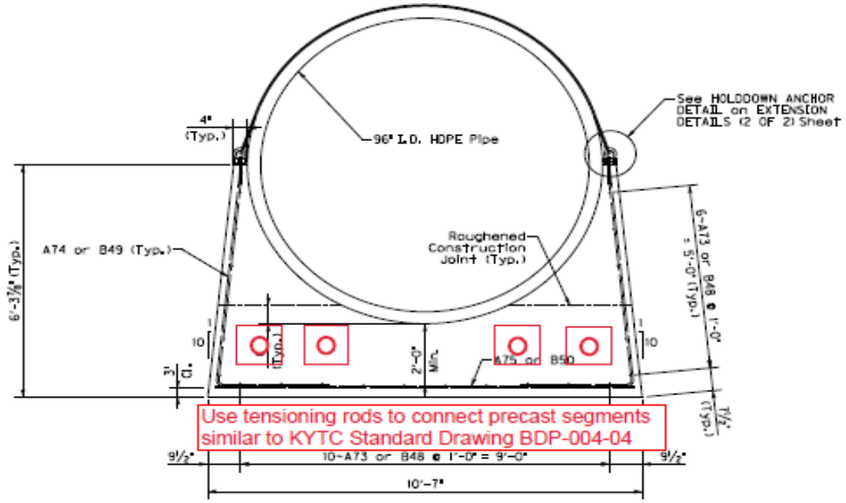


CONCRETE CRADLE DETAIL AT PEDESTRIAN BRIDGE PIER COLUMN

Holddown hardware not shown for clarity.

NOTES:

1. Pipe connections shall not be permitted within the temporary unsupported span at the Drilled Shaft location.
2. See Drawing Number 28746 for Drilled Shaft details.
3. Clear distance between HDPE Pipe and Drilled Shaft is based on an assumed outer pipe diameter of 103.8 inches.
4. Field cut bars as needed to accommodate required gaps in the Concrete Cradle.
5. At each pipe joint, provide a gap in the cradle as shown to facilitate sealing each joint per the manufacturer's recommendations. Contractor shall ensure that each pipe joint connection is watertight. Cast and backfill gap in Concrete Cradle with Concrete Class 'A' after the HDPE Pipe connection is completed. Contractor to determine the number and location of pipe joints in the field.
6. The Contractor shall provide a permanent 7'-0" gap in the cradle as shown to protect the drilled shaft for the Pedestrian Bridge. No pipe joints shall be allowed within the 7'-0" cradle gap at the drilled shaft location. This gap does not need to be backfilled with Concrete Class 'A'.
7. Contractor shall provide ½" Cork Expansion Material at each end of the Concrete Cradle between the cradle concrete and the existing culvert concrete or the proposed hydraulic structures concrete. All costs related to cork shall be considered incidental to the unit price bid for Concrete Class 'A'.



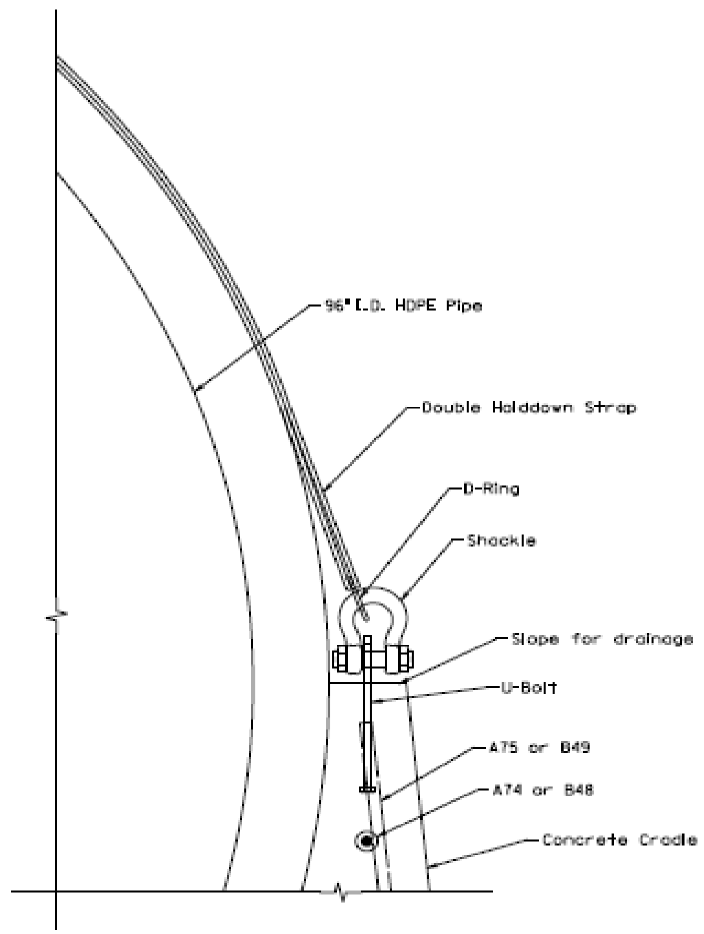
CONCRETE CRADLE SECTION

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS	REVISION	DATE	PREPARED BY HDR	DATE: November, 2023	CHECKED BY	EXTENSION DETAILS (1 OF 2)	ROUTE	ITEM NO.	COUNTY OF
				DESIGNED BY: A. Cole	E. Farlan	CROSSING	WASHINGTON AVE.	10-376.00	BREATHITT
				DETAILED BY: A. Cole	T. Swiderman	MILLER BRANCH	SHEET NO. S16	DRAWING NUMBER 28747	

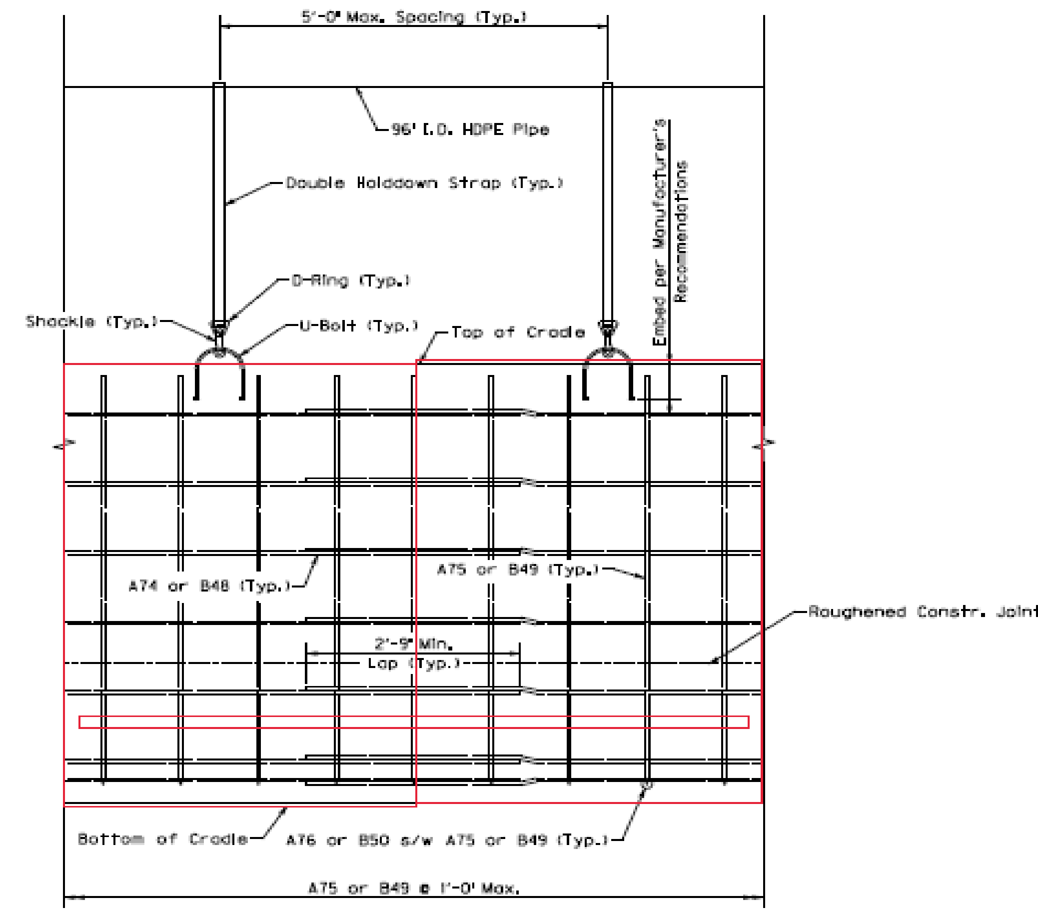
MicroStation v8.11.9.819 | USER: ACOLE | DATE PLOTTED: 11/7/2023 | FILE NAME: d:\pwworking\acole\d0183884\d028747_S16.dgn

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: VALUE PROPOSAL



HOLDDOWN ANCHOR DETAIL



HOLDDOWN ANCHOR ELEVATION

5ft thick precast concrete pipe cradle sections connected with tension rods.

NOTES:

1. Rebar may adjusted to avoid interference with anchor assembly hardware. However in no case shall the maximum spacing of reinforcement in the Concrete Cradle exceed 12 inches. Additional bars may be required to accommodate this.

2. Straps shall be polyester webbing. All anchor assembly hardware shall be able to resist a safe working load of 10,000 pounds.

3. If changes to the anchorage system are proposed by the Contractor, submit the changes to the Engineer of Record for approval.

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS | REVISION | DATE | PREPARED BY HDR | DATE: November, 2023 | DESIGNED BY: A. Cole | DETAILED BY: A. Cole | CHECKED BY E. Farlan | T. Swieterman | EXTENSION DETAILS (2 OF 2) | CROSSING MILLER BRANCH | ROUTE WASHINGTON AVE. | ITEM NO. 10-376.00 | SHEET NO. S17 | COUNTY OF BREATHITT | DRAWING NUMBER 28747

VALUE PROPOSAL

MW-01

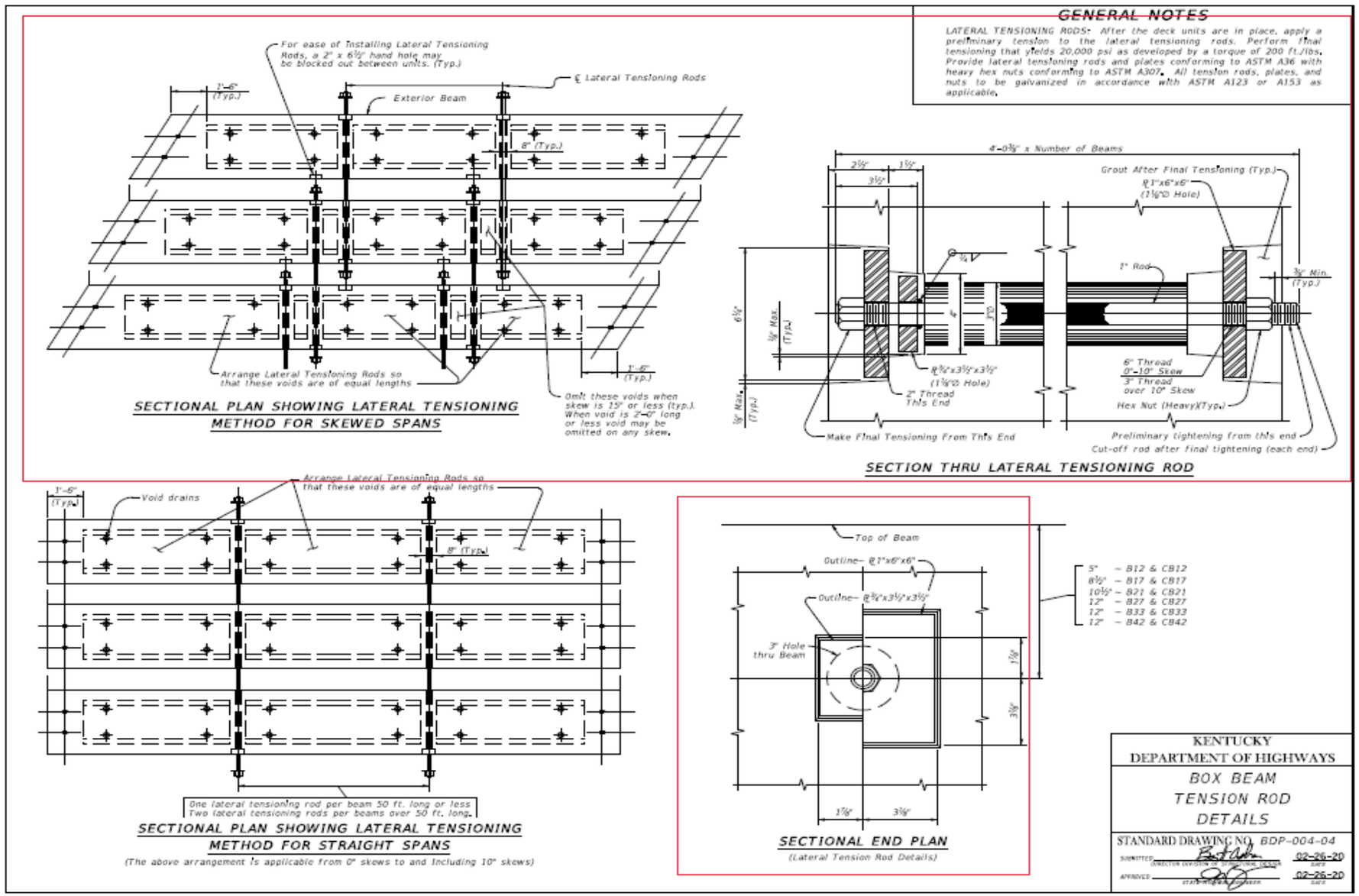
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Simplify inlet and outlet structures to shorten construction duration

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL
MW-02
Kentucky Transportation Cabinet
KY 15, Breathitt County Major Widening
Item No. 10-376.00

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork
FUNCTION	**Maintain Water**
ASSOCIATED IDEAS	MI-02: Investigate the thickness of the wing walls; the thickness is less than Height /12 for a few of the wings MI-04: Investigate the need for vertical reinforcement on the front and back face of the wing walls; since the wings can be submerged there will be forces on each face

VALUE PROPOSAL SYNOPSIS:

Making a consistent wing wall thickness throughout the project should reduce formwork cost and increase constructability even though more material will be used.

Reliability	**Maintained**	**Functionality**	**Improved**	**$ Initial Cost Avoidance (Add)**	
O&M	**Maintained**	**Schedule Impact**	**Maintained**	**$0**	

BASELINE CONCEPT:

The wing wall thickness varies throughout the project and is listed as 10", 1'-0", and 1'-3".

VALUE PROPOSAL DESCRIPTION:

Consider making the wings all the same thickness throughout the project and check the design that the wing thickness and front face reinforcement is adequate.

ADVANTAGES:	DISADVANTAGES:
● Ease of constructability with consistent formwork	● Redesigning and updating the drawings with little time before the letting
● Verifying that the design is adequate	● Uses more material
● Formwork cost savings	●
●	●
●	●
●	●
●	●

VALUE PROPOSAL

MW-02

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

DISCUSSION & JUSTIFICATION:

• Technical Considerations - The wing wall thickness is inconsistent throughout the entire project and is shown as 10", 1'-0" and 1-3". Making these thicknesses all the same would make it easier for formwork and constructability. The outlet wings of the KY15 extension and Main Street 6'x6' culvert are all connected and are 3 different sizes. This will make it difficult for connecting the formwork and for the back face horizontal bars to connect between wings.

Several of the wing walls have thicknesses less than the rule of thumb, Design Height/12. Please verify that the correct soil pressure and live load surcharge was used in the design.

At all of these structures, the water level will fluctuate and the wings will be submerged. Consider placing reinforcement in the front face, that is developed into the footing, to resist any water pressure acting on the front face.

• Cost Considerations - Increasing the wing thickness for constructability will increase the amount of material used, but should decrease the labor and hopefully add a savings. This cost savings can only be captured by a contractor therefore a cost estimate was not performed.

• Schedule Impacts - Should be a slight improvement to the construction schedule.

• Risk Considerations - Ease of constructability should decrease the risk.

• Project Management Considerations (including Redesign Effort) - A moderate redesign effort will be required to change the wing thickness and a small effort will be required to verify these concerns in the calculations.

• Stakeholder Acceptance - Since more material will be added to the project, the time savings might

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

DISCUSSION & JUSTIFICATION: (cont.)

not be significant enough to offset the additional material. This should be considered by the stakeholder.

• Implementation Considerations - Implementation should make it easier for the contractor to build, but will cause a moderate redesign effort for the designers.

VALUE PROPOSAL

MW-02

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

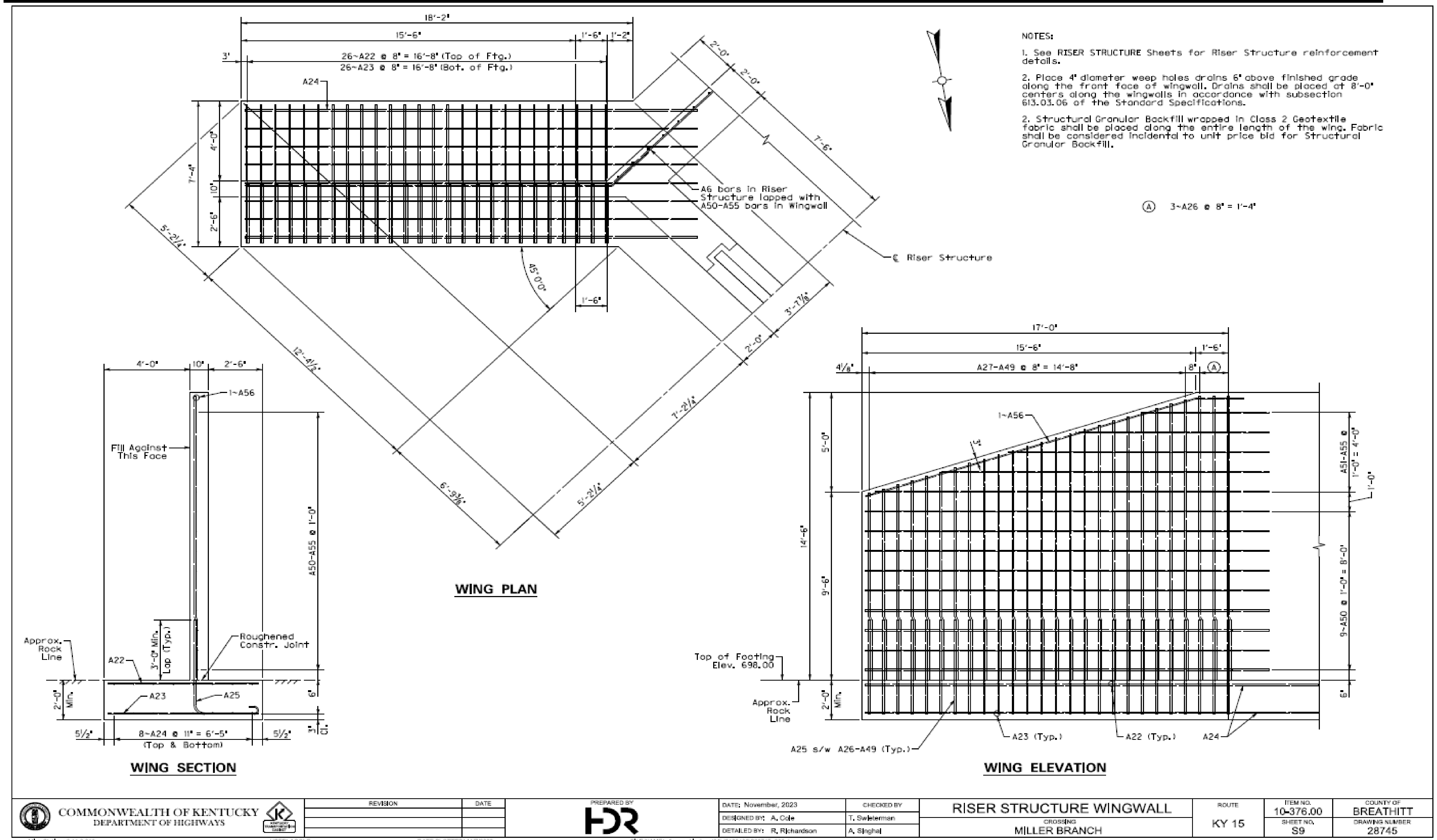
TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No perceived impact	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No perceived impact	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Maintained
Justification for Impact Score	No perceived impact	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score	No perceived impact	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No perceived impact	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	No perceived impact	
Risk	An assessment of the identified risks of the project.	Improved
Justification for Impact Score	Wings will be easier to construct with consistent formwork, which should reduce risk.	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No perceived impact	

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT


NOTES:
1. See RISER STRUCTURE Sheets for Riser Structure reinforcement details.
2. Place 4" diameter weep holes drains 6" above finished grade along the front face of wingwall. Drains shall be placed at 8'-0" centers along the wingwalls in accordance with subsection 613.03.06 of the Standard Specifications.
2. Structural Granular Backfill wrapped in Class 2 Geotextile fabric shall be placed along the entire length of the wing. Fabric shall be considered incidental to unit price bid for Structural Granular Backfill.
(A) 3~A26 @ 8" = 1'-4"
26~A22 @ 8" = 16'-8" (Top of Ftg.)
26~A23 @ 8" = 16'-8" (Bot. of Ftg.)
A6 bars in Riser Structure lapped with A50-A55 bars in Wingwall
℄ Riser Structure
WING PLAN
Fill Against This Face
Roughened Constr. Joint
Approx. Rock Line
8~A24 @ 11" = 6'-5" (Top & Bottom)
A50-A55 @ 1'-0"
WING SECTION
A27-A49 @ 8" = 14'-8"
Top of Footing Elev. 698.00
A25 s/w A26-A49 (Typ.)
A23 (Typ.)
A22 (Typ.)
9~A50 @ 1'-0" = 8'-0"
A51-A55 @ 1'-0" = 4'-0"
WING ELEVATION
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
DATE: November, 2023
DESIGNED BY: A. Cole
DETAILED BY: R. Richardson
CHECKED BY
T. Swieterman
A. Singhal
RISER STRUCTURE WINGWALL
CROSSING
MILLER BRANCH
ROUTE
KY 15
ITEM NO.
10-376.00
SHEET NO.
S9
COUNTY OF
BREATHITT
DRAWING NUMBER
28745

VALUE PROPOSAL

MW-02

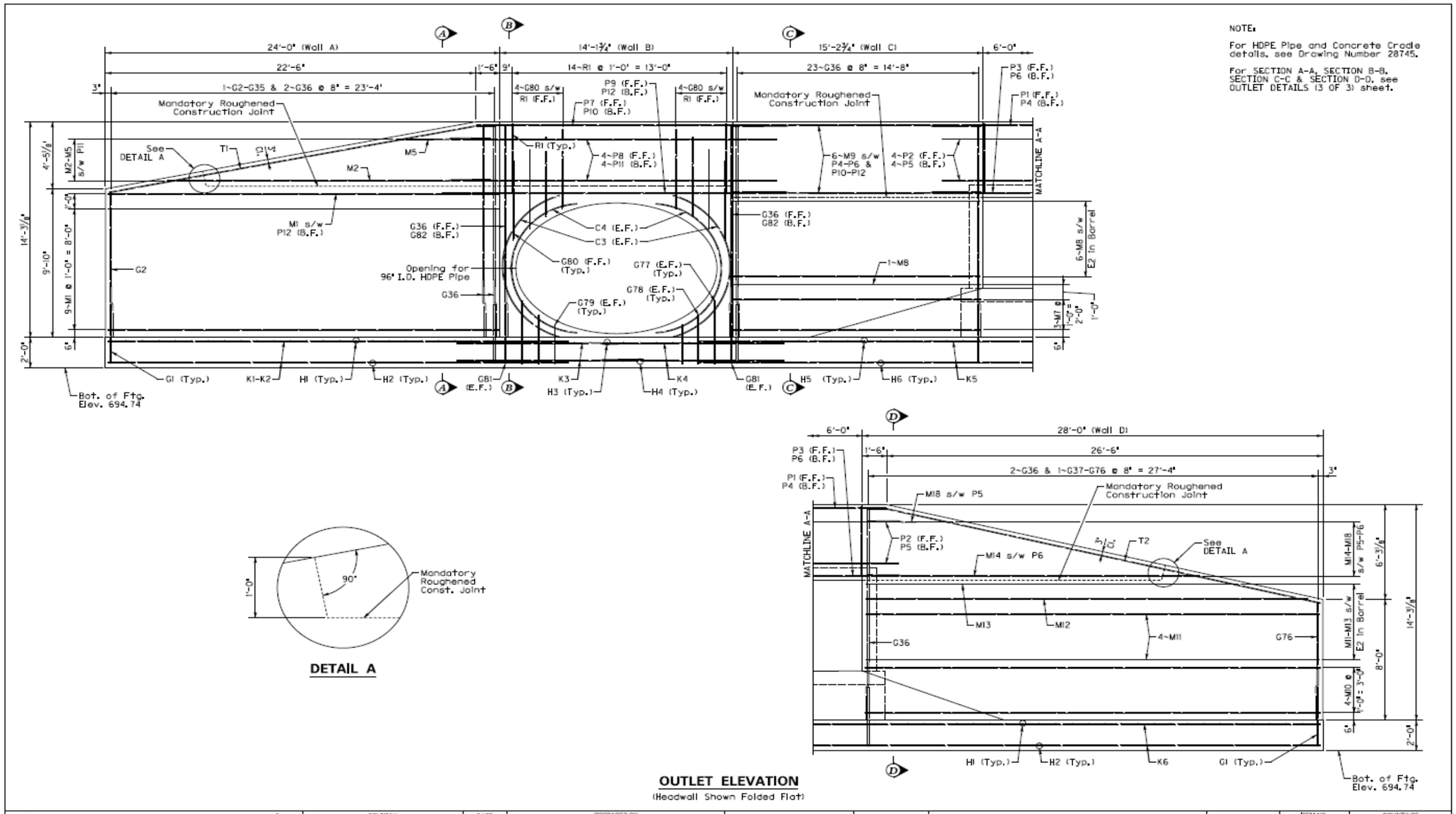
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



DETAIL A

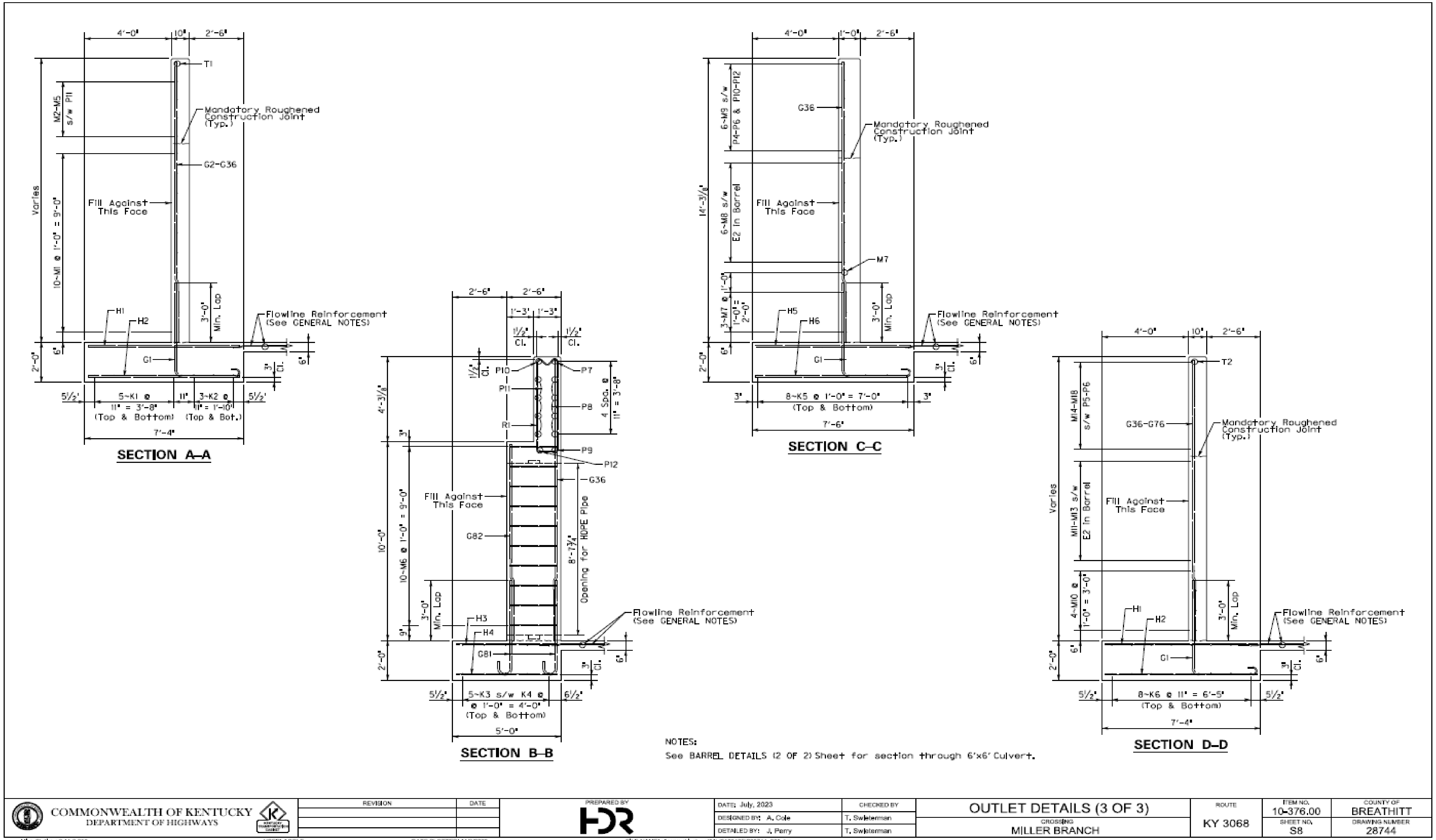
OUTLET ELEVATION
(Headwall Shown Folded Flat)

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS	REVISION	DATE	PREPARED BY HDR	DATE: July, 2023	CHECKED BY	OUTLET DETAILS (2 OF 3)	ROUTE	ITEM NO.	COUNTY OF
				DESIGNED BY: A. Cole	T. Swieterman	CROSSING: MILLER BRANCH	KY 3068	10-376.00	BREATHITT
				DETAILED BY: J. Perry	T. Swieterman			SHEET NO. S7	DRAWING NUMBER 28744

MicroStation v8.11.9.919 | USER: ACOLE | DATE PLOTTED: 11/9/2023 | FILE NAME: c:\pework\highest01\d0188485\l28744_007.dgn

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

MW-02

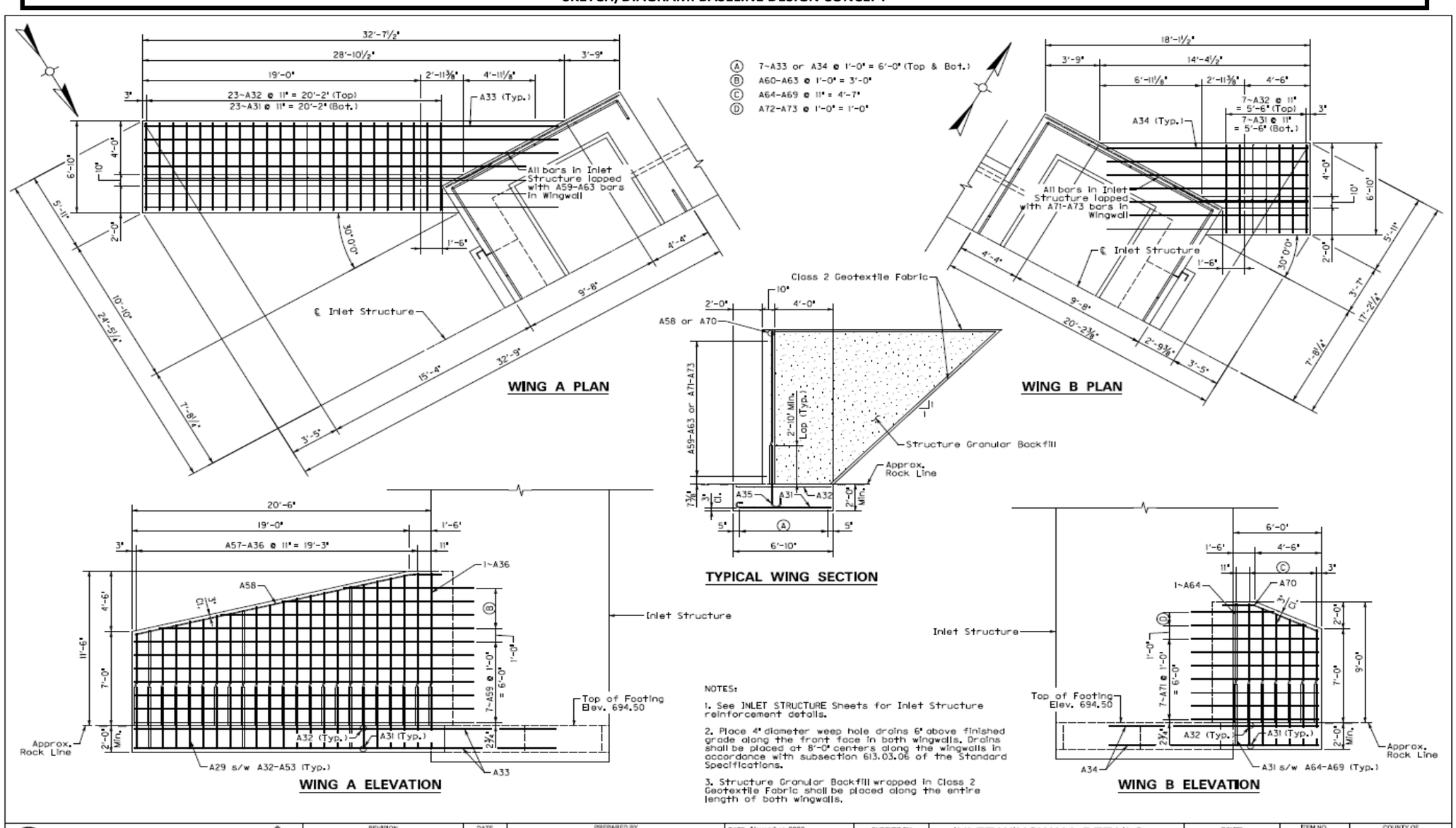
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

MW-02

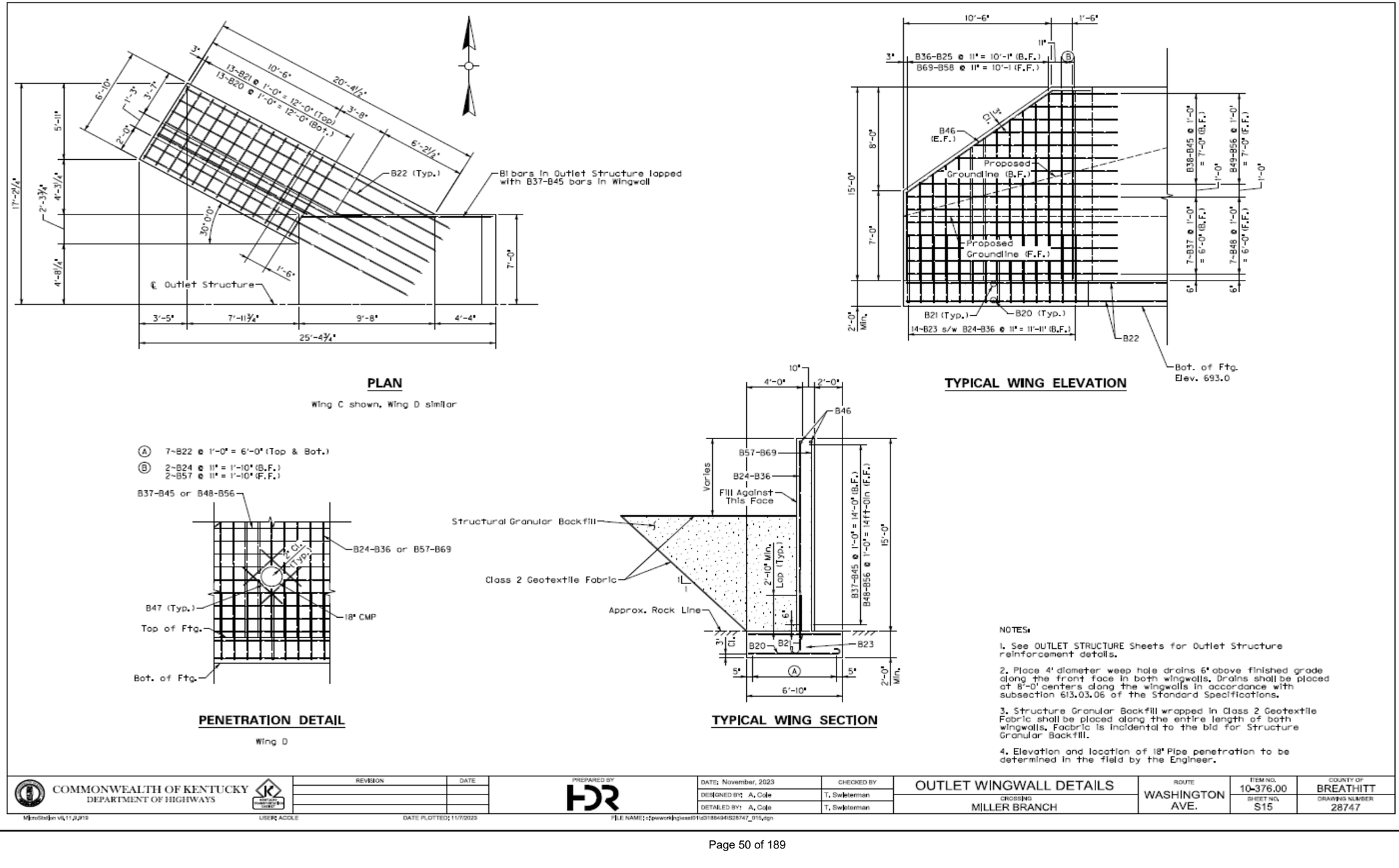
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

REVISION	DATE

PREPARED BY HDR

DATE: November, 2023	CHECKED BY
DESIGNED BY: A. Cole	T. Swieterman
DETAILED BY: A. Cole	T. Swieterman

OUTLET WINGWALL DETAILS

CROSSING: MILLER BRANCH

ROUTE	ITEM NO.	COUNTY OF
WASHINGTON AVE.	10-376.00	BREATHITT
	SHEET NO. S15	DRAWING NUMBER 28747

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VALUE PROPOSAL

MW-02

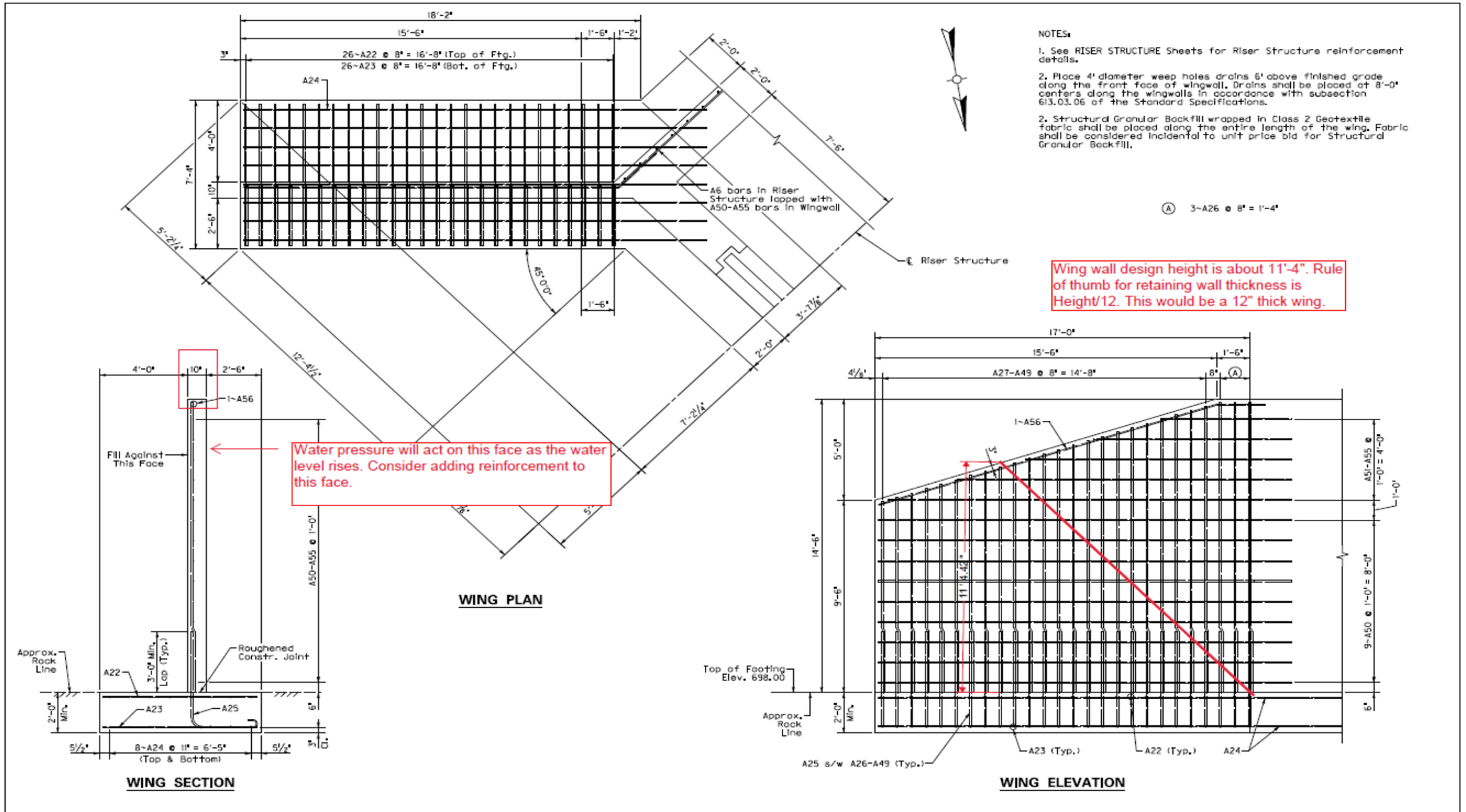
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MW-02

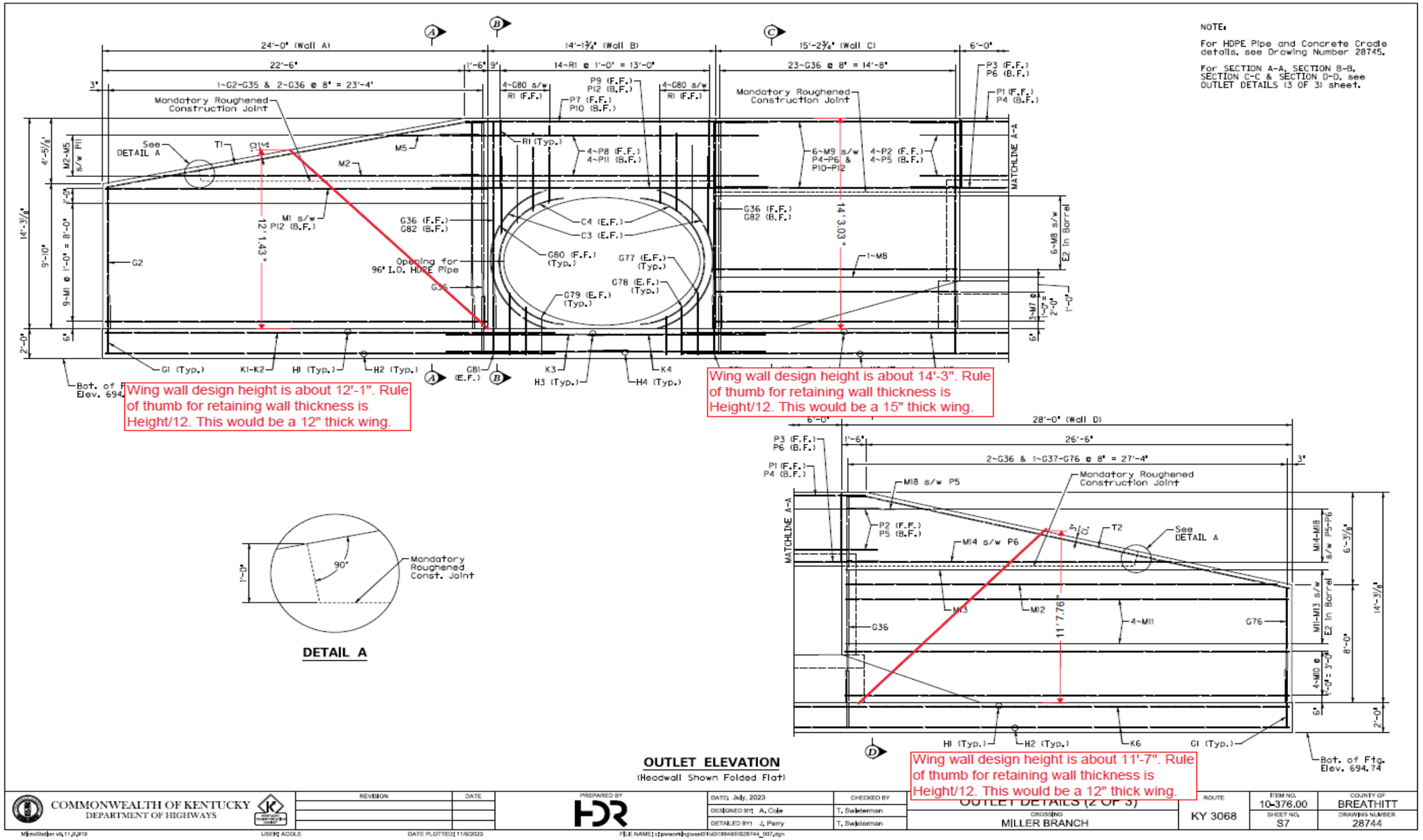
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

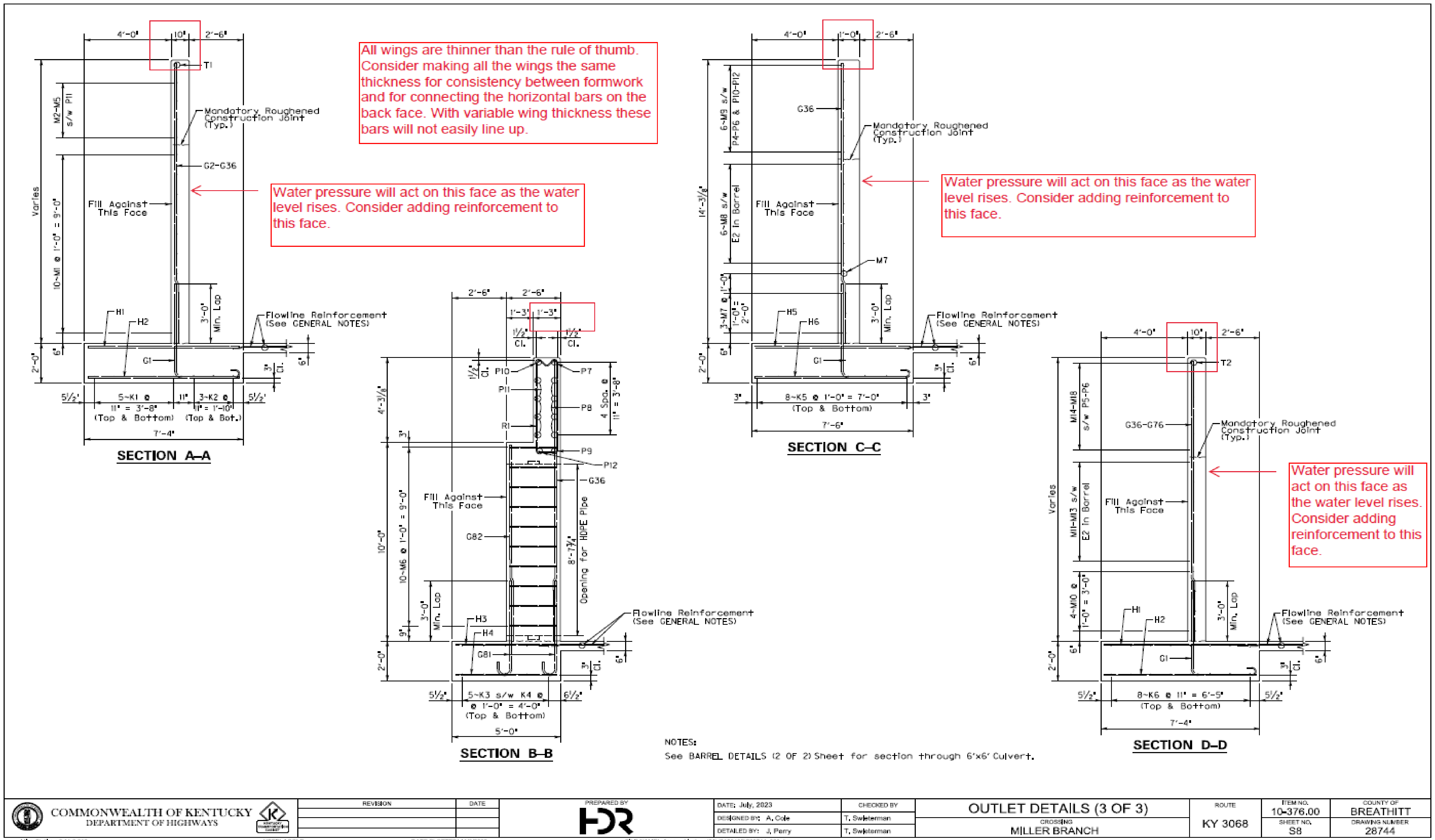
TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: VALUE PROPOSAL



TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: VALUE PROPOSAL


All wings are thinner than the rule of thumb. Consider making all the wings the same thickness for consistency between formwork and for connecting the horizontal bars on the back face. With variable wing thickness these bars will not easily line up.
Water pressure will act on this face as the water level rises. Consider adding reinforcement to this face.
Water pressure will act on this face as the water level rises. Consider adding reinforcement to this face.
Water pressure will act on this face as the water level rises. Consider adding reinforcement to this face.
SECTION A–A
SECTION B–B
SECTION C–C
SECTION D–D
Fill Against This Face
Mandatory Roughened Construction Joint (Typ.)
Flowline Reinforcement (See GENERAL NOTES)
NOTES:
See BARREL DETAILS (2 OF 2) Sheet for section through 6'x6' Culvert.
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
OUTLET DETAILS (3 OF 3)
MILLER BRANCH
KY 3068
10-376.00
S8
BREATHITT
28744
DATE: July, 2023
DESIGNED BY: A. Cole
DETAILED BY: J. Perry
CHECKED BY T. Swieterman

VALUE PROPOSAL

MW-02

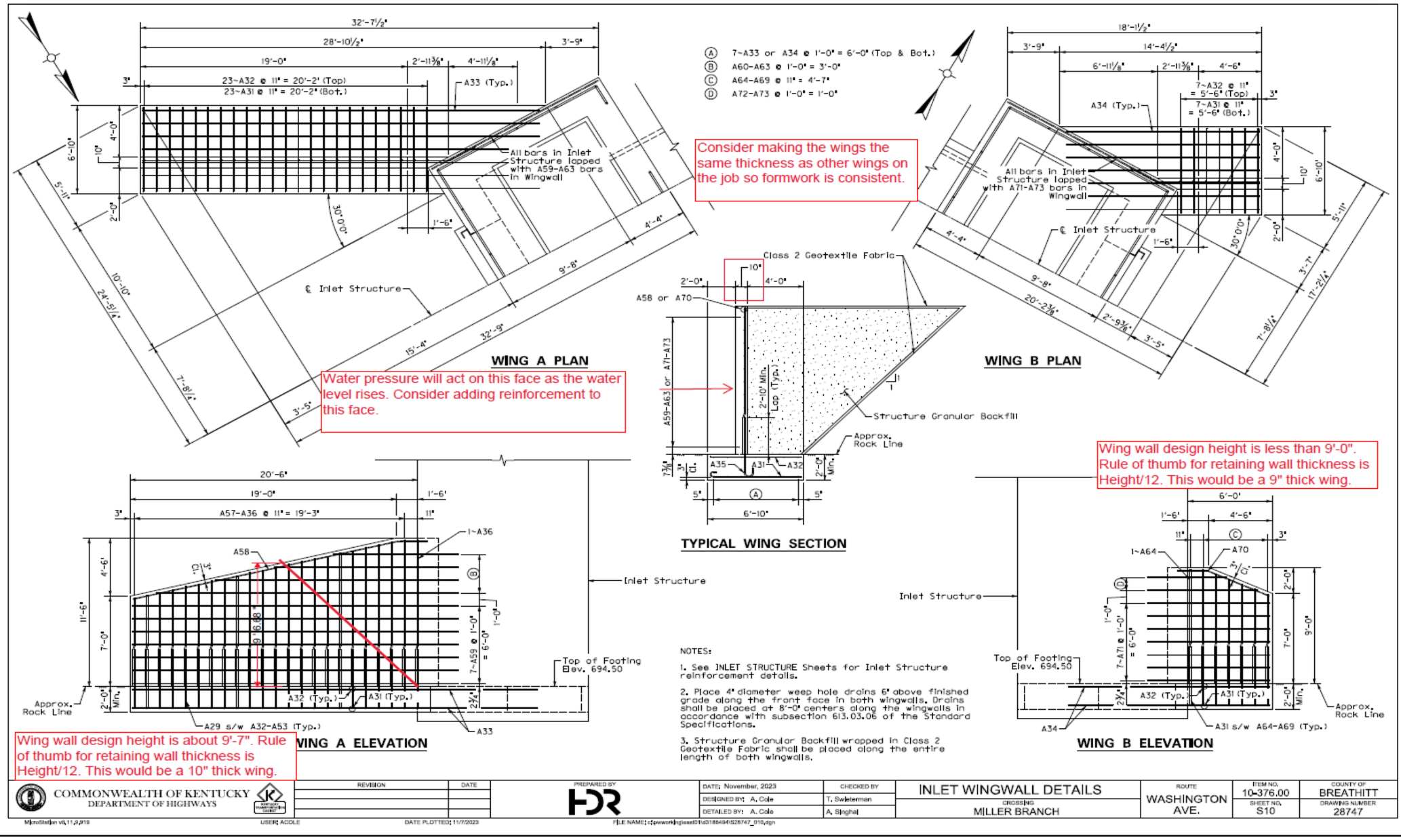
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MW-02

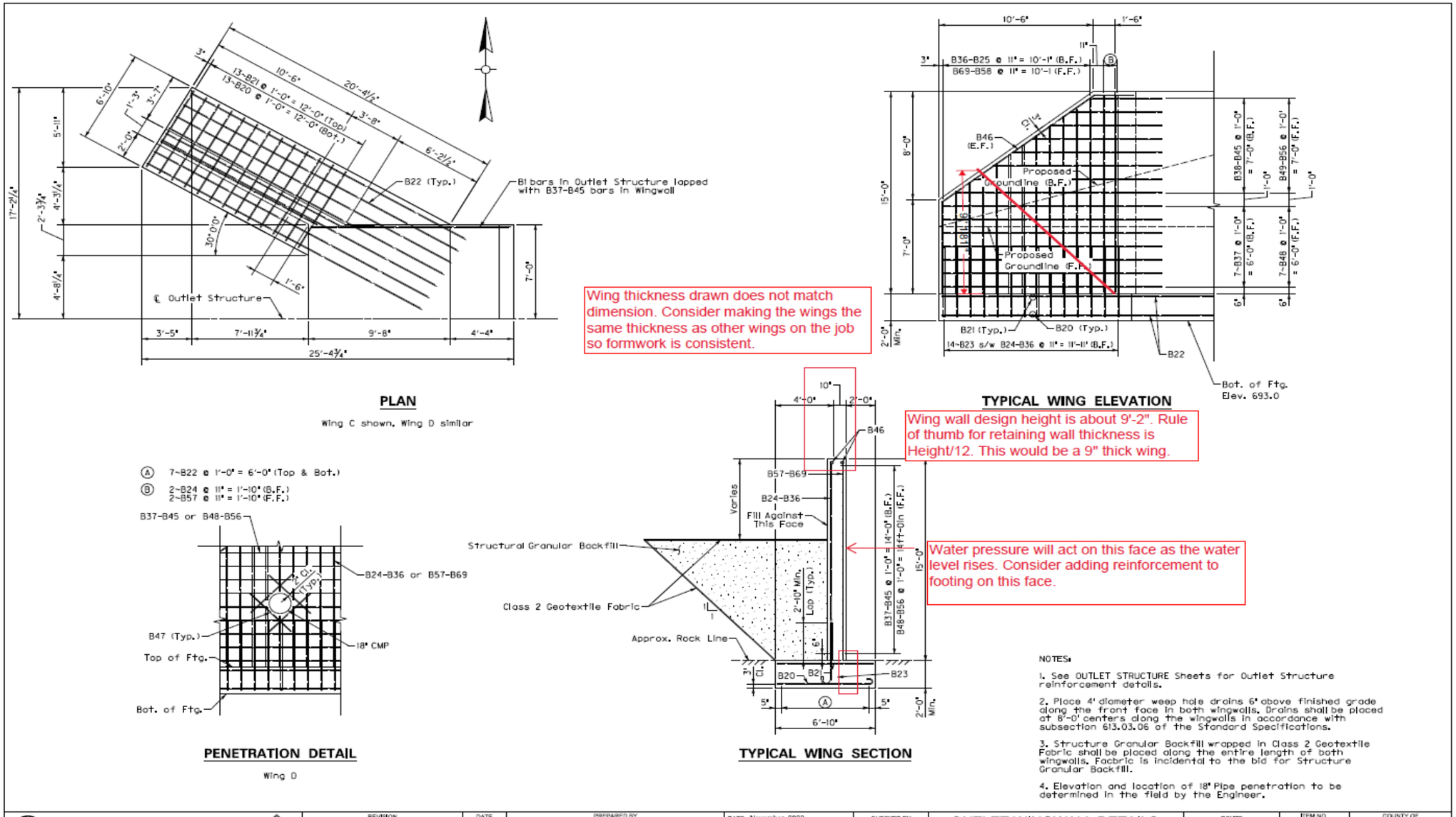
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MW-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Verify that the right-of-way is adequate for cofferdam and segmental pipe installation
FUNCTION	**Maintain Water**

VALUE PROPOSAL SYNOPSIS:

The purpose of this proposal was to verify that there will be enough real estate within ROW to accommodate installing the HDPE pipe liner inside the existing 10 X 10 RCBC.

Reliability	**Maintained**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**	
O&M	**Maintained**	**Schedule Impact**	**Maintained**	**$0**	

BASELINE CONCEPT:

N/A

VALUE PROPOSAL:

N/A

ADVANTAGES:	**DISADVANTAGES:**
● Allows time to make any corrections, changes or obtain additional easement if determined to be needed, rather than wait to learn this in construction	● None anticipated
●	●
●	●
●	●
●	●
●	●
●	●

VERIFICATION EFFORT

VALUE PROPOSAL

MW-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Verify that the right-of-way is adequate for cofferdam and segmental pipe installation

DISCUSSION & JUSTIFICATION:

The purpose of this proposal was to verify there is enough space to install the HDPE liner inside the 10' X 10' RCBC. After review there appears to be approximately 100' from the existing 10' X 10' RCBC inlet and outlet to the edge of the proposed cofferdam on both the East and West Sides of the structure. Assuming that the 96" HDPE liner is manufactured in 20' or less lengths there will be ample room to accommodate the liner during construction. No further action required.

- Technical Considerations: N/A
- Cost Considerations; N/A
- Schedule Impacts: N/A
- Risk Considerations: N/A
- Project Management Considerations (including Redesign Effort): N/A
- Stakeholder Acceptance: N/A
- Implementation Considerations: N/A

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

MW-04

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place
FUNCTION	**Maintain Water**

VALUE PROPOSAL SYNOPSIS:

Using a precast inlet at Washington Avenue will reduce the duration of shoring and dewatering methods during this phase of construction. This will reduce the risk of flooding during construction and could reduce the overall cost of this structure.

Reliability	**Maintained**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**	
O&M	**Maintained**	**Schedule Impact**	**Improved**	**$0**	

BASELINE CONCEPT:

The inlet structure at Washington Avenue is a reinforced cast-in-place concrete structure that is a 14ft by 20ft open box structure and is 52ft tall. Installing this structure is key to controlling the storm water for the entire lake.

VALUE PROPOSAL DESCRIPTION:

Give the contractor the option to make this structure precast concrete. This should reduce the amount of time it takes to install while dewatering methods are in place.

ADVANTAGES:	**DISADVANTAGES:**
● Reduces construction time with dewatering methods in place	● Additional design with limited time in schedule
● Reduces risk of flooding with dewatering methods in place	● Slightly more complex construction practices
●	● Larger crane to set pieces
●	● Shipping large precast sections
●	●
●	●
●	●

DESIGN SUGGESTION

VALUE PROPOSAL

MW-04

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

DISCUSSION & JUSTIFICATION:

A large risk of this project is building the flood controlling structures with the use of shoring and dewatering methods while controlling the water levels during any storm events. Minimizing the time that dewatering methods are in place will reduce project risk and could result in a cost savings. This cost savings is difficult for a designer to capture since it a savings of time and risk. This can only truly be captured by the contractor so a cost estimate was not performed.

The Washington Avenue structure is a large structure that will take a significant amount of time to build and this structure is the first step in getting flood protection to the rest of the project. One way to construct this structure faster, while the dewatering methods are in place, is to build it as precast concrete rather than cast-in-place.

Since the plans are nearly complete on this project, redesigning and detailing this structure in a short amount of time as a precast concrete structure would be difficult. At minimum, a note could be place in the plans allowing the contractor to convert the structure to precast. This note would require the contractor to hire an engineer licensed in Kentucky to design the precast structure. Additionally an Alternate Estimate of Quantities for this precast option could be added. The cast-in-place quantities would be removed and a bid item for the Precast Concrete Inlet would be added. See the sketch page for an example. This allows the contractor an option and they can place a bid for this item. However it is difficult to bid something that is not designed and turns this structure into a design build project.

If there was more time the design team could redesign this structure as precast concrete to show with the cast-in-place option in the plans. A few things to consider with the precast concrete structure.

- Use rectangular pieces and stack them on top of each other. This might require the overall dimensions of the box section to be adjusted from 14ftx20ft to 12ftx26ft. This keeps a similar interior area, but makes the width 12ft which should be easier to ship.

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

DISCUSSION & JUSTIFICATION: (cont.)

- The contractor can elect to cast the sections on site. This allows their crew to do the work and make the revenue along with eliminating the shipping concerns.
- Determine height of each section by weight. Assume a reasonably sized crane can set these pieces in place. If the piece is too heavy the savings will be absorbed by the cost of a large crane.
- The current walls are 2’-6” thick with #7 bars spaced at 1’-0” for the horizontal and vertical bars. Consider reducing the rebar spacing or using larger bars to reduce the wall thickness and piece weight.
- Consider sizing the inlet structure to match standard precast concrete culvert formwork. This will reduce forming cost.
- Splicing the segments can be handled multiple ways.
  - Post tensioning bars.
  - Post tensioning tendons.
  - Mechanical couplers on the mild reinforcement with a closure pour.
- The walls could be cast as individual panels with vertical closure pours between segments rather than as boxes stacked on top of each other.

Implementation of a precast concrete inlet should be similar to the construction of a precast concrete culvert with the installation of the pipe and wingwalls. There is an exception with the complexity and weight of the pieces at the base.

VALUE PROPOSAL

MW-04

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No perceived impact.	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No perceived impact.	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Maintained
Justification for Impact Score	No perceived impact.	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Improved
Justification for Impact Score	Reduces time with shoring and dewatering methods in place reduces the risk of flooding during construction.	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No perceived impact.	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	No perceived impact.	
Risk	An assessment of the identified risks of the project.	Improved
Justification for Impact Score	Reduces time with shoring and dewatering methods in place reduces the risk of flooding during construction.	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No perceived impact.	

VALUE PROPOSAL

MW-04

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT

N

Estimate of Quantities Table in the current plans

ESTIMATE OF QUANTITIES

BID ITEM CODE	08100	08150	20465EC	08003	08002	08037	24786EN	24583EC	26207ED	24550EC	26203EC	26202EC	26201EC	21321NC	24798ED	08160	20478ND	26198ED	02611	02612	02700	26197EC	02231	50003	25086EC	24886EC	24884ED	24843EC	26213EC	26212EC	40130	XXXXX	XXXXX	XXXXX	XXXXX
BID ITEM	Concrete Class "A"	Steel Reinforcement	Clean Culvert	Foundation Preparation	Structure Excavation, Solid Rock	Cofferdam	HDPE Pipe	HDPE Pipe Liner	Secant Shafts	Vibration Monitoring	Secant Shaft Concrete Cores	Water Pressure Tests in Cores (Single Packer)	24-Hour Falling Head Permeability Tests in Cores	CSL Testing (4 Tubes)	Drop In Grate	Structural Steel ①	Manhole Frame and Lid, Type 2	Trash Rack	Handrail Type A-1	Handrail Type A-2	Sand	AASHTO #89 Stone	Structure Granular Backfill	Electrical	Automated Slide Gate	Flap Gate	Permanent Steel Casing	Vibrating Wire Piezometer	Soil Grouting	Secant Shaft with Lightweight Concrete	Rotating Beacon and Pole	Vibrating Wire Data Logger (4-Channel)	Water Level Sensor	Pressure Testing of Soil Grouting	CCTV Soil Grouting Inspection
UNIT	C.Y.	LBS.	L.S.	L.S.	C.Y.	L.S.	L.F.	L.F.	L.F.	L.S.	EACH	EACH	EACH	EACH	EACH	L.S.	EACH	S.F.	L.F.	L.F.	Tons	Tons	C.Y.	L.S.	EACH	EACH	L.F.	EACH	LS	L.F.	EACH	EACH	EACH	EACH	EACH
Inlet Extension	371.5	40398			38	1	52	99							1			77		58	333	156	78	1		1	12				1				
Outlet Extension	180.4	14371			30	1	59	109									1		46		324	167	104		1								1		
Secant Shaft Wall									3542		4	2	3	3														8	1	237		1		1	1
																				1															
BRIDGE TOTALS	551.9	54769	1	1	68	2	111	208	3542	1	4	2	3	3	1	1	1	77	46	58	657	323	182	1	1	1	12	8	1	237	1	1	1	1	1

VALUE PROPOSAL

MW-04

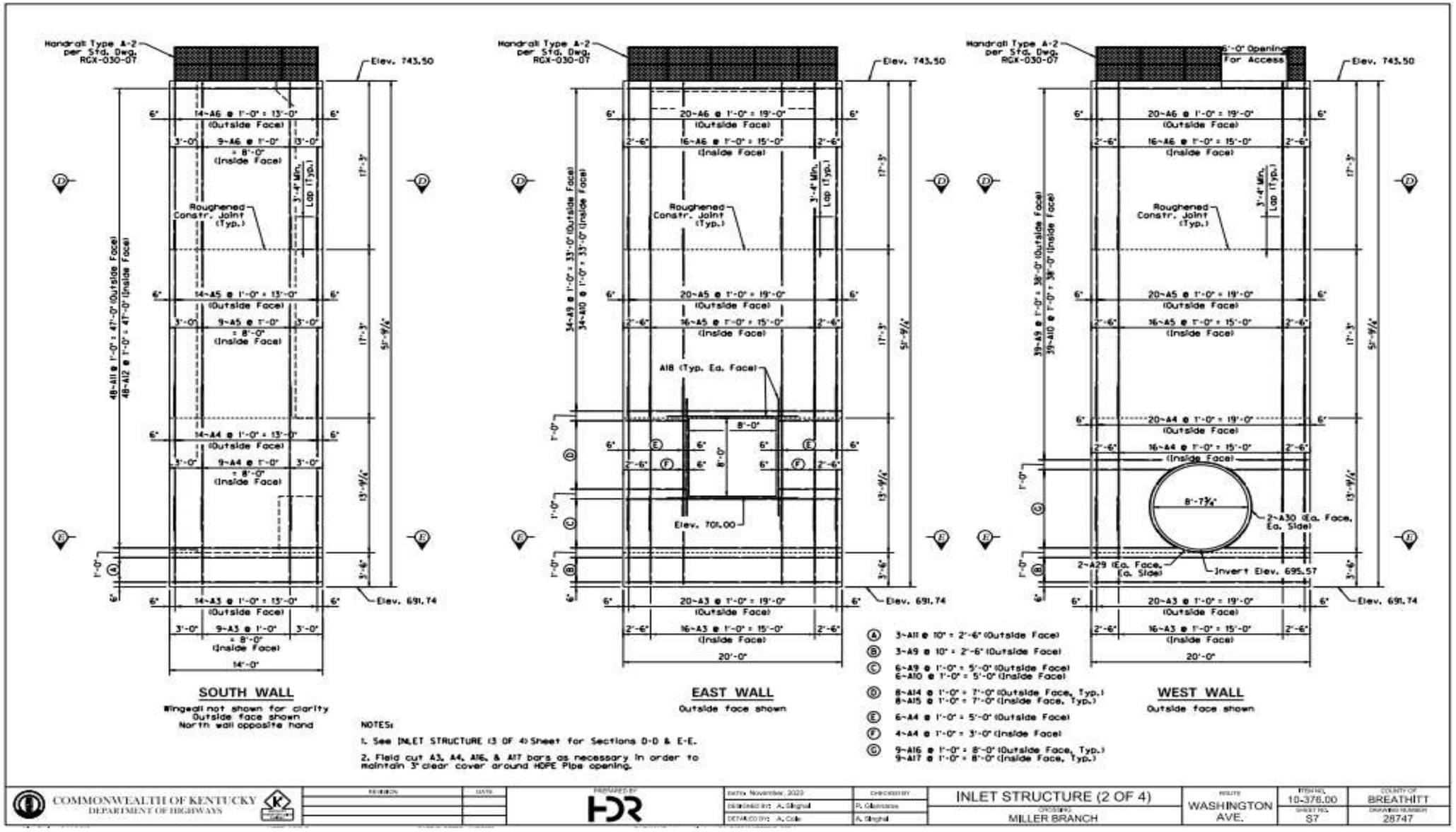
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

MW-04

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

SKETCH/DIAGRAM: VALUE PROPOSAL

N

Example 1 of an Estimate of Quantities Table showing an alternate in the bid.

ESTIMATE OF QUANTITIES

	BID ITEM CODE	08151	08001	08002	08020	02998	03299	08033	08051	08095	08160	08170	25028ED	23859EC	02604	24596EN	02603		Hollow Column Alternate			H – Column Alternate		
	BID ITEM	Steel Reinforcement, Epoxy Coated	Structure Excavation, Common ⑥⑧⑨	Structure Excavation, Solid Rock ⑧	Crushed Aggregate Slope Protection ③	Masonry Coating	Armored Edge for Concrete	Test Piles	Piles – Steel HP 14x89	Pile Points 14"	Structural Steel ①	Shear Connectors ②	Rail System Single Slope 40 Inch	Finger Expansion Joint	Fabric Geotextile Class 1A ④	Granular Backfill ④	Fabric Geotextile Class 2 ④		Concrete Class "A" ⑤	Concrete Class "AA" ⑦	Steel Reinforcement	Concrete Class "A" ⑤	Concrete Class "AA" ⑦	Steel Reinforcement
	UNIT	LBS.	C.Y.	C.Y.	Tons	S.Y.	L.F.	L.F.	L.F.	Each	L.S.	L.S.	L.F.	L.F.	S.Y.	C.Y.	S.Y.		C.Y.	C.Y.	LBS.	C.Y.	C.Y.	LBS.
Substructure	ABUTMENT 1	24320			757	51	48	37	734	22				48	2225	563	451		208	50		208	50	
	PIER #1		45	878		187													717		124065	717		124065
	PIER #2		342	1153		187													1041		225805	555	394	324254
	PIER #3		439	1443		187													1041		225805	555	394	324254
	PIER #4		86	302		180													427		79953	427		79953
	PIER #5		920	4792		180		82	1945	25									514		84618	514		84618
	ABUTMENT 2	24806	150	945	535	51	48	19	414	22				48	2240	579	458		212	50		212	50	
	Superstructure	673468				2117					1	1	2643							1892			1892	
	BRIDGE TOTALS	722594	1982	9513	1292	3140	96	138	3093	69	1	1	2643	96	4465	1142	909		4160	1992	740246	3188	2780	937144

VALUE PROPOSAL

MW-04

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

SKETCH/DIAGRAM: VALUE PROPOSAL

Example 2 of an Estimate of Quantities Table showing an alternate in the bid.

QUANTITIES – 8′ x 4′ REINF. CONCRETE CULVERT

BID ITEM CODE	ITEM	UNIT	QUANTITY
08100	CLASS 'A' CONCRETE	Cu Yds	61
08150	STEEL REINFORCEMENT	Lbs	5901
08003	FOUNDATION PREPARATION	LS	1
02484	CHANNEL LINING CLASS III	TON	361
02602	FABRIC-GEOTEXTILE CLASS 1	SY	300
02555	CONCRETE CLASS B	Cu Yds	17

QUANTITIES – 8′ x 4′ PRECAST CULVERT ALTERNATE

BID ITEM CODE	ITEM	UNIT	QUANTITY
08100	CLASS 'A' CONCRETE	Cu Yds	15
08150	STEEL REINFORCEMENT	Lbs	1053
20092ES611	PRECAST CONCRETE BOX CULVERT	LF	51
08003	FOUNDATION PREPARATION	LS	1
02484	CHANNEL LINING CLASS III	TON	361
02602	FABRIC-GEOTEXTILE CLASS 1	SY	300
02555	CONCRETE CLASS B	Cu Yds	17

QUANTITIES – 84″ DIAMETER PIPE CULVERT ALTERNATE

BID ITEM CODE	ITEM	UNIT	QUANTITY
08100	CLASS 'A' CONCRETE	Cu Yds	29
08150	STEEL REINFORCEMENT	Lbs	2390
00476	CULVERT PIPE 84 IN	LF	43
08003	FOUNDATION PREPARATION	LS	1
02484	CHANNEL LINING CLASS III	TON	365
02602	FABRIC-GEOTEXTILE CLASS 1	SY	303
02555	CONCRETE CLASS B	Cu Yds	17

QUANTITIES – 84″ EQUIV. PIPE ARCH ALTERNATE

BID ITEM CODE	ITEM	UNIT	QUANTITY
08100	CLASS 'A' CONCRETE	Cu Yds	16
08150	STEEL REINFORCEMENT	Lbs	1076
00506	CULVERT PIPE 84 IN EQUIV.	LF	49
08003	FOUNDATION PREPARATION	LS	1
02484	CHANNEL LINING CLASS III	TON	363
02602	FABRIC-GEOTEXTILE CLASS 1	SY	301
02555	CONCRETE CLASS B	Cu Yds	17

VALUE PROPOSAL

MW-04

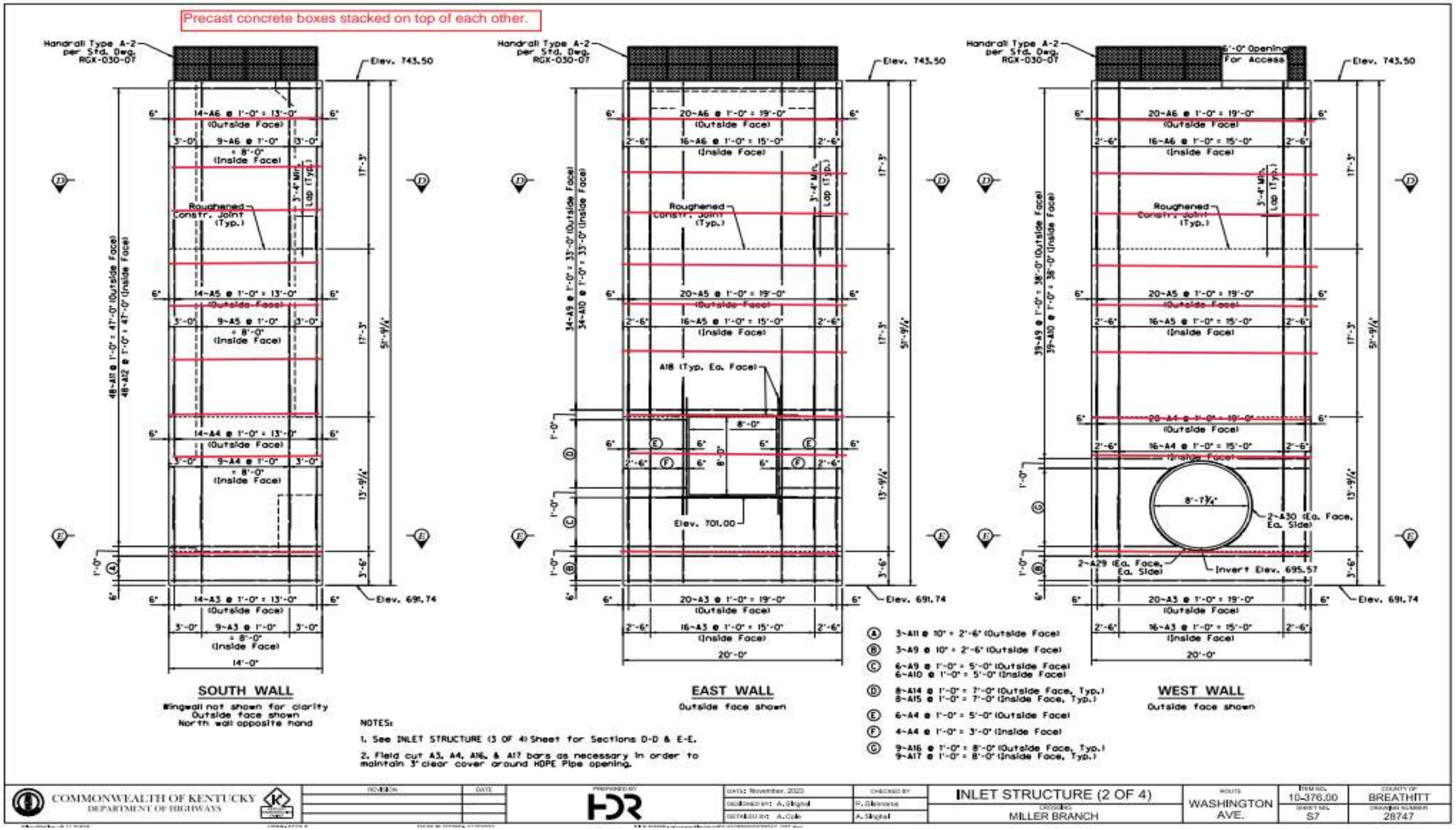
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MW-04

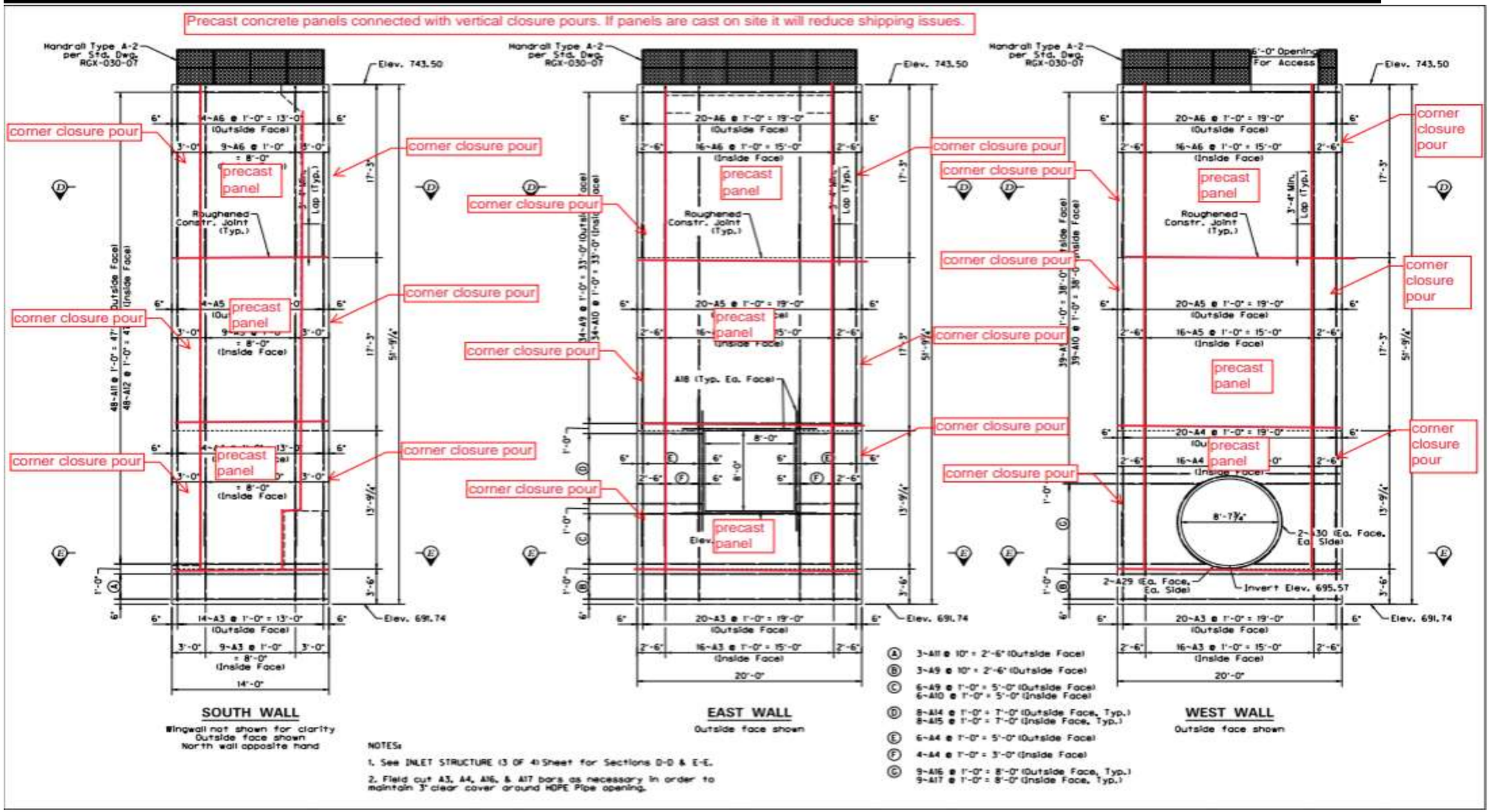
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MW-08

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Evaluate alternatives to safeloading existing 6'x6' culvert across KY 15 at Main Street
FUNCTION	**Maintain Water**

VALUE PROPOSAL SYNOPSIS:

The purpose of this item was to look at alternative methods of safeloading the existing 6X6 culvert that currently runs underneath KY 15 at Main Street. The VE team is suggesting future investigation into Pneumatic Backstowing as there could possibly be a considerable cost savings if it is found to be appropriate for this application.

Reliability	**Maintained**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**	
O&M	**Maintained**	**Schedule Impact**	**Maintained**	**$88,000**	

BASELINE CONCEPT:

The baseline concept is traditional flowable fill safeloading of the existing 6 X 6 box culvert that is to be abandoned.

VALUE PROPOSAL:

A possible alternative would be to perform "Pneumatic Backstowing" (KYTC 20667ED) in lieu of traditional Flowable fill safeloading.

ADVANTAGES:	**DISADVANTAGES:**
● Appears to be a cost effective alternative to Flowable Fill Safeloading	● Suggestions is not backed by experience of the use of this method
●	● More research will be needed to determine if this alternative is effective for the particular application for this project.
●	●
●	●
●	●

$ COST SUMMARY	**Initial Costs**	**O&M Costs**	**Total Life Cycle Cost**
BASELINE CONCEPT:	$140,000	$0	$140,000
VALUE PROPOSAL:	$52,000	$0	$52,000
TOTAL (Baseline less Proposed)	$88,000	$0	$88,000

AVOID COST

VALUE PROPOSAL

MW-08

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Evaluate alternatives to safeloading existing 6'x6' culvert across KY 15 at Main Street

DISCUSSION & JUSTIFICATION:

A possible alternative to traditional Flowable fill safeloading may be to perform a pneumatic backstowing procedure. This alternative is to fill the box culvert with aggregate or sand by means of pneumatic placement.

Cost assumptions:
Baseline price used for this analysis was retrieved from the roadway line item 0054 listed as $396.98/CY. It should be noted that this line item is not specifically for the Box Culvert Safeloading. It appears the box culvert line item is part of the 1 EA price for "6X6 rcbc culvert - line item 0154. It should be noted that the unit price for safeloading under this line item may differ from the unit price used.

Alternative unit pricing is based from average unit prices determined from Bid X with a date range of 2020 - 2023. The unit price used for this analysis is $99.00/Ton
- Note: This line item is based on tons whereas the typical safeload line item is based on CY.
- A factor of 1.4 was used to convert CY of flowable fill to Tons of sand.
- Note: Some contractors that are known to perform work in this area bid $0.00 for this line item on past bids.
- Note: It appears newer bids may have a unit price closer to $150.00/ton. This difference may also be based off of lower quantities installed.

Risk consideration: This alternative is being presented with limited field experience of using this application for Safeloading. We highly advise that further investigation be made prior to consideration of this method being placed into plans and specifications for this project.

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

TITLE	Evaluate alternatives to safeloading existing 6'x6' culvert across KY 15 at Main Street

DISCUSSION & JUSTIFICATION: (cont.)

• Technical Considerations: self-explanatory

• Schedule Impacts: no anticipated impact

• Project Management Considerations (including Redesign Effort): The project manager will need to research this method to ensure that is applicable for the scope of this project. The VE team does not anticipate that this will require additional redesign effort.

• Stakeholder Acceptance: no anticipated impact.

• Implementation Considerations: self-explanatory

VALUE PROPOSAL

MW-08

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Evaluate alternatives to safeloading existing 6'x6' culvert across KY 15 at Main Street

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No perceived impact	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No perceived impact	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Maintained
Justification for Impact Score	No perceived impact	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score	No perceived impact	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No perceived impact	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	No perceived impact	
Risk	An assessment of the identified risks of the project.	Maintained
Justification for Impact Score	No perceived impact	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No perceived impact	

VALUE PROPOSAL

MW-08

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Evaluate alternatives to safeloading existing 6'x6' culvert across KY 15 at Main Street
Assumptions & Calculations	No Assumptions / Calculations noted.

DESIGN ELEMENT	**BASELINE CONCEPT**				**VALUE PROPOSAL**		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Safeloading	CY	352	$397	$139,658			
Pneumatic Backstowing	TN				493	$99	$48,807
4' depth class B concrete caps	CY				11	$250	$2,750
TOTAL				$140,000			$52,000
						Impact to Initial Cost (Baseline Less Proposed)	**$88,000**

Note: Total costs are rounded to the nearest thousand dollars.

AVOID COST

VALUE PROPOSAL

MW-10

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Investigate changing box culvert across Main Street to a pipe
FUNCTION	**Maintain Water**
ASSOCIATED IDEAS	MW-09: Shorten proposed box culvert and add more open channel at outlet

VALUE PROPOSAL SYNOPSIS:

Replace the 6'x6' RCBC with a pipe (assume 72" diameter), assuming that hydraulic capacity is not a problem. This would reduce the cost and shorten the construction schedule.

Reliability	**Maintained**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**	
O&M	**Maintained**	**Schedule Impact**	**Improved**	**$830,000**	

BASELINE CONCEPT:

Construct 420 LF of 6'x6' RCBC at Main Street (KY 3068) Sta. 48+58.73.

VALUE PROPOSAL DESCRIPTION:

An existing 66" CMP and two 18" CMPs will remain in service at the junction box at the upstream end of the proposed 6'x6' RCBC. Do the flows justify a 6'x6' RCBC? Consider replacing the RCBC with a 72" pipe. Note: The East Backwater Access Road appears to be a conflict with the associated idea MW-09, so it will not be evaluated.

ADVANTAGES:	**DISADVANTAGES:**
● Cost savings	● Reduces hydraulic capacity
● Shorten construction schedule	● Connection to outlet headwall structure
●	●
●	●

$ COST SUMMARY	**Initial Costs**	**O&M Costs**	**Total Life Cycle Cost**
BASELINE CONCEPT:	$983,000	$0	$983,000
VALUE PROPOSAL DESCRIPTION:	$153,000	$0	$153,000
TOTAL (Baseline less Proposed)	$830,000	$0	$830,000

AVOID COST

VALUE PROPOSAL

MW-10

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Investigate changing box culvert across Main Street to a pipe

DISCUSSION & JUSTIFICATION:

• Technical Considerations - There is a significant hydraulic capacity increase when comparing the existing 66" and 18" CMPs leading to the proposed 6'x6' RCBC. Is that additional capacity needed, or was a 6'x6' RCBC selected to match the size of the existing RCBC that is being abandoned?

• Cost Considerations - The RCBC is estimated to cost $1.707 million for 420 LF, for a unit cost of $4064/LF (includes outlet headwall). 72" storm sewer pipe hasn't been bid since 2021, but 72" culvert pipe was bid in 2022 for an average unit price of $460/LF (does not include headwalls)

• Schedule Impacts - installing pipe should be faster than constructing the RCBC.

• Risk Considerations - Assuming that the hydraulics are acceptable for 72" pipe, there is a perception risk of installing a proposed pipe to replace an existing RCBC.

• Project Management Considerations (including Redesign Effort) - Redesign of structure plans for outlet headwall; omitting RCBC; adding situation sheet for 72" pipe

• Stakeholder Acceptance - see statement above in Risk Considerations regarding perception

• Implementation Considerations - Potential issues could be the connection at the existing upstream junction box. The out-to-out width of a 72" RCP is less than the out-to-out width of the proposed RCBC, so the value proposal should be no worse at that location.

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

MW-10

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Investigate changing box culvert across Main Street to a pipe

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No perceived impact	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No perceived impact	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Maintained
Justification for Impact Score	No perceived impact	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Improved
Justification for Impact Score	Shorter construction time	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No perceived impact	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Improved
Justification for Impact Score	Shorter construction time.	
Risk	An assessment of the identified risks of the project.	Maintained
Justification for Impact Score	No perceived impact	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	"Maintained" is based on the assumption that the additional capacity provided by the RCBC is not needed based on hydraulic calculations. If it is needed, then change this to "Degraded."	

VALUE PROPOSAL

MW-10

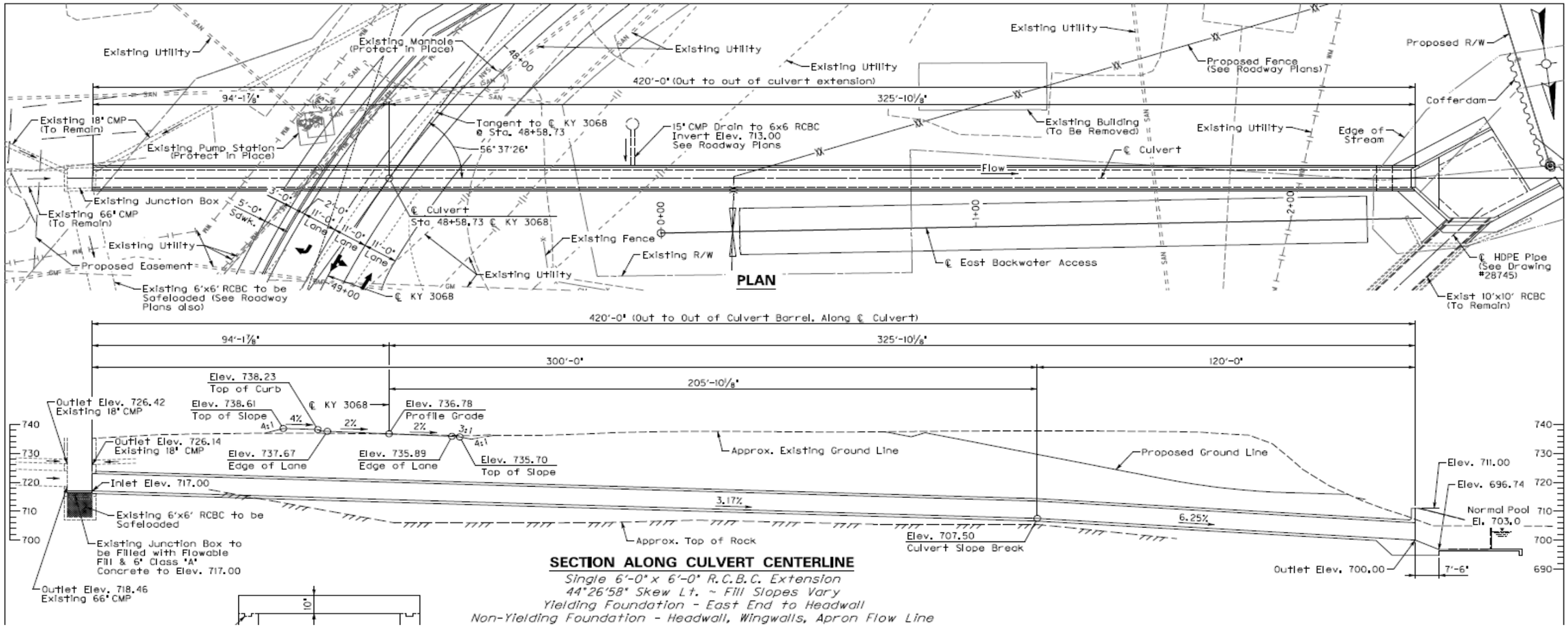
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Investigate changing box culvert across Main Street to a pipe

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



SECTION ALONG CULVERT CENTERLINE

Single 6'-0" x 6'-0" R.C.B.C. Extension
44°26'58" Skew Lt. ~ Fill Slopes Vary
Yielding Foundation - East End to Headwall
Non-Yielding Foundation - Headwall, Wingwalls, Apron Flow Line

VALUE PROPOSAL

MW-10

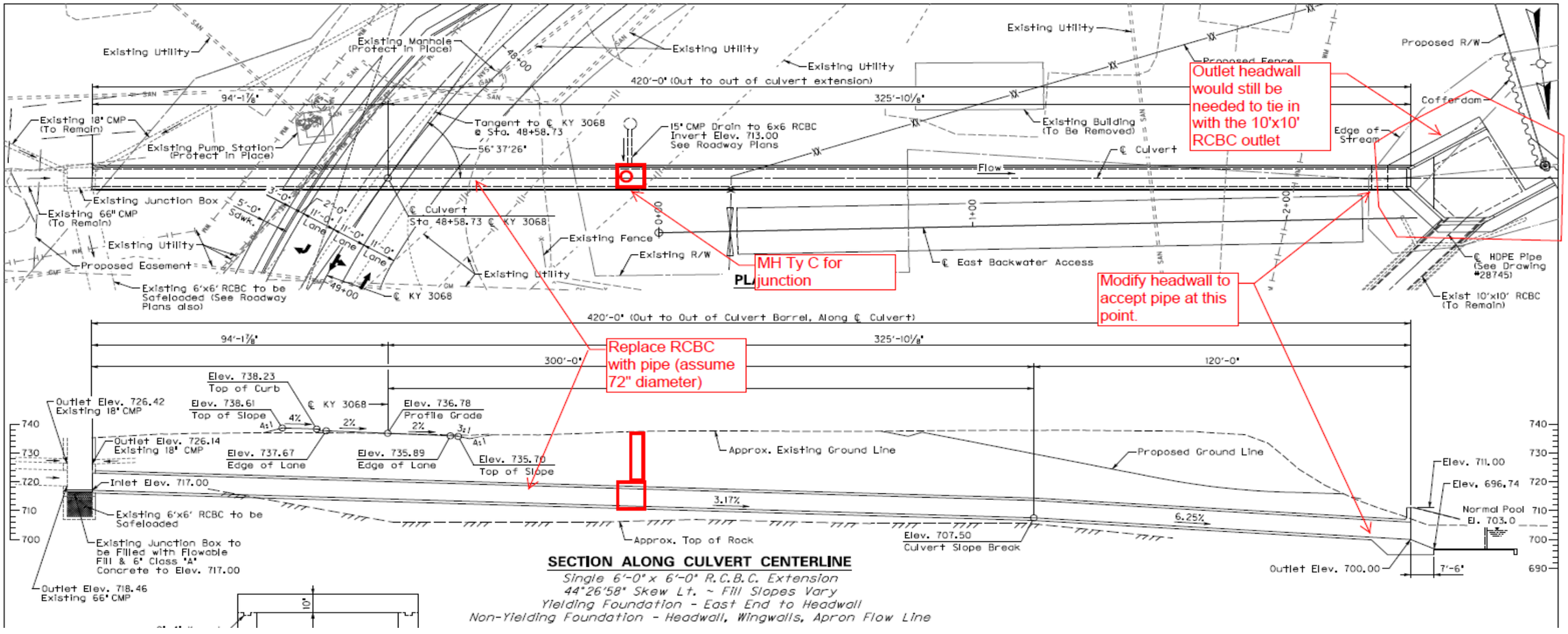
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Investigate changing box culvert across Main Street to a pipe

SKETCH/DIAGRAM: VALUE PROPOSAL



SECTION ALONG CULVERT CENTERLINE

Single 6'-0" x 6'-0" R.C.B.C. Extension
44°26'58" Skew Lt. ~ Fill Slopes Vary
Yielding Foundation - East End to Headwall
Non-Yielding Foundation - Headwall, Wingwalls, Apron Flow Line

MW-10

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Investigate changing box culvert across Main Street to a pipe
Assumptions & Calculations	See cost notes below

DESIGN ELEMENT	BASELINE CONCEPT				VALUE PROPOSAL		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
RCBC (from closeout form, see notes to right)	LF	420	$2,341	$983,220			
72" pipe	LF				420	$350	$147,000
MH TY C	EA				1	$6,000	$6,000
TOTAL				$983,000			$153,000
						Impact to Initial Cost (Baseline Less Proposed)	**$830,000**

RCBC cost notes:

From closeout form:

Total cost = $ 1,162,534

-179521 deduct "Clean culvert" and "Safeloading"

RCBC cost= $ 983,013

Length (ft) 420

Cost per LF = $ 2,341

These costs would need to be fine tuned to extract the headwall items

72" pipe cost notes:

2021 ave unit prices ($/LF) $ 300

increase for inflation (assume 7 7%

# of years 2

2023 ave unit cost = $ 343

say $350/LF

Technically, this would be storm sewer pipe bid item, but 72" culvert pipe has been bid more recently, and is close enough for this

Note: Total costs are rounded to the nearest thousand dollars.

AVOID COST

VALUE PROPOSAL

MT-07

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review the MOT phasing plan
FUNCTION	**Maintain Traffic**
ASSOCIATED IDEAS	MT-01: Review haul route for east end of project MT-02: Review haul route for Washington Avenue/south side of project MT-03: Review haul route for the waste area MT-04: Review Washington Avenue closure and secant wall construction MT-06: Extend the duration of the allowable closure to construct box culvert elements, secant wall, and roadway widening between Bobcat Lane and KY 15 MT-08: Send haul trucks on Panbowl Road to east dam area in lieu of KY 15 AC-01: Verify that there are no utility conflicts with MOT and/or construction phasing MC-05: Review project for buildability

VALUE PROPOSAL SYNOPSIS:

The purpose of this analysis was to evaluate the baseline MOT and construction phasing to help identify any areas that may reduce construction schedule, minimize haul route risks, or help with traffic flow. After the evaluation of construction phasing no items were identified that would be beneficial to the project team.

Reliability	**Maintained**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**
O&M	**Maintained**	**Schedule Impact**	**Maintained**	**$0**

BASELINE CONCEPT:

The current Maintenance of Traffic (MOT) plan.

VALUE PROPOSAL:

No added value was found through this analysis exercise. The Design team has done a good job maximizing their construction phasing and minimizing impacts to the local community.

ADVANTAGES:	DISADVANTAGES:
● Verification of approach	● None apparent
●	●
●	●
●	●

DESIGN SUGGESTION

VALUE PROPOSAL

MT-07

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review the MOT phasing plan

DISCUSSION & JUSTIFICATION:

The VE team reviewed each phase of the of the MOT plan. While reviewing we looked for possible ways to reduce haul routes, minimize construction schedule, or reduce impacts to the local citizens.

The Main Street, Washington Ave., and Lakeside Drive road closures were closely reviewed to determine if there were alternatives to help lessen closure time or reduce construction time. No optimization was found.

Alternatives for the haul route to the waste area was also considered, especially looking at reduction of the use of Panbowl Road. We found that without buying additional ROW, we did not find a better alternative.

Minimizing the Haul to the south side of the project was also considered in this analysis. Although no phasing alternative was found to help reduce this maneuver, we do suggest that the KYTC inspection team pay close attention to the contractors management of material. We believe that the Kentucky River Channel area has approximately 20,000 CY of potentially usable material for embankments on the South side of the project.

- Technical Considerations - N/A
- Cost Considerations - N/A
- Schedule Impacts - N/A
- Risk Considerations - N/A
- Project Management Considerations (including Redesign Effort) - N/A
- Stakeholder Acceptance N/A
- Implementation Considerations - N/A

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

MT-07

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review the MOT phasing plan

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score		
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score		
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Maintained
Justification for Impact Score		
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score		
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score		
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score		
Risk	An assessment of the identified risks of the project.	Maintained
Justification for Impact Score		
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score		

VALUE PROPOSAL

OT-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate
FUNCTION	**Optimize Template**

VALUE PROPOSAL SYNOPSIS:

Decrease the lane widths on KY 3068 (Main Street Sta. 54+00 to Sta. 49+00), KY 1812 (Sta. 50+85 to Sta. 54+20), Lakeside Drive (CS 1040, Sta. 5+25 to Sta. 10+00) and Panbowl Road Extended (Sta. 10+00 to 14+51), better matching the existing roads that have 9' to ' 10' lanes. While decreasing this pavement width by 2', neither function or performance of these road segments will be changed.

Reliability	**Maintained**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**	
O&M	**Improved**	**Schedule Impact**	**Maintained**	**$26,000**	

BASELINE CONCEPT:

The existing plans show 11' lanes for KY 3068 (Main Street Sta. 54+00 to Sta. 49+00), KY 1812 (Sta. 50+85 to Sta. 54+20), Lakeside Drive (CS 1040, Sta. 5+25 to Sta. 10+00) and Panbowl Road Extended (Sta. 10+00 to 14+51).

VALUE PROPOSAL:

Remove 2' of pavement width (1' each lane) from each of the two lanes on KY 3068 (Main Street Sta. 54+00 to Sta. 49+00), KY 1812 (Sta. 50+85 to Sta. 54+20), Lakeside Drive (CS 1040, Sta. 5+25 to Sta. 10+00) and Panbowl Road Extended (Sta. 10+00 to 14+51). Pavement cost will also be decreased.

ADVANTAGES:	**DISADVANTAGES:**
● Consistent with existing lane geometry	● Does not meet standards if KY 1812 has Design Speed of 35 MPH or higher
● Eliminates 2' of the pavement widening	● Does not meet standards if KY 3068 & Panbowl Road Design Speed is over 45 MPH
● Savings in construction	●
● Future maintenance savings	●
●	●
●	●

$ COST SUMMARY	**Initial Costs**	**O&M Costs**	**Total Life Cycle Cost**
BASELINE CONCEPT:	$1,164,000	$0	$1,164,000
VALUE PROPOSAL:	$1,138,000	$0	$1,138,000
TOTAL (Baseline less Proposed)	$26,000	$0	$26,000
			AVOID COST

VALUE PROPOSAL

OT-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate

DISCUSSION & JUSTIFICATION:

Decrease the lane widths of about 1761' of road segments on KY 3068 (Main Street Sta. 54+00 to Sta. 49+00), KY 1812 (Sta. 50+85 to Sta. 54+20), Lakeside Drive (CS 1040, Sta. 5+25 to Sta. 10+00) and Panbowl Road Extended (Sta. 10+00 to 14+51), matches the existing roads that have lane widths of 9' to ' 10'. While decreasing this pavement width by 2', neither function or performance of these road segments will be changed. See the attached Typical Section Sketch.

• KY 1812 with an ADT=912' (2018) on a Collector Road would require a 40 MPH Design Speed with 11' lanes; however, with a reverse curve having 200' radii and superelevation just less than 4% would be a design speed below 30 MPH, therefore meeting the 10' lane requirement. KY 3068 and Panbowl Road are both considered local roads. For KY 3068 with an ADT=1717 (2018), would require a 40 MPH design with 10' lanes, However, the radius on KY 3068 of 325' at a superelevation of 4% is less than a 35 MPH design speed. Lakeside Drive/Panbowl Rd Extension with a radius of 300' on normal crown would be less than a 35 MPH design speed. A new typical would be needed for KY 1812 and Lakeside Drive/Panbowl Road Extension as the existing template would remain for Brewer Drive and Panbowl Connector. The KY 3068 Typical would need edited.

• Cost Consideration as shown in the cost calculations, reduce the cost of these approaches.

• There would be no schedule impacts as these changes would be fairly minor.

• Given the short lengths of the approaches and the fact they would meet existing conditions as to lane width, there should be no risk associated as long as the turning radius do not decrease.

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

OT-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No Perceived impacts	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No Change.	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Improved
Justification for Impact Score	There will be 3,522 sqft less of pavement to maintain.	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score	No Change.	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No Change.	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	These improvements should not take very much time to address, so project schedule should not change.	
Risk	An assessment of the identified risks of the project.	Maintained
Justification for Impact Score	No Change.	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No Change.	

VALUE PROPOSAL

OT-01

Kentucky Transportation Cabinet

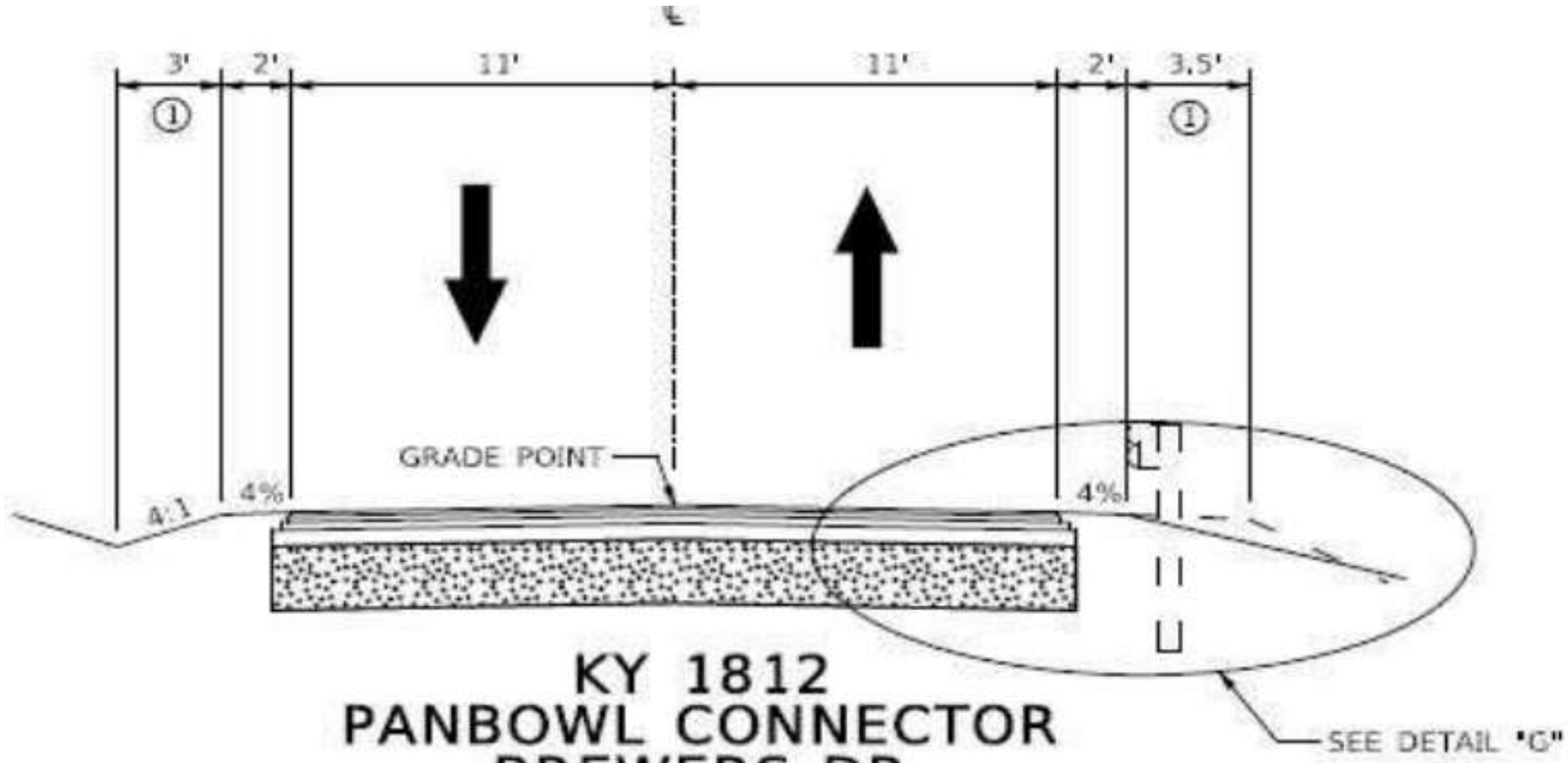
KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT

TYPICAL KY 1812



KY 1812
PANBOWL CONNECTOR
BREWERS DR
PANBOWL RD EXTENSION
LAKESIDE DR

VALUE PROPOSAL

OT-01

Kentucky Transportation Cabinet

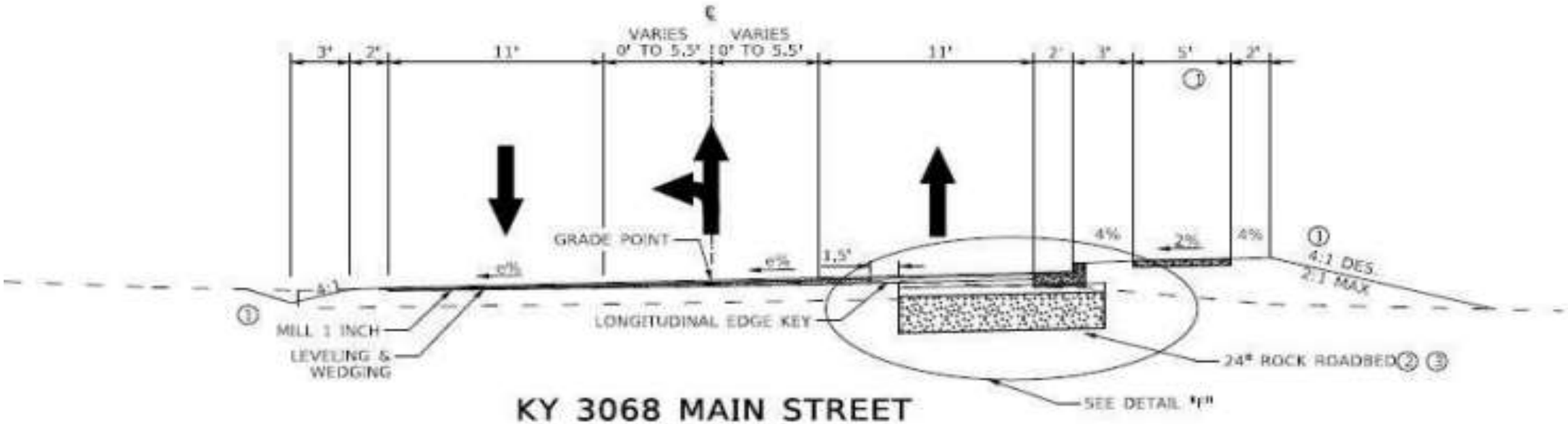
KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT

TYPICAL KY 3068



KY 3068 MAIN STREET

FULL DEPTH CONSTRUCTION:
LT STA. 48+25 TO 49+35
RT STA. 48+45 TO 49+35

VALUE PROPOSAL

OT-01

Kentucky Transportation Cabinet

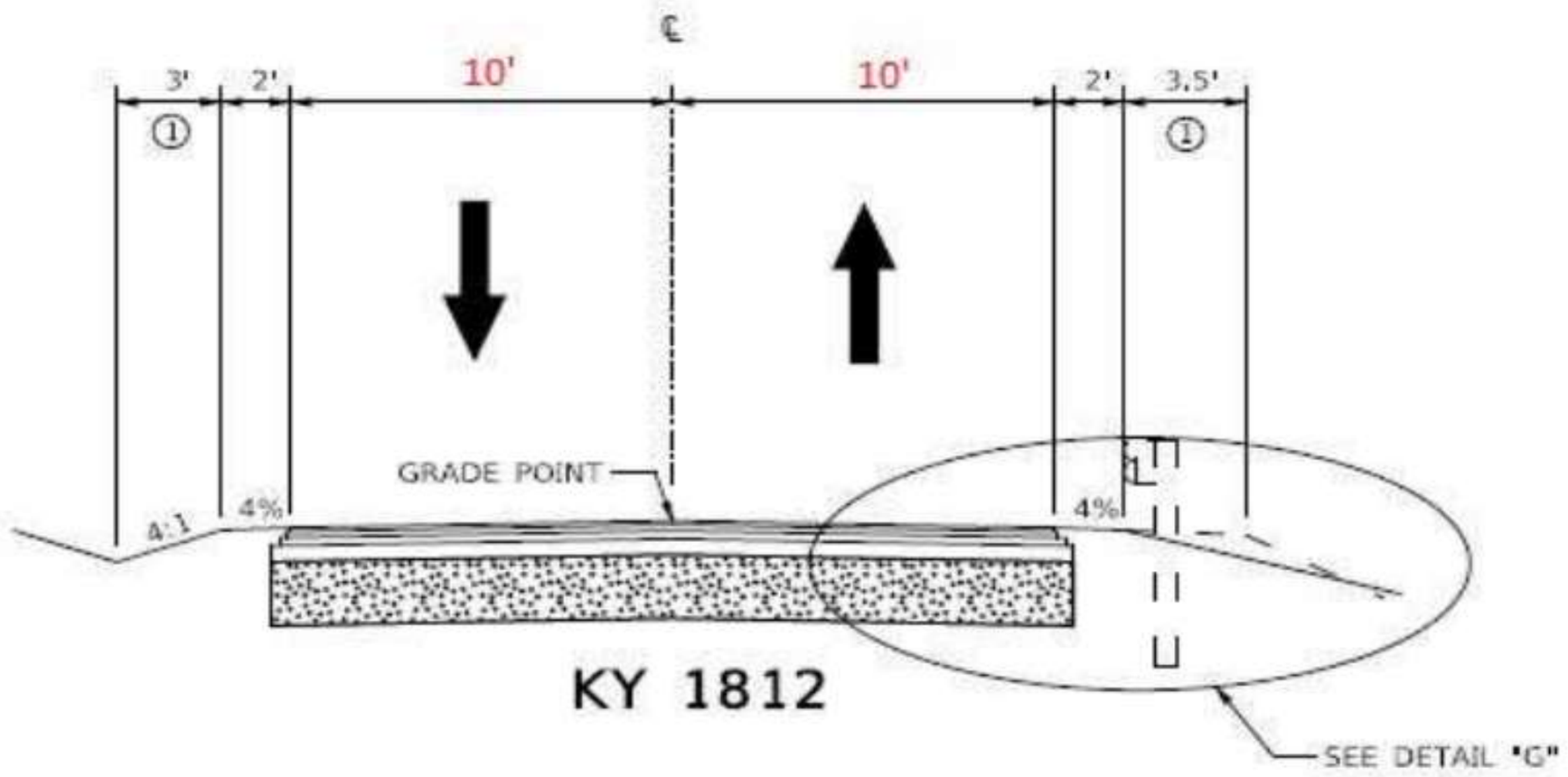
KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate

SKETCH/DIAGRAM: VALUE PROPOSAL

TYPICAL KY 1812 AND LAKESIDE DRIVE PANBOWL ROAD EXTENSION



VALUE PROPOSAL

OT-01

Kentucky Transportation Cabinet

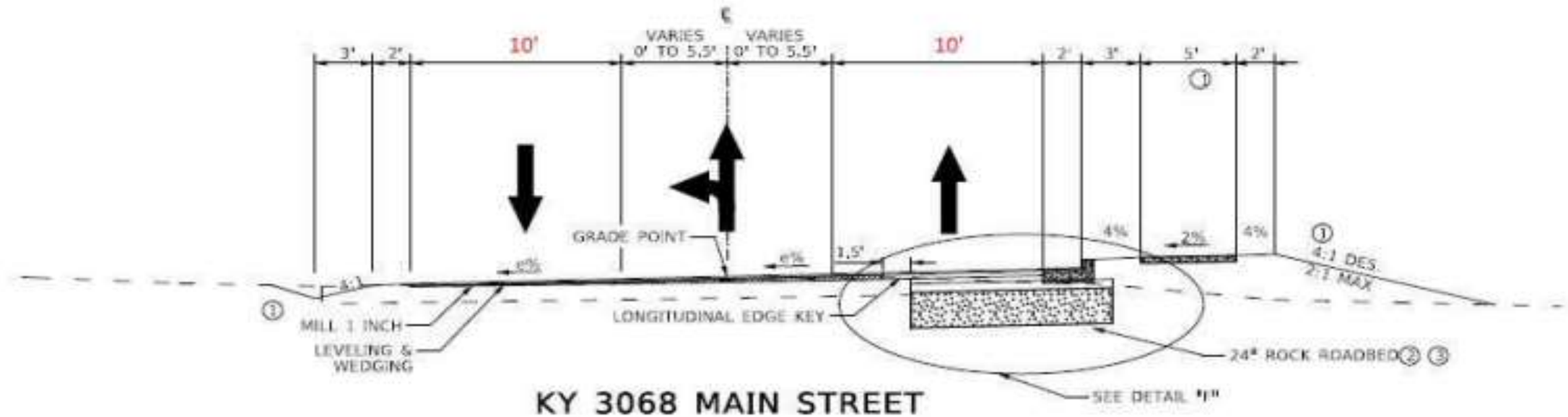
KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate

SKETCH/DIAGRAM: VALUE PROPOSAL

TYPICAL KY 3068



KY 3068 MAIN STREET

FULL DEPTH CONSTRUCTION:
LT STA. 48+25 TO 49+35
RT STA. 48+45 TO 49+35

VALUE PROPOSAL

OT-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate
Assumptions & Calculations	Quatities for the reduction of 2' of pavement and subgrade are subtracted below.

DESIGN ELEMENT	**BASELINE CONCEPT**				**VALUE PROPOSAL**		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Crushed Stone Base	Ton	10,295	$33	$337,779	10,160	$33	$333,350
Cl2 Asph Base 1.0D PG64-22	Ton	4,544	$122	$552,505	4,404	$122	$535,482
Cl2 Asph Surface 0.38D PG64-22	Ton	1,409	$123	$172,856	1,377	$123	$168,930
Fabric-Geotextile Class I	SY	43,672	$2	$100,882	43,281	$2	$99,979
TOTAL				$1,164,000			$1,138,000
						Impact to Initial Cost (Baseline Less Proposed)	**$26,000**

Note: Total costs are rounded to the nearest thousand dollars.

AVOID COST

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.
FUNCTION	**Optimize Template**
ASSOCIATED IDEAS	MI-07: Reduce sidewalk buffer width in rock cut from 3' to 2'

VALUE PROPOSAL SYNOPSIS:

Decrease the ditch bench between Rt. Station 553+00 to Rt. Station 558+00 that is a proposed 20' ditch bench with cut slopes similar to the beginning of the cut where either a 4' Ditch Bench or 10' Ditch Bench is proposed.

Reliability	**Improved**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**	
O&M	**Maintained**	**Schedule Impact**	**Degraded**	**$96,000**	

BASELINE CONCEPT:

The project begins with a 4' Ditch Bench then changes to a 20’ Ditch Bench that is carried through the rock cut once it begins, then goes into a 10’ FB ditch for a short distance.

VALUE PROPOSAL:

Decrease the 20' ditch bench between about Rt. Sta. 553+00 to Rt. Sta. 554+00 to a 10' ditch bench, then decrease the 20' ditch bench to 4' from about Sta. 554+50 to 558+00. Reduces excavation, therefore reducing waste on the project.

ADVANTAGES:	**DISADVANTAGES:**
● Reduces excavation and waste	● Will take a week or so to reevaluate, change slopes, and get new quantities
● Reduces construction cost	●
● Reducing the sidewalk buffer would provide additional decrease in excavation not included in this cost savings shown	●
●	●

$ COST SUMMARY	**Initial Costs**	**O&M Costs**	**Total Life Cycle Cost**
BASELINE CONCEPT:	$7,292,000	$0	$7,292,000
VALUE PROPOSAL:	$7,196,000	$0	$7,196,000
TOTAL (Baseline less Proposed)	$96,000	$0	$96,000

AVOID COST

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.

DISCUSSION & JUSTIFICATION:

• Decrease the 20' ditch bench between about Rt. Sta. 553+00 to Rt. Sta. 554+00 to a 10' ditch bench, then decrease the 20' ditch bench to 4' from about Sta. 554+50 to 558+00. At the beginning of the project between Rt. Sta. 538+00 to Rt. Sta. 546+50, the ditch bench begins with a 4' Ditch Bench, then changes to a 10' Ditch Bench for a short distance before changing to the 20' Ditch Bench. Where the ditch bench is 4' or 10' is in areas with cuts comparable to the proposed stations to reduce the ditch bench above. Excavation could be reduced by about 7,995 CUYD. See Sketches of Cross Sections and calculations. Additional reduction in excavation could be experienced by reducing the buffer at the sidewalk.

• This decrease in the ditch bench would allow for a decrease in excavation and therefore cost of the project. Not included in the cost estimate is the cost savings that would be captured if the sidewalk buffer was reduced by 1 '.

• This rework of the ditch bench and slopes might take a week or so to make changes on the plans, cross sections and get new quantities.

• Unless the Geotechnical Branch believes this rock is different than at the beginning of the cut, the risk should be no different than at the beginning of the cut.

• This concept needs to be reviewed by the Geotechnical Branch and get there concurrence.

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No Change	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No Change	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Maintained
Justification for Impact Score	No Change	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Improved
Justification for Impact Score	Reduces excavation time during construction.	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No Change	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Degraded
Justification for Impact Score	Project Schedule may take a week or so to reevaluate and make changes.	
Risk	An assessment of the identified risks of the project.	Maintained
Justification for Impact Score	Assuming the rock in this area is no different than the rock at the beginning of the cut, the risk would be the same as the beginning and as with any rock cut.	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No Impact.	

VALUE PROPOSAL

OT-03

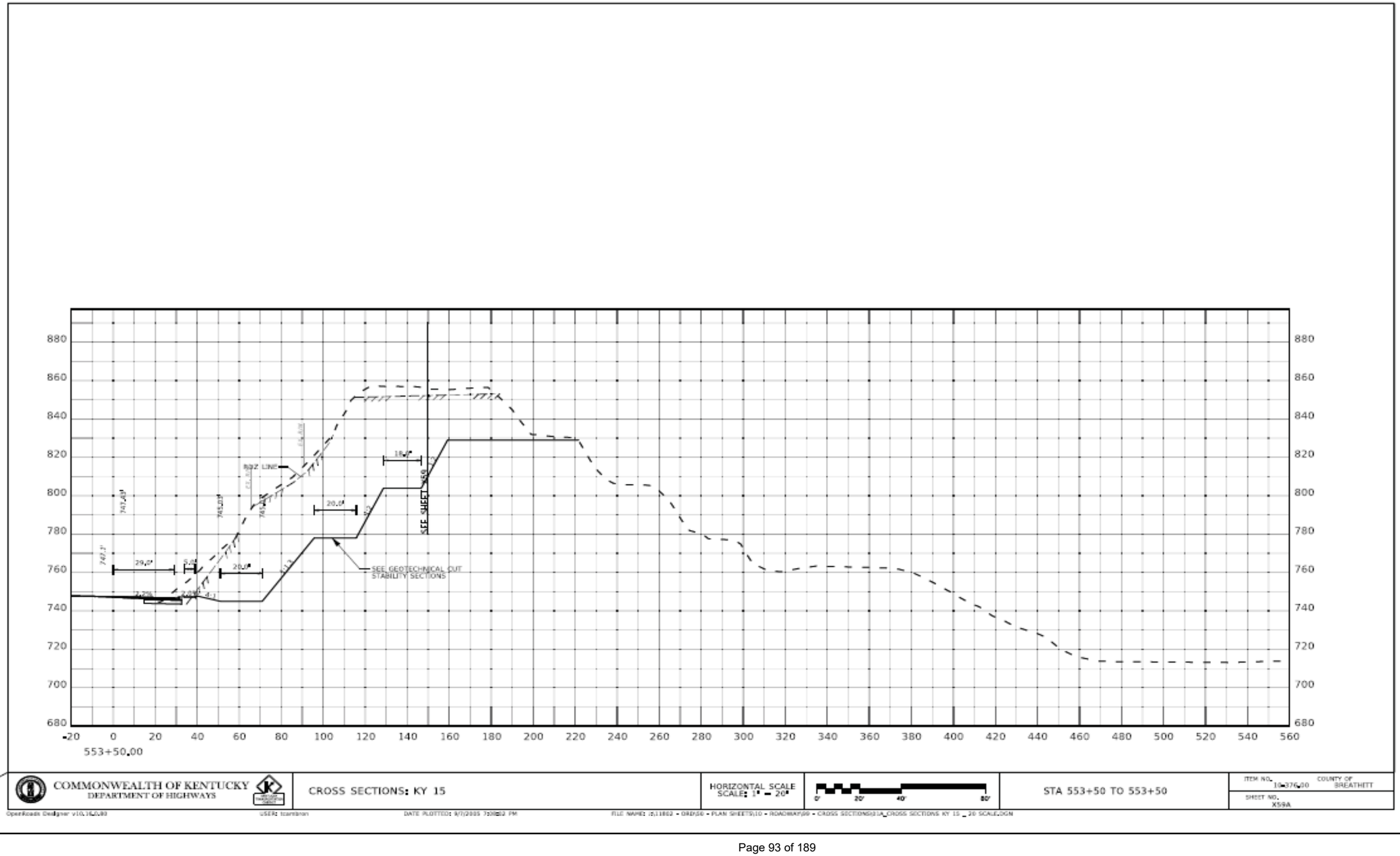
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

CROSS SECTIONS: KY 15

HORIZONTAL SCALE
SCALE: 1" = 20'

0' 20' 40' 80'

STA 553+50 TO 553+50

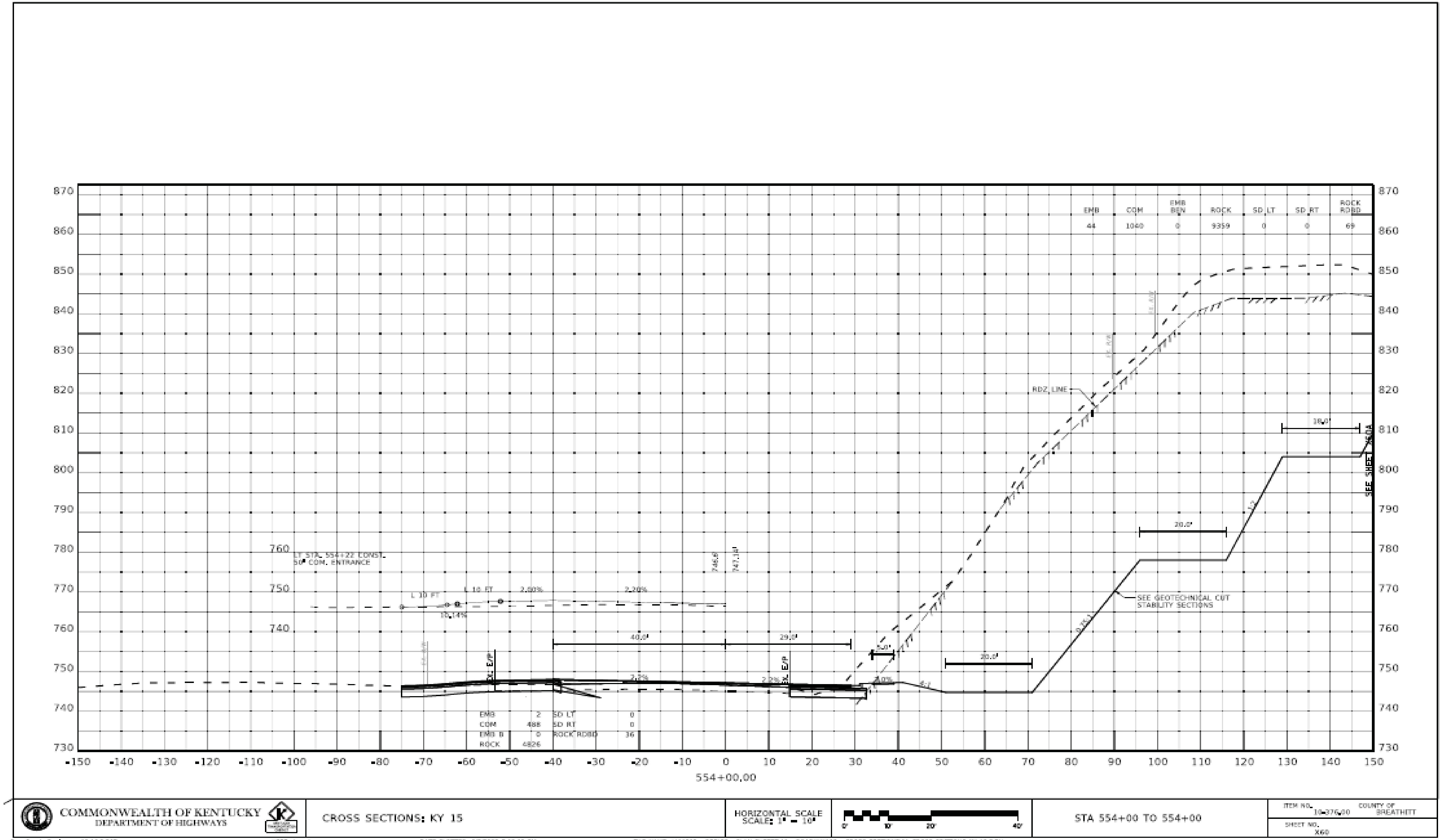
ITEM NO. 10-376.00 COUNTY OF BREATHITT

SHEET NO. X59A

OpenRoads Designer v10.10.0.80 USER: tcampion DATE PLOTTED: 9/7/2005 7:08:02 PM FILE NAME: J:\11802 - ORDSD - PLAN SHEETS\10 - ROADWAY\00 - CROSS SECTIONS\10A_CROSS SECTIONS KY 15 _ 20 SCALE.DGN

TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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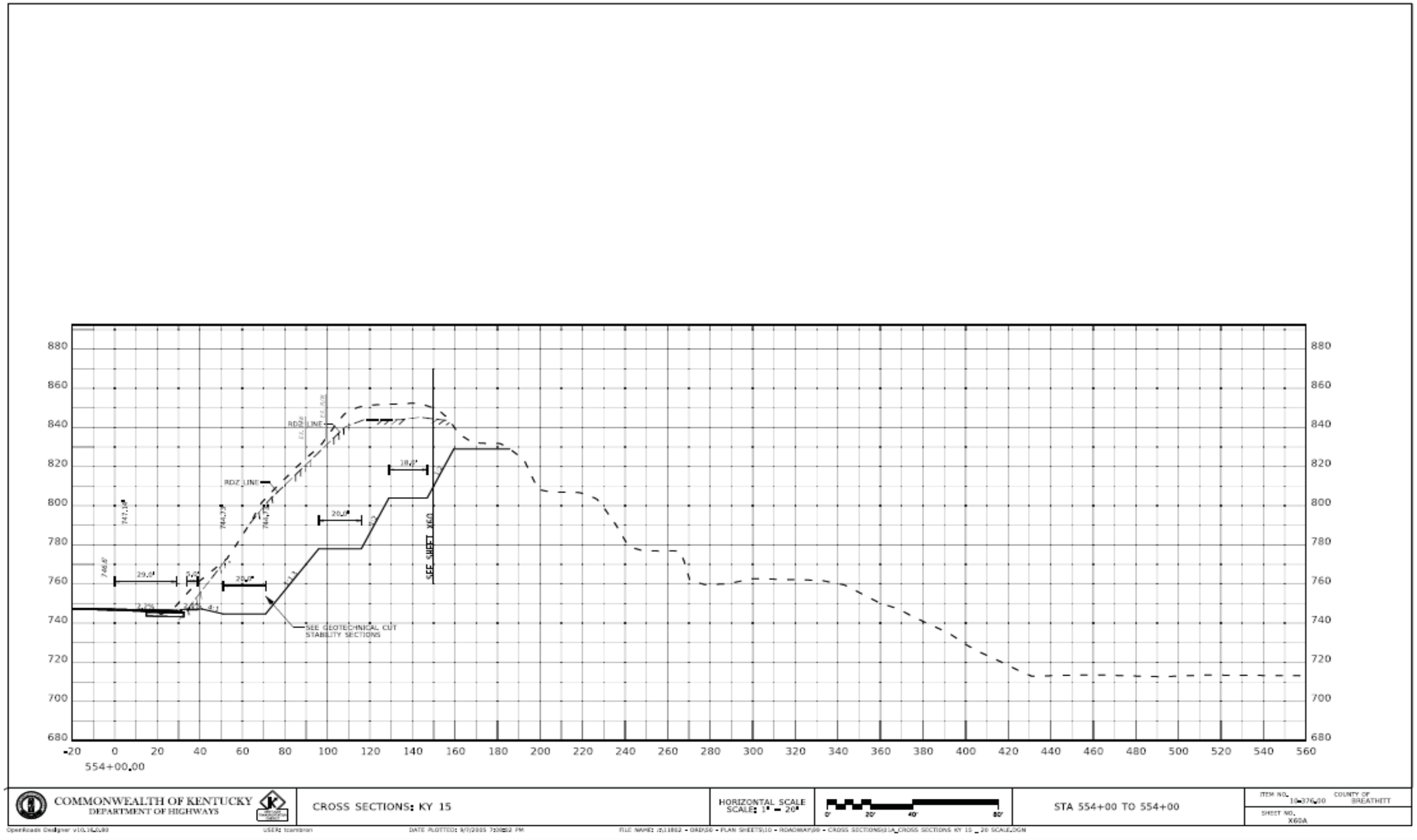

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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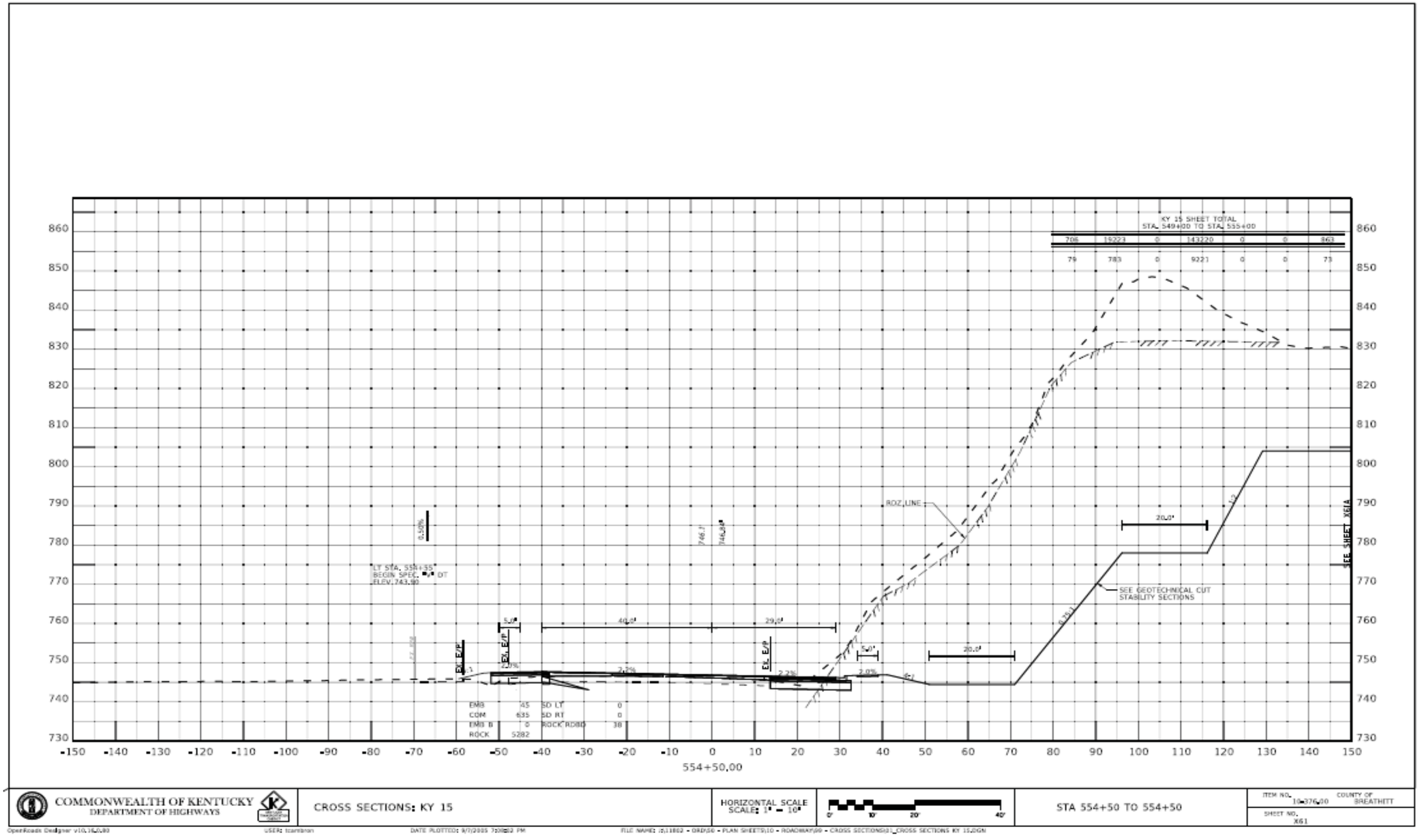


COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

CROSS SECTIONS: KY 15

HORIZONTAL SCALE: 1" = 10'

0' 10' 20' 40'

STA 554+50 TO 554+50

ITEM NO. 10-376.00 COUNTY OF BREATHITT

SHEET NO. X61

OpenRoads Designer v10.15.0.80 USER: tcambron DATE PLOTTED: 8/7/2025 7:08:02 PM FILE NAME: d:\11802 - ORDSC - PLAN SHEETS\10 - ROADWAY\09 - CROSS SECTIONS\01_CROSS SECTIONS KY 15.DGN

VALUE PROPOSAL

OT-03

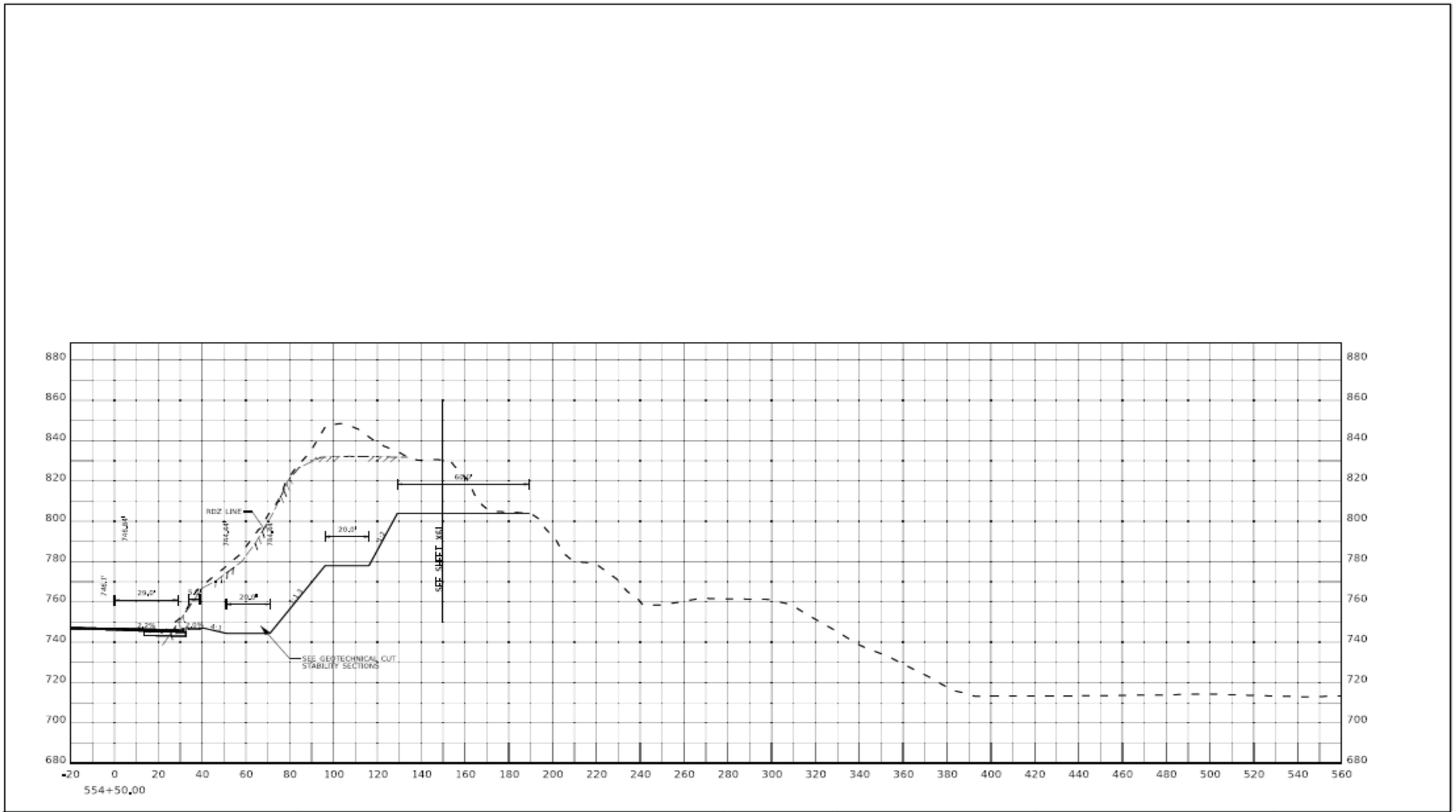
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

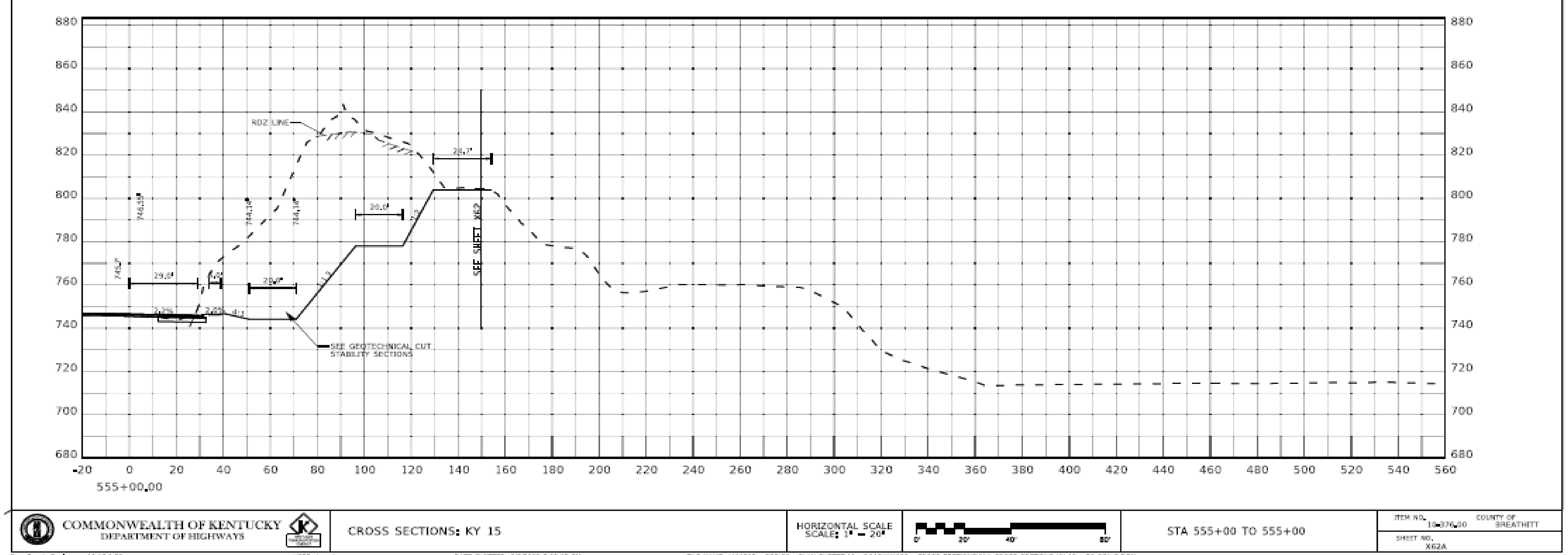
TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



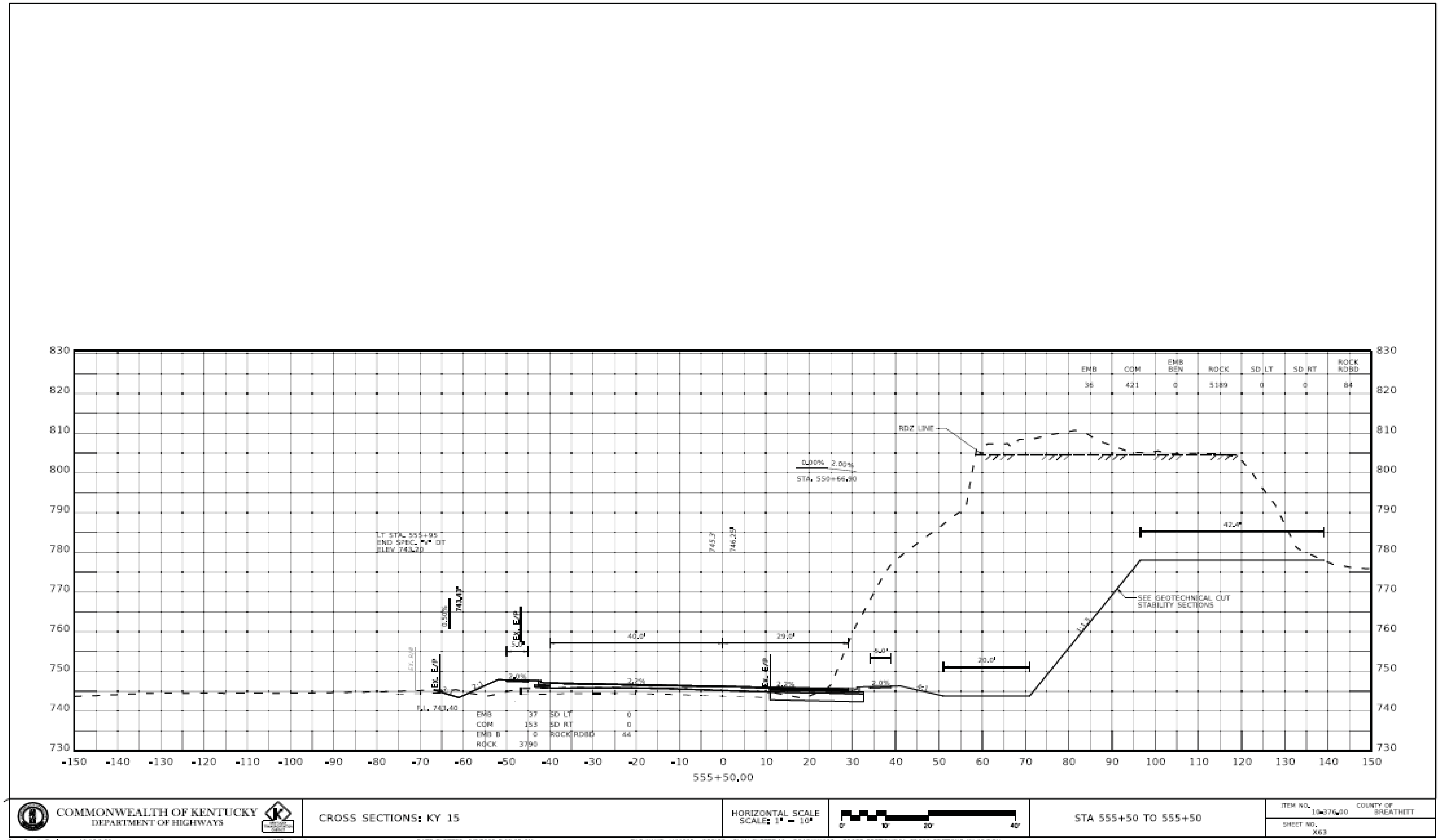
TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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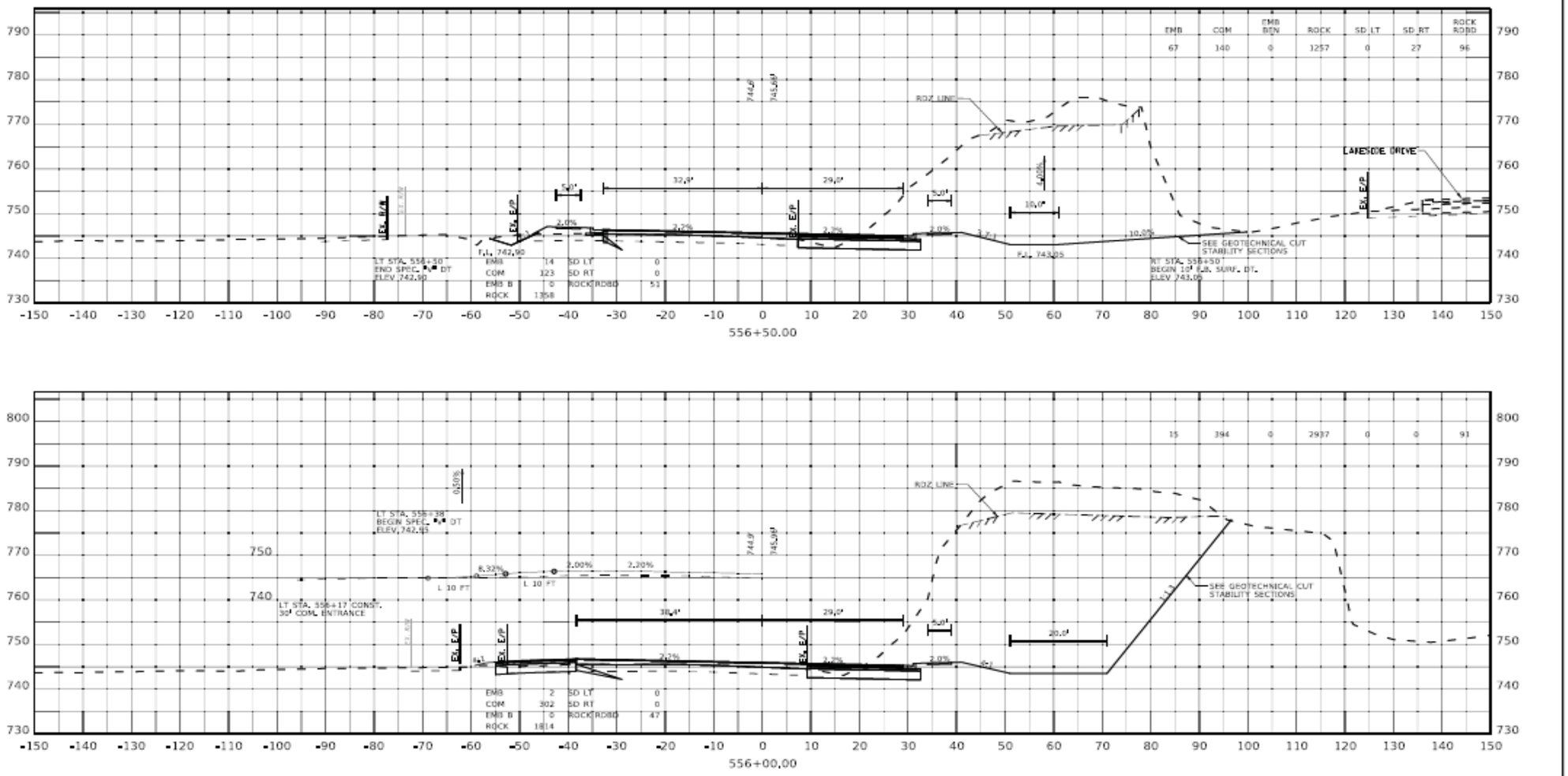
SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS	CROSS SECTIONS: KY 15	HORIZONTAL SCALE SCALE: 1" = 10' (0' 10' 20' 40')	STA 556+00 TO 556+50	ITEM NO. 10-376.00 COUNTY OF BREATHITT SHEET NO. X64

OpenRoads Designer v10.16.2.267 USER: mlawson DATE PLOTTED: 8/7/2025 7:08:02 PM FILE NAME: d:\11862 - ORD\50 - PLAN SHEETS\10 - ROADWAY\99 - CROSS SECTIONS\01_CROSS SECTIONS KY 15 - SHARED USE PATH.DGN

VALUE PROPOSAL

OT-03

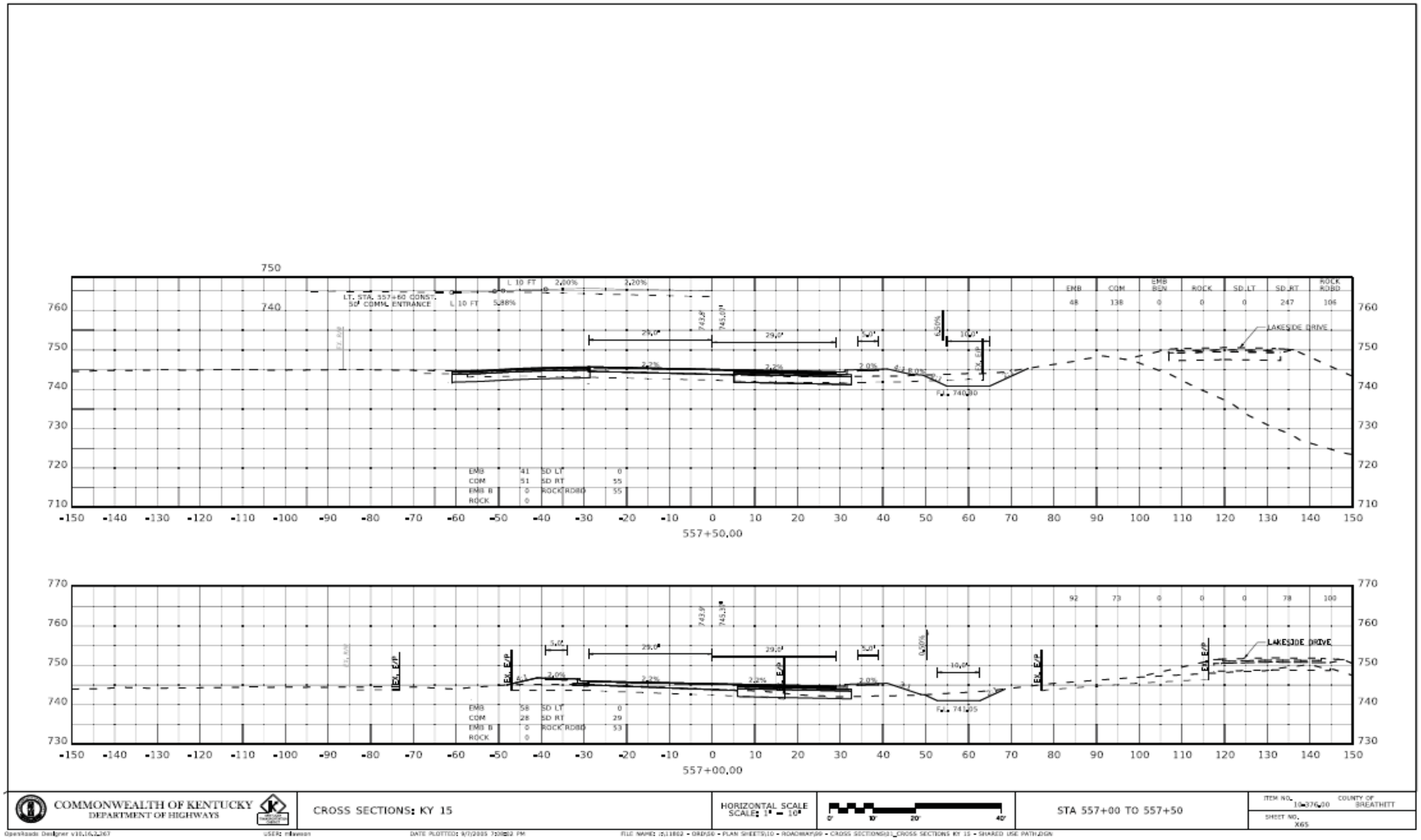
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



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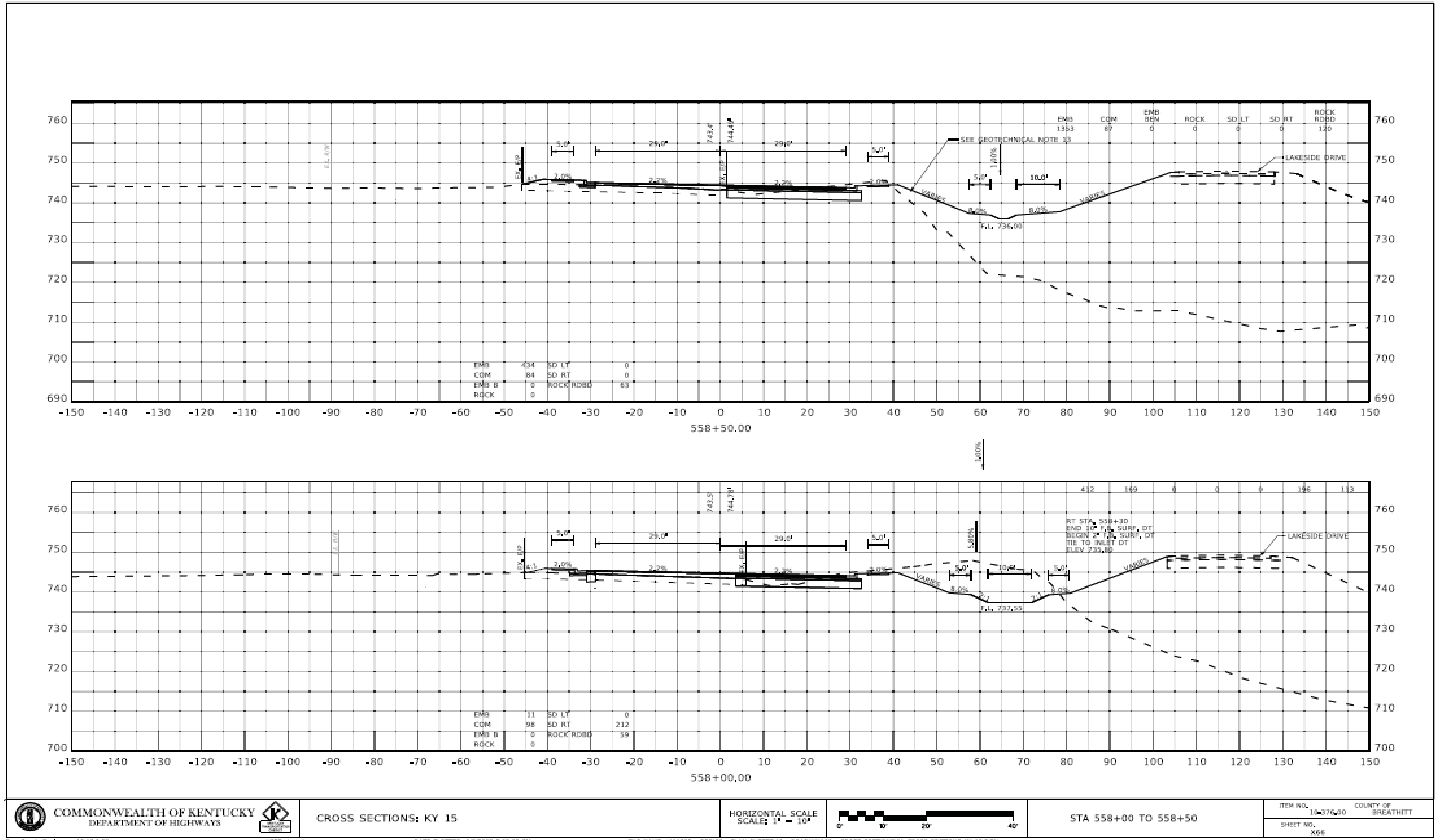

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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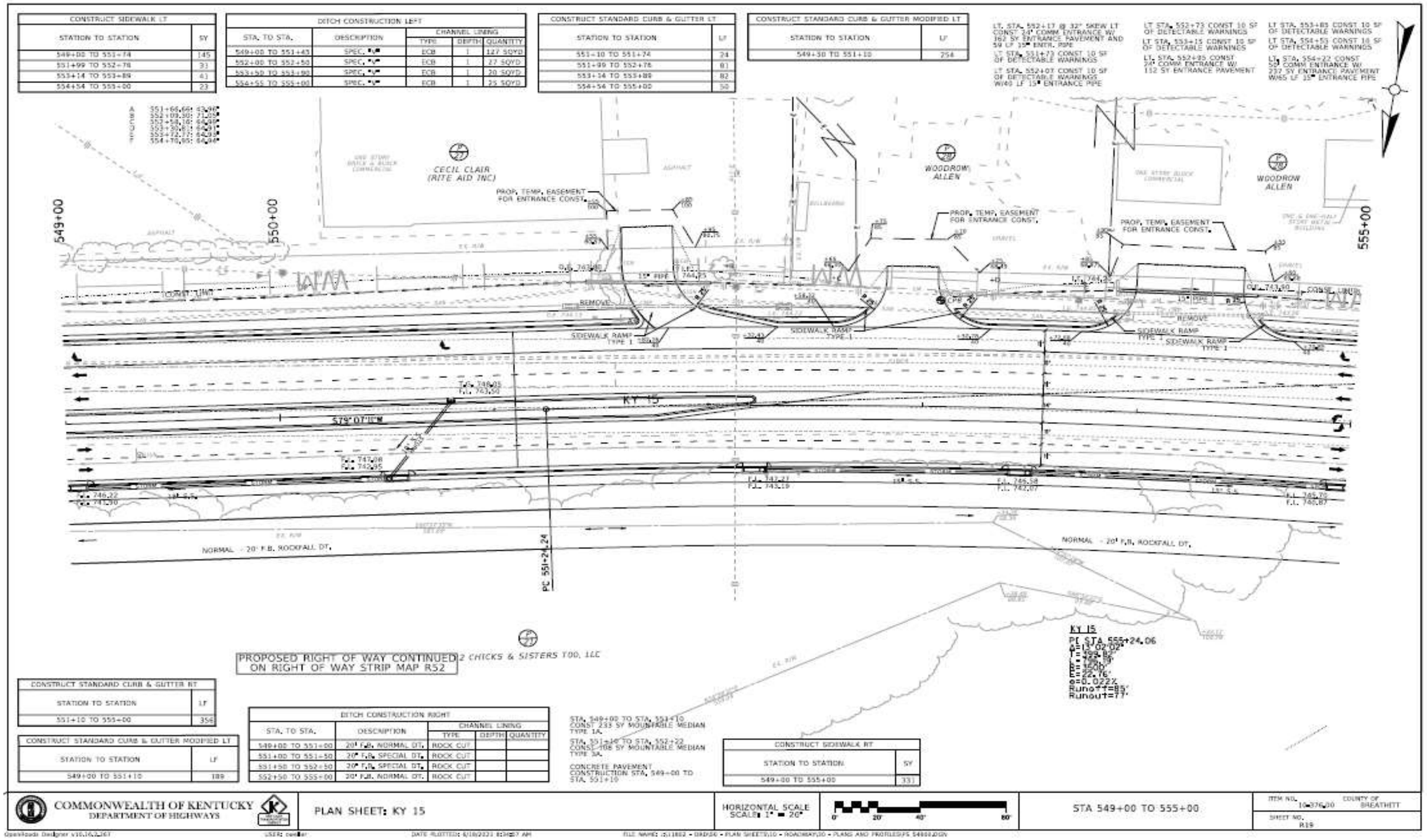
SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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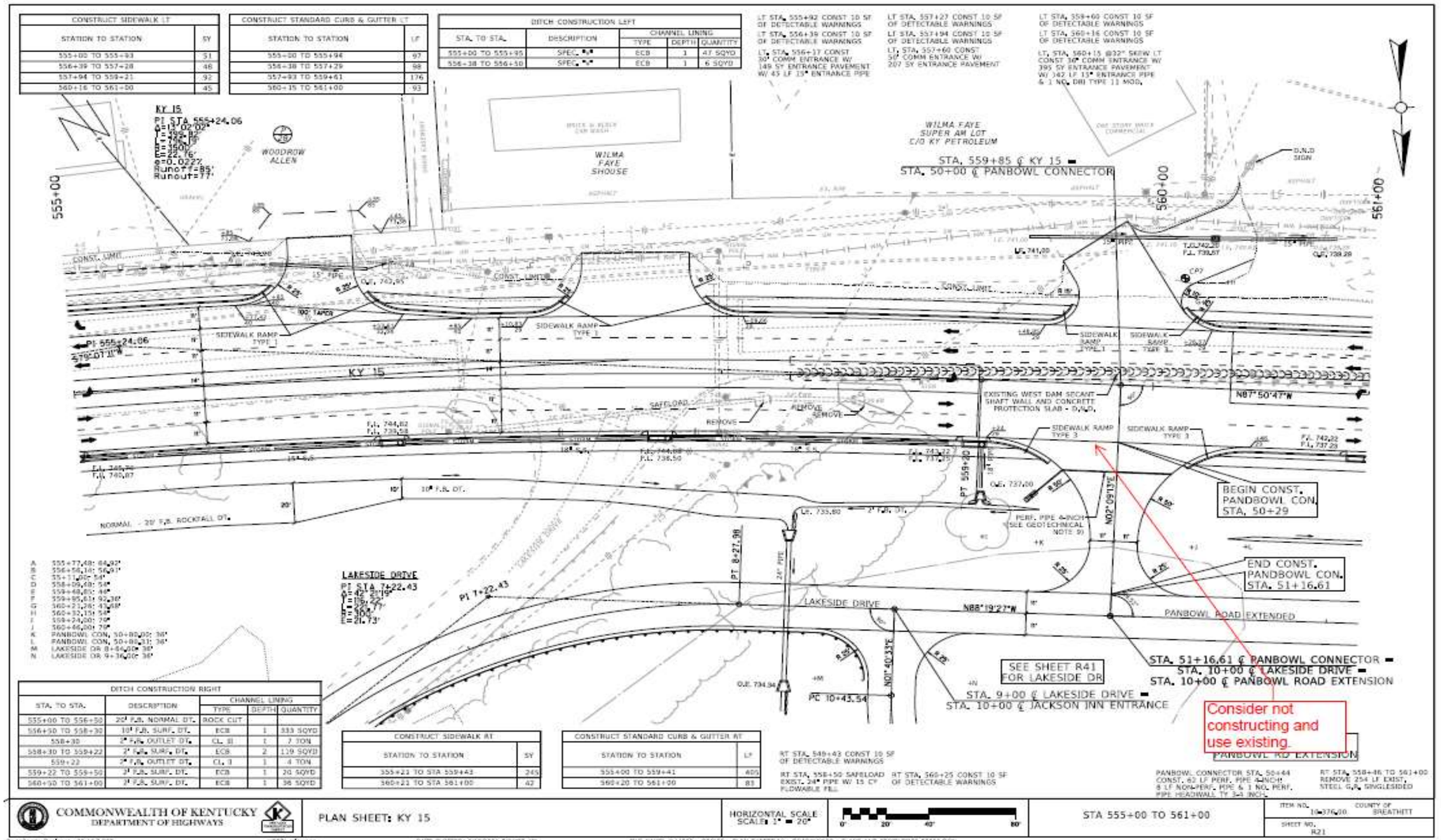
SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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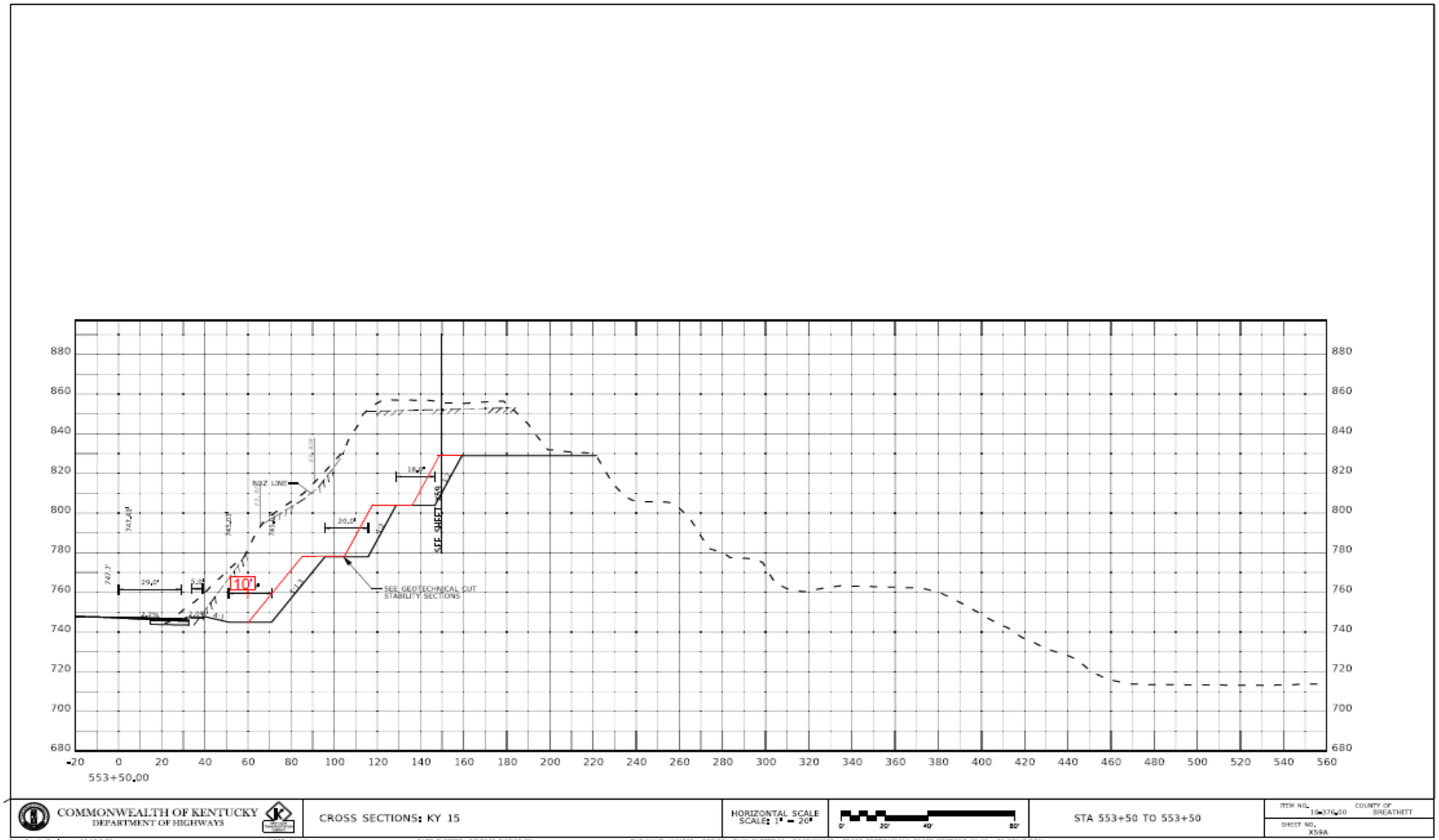
SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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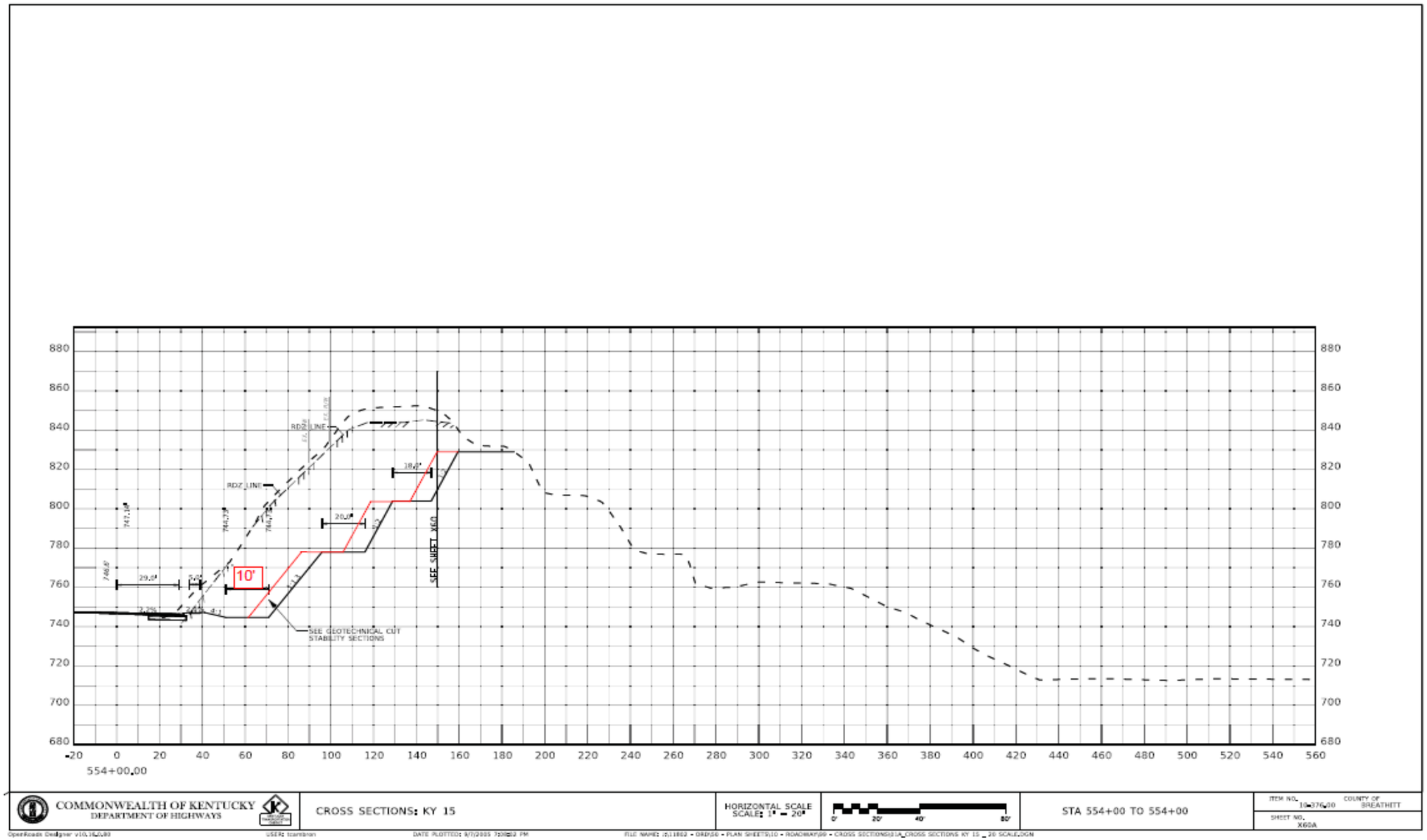

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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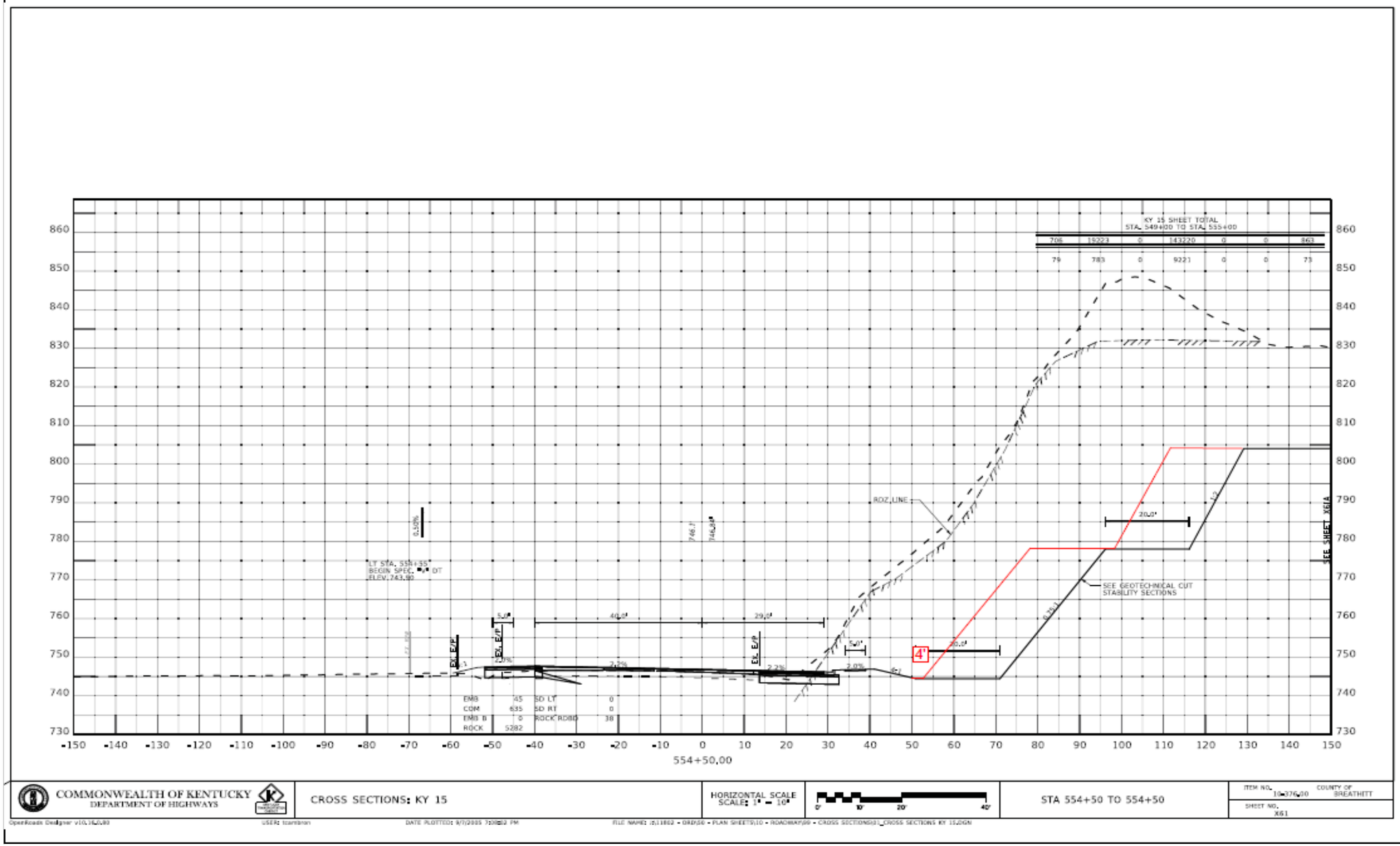

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS

CROSS SECTIONS: KY 15

HORIZONTAL SCALE
SCALE: 1" = 10'
0' 10' 20' 40'

STA 554+50 TO 554+50

ITEM NO. 10-376.00 COUNTY OF BREATHITT
SHEET NO. X61

OpenRoads Designer v10.16.0.93 USER: tcamberon DATE PLOTTED: 8/1/2005 7:08:02 PM FILE NAME: i511802 - ORDS50 - PLAN SHEETS\10 - ROADWAY\99 - CROSS SECTIONS\11_CROSS SECTIONS KY 15.DGN

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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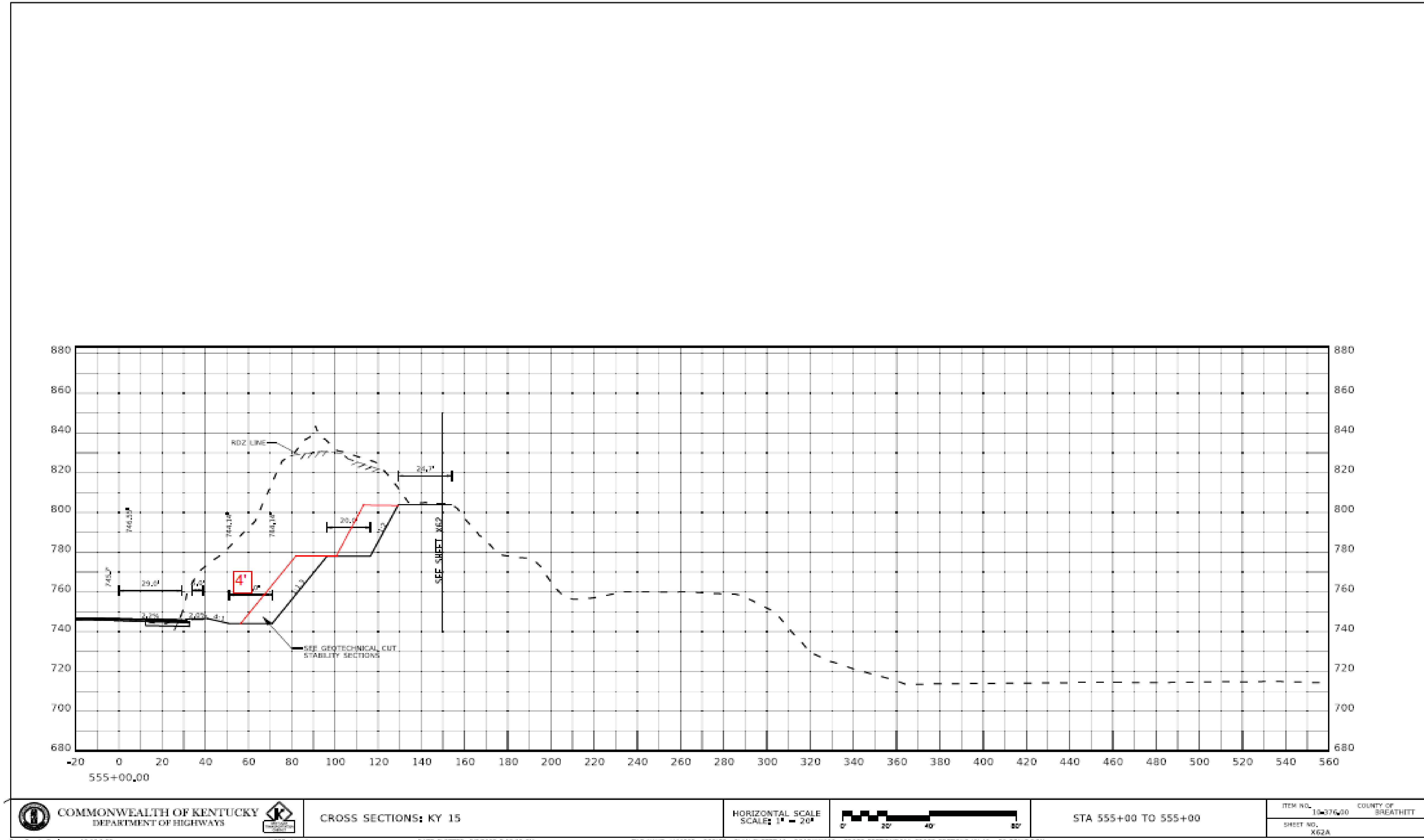

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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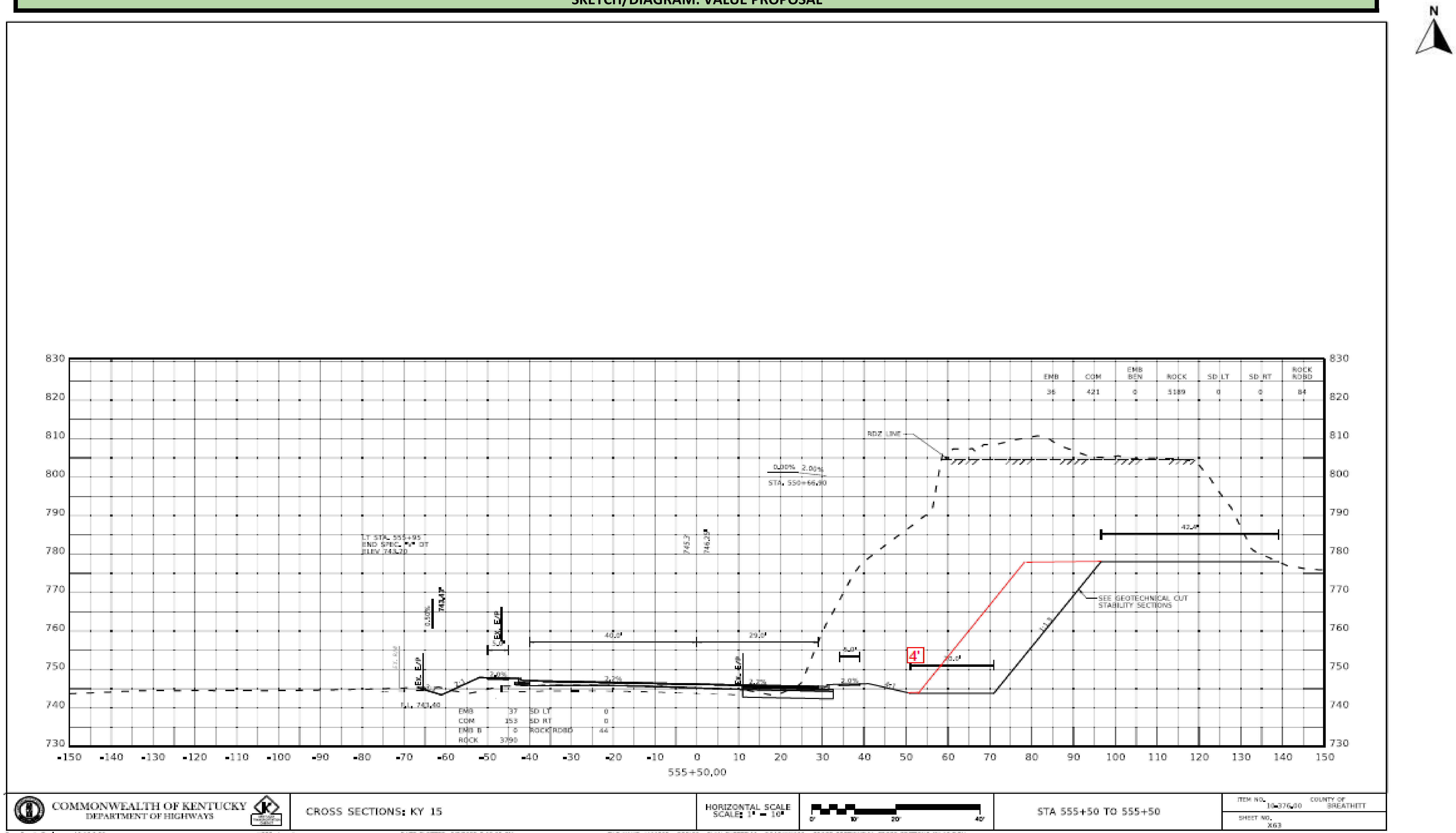

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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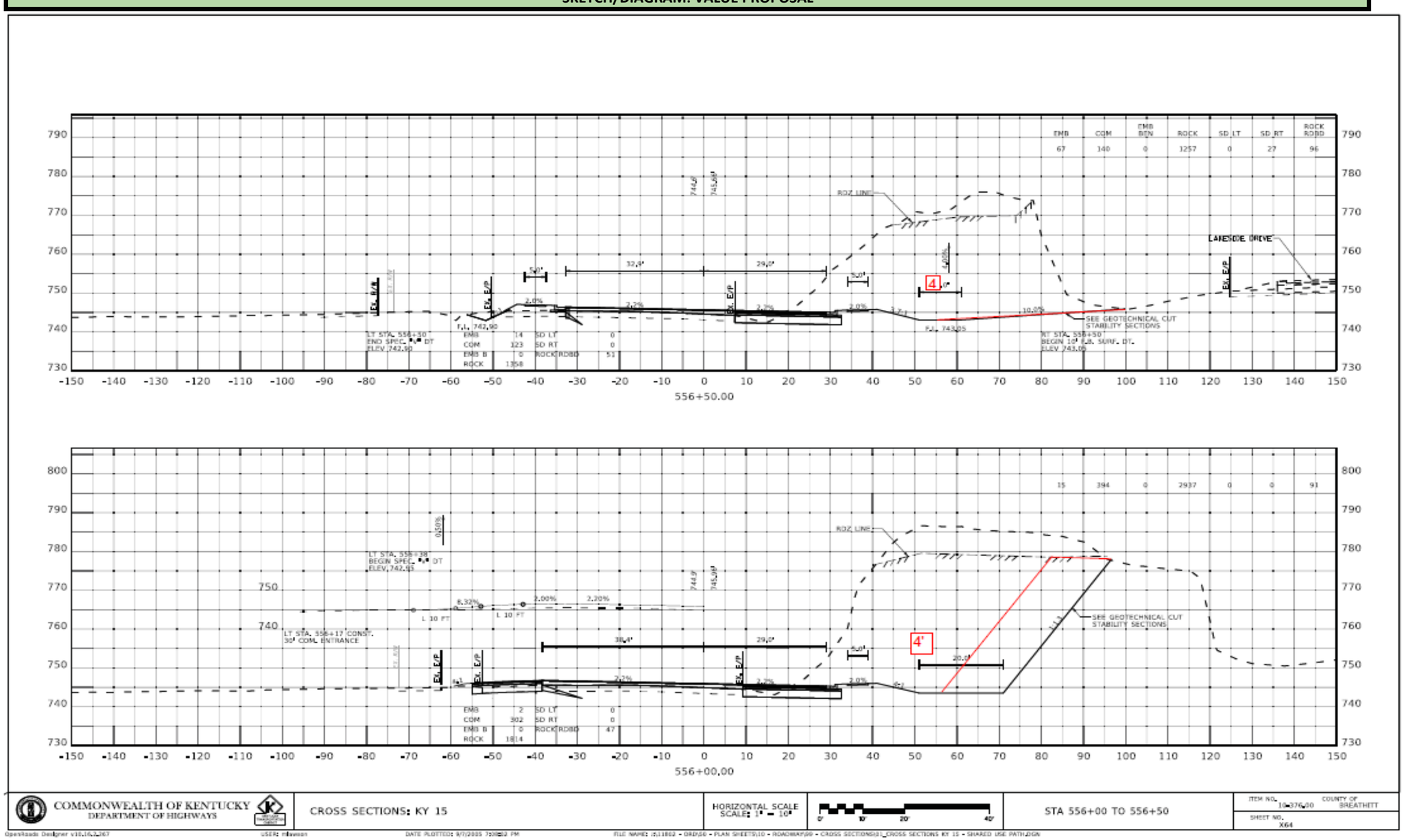

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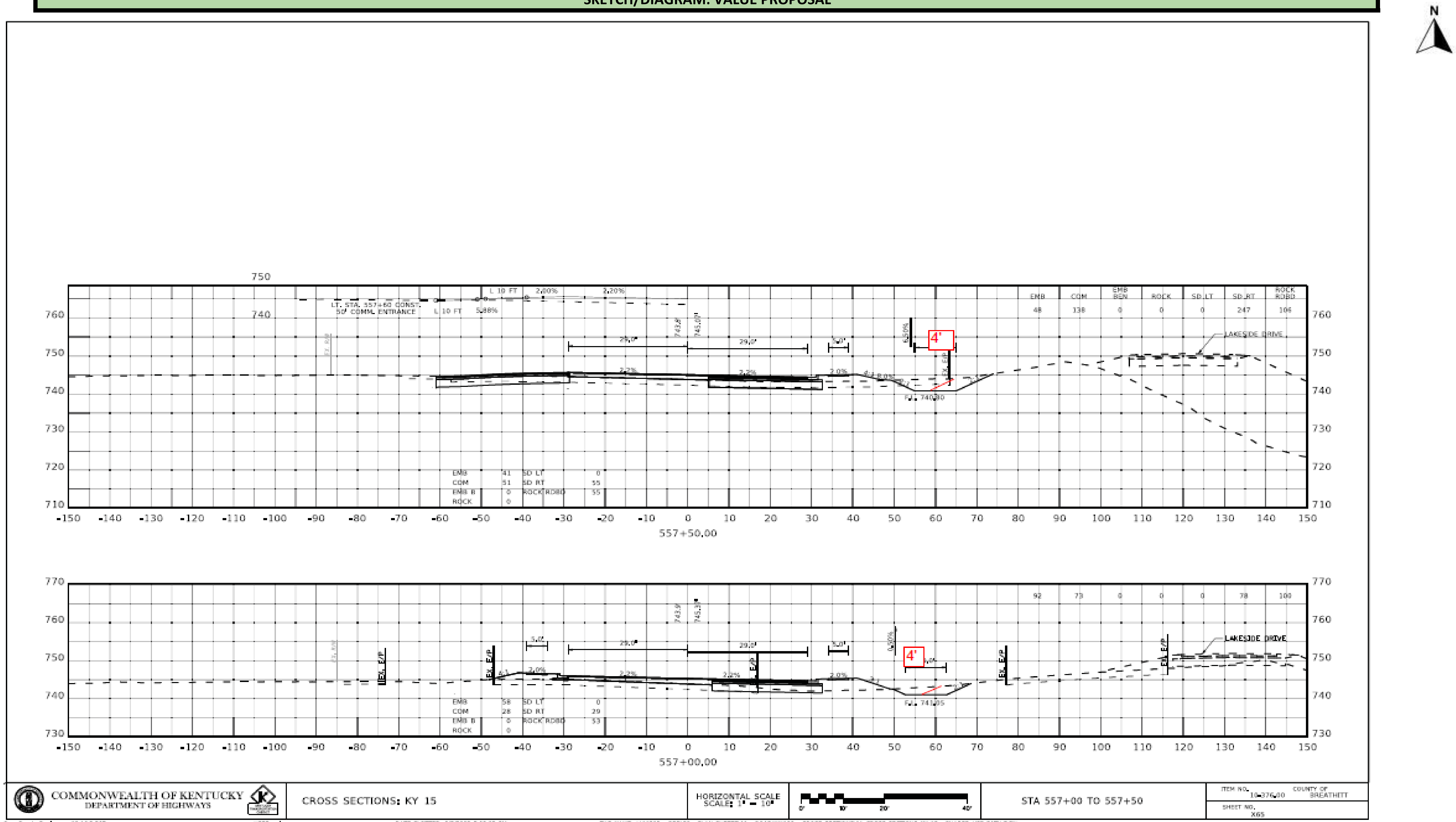
SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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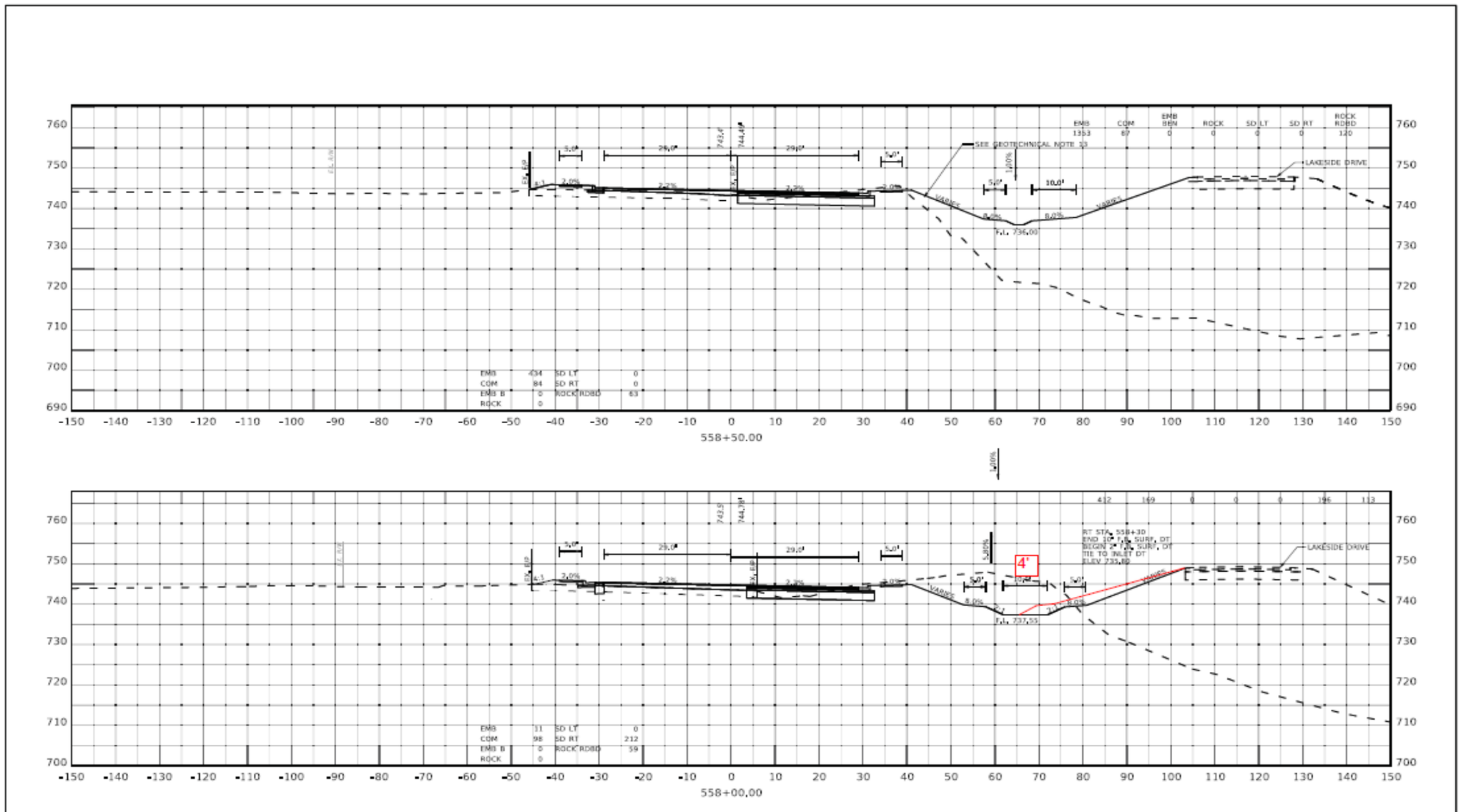
SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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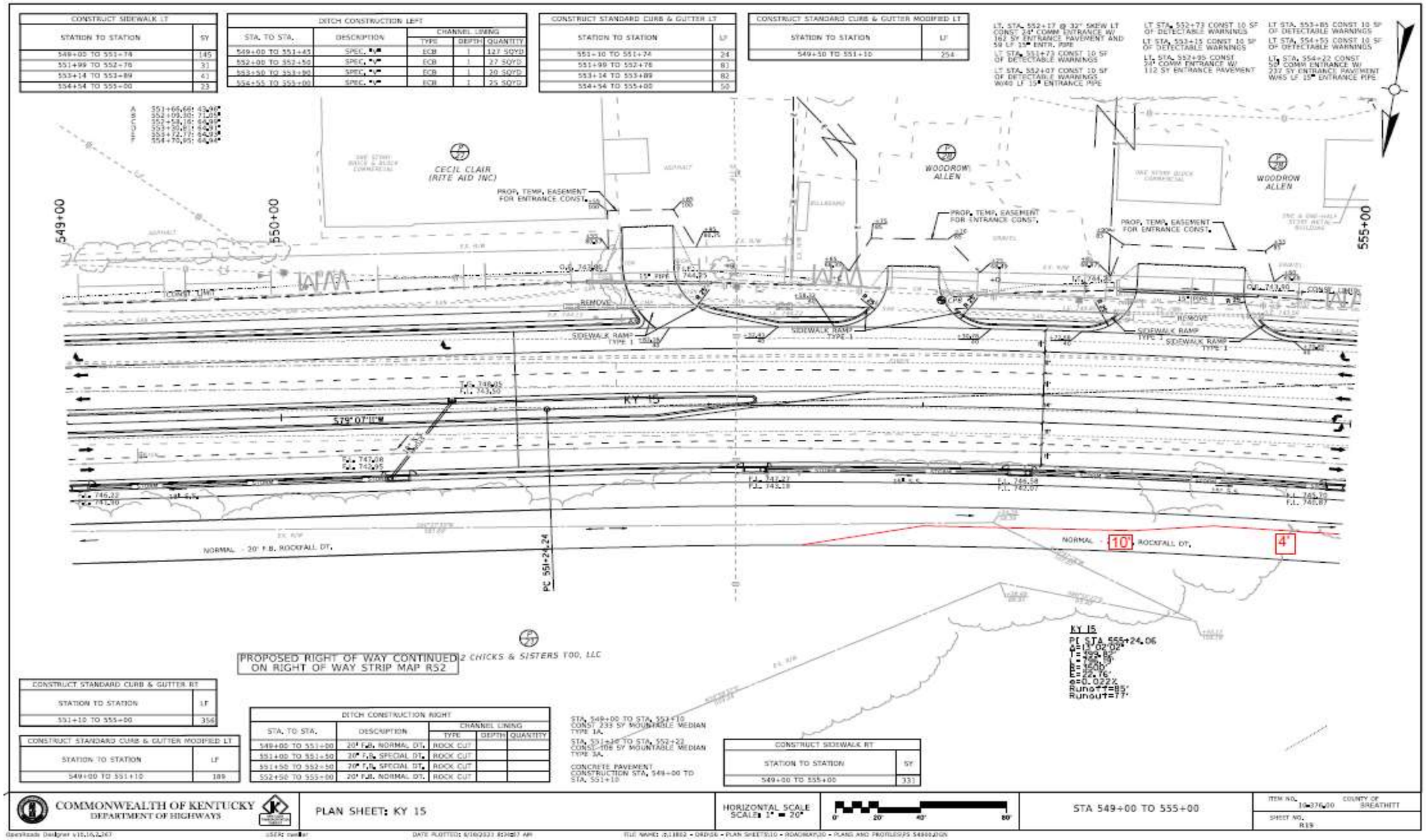

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

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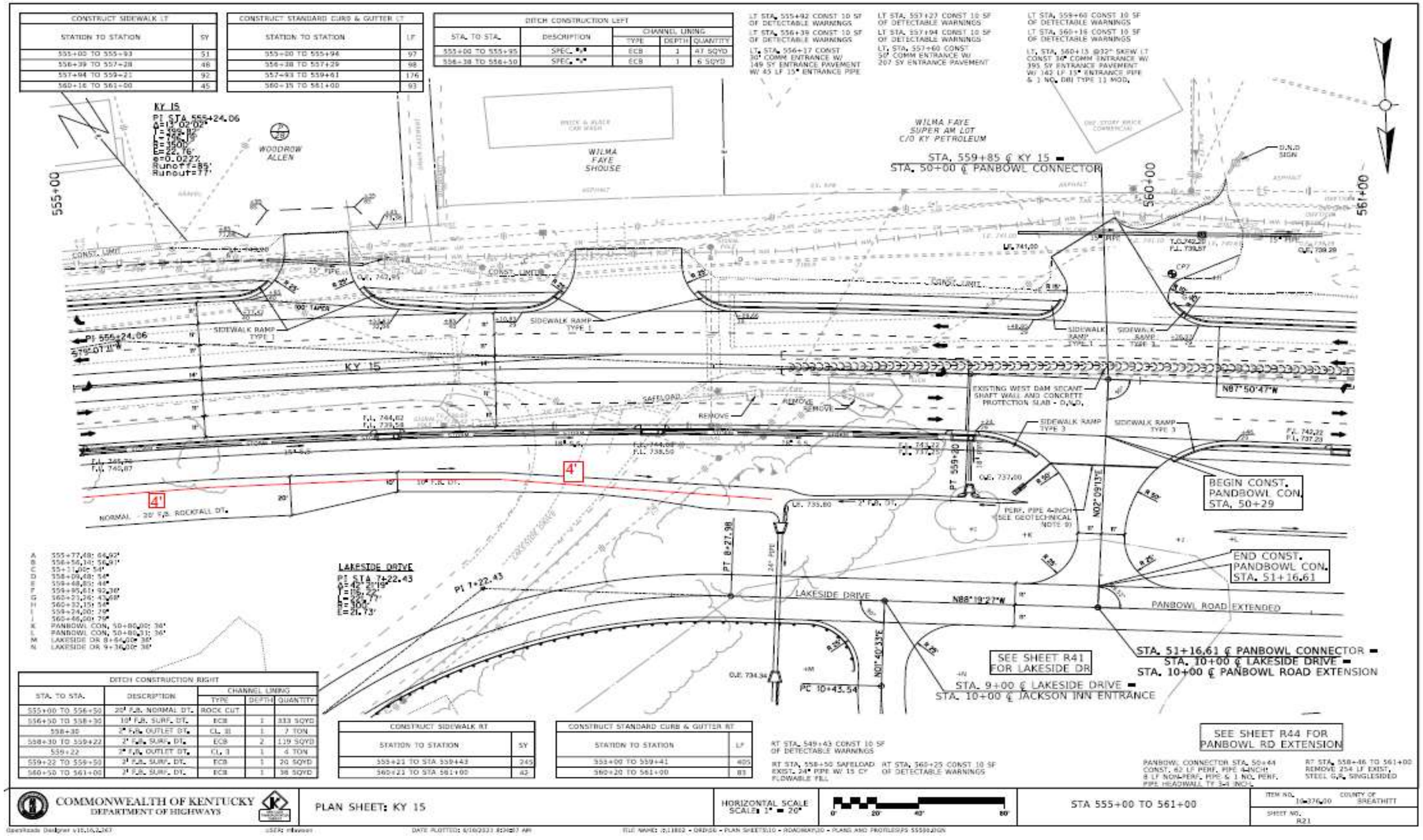


VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.

SKETCH/DIAGRAM: VALUE PROPOSAL

Station	Area 1 Saved	Area 2 Saved	Area 3 Saved	Avg Area	Excavation Reduced (CY)
553+50	10x34	10x25	10x24	830	
					1556
554+00	10x36	10x26	10x24	850	
					1676
554+50	16x34	16x26		960	
					1778
555+00	16x35	16x25		960	
					1393
555+50	16x34			544	
					1007
556+00	16x34			544	
					504
556+50	0			0	
					11
557+00	6x2			12	
					28
557+50	6x3			18	
					42
558+00	6x2.5	6x2		27	
			TOTAL REDUCED EXCAVATION		**7995**

VALUE PROPOSAL

OT-03

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00.
Assumptions & Calculations	See the attachment for the CUYD of excavation subtracted below. This is an approximate number.

DESIGN ELEMENT	**BASELINE CONCEPT**				**VALUE PROPOSAL**		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Roadway Excavation	CUYD	607,693	$12	$7,292,316	599,698	$12	$7,196,376
TOTAL				$7,292,000			$7,196,000
						Impact to Initial Cost (Baseline Less Proposed)	**$96,000**

Note: Total costs are rounded to the nearest thousand dollars.

AVOID COST

VALUE PROPOSAL

OT-06

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Shift Sta. 509+50 to Sta. 518+00 south to match existing edge of pavement
FUNCTION	**Optimize Template**
ASSOCIATED IDEAS	OT-07: Add gravity wall to eliminate sliver fill, approximately Sta. 516 to Sta. 520

VALUE PROPOSAL SYNOPSIS:

Avoiding sliver fills and embankment benching along the south side of the east dam would simplify construction and reduce the limits of impacts.

Reliability	**Maintained**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**
O&M	**Degraded**	**Schedule Impact**	**Maintained**	**($40,000)**

BASELINE CONCEPT:

The proposed alignment is currently shifted north, away from the south edge of pavement in this station range, and also has sliver fills with embankment benching along the south side.

VALUE PROPOSAL DESCRIPTION:

Revising the alignment was investigated but will not be further evaluated. It would likely require a compound curve to avoid changing the current 6710' radius curve at PI Sta. 523+61.62, and the design team requested that the VE not revise the alignment. Therefore this value proposal will focus on avoiding the sliver fills on the south side with revised slopes and/or a proposed gravity wall.

ADVANTAGES:	**DISADVANTAGES:**
● Reduces embankment benching	● Adds standard gravity wall behind sidewalk and guardrail
● Eliminates sliver fills	● Maintenance increases
● Reduces limits of construction on south face of east dam	●
●	●

$ COST SUMMARY	**Initial Costs**	**O&M Costs**	**Total Life Cycle Cost**
BASELINE CONCEPT:	$54,000	$0	$54,000
VALUE PROPOSAL DESCRIPTION:	$94,000	$0	$94,000
TOTAL (Baseline less Proposed)	($40,000)	$0	($40,000)
			ADD COST

VALUE PROPOSAL

OT-06

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Shift Sta. 509+50 to Sta. 518+00 south to match existing edge of pavement

DISCUSSION & JUSTIFICATION:

• Technical Considerations -
- Change proposed side slope to 2:1 from Lt. Sta. 515+00 to 517+00 and tie in near the top of the slope.
- Construct standard gravity wall from Lt. Sta. 517+00 to 519+50, with handrail added on top for ped protection.
- Construction of retaining wall will require structure excavation, but is no greater impact than the embankment benching currently shown on the cross sections.

• Cost Considerations - Earthwork costs will be reduced, but there will be added cost for the gravity wall and associated items.

• Schedule Impacts - construction of the gravity wall may take longer than the baseline design, but it likely would not impact the overall construction schedule.

• Risk Considerations - reduces risk of impacts to the dam during construction

• Project Management Considerations (including Redesign Effort) - this would not require a significant redesign effort.

• Stakeholder Acceptance - not anticipated to be controversial

• Implementation Considerations -

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

OT-06

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Shift Sta. 509+50 to Sta. 518+00 south to match existing edge of pavement

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No impact	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No impact	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Degraded
Justification for Impact Score	Increases long term maintenance of wall and handrail.	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score	No impact	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No impact	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	No impact	
Risk	An assessment of the identified risks of the project.	Improved
Justification for Impact Score	Reduces risk of impacts to the dam during construction.	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No impact	

VALUE PROPOSAL

OT-06

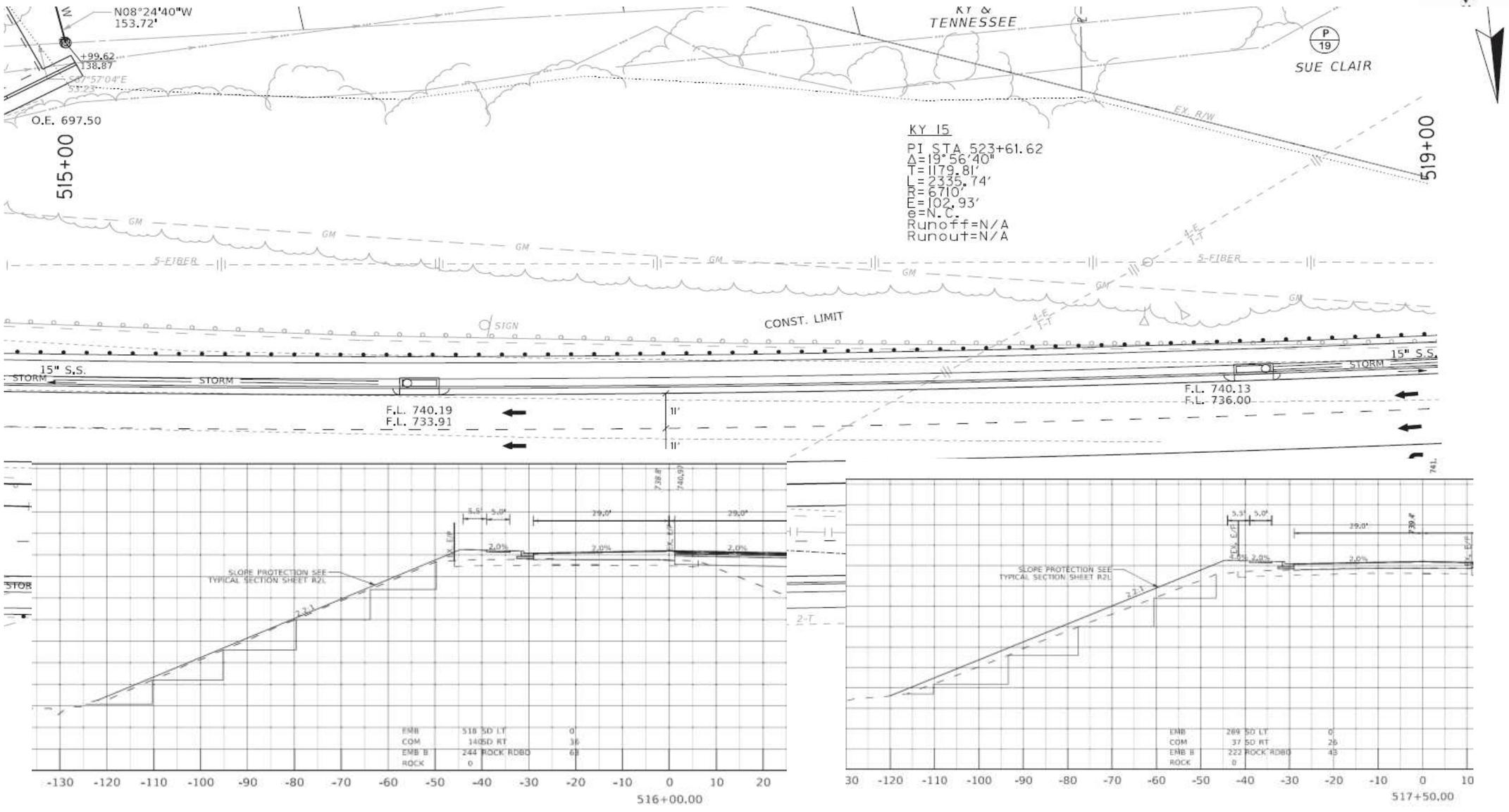
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Shift Sta. 509+50 to Sta. 518+00 south to match existing edge of pavement

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

OT-06

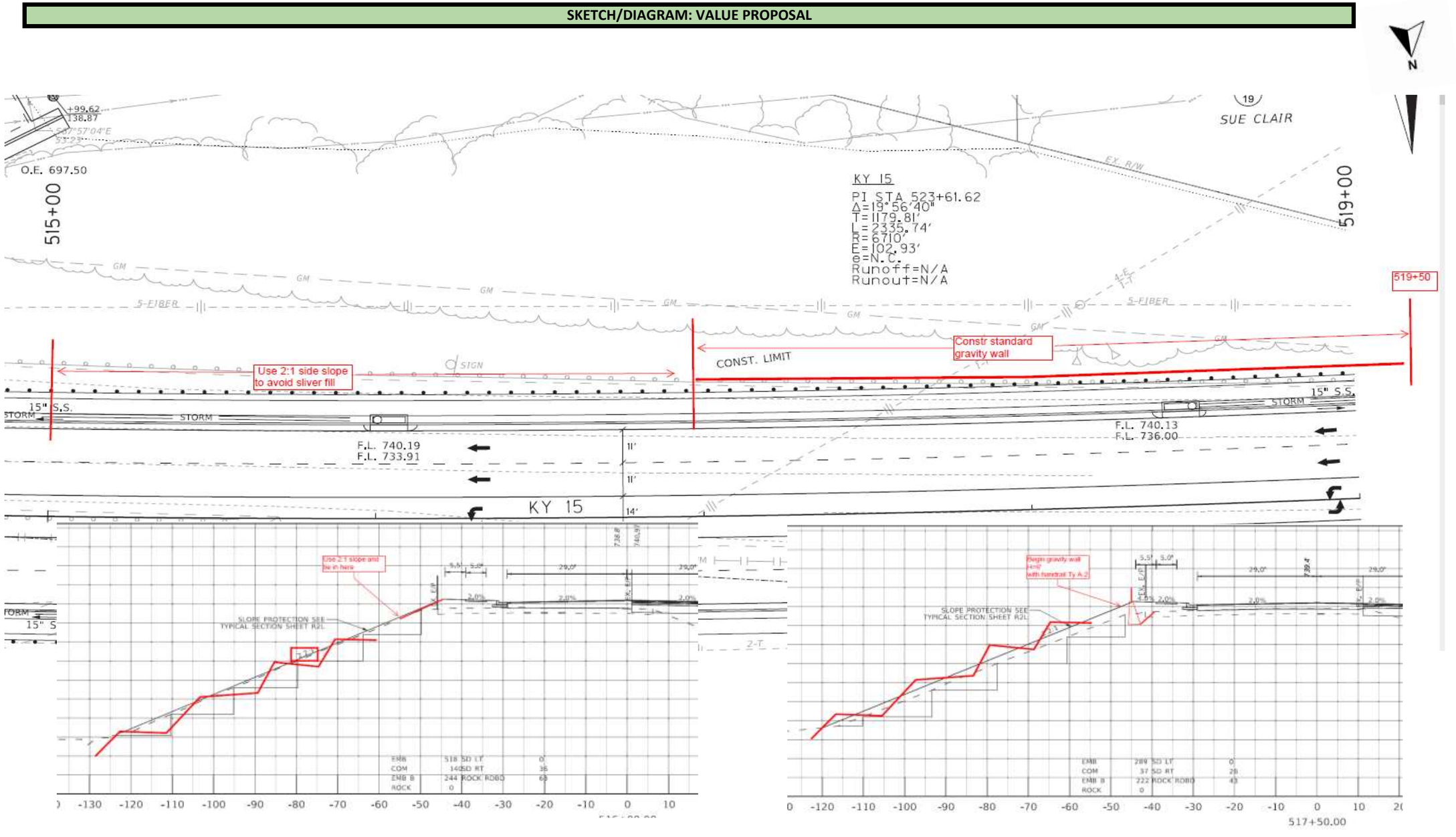
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Shift Sta. 509+50 to Sta. 518+00 south to match existing edge of pavement

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

OT-06

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Shift Sta. 509+50 to Sta. 518+00 south to match existing edge of pavement
Assumptions & Calculations	Assumptions / Calculations noted parenthetically in description of design elements)

DESIGN ELEMENT	**BASELINE CONCEPT**				**VALUE PROPOSAL**		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Emb Benching (unit cost from design team construction estimate)	CY	2,960	$12	$35,520			
Embankment (unit cost from design team construction estimate)	CY	1,500	$12	$18,000			
Concrete Class B (unit cost from design team construction estimate)	CY				112	$590	$66,080
Structure Excavation (unit cost from 2022 ave unit price, increased by 7% for 1 years of inflation)	CY				140	$55	$7,700
Handrail Ty A-2 (unit cost from 2021 ave unit price, increased by 15% for 2 years of inflation)	LF				250	$82	$20,500
TOTAL				$54,000			$94,000
						Impact to Initial Cost (Baseline Less Proposed)	**($40,000)**

Note: Total costs are rounded to the nearest thousand dollars.

ADD COST

VALUE PROPOSAL

ME-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Designer or KYTC to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 555
FUNCTION	**Move Excavation**
ASSOCIATED IDEAS	ME-02: Contractor to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 556+50 ME-05: Verify quantity of non-durable wasted material ME-06: Optimize material placement and removal

VALUE PROPOSAL SYNOPSIS:

The VE team is proposing for KYTC to perform the suggested bores as outlined on plan sheets, pages R97-R99. We believe there is a substantial amount of borrow material generated from the mass cut that is unknown in its nature. More substantial information of the material may reduce some material management risk.

Reliability	**Improved**	**Functionality**	**Improved**	**$ Initial Cost Avoidance (Add)**
O&M	**Improved**	**Schedule Impact**	**Degraded**	**$0**

BASELINE CONCEPT:

There are no borings for the mass cut on the North side of KY 15.

VALUE PROPOSAL:

The VE team is proposing for KYTC to perform the suggested bores as outlined on plan sheets, pages R97-R99. We believe there is a substantial amount of borrow material generated from the mass cut that is unknown in its nature. More substantial information of the material may reduce some material management risk.

ADVANTAGES:	DISADVANTAGES:
● Provides the ability to have a better picture of the material that is available to construct critical elements of the project	● More cost to the design phase of the project
● Gives the Section Engineer and inspection staff more information to ensure that the contractor will be blasting in a way to not intermix undesirable material	● May delay the letting date
● Ensures that the currently assumed usable material quantities are accurate	●
● Knowledge of the material strata may reduce the bid amount slightly as the contractor will have more information so as not to build in additional risk factors	●
●	●

DESIGN SUGGESTION

VALUE PROPOSAL

ME-01

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Designer or KYTC to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 555

DISCUSSION & JUSTIFICATION:

The VE team suggests that the design team move forward with retrieving the suggested borings that are suggested on the plan sheets R97-R99. This additional information will help give a better idea of the actual usable material that is available for the project. Knowing that non-durable shale is present on this cut it would be advisable to have a solid idea of the layers between durable and undurable materials. This information will help the construction team manage blasting depths and excavation to avoid intermixing embankment materials and inadvertently placing non- durable shale in embankments and rock roadbed applications. Firm knowledge of the material strata may also help reduce the unit price when bid as the contractor may not build in as much risk for this item.

• Technical Considerations: As shown on the attached plan there is approximately 200,000 CY of material that will be extracted from the mass cut that is currently not classified and therefore presents a high risk of intermingling durable and non-durable materials.

• Cost Considerations: Consideration should be weighed to the added cost of the additional borings and testing of the material as this will add to the design cost

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

TITLE	Designer or KYTC to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 555

DISCUSSION & JUSTIFICATION: (cont.)

• Schedule Impacts: Consideration should be weighed to the impact of schedule as this exercise may delay a quickly approaching letting date.

• Risk Considerations: Boring information and material testing should help give the construction team better knowledge of the material that will be realized from the cut. This should help the inspection team and contractor make cuts that will reduce intermingling of materials and ultimately help prevent this risk.

• Project Management Considerations (including Redesign Effort) - N/A

• Stakeholder Acceptance - N/A

• Implementation Considerations - N/A

VALUE PROPOSAL

ME-01

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KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Designer or KYTC to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 555

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No perceived impact.	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No perceived impact.	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Improved
Justification for Impact Score	With a Geotech report, the construction team will have better understanding of the proper material to be used for rock roadbed and damn stabilization efforts. If the proper material is used during construction efforts the roadway and damn will have a longer service life.	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score	No perceived impact.	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No perceived impact.	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Degraded
Justification for Impact Score		
Risk	An assessment of the identified risks of the project.	Improved
Justification for Impact Score		
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No perceived impact.	

VALUE PROPOSAL

ME-01

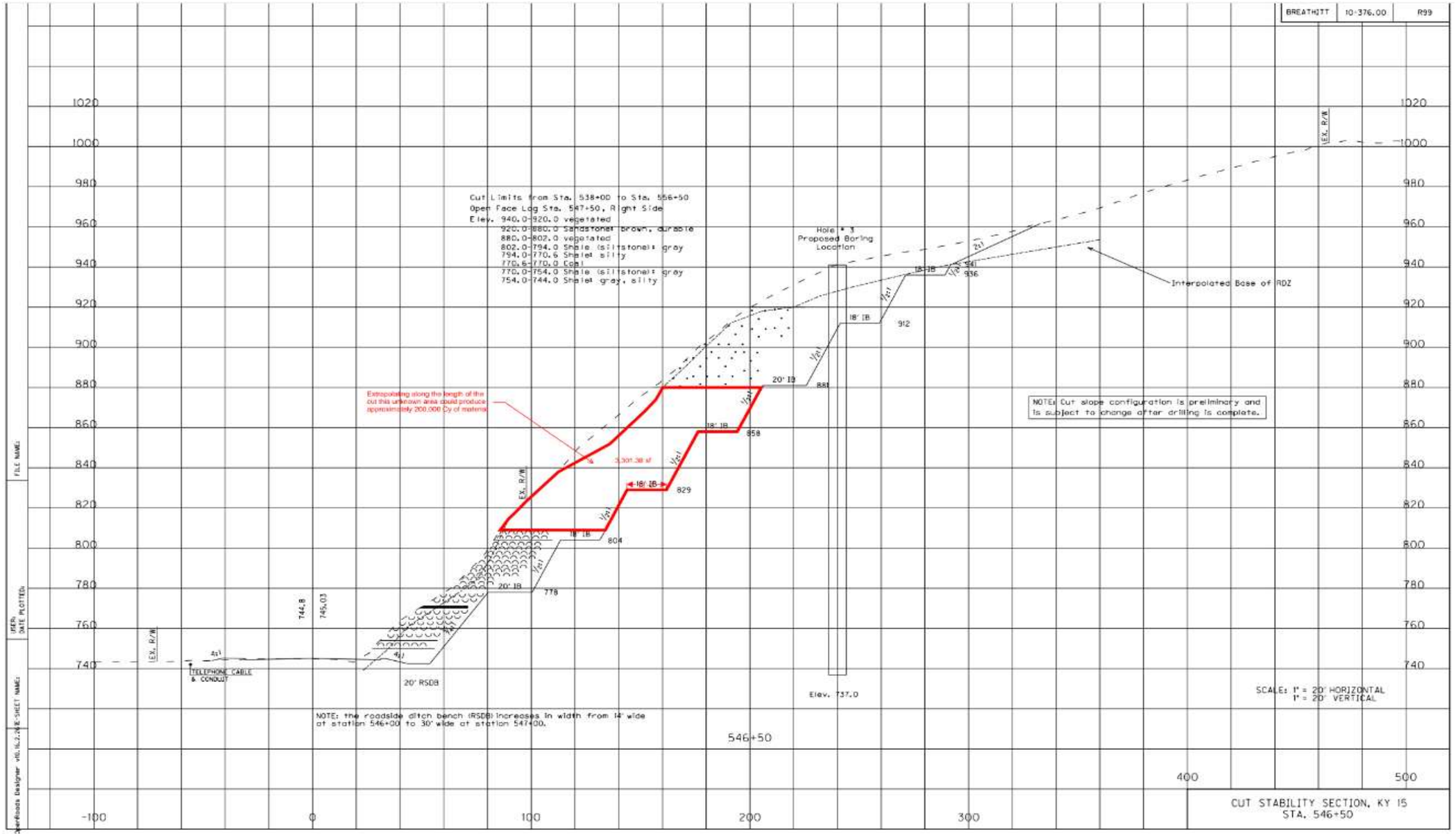
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Designer or KYTC to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 555

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MC-02

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review cost estimate
FUNCTION	**Manage Construction**
ASSOCIATED IDEAS	MC-03: Rerun cost estimate in the Cost Estimator program with updated cost table

VALUE PROPOSAL SYNOPSIS:

This proposal is a review of the cost estimate to identify and account for any recent cost increases and reduce the risk of cost overruns during construction.

Reliability	**Improved**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**
O&M	**Maintained**	**Schedule Impact**	**Maintained**	**($364,000)**

BASELINE CONCEPT:

There was a cost estimate prepared June 02, 2023.

VALUE PROPOSAL:

Proposal cost estimate prepared November 29, 2023 and includes the most recent KYTC cost catalog (October 2023).

ADVANTAGES:	**DISADVANTAGES:**
● More accurate cost	● Cost is higher
● Ensures the correct amount of C funds can be allocated	●
●	●
●	●
●	●

$ COST SUMMARY	**Initial Costs**	**O&M Costs**	**Total Life Cycle Cost**
BASELINE CONCEPT:	$27,849,000	$0	$27,849,000
VALUE PROPOSAL:	$28,213,000	$0	$28,213,000
TOTAL (Baseline less Proposed)	($364,000)	$0	($364,000)

ADD COST

VALUE PROPOSAL

MC-02

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review cost estimate

DISCUSSION & JUSTIFICATION:

The goal of this proposal is to get a more accurate cost estimate that will include any price changes since the most recent estimate. This will reduce project risk by reducing the likelihood of higher than expected construction bids.

Implementation of this proposal should require minimal work on the design team, have no impact to schedule, no additional technical considerations, and no opposition from stakeholders.

The true cost of this proposal should also be nothing, because this is only to get a more accurate idea of what the real cost will be.

Estimator earthwork estimate increased from 5.79$/CUYD to 9.96$/CUYD. The project team may want to investigate if the $12/cuyd estimate should be increased.

Paving estimate increased from $3.06M to $3.3M

Roadway estimate increased from $9.94M to $10.06M

Structures estimate returned concrete and steel unit prices lower than shown and was left unchanged.

Drainage estimate increased from $1.57M to $1.66M

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

MC-02

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review cost estimate
Assumptions & Calculations	Estimate was re-run using KYTC most current cost catalog.

DESIGN ELEMENT	**BASELINE CONCEPT**				**VALUE PROPOSAL**		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Cost Estimate	LS	1	$27,848,792	$27,848,792	1	$28,213,081	$28,213,081
TOTAL				$27,849,000			$28,213,000
						Impact to Initial Cost (Baseline Less Proposed)	**($364,000)**

Note: Total costs are rounded to the nearest thousand dollars.

ADD COST

Estimate

Estimated Cost:$24,533,114.09

Contingency: 15.00%

Estimated Total: $28,213,081.20

Base Date: 11/29/23

Spec Year: 08

Unit System: E

Work Type: GRADE & DRAIN WITH ASPHALT SURFACE

Highway Type: STATE ROUTE

Urban/Rural Type: URBAN

Season: SPRING

County: BREATHITT

Latitude of Midpoint: 0

Longitude of Midpoint: 0

District: 10

Federal Project Number:

State Project Number:

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
Group 0001: PAVING					
0001	00003 CRUSHED STONE BASE	10,295.00	TON	$35.57	$366,193.15
0002	00100 ASPHALT SEAL AGGREGATE	11.35	TON	$676.36	$7,676.69
0003	00103 ASPHALT SEAL COAT	1.36	TON	$2,358.26	$3,207.23
0004	00190 LEVELING & WEDGING PG64-22	9,070.00	TON	$93.78	$850,584.60
0005	00212 CL2 ASPH BASE 1.00D PG64-22	1,544.00	TON	$127.20	$196,396.80
0006	00214 CL3 ASPH BASE 1.00D PG64-22	4,544.00	TON	$96.96	$440,586.24
0007	00301 CL2 ASPH SURF 0.38D PG64-22	825.00	TON	$136.99	$113,016.75
0008	00307 CL2 ASPH SURF 0.38B PG64-22	1,409.00	TON	$122.49	$172,588.41
0009	00388 CL3 ASPH SURF 0.38B PG64-22	3,533.00	TON	$148.98	$526,346.34
0010	02073 JPC PAVEMENT-9 IN Used 6/2/23 Estimate	5,008.00	SQYD	$72.00	$360,576.00
0011	02084 JPC PAVEMENT-8 IN	588.00	SQYD	$130.55	$76,763.40
0012	02676 MOBILIZATION FOR MILL & TEXT Used 6/2/23 Estimate	2.00	LS	$3,600.00	$7,200.00
0013	02677 ASPHALT PAVE MILLING & TEXTURING	3,873.00	TON	$36.77	$142,410.21
0014	24970EC ASPHALT MATERIAL FOR TACK NON-TRACKING	31.98	TON	$14.23	$455.08
0015	00020 TRAFFIC BOUND BASE	1,063.00	TON	$30.93	$32,878.59

Total for Group 0001:$3,296,879.49

Group 0002: ROADWAY

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0016	01015 INSPECT & CERTIFY EDGE DRAIN SYSTEM Used 6/2/23 Estimate	1.00	LS	$11,800.00	$11,800.00
0017	01810 STANDARD CURB AND GUTTER	10,215.00	LF	$30.90	$315,643.50
0018	01811 STANDARD CURB AND GUTTER MOD	1,270.00	LF	$42.30	$53,721.00
0019	01875 STANDARD HEADER CURB	142.00	LF	$72.63	$10,313.46
0020	01945 MOUNTABLE MEDIAN TYPE 1A Used 6/2/23 Estimtate	282.00	SQYD	$150.00	$42,300.00
0021	01947 MOUNTABLE MEDIAN TYPE 3A Used 6/2/23 Estimate	108.00	SQYD	$145.00	$15,660.00
0022	01987 DELINEATOR FOR GUARDRAIL BI DIRECTIONAL WHITE	24.00	EACH	$14.36	$344.64
0023	02014 BARRICADE-TYPE III	30.00	EACH	$202.75	$6,082.50
0024	02091 REMOVE PAVEMENT	743.00	SQYD	$13.07	$9,711.01
0025	02159 TEMP DITCH	3,744.00	LF	$0.42	$1,572.48
0026	02160 CLEAN TEMP DITCH	1,872.00	LF	$0.02	$37.44
0027	02200 ROADWAY EXCAVATION Estimator had 9.96 - Increased from 5.79 Used 6/2/23 Estimate	607,693.00	CUYD	$12.00	$7,292,316.00
0028	02242 WATER	269.00	MGAL	$5.15	$1,385.35
0029	02262 FENCE-WOVEN WIRE TYPE 1	1,293.00	LF	$14.47	$18,709.71
0030	02289 DOUBLE VEHICULAR WOVEN WIRE GATE Used 6/2/23 Estimate	4.00	EACH	$4,500.00	$18,000.00
0031	02351 GUARDRAIL-STEEL W BEAM-S FACE	2,526.00	LF	$37.89	$95,710.14
0032	02360 GUARDRAIL TERMINAL SECTION NO 1	6.00	EACH	$91.74	$550.44

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0033	02367 GUARDRAIL END TREATMENT TYPE 1	2.00	EACH	$4,315.36	$8,630.72
0034	02369 GUARDRAIL END TREATMENT TYPE 2A	4.00	EACH	$1,040.40	$4,161.60
0035	02381 REMOVE GUARDRAIL	3,688.00	LF	$2.59	$9,551.92
0036	02429 RIGHT-OF-WAY MONUMENT TYPE 1	48.00	EACH	$131.23	$6,299.04
0037	02432 WITNESS POST	48.00	EACH	$105.21	$5,050.08
0038	02483 CHANNEL LINING CLASS II	1,123.00	TON	$53.67	$60,271.41
0039	02484 CHANNEL LINING CLASS III	615.00	TON	$48.04	$29,544.60
0040	02488 CHANNEL LINING CLASS IV Used 6/2/23 Estimate	12,980.00	CUYD	$9.51	$123,439.80
0041	02545 CLEARING AND GRUBBING Clearing and Grubbing Used 6/2/23 Estimate	1.00	LS	$40,750.00	$40,750.00
0042	02555 CONCRETE-CLASS B	13.80	CUYD	$675.96	$9,328.25
0043	02562 TEMPORARY SIGNS	1,000.00	SQFT	$11.22	$11,220.00
0044	02585 EDGE KEY	267.00	LF	$35.76	$9,547.92
0045	02602 FABRIC-GEOTEXTILE CLASS 1	43,672.00	SQYD	$2.41	$105,249.52
0046	02650 MAINTAIN & CONTROL TRAFFIC Used 6/2/23 Estimate	1.00	LS	$250,000.00	$250,000.00
0047	02671 PORTABLE CHANGEABLE MESSAGE SIGN	3.00	EACH	$4,984.55	$14,953.65
0048	02690 SAFELOADING	71.00	CUYD	$323.04	$22,935.84
0049	02696	7,012.00	LF	$0.84	$5,890.08

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
	SHOULDER RUMBLE STRIPS				
0050	02701 TEMP SILT FENCE	3,744.00	LF	$2.86	$10,707.84
0051	02703 SILT TRAP TYPE A	59.00	EACH	$69.80	$4,118.20
0052	02704 SILT TRAP TYPE B	59.00	EACH	$194.15	$11,454.85
0053	02705 SILT TRAP TYPE C	59.00	EACH	$70.85	$4,180.15
0054	02706 CLEAN SILT TRAP TYPE A	59.00	EACH	$1.10	$64.90
0055	02707 CLEAN SILT TRAP TYPE B	59.00	EACH	$2.79	$164.61
0056	02708 CLEAN SILT TRAP TYPE C	59.00	EACH	$2.88	$169.92
0057	02720 SIDEWALK-4 IN CONCRETE Used 6/2/23 Estimate	7,682.00	SQYD	$42.98	$330,172.36
0058	02726 STAKING Used 6/2/23 Estimate	1.00	LS	$25,000.00	$25,000.00
0059	03171 CONCRETE BARRIER WALL TYPE 9T	2,000.00	LF	$34.05	$68,100.00
0060	04935 TEMP SIGNAL Used 6/2/23 Estimate	1.00	LS	$10,000.00	$10,000.00
0061	05950 EROSION CONTROL BLANKET	2,370.00	SQYD	$3.23	$7,655.10
0062	05952 TEMP MULCH	192,849.00	SQYD	$0.21	$40,498.29
0063	05953 TEMP SEEDING AND PROTECTION	143,917.00	SQYD	$0.21	$30,222.57
0064	05963 INITIAL FERTILIZER	9.00	TON	$1,289.07	$11,601.63
0065	05964 MAINTENANCE FERTILIZER	15.00	TON	$1,486.91	$22,303.65

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0066	05985 SEEDING AND PROTECTION	287,835.00	SQYD	$0.32	$92,107.20
0067	05992 AGRICULTURAL LIMESTONE	178.40	TON	$120.59	$21,513.26
0068	06510 PAVE STRIPING-TEMP PAINT-4 IN	48,670.00	LF	$0.04	$1,946.80
0069	06514 PAVE STRIPING-PERM PAINT-4 IN	11,700.00	LF	$0.31	$3,627.00
0070	06542 PAVE STRIPING-THERMO-6 IN W	17,883.00	LF	$1.47	$26,288.01
0071	06543 PAVE STRIPING-THERMO-6 IN Y	14,900.00	LF	$1.43	$21,307.00
0072	06546 PAVE STRIPING-THERMO-12 IN W	1,103.00	LF	$3.32	$3,661.96
0073	06568 PAVE MARKING-THERMO STOP BAR-24IN	630.00	LF	$11.84	$7,459.20
0074	06569 PAVE MARKING-THERMO CROSS-HATCH	340.00	SQFT	$5.05	$1,717.00
0075	06574 PAVE MARKING-THERMO CURV ARROW	68.00	EACH	$126.73	$8,617.64
0076	06575 PAVE MARKING-THERMO COMB ARROW	13.00	EACH	$155.59	$2,022.67
0077	06578 PAVE MARKING-THERMO MERGE ARROW	5.00	EACH	$306.12	$1,530.60
0079	10020NS FUEL ADJUSTMENT	143,001.00	DOLL	$1.00	$143,001.00
0080	10030NS ASPHALT ADJUSTMENT Used 6/2/23 Estimate	81,808.00	DOLL	$1.00	$81,808.00
0081	20071EC JOINT ADHESIVE	6,361.00	LF	$1.51	$9,605.11
0082	20099ES842 PAVE MARK TEMP PAINT STOP BAR Used 6/2/23 Estimate	564.00	LF	$3.05	$1,720.20
0083	20738NS112 TEMP CRASH CUSHION	2.00	EACH	$4,000.00	$8,000.00

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
	USed 6/2/23 Estimate				
0084	21289ED LONGITUDINAL EDGE KEY	6,361.00	LF	$4.31	$27,415.91
0085	23158ES505 DETECTABLE WARNINGS	675.00	SQFT	$48.33	$32,622.75
0086	23274EN11F TURF REINFORCEMENT MAT 1	18.00	SQYD	$11.94	$214.92
0087	23608EC YELLOW PAINT FOR MEDIAN SAFETY NOSE Used 6/2/23 Estimate	95.00	SQFT	$1.12	$106.40
0088	24814EC PIPELINE INSPECTION	8,465.00	LF	$1.70	$14,390.50
0089	24845EC UTILITY COORDINATION Used 6/2/23 Estimate	1.00	LS	$25,000.00	$25,000.00
0090	23119EN PEDESTRIAN SAFETY FENCE Used 6/2/23 Estimate	293.00	LF	$165.00	$48,345.00
0091	24864EC PVC FOLD AND FORM PIPE LINER-30 IN Used 6/2/23 Estimate	160.00	LF	$140.00	$22,400.00
0092	24865EC PVC FOLD AND FORM PIPE LINER-36 IN Used 6/2/23 Estimate	222.00	LF	$175.00	$38,850.00
0093	22664EN WATER BLASTING EXISTING STRIPE	2,200.00	LF	$2.26	$4,972.00
0094	06549 PAVE STRIPING-TEMP REM TAPE-B	200.00	LF	$2.75	$550.00
0095	01792 ADJUST MANHOLE	3.00	EACH	$820.36	$2,461.08
0096	21659NN RELOCATE SIGNAL HEAD Used 6/2/23 Estimate	28.00	EACH	$295.00	$8,260.00
0097	06610 INLAID PAVEMENT MARKER-MW	318.00	EACH	$25.87	$8,226.66
0098	06612 INLAID PAVEMENT MARKER-BY	299.00	EACH	$29.30	$8,760.70
0099	23264ES717 PAVE MARK TY 1 TAPE X-WALK-12 IN Used 6/2/23 Estimate	401.00	LF	$15.00	$6,015.00
0100	23265ES717 PAVE MARK TY 1 TAPE STOP BAR-24 IN	98.00	LF	$36.24	$3,551.52

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0101	23270ES717 PAVE MARK TY 1 TAPE-CURV ARROW	11.00	EACH	$563.86	$6,202.46
0102	23869EC PAVE STRIPE-WET REF TAPE-4 IN Y Used 6/2/23 Estimate	260.00	LF	$8.00	$2,080.00
0103	23870EC PAVE STRIPE-WET REF TAPE-4 IN W Used 6/2/23 Estimate	494.00	LF	$8.00	$3,952.00
0104	23871EC PAVE STRIPE-WET REF TAPE-6 IN Y Used 6/2/23 Estimate	1,808.00	LF	$8.50	$15,368.00
0105	23872EC PAVE STRIPE-WET REF TAPE-6 IN W	1,365.00	LF	$9.11	$12,435.15
0106	20550ND SAWCUT PAVEMENT	6,361.00	LF	$2.53	$16,093.33
0107	20191ED OBJECT MARKER TY 3	2.00	EACH	$169.20	$338.40
0108	20411ED LAW ENFORCEMENT OFFICER	120.00	HOUR	$87.87	$10,544.40
0109	02273 FENCE-4 FT CHAIN LINK Used 6/2/23 Estimate	878.00	LF	$100.00	$87,800.00
0110	20166ES810 TEMPORARY PIPE	180.00	LF	$89.96	$16,192.80
0111	23055N REMOVE Private Recreational Vehicle Hook-Up-Electrical Used 6/2/23 Estimate	3.00	LS	$1,500.00	$4,500.00
0112	23055N REMOVE Private Recreational Vehichle Hook-Up-Water Used 6/2/23 Estimate	3.00	LS	$750.00	$2,250.00
0113	23055N REMOVE Remover Private Recreational Vehichle Hook-Up-Sanitary Sewer USed 6/2/23 Estimate	3.00	LS	$1,500.00	$4,500.00

Total for Group 0002:$10,057,427.80

Group 0003: DRAINAGE

0114	00521 STORM SEWER PIPE-15 IN	5,046.00	LF	$44.57	$224,900.22
0115	00522 STORM SEWER PIPE-18 IN	2,444.00	LF	$120.58	$294,697.52
0116	00524 STORM SEWER PIPE-24 IN	235.00	LF	$180.68	$42,459.80

Line #	Item Number Description *Supplemental Description*	Quantity	Units	Unit Price	Extension
0117	00526 STORM SEWER PIPE-30 IN	13.00	LF	$195.94	$2,547.22
0118	00528 STORM SEWER PIPE-36 IN	203.00	LF	$206.83	$41,986.49
0119	00529 STORM SEWER PIPE-42 IN Used 6/2/23 Estimate	522.00	LF	$180.00	$93,960.00
0120	00461 CULVERT PIPE-15 IN	269.00	LF	$96.55	$25,971.95
0121	00462 CULVERT PIPE-18 IN	132.00	LF	$148.25	$19,569.00
0122	00464 CULVERT PIPE-24 IN	132.00	LF	$164.17	$21,670.44
0123	00466 CULVERT PIPE-30 IN	58.00	LF	$186.20	$10,799.60
0124	00440 ENTRANCE PIPE-15 IN	205.00	LF	$69.34	$14,214.70
0125	00445 ENTRANCE PIPE-30 IN Used 6/2/23 Estimate	286.00	LF	$117.99	$33,745.14
0126	01202 PIPE CULVERT HEADWALL-15 IN Used 6/2/23 Estimate	13.00	EACH	$1,750.00	$22,750.00
0127	01204 PIPE CULVERT HEADWALL-18 IN	5.00	EACH	$1,312.04	$6,560.20
0128	01208 PIPE CULVERT HEADWALL-24 IN	4.00	EACH	$1,704.36	$6,817.44
0129	01210 PIPE CULVERT HEADWALL-30 IN	8.00	EACH	$2,526.38	$20,211.04
0130	01214 PIPE CULVERT HEADWALL-42 IN	1.00	EACH	$5,964.74	$5,964.74
0131	01456 CURB BOX INLET TYPE A	66.00	EACH	$7,292.85	$481,328.10
0132	01493 DROP BOX INLET TYPE 2	2.00	EACH	$5,744.08	$11,488.16
0133	01496	3.00	EACH	$7,378.81	$22,136.43

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
	DROP BOX INLET TYPE 3				
0134	01538 DROP BOX INLET TYPE 7	2.00	EACH	$9,273.04	$18,546.08
0135	01559 DROP BOX INLET TYPE 13G	1.00	EACH	$5,647.96	$5,647.96
0136	01580 DROP BOX INLET TYPE 15 Used 6/2/23 Estimate	2.00	EACH	$2,300.00	$4,600.00
0137	01650 JUNCTION BOX	3.00	EACH	$3,751.75	$11,255.25
0138	01452 S & F BOX INLET-OUTLET-30 IN	1.00	EACH	$7,255.99	$7,255.99
0139	26131ED SLOPED AND MITERED HEADWALL-18 IN	1.00	EACH	$3,428.58	$3,428.58
0140	01761 MANHOLE TYPE B	2.00	EACH	$5,353.61	$10,707.22
0141	01310 REMOVE PIPE	157.00	LF	$35.99	$5,650.43
0142	02625 REMOVE HEADWALL	1.00	EACH	$894.25	$894.25
0143	01705 REMOVE CURB & GUTTER BOX INLET Used 6/2/23 Estimate	1.00	EACH	$1,150.00	$1,150.00
0144	01000 PERFORATED PIPE-4 IN	736.00	LF	$15.84	$11,658.24
0145	01010 NON-PERFORATED PIPE-4 IN	680.00	LF	$10.61	$7,214.80
0146	01005 PERFORATED PIPE EDGE DRAIN-4 IN	9,212.00	LF	$14.54	$133,942.48
0147	01020 PERF PIPE HEADWALL TY 1-4 IN	7.00	EACH	$835.15	$5,846.05
0148	01024 PERF PIPE HEADWALL TY 2-4 IN	3.00	EACH	$896.89	$2,690.67
0149	01028 PERF PIPE HEADWALL TY 3-4 IN	12.00	EACH	$838.17	$10,058.04

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0150	01032 PERF PIPE HEADWALL TY 4-4 IN	2.00	EACH	$976.21	$1,952.42
0151	00078 CRUSHED AGGREGATE SIZE NO 2	24.00	TON	$79.55	$1,909.20
0152	01740 CORED HOLE DRAINAGE BOX CON-4 IN	44.00	EACH	$278.14	$12,238.16

Total for Group 0003:$1,660,424.01

Group 0004: BRIDGE

0153	10x10 Spilway Culvert (75 lf)	1.00		$1,000,181.00	$1,000,181.00
0154	Pedestrian Access Bridge Washington Ave	1.00		$271,774.00	$271,774.00
0155	6x6 RCBC Culvert	1.00		$1,707,011.00	$1,707,011.00
0156	Washington Avenue Culvert Extension	1.00		$1,896,875.00	$1,896,875.00
0157	Washington Avenue Cutt Off Wall	1.00		$2,300,235.00	$2,300,235.00

Total for Group 0004:$7,176,076.00

Group 0007: SIGNING

0158	06406 SBM ALUM SHEET SIGNS .080 IN	370.00	SQFT	$34.00	$12,580.00
0159	06407 SBM ALUM SHEET SIGNS .125 IN	687.00	SQFT	$31.94	$21,942.78
0160	06410 STEEL POST TYPE 1	66.00	LF	$31.83	$2,100.78
0161	06411 STEEL POST TYPE 2	1,413.00	LF	$25.65	$36,243.45
0162	21134ND REMOVE-STORE AND REINSTALL SIGN	4.00	EACH	$442.33	$1,769.32

Total for Group 0007:$74,636.33

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
Group 0008: SIGNALIZATION					
0163	04740 POLE BASE	2.00	EACH	$1,993.61	$3,987.22
0164	04780 FUSED CONNECTOR KIT	63.00	EACH	$145.82	$9,186.66
0165	04820 TRENCHING AND BACKFILLING	120.00	LF	$7.68	$921.60
0166	04844 CABLE-NO. 14/5C	6,140.00	LF	$2.14	$13,139.60
0167	04845 CABLE-NO. 14/7C	990.00	LF	$2.44	$2,415.60
0168	04886 MESSENGER-15400 LB	1,760.00	LF	$7.92	$13,939.20
0169	04932 INSTALL STEEL STRAIN POLE	16.00	EACH	$3,456.89	$55,310.24
0170	04953 TEMP RELOCATION OF SIGNAL HEAD	45.00	EACH	$366.70	$16,501.50
0171	06472 INSTALL SPAN MOUNTED SIGN	13.00	EACH	$394.12	$5,123.56
0172	24955ED REMOVE SIGNAL EQUIPMENT	5.00	EACH	$431.87	$2,159.35
0173	20093NS835 INSTALL PEDESTRIAN HEAD-LED	24.00	EACH	$444.86	$10,676.64
0174	20188NS835 INSTALL LED SIGNAL-3 SECTION	34.00	EACH	$543.85	$18,490.90
0175	20266ES835 INSTALL LED SIGNAL- 4 SECTION	3.00	EACH	$532.54	$1,597.62
0176	20390NS835 INSTALL COORDINATING UNIT	4.00	EACH	$1,372.53	$5,490.12
0177	21743NN INSTALL PEDESTRIAN DETECTOR	24.00	EACH	$303.10	$7,274.40
0178	22939ND INSTALL LUMINAIRE POLE Used 6/2/23 Estimate	2.00	EACH	$1,800.00	$3,600.00

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0179	23068NN REMOVE & REINSTALL COORDINATING UNIT Used 6/2/23 Estimate	4.00	EACH	$3,600.00	$14,400.00
0180	23157EN TRAFFIC SIGNAL POLE BASE	67.50	CUYD	$496.71	$33,527.92
0181	23222EC INSTALL SIGNAL PEDESTAL	3.00	EACH	$1,844.37	$5,533.11
0182	24601EC INSTALL Install	2.00	EACH	$2,113.57	$4,227.14
0183	24900EC PVC CONDUIT-1 1/4 IN-SCHEDULE 80	80.00	LF	$7.26	$580.80
0184	24901EC PVC CONDUIT-2 IN-SCHEDULE 80	240.00	LF	$9.56	$2,294.40
0185	24908EC INSTALL SIGNAL CONTROLLER-TY ATC	4.00	EACH	$7,338.91	$29,355.64
0186	26119EC INSTALL RADAR PRESENCE DETECTOR TYPE A	15.00	EACH	$1,978.25	$29,673.75

Total for Group 0008:$289,406.97

Group 0009: LIGHTING

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0187	04701 POLE 40 FT MTG HT	40.00	EACH	$0.00	$0.00
0188	04724 BRACKET 12 FT Used 6/2/23 Estimate	48.00	EACH	$663.40	$31,843.20
0189	04740 POLE BASE	51.00	EACH	$1,993.61	$101,674.11
0190	04750 TRANSFORMER BASE	40.00	EACH	$394.42	$15,776.80
0191	04761 LIGHTING CONTROL EQUIPMENT	2.00	EACH	$24,956.98	$49,913.96
0192	04780 FUSED CONNECTOR KIT Used 6/2/23 Estimate	96.00	EACH	$141.64	$13,597.44
0193	04793 CONDUIT-1 1/4 IN USed 6/2/23 Estimate	8,235.00	LF	$12.16	$100,137.60
0194	04795 CONDUIT-2 IN	1,120.00	LF	$19.33	$21,649.60

Line #	Item Number / Description / *Supplemental Description*	Quantity	Units	Unit Price	Extension
0195	04820 TRENCHING AND BACKFILLING	8,205.00	LF	$7.68	$63,014.40
0196	04832 WIRE-NO. 12	2,748.00	LF	$0.38	$1,044.24
0197	23778EC WIRE-NO. 10 Used 6/2/23 Estimate	16,550.00	LF	$0.94	$15,557.00
0198	04834 WIRE-NO. 6 Used 6/2/23 Estimate	6,995.00	LF	$1.40	$9,793.00
0199	20391NS835 ELECTRICAL JUNCTION BOX TYPE A Used 6/2/23 Estimate	25.00	EACH	$1,203.63	$30,090.75
0200	21543EN BORE AND JACK CONDUIT	1,010.00	LF	$19.18	$19,371.80
0201	24589ED LED LUMINAIRE	48.00	EACH	$568.65	$27,295.20

Total for Group 0009:$500,759.10

Group 0019: DEMOBILIZATION &/OR MOBILIZATION

Line #	Item Number / Description	Quantity	Units	Unit Price	Extension
0202	02568 MOBILIZATION	1.00	LS	$1,136,541.84	$1,136,541.84
0203	02569 DEMOBILIZATION	1.00	LS	$340,962.55	$340,962.55

Total for Group 0019:$1,477,504.39

VALUE PROPOSAL

MI-06

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side
FUNCTION	**Miscellaneous**

VALUE PROPOSAL SYNOPSIS:

Add Multi Use Path at beginning of project to Main Street in existing Right-of-Way on the left side. Ending at Main Street, does not allow pedestrians or bicyclists to access Walgreens, restaurants or gas station unless they use the shoulder of the roadway. This connectivity will satisfy part of the project need that is not met.

Reliability	**Improved**	**Functionality**	**Improved**	**$ Initial Cost Avoidance (Add)**
O&M	**Degraded**	**Schedule Impact**	**Maintained**	**($17,000)**

BASELINE CONCEPT:

The existing plans does not provide a facility for the pedestrians or bicyclist at from the beginning to Main Street.

VALUE PROPOSAL:

Adding the 8' Shared Use Path on left side at the beginning will to connect users with destination. Value proposal to connect the proposed facility that ends at Main Street with destination points within the project limits by starting Shared Use Facility at the gas station. This provides a more protected/defined travel mode to help accommodate the 48% of households with zero to one car.

ADVANTAGES:	**DISADVANTAGES:**
● Connects pedestrian-bicycle usage with destination points, Ie. Walgreens, gas station, restaurant, etc.	● Will add some cost to the project
● Wide existing Right-of Way will accommodate facility	● Would be constructed over some utilities
● Removes dropping users at Main Street, forcing them to walk or bike on the shoulder	● Future maintenance cost
● Meets part of the Purpose and Need for the Project non-motorized users	●
●	●

$ COST SUMMARY	**Initial Costs**	**O&M Costs**	**Total Life Cycle Cost**
BASELINE CONCEPT:	$668,000	$0	$668,000
VALUE PROPOSAL:	$685,000	$0	$685,000
TOTAL (Baseline less Proposed)	($17,000)	$0	($17,000)

ADD COST

VALUE PROPOSAL

MI-06

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side

DISCUSSION & JUSTIFICATION:

• Technical Considerations: There are about 523 feet at the beginning of the project that have no pedestrian accommodation other than shoulders. On the left, is a couple of businesses, restaurant, gas station and Walgreens. Dropping the sidewalk/Shared Use Path at Main Street creates a potential safety concern for users to use the shoulder as they complete their destination. From the Purpose and Need Statement in the DES: Pedestrian Usage: City of Jackson residents regularly walk or bike along KY 15 even though no dedicated pedestrian or bike facilities exist. High unemployment, a distressed economy with high poverty levels, and lack of other transportation options are likely contributors to high pedestrian usage. In addition, Census estimates show 48% of Breathitt County households have access to zero or one vehicles, necessitating other travel modes. Given the 48% statistic and that there is plenty of ROW on the left, the VE team believes either a continuation of the sidewalk or Shared Use Path should be evaluated in order for this project to fully meet the need of the project. This 8' Shared Use Path would go to the Gas Station Entrance and would be about 390' in length. Some of it could be built on the old pavement to be removed. Other parts of the path would cross utilities, however, given that the path could be constructed on top of the existing ground with very little to no digging, utilities should not be an issue.

• Cost Considerations: There will be some added cost for this construction.

• Schedule Impacts / Project Management Considerations (including Redesign Effort): Design should be simple and not take more than a day or so to layout and quantify .

• Risk Considerations: Adding this Shared Use Path removes risk associated with ending the current sidewalk sending users onto the shoulder.

• Stakeholder Acceptance: This additional path will help to fully accommodate the area to the best the project can provide for non-motorized users.

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side

DISCUSSION & JUSTIFICATION: (cont.)

• Implementation Considerations: Before designing, it would be good to get input from the utility companies whose line the path will cross.

VALUE PROPOSAL

MI-06

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Improved
Justification for Impact Score	This will help to improve the safety by removing pedestrians from near the roadway on the shoulder.	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No Change.	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Degraded
Justification for Impact Score	This additional path will increase future maintenance needs slightly.	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score	No Change.	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No Change.	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	Would add one or two days to design.	
Risk	An assessment of the identified risks of the project.	Improved
Justification for Impact Score	Reduces risk from pedestrians being on the shoulder near traffic.	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No Change.	

VALUE PROPOSAL

MI-06

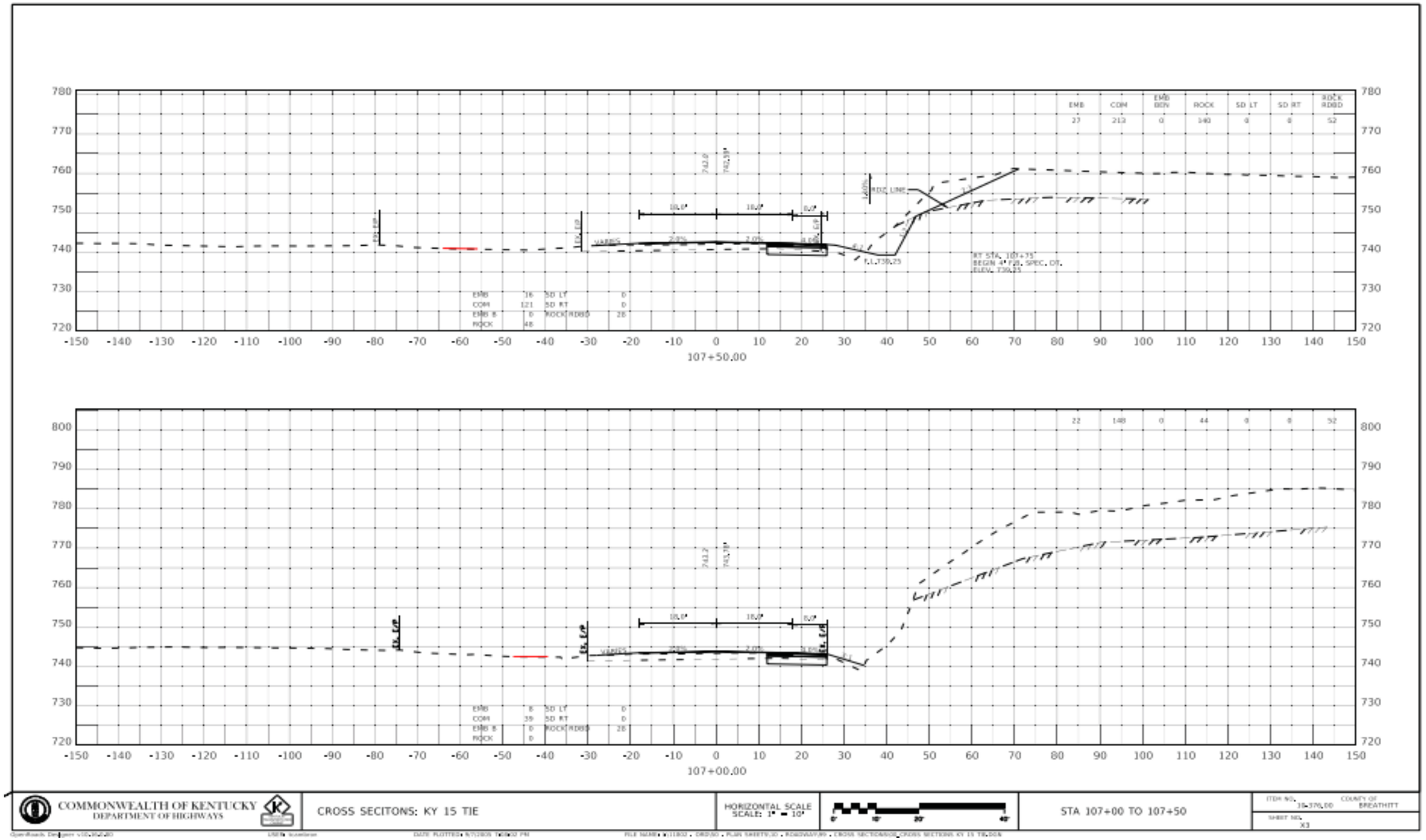
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

MI-06

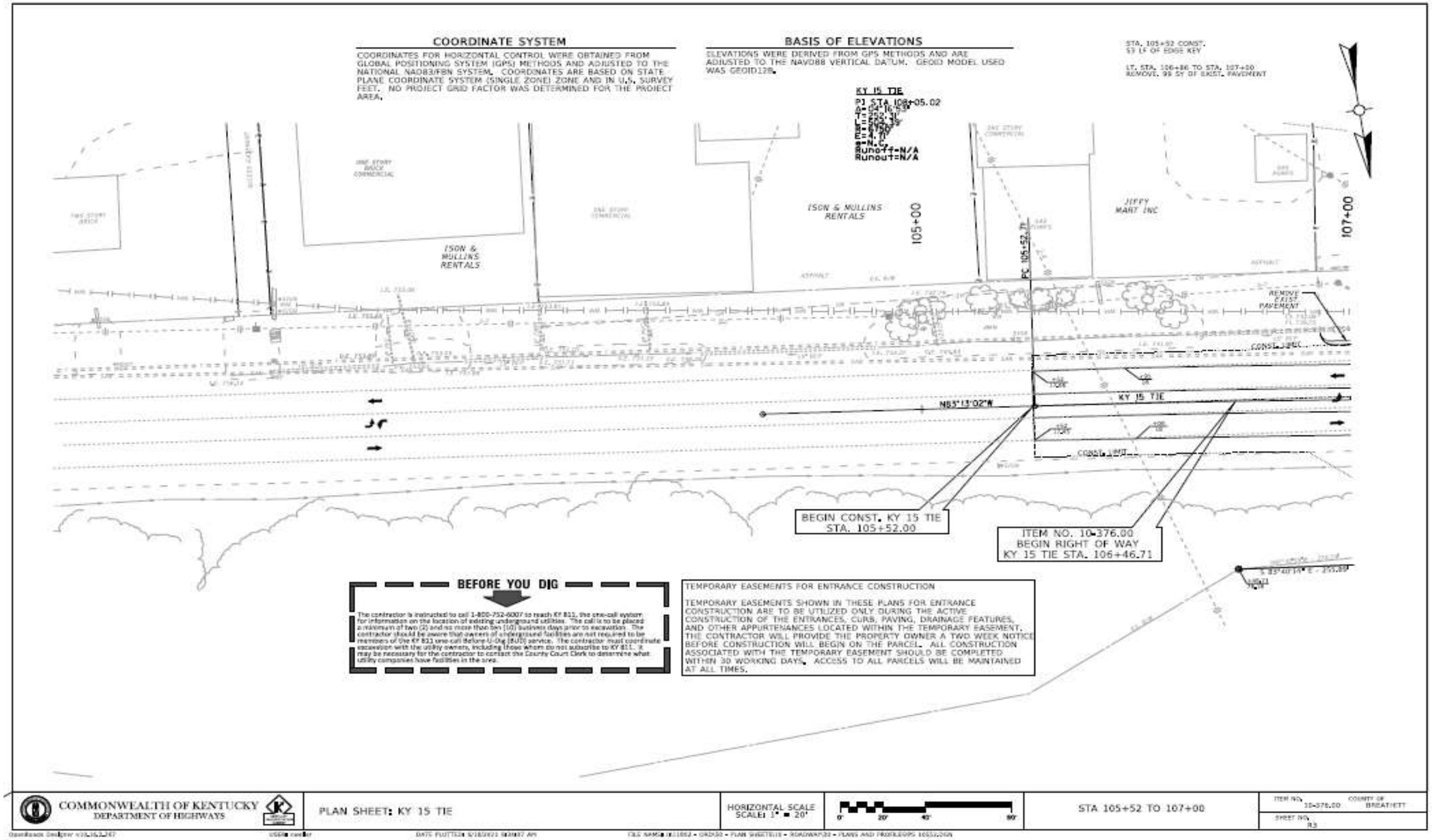
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

MI-06

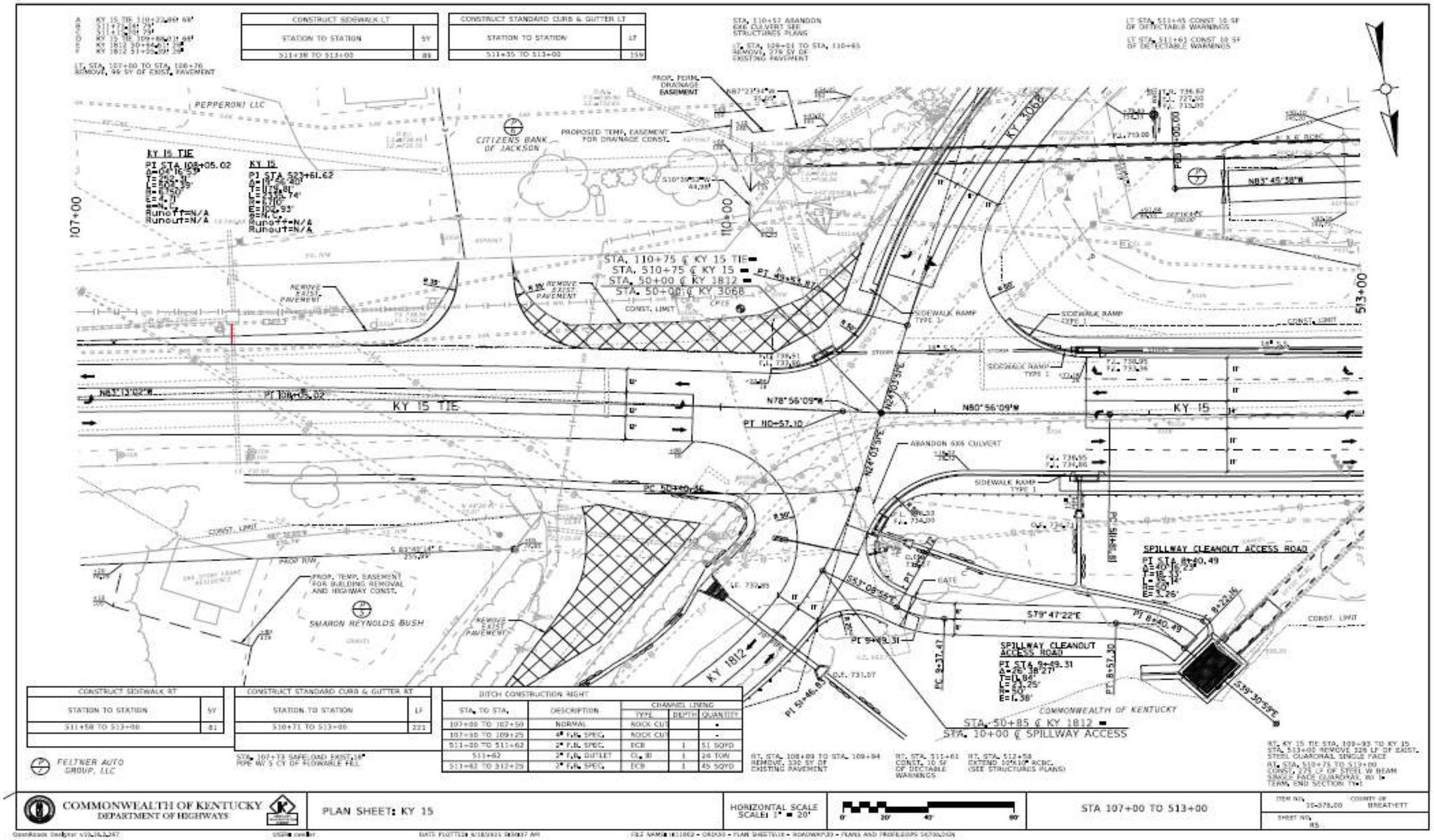
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



VALUE PROPOSAL

MI-06

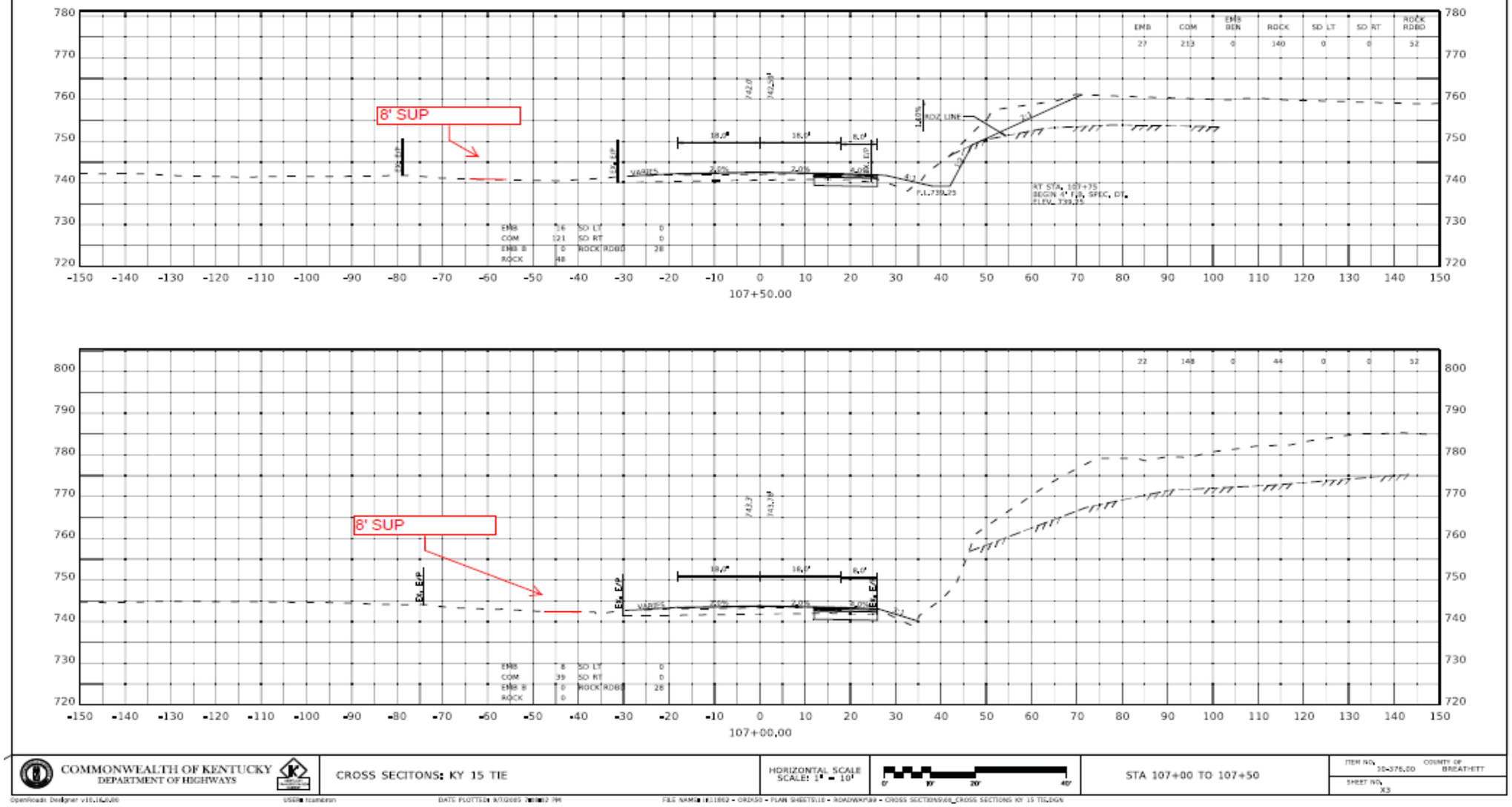
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MI-06

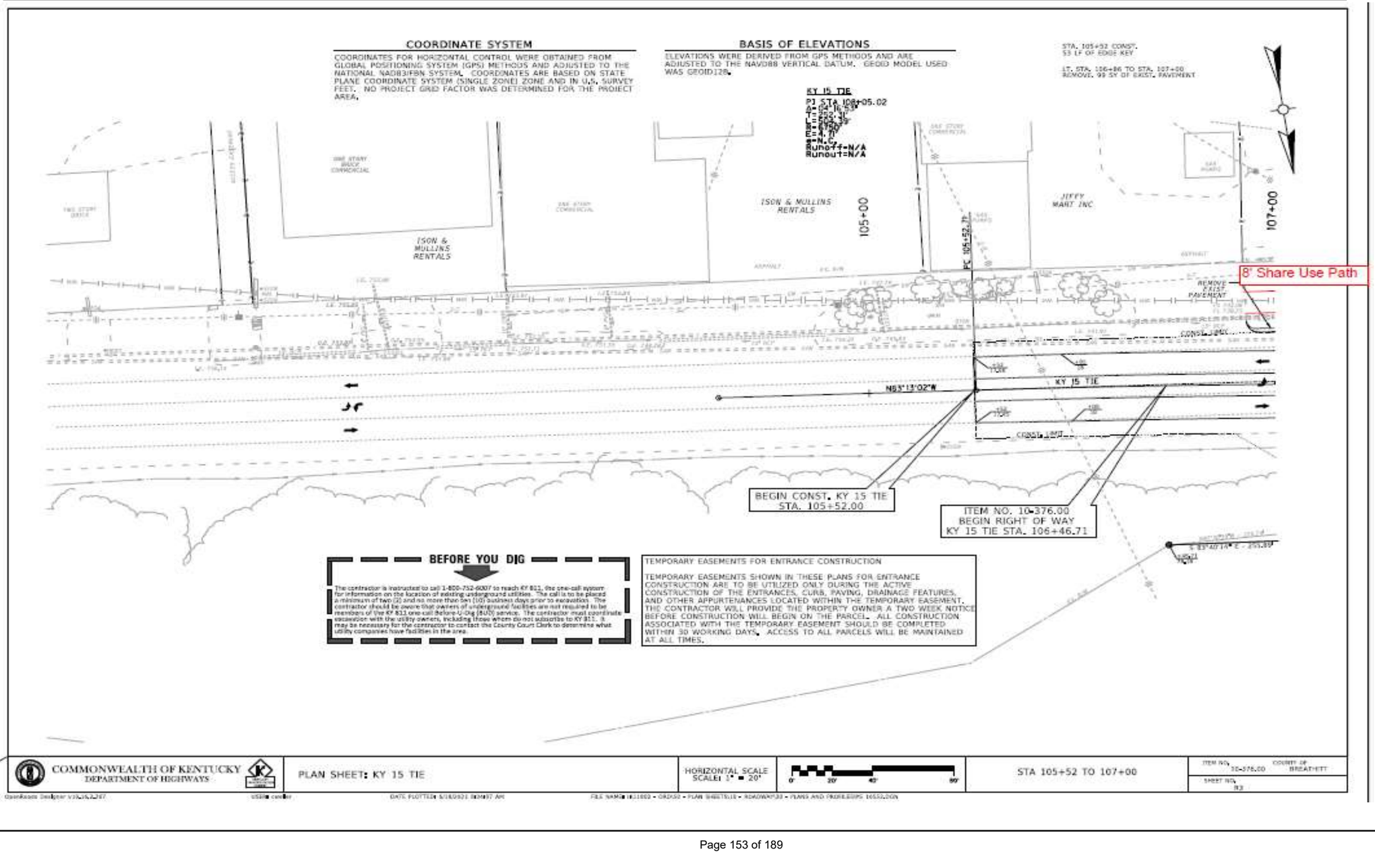
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MI-06

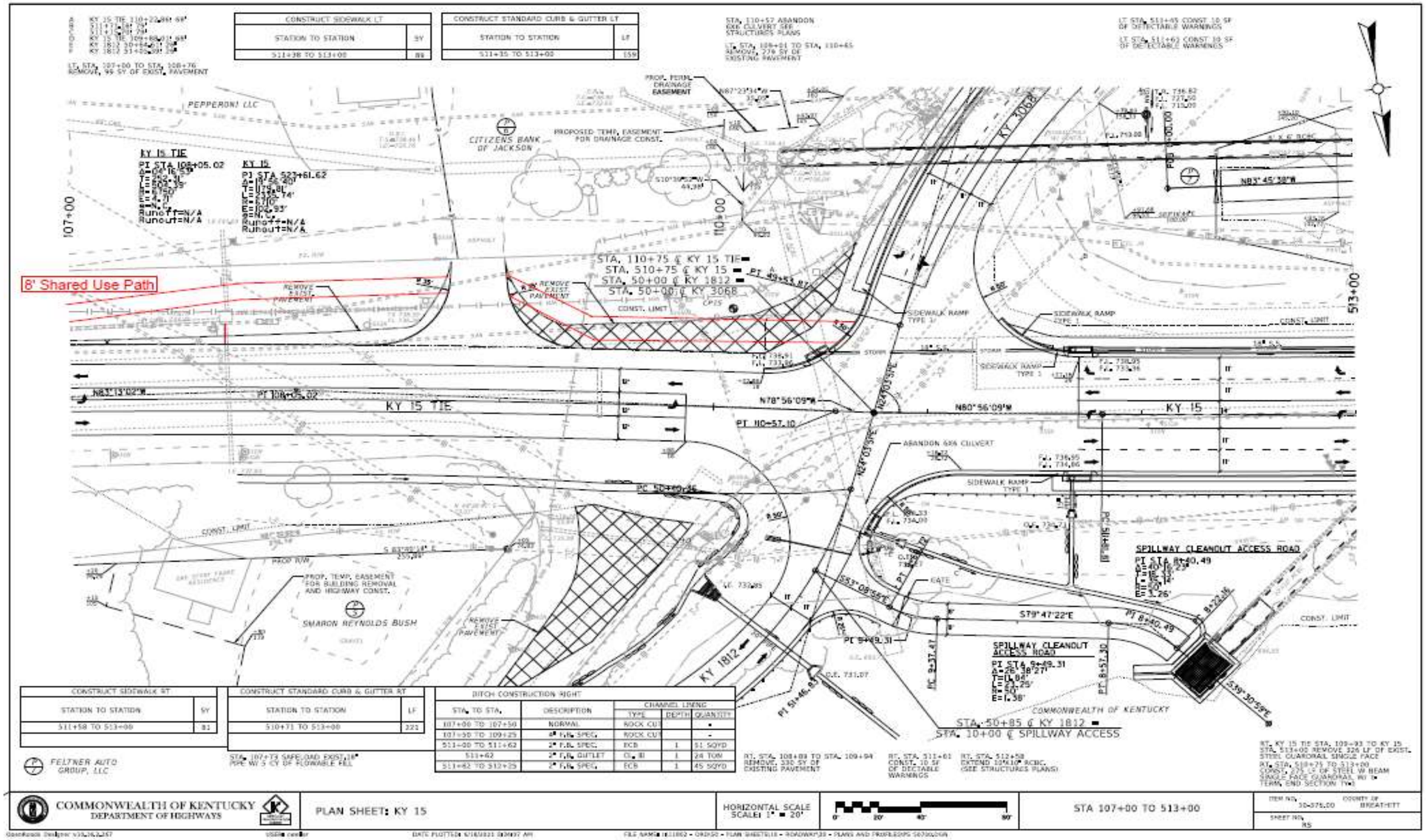
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MI-06

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Extend sidewalk or shared use path from Main Street to beginning on the left side
Assumptions & Calculations	The additiona quanities are for the added 3' of width for the Shared Use Path.

DESIGN ELEMENT	**BASELINE CONCEPT**				**VALUE PROPOSAL**		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Sidewalk-4In Concrete	SY	7,682	$43	$330,172	8,029	$43	$345,086
Crush Stone Baase	Ton	10,295	$33	$337,779	10,375	$33	$340,404
TOTAL				$668,000			$685,000
						Impact to Initial Cost (Baseline Less Proposed)	**($17,000)**

Note: Total costs are rounded to the nearest thousand dollars.

ADD COST

VALUE PROPOSAL

MI-08

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review value add vs cost of upgrading all sidewalks to shared use paths
FUNCTION	**Miscellaneous**
ASSOCIATED IDEAS	

VALUE PROPOSAL SYNOPSIS:

This proposal would increase pedestrian and bicycle mobility by providing grade-separated bicycle accommodations on both sides of the road, and throughout the length of the project. Also pedestrian accommodations would be increased by the additional width of a Shared Use Path and there would be increased connectivity of destination points within project limits. This would come at minimal project cost.

Reliability	**Maintained**	**Functionality**	**Improved**	**$ Initial Cost Avoidance (Add)**
O&M	**Degraded**	**Schedule Impact**	**Maintained**	**($149,000)**

BASELINE CONCEPT:

The current plans have pedestrian facilities on both sides of KY 15 through most of the project length. There is a 8' Shared Use Path connecting the elementary school to the high school, with 5' sidewalks elsewhere.

VALUE PROPOSAL:

The value proposal would upgrade all 5' sidewalks to 8' Shared Use Paths.

ADVANTAGES:	DISADVANTAGES:
● Increases pedestrian mobility	● Increases cost
● Increases bicycle mobility	● Elimination of utility strip
● Addition of bicycle-capable facility	● Increases concrete surface area to maintain
● Improves connectivity of destinations in project limits	●
●	●

$ COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE CONCEPT:	$670,000	$0	$670,000
VALUE PROPOSAL:	$819,000	$0	$819,000
TOTAL (Baseline less Proposed)	($149,000)	$0	($149,000)

ADD COST

VALUE PROPOSAL

MI-08

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review value add vs cost of upgrading all sidewalks to shared use paths

DISCUSSION & JUSTIFICATION:

Widening all sidewalks to Shared Use Paths in the project will provide better pedestrian and bicycle accommodations. Because 48% of Jackson residents have access to zero or only one vehicle, pedestrian and bicycle facilities are crucial for local transportation and mobility. Upgrading all sidewalks to Shared Use Paths would give bicyclists the ability to travel on a grade separated pedestrian facility on both sides of the road. This would greatly increase bicycle access and mobility in Jackson.

The Shared Use Path proposed in the current plan set is also the minimum width required by the KYTC design manual. Having a Shared Use Path on both sides of the road would aid with any shortcomings from a minimum design width.

The construction of 8’ wide Shared Use Paths instead of 5’ wide sidewalks would increase the project budget by approximately $149,000 and require no additional right of way. This would remove the 3’ utility strip and further consideration of access and maintenance of utilities and storm sewer systems that may use this area may be needed. Additionally, the added sidewalk area would need to be maintained in future, adding additional future maintenance costs.

The upgrading of sidewalks to Shared Use Paths should not increase construction complexity and could be constructed without increasing the construction scheduling. This upgrade should also not add any additional project risk. Implementation of this proposal would only require additional concrete placement. The current plans would only need minor revisions to include this proposal.

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

MI-08

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review value add vs cost of upgrading all sidewalks to shared use paths

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No perceived impact.	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Improved
Justification for Impact Score	Increases bicycle and pedestrian operation by providing more width, allowing two way pedestrian movement on both sides of road, and allowing for bicycle travel on pedestrian facility on both sides of road.	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Degraded
Justification for Impact Score	Adds additional sidewalk area that will need to be maintained. Eliminates utility buffer making any utilities in utility strip harder to maintain and access.	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score	No perceived impact.	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No perceived impact.	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	No perceived impact.	
Risk	An assessment of the identified risks of the project.	Maintained
Justification for Impact Score	No perceived impact.	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No perceived impact.	

VALUE PROPOSAL

MI-08

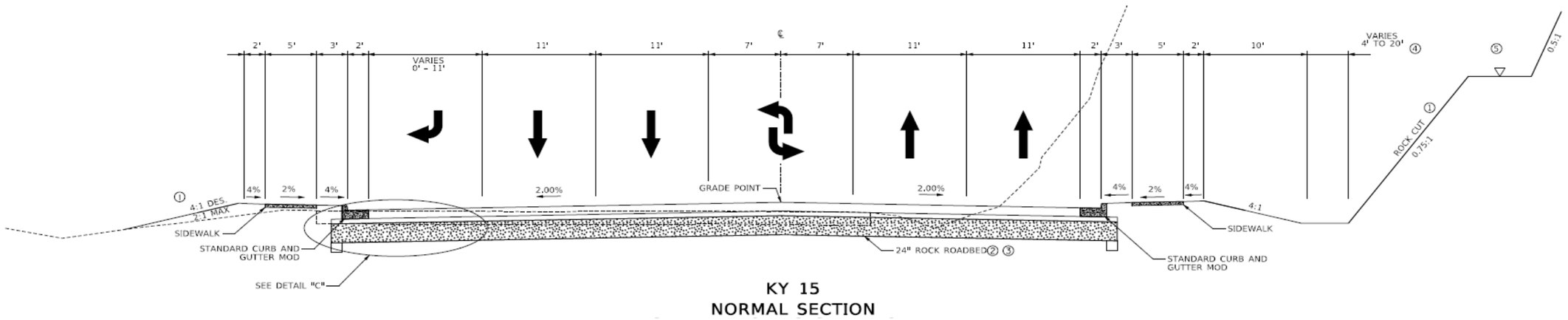
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review value add vs cost of upgrading all sidewalks to shared use paths

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT



KY 15
NORMAL SECTION

VALUE PROPOSAL

MI-08

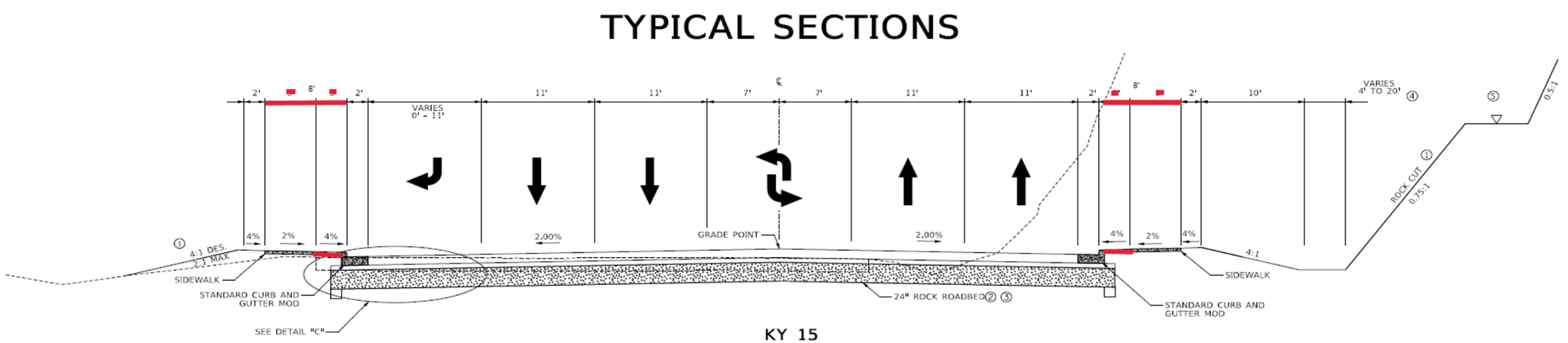
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review value add vs cost of upgrading all sidewalks to shared use paths

SKETCH/DIAGRAM: VALUE PROPOSAL



KY 15
NORMAL SECTION

ALL SECTIONS WITH SIDEWALK WIDENED TO 8'

VALUE PROPOSAL

MI-08

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Review value add vs cost of upgrading all sidewalks to shared use paths
Assumptions & Calculations	Scaled all 5 foot sidewalk section quantities from 5 feet to 8 feet. Assumed no effect to earthwork.

DESIGN ELEMENT	**BASELINE CONCEPT**				**VALUE PROPOSAL**		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Sidewalk 4-in Concrete	SY	7,682	$42.98	$330,172	10,621	$42.98	$456,491
Crushed Stone Base	Ton	10,295	$33	$339,735	10,971	$33	$362,043
TOTAL				$670,000			$819,000
						Impact to Initial Cost (Baseline Less Proposed)	**($149,000)**

Note: Total costs are rounded to the nearest thousand dollars. **ADD COST**

VALUE PROPOSAL

MI-11

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)
FUNCTION	**Miscellaneous**
ASSOCIATED IDEAS	MI-12: Review the limits of the cofferdam and verify that the liner is not impacted MI-13: Address potential settlement in the fill at the waterways prior to placement

VALUE PROPOSAL SYNOPSIS:

Adding a detail to the plans showing how fill shall be placed in Panbowl Lake will help prevent errors during construction. Additionally, adding a settlement platform will help mitigate settlement risk. The clay liner is an important aspect of the dam, the design team should verify impact to the dam.

Reliability	**Improved**	**Functionality**	**Maintained**	**$ Initial Cost Avoidance (Add)**	
O&M	**Improved**	**Schedule Impact**	**Maintained**	**($10,000)**	

BASELINE CONCEPT:

Note 13 on Sheet R92 (Geotechnical Notes) describes the construction details required for placing fill material in Panbowl Lake. No detail is included in the plans. No settlement monitoring devices are specified, and the clay liner for the dam is not mentioned in the note.

VALUE PROPOSAL DESCRIPTION:

Adding a detail in the plans would help clarify this information for the contractor and would help prevent oversights/errors during construction. Consider adding settlement monitoring device - 1 at east dam and 1 at west dam. Consider adding language in the plans to clarify the importance of not disturbing the clay liner during construction. Consider how the cofferdam may impact the clay liner.

ADVANTAGES:	**DISADVANTAGES:**
● Clarify design intent in the plans	● Additional design time, although minimal
● Reduces the potential for oversight by the contractor during construction	●
● Reduces the potential of settlement being a problem	●
● Reduces the risk of impacting the clay liner on the existing dams	●
●	●

$ COST SUMMARY	**Initial Costs**	**O&M Costs**	**Total Life Cycle Cost**
BASELINE CONCEPT:	$0	$0	$0
VALUE PROPOSAL DESCRIPTION:	$10,000	$0	$10,000
TOTAL (Baseline less Proposed)	($10,000)	$0	($10,000)

ADD COST

VALUE PROPOSAL

MI-11

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)

DISCUSSION & JUSTIFICATION:

• Technical Considerations - It is the VE Team's understanding of the project that the clay liner shall not be damaged during construction. A cofferdam will be required for the construction of the inlet riser structure. If the clay liner is not to be penetrated by the cofferdam, it would be beneficial to add a detail to the plans showing the limits of the clay liner and where is it permitted to construct the cofferdam.

Adding a detail to show the intent of the geotechnical note describing how the fill is to be placed will help clarify the design intent for the contractor.

Adding settlement monitoring devices will help mitigate the potential for settlement of fill placed in the lake being a long-term problem for the quality of the construction.

• Cost Considerations - minimal impacts to current cost, but potential savings on future maintenance costs.

• Schedule Impacts - none

• Risk Considerations - reduce risk of construction being out of spec; reduce risk of settlement being a future problem; reduce risk of impacts to the clay liner of the dams.

• Project Management Considerations (including Redesign Effort) - small impact to redesign

• Stakeholder Acceptance - no issues

• Implementation Considerations - minimal

OUT-BRIEF PRESENTATION COMMENTS:

No comments noted.

VALUE PROPOSAL

MI-11

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)

IMPACT TO PERFORMANCE

Performance Attribute	Definition	Score
Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.	Maintained
Justification for Impact Score	No impact	
Local Operations (Washington Ave.)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.	Maintained
Justification for Impact Score	No impact	
Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.	Improved
Justification for Impact Score	Reducing the risk of construction not being done according to spec will result in better stability and less future maintenance.	
Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.	Maintained
Justification for Impact Score	No impact	
Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.	Maintained
Justification for Impact Score	No impact	
Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.	Maintained
Justification for Impact Score	No impact	
Risk	An assessment of the identified risks of the project.	Improved
Justification for Impact Score	Reducing the risk of construction not being done according to spec	
Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.	Maintained
Justification for Impact Score	No impact	

TITLE	Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)

SKETCH/DIAGRAM: BASELINE DESIGN CONCEPT

N

COUNTY OF	ITEM NO.	SHEET NO.
BREATHITT	10-0376.00	R92

GEOTECHNICAL NOTES

1.) In accordance with Section 206 of the current Standard Specifications, the moisture content of embankment material shall not vary from the optimum moisture content as determined by the current version of KM 64-511 by more than +2 percent or less than -2 percent. This moisture content requirement shall have equal weight with the density requirement when determining the acceptability of embankment construction. Refer to the Family of Curves for moisture/density correlation.

2.) All soils, whether from roadway or borrow, may require manipulation to obtain proper moisture content prior to compaction. Direct payment shall not be permitted for rehandling, hauling, stockpiling, and/or manipulating soils.

3.) Excavation of surface ditches and channel changes adjacent to embankment areas shall be performed prior to the placement of the adjacent embankments. The material excavated for the channel changes and surface ditches is suitable for embankment construction if dried to proper moisture content in accordance with Section 206 of the current Standard Specifications for Road and Bridge Construction.

4.) The Contractor is responsible for conducting any operations necessary to excavate the cut areas to the required typical section. These operations shall be incidental to Roadway Excavation or Embankment-in-Place and no additional compensation shall be made for this work.

5.) The Contractor shall conduct grading operations in such a manner that sandstone and durable shale from roadway excavation be stockpiled separately or otherwise manipulated so that the maximum quantity is available for those areas requiring said material. Wasting of sandstone shall not be allowed without approval from the Engineer. No direct payment will be allowed for such necessary manipulating as stockpiling, hauling and/or double handling the material.

6.) Some of the soil horizons and slopes on the project are subject to erosion. Necessary procedures in accordance with Sections 212 and 213 of the current Standard Specifications for Road and Bridge Construction shall be followed on construction.

7.) Removal of existing structures and other obstructions shall be completed in accordance with Section 203 of the current Standard Specifications for Road and Bridge Construction.

8.) Clearing and grubbing of roadway areas shall be completed in accordance with the requirements of Section 202 of the current Standard Specifications for Road and Bridge Construction before embankment placement

11.) Transverse benching and/or perforated pipe underdrains shall be installed at the following approximate locations and any others designated by the Engineer. Contrary to Standard Drawing RDP-006, transverse benches and perforated pipe underdrains shall be placed on both the upgrade and downgrade cut to fill transitions.

KY 1812
Station 50+05
Station 52+94

Lakeside Drive
Station 675+55
Station 711+85

12.) Construct the embankments using durable shale and/or sandstone from roadway excavation. The use of sandstone for embankment construction shall only be permitted if the contractor has stockpiled an ample quantity for use as Panbowl Lake embankment fill and two-foot rock roadbed. The face of embankments may be dressed with soil to accomodate vegetation growth.

13.) Embankment construction within the limits of the existing Panbowl Lake shall use durable sandstone from the existing groundline to at least one foot above the normal pool water elevation of 712.50. Prior to placing stone, Fabric-Geotextile Class 1 (stabilization) shall be placed to stabilize and separate the stone from the existing embankment subgrade. The fabric shall be in accordance with Section 843 of the Standard Specifications. The geotextile fabric will be required beneath all embankment material placed within the limits of Panbowl Lake. The Contractor shall confirm all final fill slopes placed below normal water elevation of Panbowl Lake using measures approved by the Engineer.

14.) Construct a 2-foot rock roadbed consisting of durable sandstone from roadway excavation for the entire project. Where the roadbed is placed on a soil subgrade, the roadbed shall be underlain with Fabric-Geotextile Class 1 (Stabilization) in accordance with Sections 214 & 843 of the current Standard Specifications (any outdated references to fabric "type" shall be ignored). Extend the roadbed from shoulder to shoulder in the fills and ditchline to ditchline in the cuts. Where soft and/or wet subgrade is encountered, during construction, the thickness of the rock roadbed may need to be adjusted (increased) to also serve as a working platform for subgrade stabilization. These adjustments, as directed by the Engineer, may depend on seasonal fluctuations in the water table.

15.) In areas where pavement is not to be overlaid, existing bituminous concrete located at a distance less than three feet below the proposed subgrade elevation within the limits of new roadway embankments, shall be removed entirely. This shall be performed in compliance

13.) Embankment construction within the limits of the existing Panbowl Lake shall use durable sandstone from the existing groundline to at least one foot above the normal pool water elevation of 712.50. Prior to placing stone, Fabric-Geotextile Class 1 (stabilization) shall be placed to stabilize and separate the stone from the existing embankment subgrade. The fabric shall be in accordance with Section 843 of the Standard Specifications. The geotextile fabric will be required beneath all embankment material placed within the limits of Panbowl Lake. The Contractor shall confirm all final fill slopes placed below normal water elevation of Panbowl Lake using measures approved by the Engineer.

RGX-010 at the locations listed below and/or as directed by the Engineer. Contrary to Standard Drawing RGX-010, the typical rise height for benching into soil/earth slopes shall be 4 to 6 feet. Benches in soil/earth slopes shall be constructed one at a time beginning with the lowest bench and each bench shall be backfilled prior to excavation of the next bench.

KY 15
Station 520+00 to 528+25, Right Side
Station 522+75 to 532+75, Left Side

Washington Avenue
Station 42+75 to 46+75, Right Side
Station 42+75 to 44+75, Left Side
Station 46+25 to 47+50, Left Side

KY 1812
Station 50+25 to 53+00, Right Side

Lakeside Drive
Station 11+00 to 13+00, Left Side

USER:
DATE PLOTTED:
E-SHEET NAME:

DESIGNED BY:
DATE SUBMITTED:

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS
COUNTY OF
BREATHITT

VALUE PROPOSAL

MI-11

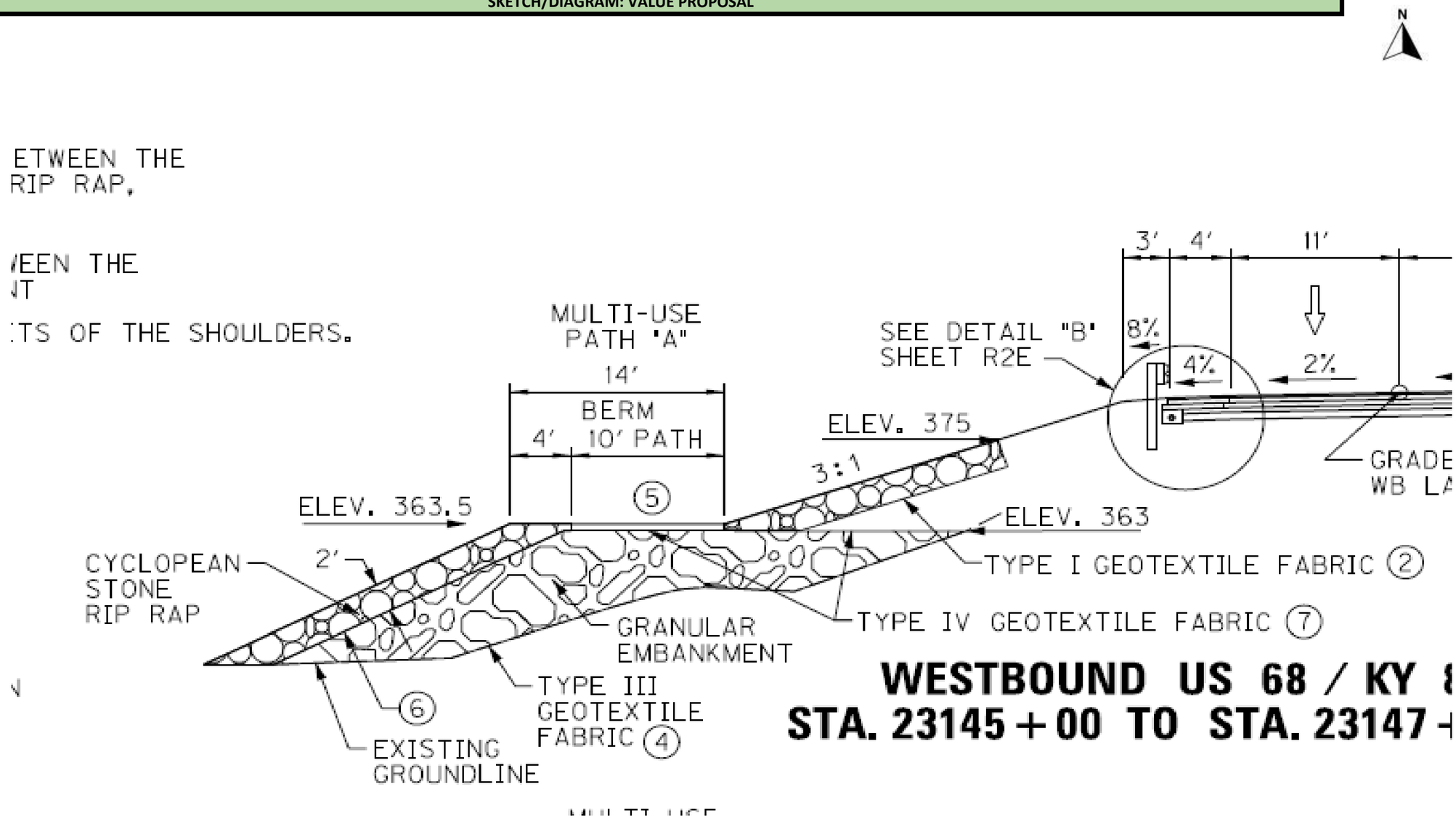
Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)

SKETCH/DIAGRAM: VALUE PROPOSAL



VALUE PROPOSAL

MI-11

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

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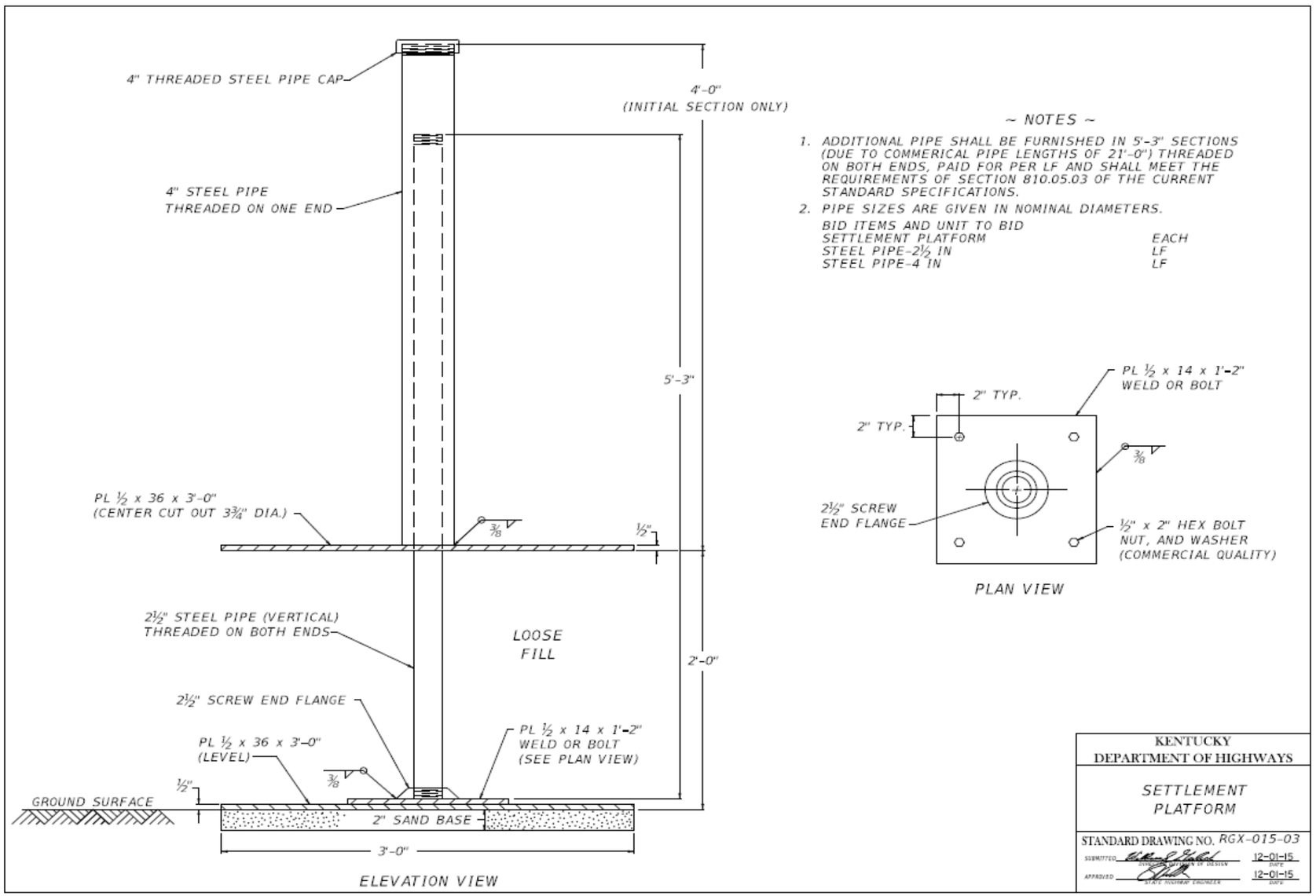


VALUE PROPOSAL

MI-11

Kentucky Transportation Cabinet

KY 15, Breathitt County Major Widening

Item No. 10-376.00

TITLE	Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)
Assumptions & Calculations	No Assumptions / Calculations noted.

DESIGN ELEMENT	**BASELINE CONCEPT**				**VALUE PROPOSAL**		
Description	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Settlement platform	EA				2	$3,000	$6,000
STEEL PIPE-2 1/2 IN	LF				40	$75	$3,000
STEEL PIPE-4 IN	LF				40	$30	$1,200
TOTAL				$0			$10,000
						Impact to Initial Cost (Baseline Less Proposed)	**($10,000)**

Note: Total costs are rounded to the nearest thousand dollars.

ADD COST

PART

II

Appendices

VE Study Documentation

Appendix

A

VE Study Overview

A.1 Introduction

A Value Engineering (VE) study was conducted on the Final Design Phase documents for the **KY 15, Breathitt County Major Widening** project for the Kentucky Transportation Cabinet (KYTC) from November 27-December 1, 2023 for the project described below.

The value engineering (VE) team, having reviewed the documents and received the in-briefing presentation by the project team, began to see their opportunity was to contribute both quantitative and qualitative suggestions and improvements to the design that would improve the value of this project through improved function. While the VE team was able to pursue cost savings and/or achieve savings through suggested changes, the real focus of the team was to enhance the quality that was already taking shape in the current design. The VE team had the benefit of providing a new set of lenses in trying to find additional enhancements to the design of the project, as they are not burdened by the history of the project. The VE team could see the project with a fresh perspective, and the value proposals are offered as creative contributions to an excellent design effort that has brought the project to this point. In all cases, the focus was to search for opportunities that will enhance the functionality of the transportation infrastructure while reducing the resources required to build, operate, and maintain it.

It is important to note that this value effort was conducted at the Final Design Phase with the project scheduled to let in February 2024, so the VE team was cognizant that any significant design changes were not feasible, and the effort had a constructability focus.

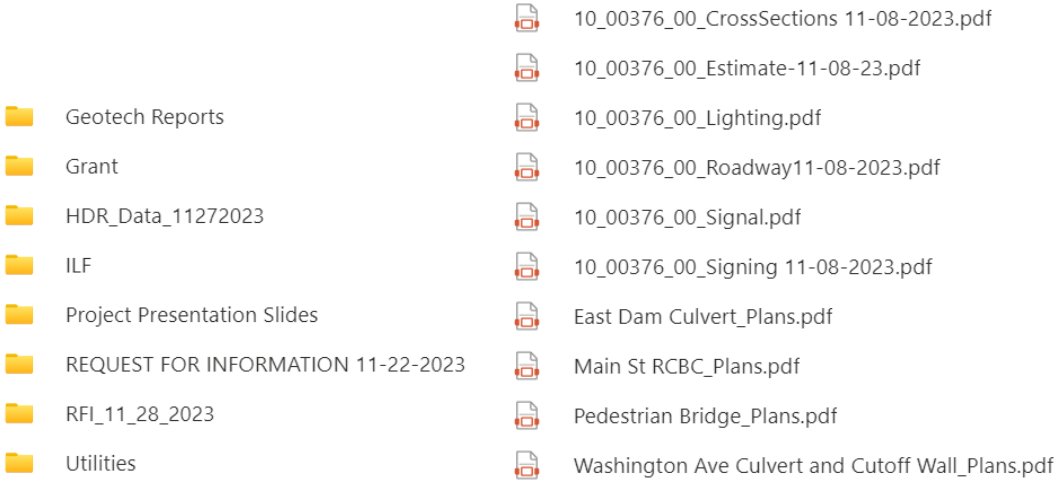
A.2 Project Description

This project involves construction of improvements that includes widening KY 15 to facilitate completing safety improvements to the earth dams; adding a lane in each direction on KY 15; adding a sidewalk and shared use path along KY 15; and replacing the flap gate structure and installing a new additional sluice gate under Washington Avenue.

The project is due to be let in February 2024 and construction is anticipated to be completed over three seasons. The overall project budget is $47M, including Roadway, ROW and In-lieu Fees; and partially funded through a RAISE Grant of $21M.

A.2.1 List of Documents Reviewed

The following list of documents were reviewed and used by the value team to develop their understanding of the project.



A.2.2 In-brief Meeting

At the in-brief meeting on Monday, November 27, 2023, the project team gave a high-level briefing on the project to the VE team. The presentation included a question and answer period to ensure that the VE team had a good understanding of the project scope.

A.2.3 Site Visit

While the VE team was not able to place eyes on the project via a site visit, the project documents that were received (and previously mentioned) were extremely helpful to further the VE team's understanding of the project elements and their context.

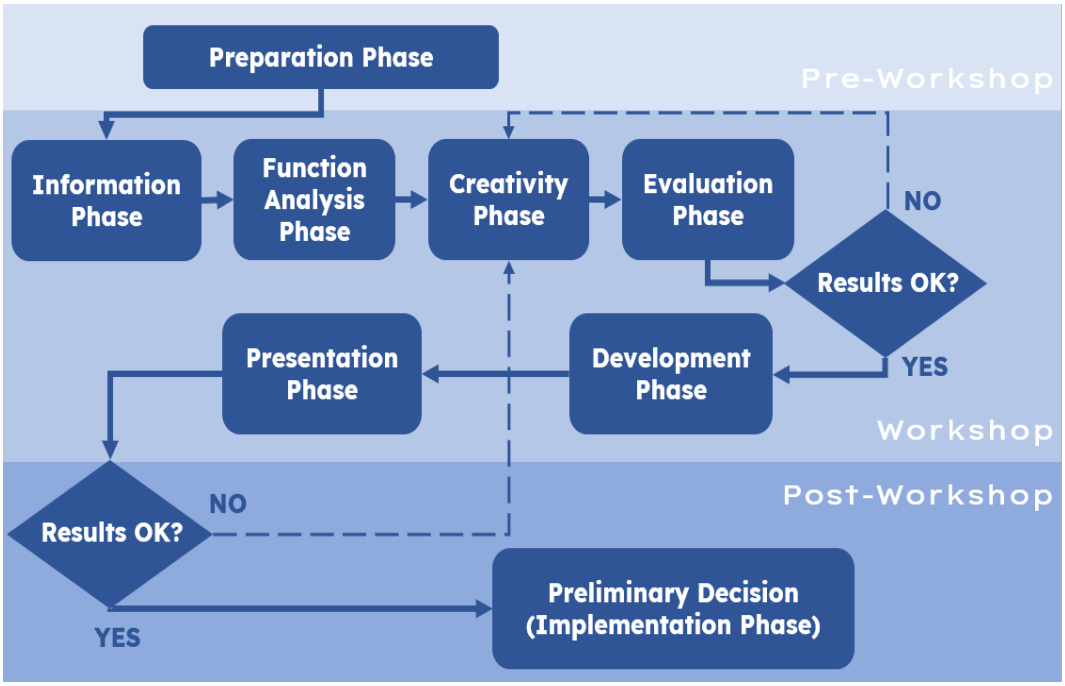
A.2.4 Out-brief Presentation

An out-brief presentation was held on Friday, December 1, 2023. The objective of the presentation was to put forward the results and key findings of the value study. This involved a PowerPoint slide presentation to the project stakeholders and decision makers. During the presentation, the value team highlighted aspects of featured value proposals, providing an opportunity for discussion and/or clarification of the concepts presented. The design team, stakeholders, and decision makers were given the opportunity to ask questions throughout the presentation, which the VE team fully addressed as part of the presentation. This report has been created to document the value study.

A.3 VM Process

The value methodology (Synonyms: value analysis, value engineering, and value management) is a function-oriented, systematic, team approach to add customer value to a program, facility, system, or service. Improvements in performance, quality, initial and life cycle cost are paramount in the value methodology.

Figure A-1: The VM Process



The workshop is conducted in accordance with the methodology as established by SAVE International, the value society, and is structured using the Value Methodology (VM) as outlined in Table A-1, Value Methodology, which follows a systematic process (eight phases). Please note that Table A-1 reflects the Objectives and Outcomes of each VM phase.

Table A-1: Value Methodology

Value Methodology Stage / Phase	VM Phase Functions Achieved	Objectives of this Phase	Outcomes of this Phase
Phase 1: Preparation Phase	Identify Subject Identify Goals Define Value Organize Effort	• Identify the study project • Identify roles and responsibilities • Define study scope, goals, and objectives • Select team leader • Conduct pre-study meeting • Select value study team members • Identify stakeholders, decision-makers, and technical reviewers • Obtain time commitment • Identify data collection • Select study dates • Determine study logistics, agenda • Collect and distribute data	• Fosters understanding of value study priorities • Defines and manages expectations • Organizes the value study • Offers a thorough review of the project • Tests meeting platform and virtual tools to maximize engagement and collaboration • Primes the team for the value workshop

Value Methodology Stage / Phase	VM Phase Functions Achieved	Objectives of this Phase	Outcomes of this Phase
		• Perform technology dry-run for a virtual workshop • Send team primer to value study team • Team members to complete Key Issues Memos (KIM)	
Phase 2: Information Phase	Analyze Information Transform Information Orient Participants	• Present design concept • Present stakeholders' interests • Review project issues and objectives • Discuss deviation from design standards • Define project performance metrics • Discuss problems the project must solve; • identify issues the design may not address • Visit project site / virtual site tour	• It brings all value study team members to a common understanding of the project, including its challenges and constraints • Establishes the benchmark for which to identify alternatives • Gains a real-world perspective of the project and builds the foundation for function analysis
Phase 3: Function Analysis Phase	Define Functions Allocate Resources Allocate Performance Prioritize Functions	• Identify and classify functions • Apply cost and risk relative to performance • Prioritize functions • Select specific functions for study	• Provides a comprehensive understanding by focusing on what the project does rather than what it is • Identifies what the project must do to satisfy needs and objectives • Focuses on functions with the greatest opportunity for project improvements
Phase 4: Creativity Phase	Generate Ideas	• Brainstorm to generate performance-focused ideas for alternative ways to perform functions • Discuss, build on and clarify ideas	• The value team develops a broad array of ideas that provides a wide variety of possible alternative components or methods to improve project value
Phase 5: Evaluation Phase	Evaluate Ideas Select Ideas	• Eliminate obvious "fatal flaw" ideas • Score ideas based on meeting performance criteria, value key and project/study goals • Discuss conflicting rankings, further clarify ideas and determine final rankings • Discuss ideas with client and decision-makers (midpoint review) • Assign alternatives for the development phase	• Prioritizes ideas for development, focusing on those with the highest potential for performance improvement and cost savings • Determine value: performance/cost • Focuses team's effort to develop alternatives that best meet client study objectives
Phase 6: Development Phase	Transform Ideas Develop Information	• Validate and refine idea concepts • Compare to the original design concept • Define implementation considerations • Prepare sketches and calculations • Measure performance • Estimate costs, life-cycle cost benefits/costs	• Provides a side-by-side comparison of baseline and alternative—concepts, initial costs, life-cycle costs, sketches, performance metrics

Value Methodology Stage / Phase	VM Phase Functions Achieved	Objectives of this Phase	Outcomes of this Phase
Phase 7: Presentation Phase	Present Information Propose Change	• Present developed ideas to client, designers, decision-makers, stakeholders • Document feedback • Produce draft report	• Ensures management and other key stakeholders understand the rationale of the value alternatives and design suggestions
Phase 8: Implementation Phase	Implement Change Manage Change Realize Value	• Document process and study findings • Develop and distribute VE study summary report • Review study summary report • Assess alternatives for acceptance • Prepare draft implementation dispositions • Resolve conditionally accepted alternatives • Develop an implementation plan with the project manager • Project manager sign-off on VE implementation plan • Final presentation of study results	• Involves those who will implement and increases the likelihood of implementation • Improves the actual value of the project

A.4 Workshop Participants

A.4.1 The Value Team

- David Lanham [Palmer] Hydraulics / Drainage
- Aaron Thomas [Palmer] Structures
- Keith Damron [AEI] Roadway / Geometrics
- Eric Bean [Qk4] Constructability
- Ethan Adams [KYTC] Master of Design
- Katy Stewart [KYTC] Quality Assurance Branch Manager
- Pat Miller [RHA] Team Leader
- Colin Miller [RHA] Technical Assistant

A.4.2 Attendance Record

The attendance record for all workshop participants is included on the following pages.

Workshop Attendee List

November 27-30 & December 1, 2023														Name	Organization	Position
IBP		27		28		29		30		1		OBP				
am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm			
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	Patrice Miller, CVS	RHA	Team Leader
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	Colin Miller, VMA	RHA	Technical Assistant
														Full Week		
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	David Lanham	Palmer	Hydraulics / Drainage
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	Aaron Thomas	Palmer	Structures
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	Keith Damron	AEI	Roadway / Geometrics
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	Eric Bean	Qk4	Constructability
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	Ethan Adams	KYTC	Highway Design
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	Katy Stewart	KYTC	Quality Assurance Branch Manager
														In & Out Brief		
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☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	Amanda Desmond		
☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	Aric Skaggs		
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☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	Wes Ratliff		
☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Paul Looney		
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☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	Devin Chittenden		
☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Wes Hagerman		
☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	Erman Caudill		
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☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑	Jonathan Reynolds		
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A.5 Agenda

A copy of the agenda used for the Value Engineering Study, noting the time allocated to each one of the Value Methodology phases, is included on the following pages.

Value Engineering (VE) Workshop Agenda

Project Name: Kentucky Transportation Cabinet
KY 15, Breathitt County Major Widening
Item No. 10-376.00
VE Workshop

Dates: November 27 – December 1, 2023 (see detailed times below)

Study Location: Virtual (Microsoft Teams)

Day 1: Monday, November 27, 9:00 AM – 5:00 PM EST

MS Teams Invitation Link – Day 1: CLICK HERE **-or-** **Call-in: +1 323-484-8978**
Access Code: 934 751 845 #

Time EST	VE Activity	Participants	Comments
9:00	Welcome & Introductions Brief Overview of Value Engineering Process & VE Agenda Review (CVS Facilitator)	All	
	INFORMATION PHASE		
9:20	Project Overview, Presentation & Virtual Site Tour (KYTC Project Manager, Consultant Design Lead/s)	All	
10:30	Short Break		
10:45	Identify/Review: ▪ Project Goals ▪ VE Study Objectives (Focus of VE Study) ▪ VE Study Constraints ▪ Identify, Define & Rank Performance Attributes	All	
12:00	Conclusion of In-brief meeting / Long Break		
1:00	Discuss Team Observations, Project Risks Review Cost Model, Schedule, Other	VE Team	
	FUNCTION ANALYSIS PHASE		
2:00	Function Identification of Project Elements ▪ Identify/Classify Project Functions ▪ Apply Risks/Resources to Functions ▪ Select Specific Functions for Study	VE Team	
3:00	Short Break		
	CREATIVITY PHASE		
3:15	Brainstorm Ideas / Alternatives		
5:00	Adjourn		

All: Decision-makers, Design Team, Stakeholders, VE Team (Shaded rows)
VE Team: Subject Matter Experts and others serving as full-time VE Team members

Day 2: Tuesday, November 28, 9:00 AM – 5:00 PM EST

MS Teams Invitation Link – Day 2: CLICK HERE **-or-** **Call-in: +1 323-484-8978**
Access Code: 934 751 845 #

Time EST	VE Activity	Participants	Comments
9:00	Check-in	VE Team	
CREATIVITY PHASE - continued			
9:05	Brainstorm Ideas / Alternatives	VE Team	
10:30	Short Break		
10:45	Brainstorm Ideas / Alternatives	VE Team	
12:00	Long Break		
EVALUATION PHASE			
1:00	Evaluation of Ideas – Team Assignments for Development	VE Team	
3:00	Short Break		
DEVELOPMENT PHASE			
3:15	Review Workbook Template & Process Flow Develop / Cost Alternatives	VE Team	
5:00	Adjourn		

Day 3: Wednesday, November 29, 9:00 AM – 5:00 PM EST

MS Teams Invitation Link – Day 3: CLICK HERE **-or-** **Call-in: +1 323-484-8978**
Access Code: 934 751 845 #

Time EST	VE Study Activity	Participants	Comments
9:00	Check-in	VE Team	
DEVELOPMENT PHASE - continued			
9:05	Develop / Cost Alternatives	VE Team	
10:45	Develop / Cost Alternatives	VE Team	
11:30	Check-in	VE Team	
12:00	Long Break		
1:00	Develop / Cost Alternatives	VE Team	
4:30	Check-in	VE Team	
5:00	Adjourn		

All: Decision-makers, Design Team, Stakeholders, VE Team (Shaded rows)
VE Team: Subject Matter Experts and others serving as full-time VE Team members

Day 4: Thursday, November 30, 9:00 AM – 5:00 PM EST

MS Teams Invitation Link – Day 4: CLICK HERE -or- Call-in: +1 323-484-8978
Access Code: 934 751 845 #

Time EST	VE Study Activity	Participants	Comments
9:00	Check-in	VE Team	
DEVELOPMENT PHASE - continued			
9:10	Develop / Cost Alternatives - Complete	VE Team	
11:30	Check-in		
12:00	Long Break		
1:00	Alternatives to Present Peer Review Workbooks Prepare Presentation	VE Team	
4:00	Run-through Presentation	VE Team	
5:00	Adjourn		

Day 5: Friday, December 1, 8:00 AM – Noon EST

MS Teams Invitation Link – Day 4: CLICK HERE -or- Call-in: +1 323-484-8978
Access Code: 494 985 044 #

Time EST	VE Study Activity	Participants	Comments
8:00	Check-in	VE Team	
DEVELOPMENT PHASE - continued			
8:05	Peer Review Workbooks – Complete Practice Presentation	VE Team	
9:30	Short Break		
9:45	Ready to present	VE Team	
PRESENTATION PHASE			
10:00	Presentation of Key Finding/VE Alternatives to Stakeholders/Decision-makers	All	
11:30	Workshop Close-out	VE Team	
12:00	Adjourn	VE Team	

All: Decision-makers, Design Team, Stakeholders, VE Team (Shaded rows)
VE Team: Subject Matter Experts and others serving as full-time VE Team members

Appendix

B

Project Analysis

B.1 Cost Model

Cost models were prepared for the project; they are based on the cost estimate data prepared by EA Partners, PLC dated June 2, 2023.

The Pareto Concept: Typically, 80% of the total cost of a project is due to 20% of the elements of that project. Focusing on that 20% achieves the greatest impact in cost reduction and value improvement.

How to read the Cost Model Data Table: In the Cost Model Data Table, the project elements are sorted from largest down to smallest with a cumulative percentage; all project items above the 80% mark represent approximately 80% of the total project cost.

Table B: Cost Model Data Table (without 15% Contingency applied)

Group	Description	Estimated Cost	% Total	% Cumulative
0002	Roadway - Excavation	$7,292,316.00	30.11%	30.11%
0001	Paving	$3,064,222.24	12.65%	42.77%
0002	Roadway - Other	$2,649,808.31	10.94%	53.71%
0004	Bridge - Washington Avenue Cut Off Wall	$2,300,235.00	9.50%	63.21%
0004	Bridge - WASHINGTON AVENUE CULVERT EXTENSION Maintenance Access and Riser	$1,896,875.00	7.83%	71.04%
0004	Bridge - 6x6 rcbc culvert (423lf)	$1,707,011.00	7.05%	78.09%
0003	Drainage	$1,569,728.33	6.48%	84.57%
0019	Mobilization	$1,136,541.84	4.69%	89.27%
0004	Bridge - 10x10 spillway culver (75lf)	$1,000,181.00	4.13%	93.40%
0009	Lighting	$560,932.38	2.32%	95.71%
0008	Signalization	$360,467.15	1.49%	97.20%
0019	Demobilization	$340,962.55	1.41%	98.61%
0004	Bridge - Pedestrian Access Bridge Washington Ave	$271,774.00	1.12%	99.73%
0007	Signing	$65,286.33	0.27%	100.00%
	Total	**$24,216,341.13**	**100.00%**	

B.2 Performance Criteria

During the in-brief meeting, the project team and VE team reviewed the performance criteria to confirm their inclusion as a tool to both evaluate and develop ideas during the Evaluation and Development Phases of the workshop. Table B-2 presents the list and description of these criteria.

Table B-4: List of Performance Criteria

LIST OF CRITERIA	#	Criteria:	Description:
	A	Mainline Operations	An assessment of traffic operations and safety on the mainline facility(s), including off-ramps, collector-distributor roads, and school operations. Operational considerations include level of service relative to the 20-year traffic projections as well as geometric considerations such as design speed, sight distance, lane widths and shoulder widths.
	B	Local Operations (Washington Avenue)	An assessment of traffic operations and safety on the local roadway infrastructure, including on-ramps and frontage roads. Operational considerations include level of service relative to the 20-year traffic projections; geometric considerations such as design speed, sight distance, lane widths; bicycle and pedestrian operations and access.
	C	Maintainability	An assessment of the long-term maintainability of the transportation facility(s), culverts, and flood defense. Maintenance considerations include the overall durability, longevity and maintainability of pavements, structures and systems; ease of maintenance; accessibility and safety considerations for maintenance personnel.
	D	Construction Impacts	An assessment of the temporary impacts to the public during construction related to traffic disruptions, detours and delays; impacts to businesses and residents relative to access, visual, noise, vibration, dust and construction traffic; environmental impacts; waste sites.
	E	Environmental Impacts	An assessment of the permanent impacts to the environment including ecological (i.e., flora, fauna, air quality, water quality, erosion control, visual, noise); socioeconomic impacts (i.e., environmental justice, business, residents); impacts to cultural, recreational and historic resources.
	F	Project Schedule	An assessment of the total project delivery from the time as measured from the time of the VE Study to completion of construction; Let February 2024, Construction Duration 36 months with completion Q4 2026.
	G	Risk	An assessment of the identified risks of the project.
	H	Hydrological Impacts	An assessment of the project's impact to lakes, rivers and streams in its vicinity. The attribute also considers the performance of the transportation facility and lake infrastructure during flood events.

B.3 VE Team Observations and Concerns

In the Preparation Phase for the workshop and after completing review of project documentation, the VE team completed Key Issue Memos for which they identified observations and concerns to be addressed during the creative generation of potential ideas and alternatives. The following is a list of the value team's observations:

- Increased roadway capacity
- Improvements to pedestrian mobility
- Impacts to Panbowl Lake
- Changes to flood control system
- Secant shaft wall on Washington Ave
- Sliver fills
- Changes to flood control system
- Changes to existing dams, including secant wall and fills
- New pedestrian facilities
- Reduction of an intersection on KY 15 (Lakeshore Dr)
- Costly drainage structures
- Costly rock excavation
- ROW purchased for a detour route
- Long stretches without pedestrian crossings
- Concern that the true Durable Sandstone realized form blasting may not cover the entire project needs for 2' Shot rock roadbed and Dam embankments. The VE team also has concern that the unusable material may lead to currently unassumed haul off
- If it is not necessary to Add fill to the Panbowl lakes berms, the team may look at the proposed work that is shown in these areas. These are two areas that could have some valuable cost savings
- KY 3068 shows a curb to the East. Long radius vehicles may have a hard time traversing the turn to the East. Possible elimination?
- The newly proposed 5' sidewalk on the North side of KY 15, from 535+00 – 559+85, may need to be looked at for deletion. Even with the widened ditch is there any concern of falling rock/shale after future degradation from this round of cleanup
- The reinforcement on the northwest wall opening on Drawing Number 28745 is less than required by ACI 318-19 8.5.4. LRFD does not cover this detail well
- The culvert extensions are very complicated with the existing culverts being stepped, but based on the existing conditions there is not a good alternative
- Several of the wing walls seem thin for as tall as they are. The thickness is less than Height/12.
- 3:1 slope was used at the Washington Avenue culvert and the geotechnical report S-116-2022 shows 2:1 slope at this location
- KY 1812 intersection realignment into Panbowl Lake
- Local Roads below 2000 ADT 10' Lanes up to 40 MPH KY 1812 and KY 3068 coming to stop conditions, so I would think 10 lanes could be considered instead of the 11 lanes.11' Lanes on. HIS shows KY 182 with existing 9' lanes and KY 3068 with existing 10' lanes
- Design Manual allows TWLTL to range from 12'-14'
- Length to carry the 20' Ditch Bench
- Long 2:1 slope on Washington Ave. Some are sliver fills that require embankment benching
- Lake Side Drive shows a grade of -3.96% max. with significant fill

- New Panbowl Lake Connector instead of keeping the existing connector 500' west

B.4 Risk Identification

In the Preparation Phase for the workshop and after completing review of project documentation, the VE team identified project risks. Risk is a measure of future uncertainties in achieving program and/or project performance goals and objectives within defined cost, schedules, and performance constraints. Risk can be associated with all aspects of a program/project (e.g., threat, technology maturity, supplier capability, design maturation, performance against plan) as these aspects relate across the project's cost and schedule. Risk addresses the potential variation in the planned approach and its expected outcome. Risks may also represent opportunities within a project that could be exploited to the benefit of the project.

Please note that these identified risks assisted the VE team in prioritizing functions for selection to brainstorm alternatives and were an opportunity to identify mitigation measures during the Creativity Phase; these have the potential of impacting the project budget, schedule, and performance.

- Waste site availability and cost
- Washington Ave secant shaft wall vs. the existing 10'x10' RCBC
- Difficulty of construction in the lake and in the Ky River channel
- Difficulty of dam protection construction
- Blasting for rock cut adjacent to KY 15
- Maintenance of flood protection during construction
- Secant pile wall in existing dam and through existing culvert
- Fills on existing dam
- Rock blasting in town
- Excavation waste location availability
- Reduced roadway capacity during MOT
- It appears the earthwork for this project has been balanced. However, I don't believe that the type of material that will be realized from the borrow has been accounted for, leaving excess haul off site.
- Large amounts of fill on top of the existing lake
- Flood and control of water during construction
- Impacting Pan Bowl Lake at the beginning on KY 1812 intersection realignment with a 40' feet of fill, about 100' wide. Recent Flooding makes the loss of this area riskier, along with building the subgrade in this pond area
- Cut slopes that currently are experience issues

Appendix

C

Function Analysis

C.1 Introduction

Function definition and analysis is the heart of the Value Methodology (VM). It is the primary activity that separates VM from all other "improvement" programs. The objective of this phase is to ensure the entire team agrees upon the purposes for the project elements. Furthermore, this phase assists with development of the most beneficial areas for continuing study.

C.2 Random Function Identification

The VE team identified the functions of the project using active verbs and measurable nouns. This process allowed the team to truly understand the functions associated with the project.

Functions were identified and prioritized using the previously identified risks, available cost data, and the VE team expertise. The VE team identified "Control Flooding", "Increase Capacity", and "Improve Safety" as the basic functions of the project. The Function Analysis Worksheet (Table C-1) is shown for the project and reflects the complete list of functions.

Table C-1: Random Function Identification Worksheet for Project

Identify Functions		Classify Functions	Prioritize Functions			
Active Verb	**Measurable Noun**	**Higher-Order Basic Secondary**	**COST**	**RISK**	**SELECT FOR CREATIVITY PHASE**	**Remarks**
Ease	Maintenance	Secondary	Medium	Low		
Improve	Non-Vehicular-Mobility	Secondary	High	High	YES	
Control	Flooding	Basic				
Improve	Turning-Movements	Secondary	High	Medium	YES	
Maintain	Traffic	Secondary	Low	High	YES	
Increase	Capacity	Basic				
Move	Excavation	Secondary	High	High	YES	
Manage	Construction	Secondary	Medium	High	YES	Ease and Speed
Maintain	Water	Secondary	High	High	YES	During Construction
Manage	Access	Secondary	Low	Medium		
Avoid	Conflict	Secondary	High	High	YES	Utilities, Structures, Etc.
Improve	Safety	Basic				
Improve	Mobility	Higher-Order				
Relieve	Congestion	Higher-Order				
Optimize	Template	Secondary	High	High	YES	
Support	Load	Secondary	High	Medium	YES	Pavement Design
Improve	Rideability	Secondary	Low	Low		
Convey	Stormwater	Secondary	High	High	YES	

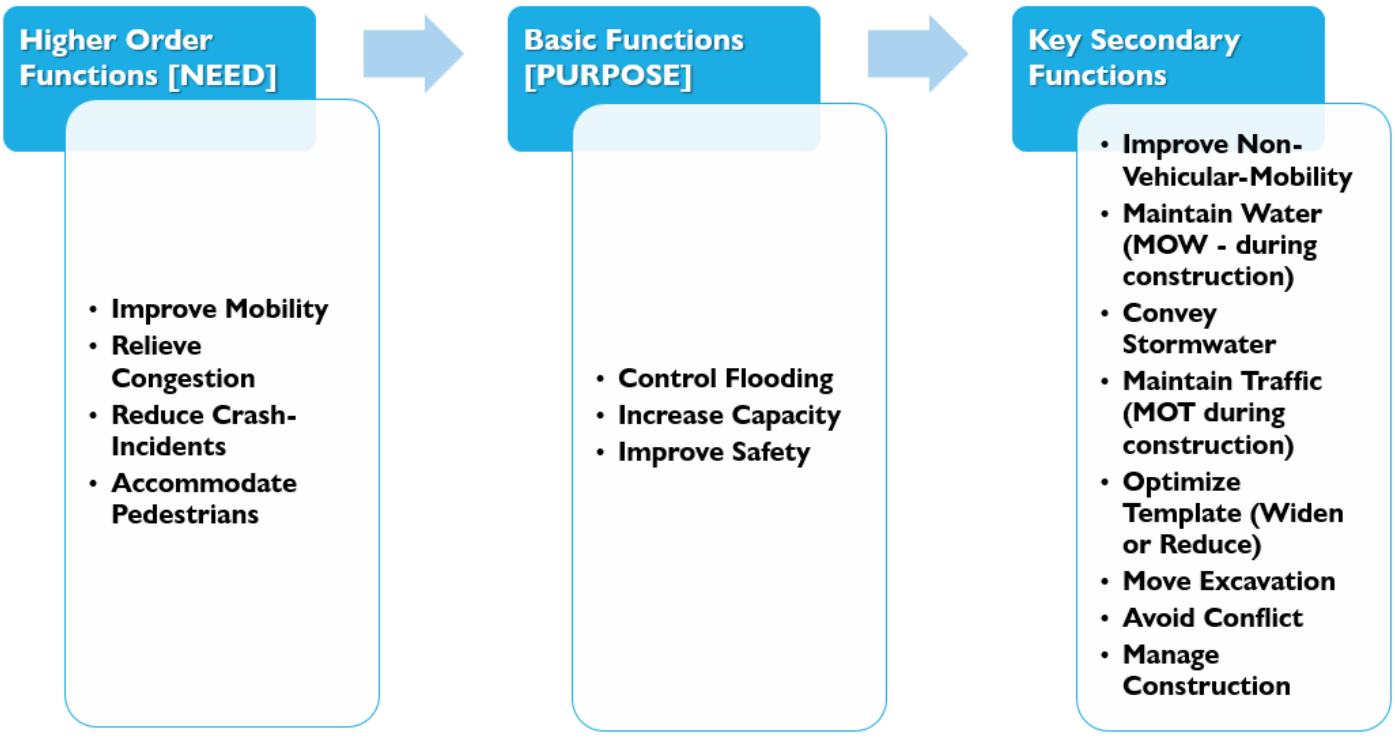
Identify Functions		Classify Functions	Prioritize Functions			
Active Verb	**Measurable Noun**	**Higher-Order Basic Secondary**	**COST**	**RISK**	**SELECT FOR CREATIVITY PHASE**	**Remarks**
Create	Maintenance-Access	Secondary				w/ 'Ease Maintenance'
Maintain	Lake-Level	Secondary				w/ 'Control Flooding'
Reduce	Crash-Incidents	Higher-Order				
Accommodate	Pedestrians	Higher-Order				

The definitions of the classifications are:

- **Higher Order Function:** The specific goals or needs for which the basic function exists and is outside the scope of the subject under study. [NEED]
- **Basic Function:** The specific purpose(s) for which a project exists and answers the question, "what must it do?" [PURPOSE]
- **Secondary Function:** A function that supports the basic function or required secondary functions and results from the specific design approach to achieve the basic function.

Please note that the Basic and Higher-Order functions relate directly to the project's Purpose and Need as illustrated in Figure C-1.

Figure C-1: Function Analysis and Purpose & Need



Appendix

D

Idea List and Evaluation

D.1 Introduction

The objective of the Creativity Phase is to generate a large quantity of ideas on alternate ways to perform each function selected for study. It uses common brainstorming techniques, including ideation that is unconstrained by habit, tradition, negative attitudes, assumed restrictions, and specific criteria. No judgment takes place during this phase of the study, though ideas are discussed for clarification purposes.

What makes the Creativity Phase of the value methodology successful is for the VE team not to conceive ways to design a project, but to develop ways to perform the functions selected for study. Past experience is combined and recombined to form new combinations that will perform the desired functions, regardless of what is included in the original project concept and improve the value of the project compared to what was originally considered attainable.

The VE team brainstormed 64 ideas. Of these, 16 ideas were identified for further development into Value Proposals (9) and Design Suggestions (7). In addition, 10 Design Comments were also identified during the value study. These comments can be considered in the next phase of design development.

D.2 Summary of Outcomes

The table below summarizes by function the total number of ideas brainstormed and developed as either Quantitative or Qualitative value proposals.

Table D-1: Summary of Ideas Brainstormed (by Function)

Function / Focus Area	Abbreviation	Total Number of Ideas Brainstormed	Total Number of Value Proposals Developed & Cost-Only Proposals	Total Number of Design Suggestions	Total Number of Design Comments
Improve Non-Vehicular-Mobility	IN	5	1	0	0
Maintain Water (MOW – during construction)	MW	10	2	4	0
Convey Stormwater	CS	7	0	0	5
Maintain Traffic (MOT – during construction)	MT	8	0	1	1
Optimize Template	OT	7	3	0	1
Move Excavation	ME	6	0	1	0
Avoid Conflict	AC	1	0	0	0
Manage Construction	MC	7	1	0	1
Miscellaneous	MI	13	2	1	2
TOTAL	**--**	**64**	**9**	**7**	**10**

D.3 Evaluation Techniques Used

The VE team members evaluated the ideas using a two-step process. The first step, to shorten the list, identified ideas that scored as follows:

Table D-2: Evaluation Key (Step 1)

Score	Description
5	Great Value (Workbook prepared)
4	Good Value (Workbook prepared)
3	Moderate Value (No workbook prepared; however, a few were identified as cost-cutting measures only and a cost page was prepared)
2	Poor Value (No workbook prepared)
DS	Design Suggestion, More than a DC, requires further explanation (Workbook prepared)
DC	Design Comment, Stand-alone comment that needs no further explanation; a list of these will be given to the project design team (see Section 2)
ABC	Already Being Considered/Done, Included in the baseline concept
OS	Out of Scope, Not a part of this project
FF	Fatal Flaw, Violates a code or standard

This first step evaluation scored the ideas as appropriate to eliminate them from further evaluation.

The second step scored the remaining ideas using the Value Relationship Key along with the idea's alignment with previously identified project goals, functions, and performance criteria. The prioritization for further development and documentation is as follows:

Table D-3: Rating (Step 2)

Value Relationship Key	**Value = Function Performance / Resources**					
5	F	F+	F++	F++	F++	F++
Great Value Opportunity	R--	R--	R	R-	R--	R+
4	F-	F	F+	F+	F+	
Good Value Opportunity	R--	R-	R	R-	R+	
3	F--	F-	F+(*)	F++(*)		
Moderate Value Opportunity	R--	R-	R++	R++		
2	F--	F-	F	F		
Poor Value Opportunity	R	R--	R+	R++		

**Is the Function improved to the point that it overcomes the high cost?*

Figure D-1: Value Cue Key (Magnitude of Change)

Value Cue Key – Magnitude of Change	
F++ = Large increase in function	R-- = Large decrease in resources used
F+ = Small increase in function	R- = Small decrease in resources used
F = No impact in function	R = No impact in resources used
F- = Small negative impact in function	R+ = Small increase in resources used
F-- = Large negative impact in function	R++ = Large increase in resources used

D.4 List of Scored Ideas Organized by Function

The list of scored ideas is shown on the following pages. During the Creativity and Evaluation Phases of the workshop, value team members were actively engaged in the brainstorming and evaluation of ideas. During the Evaluation Phase, some ideas were combined with others and are designated as such by the nomenclature "w/" (with another idea).

Also, please note that in a few cases, an idea that initially received a score (5, 4, or DS) indicating that it would be developed, may later have been rescored because of the VE team "digging in" and finding reason(s) that it was deemed not providing the value opportunity originally thought. These ideas were then discarded from the Development Phase and the justification is noted with red text below the idea title.

Table D-4: "Scored" Creative Idea List

Idea No.	Idea Title	Score
***Key:** 5=Great Value Opportunity; 4=Good Value Opportunity; 3=Moderate Value Opportunity; 2=Poor Value Opportunity; FF=Fatal Flaw; DS=Design Suggestion; DC=Design Comment; EC=Estimate Comment; ABC=Already Been Considered/ Already Being Done; OS=Out-of-scope		
IN	**Improve Non-Vehicular-Mobility**	
IN-01	Verify the need for the shared use path width between Jett Drive and Washington Avenue	ABC
IN-02	Consider expanding shared use path up to Main Street	4
IN-03	Relocate safety gate from begin of bridge to edge of bridge to provide pedestrian access	2
IN-04	Add mid-block crossings for pedestrians	2
IN-05	Add HAWK for mid-block crossings for pedestrians	2
MW	**Maintain Water (MOW - during construction)**	
MW-01	Simplify inlet and outlet structures to shorten construction duration	DS
MW-02	Consider making all the culvert wing walls the same thickness for ease of constructability and formwork	DS
MW-03	Verify that the right-of-way is adequate for cofferdam and segmental pipe installation	DS
MW-04	Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place	DS
MW-05	Use precast for all inlet structures	w/MW-01
MW-06	Use precast for pipe cradles	w/MW-01
MW-07	Use/modify existing inlet structure (upstream end of 10'x10') in lieu of building new inlet structure	2
MW-08	Evaluate alternatives to existing 6'x6' culvert across KY 15 at Main Street	4
MW-09	Shorten proposed box culvert and add more open channel at outlet	w/MW-10
MW-10	Investigate changing box culvert across Main Street to a pipe	4

Idea No.	Idea Title	Score
***Key:** 5=Great Value Opportunity; 4=Good Value Opportunity; 3=Moderate Value Opportunity; 2=Poor Value Opportunity; FF=Fatal Flaw; DS=Design Suggestion; DC=Design Comment; EC=Estimate Comment; ABC=Already Been Considered/ Already Being Done; OS=Out-of-scope		
CS	**Convey Stormwater**	
CS-01	Shorten bridge by moving inlet structure closer to Washington Avenue	2
CS-02	The reinforcement on the northwest wall opening on Drawing No. 28745 is less than required by ACI 318-19 8.5.4. LRFD does not cover this detail well	DC
CS-03	Outlet storm sewer systems into the roadside ditches more often to reduce length of proposed storm sewer system	3
CS-04	Add an access ladder inside the inlet structure at Washington Avenue for maintenance access	DC
CS-05	Consider standby pumps during construction; modify MOT note to include this language	DC
CS-06	Give the Contractor the ability to shutdown Washington Avenue for flooding events during construction of culvert structures	DC
CS-07	Add a backup system to open the gate in the event of mechanical failure	DC
MT	**Maintain Traffic (MOT during construction)**	
MT-01	Review haul route for east end of project	w/MT-07
MT-02	Review haul route for Washington Avenue/south side of project	w/MT-07
MT-03	Review haul route for the waste area	w/MT-07
MT-04	Review Washington Avenue closure and secant wall construction	w/MT-07
MT-05	Include in specifications language to allow for Washington Avenue closures during flooding event	DC
MT-06	Extend the duration of the allowable closure to construct box culvert elements, secant wall, and roadway widening between Bobcat Lane and KY 15	w/MT-07
MT-07	Review the MOT phasing plan	DS
MT-08	Send haul trucks on Panbowl Road to east dam area in lieu of KY 15	w/MT-07
OT	**Optimize Template (Widen or Reduce)**	
OT-01	Reduce lane widths from 11′ to 10′ on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate	4
OT-02	Decrease the TWLTL from 14′ to 12′	3
OT-03	Decrease ditch bench currently shown as 20′ between Rt. Sta. 553+00 to Rt. Sta. 558+00.	4
OT-04	Steepen Lakeside Drive to decrease fill in the Panbowl area	DC
OT-05	Remove the new Panbowl Lake Connector and keep the existing connector 500′ west to maintain consistency with existing traffic	2
OT-06	Shift Sta. 509+50 to Sta. 518+00 north to match existing edge of pavement	4
OT-07	Add gravity wall to eliminate sliver fill, approximately Sta. 516 to Sta. 520	w/OT-06
ME	**Move Excavation**	
ME-01	Designer or KYTC to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 555	DS
ME-02	Contractor to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 555	w/ME-01
ME-03	Use durable sandstone for fill at Panbowl Lake	ABC
ME-04	Use durable shale for two-foot rock roadbed	w/ME-01
ME-05	Verify quantity of non-durable wasted material	w/ME-01
ME-06	Optimize material placement and removal	w/ME-01

Idea No.	Idea Title	Score
***Key:** 5=Great Value Opportunity; 4=Good Value Opportunity; 3=Moderate Value Opportunity; 2=Poor Value Opportunity; FF=Fatal Flaw; DS=Design Suggestion; DC=Design Comment; EC=Estimate Comment; ABC=Already Been Considered/ Already Being Done; OS=Out-of-scope		
AC	**Avoid Conflict**	
AC-01	Verify that there are no utility conflicts with MOT and/or construction phasing	w/MT-07
MC	**Manage Construction**	
MC-01	Review construction schedule NOTE: The VE team reviewed the project schedule that was provided in the Grant. There was not sufficient detail to perform a thorough review. It is further noted that the Contractor will be providing a construction schedule for KYTC review.	DC
MC-02	Review cost estimate	4
MC-03	Rerun cost estimate in the Cost Estimator program with updated cost table	w/MC-02
MC-04	Review project for biddability	ABC
MC-05	Review project for buildability	w/MT-07
MC-06	Review project for operability	ABC
MC-07	Review phasing plan to provide flood protection earlier	ABC
MI	**Miscellaneous**	
MI-01	Consider extending the existing 6'x6' RCBC near Sta. 110+50, rather than construct a new RCBC	2
MI-02	Investigate the thickness of the wing walls; the thickness is less than Height /12 for a few of the wings	w/MW-02
MI-03	Look at steepening Lakeside Drive to decrease fill in the Panbowl Lake area (local roads can have a max. 7% grade); this would create a sag condition	w/OT-04
MI-04	Investigate the need for vertical reinforcement on the front and back face of the wing walls; since the wings can be submerged there will be forces on each face	w/MW-02
MI-05	Bid the longitudinal edge key with milling and texturing instead of long edge key item to reduce cost	3
MI-06	Extend sidewalk or shared use path from Main Street to beginning on the left side. From the P&N: Pedestrian Usage: City of Jackson residents regularly walk or bike along KY 15 even though no dedicated pedestrian or bike facilities exist. High unemployment, a distressed economy with high poverty levels, and lack of other transportation options are likely contributors to high pedestrian usage. In addition, Census estimates show 48% of Breathitt County households have access to zero or one vehicles, necessitating other travel modes.	4
MI-07	Reduce sidewalk buffer width in rock cut from 3′ to 2′	w/OT-03
MI-08	Review value add vs cost of upgrading all sidewalks to shared use paths	4
MI-09	12′ Radius on Entrance at Rt Sta. 535+90 is less than the normal 25′ used at a minimum throughout. If a wider entrance is to compensate, then stripe island to provide direction and separation in the entrance.	DC
MI-10	15′/10′ radii at entrance Lt. Station 560+15 is less than the 25′ used throughout on the mainline	DC
MI-11	Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)	DS
MI-12	Review the limits of the cofferdam and verify that the liner is not impacted	w/MI-11
MI-13	Address potential settlement in the fill at the waterways prior to placement	w/MI-11

Appendix

E

Supplemental Information

EA Partners, PLC

CIVIL ENGINEERS • LAND SURVEYORS • LANDSCAPE ARCHITECTS

F I N A L

TO: Aric Skaggs, P.E.
Project Manager

FROM: Paul Looney, P.E.
E A Partners, PLC

DATE: December 18th, 2023

SUBJECT: KY 15 Value Engineering Recommendations
Breathitt County

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- **Aric Skaggs (D10 Project Manager)**
- **Aaron Wallace (CO Geotech)**
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The Value Engineering team had provided the Project Team with their recommendations on December 1st, 2023.

Each recommendation was discussed, and the Project Team determined whether the recommendations would be incorporated into the project.

IN-02 Consider expanding shared use path up to Main Street

EA Partners showed a typical cross section at the east Dam where there is currently a proposed guardrail. Adding a shared use path along

this section and adding a 5-foot clearance to the guard rail would take some of the east Dam slope protection into the existing backwater channel or outside of ROW. The Design team also noted that with the high embankment and 2:1 slope adjacent to a shared use path would warrant adding protection for cyclists. Guardrail is lower than the required 42-inch high bicycle railing. Adding bicycle railing in front of the guardrail was seen as a risk that could compromise the effective operation of the guardrail.

Design Team Decision: Recommendation not incorporated.

MW-01 Simplify inlet and outlet structures to shorten construction duration

The location of the sluice gate and flap gate has been developed with consideration given to construction, maintenance, operation and flood defense.

Design Team Decision: Recommendation not incorporated.

MW-02 Consider making all the culvert wing walls the same thickness for ease of constructability and formwork.

Wall thickness and additional reinforcement for hydrostatic pressures seen as advantageous to the design and construction of the structures.

Design team Decision: *Recommendation to be incorporated.*

MW-03 Verify that the right-of-way is adequate for cofferdam and segmental pipe installation

The project team believes there is sufficient ROW to construct 10 x 10 culvert.

Design team Decision: *Recommendation met.*

MW-04 Build structure on Washington Avenue as pre-fabricated in lieu of cast-in-place

Cast-in-place is the KYTC preferred culvert construction unless constructability considerations present reasons to consider pre-fabricated culvert structures.

Use of precast elements for the riser structure would pose design, construction and maintenance challenges at the interfaces between precast elements when considering the hydraulic loading pressures from flood events.

Design Team Decision: Recommendation not incorporated.

MW-08 Evaluate alternatives to existing 6'x6' culvert across KY 15 at Main Street

The existing 6x6 culvert is to be abandoned. The design team proposed safe loading. The VE suggested the use of pneumatic backstowing. The design team suggest pneumatic backstowing is a process/method used primarily for abandoning elements of mineworkings.

Geotechnical team suggest the pneumatic backstowing alternate method for abandoning the culvert would not be applicable in this situation and the proposed safe loading would be a more suitable and reliable approach.

Design Team Decision: Recommendation not incorporated.

MW-10 Investigate changing box culvert across Main Street to a pipe

The Design team believe the construction of a RCBC in this situation will afford the project with a structure that would have a longer design life and easier ongoing cleaning/maintenance. A box culvert would also be less susceptible to the implications of flooding and standing water within the backwater channel resulting from flood events within the Panbowl Lake watershed. Maintaining the capacity of the outflow from the bank box DBI was an important consideration to the district during design development.

Design Team Decision: Recommendation not incorporated.

MT-07 Review the MOT phasing plan

MT-07 incorporated a number of sub comments which have been reviewed and commented on below:

- MT-01: Review haul route for east end of project
  The design team noted that the proposed MOT phasing allows material to be hauled along KY 15 within the proposed widening areas from east to west of the project.
  Design Team Decision: No change to MOT Phasing required.

- MT-02: Review haul route for Washington Avenue/south side of project
  Hauling material to south of KY 15, to the channel and west Dam will require a means and method working from the contractor. It is noted that the school operates as an entrance off Washington Avenue for school pickup/drop off, but parent leave from the back of the school property towards Jackson. Flag crossing and coned lanes from KY 15 to Bobcat Lane could be utilized outside of school hours. Proposed MOT phasing also allows access for material to be hauled from east to west on the south side of KY

15 with usual consideration given to maintaining business accesses and signalized intersections.
Design Team Decision: No change to MOT Phasing required.

- MT-03: Review haul route for the waste area
  A waste site has been identified and during phase 2 design it was proposed to haul off road and along the rear of properties adjacent to Panbowl Road. During ROW negotiation, it became clear the property owners would not allow this therefore the haul route would be along Panbowl Road. The design team also recognize that the contractor could propose their own waste site by negotiating with other land owners.
  Design Team Decision: No change to MOT Phasing proposed.

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  MT-06: Extend the duration of the allowable closure to construct box culvert elements, secant wall, and roadway widening between Bobcat Lane and KY 15.

  Closure of Washington Avenue is for the construction of concrete pavement and is expected to be undertaken during the school summer break. Secant wall construction would extend for a longer period (est 5 month) and temporary widening and reduced lane widths on Washington avenue will be used to maintain traffic on Washington Avenue and access to the school. RCBC work would not impact Washington Avenue beyond a short-term lane closure for material delivery or concrete delivery.

  Design Team Decision: No change to MOT Phasing proposed.

- MT-08: Send haul trucks on Panbowl Road to east dam area in lieu of KY 15
  Using Panbowl Road to the east dam would mean material would be hauled using road trucks possibly increasing earthworks costs.
  Design Team Decision: No change to MOT Phasing proposed.

- AC-01: Verify that there are no utility conflicts with MOT and/or construction phasing
  Nesbitt Engineering are developing underground utility relocations based on the project MOT phasing.
  Design Team Decision: Recommendation has been met.

- MC-05: Review project for buildability
  The project has undergone an independent constructability review.
  Design Team Decision: Recommendation has been met.

OT-01 Reduce lane widths from 11' to 10' on Lakeside Drive/Panbowl Rd Extension, Main Street (3068), 1812, and others as appropriate.

KY 1812 should not be reduced. 55 mph requires 11’ min lanes. It was recognized that other proposed routes could be reduced from 11’ to 10’. It is noted that KY 3068 is a short length and has a turn lane. The design team considers the benefits of the additional lane width for maintenance of traffic for lake embankment maintenance outweighs the value of a small monetary savings.

Design Team Decision: Recommendation not incorporated.

OT-03 Decrease ditch bench currently shown as 20' between Rt. Sta. 553+00 to Rt. Sta. 558+00. &

ME-01 Designer or KYTC to conduct additional geotechnical investigation (e.g., borings) from approximately Sta. 537 to Sta. 555

The proposed ditch is a geotechnical required fall bench for the cut along KY 15. While this may be possible to be reduced, a reduction to 4’ would not be considered feasible. It is also noted that if shale is required to be removed from the ditch/fall bench then maintenance staff would need a wider ditch to access with machinery to clean the ditch.

It is also noted that the additional geotechnical investigation, which was not done during the design phase as the property owner denied access, will be completed during construction. Reducing the ditch width at this time may be premature depending on the outcome of the remaining geotechnical investigation.

Design Team Decision: Recommendation not incorporated.

OT-06 Shift Sta. 509+50 to Sta. 518+00 north to match existing edge of pavement

The Design team believes this should be “shift to the south” due to the orientation of the plan sheets. The Design Team notes that during design the disturbed limit of KY15 was at the top of the existing east dam after adding the C&G and sidewalk. The alignment was established with this consideration.

Following the recent floods of Panbowl Lake and the KY River, the east dam embankment was identified as requiring slope protection which was added to the proposed KY 15 widening project and the existing slopes required adjusting closer to a 2.5:1 slope.

Design Team Decision: Recommendation not incorporated.

MC-02 Review cost estimate

The Design Team considers the roadway excavation rate of $12 to still be applicable. It was also noted that a 15% contingency is still being used due to supply chain and material cost increases outside of estimator rates.

Design team Decision: *Recommendation to be incorporated.*

MI-06 Extend sidewalk or shared use path from Main Street to beginning on the left side

This project has connectivity to the bank parking lot and pedestrians would still have possible access to the east albeit not on a dedicated sidewalk.

The addition of sidewalks to the south of KY 15 and east of Mainstreet will be reviewed following the construction of this project and could be incorporated in the future.

It was also noted that if a sidewalk would be constructed then this should be done in such a way as to be compatible to the long term desire to extend the 4 lanes on KY 15 to the east.

Design team Decision: *Defer to a future project*

MI-08 Review value add vs cost of upgrading all sidewalks to shared use paths

There are challenges along the section near Hardees with the possible need for a bicycle railing behind a shared use path. This would stop pedestrian access from the sidewalk to the businesses along this corridor. Also the challenge of extending the shared use path from

Jett Drive to Main Street has previously been discussed.

It is noted that the fall bench at the base of the Washington Avenue cut has been designed from the back of berm so an 8’ shared use path could be constructed in the future without the need to widen this fall bench as the fall bench could be measured from the back of sidewalk.

It is noted that the design team had discussed the possibility of extending the shared use path along KY 15 but during design development it was decided that if this is done then it would be done in the future if Jackson developed trails or leisure activities around Panbowl lake. The design team did not think this was the appropriate time to include it within this project.

Design team Decision: *Defer to a future project*

MI-11 Clarify how structural fill is to be placed in the water (i.e., Panbowl Lake, River)

Typical section will be developed to help communicate the intent of the geotechnical notes. Similar to the detailed typical sections for the channel and west dam. Settlement platforms will also be included within the proposed geotechnical notes and recommendations.

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