

Quality Matters

Vol. III, Issue 3 – Fall 2013

from the Quality Assurance Branch (QAB) of Highway Design

What does a Temporary Traffic Control Plan (TTCP) have to do with work zones and safety?

The relationship between Temporary Traffic Control Plans (TTCP) and work zones and safety has various dimensions of importance for project developers, project delivery and the public. Everyone has experienced the basic layout of Figure 6C-1, shown below. The layout is straight from the Manual on Uniform Traffic Control Devices (MUTCD).

Did you know the Kentucky Transportation Cabinet follows the Federal Register for Work Zone Safety and Mobility and has “Policy and Procedures for the Safety and Mobility of Traffic through Work Zones”?

The policy states all designers, whether state employees or consultants, who are involved in the development or design of a TTCP project shall

have completed an approved training course in work zone traffic control within the last five years. The Statewide Work Zone Review Committee will be the approval authority for these courses.

Moreover, for the construction industry, the Cabinet will require certification for certain personnel, such as flaggers and traffic control supervisors.

During project development, understanding of drainage design is priority, especially when we think of where the water is going to go in all phases of constructing and completion of the project. Maintenance of traffic should also have the same degree of conviction.

Other questions should be asked as well. How is this project going to be built? Where will the traffic movement go with safety in mind? Is there an alternate route (detour)? What issues may arise while building in phases? Those are among the countless other questions that need to be considered in a TTCP to fully develop a plan that works. If these questions aren't asked, significant costs, schedule delays, vehicular incidents and danger to construction workers can occur.

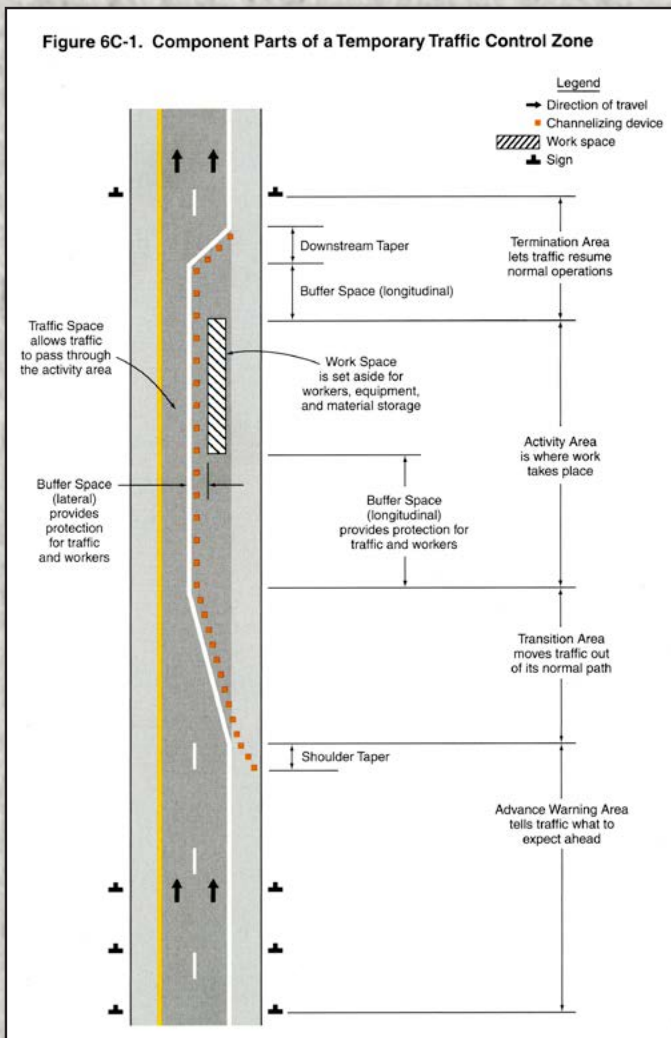
A recent Constructability Review (CR) Program survey conducted by the Quality Assurance Branch revealed that review of MOT/Phasing takes top priority. If the transportation industry feels this is a main concern, then action is necessary.

Knowing the effects of previous poor TTC plans can be helpful as lessons learned. The following are a few issues to keep in mind for project developers:

- When a detour is utilized, consider the alternate route and its characteristics for the prescribed traffic use. Have quantifiable additional materials available on plans to maintain the traffic. Also, once the project is complete, think about the detour's need for possible repairs.
- Where access to adjacent properties from construction area, supply proper quantities of material for keeping access available for use.
- Signage on plans should reflect the anticipated changes of the construction phases. Dynamic plans are preferred to static plans for the TTCP.
- A public information plan could be used for significant projects and for regular projects.

Bottom line, achieving a safe and efficient temporary mobility for projects is just as important as the actual design itself. From early design to implementation, creating an orchestrated event for everyone will make a much better product for all to enjoy. In doing so, training is an integral part of what is to come for Kentucky's transportation industry as TTCP is ever changing, likewise growth of knowledge and experience. Be on the lookout for future TTCP training.

by [Boday Borres, PE, AVS](#)



Hydraulic energy dissipation at work for KYTC

Currently, District 4's design staff is putting to work an old, yet effective, energy dissipation technique to solve a continuous maintenance problem. Behaving similarly to the original St. Anthony Falls found on the Upper Mississippi River in the heart of Minneapolis, the St. Anthony Falls (SAF) headwall acts as a dissipater for the hydraulic energy created by supercritical flow exiting the drainage structure. This flow, if left unaccounted for, may certainly cause severe scour at the exit of a drainage structure like a box culvert or culvert pipe.

This dilemma is exactly what District 4 was facing on U.S. 31E in LaRue County. An existing culvert without adequate outlet protection caused constant scour following

large rain events leaving the maintenance crew with a perpetual repair task. In conjunction with a roadway project to correct alignment and drainage deficiencies, a new 8-foot by 4-foot box culvert was built to utilize the SAF headwall (photo below). To see the headwall in action please select the link below if you are viewing this electronically. As you will be able to see, the dissipation of the flow is incredible. The water leaving the apron is dispersed evenly across and becomes manageable with standard channel protection beyond the headwall.

The KYTC construction staff indicated the headwall was certainly more difficult to construct requiring four separate pours to



complete. However, it has already seen the benefit of the performance of the headwall during substantial rainfall events, noting very little scour with channel protection not yet installed. The KYTC design staff commented this structure was a best fit for the situation.

Gradual stream degradation had caused a change in elevation of structure outlet and the stream bed, creating a waterfall effect which generated a 10-foot scour hole. The SAF accomplished the grade change for the new outlet elevation while maintaining a fixed inlet elevation. Its design allows for debris to pass through more easily than other options even as energy dissipation occurs. The SAF and culvert were designed by consultant on contract.

For more information on SAF headwalls as an energy dissipation option please visit [Chapter 10 of the old Drainage Manual](#).

by [Travis Carrico, PE](#)



Requires latest version of Adobe Flash Player.

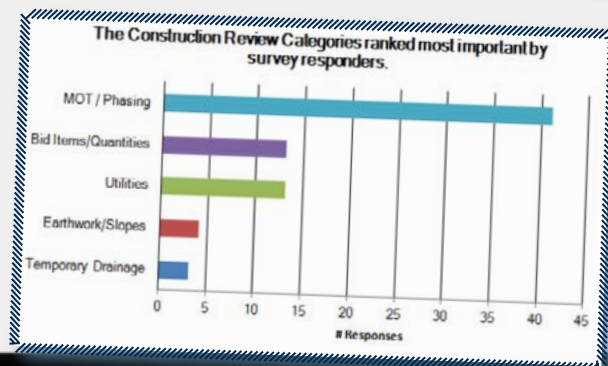
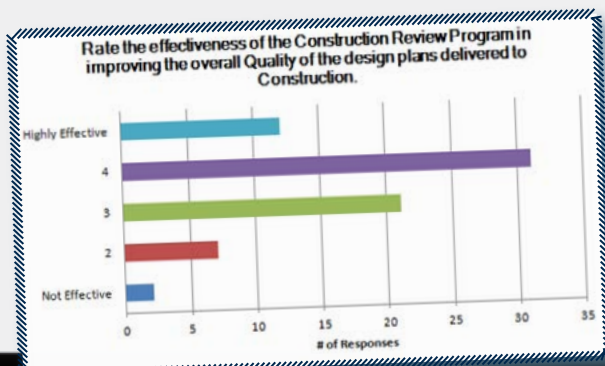
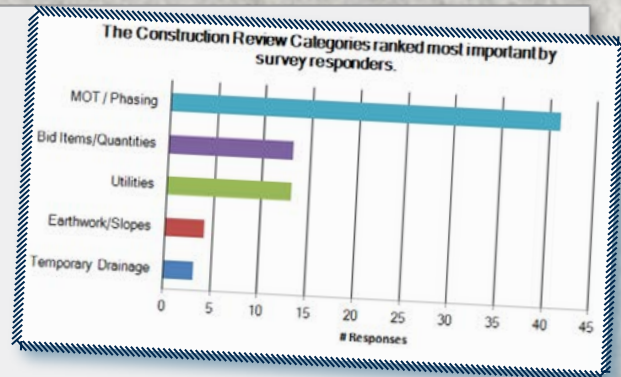
Scroll over picture and click to activate video and watch the headwall in action

Constructability Review Survey Results

In May, Quality Assurance conducted a survey to evaluate the Constructability Review Program. The survey was distributed to KYTC Design and Construction personnel. Design consultants were also asked to participate. The key findings of the survey were:

- Most respondents found the program to be effective.
- The milestone where the program performs the best is Joint Inspection.
- MOT /Phasing is the Review Category that is the most important.

by [Eileen Vaughan, PE](#)



VALUE ENGINEERING TRAINING

40- Hour Module 1 Certification

December 2- 6, 2013

Participants will learn the fundamentals of value methodology (VM). The course will include lecture and hands-on practice. This workshop will demonstrate the effectiveness of VM techniques in enhancing value while possibly reducing costs. The AVS certification exam will be administered on the last day of the course.

The course is sponsored by the Kentucky Transportation Cabinet and will be held at the KYTC Conference Center, 200 Mero Street, Frankfort.

Non KYTC Employee Cost: \$750.00/person (includes exam fee & workbook) Class size is limited.

Email registration information to eileen.vaughan@ky.gov & mail *payment to:

Eileen Vaughan

Kentucky Transportation Cabinet
Highway Design 5th floor
200 Mero St
Frankfort, Kentucky 40622

Instructed By:

Renee Hoekstra, CVS



*Make checks payable to the *Kentucky Transportation Cabinet*

KYTC Employees: Please complete the TC 12-243 form, obtain your supervisor's signature & email the form to eileen.vaughan@ky.gov

QAB's Constructability - On the Move

After a year with Jonathan West in QAB, he has moved on as the TEBM for Project Development in District 5. He worked as the Post-Construction Review Coordinator, and then, the Constructability Review Coordinator. For a short stint, he also was the Chief Editor for Quality Matters newsletter. Although West has left us, we are forever grateful for his contribution to the branch. He is always welcome to come back. If you would like to contact him, his email remains the same:

jonathan.west@ky.gov

Byron Johnson who was serving as an interim Constructability Reviewer has taken a full-time position as the Section Supervisor in the Project Development Branch in District 2. He has always been an asset to the district and for the past few years for the whole Cabinet as he reviewed plans across the state. His construction background will give him insight to his new role as a highway designer. If you would like to contact him, his email is:

byron.johnson@ky.gov

Newly awarded VE
statewide contract goes to...
for 2013-15.

HDR



Hotel Accommodations at:
Capital Plaza Hotel
405 Wilkinson Blvd., Frankfort, KY 40601
Blocked rooms: VEMOD1
\$83.00/night, not including taxes

Upcoming Training:

Kentucky Engineering Center:

[\(http://www.kyengcenter.org/\)](http://www.kyengcenter.org/)

- Sept. 7 Fall 2013 Civil Engineering PE Review Course
- Sept. 14 Fall 2013 Civil Engineering PE Review Course
- Sept. 17 Somerset – One Day Fall Seminar (Five topics, see website for agenda)
- Sept. 21 Fall 2013 Civil Engineering PE Review Course
- Sept. 24 Highway Capacity Analysis Using HCM 2010 & HCS 2010
- Sept. 28 Fall 2013 Civil Engineering PE Review Course
- Oct. 1 Bowling Green – One Day Fall Seminar (7 topics, see website for agenda)
- Oct. 8 Microstation / InRoads (Four days)
- Oct. 15 Prestonsburg – One Day Fall Seminar (Eight topics, see website for agenda)
- Nov. 5 Microstation / InRoads (Four days)
- Nov. 19 Paducah – One Day Fall Seminar (Eight topics, see website for agenda)
- Dec. 3 Microstation / InRoads (Four days)
- Dec. 17 KRS 322 MTS Code of Conduct and Expert Witness
- Dec. 17 Lexington One Day Seminar (Agenda TBA)

KYTC/FHWA/ACEC-KY Partnering Conference

Sept. 9 - 11 Galt House Hotel, Louisville, KY

Lessons Learned

by [Travis Carrico, PE](#)

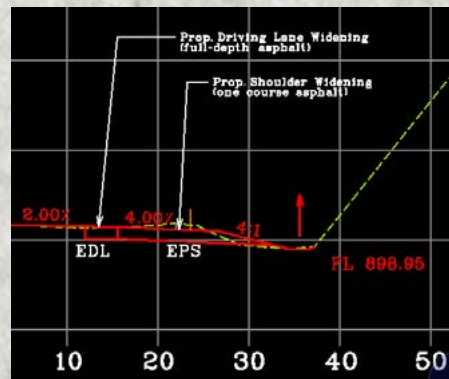
This is the seventh installment of the series, "Lessons Learned from the Post Construction Review (PCR) Circuit." The Quality Assurance Branch (QAB) continues to meet with various divisions and districts to solicit input from KYTC staff, design consultants and contractors. We have chosen to highlight the following issues from the most recent discussions.

Widening existing pavement with constructability in mind

Recently, a project was reviewed that detailed a narrow two-foot pavement widening for mainline driving lanes. Additionally, the proposed adjacent paved shoulder was intended for use of Maintenance of Traffic (MOT) during the part-width construction process. The proposed shoulder was designed with one course of asphalt base. This situation presented an opportunity for improper compaction of the narrow widening due to the non-conventional placement methods necessary. Also, the minimal shoulder pavement thickness poses a risk of potential failure due to the sustained traffic it would receive during construction.

It's important for designers to consider conventional construction techniques while

designing part-width projects. Equally important for part-width projects is the need for consideration to be given to the effects MOT plans can have on proposed pavements, particularly on paved shoulders.



Shelved plans and their issues

On a current post construction review, an issue regarding shelved plans arose. The plans were shelved for nearly a decade and in the meantime an additional school was constructed in the project limits on the same site as the original school. This significantly changed traffic generation from the property. Originally, one entrance was established for the entire campus. Therefore, it became very congested during the peak hour. During construction, a second entrance was built to

help promote better traffic flow on and off the main roadway.

In hindsight, as suggested by the review team, the best solution may have been two entrances along a stretch of two-lane roadway with a two-way-left-turn-lane to provide adequate turning movement storage. The point is, when plans are shelved for any considerable time, it's very important that the surrounding property usage in the project area be re-examined for changes.

Approach road access

Review of a project in the past post construction review circuit revealed an issue with an existing county road losing one of its two access points to the state roadway upon completion of construction. Only a handful of properties existed on the county roadway and the road itself was only a few tenths of a mile long.

On paper, the planned access point seemed adequate. However, that single existing access left in place often incurred flooding; deeming it inaccessible during large rainfall events. The solution was to provide residents a new access point to the proposed mainline with a sufficient drainage structure via change order. Proper investigation of the project area is critical to project success.

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Lessons Learned Database Available Online

<http://transportation.ky.gov/Highway-Design/Pages/Lessons-Learned.aspx>