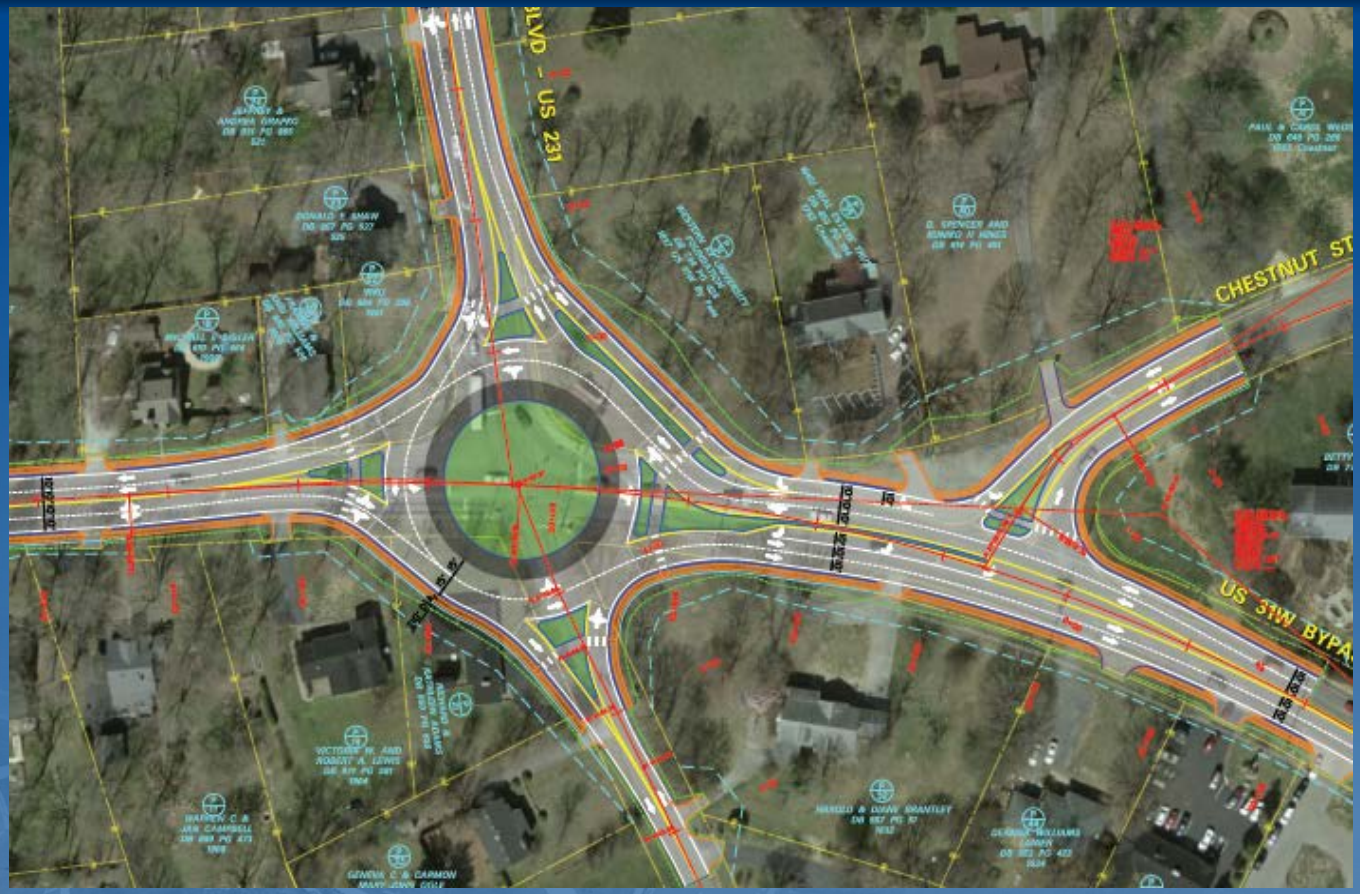
Development of Bowling Green's First Roundabout



KENTUCKY TRANSPORTATION CABINET

BURGESS & NIPLE

Greg Meredith P.E., *District 3 Chief District Engineer*
Arrell Thompson P.E., *Burgess & Niple*
Joe Plunk, P.E., *District 3 Project Development Branch Mgr*

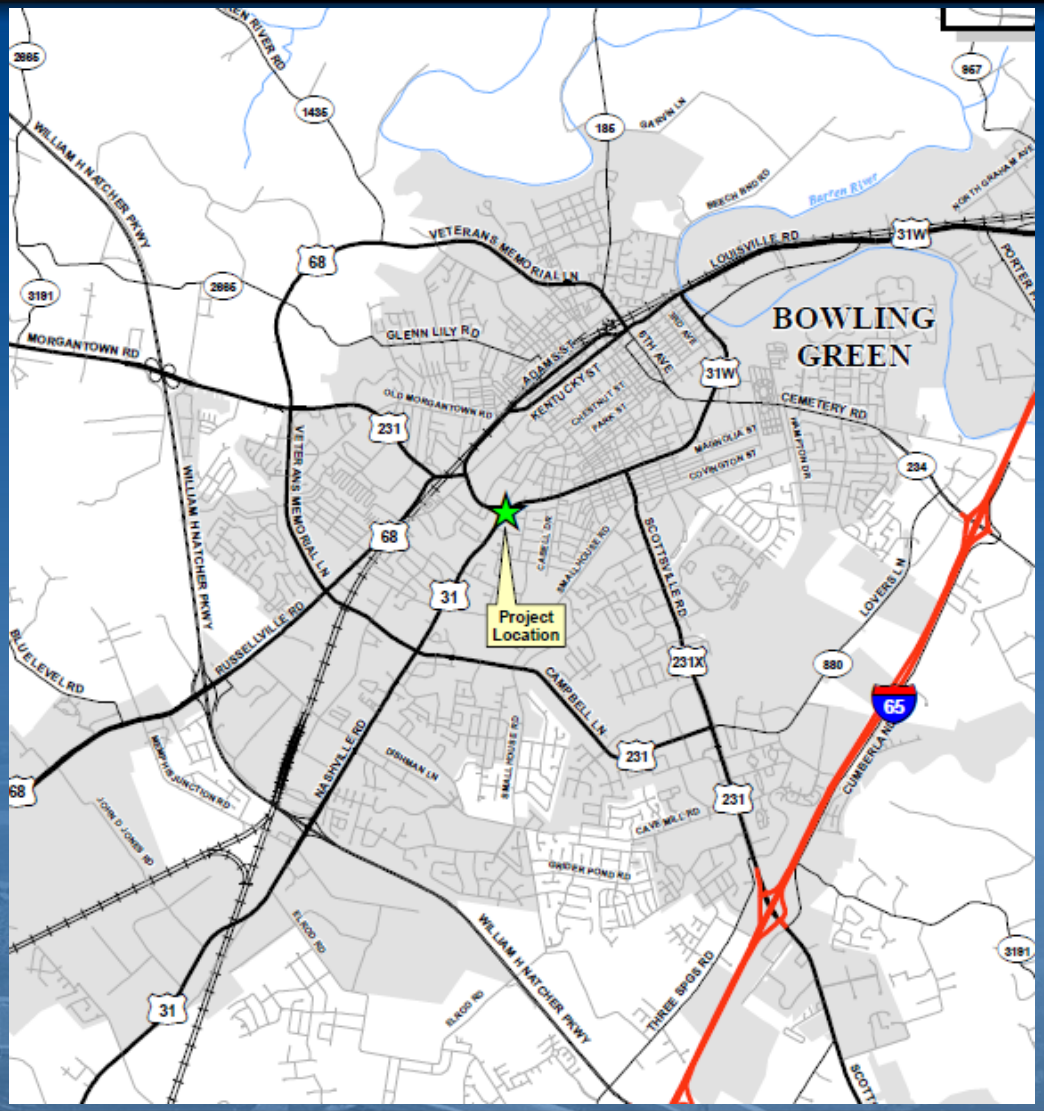
Sept. 9, 2014

Outline

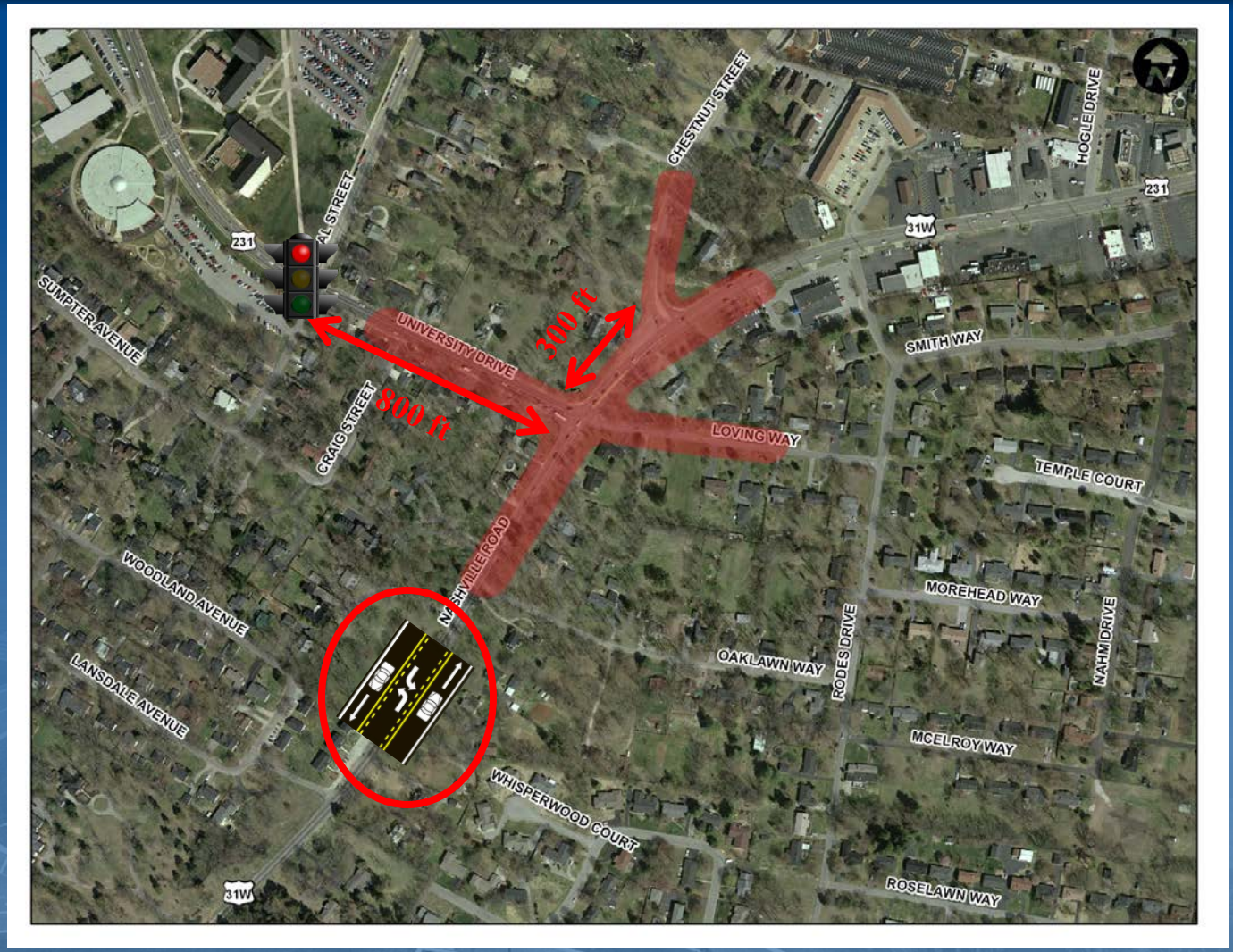
1. Existing Conditions
2. Pre-design Project History
3. Benefits of Roundabouts
4. Development of Design Project
5. Getting the Project to Letting

KENTUCKY TRANSPORTATION CABINET

Project Location Map



Constraints



Project Orientation

- Approximate Traffic Numbers
  - US 31W North approx. 18,000 ADT
  - US 31W South approx. 22,000 ADT
  - University Blvd approx. 19,000 ADT
  - Chestnut Street approx. 4,500 ADT
  - Loving Way approx. 2,500 ADT

US 31W Bypass looking North, construction completed just after World War II.

Chestnut approaching US 31W

Intersection of Chestnut Street with US 31W Bypass.

Motorist turning left from Northbound US 31W onto Chestnut Street.

Chestnut Street is a key route with WKU bus routes.

Utilities adjacent to University Boulevard.

University Boulevard traffic queue approaching US 31W.

Loving Way approach to US 31W.

Queue on Loving Way.

Outline

1. Existing Conditions
2. Pre-design Project History
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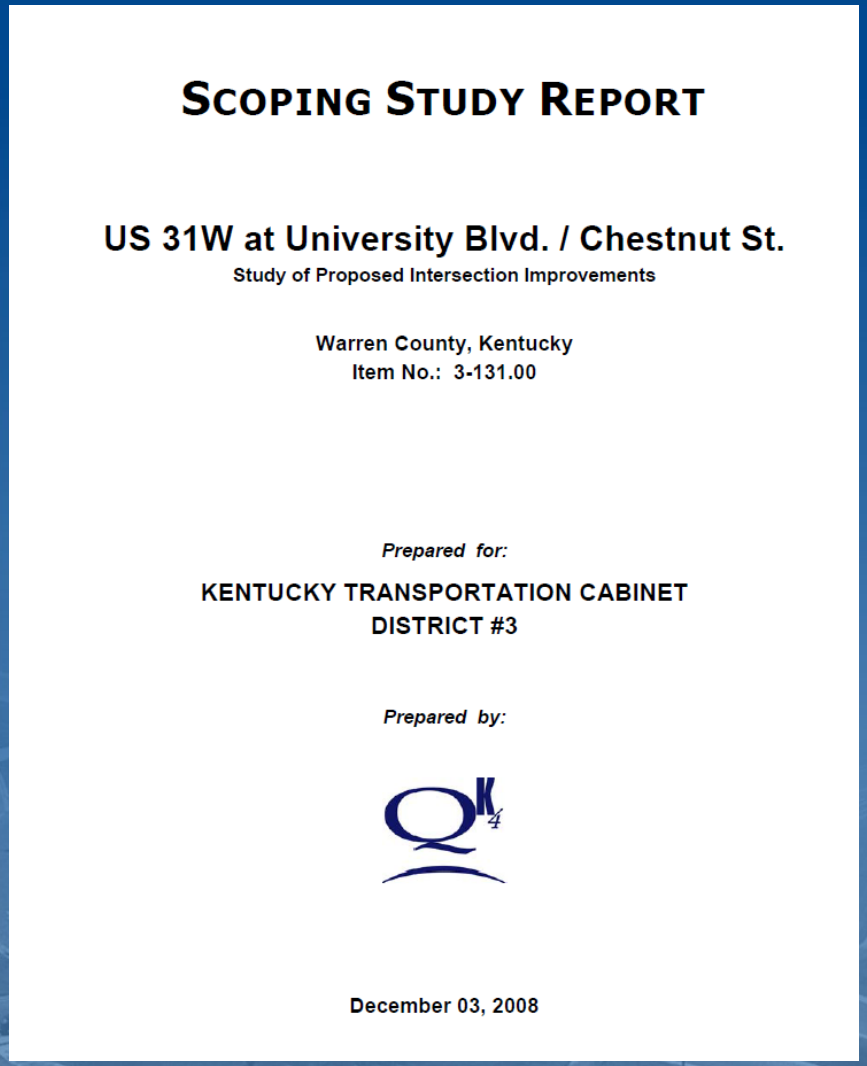
KENTUCKY TRANSPORTATION CABINET

Scoping Study in 2007-2008



SCOPING STUDY REPORT

US 31W at University Blvd. / Chestnut St.
Study of Proposed Intersection Improvements

Warren County, Kentucky
Item No.: 3-131.00

Prepared for:

KENTUCKY TRANSPORTATION CABINET
DISTRICT #3

Prepared by:

December 03, 2008

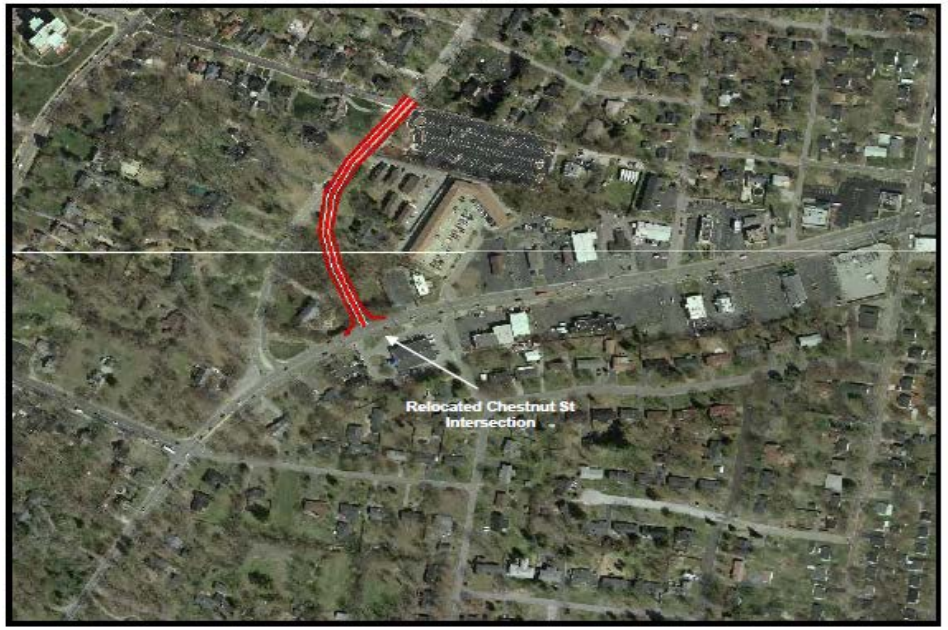
- QK4 was tasked on their statewide design contract to look at possible solutions to include both intersections
- They developed several alternatives:

Alternative 1: Widen for turn lanes

Alternative 1 Summary of Delays

From	To	AM Peak	PM Peak
Northbound US 31	Eastbound Loving	17	31
Northbound US 31	Northbound US 31	18	30
Northbound US 31	Northbound Chestnut	35	48
Northbound US 31	Westbound University	38	109
Westbound Loving	Northbound US 31	21	25
Westbound Loving	Northbound Chestnut	29	28
Westbound Loving	Westbound University	20	21
Westbound Loving	Southbound US 31	17	5
Southbound US 31	Northbound Chestnut	1	5
Southbound US 31	Westbound University	7	41
Southbound US 31	Southbound US 31	21	20
Southbound US 31	Eastbound Loving	34	64
Southbound Chestnut	Westbound University	13	184
Southbound Chestnut	Southbound US 31	18	175
Southbound Chestnut	Eastbound Loving	17	186
Southbound Chestnut	Northbound US 31	19	26
Eastbound University	Southbound US 31	20	5
Eastbound University	Eastbound Loving	18	136
Eastbound University	Northbound US 31	32	157
Eastbound University	Northbound Chestnut	45	164

Alternative 2: Realign Chestnut Street



Alternative 2 Summary of Delays

From	To	AM Peak	PM Peak
Northbound US 31	Eastbound Loving	20	36
Northbound US 31	Northbound US 31	21	36
Northbound US 31	Northbound Chestnut	24	52
Northbound US 31	Westbound University	57	120
Westbound Loving	Northbound US 31	26	19
Westbound Loving	Northbound Chestnut	32	20
Westbound Loving	Westbound University	23	23
Westbound Loving	Southbound US 31	17	6
Southbound US 31	Northbound Chestnut	1	170
Southbound US 31	Westbound University	8	273
Southbound US 31	Southbound US 31	25	257
Southbound US 31	Eastbound Loving	38	246
Southbound Chestnut	Westbound University	15	161
Southbound Chestnut	Southbound US 31	40	160
Southbound Chestnut	Eastbound Loving	22	138
Southbound Chestnut	Northbound US 31	12	15
Eastbound University	Southbound US 31	22	136
Eastbound University	Eastbound Loving	22	143
Eastbound University	Northbound US 31	32	161
Eastbound University	Northbound Chestnut	36	182

Alternative 5: Dual Roundabouts

Alternative 5 Summary of Delays

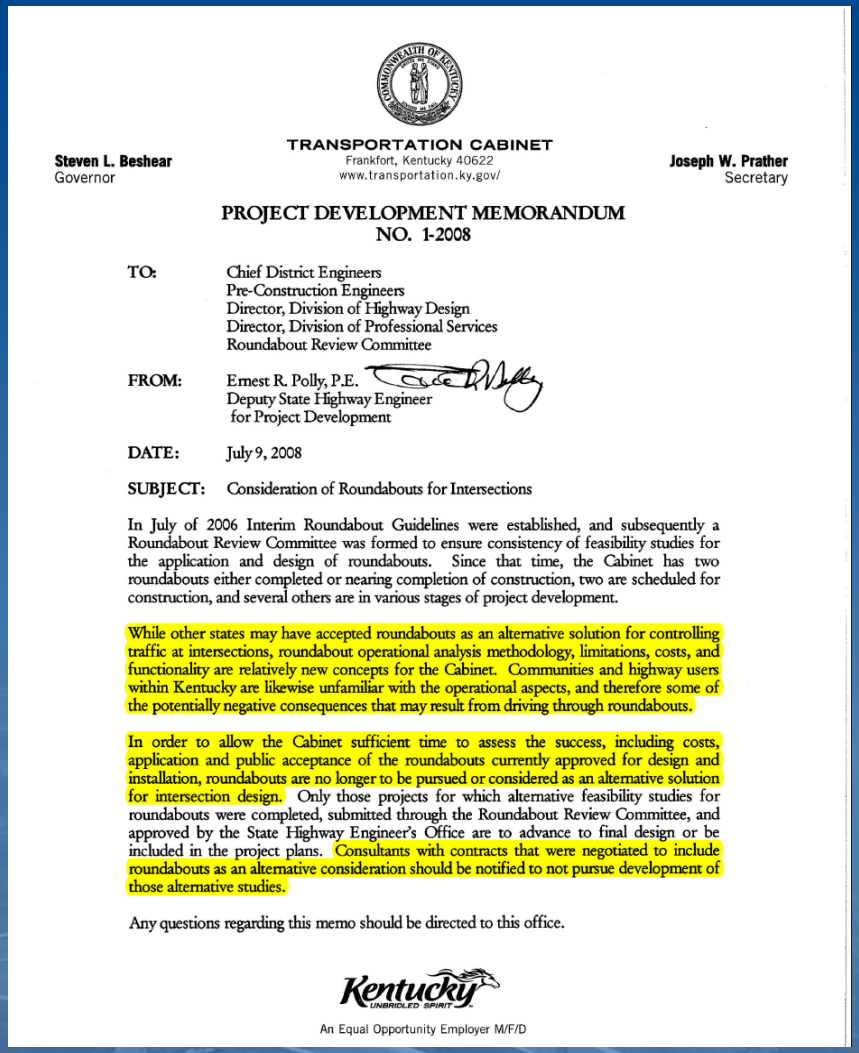
From	To	AM Peak	PM Peak
Northbound US 31	Eastbound Loving	22	103
Northbound US 31	Northbound US 31	22	168
Northbound US 31	Northbound Chestnut	64	240
Northbound US 31	Westbound University	63	111
Westbound Loving	Northbound US 31	29	4
Westbound Loving	Northbound Chestnut	54	12
Westbound Loving	Westbound University	48	11
Westbound Loving	Southbound US 31	38	9
Southbound US 31	Northbound Chestnut	6	9
Southbound US 31	Westbound University	10	24
Southbound US 31	Southbound US 31	42	18
Southbound US 31	Eastbound Loving	21	18
Southbound Chestnut	Westbound University	8	60
Southbound Chestnut	Southbound US 31	11	66
Southbound Chestnut	Eastbound Loving	20	52
Southbound Chestnut	Northbound US 31	5	18
Eastbound University	Southbound US 31	1	16
Eastbound University	Eastbound Loving	1	17
Eastbound University	Northbound US 31	3	40
Eastbound University	Northbound Chestnut	6	64

Alternative 6: Single Roundabout

Alternative 6 Summary of Delays

From	To	AM Peak	PM Peak
Northbound US 31	Eastbound Loving	17	44
Northbound US 31	Northbound US 31	17	37
Northbound US 31	Northbound Chestnut	12	39
Northbound US 31	Westbound University	51	123
Westbound Loving	Northbound US 31	29	30
Westbound Loving	Northbound Chestnut	15	35
Westbound Loving	Westbound University	23	28
Westbound Loving	Southbound US 31	8	11
Southbound US 31	Northbound Chestnut	1	149
Southbound US 31	Westbound University	26	189
Southbound US 31	Southbound US 31	52	268
Southbound US 31	Eastbound Loving	88	267
Southbound Chestnut	Westbound University	18	57
Southbound Chestnut	Southbound US 31	19	250
Southbound Chestnut	Eastbound Loving	23	227
Southbound Chestnut	Northbound US 31	4	215
Eastbound University	Southbound US 31	24	132
Eastbound University	Eastbound Loving	24	134
Eastbound University	Northbound US 31	44	155
Eastbound University	Northbound Chestnut	35	166

Roundabout Moratorium



TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Steven L. Beshear
Governor

Joseph W. Prather
Secretary

PROJECT DEVELOPMENT MEMORANDUM
NO. 1-2008

TO: Chief District Engineers
Pre-Construction Engineers
Director, Division of Highway Design
Director, Division of Professional Services
Roundabout Review Committee

FROM: Ernest R. Polly, P.E.
Deputy State Highway Engineer
for Project Development

DATE: July 9, 2008

SUBJECT: Consideration of Roundabouts for Intersections

In July of 2006 Interim Roundabout Guidelines were established, and subsequently a Roundabout Review Committee was formed to ensure consistency of feasibility studies for the application and design of roundabouts. Since that time, the Cabinet has two roundabouts either completed or nearing completion of construction, two are scheduled for construction, and several others are in various stages of project development.

While other states may have accepted roundabouts as an alternative solution for controlling traffic at intersections, roundabout operational analysis methodology, limitations, costs, and functionality are relatively new concepts for the Cabinet. Communities and highway users within Kentucky are likewise unfamiliar with the operational aspects, and therefore some of the potentially negative consequences that may result from driving through roundabouts.

In order to allow the Cabinet sufficient time to assess the success, including costs, application and public acceptance of the roundabouts currently approved for design and installation, roundabouts are no longer to be pursued or considered as an alternative solution for intersection design. Only those projects for which alternative feasibility studies for roundabouts were completed, submitted through the Roundabout Review Committee, and approved by the State Highway Engineer's Office are to advance to final design or be included in the project plans. Consultants with contracts that were negotiated to include roundabouts as an alternative consideration should be notified to not pursue development of those alternative studies.

Any questions regarding this memo should be directed to this office.

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Roundabouts again an alternative

TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Steven L. Beshear
Governor

Michael W. Hancock, P.E.
Acting Secretary

DESIGN MEMORANDUM NO. 03-10

TO: **Chief District Engineers**
Design Engineers
Active Consultants

FROM: **Jeff D. Jasper, P.E., Director**
Division of Highway Design

DATE: **July 20, 2010**

SUBJECT: **Design Guidance for Roundabout Intersections**

The Kentucky Transportation Cabinet continues to support the modern roundabout as a viable alternative for intersection design. To ensure successful operation, roundabouts must be placed at appropriate locations and be designed properly for the conditions. Effective with this memorandum, the attached design guidance should be used when considering a roundabout as an intersection alternative. Both single and multi-lane designs may be pursued at this time.

Roundabout Review and Approval

Conceptual Design Approval- In order for a roundabout to be identified as a preferred alternative, a concept report shall be submitted to, and approved by, the Division of Highway Design. Districts may submit this report through their respective Location Engineers for approval by the Director. This submittal should occur prior to public involvement activities and no later than the preliminary line and grade meeting. The concept report shall include at a minimum:

- Operational analysis and determination of lane configuration
- Identification of design vehicle(s)
- Preliminary layout including identification of inscribed circle diameter (see Tables 3 & 4 in the policy guidance attached)

Final Design Approval- The following information shall be submitted for approval as an appendix to the Design Executive Summary. This information should be submitted in graphical format.

- Design vehicle turning paths

Kentucky
UNBRIDLED SPIRIT

- Fastest path determination
- Entry Angle
- Sight Distance Analysis

Traffic Operations Approval- Lighting, Signing and Pavement Markings shall be presented at the Joint Inspection Meeting for approval by the Division of Traffic Operations.

Any questions regarding this memorandum should be directed to this office.

JDJ

Attachment

Approved Highway Plan Funding:

2008 Highway Plan Project Allotments: (Item No. 3-131)

Right of Way	Utilities	Construction	Total
$470,000	$760,000	$1,130,000	$2,360,000

2010 Highway Plan Project Allotments:

Right of Way	Utilities	Construction	Total
$470,000	$760,000	$2,200,000	$3,430,000

-all State Bond Funds- i.e. secure funds

2012 Highway Plan Project Allotments:

Right of Way	Utilities	Construction	Total
$1,050,000	$760,000	$1,170,000	$2,980,000

-all "SPP" and State Bond Funds- i.e. still secure

Feasibility Study by KTC (Adam Kirk)

ROUNDABOUT FEASIBILITY REVIEW AND ANALYSIS
US 31W AT UNIVERSITY BOULEVARD AND CHESTNUT STREET

Bowling Green, Warren County, Kentucky
Item No. 3-131.00

Prepared for

Kentucky Transportation Cabinet
District 3

Prepared by

Adam Kirk
Kentucky Transportation Center

September 10, 2010

CONCLUSION

This report analyzed the feasibility of a single roundabout alternative to alleviate congestion at University Boulevard and Chestnut Street. The analysis presented above has identified the modified roundabout as feasible at US31W and University Boulevard and found that it provides improved performance over the other alternatives initially considered at this location. The conceptual schematic of the design presented in **Attachment A** should be further evaluated to refine the roundabout geometrics and to identify potential methods for reducing impacts on residences and businesses on US 31W.

Outline

1. Existing Conditions
2. Pre-design Project History
3. **Benefits of Roundabouts**
4. Development of Design Project
5. Getting the Project to Letting

KENTUCKY TRANSPORTATION CABINET

Benefits of Roundabouts

1. Conflict points are reduced
2. Geometrics encourage speed reduction
3. Lower operating speeds reduce crash severity
4. Continuous flow reduces delay
5. Reduced fuel consumption (noise & air quality impacts)
6. Operation/maintenance costs can be less than signalized

Outline

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KENTUCKY TRANSPORTATION CABINET

Project Purpose & Need

The purpose of this project is to improve safety and mobility for motorists, bicyclists, and pedestrians along US 31W through the intersections with University Boulevard/Loving Way and with Chestnut Street.

Project Development Milestones

Nov. 2010	• KYTC issues Request for Proposals (RFP)
June 2011	• Consultant receives Notice to Proceed for Preliminary Engineering
Sept. 2011	• Project Team Meeting reviews Traffic Micro-simulation Analysis (VISSIM)
Nov. 2011	• Line & Grade Inspection to select recommended alternative
June 2012	• Consultant receives Notice to Proceed for Final Design
Jan. 2013	• Joint Inspection & Utility Coordination Meeting
Feb. 2013	• Public Meeting & ROW and Utility Funds authorized

Unique Project Challenges

1. WKU

Transit route

Minimizing property impacts

Younger driving population

Unique Project Challenges

2. Residences on two of four quadrants

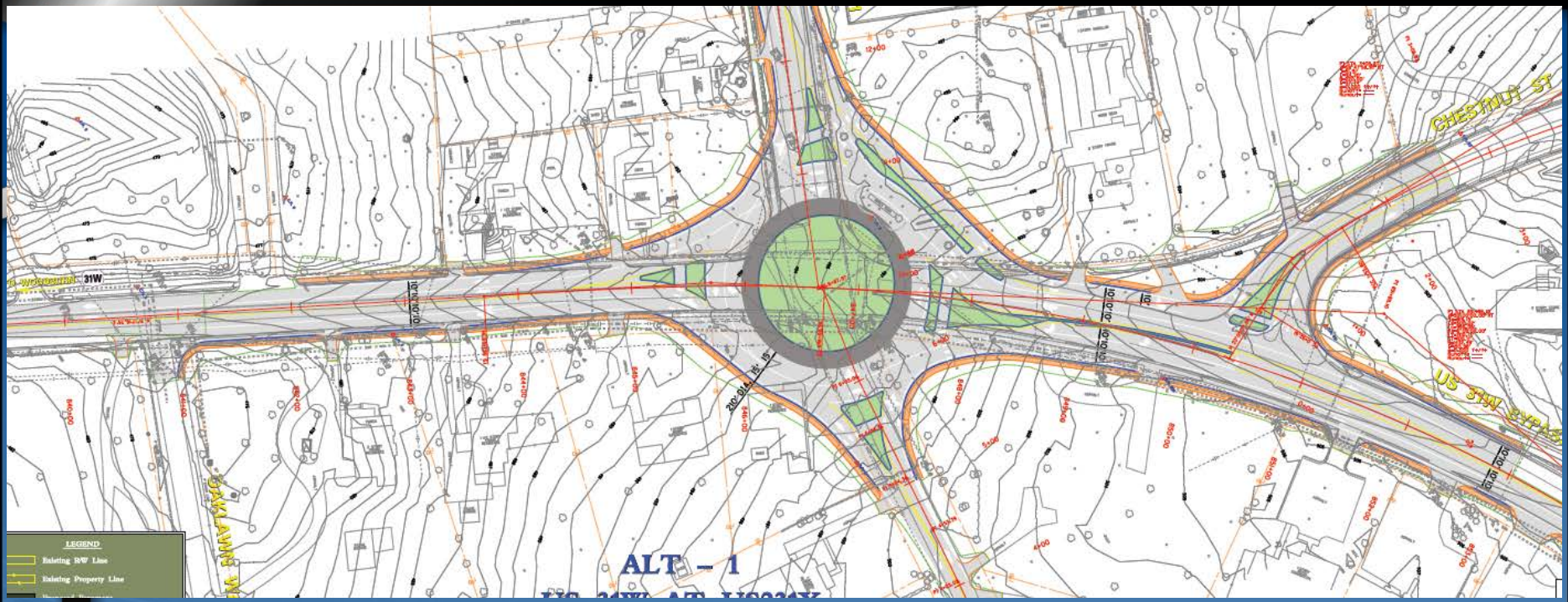
- Limited existing ROW
- Entrances
- 23 parcels

Unique Project Challenges

3. Profile grade and cross slopes into intersection

US 31W ~ 4% profile grade
Chestnut St. ~ 5% profile grade
US 31W horizontal curve creates superelevated pavement slopes

Recommended Alternative



Outline

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KENTUCKY TRANSPORTATION CABINET

Utility Coordination

- KYTC acquired utility easements
- KYTC paid 100% for private if dates met

- 7 utilities
- BGMU 69 kV trans. line
- AT&T duct bank

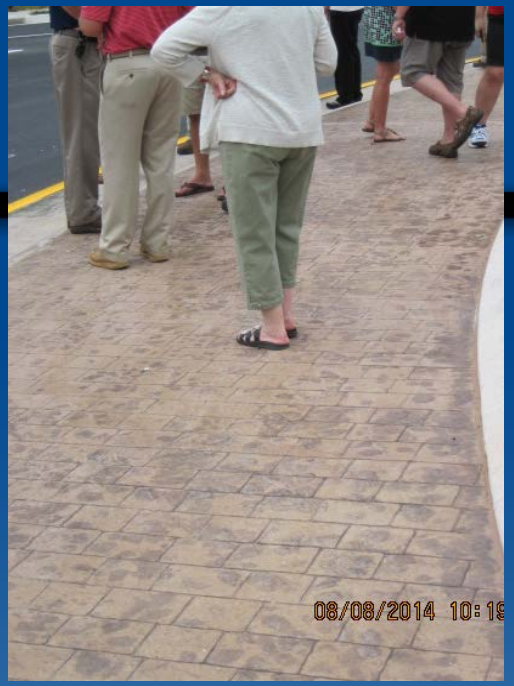
Project Development Milestones

Mar. 2013	• Coordination begins on Lighting Plans (Div. of Traffic, BGMU, B&N)
Apr. 2013	• NTP for Statewide ROW Services (HMB)
Aug. 2013	• Geotech drilling for self supporting steel poles
Sep. 2013	• Coordination begins w/ WKU on Landscaping
Dec. 2013	• ROW Clear (only 1 condemnation)
Dec. 2013	• First utility agreement executed

Project Development Milestones

Jan. 2014	• Utility relocations begin (to clear by May 15)
Mar. 2014	• Final plans submitted (+addendums)
Apr. 25, 2014	• Letting
Apr. 28, 2014	• Contract awarded
May 2, 2014	• Preconstruction Meeting
May 4, 2014	• Construction begins
Aug. 8, 2014	• Ribbon Cutting / Open to Traffic (96 days)

Finished Product



Top Left: Ribbon cutting.
Top Right: Stamped concrete truck apron.
Bottom Right: WKU Gateway Wall in Central Island.

Time Lapse Video

http://www.scottyscontracting.com/TimeLapse.wmv

Development of Bowling Green's First Roundabout

Thank you

BURGESS & NIPLE

KENTUCKY TRANSPORTATION CABINET

KTC