Truck Route Access Evaluation: Bullitt County Stone, Shepherdsville, Site #2031

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TRUCK ROUTE ACCESS EVALUATION

Bullitt County Stone
Shepherdsville
Site # 2031

KTC Report No. 99-26

“Freight Movement and Intermodal Access in Kentucky”
Project No. SPR 98-189

By

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with

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UK

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1.0 Introduction

This is a study undertaken by the Kentucky Transportation Center on behalf of the Kentucky Transportation Cabinet (KYTC). There are two main objectives of the Freight Movement and Intermodal Access in Kentucky Study (SPR 98-189): evaluation of the access for trucks between intermodal or other truck generating sites and the National Highway System (NHS); and furthering the understanding of freight commodity flows throughout the state. This report summarizes the access evaluation for the Bullitt County Stone facility located in Bullitt County in the KIPDA Area Development District (ADD) and KYTC Highway District #5. The location of the site is shown in Figure 1. Work on other specific sites as well as the freight commodity flow task is ongoing and documented elsewhere.

The sites to be evaluated in this study were selected from two existing databases (a truck facility survey from 1994 and the intermodal facility inventory) based on ADD and KYTC Highway District planner recommendations, geographic location, distance to the NHS, and the number of trucks accessing the site. Consideration was also made for the freight type handled and transportation modes used.

The site was visited for video recording on February 18, 1998. The field data were collected on September 1 and October 13, 1998. The facility is located on KY 1526 approximately 4 miles northeast of Shepherdsville. A phone survey was conducted with facility managers early in the study process. The phone survey conducted with Bullitt County Stone found that approximately 180 trucks per day access the site. The most common truck is a triaxle with the largest being a 48-foot semitrailer. The freight handled at this facility is primarily stone. The survey respondent did not indicate any problems along this route, and it was noted that a new bypass has alleviated some problems. The phone survey information can be found in Appendix A.

2.0 Truck Route in Use

Figure 1 shows the primary route used to reach the National Highway System from the facility on KY 1526. Trucks travel south on KY 61 then east on KY 44 to reach exit 117 of I-65. This is a total route length of 4.3 miles. KY 61 and KY 1526 are rural highways with 1998 ADTs of 17,156 and 6,593 respectively. KY 44 has significant commercial development. KY 44 is divided by a center turn lane, has four traffic signals and an 1998 ADT of 18,194. All of the roads are state-maintained.
Figure 1: Location of Truck Generating Site
3.0 Route Data Collection and Evaluation

The route features that are to be evaluated in this study are shown in Table 1 along with a brief description of the evaluation method. While some of these features required only subjective evaluation by the engineer during site inspection, others required quantitative measurement in order to label the particular point or section as "preferred," "adequate" or "less than adequate" for truck access. The guidelines for labeling a point or section into one of these three descriptive categories are provided in both the interim and final report for this project. In several cases measurements were only taken where subjective evaluation indicated a problem might exist.

3.1 Traffic Operations and Level of Service

The survey of this site indicated that there were no operational problems or concerns for this site. Thus, no traffic evaluations were performed.

3.2 Accident History

In 1997, the Kentucky Transportation Center studied all state-maintained roads throughout Kentucky and determined average truck accident rates for different types of road sections. A critical accident rate was then calculated using the average accident rate for a specific highway type along with an assumed level of statistical significance and exposure (vehicle miles traveled). There were no sections of this route with a truck accident rate as high as the critical rate for the particular highway type.

Figure 2 shows the locations of accidents during the years 1995, 1996 and 1997. The figure shows that the locations with the highest number of accidents were in Shepherdsville and near the I-65 interchange. It is not unexpected for intersection accidents to be common in higher traffic areas. However, as indicated in a summary of the types of accidents along the truck route in Table 2 for the same three year period, the percentage of these accidents involving trucks is very low. The percentage of accidents involving trucks (3.7%) is lower than the percentage trucks on the route (5.9%). This suggests there are no apparent truck related safety concerns along this route from an accident history point of view. The percentage trucks was obtained from a 1993 KYTC Vehicle Classification Count on KY 61.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Methodology</th>
<th>Team Consensus based on Committee Meeting and Draft Report Feedback</th>
<th>Feature Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offtracking</td>
<td>Lane Width with formula based on wheel and axle spacing</td>
<td>Evaluate where observation of trucks indicates possible offtracking - use HIS data and collect in field</td>
<td>Point</td>
</tr>
<tr>
<td>Max. Safe Speed on a Curve</td>
<td>Ball Bank Indicator Reading</td>
<td>Evaluate complete route due to ease of data collection</td>
<td>Point</td>
</tr>
<tr>
<td>Grade</td>
<td>Speed Reduction Tables with Percent Grade and Direct Observation</td>
<td>Evaluate where observation of trucks indicates speed reduction occurs using HIS data and collect in field as needed</td>
<td>Continuous</td>
</tr>
<tr>
<td>Lane Width</td>
<td>HIS data and field measurement</td>
<td>Review complete route due to ease of data collection</td>
<td>Continuous</td>
</tr>
<tr>
<td>Clear Zone</td>
<td>Observation</td>
<td>Subjective evaluation</td>
<td>Subjective</td>
</tr>
<tr>
<td>Shoulders</td>
<td>HIS data and field measurement</td>
<td>Evaluate where HIS data is available and estimate based on observation elsewhere</td>
<td>Continuous</td>
</tr>
<tr>
<td>Pavement Condition</td>
<td>Observation</td>
<td>Subjective evaluation</td>
<td>Subjective</td>
</tr>
<tr>
<td>Truck Stopping Sight Distance</td>
<td>Field measurements</td>
<td>Measure only when observation indicates possible problem</td>
<td>Point</td>
</tr>
<tr>
<td>Turning Radii</td>
<td>Field measurements and observations of trucks</td>
<td>Measure only when observation indicates possible problem</td>
<td>Point</td>
</tr>
<tr>
<td>Accident History</td>
<td>Accident data files and KTC High Truck Accident Report</td>
<td>Do for entire route</td>
<td>Subjective</td>
</tr>
<tr>
<td>Intersection LOS</td>
<td>Traffic counts</td>
<td>Only where problems are indicated by facility managers</td>
<td>Point</td>
</tr>
<tr>
<td>Route LOS</td>
<td>Traffic counts and travel time studies</td>
<td>Only where problems are indicated by managers</td>
<td>Continuous</td>
</tr>
<tr>
<td>RR Crossings</td>
<td>Field Observation</td>
<td>Evaluate all level crossings</td>
<td>Point</td>
</tr>
<tr>
<td>Bridges</td>
<td>KYTC Sufficiency Rating</td>
<td>Evaluate all bridges</td>
<td>Point</td>
</tr>
</tbody>
</table>
Figure 2: Accident Locations (1995 - 1997)
Table 2: Accident Types along Truck Route

<table>
<thead>
<tr>
<th></th>
<th>Non-Truck Accidents</th>
<th>Truck Accidents</th>
<th>Percent Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>208</td>
<td>8</td>
<td>3.7</td>
</tr>
<tr>
<td>Fatal Accidents</td>
<td>2</td>
<td>1</td>
<td>33.3</td>
</tr>
<tr>
<td>Injury</td>
<td>59</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Intersection</td>
<td>94</td>
<td>4</td>
<td>4.1</td>
</tr>
</tbody>
</table>

3.3 Cross Section Features

Figures 3 and 4 illustrate the sections of the route having different widths of lanes and shoulders. KY 1526 has “adequate” 11-foot lanes and KY 44 has “preferred” 12-foot lanes. The lane width on KY 44 varies from a “less than adequate” 10 feet to a “preferred” 12 feet. A short section of KY 61 had an “adequate” 10-foot stabilized shoulder and part of KY 44 had a “preferred” 10-foot paved shoulder. The curbed section of KY 61 had a paved parking lane which could be used as a shoulder. All other route sections had “less than adequate” shoulders of various widths. As shown in Figure 5, the section of KY 61 just north of Shepherdsville had utility poles close to the roadway. No other significant clear zone problems were found on the route. The pavement was in generally good condition.
Figure 3: Lane Widths

LEGEND
- Facility
- Lane Width - 10 Feet
- Lane Width - 11 Feet
- Lane Width - 12 Feet
- State Highway System
- Other Roads

Scale - 1:40000

0.4 0.4 0.8 1.2 Miles
900 900 1800 Meters
Figure 4: Shoulder Widths
3.4 Curvature Features

Grades are considered problematic if they cause trucks to slow down excessively. No such grades were found on this route.

Offtracking is considered a problem where a truck cannot stay in its lane through a curve. Three curves near the bridge over I-65 were rated “adequate” for offtracking as calculated from lane width and degree of curvature. The curve locations are shown in Figure 6. Two of those curves were rated “less than adequate” for safe speed on a curve as indicated by ball bank indicator readings (see Figure 7).

The turning radius from KY 44 onto KY 61 was approximated in the field. The approximate layout of this intersection is shown in Figure 8. The 35-foot radius was rated “less than adequate” because trucks must turn into opposing traffic.
Figure 6: Curves Where Offtracking Could Occur

LEGEND
- Facility
- Offtracking - Adequate

Scale - 1:40000

0.3 0 0.3 0.6 0.9 1.2 Miles

500 0 500 1000 1500 2000 Meters
Figure 7: Curves Where Safe Speed May be a Problem

LEGEND

- Facility
- Curve Speed - Less Than Adequate

Scale - 1:40000

0.4 0 0.4 0.8 1.2 Miles

900 0 900 1800 Meters
3.5 Railroad Crossings

There was one at-grade railroad crossing on KY 44 approximately 600 feet east of KY 61. The crossing received an “adequate” rating because it was humped. This crossing can cause traffic problems by causing traffic to back up into the nearby intersection.

3.6 Bridges

As shown in Figure 9, there were five bridges on this route. The bridge sufficiency ratings (provided by the Division of Operations at the KYTC) for those bridges is listed in Table 3. A sufficiency rating of 80 or higher (out of a possible 100) is considered “preferred,” and a rating of at least 50 is “adequate.” Two of the bridges received an “adequate” rating.
Figure 9: Bridge Locations

[Map showing bridge locations with a legend indicating symbols and units of measurement.]
Table 3: Bridge Sufficiency Ratings

<table>
<thead>
<tr>
<th>Route</th>
<th>Milepoint</th>
<th>Sufficiency Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>KY 44</td>
<td>13.1</td>
<td>65.0</td>
</tr>
<tr>
<td>KY 61</td>
<td>16.3</td>
<td>73.8</td>
</tr>
<tr>
<td>KY 61</td>
<td>17.0</td>
<td>90.2</td>
</tr>
<tr>
<td>KY 61</td>
<td>17.4</td>
<td>83.7</td>
</tr>
<tr>
<td>KY 61</td>
<td>18.0</td>
<td>93.9</td>
</tr>
</tbody>
</table>

3.7 Sight Distance

There were no sight distance problems observed on this route.

3.8 Other Route Features

KY 44 has four lanes at the I-65 interchange and soon narrows to two lanes. The right westbound lane ends in the intersection shown in Figure 10. Two through lanes enter the intersection with a one departure lane. Vehicles were observed traveling on the shoulder attempting to merge after the intersection.

Figure 10: Lane Drop on KY 44 (Looking East)
4.0 Route Evaluation and Recommendations

4.1 Problem Truck Miles and Truck Points

In order to compare different routes to consider relative urgency of needed route improvements the features rated "preferred," "adequate" and "less than adequate" along a route were normalized for the number of miles, number of points and number of trucks using the route section. In the case of this Bullitt County route, seven features that were evaluated quantitatively have sections or points that are considered only "adequate" or "less than adequate." A section or point that is considered "less than adequate" is weighted two times that of an "adequate" point or section. Less than "preferred" sections are weighted by length as well as the number of trucks passing that point. The number of trucks on KY 61 was obtained from a 1993 KYTC Vehicle Classification Count. The percentage trucks was not available for KY 44, so it was assumed that the truck percentage is similar to that on KY 61. The survey information was used to estimate the number of trucks on KY 1526.

Table 4 contains the total problem truck miles and total problem points for lane width, shoulder, offtracking, curve speed, turning radius, railroad and bridges along this route. The rating of this route relative to others evaluated will be reported in the final report.

4.2 Maintenance Improvement Locations

Some features noted during the site work could be addressed during routine maintenance programs by either the state or county and therefore could improve truck access without requiring major construction or expense. The merge area on KY 44 westbound could be shifted so that it does not occur in the intersection.
Table 4: Summary of Problem Truck Miles and Points for Entire Route

<table>
<thead>
<tr>
<th>Feature</th>
<th>Road</th>
<th>Location</th>
<th>Points*</th>
<th>Length (miles)</th>
<th>Trucks (/day)</th>
<th>Truck-points</th>
<th>Truck-miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane Width</td>
<td>KY 61</td>
<td>10' Sections</td>
<td>2</td>
<td>1.5</td>
<td>664</td>
<td></td>
<td>1992.0</td>
</tr>
<tr>
<td></td>
<td>KY 61</td>
<td>11' Sections</td>
<td>1</td>
<td>1.9</td>
<td>664</td>
<td></td>
<td>1261.6</td>
</tr>
<tr>
<td></td>
<td>KY 1526</td>
<td>Length</td>
<td>1</td>
<td>0.2</td>
<td>360</td>
<td></td>
<td>72.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>3,325.6</strong></td>
</tr>
<tr>
<td>Shoulders</td>
<td>KY 44</td>
<td>West of I-64</td>
<td>2</td>
<td>0.5</td>
<td>1410</td>
<td></td>
<td>1410.0</td>
</tr>
<tr>
<td></td>
<td>KY 61</td>
<td>Near town</td>
<td>2</td>
<td>1.8</td>
<td>664</td>
<td></td>
<td>2390.4</td>
</tr>
<tr>
<td></td>
<td>KY 61</td>
<td>Middle section</td>
<td>1</td>
<td>0.5</td>
<td>664</td>
<td></td>
<td>332.0</td>
</tr>
<tr>
<td></td>
<td>KY 61</td>
<td>Near KY 1526</td>
<td>2</td>
<td>1.1</td>
<td>664</td>
<td></td>
<td>1460.8</td>
</tr>
<tr>
<td></td>
<td>KY 1526</td>
<td>Length</td>
<td>2</td>
<td>0.2</td>
<td>360</td>
<td></td>
<td>144.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>5,737.2</strong></td>
</tr>
<tr>
<td>Offtracking</td>
<td>KY 61</td>
<td>MP 16.2</td>
<td>1</td>
<td>664</td>
<td>664</td>
<td></td>
<td><strong>1,992</strong></td>
</tr>
<tr>
<td></td>
<td>KY 61</td>
<td>MP 16.4</td>
<td>1</td>
<td>664</td>
<td>664</td>
<td></td>
<td><strong>1,992</strong></td>
</tr>
<tr>
<td></td>
<td>KY 61</td>
<td>MP 16.6</td>
<td>1</td>
<td>664</td>
<td>664</td>
<td></td>
<td><strong>1,992</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>1,992</strong></td>
</tr>
<tr>
<td>Curve Speed</td>
<td>KY 61</td>
<td>MP 16.2</td>
<td>2</td>
<td>664</td>
<td>1328</td>
<td></td>
<td><strong>2,656</strong></td>
</tr>
<tr>
<td></td>
<td>KY 61</td>
<td>MP 16.4</td>
<td>2</td>
<td>664</td>
<td>1328</td>
<td></td>
<td><strong>2,656</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>2,656</strong></td>
</tr>
<tr>
<td>Turning Radius</td>
<td>KY 44</td>
<td></td>
<td>2</td>
<td>705</td>
<td>705</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Railroad</td>
<td>KY 61</td>
<td>East of KY 61</td>
<td>1</td>
<td>664</td>
<td>664</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridges</td>
<td>KY 44</td>
<td>MP 13.1</td>
<td>1</td>
<td>1410</td>
<td>1410</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>KY 61</td>
<td>MP 16.3</td>
<td>1</td>
<td>664</td>
<td>664</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>2,074</strong></td>
</tr>
</tbody>
</table>

*1 point for "adequate" features and 2 points for "less than adequate" features (0 points for "preferred" features not shown)
4.3 Overall Route Rating

In order to account for both the subjectively and objectively evaluated route features along truck routes throughout the state, UK engineers who studied the route and its features (either during a site visit or by viewing a video of trucks using the routes) have rated the overall access on a scale of 1 through 10. The interpretation for these ratings is shown in Table 5. The route to Bullitt County Stone was given an overall rating of 7 indicating that minor improvements could improve truck access along the route.

Table 5: Interpretation of the Overall Route Rating

<table>
<thead>
<tr>
<th>Overall Route Rating</th>
<th>Qualitative Interpretation of Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trucks should not be using this route</td>
</tr>
<tr>
<td>2</td>
<td>Major construction is required to improve this route</td>
</tr>
<tr>
<td>3-5</td>
<td>Minor improvements are required on this route</td>
</tr>
<tr>
<td>6-8</td>
<td>Minor improvements could improve this route</td>
</tr>
<tr>
<td>9</td>
<td>Minor problems exist that do not seriously impede truck access</td>
</tr>
<tr>
<td>10</td>
<td>Trucks are served with reasonable access</td>
</tr>
</tbody>
</table>

4.4 Conclusions and Recommendations

In conclusion, the following problems were identified along the truck route:

- Narrow lanes and shoulders on KY 61,
- Problematic horizontal curves on KY 61,
- Inadequate turning radius at the intersection of KY 44 and KY 61,
- A humped railroad crossing on KY 44, and
- An intersection in the merge area of a lane drop on KY 44.

The recommended improvements are:

- The intersection of KY 44 and KY 61 could be rebuilt,
- The humped railroad crossing could be improved, and
- The merge area on KY 44 could be moved away from the intersection.
Appendices
Appendix A: Phone Survey Conducted with Facility

<table>
<thead>
<tr>
<th>Facility ID</th>
<th>Facility Name</th>
<th>Location / City</th>
<th>County</th>
<th>ADD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2031</td>
<td>Bullitt County Stone</td>
<td>Shepherdsville</td>
<td>Bullitt</td>
<td>KIPDA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Title</th>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tommy Jewell</td>
<td></td>
<td>502-957-5180</td>
<td>502-957-5394</td>
</tr>
</tbody>
</table>

1. Is the location of your facility on the map correct? Yes

2. Our information shows about ___ trucks per day access your facility. Is that correct? Yes

3. Is the truck traffic to and from your facility seasonal or mostly constant?
   Peak in August and September

4. (If truck traffic is seasonal) Is the ___ trucks/day for the peak season? No, 250 peak

5. What is the most common size truck operating at your facility? Triaxle

6. What is the largest truck operating at your facility? 48' Semitrailer

7. What type of freight or commodity is shipped, and is incoming and outgoing freight different?
   (one may be an empty truck)

8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon) Constant

9. What traffic congestion and delay problems along the routes are you aware of, or feel need improvement?
   Location (route segment, intersection, etc.) Time and Day of Week
   None

10. Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W)
    To South End

11. Do you have any other problems or concerns along the route you would like us to consider?
    No - New bypass opened last spring that has helped alleviate problems.

12. Would you like a copy of the final report (roadway/route evaluation ???) Yes