TRUCK ROUTE ACCESS EVALUATION

Cook Family Foods
Grayson
Site # 2663

Report No. KTC-98-28

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

By

Joel Weber

with

Ken Agent
Brian Aldridge
Lisa Aultman-Hall
Dave Cain
Nicole Lefever
Nick Stamatiadis

Kentucky Transportation Center and the Department of Civil Engineering
University of Kentucky

September 1998
Table of Contents

1.0 Introduction .............................................................. I
2.0 Truck Route in Use .......................................................... 1
3.0 Route Data Collection and Evaluation ...................................... 3
   3.1 Traffic Operations and Level of Service ................................... 3
   3.2 Accident History .......................................................... 6
   3.3 Cross Section Features .................................................. 6
   3.4 Curvature Features ...................................................... 6
   3.5 Railroad Crossings .................................................... 10
   3.6 Bridges ............................................................... 10
   3.7 Sight Distance ......................................................... 10
   3.8 Other Route Features ................................................ 10
4.0 Route Evaluation and Recommendations ................................... 11
   4.1 Problem Truck Miles and Truck Points ................................... 11
   4.2 Maintenance Improvement Locations .................................... 12
   4.3 Overall Route Rating .................................................. 12

Appendices

Appendix A: Field Site Visit Dates and Activities
Appendix B: Phone Survey Conducted with Facility
Appendix C: Traffic Counts, Intersection Layout and Travel Time Data
List of Tables

Table 1: Route Features and Method of Evaluation ................................... 4
Table 2. LOS analysis for intersection (sec/veh / LOS) ................................. 5
Table 3: Accident Types along CW Stevens Boulevard ................................. 6
Table 4: Summary of Problem Truck Miles and Points for Entire Route .......... 11
Table 5: Interpretation of the Overall Route Rating .................................. 12

List of Figures

Figure 1: Location of Truck Generating Site .............................................. 2
Figure 2: Lane Widths ............................................................................. 7
Figure 3: Shoulder Widths ...................................................................... 8
Figure 4: Approximate Turning Radius at KY 1/KY 7 and CW Stevens Boulevard ... 9
Figure 5: Truck Turning from KY 1/KY 7 onto CW Stevens Boulevard .......... 10
1.0 Introduction

This is a study undertaken 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 Cook Family Foods facility located in Carter county in the FIVCO Area Development District (ADD) and KYTC Highway District #9. The location of the site is shown in Figure 1. Work on other specific sites as well as the freight commodity flow task are on-going and are 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 and data collection as listed in Appendix A. The facility is located at the end of CW Stevens Boulevard approximately 0.5 miles east of KY 1/KY 7, which is part of the National Highway System. The surrounding area is currently being developed. A phone survey was conducted with facility managers early in the study process. The phone survey found that approximately 50 trucks per day access the site. The trucks are generally semi tractor trailers with a maximum length of 53 feet. The freight handled at this facility is primarily meat products. The survey indicated that the traffic signal at the intersection of CW Stevens Boulevard and KY 1/KY 7 is slow, and that the exit ramp from I-64 eastbound does not have a traffic signal. The phone survey information can be found in Appendix B.

2.0 Truck Route in Use

There is currently only one route for trucks to reach the National Highway System from this site. *The trucks accessing the facility are traveling to and from KY 1/KY 7, a distance of less than a mile as shown in Figure 1. CW Stevens Boulevard is a paved street with extremely faded center and edge lines. It is not state maintained. The only traffic signal on the route is at the intersection of CW Stevens Boulevard and KY 1/KY 7.

*Although the route to the NHS ends at KY1/KY 7, the evaluation of traffic operations and level of service in Section 3.1 was expanded to include the I-64 interchange so that the problems described in the phone survey could be addressed.
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 require 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 as “preferred” type sections and points do not contribute to an increase in the problem truck points or miles that are summed for the route (see Section 4).

3.1 Traffic Operations and Level of Service

The phone survey of this site indicated that there may be a need for a signal at the I-64 ramps and there are delay related problems at the intersection of KY 1/KY 7 and CW Stevens Boulevard. Therefore, the intersection was analyzed using the Level of Service (LOS) approach from the Highway Capacity Software and an overall arterial LOS was utilized using a travel time study. The midday peak period was used for both analysis. Basic assumptions for all intersections are the lack of signal coordination, the absence of pedestrians, and the use of 3 seconds as lost time per phase. The lane use diagrams and volume counts for each intersection are shown in Appendix C.

The results for the intersection using the HCS analysis are shown in Table 2. The LOS for the intersection is at acceptable level A overall, with very low delays and no approach has any significant delays.

For the arterial analysis, a travel time study was conducted where an observer traveled along the path to access I-64 in both directions while maintaining the speed of the traffic. Three passes were made for each direction (field data is shown in Appendix C) and the average time for each direction was computed--131 sec to I-64 and 164 sec from I-64. Given the length of the route, 1.010 miles, the average travel speeds were computed--to I-65 27.8 mph and from I-65 22.2 mph. Using the Highway Capacity Manual and for a type II arterial--urban with medium development and 45 mph speed limit--the LOS is B for the direction toward I-64 and C for the direction from I-64. Therefore, no significant delays or operational problems experienced along this route, since the arterial operates at an acceptable LOS during the peak period.

Finally, the traffic volumes recorded do not indicate that a signal is warranted at the interstate ramps based on required volumes according to the Manual of Uniform Traffic Control Devices.

Given this analysis, the access route operates at an acceptable level. As the area develops further, traffic consideration may be warranted.
<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>
Table 2. LOS analysis for intersection (sec/veh / LOS) (May 14, 1998)

<table>
<thead>
<tr>
<th>Intersection</th>
<th>East-bound</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Inters.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LTR</td>
<td>App</td>
<td>L</td>
<td>T+R</td>
<td>App</td>
<td>LTR</td>
<td>App</td>
<td></td>
</tr>
<tr>
<td>KY 1/KY 7 @ CW Stevens</td>
<td>9.7/B</td>
<td>9.6/B</td>
<td>10.0/B</td>
<td>9.4/B</td>
<td>9.8/B</td>
<td>5.9/A</td>
<td>6.0/A</td>
<td>5.7/B</td>
</tr>
</tbody>
</table>
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 (vehicles miles traveled). There were no sections of this route with a truck accident rate as high as the critical rate for that particular highway type.

A summary of the accidents along CW Stevens Boulevard is shown in Table 3 for the years 1994, 1995 and 1996. There were only three accidents along this route, none of them involving trucks. This suggests there are no apparent truck related safety concerns along this route from an accident history point of view.

Table 3: Accident Types along CW Stevens Boulevard

<table>
<thead>
<tr>
<th></th>
<th>Non-Truck Accidents</th>
<th>Truck Accidents</th>
<th>Percent Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal Accidents</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Injury</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Intersection</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

3.3 Cross Section Features

Figures 2 and 3 illustrate the sections of the route having different widths of lanes and shoulders. The 11 foot lanes and 10 foot gravel shoulders on the first section (0.24 mi) of CW Stevens Boulevard are considered “adequate” for trucks. The remaining section has “less than adequate” 10.5 foot lanes and does not have a shoulder which is also considered “less than adequate.” No significant clear zone problems were found and the pavement was in good condition.

3.4 Curvature Features

Grades are considered problematic if they cause trucks to slow down excessively. No such grades were found on CW Stevens Boulevard. There were no segments where safe speed on curves or offtracking would be a problem for trucks along this route.
Figure 2: Lane Widths

LEGEND

- Facility
- Lane Width: 10.5 Feet
- Lane Width: 11 Feet
- State Highway System
- Other Roads

Scale - 1:12000

0.3 0 0.3 0.6 Miles
300 0 300 600 Meters
Figure 3: Shoulder Widths

LEGEND

- Facility
- No Shoulder
- Shoulder Width: 10 Feet
- State Highway System
- Other Roads

Scale - 1:12000

0.3 0 0.3 0.6 Miles

300 0 300 600 Meters
The turning radius from KY 1/KY 7 onto CW Stevens Boulevard was approximated in the field. The layout of this location is shown in Figure 4. The 40 foot radius was rated "adequate" because the trucks must use the gravel shoulder to complete the turn as shown in Figure 5. The turning radius from CW Stevens Boulevard north onto KY 1/KY 7 was also rated "adequate" because trucks can complete turn by partially encroaching on other lanes in the same direction.

**Figure 4: Approximate Turning Radius at KY 1/KY 7 and CW Stevens Boulevard**
3.5 Railroad Crossings

There were no at-grade railroad crossings on this route.

3.6 Bridges

There were no bridges on this route.

3.7 Sight Distance

There were no sight distance problems on this route.

3.8 Other Route Features

There is a K-mart on CW Stevens Boulevard near the entrance to Cook Family Foods (see Figure 1). Several trucks were observed using the K-mart parking lot as a turning area and for short term parking. The turning radius onto CW Stevens Boulevard at the K-mart entrance is "less than adequate."
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 are to be normalized for the number of miles, number of points and number of trucks using the route section. In the case of the Cook Family Foods route, three 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 was obtained from a 1998 KYTC Vehicle Classification Count.

Table 4 contains the total problem truck miles and total problem points for lane width, shoulders and turning radii along this route. The rating of this route relative to others evaluated will be reported in the final report.

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>CW Stevens</td>
<td>First half</td>
<td>1</td>
<td>0.24</td>
<td>307</td>
<td></td>
<td>73.7</td>
</tr>
<tr>
<td></td>
<td>CW Stevens</td>
<td>Second half</td>
<td>2</td>
<td>0.24</td>
<td>307</td>
<td></td>
<td>147.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>221.1</td>
</tr>
<tr>
<td>Shoulders</td>
<td>CW Stevens</td>
<td>First half</td>
<td>1</td>
<td>0.24</td>
<td>307</td>
<td></td>
<td>73.7</td>
</tr>
<tr>
<td></td>
<td>CW Stevens</td>
<td>Second half</td>
<td>2</td>
<td>0.24</td>
<td>307</td>
<td></td>
<td>147.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>221.1</td>
</tr>
<tr>
<td>Turning Radii</td>
<td>KY 1/KY7</td>
<td>CW Stevens</td>
<td>1</td>
<td>261</td>
<td>261</td>
<td></td>
<td>261</td>
</tr>
<tr>
<td></td>
<td>CW Stevens</td>
<td>KY 1/KY7</td>
<td>1</td>
<td>46</td>
<td>46</td>
<td></td>
<td>46</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>307</td>
</tr>
</tbody>
</table>

*1 point for "adequate" features and 2 points for "less than adequate" features (0 points for "preferred" features not shown)
4.2 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 center and edge lines on CW Stevens Boulevard could be repainted, and pavement widening could reduce the turning radius problems at the intersection of CW Stevens Boulevard and KY 1/KY 7.

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 in Carter County to Cook Family Foods was given an overall rating of 8 indicating that minor improvements could improve the truck access along this route.

<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>

Table 5: Interpretation of the Overall Route Rating
Appendix A: Field Site Visit Dates and Activities

February 25, 1998 - initial site visit and video taping
May 6, 1998 - field data collection
May 14, 1998 - traffic counts and travel time survey
Appendix B: 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>2663</td>
<td>Cook Family Foods</td>
<td>Grayson</td>
<td>Carter</td>
<td>FIVCO</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>Don Bond</td>
<td></td>
<td>606-474-3900</td>
<td>606-474-3939</td>
</tr>
</tbody>
</table>

1. Is the location of your facility on the map correct? No, should be at end of CW Stevens
2. Our information shows about ___50___ trucks per day access your facility. Is that correct? Yes
3. Is the truck traffic to and from your facility seasonal or mostly constant? Seasonal, September - April peak season
4. (If truck traffic is seasonal) Is the ___50___ trucks/day for the peak season? Yes
5. What is the most common size truck operating at your facility? Semitrailer 40' refrigerated
6. What is the largest truck operating at your facility? Semitrailer 53'
7. What type of freight or commodity is shipped, and is incoming and outgoing freight different? (one may be an empty truck)
   In: Green hams Out: Processed boxed hams
8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon) In: 6:00 a.m. - 3:00 p.m. Out: Noon - 10:00 p.m.
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
   Exit ramp from eastbound I-64 - lack of signal causes backup. Primarily p.m.
10. Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W) Mostly I-64
11. Do you have any other problems or concerns along the route you would like us to consider? Increasing development is causing high volume on CW Stevens. The 2-lane road is inadequate. Turning radius a corner of CW Stevens and KY 1/KY 7 causes corners to be abused.
12. Would you like a copy of the final report (roadway/route evaluation ???) Yes
Appendix C: Traffic Counts, Intersection Layout and Travel Time Data

Travel Time Data

<table>
<thead>
<tr>
<th>To I-64</th>
<th>From I-64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>Time (min)</td>
</tr>
<tr>
<td>1</td>
<td>1:31</td>
</tr>
<tr>
<td>2</td>
<td>3:03</td>
</tr>
<tr>
<td>3</td>
<td>1:59</td>
</tr>
<tr>
<td>Avg (sec)</td>
<td>131</td>
</tr>
</tbody>
</table>

I-64 exit 172 Eastbound ramp

KY 1/KY 7 @ CW Stevens