

TRUCK ROUTE ACCESS EVALUATION

Owensboro Riverport Authority/Miles Farm Supply Dock
Daviness County
Site #24

Report No. KTC-99-14

“Freight Movement and Intermodal Access in Kentucky”
SPR 98-189

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February 1999

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1.0 Introduction

The Freight Movement and Intermodal Access in Kentucky Study (SPR 98-189), undertaken by the Kentucky Transportation Center (KTC) on behalf of the Kentucky Transportation Cabinet (KYTC), has two main objectives. These objectives include 1) the evaluation of access for trucks between intermodal or other truck generating sites and the National Highway System (NHS) and 2) furthering the understanding of freight commodity flows throughout the state. This report summarizes the access evaluation for one cluster of sites located northwest of Owensboro in the Green River Area Development District (ADD) and Kentucky Transportation Cabinet (KYTC) Highway District #2. 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 were selected from two existing databases (a truck facility survey from 1994 and the intermodal facility inventory) based on ADD and KYTC 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.

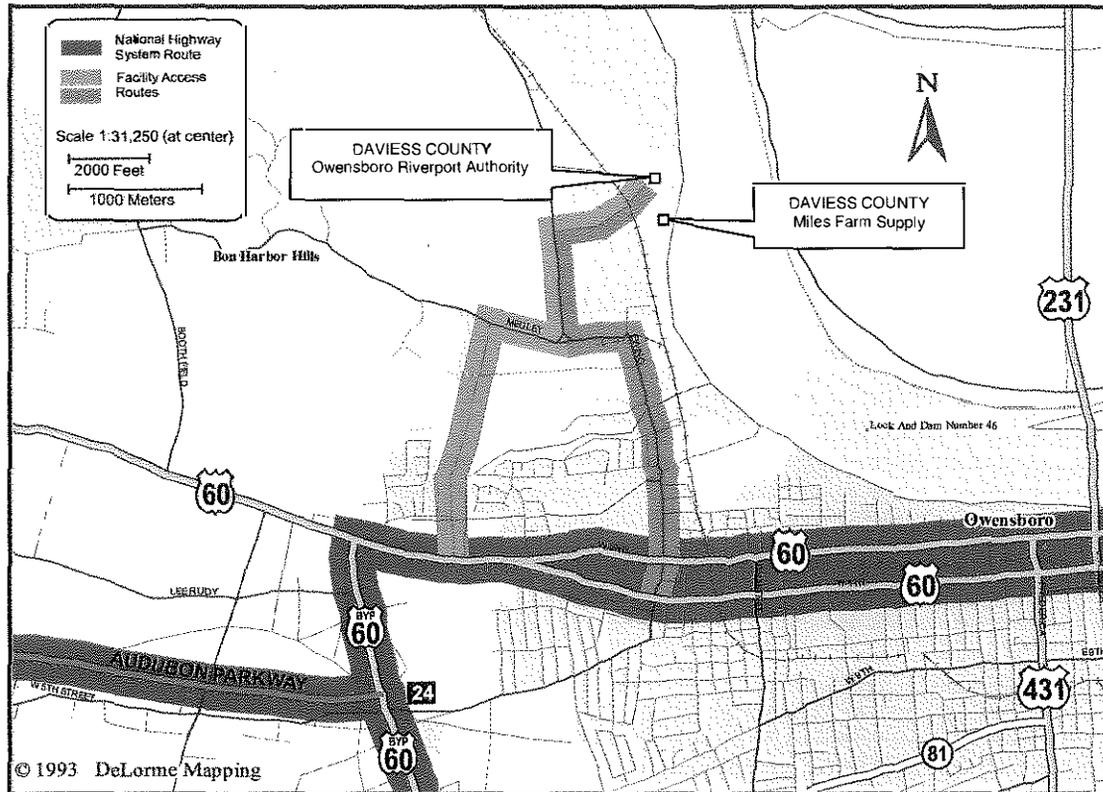
The facilities for study in this report are the Owensboro Riverport Authority and Miles Farm Supply Dock, both of which are located northwest of Owensboro adjacent to the Ohio River. The truck routes were videotaped on February 27, 1998 and the site was visited for data collection on August 14 and 15, 1998. A phone survey was completed early in the study process in order to allow the facility managers to indicate truck routes and express concerns related to access-limiting issues of the truck routes. The surveys, which can be found in Appendix A, indicated that a total of approximately 225 trucks per day (two-way trips during the peak season) are accessing the site. The most common size truck for the Miles Farm Supply dock is a 48 foot semi-trailer. For the Owensboro Riverport Authority, the most common truck is a 53 foot semi-trailer.

2.0 Truck Routes in Use

There are two routes for trucks to reach the NHS, US 60 in this case. The first route (referred to as the "west route", green on Figure 1), which is listed as an intermodal connector, takes trucks from the facility on Harbor Drive west to KY 331. Trucks turn left from Harbor Drive onto KY 331 south and proceed southwest to the intersection with US 60. KY 331 is in the AAA weight class, indicating that it is intended to carry 80,000 pound trucks. Traffic signal control is found at the intersection of US 60 and KY 331, where KY 331 terminates. The route portion of KY 331 lies along relatively flat terrain and consists of both industrial and residential (apartments are located from milepoints 0.0 to 0.3) developments. The average daily traffic (ADT) on KY 331 is 6,163 vehicles (from 1996 KYTC traffic counts). The ADT on Harbor Road is 1,790 vehicles per day (from a 1998 classification count conducted for the KYTC Division of Planning).

The second available route (referred to as the "east route", orange on Figure 1) overlaps the west route on Harbor Road and on KY 331 from milepoints 1.14 to 1.56. At milepost 1.14, trucks leaving the site turn left and proceed east on Medley Road for approximately 0.25 miles. Medley

Figure 1: Location of Truck Generating Sites (Owensboro, KY)



Road turns into Ewing Road just prior to a railroad track crossing. Ewing continues south to the signalized intersection with US 60 (West Second Street). Medley and Ewing Roads are best characterized as light industrial development. From the site visits, it was apparent that there were no other significant sources of truck traffic along the east route.

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. Measurements were only taken where subjective evaluation indicated a problem might exist.

Table 1: Route Features and Method of Evaluation

Feature	Methodology	Team Consensus based on Committee Meeting and Draft Report Feedback	Feature Type
Offtracking	Lane Width with formula based on wheel and axle spacing	Evaluate where observation of trucks indicates possible offtracking - use HIS data and collect in field	Point
Max. Safe Speed on a Curve	Ball Bank Indicator Reading	Evaluate complete route due to ease of data collection	Point
Grade	Speed Reduction Tables with Percent Grade and Direct Observation	Evaluate where observation of trucks indicates speed reduction occurs using HIS data and collect in field as needed	Continuous
Lane Width	HIS data and field measurement	Review complete route due to ease of data collection	Continuous
Clear Zone	Observation	Subjective evaluation	Subjective
Shoulders	HIS data and field measurement	Evaluate where HIS data is available and estimate based on observation elsewhere	Continuous
Pavement Condition	Observation	Subjective evaluation	Subjective
Truck Stopping Sight Distance	Field measurements	Measure only when observation indicates possible problem	Point
Turning Radii	Field measurements and observations of trucks	Measure only when observation indicates possible problem	Point
Accident History	Accident data files and KTC High Truck Accident Report	Do for entire route	Subjective
Intersection LOS	Traffic counts	Only where problems are indicated by facility managers	Point
Route LOS	Traffic counts and travel time studies	Only where problems are indicated by managers	Continuous
RR Crossings	Field Observation	Evaluate all level crossings	Point
Bridges	KYTC Sufficiency Rating	Evaluate all bridges	Point

3.1 Traffic Operations and Level of Service

The survey of this site indicated that there were problems with congestion on US 60, but US 60 is part of the National Highway System and is not under study here. Thus, the congestion on US 60 was not considered. Since no specific problems were mentioned for the access route, the route is assumed to operate at an acceptable level of service.

3.2 Accidents

In 1997 the Kentucky Transportation Center studied all the state-maintained roads throughout Kentucky and determined average truck accident rates for different types of road sections. A critical accident rate was 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 are no portions of the access routes for this site that have critical rate factors greater than one.

Figure 2 shows the locations of accidents during the years 1995, 1996, and 1997. A summary of the accidents along both truck routes (for all roads, not just state-maintained roads) is shown in Table 2 for the same three-year period. With only three accidents involving trucks during the three-year period, there are no serious problems from a recent accident history point of view.

3.3 Cross Section Features

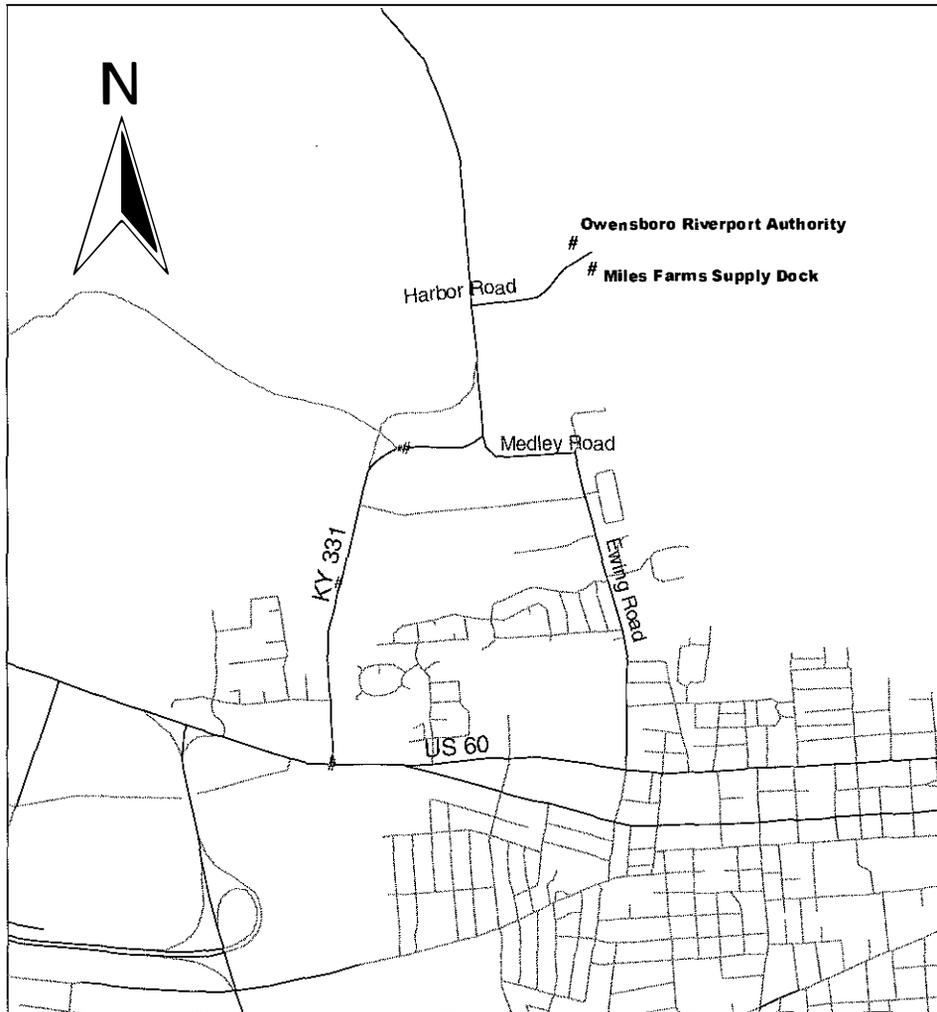
Figures 3 and 4 illustrate the sections of the route with different lane widths and shoulder types, respectively. KY 331 is composed of “preferred” 12-foot lanes while Medley, Ewing, and Harbor Roads have only “adequate” 11-foot lanes. All roads lack adequate shoulders as all have only 2- to 4-feet of turf available.

Portions of both the east and west routes are lacking adequate clear zone. Figures 5 and 6 illustrate that utility poles are obstructing available clear zone along KY 331 and Ewing Roads (respectively). Utility poles do not affect Harbor and Medley Roads and both possess adequate clear zone.

3.4 Curvature Features

If a truck is incapable of travelling without offtracking into the adjacent travel lane, then the roadway segment is inadequate. The only curvature that was investigated with measurements along either route occurs on the east route at the railroad crossing near the northern end of Ewing Road, as shown in Figures 7 and 8. The radius of curvature for this section was approximately 1,320 feet, resulting in a degree of curvature of approximately 4 degrees. While this degree of curvature together with 11-foot lanes suggests the curve is satisfactory, from observation it was evident that offtracking does indeed occur. Thus, the curvature was deemed “less than adequate”.

Figure 2: Accident Locations (1995 - 1997)



LEGEND

- # Facility
- * Accidents: 1
- # Accidents: 2

Scale - 1:25000

0.3 0 0.3 0.6 Miles



400 0 400 800 Meters



Table 2: Accident Types along Daviess County Truck Route

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Trucks</i>
Total	24	3	11.1
Fatal Accidents	0	0	0.0
Injury	6	1	14.3
Intersection	10	0	0.0

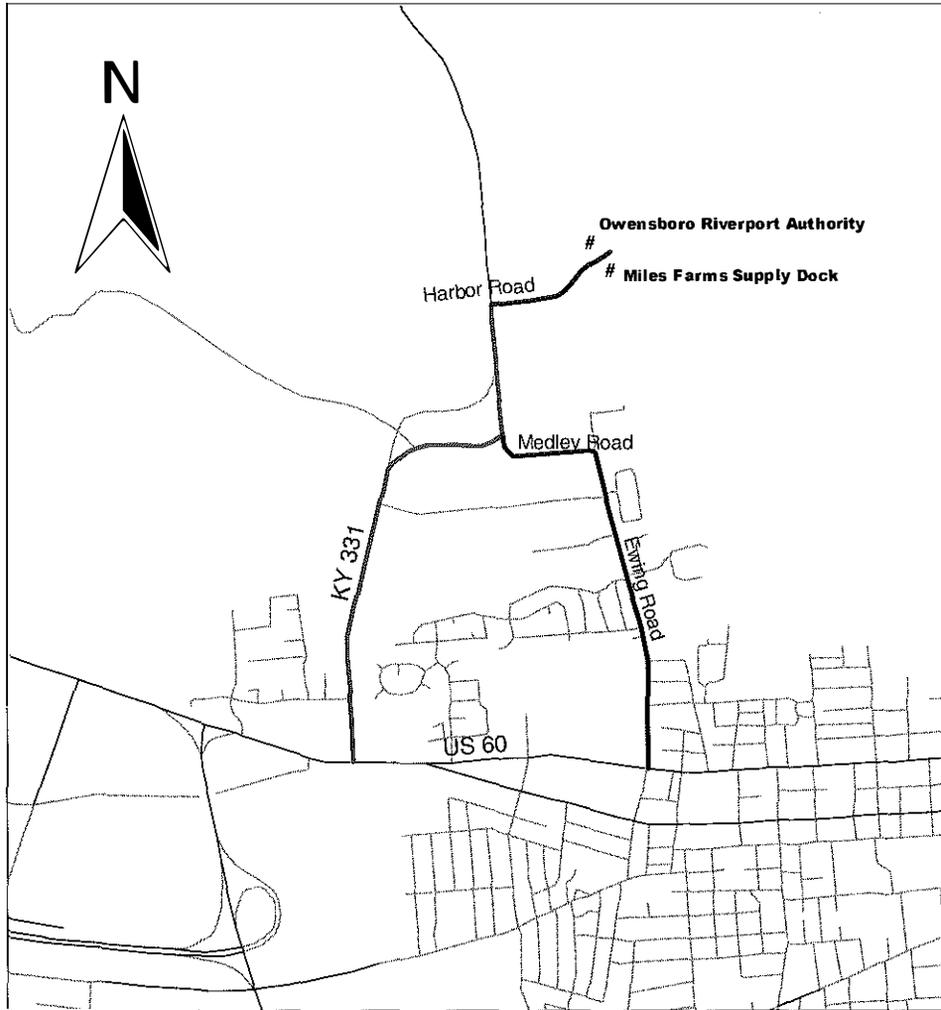
Curvature was tested for safe speeds by use of the ball bank indicator. There were no curves that failed the ball bank test along either route. The curve near the northern end of Ewing Road had a posted advisory speed of 15 miles per hour. At this speed, the ball bank reading was within acceptable limits. However, many trucks were observed traveling through the curve at higher speeds.

Two intersection turning radii were investigated with measurements due to suspected problems, one on each of the two routes. On the east route, the intersection of Ewing Road and US 60 has approximately a 45-foot turning radius (for trucks turning onto westbound US 60 which is one-way at this point) which is normally considered “less than adequate”. However, since trucks have two lanes to use for the turning movement, the radius does not pose a problem for trucks. The availability of two lanes at this signalized intersection allows trucks to enter onto US 60 while offtracking slightly into the adjacent lane without opposing other vehicles on the road which is considered “adequate”. The intersection of KY 331 and US 60 (pictured in Figures 9 and 10 on the west route) was also evaluated due to suspected radius problems. Trucks turning right onto KY 331 north from westbound US 60 have a turning radius of approximately 80 feet. Pavement in this corner of the intersection is in poor condition and some trucks swing out wider than is required to avoid tracking their rear wheels through this area. However, if vehicles are in the left turn lane on KY 331, trucks were able to make the right turn without offtracking. Thus, the right turning radius is considered “adequate”. The left turn radius from US 60 onto KY 331 was also considered adequate as trucks are required to offtrack slightly into the adjacent lane in order to make the turn.

3.5 Railroad Crossings

There is one active at-grade railroad crossing on the overlapping portion of the routes. It is on Harbor Road, approximately 0.35 miles from the intersection of KY 331. The crossing surface is in relatively good condition and warning lights are present (there are no crossing gates). The crossing is rated as “preferred”. There is one non-active crossing at the confluence of Medley and Ewing Roads (see Figures 7 and 8). This crossing, while not receiving a rating since it is not currently in use, lies in the sharp curve discussed in section 3.4 and its pavement surface is in poor condition.

Figure 3: Lane Widths



LEGEND

#	Facility
— — — — —	Lane Width: 11 Feet
— — — — —	Lane Width: 12 Feet

Scale - 1:25000

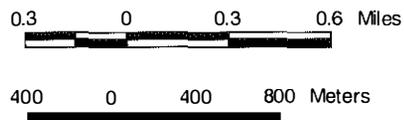
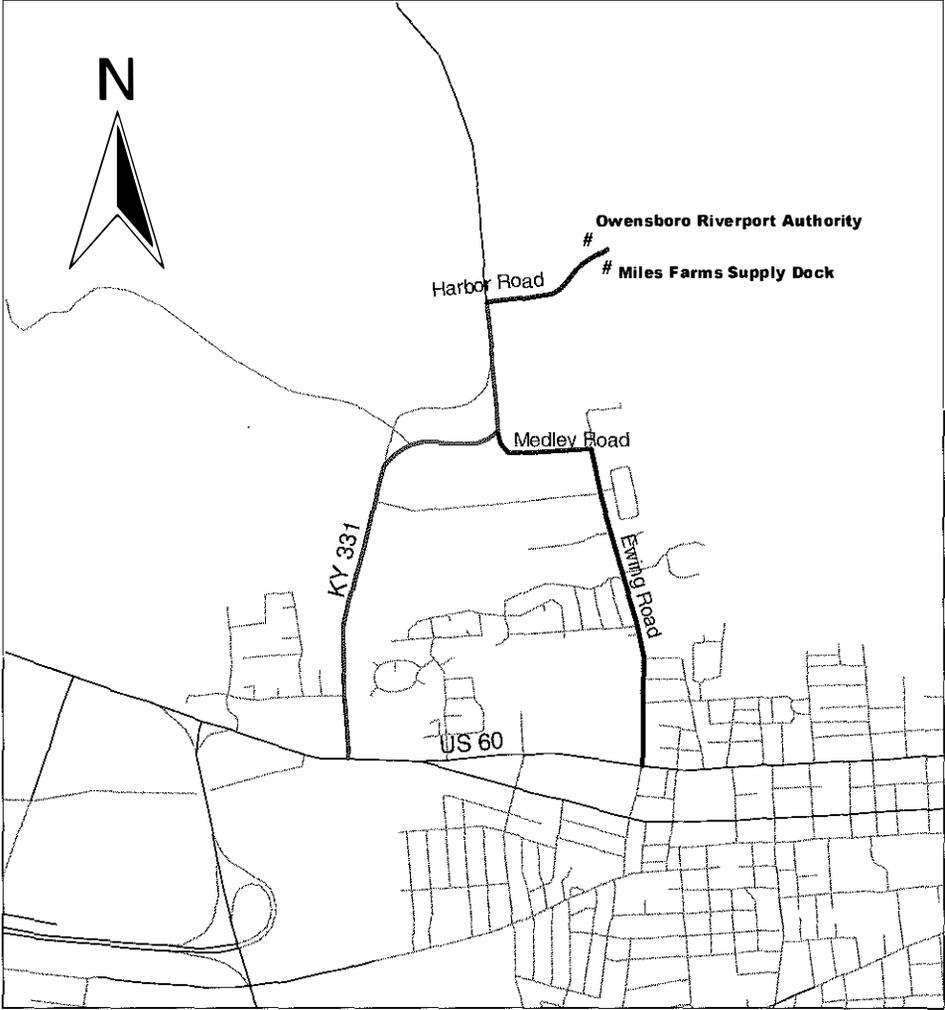


Figure 4: Shoulder Widths



LEGEND

- # Facility
- Shoulder Width: 3 Feet
- Shoulder Width: 2-4 Feet

Scale - 1:25000

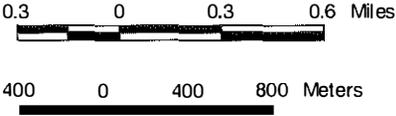


Figure 5: Northbound View of KY 331

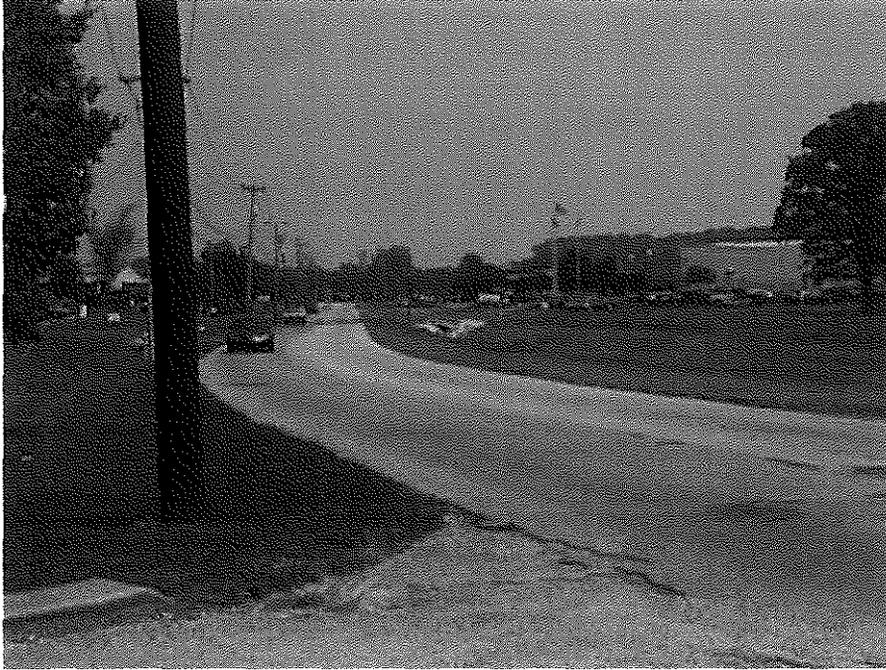


Figure 6: Southbound View of Ewing Road



Figure 7: Curvature at Intersection of Ewing and Medley Roads



Figure 8: Curvature on Northern End of Ewing Road

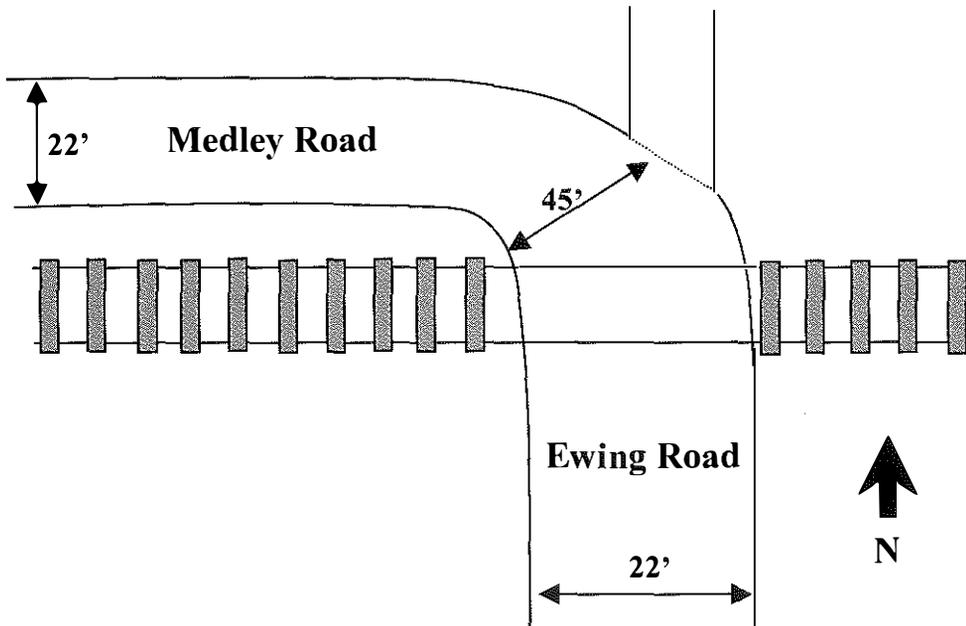


Figure 9: Right Turning Truck at Intersection of KY 331 and US 60



Figure 10: Left Turning Truck at Intersection of KY 331 and US 60



3.6 Bridges

There are no bridges that fall along either route.

3.7 Sight Distance

There were no apparent problems associated with sight distance along either route.

4.0 Complete Route Evaluation and Recommendations

4.1 Problem Truck Miles and Truck Points

In order to compare different routes to consider the relative urgency of needed route improvements, the features rated “preferred”, “adequate”, and “less than adequate” along a route have been normalized for the number of miles, number of points, and number of trucks using the section. 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 weighed by length as well as the number of trucks passing that point.

Table 3 contains the total problem truck miles and total problem points for lane width, shoulders, railroad crossings, and turning radii along this route. The rating of this route relative to others evaluated will be reported in the final report.

4.2 Maintenance Improvement Locations

One possible improvement to the routes would be to improve the pavement conditions on the inactive railroad crossing near the end of Ewing Road. Pavement at the northeastern corner of the intersection of KY 331 and US 60 is also in need of repair.

4.3 Overall Route Rating

In order to account for both the subjectively and objectively evaluated route features along truck routes throughout the state, a panel of Kentucky Transportation Center engineers who are responsible for studying the routes associated with this project devised a scale for quantitatively scoring the route from 1 to 10. The interpretation for this scale can be seen in Table 5. The west route, running from the site along KY 331 to US 60, is rated at a 9. The east route, running from the site along KY 331, Medley Road, and then Ewing Road to US 60, merits a rating of 8. Both routes serve to provide reasonable access to the facilities.

Table 3: Summary of Problem Truck Miles and Truck Points for West Route

Feature	Road	Location	Points*	Length (miles)	Trucks (/day)	Truck- points	Truck- miles
Lane width	Harbor Road	Length	1	0.5	421		
Total							0.0
Shoulders	KY 331	Length	2	1.56	530		1653.6
	Harbor Road	Length	2		NA		
Total							1653.6
Turning radius	KY 331	US 60	1		530	530	
Total						530	

* Note: 1 point for "adequate" features and 2 points for "less than adequate" features
(0 points for "preferred" features not shown)

Table 4: Summary of Problem Truck Miles and Truck Points for East Route

Feature	Road	Location	Points*	Length (miles)	Trucks (/day)	Truck- points	Truck- miles
Lane width	Ewing	Length	1	1.2	NA		0
	Medley	Length	1	0.3	NA		0
	Harbor Road	Length	1	0.5	NA		0
Total							0
Shoulders	KY 331	MP 1.56 - 0.97	2	0.59	421		496.8
	Ewing	Length	2	1.2	NA		0
	Medley	Length	2	0.3	NA		0
	Harbor Road	Length	2	0.5	NA		0
Total							496.8
Curve safe speed	Ewing Road	Northern end	2		NA	0	
Total						0	
Turning radius	Ewing Road	US 60	1		NA	0	
Total						0	

* Note: 1 point for "adequate" features and 2 points for "less than adequate" features
(0 points for "preferred" features not shown)

4.4 Conclusions and Recommendations

In conclusion, the following problems were identified along the truck access routes to the Owensboro Riverport Authority and Miles Farm Supply outside Owensboro:

- Significant lengths of route with less than "preferred" lane widths and shoulders;
- Significant lengths of roadway with insufficient clear zone;
- One horizontal curve with offtracking and safe speed problems;
- One less than "preferred" turning radius with problems for right turning trucks; and
- One less than "preferred" turning radius with problems for both left and right turning trucks.

In order to correct the less than "preferred" lane and shoulder widths found along the routes, complete reconstruction of both the east and west route would be necessary. Given the current volume of trucks found along both routes, such action may not be feasible. Should the area see an increase in truck volumes in the future, such reconstruction might be reconsidered. Both intersections with turning radius problems could be improved through lane widening in the vicinity of the intersection.

Table 5: Interpretation of the Overall Route Rating

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

Appendices

Appendix A: Phone Surveys Conducted with Facility Managers

PHONE SURVEY RESULTS

<u>Facility ID</u>	<u>Facility Name</u>	<u>Location / City</u>	<u>County</u>	<u>ADD</u>
24	MILES FARM SUPPLY	OWENSBORO	DAVIESS	GREEN RIVER
<u>Contact Name</u>	<u>Title</u>	<u>Phone</u>	<u>Fax</u>	
JERRY MATTINGLY		502-926-2420	502-926-7802	
DARRYL BATES			502-683-3143	

1. Is the location of your facility on the map correct? YES, 2290 HARBOR RD.
2. Our information shows about 48 trucks per day access your facility. Is that correct? *If not, fill in correct volume.*
3. Is the truck traffic to and from your facility seasonal or mostly constant?
SEASONAL MAR. - JUNE 100, JULY, AUG 20-25
4. *(If truck traffic is seasonal)* Is the 48 trucks/day for the peak season? YES
5. What is the most common size truck operating at your facility? 48' SEMITRAILER
6. What is the largest truck operating at your facility? 53' SEMITRAILER
7. What type of freight or commodity is shipped, and is incoming and outgoing freight different? *(one may be an empty truck)* IN - BULK FERTILIZER, ANHYDROUS, PKG. AG. CHEM., SEED, GRAIN, BULK CHEM. OUT - AG. EQUIPMENT
8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon) 7-8 A. 2-3 P.
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
US 60 WEST OF TOWN, FUTURE - COMPLETION OF NEW BRIDGE OVER OHIO RVER. - CONGESTION E. OF TOWN
10. Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W)
KELLER WEST TO KY 81 N TO US 60 BYPASS. CARTER N. TO E ON SOUTH TOWN BLVD. TO US 431 TO US 60 BYPASS.
11. Do you have any other problems or concerns along the route you would like us to consider?
US 60 E. INTO TOWN - CONGESTION, SOLUTION - ADDITIONAL LOOP TO NEW BRIDGE TO KY 54.
12. Would you like a copy of the final report (roadway/route evaluation ???) YES

NOTES/COMMENTS:

PHONE SURVEY RESULTS

<u>Facility ID</u>	<u>Facility Name</u>	<u>Location / City</u>	<u>County</u>	<u>ADD</u>
24	OWENSBORO	OWENSBORO	DAVIESS	GREEN RIVER

RIVERPORT AUTHORITY

<u>Contact Name</u>	<u>Title</u>	<u>Phone</u>	<u>Fax</u>
PAT OGLE	PORT DIRECTOR	502-926-4238	502-683-3711

1. Is the location of your facility on the map correct? YES
2. Our information shows about 125 trucks per day access your facility. Is that correct? *If not, fill in correct volume.* YES
3. Is the truck traffic to and from your facility seasonal or mostly constant?
SEASONAL (FERTILIZER)
4. *(If truck traffic is seasonal)* Is the 125 trucks/day for the peak season? YES
5. What is the most common size truck operating at your facility? 53' - 55' SEMITRAILER
6. What is the largest truck operating at your facility?
7. What type of freight or commodity is shipped, and is incoming and outgoing freight different? *(one may be an empty truck)* OUT - NITRATE, FERTILIZERS, ALUMINUM, STEEL COILS/REBAR, PAPER PRODUCTS, GLASS CONTAINERS, SOME FOOD STUFF.
8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon) EARLY A.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
SEVERAL PLANTS IN AREA - AREA IS COMPLETED
MAIN ROAD IN AREA NEEDS CENTER TURNING LANE (INDUSTRIAL DRIVE).
10. Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W) METAL - 300 - 400 MILE RADIUS, EAST US 60 TO HAWESVILLE TO I-64. MOST HANCOCK CO. ALUMINUM PLANT.
11. Do you have any other problems or concerns along the route you would like us to consider?
HAS DISCUSSED CONCERNS WITH KIETH HARPO (GRAV)
12. Would you like a copy of the final report (roadway/route evaluation ???) YES

NOTES/COMMENTS: