

TRUCK ROUTE ACCESS EVALUATION

Bath County Industrial Site  
Off of Kendall Springs Road Southwest of Owingsville  
Site #26

Report No. KTC-98-33

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

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September 1998

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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 facilities located in Bath County in the Gateway 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 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 National Highway System, 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 several times for data collection and video recordings as listed in Appendix A. The following facilities are located in the area: Donotech, Custom Foods, and Bath Manufacturing. All facilities are located off of Kendall Springs Road, on Donotech Drive, Darnell Drive, and Bath Mfg. Drive. Figures 2 and 3 show the relative location of the facilities found at this site (note that Bath Manufacturing was not yet completed). Phone surveys completed on the facilities indicate that only moderate truck traffic from these facilities travel on Kendall Springs Road. Approximately 15 trucks per day are placed on the route due to the operations of this site.

## **2.0 Truck Routes in Use**

There is only one route for trucks to reach the National Highway System, I-64 in this case. This route takes trucks from their respective entrances onto Kendall Springs Road east. At the end of Kendall Springs Road, the trucks must turn south onto KY 36 and proceed approximately 0.7 miles to the on-ramps for Interstate 64. The total length of the route varies from 1.4 miles for Bath Manufacturing to 1.3 miles for Custom Food Products. Kendall Springs lies along rolling terrain and is rural in character. KY 36 is in the AAA weight class, indicating that it is intended for use by trucks with a maximum of 80,000 pounds gross weight. There is no traffic signal control along this 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 require only subjective evaluation by the engineer during site inspection, others require quantitative measurement in

Figure 1: Location of Truck Generating Sites

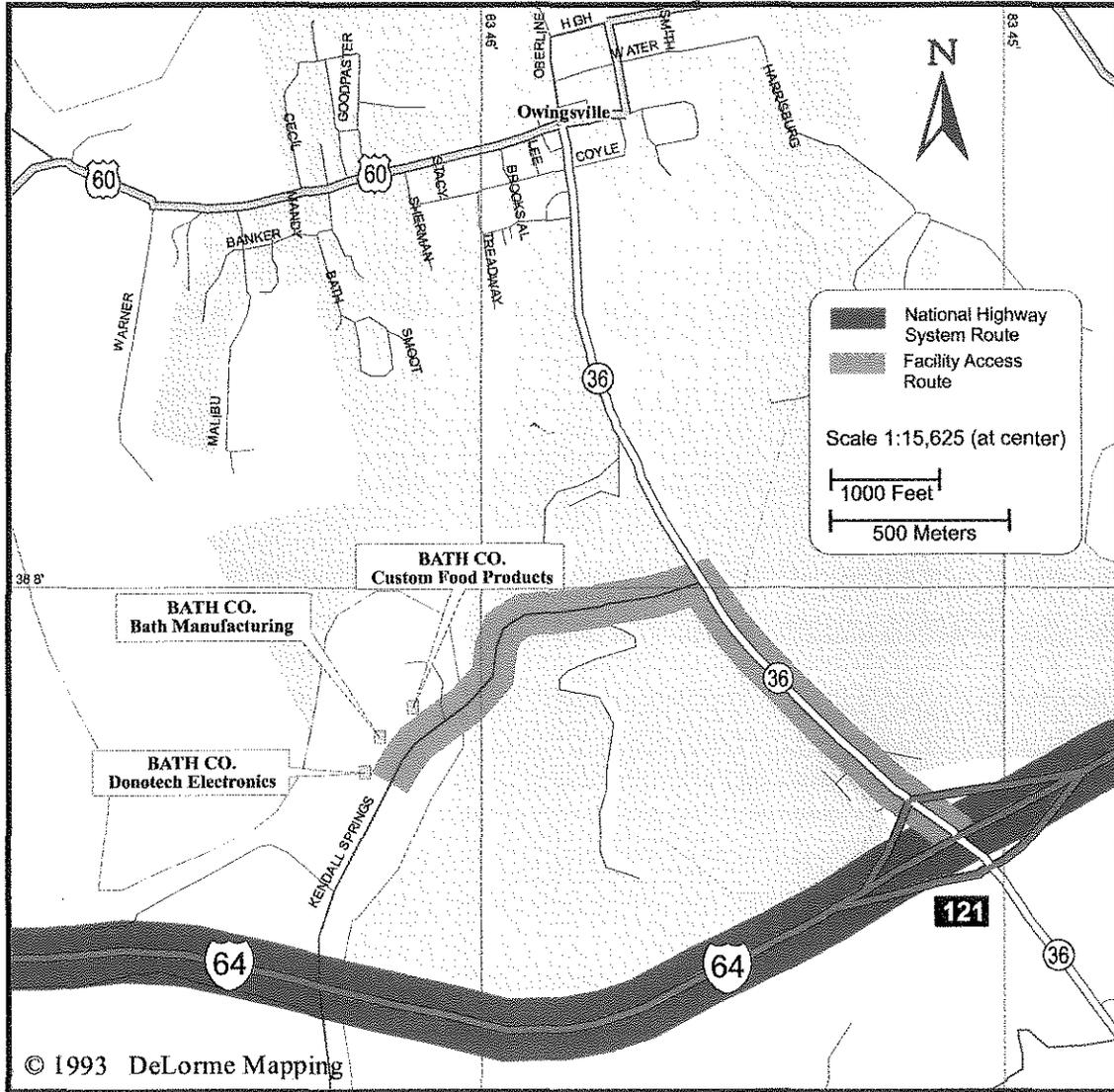


Figure 2: Aerial photograph of the Bath County site (facilities circled, 1995 picture)

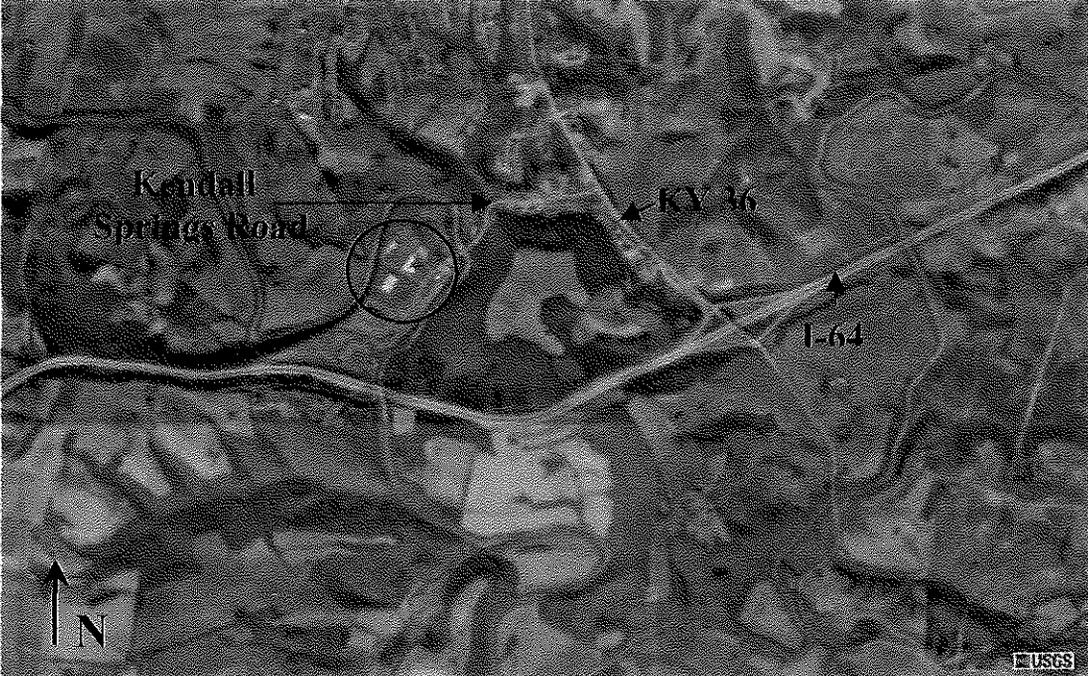
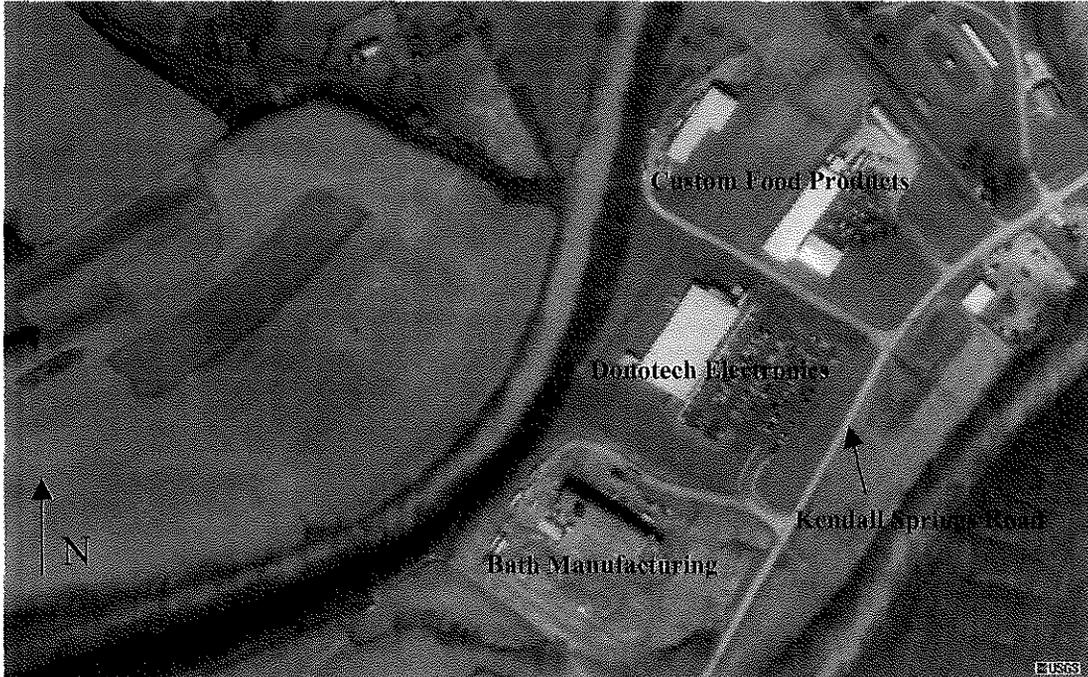


Figure 3: Location of facilities on Kendall Springs Road (1995 picture)\*



\*Note: Bath Manufacturing under construction.

**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

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. The only issue raised was the possible signalization of the freeway exit. However, traffic counts performed at the intersection (Appendix C) indicate the traffic volumes are low and that there is no current need for a traffic signal. No level of service evaluation was performed as the intersection obviously performs at a LOS of A.

Thus, the route is assumed to operate at an acceptable level.

### 3.2 Accidents

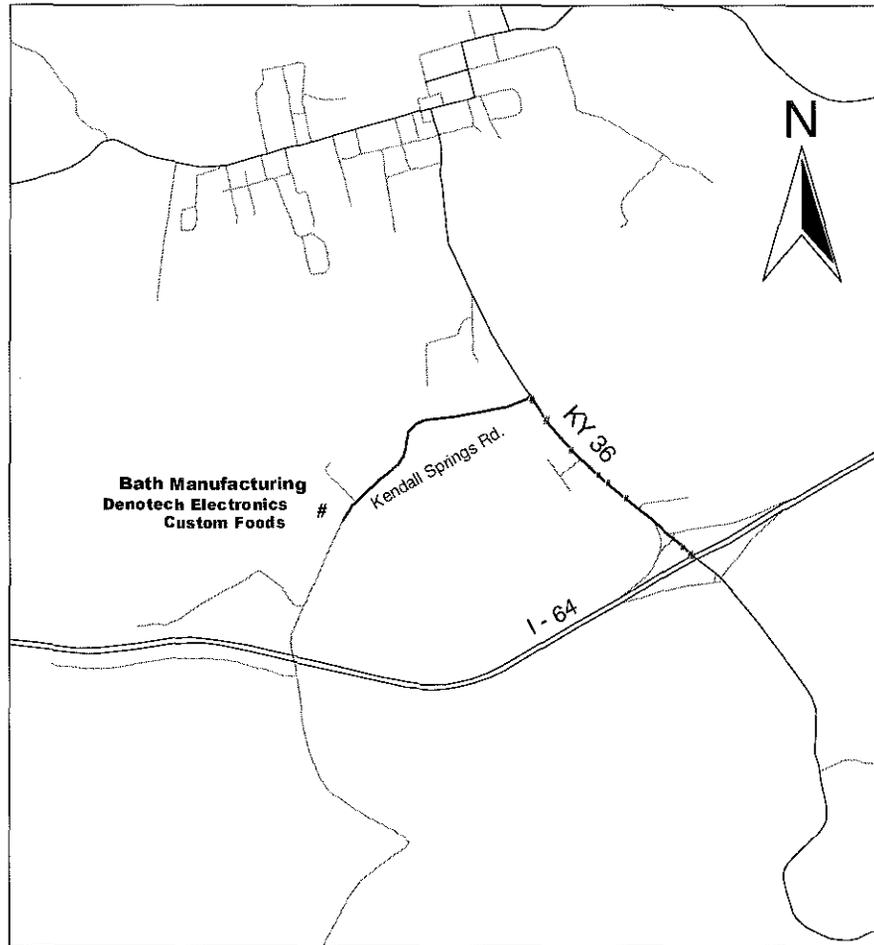
In 1997 the Kentucky Transportation Center studied all the state-maintained roads throughout Kentucky and determined average truck accident rates for different types of road sections. A critical accident rate was then calculated using the average accident rate for a specific highway type along with an assumed level of statistical significance and exposure (vehicle miles traveled). There are no portions of this route that possess a critical rate factor greater than one. Thus, the truck accident rate is no greater than the critical rate.

Figure 4 shows the locations and number of accidents during the years 1994, 1995, and 1996. 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. The number of accidents along this route for the three-year period of study is insignificant and only one included a truck.

**Table 2: Accident Types along Bath County Truck Route**

	Non-Truck Accidents	Truck Accidents	Percent Trucks
Total	22	2	8.3
Fatal Accidents	1	0	0
Injury	11	0	0
Intersection	6	1	14.3

**Figure 4: Accident Locations (1994-1996)**



**LEGEND**

- # Facility
- \* Accidents: 1 - 2
- # Accidents: 3 - 4
- # Accidents: 5 - 7
- Freight Access Route
- ==== State Highway System
- Other Roads

**Scale - 1:23000**

0.3 0 0.3 0.6 Miles

500 0 500 1000 Meters

### 3.3 Cross Section Features

Figures 5 and 6 illustrate the different widths of both lanes and shoulders along the route. The 12 foot lanes along KY 36 are preferred for trucks, but the widths along Kendall Springs Road are “less than adequate” along its onset to approximately 0.25 miles from KY 36, where a downhill grade and curvature begin. This first section consists of 10.5 foot lanes, which are considered inadequate, whereas the road widens to “preferred” 12 foot lanes during the descent and curve from 0.25 to 0.4 miles from KY 36. After the bridge over Slate Creek is traversed at the bottom of the grade, the lane widths are decreased to 11.5 feet, thus acquiring a rating of “adequate”.

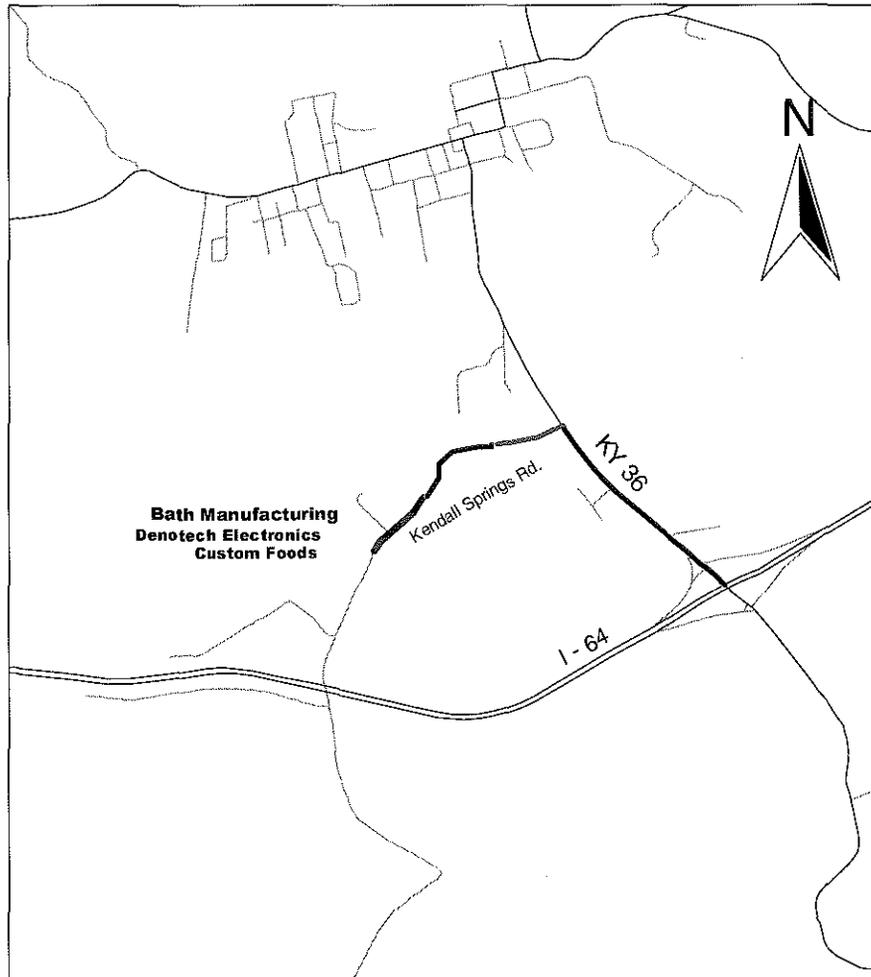
The 10 foot paved shoulders along the route section of KY 36 are considered “preferred”, whereas the 2 – 4 foot turf and gravel shoulders along the length of Kendall Springs Road are considered “less than adequate”. In addition, the southern side of Kendall Springs Road occurring during the grade and curvature has no shoulder, and therefore the clear zone is inadequate as well. The pavement during this section is, at times, a foot or more above the adjacent roadside. Erosion has swept much of the roadside away and it is in need of repair. Should a vehicle (especially a truck) be forced to drive into this area, recovery may not be possible.

### 3.4 Curvature Features

Curvature can cause problems for all drivers, but the effects on trucks can be more severe. If a truck is incapable of travelling the posted speed limit while remaining in its own travel lane, then the roadway segment is inadequate. The section of KY 36 that is used for this route has no curvature that might cause problems. However, Kendall Springs Road has one section that is problematic, which can be seen in Figure 6 as the portion with no shoulder. The curve in question begins at the onset of a grade, approximately 0.25 miles from the beginning of Kendall Springs Road at KY 36. There is no signage indicating a reduced travel speed along Kendall Springs. Therefore, the ball bank indicator was used at 55 miles-per-hour in order to investigate the adequacy of the roadway curvature. This section of Kendall Springs, occurring approximately 0.25 to 0.4 miles from the intersection of KY 36 failed the ball bank test. This results in a rating of “less than adequate” for horizontal curvature.

Two grades, which can be seen in Figure 7, were seen as having the potential to cause problems for trucks. The vertical curvature along KY 36 immediately prior to the intersection of Kendall Springs Road consists of over an 8.5% grade. The previously mentioned section of Kendall Springs that is composed of horizontal curvature also lies along a grade that is approximately 6 to 8%. Both are considered “less than adequate” as both will cause trucks to slow down excessively.

**Figure 5: Lane Widths**



**LEGEND**

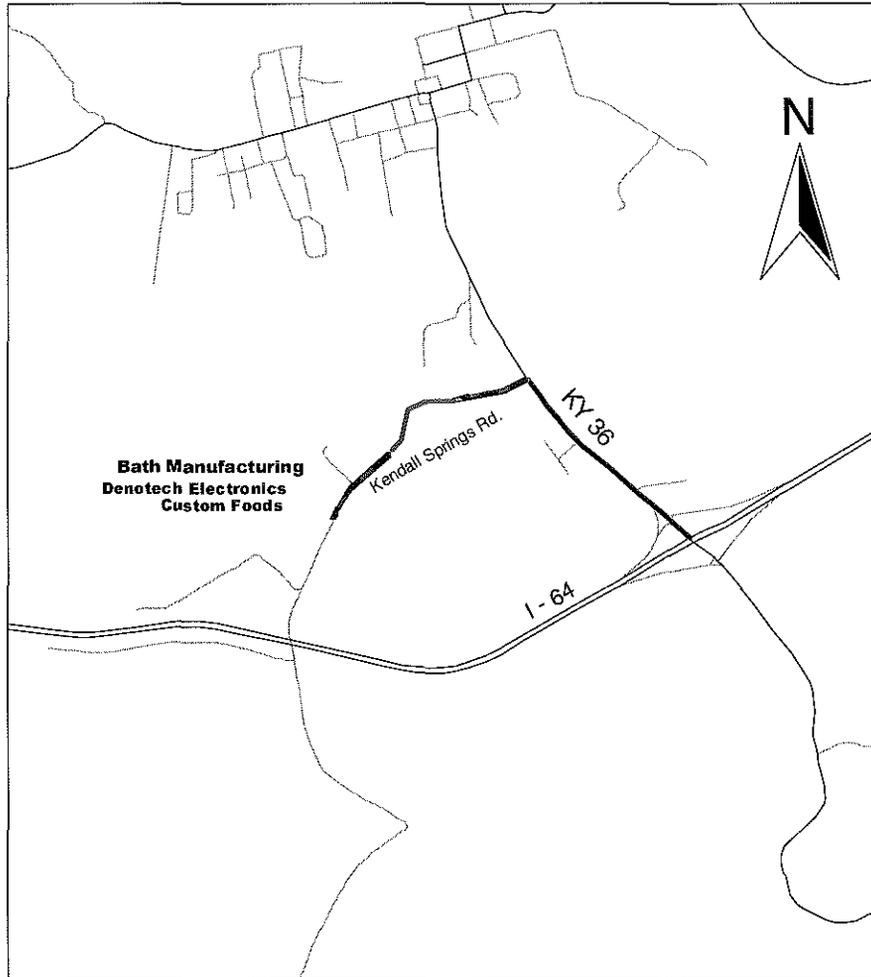
#	Facility
—	Lane Width: 10.5 Feet
—	Lane Width: 11 Feet
—	Lane Width: 12 Feet
—	State Highway System
—	Other Roads

Scale - 1:23000

0.3 0 0.3 0.6 Miles

500 0 500 1000 Meters

Figure 6: Shoulder Widths



**LEGEND**

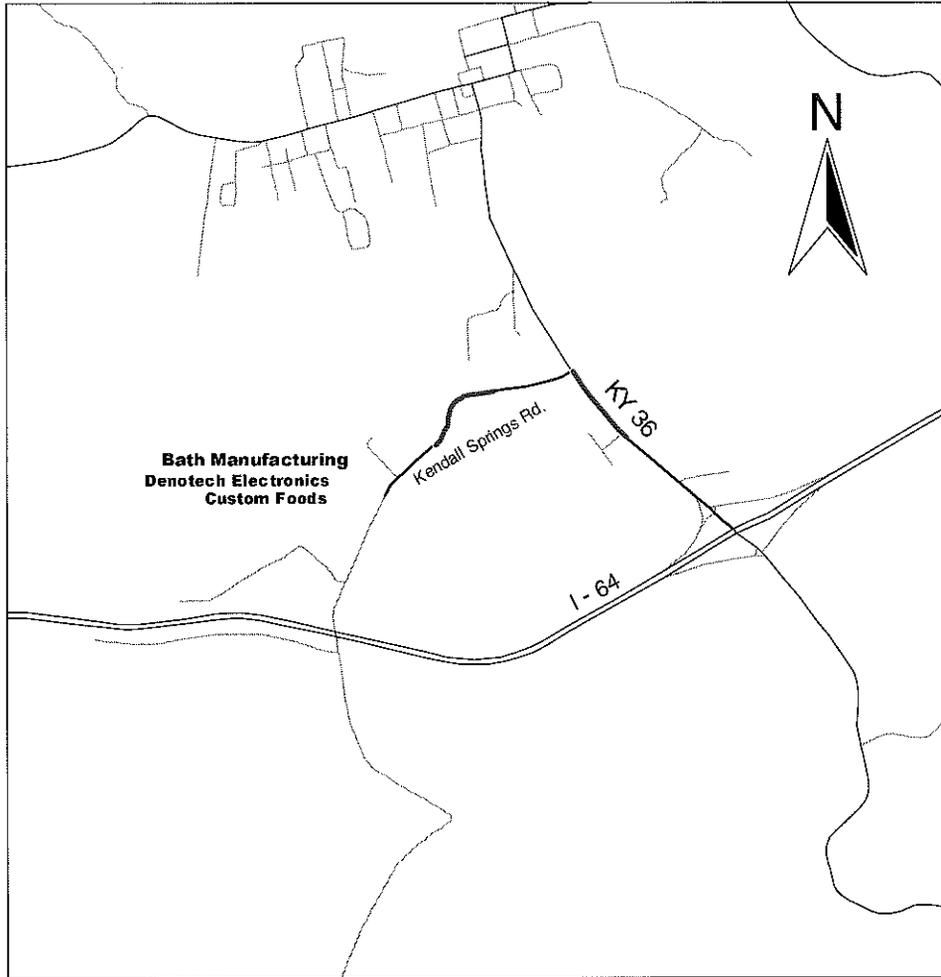
- |   |                          |
|---|--------------------------|
| # | Facility                 |
| — | No Shoulder              |
| — | Shoulder Width: 2-4 Feet |
| — | Shoulder Width: 10 Feet  |
| — | State Highway System     |
| — | Other Roads              |

Scale - 1:23000

0.3 0 0.3 0.6 Miles

500 0 500 1000 Meters

**Figure 7: Grade Locations**



**LEGEND**

- |   |                            |
|---|----------------------------|
| # | Facility                   |
|   | Grade - Less than Adequate |
|   | Freight Access Route       |
|   | State Highway System       |
|   | Other Roads                |

**Scale - 1:23000**

0.3 0 0.3 0.6 Miles

500 0 500 1000 Meters

### **3.5 Railroad Crossings**

There are no at-grade railroad crossings along this route.

### **3.6 Bridges**

Figure 8 shows the location of the two bridges found along this route. There is one county bridge, occurring approximately 0.45 miles from KY 36 on Kendall Springs Road. The bridge, which crosses Slate Creek, received a KYTC sufficiency rating of 99.9 out of a possible 100 points, earning a rating of “preferred”. The only other bridge lies on KY 36 and crosses I-64. It received a sufficiency rating of 91.2, which is also considered to be “preferred”.

### **3.7 Sight Distance**

There were no noticeable problems associated with sight distances along the route.

## **4.0 Complete Route Evaluation and Recommendations**

### **4.1 Problem Truck Miles and Truck Points**

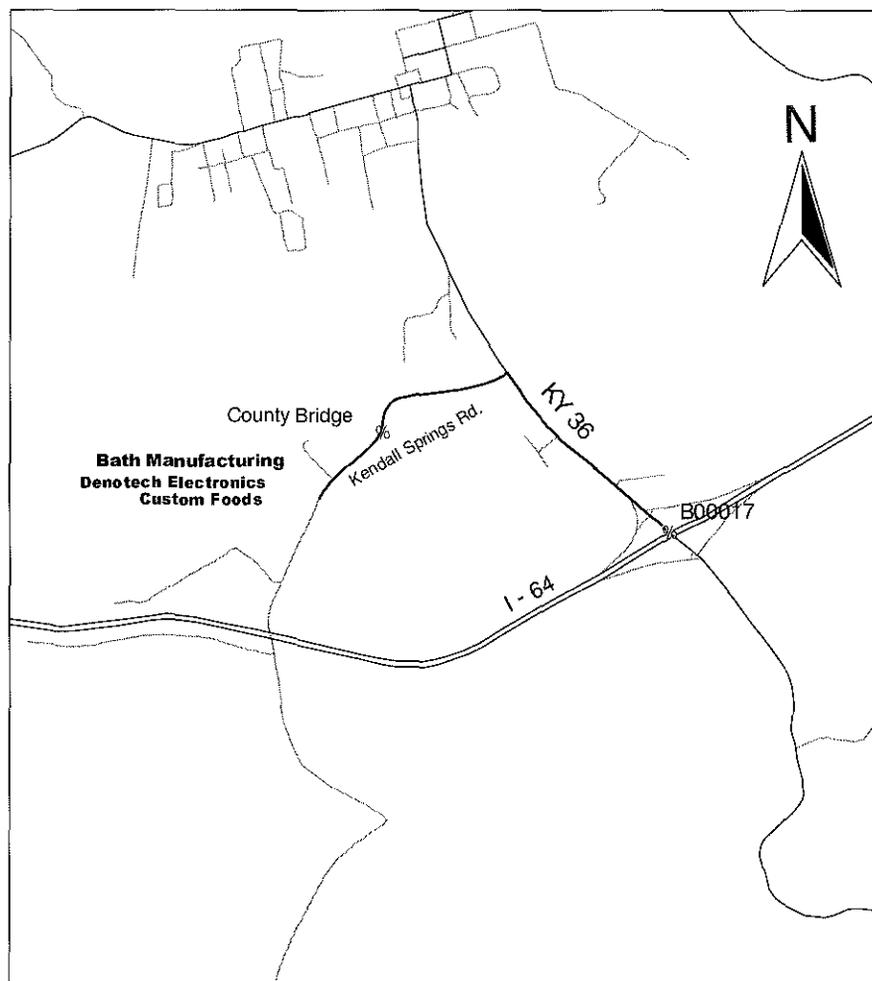
In order to compare different routes to consider the relative urgency of needed route improvements, the features rated “preferred”, “adequate”, and “less than adequate” along a route are to be normalized for the number of miles, number of points, and number of trucks using the section. In the case of this Bath County truck route, five features that were evaluated quantitatively have sections or points that are considered “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 weighed by length as well as the number of trucks passing that point. The truck volumes found in Table 3 were obtained from 1998 traffic counts conducted by the KYTC Division of Planning.

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

### **4.2 Maintenance Improvement Locations**

There are several locations where improvements are possible along this route. The curved section of Kendall Springs Road (0.25 to 0.4 miles from KY 36) is in need of shoulder rehabilitation and drainage improvements. Currently, there is no clear zone

**Figure 8: Bridge Locations**



**LEGEND**

- # Facility
- % B00017 Bridges
- Freight Access Route
- State Highway System
- Other Roads

**Scale - 1:23000**

0.3 0 0.3 0.6 Miles

500 0 500 1000 Meters

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

Feature	Road	Location	Points*	Length (miles)	Trucks (/day)	Truck-points	Truck-miles
<b>Grade</b>	Kendall Springs	0.25 - 0.4 miles from KY 36	2	0.15	41		12.3
	KY 36	MP 12.077 to Kendall Springs	2	0.35	213		149.1
<b>Total</b>							<b>161.4</b>
<b>Lane width</b>	Kendall Springs	To 0.25 miles from KY 36	2	0.23	41		18.9
	Kendall Springs	0.4 - 0.63 miles from KY 36	1	0.23	41		9.4
<b>Total</b>							<b>28.3</b>
<b>Shoulders</b>	Kendall Springs	Length	2	0.66	41		54.1
<b>Total</b>							<b>54.1</b>
<b>Curve speed</b>	Kendall Springs	0.25 - 0.4 miles from KY 36	2	0.15	41	12.3	
<b>Total</b>						<b>12.3</b>	
<b>Offtracking</b>	Kendall Springs	0.25 - 0.4 miles from KY 36	1	0.15	41	6.15	
<b>Total</b>						<b>6.15</b>	

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

available on the inside of this curve. Kendall Springs could also benefit from the inclusion of striping, as neither edge nor lane markings are currently existent.

### 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 4. The route in Bath County from I-64 to the Kendall Springs industrial park was given an overall rating of 7 indicating that minor improvements could improve the truck access along the route.

**Table 4: Interpretation of the Overall Route Rating**

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

#### **4.4 Conclusions and Recommendations**

In conclusion, the following problems were identified along the truck access routes to the Bath County Industrial Site in Bath County:

- Significant length of route with less than "preferred" lane widths and shoulders;
- Two less than "preferred" grades; and
- One curve with offtracking and safe-speed problems.

The only problem with the state-maintained portion of this route is the grade on KY 36. The section of Kendall Springs Road with no clear zone or usable shoulder is in need of drainage improvements, shoulder construction, and speed advisory signs. The remaining problems associated with lane widths and shoulders can only be alleviated by reconstructing the non state-maintained portion of the route. If truck volumes along this portion of the route were to increase, then such action might be considered.

## **Appendices**

## **Appendix A: Field Site Visit Dates and Activities**

January 14, 1998 – initial site visit and video taping

May 25, 1998 – field data collection

June 9, 1998 – traffic counts and travel time survey

## Appendix B: Phone Surveys Conducted with Facilities

### PHONE SURVEY RESULTS

<u>Facility ID</u>	<u>Facility Name</u>	<u>Location / City</u>	<u>County</u>	<u>ADD</u>
26	Custom Food Products	Owingsville	Bath	Gateway

<u>Contact Name</u>	<u>Title</u>	<u>Phone</u>	<u>Fax</u>
Maurice Morley		606-674-6772	606-674-6076

1. Is the location of your facility on the map correct?
2. Our information shows about 6-8 trucks per day access your facility. Is that correct? *If not, fill in correct volume.*

#### Is the truck traffic to and from your facility seasonal or mostly constant?

Constant

4. *(If truck traffic is seasonal)* Is the \_\_\_ trucks/day for the peak season?
5. What is the most common size truck operating at your facility? 44' -48' Semitrailer
3. 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)*  
Meat products - refrigerated
8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon) 6:00 - 10:00 am
4. 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
5. Where do trucks at your facility go to and come from? **(This may be an interstate, cities, general direction-N,S,E,W)** Kendall Springs TO KY 36 TO I-64  
Majority go to/ from Lexington
6. Do you have any other problems or concerns along the route you would like us to consider?  
Better signage to Kendall Springs area could use partial interchange at Kendall Springs u.p. exit 121 becoming congested w/ business growth.
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>
26	Donotech Electronics	Owingsville	Bath	Gateway

<u>Contact Name</u>	<u>Title</u>	<u>Phone</u>	<u>Fax</u>
Kim Adams		606-674-6319	606-674-2732

1. Is the location of your facility on the map correct?
2. Our information shows about   5   trucks per day access your facility. Is that correct? *If not, fill in correct volume.*
7. Is the truck traffic to and from your facility seasonal or mostly constant?  
Constant
4. *(If truck traffic is seasonal)* Is the        trucks/day for the peak season?
5. What is the most common size truck operating at your facility?                   48' Semitrailer
8. 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)* Electronic boards  
In - Electronic parts, flux, plastic parts
8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon) 2:00 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  
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)    KY 36 to I-65
11. Do you have any other problems or concerns along the route you would like us to consider?  
Road settlement KY 36 east of I-64 interchange (exit 121) near Bourbon Furnace (ruins) frequent patching
12. Would you like a copy of the final report (roadway/route evaluation ???)                   Yes

NOTES/COMMENTS:

## PHONE SURVEY RESULTS

<u>Facility ID</u> 26	<u>Facility Name</u> Bath Mfg.	<u>Location / City</u> Owingsville	<u>County</u> Bath	<u>ADD</u> Gateway
<u>Contact Name</u> Angel Anderson	<u>Title</u>	<u>Phone</u> 606-674-6000	<u>Fax</u> 606-674-2187	

1. Is the location of your facility on the map correct? Yes
2. Our information shows about 2 trucks per day access your facility. Is that correct? *If not, fill in correct volume.* Yes
12. Is the truck traffic to and from your facility seasonal or mostly constant?  
Constant
4. *(If truck traffic is seasonal)* Is the \_\_\_\_\_ trucks/day for the peak season?
5. What is the most common size truck operating at your facility? 45' Semitrailer
13. 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)*  
In - Supplies, mfg. Supplies  
Out - Uniform parts
8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon)

**What traffic congestion and delay problems along the routes are you aware of, or feel need improvement?**

<u>Location (route segment, intersection, etc.)</u>	<u>Time and Day of Week</u>
Not aware of any, Ms. Anderson contacted plant manager and neither had any concerns with access in their area. There have been recent improvements in the area.	

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

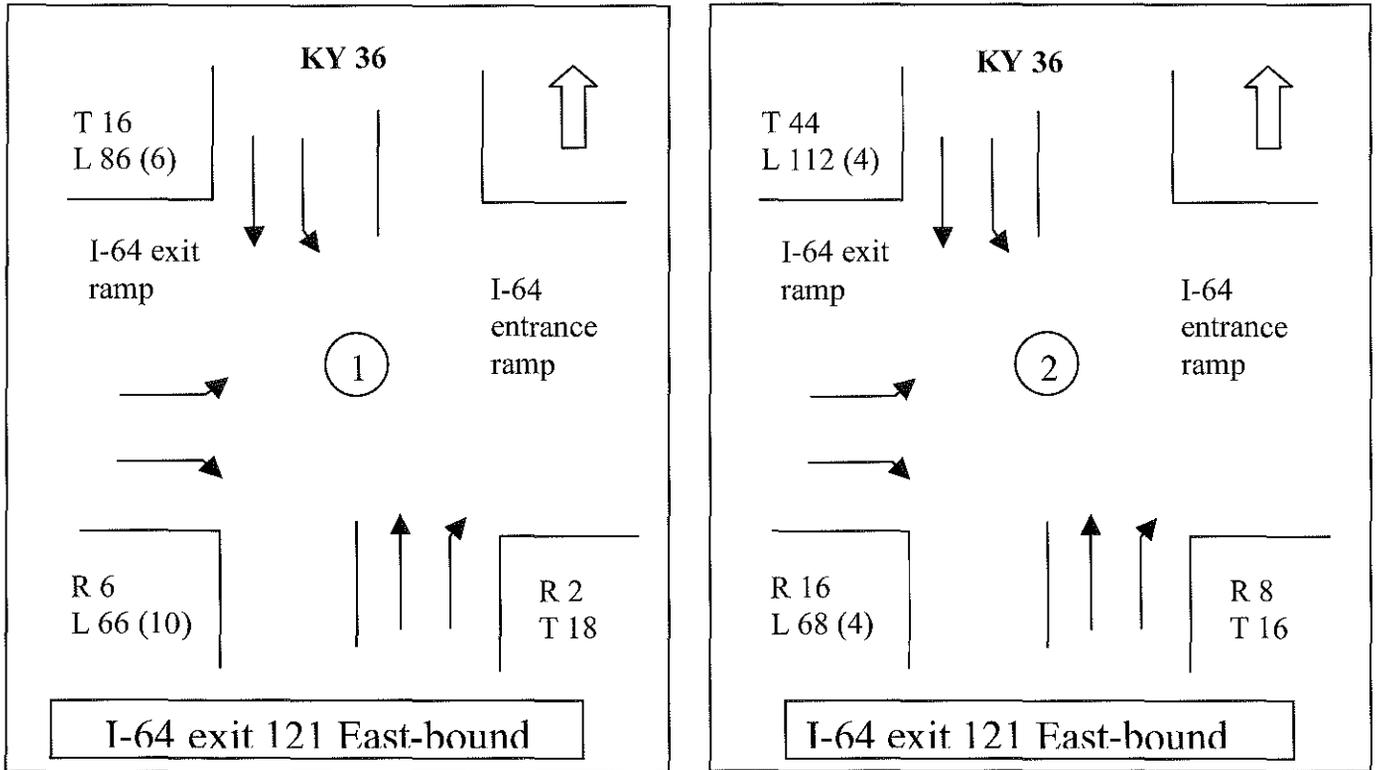
Out - Mason, OH  
In - Tenn./ Miss.

**Do you have any other problems or concerns along the route you would like us to consider?**

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

NOTES/COMMENTS:

**Appendix C: Traffic Counts Conducted by KTC\***



\* Note: Counts in parentheses represent trucks (not included in movement counts)

Intersections in Bath County – Entrance and exit ramps from KY 36 onto I-64

#1 counted @ 9 - 10 a.m.

#2 counted @ 2 - 3 p.m.

