

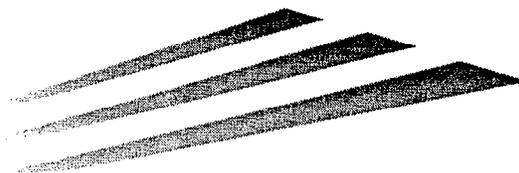


# KENTUCKY TRANSPORTATION CENTER

*College of Engineering*

## TRUCK ROUTE ACCESS EVALUATION

United Parcel Service,  
Standiford Field Louisville Airport,  
& Ford Motor Company  
Louisville  
Site #6



University of Kentucky

REPRODUCED BY: **NTIS**  
U.S. Department of Commerce  
National Technical Information Service  
Springfield, Virginia 22161



# TRUCK ROUTE ACCESS EVALUATION

United Parcel Service, Standiford Field Louisville Airport, and Ford Motor Company  
Louisville  
Site # 6

KTC Report No. 99-32

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

By

Lisa Aultman-Hall

with

Ken Agent  
Brian Aldridge  
Dave Cain  
Joel Weber



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

May 1999



## Table of Contents

1.0 Introduction .....	1
2.0 Truck Routes in Use .....	1
3.0 Route Data Collection and Evaluation .....	3
3.1 Traffic Operations and Level of Service .....	3
3.2 Accident History .....	7
3.3 Cross Section Features .....	8
3.4 Curvature Features .....	8
3.5 Railroad Crossings .....	10
3.6 Bridges .....	10
3.7 Sight Distance .....	10
4.0 Route Evaluation and Recommendations .....	10
4.1 Problem Truck Miles and Truck Points .....	10
4.2 Maintenance Improvement Locations .....	10
4.3 Overall Route Rating .....	11
4.4 Conclusions and Recommendations .....	12

### Appendices

Appendix A: Phone Survey Results .....	14
Appendix B: Traffic Level of Service Information .....	15

Reproduced from  
best available copy.



**PROTECTED UNDER INTERNATIONAL COPYRIGHT  
ALL RIGHTS RESERVED  
NATIONAL TECHNICAL INFORMATION SERVICE  
U.S. DEPARTMENT OF COMMERCE**

### List of Tables

Table 1: Route Features and Method of Evaluation .....	6
Table 2: Accident Types along Crittendon Avenue .....	7
Table 3: Accident Types along Grade Lane .....	7
Table 4: Accident Types along Fern Valley Road .....	8
Table 5: Summary of Problem Truck Miles .....	11
Table 6: Interpretation of the Overall Route Rating .....	11

### List of Figures

Figure 1: Location of Truck Generating Site .....	2
Figure 2: Crittendon Avenue .....	4
Figure 3: Fern Valley Road .....	4
Figure 4: Grade Lane Between Fern Valley and I-65 .....	5
Figure 5: Shoulder Widths .....	9

## **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): 1) evaluation of the 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 the areas around the Standiford Field Louisville Airport. This includes two large generators off of Fern Valley Road: Ford Motor Company and the United Parcel Service. These sites are located in Jefferson County in the KIPDA Area Development District (ADD) and KYTC Highway District #5. The location of the site and routes is shown in Figure 1. Smaller industries to the west of the airport field along Crittendon Avenue include Akzo Nobel Trucking, General Electric Supply, KT Shannon Lumber Company, Airside Commerce Center, United Catalyst Incorporated, and Rapid Runner Warehousing. Work on other specific sites throughout Kentucky as well as the freight commodity flow task is ongoing and documented elsewhere.

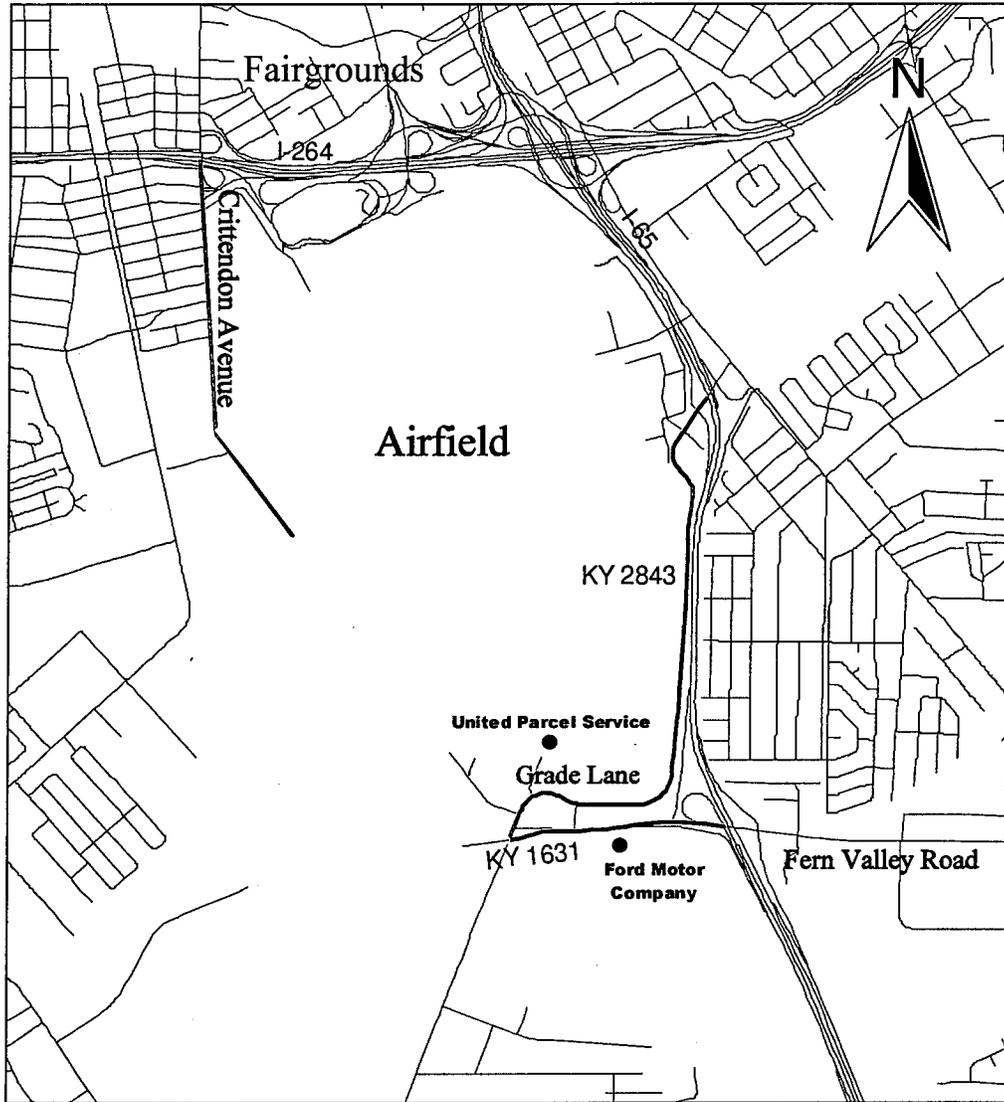
The sites to be evaluated in this study were selected from two existing databases (a truck facility survey from 1994 and the intermodal facility inventory) based on ADD and KYTC Highway District planner recommendations, geographic location, distance to the NHS, and the number of trucks accessing the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

The site was visited for video recording on November 21, 1998, data collection on September 29, 1998 and intersection traffic counts on December 15, 1998. The facilities are located south of I-264 and west of I-65 in Louisville either on or adjacent to the airport facility. The surrounding area is generally urban and fairly commercial / industrial. A phone survey was conducted with a UPS facility manager early in the study process. The survey found that approximately 150 trucks per day normally access the site with as many as 400 in the peak of the year. The most common truck is a 28-foot drop van but trucks as large as 53-foot semi-trailers also access the site. No traffic congestion problems were raised. Attempts to contact other large truck generators in the area were unsuccessful. The phone survey is in Appendix A.

## **2.0 Truck Routes in Use**

As shown in Figure 1, there are two routes to reach the NHS (Interstates 65 and 264) which will be evaluated. The route to the west of the airport provides access to the smaller light industrial sites. Although Crittendon Avenue previously continued south along the airport property to Fern Valley Road which connects to I-65, a section of this road has been closed as part of a larger reconstruction of airport access roads which include the completion of Grade Lane to the east of the airfield. Therefore, trucks from these smaller industrial sites travel north on Crittendon Avenue and access the NHS via an interchange with I-264. The interchanges in this area are somewhat confusing when exiting I-264 as ramps separate and merge to provide access to the passenger terminals, the Kentucky Fair and Exposition Grounds as well as I-65.

**Figure 1: Location of Truck Generating Site**



**LEGEND**

- Facility
- Truck Access Route

Scale - 1:30000

0.5 0 0.5 Miles

500 0 500 1000 Meters

The second route to be evaluated is found to the south and east of the airfield. The route starts at the I-65 interchange with Fern Valley Road, turns right at Grade Lane and continues adjacent the airfield to the interchange with I-65. Trucks coming from or going to I-65 north must travel a small distance on the Preston Highway (KY 61) at this more northern interchange. Obviously trucks accessing the Ford Motor Company or UPS would only use one or the other half of this route to gain access to I-65. For ease, the route is evaluated as a whole.

Crittendon Drive to the west of the airfield (shown in Figure 2) has four 12-foot lanes with a turf shoulder that varies in width. This road has a total length of 1.4 miles and is no longer state-maintained. Fern Valley Road (shown in Figure 3) is KY1631 and has four 12-foot lanes with paved 10-foot shoulders. The western portion of the road has a two-way left turn lane in the center. Fern Valley Road now dead ends approximately 1500 feet beyond the intersection with Grade Lane. A total of 0.75 miles of the truck access route lies along Fern Valley Road. This section has an ADT of 30,819 (KYTC HIS data). Grade Lane is shown in Figure 4. This curbed section has 12-foot lanes (wider in some locations). The section varies from two to four-lanes and has some curbed sections while others have gravel shoulders. The total distance from Fern Valley to I-65 along Grade Lane is 2 miles. Grade Lane is state-maintained and is also known as KY 2843.

### **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.

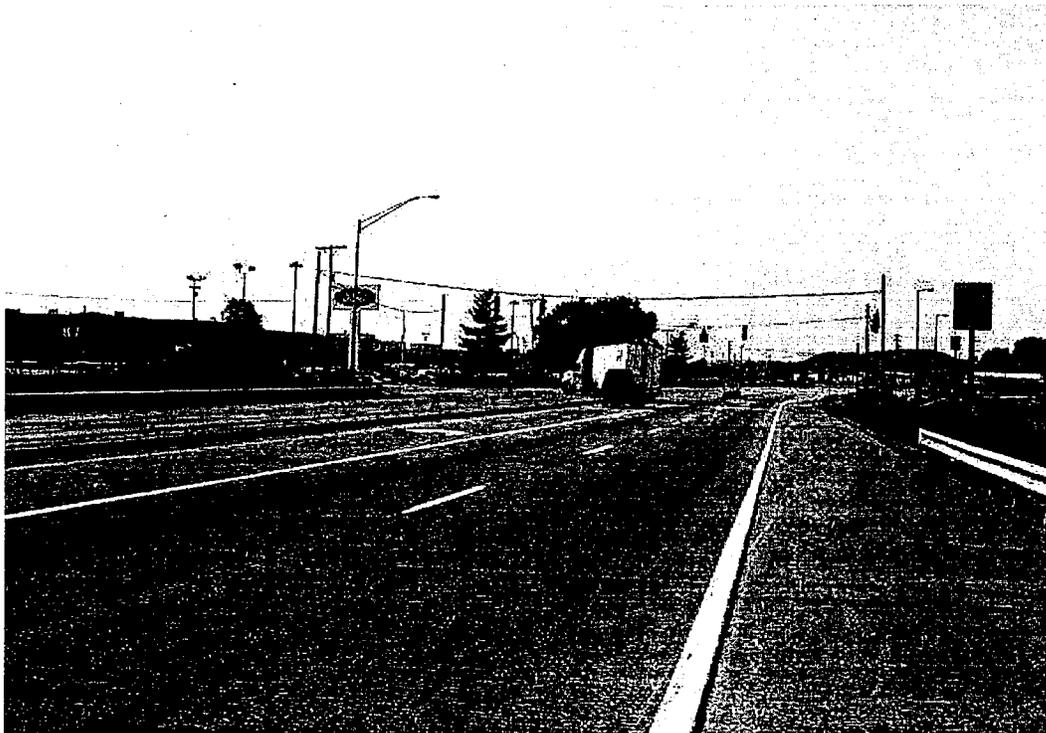
#### **3.1 Traffic Operations and Level of Service**

The survey of this site indicated that traffic backups occur in the right hand lane of the intersection of Grade Lane with the Preston Highway (KY 61) during the weekday PM peak. Traffic counts for a level of service evaluation at the signalized intersection were conducted. Detailed results can be found in Appendix B. The LOS was determined using the Highway Capacity Manual software assuming random arrivals and fixed timing based on an estimate of the timing plan during the time of evaluation. The overall estimate of LOS is D. This might be considered reasonable for an urban area arterial during the peak periods. However, this intersection should be flagged as a possible concern if truck or total traffic is expected to grow in the areas. Further investigation might reveal the problem could be solved through changes in traffic signal timing.

**Figure 2: Crittendon Avenue (west of Airport)**



**Figure 3: Fern Valley Road (between I-65 and Grade Lane)**



**Figure 4: Grade Lane Between Fern Valley Road and I-65 (looking south)**



**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

### 3.2 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). The section of KY 1631, Fern Valley Road, had a critical truck accident rate factor of 1.32, indicating a possible truck accident problem. The truck accident rate is 32% higher than would be considered critical on a four-lane urban arterial.

A summary of the accidents along the truck routes is shown in Tables 2 through 4 for 1995 through 1997. Truck accidents represent a moderate percent of the overall accidents along both the routes but are higher on Fern Valley Road. These results indicate that there are truck accident safety issues that may require further investigation. As indicated in subsequent sections of this report very few geometric deficiencies exist along these routes which might contribute to accidents.

**Table 2: Accident Types along Crittendon Avenue**

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Truck Accidents</i>
Total	13	1	7.7
Fatal Accidents	0	0	***
Injury	4	0	0.0
Intersection	6	1	14.3

**Table 3: Accident Types along Grade Lane**

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Truck Accidents</i>
Total	13	1	7.7
Fatal Accidents	0	0	***
Injury	4	0	0.0
Intersection	6	1	14.3

**Table 4: Accident Types along Fern Valley Road**

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Truck Accidents</i>
Total	81	19	23.5
Fatal Accidents	0	0	***
Injury	19	3	13.6
Intersection	44	12	21.4

### **3.3 Cross Section Features**

All sections of these three routes have at least 12-foot lanes that are considered “preferred” in this study. Figure 5 illustrates the sections of the routes having different widths and types of shoulders. The 10-foot paved shoulders are considered “preferred” while all others are rated “less than adequate”.

The pavement was good on Grade Lane and Fern Valley Road but only fair on Crittendon Avenue. The clear zone on Crittendon Avenue is obstructed by utility poles and the airport fence.

A few minor obstructions were noted on Grade Lane.

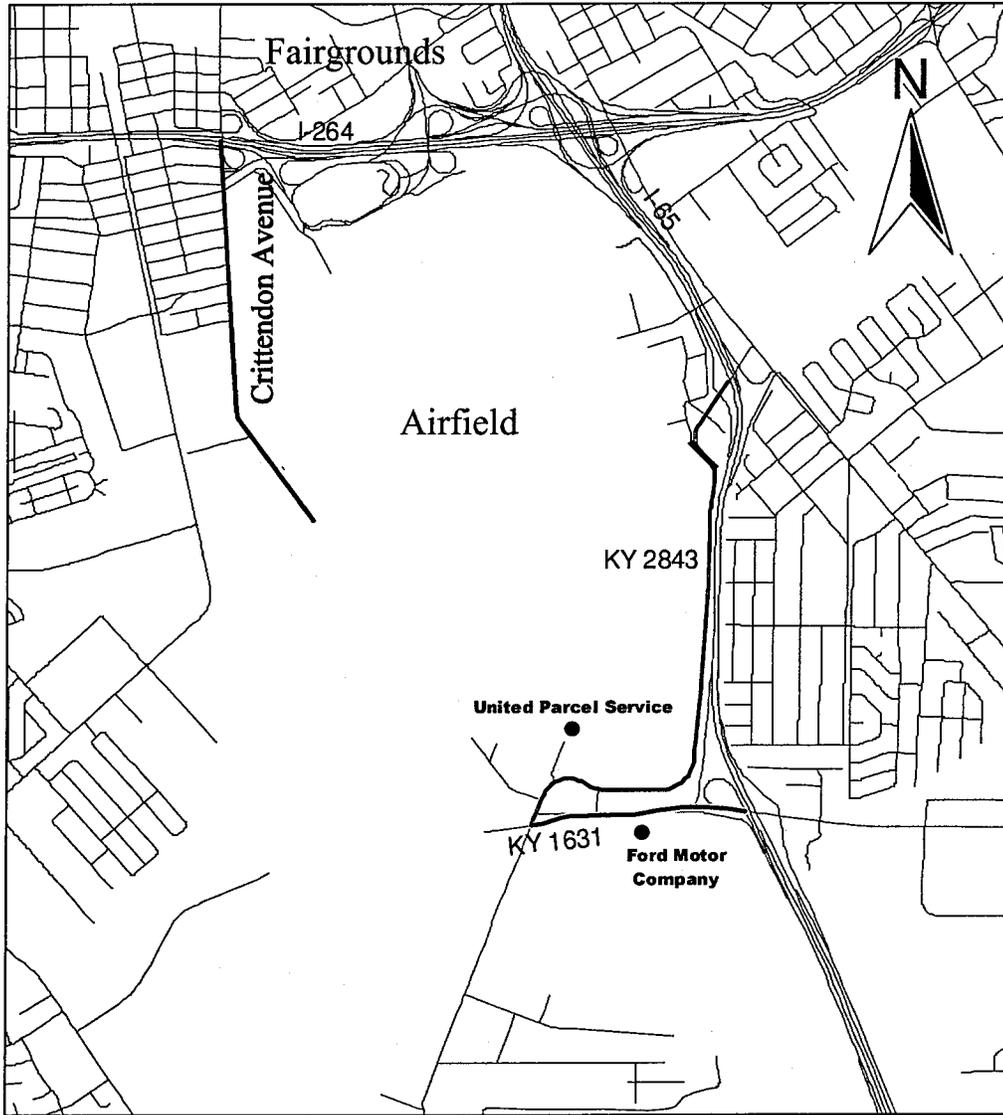
### **3.4 Curvature Features**

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

Offtracking is considered a problem where a truck cannot stay in its lane through a curve. No such horizontal curve offtracking problems were found on this route. Safe speed problems on curves did not exist on these routes.

The right turning radius at the intersection of Fern Valley Road and Grade Lane was noted during the phone survey as problematic. There is a very small right turning bay for traffic making this movement. The turn is tight, but trucks can make the turn from the right most lane and do not offtrack into opposing or adjacent lanes. Therefore, the turn is rated “preferred.”

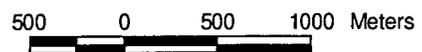
**Figure 5: Shoulder Widths**



**LEGEND**

- Facility
- Shoulder Width: Curbed
- Shoulder Width: 2-6 Feet (Turf/Gravel)
- Shoulder Width: 10 Feet (Paved)

**Scale - 1:30000**



### **3.5 Railroad Crossings**

There were no at-grade railroad crossings on these routes.

### **3.6 Bridges**

There are two bridges on these routes. One is the overpass on Fern Valley Road over I-65. The other is a bridge approximately 0.2 miles south of I-264 interchange on Crittendon Avenue. The bridge sufficiency rating (provided by the KYTC Division of Operations) for the overpass is 90.8. A sufficiency rating of 80 or higher (out of a possible 100) is considered “preferred,” and a rating of at least 50 is “adequate.” Therefore the overpass bridge is rated “preferred”. The Crittendon Avenue bridge could not be found in the KYTC database and the Division of Operations is investigating this omission.

### **3.7 Sight Distance**

There were no sight distance problems noted on this route.

## **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 have been normalized for the number of miles, number of points and number of trucks using the route section. In the case of these Jefferson County routes, only one feature that was evaluated quantitatively has sections 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 KYTC HIS data and based on phone survey information. Truck volumes on Crittendon Avenue after the closure of the extension around the south of the airfield to Fern Valley Road is unknown.

Table 5 contains the total problem truck miles for shoulders. The rating of the routes relative to others evaluated will be reported in the final report.

### **4.2 Maintenance Improvement Locations**

No specific deficiencies that could be addressed through routine maintenance were noted for these routes.

### 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 6. Both these routes are assigned a rating of 10 indicating that minor problems exist that do not seriously impede truck traffic.

**Table 5: Summary of Problem Truck Miles**

Feature	Road	Location	Points*	Length (miles)	Trucks (/day)	Truck-points	Truck-miles
Shoulders	Grade		2	2.5	137		685.0
	Crittendon		2	1.4	NA		NA
<b>Total</b>							<b>685++</b>

\*1 point for “adequate” features and 2 points for “less than adequate” features (0 points for “preferred” features not shown)

**Table 6: 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
3-5	Minor improvements are <u>required</u> on this route
6-8	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

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

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

- Minor shoulders deficiencies, and
- One section with a critically high truck accident rate.

Trucks are served with good access at this site. A minor improvement for the right turning bay at Fern Valley Road and Grade Lane might be considered. Further investigation as to the reasons for the high truck accident rates on Fern Valley Road might also be considered.

## **Appendices**



## Appendix B: Traffic Level of Service Information

Data Collection: December 15, 1998, PM peak

NB LOS = C

SB LOS = D

EB LOS = D

Overall LOS = D

