



Date	To
July 25, 2005	Gorham Bypass File (30251-PL)
From	Subject
Technical Memorandum	Paul Godfrey, PE
	Updated Intersection Safety Analysis

Introduction

The purpose of technical memorandum is to document the updated intersection safety analysis performed for the study area intersections as part of the Gorham Bypass Study. The methodology, results, and conclusions of this analysis are identified below.

Background

As part of the Gorham Bypass Study effort, a qualitative assessment of safety was performed for 16 study area intersections. This assessment was based on a volume reduction identified at the study area intersections compared to no-build and was summarized by identifying the number of intersections whose crash rates were anticipated to improve for each alternative.

Updated Crash Analysis Methodology

FHWA recently developed models to determine crash frequency at rural intersections. These models were designed to provide a process to quantitatively assess the safety of the no-build option compared to other build options. This assessment provides valuable safety outcome information to the public as part of the project evaluation process.

Crash frequency models were developed for both rural signalized and unsignalized (stop-controlled) intersections. Crash frequency model equations are shown that are applicable to the Gorham Bypass Study are shown below:

Three-leg Stop Controlled Intersection

$$N = e^{-10.9 + 0.79 \ln(ADT1) + 0.49 \ln(ADT2)}$$

Four-leg Stop Controlled Intersection

$$N = e^{-9.34 + 0.60 \ln(ADT1) + 0.61 \ln(ADT2)}$$

Four-leg Signalized Intersection

$$N = e^{-5.73 + 0.60 \ln(ADT1) + 0.20 \ln(ADT2)}$$

Where:

N = Number of crashed per year

ADT1 = Average Daily Volume on the Major Road

ADT 2 = Average Daily Volume on the Minor Road

Crash Analysis Results

Using the crash frequency model equations identified above and traffic volumes developed for the Gorham Bypass Study, an updated intersection safety analysis was performed. Please note that the number of intersections analyzed has been reduced from 16 to 12 due to the necessary traffic volume data required for the frequency model equations. The results of this analysis are attached in Table 1.

Conclusions

Based on the results of the updated crash analysis, the following conclusions can be reached:

- Build alternatives are anticipated to reduce crash frequencies at the majority of study area intersections (75% or greater).
- The upgrade alternative is anticipated to worsen crash frequencies at study area intersections by approximately 15% over the no-build
- The single bypass alternatives (1C, 1E) are anticipated to reduce crash frequencies by approximately 11% over the no-build for those intersections whose crash frequency reduces.
- The multiple bypass alternatives (6B, 6C, and 6D) are anticipated to reduce crash frequencies by approximately 25% over the no-build for those intersections whose crash frequency reduces.

Conclusions are based on the results of the updated crash analysis performed for the Gorham Bypass Study.