Traffic Operations Analysis at Four Intersections in Harrison County, Mississippi

Canal Road and Landon Road - Harrison County

Canal Road and 16th Street - Harrison County

Canal Road and 28th Street - City of Gulfport & Harrison County

28th Street and Klondyke Road - City of Long Beach

DRAFT

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A Work Assignment under the Transportation Master Services Contract between Gulf Regional Planning Commission and Neel-Schaffer, Inc.

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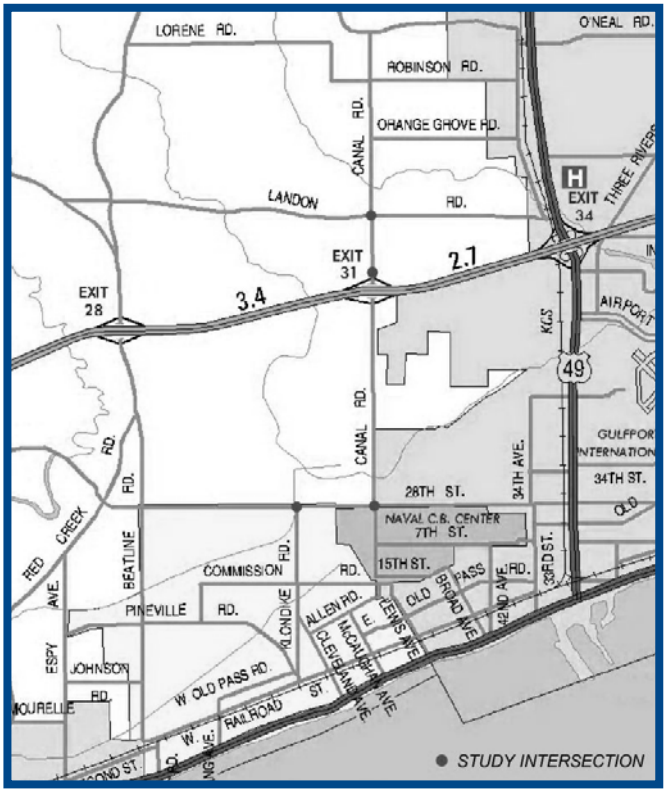
Section 1 Introduction

1.1 Background

The Gulf Regional Planning Commission (GRPC) initiated a work assignment for Neel-Schaffer to provide traffic engineering services related to the operation analysis of four intersections in Harrison County, Mississippi. The work assignment was executed to help the City of Long Beach, City of Gulfport, and Harrison County assess the traffic congestion at the study intersections and to make recommendations for short term and long term projects that would help improve traffic operations. The scope of work included attending project meetings with the project team and governing agencies, collecting field data related to perceived traffic problem areas, evaluating existing conditions and potential improvements, and providing graphic illustrations of data and proposed solutions.

GRPC, in conjunction with the City of Long Beach and Harrison County, identified four intersections in need of traffic operation and/or safety improvements. The study includes the following intersections:



- Canal Road and Landon Road
- Canal Road and 16th Street
- Canal Road and 28th Street
- 28th Street and Klondyke Road

Figure 1.1
Project Location Map
Source – Mississippi Department of Transportation

1.2 Project Understanding

The first portion of this work assignment was to document the existing conditions at the four study locations. Several pieces of data were collected to document the existing conditions and to help forecast future conditions at the study locations. The data collection efforts included gathering information from GRPC, the City of Gulfport and Harrison County. Also, Neel-Schaffer staff provided field data collection efforts for data not readily available.

The second portion of this work assignment was to evaluate the existing conditions at the four study locations based on the existing traffic volumes, field data relevant to the existing geometrics, and traffic signal timing data (where applicable). The AM and PM peak hour volumes were used for the evaluation, as they typically represent the highest demands on the intersections during an average weekday. A computer model was built representing the AM and PM peak scenarios for the selected intersections. SYNCHRO was utilized for the signalized intersections, while HCS+ was utilized for the unsignalized intersections. These computer models utilize the Highway Capacity Manual methodology for computing the average vehicular delays at each of the intersections.

Proposed improvements were developed for the study intersections that may include geometric improvements, roadway widening, traffic signal installation or signal timing modifications. Dependent upon the study intersection, several alternatives were considered for improvements. The Year 2015 estimated volumes were used for the traffic analysis to evaluate the operation of the intersection based upon the potential improvements.

Recommendations for improvements were developed for short term implementation (0-1 years) and long term implementation (5-10 years).

1.3 Basis of Analysis

The capacity and level-of-service (LOS) of an intersection is evaluated based on the delay, turning movement volumes, traffic composition, and roadway geometrics. The methodology utilized in this analysis is based on the Highway Capacity Manual (HCM), 2000. The level of service, as outlined in the HCM, is reported as a letter designation of LOS A through LOS F (A is the least delay and F is the most delay).

The level-of-service is based on delay per vehicle (in seconds). The delay range for signalized intersections is as follows:

LOS	Delay (s/veh)
A	≤ 10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80

The delay range for unsignalized intersections, both two-way and four-way stop controlled, is as follows:

LOS	Delay (s/veh)
A	≤ 10
B	> 10 – 15
C	> 15 – 25
D	> 25 – 35
E	> 35 – 50
F	> 50

1.4 Traffic Signal Warrants

To determine if a traffic signal can be installed at a particular intersection, the traffic signal warrants outlined in the Manual on Uniform Traffic Control Devices (MUTCD) must be evaluated. There are eight warrants outlined in the MUTCD.

Warrant 1	Eight-Hour Vehicle Volume
Warrant 2	Four-Hour Vehicle Volume
Warrant 3	Peak Hour
Warrant 4	Pedestrian Volume
Warrant 5	School Crossing
Warrant 6	Coordinated Signal System
Warrant 7	Crash Experience
Warrant 8	Roadway Network

The first three warrants (the vehicular volume warrants) were evaluated to determine whether a traffic signal could be a potential improvement at the unsignalized intersections in this work assignment. The volumes warrants are based on the higher volume minor street approach and the combined two-way major street approach volumes.

The eight-hour warrant sets forth minimum volumes for eight hours of the day for the heaviest volume approach of the minor street and the combined approach volume of the major street. The four-hour warrant and peak hour warrant involve plotting points on a graph based on volumes from the major and minor streets.

Each of the three vehicular volume warrants have two alternatives for the signal warrant evaluation. The first is commonly referred to as a “full warrant”, where the minimum threshold is at the highest level and there are no adjustments for speed or population. The other is a “reduced warrant”, or 70% warrant. In this instance, the minimum threshold is reduced based on either a 40 mph or greater speed on the major street or if the intersection lies within the built-up area of an isolated community.