MEMORANDUM

To: Traffic Study Files

From: Alison Mills, P.E., South Area Transportation Engineer
      Transportation Engineering Division
      Austin Transportation Department

Date: December 27, 2021

Subject: SPEED ZONE INVESTIGATION

Location: W. Slaughter Lane – Ranch to Market (RM) 1826 to Escarpment Boulevard

Date(s) of Previous Investigation: None

A traffic engineering investigation has been conducted by the Transportation Engineering Division (TED) to determine the appropriate speed limit on W. Slaughter Lane from RM 1826 to Escarpment Boulevard. Currently, the speed limit on W. Slaughter Lane in this section of roadway is 50 MPH. Figure 1 represents a map of the study area.

Location Conditions:

W. Slaughter Lane from RM 1826 to Escarpment Boulevard is a divided, two-way, four-lane, arterial roadway. The roadway is approximately 1.6 miles and treated as a single segment due to similar land use and functional classification along the length of the roadway. W. Slaughter Lane from RM 1826 to Escarpment Boulevard is 50 MPH with no front facing homes. There is one school and a park along this segment.

Table 1 presents more information of each street segment studied, while Figures 2 and 3 present maps of the street segments studied.

Table 1: Location Information

<table>
<thead>
<tr>
<th>Street Segment</th>
<th>Segment Length (Miles)</th>
<th>Number of Unsignalized Access Points</th>
<th>Number of Signalized Intersections</th>
<th>Width (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. Slaughter Lane – RM 1826 to Escarpment Blvd.</td>
<td>1.6</td>
<td>10</td>
<td>3</td>
<td>80-90</td>
</tr>
</tbody>
</table>
Investigation Data

TED’s investigation was conducted in accordance with the TxDOT’s “Procedures for Establishing Speed Zones,” which focuses on a traditional methodology of 85th percentile speeds.

This investigation also utilized FHWA’s USLIMITS2 tool to evaluate speed limits from a safe systems approach, which includes the following inputs to consider in setting reasonable, safe, and consistent speed limits based on the context and operating characteristics on the study segment:

- 85th percentile speed
- 50th percentile speed
- Statutory speed limit
- Section length
- Road alignment
- Median treatment
- Number of through lanes
- Adjacent land use
- Driveway density
- Traffic control devices
- Bicycle, pedestrian, and parking activity
- Daily vehicular volume
- Crash rate

Speed and volume data were collected in December 2021 to determine the appropriate posted speed limit for W. Slaughter Lane. It is important to note that data collection points were limited due to the presence of a work zone at the southern end of the segment and a school zone at the northern end of the study segment.

Table 2 summarizes the 85th percentile speed, 50th percentile speed, and daily traffic volumes collected on W. Slaughter Lane at various points.

<table>
<thead>
<tr>
<th>Street</th>
<th>Data Collection Points</th>
<th>Existing Speed Limit</th>
<th>85% Speed</th>
<th>50% Speed</th>
<th>Traffic Volumes (ADT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. Slaughter Ln</td>
<td>West of Barstow Ave</td>
<td>50</td>
<td>54</td>
<td>53</td>
<td>7716</td>
</tr>
</tbody>
</table>

Crash data was obtained from the City of Austin’s Vision Zero database. This database obtains crash data from the Texas Department of Transportation (TxDOT) Crash Record Information System (CRIS) database. Total number of crashes and total number of fatal or injury crashes from November 30, 2016 to November 30, 2021 were obtained for the extents of this project limits and summarized in Table 3. A crash was determined to be within the study area if the primary address was along the W Slaughter Lane street segments.

<table>
<thead>
<tr>
<th>Street Limits</th>
<th>Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM 1826 to Escarpment Blvd</td>
<td>98  31</td>
</tr>
</tbody>
</table>

A USLIMITS2 study was run in both directions for all identified data point on W. Slaughter Lane. In accordance with the “Texas Procedures for Establishing Speed Zones,” the speed limit can be set at different values by direction of travel on divided roadways. However, City of Austin prefers setting speed limits at the same value for both directions of travel to aid in enforcement and meeting drivers’ expectations in an urban environment. Therefore, the recommended speed limit is to be 45 MPH in the westbound and eastbound directions of W. Slaughter Lane. In addition, on W Slaughter Lane, the land use and functional classification is maintained for the length of the segment. Speed recommendations at each point were considered to select one consistent speed limit for the length of the segment. The results of the USLIMITS2 Speed Zoning Report are summarized in Table 4 below.
Table 4: USLIMITS2 Speed Zoning Report Results

<table>
<thead>
<tr>
<th>Street</th>
<th>Data Location</th>
<th>Existing Speed Limit (mph)</th>
<th>USLIMITS2 Recommended Speed Limit (mph)</th>
<th>Recommended Speed Limit – Both Directions (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. Slaughter Ln</td>
<td>West of Barstow Ave</td>
<td>50</td>
<td>45</td>
<td>45</td>
</tr>
</tbody>
</table>

Figure 2 presents a map of the study area and the proposed speed limit based on the collected data and analysis.

Recommendation

TED has determined a speed limit of 45 mph for westbound and eastbound traffic is appropriate for the study segments, based on the two methodologies used for setting speed limits and particularly these considerations.
Project Overview

**Project Name: W. Slaughter Lane Speed Study**

**Analyst:** Cody Stone

**Date:** 2021-12-18

**Basic Project Information**
- Route Name: W. Slaughter Lane
- From: RM 1826
- To: Escarpment Blvd
- State: Texas
- County: Travis County
- City: Austin city
- Route Type: Road Section in Developed Area
- Route Status: Existing

**Roadway Information**
- Section Length: 1.6 mile(s)
- Statutory Speed Limit: None
- Existing Speed Limit: 50 mph
- Adverse Alignment: No
- One-Way Street: No
- Divided/Undivided: Divided
- Number of Through Lanes: 4
- Area Type: Residential-Collector/Arterial
- Number of Driveways: 10
- Number of Signals: 3

**Crash Data Information**
- Crash Data Years: 5.00
- Crash AADT: 7716 veh/day
- Total Number of Crashes: 98
- Total Number of Injury Crashes: 31
- Section Crash Rate: 435 per 100 MVM
- Section Injury Crash Rate: 138 per 100 MVM
- Crash Rate Average for Similar Roads: 250
- Injury Rate Average for Similar Roads: 78

**Traffic Information**
- 85th Percentile Speed: 54 mph
- 50th Percentile Speed: 50 mph
- AADT: 7716 veh/day
- On Street Parking and Usage: Not High
- Pedestrian / Bicyclist Activity: Not High

**Recommended Speed Limit:**

**Note:** The section crash rate of 435 per 100 MVM is above the critical rate (306). The injury crash rate for the section of 138 per 100 MVM is above the critical rate (111). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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**Equations Used in the Crash Data Calculations**

**Exposure (M)**

\[ M = \frac{(\text{Section AADT} \times 365 \times \text{Section Length} \times \text{Duration of Crash Data})}{100000000} \]

\[ M = \frac{(7716 \times 365 \times 1.6 \times 5.00)}{100000000} \]

\[ M = 0.2253 \]

**Crash Rate (Rc)**

\[ Rc = \frac{(\text{Section Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})} \]

\[ Rc = \frac{(19.60 \times 100000000)}{(7716 \times 365 \times 1.6)} \]

\[ Rc = 434.96 \text{ crashes per 100 MVM} \]

**Injury Rate (Ri)**

\[ Ri = \frac{(\text{Section Injury Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})} \]

\[ Ri = \frac{(6.20 \times 100000000)}{(7716 \times 365 \times 1.6)} \]

\[ Ri = 137.59 \text{ injuries per 100 MVM} \]

**Critical Crash Rate (Cc)**

\[ Cc = \text{Crash Average of Similar Sections} + 1.645 \times (\text{Crash Average of Similar Sections} / \text{Exposure})^{(1/2)} + (1 / (2 \times \text{Exposure})) \]

\[ Cc = 249.53 + 1.645 \times (249.53 / 0.2253)^{(1/2)} + (1 / (2 \times 0.2253)) \]

\[ Cc = 306.50 \text{ crashes per 100 MVM} \]
Critical Injury Rate ($I_c$)
$I_c = \text{Injury Crash Average of Similar Sections} + 1.645 \times (\text{Injury Crash Average of Similar Sections} / \text{Exposure}) ^ {\frac{1}{2}} + \frac{1}{2 \times \text{Exposure}}$

$I_c = 77.94 + 1.645 \times (77.94 / 0.2253) ^ {\frac{1}{2}} + \frac{1}{2 \times 0.2253}$

$I_c = 110.75$ injuries per 100 MVM
USLIMITS2 Speed Zoning Report

Project Overview

Project Name: W. Slaughter Lane Speed Study

Analyst: Cody Stone

Basic Project Information
Route Name: W. Slaughter Lane
From: RM 1826
To: Escarpment Blvd
State: Texas
County: Travis County
City: Austin city
Route Type: Road Section in Developed Area
Route Status: Existing

Crash Data Information
Crash Data Years: 5.00
Crash AADT: 7716 veh/day
Total Number of Crashes: 98
Total Number of Injury Crashes: 31
Section Crash Rate: 435 per 100 MVM
Section Injury Crash Rate: 138 per 100 MVM
Crash Rate Average for Similar Roads: 250
Injury Rate Average for Similar Roads: 78

Roadway Information
Section Length: 1.6 mile(s)
Statutory Speed Limit: None
Existing Speed Limit: 50 mph
Adverse Alignment: No
One-Way Street: No
Divided/Undivided: Divided
Number of Through Lanes: 4
Area Type: Residential-Collector/Arterial
Number of Driveways: 10
Number of Signals: 3

Traffic Information
85th Percentile Speed: 53 mph
50th Percentile Speed: 46 mph
AADT: 7716 veh/day
On Street Parking and Usage: Not High
Pedestrian / Bicyclist Activity: Not High

Recommended Speed Limit:

Note: The section crash rate of 435 per 100 MVM is above the critical rate (306). The injury crash rate for the section of 138 per 100 MVM is above the critical rate (111). A comprehensive crash study should be undertaken to identify engineering and traffic control deficiencies and appropriate corrective actions. The speed limit should only be reduced as a last measure after all other treatments have either been tried or ruled out.

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\[ Rc = \frac{(19.60 \times 100000000)}{(7716 \times 365 \times 1.6)} \]
\[ Rc = 434.96 \text{ crashes per 100 MVM} \]

Injury Rate (Ri)

\[ Ri = \frac{(\text{Section Injury Crash Average} \times 100000000)}{(\text{Section AADT} \times 365 \times \text{Section Length})} \]
\[ Ri = \frac{(6.20 \times 100000000)}{(7716 \times 365 \times 1.6)} \]
\[ Ri = 137.59 \text{ injuries per 100 MVM} \]

Critical Crash Rate (Cc)

\[ Cc = \text{Crash Average of Similar Sections} + 1.645 \times (\text{Crash Average of Similar Sections} / \text{Exposure})^{(1/2)} + (1 / (2 \times \text{Exposure})) \]
\[ Cc = 249.53 + 1.645 \times (249.53 / 0.2253)^{(1/2)} + (1 / (2 \times 0.2253)) \]
\[ Cc = 306.50 \text{ crashes per 100 MVM} \]
**Critical Injury Rate (Ic)**

\[
Ic = \text{Injury Crash Average of Similar Sections} + 1.645 \times \left( \frac{\text{Injury Crash Average of Similar Sections}}{\text{Exposure}} \right)^{1/2} + \frac{1}{2 \times \text{Exposure}}
\]

\[
Ic = 77.94 + 1.645 \times \left( \frac{77.94}{0.2253} \right)^{1/2} + \frac{1}{2 \times 0.2253}
\]

\[
Ic = 110.75 \text{ injuries per 100 MVM}
\]