November 29, 2024

City of Leon Valley
Ms. Melinda Moritz
Public Works Director
6400 El Verde Road
Leon Valley, Texas 78238

RE: TECHNICAL MEMORANDUM
Follow Up Traffic Safety Assessment of the Evers Road and Adair Drive
Leon Valley, Texas

Background:

A traffic safety assessment was conducted to re-evaluate existing traffic conditions at the Evers Road and Adair Drive intersection in Leon Valley, Texas. A previous safety assessment was conducted in April of 2022 and followed-up with this safety assessment. The intersection provides the single-access point for the 27 properties located along Adair Drive and Countess Adria Lane to Evers Road. The posted speed limit along Evers Road is 30 miles per hour. Figure 1 below illustrates the location of the Evers Road and Adair Drive intersection in Leon Valley, Texas.

Figure 1. Evers Road and Adair Drive Intersection

Intersection Crash Frequency:

Previously, the City of Leon Valley had queried the city's police crash logs for crash history at the Evers Road and Adair Drive intersection between March 2017 and March 2022 and found no intersection related crashes during that time period. Additional crash data was queried for the adjacent intersections along Eves Road and it was determined that 18 crashed have occurred during the same timeframe with all crashes related to some level of driver inattention. Crash frequency is not believed to be the safety factor necessitating this assessment.

Stopping and Intersection Sight Distance Assessment:

Also discussed in the previous intersection assessment, Stopping Sight Distance (SSD) is the length of roadway ahead that is visible to the driver approaching an intersection. The available sight distance on a roadway should be sufficiently long to enable a vehicle traveling at or a near the design speed to stop before reaching a stationary object on its path. Given the current posted speed limit along Evers Road (30 miles per hour), drivers approaching the intersection along Evers Road would need approximately 200' of sight distance as established in the American Association of State Highway Transportation Officials (AASHTO) *Policy on Geometric Design of Highways and Streets* to come to a complete stop if an obstruction is observed at the intersection, specifically a vehicle exiting the subdivision from Adair Drive and turning onto Evers Road. Considering the crash frequency observed between March 2017 and 2022 as well as the low traffic volumes from the 25-lot subdivision, stopping sight distance would not be of significant concern.

Intersection Sight Distance (ISD) is the length of roadway visible to the driver at a stopped condition, typically at the stop bar of a stop-controlled intersection. Intersection sight distance is measured from a point located approximately 3.5' above ground level (driver's eye height for passenger cars) and approximately 14.5' from the edge of travel lane to a point located approximately 335' (assuming 30 miles per hour) from the intersection and 3.5' above ground level. Figure 2 below illustrates the intersection sight distance triangles for vehicles at a stop-controlled intersection. Intersection sight distance for the Adair Drive approach to Evers Road is observed to be less than the required 335' and may benefit from warning signage. Figure 3 illustrates the existing intersection sight distance, facing west along Evers Road.

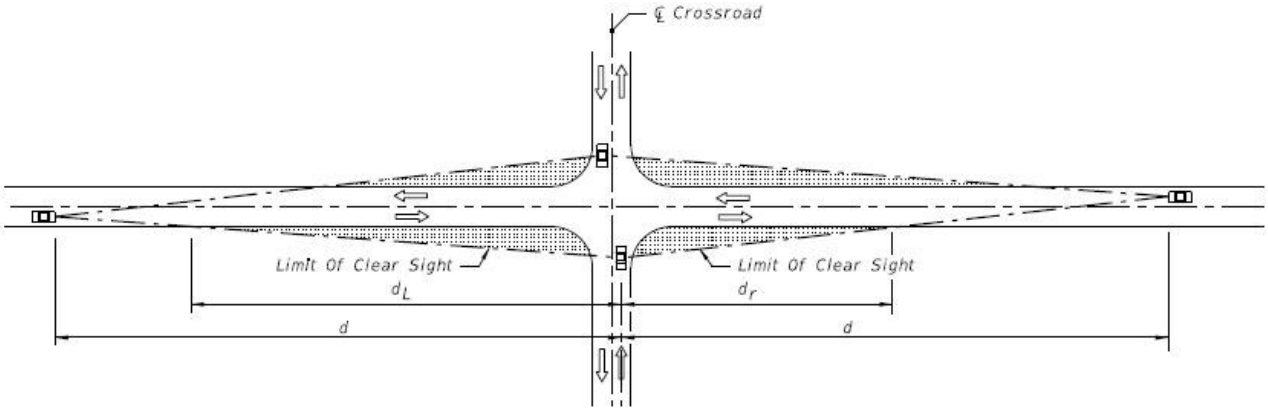

Figure 2. AASHTO Intersection Sight Distance Triangles

Sight distance is also obstructed by an existing privacy fence at the south-west corner of the intersection, further limiting visibility of vehicles approaching along eastbound Evers Road towards Adair Drive, shown in Figure 3.

Figure 3. View from the Adair Drive approach to Evers Road

Existing Pavement Markings:

Currently, the Evers Road approaches to Adair Drive are striped for two-lanes in each direction of travel and no shoulders. Adair Drive does not currently have any pavement markings. It may be beneficial to provide a stop bar at the Adair Drive approach to Evers Road to increase sight distance around the existing privacy fence however; a stop bar located much closer to the Evers Road travel lanes would also conflict with the existing pedestrian ramps. The placing of a stop bar closer to the travel lanes would require adjustments to the existing pedestrian ramps to remain between the Evers Road travel lanes and the Adair Drive approach stop bar.

Existing Warning Signage:

Currently, there is a "Side Road" advanced warning sign (MUTCD W2-2R Designation) located approximately 560' from the intersection along the eastbound Evers Road approach to Adair Drive however the Texas Manual on Uniform Traffic Control Devices (MUTCD) does allow for closer spacing between the intersection and sign location. Table 2C-4 (Guidelines for Advanced Placement of Warning Signs) of the Texas MUTCD does allow for a minimum of 100' from the intersection to provide for a driver to search for the side street following observation of the advanced warning sign. The current 550' upstream placement of the advanced warning sign may be adjusted to 250' to adequately serve the purpose of a warning sign at a 30 mile per hour operating speed.

Figure 4. Side Road Advanced Warning Sign (MUTCD W2-2R)

Proposed Sight Distance Mitigation Alternatives

Another option for an intersection with limited sight distance is a dynamic warning sign, as shown in Figure 5 below. The Intersection Conflicting Warning System (ICWS) can be designed to either detect vehicles on the minor roadway (Adair Drive) and indicate their presence to drivers on the main road (Evers Road), or indicate to the driver on the minor road when there is oncoming traffic on the main roadway. The Crash Modification Factors (CMF) Clearinghouse lists a 32-percent reduction for all crash types when installing a "Vehicles Entering When Flashing" system (advanced post-mounted signs on the major road and detection on the minor roadway at stop-controlled intersections). Appendix A includes an Unsignalized Intersection Improvement Guide for the Install of an Intersection Conflict Warning System.

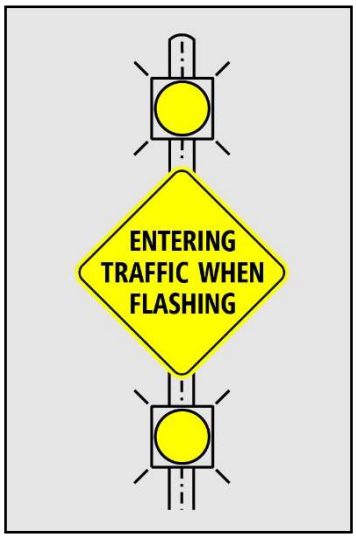

Figure 5. Traffic Entering When Flashing Warning Sign (MUTCD W2-10)

In addition to the installation of signage and conflicting warning system, it may be recommended that a clear zone be established using the intersection sight distance sight triangles, specifically along the eastbound Evers Road approach to Adair Drive which may require the removal of a wooden picket fence on the south-west corner of the intersection, shown in Figure 6 below.

Figure 6. Wooden Fence Obstruction on South-West Corner of Intersection

Conclusions and Recommendations:

Based on the existing 30 mile per hour speed limit along Evers Road and the lack of crash history at the intersection of Evers Road and Adair Drive, there remains insufficient evidence to warrant the implementation of additional roadway improvements at the intersection. However, in addition to the previously relocated "Side Road" advanced warning sign from its previous 560' from Adair Drive to approximately 250' from Adair Drive, consideration may be given to the installation of an Intersection Conflicting Warning System and the clearing of the Adair Drive sight distance triangles.

If you have any questions regarding this traffic safety assessment, please feel free to contact me by phone at 210.535.3558 or by e-mail at r-arredondo@acgroupllc.com.

Rene Arredondo, P.E., PTOE
Traffic Engineer

Attachments: Appendix A – UIIG Sheet for the Installation of Intersection Conflict Warning System
Appendix B – UIIG Sheet for the Clearing of Intersection Sight Triangles

Appendix A

UIIG Sheet for Installation of Intersection Conflict Warning System

Unsignalized Intersection Improvement Guide

Install an Intersection Conflict Warning System (ICWS)

Intelligent Transportation System (ITS) technology used to warn motorists approaching an intersection of potential conflicts with other approaching vehicles. Such systems include detection of vehicles on the major road, minor road, or both.

Source: Terry Berends (WSDOT)

This ICWS employs ground-mounted signing and Warning Beacons to warn major road drivers that one or more vehicles may be entering from the minor road.

Source: VHB

This ICWS utilizes overhead signing and Warning Beacons to warn major road drivers that one or more vehicles may be entering from the minor road.

Targeted Crash Types

- Right-angle
- Rear-end (major road)

Problems Addressed

- Inadequate visibility of intersection or intersection traffic control devices
- Inadequate intersection sight distance
- Misjudgment of gaps
- Speeding

Conditions Addressed

- Crash history involving vehicles entering or crossing major road.
- Difficulty among drivers in determining appropriate gaps in traffic.
- Awareness of the intersection is lacking.
- High running speeds are typical of major road traffic.

Considerations

- There are applications designed for the major road approaches only, the minor road approaches only, or the approaches of both roads.
- Requires similar equipment to a traffic signal: controller, cabinet, detection devices (loops or video), and possibly LED message signs.
- Message should be simple and easily understood.
- Place at a distance from the intersection that would provide the approaching driver time to react.
- When ICWS design incorporates dynamic messages, some agencies program their devices to display random dots on the message screen when they are not working properly.

Other Resources

Stop-Controlled Intersection Safety: Through Route Activated Warning System, FWHA

Innovative Operational Safety Improvements at Unsignalized Intersections, Florida DOT

NCHRP 613: Guidelines for Selection of Speed Reduction Treatments at High-Speed Intersections

Select Examples

US 24 & MO 15, Paris, MO

NC 42 & Castleberry Rd., Clayton, NC

Salem Church Rd. & Kingsland Rd., Richmond, VA

Check for Crash Modification Factor: CMF Crash Modification Factors Clearinghouse

Appendix B

UIIG Sheet for the Clearing of Intersection Sight Triangles

Clear the Intersection Sight Triangles

Removal of overgrown foliage or other objects (e.g., signs, vehicular parking, utility poles, fences) obstructing the sight triangle without involving major construction.


Source: Lee Engineering, LLC

Source: Lee Engineering, LLC

In both images, sight triangles were improved by creating a buffer area between the approaching through lane and near edge of roadway.


Source: VHB

Site distance could be improved at this intersection by trimming the vegetation.

Check for Crash Modification Factor: CMF CRASH MODIFICATION FACTORS CLEARINGHOUSE

Targeted Crash Types

- Right-angle
- Rear-end (major road)

Problems Addressed

- Inadequate intersection sight distance
- Inadequate visibility of intersection or intersection traffic control devices

Conditions Addressed

- Inadequate sight distance at intersection due to obstructions in the sight triangle (in the median or on the roadside).
- Crash history or observed conflicts due to inadequate sight distance.

Considerations

- Removal of obstructions on private property will require coordination with property owners.
- Agency policy or local ordinances regarding planting and landscaping features on property corners should be reviewed, revised as necessary, and enforced.
- The position of the minor road stop line may be adjusted to improve visibility from the minor road approach.
- If adequate sight distance cannot be maintained, consider appropriateness of an all-way stop condition.

Industry Standard

AASHTO Green Book

Section 9.5.2: Sight Triangles

Other Resources

NCHRP 500 Volume 5: A Guide for Addressing Unsignalized Intersections

Intersection Safety: A Manual for Local Rural Road Owners, FHWA