



Appendix A

Existing Conditions Analysis

FM 76 (North Loop Drive) Feasibility Study

January 2023

Table of Contents

1.	Introduction	1
2.	Roadway Widths	3
3.	Available Right-of-Way (ROW)	5
4.	Existing Road Geometry.....	6
5.	Intersections.....	8
5.1	Signalized Intersection - FM 76 and Horizon Blvd (FM 1281).....	10
5.2	Signalized Intersection - FM 76 and FM 1110 (Clint Cut-Off Rd)	10
5.3	Signalized Intersection - FM 76 and FM 1110 (Clint-San Elizario)	11
5.4	Signalized Intersection – Camp St (FM 76), Fabens Rd, and Island Rd (FM 76)	11
5.5	Signalized Intersection – Island Rd (FM 76) and Alameda Ave (SH 20).....	12
6.	Signs and Markings	12
6.1.	Signs.....	12
6.2.	Markings.....	13
7.	Safety Features.....	14
8.	Pavement Condition	15
9.	Utilities.....	16
9.1	Water, Wastewater, and Stormwater.....	16
9.2	Electric Transmission	17
9.3	Gas	17

List of Tables

Table 1: Horizontal Curve Details..... 7
Table 2: Intersection Details 8

List of Figures

Figure 1: FM 76 (North Loop Dr) Near the Start of the Corridor	2
Figure 2: FM 76 (North Loop Dr) Near the End of the Corridor	2
Figure 3: Study Corridor Limits.....	2
Figure 4: Existing Typical Cross Sections	4
Figure 5: Schematic ROW Map	5
Figure 6: Posted Speed Limit	6
Figure 7: Curve Location near Sudan Dr along FM 76 (North Loop Dr).....	6
Figure 8: FM 76 and Horizon Blvd (FM 1281) Intersection.....	10
Figure 9: FM 76 and FM 1110 (Clint Cut-Off Rd) Intersection	10
Figure 10: FM 76 and FM 1110 (Clint-San Elizario) Intersection	11
Figure 11: Camp St (FM 76), Fabens Rd, and Island Rd (FM 76) Intersection	11
Figure 12: Island Rd (FM 76) and Alameda Ave (SH 20) Intersection.....	12
Figure 13: Signages along FM 76 (North Loop Dr)	13
Figure 14: Striping along FM 76 (North Loop Dr).....	14
Figure 15: Safety Features along FM 76 (North Loop Dr)	14
Figure 16: Missing Safety Features along FM 76 (North Loop Dr)	15
Figure 17: Pavement Condition Scores	16

List of Appendices

Appendix A.1 - Existing ROW Map

Appendix A.2 - Existing Signalized Intersections Layout

Appendix A.3 - Utility Exhibits

1. Introduction

This memorandum describes the existing conditions along the FM 76 (North Loop Drive (Dr)) corridor. The existing condition assessment provides a basis for identifying and analyzing challenges and constraints within the corridor. This includes an evaluation of the key roadway-related aspects of the corridor, which are:

- Roadway Widths
- Available Right-of-Way (ROW)
- Existing Road Geometry
- Intersections
- Signs and Markings
- Safety Features
- Pavement Condition
- Utilities

The FM 76 (North Loop Dr) Corridor Feasibility Study will examine mobility and safety for a segment of FM 76 (North Loop Dr) that is 12.5 miles long, located between FM 1281 (Horizon Boulevard (Blvd)) in Socorro and State Highway (SH) 20 (Alameda Avenue (Ave)) in Fabens. The existing roadway configurations near the beginning and end of the corridor are shown in **Figure 1** and **Figure 2** respectively, while the FM 76 (North Loop Dr) feasibility study limits are shown in **Figure 3**. The FM 76 (North Loop Dr) corridor is primarily a two-lane undivided roadway, with the exception of the segment located between Horizon Blvd (FM 1281) and Milo Dr, which is a four-lane segment. The corridor is classified as a Minor Arterial between Horizon Blvd (FM 1281) and Clint-San Elizario (FM 1110), and as a Major Collector from FM 1110 until the end of the corridor at Alameda Ave (SH 20) in Fabens. The corridor runs parallel to IH 10 located to the east, and Alameda Ave (SH 20) to the west. It is part of Texas Department of Transportation (TxDOT) roadway system and the transportation right-of-way (ROW) for the entire length is owned by TxDOT.



Figure 1: FM 76 (North Loop Dr) Near the Start of the Corridor



Figure 2: FM 76 (North Loop Dr) Near the End of the Corridor



Source: CDM Smith, 2022

Figure 3: Study Corridor Limits

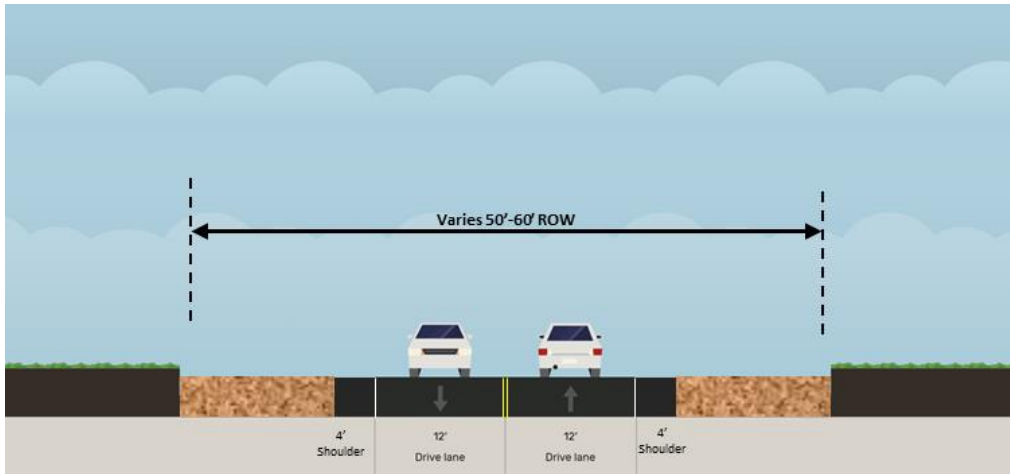
2. Roadway Widths

As previously mentioned, the corridor consists of a two-lane undivided roadway configuration, except for the 0.2 miles long segment between Horizon Blvd (FM 1281) and Milo Dr, which has a four-lane configuration with a median. The lane width in this section, varies between 11 ft and 14 ft, with a paved shoulder of around 11 ft wide on both sides. A 5 ft wide sidewalk is also observed on both sides along this section.

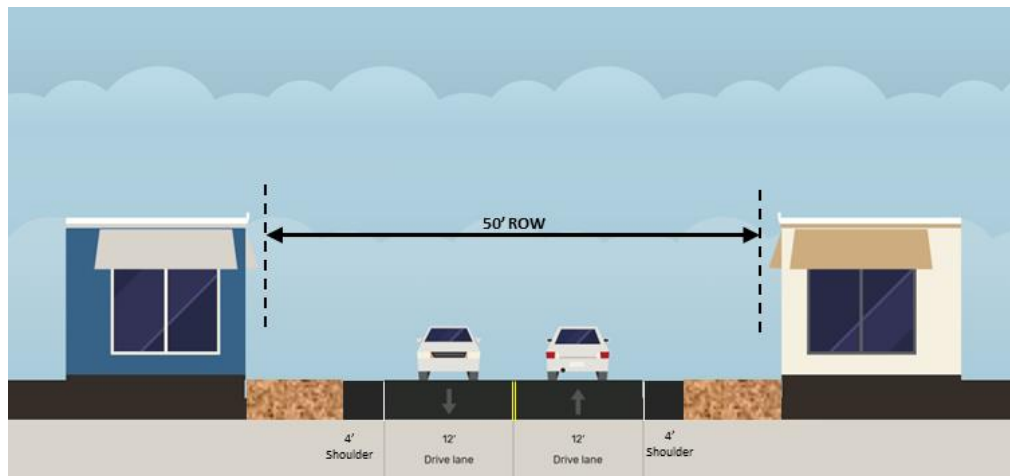
The rest of the corridor consists of two lanes, with a lane width between 11 ft and 12 ft, and a paved shoulder between 3 ft and 4 ft observed on either side of the roadway, except at intersections, where additional turn lanes are observed. There is no sidewalk available throughout the remainder of the corridor, except at the intersection of FM 76 (North Loop Dr) with Fabens Road (Rd), extending over to Alameda Ave (SH 20), for a length of around 0.2 miles. The corridor's existing typical cross sections are shown in **Figure 4**. The lane widths adhere to TxDOT standards throughout the corridor length and no deficiencies were observed in the existing configuration.



Existing Typical Four Lane Section – Close to Horizon Blvd Intersection



Typical Two Lane Rural Section



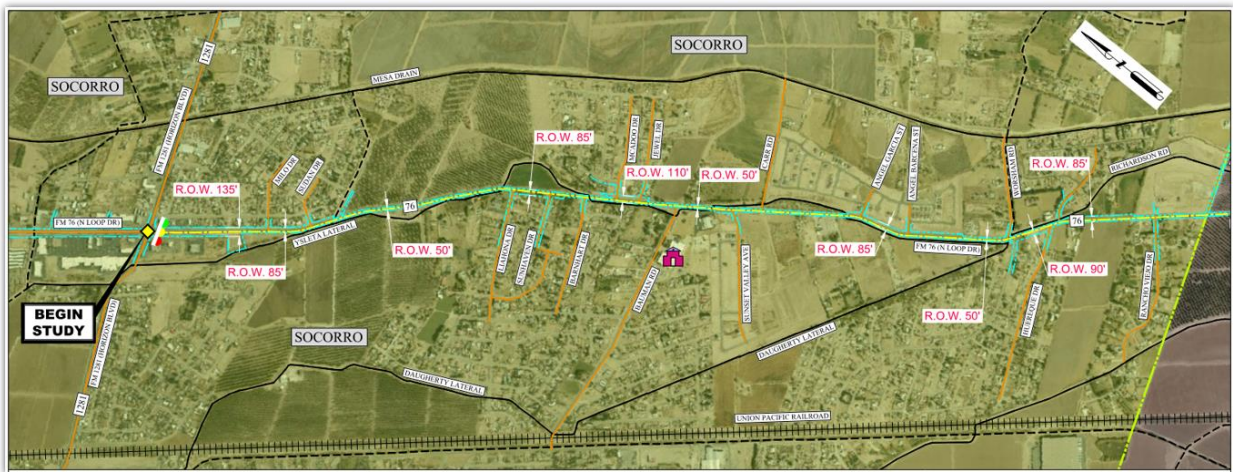
Typical Two Lane Section – Fabens City Limits

Source: CDM Smith, 2022

Figure 4: Existing Typical Cross Sections

3. Available Right-of-Way (ROW)

The majority of the existing ROW from Horizon Blvd (FM 1281) to Fabens (end of the corridor) ranges from 50 ft to 60 ft (around 63% of the corridor length). The initial section located at the intersection of Horizon Blvd has a ROW of 135 ft (for a length of 0.29 miles), while the ROW reduces down to 50 ft within the Fabens city limit. ROW reduces to an average width of 55 ft at the areas where the irrigation canals are adjacent to roadway. And also, approximately 1,800 ft of 35 ft ROW is dedicated to the City of Socorro, adjacent to TxDOT ROW in Leonor Estates Subdivision. A schematic ROW map is shown in **Figure 5**. Refer to **Appendix A.1** for further details about ROW along the corridor including detailed maps.



Source: CDM Smith, 2022

Figure 5: Schematic ROW Map

4. Existing Road Geometry

The posted speed limit along the corridor varies between 35 miles per hour (mph) and 55 mph. The speeds are reduced at curve locations within the corridor. A posted speed limit of 45 mph is observed between Horizon Blvd (FM 1281) and Anderson Rd for a length of 3.1 miles. The speed limit is 55 mph from Anderson Rd to 5th St at Fabens. From there, the speed reduces to 45 mph up to 3rd St, where it is further reduced to 35 mph until the end of the corridor. The posted speed limit on the corridor is shown in the **Figure 6**.



Figure 6: Posted Speed Limit

The existing roadway geometry was reviewed based on the FM 76 (North Loop Dr) Plans of Existing Right-of-Way Project (in 2020) and as-builts collected during the study. It was observed that the roadway alignment is composed of straight segments and curves. Most of the curve radii adhere to TxDOT's design criteria as per the speed limits. The vertical geometry is almost flat, and no steep gradients were observed. **Figure 7** shows a curve location near Sudan Dr, along the corridor.



Figure 7: Curve Location near Sudan Dr along FM 76 (North Loop Dr)

A summary of the corridor's curve geometry is provided in **Table 1**. Wherever the curve radius is less than the design criteria, reduced speed limit signs are available. A minimum radius of 643' should be maintained for 6% superelevation for a speed of 45 mph and 1060' for 55mph. For curve C1, the radius is 574.41' so the speed at this location is reduced to 40 mph with a speed limit sign, similar to curves C7 and C8. For small deflection angles, curves should be sufficiently long to avoid the appearance of a kink, at least 500 ft long for a central angle of 5 degrees, and the minimum length should be increased to 100 ft for each 1-degree decrease in the central angle. Curves C4, C5, C10

and C12 has deflection angle less than 5 degrees and do not satisfy the above criteria. As per AASHTO guidelines, the minimum length for horizontal curve for main highways should be fifteen times the design speed (expressed in mph). Curves C1, C2, C3, C6, C7, C8, C9 has a posted speed of 45 mph, resulting in the minimum length for horizontal curve to be 675 ft. Curve C11 have a posted speed of 55 mph, resulting in the minimum length for horizontal curve to be 825 ft. Hence, the above-mentioned curves do not satisfy this requirement.

Recent as-builts were not available for the section from Clint-San Elizario (FM 1110) to the end of the corridor, therefore, a detailed review was not conducted. The speed at this section is 55 mph and at Fabens, the speed further reduces to 35 mph. There are close to ten major curves and a few curve locations where the speeds are reduced to attain the minimum required curve radius, such as the curve near Reina Rd, Ruffian Way, and the curve near Fabens where the speed limit is reduced to 30 mph.

Table 1: Horizontal Curve Details

Curve No.	PI Station	Curve Radius, ft	Curve Length, ft	Location
C1	625+39.08	574.41	169.93	FM 76 and Sudan Dr
C2	635+53.00	1129.27	205.19	FM 76 and Clems Rd
C3	644+19.02	1146.46	135.06	Before FM 76 and Liahona Dr
C4	649+55.31	2864.92	161.67	Before FM 76 and Liahona Dr
C5	657+14.46	2835.3	160.00	FM 76 and Liahona Dr
C6	712+02.56	716.69	257.26	FM 76 and Angel Gracia St
C7	719+07.90	637.27	226.16	FM 76 and Angel Barcena St
C8	735+01.29	637.24	238.38	FM 76 and Worsham Rd
C9	744+47.32	955.88	256.92	FM 76 and Huereque Dr
C10	802+36.02	5730.9	103.36	FM 76 and Young John St
C11	835+43.16	1919.83	238.33	FM 76 and Clint Cut-Off Rd
C12	900+14.49	5736.91	388.83	FM 76 and Clint San-Elizario

5. Intersections

There are 46 intersections along the corridor, of which 40 are 3-legged intersections and 6 are 4-legged intersections. There are 5 signalized intersections at the following locations: Horizon Blvd, FM 1110 (Clint Cut-Off Rd), FM 1110 (Clint-San Elizario), Camp St at Fabens, and Alameda Ave (SH 20). Apart from the 46 intersections, there are various access points that connect directly to the corridor, and a few more access points will be added due to upcoming developments. A summary of the existing intersection locations is provided in **Table 2**. The signalized intersection layouts are shown in **Appendix A.2**.

Table 2: Intersection Details

No.	Intersection	Intersection Control	Intersection Configuration
1	FM 76 and Horizon Blvd (FM 1281)	Signal	4-Leg
2	FM 76 and Milo Dr	Stop	3-Leg
3	FM 76 and Sudan Dr	Stop	3-Leg
4	FM 76 and Clems Rd	Stop	3-Leg
5	FM 76 and Liahona Dr	Stop	3-Leg
6	FM 76 and Sunhaven Dr	Stop	3-Leg
7	FM 76 and Barnhart Dr	Stop	3-Leg
8	FM 76 and McAdoo Dr	Stop	3-Leg
9	FM 76 and Jewel Dr	Stop	3-Leg
10	FM 76 and Bauman Rd	Stop	3-Leg
11	FM 76 and Carr Rd	Stop	3-Leg
12	FM 76 and Sunset Valley Ave	Stop	3-Leg
13	FM 76 and Angel Garcia St	Stop	3-Leg
14	FM 76 and Angel Barcena St	Stop	3-Leg
15	FM 76 and Worsham Rd	Stop	3-Leg
16	FM 76 and Wellettka Dr	Stop	3-Leg
17	FM 76 and Hureque Dr	Stop	3-Leg
18	FM 76 and Richardson Rd	Stop	3-Leg
19	FM 76 and Rancho Viejo Dr	Stop	3-Leg
20	FM 76 and Anderson Rd	Stop	3-Leg
21	FM 76 and Young John St	Stop	3-Leg

No.	Intersection	Intersection Control	Intersection Configuration
22	FM 76 and Estate Dr	Stop	3-Leg
23	FM 76 and Pickard Rd	Stop	3-Leg
24	FM 76 and FM 1110 (Clint Cut-Off Rd)	Signal	4-Leg
25	FM 76 and Fenter Rd	Stop	3-Leg
26	FM 76 and Roberts Ranch Rd	Stop	3-Leg
27	FM 76 and Celum Rd	Stop	3-Leg
28	FM 76 and FM 1110 (Clint-San Elizario)	Signal	3-Leg
29	FM 76 and Reina Rd	Stop	3-Leg
30	FM 76 and Phantom Rd	Stop	3-Leg
31	FM 76 and Ruffian Way	Stop	3-Leg
32	FM 76 and Webb Rd	Stop	3-Leg
33	FM 76 and Tata Dr	Stop	3-Leg
34	FM 76 and Gina Dr	Stop	3-Leg
35	FM 76 and Porter Rebb Rd	Stop	3-Leg
36	FM 76 and Onate Dr	Stop	3-Leg
37	FM 76 and De Vargas Dr	Stop	3-Leg
38	FM 76 and Ponce De Leon Dr	Stop	3-Leg
39	FM 76 and 5 th St	Stop	3-Leg
40	FM 76 and 3 rd St	Stop	4-Leg
41	FM 76 and 2 nd St	Stop	3-Leg
42	FM 76 and 1 st St	Stop	4-Leg
43	Camp St (FM 76), Fabens Rd, and Island Rd (FM 76)	Signal	4-Leg
44	Island Rd (FM 76) and Bryan St	Stop	3-Leg
45	Island Rd (FM 76) and Austin St	Stop	3-Leg
46	Island Rd (FM 76) and SH 20 (Alameda Ave)	Signal	4-Leg

Note: The stop-controlled intersections have the stop control on the intersecting routes and not on FM 76 (North Loop Dr). Details of signalized intersections are provided in subsequent sections.

5.1 Signalized Intersection - FM 76 and Horizon Blvd (FM 1281)

The intersection of FM 76 (North Loop Dr) and FM 1281 (Horizon Blvd) is a four-legged signalized intersection, and both corridors have a four-lane configuration with a pedestrian crossing. The northbound and southbound approaches of FM 1281 (Horizon Blvd) have two through-lane movements with dedicated left and right-turn lanes. The east and westbound approaches of FM 76 (North Loop Dr) also have two through-lane movements with dedicated right and left-turn lanes. An overview of the intersection is shown in **Figure 8**.



Figure 8: FM 76 and Horizon Blvd (FM 1281) Intersection

Commercial activities were observed abutting the intersection, with gas stations located on the northeast and southwest corners of the intersection. Access roads were observed close to the turning lanes.

5.2 Signalized Intersection - FM 76 and FM 1110 (Clint Cut-Off Rd)

The intersection of FM 76 (North Loop Dr) and FM 1110 (Clint Cut-Off Rd) is a four-legged signalized intersection. Both FM 76 (North Loop Dr) and FM 1110 (Clint Cut-Off Rd) have a two-lane configuration. The northern approach has a single-lane configuration and leads to several residential dwellings. Marked crosswalks are present at the intersection approaches, to facilitate pedestrian crossings. Dedicated left turn lanes were observed on the east and west approach of FM 76 (North Loop Dr). An overview of the intersection is shown in **Figure 9**. The intersection is surrounded by agriculture/open land.



Figure 9: FM 76 and FM 1110 (Clint Cut-Off Rd) Intersection

5.3 Signalized Intersection - FM 76 and FM 1110 (Clint-San Elizario)

The intersection of FM 76 (North Loop Dr) and FM 1110 (Clint-San Elizario) is a three-legged signalized intersection. Both FM 76 (North Loop Dr) and FM 1110 (Clint-San Elizario) have a two-lane configuration. Marked crosswalks are present at the intersection approaches, to facilitate pedestrian movement. An overview of the intersection is shown in **Figure 10**. Dedicated left turn lanes were observed on the west approach of FM 76 (North Loop Dr) and the north approach of FM 1110 (Clint-San Elizario). The intersection is surrounded by agriculture/open land. Celum Rd access is located about 265 ft from the stop line of the intersection.



Figure 10: FM 76 and FM 1110 (Clint-San Elizario) Intersection

5.4 Signalized Intersection – Camp St (FM 76), Fabens Rd, and Island Rd (FM 76)

The intersection of Camp St (FM 76), Fabens Rd and Island Rd (FM 76) is a four-legged signalized intersection, and the connecting corridors have a two-lane configuration with marked crosswalks at the intersection approaches, to facilitate pedestrian crossings. Dedicated left turn lanes were observed along Fabens Rd and Island Rd (FM 76). An overview of the intersection is shown in **Figure 11**. Commercial activities were observed abutting the intersection and access roads were observed close to the intersection area.



Figure 11: Camp St (FM 76), Fabens Rd, and Island Rd (FM 76) Intersection

5.5 Signalized Intersection – Island Rd (FM 76) and Alameda Ave (SH 20)

The intersection of Island Rd (FM 76) and Alameda Ave (SH 20) is a four-legged signalized intersection. The connecting corridors have a two-lane configuration with marked crosswalks at the intersection approaches to facilitate pedestrian movement. Dedicated left turn lanes were observed along Island Rd. Commercial activities were observed abutting the intersection and access roads were observed close to the intersection area, and the gas station is observed on the northwest corner of the intersection. An overview of the intersection is shown in **Figure 12**.



Figure 12: Island Rd (FM 76) and Alameda Ave (SH 20) Intersection

6. Signs and Markings

Signs and markings are observed throughout the corridor. At few locations, the markings were not clearly visible, and signposts were slanted.

6.1. Signs

Route marker signs, speed limit signs, curve ahead signs, with speed restrictions at curves are observed along the corridor. Stop signs are observed at all the stop-controlled intersections and chevron marking signs are observed at the curve locations. Speed limit signs were observed at sections with a change in speed. **Figure 13** shows the views of signage along the corridor.



Figure 13: Signages along FM 76 (North Loop Dr)

6.2. Markings

Pavement marking at the center of the roadway is visible throughout the corridor, along with edge lines, although at some locations, the marking is faded. The center line marking is demarcated for zones of no-passing with a double yellow solid line and a one-sided yellow line at several locations. The intersections are also clearly marked with stop lines, pedestrian crossings, and yield, with arrows and left turn only markings. The dedicated turn lanes were also marked with proper arrow signs at all the required locations. Restriping of markings is required for clear visibility to the road users on both the corridor and connecting roads. **Figure 14** shows the views of striping along the corridor.



Figure 14: Striping along FM 76 (North Loop Dr)

7. Safety Features

Guardrails were observed at a couple of locations where embankment slopes were high, or at curve locations and canal crossing locations. Safety features along FM 76 (North Loop Dr) are shown in Figure 15.



Figure 15: Safety Features along FM 76 (North Loop Dr)

Additional safety features are required at all the locations where parapet walls/barriers are missing at canal crossings, and at locations where the canal is abutting the corridor. Typical locations where safety features are missing are shown in **Figure 16**.



Socorro Fire Department Entrance near Bauman Rd



Canal crossing near Carr Rd

Figure 16: Missing Safety Features along FM 76 (North Loop Dr)

8. Pavement Condition

Evaluation of TxDOT Pavement Management Information System (PMIS) data for 2022 shows that the existing pavement condition of FM 76 (North Loop Dr) between Horizon Blvd and Fabens is in good to very good condition, as 84% of the pavement has a score between 90 and 100, 12% of the pavement has a score of 70 to 90, and 4% of the pavement has a poor condition score between 35 and 50. The section that is characterized as “good” is located close to FM 1110 (Clint-San Elizario), while the section characterized as “poor” is observed in the Fabens area. Drainage issues and poor shoulder conditions were observed where the canal runs abutting the corridor. The canal banks at some locations slopes towards the existing road, causing localized water pockets along the shoulders. The pavement condition chart is shown in **Figure 17**.

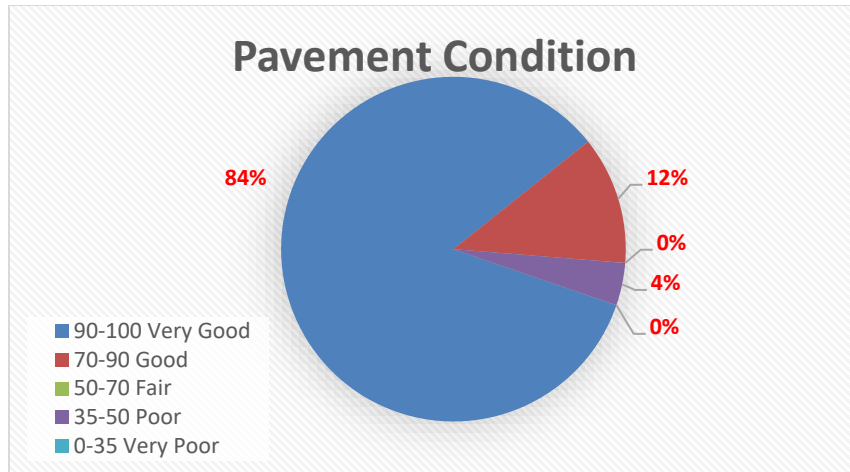


Figure 17: Pavement Condition Scores

9. Utilities

Utility data collection within the FM 76 (North Loop Dr) study area included water, wastewater, major electric lines, and gas. No utility data was collected for communication lines, (cable, telephone, etc.) ITS infrastructure, or other utilities.

9.1 Water, Wastewater, and Stormwater

GIS information for utilities was obtained from the Lower Valley Water District (LVWD) and El Paso County Water Control and Improvement District #4 (EPCWCID) to identify the location and extent of water and wastewater utilities within the study area. The data collected identified approximately 14 active water lines crossing the FM 76 (North Loop Dr) corridor study area, ranging from 2" to 12" in size. Approximately 42,000 linear ft of water lines run through the north side of the ROW and 3,000 linear ft run through the south side of the ROW.

The information collected also identified 10 active wastewater lines crossing the FM 76 (North Loop Dr) corridor study area, ranging from 6" to 12" in size. Approximately 850 linear ft of wastewater lines run through the north side of the ROW, 500 linear ft run through the south side of the ROW, and 400 linear ft run through the middle of the ROW. The information collected for drainage and irrigation canals identified approximately 22 channel crossings within the study area. Channels running adjacent to the ROW consist of approximately 3,800 linear ft south of the corridor ROW and approximately 14,500 linear ft north of the corridor ROW. Water, wastewater, and stormwater utilities are shown in **Appendix A.3**.

9.2 Electric Transmission

Overhead electric transmission data was collected from aerial photography and a corridor video reconnaissance survey to identify the location and extent of the major electric transmission lines within the study area. There are 13 locations where major overhead electric lines cross the FM 76 (North Loop Dr) corridor within the study area. Approximately 10.7 miles of overhead power lines run along the corridor ROW either inside or just outside of the ROW lines. Electric Transmission utilities are shown in the utility exhibit shown in **Appendix A.3**.

9.3 Gas

Gas utility lines maps were obtained from ONE Gas to identify the location and extent of gas utilities within the study area. The data collected identified approximately 20,000 linear ft of gas lines running through the ROW and approximately 13 crossings. Additionally, there are approximately 5,300 linear ft of gas lines in planning stages east of Fabens from 5th St. To De Vargas Dr and a new proposed connection for a new subdivision east of Harves Grove Ln. Gas utilities are shown in the utility exhibit shown in **Appendix A.3**.



APPENDIX A.1

Existing ROW Map



APPENDIX A.2

Existing Signalized Intersection Layout



APPENDIX A.3

Utility Exhibit