

Project Analysis

L-2397 SR 17

PIONEER WAY TO STRATFORD ROAD

MP 51.73 TO MP 55.21

Overview

This I1 mobility project was initiated in 1996 to address the mobility problems on 3.5 miles of SR 17 in the City of Moses Lake. Increasing traffic volumes, accidents, and congestion due to four major at grade intersections on this two lane roadway, coupled with SR 17 being a major trucking route warranted an improvement.

For this Non-NHS Mobility project, the Design Matrix calls for Full Design Level, with an option to use Modified Design Level based on a corridor, or project, analysis. In the WSDOT Design Manual, an ADT of 13,000, DHV of 1430, and a truck percentage of 10%, indicates a P-2 Multi-lane Design Class. As per note 2 of the Design Matrix 4 and 5, the region proposes to change the design level of this project from Full Design Level to MDL-8 for the Multilane Undivided section from M.P. 51.73/Pioneer Way to M.P. 53.22/Wheeler Road and from Full Design Level to MDL-4, for the Multilane Divided section from M.P. 53.22/Wheeler Road to the end of the project M.P. 55.21.

The project prospectus and a value engineering study completed in 1997 support the change in Design Level.

Route Description

This section of SR 17 is located adjacent to schools, residential, business, light industrial, and environmentally sensitive areas. The existing roadway consists of two 12-foot lanes with 8-foot shoulders, 2:1 fill slopes behind guardrail in the vicinity of the Parker Horn Bridge and 3:1 to 4:1 fill slopes with 2:1 cut slopes on the remainder of the project.

A signalized illuminated left turn lane is provided at the intersections of SR 17 M.P. 51.73/Pioneer Way, SR 17 M.P. 52.20/Nelson Road, SR 17 M.P. 53.22/Wheeler Road, and SR 17 M.P. 53.91/Broadway Avenue. Also located within the project limits is the Parker Horn Bridge, Br. No. 017/215 M.P. 54.24; a railroad crossing with a signal with no crossing arms, Grade No. 396983B M.P. 54.40; and the Stratford Road Overcrossing, Br. No. 017/216 M.P. 54.73. The posted speed is 50 mph in both directions.

	Existing Conditions	Modified Design Level (MDL-4/MDL-8)	Full Design Level (P-2)	Proposed Level(MDL-4/MDL-8)
Fill Slopes	3:1 to 4:1	4:1	6:1	4:1
Lane Width	12'	12'	12'	12'
No. Thru Lanes	2	4	4	4
Shoulder Width				
Right	8'	6'	10'	8'
Left	None	2'	4'	3'
Median Width	None	Existing/2'	16'	8'/Divided Section 12'/Undivided Section
Design Speed	50 mph posted	Posted/Operational (whichever is greater)	70 mph	55 mph

Accidents

The accident history for Pioneer Way to Stratford Road, from January 1, 1996 thru December 31, 2000 has been reviewed. In this time frame there were a total of 182 reported accidents that resulted in 67 injuries and 3 fatalities.

70% or 128 of the reported accidents occurred in the vicinity of the following intersections or interchange:

SR 17/Pioneer Way intersection, M.P. 51.75 to 51.93:
22 accidents

SR 17/Nelson Road intersection, M.P. 52.20:
22 accidents

SR 17/Wheeler Road intersection, M.P. 53.22:
18 accidents

SR 17/Broadway intersection, M.P. 53.91:
36 accidents

Stratford Road Interchange Ramps, Vicinity M.P. 54.73:
30 accidents. (17 of the accidents occurred on the southbound off ramp where the mainline ends a two-lane section by requiring the outside lane to use the off ramp.)

Within the project limits there were a total of 13 reported crossover accidents. The following is a breakdown of crossover accidents occurring between intersections:

SR 17/Wheeler Road to SR 17/Broadway Ave. - MP 53.22 to MP 53.91
3 cross over accidents:

SR 17/Broadway to Stratford Road Interchange - MP 53.91 to MP 55.03
10 cross over accidents

Within the project limits there were a total of 9 accidents where the vehicle ended up off the road past the right shoulder. Out of the 9 accidents there were four accidents where the vehicle overturned on the side slope. They occurred at the following locations:

NB: MP 52.91, Existing slope < 4:1, Excessive Speed/Wet
NB: MP 53.50, Existing slope < 4:1, Inattention
SB: MP 53.76, Existing slope < 4:1, Inattention
NB: MP 54.25, Located on bridge end currently protected by guardrail

DESIGN LEVEL CHANGE JUSTIFICATION

Three areas where Full Design Level and Modified Design Level differ are fill slopes, median width, and design speed. These differences are addressed as follows:

1: Fill Slopes

Fill Slopes of 6:1 has a negative affect on the adjacent properties due to needing additional right of way for this slope over 4:1 slopes. As mentioned earlier, this project is located in a residential and commercial area with schools and businesses. Changing to 4:1 slopes will alleviate purchasing additional right of way and reduce the negative affect on environmentally sensitive areas and the adjacent landowners. Slopes at a 4:1 are traversable, allowing errant vehicles to recover. Of the nine accidents listed as runoff the road, the four that overturned were on slopes less than 4:1. For these reasons a modified design level with consistent 4:1 side slopes is justifiable, and follows the Value Engineering Recommendation.

2: Design Speed

Full design standards call for a 70 MPH design speed. Going to a design speed of 55 MPH, which is 5 MPH over the posted speed of 50 MPH, is justifiable. On either end of this section of SR 17 the highway is in a four lane configuration with posted speeds of 45 and 50 MPH. Encouraging drivers with a 70 MPH facility in a residential area along with four at grade intersections is inappropriate for the corridor. Utilizing a design speed just higher than the posted speed of 50 MPH (which will not change) matches the character of the area and matches driver expectancy. A modified design level is consistent with this approach which was recognized when the project prospectus was generated.

3: Median Widths

The modified design level allows for a minimum 2 foot median rather than 16 foot for full design standard. This project proposes an eight foot separation of traffic in the divided section and 12 foot median in the undivided section. These reductions from full standard will alleviate the community concerns and impacts of additional right of way while providing necessary median width. Reductions in impacts to environmentally sensitive areas, utilities, and a bridge at the Stratford Road Interchange support the modified design level.

With the 12 foot median in the undivided section MP 51.73 to MP 53.22 a comfortable distance is separating opposing traffic and ties into the left turn lanes required at three of the signalized intersections. Basically, this keeps the roadway on tangent in this area. There were no crossover accidents on this section supporting putting a median barrier in place now, but also allows installation at a later date if conditions change.

From MP 53.22 to MP 55.21 there were 13 crossover accidents warranting a divided section. The median width of 8 feet provides adequate shoulder width along the barrier without further affecting adjacent properties, wetlands, buildings, and the bridge at Stratford Road. This width is consistent with this section of highway. Modified Design Level is appropriate for the median width selected for this project.

Summary

By following the MDL4/MDL8 standards an additional two lanes on the mainline will be constructed. Also, right turn lanes will be lengthened or built and left turn lanes will be lengthened at the intersections addressing the intersection related accidents. The modified design level will give us the desired level of service for mobility and enhance the safety of this corridor. Therefore, due to the urban conditions, environmental constraints, additional cost, and minimal benefit, the region feels constructing to full design level is not justified. Full Design Level would increase the cost of the project from \$13,500,000 to \$20,000,000 an increase of about 50%. The region proposes to construct this project to the modified design levels MDL4/MDL8.

Regional Concurrence Date

HQ Design Approval Date