Heritage Hills Metropolitan District

Heritage Hills Parkway Speed Study

IMEG #21000593.00

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1. Introduction

This speed study is prepared for the Heritage Hills Metropolitan District (Metro District) located in the City of Lone Tree, Douglas County, Colorado. The speed study is based upon general engineering criteria related to transportation planning within the State of Colorado.

The main purpose of this study is to determine what the 85th percentile speed is along the Heritage Hills Parkway corridor and provide options for ensuring the 85th percentile speed is within proximity to the posted speed limit.

2. General Location and Description

The roadway corridor studied is Heritage Hills Parkway from Cedar Hill Place to Sunset Hill Place, all within the Heritage Hills Subdivision and within the controlled access (gated) community. A General Location Map is attached within Appendix A.

B. Background and Historical Information

1. Corridor Characteristics

Heritage Hills Parkway (Parkway) is classified as a local collector (less than 2,000 vehicles per day). Parkway is a multi-modal boulevard which allows access by way of vehicles, bicyclists, and pedestrians. The typical roadway section consists of 30-feet of pavement with concrete curb/gutter on either side. A concrete sidewalk of various widths (8-feet typically) meanders adjacent to the Parkway as attached and detached to the roadway section. The roadway section allows for one-lane of travel in each of the two directions. On-street parking is prohibited by signage throughout the corridor.

Pavement striping is limited to only stop bars at stop conditions. There is currently no centerline striping, shoulder striping, or crosswalk markings.

Currently, the posted speed limit is 25 miles per hour (MPH) throughout the corridor. When the Parkway was originally constructed the speed limit was posted at 31 miles per hour. It was revised to 25 MPH within the last 5 years according to Heritage Hills Metropolitan District Board Members.

There are twelve (12) intersections or access points along this corridor. This includes five (5) intersections that are controlled by multi-way stop conditions. The other seven

(7) intersections are controlled by stop conditions for the minor road intersecting Parkway.

Standard street lighting is implemented throughout the corridor by means of roadway lighting provided by Xcel Energy owned/maintained streetlights. The streetlights are spaced at approximately 170-feet and generally located on the west side of the roadway.

2. Public Concerns

The Metro District has received communications by means of conversations and emails from residents indicated citizen concerns related to Heritage Hills Parkway specifically.

A. High Travel Speed - Many residents have communicated concerns with travel speeds by vehicles traveling on the Parkway. These concerns are based off of visual observation by residents.

B. Vehicle/Pedestrian Conflict - Residents have voiced concerns over instances of conflict between vehicles and pedestrian and/or bicyclists in a situation of "near misses" particularly at intersections where pedestrians/bicyclists are crossing Heritage Hills Parkway. IMEG inquired with the City of Lone Tree Police Department to determine if there were any reported incidents of vehicle/pedestrian collisions along the corridor. The City did not have any records within the last five (5) years of reported collisions.

C. Incomplete Stops at Intersections - Residents also indicated that by visual observations, many drivers do not come to a complete stop at intersections within this corridor and are observed rolling through stop signs.

C. Data Collection

IMEG utilized the Miovision Scout system to record number of vehicles and travel speed between two specific points for each data collection. These units were placed at within two separate locations along the Parkway and two separate sets of data were collected at each location.

The automated traffic counting devices collected data between April 13, 2021, and May 7, 2021, at both locations. A total of four data sets were collected and each data set consisted of a 72-hour study period beginning on a Tuesday at 6:00 AM and completing the collection on the Friday at 6:00 AM.

Due to the locations of stop conditions along the Parkway, it was difficult to determine the area of peak travel speed due to the lengthy acceleration and deceleration zones along the Parkway. Two locations were determined to have peak areas of speed based on visual observations.

These two segments were selected based upon this visual observation and the lengths of these two segments.

Outside influences on this data included weather related impacts to volume and speed of traffic in addition to COVID-19 restrictions implemented in the area that have noticeably revised traffic patterns in the area including reduced volumes on a daily basis.

The speed study methodology is based on an engineering approach which compares the real-time 85th percentile speed with the posted speed limit. This verifies whether the posted speed limit represents the actual real-time free-flow speed along the corridor. The traffic data analysis and the corridor review were performed according to guidelines stipulated in the Manual on Uniform Traffic Control Devices (MUTCD).

1. Segment 1 - Hidden Hill Place to Shadow Hill Circle

Segment 1 Study Area consists of a length between Hidden Hill Place and Shadow Hill Circle of approximately 1,185 feet. The following data summarizes the findings of this segment:

- 140 trips per day (Average)
- Minimum Speed = 12.5 MPH
- Maximum Speed = 53.7 MPH
- **85th Percentile Speed = 33.5 MPH**

There are two intersections within this segment of which no volume or speed data was collected and analyzed for this study. The intersecting streets were Aspen Hill Circle and Vista Hill Circle. Since no data was collected for these movements, the only trips accounted for with this data set is for movements completed from the intersection of Hidden Hill Place to Shadow Hill Circle.

2. Segment 2 - Winding Hill Avenue to Shadow Hill Circle

Segment 2 Study Area consists of a length between Winding Hill Avenue and Shadow Hill Circle of approximately 1,150 feet. The following data summarizes the findings of this segment:

- 110 trips per day (Average)
- Minimum Speed = 8.6 MPH
- Maximum Speed = 51.0 MPH
- 85th Percentile Speed = 36.4 MPH

There is one intersection within this segment of which no volume or speed data was collected and analyzed for this study. The intersecting street was Sunset Hill Circle. Since no data was collected for this movements, the only trips accounted for with this data set is for movements completed from the intersection of Winding Hill Avenue to Shadow Hill Circle.

3. General Observations from Site Visits and Data Collected

Upon reviewing the data collected, it is noted that the 85th percentile speed is 34 to 45 percent higher than the posted speed limits for both sections. According to the MUTCD, engineers recommend setting the posted speed limit at the 85th percentile speed. This is a quantitative indication that there are excessive speeds along the Parkway or that the posted speed limit should be adjusted to 35 miles per hour to be consistent with vehicle speeds.

Field observations of the corridor include the following notable events:

- Numerous "Slow and Roll" through Stop Conditions.
- Excessive speeds and aggressive acceleration in between stop conditions.

- A notable number of commercial vehicles from deliveries, construction contractors, and ground maintenance contractors.

- A secondary vehicle volume count was completed at both entrances to determine the average number of trips per day at each gate. The average number of trips per day at the west entrance (Yosemite Street access) was 3,720 and the south entrance (Heritage Hills Circle access) was 4,028.

4. Summary of Findings

Based on this information, IMEG has developed a summary of findings for this corridor including the following:

- 85th Percentile of actual speeds is 34-45% higher than posted speed limit.

- "Complete Stop" failures at all stop conditions.

- Unwarranted Stop Conditions cause excessive speeds between intersections.

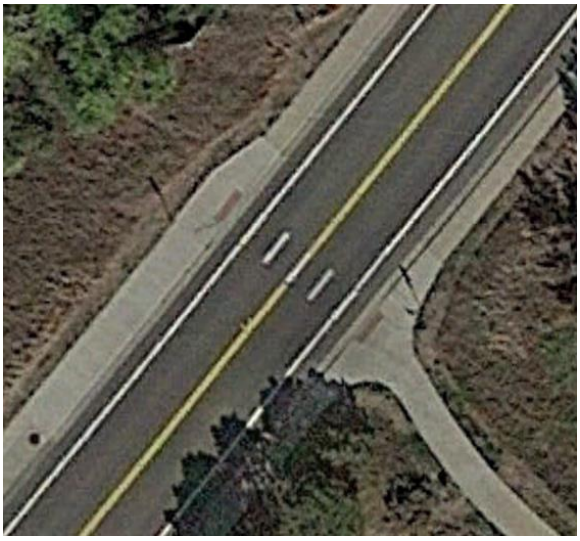
- Zero incidents of pedestrian/vehicle conflict or near misses.

D. Recommendations of Improvements

Based on the data collected and the site observations, IMEG has developed four (4) options for mitigating or minimizing the concerns brought before the Metropolitan District and these options are presented below with brief descriptions.

1. Option #1 - Striping Enhancements

Install a collection of pavement striping improvements including solid double yellow centerline striping from the south access to Star Hill Circle, 4-inch solid white striping for shoulder striping that could be utilized for a bike lane, crosswalk blocks at three (3) intersections where pedestrians cross Heritage Hills Parkway, and pedestrian crossing signs at the three pedestrian crossings. The estimated project costs for design and construction of these improvements are $15,000 to $30,000.



2. Option #2 - Pedestrian Crossing Improvements

Improvements to the geometry of three intersections (Shadow Hill Circle South, Shadow Hill Circle North, and Hidden Hill Place) including modifying curb returns to create bump outs, updating handicap ramps, and the option of creating a raised intersection or crosswalks. By modifying the curb returns, this creates a shorter crossing distance for pedestrians. This also creates a traffic calming effect by narrowing the pavement section. The estimated project costs for design and construction of these improvements are $50,000 to $150,000 dependent upon repaving the intersection.

3. Option #3 - Stop Sign Removal/Traffic Calming Improvements

Option 3 is considered to be a combination of Option #1 and #2 plus the proposal to remove multi-way stop signs for the Parkway approaches at 4 intersections. In additions to the improvements at the intersections, there is an opportunity provide chicane sections between intersections to narrow the pavement section. The estimated projects costs for design and construction of these improvements are $250,000 to $500,000.

4. Option #4 - Update Posted Speed Limit Signs

Updating the Posted Speed Limit Signs to 30 or 35 MPH is recognized as a fourth option for the Metro District to consider. The estimated project costs for these improvements would be less than $5,000.

E. Potential Impacts and Influences

With any of the options presented above implemented to the Parkway, there will be impacts and influences. Drivers tend to be creatures of habit so the experience of driving on the Parkway will be different to residents and guests alike.

Additionally, with most of these options there will be impacts to the existing landscaping and irrigation improvements. IMEG anticipates coordinating any landscape or irrigation components

that are impacted with your Landscape Maintenance Contractor with the roadway improvements that are implemented.

Snow plowing operations will more than likely be impacted by the improvements proposed above. Narrow road sections create additional obstacles for snowplow operators. This will decrease the efficiencies of the snow plowing operations in some degree.

Lastly, there will be greater maintenance costs associated with these improvements due to the added landscape areas and hardscape improvements.

F. Conclusions

The preceding information provided indicates a concern with the level of travel speed along Heritage Hills Parkway and failure to complete full stops at stop conditions. Concerns raised about vehicle/pedestrian conflicts were not observed during this study. IMEG believes there are certain levels of improvements necessary to the roadway infrastructure to alleviate both the excessive speeds and provide a safer means of crossing the Parkway for pedestrians based on these findings.

After completing a comprehensive analysis of the traffic data, IMEG recommends implementing a minimum of one of the four options presented above to address the findings discovered within this report.

Appendix A

Vicinity Map