



December 6, 2016

Eric Griffin
Lewis & Clark County
3402 Cooney Drive
Helena, MT 59601

RE: Lake Helena Drive Speed Limit Study

Dear Eric,

Per your request Abelin Traffic Services (ATS) has reviewed the existing speed limits on Lake Helena Drive between the East Helena city limits and the causeway at Lake Helena. The current posted speed limits on this road increase from 35 MPH at the East Helena city limits to 50 MPH north of Canyon Ferry Road. Between York Road and Deal Lane the speed limit is set at 40 MPH and decreases to 35 MPH north of Deal Lane. Lewis & Clark County requested that ATS perform a speed study to determine if the posted speed limits are appropriate for the existing road conditions and if the speed limits could be changed to create more uniform speeds for the route and provide more consistency with other routes in the area.

Existing Conditions

The study roadway begins at the north city limits of East Helena on Lake Helena Drive (Intersection of Lake Helena Drive and Lewis Street) and extends north to the Lake Helena causeway. The road is primarily straight with a slight S-curve at Country View Drive. The roadway is relatively flat south of York Road and has a consistent slight uphill grade to the north. North of York Road Lake Helena Drive is characterized by rolling hills with moderate grades as the roadway crosses various drainages as it climbs towards the mountains to the north before dropping back down to Lake Helena. Lake Helena Drive continues across the causeway to the north and becomes Hauser Dam Road. The roadside environment consists of a mix of residential areas and open lands. The Fox Ridge Golf Club is located west of Lake Helena Drive just north of York Road. See **Figure 1** for a map of the study roadway.

Through the study area, Lake Helena Drive has a paved width of 25 to 26 feet on 55 to 85 feet of right-of-way. The road surface is paved south of Deal Lane and is gravel from Deal Lane to the causeway. The pavement is primarily in good condition with one section of fair condition pavement between Lewis Street and Sly Road. The gravel portion of the roadway is in good to fair condition. The full length of the paved portion of the study roadway (from Lewis Street to Deal Lane) does not have any passing zones or shoulder striping. Roadside visibility is good and the clear zones have few obstructions. The rolling hills to the north of York road and the slight S-bends north of Deal do create intermittent sight distance obstructions for drivers. The roadway has 20 public approaches and 35 private approaches.

Historic traffic data for Lake Helena Drive was obtained from Lewis & Clark County. The historic data for this location is presented in **Table 1**. The Average Annual Daily Traffic (AADT) data indicates that traffic volumes along Lake Helena Drive have increased slightly over the past ten years.

Table 1 – Historic Traffic Data

Lake Helena Drive Location	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
South of Canyon Ferry Road	2,091	1960	2,060	2,112	2,236	1,928	1,870	1,920	na	1,831
North of Canyon Ferry Road	2,617	4394	3,898	5,772	4,476	4,933	4,048	na	na	4,828
South of York Road	2,690	2574	2,546	3,332	3,231	3,042	3,005	3,153	na	2,724
North of York Road	1,619	1513	1,667	899	1,796	1,718	1,510	na	na	1,235
South of Deal Lane	1,243	1188	1,285	1,599	1,361	1,240	1,132	na	na	962
North of Deal Lane	986	938	842	965	965	976	864	859	na	765

Crash Data

ATS obtained vehicle crash data for the study roadway from the L&C County vehicle crash database. This data indicated that 32 vehicle crashes have occurred along Lake Helena Drive over the past five years. Of these 32 crashes, 15 were multi-vehicle accidents, and 11 resulted in injuries. A total of eight crashes occurred at the intersection of York Road. Only 2 crashes occurred at the roundabout at the intersection with Canyon Ferry Road. Half of the crashes (50%) occurred in darkened conditions and 47% occurred on icy, snowy, or wet roads. The crash rate on Lake Helena Drive is 1.3 crashes per million vehicle miles traveled, which is in line with the state average for collector roadways.

Speed Data

In order to analyze vehicle speed data Engineers calculate a variety of operational characteristics based on vehicle speed distribution data. The significant data includes average vehicle speed, 85th percentile speed, and pace speeds. **Figure 2** shows a standard vehicle speed distribution with a 45 MPH average speed (red line). The 85th Percentile speed is point at which 85% of traffic falls below on the cumulative speed line (purple line). The pace is the 10 MPH increment that has the highest number of observed vehicle speeds.

Figure 1 - Vicinity Map

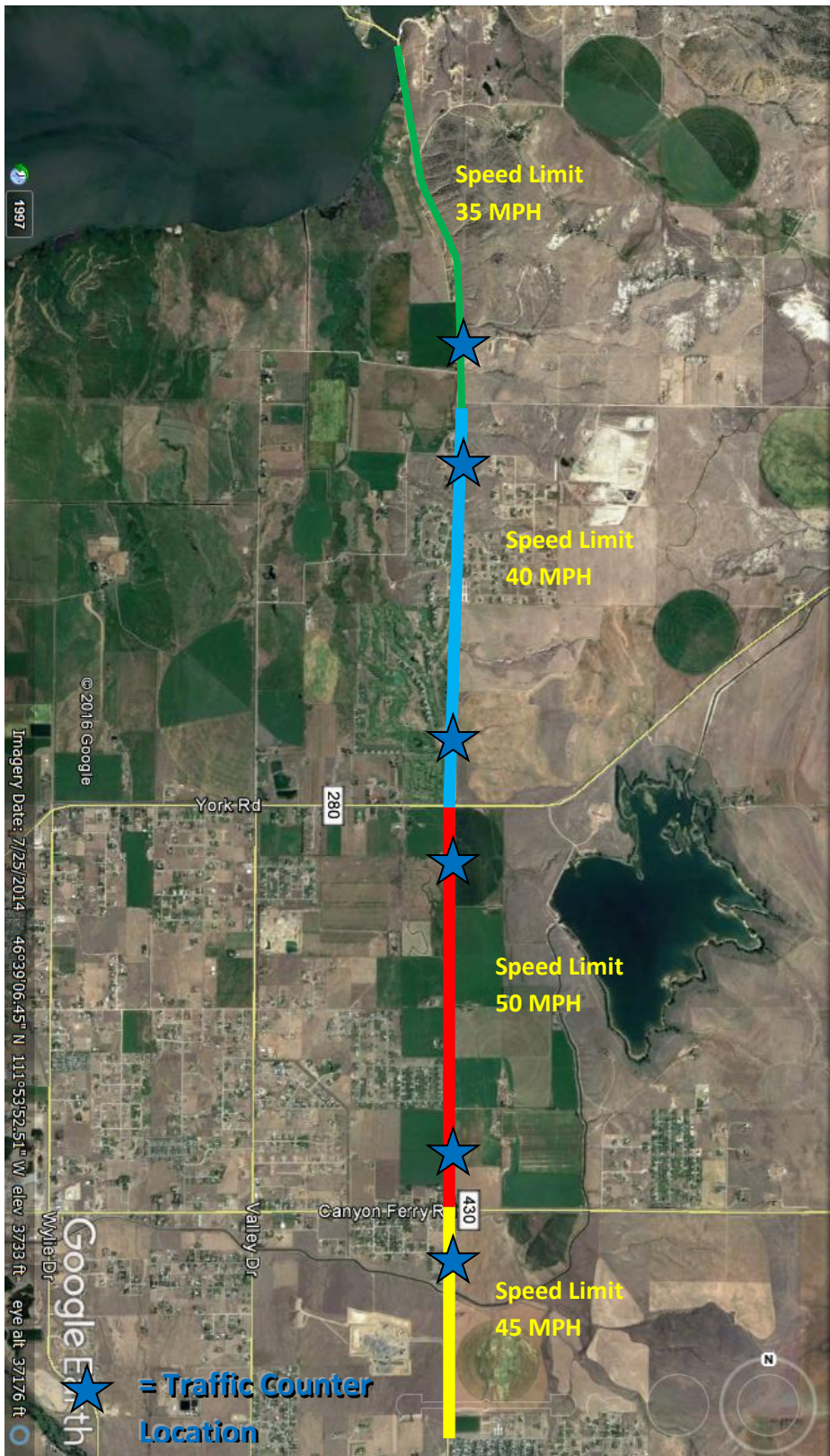
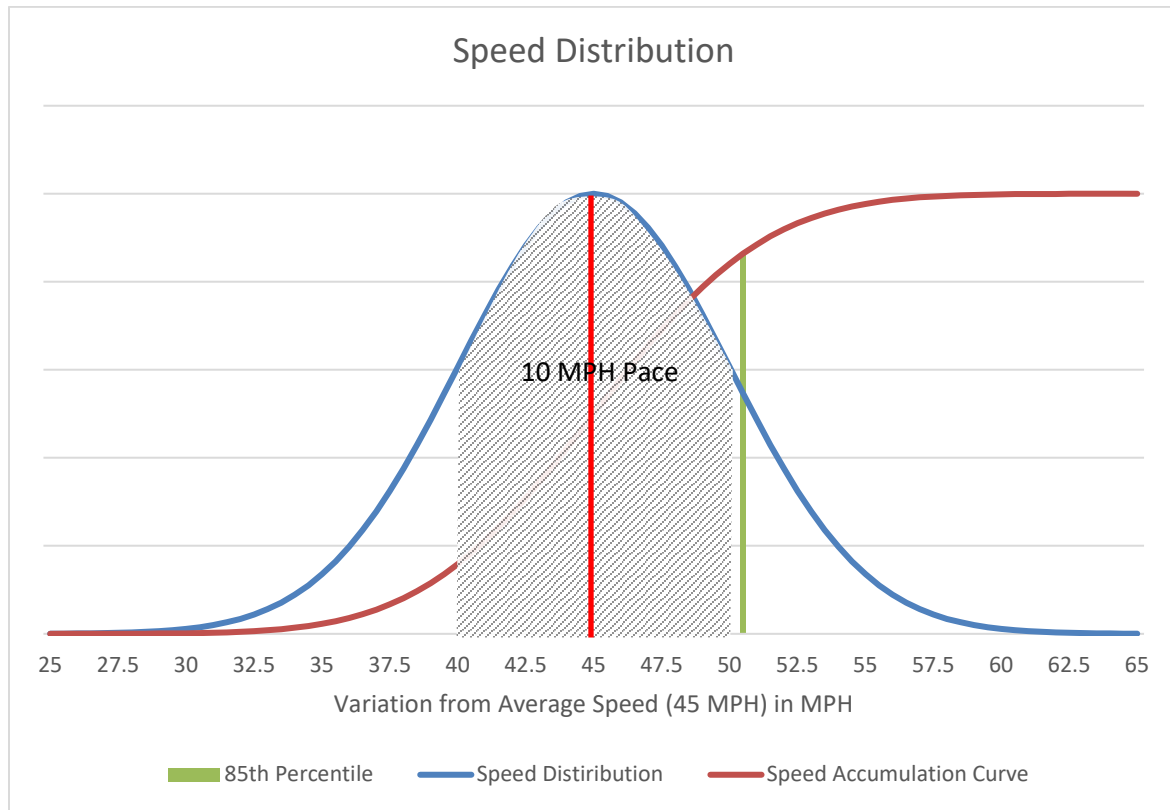


Figure 2 – Standard Speed Profile



Vehicle speed data was collected at six locations along Lake Helena Drive from August 10th to the 12th and September 19th to the 21st of 2016. The sites were located south of Canyon Ferry Road (Station 1), north of Canyon Ferry Road (Station 2), south of York Road (Station 3), north of York Road (Station 4), south of Deal Lane (Station 5), and north of Deal Lane (Station 6). The weather conditions during the traffic study were warm and dry with very good driving conditions throughout the data collection period. The data was collected continuously for 48 hour periods using Diamond Unicorn Limited traffic counters to record the individual speed data from every vehicle using the road. The results of the data collection are shown in **Table 2**. A detailed roadway characteristics and speed data table is included in the appendix.

TABLE 2 – Vehicle Speed Data

	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6
Average Speed (MPH)	43.2	42.2	43.9	41.0	44.7	37.0
85% Percentile Speed (MPH)	48.7	48.5	49.6	47.2	51.0	43.6
10 MPH Pace Speeds (MPH)	40 – 50	40 – 50	40 – 50	35 – 45	40 – 50	30 – 40
Percent in Pace	71%	56%	64%	65%	64%	59%
Observed Daily Traffic (VPD)	2,724	1,713	1,220	1,931	930	599
Percent Trucks	8.1%	5.1%	5.4%	5.4%	7.1%	5.2%

The observed traffic data indicates that the vehicle speeds along Lake Helena Drive are fairly consistent. The most commonly used road operations characteristic for posting a speed limit is the 85th percentile speed. However, it is reasonable to set a posted speed limit below the 85th percentile speeds if the road conditions and roadside environment are inconsistent with the observed vehicle speeds. The 85th percentile speeds on the paved sections of road (Stations 1-5) varied from 47 to 51 MPH. The 85th percentile speed on the gravel section was 44 MPH. Average vehicle speeds along the road were all below 45 MPH. The 10 MPH pace speeds (the 10 MPH range in which the most road users are driving) were 40 – 50 MPH for Stations 1, 2, 3, and 4 while for Station 5 it was 35 – 45 MPH. Pace speeds on the gravel section was 30-40 MPH. In general, it is desirable to have the majority of traffic on a roadway traveling within or around the 10 MPH pace. This decreases the variability in vehicle speeds and decreases vehicle conflicts.

Recommendations

Based on the vehicle speed profiles it is recommended that the posted speed limits on Lake Helena Drive be changed to a consistent 45 MPH from the existing 45 MPH speed limit north of Boundary Street to Deal Lane. This change would decrease the speed limit by 5 MPH from Canyon Ferry Road to York Road and increase the speed limit by 5 MPH from York Road to Deal Lane. The existing 35 MPH speed limit on the gravel section from Deal Lane to the Causeway should remain. This would provide one consistent speed limit for the entire paved section of roadway which is justified by the consistency in existing vehicle speeds along the section. The existing 35 MPH speed limit on the gravel section is appropriate for the road conditions and should remain. If you have any questions about these results please feel free to call me at 406-459-1443

Sincerely,

A handwritten signature in dark ink, appearing to read 'Bob Abelin', written in a cursive style.

Bob Abelin, P.E.
Abelin Traffic Services, Inc.

Lake Helena Drive

Section Number	Length	Start	End			Speed Limit	Avg. Speed	85% Speed	Pace	% in Pace	Road Width
1	0.4	0.0	0.4	Lewis St	Boundary St	35					24.9
2	0.1	0.4	0.5	Boundary St	North of Lagoon	35					25.4
3	0.6	1.1	1.8	North of Lagoon	Canal Dr	45	43.2	48.7	40-50	71%	25.4
4	0.3	1.8	2.1	Canal Dr	Roundabout Warning	45					25.4
5	0.3	2.1	2.3	Warning	50 Speed Limit (Throu	45	42.2	48.5	40-50	59%	Var.
6	0.4	2.3	2.7	50 Speed Limit	Sly Road	50					26.3
7	1.5	2.7	4.2	Sly Road	York Road	50	43.9	49.6	40-50	64%	26.3
8	1.1	4.2	5.2	York Road	Melkat Ln	40	41.0	47.2	35-45	65%	25.4
9	1.0	5.2	6.2	Melkat Ln	Deal Ln	40	44.7	51.00	40-50	64%	25.4
10	1.9	6.2	8.1	Deal Ln	Causeway	35	37.0	43.60	30-40	59%	26.0

Section Number	NB Lane	SB Lane	Road Condition	Roadside Environment	Alignment	ROW Width	Total App.	Approach Density	Percent Trucks	ADT Volume
1	12.2	11.9	Good	East – Residential	Straight	55	7	17.9		2724
2	11.5	11.4	Good	Open Land	Straight	65	0	0.0		2724
3	11.5	11.4	Good	Open Land/Light Residential	Straight	75	5	7.8	8.1%	2724
4	11.5	11.4	Good	Residential	Straight	75	4	13.8		2724
5	11.5	11.4	Good	West - Residential	Straight	85	4	15.4	5.1%	1713
6	13.1	13.2	Moderate	Open Land	Straight	85	3	7.7		1713
7	13.1	13.2	Good	Open Land/Light Residential	Slight Right Curve	75	8	5.4	5.4%	1220
8	11.9	11.9	Good	East – Open Land	Two Curves BB 45	75	8	7.6	5.4%	1831
9	11.9	11.9	Good	Light Residential/Open Land	Straight	75	9	9.3	7.1%	930
10	N/A	N/A	Gravel	Light Residential/Lake Shore	Curving	75	8	4.2	5.2%	599
Avg.								8.9		