



# mesa·az Transportation Advisory Board Report

**Date:** May 16, 2017  
**To:** Transportation Advisory Board  
**From:** Ryan Hudson, Transportation Engineer  
**Subject:** Efficacy of Various Speed Mitigation Measures in Mesa

## Purpose

The purpose of this report is to present findings of several before and after studies of vehicle speeds on streets in Mesa that had speed mitigation features installed. The studies were performed on a variety of different street types (arterial, residential, etc.) and evaluate the efficacy of driver speed feedback signs (DSFS), reduced speed limits, and pavement markings.

## Background

The need for speed mitigation was investigated based on citizens' concerns and substantiated by speed data collection. To determine the traffic speeds after each feature was installed, speed data was collected at the same locations as the before counts.

## Discussion

See **Figure 1** for a description of all study locations as well as the respective speed mitigation feature implemented at each location.

The study results for each location are detailed below:

1. **Sossaman Road from Ray Road to Velocity Way** (Adjacent to the Phoenix Mesa Gateway Airport, PMGA) – Installation of two DSFS per direction of travel.

Speed counts were collected at three different locations for each direction of travel (NB and SB) for the before and after counts. The speed data shows some significant decrease in vehicle speeds at/near locations where a DSFS was installed. This is specifically true for the NB and SB locations near the PMGA terminal, which is a high activity center. See **Figure 2**.

2. **Harris Drive from Southern Avenue to 8<sup>th</sup> Street** (Adjacent to Mesa High School) – Installation of one DSFS per each direction of travel.

Speed counts were collected at two different locations on Harris Drive, south and north of the high visibility crosswalk between Mesa High School and the church as

shown on **Figure 3**. The south location, which counted NB vehicles coming from Southern Avenue approaching the Mesa High School campus, showed an 8.7 mph reduction in 85<sup>th</sup> percentile speed. The north location did not show any negligible change in vehicle speeds.

3. **Main Street from Country Club Drive to Centennial Way** (Downtown Mesa) – Reduction of speed limit from 30 mph to 25 mph.

Speed counts were collected at four locations along Main Street between Mesa Drive and Country Club Drive prior to the speed limit reduction from 30 mph to 25 mph, two of which were between Centennial Way/Sirrine and Country Club Drive. After the speed limit reduction, effective from Centennial Way/Sirrine to Country Club Drive, speed counts were taken at eight locations along Main Street, seven of which were in the effective 25 mph limits. See **Figure 4** for all count locations and the respective eastbound or westbound speed data. **Table 1** below shows the average speeds (weighted) before and after the speed limit reduction within the affected area. The results show no significant change in average or 85<sup>th</sup> percentile speeds and volumes decreased by approximately 14% from 2016 to 2017.

**Table 1** – Speed Counts on Main Street Before & After Speed Limit Reduction

<b>Weighted Averages from Several Locations on Main Street Where the Speed Limit was Reduced from 30 mph to 25 mph</b>			
<b>Main St Between Centennial/Sirrine &amp; Country Club Dr</b>			
<b>Dec-16 Installed</b>	<b>Feb-16 Before</b>	<b>Feb-17 After</b>	<b>Change</b>
<b>Avg. Speed (mph)</b>	22.5	23.2	0.7
<b>85<sup>th</sup>-tile Speed (mph)</b>	28.2	28.4	0.3
<b>% Veh &gt; 25 mph</b>	30.8%	34.7%	4.0%
<b>% Veh &gt; 35 mph</b>	0.8%	1.1%	0.3%
<b>% Veh &gt; 45 mph</b>	0.0%	0.0%	0.0%
<b>% Veh &gt; 55 mph</b>	0.0%	0.0%	0.0%
<b>Daily Volume (vpd)*</b>	5221	4502	-719
<b>Posted Speed Limit</b>	<b>30 mph</b>	<b>25 mph</b>	<b>N/A</b>
<i>Before Data: 2-day weighted average February 24-25, 2016, at two locations After Data: 2-day weighted average February 14-15, 2017, at seven locations *Single Direction Volume</i>			

4. **McLellan Road from Stapley Drive to Gilbert Road** (Candlelight Estates Neighborhood) – Reduction of speed limit from 30 mph to 25 mph.

**Figure 5** shows the traffic count locations and vehicle speeds collected at three locations on McLellan Road before and after the speed limit was reduced from 30 mph to 25 mph. The speed limit was reduced in August 2016, after pavement markings had been installed on McLellan Road. The change in vehicle speeds varies significantly at the three different count locations, although all locations show a decrease in 85<sup>th</sup> percentile speeds and percentage of vehicles traveling over 35 mph. **Table 2** below shows the before and after count averages (weighted) as taken from the three count locations.

**Table 2** – Speed Counts on McLellan Road Before & After Speed Limit Reduction

<b>Weighted Average from 3 Locations on McLellan Road</b>			
<b>McLellan Road Between Stapley Drive &amp; Gilbert Road</b>			
<b>Aug-16*</b>	<b>Jul-16</b>	<b>Nov-16</b>	<b>Average</b>
<b>Installed</b>	<b>Before</b>	<b>After</b>	<b>Change</b>
<b>Avg. Speed (mph)</b>	30.1	29.7	-0.4
<b>85th%-tile Speed (mph)</b>	38.5	35.1	-3.4
<b>% Veh &gt; 25 mph</b>	70.2%	82.8%	12.7%
<b>% Veh &gt; 35 mph</b>	24.8%	14.5%	-10.3%
<b>% Veh &gt; 45 mph</b>	5.3%	0.4%	-4.8%
<b>% Veh &gt; 55 mph</b>	0.3%	0.0%	-0.3%
<b>Daily Volume (vpd)</b>	984	1146	162
<b>Posted Speed Limit</b>	<b>30 mph</b>	<b>25 mph</b>	<b>N/A</b>
<i>Before Data: 2-day weighted average July 19-20, 2016, at three locations</i>			
<i>After Data: 5-day weighted average November 17-18 &amp; 21-23, 2016, at three locations</i>			
<i>*Speed limit reduced to 25 mph after pavement markings had been installed</i>			

5. **McLellan Road from Stapley Drive to Gilbert Road** (Candlelight Estates Neighborhood) – Installation of pavement markings to delineate travel, bike and parking lanes.

Speed counts were collected at three different locations on McLellan Road between Stapley Drive and Gilbert Road. The before and after counts were collected at the same exact locations and show an overall increase in average and 85<sup>th</sup> percentile speeds. The counts do show a significant reduction in volume which could be due to seasonal variability. The after counts were taken 3 months after the before counts were collected. See **Table 3** on the next page for average (weighted) speed data and **Figure 6** for a detailed breakdown at each count location.

**Table 3** – Speed Counts on McLellan Road Before & After Pavement Markings

<b>Weighted Average from 3 Locations on McLellan Road</b>			
<b>McLellan Road Between Stapley Drive &amp; Gilbert Road</b>			
<b>Apr-16</b>	<b>Feb &amp; Apr-16</b>	<b>Jul-16</b>	<b>Average</b>
<b>Installed</b>	<b>Before</b>	<b>After</b>	<b>Change</b>
<b>Avg. Speed (mph)</b>	29.8	30.1	0.3
<b>85th%-tile Speed (mph)</b>	36.0	38.5	2.5
<b>% Veh &gt; 25 mph</b>	78.6%	70.2%	-8.4%
<b>% Veh &gt; 35 mph</b>	18.0%	24.8%	6.8%
<b>% Veh &gt; 45 mph</b>	1.1%	5.3%	4.1%
<b>% Veh &gt; 55 mph</b>	0.1%	0.3%	0.2%
<b>Daily Volume (vpd)</b>	1247	984	-263
<i>Before Data: 2-day weighted average February/April, 2016, at three locations</i>			
<i>After Data: 2-day weighted average July 19-20, 2016, at three locations</i>			
<i>NOTE: Posted speed limit at time of before &amp; after counts was 30 mph on McLellan Road</i>			

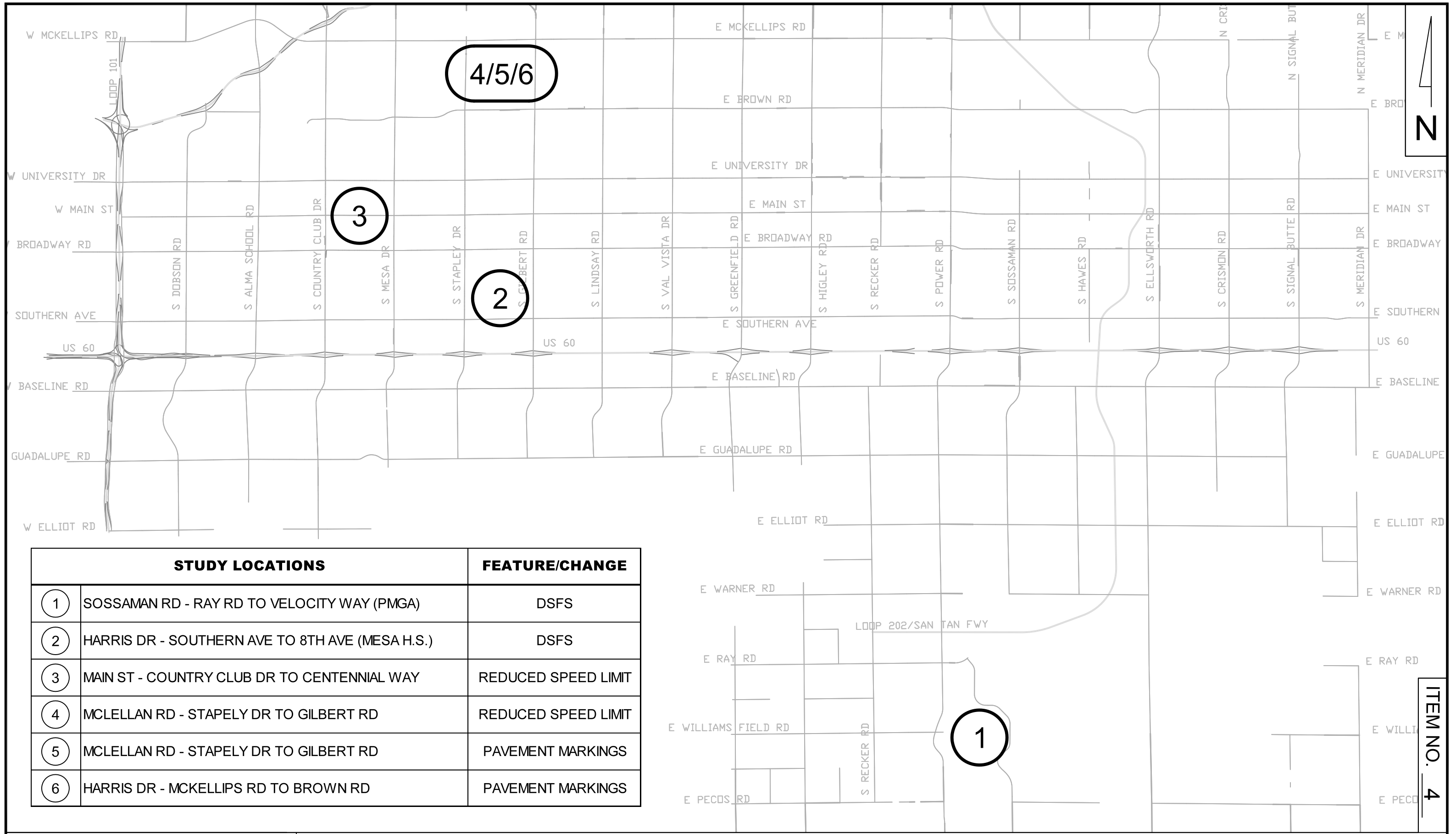
6. **Harris Drive from McKellips Road to Brown Road** (Candlelight Estates Neighborhood) – Installation of pavement markings to delineate travel, bike and parking lanes.

Speed counts were collected at two different locations on Harris Drive between McKellips and Brown Roads. The before and after counts were collected at the same exact locations and show an overall increase in average and 85<sup>th</sup> percentile speeds. The counts do show a significant reduction in volume which could be due to seasonal variability. After counts were taken on two occasions following the installation of the pavement markings in June 2016. Counts were collected one month (July) and three months (September) after the installation of pavement markings. See **Table 4** below for average (weighted) speed data and **Figure 7** for a detailed breakdown at each count location.

**Table 4** – Speed Counts on Harris Drive Before & After Pavement Markings

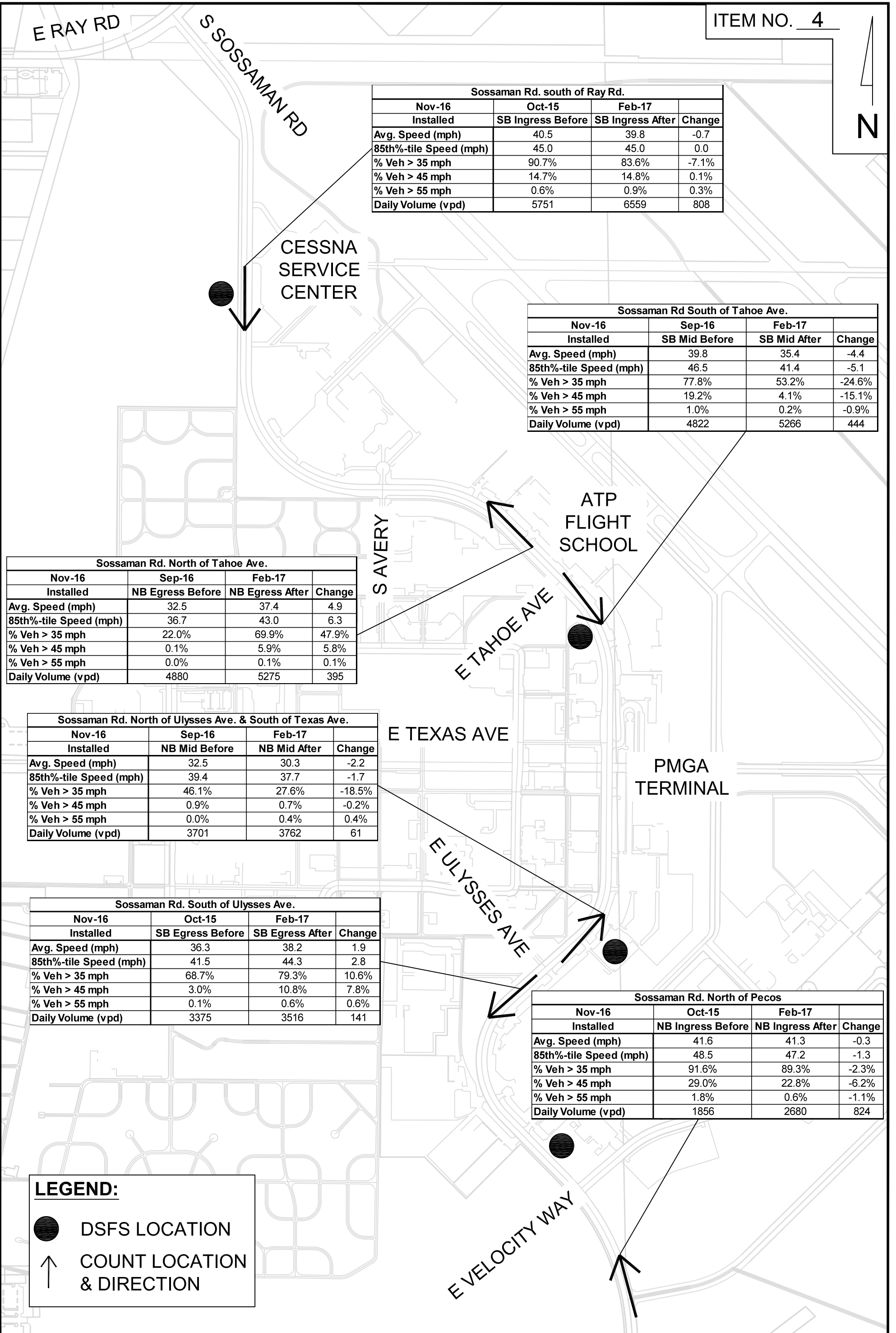
<b>Weighted Average from 2 Locations on Harris Drive</b>			
<b>Harris Drive Between McKellips Rd &amp; Brown Rd</b>			
<b>Jun-16</b>	<b>Apr-16</b>	<b>Jul &amp; Sep-16</b>	<b>Average</b>
<b>Installed</b>	<b>Before</b>	<b>After</b>	<b>Change</b>
<b>Avg. Speed (mph)</b>	29.0	30.8	1.7
<b>85th%-tile Speed (mph)</b>	34.4	37.0	2.6
<b>% Veh &gt; 25 mph</b>	78.6%	84.9%	6.3%
<b>% Veh &gt; 35 mph</b>	11.7%	21.4%	9.7%
<b>% Veh &gt; 45 mph</b>	0.4%	1.7%	1.2%
<b>% Veh &gt; 55 mph</b>	0.1%	0.1%	0.1%
<b>Daily Volume (vpd)</b>	1827	1593	-234
<i>Before Data: 2-day weighted average April 6-7, 2016, at two locations</i>			
<i>After Data: 2-day &amp; 5-day weighted average July/September, 2016, at two locations</i>			
<b>NOTE: 25 mph posted speed limit on Harris Drive</b>			

Similar Mesa studies have been done in the past to examine the effectiveness of edgeline pavement markings (2003). The studies showed varied results for the different street segments where the edgelines were installed. Some streets showed a decrease of up to 3.0 mph in 85<sup>th</sup> percentile speeds while others did not show any significant change.



STUDY LOCATIONS		FEATURE/CHANGE
①	SOSSAMAN RD - RAY RD TO VELOCITY WAY (PMGA)	DSFS
②	HARRIS DR - SOUTHERN AVE TO 8TH AVE (MESA H.S.)	DSFS
③	MAIN ST - COUNTRY CLUB DR TO CENTENNIAL WAY	REDUCED SPEED LIMIT
④	MCLELLAN RD - STAPELY DR TO GILBERT RD	REDUCED SPEED LIMIT
⑤	MCLELLAN RD - STAPELY DR TO GILBERT RD	PAVEMENT MARKINGS
⑥	HARRIS DR - MCKELLIPS RD TO BROWN RD	PAVEMENT MARKINGS

ITEM NO. 4



Sossaman Rd. south of Ray Rd.			
Nov-16 Installed	Oct-15 SB Ingress Before	Feb-17 SB Ingress After	Change
Avg. Speed (mph)	40.5	39.8	-0.7
85th%-tile Speed (mph)	45.0	45.0	0.0
% Veh > 35 mph	90.7%	83.6%	-7.1%
% Veh > 45 mph	14.7%	14.8%	0.1%
% Veh > 55 mph	0.6%	0.9%	0.3%
Daily Volume (vpd)	5751	6559	808

Sossaman Rd South of Tahoe Ave.			
Nov-16 Installed	Sep-16 SB Mid Before	Feb-17 SB Mid After	Change
Avg. Speed (mph)	39.8	35.4	-4.4
85th%-tile Speed (mph)	46.5	41.4	-5.1
% Veh > 35 mph	77.8%	53.2%	-24.6%
% Veh > 45 mph	19.2%	4.1%	-15.1%
% Veh > 55 mph	1.0%	0.2%	-0.9%
Daily Volume (vpd)	4822	5266	444

Sossaman Rd. North of Tahoe Ave.			
Nov-16 Installed	Sep-16 NB Egress Before	Feb-17 NB Egress After	Change
Avg. Speed (mph)	32.5	37.4	4.9
85th%-tile Speed (mph)	36.7	43.0	6.3
% Veh > 35 mph	22.0%	69.9%	47.9%
% Veh > 45 mph	0.1%	5.9%	5.8%
% Veh > 55 mph	0.0%	0.1%	0.1%
Daily Volume (vpd)	4880	5275	395

Sossaman Rd. North of Ulysses Ave. & South of Texas Ave.			
Nov-16 Installed	Sep-16 NB Mid Before	Feb-17 NB Mid After	Change
Avg. Speed (mph)	32.5	30.3	-2.2
85th%-tile Speed (mph)	39.4	37.7	-1.7
% Veh > 35 mph	46.1%	27.6%	-18.5%
% Veh > 45 mph	0.9%	0.7%	-0.2%
% Veh > 55 mph	0.0%	0.4%	0.4%
Daily Volume (vpd)	3701	3762	61

Sossaman Rd. South of Ulysses Ave.			
Nov-16 Installed	Oct-15 SB Egress Before	Feb-17 SB Egress After	Change
Avg. Speed (mph)	36.3	38.2	1.9
85th%-tile Speed (mph)	41.5	44.3	2.8
% Veh > 35 mph	68.7%	79.3%	10.6%
% Veh > 45 mph	3.0%	10.8%	7.8%
% Veh > 55 mph	0.1%	0.6%	0.6%
Daily Volume (vpd)	3375	3516	141

Sossaman Rd. North of Pecos			
Nov-16 Installed	Oct-15 NB Ingress Before	Feb-17 NB Ingress After	Change
Avg. Speed (mph)	41.6	41.3	-0.3
85th%-tile Speed (mph)	48.5	47.2	-1.3
% Veh > 35 mph	91.6%	89.3%	-2.3%
% Veh > 45 mph	29.0%	22.8%	-6.2%
% Veh > 55 mph	1.8%	0.6%	-1.1%
Daily Volume (vpd)	1856	2680	824

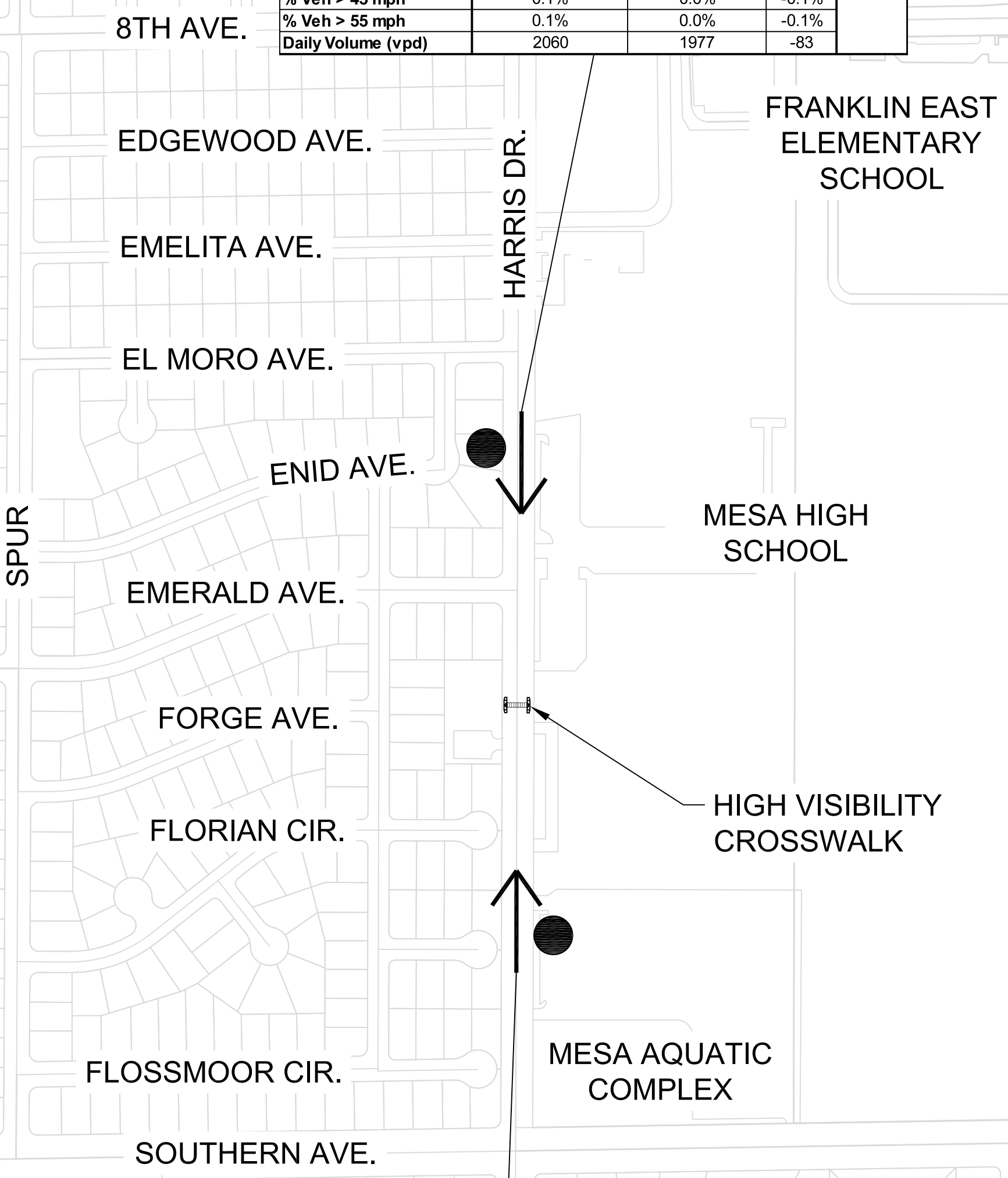
**LEGEND:**

- DSFS LOCATION
- ↑ COUNT LOCATION & DIRECTION

**LEGEND:**

- DSFS LOCATION
- ↑ COUNT LOCATION & DIRECTION

SB Harris Dr. Between Emerald Ave. & El Moro Ave.				Posted Speed Limit: 25mph
Jun-15 Installed	Apr-15 SB Before	Sep-15 SB After	Change	
Avg. Speed (mph)	23.7	23.8	0.1	
85th%-tile Speed (mph)	28.8	29.5	0.7	
% Veh > 25 mph	36.7%	40.0%	3.4%	
% Veh > 35 mph	1.0%	3.4%	2.4%	
% Veh > 45 mph	0.1%	0.0%	-0.1%	
% Veh > 55 mph	0.1%	0.0%	-0.1%	
Daily Volume (vpd)	2060	1977	-83	



NB Harris Dr. North of Southern Ave.				Posted Speed Limit: 25mph
Jun-15 Installed	Apr-15 NB Before	Sep-15 NB After	Change	
Avg. Speed (mph)	29.2	22.7	-6.5	
85th%-tile Speed (mph)	36.0	27.3	-8.7	
% Veh > 25 mph	74.9%	24.7%	-50.2%	
% Veh > 35 mph	17.8%	0.2%	-17.6%	
% Veh > 45 mph	0.7%	0.0%	-0.7%	
% Veh > 55 mph	0.1%	0.0%	-0.1%	
Daily Volume (vpd)	2538	2084	-454	

**LEGEND:**

- 25 MPH SPEED LIMIT SIGN
- ↑ COUNT LOCATION & DIRECTION

Westbound Main St. Btwn. MacDonald & Robson				Speed Limit Changed from 30mph to 25mph
Dec-16 Installed	Feb-16 WB Before	Feb-17 WB After	Change	
Avg. Speed (mph)	22.4	22.7	0.3	
85th%-tile Speed (mph)	28.1	28.5	0.4	
% Veh > 25 mph	31.0%	34.3%	3.2%	
% Veh > 35 mph	0.5%	1.1%	0.6%	
% Veh > 45 mph	0.0%	0.0%	0.0%	
% Veh > 55 mph	0.0%	0.0%	0.0%	
Daily Volume (vpd)	5206	4404	-802	
		30 mph SL	25 mph SL	

Westbound Main St. Between Center & MacDonald		Speed Limit Changed from 30mph to 25mph
Dec-16 Installed	Feb-17 WB After	
Avg. Speed (mph)	23.5	
85th%-tile Speed (mph)	29.1	
% Veh > 25 mph	42.0%	
% Veh > 35 mph	1.8%	
% Veh > 45 mph	0.0%	
% Veh > 55 mph	0.0%	
Daily Volume (vpd)	4030	
		25 mph SL

Westbound Main St. Btwn. Hibbert & Centennial				Speed Limit (No Change)
Dec-16 Installed	Feb-16 WB Before	Feb-17 WB After	Change	
Avg. Speed (mph)	25.3	29.4	4.1	
85th%-tile Speed (mph)	30.6	34.1	3.5	
% Veh > 25 mph	55.3%	86.6%	31.3%	
% Veh > 35 mph	2.4%	8.7%	6.3%	
% Veh > 45 mph	0.0%	0.1%	0.1%	
% Veh > 55 mph	0.0%	0.0%	0.0%	
Daily Volume (vpd)	5475	4312	-1163	
		30 mph SL	30 mph SL	

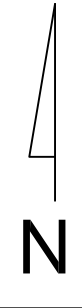
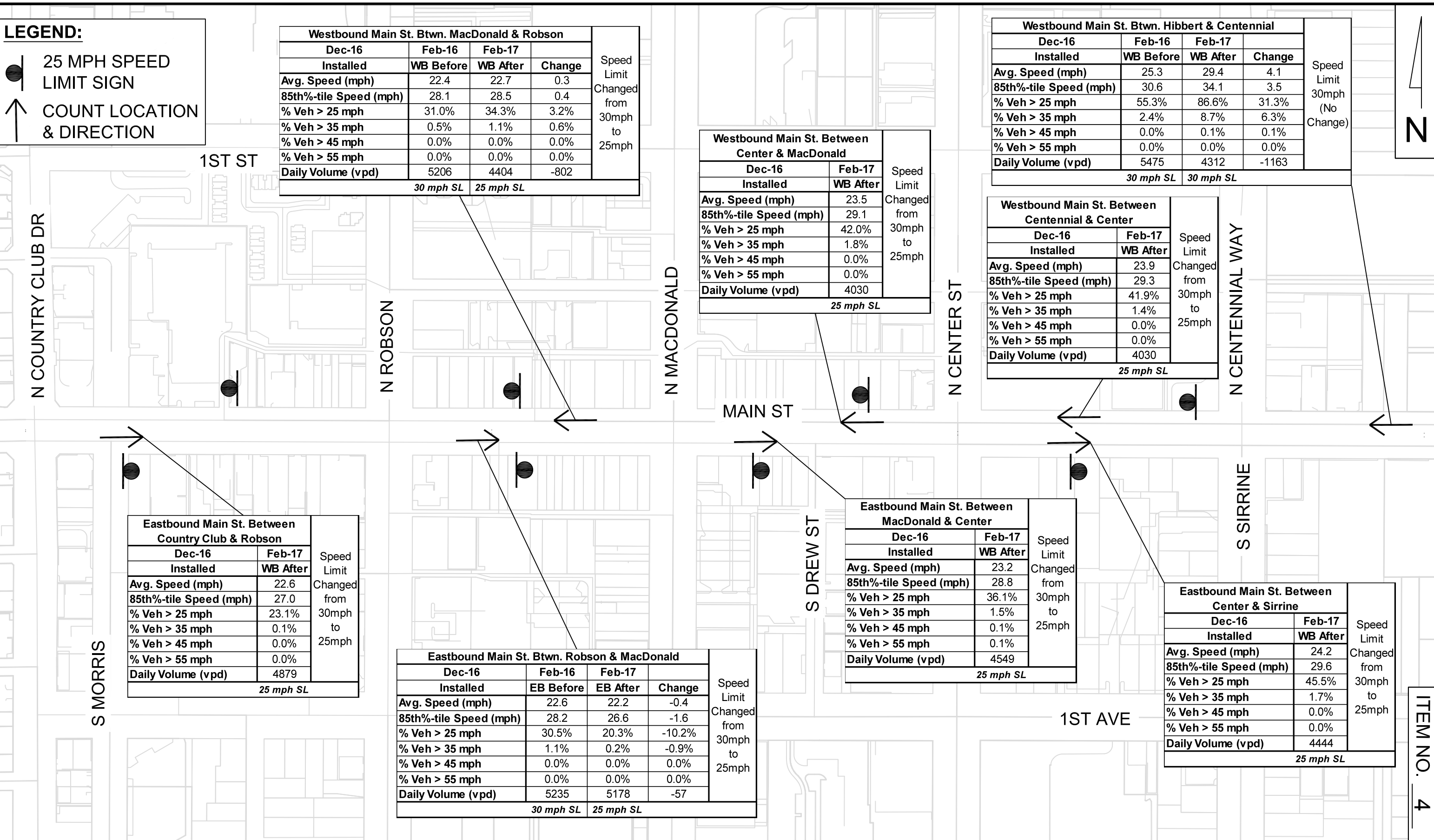
Westbound Main St. Between Centennial & Center		Speed Limit Changed from 30mph to 25mph
Dec-16 Installed	Feb-17 WB After	
Avg. Speed (mph)	23.9	
85th%-tile Speed (mph)	29.3	
% Veh > 25 mph	41.9%	
% Veh > 35 mph	1.4%	
% Veh > 45 mph	0.0%	
% Veh > 55 mph	0.0%	
Daily Volume (vpd)	4030	
		25 mph SL

Eastbound Main St. Between Country Club & Robson		Speed Limit Changed from 30mph to 25mph
Dec-16 Installed	Feb-17 WB After	
Avg. Speed (mph)	22.6	
85th%-tile Speed (mph)	27.0	
% Veh > 25 mph	23.1%	
% Veh > 35 mph	0.1%	
% Veh > 45 mph	0.0%	
% Veh > 55 mph	0.0%	
Daily Volume (vpd)	4879	
		25 mph SL

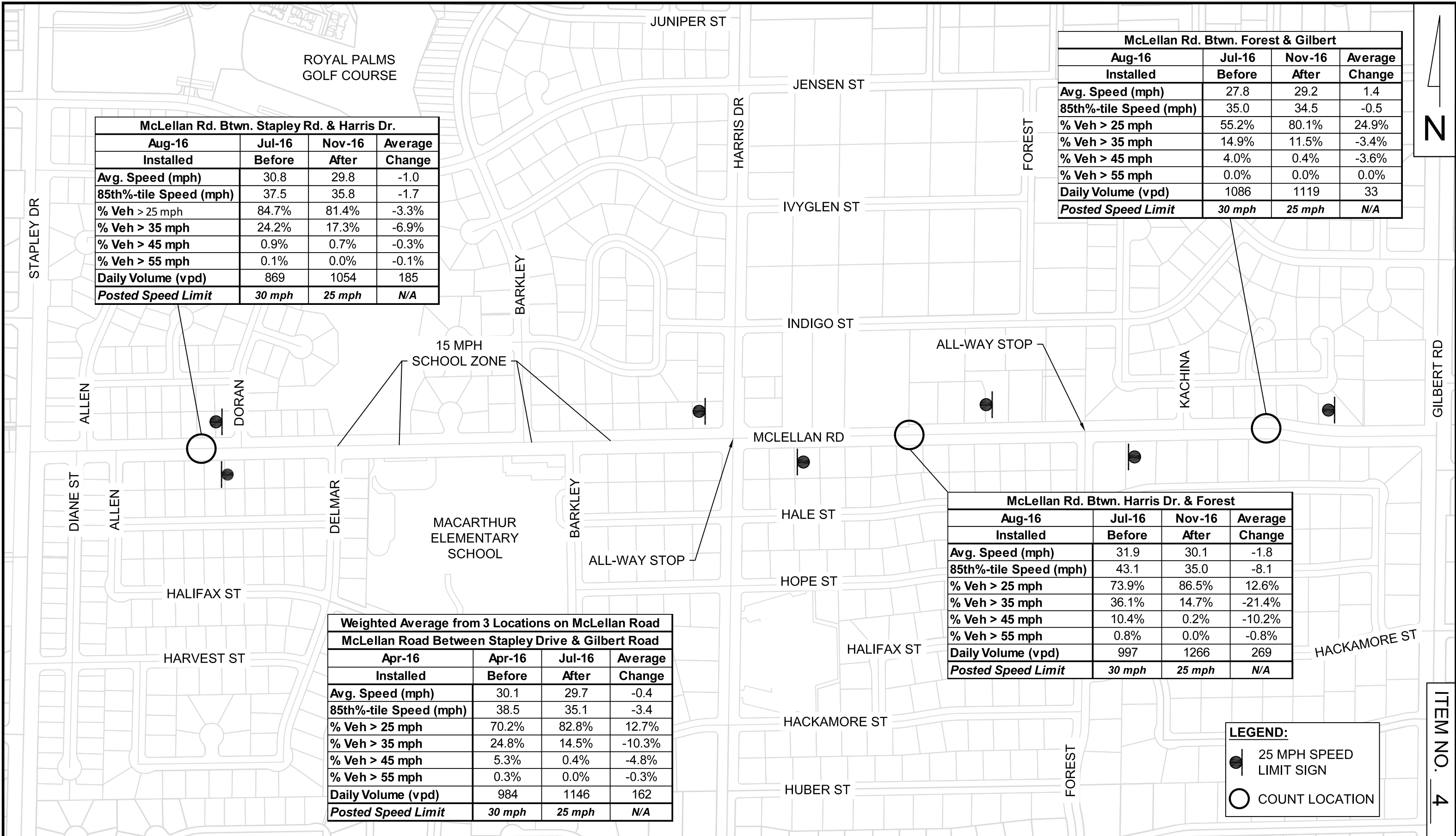
Eastbound Main St. Btwn. Robson & MacDonald				Speed Limit Changed from 30mph to 25mph
Dec-16 Installed	Feb-16 EB Before	Feb-17 EB After	Change	
Avg. Speed (mph)	22.6	22.2	-0.4	
85th%-tile Speed (mph)	28.2	26.6	-1.6	
% Veh > 25 mph	30.5%	20.3%	-10.2%	
% Veh > 35 mph	1.1%	0.2%	-0.9%	
% Veh > 45 mph	0.0%	0.0%	0.0%	
% Veh > 55 mph	0.0%	0.0%	0.0%	
Daily Volume (vpd)	5235	5178	-57	
		30 mph SL	25 mph SL	

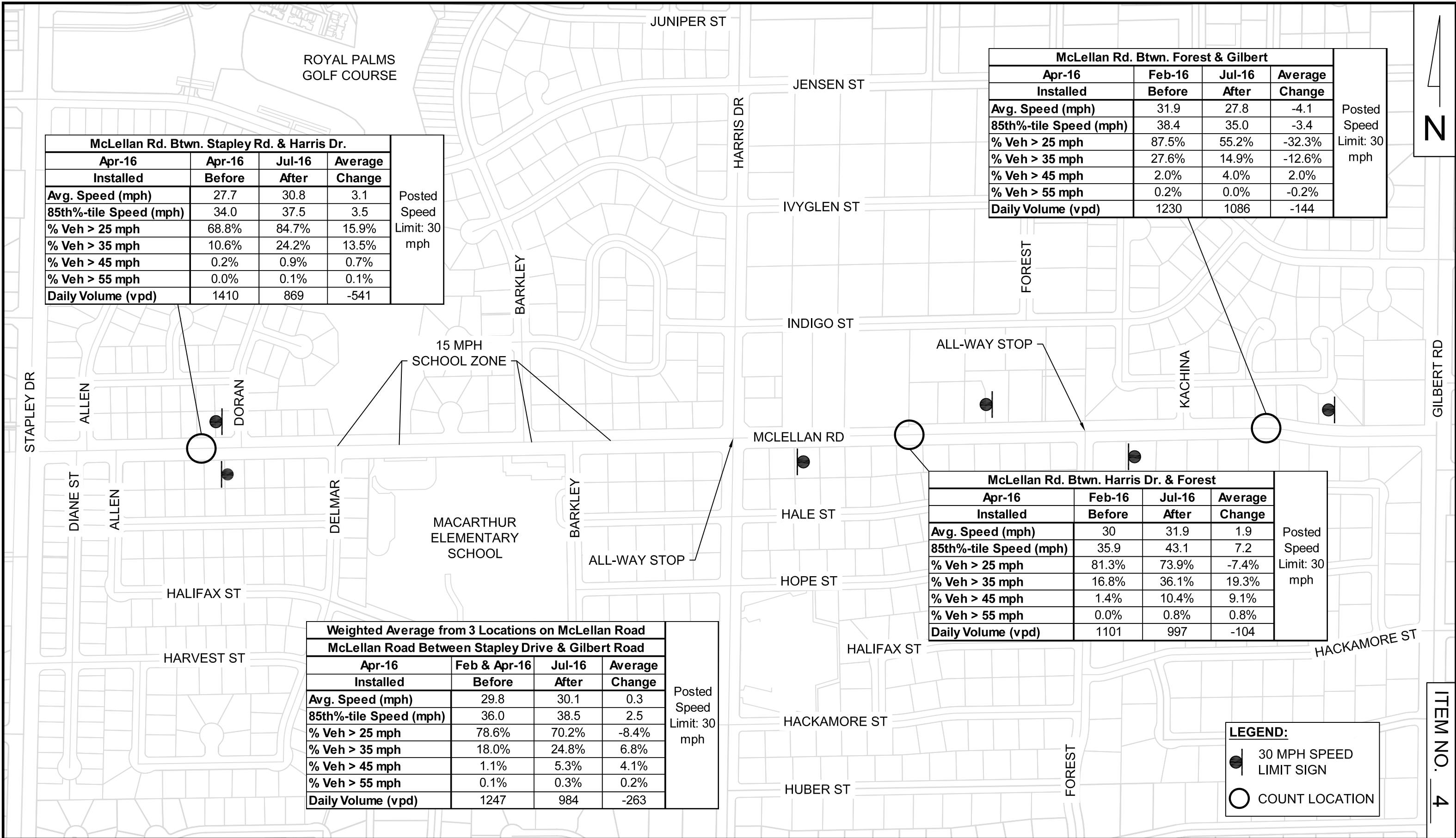
Eastbound Main St. Between MacDonald & Center		Speed Limit Changed from 30mph to 25mph
Dec-16 Installed	Feb-17 WB After	
Avg. Speed (mph)	23.2	
85th%-tile Speed (mph)	28.8	
% Veh > 25 mph	36.1%	
% Veh > 35 mph	1.5%	
% Veh > 45 mph	0.1%	
% Veh > 55 mph	0.1%	
Daily Volume (vpd)	4549	
		25 mph SL

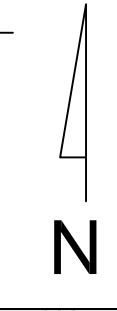
Eastbound Main St. Between Center & SIRRINE		Speed Limit Changed from 30mph to 25mph
Dec-16 Installed	Feb-17 WB After	
Avg. Speed (mph)	24.2	
85th%-tile Speed (mph)	29.6	
% Veh > 25 mph	45.5%	
% Veh > 35 mph	1.7%	
% Veh > 45 mph	0.0%	
% Veh > 55 mph	0.0%	
Daily Volume (vpd)	4444	
		25 mph SL











Harris Drive Between McKellips Rd & McLellan Rd				
Jun-16	Apr-16	Jul-16	Sep-16	Average
Installed	Before	After		Change
Avg. Speed (mph)	29.5	31.7	30.7	1.7
85th%-tile Speed (mph)	34.6	37.5	36.3	2.3
% Veh > 25 mph	82.6%	91.0%	87.0%	6.4%
% Veh > 35 mph	12.5%	24.2%	19.3%	9.2%
% Veh > 45 mph	0.6%	0.8%	0.8%	0.2%
% Veh > 55 mph	0.1%	0.1%	0.1%	0.0%
Daily Volume (vpd)	1946	1662	1654	-288

Weighted Average from 2 Locations on Harris Drive			
Harris Drive Between McKellips Rd & Brown Rd			
Jun-16	Apr-16	Jul & Sep-16	Average
Installed	Before	After	Change
Avg. Speed (mph)	29.0	30.8	1.7
85th%-tile Speed (mph)	34.4	37.0	2.6
% Veh > 25 mph	78.6%	84.9%	6.3%
% Veh > 35 mph	11.7%	21.4%	9.7%
% Veh > 45 mph	0.4%	1.7%	1.2%
% Veh > 55 mph	0.1%	0.1%	0.1%
Daily Volume (vpd)	1827	1593	-234

Posted Speed Limit: 25 mph



15 MPH SCHOOL ZONE

ALL-WAY STOP

MACARTHUR ELEMENTARY SCHOOL

Harris Drive Between McLellan Rd & Brown Rd				
Jun-16	Apr-16	Jul-16	Sep-16	Average
Installed	Before	After		Change
Avg. Speed (mph)	28.5	30.1	30.5	1.8
85th%-tile Speed (mph)	34.2	36.0	37.9	2.8
% Veh > 25 mph	73.9%	83.2%	78.1%	6.7%
% Veh > 35 mph	10.8%	17.8%	23.6%	9.9%
% Veh > 45 mph	0.3%	0.7%	4.2%	2.1%
% Veh > 55 mph	0.1%	0.1%	0.4%	0.1%
Daily Volume (vpd)	1708	1373	1683	-180

**LEGEND:**

-  25 MPH SPEED LIMIT SIGN
-  COUNT LOCATION

