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- From: John Hausman PE, PTOE, Muller Engineering Company  
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- Date: August 21, 2015
- Project: Dillon Road /144<sup>th</sup> Avenue – Phase 1 Improvements
- Re: Draft Traffic Analysis Memorandum

## Introduction

The purpose of this technical memorandum is to present traffic analysis and improvement recommendations for the Dillon Road / 144<sup>th</sup> Avenue corridor from 120<sup>th</sup> Street to Sheridan Boulevard. The City and County of Broomfield is considering interim Phase 1 corridor improvements to aid in near-term traffic operations until a four-lane roadway section (Phase 2) can be constructed. This memo analyzes the proposed near-term improvements as well as the long-term buildout of the corridor. **Figure 1** shows the project corridor. The corridor is approximately one mile in length between Sheridan Boulevard and 120<sup>th</sup> Street.



Figure 1: Vicinity Map

## Data Collection

Existing and future conditions at the intersections were established using the *Dillon Road/144<sup>th</sup> Avenue Traffic Forecast and Adjacent Roadway Impact Analysis* (Fox Tuttle, June 2013) and the most recent versions of the 2015 and 2035 DRCOG regional travel demand models. Additional turning movement and daily traffic counts were provided by the City and County of Broomfield.

The most recent AM and PM peak hour turning movement counts (TMC) for the corridor are from 2013 and were provided by the City and County of Broomfield. In addition, the *Dillon Road/144<sup>th</sup> Avenue*

*Traffic Forecast and Adjacent Roadway Impact Analysis* presented 2012 peak hour TMCs. The 2012 and 2013 TMCs are provided in **Appendix A**.

The *Dillon Road/144<sup>th</sup> Avenue Traffic Forecast and Adjacent Roadway Impact Analysis* also presented 2035 turning movement forecasts for the corridor. These forecasts as well as the current forecasts from the 2015 and 2035 DRCOG regional travel demand models were collected and reviewed to develop long-range turning movement forecasts for the corridor.

## **Traffic Analysis Purpose and Methodology**

The City and County of Broomfield would like to consider alternative intersection designs at the 120<sup>th</sup> Street and Aspen Street intersections to better serve the traffic demands of the corridor. The intersections are currently traditional signalized T-intersections. Traffic demands in the corridor are very directional in nature. The AM peak period traffic demand is predominantly in the westbound direction. The demand reverses to the eastbound direction during the PM peak period. As a result, traditional signalized intersections don't serve traffic demands as efficiently as more innovative intersection designs. Specifically "Florida-T" and Roundabout intersections have been identified as potential alternatives.

The traffic analysis presented will investigate the ability for traditional signalized, Florida-T and roundabout intersections to serve existing and future traffic demands. In addition, a set of Phase 1 improvements identified for the corridor will be analyzed. The Phase 1 improvements include the construction of three auxiliary lanes along westbound Dillon Road. The first auxiliary lane would provide a second westbound receiving lane at Sheridan Boulevard. The lane would be approximately 800 feet long and allow two westbound through lanes across Sheridan Boulevard. The second and third auxiliary lanes would be approximately 800 feet in length (downstream from the intersection) and provide a second westbound through lane at Aspen Street and 120<sup>th</sup> Street. There are no Phase 1 improvements proposed for eastbound Dillon Road, except for minor modifications to the right/through lane at Sheridan Boulevard.

The traffic analysis will present the volume to capacity (v/c) ratio, 95<sup>th</sup> percentile queue, average delay and LOS for the peak direction approach (westbound in the AM, eastbound in the PM) as well as the total calculated travel time through the three intersections. These data will then be used to compare the different intersection alternatives for the corridor.

Synchro 7 software was used to analyze the signalized alternatives. Rodel roundabout analysis software was used to analyze the roundabout alternatives. The Synchro and Rodel analysis output for 2013 is provided in **Appendices B and C**, respectively. The 2035 Synchro and Rodel analysis output is provided in **Appendices D and E**, respectively. A side-by-side comparison of the geometric layouts that were analyzed for both 2013 and 2035 conditions is provided in **Appendix F**.

### Existing (2013) Traffic Conditions

Figure 2 presents the 2013 peak hour turning movement counts for the corridor and the existing intersection lane geometry at each of the three corridor intersections.

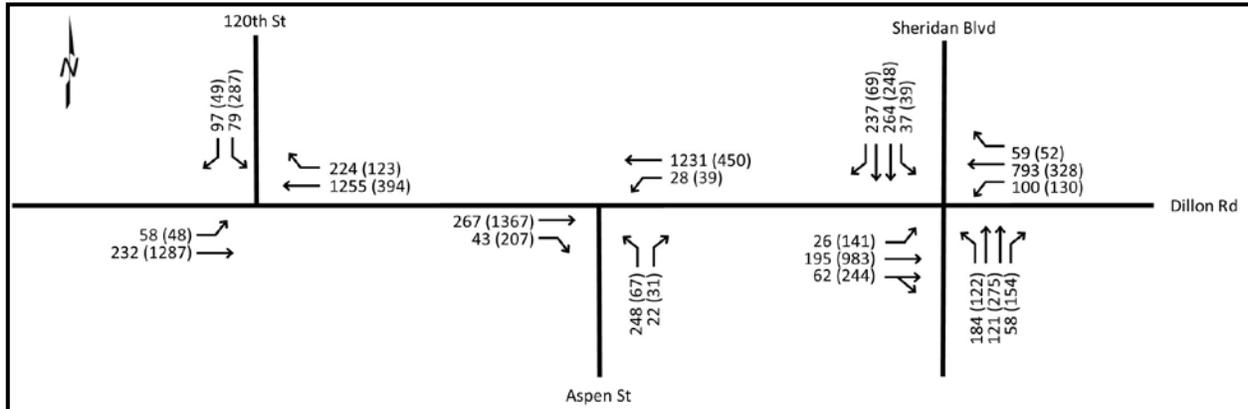


Figure 2: Existing (2013) Intersection Geometry and Peak Hour Volumes

Table 1 presents the AM peak hour performance measures for the westbound direction on Dillon Road and the eastbound direction during the PM peak hour. The v/c, 95<sup>th</sup> percentile queue, LOS and average delay is reported for the approach at each intersection as well as the total travel time, queue and delay for the entire corridor. Overall, the corridor totals will be used to compare the intersection scenarios for the corridor.

For 2013 conditions, the westbound travel time during the AM peak hour was calculated to be 224 seconds. The eastbound travel time was calculated to be 167 seconds during the PM peak hour. The total queue during both peak hours was calculated to be 3,700 feet or greater with the longest queues at the Aspen Street and 120<sup>th</sup> Street intersections. Both peak hours also experience over 100 seconds of average delay at the intersections.

The calculated performance measures were found to confirm, in general, the observed and documented peak hour operations along the corridor. Current travel conditions in the peak direction are characterized by long queues and delays and traffic volumes at or over capacity.

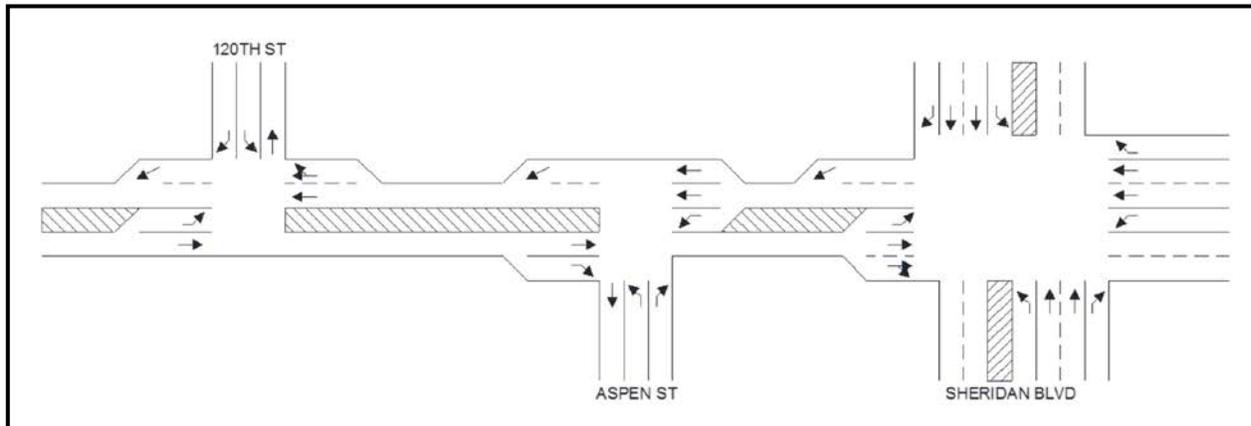
Table 1: Existing (2013) Travel Time, V/C, 95<sup>th</sup> Percentile Queue, LOS and Average Delay

	AM Peak Hour Westbound Dillon Road					PM Peak Hour Eastbound Dillon Road				
	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)
Sheridan Blvd		0.77	875	C	26		0.67	245	B	15
Aspen Street		1.04	1685	D	50		1.05	1865	E	57
120 <sup>th</sup> Street		1.00	1360	C	27		1.03	1645	D	52
<i>Corridor Total</i>	<i>224</i>		<i>3920</i>		<i>103</i>	<i>219</i>		<i>3755</i>		<i>124</i>

Source: Muller Engineering Company, 2015

### 2013 Traffic Conditions – Traditional Intersections (Phase 1)

The proposed traditional intersection improvements will maintain the existing signalized intersection configuration along the corridor. The proposed improvements will add westbound auxiliary lanes at each intersection. At Sheridan Boulevard, a second westbound receiving lane is proposed. The lane would be approximately 800 feet in length and enable a second westbound through lane across the intersection. At Aspen Street and 120<sup>th</sup> Street, a westbound auxiliary lane approximately 1,500 feet in length would be constructed through each intersection. There are no improvements proposed in the eastbound direction, except for minor modifications to the right/through lane at Sheridan Boulevard. **Figure 3** depicts a schematic of the proposed corridor geometry with Phase 1 traditional intersection improvements.



**Figure 3: 2013 Traditional Intersection Geometry (Phase 1)**

The Phase 1 traditional intersection performance measures presented in **Table 2** demonstrate that the proposed improvements would decrease travel time, queue lengths and average delay within the corridor. As expected, the improvements have a greater impact on the AM peak hour than the PM peak hour since no eastbound geometric improvements are proposed. However, traffic operations are forecast to improve during both peak hours. The eastbound operational improvements are primarily due to signal timing adjustments with the new lane configuration.

The effectiveness of the traditional intersection improvements is limited since the added westbound auxiliary lanes are not continuous throughout the corridor. The analysis of the auxiliary lanes included an adjustment to the lane utilization factor based on guidance provided in *NCHRP Report 707, Guidelines on the Use of Auxiliary Through Lanes at Signalized Intersections*. Drivers may be reluctant to use the proposed auxiliary lanes since they would be required to merge back into the single through lane once across each intersection.

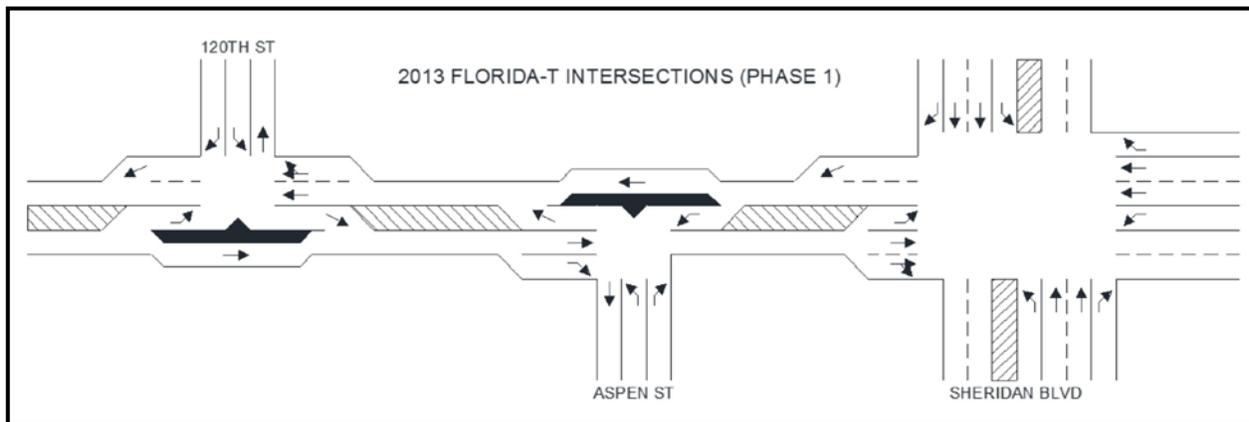
**Table 2: 2013 Traditional Intersection Improvements (Phase 1)**  
**Travel Time, V/C, 95<sup>th</sup> Percentile Queue, LOS and Average Delay**

	AM Peak Hour Westbound Dillon Road					PM Peak Hour Eastbound Dillon Road				
	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)
Sheridan Blvd		0.74	655	C	25		0.68	335	A	9
Aspen Street		0.83	260	B	11		1.04	1450	C	35
120 <sup>th</sup> Street		0.99	1215	C	27		1.05	1645	E	56
<i>Corridor Total</i>	<i>184</i>		<i>2130</i>		<i>63</i>	<i>195</i>		<i>3430</i>		<i>100</i>

Source: Muller Engineering Company, 2015

### 2013 Traffic Conditions – Florida-T Intersections (Phase 1)

This scenario would replace the existing signalized intersections at Aspen Street and 120<sup>th</sup> Street with Florida-T intersections. Florida-T intersections are an alternative intersection configuration that can be used at T-intersections. The intersection provides a free-flow bypass lane for through vehicles that do not conflict with the turning movements to/from the minor street. At Aspen Street, a single bypass through lane would be provided in the westbound direction and would be separated from the signalized intersection by a narrow raised median. At 120<sup>th</sup> Street, the bypass lane would be in the eastbound direction and a westbound auxiliary through lane would also be provided similar to the traditional intersection option. A traffic signal would control the remaining movements at the intersection. A schematic of the proposed corridor geometry with Florida-T intersections is presented in **Figure 4**.



**Figure 4: 2013 Florida-T Intersections Geometry (Phase 1)**

The Florida-T Intersections performance measures presented in **Table 3** demonstrate that the proposed improvements would decrease travel time, queue lengths and average delay within the corridor. The improvements improve traffic operations during both peak hours. The forecast travel times are comparable to the traditional intersection travel times. But the total queue lengths and average delays are reduced compared to the traditional intersections.

The effectiveness of the Florida-T intersections is increased as a result of the bypass lanes. The bypass lanes eliminate delay and queuing at one intersection in each direction along the corridor.

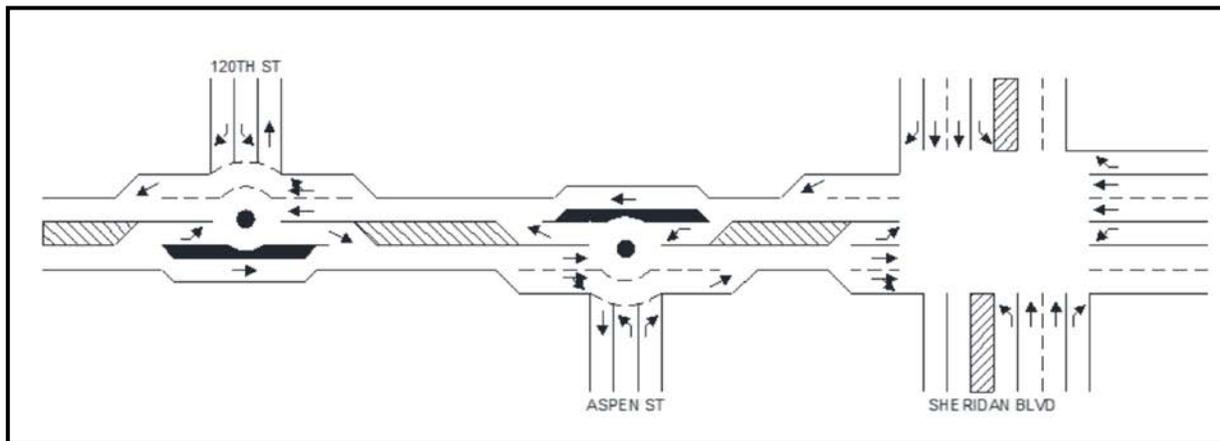
**Table 3: 2013 Florida-T Intersections (Phase 1)**  
**Travel Time, V/C, 95<sup>th</sup> Percentile Queue, LOS and Average Delay**

	AM Peak Hour Westbound Dillon Road					PM Peak Hour Eastbound Dillon Road				
	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)
Sheridan Blvd		0.69	675	C	25		0.68	325	A	8
Aspen Street		0.76	0	A	0		1.04	1870	D	48
120 <sup>th</sup> Street		0.96	1385	C	21		0.79	0	A	0
<i>Corridor Total</i>	<i>174</i>		<i>2060</i>		<i>46</i>	<i>152</i>		<i>2195</i>		<i>56</i>

Source: Muller Engineering Company, 2015

**2013 Traffic Conditions – Roundabout Intersections (Phase 1)**

This scenario would replace the existing signalized intersections at Aspen Street and 120<sup>th</sup> Street with roundabout intersections. The intersections would provide a free-flow bypass lane for through vehicles that do not conflict with the turning movements to/from the minor street. At Aspen Street, a single bypass through lane would be provided in the westbound direction and would be separated from the roundabout intersection by a narrow raised median. At 120<sup>th</sup> Street, the bypass lane would be in the eastbound direction. The roundabout would control the remaining movements at the intersection. The roundabouts would be constructed with two entry and exit lanes on Dillon Road in order to minimize future reconstruction of the intersection. A schematic of the proposed corridor geometry with Roundabout intersections is presented in **Figure 5**.



**Figure 5: 2013 Roundabout Intersections Geometry (Phase 1)**

The Roundabout Intersections performance measures presented in **Table 4** demonstrate that the proposed improvements would decrease travel time, queue lengths and average delay within the corridor compared to existing conditions, the traditional intersection improvements and the Florida-T intersections. The improvements benefit traffic operations during both peak hours. The forecast travel times are lowest of all three improvement scenarios. The roundabout intersections scenario is also forecast to have the least amount of delay and the shortest queues through the corridor.

The effectiveness of the roundabout intersections is increased by the use of a bypass lane around the roundabouts. In addition, the use of yield control at the roundabouts decreases the amount of delay by reducing the probability of needing to stop at either Aspen Street or 120<sup>th</sup> Street.

**Table 4: 2013 Roundabout Intersections (Phase 1)  
 Travel Time, V/C, 95<sup>th</sup> Percentile Queue, LOS and Average Delay**

	AM Peak Hour Westbound Dillon Road					PM Peak Hour Eastbound Dillon Road				
	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)
Sheridan Blvd		0.66	615	C	21		0.67	565	C	20
Aspen Street		0.76	0	A	0		0.78	300	A	9
120 <sup>th</sup> Street		0.73	250	A	9		0.79	0	A	0
<i>Corridor Total</i>	<i>158</i>		<i>865</i>		<i>30</i>	<i>125</i>		<i>865</i>		<i>29</i>

Source: Muller Engineering Company, 2015

### 2013 Analysis Summary

All three of the proposed improvement scenarios are forecast to improve traffic operations compared to existing conditions. Each scenario reduces corridor travel time and average delay and decreases the total length of queues along the corridor. The Roundabout Intersections scenario provides the greatest benefit in traffic operations. The Traditional Intersection improvements provide the least benefit to traffic operations. The operational benefit of the Phase 1 improvements is highly dependent on driver utilization of the short auxiliary lanes.

### 2035 Traffic Forecasts

Traffic volumes along the corridor were forecast to the year 2035 to assess the long-term effectiveness of the proposed intersection scenarios. The forecasts presented in the *Dillon Road/144<sup>th</sup> Avenue Traffic Forecast and Adjacent Roadway Impact Analysis* (Roadway Impact Analysis) were reviewed. In addition, traffic forecasts in the 2015 and 2035 DRCOG regional travel demand models were reviewed.

The review of the Roadway Impact Analysis and the models identified a few concerns with how the regional models assign traffic demand to the study corridor. The concerns included unusually high traffic growth in locations along the corridor compared to parallel corridors. In addition, forecast peak hour volumes were of a magnitude that any analyzed intersection configuration would have difficulty serving the traffic demand, minimizing the potential to conduct a meaningful comparison of scenarios. As a result, adjustments were made to the corridor forecasts to enable comparisons to be made between the proposed improvement scenarios. **Figure 6** presents the forecast 2035 AM and PM peak hour volumes and associated 20-year growth factors used in the corridor analysis.

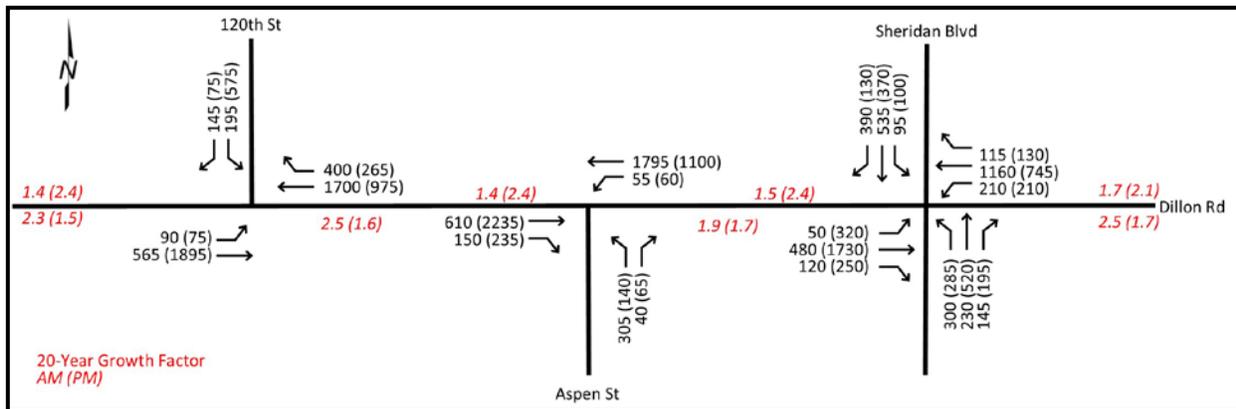


Figure 6: 2035 Peak Hour Traffic Forecasts

### 2035 Traffic Conditions – Traditional Intersections (Phase 2)

The base condition for 2035 analysis assumed that the Dillon Road corridor would be widened to provide two through lanes in each direction as part of Phase 2 improvements. All of the intersections would continue to be traditional signalized intersections. Single left-turn lanes would be provided from Dillon Road to Aspen Street and 120<sup>th</sup> Street. Right-turn lanes would also be provided on Dillon Road. At 120<sup>th</sup> Street, a double southbound left-turn lane and a single right-turn lane would be provided. At Aspen Street, a single northbound left-turn lane and a single right-turn lane would be provided.

It was also assumed that a few improvements would be made to the Sheridan Boulevard intersection. A second left-turn lane would be added in the northbound and southbound directions. The left turn lanes can be added within the existing pavement width via signing, striping and signal modifications. These left-turns would operate in protected only phasing. In the eastbound direction, a separate right-turn lane would be added. The eastbound and westbound approaches would continue to provide a single protected/permissive left-turn lane. A schematic of the proposed corridor geometry with Florida-T intersections is presented in **Figure 7**.

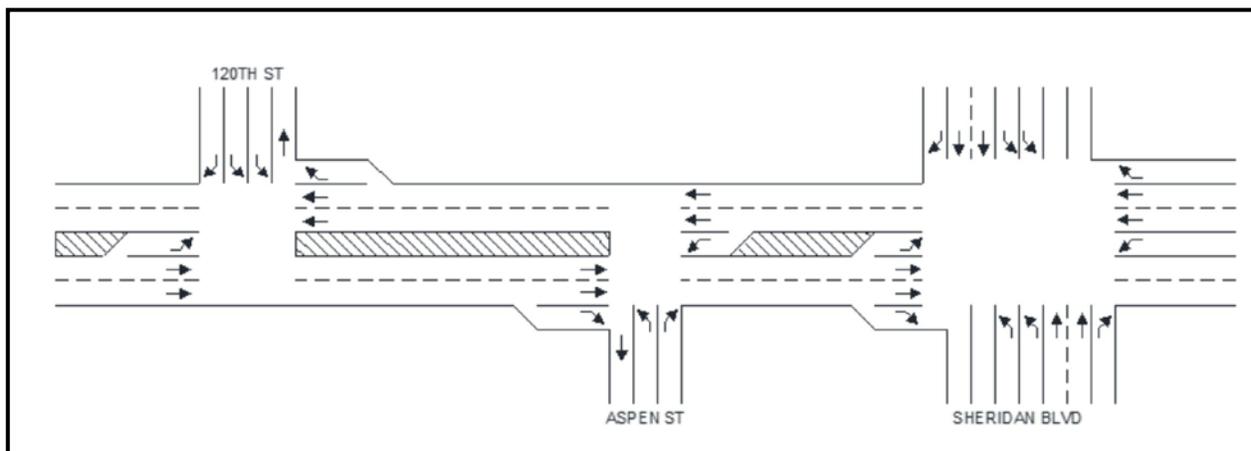


Figure 7: 2035 Traditional Intersection Geometry (Phase 2)

The traditional intersections 2035 performance measures presented in **Table 5** demonstrate that forecast baseline traffic operations improve in the westbound direction but degrade in the eastbound along the corridor in 2035 compared to existing performance measures. The peak direction of travel

during each peak hour is forecast to be at or near capacity at each intersection. The longest travel time and total queuing as well as highest delay is forecast for the PM peak hour in the eastbound direction. This, in general, is a result of the PM peak hour volumes being higher than the AM peak hour volumes.

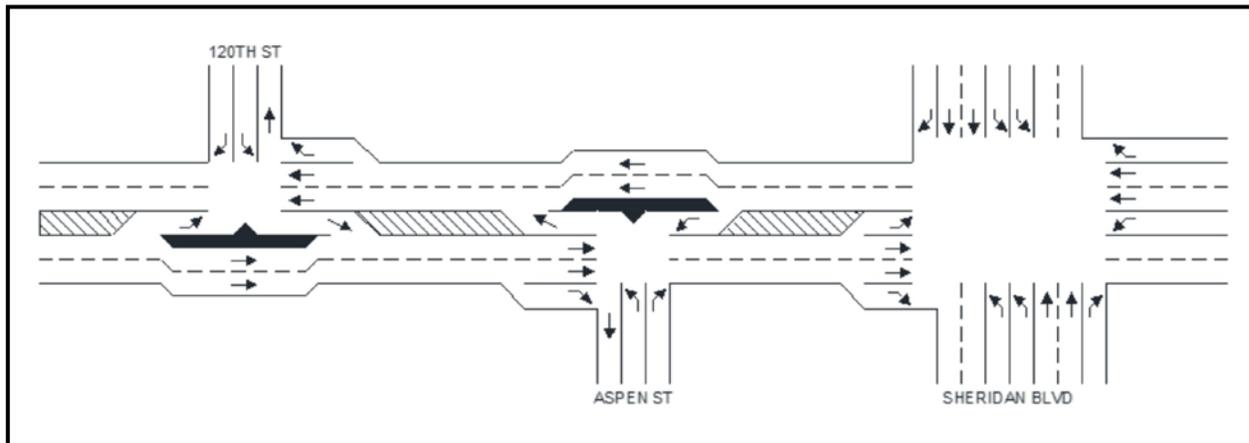
**Table 5: 2035 Traditional Intersections (Phase 2)**  
**Travel Time, V/C, 95<sup>th</sup> Percentile Queue, LOS and Average Delay**

	AM Peak Hour Westbound Dillon Road					PM Peak Hour Eastbound Dillon Road				
	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)
Sheridan Blvd		0.91	650	D	43		1.15	1150	F	98
Aspen Street		0.85	145	A	8		0.95	1280	B	17
120 <sup>th</sup> Street		0.80	325	A	7		0.97	620	C	28
<i>Corridor Total</i>	<i>179</i>		<i>1120</i>		<i>58</i>	<i>269</i>		<i>3050</i>		<i>143</i>

Source: Muller Engineering Company, 2015

**2035 Traffic Conditions – Florida-T Intersections (Phase 2)**

The 2035 Florida-T Intersections scenario would be similar to the 2013 configuration. A second through lane would be constructed in each direction to serve the increased traffic demand. Right-turn lanes would also be provided on Dillon Road at each intersection. The previously discussed improvements at Sheridan Boulevard were also assumed in the Florida-T scenario. However, the southbound left-turn at 120<sup>th</sup> Street would remain a single left due to the difficulty of merging dual left-turn lanes into eastbound traffic. A schematic of the proposed corridor geometry with Florida-T intersections is presented in **Figure 8**.



**Figure 8: 2035 Florida-T Geometry (Phase 2)**

The Florida-T Intersections 2035 performance measures presented in **Table 6** demonstrate that the proposed improvements would decrease travel time, queue lengths and average delay within the corridor compared to baseline 2035 conditions in the PM peak hour. The Florida-T intersections are forecast to provide operations comparable to the traditional intersections during the AM peak hour.

The effectiveness of the Florida-T intersections is increased by the use of a bypass lanes around the signalized intersections. The bypass lanes allow the traffic signal in the minor direction of travel to

typically operate using a half cycle length compared to the remainder of the corridor, decreasing side street delay. This flexibility in traffic signal timing allows the Florida-T intersections to be more responsive to varying traffic demands along the corridor during both peak and off-peak periods. The Florida-T intersections serve the high PM peak hour volumes better than the baseline traditional intersections. The scenario is forecast to have shorter travel times, total queuing and average intersection delay during the PM peak hour.

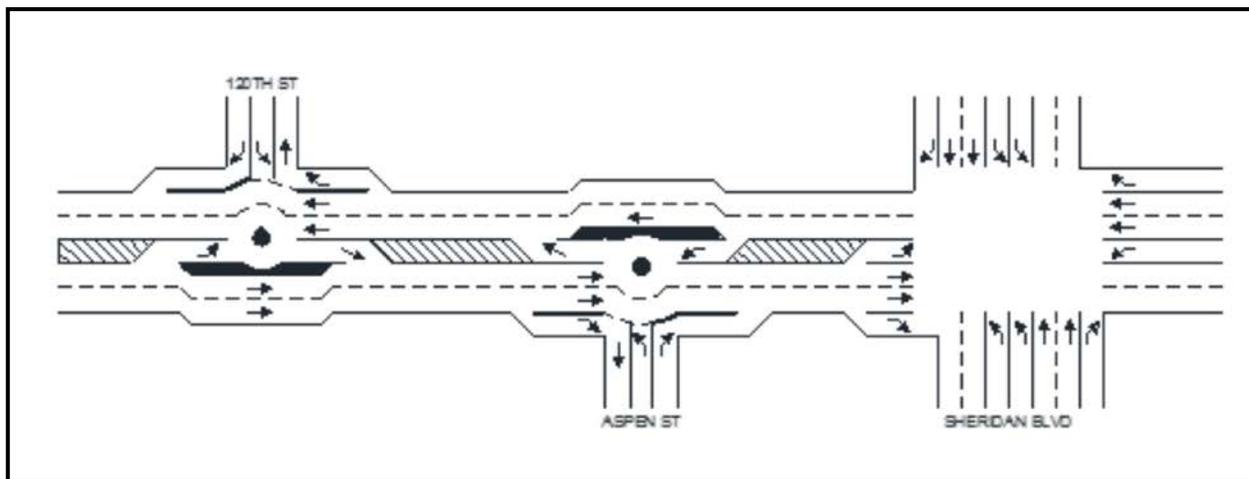
**Table 6: 2035 Florida-T Intersections (Phase 2)**  
 Travel Time, V/C, 95<sup>th</sup> Percentile Queue, LOS and Average Delay

	AM Peak Hour Westbound Dillon Road					PM Peak Hour Eastbound Dillon Road				
	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)
Sheridan Blvd		0.92	655	D	45		1.15	1090	F	94
Aspen Street		0.58	0	A	0		0.98	1320	C	24
120 <sup>th</sup> Street		0.85	340	B	15		0.61	0	A	0
<i>Corridor Total</i>	<i>182</i>		<i>995</i>		<i>60</i>	<i>238</i>		<i>2410</i>		<i>118</i>

Source: Muller Engineering Company, 2015

**2035 Traffic Conditions – Roundabout Intersections (Phase 2)**

The 2035 Roundabout Intersections scenario would be similar to the 2013 configuration. A second through lane would be constructed in each direction to serve the increased traffic demand. Right-turn bypass lanes would also be provided on Dillon Road and the cross street at each intersection. The previously discussed improvements at Sheridan Boulevard were also assumed in the Florida-T scenario. A schematic of the proposed corridor geometry for this option is presented in **Figure 9**.



**Figure 9: 2035 Roundabout Intersections Geometry (Phase 2)**

The roundabout Intersections performance measures presented in **Table 7** demonstrate that the proposed improvements would provide comparable travel time, total queuing and average delay compared to the baseline and Florida-T scenarios in the AM peak hour. However, during the PM peak hour, the roundabout at Aspen Street is forecast to be over capacity due to the high volume of

eastbound through traffic. As a result, the corridor travel time, queuing and average delay is forecast to increase compared to baseline conditions.

The 2035 analysis demonstrates that the effectiveness of the roundabout intersections is limited by the entry capacity along the peak direction of travel. Once that capacity is reached there is little flexibility to increase capacity for the peak traffic flows into the roundabout.

**Table 7: 2035 Roundabout Intersections (Phase 2)**  
**Travel Time, V/C, 95<sup>th</sup> Percentile Queue, LOS and Average Delay**

	AM Peak Hour Westbound Dillon Road					PM Peak Hour Eastbound Dillon Road				
	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)	Travel Time (sec)	V/C	Queue (ft)	LOS	Delay (sec)
Sheridan Blvd		0.81	660	D	39		1.15	1200	F	111
Aspen Street		0.58	0	A	0		1.09	3295	F	51
120 <sup>th</sup> Street		0.85	485	B	11		0.61	0	A	0
<i>Corridor Total</i>	<i>172</i>		<i>1145</i>		<i>50</i>	<i>282</i>		<i>4495</i>		<i>162</i>

Source: Muller Engineering Company, 2015

### 2035 Analysis Summary

The analysis of forecast 2035 traffic conditions indicates that each geometric scenario would provide sufficient capacity and reduced delays for westbound traffic during the AM peak period. During the PM peak period, all of the options operate at LOS F at the Sheridan intersection. The roundabout option has slightly higher delay than the other two due to the absence of progressed traffic flow between Sheridan and the intersections to the west. The roundabout option also operates more poorly at Aspen Street due to the high volume of eastbound traffic flow entering the roundabout. The Florida-T intersections are forecast to provide the shortest corridor travel times during the PM peak hour. The Florida-T scenario also provides the shortest amount of queuing along the corridor and the lowest amount of average intersection delay.

**Table 8** provides an intersection-level comparison of the three scenarios. The roundabout scenario results in the highest cumulative delay for the combined peak hours. The average delay and LOS are comparable between the traditional and Florida-T intersections. However, the Florida-T intersections offer slightly more capacity and lower delay compared to the traditional intersection option.

**Table 8: 2035 Intersection Analysis Summary  
 V/C, LOS and Average Delay**

Scenario/ Intersection	AM Peak Hour			PM Peak Hour		
	V/C	Delay	LOS	V/C	Delay	LOS
<b>Traditional</b>						
120 <sup>th</sup> St	0.75	10	A	0.94	23	C
Aspen St	0.86	16	B	0.90	15	B
Sheridan Blvd	0.86	36	D	0.99	64	E
<b>Florida-T</b>						
120 <sup>th</sup> St	0.83	15	B	0.80	17	B
Aspen St	0.58	7	A	0.91	19	B
Sheridan Blvd	0.87	36	D	0.99	63	E
<b>Roundabout</b>						
120 <sup>th</sup> St	NA	95	F	NA	117	F
Aspen St	NA	5	A	NA	132	F
Sheridan Blvd	0.84	43	D	1.05	69	E

Source: Muller Engineering Company, 2015

## Conclusions

Based on the 2013 and 2035 traffic operations analysis, the Florida-T intersection provides the best improvement for vehicular travel time and intersection capacity. Due to the free-flow bypass lanes in one direction at each intersection, Florida-T intersections require fewer stops along the corridor. In general, this results in less delay and more available capacity at the 120<sup>th</sup> Street and Aspen Street intersections, especially in the peak direction of travel during each peak hour. However, the intersections are not conducive to providing pedestrian crossings of Dillon Road. If the City and County of Broomfield anticipates the need for future pedestrian crossings of Dillon Road at 120<sup>th</sup> Street or Aspen Street, then the traditional intersection option would better serve the corridor for that purpose.

**Appendix A: 2012 and 2013 Traffic Counts**

Aspen & Dillon AM Turn Count  
6/24/2013

One DesCombes Dr  
Broomfield, Colorado 80020

File Name : untitled4  
Site Code : 00000000  
Start Date : 06/24/2013  
Page No : 1

Groups Printed- Unshifted

Start Time	DILLON RD From East		ASPEN From South		DILLON RD From West		Int. Total
	Thru	Left	Right	Left	Right	Thru	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	264	4	8	40	9	49	374
07:15 AM	271	6	3	56	6	48	390
07:30 AM	252	9	3	77	13	75	429
07:45 AM	235	8	8	75	15	95	436
Total	1022	27	22	248	43	267	1629
Grand Total	1022	27	22	248	43	267	1629
Apprch %	97.4	2.6	8.1	91.9	13.9	86.1	
Total %	62.7	1.7	1.4	15.2	2.6	16.4	

Dillon Road and Aspen St  
6/18/2013 5pm-6pm

One DesCombes Dr  
Broomfield, Colorado 80020

File Name : untitled2  
Site Code : 00000000  
Start Date : 06/17/2013  
Page No : 1

Groups Printed- Unshifted

Start Time	144 From East		ASPEN From South		144 From West		Int. Total
	Thru	Left	Right	Left	Right	Thru	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
05:00 PM	91	12	8	18	49	301	479
05:15 PM	96	11	5	10	41	339	502
05:30 PM	96	13	3	19	59	279	469
05:45 PM	100	3	15	10	50	300	478
Total	383	39	31	57	199	1219	1928
Grand Total	383	39	31	57	199	1219	1928
Aprch %	90.8	9.2	35.2	64.8	14.0	86.0	
Total %	19.9	2.0	1.6	3.0	10.3	63.2	

144th and Sheridan AM Turn Count  
6/25/2013

One DesCombes Dr  
Broomfield, Colorado 80020

File Name : untitled5  
Site Code : 00000000  
Start Date : 06/25/2013  
Page No : 1

Groups Printed- Unshifted

Start Time	SHERIDAN From North			144th From East			SHERIDAN From South			144th From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	60	60	9	6	182	27	3	24	53	8	35	9	476
07:15 AM	41	63	1	9	201	21	10	19	44	10	40	9	468
07:30 AM	59	58	14	14	148	25	18	44	39	24	49	4	496
07:45 AM	58	83	13	25	138	19	27	34	33	20	71	4	525
Total	218	264	37	54	669	92	58	121	169	62	195	26	1965
Grand Total	218	264	37	54	669	92	58	121	169	62	195	26	1965
Apprch %	42.0	50.9	7.1	6.6	82.1	11.3	16.7	34.8	48.6	21.9	68.9	9.2	
Total %	11.1	13.4	1.9	2.7	34.0	4.7	3.0	6.2	8.6	3.2	9.9	1.3	

City & County of Broomfield  
 One DesCombes Dr  
 Broomfield, Colorado 80020

144th & Sheridan PM  
 7/8/2014

File Name : untitled1  
 Site Code : 00000000  
 Start Date : 07/08/2014  
 Page No : 1

Groups Printed- Unshifted

Start Time	Sheridan From North			144th From East			Sheridan From South			Dillon From West			Int. Total
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
05:00 PM	19	70	11	13	97	39	43	74	34	58	225	31	714
05:15 PM	11	69	6	12	74	19	40	74	22	51	215	32	625
05:30 PM	22	60	12	14	57	32	39	68	29	48	224	29	634
05:45 PM	11	49	10	13	75	40	32	59	28	59	211	33	620
Total	63	248	39	52	303	130	154	275	113	216	875	125	2593
Grand Total	63	248	39	52	303	130	154	275	113	216	875	125	2593
Apprch %	18.0	70.9	11.1	10.7	62.5	26.8	28.4	50.7	20.8	17.8	72.0	10.3	
Total %	2.4	9.6	1.5	2.0	11.7	5.0	5.9	10.6	4.4	8.3	33.7	4.8	

Dillon Rd & S 120th St AM Turn Count  
6/27/2013

One DesCombes Dr  
Broomfield, Colorado 80020

File Name : DILLON~3  
Site Code : 00000000  
Start Date : 06/27/2013  
Page No : 1

Groups Printed- Unshifted

Start Time	S 120th St From North		Dillon From East		Dillon From West		Int. Total
	Right	Left	Right	Thru	Thru	Left	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	21	15	51	231	41	22	381
07:15 AM	26	13	50	282	54	13	438
07:30 AM	28	24	46	264	71	7	440
07:45 AM	22	27	54	259	66	16	444
Total	97	79	201	1036	232	58	1703
Grand Total	97	79	201	1036	232	58	1703
Apprch %	55.1	44.9	16.2	83.8	80.0	20.0	
Total %	5.7	4.6	11.8	60.8	13.6	3.4	

Dillon Rd & S 120th St PM Turn Count  
6/26/2013

One DesCombes Dr  
Broomfield, Colorado 80020

File Name : Dillon & S 120th St 6-2013 PM  
Site Code : 00000000  
Start Date : 06/26/2013  
Page No : 1

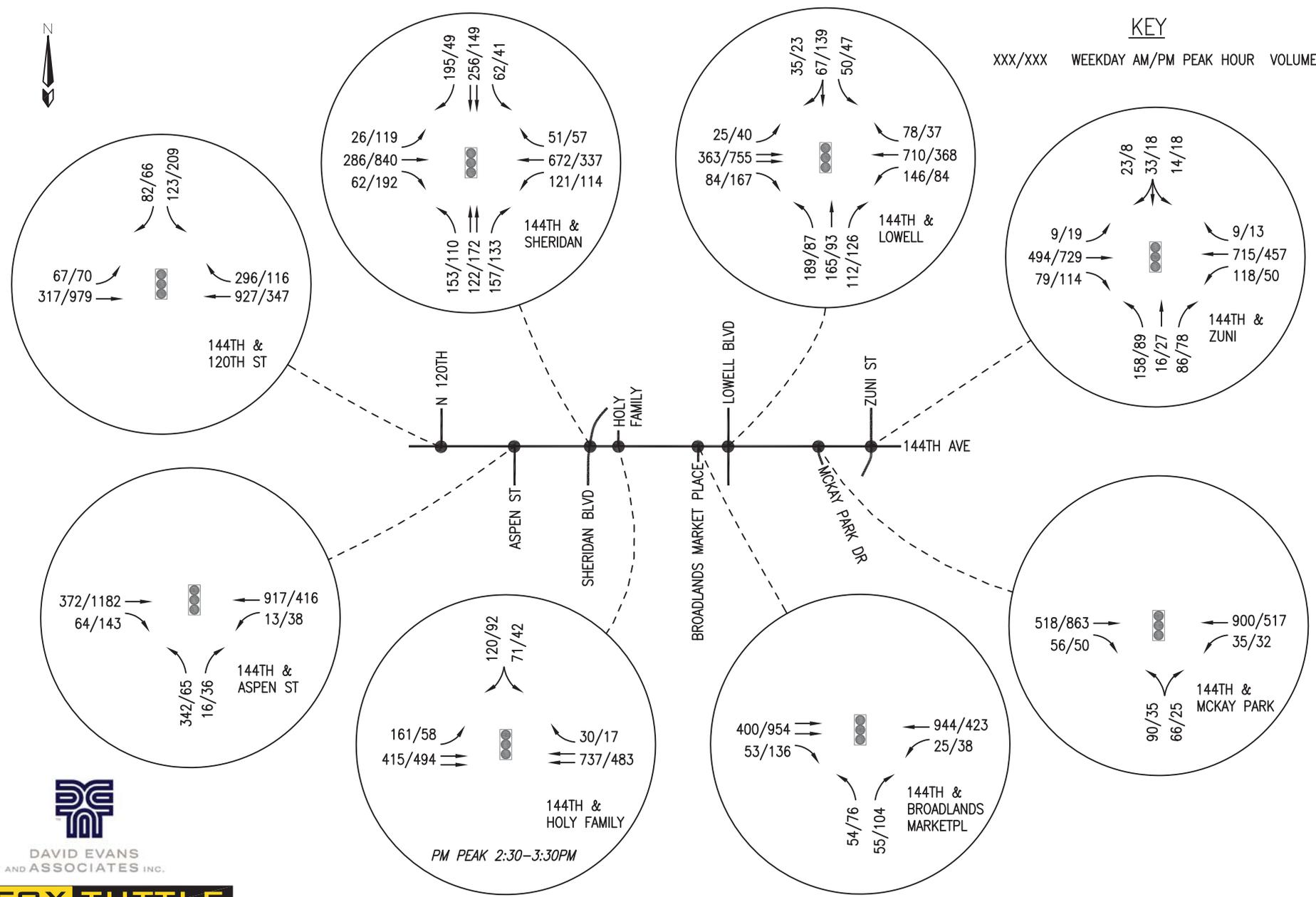
Groups Printed- Unshifted

Start Time	S 120th St From North		Dillon Rd From East		Dillon Rd From West		Int. Total
	Right	Left	Right	Thru	Thru	Left	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	
05:00 PM	11	75	26	111	299	15	537
05:15 PM	18	86	28	78	278	8	496
05:30 PM	13	66	28	107	301	13	528
05:45 PM	7	60	41	98	309	12	527
Total	49	287	123	394	1187	48	2088
Grand Total	49	287	123	394	1187	48	2088
Apprch %	14.6	85.4	23.8	76.2	96.1	3.9	
Total %	2.3	13.7	5.9	18.9	56.8	2.3	



### KEY

XXX/XXX WEEKDAY AM/PM PEAK HOUR VOLUME



DAVID EVANS AND ASSOCIATES INC.

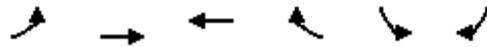


FT Project #	12024	Original Scale	NTS	Date	12/17/12	Drawn by	SGT	Figure #	2
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**Appendix B: 2013 Synchro Output**

Timings  
3: Dillon Road & 120th St

Dillon Road Phase 1  
8/17/2015

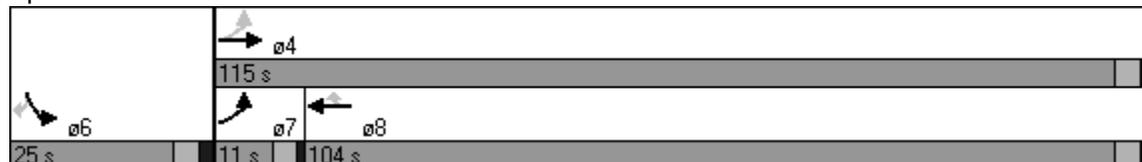


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↶	↶	↷	↶	↷
Volume (vph)	58	232	1255	224	79	97
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Detector Phase	7	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0	15.0	5.0	5.0
Minimum Split (s)	10.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	11.0	115.0	104.0	104.0	25.0	25.0
Total Split (%)	7.9%	82.1%	74.3%	74.3%	17.9%	17.9%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	118.5	117.5	108.4	108.4	12.5	12.5
Actuated g/C Ratio	0.85	0.84	0.77	0.77	0.09	0.09
v/c Ratio	0.47	0.17	1.00	0.20	0.57	0.46
Control Delay	27.0	2.6	26.8	1.4	75.3	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	2.6	26.8	1.4	75.3	16.6
LOS	C	A	C	A	E	B
Approach Delay		7.5	23.0		43.0	
Approach LOS		A	C		D	

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 130 (93%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.00  
 Intersection Signal Delay: 22.5  
 Intersection LOS: C  
 Intersection Capacity Utilization 84.4%  
 ICU Level of Service E  
 Analysis Period (min) 15

Splits and Phases: 3: Dillon Road & 120th St



Timings  
5: Dillon Rd & Aspen St

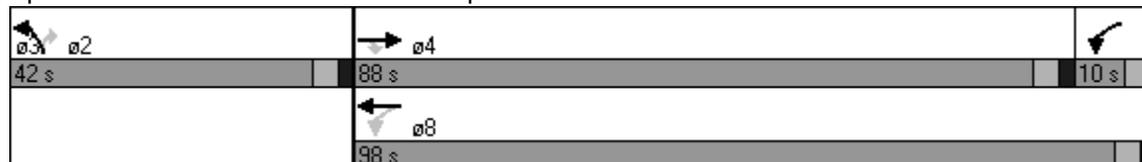
Dillon Road Phase 1  
8/17/2015

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Volume (vph)	267	43	28	1231	248	22
Turn Type	Perm pm+pt			Perm		
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	5.0	15.0	5.0	5.0
Minimum Split (s)	21.0	21.0	10.0	21.0	21.0	21.0
Total Split (s)	88.0	88.0	10.0	98.0	42.0	42.0
Total Split (%)	62.9%	62.9%	7.1%	70.0%	30.0%	30.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	96.2	96.2	103.2	102.2	27.8	27.8
Actuated g/C Ratio	0.69	0.69	0.74	0.73	0.20	0.20
v/c Ratio	0.24	0.04	0.04	1.04	0.81	0.08
Control Delay	7.5	1.2	4.7	49.9	71.9	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	1.2	4.7	49.9	71.9	14.6
LOS	A	A	A	D	E	B
Approach Delay	6.6			48.9	67.3	
Approach LOS	A			D	E	

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 97 (69%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.04  
 Intersection Signal Delay: 44.5  
 Intersection Capacity Utilization 91.2%  
 Analysis Period (min) 15  
 Intersection LOS: D  
 ICU Level of Service F

Splits and Phases: 5: Dillon Rd & Aspen St



Timings  
7: Dillon Rd & Sheridan Blvd

Dillon Road Phase 1  
8/17/2015

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	26	195	100	793	59	184	121	58	37	264	237
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	15.0	5.0	15.0	15.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	20.0	24.0	10.0	44.0	44.0	10.0	41.0	41.0	10.0	24.0	24.0
Total Split (s)	12.0	80.0	12.0	80.0	80.0	15.0	33.0	33.0	15.0	33.0	33.0
Total Split (%)	8.6%	57.1%	8.6%	57.1%	57.1%	10.7%	23.6%	23.6%	10.7%	23.6%	23.6%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes										
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	90.6	82.3	96.3	88.5	88.5	33.7	22.9	22.9	28.1	18.1	18.1
Actuated g/C Ratio	0.65	0.59	0.69	0.63	0.63	0.24	0.16	0.16	0.20	0.13	0.13
v/c Ratio	0.11	0.15	0.15	0.77	0.07	0.87	0.24	0.21	0.15	0.66	0.67
Control Delay	11.3	17.3	8.1	26.4	5.4	79.6	53.0	13.3	40.6	65.5	20.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	17.3	8.1	26.4	5.4	79.6	53.0	13.3	40.6	65.5	20.6
LOS	B	B	A	C	A	E	D	B	D	E	C
Approach Delay		16.7		23.2			60.1			44.0	
Approach LOS		B		C			E			D	

Intersection Summary

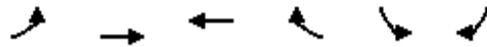
Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 42 (30%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.87  
 Intersection Signal Delay: 33.8  
 Intersection LOS: C  
 Intersection Capacity Utilization 88.1%  
 ICU Level of Service E  
 Analysis Period (min) 15

Splits and Phases: 7: Dillon Rd & Sheridan Blvd

ø1	ø2	ø3	ø4
15 s	33 s	12 s	80 s
ø5	ø6	ø7	ø8
15 s	33 s	12 s	80 s

Timings  
3: Dillon Road & 120th St

Dillon Road Phase 1  
8/17/2015

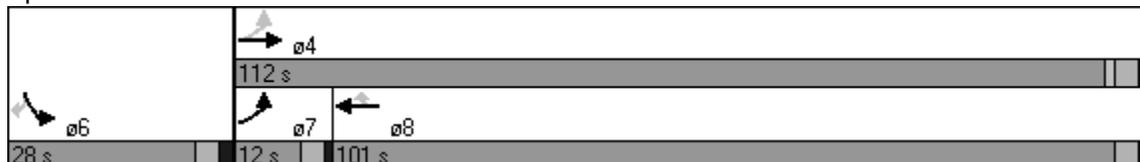


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↑	↗	↖	↗
Volume (vph)	48	1287	394	123	287	49
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Detector Phase	7	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0	15.0	5.0	5.0
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	112.0	101.0	101.0	28.0	28.0
Total Split (%)	8.5%	79.4%	71.6%	71.6%	19.9%	19.9%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	109.0	108.0	99.4	99.4	23.0	23.0
Actuated g/C Ratio	0.77	0.77	0.70	0.70	0.16	0.16
v/c Ratio	0.08	1.03	0.34	0.12	1.14	0.20
Control Delay	4.0	51.6	9.4	1.4	150.0	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	51.6	9.4	1.4	150.0	30.9
LOS	A	D	A	A	F	C
Approach Delay		49.9	7.5		132.7	
Approach LOS		D	A		F	

Intersection Summary

Cycle Length: 141  
 Actuated Cycle Length: 141  
 Offset: 129 (91%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.14  
 Intersection Signal Delay: 52.6  
 Intersection LOS: D  
 Intersection Capacity Utilization 96.6%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 3: Dillon Road & 120th St



Timings  
5: Dillon Rd & Aspen St

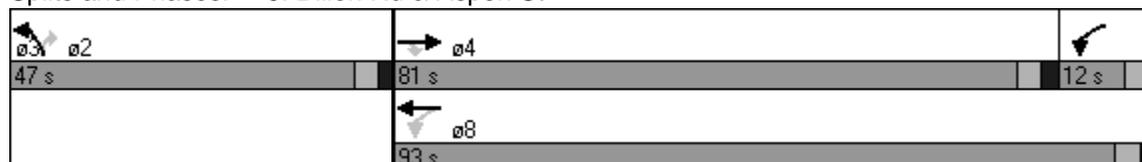
Dillon Road Phase 1  
8/17/2015

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Volume (vph)	1367	207	39	450	67	31
Turn Type		Perm pm+pt				Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	5.0	15.0	5.0	5.0
Minimum Split (s)	21.0	21.0	12.0	21.0	21.0	21.0
Total Split (s)	81.0	81.0	12.0	93.0	47.0	47.0
Total Split (%)	57.9%	57.9%	8.6%	66.4%	33.6%	33.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	112.3	112.3	122.7	121.9	11.5	11.5
Actuated g/C Ratio	0.80	0.80	0.88	0.87	0.08	0.08
v/c Ratio	1.05	0.18	0.30	0.32	0.53	0.22
Control Delay	56.8	3.4	16.8	2.2	74.7	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	3.4	16.8	2.2	74.7	20.8
LOS	E	A	B	A	E	C
Approach Delay	49.7			3.4	57.6	
Approach LOS	D			A	E	

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 35 (25%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.05  
 Intersection Signal Delay: 39.6  
 Intersection LOS: D  
 Intersection Capacity Utilization 88.4%  
 ICU Level of Service E  
 Analysis Period (min) 15

Splits and Phases: 5: Dillon Rd & Aspen St



Timings  
7: Dillon Rd & Sheridan Blvd

Dillon Road Phase 1  
8/17/2015

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations												
Volume (vph)	141	983	130	328	52	122	275	154	39	248	69	
Turn Type	pm+pt		pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	
Protected Phases	7	4	3	8		5	2		1	6		
Permitted Phases	4		8		8	2		2	6		6	
Detector Phase	7	4	3	8	8	5	2	2	1	6	6	
Switch Phase												
Minimum Initial (s)	5.0	15.0	5.0	15.0	15.0	5.0	15.0	15.0	5.0	15.0	15.0	
Minimum Split (s)	20.0	23.0	10.0	44.0	44.0	10.0	41.0	41.0	10.0	23.0	23.0	
Total Split (s)	12.0	81.0	12.0	81.0	81.0	15.0	32.0	32.0	15.0	32.0	32.0	
Total Split (%)	8.6%	57.9%	8.6%	57.9%	57.9%	10.7%	22.9%	22.9%	10.7%	22.9%	22.9%	
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lead	
Lead-Lag Optimize?	Yes											
Recall Mode	None	C-Max	None	C-Max	C-Max	None	None	None	None	None	None	
Act Effct Green (s)	97.1	85.7	98.3	86.2	86.2	28.2	20.2	20.2	25.2	17.2	17.2	
Actuated g/C Ratio	0.69	0.61	0.70	0.62	0.62	0.20	0.14	0.14	0.18	0.12	0.12	
v/c Ratio	0.23	0.67	0.52	0.33	0.06	0.65	0.62	0.47	0.25	0.66	0.30	
Control Delay	7.1	14.6	13.5	14.9	3.4	66.7	62.5	11.7	49.1	66.3	14.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.1	14.6	13.5	14.9	3.4	66.7	62.5	11.7	49.1	66.3	14.2	
LOS	A	B	B	B	A	E	E	B	D	E	B	
Approach Delay		13.8		13.4			49.2			54.4		
Approach LOS		B		B			D			D		

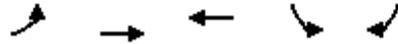
Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 54 (39%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow  
 Natural Cycle: 115  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.67  
 Intersection Signal Delay: 25.9  
 Intersection LOS: C  
 Intersection Capacity Utilization 80.8%  
 ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 7: Dillon Rd & Sheridan Blvd

ø2	ø1	ø3	ø4
32 s	15 s	12 s	81 s
ø6	ø5	ø7	ø8
32 s	15 s	12 s	81 s

Timings  
3: Dillon Road & 120th St

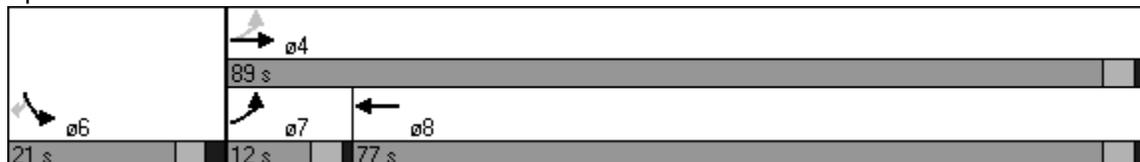


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑	↕	↘	↗
Volume (vph)	58	232	1255	79	97
Turn Type	pm+pt				Perm
Protected Phases	7	4	8	6	
Permitted Phases	4				6
Detector Phase	7	4	8	6	6
Switch Phase					
Minimum Initial (s)	5.0	15.0	15.0	5.0	5.0
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	89.0	77.0	21.0	21.0
Total Split (%)	10.9%	80.9%	70.0%	19.1%	19.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	90.0	89.0	80.4	11.0	11.0
Actuated g/C Ratio	0.82	0.81	0.73	0.10	0.10
v/c Ratio	0.38	0.18	0.99	0.51	0.43
Control Delay	14.5	2.9	27.0	57.1	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	2.9	27.0	57.1	14.2
LOS	B	A	C	E	B
Approach Delay		5.2	27.0	33.5	
Approach LOS		A	C	C	

Intersection Summary

Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 74 (67%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow  
 Natural Cycle: 130  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.99  
 Intersection Signal Delay: 24.3  
 Intersection Capacity Utilization 63.8%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service B

Splits and Phases: 3: Dillon Road & 120th St



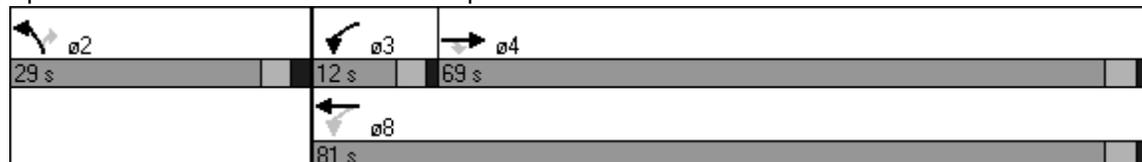
Timings  
5: Dillon Rd & Aspen St

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑↑	↘	↗
Volume (vph)	267	43	28	1231	248	22
Turn Type	Perm pm+pt			Perm		
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	5.0	15.0	5.0	5.0
Minimum Split (s)	21.0	21.0	12.0	21.0	21.0	21.0
Total Split (s)	69.0	69.0	12.0	81.0	29.0	29.0
Total Split (%)	62.7%	62.7%	10.9%	73.6%	26.4%	26.4%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	72.4	72.4	79.7	78.7	21.3	21.3
Actuated g/C Ratio	0.66	0.66	0.72	0.72	0.19	0.19
v/c Ratio	0.25	0.05	0.04	0.83	0.83	0.08
Control Delay	7.0	1.3	4.0	10.7	63.8	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	1.3	4.0	10.7	63.8	13.7
LOS	A	A	A	B	E	B
Approach Delay	6.2			10.6	59.7	
Approach LOS	A			B	E	

Intersection Summary

Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 49 (45%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 17.1  
 Intersection Capacity Utilization 58.8%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service B

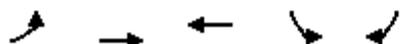
Splits and Phases: 5: Dillon Rd & Aspen St





Timings  
3: Dillon Road & 120th St

Dillon Road Phase 1  
8/17/2015

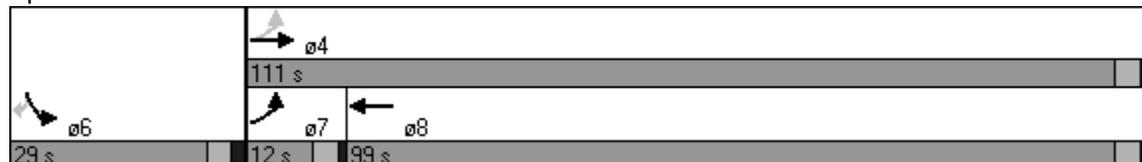


Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↖	↑	↕	↘	↗
Volume (vph)	48	1287	394	287	49
Turn Type	pm+pt				Perm
Protected Phases	7	4	8	6	
Permitted Phases	4				6
Detector Phase	7	4	8	6	6
Switch Phase					
Minimum Initial (s)	5.0	15.0	15.0	5.0	5.0
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	111.0	99.0	29.0	29.0
Total Split (%)	8.6%	79.3%	70.7%	20.7%	20.7%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Max	C-Max	None	None
Act Effct Green (s)	107.0	106.0	97.4	24.0	24.0
Actuated g/C Ratio	0.76	0.76	0.70	0.17	0.17
v/c Ratio	0.12	1.05	0.39	1.09	0.19
Control Delay	4.6	56.3	5.8	131.4	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.6	56.3	5.8	131.4	29.9
LOS	A	E	A	F	C
Approach Delay		54.4	5.8	116.7	
Approach LOS		D	A	F	

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 46 (33%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.09  
 Intersection Signal Delay: 52.5  
 Intersection LOS: D  
 Intersection Capacity Utilization 96.6%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 3: Dillon Road & 120th St



Timings  
5: Dillon Rd & Aspen St

Dillon Road Phase 1  
8/17/2015

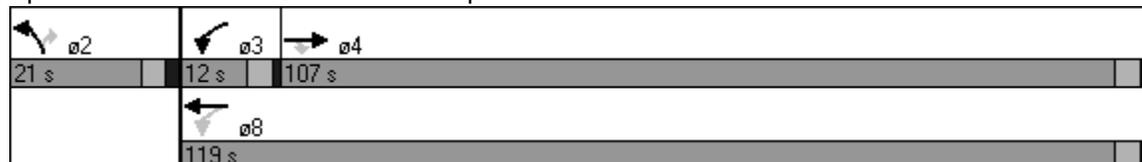
	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑↑	↘	↗
Volume (vph)	1367	207	39	450	67	31
Turn Type	Perm pm+pt			Perm		
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	15.0	15.0	5.0	15.0	5.0	5.0
Minimum Split (s)	21.0	21.0	12.0	21.0	21.0	21.0
Total Split (s)	107.0	107.0	12.0	119.0	21.0	21.0
Total Split (%)	76.4%	76.4%	8.6%	85.0%	15.0%	15.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	113.6	113.6	122.0	122.0	11.4	11.4
Actuated g/C Ratio	0.81	0.81	0.87	0.87	0.08	0.08
v/c Ratio	1.04	0.18	0.33	0.27	0.54	0.22
Control Delay	34.8	1.4	12.4	3.6	75.1	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	1.4	12.4	3.6	75.1	21.0
LOS	C	A	B	A	E	C
Approach Delay	30.4			4.3	57.9	
Approach LOS	C			A	E	

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 92 (66%), Referenced to phase 4:EBT and 8:WBTL, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.04  
 Intersection Signal Delay: 25.7  
 Intersection Capacity Utilization 88.4%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service E

Splits and Phases: 5: Dillon Rd & Aspen St







Timings  
5: Dillon Rd & Aspen St

Dillon Road Phase 1  
8/17/2015

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Volume (vph)	267	43	28	1231	248	22
Turn Type		Perm D.P+P			pt+ov	
Protected Phases	2		1		4	1 4
Permitted Phases		2	2	Free		
Detector Phase	2	2	1		4	1 4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	21.0	21.0	12.0		21.0	
Total Split (s)	31.0	31.0	12.0	0.0	27.0	39.0
Total Split (%)	44.3%	44.3%	17.1%	0.0%	38.6%	55.7%
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None		None	
Act Effct Green (s)	36.8	36.8	40.7	70.0	16.3	27.4
Actuated g/C Ratio	0.53	0.53	0.58	1.00	0.23	0.39
v/c Ratio	0.31	0.06	0.05	0.76	0.69	0.04
Control Delay	9.3	1.6	7.0	7.2	33.4	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	1.6	7.0	7.2	33.4	4.6
LOS	A	A	A	A	C	A
Approach Delay	8.2			7.2	31.1	
Approach LOS	A			A	C	

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 27 (39%), Referenced to phase 2:EBWB, Start of Yellow  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.76  
 Intersection Signal Delay: 10.9  
 Intersection Capacity Utilization 90.4%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service E

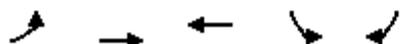
Splits and Phases: 5: Dillon Rd & Aspen St





Timings  
3: Dillon Road & 120th St

Dillon Road Phase 1  
8/17/2015



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Volume (vph)	48	1287	394	287	49
Turn Type	D.P+P			pt+ov	
Protected Phases	1		2	4	4 1
Permitted Phases	2	Free			
Detector Phase	1		2	4	4 1
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	
Minimum Split (s)	12.0		21.0	21.0	
Total Split (s)	12.0	0.0	33.0	25.0	37.0
Total Split (%)	17.1%	0.0%	47.1%	35.7%	52.9%
Yellow Time (s)	3.0		3.0	3.0	
All-Red Time (s)	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None		C-Max	None	
Act Effct Green (s)	39.0	70.0	33.8	17.0	28.3
Actuated g/C Ratio	0.56	1.00	0.48	0.24	0.40
v/c Ratio	0.15	0.79	0.56	0.77	0.08
Control Delay	7.5	3.7	15.3	37.4	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	3.7	15.3	37.4	3.9
LOS	A	A	B	D	A
Approach Delay		3.9	15.3	32.5	
Approach LOS		A	B	C	

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 22 (31%), Referenced to phase 2:EBWB, Start of Yellow  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.79  
 Intersection Signal Delay: 11.0  
 Intersection LOS: B  
 Intersection Capacity Utilization 95.8%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 3: Dillon Road & 120th St



Timings  
5: Dillon Rd & Aspen St

Dillon Road Phase 1  
8/17/2015

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Volume (vph)	1367	207	39	450	67	31
Turn Type		Perm D.P+P			pt+ov	
Protected Phases	2		1		4	4 1
Permitted Phases		2	2	Free		
Detector Phase	2	2	1		4	4 1
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	21.0	21.0	12.0		21.0	
Total Split (s)	107.0	107.0	12.0	0.0	21.0	33.0
Total Split (%)	76.4%	76.4%	8.6%	0.0%	15.0%	23.6%
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None		None	
Act Effct Green (s)	113.0	113.0	117.0	140.0	11.4	20.4
Actuated g/C Ratio	0.81	0.81	0.84	1.00	0.08	0.15
v/c Ratio	1.04	0.18	0.34	0.28	0.54	0.14
Control Delay	48.0	1.0	13.9	0.4	75.1	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.0	1.0	13.9	0.4	75.1	15.6
LOS	D	A	B	A	E	B
Approach Delay	41.8			1.5	56.2	
Approach LOS	D			A	E	

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 96 (69%), Referenced to phase 2:EBWB, Start of Yellow  
 Natural Cycle: 150  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.04  
 Intersection Signal Delay: 33.4  
 Intersection Capacity Utilization 88.2%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service E

Splits and Phases: 5: Dillon Rd & Aspen St

↖ ø1	→ ø2	↘ ø4
12 s	107 s	21 s







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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Aspen St	II	40	47.6	7.5	55.1	0.51	33.4	B
Sheridan Blvd	II	40	47.7	17.3	65.0	0.53	29.4	B
Total	II		95.3	24.8	120.1	1.04	31.2	B

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	26.4	51.9	0.22	15.4	E
Aspen St	II	40	47.7	49.9	97.6	0.53	19.6	D
120th St	II	40	47.6	26.8	74.4	0.51	24.7	C
Total	II		120.8	103.1	223.9	1.26	20.3	D

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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Aspen St	II	40	47.6	56.8	104.4	0.51	17.6	D
Sheridan Blvd	II	40	47.7	14.6	62.3	0.53	30.6	B
Total	II		95.3	71.4	166.7	1.04	22.5	C

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	14.9	40.4	0.22	19.7	D
Aspen St	II	40	47.7	2.2	49.9	0.53	38.3	A
120th St	II	40	47.6	9.4	57.0	0.51	32.3	B
Total	II		120.8	26.5	147.3	1.26	30.9	B

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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Aspen St	II	40	47.6	7.0	54.6	0.51	33.7	B
Sheridan Blvd	II	40	47.8	9.4	57.2	0.53	33.4	B
Total	II		95.4	16.4	111.8	1.04	33.5	B

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	25.3	50.8	0.22	15.7	E
Aspen St	II	40	47.8	10.7	58.5	0.53	32.6	B
120th St	II	40	47.6	27.0	74.6	0.51	24.7	C
Total	II		120.9	63.0	183.9	1.26	24.7	C

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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Aspen St	II	40	47.6	34.8	82.4	0.51	22.3	C
Sheridan Blvd	II	40	47.8	8.7	56.5	0.53	33.8	B
Total	II		95.4	43.5	138.9	1.04	27.0	C

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	13.9	39.4	0.22	20.2	D
Aspen St	II	40	47.8	3.6	51.4	0.53	37.1	A
120th St	II	40	47.6	5.8	53.4	0.51	34.5	B
Total	II		120.9	23.3	144.2	1.26	31.5	B

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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Aspen St	II	40	47.6	9.3	56.9	0.51	32.4	B
Sheridan Blvd	II	40	47.8	7.0	54.8	0.53	34.8	B
Total	II		95.4	16.3	111.7	1.04	33.6	B

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	24.8	50.3	0.22	15.9	E
Aspen St	II	40	47.8	7.2	55.0	0.53	34.7	B
120th St	II	40	47.6	21.3	68.9	0.51	26.7	C
Total	II		120.9	53.3	174.2	1.26	26.1	C

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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Aspen St	II	40	47.6	48.0	95.6	0.51	19.3	D
Sheridan Blvd	II	40	47.8	8.4	56.2	0.53	34.0	B
Total	II		95.4	56.4	151.8	1.04	24.7	C

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	13.9	39.4	0.22	20.2	D
Aspen St	II	40	47.8	0.4	48.2	0.53	39.6	A
120th St	II	40	47.6	15.3	62.9	0.51	29.3	B
Total	II		120.9	29.6	150.5	1.26	30.2	B

**Appendix C: 2013 Rodel Output**

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Dillon Road - Phase 1	2013 Synthetic Flow Profile (veh)
120th Street Roundabout	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	95% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	WB Dillon-East Leg	90	0	24.00	2	28.00	2	33.00	66.00	30.00
2	SB 120th-North Leg	180	0	12.00	1	15.00	1	33.00	66.00	30.00
3	EB Dillon-West Leg	270	0	12.00	1	15.00	1	33.00	66.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	WB Dillon-East Leg	180.00	16.00	1	13.00	1	12.00	1
2	SB 120th-North Leg	180.00	34.00	2	13.00	1	12.00	1
3	EB Dillon-West Leg	180.00	16.00	1	26.00	2	24.00	2

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	WB Dillon-East Leg	0	1.000	0	1.000	12.00	3584	0	12.00	1792	0
2	SB 120th-North Leg	0	1.000	0	1.000	12.00	1792	0	12.00	1792	0
3	EB Dillon-West Leg	0	1.000	0	1.000	12.00	1792	0	24.00	3584	0

## Traffic Flow Data (veh/hr)

### 2013 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers	
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	WB Dillon-East Leg	0	1036	301	0	3.0	1.00
2	SB 120th-North Leg	0	79	97	0	2.0	1.00
3	EB Dillon-West Leg	0	58	0	0	3.0	1.00

### 2013 AM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	WB Dillon-East Leg	0.750	1.125	0.750	0	30	60
2	SB 120th-North Leg	0.750	1.125	0.750	0	30	60
3	EB Dillon-West Leg	0.750	1.125	0.750	0	30	60

## Operational Results

### 2013 AM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	WB Dillon-East Leg	None	1337		58		79	1885		0.7318
2	SB 120th-North Leg	None	176		1036		359	474		0.3965
3	EB Dillon-West Leg	None	58		79		1133	786		0.0756

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	WB Dillon-East Leg	None	8.16		8.16	10.25		A		A
2	SB 120th-North Leg	None	12.18		12.18	2.10		B		B
3	EB Dillon-West Leg	None	4.76		4.76	0.23		A		A

## 2013 AM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	WB Dillon-East Leg	None	1508		65		89	1878			0.8190
2	SB 120th-North Leg	None	198		1167		404	427			0.4781
3	EB Dillon-West Leg	None	65		89		1276	781			0.0846

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	WB Dillon-East Leg	None	9.68		9.68	10.25		A		A
2	SB 120th-North Leg	None	13.96		13.96	2.10		B		B
3	EB Dillon-West Leg	None	4.76		4.76	0.23		A		A

## Approach Flow Profile

### 2013 AM Peak - Approach Flows (Veh / Hour)

Time Slice	WB Dillon-East Leg	SB 120th-North Leg	EB Dillon-West Leg
0.0 - 7.5	139.04	18.30	6.03
7.5 - 15.0	161.87	21.31	7.02
15.0 - 22.5	179.14	23.58	7.77
22.5 - 30.0	188.45	24.81	8.18
30.0 - 37.5	188.45	24.81	8.18
37.5 - 45.0	179.14	23.58	7.77
45.0 - 52.5	161.87	21.31	7.02
52.5 - 60.0	139.04	18.30	6.03
Peak 15 min	188.45	24.81	8.18
Peak 60 min	167.13	22.00	7.25

## Exit Flow Profile

### 2013 AM Peak - Exit Flows (Veh / Hour)

Time Slice	WB Dillon-East Leg	SB 120th-North Leg	EB Dillon-West Leg
0.0 - 7.5	8.20	37.30	117.69
7.5 - 15.0	9.53	43.37	136.82
15.0 - 22.5	10.55	47.99	151.39
22.5 - 30.0	11.11	50.51	159.36
30.0 - 37.5	11.13	50.59	159.64
37.5 - 45.0	10.60	48.16	152.02
45.0 - 52.5	9.61	43.60	137.68
52.5 - 60.0	8.25	37.44	118.23
0-60	79	359	1133
%Trucks	2.00	3.00	2.91

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Dillon Road-Phase 1	2013 Synthetic Flow Profile (veh)
Aspen Street Roundabout	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	95% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	NB Aspen-South Leg	0	0	12.00	1	15.00	1	33.00	66.00	30.00
2	WB Dillon-East Leg	90	0	12.00	1	15.00	1	33.00	66.00	30.00
3	EB Dillon-West Leg	270	0	24.00	2	26.00	2	33.00	66.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Aspen-South Leg	180.00	33.00	2	13.00	1	12.00	1
2	WB Dillon-East Leg	180.00	16.00	1	26.00	2	24.00	2
3	EB Dillon-West Leg	180.00	16.00	1	13.00	1	12.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Aspen-South Leg	0	1.000	0	1.000	12.00	1792	0	12.00	1792	0
2	WB Dillon-East Leg	0	1.000	0	1.000	12.00	1792	0	24.00	3584	0
3	EB Dillon-West Leg	0	1.000	0	1.000	12.00	3584	0	12.00	1792	0

## Traffic Flow Data (veh/hr)

### 2013 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers	
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	NB Aspen-South Leg	0	248	22	0	2.0	1.00
2	WB Dillon-East Leg	0	27	0	0	3.0	1.00
3	EB Dillon-West Leg	0	267	43	0	3.0	1.00

### 2013 AM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	NB Aspen-South Leg	0.750	1.125	0.750	0	30	60
2	WB Dillon-East Leg	0.750	1.125	0.750	0	30	60
3	EB Dillon-West Leg	0.750	1.125	0.750	0	30	60

## Operational Results

### 2013 AM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	NB Aspen-South Leg	None	270		267		70	745		0.3742
2	WB Dillon-East Leg	None	27		248		289	705		0.0394
3	EB Dillon-West Leg	None	310		27		248	1899		0.1663

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Aspen-South Leg	None	7.37		7.37	1.76		A		A
2	WB Dillon-East Leg	None	5.12		5.12	0.12		A		A
3	EB Dillon-West Leg	None	2.53		2.53	0.66		A		A

## 2013 AM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	NB Aspen-South Leg	None	304		301		79	733		0.4223
2	WB Dillon-East Leg	None	30		280		326	690		0.0446
3	EB Dillon-West Leg	None	350		30		280	1896		0.1854

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Aspen-South Leg	None	7.77		7.77	1.76		A		A
2	WB Dillon-East Leg	None	5.16		5.16	0.12		A		A
3	EB Dillon-West Leg	None	2.55		2.55	0.66		A		A

## Approach Flow Profile

### 2013 AM Peak - Approach Flows (Veh / Hour)

Time Slice	NB Aspen-South Leg	WB Dillon-East Leg	EB Dillon-West Leg
0.0 - 7.5	28.08	2.81	32.24
7.5 - 15.0	32.69	3.27	37.53
15.0 - 22.5	36.18	3.62	41.54
22.5 - 30.0	38.06	3.81	43.70
30.0 - 37.5	38.06	3.81	43.70
37.5 - 45.0	36.18	3.62	41.54
45.0 - 52.5	32.69	3.27	37.53
52.5 - 60.0	28.08	2.81	32.24
Peak 15 min	38.06	3.81	43.70
Peak 60 min	33.75	3.38	38.75

## Exit Flow Profile

### 2013 AM Peak - Exit Flows (Veh / Hour)

Time Slice	NB Aspen-South Leg	WB Dillon-East Leg	EB Dillon-West Leg
0.0 - 7.5	7.28	30.04	25.77
7.5 - 15.0	8.47	34.97	29.97
15.0 - 22.5	9.37	38.71	33.18
22.5 - 30.0	9.86	40.73	34.93
30.0 - 37.5	9.87	40.73	34.95
37.5 - 45.0	9.38	38.73	33.25
45.0 - 52.5	8.48	35.01	30.07
52.5 - 60.0	7.28	30.07	25.84
0-60	70	289	248
%Trucks	3.00	2.92	2.00

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Dillon Road - Phase 1	2013 Synthetic Flow Profile (veh)
120th Street Roundabout	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	95% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	WB Dillon-East Leg	90	0	24.00	2	28.00	2	33.00	66.00	30.00
2	SB 120th-North Leg	180	0	12.00	1	15.00	1	33.00	66.00	30.00
3	EB Dillon-West Leg	270	0	12.00	1	15.00	1	33.00	66.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	WB Dillon-East Leg	180.00	16.00	1	13.00	1	12.00	1
2	SB 120th-North Leg	180.00	34.00	2	13.00	1	12.00	1
3	EB Dillon-West Leg	180.00	16.00	1	26.00	2	24.00	2

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	WB Dillon-East Leg	0	1.000	0	1.000	12.00	3584	0	12.00	1792	0
2	SB 120th-North Leg	0	1.000	0	1.000	12.00	1792	0	12.00	1792	0
3	EB Dillon-West Leg	0	1.000	0	1.000	12.00	1792	0	24.00	3584	0

## Traffic Flow Data (veh/hr)

### 2013 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers	
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	WB Dillon-East Leg	0	394	123	0	3.0	1.00
2	SB 120th-North Leg	0	287	49	0	2.0	1.00
3	EB Dillon-West Leg	0	48	0	0	3.0	1.00

### 2013 PM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	WB Dillon-East Leg	0.750	1.125	0.750	0	30	60
2	SB 120th-North Leg	0.750	1.125	0.750	0	30	60
3	EB Dillon-West Leg	0.750	1.125	0.750	0	30	60

## Operational Results

### 2013 PM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	WB Dillon-East Leg	None	517		48		287	1895		0.2785
2	SB 120th-North Leg	None	336		394		171	700		0.4990
3	EB Dillon-West Leg	None	48		287		443	687		0.0720

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	WB Dillon-East Leg	None	3.28		3.28	1.45		A		A
2	SB 120th-North Leg	None	9.66		9.66	2.98		A		A
3	EB Dillon-West Leg	None	5.44		5.44	0.22		A		A

## 2013 PM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	WB Dillon-East Leg	None	583		54		323	1889		0.3109
2	SB 120th-North Leg	None	379		444		193	683		0.5677
3	EB Dillon-West Leg	None	54		323		499	669		0.0818

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	WB Dillon-East Leg	None	3.37		3.37	1.45		A		A
2	SB 120th-North Leg	None	10.60		10.60	2.98		B		B
3	EB Dillon-West Leg	None	5.52		5.52	0.22		A		A

## Approach Flow Profile

### 2013 PM Peak - Approach Flows (Veh / Hour)

Time Slice	WB Dillon-East Leg	SB 120th-North Leg	EB Dillon-West Leg
0.0 - 7.5	53.76	34.94	4.99
7.5 - 15.0	62.59	40.68	5.81
15.0 - 22.5	69.27	45.02	6.43
22.5 - 30.0	72.87	47.36	6.77
30.0 - 37.5	72.87	47.36	6.77
37.5 - 45.0	69.27	45.02	6.43
45.0 - 52.5	62.59	40.68	5.81
52.5 - 60.0	53.76	34.94	4.99
Peak 15 min	72.87	47.36	6.77
Peak 60 min	64.63	42.00	6.00

## Exit Flow Profile

### 2013 PM Peak - Exit Flows (Veh / Hour)

Time Slice	WB Dillon-East Leg	SB 120th-North Leg	EB Dillon-West Leg
0.0 - 7.5	29.81	17.77	46.05
7.5 - 15.0	34.66	20.69	53.59
15.0 - 22.5	38.37	22.90	59.31
22.5 - 30.0	40.39	24.10	62.42
30.0 - 37.5	40.44	24.10	62.44
37.5 - 45.0	38.49	22.92	59.37
45.0 - 52.5	34.84	20.72	53.68
52.5 - 60.0	29.94	17.80	46.12
0-60	287	171	443
%Trucks	2.00	3.00	2.89

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Dillon Road-Phase 1	2013 Synthetic Flow Profile (veh)
Aspen Street Roundabout	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	95% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	No
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	NB Aspen-South Leg	0	0	12.00	1	15.00	1	33.00	66.00	30.00
2	WB Dillon-East Leg	90	0	12.00	1	15.00	1	33.00	66.00	30.00
3	EB Dillon-West Leg	270	0	24.00	2	26.00	2	33.00	66.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Aspen-South Leg	180.00	33.00	2	13.00	1	12.00	1
2	WB Dillon-East Leg	180.00	16.00	1	26.00	2	24.00	2
3	EB Dillon-West Leg	180.00	16.00	1	13.00	1	12.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Aspen-South Leg	0	1.000	0	1.000	12.00	1792	0	12.00	1792	0
2	WB Dillon-East Leg	0	1.000	0	1.000	12.00	1792	0	24.00	3584	0
3	EB Dillon-West Leg	0	1.000	0	1.000	12.00	3584	0	12.00	1792	0

## Traffic Flow Data (veh/hr)

### 2013 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers	
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	NB Aspen-South Leg	0	57	31	0	2.0	1.00
2	WB Dillon-East Leg	0	39	0	0	3.0	1.00
3	EB Dillon-West Leg	0	1219	199	0	3.0	1.00

### 2013 PM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	NB Aspen-South Leg	0.750	1.125	0.750	0	30	60
2	WB Dillon-East Leg	0.750	1.125	0.750	0	30	60
3	EB Dillon-West Leg	0.750	1.125	0.750	0	30	60

## Operational Results

### 2013 PM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	NB Aspen-South Leg	None	88		1219		238	409		0.2320
2	WB Dillon-East Leg	None	39		57		1250	796		0.0502
3	EB Dillon-West Leg	None	1418		39		57	1888		0.7758

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Aspen-South Leg	None	11.30		11.30	0.97		B		B
2	WB Dillon-East Leg	None	4.58		4.58	0.15		A		A
3	EB Dillon-West Leg	None	8.67		8.67	11.89		A		A

## 2013 PM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)				Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass
1	NB Aspen-South Leg	None	99		1372		268	355		0.2873
2	WB Dillon-East Leg	None	44		64		1407	793		0.0560
3	EB Dillon-West Leg	None	1599		44		64	1883		0.8678

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Aspen-South Leg	None	12.81		12.81	0.97		B		B
2	WB Dillon-East Leg	None	4.56		4.56	0.15		A		A
3	EB Dillon-West Leg	None	10.59		10.59	11.89		B		B

## Approach Flow Profile

### 2013 PM Peak - Approach Flows (Veh / Hour)

Time Slice	NB Aspen-South Leg	WB Dillon-East Leg	EB Dillon-West Leg
0.0 - 7.5	9.15	4.06	147.46
7.5 - 15.0	10.65	4.72	171.68
15.0 - 22.5	11.79	5.23	189.99
22.5 - 30.0	12.40	5.50	199.87
30.0 - 37.5	12.40	5.50	199.87
37.5 - 45.0	11.79	5.23	189.99
45.0 - 52.5	10.65	4.72	171.68
52.5 - 60.0	9.15	4.06	147.46
Peak 15 min	12.40	5.50	199.87
Peak 60 min	11.00	4.88	177.25

## Exit Flow Profile

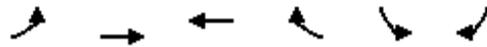
### 2013 PM Peak - Exit Flows (Veh / Hour)

Time Slice	NB Aspen-South Leg	WB Dillon-East Leg	EB Dillon-West Leg
0.0 - 7.5	24.73	129.84	5.92
7.5 - 15.0	28.75	150.93	6.88
15.0 - 22.5	31.80	166.95	7.61
22.5 - 30.0	33.47	175.73	8.02
30.0 - 37.5	33.53	176.10	8.03
37.5 - 45.0	31.94	167.77	7.65
45.0 - 52.5	28.93	152.02	6.93
52.5 - 60.0	24.83	130.48	5.95
0-60	238	1250	57
%Trucks	3.00	2.98	2.00

**Appendix D: 2035 Synchro Output**

Timings  
3: Dillon Road & 120th St

Dillon Road Phase 1  
8/17/2015

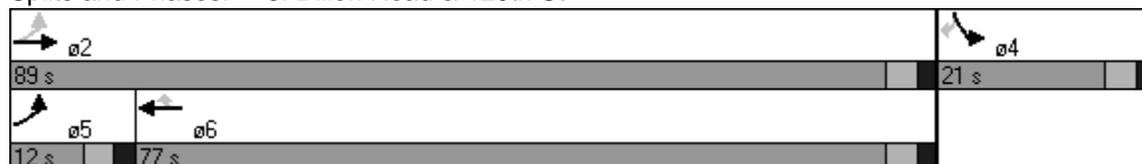


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Volume (vph)	90	565	1700	400	195	145
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	89.0	77.0	77.0	21.0	21.0
Total Split (%)	10.9%	80.9%	70.0%	70.0%	19.1%	19.1%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	87.6	87.6	75.5	75.5	12.4	12.4
Actuated g/C Ratio	0.80	0.80	0.69	0.69	0.11	0.11
v/c Ratio	0.53	0.23	0.80	0.37	0.58	0.58
Control Delay	21.6	3.2	6.7	0.5	52.3	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	3.2	6.7	0.5	52.3	22.7
LOS	C	A	A	A	D	C
Approach Delay		5.7	5.5		39.7	
Approach LOS		A	A		D	

Intersection Summary

Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 25 (23%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 9.3  
 Intersection Capacity Utilization 73.2%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service D

Splits and Phases: 3: Dillon Road & 120th St





Timings  
7: Dillon Rd & Sheridan Blvd

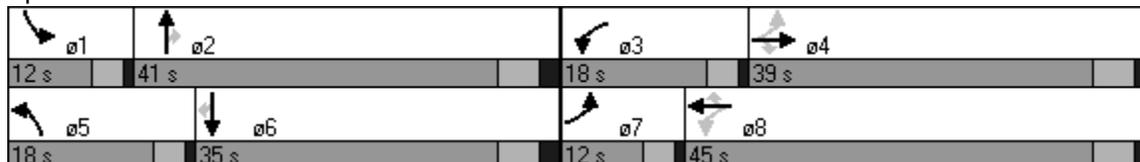
Dillon Road Phase 1  
8/17/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	480	120	210	1160	115	300	230	145	95	535	390
Turn Type	pm+pt		Perm	pm+pt		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	12.0	23.0	23.0	12.0	44.0	44.0	12.0	41.0	41.0	12.0	23.0	23.0
Total Split (s)	12.0	39.0	39.0	18.0	45.0	45.0	18.0	41.0	41.0	12.0	35.0	35.0
Total Split (%)	10.9%	35.5%	35.5%	16.4%	40.9%	40.9%	16.4%	37.3%	37.3%	10.9%	31.8%	31.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	47.0	37.9	37.9	56.5	45.4	45.4	13.6	31.8	31.8	7.7	25.8	25.8
Actuated g/C Ratio	0.43	0.34	0.34	0.51	0.41	0.41	0.12	0.29	0.29	0.07	0.23	0.23
v/c Ratio	0.31	0.45	0.22	0.53	0.91	0.18	0.81	0.26	0.29	0.45	0.74	0.87
Control Delay	10.3	16.7	7.2	20.9	43.4	7.4	63.2	30.1	5.8	55.7	44.8	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	16.7	7.2	20.9	43.4	7.4	63.2	30.1	5.8	55.7	44.8	42.0
LOS	B	B	A	C	D	A	E	C	A	E	D	D
Approach Delay		14.5			37.4			39.5			44.8	
Approach LOS		B			D			D			D	

Intersection Summary

Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 24 (22%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 35.9  
 Intersection LOS: D  
 Intersection Capacity Utilization 81.7%  
 ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 7: Dillon Rd & Sheridan Blvd



Timings  
3: Dillon Rd & 120th St

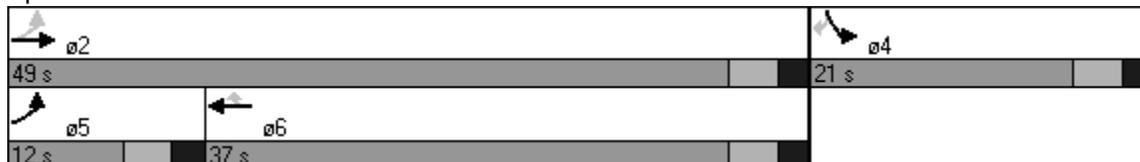


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷	↷	↶	↷
Volume (vph)	75	1895	975	265	575	75
Turn Type	pm+pt			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases	2			6		4
Detector Phase	5	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	12.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	12.0	49.0	37.0	37.0	21.0	21.0
Total Split (%)	17.1%	70.0%	52.9%	52.9%	30.0%	30.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	None	None
Act Effct Green (s)	44.3	44.3	34.9	34.9	15.7	15.7
Actuated g/C Ratio	0.63	0.63	0.50	0.50	0.22	0.22
v/c Ratio	0.27	0.97	0.63	0.32	0.86	0.21
Control Delay	7.3	27.6	11.0	3.2	39.9	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	27.6	11.0	3.2	39.9	7.4
LOS	A	C	B	A	D	A
Approach Delay		26.9	9.4		36.1	
Approach LOS		C	A		D	

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 53 (76%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.97  
 Intersection Signal Delay: 22.8  
 Intersection LOS: C  
 Intersection Capacity Utilization 80.9%  
 ICU Level of Service D  
 Analysis Period (min) 15

Splits and Phases: 3: Dillon Rd & 120th St



Timings  
5: Dillon Rd & Aspen St

Dillon Road Phase 1  
8/17/2015

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘↘	↗
Volume (vph)	2235	235	60	1100	140	65
Turn Type		Perm	pm+pt			pm+ov
Protected Phases	2		1	6	4	1
Permitted Phases		2	6			4
Detector Phase	2	2	1	6	4	1
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	21.0	21.0	12.0	21.0	21.0	12.0
Total Split (s)	107.0	107.0	12.0	119.0	21.0	12.0
Total Split (%)	76.4%	76.4%	8.6%	85.0%	15.0%	8.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead
Lead-Lag Optimize?	Yes	Yes	Yes			Yes
Recall Mode	C-Max	C-Max	None	C-Max	None	None
Act Effct Green (s)	106.3	106.3	118.1	118.1	11.9	23.7
Actuated g/C Ratio	0.76	0.76	0.84	0.84	0.08	0.17
v/c Ratio	0.95	0.22	0.49	0.42	0.55	0.27
Control Delay	16.9	1.0	48.6	2.0	68.8	44.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	1.0	48.6	2.0	68.8	44.3
LOS	B	A	D	A	E	D
Approach Delay	15.4			4.4	61.0	
Approach LOS	B			A	E	

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 98 (70%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow  
 Natural Cycle: 130  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.95  
 Intersection Signal Delay: 14.5  
 Intersection Capacity Utilization 77.8%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service D

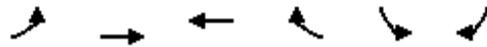
Splits and Phases: 5: Dillon Rd & Aspen St

↖ ø1	→ ø2	↘ ø4
12 s	107 s	21 s
← ø6		
119 s		



Timings  
3: Dillon Road & 120th St

Dillon Road Phase 1  
8/17/2015



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	90	565	1700	400	195	145
Turn Type	D.P+P			Perm		pt+ov
Protected Phases	1		2		4	4 1
Permitted Phases	2	Free		2		
Detector Phase	1		2	2	4	4 1
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	
Minimum Split (s)	12.0		21.0	21.0	21.0	
Total Split (s)	12.0	0.0	74.0	74.0	24.0	36.0
Total Split (%)	10.9%	0.0%	67.3%	67.3%	21.8%	32.7%
Yellow Time (s)	3.0		3.0	3.0	3.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None		C-Max	C-Max	None	
Act Effct Green (s)	77.7	110.0	71.0	71.0	17.3	29.0
Actuated g/C Ratio	0.71	1.00	0.65	0.65	0.16	0.26
v/c Ratio	0.59	0.18	0.85	0.39	0.81	0.39
Control Delay	31.2	0.1	14.7	1.3	67.5	31.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	0.1	14.7	1.3	67.5	31.3
LOS	C	A	B	A	E	C
Approach Delay		4.4	12.2		52.1	
Approach LOS		A	B		D	

Intersection Summary

Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 106 (96%), Referenced to phase 2:EBWB, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 14.9  
 Intersection Capacity Utilization 78.8%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service D

Splits and Phases: 3: Dillon Road & 120th St



Timings  
5: Dillon Rd & Aspen St

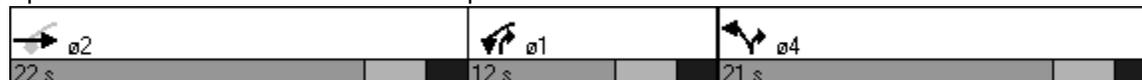
Dillon Road Phase 1  
8/17/2015

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Volume (vph)	610	150	55	1795	305	40
Turn Type		Perm	D.P+P			pt+ov
Protected Phases	2		1		4	4 1
Permitted Phases		2	2	Free		
Detector Phase	2	2	1		4	4 1
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	21.0	21.0	12.0		21.0	
Total Split (s)	22.0	22.0	12.0	0.0	21.0	33.0
Total Split (%)	40.0%	40.0%	21.8%	0.0%	38.2%	60.0%
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None		None	
Act Effct Green (s)	23.7	23.7	29.6	55.0	14.6	21.3
Actuated g/C Ratio	0.43	0.43	0.54	1.00	0.27	0.39
v/c Ratio	0.46	0.22	0.14	0.58	0.74	0.07
Control Delay	11.3	1.9	9.3	1.8	29.8	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	1.9	9.3	1.8	29.8	3.0
LOS	B	A	A	A	C	A
Approach Delay	9.5			2.0	26.7	
Approach LOS	A			A	C	

Intersection Summary

Cycle Length: 55  
 Actuated Cycle Length: 55  
 Offset: 7 (13%), Referenced to phase 2:EBWB, Start of Yellow  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.74  
 Intersection Signal Delay: 6.8  
 Intersection LOS: A  
 Intersection Capacity Utilization 77.7%  
 ICU Level of Service D  
 Analysis Period (min) 15

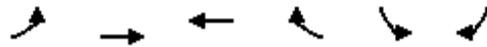
Splits and Phases: 5: Dillon Rd & Aspen St





Timings  
3: Dillon Rd & 120th St

Dillon Road Phase 1  
8/17/2015

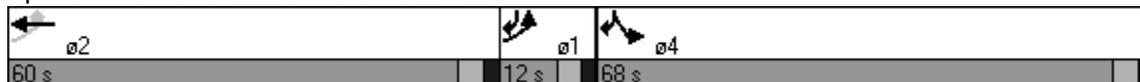


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	75	1895	995	265	575	75
Turn Type	D.P+P		Perm		pt+ov	
Protected Phases	1		2		4	4 1
Permitted Phases	2	Free		2		
Detector Phase	1		2	2	4	4 1
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	
Minimum Split (s)	12.0		21.0	21.0	21.0	
Total Split (s)	12.0	0.0	60.0	60.0	68.0	80.0
Total Split (%)	8.6%	0.0%	42.9%	42.9%	48.6%	57.1%
Yellow Time (s)	3.0		3.0	3.0	3.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None		C-Max	C-Max	None	
Act Effct Green (s)	67.7	140.0	61.0	61.0	57.3	69.0
Actuated g/C Ratio	0.48	1.00	0.44	0.44	0.41	0.49
v/c Ratio	0.46	0.61	0.74	0.35	0.91	0.11
Control Delay	41.7	0.9	25.2	4.2	57.0	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.7	0.9	25.2	4.2	57.0	11.9
LOS	D	A	C	A	E	B
Approach Delay		2.4	20.8		51.8	
Approach LOS		A	C		D	

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 5 (4%), Referenced to phase 2:EBWB, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 16.7  
 Intersection LOS: B  
 Intersection Capacity Utilization 96.4%  
 ICU Level of Service F  
 Analysis Period (min) 15

Splits and Phases: 3: Dillon Rd & 120th St



Timings  
5: Dillon Rd & Aspen St

Dillon Road Phase 1  
8/17/2015

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↗
Volume (vph)	2235	235	60	1080	140	65
Turn Type		Perm	D.P+P			pt+ov
Protected Phases	2		1		4	4 1
Permitted Phases		2	2	Free		
Detector Phase	2	2	1		4	4 1
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	21.0	21.0	12.0		21.0	
Total Split (s)	107.0	107.0	12.0	0.0	21.0	33.0
Total Split (%)	76.4%	76.4%	8.6%	0.0%	15.0%	23.6%
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None		None	
Act Effct Green (s)	103.0	103.0	109.7	140.0	15.3	27.0
Actuated g/C Ratio	0.74	0.74	0.78	1.00	0.11	0.19
v/c Ratio	0.98	0.22	0.49	0.35	0.83	0.24
Control Delay	23.6	1.2	44.8	0.3	94.4	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	1.2	44.8	0.3	94.4	42.0
LOS	C	A	D	A	F	D
Approach Delay	21.5			2.6	77.8	
Approach LOS	C			A	E	

Intersection Summary

Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 126 (90%), Referenced to phase 2:EBWB, Start of Yellow  
 Natural Cycle: 130  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.98  
 Intersection Signal Delay: 18.9  
 Intersection Capacity Utilization 81.7%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service D

Splits and Phases: 5: Dillon Rd & Aspen St

→ ø2 107 s	↖ ø1 12 s	↗ ø4 21 s
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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Aspen St	II	40	47.6	15.4	63.0	0.51	29.2	B
Sheridan Blvd	II	40	47.7	16.7	64.4	0.53	29.6	B
Total	II		95.3	32.1	127.4	1.04	29.4	B

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	43.4	68.9	0.22	11.6	F
Aspen St	II	40	47.7	8.4	56.1	0.53	34.0	B
120th St	II	40	47.6	6.7	54.3	0.51	33.9	B
Total	II		120.8	58.5	179.3	1.26	25.4	C

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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
120th St	II	40	31.9	27.6	59.5	0.31	18.9	D
Aspen St	II	40	47.6	16.9	64.5	0.51	28.5	B
Sheridan Blvd	II	40	47.7	97.7	145.4	0.53	13.1	E
Total	II		127.2	142.2	269.4	1.35	18.1	D

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	32.4	57.9	0.22	13.8	E
Aspen St	II	40	47.7	2.0	49.7	0.53	38.4	A
120th St	II	40	47.6	11.0	58.6	0.51	31.4	B
Total	II		120.8	45.4	166.2	1.26	27.4	C

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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Aspen St	II	40	47.6	11.3	58.9	0.51	31.3	B
Sheridan Blvd	II	40	47.7	17.6	65.3	0.53	29.2	B
Total	II		95.3	28.9	124.2	1.04	30.2	B

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	44.6	70.1	0.22	11.4	F
Aspen St	II	40	47.7	1.8	49.5	0.53	38.6	A
120th St	II	40	47.6	14.7	62.3	0.51	29.5	B
Total	II		120.8	61.1	181.9	1.26	25.0	C

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 Arterial Level of Service: EB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
120th St	II	40	24.3	0.9	25.2	0.21	30.2	B
Aspen St	II	40	47.6	23.6	71.2	0.51	25.9	C
Sheridan Blvd	II	40	47.7	94.3	142.0	0.53	13.4	E
Total	II		119.6	118.8	238.4	1.25	18.9	D

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 Arterial Level of Service: WB Dillon Rd
 

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Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Sheridan Blvd	II	40	25.5	33.1	58.6	0.22	13.6	E
Aspen St	II	40	47.7	0.3	48.0	0.53	39.8	A
120th St	II	40	47.6	25.2	72.8	0.51	25.3	C
Total	II		120.8	58.6	179.4	1.26	25.3	C

**Appendix E: 2035 Rodel Output**

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Dillon Road - Phase 1	2035 Synthetic Flow Profile (veh)
120th Street Roundabout - 4 Lane Dillon	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	95% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	Yes
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	WB Dillon-East Leg	90	0	24.00	2	28.00	2	33.00	66.00	30.00
2	SB 120th-North Leg	180	0	12.00	1	15.00	1	33.00	66.00	30.00
3	EB Dillon-West Leg	270	0	12.00	1	15.00	1	33.00	66.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	WB Dillon-East Leg	180.00	16.00	1	13.00	1	12.00	1
2	SB 120th-North Leg	180.00	34.00	2	13.00	1	12.00	1
3	EB Dillon-West Leg	180.00	16.00	1	26.00	2	24.00	2

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	WB Dillon-East Leg	200	1.000	0	1.000	36.00	5377	0	12.00	1792	0
2	SB 120th-North Leg	240	1.000	0	1.000	12.00	1792	0	12.00	1792	0
3	EB Dillon-West Leg	0	1.000	0	1.000	12.00	1792	0	24.00	3584	0

## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	WB Dillon-East Leg	Yield	400	24	2	12	1	36	3
2	SB 120th-North Leg	Yield	145	12	1	12	1	12	1

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	WB Dillon-East Leg	12	1	0	130	66.0003 1046	30	2	SB 120th-North Leg	1	2
2	SB 120th-North Leg	12	1	0	130	66.0003 1046	30	3	EB Dillon-West Leg	2	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	WB Dillon-East Leg	0	1.000	0	1.000
2	SB 120th-North Leg	0	1.000	0	1.000

## Traffic Flow Data (veh/hr)

### 2035 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers	
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	WB Dillon-East Leg	0	1700	0	400	3.0	1.00
2	SB 120th-North Leg	0	195	0	145	2.0	1.00
3	EB Dillon-West Leg	0	90	0	0	3.0	1.00

### 2035 AM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	WB Dillon-East Leg	0.750	1.125	0.750	0	30	60
2	SB 120th-North Leg	0.750	1.125	0.750	0	30	60
3	EB Dillon-West Leg	0.750	1.125	0.750	0	30	60

## Operational Results

### 2035 AM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	WB Dillon-East Leg	Yield	1700	400	90	90	195	2049	715	0.8615	0.5823
2	SB 120th-North Leg	Yield	195	145	1699	1699	490	395	73	0.5528	21.5674
3	EB Dillon-West Leg	None	90		195		1764	731		0.1266	

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	WB Dillon-East Leg	Yield	10.75	11.63	10.92	19.35	4.25	B	B	B
2	SB 120th-North Leg	Yield	20.19	1469.20	638.15	4.50	166.44	C	F	F
3	EB Dillon-West Leg	None	5.41		5.41	0.42		A		A

## 2035 AM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	WB Dillon-East Leg	Yield	1917	451	101	101	217	2038	709	0.9674	0.6534
2	SB 120th-North Leg	Yield	220	164	1904	1904	551	327	8	0.7073	56.5137
3	EB Dillon-West Leg	None	101		217		1911	720		0.1427	

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	WB Dillon-East Leg	Yield	14.36	12.83	14.07	19.35	4.25	B	B	B
2	SB 120th-North Leg	Yield	25.81	1940.58	842.40	4.50	121.16	D	F	F
3	EB Dillon-West Leg	None	5.47		5.47	0.42		A		A

## Approach Flow Profile

### 2035 AM Peak - Approach Flows (Veh / Hour)

Time Slice	WB Dillon-East Leg	SB 120th-North Leg	EB Dillon-West Leg
0.0 - 7.5	218.38	35.36	9.36
7.5 - 15.0	254.25	41.16	10.90
15.0 - 22.5	281.37	45.56	12.06
22.5 - 30.0	296.00	47.92	12.69
30.0 - 37.5	296.00	47.92	12.69
37.5 - 45.0	281.37	45.56	12.06
45.0 - 52.5	254.25	41.16	10.90
52.5 - 60.0	218.38	35.36	9.36
Peak 15 min	296.00	47.92	12.69
Peak 60 min	262.50	42.50	11.25

## Exit Flow Profile

### 2035 AM Peak - Exit Flows (Veh / Hour)

Time Slice	WB Dillon-East Leg	SB 120th-North Leg	EB Dillon-West Leg
0.0 - 7.5	20.23	50.83	190.75
7.5 - 15.0	23.31	59.00	215.33
15.0 - 22.5	25.68	65.33	230.44
22.5 - 30.0	27.01	68.84	238.41
30.0 - 37.5	27.34	69.02	239.42
37.5 - 45.0	26.39	65.77	233.08
45.0 - 52.5	24.25	59.69	219.36
52.5 - 60.0	20.48	51.32	197.35
0-60	195	490	1764
%Trucks	2.00	3.00	3.00

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Dillon Road-Phase 1	2012 Synthetic Flow Profile (veh)
Aspen Street Roundabout - 4 Lane Dillon	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
AM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	95% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	NB Aspen-South Leg	0	0	12.00	1	15.00	1	33.00	66.00	30.00
2	WB Dillon-East Leg	90	0	12.00	1	15.00	1	33.00	66.00	30.00
3	EB Dillon-West Leg	270	0	24.00	2	26.00	2	33.00	66.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Aspen-South Leg	180.00	33.00	2	13.00	1	12.00	1
2	WB Dillon-East Leg	180.00	16.00	1	26.00	2	24.00	2
3	EB Dillon-West Leg	180.00	16.00	1	13.00	1	12.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Aspen-South Leg	0	1.000	0	1.000	12.00	1792	0	12.00	1792	0
2	WB Dillon-East Leg	0	1.000	0	1.000	12.00	1792	0	24.00	3584	0
3	EB Dillon-West Leg	0	1.000	500	1.000	36.00	5377	0	12.00	1792	0

## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	NB Aspen-South Leg	Yield	40	12	1	12	1	12	1
3	EB Dillon-West Leg	Yield	150	24	2	12	1	36	3

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	NB Aspen-South Leg	12	1	0	130	66.0002 5133	30	2	WB Dillon-East Leg	2	2
3	EB Dillon-West Leg	12	1	0	130	66.0002 5133	30	1	NB Aspen-South Leg	1	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	NB Aspen-South Leg	0	1.000	0	1.000
3	EB Dillon-West Leg	0	1.000	0	1.000

## Traffic Flow Data (veh/hr)

### 2012 AM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers	
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	NB Aspen-South Leg	0	305	0	40	2.0	1.00
2	WB Dillon-East Leg	0	55	0	0	3.0	1.00
3	EB Dillon-West Leg	0	610	0	150	3.0	1.00

### 2012 AM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	NB Aspen-South Leg	0.750	1.125	0.750	0	30	60
2	WB Dillon-East Leg	0.750	1.125	0.750	0	30	60
3	EB Dillon-West Leg	0.750	1.125	0.750	0	30	60

## Operational Results

### 2012 AM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Aspen-South Leg	Yield	305	40	610	610	205	624	556	0.5123	0.0748
2	WB Dillon-East Leg	None	55		305		650	678		0.0836	
3	EB Dillon-West Leg	Yield	610	150	55	55	305	2358	731	0.2633	0.2107

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Aspen-South Leg	Yield	11.16	6.97	10.67	3.22	0.24	B	A	B
2	WB Dillon-East Leg	None	5.57		5.57	0.26		A		A
3	EB Dillon-West Leg	Yield	1.98	6.16	2.80	1.03	0.79	A	A	A

## 2012 AM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Aspen-South Leg	Yield	344	45	688	688	231	597	529	0.5919	0.0866
2	WB Dillon-East Leg	None	62		344		733	660		0.0952	
3	EB Dillon-West Leg	Yield	688	169	62	62	344	2351	728	0.2938	0.2355

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Aspen-South Leg	Yield	12.54	7.21	11.92	3.22	0.24	B	A	B
2	WB Dillon-East Leg	None	5.67		5.67	0.26		A		A
3	EB Dillon-West Leg	Yield	2.03	6.25	2.86	1.03	0.79	A	A	A

## Approach Flow Profile

### 2012 AM Peak - Approach Flows (Veh / Hour)

Time Slice	NB Aspen-South Leg	WB Dillon-East Leg	EB Dillon-West Leg
0.0 - 7.5	35.88	5.72	79.03
7.5 - 15.0	41.77	6.66	92.01
15.0 - 22.5	46.23	7.37	101.83
22.5 - 30.0	48.63	7.75	107.12
30.0 - 37.5	48.63	7.75	107.12
37.5 - 45.0	46.23	7.37	101.83
45.0 - 52.5	41.77	6.66	92.01
52.5 - 60.0	35.88	5.72	79.03
Peak 15 min	48.63	7.75	107.12
Peak 60 min	43.13	6.88	95.00

## Exit Flow Profile

### 2012 AM Peak - Exit Flows (Veh / Hour)

Time Slice	NB Aspen-South Leg	WB Dillon-East Leg	EB Dillon-West Leg
0.0 - 7.5	21.29	67.57	31.67
7.5 - 15.0	24.77	78.65	36.81
15.0 - 22.5	27.43	87.06	40.74
22.5 - 30.0	28.87	91.60	42.90
30.0 - 37.5	28.89	91.62	42.98
37.5 - 45.0	27.48	87.11	40.92
45.0 - 52.5	24.86	78.73	37.06
52.5 - 60.0	21.37	67.64	31.85
0-60	205	650	305
%Trucks	3.00	3.00	2.00

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Dillon Road - Phase 1	2035 Synthetic Flow Profile (veh)
120th Street Roundabout - 4 Lane Dillon	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	95% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	No
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	WB Dillon-East Leg	90	0	24.00	2	28.00	2	33.00	66.00	30.00
2	SB 120th-North Leg	180	0	12.00	1	15.00	1	33.00	66.00	30.00
3	EB Dillon-West Leg	270	0	12.00	1	15.00	1	33.00	66.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	WB Dillon-East Leg	180.00	16.00	1	13.00	1	12.00	1
2	SB 120th-North Leg	180.00	34.00	2	13.00	1	12.00	1
3	EB Dillon-West Leg	180.00	16.00	1	26.00	2	24.00	2

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	WB Dillon-East Leg	0	1.000	0	1.000	36.00	5377	0	12.00	1792	0
2	SB 120th-North Leg	0	1.000	0	1.000	12.00	1792	0	12.00	1792	0
3	EB Dillon-West Leg	0	1.000	0	1.000	12.00	1792	0	24.00	3584	0

## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	WB Dillon-East Leg	Yield	265	24	2	12	1	36	3
2	SB 120th-North Leg	Yield	75	12	1	12	1	12	1

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	WB Dillon-East Leg	12	1	0	130	66.0003 168	30	2	SB 120th-North Leg	1	2
2	SB 120th-North Leg	12	1	0	130	66.0003 168	30	3	EB Dillon-West Leg	2	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	WB Dillon-East Leg	0	1.000	0	1.000
2	SB 120th-North Leg	0	1.000	0	1.000

## Traffic Flow Data (veh/hr)

### 2035 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers	
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	WB Dillon-East Leg	0	975	0	265	3.0	1.00
2	SB 120th-North Leg	0	575	0	75	2.0	1.00
3	EB Dillon-West Leg	0	75	0	0	3.0	1.00

### 2035 PM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	WB Dillon-East Leg	0.750	1.125	0.750	0	30	60
2	SB 120th-North Leg	0.750	1.125	0.750	0	30	60
3	EB Dillon-West Leg	0.750	1.125	0.750	0	30	60

## Operational Results

### 2035 PM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	WB Dillon-East Leg	Yield	975	265	75	75	460	1869	722	0.5333	0.3788
2	SB 120th-North Leg	Yield	575	75	975	975	340	469	228	2.2081	0.3698
3	EB Dillon-West Leg	None	75		460		1050	604		0.1270	

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	WB Dillon-East Leg	Yield	3.85	7.88	4.71	3.39	1.82	A	A	A
2	SB 120th-North Leg	Yield	386.60	25.03	344.88	230.82	1.95	F	D	F
3	EB Dillon-West Leg	None	6.48		6.48	0.40		A		A

## 2035 PM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	WB Dillon-East Leg	Yield	1099	299	85	85	426	1860	717	0.5965	0.4241
2	SB 120th-North Leg	Yield	648	85	1099	1099	383	426	191	2.4467	0.4699
3	EB Dillon-West Leg	None	85		426		1183	621		0.1382	

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	WB Dillon-East Leg	Yield	4.22	8.24	5.08	3.39	1.82	A	A	A
2	SB 120th-North Leg	Yield	347.95	29.83	311.24	174.38	1.95	F	D	F
3	EB Dillon-West Leg	None	6.35		6.35	0.40		A		A

## Approach Flow Profile

### 2035 PM Peak - Approach Flows (Veh / Hour)

Time Slice	WB Dillon-East Leg	SB 120th-North Leg	EB Dillon-West Leg
0.0 - 7.5	128.95	67.60	7.80
7.5 - 15.0	150.13	78.70	9.08
15.0 - 22.5	166.14	87.09	10.05
22.5 - 30.0	174.78	91.62	10.57
30.0 - 37.5	174.78	91.62	10.57
37.5 - 45.0	166.14	87.09	10.05
45.0 - 52.5	150.13	78.70	9.08
52.5 - 60.0	128.95	67.60	7.80
Peak 15 min	174.78	91.62	10.57
Peak 60 min	155.00	81.25	9.38

## Exit Flow Profile

### 2035 PM Peak - Exit Flows (Veh / Hour)

Time Slice	WB Dillon-East Leg	SB 120th-North Leg	EB Dillon-West Leg
0.0 - 7.5	57.78	35.29	109.04
7.5 - 15.0	59.25	41.03	126.75
15.0 - 22.5	55.68	45.44	140.29
22.5 - 30.0	53.30	47.86	147.71
30.0 - 37.5	53.25	47.92	147.96
37.5 - 45.0	55.56	45.60	140.88
45.0 - 52.5	59.89	41.28	127.57
52.5 - 60.0	65.67	35.49	109.60
0-60	460	340	1050
%Trucks	2.00	3.00	3.00

## Scheme Summary

### Control Data

#### Control Data and Model Parameters

Dillon Road-Phase 1	2012 Synthetic Flow Profile (veh)
Aspen Street Roundabout - 4 Lane Dillon	7.5 min Time Slice
Rodel-Win1	Queuing Delays (sec)
Right Hand Drive	Daylight conditions
PM Peak Hour	Peak 60/15 min Results
Full Geometry	Output flows: Vehicles
English Units (ft)	95% Confidence Level

#### Available Data

Entry Capacity Calibrated	No
Entry Capacity Modified	Yes
Crosswalks	No
Flows Factored	No
Approach/Exit Road Capacity Calibrated	No
Accidents	No
Accident Costs	No
Bypass Model	Yes
Bypass Calibration	No
Global Results	Yes

## Operational Data

### Main Geometry (ft)

#### Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle ?
1	NB Aspen-South Leg	0	0	12.00	1	15.00	1	33.00	66.00	30.00
2	WB Dillon-East Leg	90	0	12.00	1	15.00	1	33.00	66.00	30.00
3	EB Dillon-West Leg	270	0	24.00	2	26.00	2	33.00	66.00	30.00

#### Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	NB Aspen-South Leg	180.00	33.00	2	13.00	1	12.00	1
2	WB Dillon-East Leg	180.00	16.00	1	26.00	2	24.00	2
3	EB Dillon-West Leg	180.00	16.00	1	13.00	1	12.00	1

#### Capacity Modifiers and Capacity Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Entry Calibration		Approach Road			Exit Road		
		Capacity + or -	XWalk Factor	Intercept + or -	Slope Factor	V (ft)	Default Capacity	Calib Capacity	V (ft)	Default Capacity	Calib Capacity
1	NB Aspen-South Leg	230	1.000	0	1.000	12.00	1792	0	12.00	1792	0
2	WB Dillon-East Leg	0	1.000	0	1.000	12.00	1792	0	24.00	3584	0
3	EB Dillon-West Leg	-50	1.000	500	1.000	36.00	5377	0	12.00	1792	0

## Bypass Geometry

### Bypass Approach Geometry (ft)

Leg	Leg Names	Bypass Type	Bypass Flows	V	nv	Vb	nvb	Vt	nvt
1	NB Aspen-South Leg	Yield	65	12	1	12	1	12	1
3	EB Dillon-West Leg	Yield	235	24	2	12	1	36	3

### Bypass Entry and Exit Geometry (ft)

Leg	Leg Names	Entry Geometry						Leg	Leg Names	Exit Lanes	
		Eb	neb	Lb	Lt	Rb	Phib			nex	Nmx
1	NB Aspen-South Leg	12	1	0	130	66.0002 5766	30	2	WB Dillon-East Leg	2	2
3	EB Dillon-West Leg	12	1	0	130	66.0002 5766	30	1	NB Aspen-South Leg	1	2

### Bypass Entry Capacity Modifiers and Calibration (veh/hr)

Leg	Leg Names	Entry Capacity		Calibration	
		Capacity + or -	Cross Walk Factor	Intercept + or -	Slope Factor
1	NB Aspen-South Leg	0	1.000	0	1.000
3	EB Dillon-West Leg	0	1.000	0	1.000

## Traffic Flow Data (veh/hr)

### 2012 PM Peak Peak Hour Flows

Leg	Leg Names	Turning Flows				Flow Modifiers	
		U-Turn	Exit-2	Exit-1	Bypass	Trucks %	Flow Factor
1	NB Aspen-South Leg	0	140	0	65	2.0	1.00
2	WB Dillon-East Leg	0	60	0	0	3.0	1.00
3	EB Dillon-West Leg	0	2235	0	235	3.0	1.00

### 2012 PM Peak Synthetic Flow Profile - Timeslice 7.5 mins

Leg	Leg Names	Flow Ratios			Flow Times		
		Ratio 1	Ratio 2	Ratio 3	Time 1	Time 2	Time 3
1	NB Aspen-South Leg	0.750	1.125	0.750	0	30	60
2	WB Dillon-East Leg	0.750	1.125	0.750	0	30	60
3	EB Dillon-West Leg	0.750	1.125	0.750	0	30	60

## Operational Results

### 2012 PM Peak - 60 minutes

#### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Aspen-South Leg	Yield	140	65	2209	2209	295	234	0	0.7099	351898.6915
2	WB Dillon-East Leg	None	60		140		2209	757		0.0813	
3	EB Dillon-West Leg	Yield	2235	235	60	60	140	2305	729	1.0934	0.3320

#### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Aspen-South Leg	Yield	44.38	3663.84	1192.01	6.37	118.53	E	F	F
2	WB Dillon-East Leg	None	4.97		4.97	0.25		A		A
3	EB Dillon-West Leg	Yield	50.98	7.27	46.82	131.86	1.48	F	A	E

## 2012 PM Peak - 15 minutes

### Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	NB Aspen-South Leg	Yield	158	73	2297	2297	332	204	0	0.8578	366079.8169
2	WB Dillon-East Leg	None	68		155		2297	749		0.0913	
3	EB Dillon-West Leg	Yield	2520	265	68	68	155	2297	725	1.2065	0.3713

### Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	NB Aspen-South Leg	Yield	52.77	3729.78	1218.65	6.37	78.12	F	F	F
2	WB Dillon-East Leg	None	4.98		4.98	0.25		A		A
3	EB Dillon-West Leg	Yield	59.98	7.53	54.99	122.25	1.48	F	A	F

## Approach Flow Profile

### 2012 PM Peak - Approach Flows (Veh / Hour)

Time Slice	NB Aspen-South Leg	WB Dillon-East Leg	EB Dillon-West Leg
0.0 - 7.5	21.32	6.24	256.86
7.5 - 15.0	24.82	7.26	299.04
15.0 - 22.5	27.47	8.04	330.95
22.5 - 30.0	28.90	8.46	348.15
30.0 - 37.5	28.90	8.46	348.15
37.5 - 45.0	27.47	8.04	330.95
45.0 - 52.5	24.82	7.26	299.04
52.5 - 60.0	21.32	6.24	256.86
Peak 15 min	28.90	8.46	348.15
Peak 60 min	25.62	7.50	308.75

## Exit Flow Profile

### 2012 PM Peak - Exit Flows (Veh / Hour)

Time Slice	NB Aspen-South Leg	WB Dillon-East Leg	EB Dillon-West Leg
0.0 - 7.5	30.63	232.38	14.50
7.5 - 15.0	35.62	266.11	16.45
15.0 - 22.5	39.44	286.70	17.78
22.5 - 30.0	41.53	287.18	19.22
30.0 - 37.5	41.57	287.17	19.63
37.5 - 45.0	39.56	287.57	18.76
45.0 - 52.5	35.80	288.30	17.51
52.5 - 60.0	30.78	273.93	15.99
0-60	295	2209	140
%Trucks	3.00	3.00	2.00

**Appendix F: Geometric Layout Comparison Sheet**

