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December 6, 2017

Mr. Drew Balsick
PRI #2, LLC
6385 Corporate Drive
Colorado Springs, CO

See comments from the Dec 6 TIS associated with the Flying Horse North Preliminary Plan (SP-17-012).

Include the following:

- Engineer's and Developer's certification page with signatures and stamp.
- Provide the Roundabout design analysis (geometry, fastest path, entry angles, Autoturn for the design vehicles WB67, etc.)
- Provide the analysis/recommendation for the driveway location for the lots adjacent to the roundabouts. How far away should the driveways be located away from the roundabout? Lots 29, 41 and 44 both have frontage fully at the roundabout.
- List the approved deviation (with reference number or PUD modification from the ECM).
- List proposed deviation request being submitted.

Dear Drew:

LSC Transportation Consultants, Inc. has prepared this report for the proposed Flying Horse North Filing No. 1. As shown in Figure 1, the Flying Horse North development site is located generally south of Hodgen Road and west of Black Forest Road in El Paso County, Colorado. LSC prepared a traffic impact study (TIS) for the entire Flying Horse North PUD in 2016. The master lot and street plan for Flying Horse North has not significantly changed since completion of the report, however the proposed phasing plan has changed with the currently proposed Filing No. 1. This report is intended as a Filing No. 1 site-specific traffic report and an addendum/update to the master TIS for Flying Horse North PUD (dated July 21, 2016). Also, please refer to the separate LSC traffic report for the Preliminary Plan dated December 6, 2017.

LAND USE AND ACCESS

At buildout, Flying Horse North is planned to contain 283 single-family homes and an 18-hole golf course. These land uses were assumed in the 2016 Flying Horse North master TIS and have not changed. Phases 1 and 2 in the master TIS included 43 dwelling units. The currently proposed first phase/Filing No. 1 includes 80 single-family homes and the golf course. The current site plan is shown in Figure 2 with the proposed Filing 1 area shown with a red border.

Access for Filing No. 1 is proposed via a new east/west Rural Major Collector road (Stagecoach Road) that would extend from the SH 83/Stagecoach Road intersection to Black Forest Road (aligning with the north intersection of Black Forest Road/Terra Ridge Circle). The 2016 master Flying Horse North TIS analyzed the first two phases with Stagecoach Road built east from SH 83 about two miles to serve Phase 1 lots on the west side of the project and west from Black Forest Road to serve Phase 2 lots on the east side of the project. An emergency access/"pioneer" road was planned between these two sections. Stagecoach Road is now planned to be constructed and paved from SH 83 to Black Forest Road with Filing No. 1.

No changes to the long-term/buildout access and roadway network as shown in the 2016 Flying Horse North master TIA are proposed.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

The area roadways in the site's vicinity are shown on Figure 1 and are described below.

- **Hodgen Road** is a two-lane paved Rural Minor Arterial road that extends east from the intersection of Roller Coaster Road/Baptist Road to Eastonville Road. The speed limit on Hodgen Road is generally 55 miles per hour (mph) east of SH 83.
- **State Highway (SH) 83** extends from Colorado Springs north to Parker and areas of southeast Denver. In the vicinity of the site, SH 83 is classified as a Regional Highway (R-A). At this location, SH 83 is a two-lane rural highway with two- to four-foot shoulders and a speed limit of 55 mph. The intersection with Hodgen Road is signalized.
- **Shoup Road** is a two-lane, paved Rural Minor Arterial road that extends east from SH 85 Highway (US) 83 to just east of Vollmer Road. The posted speed limit on Shoup Road is 45 mph.
- **Black Forest Road** is a two-lane, paved Rural Minor Arterial road that extends north from Woodmen Road to County Line Road. Black Forest Road is offset about one-quarter mile to the east at Hodgen Road. In the vicinity of the site the posted speed limit on Black Forest Road is 45 mph.
- **Holmes Road** is a rural local paved two-lane road that extends north from Shoup Road to just north of Vessey Road. Holmes Road is planned to be extended north into the site as part of this development. The posted speed limit on Homes Road is 30 mph.
- **Vessey Road** is a rural local paved two-lane road that extends east from the Cathedral Pines development to Black Forest Road.

Existing Traffic Conditions

Figure 3 shows the existing traffic at the intersection of SH 83/Stagecoach. This figure shows the 2016 CDOT annual average daily traffic volume on SH 83, recent count data on SH 83 just south of Hodgen Road, and estimates of current peak-hour volumes at the SH 83/Stagecoach intersection based on the traffic data. Please refer to the master study (Figure 3 of that study) for previous traffic counts conducted by LSC at Stagecoach/SH 83 (January 2016) and for Black Forest Road traffic volume information.

Existing Level of Service

Level of service (LOS) is a quantitative measure of the level of delay at an intersection. Level of service is indicated on a scale from “A” to “F.” LOS A represents control delay of less than 10 seconds for unsignalized and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections and more than 80 seconds for signalized intersections. Table 1 shows the level of service delay ranges.

Table 1 Intersection Levels of Service Delay Ranges			
Level of Service	Signalized Intersections		Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	V/C⁽¹⁾	Average Control Delay (seconds per vehicle)⁽²⁾
A	10.0 sec or less	less than 0.60	10.0 sec or less
B	10.1-20.0 sec	0.60-0.69	10.1-15.0 sec
C	20.1-35.0 sec	0.70-0.79	15.1-25.0 sec
D	35.1-55.0 sec	0.80-0.89	25.1-35.0 sec
E	55.1-80.0 sec	0.90-0.99	35.1-50.0 sec
F	80.1 sec or more	1.00 and greater	50.1 sec or more
(1) Source: <i>Transportation Research Circular 212</i> (2) For unsignalized intersections if V/C ratio is greater than 1.0 the level of service is LOS F regardless of the projected average control delay per vehicle.			

The intersections of SH 83/Stagecoach and Hodgen/Black Forest (west) were analyzed to determine the existing levels of service during the peak hours based on the unsignalized method of analysis procedures outlined in the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board. The results of the level of service analysis are shown in Figure 2. The level of service reports are attached.

As shown on Figure 3, all movements at the intersections of SH 83/Stagecoach and Hodgen/Black Forest (west) are currently operating at level of service C or better during the peak hours.

BACKGROUND TRAFFIC

Figure 4 shows the short-term (year 2026) background traffic volumes on the area roadway segments and at the intersections in the vicinity of the site. This figure has been taken from the Master TIS (Figure 4 of that report) and updated to account for the currently planned Stagecoach connection with Filing No. 1.

Background traffic is the traffic estimated for the existing and planned short-term future roadways in the study area. These include the new roadways planned for Flying Horse North Filing No. 1 including Stagecoach Road between SH 83 and Black Forest Road but not the Holmes Road extension north to Stagecoach. Although background traffic estimates include

the new on-site roadways, they do not include traffic to be generated by the Filing No. 1 land uses (80 single-family homes and the golf course). Background traffic has been presented in this manner to clearly show estimates of non-site traffic volumes on the Stagecoach Road connection through this proposed development. Most of the background traffic projected to use Stagecoach represents a shift of local traffic volume from other current travel routes with the new routes through the Flying Horse North site. LSC does not anticipate significant use of the new on-site road connections by non-local-area traffic/through traffic.

TRIP GENERATION

The site-generated vehicle-trips were estimated using the nationally published trip generation rates from *Trip Generation, 9th Edition, 2012* by the Institute of Transportation Engineers (ITE). Table 2 shows the site's average weekday, morning peak-hour, and afternoon peak-hour trip generation estimates for Filing No. 1.

At buildout of Filing No. 1, Flying Horse North could be expected to generate about 1,405 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour, which typically occurs for one hour between 6:30 and 8:30 a.m., about 44 vehicles would enter and 53 vehicles would exit the site. During the afternoon peak hour, which typically occurs for one hour between 4:30 and 6:30 p.m., about 77 vehicles would enter and 56 vehicles would exit the site.

DIRECTIONAL DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated trips on the area roadway network is an important factor in determining the site's traffic impacts. Figure 5 shows directional distribution estimates for the site-generated trips. The estimates have been based on the following factors: the site's land uses, the roadway network and access connections, and the site's location with respect to the nearby employment, commercial centers, other residential areas, and the balance of the Colorado Springs metropolitan area.

When the distribution percentages in Figure 5 are applied to the trip generation estimates shown in Table 2, the site-generated traffic volumes on the area roadways can be determined. The Filing No. 1 site-generated traffic volumes are shown in Figure 6. Figure 6 also shows average weekday traffic volumes on the internal and off-site roadways. The Filing No. 1 site-generated traffic volume estimates assume Stagecoach Road has been completed between SH 83 and Black Forest Road but assumes Holmes Road has not been extended north through the site to Stagecoach Road. These volumes also assume no direct access to Hodgen Road or access to Black Forest Road other than via the planned Stagecoach Road connection.

SHORT-TERM TOTAL TRAFFIC

Figure 7 shows the short-term total traffic volumes at the intersections in the vicinity of the site assuming buildout of Filing No. 1. These volumes are the sum of the short-term background traffic volumes from Figure 4 plus the Filing No. 1 site-generated traffic volumes from Figure 6.

2040 TOTAL TRAFFIC

A master-level traffic report was prepared for Flying Horse North in 2016. This overall/ master traffic impact study by LSC was dated July 21, 2016 and included long-term traffic volume projections, level of service analysis, signal warrant analysis and recommended roadway improvements/functional classifications. The overall land use and access plan has not changed since completion of the report so all the findings and recommendations for project buildout/long term presented in that report are still applicable.

PROJECTED LEVEL OF SERVICE

The intersections in the vicinity of the site have been analyzed to determine the projected short-term level of service based on the unsignalized method of analysis procedures outlined in the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board.

The intersections of Hogden/Black Forest and Stagecoach/Black Forest Road are projected to operate at level of service C or better during the peak hours for all movements as Stop-sign-controlled intersections based on the short-term total traffic volumes.

A southbound left-turn acceleration lane will be required on SH 83 at Stagecoach Road. A simulation was performed using Synchro/SimTraffic to determine the impact of this lane. The simulation was run five times and the results averaged. The average delay for each movement was then compared to the delay shown in Table 1 to determine the projected level of service. The short-term analysis indicates the westbound approach left-turn movement at this intersection is projected to operate at LOS C during the afternoon peak hour.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

Update trip values to
match Table 2

- At buildout Flying Horse North Filing No. 1 could be expected to generate about 1,405 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak hour about 44 vehicles would enter and 53 vehicles would exit the site. During the afternoon peak hour about 77 vehicles would enter and 56 vehicles would exit the site.

Level of Service

- The intersections of Hogden/Black Forest and Stagecoach/Black Forest Road are projected to operate at level of service C or better during the peak hours for all movements as Stop-sign-controlled intersections based on the projected short-term total.

- All movements at the Stop-sign-controlled intersection of SH 83/Stagecoach are projected to operate at level of service C or better during the peak hours based on the short-term total traffic.

Auxiliary Turn Lanes

- Table 3 shows a summary of the auxiliary turn lanes that will be required with Filing No. 1.
- Based on the projected short-term total traffic volumes and the criteria contained in the *State of Colorado Highway Access Code*, a northbound right-turn deceleration lane would be required on SH 83 approaching Stagecoach Road. This lane should be 378 feet long plus a 222-foot-long taper.
- Based on the projected short-term total site-generated traffic volumes and the criteria contained in the *State of Colorado Highway Access Code*, a southbound left-turn lane would be required on SH 83 approaching Stagecoach Road. This lane should be 418 feet long plus a 222-foot-long taper.
- Based on the short-term total traffic volumes and the criteria contained in the *State of Colorado Highway Access Code*, a northbound right-turn acceleration lane would not be required on SH 83 at Stagecoach Road for Filing 1. However, the applicant may choose to construct this lane along with the other auxiliary turn lanes required with Filing No. 1. This lane, if constructed with this filing, should be 738 feet long plus a 222-foot-long taper.
- Based on comments received from the Colorado Department of Transportation, a southbound left-turn acceleration lane will be required on SH 83 from Stagecoach Road. This lane should be 738 feet long plus a 222-foot taper (adjusted for grades as necessary).
- Based on the projected short-term total traffic volumes and on the criteria contained in the *El Paso County Engineering Criteria Manual*, a northbound left-turn lane would **not** be required on Black Forest Road approaching Stagecoach Road. As shown in the 2016 Flying Horse North Traffic Impact Study, this lane will be required with future filings. The recommended lane and taper lengths shown in that report are still applicable.

CDOT Access Permitting

CDOT issued access permit No. 216020 (2/22/2017) for access to Highway 83 at the Stagecoach Road intersection for up to the first 40 single-family residential dwelling units of Flying Horse North. The currently proposed Filing No. 1 will include 80 single-family residential dwelling units plus the golf course. Therefore, a new access permit will be needed once more than 40 dwelling units are constructed and occupied or if the traffic volumes indicated in the permit are exceeded.

Typically, El Paso County will require access permit and issuance of a CDOT Notice-to-Proceed (NTP) prior to Plat recording. However, as an access permit and NTP (a no-new-construction permit) are in-place for a portion of the currently proposed 80 Filing 1 lots, the applicant is requesting that the new change-in-use access permit (for 80 lots plus the golf course) NTP, highway improvements design approval, construction of the auxiliary lanes, and CDOT acceptance of the improvements be required prior to the certificate of occupancy for dwelling units over 40. This will allow limited development within Filing 1 to begin while the turn lanes are designed and plans are reviewed and approved by CDOT.

Filing No. 1 Roadway Classifications

- Stagecoach Road will be classified as a Rural Minor Collector roadway between SH 83 and the first roundabout to the east. East of the roundabout, Stagecoach Road will be classified as a Rural Minor Collector per the PUD plan approval. All other Filing No. 1 streets will be classified as Rural Local roadways.

Coordinate with the design engineer. Per the construction plans and preliminary plan, Milam Road is identified as Rural Minor Collector.

Countywide Road Impact Fee Program

- The Flying Horse North Filing No. 1 will be required to participate in the Countywide Road Impact Fee program. The specific PID option (or opt-out option) as well as the specific calculated fee amount will be provided prior to recording of the plat. The fee per residential dwelling unit will be payable at the time of the building permit. The golf course will also be subject to the fee.

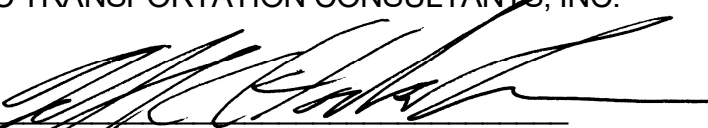
* * * * *

Please contact me if you have any questions regarding this report.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By


Jeffrey C. Hodsdon, P.E., PTOE
Principal

JCH:KDF:bjwb

Enclosures: Tables 2 and 3
Figures 1-7
Level of Service Reports

Update, there are now 80 total lots being platted with filing 1.

Table 2
Trip Generation Estimate
Flying Horse North

Phase	Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates ⁽¹⁾					Total Trips Generated				
				Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour		Average Weekday Traffic	Morning Peak Hour		Afternoon Peak Hour	
					In	Out	In	Out		In	Out	In	Out
1	210	Single-Family Detached Housing	77 DU ⁽²⁾	9.52	0.19	0.56	0.63	0.37	733	14	43	49	28
	430	Golf Course	18 holes	35.74	1.63	0.43	1.49	1.43	643	29	8	27	26
		Total Phase 1							1,376	44	51	76	54
2	210	Single-Family Detached Housing	58 DU	9.52	0.19	0.56	0.63	0.37	552	11	33	37	21
		Total Phases 1 and 2	135 DU						1,929	55	84	113	75
3	210	Single-Family Detached Housing	35 DU	9.52	0.19	0.56	0.63	0.37	333	7	20	22	13
4	210	Single-Family Detached Housing	23 DU	9.52	0.19	0.56	0.63	0.37	219	4	13	14	9
5	210	Single-Family Detached Housing	27 DU	9.52	0.19	0.56	0.63	0.37	257	5	15	17	10
6	210	Single-Family Detached Housing	20 DU	9.52	0.19	0.56	0.63	0.37	190	4	11	13	7
7	210	Single-Family Detached Housing	37 DU	9.52	0.19	0.56	0.63	0.37	352	7	21	23	14
8	210	Single-Family Detached Housing	5 DU	9.52	0.19	0.56	0.63	0.37	48	1	3	3	2
		Total Phases 5-8	147 DU						1,399	28	83	93	54
		Buildout	282 DU						3,328	82	166	205	130

Notes:

(1) Source: "Trip Generation, 9th Edition, 2012" by the Institute of Transportation Engineers (ITE)

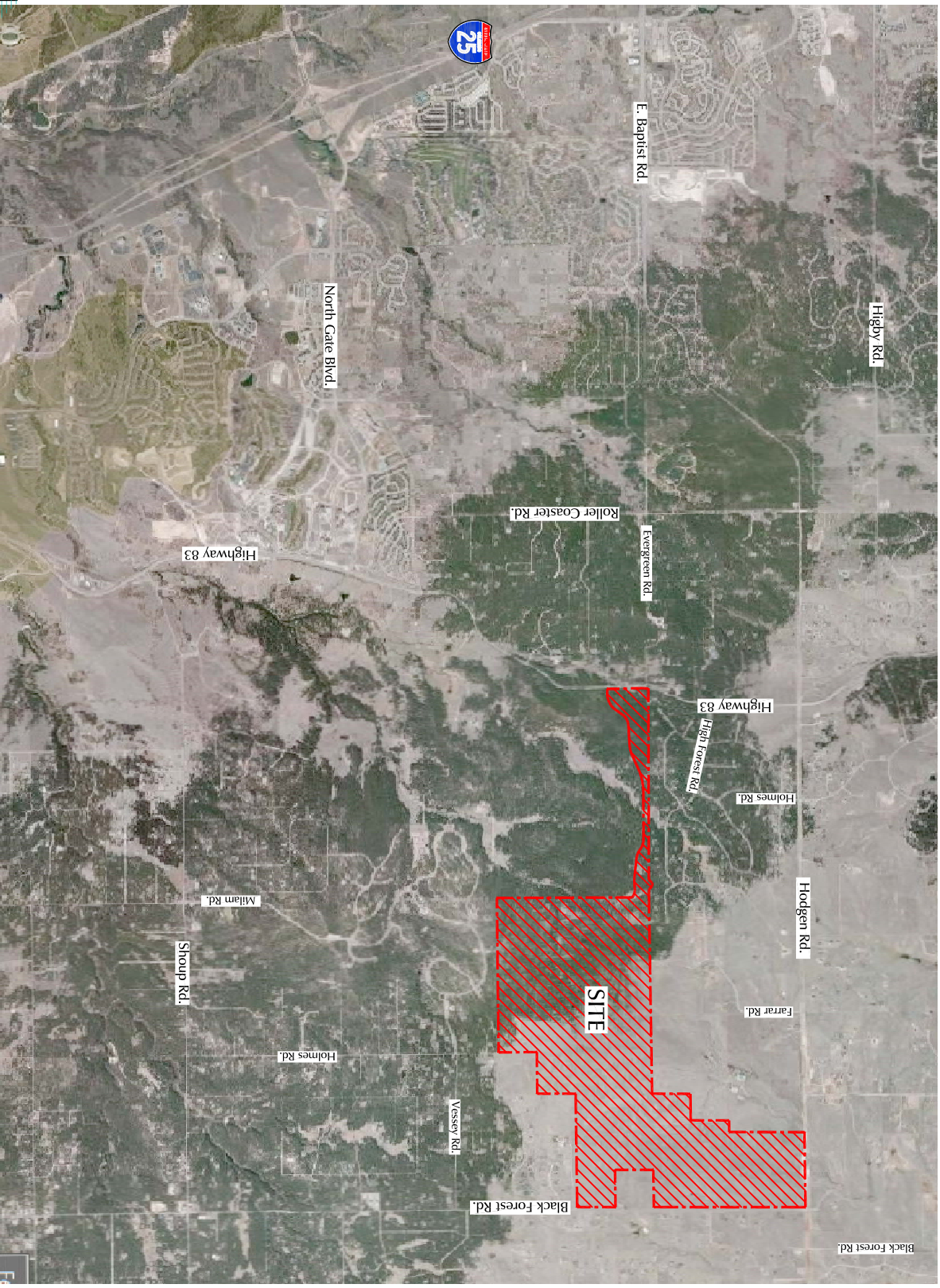
(2) DU = dwelling unit

Source: LSC Transportation Consultants, Inc.

The Preliminary Plan (SP-17-012) is now showing 283 lots at buildout.

Table 3
Recommended Improvements
Flying Horse North Filing No. 1

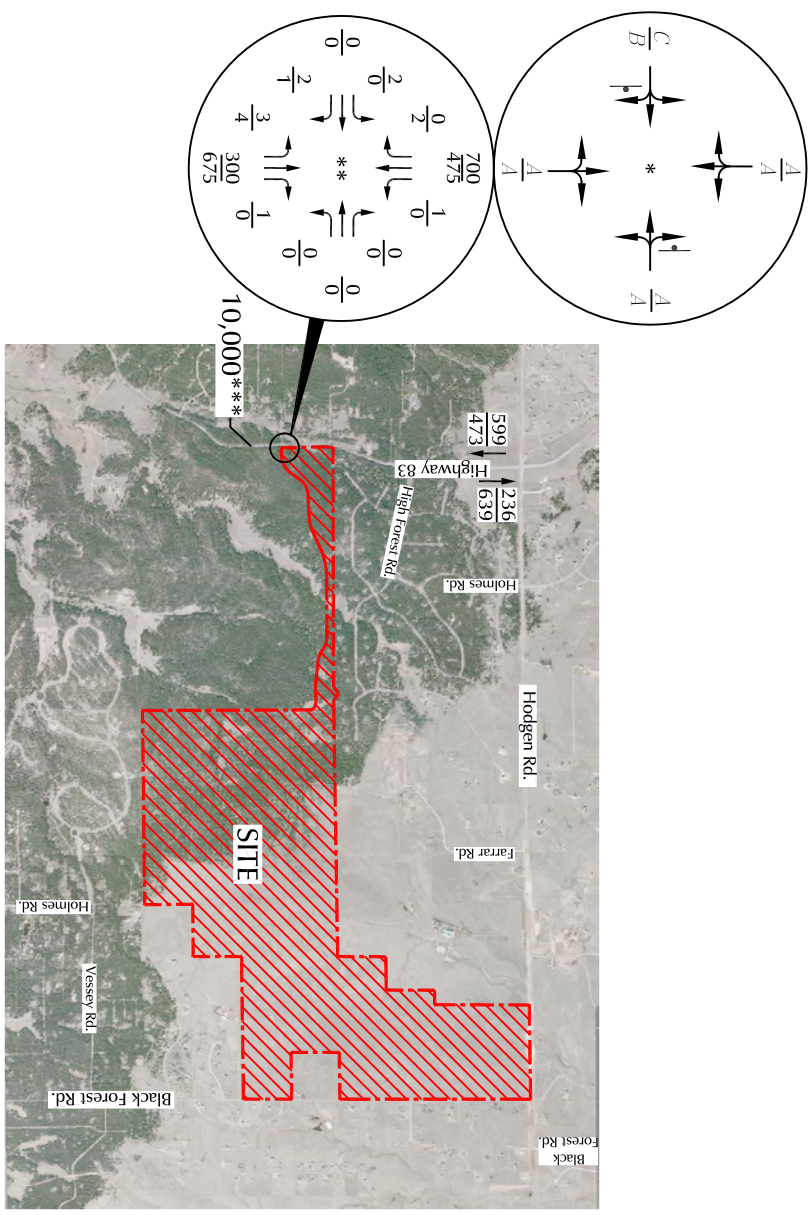
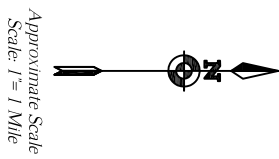
Intersection/Road	Improvement	Lane Length (ft)	Taper Length (ft)
SH 83/Stagecoach	Northbound Right-Turn Deceleration Lane	378	222
	Northbound Right-Turn Acceleration Lane	738	222
	Southbound Left-Turn Lane	418	222
	Southbound Left-Turn Acceleration Lane	738	222
<i>Source: LSC Transportation Consultants, Inc.</i>			



Vicinity Map

Figure 1

Flying Horse North Filing No. 1 (LSC #164050)



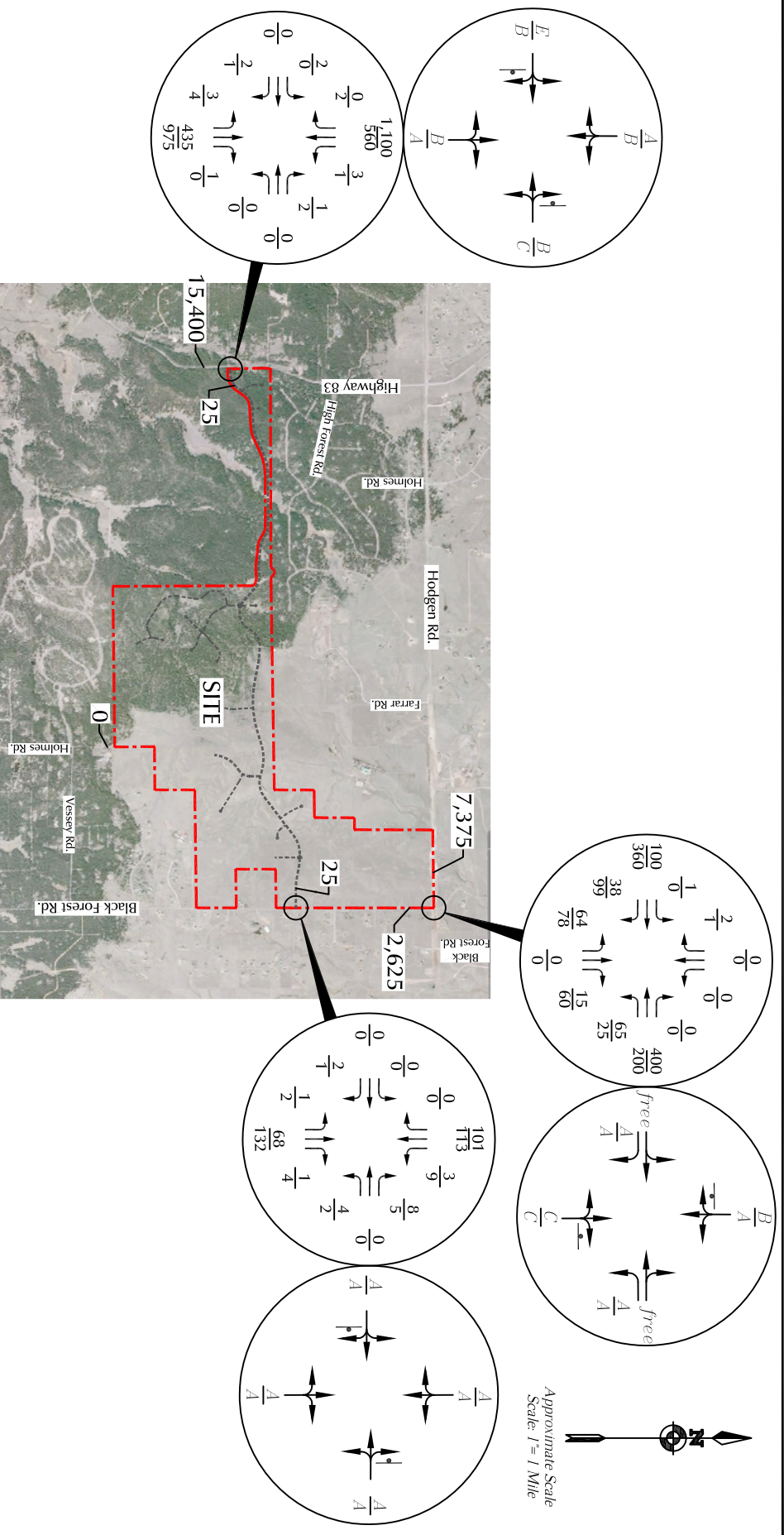
* Based on counts by LSC June 21, 2017
 ** Based on counts by LSC Feb 2016 and June 2017 and CDOT data
 *** CDOT 2016 AADT

LEGEND:

- ⊥ = Stop Sign
- $\frac{XX}{XX}$ = $\frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$
- $\frac{A}{B}$ = $\frac{\text{AM Individual Movement Peak-Hour Level of Service}}{\text{PM Individual Movement Peak-Hour Level of Service}}$
- XXX = Average Weekday Traffic (vehicles per day)

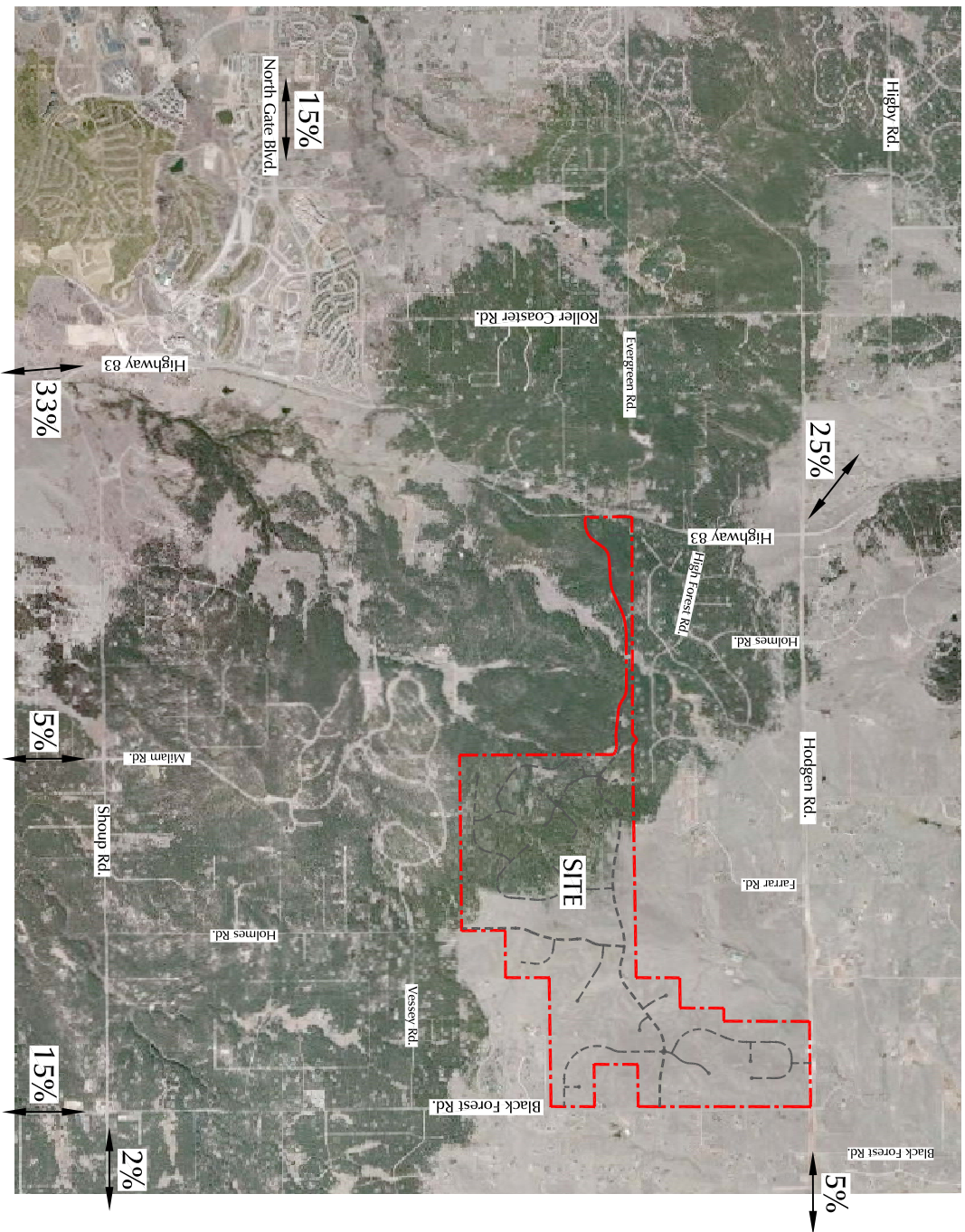
Existing Traffic, Lane Geometry, Traffic Control and Level of Service

Figure 3



Short-Term Background Traffic, Lane Geometry, Traffic Control and Level of Service

Figure 4



Approximate Scale
Scale: 1" = 1 Mile

Figure 5

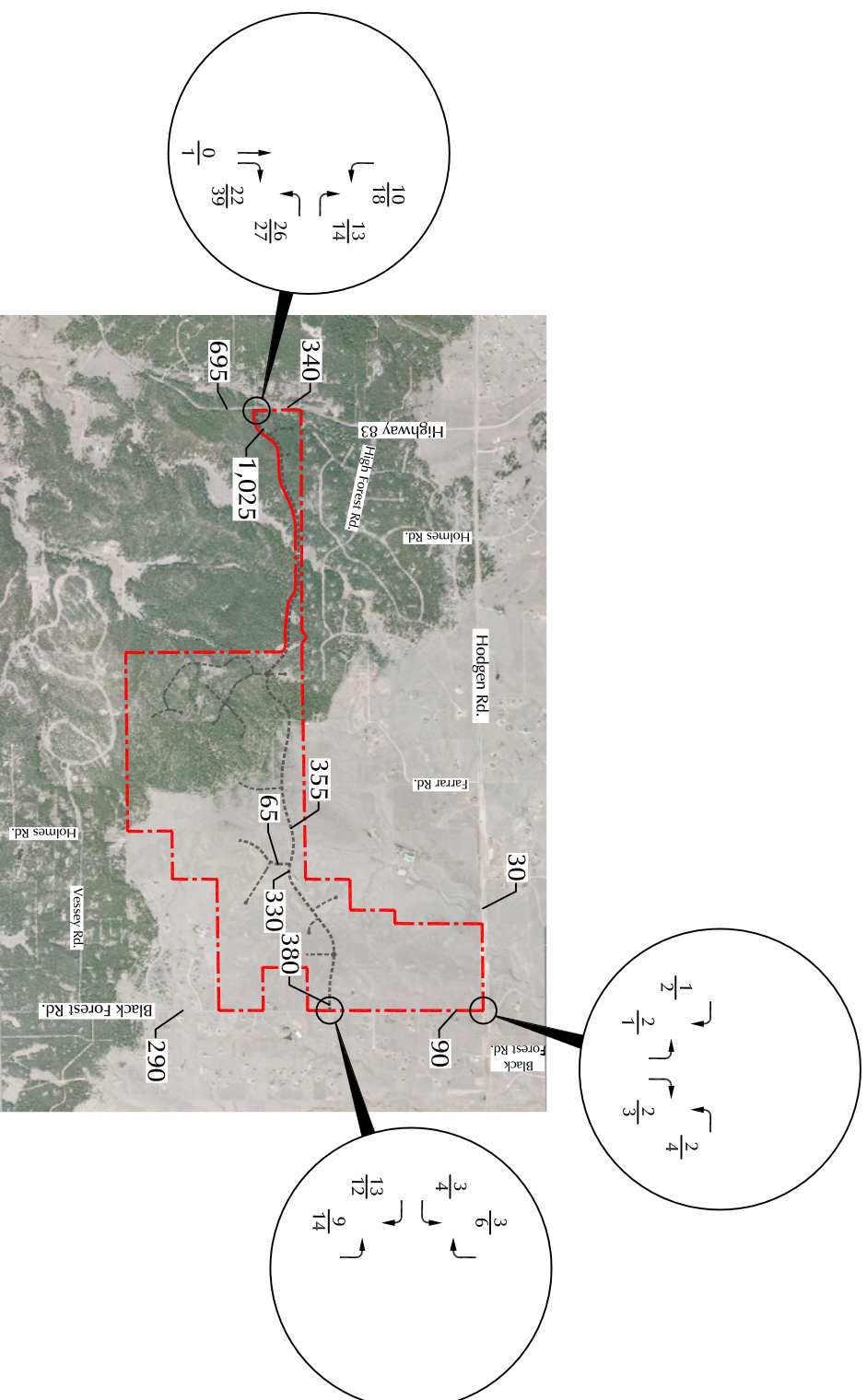
LEGEND:
 ↔ XX% = Percent Directional Distribution

Directional Distribution of Site-Generated Traffic

Flying Horse North Filing No. 1 (LSC #164050)



Approximate Scale
Scale: 1" = 1 Mile



LEGEND:







XX = AM Weekday Peak-Hour Traffic (vehicles per hour)
XX = PM Weekday Peak-Hour Traffic (vehicles per hour)
XXX = Average Weekday Traffic (vehicles per day)

Assignment of Filing No. 1 Site-Generated Traffic

Flying Horse North Filing No. 1 (LSC #164050)

HCM 6th TWSC
2: Black Forest Rd (West)/Driveway & Hodgen Rd

Existing Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	69	35	52	300	0	51	0	12	0	0	2
Future Vol, veh/h	1	69	35	52	300	0	51	0	12	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	240	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	97	97	97	88	88	88	25	25	25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	81	41	54	309	0	58	0	14	0	0	8
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	309	0	0	122	0	0	504	500	81	528	541	309
Stage 1	-	-	-	-	-	-	83	83	-	417	417	-
Stage 2	-	-	-	-	-	-	421	417	-	111	124	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1252	-	-	1465	-	-	478	473	979	461	448	731
Stage 1	-	-	-	-	-	-	925	826	-	613	591	-
Stage 2	-	-	-	-	-	-	610	591	-	894	793	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1252	-	-	1465	-	-	459	455	979	442	431	731
Mov Cap-2 Maneuver	-	-	-	-	-	-	459	455	-	442	431	-
Stage 1	-	-	-	-	-	-	924	825	-	612	569	-
Stage 2	-	-	-	-	-	-	581	569	-	881	792	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.1			13.2			10		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	511	1252	-	-	1465	-	-	731				
HCM Lane V/C Ratio	0.14	0.001	-	-	0.037	-	-	0.011				
HCM Control Delay (s)	13.2	7.9	0	-	7.6	-	-	10				
HCM Lane LOS	B	A	A	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0				

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	2	0	0	0	3	267	1	1	672	0
Future Vol, veh/h	2	0	2	0	0	0	3	267	1	1	672	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	100	100	100	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	2	0	0	0	3	267	1	1	791	0







Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1067	1067	791	1068	1067	268	791	0	0	268	0	0
Stage 1	793	793	-	274	274	-	-	-	-	-	-	-
Stage 2	274	274	-	794	793	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	200	222	390	199	222	771	829	-	-	1296	-	-
Stage 1	382	400	-	732	683	-	-	-	-	-	-	-
Stage 2	732	683	-	381	400	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	199	221	390	197	221	771	829	-	-	1296	-	-
Mov Cap-2 Maneuver	199	221	-	197	221	-	-	-	-	-	-	-
Stage 1	380	400	-	729	680	-	-	-	-	-	-	-
Stage 2	729	680	-	378	400	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	18.9		0		0.1		0	
HCM LOS	C		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	829	-	-	264	-	1296	-
HCM Lane V/C Ratio	0.004	-	-	0.016	-	0.001	-
HCM Control Delay (s)	9.4	0	-	18.9	0	7.8	0
HCM Lane LOS	A	A	-	C	A	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-	0	-

HCM 6th TWSC
2: Black Forest Rd (West)/Driveway & Hodgen Rd

Existing Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	270	69	22	151	0	63	0	44	0	0	1
Future Vol, veh/h	0	270	69	22	151	0	63	0	44	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	240	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	79	79	79	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	273	70	28	191	0	63	0	44	0	0	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	191	0	0	343	0	0	521	520	273	577	590	191
Stage 1	-	-	-	-	-	-	273	273	-	247	247	-
Stage 2	-	-	-	-	-	-	248	247	-	330	343	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1383	-	-	1216	-	-	466	461	766	428	420	851
Stage 1	-	-	-	-	-	-	733	684	-	757	702	-
Stage 2	-	-	-	-	-	-	756	702	-	683	637	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1383	-	-	1216	-	-	457	450	766	396	410	851
Mov Cap-2 Maneuver	-	-	-	-	-	-	457	450	-	396	410	-
Stage 1	-	-	-	-	-	-	733	684	-	757	686	-
Stage 2	-	-	-	-	-	-	738	686	-	644	637	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1			13.2			9.2		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	548	1383	-	-	1216	-	-	851				
HCM Lane V/C Ratio	0.195	-	-	-	0.023	-	-	0.001				
HCM Control Delay (s)	13.2	0	-	-	8	-	-	9.2				
HCM Lane LOS	B	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	0.7	0	-	-	0.1	-	-	0				

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	1	0	0	0	4	599	0	0	341	2
Future Vol, veh/h	0	0	1	0	0	0	4	599	0	0	341	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	91	91	91	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1	0	0	0	4	658	0	0	341	2

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1008	1008	342	1009	1009	658	343	0	0	658	0	0
Stage 1	342	342	-	666	666	-	-	-	-	-	-	-
Stage 2	666	666	-	343	343	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	219	240	701	219	240	464	1216	-	-	930	-	-
Stage 1	673	638	-	449	457	-	-	-	-	-	-	-
Stage 2	449	457	-	672	637	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	218	239	701	218	239	464	1216	-	-	930	-	-
Mov Cap-2 Maneuver	218	239	-	218	239	-	-	-	-	-	-	-
Stage 1	670	638	-	447	455	-	-	-	-	-	-	-
Stage 2	447	455	-	671	637	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.1		0		0.1		0	
HCM LOS	B		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1216	-	-	701	-	930	-
HCM Lane V/C Ratio	0.004	-	-	0.002	-	-	-
HCM Control Delay (s)	8	0	-	10.1	0	0	-
HCM Lane LOS	A	A	-	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-

HCM 6th TWSC
2: Black Forest Rd (West)/Driveway & Hodgen Rd

Short-Term Background Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↗			↕			↕	
Traffic Vol, veh/h	1	100	38	65	400	0	64	0	15	0	0	2
Future Vol, veh/h	1	100	38	65	400	0	64	0	15	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	240	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	97	97	97	92	92	92	25	25	25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	118	45	67	412	0	70	0	16	0	0	8
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	412	0	0	163	0	0	670	666	118	697	711	412
Stage 1	-	-	-	-	-	-	120	120	-	546	546	-
Stage 2	-	-	-	-	-	-	550	546	-	151	165	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1147	-	-	1416	-	-	371	380	934	356	358	640
Stage 1	-	-	-	-	-	-	884	796	-	522	518	-
Stage 2	-	-	-	-	-	-	519	518	-	851	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1147	-	-	1416	-	-	353	362	934	337	341	640
Mov Cap-2 Maneuver	-	-	-	-	-	-	353	362	-	337	341	-
Stage 1	-	-	-	-	-	-	883	795	-	521	494	-
Stage 2	-	-	-	-	-	-	488	494	-	835	761	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.1			16.4			10.7		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	400	1147	-	-	1416	-	-	640				
HCM Lane V/C Ratio	0.215	0.001	-	-	0.047	-	-	0.013				
HCM Control Delay (s)	16.4	8.1	0	-	7.7	-	-	10.7				
HCM Lane LOS	C	A	A	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	0				

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	0	0	2	4	0	8	1	68	1	3	101	0
Future Vol, veh/h	0	0	2	4	0	8	1	68	1	3	101	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	340	-	-	340	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	2	4	0	9	1	74	1	3	110	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	197	193	110	194	193	75	110	0	0	75	0	0
Stage 1	116	116	-	77	77	-	-	-	-	-	-	-
Stage 2	81	77	-	117	116	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	762	702	943	765	702	986	1480	-	-	1524	-	-
Stage 1	889	800	-	932	831	-	-	-	-	-	-	-
Stage 2	927	831	-	888	800	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	754	700	943	762	700	986	1480	-	-	1524	-	-
Mov Cap-2 Maneuver	754	700	-	762	700	-	-	-	-	-	-	-
Stage 1	888	798	-	931	830	-	-	-	-	-	-	-
Stage 2	918	830	-	884	798	-	-	-	-	-	-	-







Approach	EB		WB		NB		SB	
HCM Control Delay, s	8.8		9.1		0.1		0.2	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1480	-	-	943	898	1524	-
HCM Lane V/C Ratio	0.001	-	-	0.002	0.015	0.002	-
HCM Control Delay (s)	7.4	-	-	8.8	9.1	7.4	-
HCM Lane LOS	A	-	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	2	0	0	1	3	435	1	1	1100	0
Future Vol, veh/h	2	0	2	0	0	1	3	435	1	1	1100	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	100	100	100	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	0	2	0	0	1	3	435	1	1	1294	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1738	1738	1294	1739	1738	436	1294	0	0	436	0	0
Stage 1	1296	1296	-	442	442	-	-	-	-	-	-	-
Stage 2	442	442	-	1297	1296	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	68	87	199	68	87	620	536	-	-	1124	-	-
Stage 1	199	232	-	594	576	-	-	-	-	-	-	-
Stage 2	594	576	-	199	232	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	67	86	199	67	86	620	536	-	-	1124	-	-
Mov Cap-2 Maneuver	67	86	-	67	86	-	-	-	-	-	-	-
Stage 1	198	231	-	590	572	-	-	-	-	-	-	-
Stage 2	589	572	-	196	231	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	42.6		10.8		0.1		0					
HCM LOS	E		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	536	-	-	100	620	1124	-	-				
HCM Lane V/C Ratio	0.006	-	-	0.043	0.002	0.001	-	-				
HCM Control Delay (s)	11.8	0	-	42.6	10.8	8.2	0	-				
HCM Lane LOS	B	A	-	E	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

HCM 6th TWSC
2: Black Forest Rd (West)/Driveway & Hodgen Rd

Short-Term Background Traffic
PM Peak Hour







Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	360	99	25	200	0	78	0	60	0	0	1
Future Vol, veh/h	0	360	99	25	200	0	78	0	60	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	240	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	79	79	79	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	364	100	32	253	0	78	0	60	0	0	1
Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	253	0	0	464	0	0	682	681	364	761	781	253
Stage 1	-	-	-	-	-	-	364	364	-	317	317	-
Stage 2	-	-	-	-	-	-	318	317	-	444	464	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1312	-	-	1097	-	-	364	373	681	322	326	786
Stage 1	-	-	-	-	-	-	655	624	-	694	654	-
Stage 2	-	-	-	-	-	-	693	654	-	593	564	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1312	-	-	1097	-	-	355	362	681	287	317	786
Mov Cap-2 Maneuver	-	-	-	-	-	-	355	362	-	287	317	-
Stage 1	-	-	-	-	-	-	655	624	-	694	635	-
Stage 2	-	-	-	-	-	-	672	635	-	541	564	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	0		0.9		16.6		9.6					
HCM LOS					C		A					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	448	1312	-	-	1097	-	-	786				
HCM Lane V/C Ratio	0.308	-	-	-	0.029	-	-	0.001				
HCM Control Delay (s)	16.6	0	-	-	8.4	-	-	9.6				
HCM Lane LOS	C	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	1.3	0	-	-	0.1	-	-	0				

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	0	0	1	2	0	5	2	132	4	9	113	0
Future Vol, veh/h	0	0	1	2	0	5	2	132	4	9	113	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	340	-	-	340	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1	2	0	5	2	143	4	10	123	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	295	294	123	293	292	145	123	0	0	147	0	0
Stage 1	143	143	-	149	149	-	-	-	-	-	-	-
Stage 2	152	151	-	144	143	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	657	617	928	659	619	902	1464	-	-	1435	-	-
Stage 1	860	779	-	854	774	-	-	-	-	-	-	-
Stage 2	850	772	-	859	779	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	649	612	928	654	614	902	1464	-	-	1435	-	-
Mov Cap-2 Maneuver	649	612	-	654	614	-	-	-	-	-	-	-
Stage 1	859	774	-	853	773	-	-	-	-	-	-	-
Stage 2	844	771	-	852	774	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	8.9		9.5		0.1		0.6					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1464	-	-	928	814	1435	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.001	0.009	0.007	-	-				
HCM Control Delay (s)	7.5	-	-	8.9	9.5	7.5	-	-				
HCM Lane LOS	A	-	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-				

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	1	0	0	2	4	975	0	1	560	2
Future Vol, veh/h	0	0	1	0	0	2	4	975	0	1	560	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	91	91	91	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1	0	0	2	4	1071	0	1	560	2
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1643	1642	561	1643	1643	1071	562	0	0	1071	0	0
Stage 1	563	563	-	1079	1079	-	-	-	-	-	-	-
Stage 2	1080	1079	-	564	564	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	80	100	527	80	100	268	1009	-	-	651	-	-
Stage 1	511	509	-	264	295	-	-	-	-	-	-	-
Stage 2	264	295	-	510	508	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	79	99	527	79	99	268	1009	-	-	651	-	-
Mov Cap-2 Maneuver	79	99	-	79	99	-	-	-	-	-	-	-
Stage 1	506	508	-	261	292	-	-	-	-	-	-	-
Stage 2	259	292	-	508	507	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	11.8		18.5		0		0					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1009	-	-	527	268	651	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.002	0.008	0.002	-	-				
HCM Control Delay (s)	8.6	0	-	11.8	18.5	10.5	0	-				
HCM Lane LOS	A	A	-	B	C	B	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-				

HCM 6th TWSC
2: Black Forest Rd (West)/Driveway & Hodgen Rd

Short-Term Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	100	39	67	400	0	66	0	17	0	0	2
Future Vol, veh/h	1	100	39	67	400	0	66	0	17	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	240	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	97	97	97	92	92	92	25	25	25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	118	46	69	412	0	72	0	18	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	412	0	0	164	0	0	674	670	118	702	716	412
Stage 1	-	-	-	-	-	-	120	120	-	550	550	-
Stage 2	-	-	-	-	-	-	554	550	-	152	166	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1147	-	-	1414	-	-	368	378	934	353	356	640
Stage 1	-	-	-	-	-	-	884	796	-	519	516	-
Stage 2	-	-	-	-	-	-	517	516	-	850	761	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1147	-	-	1414	-	-	350	359	934	333	338	640
Mov Cap-2 Maneuver	-	-	-	-	-	-	350	359	-	333	338	-
Stage 1	-	-	-	-	-	-	883	795	-	518	491	-
Stage 2	-	-	-	-	-	-	486	491	-	832	760	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.1			16.6			10.7		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	401	1147	-	-	1414	-	-	640
HCM Lane V/C Ratio	0.225	0.001	-	-	0.049	-	-	0.013
HCM Control Delay (s)	16.6	8.1	0	-	7.7	-	-	10.7
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.9	0	-	-	0.2	-	-	0

HCM 6th TWSC
5: Black Forest Rd & Stagecoach/Terra Ridge (north)

Short-Term Total Traffic
AM Peak Hour

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	15	4	0	8	10	68	1	3	101	3
Future Vol, veh/h	3	0	15	4	0	8	10	68	1	3	101	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	16	4	0	9	11	74	1	3	110	3
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	219	215	112	223	216	75	113	0	0	75	0	0
Stage 1	118	118	-	97	97	-	-	-	-	-	-	-
Stage 2	101	97	-	126	119	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	737	683	941	733	682	986	1476	-	-	1524	-	-
Stage 1	887	798	-	910	815	-	-	-	-	-	-	-
Stage 2	905	815	-	878	797	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	725	676	941	715	675	986	1476	-	-	1524	-	-
Mov Cap-2 Maneuver	725	676	-	715	675	-	-	-	-	-	-	-
Stage 1	880	796	-	903	808	-	-	-	-	-	-	-
Stage 2	890	808	-	861	795	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	9.1		9.2		0.9		0.2					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1476	-	-	896	875	1524	-	-				
HCM Lane V/C Ratio	0.007	-	-	0.022	0.015	0.002	-	-				
HCM Control Delay (s)	7.5	0	-	9.1	9.2	7.4	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

SimTraffic Performance Report

126: SH 83 & Stagecoach Rd Performance by lane Interval #1 7:00

Lane	EB	WB	WB	NB	NB	NB	SB	SB	All
Movements Served	LTR	LT	R	L	T	R	L	TR	
Stop Del/Veh (s)	10.1	5.1	4.3	1.8	0.0	0.0	0.7	0.0	0.1

126: SH 83 & Stagecoach Rd Performance by lane Interval #2 7:15

Lane	EB	WB	WB	NB	NB	NB	SB	SB	All
Movements Served	LTR	LT	R	L	T	R	L	TR	
Stop Del/Veh (s)	6.2	6.2	3.5	5.5	0.0	0.0	1.0	0.0	0.2

126: SH 83 & Stagecoach Rd Performance by lane Interval #3 7:30

Lane	EB	WB	WB	NB	NB	NB	SB	SB	All
Movements Served	LTR	LT	R	L	T	R	L	TR	
Stop Del/Veh (s)	13.1	4.7	3.4	10.9	0.0	0.0	1.2	0.0	0.2

126: SH 83 & Stagecoach Rd Performance by lane Interval #4 7:45

Lane	EB	WB	WB	NB	NB	NB	SB	SB	All
Movements Served	LTR	LT	R	L	T	R	L	TR	
Stop Del/Veh (s)	9.3	5.4	3.6	5.2	0.0	0.0	2.8	0.0	0.2

126: SH 83 & Stagecoach Rd Performance by lane Entire Run

Lane	EB	WB	WB	NB	NB	NB	SB	SB	All
Movements Served	LTR	LT	R	L	T	R	L	TR	
Stop Del/Veh (s)	9.7	5.4	3.4	6.3	0.0	0.0	1.5	0.0	0.2

HCM 6th TWSC
2: Black Forest Rd (West)/Driveway & Hodgen Rd

Short-Term Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↗			↕			↕	
Traffic Vol, veh/h	0	360	101	29	200	0	79	0	63	0	0	1
Future Vol, veh/h	0	360	101	29	200	0	79	0	63	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	240	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	79	79	79	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	364	102	37	253	0	79	0	63	0	0	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	253	0	0	466	0	0	692	691	364	774	793	253
Stage 1	-	-	-	-	-	-	364	364	-	327	327	-
Stage 2	-	-	-	-	-	-	328	327	-	447	466	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1312	-	-	1095	-	-	358	368	681	316	321	786
Stage 1	-	-	-	-	-	-	655	624	-	686	648	-
Stage 2	-	-	-	-	-	-	685	648	-	591	562	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1312	-	-	1095	-	-	348	355	681	279	310	786
Mov Cap-2 Maneuver	-	-	-	-	-	-	348	355	-	279	310	-
Stage 1	-	-	-	-	-	-	655	624	-	686	626	-
Stage 2	-	-	-	-	-	-	661	626	-	536	562	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.1			16.9			9.6		
HCM LOS							C			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	444	1312	-	-	1095	-	-	786				
HCM Lane V/C Ratio	0.32	-	-	-	0.034	-	-	0.001				
HCM Control Delay (s)	16.9	0	-	-	8.4	-	-	9.6				
HCM Lane LOS	C	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	1.4	0	-	-	0.1	-	-	0				

HCM 6th TWSC
5: Black Forest Rd & Stagecoach/Terra Ridge (north)

Short-Term Total Traffic
PM Peak Hour

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	0	13	2	0	5	16	132	4	9	113	6
Future Vol, veh/h	4	0	13	2	0	5	16	132	4	9	113	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	14	2	0	5	17	143	4	10	123	7
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	329	328	127	333	329	145	130	0	0	147	0	0
Stage 1	147	147	-	179	179	-	-	-	-	-	-	-
Stage 2	182	181	-	154	150	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	624	591	923	620	590	902	1455	-	-	1435	-	-
Stage 1	856	775	-	823	751	-	-	-	-	-	-	-
Stage 2	820	750	-	848	773	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	610	579	923	601	578	902	1455	-	-	1435	-	-
Mov Cap-2 Maneuver	610	579	-	601	578	-	-	-	-	-	-	-
Stage 1	845	769	-	812	741	-	-	-	-	-	-	-
Stage 2	804	740	-	828	767	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	9.5		9.6		0.8		0.5					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1455	-	-	824	789	1435	-	-				
HCM Lane V/C Ratio	0.012	-	-	0.022	0.01	0.007	-	-				
HCM Control Delay (s)	7.5	0	-	9.5	9.6	7.5	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

SimTraffic Performance Report

Short-Term Total Traffic

PM Peak Hour

126: SH 83 & Stagecoach Rd Performance by lane Interval #1 5:00

Lane	EB	WB	WB	NB	NB	SB	SB	All
Movements Served	LTR	LT	R	LT	R	L	TR	
Stop Del/Veh (s)		13.5	10.3	0.0	0.0	7.5	0.0	0.4

126: SH 83 & Stagecoach Rd Performance by lane Interval #2 5:15

Lane	WB	WB	NB	NB	SB	SB	All
Movements Served	LT	R	LT	R	L	TR	
Stop Del/Veh (s)	13.2	6.1	0.0	0.0	3.0	0.0	0.2

126: SH 83 & Stagecoach Rd Performance by lane Interval #3 5:30

Lane	EB	WB	WB	NB	NB	SB	SB	All
Movements Served	LTR	LT	R	LT	R	L	TR	
Stop Del/Veh (s)	1.5	17.8	8.3	0.0	0.0	8.0	0.0	0.6

126: SH 83 & Stagecoach Rd Performance by lane Interval #4 5:45

Lane	WB	WB	NB	NB	SB	SB	All
Movements Served	LT	R	LT	R	L	TR	
Stop Del/Veh (s)	22.1	8.5	0.0	0.0	4.2	0.0	0.5

126: SH 83 & Stagecoach Rd Performance by lane Entire Run

Lane	EB	WB	WB	NB	NB	SB	SB	All
Movements Served	LTR	LT	R	LT	R	L	TR	
Stop Del/Veh (s)	2.8	18.1	8.1	0.0	0.0	6.3	0.0	0.4

Markup Summary

dsdlaforce (6)

7/18/2019 1:11 PM
Add PCD File No. SF-18-001

Subject: Text Box
Page Label: 1
Lock: Unlocked
Author: dsdlaforce

Add PCD File No. SF-18-001

1/11/2019 1:11 PM
Add PCD File No. SF-18-001

Subject: Text Box
Page Label: 1
Lock: Unlocked
Author: dsdlaforce

See comments from the Dec 6 TIS associated with the Flying Horse North Preliminary Plan (SP-17-012).

Include the following:

- Engineer's and Developer's certification page with signatures and stamp.
- Provide the Roundabout design analysis (geometry, fastest path, entry angles, Autoturn for the design vehicles WB67, etc.)
- Provide the analysis/recommendation for the driveway location for the lots adjacent to the roundabouts. How far away should the driveways be located away from the roundabout? Lots 29, 41 and 44 both have frontage fully at the roundabout.
- List the approved deviation (with reference number or PUD modification from the ECM.
- List proposed deviation request being submitted.

1/11/2019 1:11 PM
Add PCD File No. SF-18-001

Subject: Callout
Page Label: 5
Lock: Unlocked
Author: dsdlaforce

Update trip values to match Table 2

1/11/2019 1:11 PM
Add PCD File No. SF-18-001

Subject: Callout
Page Label: 7
Lock: Unlocked
Author: dsdlaforce

Coordinate with the design engineer. Per the construction plans and preliminary plan Milam Road is identified as Rural Minor Collector

1/11/2019 1:11 PM
Add PCD File No. SF-18-001

Subject: Callout
Page Label: 8
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The Preliminary Plan (SP-17-012) is now showing 283 lots at buildout.

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Add PCD File No. SF-18-001

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Update, there are now 80 total lots being platted with filing 1.