



Include the following:

- List the classification of all adjacent or impacted roadways per the MTCP.
- List all approved deviation requests (with reference number) or PUD modification from the Engineering Criteria.
- Include the engineer's and developers certification page with signatures and stamp.
- Provide roundabout analysis (geometry, fastest path, entry angles, etc.)
- Provide 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.

210  
903  
868  
430  
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December 6, 2017

Mr. Drew Balsick  
PRI #2, LLC  
6385 Corporate Drive  
Colorado Springs, CO 80919

RE: Flying Horse North Preliminary Plan  
El Paso County, Colorado  
Traffic Impact Analysis  
LSC #174870

Dear Drew:

LSC Transportation Consultants, Inc. has prepared this report for the proposed Flying Horse North Preliminary Plan. 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 preliminary plan. This report has been prepared to accompany the preliminary plan submittal and includes a site-specific traffic report for Phase 1 and an addendum/update to the master TIS for Flying Horse North PUD (dated July 21, 2016).

## 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; however, the phasing plan has changed. The currently proposed phasing plan is attached.

The Flying Horse North master TIS analyzed three scenarios. The first scenario (Existing Plus Phase 1 and 2 Site-Generated Traffic) assumed buildout of 43 single-family homes only (no golf course). The first scenario also assumed segments of Stagecoach Road would be built east from SH 83 and west from Black Forest Road with a gravel pilot road/ungated emergency road between these two sections. The currently proposed first phase includes 80 single-family homes and also includes the golf course. Stagecoach Road is now planned to be fully constructed and paved from SH 83 to Black Forest Road with Phase 1.

The second scenario ("Short Term") analyzed in the Flying Horse North master TIS assumed buildout of 136 single-family homes plus the golf course. This scenario assumed buildout of Stagecoach Road from SH 83 to Black Forest Road but assumed Holmes Road had not been extended north through the site to Stagecoach Road. The second scenario also assumed no access connections with these phases to Holmes Road or Hodgen Road. The currently proposed Phases 1 and 2 includes 135 lots for single-family homes (one fewer than the previous "short-term" scenario) plus the golf course. In addition to comparable land use assumptions, the access plan for the currently proposed Phases 1 and 2 is the same as what was assumed for the short-term scenario in the master TIS.

The third scenario ("2040 Total") assumed buildout of 136 lots for single-family homes plus the golf course. No changes to the land use and to the long-term/buildout access and roadway network as shown in the 2016 Flying Horse North master TIA are proposed.

## **TRIP GENERATION**

The site-generated vehicle-trips were estimated using the nationally published trip generation rates from *Trip Generation, 9<sup>th</sup> Edition, 2012* by the Institute of Transportation Engineers (ITE). Table 1 shows the site's average weekday, morning peak-hour, and afternoon peak-hour trip generation estimates for the Flying Horse North development by phase.

At buildout of Phase 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.

Following buildout of Phase 2, Flying Horse North could be expected to generate about 1,929 new vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. This is about nine fewer trips than was assumed for Phases 1-6 in the Flying Horse North master TIS. During the morning peak hour about 55 vehicles would enter and 84 vehicles would exit the site. This is the same number of entering trips and one fewer exiting trip than was assumed for Phases 1-6 in the master TIA. During the afternoon peak hour about 112 vehicles would enter and 76 vehicles would exit the site. This is one fewer entering trips and the same number of exiting trips as was assumed for Phases 1-6 in the master TIA.

At buildout Flying Horse North could be expected to generate about 3,337 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 82 vehicles would enter and 167 vehicles would exit the site. During the afternoon peak hour about 205 vehicles would enter and 131 vehicles would exit the site. This matches the buildout trip generation estimate from the Flying Horse North master TIS.

## **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.

When the distribution percentages shown in Figure 5 from the Master TIS are applied to the trip generation estimates shown in Table 1, the site-generated traffic volumes on the area roadways can be determined. The Phase 1 site-generated traffic volumes are shown in Figure 1 (attached). Figure 1 also shows average weekday traffic volumes on the internal and off-site roadways. The Phase 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 other access to Black Forest Road (other than the new Stagecoach Road).

The Phase 1-6 analysis contained in the master TIS was based on one more single-family home than the currently proposed Phases 1 and 2. The access plan for this intermediate scenario is also consistent with the currently proposed plan for Phase 2. The overall land use and access plan at buildout has also not changed since completion of the master TIS. As no changes are planned for these scenarios, please refer to Figures 8 and 9 from the master TIS for the Phase 2 and buildout site-generated traffic volumes, respectively.

## **PHASE 1 TOTAL TRAFFIC**

Figure 2 (attached) shows the short-term total traffic volumes at the intersections in the vicinity of the site assuming buildout of Phase 1 only. These volumes are the sum of the short-term background traffic volumes from Figure 4 of the Flying Horse North master TIS plus the Phase 1 site-generated traffic volumes from Figure 1.

## **SHORT-TERM AND 2040 TOTAL TRAFFIC**

Please refer to Figures 11 and 12 from the master TIS for the short-term total traffic volumes following buildout of Phase 2 and 2040 total traffic volumes, respectively.

## **PROJECTED LEVEL OF SERVICE**

The intersections in the vicinity of the site have been analyzed to determine the projected level of service following buildout of Phase 1 based on the unsignalized method of analysis procedures outlined in the *Highway Capacity Manual, 6<sup>th</sup> 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 assuming buildout of Phase 1 only.

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 from the Flying Horse North master TIS 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.

Please refer to the Flying Horse North master TIS for level of service and traffic signal warrant analysis based on the projected short-term total (following Phase 2) and 2040 traffic volumes.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Trip Generation**

- Phase 1 of 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 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.
- The projected trip generation following buildout of Phase 2 of the Flying Horse North development is slightly lower than the projected trip generation for Phases 1-6 assumed in the Flying Horse North master TIS.
- The projected trip generation at buildout of Flying Horse North has not changed from what was assumed in the Flying Horse North master TIS.

### **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 following buildout of Phase 1 only.
- 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 following buildout of Phase 1 only.
- Please refer to the Flying Horse North master TIS for level of service and traffic signal warrant analysis based on the projected short-term total (following Phase 2) and 2040 traffic volumes.

## Auxiliary Turn Lanes

- Table 2 shows an updated summary of the auxiliary turn lanes that will be required based on the currently proposed phasing plan.
- Based on the projected short-term total traffic volumes following buildout of Phase 1 only 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 following buildout of Phase 1 only 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 Contradicts Table 2 which notes NBRT Accel is required with Phase 1. taper.
- Based on the short-term total traffic 1 only 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 following buildout of Phase 1 only 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. This lane will be required with what is currently proposed as Phase 3. The recommended lane and taper lengths shown in the Flying Horse North master TIS are still applicable.
- All of the recommendations for auxiliary turn lanes at buildout shown in the Flying Horse North master TIS 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 Phase 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 an 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 Phase 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 Phase 1 to begin while the turn lanes are designed and plans are reviewed and approved by CDOT.

### Phase 1 Roadway Classifications

- Stagecoach Road will be classified as a Rural Major Collector roadway between SH 83 and the first roundabout to the east. East of this first roundabout, it will be classified as a Rural Minor Collector per the PUD plan approval. All other Phase 1 roads will be classified as Rural Local roadways.

### Countywide Road

Provide an exhibit for the roadway classifications.  
The preliminary plan also identifies some roadway segments as Rural Minor Collector.

- Flying Horse North including the current Phase 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 Filing 1 (Phase 1) 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.

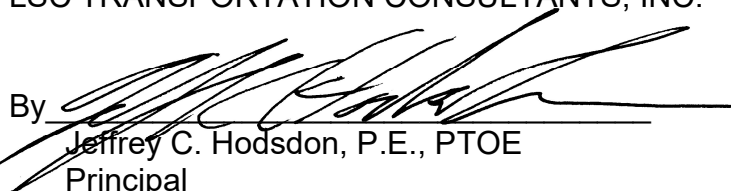
\* \* \* \* \*

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 1 and 2  
Figures 1-2  
Phasing Plan

**Table 1**  
**Trip Generation Estimate**  
**Flying Horse North Preliminary Plan**

Phase	Land Use Code	Land Use Description	Trip Generation Units	Trip Generation Rates <sup>(1)</sup>					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	80 DU <sup>(2)</sup>	9.52	0.19	0.56	0.63	0.37	762	15	45	50	30
	430	Golf Course	18 holes	35.74	1.63	0.43	1.49	1.43	643	29	8	27	26
		<b>Total Phase 1</b>							<b>1,405</b>	<b>44</b>	<b>53</b>	<b>77</b>	<b>56</b>
2	210	Single-Family Detached Housing	55 DU	9.52	0.19	0.56	0.63	0.37	524	10	31	35	20
		<b>Total Phases 1 and 2</b>	<b>135 DU</b>						<b>1,929</b>	<b>55</b>	<b>84</b>	<b>112</b>	<b>76</b>
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	28 DU	9.52	0.19	0.56	0.63	0.37	267	5	16	18	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
		<b>Total Phases 5-8</b>	<b>148 DU</b>						<b>1,409</b>	<b>28</b>	<b>83</b>	<b>93</b>	<b>55</b>
		<b>Buildout</b>	<b>283 DU</b>						<b>3,337</b>	<b>82</b>	<b>167</b>	<b>205</b>	<b>131</b>

Notes:

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

(2) DU = dwelling unit

Source: LSC Transportation Consultants, Inc.

State whether or not any improvements affected by the project are reimbursable under the current MTCP.

**Table 2**  
**Recommended Improvements**  
**Flying Horse North Preliminary Plan**

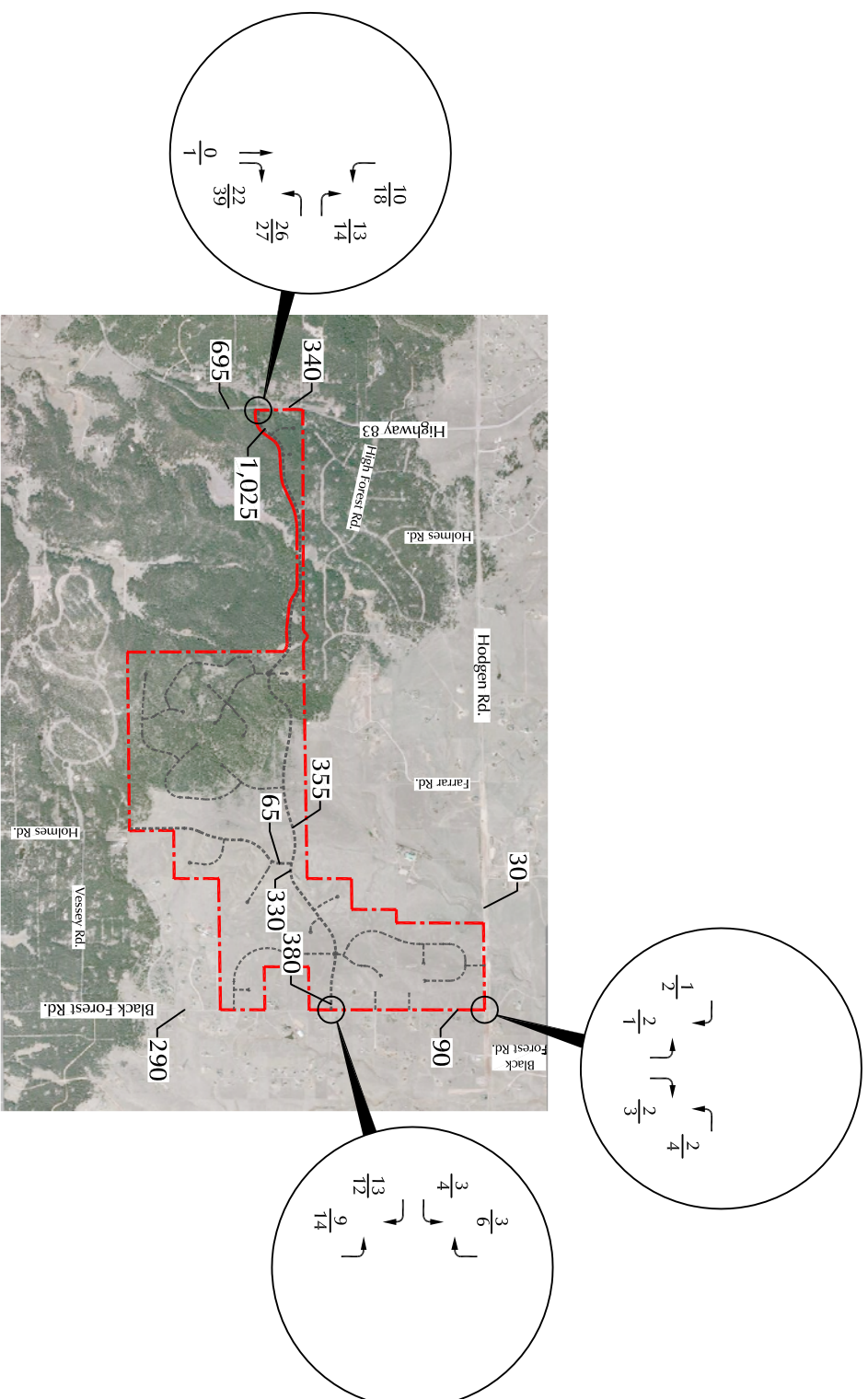
Intersection/Road	Improvement	Lane Length (ft)	Taper Length (ft)	Phase When Required
SH 83/Stagecoach	Northbound Right-Turn Deceleration Lane	378	222	1
	Northbound Right-Turn Acceleration Lane	738	222	1
	Southbound Left-Turn Lane	418	222	1
	Southbound Left-Turn Acceleration Lane	738	222	1
Hogden/Full-Movement Site Access	No Auxiliary Lanes Required			
Hogden/Black Forest (West)	No Additional Auxiliary Lanes Required			
Black Forest/Stagecoach	Northbound Left-Turn Lane	340	240	3
Black Forest/Site Access Points	No Auxiliary Lanes Required			
Holmes Road	Pave	N/A	N/A	5
Source: LSC Transportation Consultants, Inc.				

State whether the ECM sight distance criteria can be met. If this cannot be met, state the required modification so that it can be met.





Approximate Scale  
Scale: 1" = 1 Mile



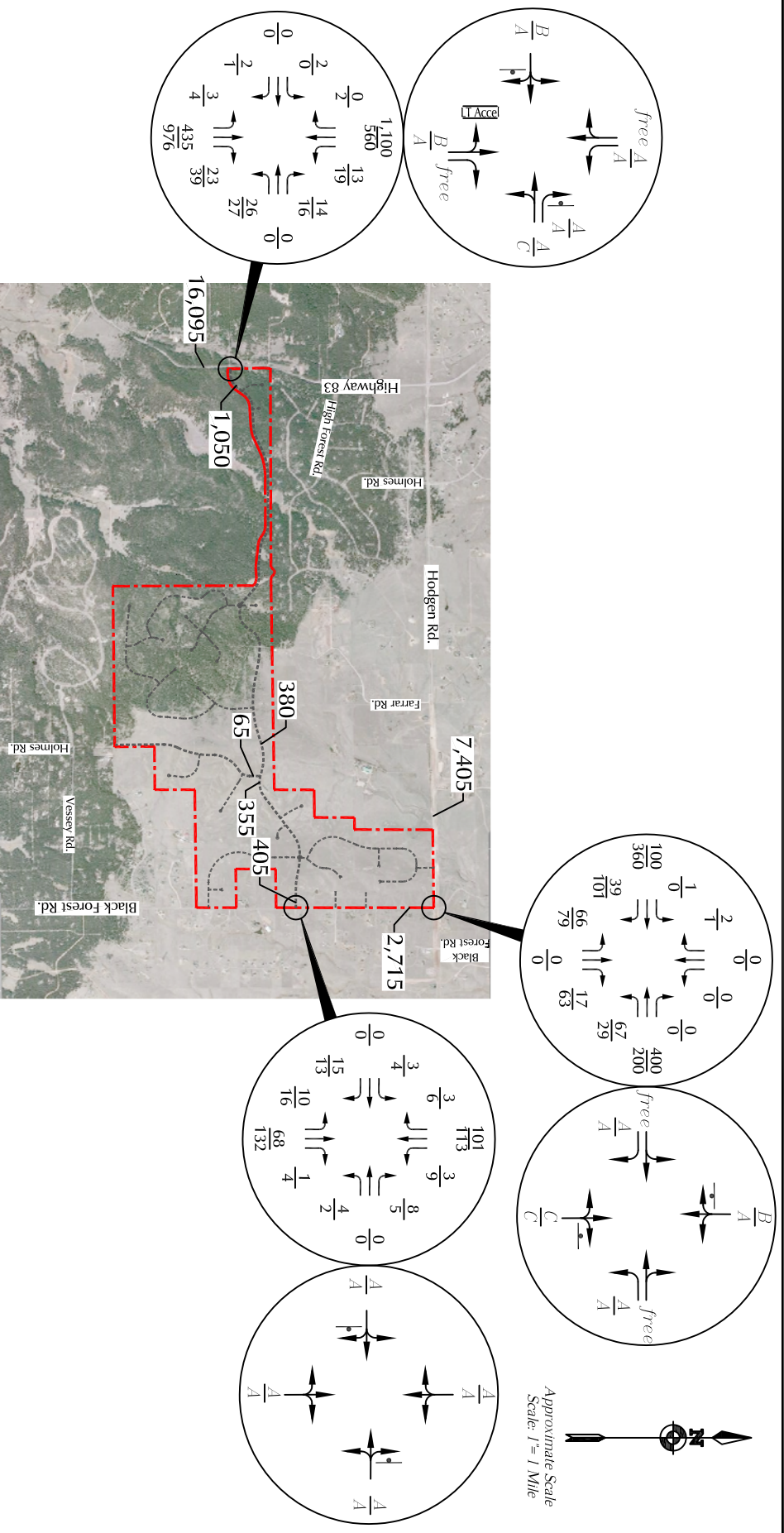
#### LEGEND:

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 $\frac{XX}{XX}$  = PM Weekday Peak-Hour Traffic (vehicles per hour)  
XXX = Average Weekday Traffic (vehicles per day)

Figure 1

## Assignment of Phase 1 Site-Generated Traffic

Flying Horse North Preliminary Plan (LSC #174870)



# LEGEND:

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

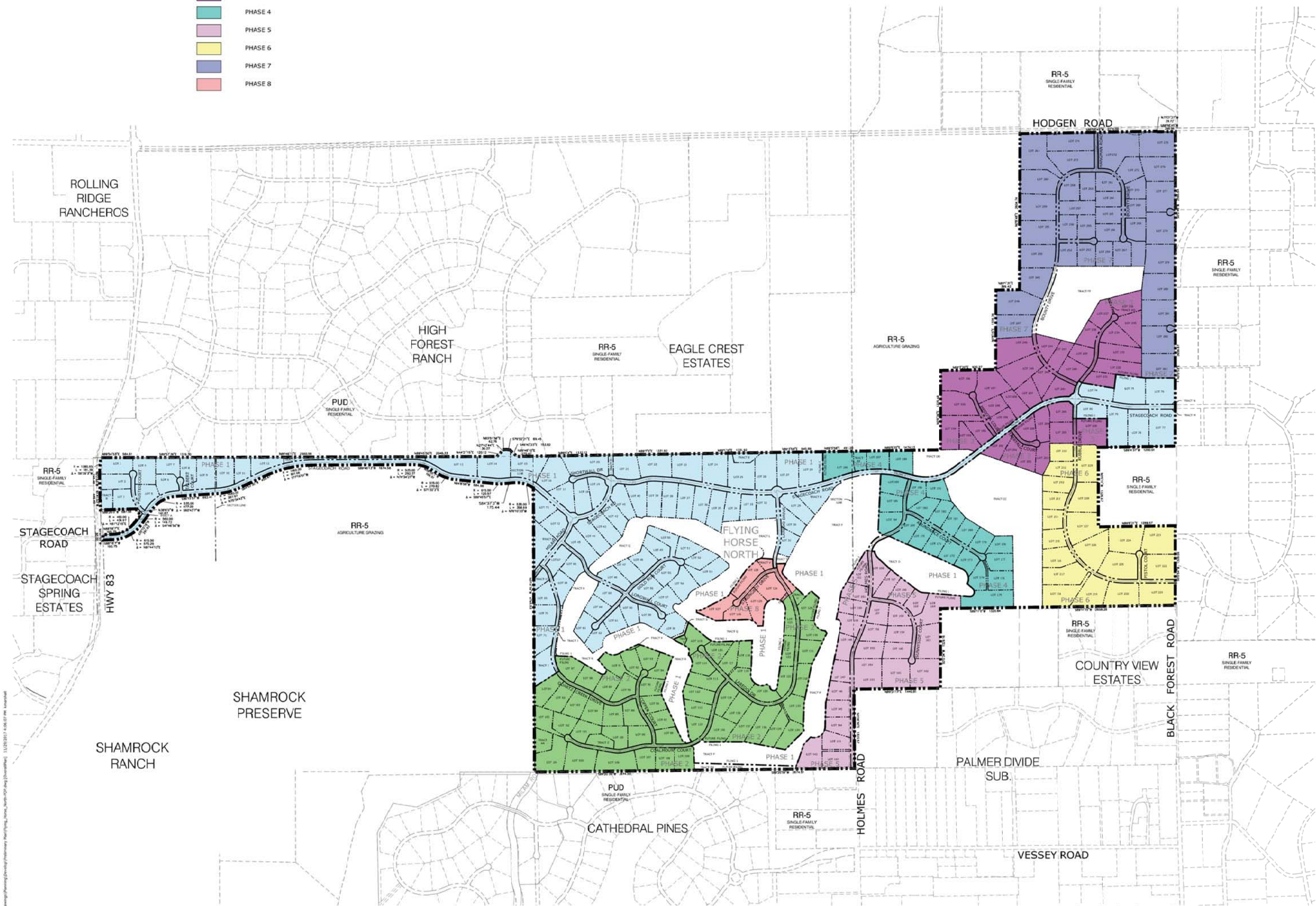
Short-Term Total Traffic Following Phase 1,  
Lane Geometry, Traffic Control and Level of Service

Figure 2



PHASING LEGEND

- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- PHASE 5
- PHASE 6
- PHASE 7
- PHASE 8



PHASING PLAN



N.E.S. Inc.  
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FLYING HORSE NORTH

DATE: 11-29-2017  
PROJECT RGR: J. MAYNARD  
PREPARED BY: K. HANSEN

PHASING PLAN

# Markup Summary

## dsdlaforce (6)



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**Author:** dsdlaforce

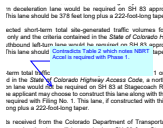
Include the following:

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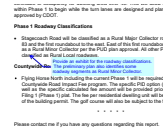
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Add PCD File No. SP-17-012



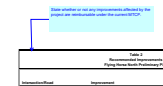
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**Author:** dsdlaforce

Contradicts Table 2 which notes NBRT Accel is required with Phase 1.



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**Author:** dsdlaforce

Provide an exhibit for the roadway classifications. The preliminary plan also identifies some roadway segments as Rural Minor Collector.



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**Author:** dsdlaforce

State whether or not any improvements affected by the project are reimbursable under the current MTCP.



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**Author:** dsdlaforce

State whether the ECM sight distance criteria can be met. If this cannot be met, state the required modification so that it can be met.