

1 Deviations are needed

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2 LSC Response (8/13/18):
Previously-submitted
deviations have been
included with this
resubmittal.

Falcon Marketplace
Driveway Permit Resubmittal
Updated Traffic Impact Analysis
(LSC #164350)
October 23, 2017

Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.

Jeffrey C. Hodsdon, P.E., #31684



Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.


A handwritten signature in blue ink, likely belonging to the Developer, written over a horizontal line.

10/27/2017

Date

Summary of Comments on Microsoft Word - Falcon Marketplace TIA Driveway Permit Update-10-23-17 BOUND REPORT.docx

Page: 1

 Number: 1 Author: dsdparsons Subject: Callout Date: 7/18/2018 12:56:31 PM

Deviations are needed

 Number: 2 Author: jchodsdon Subject: Text Box Date: 8/13/2018 1:04:51 PM

LSC Response (8/13/18): Previously-submitted deviations have been included with this resubmittal.

Right-In-Only Access/Roundabout

- The continuous lane along westbound Woodmen Road between Meridian and the access is projected to operate at weaving LOS C during the morning peak hour and LOS B during the afternoon peak hour.
- Multiple methods of analysis indicate level of service A for all roundabout approaches during the peak hours **based on 2040 volumes**.
- The southwest roundabout will see **minimal queuing** for traffic exiting Woodmen Road and entering the roundabout. A maximum queue during the peak hour of about 100-120 feet is projected and even this maximum queue will clear quickly as the queue will be more of a “rolling” queue.
- The proposed Woodmen access will have **little effect** on the operation of Woodmen Road as the turning movements will be right-turn in-only from westbound Woodmen Road with a continuous acceleration/deceleration lane between Meridian and the point of right-turn entry into the site.
- The roundabout has been designed to accommodate large tractor-trailer trucks/semis.

Meridian/Eastonville Intersection

- The northbound left turn at this intersection is projected to operate at **LOS F** during the afternoon peak hour **without the right-in-only access off Woodmen. However, it will operate at LOS D** during the afternoon peak hour with the right-in-only access off of Woodmen with the roundabout.
- The northbound left-turn queue would be **significantly longer without the Woodmen-access** scenario. **Without the right-in-only access off of Woodmen** the projected maximum queue will fill the dual left-turn lanes (457-foot queue within the lanes) and will **overspill** into the adjacent northbound through lane during the peak analysis interval.

Meridian/Woodmen Intersection

- The addition of the proposed approaching from the south westbound on Woodmen to enter least congestion and will benefit quantity of northbound through peak hour. Although the overall analysis shows failure of the off of Woodmen.

LSC Response (8/13/18): This has been added as requested. However we have also added clarification that this northbound left turn lane is "back-to-back" with the southbound left turn lane at the Woodmen/Meridian intersection. There is a shared transition taper for both lanes and any lengthening would require either shortening the shared taper and/or shortening of that southbound left turn lane at Woodmen/Meridian (likely both).

Address TIS comment #2d.

- Without the requested right-in-only from Woodmen, the northbound through movement is projected to operate at **LOS F** during the 2040

LSC Response (8/13/18): This has been addressed in the updated report.

 Number: 1 Author: dsdrice Subject: Callout Date: 7/19/2018 11:48:23 AM


unless the lanes are lengthened

 Number: 2 Author: jchodsdon Subject: Text Box Date: 8/15/2018 6:38:47 AM

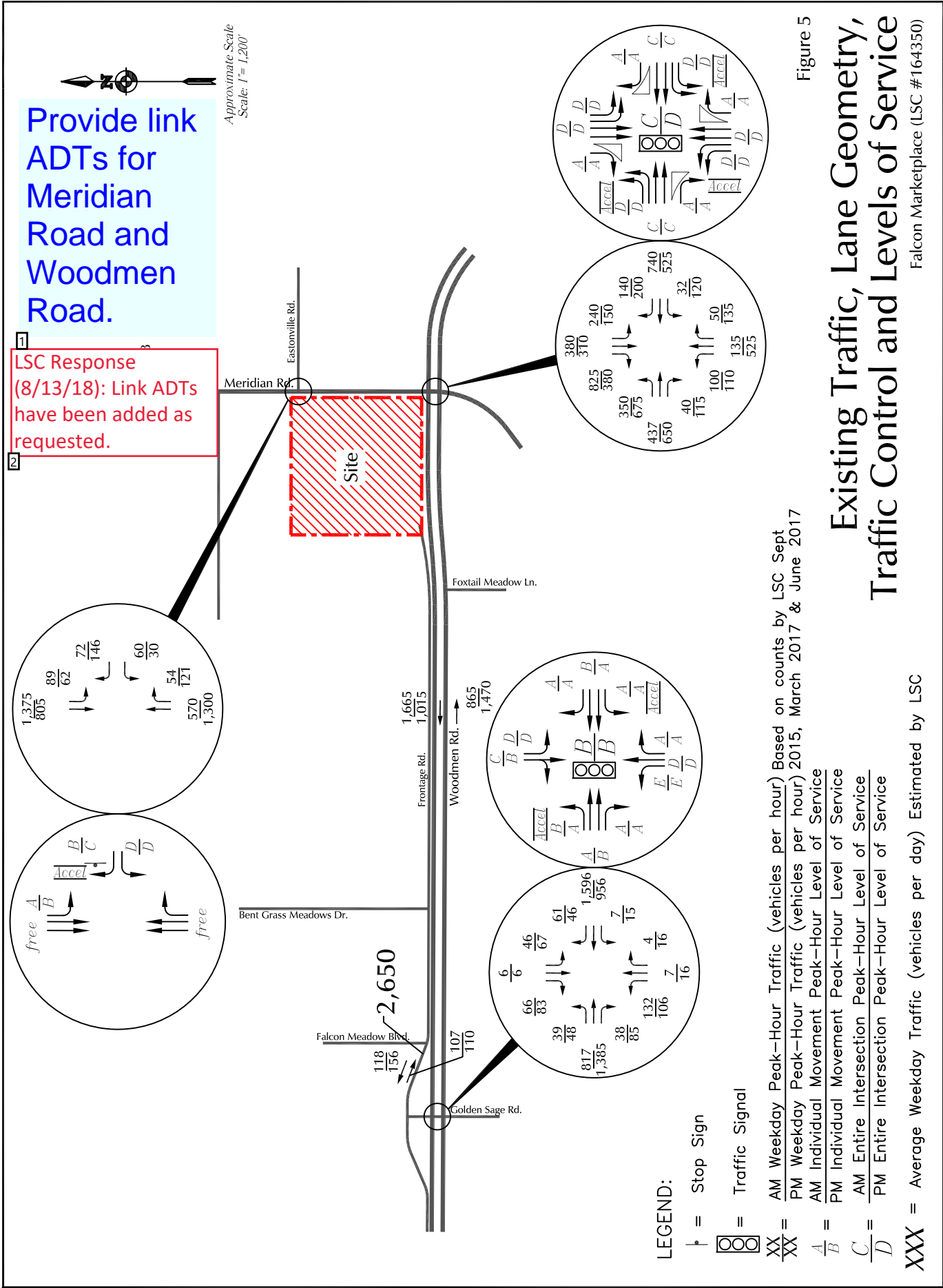
LSC Response (8/13/18): This has been added as requested. However we have also added clarification that this northbound left turn lane is "back-to-back" with the southbound left turn lane at the Woodmen/Meridian intersection. There is a shared transition taper for both lanes and any lengthening would require either shortening the shared taper and/or shortening of that southbound left turn lane at Woodmen/Meridian (likely both).


 Number: 3 Author: dsdrice Subject: Callout Date: 7/19/2018 11:50:56 AM

Address TIS comment #2d.


 Number: 4 Author: jchodsdon Subject: Text Box Date: 8/13/2018 12:40:55 PM

LSC Response (8/13/18): This has been addressed in the updated report.



 Number: 1 Author: dsdrice Subject: Text Box Date: 7/19/2018 10:08:27 AM

Provide link ADTs for Meridian Road and Woodmen Road.

 Number: 2 Author: jchodsdon Subject: Text Box Date: 8/13/2018 12:43:04 PM

LSC Response (8/13/18): Link ADTs have been added as requested.

Provide link
ADTs for
Meridian
Road and
Woodmen
Road.

LSC Response
(8/13/18): Link
ADTs have been
added as
requested.

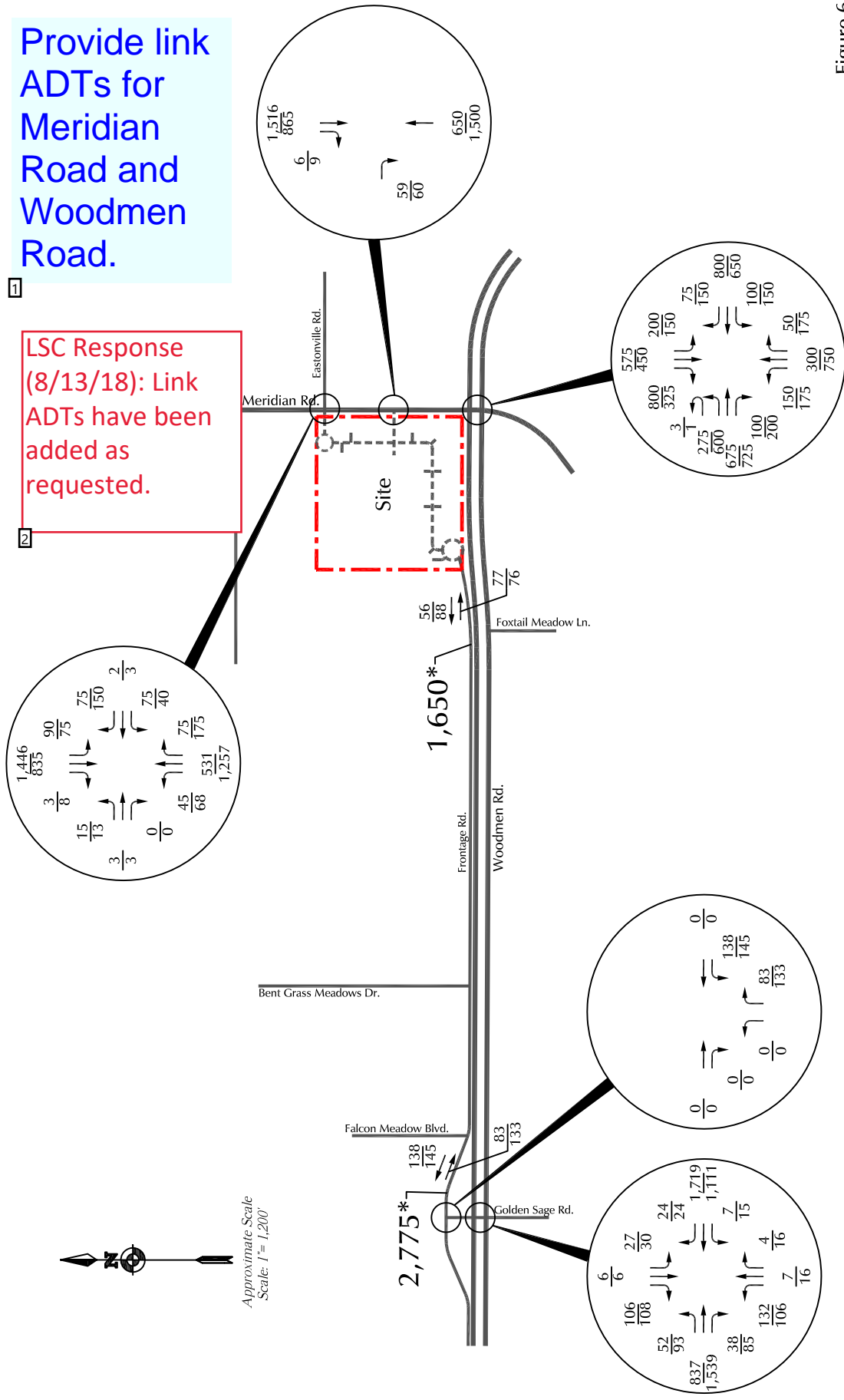



Figure 6a

Short-Term Background Traffic Without Proposed Right-In Access


Falcon Marketplace (LSC #164350)

*Frontage Road Traffic Volumes

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) Estimated by LSC

 Number: 1 Author: dsdrice Subject: Text Box Date: 7/19/2018 10:07:56 AM

Provide link ADTs for Meridian Road and Woodmen Road.

 Number: 2 Author: jchodsdon Subject: Text Box Date: 8/13/2018 12:43:47 PM

LSC Response (8/13/18): Link ADTs have been added as requested.

<p align="center">Table 3 Short-Term Total Traffic Level of Service E Movements Falcon Marketplace</p>

Intersection Movement	AM				PM			
	Volume	LOS	Delay	V/C	Volume	LOS	Delay	V/C
Without Proposed Right-in Access to Woodmen Road								
Woodmen Road/Meridian Road								
Eastbound Left	293	D	47.4	0.59	623	D	54.3	0.85
Westbound Left	100	D	52.4	0.37	150	E	57.1	0.52
Northbound Left	150	D	48.9	0.42	175	D	54.0	0.51
Southbound Left	241	D	49.0	0.56	225	E	66.9	0.75
Overall	---	C	28.4	---	---	D	38.2	---
With Proposed Right-in Access to Woodmen Road								
Woodmen Road/Meridian Road								
Eastbound Left	297	D	50.1	0.62	633	E	56.8	0.86
Westbound Left	100	D	54.8	0.39	150	E	58.6	0.53
Northbound Left	212	D	53.6	0.57	279	E	63.2	0.75
Southbound Left	241	D	51.8	0.58	225	E	69.2	0.76
Overall	---	C	30.6	---	---	D	39.9	---

Source: LSC Transportation Consultants, Inc.

Add a note
that this is
only for two
through lanes.

1

LSC Response
(8/13/18): This note has
been added as
requested.

2

Table 4
2040 Projected Total Traffic Level of Service E and F Movements
Falcon Marketplace

Intersection Movement	AM				Volume	LOS
	Volume	LOS	Delay	V/C		

Scenario: Without Proposed Right-in Access to Woodmen Road

Woodmen Road/Meridian Road

Eastbound Left	468	E	70.1	0.90	775	E	73.7	0.98
Westbound Left	150	E	55.1	0.46	225	E	60.2	0.64
Westbound Through	804	D	48.1	0.83	561	E	58.8	0.84
Northbound Left	250	E	61.4	0.69	350	D	54.9	0.69
Northbound Through	422	D	38.6	0.46	1008	F*	103.4	1.10*
Southbound Left	294	D	54.1	0.63	483	F	80.5	0.96
Southbound Through	941	D	54.4	0.92	704	D	48.1	0.77
Overall	---	D	37.4	---	---	D	53.2	---

Eastonville Road/Meridian Road

Eastbound Through	73	E	54.9	0.45	197	E	56.1	0.68
Westbound Left	250	E	61.8	0.82	200	D	47.0	0.72
Westbound Through	113	E	55.9	0.50	136	E	55.7	0.57
Northbound Left	387	E	70.3	0.87	644	F*	106.7	1.09*
Overall	---	D	38.2	---	---	D	40.0	---

Woodmen Road/Golden Sage Rd

Eastbound Left	422	E	79.2	0.94	404	D	50.3	0.72
Northbound Through	19	E	56.4	0.17	39	D	52.8	0.26
Southbound Left	251	E	63.9	0.73	191	D	53.2	0.69
Southbound Through	21	D	52.7	0.15	26	D	53.1	0.19
Overall	---	D	38.6	---	---	C	24.6	---

Scenario: With Proposed Right-in Access to Woodmen Road

Woodmen Road/Meridian Road

Eastbound Left	472	E	74.5	0.92	785	E	78.0	1.00
Westbound Left	150	E	55.7	0.47	225	E	60.4	0.64
Westbound Through	884	D	53.5	0.90	665	E	77.9	0.98
Northbound Left	328	E	78.3	0.89	465	E	60.4	0.82
Northbound Through	344	D	37.5	0.37	893	E	69.7	0.98
Southbound Left	294	D	54.9	0.64	483	F	81.7	0.96
Southbound Through	941	E	55.9	0.93	704	D	53.0	0.83
Overall	---	D	40.3	---	---	D	50.8	---

Eastonville Road/Meridian Road

Eastbound Through	73	E	59.3	0.45	197	E	55.6	0.67
Westbound Left	250	E	61.4	0.82	200	D	46.3	0.71
Westbound Through	113	E	55.8	0.50	136	E	55.6	0.56
Northbound Left	222	E	62.5	0.69	415	D	54.5	0.76
Overall	---	C	33.9	---	---	C	32.4	---


Woodmen Road/Golden Sage Rd

Eastbound Left	418	E	77.7	0.93	394	D	50.1	0.71
Northbound Through	19	E	56.4	0.17	39	D	52.9	0.26
Southbound Left	251	E	63.9	0.73	191	D	53.5	0.70
Southbound Through	21	D	52.7	0.15	26	D	53.2	0.19
Overall	---	D	39.4	---	---	C	24.7	---


Notes:

* Volume exceeds capacity - queuing analysis indicates queues will overspill the left turn lane into the adjacent through lane.

Source: LSC Transportation Consultants, Inc.

 Number: 1 Author: dsdrice Subject: Callout Date: 7/19/2018 1:22:17 PM

Add a note that this is only for two through lanes.

 Number: 2 Author: jchodsdon Subject: Text Box Date: 8/13/2018 12:44:53 PM







LSC Response (8/13/18): This note has been added as requested.

Table 7b Falcon Marketplace Roadway Improvements With Proposed Right-In Access to Woodmen Road			
Item #	Improvement	Timing	Responsibility
Countywide Road Impact Fee Program Fees and Taxes			
1	Woodmen Road Metropolitan District fees and taxes to be paid in lieu of Countywide Road Impact Fee Program fees and taxes. Woodmen Road has already been completed, but this project is joining the district.	District fees payable at platting	Falcon Marketplace
Meridian/Eastonville and Meridian Right-In/Right-Out Intersections			
2	Signalization of Meridian Road/Eastonville Road intersection.	Design and installation with the development of Falcon Marketplace once allowed by El Paso County.	Falcon Marketplace
3	Reconstruction of the Meridian center median south of Eastonville Road to achieve major street left-turn sight distance for the option of northbound/southbound protected/permissive left-turn signal phasing with interim single left-turn lanes northbound and southbound and to accommodate future northbound dual left-turn lanes if needed in the future. This lane should be 425 feet long plus a 200-foot taper. The taper would be back-to-back with the southbound dual left-turn taper.	Design and installation with the development of Falcon Marketplace.	Falcon Marketplace
4	Southbound right-turn deceleration lane on Meridian Road approaching Eastonville Road. This lane should be 235 feet long plus a 200-foot taper.	Design and installation with the development of Falcon Marketplace.	Falcon Marketplace
5	Design and construction of continuous southbound right-turn lanes and shoulder/bike lane on Meridian Road from Eastonville Road south to the proposed right-in/right-out and from the right-in/right-out south to Woodmen Road. (Note: Also please refer to related item #16 below.)	Design and installation with the development of Falcon Marketplace.	Falcon Marketplace
6	Widening of Eastonville Road east of Meridian Road to add a westbound through lane and add width as feasible between the westbound left-turn lane and the westbound through lane due to the proposed dual left-turn lanes on the west side of the intersection. This added width would allow for through lane alignment (with an acceptable offset across the intersection).	Design and installation with the development of Falcon Marketplace. Extent of this off-site improvement may be limited by available right-of-way and/or other existing constraints.	Falcon Marketplace
7	Design and construction of the proposed extension of Eastonville Road between Meridian and the proposed roundabout.	Design and installation with the development of Falcon Marketplace.	Falcon Marketplace
On-Site Improvements			
8	Design and construction of the public street connection through the site (Falcon Marketplace).	Design and installation with the development of Falcon Marketplace.	Falcon Marketplace
9	Design and construction of the proposed roundabout on-site west of the Meridian/Eastonville intersection. This would include a "stub" to the north for the anticipated future street connection north to Bent Grass Meadows Drive.	Design and installation with the development of Falcon Marketplace.	Falcon Marketplace
10	Design and construction of the proposed roundabout on-site at the east terminus of the Woodmen Frontage Road.	Design and installation with the development of Falcon Marketplace.	Falcon Marketplace
Woodmen/Meridian Intersection			
11	Extend existing westbound right-turn acceleration lane on Woodmen Road at Meridian Road to provide a continuous right-turn lane between Meridian Road and the proposed right-in-only access.	Design and installation with the development of Falcon Marketplace.	Falcon Marketplace
12	Lengthening of Woodmen eastbound dual left-turn lanes . Lengthening of eastbound left-turn lanes and potential further future lengthening to provide a 240-foot lane transition taper, 290 feet of deceleration distance plus sufficient vehicle stacking distance. CURRENT lane length: 500 feet of dual left-turn lane and 425-foot taper. Of this taper, 215 feet is full-width "decel" distance. Remaining 20 feet of the required 235-foot decel distance occurs in the first 20 feet of the 500-foot dual left-turn lanes. The remainder of the dual left-turn lanes is stacking distance - 480 feet. SHORT TERM: Based on the short-term analysis, the existing lane provides sufficient stacking distance. LONG TERM: This lane will likely need to be extended to provide a total of 940 feet of dual left storage distance plus 235 feet of deceleration length plus a 200-foot taper.	Future extension of existing dual left-turn lanes once traffic queues regularly extend beyond the 480-foot stacking distance.	Falcon Marketplace will consent to inclusion in a special improvement district comprising properties benefited by this improvement and will pay its pro-rata share (based on total traffic volumes) of the cost of the improvements.
13	Meridian northbound dual left-turn lanes: Lengthening of northbound left-turn lanes and potential further future lengthening to provide a 200-foot lane transition taper, 235 feet of deceleration distance plus sufficient vehicle stacking distance. CURRENT lane configuration: 315 feet of dual left-turn lane length, 145 feet of single left-turn lane length and a 150-foot lane transition taper from the through lane to the single left-turn lane. This provides a 150-foot taper, 235 feet of deceleration distance, and 225 feet of dual left stacking. SHORT TERM: The 315-foot dual left-turn lanes would accommodate the projected short-term queues. The deceleration distance (235 feet) plus a 200-foot taper will need to be provided south of the end of the existing 315-foot dual left stacking lanes. For the deceleration distance, 235 feet of at least single-lane width for deceleration length would flare to the north to connect to the existing dual lane width to the north. South of the deceleration portion of the lane, a standard 200-foot taper will need to be added in the median. These modifications will involve median reconstruction and respaving south of the existing dual left-turn lanes. This would result in a 200-foot taper, 235-foot deceleration distance, and 315 feet of dual left-turn stacking.	With the development of Falcon Marketplace, extend the northbound left-turn lane as described in the column to the left and as shown in Figure 25.	Short Term - Falcon Marketplace
14	Meridian northbound dual left-turn lanes. LONG TERM: Potentially, additional growth in the Falcon Area and east along Falcon Highway will add left-turning traffic demand. Long-term analysis indicates the potential future need for 400 feet of stacking distance plus the 235 feet of deceleration distance and the 200-foot taper.	Future (if necessary -- Add additional lane length beyond #13 to provide additional stacking if/when needed (as shown in Figure 26).	By other future developments impacting this turn lane. Potential for fee program credit for improvements completed as this is a regional intersection.
Golden Sage Intersections			
15	Directional wayfinding sign(s) on eastbound Woodmen Road upstream of Golden Sage - notifying/reminding eastbound motorists of the option to enter Falcon Marketplace via the Woodmen Frontage Road.	Design and installation with the development of Falcon Marketplace.	Falcon Marketplace
16	Lengthening of the current eastbound single left-turn deceleration lane on Woodmen approaching Golden Sage Road to provide a 240-foot transition taper (20:1 taper ratio), 290 feet of deceleration distance plus sufficient vehicle stacking distance. CURRENT: 175-foot taper plus a 465-foot left-turn lane which translates to a 175-foot taper, 290-foot deceleration distance, and 175 feet of stacking distance. SHORT TERM: Adequate stacking is available in the current turn lane - calculated queue length 141 feet. LONG TERM: Lengthen single left-turn lane and/or future implementation of dual left-turn lanes (if capacity needs dictate) to maintain 290 feet of deceleration length, a 240-foot lane taper (20:1 taper ratio) plus provide sufficient vehicle stacking length - model indicates 471 feet of dual left stacking distance based on morning peak-hour projected volumes. If a dual left is implemented in the future, consideration will need to be given to the configuration on Golden Sage and at the Golden Sage/Woodmen Frontage Road intersection to receive the dual left-turn movement.	Short Term: The existing lane is adequate based on the short-term analysis. Long Term: Future with additional development served by the north frontage road - extension of existing single left-turn lane and potentially widening in the median to provide dual left-turn lanes to provide additional vehicle stacking distance as described in the column to the left.	Falcon Marketplace will consent to inclusion in a special improvement district comprising properties benefited by this improvement and will pay its pro-rata share (based on total traffic volumes) of the cost of the improvements.
17	Southbound exclusive right-turn lane on Golden Sage Road approaching Woodmen Road (a continuous right-turn lane within the 150 feet between the Woodmen Frontage Road and Woodmen Road).	If/when needed to maintain acceptable level of service/traffic operations and/or to control vehicle queues.	Falcon Marketplace will consent to inclusion in a special improvement district comprising properties benefited by this improvement and will pay its pro-rata share (based on total traffic volumes) of the cost of the improvements.
18	Signalization of Golden Sage Road/Woodmen Frontage Road or reconstruction as a modern roundabout. Future additional laneage may be necessary at this intersection to accommodate vehicle queues and for traffic operations.	If/when needed to maintain acceptable level of service/traffic operations and/or to control vehicle queues.	special improvement (improvement and will pay its pro-rata share) of the cost of the improvements.

Source: LSC Transportation Consultants, Inc.

LSC Response
(8/13/18):
Revised as
requested.

Revise per discussions Feb-March 2018 (no special improvement district).

	Number: 1	Author: dsdrice	Subject: Highlight	Date: 7/19/2018 2:06:09 PM
	Number: 2	Author: dsdrice	Subject: Highlight	Date: 7/19/2018 2:07:00 PM
	Number: 3	Author: dsdrice	Subject: Highlight	Date: 7/19/2018 2:08:40 PM
	Number: 4	Author: jchodsdon	Subject: Text Box	Date: 8/13/2018 12:45:56 PM
LSC Response (8/13/18): Revised as requested.				
	Number: 5	Author: dsdrice	Subject: Highlight	Date: 7/19/2018 2:07:43 PM
	Number: 6	Author: dsdrice	Subject: Text Box	Date: 7/19/2018 2:19:45 PM
Revise per discussions Feb-March 2018 (no special improvement district).				

Calculate Phi per FDM
30.5.23. (see below)

LSC Response (8/13/18): Regarding the calculation of the Phi, the revised TIS contains updated preliminary roundabout design exhibits. These exhibits reflect updated Phi angle calculations. Also, as per TIS comments 3d and 3e (in the MS Word comment letter), the 60% and 90% roundabout submittals, including FDM 11-26 Attachment 5.1 (or equivalent), will be provided prior to final design/final plat submittal.

Figure 1

150' ICD

Roundabout Parameters

Falcon Marketplace (LSC #164350)

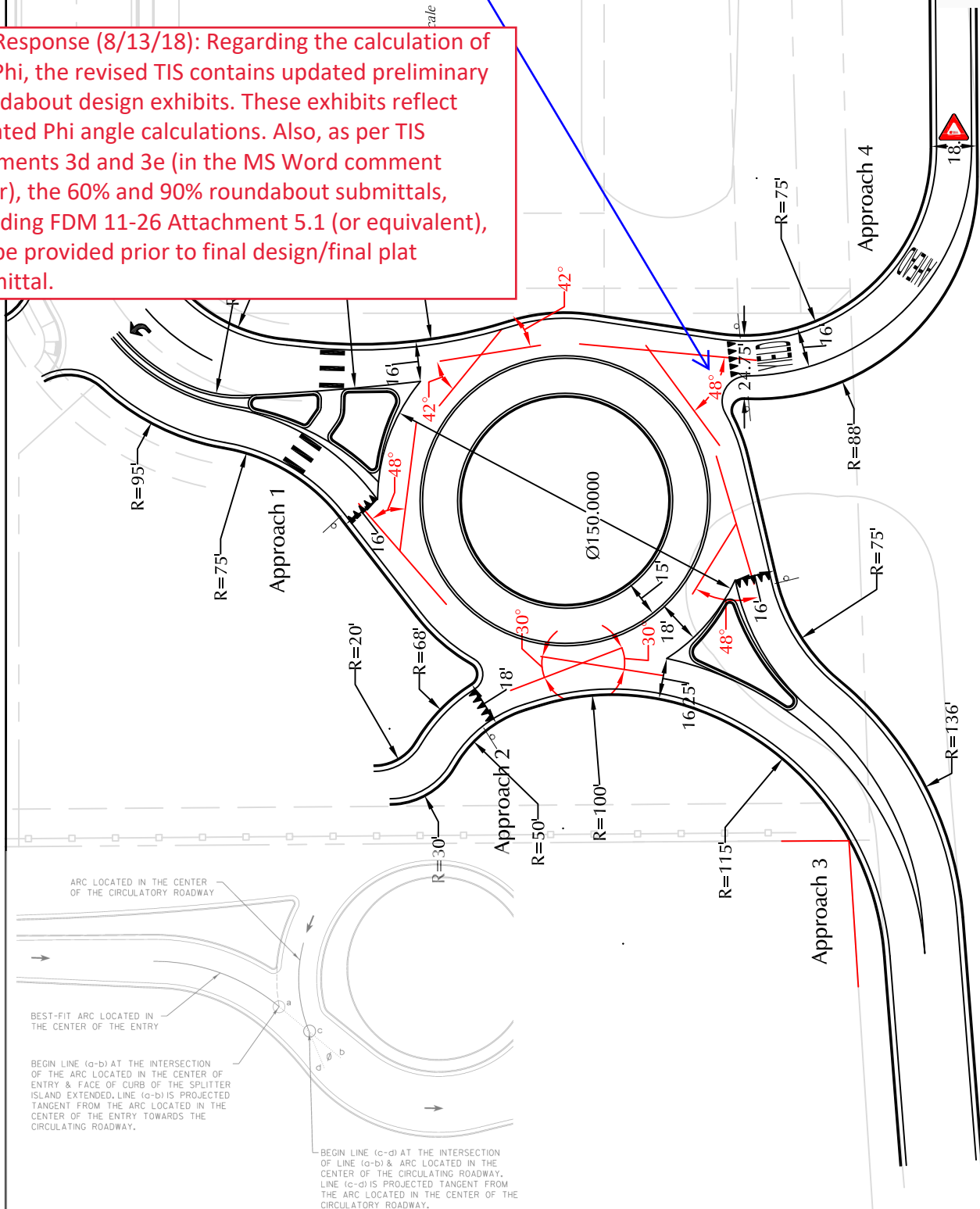


Figure 30.22 Method 2 Phi Measurement

 Number: 1 Author: dsdrice Subject: Callout Date: 7/19/2018 1:12:42 PM

Calculate Phi per FDM 30.5.23. (see below)

 Number: 2 Author: jchodsdon Subject: Text Box Date: 8/13/2018 12:33:07 PM

LSC Response (8/13/18): Regarding the calculation of the Phi, the revised TIS contains updated preliminary roundabout design exhibits. These exhibits reflect updated Phi angle calculations. Also, as per TIS comments 3d and 3e (in the MS Word comment letter), the 60% and 90% roundabout submittals, including FDM 11-26 Attachment 5.1 (or equivalent), will be provided prior to final design/final plat submittal.

 Number: 3 Author: dsdrice Subject: Snapshot Date: 7/19/2018 1:08:05 PM
