

Bent Grass East Commercial Filing No. 3

Updated Traffic Impact Analysis

Prepared for:
Land First, Inc.
1378 Promontory Bluff View
Colorado Springs, CO 80921

AUGUST 20, 2021

LSC Transportation Consultants, Inc.
Contacts: Kirstin D. Ferrin, P.E. & Jeffrey C. Hodsdon, P.E.

LSC #204660
PCD File No. SP2010

Please remove the
draft watermark from
the report and submit
with signature blocks.

1




LSC Responses to TIS Redlines

Page: 1

 Number: 1 Author: Daniel Torres Subject: Callout Date: 10/7/2021 15:14:29

[Please remove the draft watermark from the report and submit with signature blocks.](#)

 Author: jchodsdon Subject: Sticky Note Date: 10/20/2021 16:02:51

LSC Response: The watermark has been removed and the signed cert page has been added. The new report date is October 20, 2021.

The maximum westbound left-turn of Park Drive is 164 feet.

ROADWAY CLASSIFICATIONS & CROSS SECTIONS

Bent Grass Market View

The private road, Bent Grass Market View should be classified as "Urban Local." The proposed roadway cross section is 34-feet wide.

Each individual lot will be required to provide circulation such that vehicles will not back onto the street.

This street is intended only to serve the adjacent commercial lots and not through traffic. Each lot will be required to provide sufficient on-site parking as on-street parking will not be allowed. With no on-street parking, two-way traffic will be maintained.

As this will be a relatively short street serving a minimal number of commercial lots, a center two-way left-turn lane would not be necessary to separate left-turning traffic from through traffic at each of the internal lot driveway access points.

The site development plan for each individual lot will address lot access design and site circulation to accommodate the anticipated design vehicle – either single unit or multi-unit trucks.

Meridian Park Drive

Meridian Park Dr is classified as an Urban Local street and is not identified on the *2016 El Paso County Major Transportation Corridors Plan (MTCP)*. This roadway was approved and constructed with the development of the Bent Grass Commercial PUD. The land use currently proposed is consistent with the land use shown at the time the PUD was approved. It is our understanding that the county has requested Meridian Park Drive be striped with a 12-foot-wide southbound right-turn lane, a 14-foot-wide southbound through lane and an 18-foot-wide northbound through lane and no northbound or southbound left-turn lanes.

Meridian Park Drive ADT shown in the TIS report includes previously estimated potential commercial development associated with the Owl Place area. Meridian Park Drive was required by EPC to extend to the south property line to allow for possible future access to the Owl Lane area and potentially a connection between [now] Falcon Marketplace and the south end of Meridian Park Drive. This was required to ensure access management on Meridian Road, as no full movement would be allowed between Eastonville and Bent Grass Meadows Drive. This connection was basically intended as a commercial "local frontage road" for the relatively short distance between Eastonville and Bent Grass Meadows Drive.


1
The Preliminary plan shows a 30' to max. 32' cross section. Please coordinate with each other so that the report and plan are consistent. If this is 34' flow line to flow line then please state that. If you determine that a 34' paved cross section is required please have them change the plans accordingly.

2
Please also state that the right turn lane is required per ECM criteria as thresholds were met.

3
Please provide the right turn lane length characteristics proposed.

 Number: 1 Author: Daniel Torres Subject: Callout Date: 10/7/2021 15:15:35

The Preliminary plan shows a 30' to max. 32' cross section. Please coordinate with each other so that the report and plan are consistent. If this is 34' flow line to flow line then please state that. If you determine that a 34' paved cross section is required please have them change the plans accordingly.

 Author: jchodsdon Subject: Sticky Note Date: 10/20/2021 09:55:58

LSC Response: The street is proposed to be 34' flow line to flow line and 30' paved. Clarification has been added to the report.

 Number: 2 Author: Daniel Torres Subject: Callout Date: 10/7/2021 16:33:02


Please also state that the right turn lane is required per ECM criteria as thresholds were met.

 Author: jchodsdon Subject: Sticky Note Date: 10/20/2021 09:56:35

LSC Response: Added as requested.

 Number: 3 Author: Daniel Torres Subject: Callout Date: 10/7/2021 17:03:43

Please provide the right turn lane length characteristics proposed.

 Author: jchodsdon Subject: Sticky Note Date: 10/20/2021 09:58:28

LSC Response: Added as requested.

A significant portion of the projected future background traffic ADT reflects Owl Lane redevelopment trip estimates from 10-15 years ago. Commercial development of the size and configuration that was common at that time likely no longer applies today for the Owl Lane area, and any commercial development would likely be significantly smaller and generate significantly fewer trips.

AUXILIARY TURN LANE ANALYSIS

please provide the required turn lane length characteristics for the required lanes in bent grass market view.

1

Bent Grass Market View

The currently-proposed Bent Grass Market View is planned to incorporate a dedicated left-turn lane and a shared through and right-turn lane approaching Meridian Park Drive. The existing single-lane approach for 7-Eleven access on the west side of Meridian Park Drive should be signed for "NO straight through" due to the offset between the east and west legs.

The currently-proposed Bent Grass Market View is planned to incorporate separate left- and right-turn lanes approaching Bent Grass Meadows Drive. When a north leg is constructed, the left-turn lane should be restriped for a shared through and left-turn movement.

TRUCK ACCOMMODATION

Please refer to the attached Autoturn exhibit prepared by Classic Consulting for truck turns into/out of the private road and passage through the site on the private road. The site development plan for each individual lot will address lot access design and site circulation to accommodate the anticipated design vehicle – either single unit or multi-unit trucks.


APPROVED CORRIDOR STUDIES

The *El Paso County 2016 Major Transportation Corridors Plan Update* does not identify any 2040 roadway improvements projects in the vicinity of the site and there are no other known approved corridor studies in the area.


CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

- Bent Grass East Commercial Filing No. 3 can be expected to generate about 2,873 vehicle trips on the average weekday, with about half entering and half exiting in a 24-hour period. During the morning peak hour about 163 vehicles would enter, and 129 vehicles would exit the site. During the afternoon peak hour, about 145 vehicles would enter and 154 vehicles would exit the site.

 Number: 1 Author: Daniel Torres Subject: Callout Date: 10/7/2021 17:04:00

[please provide the required turn lane length characteristics for the required lanes in bent grass market view.](#)

 Author: jchodsdon Subject: Sticky Note Date: 10/20/2021 10:00:21

LSC Response: Added as requested.

southbound right-turn lane is constructed. This analysis has been included, although the traffic impact from this project is less than five percent during the morning peak hour, as this and other TIS reports for projects in this Bent Grass/Latigo/Falcon Marketplace “sub area” have called out cost sharing for these improvements. All other movements at this intersection are projected to operate at LOS D or better during the peak hours, based on the projected short-term and 2040 total traffic volumes. **Note:** this information was originally provided when this intersection was under El Paso County jurisdiction. The intersection is now subject to review (and associated requirements) by the City of Colorado Springs.

Roadway Improvements

- Auxiliary Turn Lanes


Per email on 9/14/21 by the Engineering Manager, the acceptable solution was a TWLT lane if the roadway was not widened. Please revise per previous correspondence with staff. Also please see comments on the TWLT variation exhibit provided and revise the text accordingly. ¹

- The existing section of Bent Grass Meadows Drive and Meridian Park Drive has recently been widened to allow for a three-lane eastbound approach at Meridian/Bent Grass Meadows. As part of this improvement, Bent Grass Meadows has been restriped to remove the existing westbound left-turn lane for the 7-Eleven access, which has been closed, and lengthen the existing westbound left-turn bay approaching Meridian Park Drive. The restriped lane will be about 195 feet long plus an 85-foot taper. Based on the queueing analysis discussed above, the proposed 195-foot lane will provide adequate storage for the projected queues.
- A westbound left-turn lane already exists on Bent Grass Meadows Drive approaching the west site access. The roadway was originally striped with a 110-foot-long westbound left-turn lane approaching the access location (Bent Grass Market View) and a 150-foot-long eastbound left-turn lane approaching the future access that will align with Meridian Park Drive. Based on the criteria contained in the *ECM* and a design speed of 40 miles per hour, the westbound left-turn lane approaching the west site access should be 215 feet long plus a 160-foot taper. Previous Bent Grass reports showed side-by-side left-turn lanes between Meridian Park and the west site access. However, it has been agreed upon through meetings with County staff, that **back-to-back left-turn lanes are the best solution,** given this existing section of Bent Grass Meadows Drive. The anticipated change in the projected land use for the parcels north of Bent Grass Meadows Drive to residential uses was a significant consideration. LSC’s concept for restriping of the left-turn lanes is shown in Figure 12.

- An abbreviated southbound right-turn lane is recommended at the Meridian Park Drive/Bent Grass Market View intersection. Please refer to the Auxiliary Turn Lanes section of the report for additional details/discussion.

 Number: 1 Author: Daniel Torres Subject: Callout Date: 10/11/2021 10:31:59

Per email on 9/14/21 by the Engineering Manager, the acceptable solution was a TWLT lane if the roadway was not widened. Please revise per previous correspondence with staff. Also please see comments on the TWLT variation exhibit provided and revise the text accordingly.

 Author: jchodsdon Subject: Sticky Note Date: 10/18/2021 13:13:54

LSC Response:

- This paragraph has been revised per the email and the comments.
- Figure 12 has been revised.
- LSC has addressed the additional comments on the TWLTL variation exhibit (that was provided by LSC). Also see separate response to redline PDF.

 Number: 2 Author: Daniel Torres Subject: Highlight Date: 10/7/2021 16:59:35

t back-to-back left-turn lanes are the best solution,

- Private roadway (Bent Grass Market View):
 - The queuing analysis projects the maximum approach queues for 2040 for the minor street approaches on Bent Grass Market View to be 135 feet (about 5-6 vehicles) for the eastbound approach to Meridian Park Drive and 52 feet (about 2-3 vehicles) for the northbound approach to Bent Grass Meadows Drive. LSC recommends these queue lengths be considered when placing the individual lot access points to the private road. Queue length estimates may need to be updated with each site development plan as lot users become known and to verify projections of area traffic conditions.
 - The site development plan for each individual lot will address lot access design and site circulation to accommodate the anticipated design vehicle – either single-unit or multi-unit trucks.
- Table 4 identifies the future roadway improvements that may be needed in the vicinity of the site. Table 4 also gives a recommended trigger for when each improvement will be needed. This table has been updated with this report to note that requirements may change as this intersection is now subject to review (and associated requirements) by the City of Colorado Springs.
- Table 5 shows the percentage of the projected 2040 total traffic due to Bent Grass East Commercial Filing No. 3. These percentages could be used to determine the pro-rata share of the cost of intersection improvements. **Note:** this information was originally provided when this intersection was under El Paso County jurisdiction. The intersection is now subject to review (and associated requirements) by the City of Colorado Springs.

Transportation Impact Fees

- Bent Grass East Commercial Filing No. 3 will not be required to participate in the Countywide Transportation Improvement Fee Program, as it is located within the Woodmen Road Metropolitan District. Woodmen Road district fees would apply.

* * * * *


(This space left blank intentionally)

Please provide a deviations section as done before.

1

 Number: 1 Author: Daniel Torres Subject: Text Box Date: 10/7/2021 17:16:27

Please provide a deviations section as done before.

 Author: jchodsdon Subject: Sticky Note Date: 10/20/2021 10:01:09

LSC Response: Added as requested.

Please include in the list of improvements the southbound right turn lane on Meridian Park Drive at the site access.

1


Update per comments provided.

2

Table 4 Roadway System Improvements Bent Grass Commercial Filing No. 3					
Description		Trigger	Timing	Responsibility	Associated Project
Meridian Road/Bent Grass Meadows Road					
A	Signalize Meridian/Bent Grass Meadows	Remove existing stop-sign and replace with traffic signal control.	When warrant(s) are met – 2 of the 3 conditions of the "Crash Experience" warrant are currently met. The current number of reported crashes (susceptible to correction with a signal) exceeds the threshold as do the associated traffic volume thresholds.	Under Construction	Bent Grass Metro District/ Challenger Homes
B	Right-turn acceleration lane on Meridian at Bent Grass Meadows	This improvement has been completed			
Bent Grass Meadows Dr					
C	Construct Bent Grass Meadows Drive between the existing sections located north of the Woodmen frontage road and west of Meridian Road	This improvement has been completed			
D	Restrict westbound left-turn at 7-Eleven access	This improvement has been completed			
E	Close 7-Eleven Access	This improvement has been completed			
F	Modify pavement markings to extend westbound left-turn lane approaching Meridian Park Drive	Reshape with a 195 foot long westbound left-turn lane plus a 65-foot taper	This improvement is part of an ongoing approved project.		Bent Grass Metro District
	Modify pavement markings to extend westbound left-turn lane approaching the site access and reduce the eastbound left-turn lane approaching Meridian Park Drive	Reshape the section of Bent Grass Meadows Drive between Bent Grass Market View and Meridian Park Drive as shown in Figure 12	With Bent Grass East Commercial Filing No. 3	With Bent Grass East Commercial Filing No. 3	Applicant
Woodmen frontage road/Bent Grass Meadows Dr intersection (now subject to City of Colorado Springs review and requirements)					
H	Eastbound left-turn lane on Woodmen frontage road approaching Bent Grass Meadows Dr.	ECM criteria indicates the left-turn lane would need to be 315 feet long (155 feet of deceleration length plus 160 feet of storage length) plus a 160-foot taper based on the design speed of 40 mph.	When the eastbound left-turn volume exceeds 25 vehicles per hour	With the completion of Bent Grass Meadows Dr between the Woodmen frontage road and Meridian Road. [The connection has been completed]	Challenger Homes
Woodmen/Golden Sage					
I	Add protected/permitted phasing for left-turn movements (now subject to City of Colorado Springs review and requirements)	Prepare a traffic signal modification plan and furnish/install new traffic signal heads for protected-permissive phasing and other necessary hardware, software needed to implement this phase; modify existing signal timing plan.	When Warrants are met	With Bent Grass Residential Fil No. 2	Bent Grass Residential Filing No. 2
J	Lengthening of the current eastbound single left-turn deceleration lane on Woodmen approaching Golden Sage Road	Provide a 240-foot transition taper (20:1 taper ratio), 200 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, 200-foot deceleration distance, and 175 feet of stacking distance. SHORT TERM: Adequate stacking is available in the current turn lane. calculated queue length 204 feet. LONG TERM: Lengthen single left-turn lane and/or future implementation of dual left-turn lanes (if capacity needs dictate). 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.	The estimated "trigger" of 40 PM peak hour eastbound left turns above the estimated short term total volume (from Figure 16a of the TIS) approximately translates to and additional 588 directional ADT for residential trips making this turning movement (based on the ITE single family trip ratio). This estimated threshold may be reached with a combination of site-generated trips and background trips.	AS NEEDED TO MAINTAIN ADEQUATE LEVEL OF SERVICE AND VEHICLE STACKING DISTANCE - This is estimated to be when the eastbound left turn turning volume reaches approximately 200 vehicles per hour during the PM peak. This translates to about 40 vehicles per hour over the estimated short term total volume from Figure 16a of the Falcon Marketplace TIS. Note: Short term total volumes assume the Meridian extension to Highway 24 to be open.	Bent Grass Metro District - pro-rata share (based on total traffic volumes) of the cost of the improvement. ⁽¹⁾ Note: Other potential responsibility for participation: In addition to the yet-to-be developed properties within the Bent Grass Metro District service area and the Falcon Marketplace development, other future developers of currently vacant lane within the "travel shed" of the north leg (and potentially the south leg) of the Golden Sage/Woodmen and Golden Sage/Woodmen N. Frontage Road intersection may also be assigned as responsible participants in future or completed (if a cost recovery agreement is put in place) traffic/roadway improvements.
K	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	The estimated "trigger" of 5:30 AM peak hour southbound right turns above the estimated short term total volume (from Figure 16a of the Falcon Marketplace TIS) approximately translates to an additional 510 directional ADT for residential trips making this turning movement (based on the ITE single family trip ratio). This estimated threshold may be reached with a combination of site-generated trips and background trips.	AS NEEDED TO MAINTAIN ADEQUATE LEVEL OF SERVICE AND VEHICLE STACKING DISTANCE - A preliminary trigger could be a southbound right turn volume of about 150-175 vehicles per hour. This translates to about 5 to 30 vehicles per hour over the projected short term volume from Figure 16a of the Falcon Marketplace TIS. This may be conservative due to the westbound right turn acceleration lane on Woodmen Road. Additional study may indicate a higher threshold based on empirical data collection and analysis.	Bent Grass Metro District - pro-rata share (based on total traffic volumes) of the cost of the improvement. ⁽¹⁾ Note: Other potential responsibility for participation: In addition to the yet-to-be developed properties within the Bent Grass Metro District service area and the Falcon Marketplace development, other future developers of currently vacant lane within the "travel shed" of the north leg (and potentially the south leg) of the Golden Sage/Woodmen and Golden Sage/Woodmen N. Frontage Road intersection may also be assigned as responsible participants in future or completed (if a cost recovery agreement is put in place) traffic/roadway improvements.
L	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.	Remove existing stop-signs and replace with traffic signal control or reconstruct as modern roundabout	If/when needed to maintain acceptable level of service/traffic operations and/or to control vehicle queues. Fair-share participation by the development or the district on behalf of the district members.	If/when needed to maintain acceptable level of service/traffic operations and/or to control vehicle queues.	Bent Grass Metro District - pro-rata share (based on total traffic volumes) of the cost of the improvement. ⁽¹⁾ Note: Other potential responsibility for participation: In addition to the yet-to-be developed properties within the Bent Grass Metro District service area and the Falcon Marketplace development, other future developers of currently vacant lane within the "travel shed" of the north leg (and potentially the south leg) of the Golden Sage/Woodmen N. Frontage Road intersection may also be assigned as responsible participants in future or completed (if a cost recovery agreement is put in place) traffic/roadway improvements.
*Note: This improvement is now subject to City of Colorado Springs review and requirements					
Notes:	Previous Note: It is our understanding that the specifics of the district participation will need to be included in the SIA/revised development agreement to be completed and finalized prior to the development of lots beyond the initial 40 lots. If for some reason the District is unable or unwilling to participate, or if determination by the district is delayed, the applicant would be responsible. In this case, an escrow agreement between the applicant and the County would be prepared and finalized). We understand that staff would like for that the applicant to understand the estimated/approximate costs associated with their fair share of future improvements at Golden Sage/Woodmen. LSC will provide preliminary fair share cost estimates utilizing available information from the Falcon Marketplace SIA. This will be provided by March 31st to the applicant and staff.				
(1) See Table 5 for pro-rata percentage calculations					

 Number: 1 Author: Daniel Torres Subject: Text Box Date: 10/11/2021 08:06:45


Please include in the list of improvements the southbound right turn lane on Meridian Park Drive at the site access.

 Author: jchodsdon Subject: Sticky Note Date: 10/20/2021 10:01:29

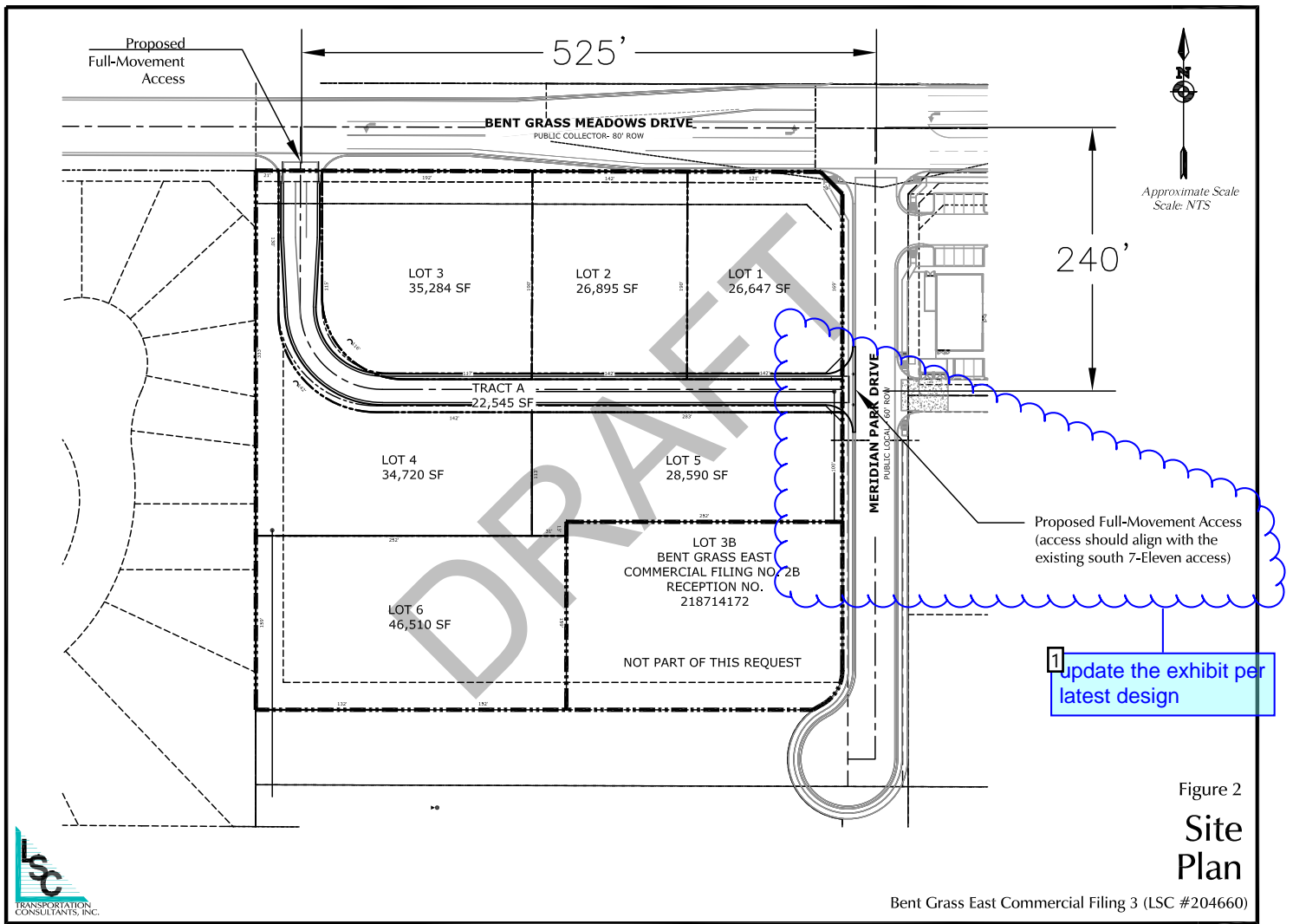
LSC Response: Added as requested.


 Number: 2 Author: Daniel Torres Subject: Cloud+ Date: 10/11/2021 10:45:17

Update per comments provided.


 Author: jchodsdon Subject: Sticky Note Date: 10/20/2021 10:02:16

LSC Response: Modified in the updated table.



 Number: 1 Author: Daniel Torres Subject: Cloud+ Date: 10/11/2021 10:33:21

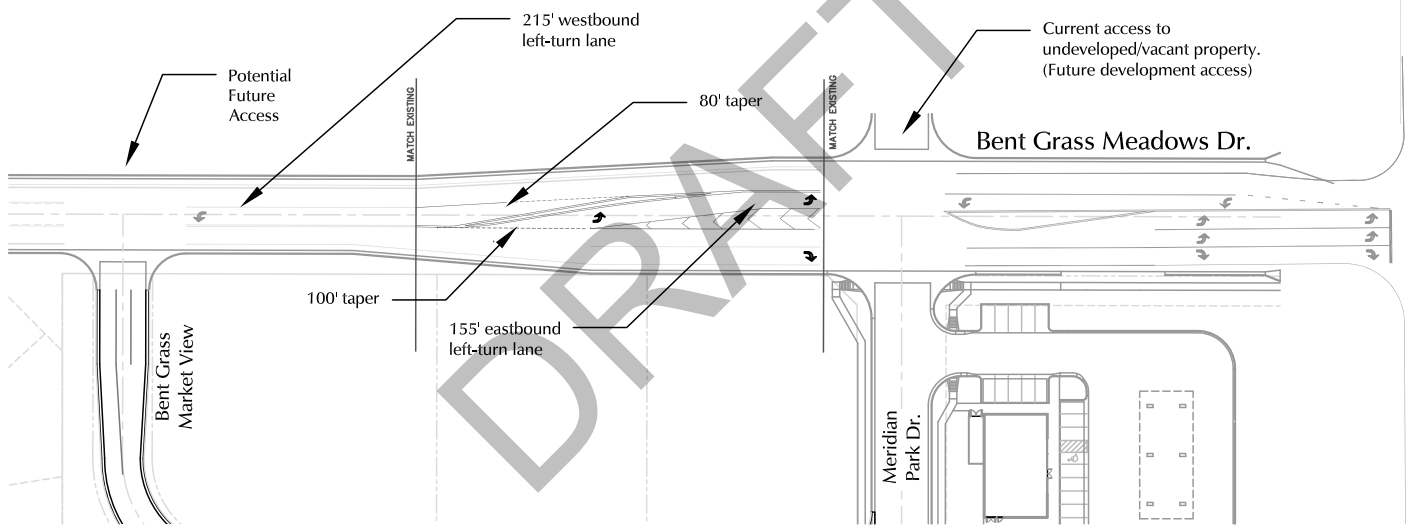
[update the exhibit per latest design](#)

 Author: jchodsdon Subject: Sticky Note Date: 10/20/2021 10:02:45

LSC Response: This figure has been updated.

1 Please update the exhibit accordingly per comments provided

Approximate Scale
1" = 100'



Recommended Left Turn Lane Restriping - Bent Grass Meadows Dr.

Bent Grass East Commercial Filing 3 (LSC #204660)

Figure 12

 Number: 1 Author: Daniel Torres Subject: Cloud+ Date: 10/11/2021 10:34:28

Please update the exhibit accordingly per comments provided

 Author: jchodsdon Subject: Sticky Note Date: 10/18/2021 13:15:11

LSC Response: This figure has been revised to reflect the TWLTL and to address the comments.