

These are only the modified pages to the TIA. Full TIA documents will be provided to ATD and DSD staff only.

EXECUTIVE SUMMARY

This report presents a summary of findings for a traffic impact analysis (TIA) performed by R-K Traffic Engineering (R-K) for the proposed 75.59 acre Grove at Shoal Creek within the City of Austin, Texas. The development is expected to complete construction by 2024.

The traffic impact analysis involved the following five components: 1) data collection, 2) trip generation, 3) trip distribution, 4) trip assignment and 5) operational analysis. A traffic model using Synchro 8 was utilized to determine various measures of effectiveness (MOE's), such as delay and level of service (LOS) for existing and proposed conditions.

The existing, future and site traffic suggest the need for several roadway improvements along with signal timing updates to accommodate the anticipated change in traffic patterns and volumes.

Identified roadway improvements include:

2018

- Install traffic signal at Highland Terrace/45th Street and MoPac southbound exit ramp intersection and restripe westbound approach to provide dual lefts. *Design, Construction and Installation by City of Austin and/or TxDOT.*
- Reconstruct northbound Bull Creek at 45th to provide 400' dual left turn lanes and a shared through/right lane. Remove northbound/southbound split phasing.
- Construct Driveway 3 on Bull Creek across from 41st.
- Add 150' northbound and 300' southbound left turn lanes on Bull Creek at Jackson Avenue/Driveway 2, add 150' right turn lane on northbound Bull Creek at Driveway 2, restripe eastbound Jackson to provide a left turn lane and shared through/right lane and install a traffic signal when warranted per Texas Manual on Uniform Traffic Control Devices (TMUTCD).
- Construct full access driveways 1 and 2.
- Construct second northbound through lane between Driveway 1 and 45th Street.
- Construct a 350' southbound left turn bay on Bull Creek at Driveway 1. Construct a 100' northbound right turn lane at Driveway 1. Construct a free right from Driveway 1 into the proposed second northbound lane. Remove left turning movement from driveway.
- Reconstruct 45th Street to provide 100' eastbound and 250' westbound left turn bays. Reconfigure traffic signal to remove Eastbound/Westbound split phasing.

Phasing

The project will be developed in two phases.

TABLE 3
Trip Generation – Adjusted – Phase 1

Land Use	Size		24-Hour	AM Peak Hour of Adjacent Street One Hour Between 7 and 9 am			PM Peak Hour of Adjacent Street One Hour Between 4 and 6 pm		
	Amount	Units		Total	Enter	Exit	Total	Enter	Exit
Single Family (210)	110	DU	1,089	82	21	62	109	69	40
Residential Condo (230)	375	DU	1,929	141	24	117	169	113	56
TxDOT Office				-88	-74	-14	-90	-10	-80
Total			3,019	136	-29	165	188	172	16

For phase 1, only 5% transit reduction was applied.

Phase 2 is full project buildout and includes all uses described in Table 2, as shown on previous page. As discussed, the volumes in this table include all allowable reductions.

Transit Assumptions

Currently Capital Metro provides bus service through route #491 and #19 along Bull Creek Road. Route #491 is run hourly three days a week during non-peak hours. This route was not considered in the analysis. Route #19 is run daily every 35 to 40 minutes in each direction; therefore, there are four to five buses each hour. This bus stops in several locations noted on the map in Appendix D. Currently a northbound stop on Bull Creek Road is located approximately 30' south of 45th Street. It is recommended that when the Bull Creek Road northbound approach is widened to provide a right turn lane that this bus stop is relocated approximately 300' south of 45th to avoid blocking the right turn lane. A 5% transit reduction was allowed for this analysis. This would indicate approximately 73 people will use the bus system in the AM Peak and approximately 102 people will use the bus system in the PM Peak. Assuming the existing 35 to 40 minute headway for each direction would provide four to five buses each hour. This is an increase of 20 to 26 riders per bus during the PM peak; therefore, it is likely to accommodate future ridership for 2024 Buildout.

Non-Motorized Assumptions

Non-motorized users include pedestrians and bicyclists. The allowed non-motorized reductions indicate 27 pedestrian/cyclists in the AM Peak and 29 pedestrian/cyclists in the PM Peak. These volumes were input into the Synchro analysis for 2024 Buildout. It was assumed that these people will access the site from the 45th Street/Bull Creek signal, proposed mid-block crossing near Post West Austin apartments, proposed Bull Creek/Jackson signal or proposed mid-block crossing near 40th Street.

Trip Distribution

Due to the nature of the proposed land uses the existing traffic distribution was used to develop a general concept for the origins and destinations of site-related trips. Adjustments were made to account for MoPac main lane traffic that would not have been counted on the ramps/frontage roads. In general, the existing traffic distribution was used to distribute the site traffic. The existing distribution was modified to account for additional traffic coming from MoPac. It was assumed that approximately 50% of the site traffic will come from MoPac. Table 5 presents a summary of the distributions of the trip origins and destinations used for the proposed development. The existing counts, No Build Conditions, Site Traffic distribution and Build Conditions with volumes for each of the time periods and development years can be seen in Appendix B – Traffic Conditions/Distribution.

TABLE 4

Trip Distribution

Roadways	AM – Percentage	PM – Percentage
MoPac/45th (North)	20%	18%
MoPac (South)	21%	17%
MoPac/35th (South)	12%	13%
Bull Creek (North)	4%	5%
Shoal Creek (North)	4%	6%
45th (East)	17%	16%
35th (West)	7%	9%
Jefferson (South)	5%	6%
Bull Creek (South)	10%	10%
Total	100%	100%

The peak hour counts were input into the existing volumes spreadsheet (found in Appendix B). A growth rate of 1 percent per year was applied to existing traffic volumes to calculate the 2018 No Build and 2024 No Build traffic volumes.

Table 7 presents the delay and LOS based on simulation results for the year 2018 No Build Conditions.

Table 8 presents the delay and LOS based on simulation results for the year 2018 Build Conditions.

The AM and PM peak hour results for the 2018 No Build and Build Conditions indicate no significant reduction in operations at the analyzed intersections based on three improvements.

1. Installation of a signal at the 45th Street/Highland Terrace and MoPac southbound exit ramp intersection and restriping the exit ramp to provide dual lefts prior to analysis year 2018 since it was shown to operate at LOS F under existing conditions.
2. The construction of a second northbound lane at both the 35th and 45th exit ramps from MoPac. The lanes are being constructed by TxDOT as part of the current managed lanes construction on MoPac.
3. Construction of a third northbound approach lane on Bull Creek at 45th to provide dual lefts and a shared through/right lane. (to be constructed by developer)
4. Construction of Driveway 3 on Bull Creek across from 41st Street.

While the analysis indicates that 3,000 ADT is accommodated with the above recommended improvements, the developer has agreed that many of the improvements determined in the 2024 analysis will be constructed for 2018 (phase 1). The Executive Summary and Conclusion highlight the proposed improvements and timelines. The analysis was not updated to reflect the construction of the 2024 improvements in the 2018 analysis.

Table 9 presents the delay and LOS based on simulation results for the year 2024 No Build Conditions.

Table 10 presents the delay and LOS based on simulation results for the year 2024 Build Conditions.

The AM and PM peak hour results for the 2024 Build Conditions indicate several improvements are necessary (in addition to the previous improvements) to maintain an acceptable LOS. The improvements include:

- Construct Driveway 2 across from Jackson Street. Stripe 150' northbound and 300' southbound left turn lanes on Bull Creek. Construct a 150' right turn lane on northbound Bull Creek at Driveway 2. Restripe eastbound Jackson Avenue to provide a left turn lane and shared through/right turn lane. Install a traffic signal when warranted per Texas MUTCD.
- Construct Driveway 1. Construct a 350' southbound left turn bay on Bull Creek at Driveway 1.
- Restripe and sign the southbound Jackson Avenue approach to 35th Street to provide a shared left/through lane and right turn only lane.
- Reconstruct 45th Street to provide 100' eastbound and 250' westbound left turn bays at Bull Creek and add a 250' northbound right turn lane on Bull Creek at 45th. Reconfigure traffic signal to remove split phasing.
- Construct Driveway 4 on Bull Creek across from 40th Street as a right-in/right-out only.
- Construct Driveway 5 on Bull Creek across from 42nd Street.

Please note that the poor LOS during the PM peak at Driveways 3 and 5 is due to exiting vehicles from the driveways. Vehicles on Bull Creek do not experience the poor LOS. The analysis indicates that the queues for Driveways 3 and 5 are only 2 and 3 vehicles during the PM peak, respectively. It should also be noted that the Sim Traffic analysis indicates vehicles exiting driveways 3 and 5, 41st and 42nd are able to exit with minimal delay.

The signalized intersection at 35th Street and Jefferson Street currently provides access across 35th Street. 15 pedestrians crossed 35th Street in the AM Peak and 13 pedestrians crossed in the PM peak the day TMCs were obtained for this intersection. A crossing guard is stationed at this intersection to assist school children crossing 35th Street to access Bryker Woods Elementary.

It should also be mentioned that the improvements at the intersection of Bull Creek and 45th will include cross-walks and improved ADA ramps.

The crosswalks at intersection and hybrid beacons are anticipated to be 10' to 12' wide.

Providing a bridge to provide pedestrian and bicycle access over Shoal Creek has been brought up several times by City Staff. The developer has agreed to post fiscal for a pedestrian/bicycle bridge.

Conclusions and Recommendations

The analysis indicates several improvements are necessary to maintain an acceptable LOS when feasible. The improvements and pro-rata are described in Table 12.

TABLE 12
Proposed Improvements and Pro-Rata Share

Intersection	Proposed Improvements	Pro-Rata Share
2018		
Driveway 3	<ul style="list-style-type: none"> Construct Driveway 3 	<ul style="list-style-type: none"> Constructed be developer
Highland Terrace /45 th /MoPac Exit Ramp	<ul style="list-style-type: none"> Install Traffic Signal when/if warranted Restripe to provide westbound dual lefts 	<ul style="list-style-type: none"> 12.2% \$250,000x0.122 = \$30,388
45 th Street at Bull Creek	<ul style="list-style-type: none"> Construct northbound left turn lane on Bull Creek Restripe northbound approach as dual lefts and shared through/right lane 	<ul style="list-style-type: none"> 26.5% \$258,750x0.265 = \$68,626
Jackson Ave at 35 th	<ul style="list-style-type: none"> Update signal timing 	<ul style="list-style-type: none"> 100% \$5,000
Bull Creek Road Trail	<ul style="list-style-type: none"> Construct 12' Multi-Use path from 45th to south end of development 	<ul style="list-style-type: none"> Constructed by developer \$524,400
Shoal Creek Trail	<ul style="list-style-type: none"> Approximately 200' from south end of park to Idlewild Road 	<ul style="list-style-type: none"> Constructed by developer \$30,000
Jackson Ave at 35 th	<ul style="list-style-type: none"> Update signal timing 	<ul style="list-style-type: none"> 100% \$5,000
MoPac at 45 th	<ul style="list-style-type: none"> Update signal timing 	<ul style="list-style-type: none"> 100% \$5,000
45 th Street at Bull Creek	<ul style="list-style-type: none"> Reconstruct intersection to provide left turn bays on 45th Street and a right turn lane on Bull Creek Modify signal to remove split phasing 	<ul style="list-style-type: none"> 26.5% \$770,000x0.265 = \$204,220
Driveway 1	<ul style="list-style-type: none"> Stripe southbound left turn lane for Driveway 1 Construct so that left turns may not exit the driveway Remove Temporary driveway 	<ul style="list-style-type: none"> Constructed by developer \$3,500
Bull Creek from Driveway 1 to 45 th	<ul style="list-style-type: none"> Construct a second northbound lane 	<ul style="list-style-type: none"> Constructed by developer \$252,500
Driveway 2	<ul style="list-style-type: none"> Construct Driveway 2 with three outbound lanes Stripe northbound and southbound left turn lanes on Bull Creek Construct northbound right turn lane for Driveway 2 Restripe eastbound Jackson to provide a left turn lane and shared through/right lane Install traffic signal. Turn on when warranted. 	<ul style="list-style-type: none"> Constructed by developer \$330,000
Driveway 4	<ul style="list-style-type: none"> Construct Driveway 4 as right-in/right-out only Construct raised median to prevent lefts 	<ul style="list-style-type: none"> Constructed by developer \$32,500
Driveway 5	<ul style="list-style-type: none"> Construct Driveway 5 with two outbound lanes 	<ul style="list-style-type: none"> Constructed by developer
Pedestrian Hybrid Beacon	<ul style="list-style-type: none"> Construct Pedestrian Hybrid Beacon across Bull Creek adjacent to Driveway 4 	<ul style="list-style-type: none"> Constructed by developer \$250,000

Pedestrian Hybrid Beacon	<ul style="list-style-type: none"> Construct Pedestrian Hybrid Beacon across Bull Creek adjacent to Driveway 1 	<ul style="list-style-type: none"> Constructed by developer \$250,000
2024		
Jackson Ave at 35th	<ul style="list-style-type: none"> Restripe and sign the southbound approach of Jackson to provide a shared left/through lane and right only lane 	<ul style="list-style-type: none"> 8.3% $\\$3,500 \times 0.083 = \\292

Many of the improvements recommended for 2024 have been moved to 2018 per Staff's request. The details of the improvements will be determined in the Traffic Phasing Agreement.

The improvements at the Bull Creek and 45th Street intersection are estimated to cost over \$1,000,000. The pro-rata for this work is 26.5% or \$272,846. However, the developer is offering to fully construct these recommended improvements.

The developer also offers to fully fund the left turn lanes and right turn lane on Bull Creek, the signal at Bull Creek and Jackson Avenue (when warranted), add a median on Bull Creek at 40th Street/Driveway 4, signal timing updates and pedestrian hybrid beacons across Bull Creek at Driveway 4 and at Driveway 1 (when warranted) and trails along Bull Creek Road and Shoal Creek. This brings the total opinion of probable costs to \$2,910,150. The developer offers to fully fund these improvements; however, it is expected that Austin Transportation Department (ATD) will perform the signal timing updates in situations in which other improvements are not being recommended at the intersection. The estimated pro-rata for the signal timing updates is \$15,000.

Pro-rata calculations for improvement at the Highland Terrace/45th/MoPac Exit Ramp intersection totals \$30,388. It is requested that fully funding all other improvements relieves the developer from payment of the \$30,388. It should also be noted that this intersection fails during the existing PM peak period, therefore; improvements should be implemented regardless as to whether this development occurs.

In summary, the developer is proposing to fully construct over 2.7 million dollars in improvements and also pay the \$15,000 in pro-rata for the signal timing changes. These costs do not include Rights-of-Way dedications or Easement preservations or posting fiscal for the proposed pedestrian/bicycle bridge over Shoal Creek.

- Add a 250' right turn lane on northbound Bull Creek at 45th and restripe to provide dual lefts, one through lane and one right turn lane.

2024

- Restripe and sign the southbound Jackson Avenue approach to 35th Street to provide a shared left/through lane and right turn only lane.

Pedestrian Hybrid Beacons

Pedestrian hybrid beacons are recommended across Bull Creek Road in the vicinity of 40th Street/Driveway 4 and at Driveway 1.