



Traffic Operations Analysis Technical Memorandum

Dallas CBD Second Light Rail Alignment (D2)

30% PRELIMINARY ENGINEERING – DRAFT

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MEMO

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TO39 D2 Subway - Traffic Analysis Summary of No-Build and Build Scenarios for Years 2024 and 2045

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Subject: DART TO39 D2 Subway Project Development
D2 Subway Traffic Analysis Results Technical Memorandum

INTRODUCTION

Dallas Area Rapid Transit (DART) is conducting Project Development, including Preliminary Engineering (PE) and development of a Supplemental Draft Environmental Impact Statement (SDEIS) for a second Central Business District (CBD) light rail alignment, known as the D2 Subway. The General Planning Consultant (GPC), was tasked with developing a methodology and conducting traffic analysis to evaluate the potential traffic impacts of the D2 Subway Project. The *Traffic Analysis Methodology Technical Memorandum* (March 2020) provided a description of the study area, an overview of the traffic model development and calibration process, traffic impact analysis methodology, a summary of Year 2017 existing conditions compared to Year 2024 No-Build conditions, growth rate assumptions for Year 2024 and 2045, and anticipated No-Build Alternative network changes under Year 2024 and 2045 No-Build conditions.

The purpose of this technical memorandum is to document the 2024 No-Build versus Build Alternative and 2045 No-Build and Build Alternative traffic analysis results. The results of the traffic analysis will be included in the SDEIS and will provide the basis for traffic mitigation measures. Once construction approaches are known, the model can be used to assess traffic detour plans and provide recommendations to alleviate potential construction impacts.

MODEL DEVELOPMENT

The following section describes the development of the No-Build and Build models for the years 2024 and 2045 including roadway geometry assumptions, train operations, and intersection control.

Roadway Geometry

No-Build Alternative

The following geometry changes were assumed to be completed by 2024 and were incorporated into the network.

- Pearl Street will operate as a two-way street between Pacific Avenue and Young Street
- Cesar Chavez Boulevard will operate as a two-way street between Pacific Avenue and Young Street
- Live Oak Street will operate as a two-way street between CBD East Transfer Center (Olive Street) and Central Expressway (Cesar Chavez Blvd) and
- Commerce Street will operate as a three-lane one-way street between Akard Street and Lane Street.

The following geometry changes were assumed to be completed by 2045 and were incorporated into the 2045 models:

- Eastbound (EB) Commerce Street converted to three lane roadway between Houston Street and Cesar Chavez Boulevard and

Westbound (WB) Elm Street converted to four lane roadway between Houston Street and Cesar Chavez Boulevard. Roadway geometry changes reflected in the Build Alternative are based on the 20% preliminary engineering design. The D2 Subway would operate at-grade through Victory Park and the Good Latimer/Deep Ellum area. Within the downtown core, the Project would be in a subway and avoid conflicts with at-grade traffic between McKinney Avenue on the west and Hawkins Street on the east.

Appendix A includes a table and maps describing the proposed roadway changes with the Build Alternative. Within the Victory Station area, D2 Subway will run along the median of Museum Way and the number of lanes would be reduced to one lane in each direction. The three intersections along Museum Way at Victory Avenue, Victory Park Lane and Houston Street would be kept fully operational for vehicular and pedestrian crossing with pre-empted traffic signals allowing train movements.

Within the Good Latimer Expressway area, the southbound (SB) left turn lane at the intersection of Good Latimer Expressway and Live Oak Street will be eliminated due to track widening for the Live Oak Station. Thus, SB left-turn movements would not be allowed at this intersection in the Build Alternative. The Project would run within the median of Good Latimer Expressway and a new junction would be located between Swiss Avenue and Pacific/Gaston Avenue.

Train Operations

Currently, all four LRT lines (Blue, Red, Orange, and Green) operate along the single Bryan/Pacific transitway mall. The headway of each line is 15 minutes which averages approximately 3.5 minutes between trains running in the same direction. When the D2 Subway is in place, the Red and Blue lines would remain in the existing transitway mall, while Orange and Green lines will switch to the proposed D2 corridor. Since the headway would remain the same (15 minutes per line), the time between trains would increase from 3.5 minutes to 7 minutes. The Build Alternative also includes a Red Line insert during the peak hour to address core capacity requirements.

Origin-Destination (OD) Matrix Forecasting

As described in the *Traffic Analysis Methodology Technical Memorandum*, a 2024 network OD Matrix was developed from calibrated 2017 OD matrix using a City of Dallas recommended annual growth rate of 1%. Similarly, a 2045 OD matrix was developed using a long-term growth rate of 0.5% to grow traffic from 2024 to 2045, as recommended by city of Dallas staff. These matrices were used for both the No-Build and Build conditions analysis.

Intersection control

Due to geometry changes with the D2 Subway, the intersection control type was changed or added at the following intersections:

- Museum Way and Victory Avenue
- Museum Way and Victory Park Lane
- Museum Way and Houston Street
- Swiss Avenue and Hawkins Street
- Broom Street and D2 Crossing
- McKinney Street and D2 Crossing

The first four intersections listed above are all stop-controlled in the No-Build condition, which were switched to signalized intersections in the Build condition. The last two intersections do not exist in the No-Build condition. However, they are expected to operate as signalized intersections in the Build condition.

In addition to these changes, the signal timings and coordination are adjusted throughout the network to reflect future traffic volumes and network geometry.

CAPACITY ANALYSIS RESULTS

The number of intersections operating at a particular Level of Service (LOS) during the No-Build and Build conditions for both analysis years are summarized in Table 1 below. Appendix B provides a comparison of average control delays and LOS associated with the No-Build and Build scenarios, for all intersections within the study area. Appendix C shows a map of all intersections reported along with a corresponding Node ID.

Initially, 160 intersections were identified in the study area. Four more intersections are included in this memorandum. Out of these four intersections listed below, the first two are switched from a stop-control to signal-control operation with D2 in place, and the remaining two are added in the Build alternative evaluation, since the streets intersect the proposed D2 subway tracks.

- Museum Way and Victory Avenue
- Museum Way and Houston Street
- Broom Street and D2 Crossing
- McKinney Street and D2 Crossing

Table 1 Summary of Intersection LOS for No-Build and Build Scenarios of Year 2024 and Year 2045

LOS	Year 2024				Year 2045			
	AM Peak Period		PM Peak Period		AM Peak Period		PM Peak Period	
	No-Build	Build	No-Build	Build	No-Build	Build	No-Build	Build
A	56	69	52	70	46	55	38	68
B	92	79	86	75	78	79	80	64
C	12	15	22	17	30	25	38	30
D	2	1	2	2	5	4	5	1
E	0	0	0	0	2	1	1	1
F	0	0	0	0	1	0	0	0
Total	162	164	162	164	162	164	162	164

2024 No-Build and Build Conditions

During both AM and PM peak periods, all study intersections are expected to operate at LOS D or better during both 2024 No-Build and Build scenarios. In addition, the LOS of intersections surrounding the existing transitway mall did not change considerably, during both AM and PM peak periods in the Build scenario.

AM PEAK PERIOD

During the AM peak period of the 2024 No-Build scenario, most of the intersections operate at LOS C or better other than the following two intersections which operate at LOS D:

- WB Woodall Rodgers Service Road and Field Street
- Ross Avenue and Pearl Street

Under the 2024 Build scenario, most of the intersections continue to operate at LOS C or better with an exception of Woodall Rodgers Service Rd and Field Street, which continues to operate at LOS D. Ross Avenue and Pearl Street improves to LOS C.

Also as noted in Table 1, more intersections are expected to operate at LOS A and C during the AM peak period in Build scenario, while fewer intersections operate at LOS B and D.

PM PEAK PERIOD

During the PM peak period of 2024 No-Build scenario, most of the intersections operate at LOS C or better with the exception of the following two intersections, which operate at LOS D. These two intersections continue to operate at LOS D in the Build scenario.

- WB Woodall Rodgers Service Road and Field Street
- Pacific Avenue and Pearl Street

Similar to AM peak period, more intersections are expected to operate at LOS A during PM peak period in the Build scenario while fewer intersections operate at LOS B or C, compared to No-Build scenario.

2045 No-Build and Build Conditions

During AM and PM peak periods of both the 2045 No-Build and Build scenarios, most of the intersections operate at LOS C or better. As shown in Table 1, more intersections are expected to operate at LOS A and

fewer intersections are expected to operate at LOS D or worse in Build scenario compared to the No-Build scenario.

AM PEAK PERIOD

During the AM peak period of the 2045 No-Build scenario, most of the intersections operate at LOS C or better. The intersections that operate at LOS D or worse are listed below.

- Main Street and Houston Street
- Commerce Street and Houston Street
- SB Good Latimer Expressway and Canton Street
- Cesar Chavez Blvd and Canton Street
- Ross Avenue and Pearl Street
- WB Woodall Rodgers Service Road and Field Street
- Commerce Street and Cesar Chavez Blvd and Jackson Street
- Young Street and Market Street

Among all the listed intersections above, the operation at Commerce Street and Houston Street is the worst with a LOS F. The operation at this intersection is improved remarkably from LOS F to LOS C in the Build scenario. Also the first four intersections listed above improved in LOS to operate at LOS C or better. The bottom four intersections continued to operate at LOS D.

PM PEAK PERIOD

During the PM peak period of 2045 No-Build scenario, most of the intersections operate at LOS C or better other than the intersections listed below.

- Ross Avenue and Griffin Street
- Ross Avenue and Pearl Street
- Federal Street and St Paul Street
- Live Oak Street and Good Latimer Expressway
- Pacific Avenue and Pearl Street
- WB Woodall Rodgers Service Road and Field Street

Among the intersections listed above, the intersection of Pacific Avenue and Pearl Street will continue to operate at LOS D and the intersection of WB Woodall Rodgers Service Road and Field Street will continue to operate at LOS E in the 2045 Build scenario. Remaining intersections are expected to improve to a better LOS in the 2045 Build scenario.

Based on the observations made above and as demonstrated in Table 1 and Appendix B, study area intersections are expected to operate better in Build scenario compared to the No-Build scenario. This is due to the fact that there are approximately half as many trains operating along the existing Bryan/Pacific transit mall, thus reducing the impacts to traffic flow associated with north-south signal coordination. With most of the D2 Subway below-grade, there are a minimal impacts to the traffic level of service.

KEY INTERSECTION ANALYSIS

A more detailed observation of intersections in the Victory Station area and Good Latimer Expressway area was conducted due to the at-grade LRT operations. Twenty-one intersections that are listed in Table 2 below were selected for this analysis as they are either crossed by the Project or near the proposed rail

tracks and potential queueing impacts need to be analyzed. The average queue length, delay, and LOS for each approach of the intersections is provided in Appendix D. A discussion of each area follows below.

Table 2 List of Intersections Analyzed at Approach Level

Node ID	Intersection
1	Olive Street and Victory Avenue
94	Olive Street and Victory Park Lane
2	Olive Street and Houston Street
161	Museum Way and Victory Avenue
3	Museum Way and Victory Park Lane
162	Museum Way and Houston Street
4	High Market Street and Victory Avenue
5	High Market Street and Houston Street
71	Broom Street and Laws Street
10	Woodall Rodgers Freeway Service Rd WB and Field Street
11	Woodall Rodgers Freeway Service Rd EB and Field Street
60	Live Oak Street and SB Central Expressway
59	Live Oak Street and NB Central Expressway
58	Good Latimer Expressway and SB Central Expressway
57	Good Latimer Expressway and NB Central Expressway
61	Good Latimer Expressway and Live Oak Street
63	Good Latimer Expressway and Gaston Street
156	Good Latimer Expressway and Elm Street
62	Swiss Avenue and Hawkins Street
163	Proposed D2/ Broom Street Crossing
164	Proposed D2/ McKinney Street Crossing

VICTORY PARK AREA

As shown in tables provided in Appendix D, most approaches of intersections in the Victory Park area operate at LOS C or better during both peak periods of both years 2024 and 2045. The queue lengths and delays of most approaches remain comparable and even improve in some cases from No-Build to Build scenario.

The intersection of Field Street and WB Woodall Rodgers Freeway Service Road operates at LOS D or worse in both No-Build and Build scenarios in both years 2024 and 2045. This is primarily due to the SB approach, which operates at a LOS F in both years 2024 and 2045 with or without D2 Subway project. There is an off-ramp from Woodall Rodgers freeway about 80 feet north of the stop bar on the SB approach which causes heavy queuing and failing conditions on that approach. This is not directly related to or caused by the D2 project.

GOOD LATIMER EXPRESSWAY AREA

During both AM and PM peak periods of years 2024 and 2045, almost all approaches of all intersections in the Good Latimer Expressway area are expected to operate at LOS C or better. The queue lengths remain the same or even improve in some cases.

GOOD LATIMER EXPRESSWAY AND GASTON AVENUE

This intersection is expected to operate similar to the train junction at the intersection of Central Expressway and Good Latimer Expressway. The track crossings on the SB and NB approaches should be protected by a gate that stops vehicles from queuing over the tracks.

The SB queue is not expected to increase significantly due to the elimination of SB left-turn movement from Good Latimer Expressway to Live Oak Street. In 2045 Build scenario, the average peak hour queue on the SB approach is expected to be slightly over 100 feet and NB approach is slightly under 100 feet, in both AM and PM peak periods. Based on observations made during future scenario simulation, the queue goes past the new tracks in SB direction and approaches the intersection with Swiss Avenue during few cycles when there is a surge in traffic. The queue in the NB direction does not reach the tracks.

The recommendations for this intersection include:

- Periodic monitoring of traffic and adjusting signal timings with a priority to SB approach; and
- Provide a gate crossing system to allow for the traffic to stay clear of the tracks in the event of a surge during peak hours.

LIVE OAK STREET AND CENTRAL EXPRESSWAY

The SB left turn at the intersection of Good Latimer Expressway and Live Oak Street is proposed to be eliminated in the Build scenario due to track widening for the station. All the traffic from this movement is expected to be rerouted to other intersections to complete their trips. As a worst-case scenario, all this traffic is shifted to SB left-turn movement at the intersection of Live Oak Street and SB Central Expressway to continue as EB traffic along Live Oak Street and through the intersection of Good Latimer Expressway. This was a natural detour based on the dynamic traffic assignment observed within the Transmodeler model developed for the traffic analysis.

Therefore, the intersections of SB and NB Central Expressway at Live Oak Street were analyzed further using Synchro 10, as a supplement. According to the Measures of Effectiveness (MOEs) shown in Table 3, both these intersections are expected to operate at LOS C or better, even with the redirected traffic. A more detailed summary of average control delays, queue lengths and LOS for each movement at these intersections is reported in Appendix E.

As shown in Appendix E, the queue on the SB left-turn movement at SB Central Expressway and Live Oak Street intersection increases due to the redirected traffic from SB approach of Good Latimer and Live Oak Street. However, a maximum queue length of 230 feet is expected during 2045 PM peak hour. The current storage available (approximately 240 feet) should be able to accommodate the queue during the PM peak hour. Therefore, no physical improvements are recommended at this intersection. However, traffic should be monitored periodically and signal timings updated to match the change in traffic conditions.

Table 3 MOEs of SB and NB Central Expy at Live Oak Street

Intersection		Live Oak St and Central Expy SB		Live Oak St and Central Expy NB	
		Delay (sec)	LOS	Delay (sec)	LOS
2024	No-Build AM	12.9	B	26.6	C
	Build AM	14.4	B	23.1	C
	No-Build PM	14.1	B	18.4	B
	Build PM	14.7	B	20.1	C
2045	No-Build AM	19.8	B	29.1	C
	Build AM	20.3	C	25.2	C
	No-Build PM	14.5	B	19.5	B
	Build PM	15.5	B	22.2	C

INTERSECTIONS ALONG EXISTING LIGHT RAIL BRYAN/PACIFIC TRANSITWAY MALL

As part of the transit signal priority operation at the intersections located along current light rail transitway mall, the signal coordination is out of sync every time a transit call is placed on the signal. It takes a few signal cycles before the signal coordination recovers. This impacts the traffic operation along the intersections on either side of the LRT.

In the No-Build scenario, the transit call is activated approximately every two minutes due to the high frequency of trains. This delays signal coordination recovery and results in traffic congestion and queuing.

In the Build scenario, the proposed D2 Subway reduces the number of trains from the No-Build scenario. As a result, the transit calls are placed approximately every four minutes, thus reducing the signal coordination issues and resulting congestion/queuing.

Appendix F provides delays and LOS for 41 intersections located along the existing LRT transitway mall between Houston Street on the west and Pearl Street on the east, and major intersections one block on either side (north and south) of the LRT. A summary of the information provided in Appendix F is shown in Table 4, which lists the number of intersections operating at same, better or worse LOS in Build scenario compared to the No-Build scenario in each analysis year. As noted in Table 4, majority of the intersections either remain at the same LOS or operate better in the Build scenario.

Table 4 Summary of Operations - Improvement along LRT

	Comparison Between No-Build and Build Conditions for Year 2024		Comparison Between No-Build and Build Conditions for Year 2045	
	AM Peak Period	PM Peak Period	AM Peak Period	PM Peak Period
Number of Intersections Operations Improved	4	7	8	10
Number of Intersections Remained at Same LOS	35	30	29	31
Number of intersections Operation Degraded	2	4	4	0
Total Number of Intersections Reported	41	41	41	41

CONCLUSION AND RECOMMENDATIONS

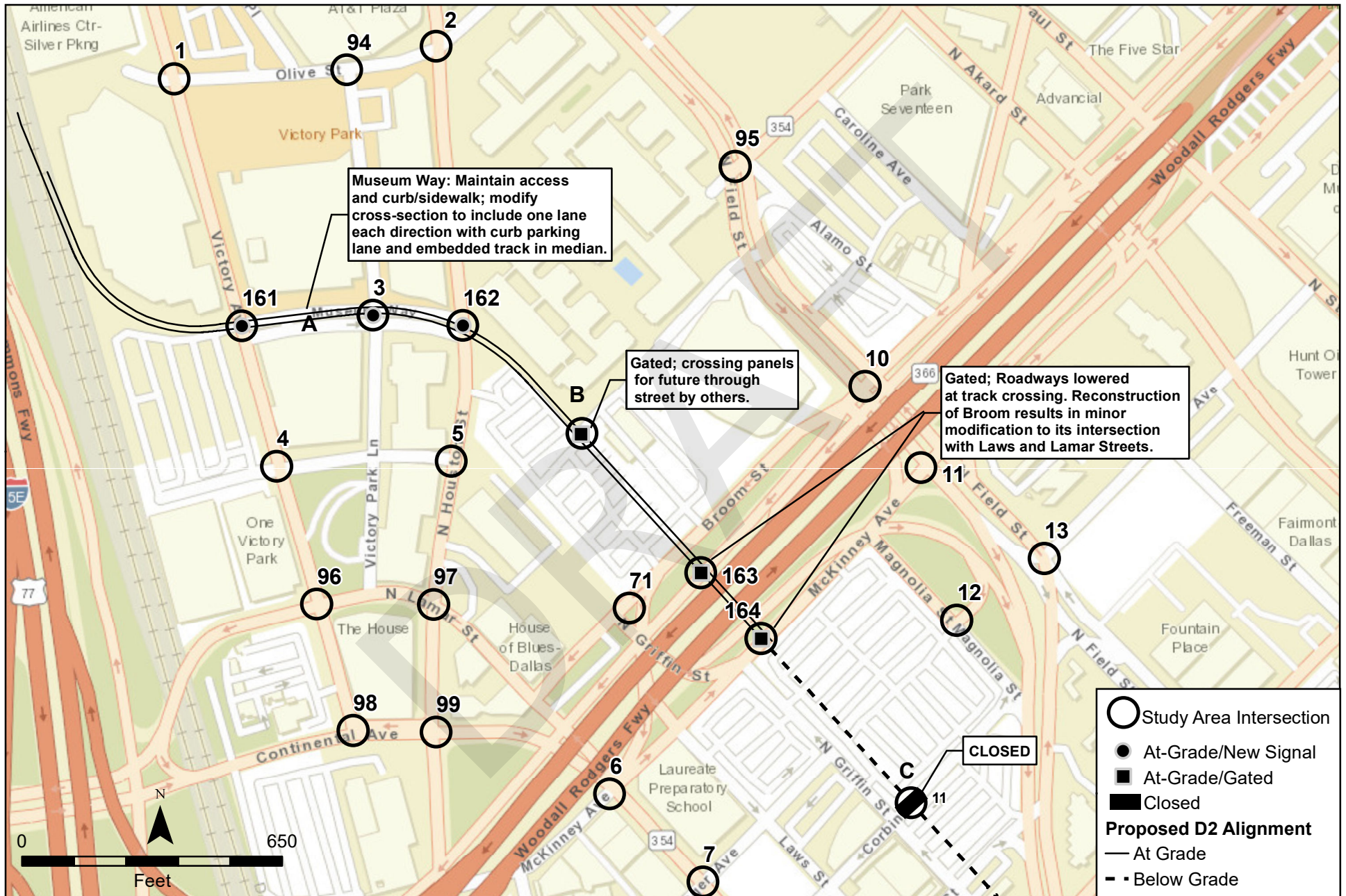
Based on the analyses and results described in the previous sections, the overall traffic operation of the entire study area is deemed acceptable with the proposed D2 Subway and that it will not have any significant impacts requiring capacity improvements. In fact, the study area intersections are expected to operate better in Build scenario compared to the No-Build scenario. This is due to the fact that train operations are reduced on the existing Bryan/Pacific transitway mall, thus reducing the impacts to traffic flow associated with north-south signal coordination.

The following recommendations would improve overall traffic operations within the study area to accommodate D2 project:

- **SB Central Expressway and Live Oak Street:**
Though the queuing on the SB approach is expected to be accommodated by the current lane configuration and storage lanes, it is recommended that the increase in traffic is periodically monitored and signal timings be adjusted as required, to accommodate the diversion in traffic from the intersection of Good Latimer Expressway and Live Oak Avenue. If required, the lane configuration can be reevaluated to provide a shared left-through lane on the SB in addition to the current left-turn only lane. The length of storage lanes can also be reevaluated.
- **Good Latimer Expressway and Gaston Avenue:**
The SB approach of this intersection is expected to have queues that are sometimes longer than 100 feet in the 2045 Build scenario. Gates controlling the traffic flow over the tracks should be provided. Also, signal timings should be periodically adjusted to accommodate the traffic demand and train priorities.

It was noted during traffic simulation that the calls placed for trains at intersections providing transit signal priorities can throw signal coordination out of sync along the north-south corridors and cause heavy queuing. Hence, it is critical to minimize such interruptions so that the signals do not stay out of sync for too long. Coordination between DART and the City of Dallas is critical to upgrade signal equipment, software and timings to meet the traffic demand requirement.

Appendix A



Appendix A-1 Proposed Permanent Changes in the Victory Park/Museum Way Area

Data Source: DART, GPC6

D2 Subway Project





Appendix A-2 Proposed Permanent Changes in the Deep Ellum/Good Latimer Area

Data Source: DART, GPC6

D2 Subway Project

Appendix A-3 Proposed Permanent Changes

Map ID	Street	Existing/No-Build Condition	Proposed Crossing Configuration	Proposed Traffic Control and Changes with Project
Victory/Museum Way Station Area				
161	Victory Avenue	Two-way, four-lane concrete roadway	At-grade	Traffic signal
3	Victory Park Lane	Two-way, two-lane concrete roadway	At-grade	Traffic signal
A	Museum Way	Two-way, four-lane concrete roadway with median parking; DART-owned 35-foot right-of-way in median	Project to be located within median.	Maintain access; new signals at Victory, Victory Park, Houston; maintain curb/sidewalk; modify cross-section to include one lane each direction with curb parking lane and embedded track in median.
162	Houston Street	Two-way, three-lane concrete roadway with center left turn lane. Striped/barrier separated cycle track in each direction.	At-grade	Traffic signal
B	River Street	Private gated access roadway for Perot Museum; roadway does not formally cross DART right-of-way	At-grade	Gated; crossing panels for future through street by others
163	Broom Street (Woodall Rodgers WB Frontage Road)	One-way, three-lane concrete roadway	At-grade	Gated; Reconstruction of roadway closer to Woodall Rodgers. Roadway lowered by 1.5 feet at track crossing. Reconstruction of Broom results in minor modification to its intersection with Laws and Lamar Streets.
11	Woodall Rodgers (SH 366) and Field Street on-ramp	Elevated freeway and elevated on-ramp from Field Street	Under elevated freeway and ramp	None; DART would seek low OCS clearance to avoid modification to ramp
164	McKinney Ave (Woodall Rodgers EB Frontage Road)	One-way, three-lane concrete roadway	At-grade	Gated. Roadway lowered by 0.5 feet at track crossing. Minor modifications to Old Griffin would be associated with this change.
C	Corbin Street	One-way, two-lane roadway.	Tunnel portal location	Would be closed due to location of portal.

Map ID	Street	Existing/No-Build Condition	Proposed Crossing Configuration	Proposed Traffic Control and Changes with Project
Deep Ellum/Good Latimer Expressway Area				
D	I-345	Elevated two-way, 10-lane facility.	Under I-345	Crossing permit and agreement required with TxDOT. Tunnel portal u-wall to be built adjacent to bridge foundations.
D	I-345 Frontage Road (northbound North Central Expressway)	One-way, one-lane frontage road.	Tunnel portal location	Northbound frontage road closed from Pacific to Swiss; possible local access south of the portal available to adjacent property.
62	Swiss Avenue	Two-way local street from I-345 to southbound Good Latimer. No through movements across Good Latimer	At-grade through intersection of Swiss and southbound Good Latimer	Swiss Avenue would be one-way westbound between Hawkins and Good Latimer to reduce conflicts with wye junction.
F	North Hawkins Street	Two-way local street.	At-grade	Gated. Proposed realignment with new Jett Way to the south.
G	Miranda Street	One-way, two lane local street	None	Close and abandon street between Hawkins and Good Latimer due to new wye junction
61	Live Oak Street	Two-way, five lanes with center left-hand turn lane. At-grade crossing of existing Green Line	At-grade crossing retained	Elimination of southbound Good Latimer left turn movement onto Live Oak due to track widening for Live Oak Station. Intersection to remain signalized.
H	Good Latimer Expressway	Two-way, four lane roadway; Green Line operates in the median between Live Oak and Elm Streets.	Alignment remains in median. Two new at-grade crossings on southbound lanes at wye junction	Two gated crossings near Swiss and Pacific. Sections would be reconstructed with embedded track and relocated median station. All travel lanes would be reduced to 10 feet. Elimination of southbound Good Latimer left turn movement onto Live Oak due to track widening for Live Oak Station.
63	Pacific/Gaston Avenue	Two-way, five lanes with center turn lanes and existing Green Line crossing	At-grade crossing retained.	Intersection to remain signalized.

Appendix B

Appendix B Traffic Analysis Summary

Node ID	Intersection	Control Type	AM Peak Period				PM Peak Period				AM Peak Period				PM Peak Period			
			No Build 2024		Build 2024		No Build 2024		Build 2024		No Build 2045		Build 2045		No Build 2045		Build 2045	
			Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS
18	Elm St and Houston St	Signalized	18.2	B	14.1	B	31.4	C	22.4	C	20.6	C	11.5	B	31.8	C	24.6	C
105	Elm St and Record St	Signalized	9.9	A	5.7	A	15.7	B	11.3	B	14.5	B	6.8	A	20.9	C	15.1	B
21	Elm St and Market St	Signalized	15.2	B	18.4	B	28.1	C	11.1	B	19.0	B	20.5	C	28.5	C	15.2	B
113	Elm St and Austin St	Signalized	5.0	A	4.9	A	10.3	B	2.7	A	9.4	A	3.8	A	10.4	B	4.3	A
25	Elm St and Lamar St	Signalized	13.5	B	16.9	B	14.8	B	16.4	B	15.4	B	15.8	B	19.7	B	19.8	B
29	Elm St and Griffin St	Signalized	14.5	B	14.6	B	18.7	B	14.1	B	20.4	C	19.0	B	28.4	C	16.9	B
32	Elm St and Field St	Signalized	16.2	B	19.5	B	14.2	B	12.7	B	18.8	B	20.8	C	18.9	B	17.7	B
75	Elm St and Akard St	Signalized	13.5	B	16.4	B	9.3	A	8.2	A	16.4	B	18.4	B	11.0	B	15.4	B
76	Elm St and Ervay St	Signalized	10.1	B	11.0	B	12.4	B	7.2	A	12.6	B	13.4	B	15.2	B	8.5	A
77	Elm St and St Paul St	Signalized	14.6	B	14.3	B	12.6	B	14.9	B	19.0	B	16.3	B	14.3	B	15.2	B
44	Elm St and Harwood St	Signalized	15.0	B	10.0	B	15.8	B	18.3	B	19.7	B	12.4	B	20.8	C	21.8	C
51	Elm St and Pearl St	Signalized	10.5	B	8.0	A	23.6	C	15.0	B	16.8	B	9.0	A	23.7	C	15.6	B
55	Elm St and Cesar Chavez Blvd	Signalized	14.1	B	15.7	B	15.8	B	14.6	B	25.6	C	15.2	B	18.3	B	17.5	B
156	Elm St and Good Latimer Expy	Signalized	18.6	B	18.8	B	17.3	B	18.2	B	22.2	C	19.5	B	17.0	B	20.1	C
68	Elm St and Malcolm X Blvd	Signalized	12.4	B	11.7	B	11.8	B	15.2	B	13.3	B	13.6	B	13.8	B	15.9	B
19	Main St and Houston St	Signalized	24.2	C	23.5	C	21.5	C	17.6	B	40.4	D	28.3	C	22.5	C	18.4	B
106	Main St and Record St	Signalized	11.7	B	7.9	A	6.4	A	11.5	B	12.9	B	13.9	B	11.3	B	12.7	B
22	Main St and Market St	Signalized	23.9	C	18.5	B	13.7	B	8.8	A	25.8	C	24.1	C	17.7	B	12.9	B
114	Main St and Austin St	Signalized	8.8	A	9.8	A	7.0	A	3.5	A	11.6	B	11.7	B	10.3	B	7.6	A
26	Main St and Lamar St	Signalized	12.7	B	13.1	B	17.9	B	18.9	B	21.8	C	12.8	B	21.7	C	20.2	C
30	Main St and Griffin St	Signalized	18.8	B	19.8	B	15.2	B	14.8	B	24.0	C	25.7	C	19.7	B	15.2	B
121	Main St and Murphy Dr	Signalized	6.1	A	3.1	A	2.7	A	2.1	A	6.1	A	6.2	A	2.8	A	2.2	A
33	Main St and Field St	Signalized	14.4	B	11.3	B	12.8	B	13.2	B	15.6	B	17.3	B	13.8	B	16.9	B
35	Main St and Akard St	Signalized	10.6	B	8.7	A	19.3	B	15.4	B	11.3	B	11.2	B	15.5	B	14.9	B
37	Main St and Ervay St	Signalized	13.3	B	9.9	A	17.2	B	11.9	B	10.5	B	13.4	B	19.0	B	13.1	B
40	Main St and St Paul St	Signalized	9.4	A	9.5	A	10.0	B	11.8	B	11.3	B	10.7	B	10.6	B	10.8	B
45	Main St and Harwood St	Signalized	18.8	B	14.4	B	12.0	B	13.7	B	25.0	C	15.8	B	13.6	B	15.3	B
52	Main St and Pearl St	Signalized	11.5	B	13.0	B	16.2	B	14.5	B	19.4	B	18.5	B	21.7	C	17.8	B
56	Main St and Cesar Chavez Blvd	Signalized	21.3	C	16.6	B	20.9	C	20.1	C	29.1	C	29.9	C	28.0	C	22.4	C
64	Main St and Good Latimer Expy	Signalized	13.8	B	10.5	B	11.6	B	12.8	B	15.3	B	9.5	A	14.4	B	14.5	B
157	Main St and Malcolm X Blvd	Signalized	10.7	B	10.4	B	10.7	B	11.2	B	11.1	B	12.6	B	11.0	B	11.1	B
20	Commerce St and Houston St	Signalized	19.0	B	20.5	C	14.4	B	13.0	B	91.7	F	27.6	C	19.8	B	13.8	B
107	Commerce St and Record St	Signalized	2.6	A	3.3	A	11.1	B	3.7	A	7.2	A	5.7	A	9.5	A	3.7	A
23	Commerce St and Market St	Signalized	17.9	B	17.2	B	10.8	B	4.7	A	22.7	C	18.6	B	13.5	B	5.2	A
115	Commerce St and Austin St	Signalized	7.3	A	6.1	A	8.5	A	6.1	A	12.3	B	9.9	A	11.2	B	8.7	A
27	Commerce St and Lamar St	Signalized	10.9	B	7.7	A	7.3	A	8.4	A	21.8	C	14.0	B	11.5	B	9.1	A
31	Commerce St and Griffin St	Signalized	17.4	B	11.9	B	10.5	B	13.0	B	21.3	C	16.0	B	15.2	B	14.1	B
34	Commerce St and Field St	Signalized	11.2	B	9.9	A	12.5	B	6.8	A	16.2	B	12.4	B	16.2	B	7.4	A
36	Commerce St and Akard St	Signalized	10.2	B	8.1	A	9.3	A	6.3	A	10.2	B	9.7	A	8.8	A	6.9	A
133	Commerce St and Browder St	Signalized	3.6	A	4.2	A	2.5	A	2.6	A	4.2	A	7.3	A	2.9	A	2.5	A
134	Commerce St and Lane St	Signalized	4.7	A	4.5	A	6.6	A	4.2	A	4.0	A	7.9	A	7.2	A	4.0	A
38	Commerce St and Ervay St	Signalized	8.4	A	11.3	B	6.0	A	8.6	A	7.9	A	13.4	B	7.3	A	8.9	A
149	Commerce St and Prather St	Signalized	2.3	A	4.5	A	2.1	A	2.6	A	5.4	A	7.5	A	4.8	A	2.9	A
41	Commerce St and St Paul St	Signalized	7.8	A	15.4	B	9.1	A	6.0	A	10.0	B	14.8	B	7.5	A	7.8	A
46	Commerce St and Harwood St	Signalized	12.5	B	5.9	A	10.8	B	18.4	B	28.0	C	6.1	A	14.1	B	21.5	C
53	Commerce St and Pearl St	Signalized	12.1	B	14.3	B	10.6	B	9.5	A	16.4	B	26.6	C	22.8	C	9.3	A
155	Commerce St, Cesar Chavez Blvd and Jackson St	Signalized	33.5	C	17.6	B	24.4	C	25.9	C	75.5	E	45.0	D	30.4	C	32.2	C

Node ID	Intersection	Control Type	AM Peak Period				PM Peak Period				AM Peak Period				PM Peak Period			
			No Build 2024		Build 2024		No Build 2024		Build 2024		No Build 2045		Build 2045		No Build 2045		Build 2045	
			Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS
66	Commerce St and SB Good Latimer Expy	Signalized	11.0	B	13.0	B	20.2	C	7.6	A	8.7	A	13.0	B	22.6	C	8.8	A
65	Commerce St and NB Good Latimer Expy	Signalized	11.9	B	11.0	B	9.3	A	5.4	A	14.0	B	12.1	B	8.9	A	6.3	A
69	Commerce St and Malcolm X Blvd	Signalized	10.4	B	8.9	A	10.7	B	7.3	A	10.5	B	9.8	A	12.7	B	7.1	A
73	Pacific Ave and Houston St	Signalized	9.8	A	21.4	C	12.9	B	17.8	B	9.6	A	19.8	B	21.7	C	22.0	C
104	Pacific Ave and Record St	Signalized	8.0	A	9.1	A	22.9	C	12.4	B	7.7	A	9.8	A	26.0	C	7.9	A
74	Pacific Ave and Market St	Signalized	9.6	A	8.0	A	17.8	B	10.1	B	9.0	A	6.7	A	16.9	B	10.8	B
24	Pacific Ave and Lamar St	Signalized	5.0	A	4.1	A	5.5	A	3.9	A	8.7	A	6.9	A	18.5	B	5.7	A
28	Pacific Ave and Griffin St	Signalized	8.6	A	7.4	A	12.9	B	13.0	B	9.5	A	10.2	B	19.8	B	15.2	B
72	Pacific Ave and Field St	Signalized	6.3	A	5.3	A	10.8	B	10.7	B	8.8	A	6.7	A	20.2	C	16.4	B
80	Pacific Ave and Akard St	Signalized	10.1	B	9.1	A	10.9	B	9.0	A	9.6	A	10.2	B	12.5	B	11.3	B
151	Pacific Ave and Ervay St	Signalized	7.7	A	6.6	A	9.6	A	15.6	B	8.7	A	7.2	A	11.1	B	14.9	B
39	Pacific Ave and St Paul St	Signalized	11.6	B	10.1	B	11.3	B	16.1	B	15.8	B	11.5	B	23.1	C	30.7	C
43	Pacific Ave and Harwood St	Signalized	16.7	B	14.2	B	15.7	B	21.0	C	21.8	C	18.9	B	24.2	C	24.4	C
150	Pacific Ave and Olive St (Harwood)	Signalized	4.6	A	5.0	A	5.3	A	6.2	A	5.1	A	5.4	A	6.6	A	7.2	A
48	Pacific Ave and Olive St	Stop	3.5	A	0.4	A	1.0	A	6.2	A	4.8	A	0.2	A	3.3	A	2.3	A
50	Pacific Ave and Pearl St	Signalized	15.7	B	12.9	B	40.4	D	37.9	D	18.6	B	12.8	B	41.3	D	42.7	D
54	Pacific Ave and Cesar Chavez Blvd	Signalized	20.9	C	21.2	C	19.4	B	19.1	B	34.5	C	19.9	B	22.8	C	20.1	C
78	Pacific Ave and N Central Expy	Stop	0.1	A	0.2	A	0.2	A	0.0	A	4.1	A	0.2	A	0.0	A	0.5	A
63	Gaston Ave and Good Latimer Expy	Signalized	15.7	B	22.8	C	25.9	C	27.2	C	19.4	B	27.0	C	34.1	C	28.4	C
67	Gaston St and Malcolm X Blvd	Signalized	10.3	B	12.0	B	9.4	A	8.6	A	11.7	B	23.2	C	10.4	B	8.6	A
101	Ross Ave and Houston St	Signalized	11.2	B	7.5	A	17.3	B	20.2	C	11.5	B	8.0	A	32.2	C	28.9	C
9	Ross Ave and Lamar St	Signalized	15.2	B	17.6	B	16.2	B	19.6	B	18.2	B	19.7	B	25.8	C	28.9	C
14	Ross Ave and Griffin St	Signalized	19.4	B	19.8	B	29.7	C	18.3	B	25.2	C	23.6	C	36.1	D	28.3	C
16	Ross Ave and Field St	Signalized	12.4	B	12.4	B	13.2	B	12.8	B	17.1	B	14.6	B	26.1	C	15.0	B
87	Ross Ave, Akard St and Ervay St and	Signalized	17.3	B	15.6	B	20.7	C	21.4	C	17.5	B	16.8	B	25.0	C	19.6	B
86	Ross St and St Paul St	Signalized	15.8	B	13.2	B	16.9	B	14.0	B	15.0	B	14.8	B	25.9	C	19.2	B
85	Ross Ave and Harwood St	Signalized	12.1	B	13.3	B	12.3	B	11.2	B	14.1	B	13.1	B	19.6	B	11.0	B
143	Ross St and Olive St	Signalized	13.2	B	11.2	B	7.8	A	8.6	A	15.1	B	11.3	B	17.0	B	8.5	A
84	Ross Ave and Pearl St	Signalized	39.1	D	34.8	C	22.2	C	23.3	C	48.8	D	42.0	D	36.8	D	23.3	C
15	San Jacinto St and Griffin St	Signalized	13.7	B	12.8	B	12.2	B	10.3	B	15.7	B	14.7	B	16.2	B	13.9	B
17	San Jacinto St and Field St	Signalized	14.9	B	12.0	B	9.6	A	10.9	B	23.0	C	12.3	B	10.6	B	11.4	B
125	San Jacinto St and Akard St	Signalized	13.2	B	13.4	B	14.1	B	13.3	B	13.8	B	12.1	B	14.1	B	15.1	B
130	San Jacinto St and Ervay St	Signalized	11.7	B	11.7	B	5.8	A	6.1	A	12.5	B	13.4	B	9.3	A	7.3	A
138	San Jacinto St and St Paul St	Signalized	8.8	A	6.8	A	8.7	A	11.4	B	10.9	B	7.5	A	11.7	B	11.7	B
144	San Jacinto St and Harwood St	Signalized	11.4	B	9.3	A	13.8	B	9.9	A	11.5	B	9.3	A	14.4	B	8.9	A
146	San Jacinto St and Olive St	Signalized	14.1	B	14.0	B	14.6	B	17.4	B	15.0	B	16.4	B	16.7	B	16.4	B
147	San Jacinto St and Pearl St	Signalized	17.9	B	16.7	B	12.5	B	13.4	B	19.4	B	17.6	B	13.7	B	12.4	B
102	Jackson St and Houston St	Signalized	10.6	B	27.6	C	5.5	A	7.2	A	14.7	B	20.3	C	15.4	B	8.0	A
110	Jackson St and Austin St	Signalized	12.5	B	10.5	B	18.0	B	17.3	B	16.1	B	13.4	B	17.5	B	13.1	B
116	Jackson St and Market St	Signalized	14.7	B	18.7	B	18.4	B	8.7	A	17.2	B	20.7	C	20.7	C	7.3	A
117	Jackson St and Lamar St	Signalized	6.4	A	7.4	A	8.4	A	10.7	B	10.5	B	8.8	A	10.6	B	10.7	B
119	Jackson St and Griffin St	Signalized	8.5	A	8.5	A	10.3	B	11.1	B	8.0	A	9.6	A	12.0	B	10.7	B
122	Jackson St and Field St	Signalized	8.6	A	7.7	A	8.4	A	5.8	A	12.1	B	9.2	A	8.7	A	5.9	A
127	Jackson St and Akard St	Signalized	7.2	A	8.4	A	5.1	A	6.0	A	9.1	A	7.9	A	6.8	A	3.9	A
135	Jackson St and Ervay St	Signalized	11.1	B	7.4	A	7.2	A	6.8	A	9.2	A	11.0	B	7.2	A	5.5	A
140	Jackson St and St Paul St	Signalized	7.3	A	17.5	B	10.5	B	6.0	A	8.0	A	16.5	B	7.6	A	6.9	A
152	Jackson St and Harwood St	Signalized	7.6	A	7.9	A	7.1	A	5.9	A	16.5	B	7.8	A	8.7	A	6.6	A
154	Jackson St and Pearl St	Signalized	12.8	B	16.1	B	14.5	B	11.2	B	8.1	A	60.9	E	18.0	B	14.7	B

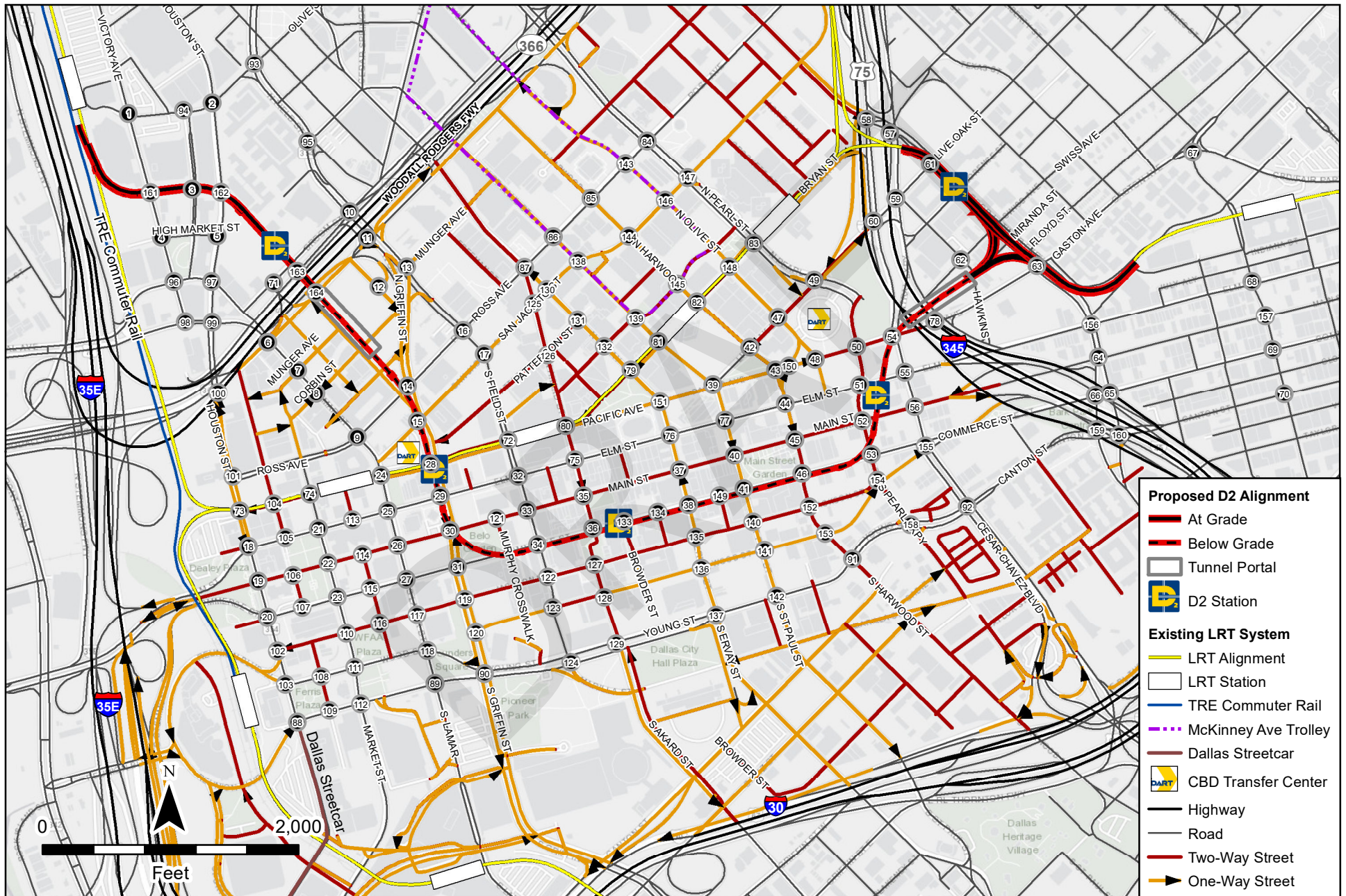
Node ID	Intersection	Control Type	AM Peak Period				PM Peak Period				AM Peak Period				PM Peak Period			
			No Build 2024		Build 2024		No Build 2024		Build 2024		No Build 2045		Build 2045		No Build 2045		Build 2045	
			Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS
88	Young St and Houston St	Signalized	16.3	B	24.6	C	12.0	B	13.0	B	14.5	B	16.6	B	12.4	B	12.9	B
109	Young St and Record St	Signalized	8.5	A	9.5	A	9.3	A	8.7	A	11.1	B	11.3	B	10.9	B	7.9	A
112	Young St and Market St	Signalized	15.1	B	18.1	B	10.0	A	9.2	A	38.3	D	36.6	D	8.5	A	9.4	A
89	Young St and Lamar St	Signalized	13.5	B	12.9	B	14.5	B	8.7	A	26.3	C	28.1	C	17.2	B	10.1	B
90	Young St and Griffin St	Signalized	18.1	B	19.2	B	15.7	B	10.7	B	21.5	C	22.8	C	14.2	B	12.4	B
124	Young St and Field St	Signalized	6.9	A	7.8	A	10.7	B	6.2	A	9.2	A	6.9	A	13.1	B	7.4	A
129	Young St and Akard St	Signalized	8.2	A	6.8	A	7.9	A	10.6	B	9.1	A	6.5	A	9.9	A	9.2	A
137	Young St and Ervay St	Signalized	20.0	C	17.2	B	21.4	C	18.9	B	19.1	B	17.5	B	20.3	C	21.9	C
142	Young St and St Paul St	Signalized	10.7	B	7.9	A	10.8	B	7.7	A	15.8	B	13.1	B	12.8	B	8.0	A
91	Young St and Harwood St	Signalized	16.3	B	16.7	B	13.7	B	16.7	B	27.1	C	25.7	C	16.8	B	19.5	B
158	Young St and Pearl St	Signalized	14.8	B	3.4	A	17.8	B	10.7	B	19.0	B	14.9	B	23.9	C	6.1	A
92	Canton St and Cesar Chavez Blvd	Signalized	25.5	C	23.0	C	12.9	B	9.2	A	67.2	E	31.8	C	20.2	C	8.5	A
159	Canton St and SB Good Latimer Expy	Signalized	14.5	B	10.9	B	16.8	B	16.1	B	38.1	D	9.7	A	24.9	C	21.0	C
160	Canton St and NB Good Latimer Expy	Signalized	24.5	C	28.4	C	8.2	A	7.8	A	28.9	C	33.1	C	8.0	A	7.6	A
70	Canton St and Malcolm X Blvd	Signalized	11.4	B	11.8	B	10.5	B	10.7	B	11.9	B	13.1	B	11.5	B	10.8	B
103	Wood St and Houston St	Signalized	13.8	B	15.6	B	15.2	B	12.5	B	13.3	B	11.3	B	19.5	B	14.9	B
108	Wood St and Record St	Signalized	8.4	A	5.3	A	10.6	B	5.5	A	11.9	B	5.1	A	9.0	A	6.9	A
111	Wood St and Market St	Signalized	10.9	B	13.8	B	11.5	B	8.5	A	16.0	B	17.8	B	12.0	B	9.0	A
118	Wood St, Young St and Lamar St	Signalized	10.6	B	12.4	B	12.9	B	17.7	B	15.1	B	16.4	B	14.1	B	20.5	C
120	Wood St and Griffin St	Signalized	4.4	A	3.1	A	3.5	A	2.4	A	5.4	A	3.7	A	3.7	A	2.4	A
123	Wood St and Field St	Signalized	8.0	A	8.6	A	10.0	A	9.6	A	13.6	B	9.7	A	10.1	B	9.3	A
128	Wood St and Akard St	Signalized	7.5	A	18.6	B	12.3	B	5.4	A	8.6	A	6.4	A	11.6	B	7.3	A
135	Wood St and Ervay St	Signalized	10.9	B	4.1	A	12.7	B	8.7	A	6.0	A	8.5	A	12.7	B	9.6	A
141	Wood St and St Paul St	Signalized	2.0	A	6.9	A	9.2	A	4.0	A	4.0	A	6.2	A	9.1	A	6.0	A
153	Wood St and Harwood St	Signalized	8.3	A	6.4	A	9.0	A	14.2	B	15.0	B	11.9	B	10.7	B	16.2	B
79	Bryan St and Ervay St	Signalized	7.4	A	7.2	A	6.9	A	7.5	A	7.2	A	6.2	A	6.1	A	8.5	A
81	Bryan St and St Paul St	Signalized	10.6	B	10.4	B	12.3	B	12.9	B	10.8	B	10.5	B	13.5	B	15.6	B
82	Bryan St and Harwood St	Signalized	13.0	B	9.4	A	11.1	B	6.9	A	13.0	B	8.9	A	11.4	B	6.1	A
148	Bryan St and Olive St	Signalized	13.0	B	15.4	B	10.5	B	10.5	B	14.8	B	16.4	B	10.6	B	12.1	B
83	Bryan St and Pearl St	Signalized	14.6	B	15.3	B	20.8	C	27.0	C	15.1	B	16.5	B	20.3	C	24.9	C
126	Patterson St and Akard St	Signalized	13.9	B	12.1	B	15.5	B	15.3	B	16.2	B	15.6	B	15.1	B	15.4	B
131	Patterson St and Ervay St	Signalized	7.1	A	4.5	A	5.2	A	2.1	A	8.7	A	3.8	A	6.5	A	3.1	A
132	Federal St and Ervay St	Signalized	9.1	A	9.1	A	11.8	B	11.0	B	9.5	A	8.9	A	11.1	B	11.7	B
139	Federal St and St Paul St	Signalized	10.2	B	10.1	B	33.4	C	23.2	C	9.6	A	10.8	B	46.7	D	26.5	C
145	Federal St and Harwood St	Signalized	7.3	A	6.8	A	14.2	B	14.8	B	7.1	A	7.3	A	16.7	B	13.8	B
94	Olive St and Victory Park Ln	Signalized	6.5	A	6.9	A	14.2	B	5.6	A	6.1	A	7.1	A	5.8	A	6.6	A
93	Olive St and Field St	Signalized	25.0	C	23.8	C	23.2	C	20.1	C	31.2	C	28.6	C	28.3	C	23.1	C
95	Cedar Springs Rd and Field St	Signalized	8.7	A	8.9	A	6.4	A	4.8	A	11.0	B	10.8	B	12.6	B	16.5	B
10	Woodall EBSR and Field St	Signalized	19.2	B	13.0	B	22.4	C	21.3	C	20.5	C	21.0	C	24.2	C	23.3	C
11	Woodall WBSR and Field St	Signalized	43.5	D	44.1	D	49.8	D	35.5	D	43.4	D	43.2	D	57.8	E	60.9	E
13	Munger Ave and Field St	Signalized	19.8	B	18.1	B	16.8	B	21.0	C	19.9	B	18.9	B	19.7	B	22.2	C
42	Live Oak St and Harwood St	Signalized	8.4	A	8.0	A	12.2	B	16.5	B	12.3	B	11.9	B	27.5	C	26.4	C
47	Live Oak St and Olive St	Signalized	12.2	B	14.6	B	14.6	B	12.1	B	14.2	B	12.9	B	17.9	B	13.9	B
49	Live Oak St and Pearl St	Signalized	19.7	B	22.7	C	24.8	C	26.8	C	23.8	C	22.8	C	22.3	C	30.0	C
60	Live Oak St and SB Cesar Chavez Blvd	Signalized	7.2	A	12.5	B	27.2	C	25.2	C	12.3	B	13.1	B	27.8	C	29.7	C
59	Live Oak St and NB Cesar Chavez Blvd	Signalized	24.2	C	20.8	C	17.4	B	15.8	B	30.7	C	29.4	C	17.3	B	14.7	B
61	Live Oak St and Good Latimer Expy	Signalized	22.4	C	17.9	B	24.5	C	20.3	C	33.9	C	18.3	B	35.1	D	23.9	C
1	Olive St and Victory Ave	Signalized	6.4	A	7.6	A	4.7	A	4.7	A	7.0	A	7.9	A	4.7	A	4.3	A

Node ID	Intersection	Control Type	AM Peak Period				PM Peak Period				AM Peak Period				PM Peak Period			
			No Build 2024		Build 2024		No Build 2024		Build 2024		No Build 2045		Build 2045		No Build 2045		Build 2045	
			Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS
2	Olive St and Houston St	Signalized	13.7	B	15.4	B	24.7	C	17.2	B	14.8	B	15.1	B	22.3	C	20.2	C
99	Continental Ave and Victory Ave	Signalized	18.6	B	18.2	B	17.9	B	16.5	B	18.6	B	18.2	B	17.4	B	17.8	B
161	Museum Way and Victory Ave	Signalized*	0.0	A	5.7	A	0.0	A	6.1	A	0.0	A	5.3	A	0.0	A	5.3	A
3	Museum Way and Victory Park Ln	Signalized*	5.1	A	2.1	A	7.1	A	3.0	A	6.9	A	2.4	A	7.3	A	6.5	A
162	Museum Way and Houston St	Signalized*	0.0	A	9.0	A	0.1	A	5.5	A	0.2	A	11.2	B	0.0	A	5.8	A
4	High Market St and Victory Ave	Stop	0.1	A	0.0	A	0.0	A	0.0	A	0.1	A	0.1	A	0.1	A	0.0	A
5	High Market St and Houston St	Stop	0.0	A	0.2	A	0.0	A	0.1	A	0.0	A	0.3	A	0.0	A	0.0	A
12	Off Ramp and Magnolia St	Stop	0.3	A	0.3	A	0.0	A	0.0	A	0.3	A	0.3	A	0.0	A	0.0	A
71	Broom St and Laws St	Stop	0.1	A	0.1	A	0.1	A	0.1	A	0.0	A	0.0	A	0.0	A	0.1	A
98	Continental Ave and Houston St	Signalized	11.4	B	12.3	B	7.5	A	8.0	A	11.0	B	10.9	B	11.5	B	8.7	A
97	Lamar St and Houston St	Signalized	11.3	B	13.3	B	12.1	B	11.0	B	14.3	B	19.7	B	15.6	B	12.1	B
96	Lamar St and Victory Ave	Signalized	13.3	B	13.7	B	12.8	B	11.2	B	13.9	B	14.7	B	12.9	B	11.4	B
8	Corbin St and Lamar St	Signalized	6.3	A	4.7	A	4.8	A	4.4	A	6.5	A	5.4	A	5.1	A	4.2	A
7	Munger Ave and Lamar St	Signalized	19.7	B	21.1	C	6.3	A	5.7	A	21.1	C	20.6	C	6.6	A	8.9	A
100	McKinney Ave and Houston St	Signalized	12.7	B	13.0	B	13.8	B	13.0	B	12.7	B	12.6	B	14.1	B	13.2	B
6	McKinney Ave and Lamar St	Signalized	24.5	C	20.6	C	18.2	B	15.1	B	24.3	C	21.4	C	19.5	B	16.1	B
58	Good Latimer Expy and SB Central Expy	Signalized	18.5	B	18.1	B	25.8	C	22.3	C	21.1	C	18.5	B	27.2	C	25.0	C
57	Good Latimer Expy and NB Central Expy	Signalized	18.0	B	19.2	B	16.5	B	12.4	B	26.9	C	23.0	C	17.5	B	13.0	B
62	Swiss Ave and Hawkins St	Stop	0.0	A	3.8	A	0.0	A	4.9	A	0.0	A	0.9	A	0.0	A	5.5	A
163	Broom St and D2 Crossing	Signalized*	-	-	4.6	A	-	-	2.3	A	-	-	5.0	A	-	-	2.5	A
164	McKinney St and D2 Crossing	Signalized*	-	-	5.3	A	-	-	2.4	A	-	-	5.5	A	-	-	2.5	A

Notes:

1. *-- Intersection is stop-controlled or not existing in No Build Conditions of both years.
2. The HCM level of service is not directly from TransModeler.
3. The Control Delay for the intersctions is the average of 10 simulation runs in TransModeler.
4. The Control Delay obtained from TransModeler is compared to the following tables to obtain LOS
 - a. Signalized Intersection - Exhibit 19-8 LOS Criteria: Moterized Vehicle Mode (*page 19-16, HCM 2016*)
 - b. Two-Way Stop-Controlled Intersections - Exihibit 20-2 LOS Criteria : Motorized Vehicle Mode (*Page 20-6, HCM 2016*)
 - c. All-Way Stop-Controlled Intersections - Exihibit 21-8 LOS Criteria : Motorized Vehicle Mode (*Page 21-9, HCM 2016*)

Appendix C



Appendix C

Transportation Network in the Study Area

Data Source: DART, GPC6

D2 Subway Project

Appendix D

Appendix D-1 Traffic Analysis on Approach Level -- Year 2024

	Intersection Name	Approach Direction	No Build 2024 AM			Build 2024 AM			No Build 2024 PM			Build 2024 PM		
			Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS
1	Olive St and Victory Ave	N	2.9	0	A	2.6	0	A	2.7	44	A	3.4	20	A
		S	4.5	35	A	3.5	48	A	4.2	97	A	11.6	106	B
		W	11.1	34	B	18.2	37	B	17.9	34	B	19.9	30	B
94	Olive St and Victory Park Ln	N	3.9	0	A	8.3	0	A	5.3	0	A	19.1	0	C
		W	6.4	44	A	6.1	32	A	10.6	34	B	6.3	36	A
		E	6.6	15	A	5.7	19	A	15.9	102	C	5.9	44	A
2	Olive St and Houston St	N	13.9	106	B	9.6	115	A	10.5	61	B	9.3	61	A
		S	9.3	48	A	7.7	49	A	10.9	45	B	10.2	46	B
		E	11.9	36	B	25.4	37	C	22.0	111	C	15.3	60	B
161	Museum Way and Victory Ave	W	14.7	78	B	31.0	90	C	48.8	134	D	33.3	94	C
		N	0.0	6	A	5.2	3	A	0.0	0	A	5.3	98	A
		S	0.0	0	A	4.7	43	A	0.0	0	A	15.1	100	C
3	Museum Way and Victory Park Ln	W	1.5	0	A	0.0	0	A	0.0	0	A	0.0	0	A
		N	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0	A
		S	0.0	0	A	4.0	0	A	7.4	0	A	1.5	0	A
162	Museum Way and Houston St	W	5.1	0	A	4.7	0	A	2.1	2	A	1.4	0	A
		E	0.7	0	A	10.3	0	B	7.2	0	A	3.2	0	A
		E	0.6	0	A	26.3	0	D	9.9	2	A	7.6	0	A
4	High Market St and Vicotry Ave	N	0.1	62	A	9.7	117	A	0.0	52	A	6.4	134	A
		S	0.0	0	A	5.2	67	A	0.0	0	A	4.2	91	A
		N	0.0	0	A	0.0	67	A	0.0	59	A	0.0	115	A
5	High Market St and Houston St	S	0.1	6	A	0.1	3	A	0.1	0	A	0.0	98	A
		W	0.0	0	A	0.0	0	A	1.5	0	A	0.0	0	A
		N	0.0	25	A	0.2	91	A	0.0	23	A	0.0	21	A
71	Broom St and Laws St	S	0.0	62	A	0.0	117	A	0.1	52	A	0.1	134	A
		E	17.2	0	C	9.0	0	A	0.0	0	A	3.2	0	A
		W	0.1	0	A	0.2	9	A	2.9	46	A	0.1	0	A
10	Woodall Rodger Fwy WB and Field St	NW	1.6	50	A	1.9	47	A	2.3	62	A	2.3	43	A
		SE	20.4	60	C	21.4	64	C	53.2	249	D	26.3	105	C
		SW	111.2	244	F	112.2	240	F	128.8	207	F	114.7	196	F
11	Woodall Rodger Fwy EB and Field St	NW	26.1	34	C	24.7	36	C	30.3	56	C	36.6	58	D
		SE	2.3	51	A	2.0	41	A	13.4	191	B	5.9	74	A
		NE	29.5	70	C	30.4	73	C	27.7	74	C	25.5	71	C
60	Live Oak St and Central Expy SB	S	8.1	74	A	17.6	73	B	17.5	82	B	15.6	72	B
		SW	2.1	134	A	2.0	118	A	46.9	76	D	42.7	62	D
		NE	29.9	71	C	13.8	71	B	31.3	143	C	30.7	116	C
59	Live Oak St and Central Expy NB	N	27.6	50	C	31.3	61	C	34.6	60	C	20.3	58	C
		NE	1.4	12	A	0.7	26	A	5.7	140	A	6.2	79	A
		SW	26.5	102	C	20.9	80	C	27.8	56	C	24.7	74	C
58	Good Latimer Expy and Central Expy SB	S	23.7	47	C	24.7	55	C	31.5	53	C	25.4	54	C
		SE	23.7	61	C	15.5	64	B	23.6	67	C	25.2	59	C
		W	1.7	41	A	1.9	28	A	7.9	90	A	5.6	64	A
57	Good Latimer Expy and Central Expy NB	SE	0.5	34	A	0.8	42	A	2.8	96	A	1.0	36	A
		N	50.0	99	D	36.0	86	D	25.7	92	C	17.9	99	B
		NW	13.4	99	B	18.7	110	B	19.2	96	B	15.2	74	B
61	Good Latimer Expy and Live Oak St	NE	24.9	34	C	20.1	52	C	29.6	133	C	36.2	101	D
		NW	29.1	225	C	26.6	178	C	19.9	120	B	13.4	114	B
		SE	6.7	71	A	16.4	89	B	21.1	107	C	10.5	81	B
		SE(LT)	27.7	81	C	Removed in Build Condition			51.8	67	D	Removed in Build Condition		
		SW	21.2	83	C	11.3	72	B	26.2	174	C	23.6	140	C

			No Build 2024 AM			Build 2024 AM			No Build 2024 PM			Build 2024 PM		
	Intersection Name	Approach Direction	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS
63	Good Latimer Expy and Gaston St	NE	16.3	50	B	26.4	65	C	33.3	113	C	38.4	122	D
		NW	10.4	76	B	25.2	117	C	18.5	77	B	17.9	81	B
		SE	16.8	61	B	23.2	80	C	23.1	103	C	25.5	98	C
		SW	26.2	85	C	17.6	80	B	29.0	106	C	22.5	78	C
156	Good Latimer Expy and Elm St	N	12.8	126	B	12.2	181	B	11.1	98	B	20.4	91	C
		S	14.2	60	B	15.5	76	B	21.3	130	C	20.3	107	C
		W	26.2	162	C	25.5	171	C	14.1	67	B	14.1	76	B
62	Swiss Ave and Hawkins St	N	0.0	0	A	0.4	0	A	0.0	0	A	5.2	0	A
		S	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0	A
		W	0.0	0	A	2.2	0	A	0.0	0	A	1.3	0	A
		E	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0	A
163	D2/Broom St Crossing	SW	Not existed in No Build Condition			4.4	61	A	Not existed in No Build Condition			1.5	48	A
164	D2/McKinney St Crossing	NE				5.2	61	A				1.8	60	A

Notes:

1. The HCM level of service is not directly from TransModeler.
2. The Control Delay for the intersctions is the average of 10 simulation runs in TransModeler.
3. The Control Delay obtained from TransModeler is compared to the following tables to obtain LOS
 - a. Signalized Intersection - Exhibit 19-8 LOS Criteria: Moterized Vehicle Mode (*page 19-16, HCM 2016*)
 - b. Two-Way Stop-Controlled Intersections - Exihibit 20-2 LOS Criteria : Motorized Vehicle Mode (*Page 20-6, HCM 2016*)
 - c. All-Way Stop-Controlled Intersections - Exihibit 21-8 LOS Criteria : Motorized Vehicle Mode (*Page 21-9, HCM 2016*)

Appendix D-2 Traffic Analysis on Approach Level -- Year 2045

	Intersection Name	Approach Direction	No Build 2045 AM			Build 2045 AM			No Build 2045 PM			Build 2045 PM		
			Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS
1	Olive St and Victory Ave	N	2.5	6	A	2.2	0	A	1.7	5	A	2.1	35	A
		S	4.8	45	A	3.0	46	A	2.2	68	A	3.7	75	A
		W	12.2	41	B	21.2	47	C	21.5	30	C	23.0	36	C
94	Olive St and Victory Park Ln	N	4.2	0	A	5.5	0	A	11.1	0	B	15.8	0	B
		W	6.0	39	A	7.0	46	A	10.0	43	A	5.0	51	A
		E	6.2	20	A	5.4	16	A	5.1	43	A	5.6	48	A
2	Olive St and Houston St	N	15.8	123	B	10.3	118	B	11.5	76	B	11.1	76	B
		S	9.2	45	A	7.2	53	A	9.9	50	A	10.8	48	B
		E	13.1	40	B	29.0	36	C	20.8	62	C	15.7	69	B
		W	14.4	76	B	30.1	80	C	43.9	151	D	38.0	110	D
161	Museum Way and Victory Ave	N	0.0	7	A	5.0	5	A	0.0	36	A	5.5	43	A
		S	0.0	0	A	4.6	38	A	0.0	7	A	5.2	49	A
		W	0.7	0	A	0.0	0	A	0.0	0	A	1.3	0	A
3	Museum Way and Victory Park Ln	N	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0	A
		S	0.9	0	A	0.0	0	A	6.7	0	A	0.7	0	A
		W	7.2	0	A	4.9	0	A	3.9	0	A	3.4	0	A
		E	2.6	0	A	11.2	0	B	7.0	0	A	14.7	15	B
162	Museum Way and Houston St	E	3.8	0	A	12.2	0	B	11.1	0	B	6.6	0	A
		N	0.6	111	A	12.6	138	B	0.0	84	A	7.7	100	A
		S	0.0	0	A	5.0	81	A	0.0	13	A	4.0	83	A
4	High Market St and Vicotry Ave	N	0.0	0	A	0.0	0	A	0.0	82	A	0.0	0	A
		S	0.1	7	A	0.0	5	A	0.1	36	A	0.0	43	A
		W	0.6	0	A	0.0	0	A	0.0	0	A	0.0	0	A
5	High Market St and Houston St	N	0.0	63	A	0.2	96	A	0.0	15	A	0.1	35	A
		S	0.0	111	A	0.0	138	A	0.1	84	A	0.1	100	A
		E	10.3	0	B	29.2	0	D	0.0	0	A	2.0	0	A
71	Broom St and Laws St	W	0.0	0	A	0.0	29	A	0.0	0	A	0.1	0	A
10	Woodall Rodger Fwy WB and Field St	NW	1.7	64	A	2.7	64	A	2.0	58	A	2.4	47	A
		SE	21.3	66	C	21.5	80	C	56.8	252	E	67.2	335	E
		SW	117.8	249	F	116.7	238	F	161.6	248	F	143.1	237	F
11	Woodall Rodger Fwy EB and Field St	NW	25.9	41	C	26.8	37	C	30.8	58	C	38.0	67	D
		SE	1.9	48	A	1.9	37	A	13.6	174	B	9.6	110	A
		NE	32.7	89	C	33.2	102	C	28.5	86	C	28.1	76	C
60	Live Oak St and Central Expy SB	S	10.6	94	B	19.0	89	B	21.1	89	C	14.7	72	B
		SW	2.6	71	A	2.0	88	A	47.3	57	D	42.3	72	D
		NE	52.2	86	D	19.1	91	B	32.1	156	C	36.5	140	D
59	Live Oak St and Central Expy NB	N	37.4	80	D	37.4	88	D	34.3	68	C	18.1	56	B
		NE	7.9	92	A	0.4	12	A	4.6	105	A	6.3	77	A
		SW	25.6	112	C	23.4	102	C	25.9	39	C	23.1	62	C
58	Good Latimer Expy and Central Expy SB	S	24.8	65	C	6.6	62	A	31.7	53	C	27.0	64	C
		SE	24.5	59	C	17.0	62	B	27.8	75	C	35.4	79	D
		W	1.8	49	A	1.9	40	A	9.3	77	A	6.4	75	A
57	Good Latimer Expy and Central Expy NB	SE	0.6	43	A	1.1	58	A	2.6	126	A	1.0	30	A
		N	77.5	143	E	35.2	95	D	24.3	93	C	23.7	130	C
		NW	15.0	110	B	18.7	108	B	19.5	106	B	18.1	101	B
61	Good Latimer Expy and Live Oak St	NE	33.8	73	C	22.2	59	C	22.2	119	C	39.8	116	D
		NW	51.7	339	D	24.1	144	C	54.0	215	D	15.1	127	B
		SE	6.5	72	A	14.7	95	B	22.9	113	C	14.5	82	B
		SE(LT)	30.4	93	C	Removed in Build Condition			34.8	9	C	Removed in Build Condition		
		SW	28.4	125	C	11.9	81	B	36.2	271	D	28.3	178	C

			No Build 2045 AM			Build 2045 AM			No Build 2045 PM			Build 2045 PM		
	Intersection Name	Approach Direction	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS	Delay (sec)	Avg Queue Length (LF)	LOS
63	Good Latimer Expy and Gaston St	NE	18.2	56	B	33.8	76	C	56.6	150	E	44.1	138	D
		NW	16.9	101	B	21.8	82	C	18.8	80	B	19.7	92	B
		SE	18.3	67	B	37.7	103	D	27.5	123	C	26.5	111	C
		SW	31.8	107	C	20.4	125	C	30.2	133	C	23.4	94	C
156	Good Latimer Expy and Elm St	N	16.9	168	B	16.4	132	B	9.8	95	A	19.9	98	B
		S	14.4	59	B	18.7	83	B	21.4	123	C	20.8	106	C
		W	33.2	293	C	24.1	153	C	15.3	68	B	15.3	82	B
62	Swiss Ave and Hawkins St	N	0.0	0	A	0.0	0	A	0.0	0	A	5.5	0	A
		S	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0	A
		W	0.0	0	A	0.0	0	A	0.0	0	A	2.8	0	A
		E	0.0	0	A	0.0	0	A	0.0	0	A	0.0	0	A
163	D2/Broom St Crossing	SW	Not existed in No Build Condition			5.3	64	A	Not existed in No Build Condition			1.8	38	A
164	D2/McKinney St Crossing	NE				5.4	66	A				2.0	66	A

Notes:

1. The HCM level of service is not directly from TransModeler.
2. The Control Delay for the intersctions is the average of 10 simulation runs in TransModeler.
3. The Control Delay obtained from TransModeler is compared to the following tables to obtain LOS
 - a. Signalized Intersection - Exhibit 19-8 LOS Criteria: Moterized Vehicle Mode (*page 19-16, HCM 2016*)
 - b. Two-Way Stop-Controlled Intersections - Exihibit 20-2 LOS Criteria : Motorized Vehicle Mode (*Page 20-6, HCM 2016*)
 - c. All-Way Stop-Controlled Intersections - Exihibit 21-8 LOS Criteria : Motorized Vehicle Mode (*Page 21-9, HCM 2016*)

Appendix E

Table E-1 Delay and LOS of Intersection Central Expressway SB and Central Expressway NB at Live Oak Street during AM peak period of 2024 No Build and Build Scenarios

Int ID	Int Name	No Build 2024 AM										Build 2024 AM									
		Movement	Hourly Volume	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Queue Length 50th (ft)	Queue Length 95th (ft)	Movement	Hourly Volume	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Queue Length 50th (ft)	Queue Length 95th (ft)
60	Live Oak St and Central Expy SB	SBL	12	17.1	B	19.2	B	12.9	B	4	15	SBL	221	21.9	C	19.9	B	14.4	B	85	145
		SB	231	17.8	B					29	46	SB	231	17.8	B					29	45
		SBR	477	19.9	B					111	#243	SBR	477	19.9	D					111	#243
		SWL	15	0.3	A	4.5	A			0	m0	SWL	15	0.3	A	4.5	A			0	m0
		SWT	569	4.6	A					0	0	SWT	569	4.6	A					0	0
		NET	17	32.5	C					32.5	C	4	13	NET	17					32.5	C
59	Live Oak St and Central Expy NB	NBL	24	21.8	C	25.9	C	26.6	C	9	28	NBL	24	21.8	C	25.9	C	23.1	C	9	28
		NBT	709	26	C					110	149	NBT	709	26	C					110	149
		NET	27	1.9	A	1.9	A			0	0	NET	236	0.8	A	0.8	A			0	0
		SWT	569	28.7	C	28.7	C			133	187	SWT	569	28.7	C	28.7	C			133	187

Table E-2 Delay and LOS of Intersection Central Expressway SB and Central Expressway NB at Live Oak Street during PM peak period of 2024 No Build and Build Scenarios

Int ID	Int Name	No Build 2024 PM										Build 2024PM									
		Movement	Hourly Volume	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Queue Length 50th (ft)	Queue Length 95th (ft)	Movement	Hourly Volume	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Queue Length 50th (ft)	Queue Length 95th (ft)
60	Live Oak St and Central Expy SB	SBL	44	24.1	C	14.2	B	14.1	B	18	44	SBL	297	24.6	C	15.2	B	14.7	B	120	198
		SB	184	23.8	C					27	45	SB	184	17.6	B					23	38
		SBR	297	6.8	A					0	61	SBR	297	4.4	A					0	51
		SWL	12	0.3	A	2.4	A			0	m0	SWL	12	0.4	A	3.6	A			0	m0
		SWT	273	2.5	A					0	0	SWT	273	3.2	A					0	0
		NET	184	31.9	C	31.9	C			44	75	NET	184	30.4	C	30.4	C			43	73
		59	Live Oak St and Central Expy NB	NBL	4	16.2	B			19.5	B	18.4	B	2	8	NBL	4			20.4	C
NBT	722			19.5	B	118	157	NBT	722					26.3	C	136	181				
NET	217			2.1	A	2.1	A	1	0	NET	162			1.5	A	1.5	A	0	0		
SWT	295			27.1	C	27.1	C	66	104	SWT	295			31.1	C	31.1	C	70	110		

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Table E-3 Delay and LOS of Intersection Central Expressway SB and Central Expressway NB at Live Oak Street during AM peak period of 2045 No Build and Build Scenarios

Int ID	Int Name	No Build 2045 AM										Build 2045 AM													
		Movement	Hourly Volume	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Queue Length 50th (ft)	Queue Length 95th (ft)	Movement	Hourly Volume	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Queue Length 50th (ft)	Queue Length 95th (ft)				
60	Live Oak St and Central Expy SB	SBL	13	17.1	B	30.6	C	19.8	B	5	17	SBL	245	22.9	C	28.9	C	20.3	C	99	167				
		SB	257	18	B					34	52	SB	257	18	B					34	52				
		SBR	530	37	D					185	#390	SBR	530	37	D					182	#390				
		SWL	17	0.6	A	6.2	A			0	m0	SWL	17	0.3	A	6.2	A			0	m0				
		SWT	632	6.4	A					0	0	SWT	632	6.4	A					0	0				
		NET	19	32.8	C					32.8	C	4	15	NET	19					32.8	C	32.9	C	4	15
59	Live Oak St and Central Expy NB	NBL	27	21.9	C	27.6	C	29.1	C	10	29	NBL	27	21.9	C	27.6	C	25.2	C	10	29				
		NBT	787	27.8	C					131	174	NBT	787	27.8	C					131	174				
		NET	30	2	A					2	A	0	0	NET	262					0.9	A	0.9	A	0	0
		SWT	632	32.3	C					32.3	C	158	220	SWT	632					32.3	C	32.3	C	158	220

Table E-4 Delay and LOS of Intersection Central Expressway SB and Central Expressway NB at Live Oak Street during PM peak period of 2045 No Build and Build Scenarios

Int ID	Int Name	No Build 2045 PM										Build 2045 PM									
		Movement	Hourly Volume	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Queue Length 50th (ft)	Queue Length 95th (ft)	Movement	Hourly Volume	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Queue Length 50th (ft)	Queue Length 95th (ft)
60	Live Oak St and Central Expy SB	SBL	49	24.3	C	14.4	B	14.5	B	21	49	SBL	330	26.8	C	16.2	B	15.5	B	143	231
		SB	204	24	C					31	51	SB	204	17.7	B					27	43
		SBR	330	7	A					0	64	SBR	330	4.6	A					0	54
		SWL	13	0.3	A	2.5	A			0	m0	SWL	13	0.4	A	3.6	A			0	m0
		SWT	303	2.6	A					0	0	SWT	303	3.7	A					0	0
		NET	204	33	C					33	C	51	85	NET	204					31.3	C
		59	Live Oak St and Central Expy NB	NBL	4	16.2	B			20.8	C	19.5	B	2	8	NBL	4			20.4	C
NBT	802			20.8	C	143	186	NBT	802					29.7	C	165	214				
NET	241			2.2	A	2.2	A	1	0	NET	180			1.7	A	1.7	A	0	0		
SWT	328			28	C	28	C	77	118	SWT	328			32.8	C	32.8	C	82	125		

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Appendix F

Appendix F Delays and LOS of Intersections along LRT

Node ID	Intersection	AM Peak Period		PM Peak Period		AM Peak Period				PM Peak Period				AM Peak Period				PM Peak Period			
		Existing 2017		Existing 2017		No Build 2024		Build 2024		No Build 2024		Build 2024		No Build 2045		Build 2045		No Build 2045		Build 2045	
		Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS	Average Control Delay (sec)	LOS
101	Ross Ave and Houston St	9.7	A	14.1	B	11.2	B	7.5	A	17.3	B	20.2	C	11.5	B	8.0	A	32.2	C	28.9	C
9	Ross Ave and Lamar St	16.0	B	24.2	C	15.2	B	17.6	B	16.2	B	19.6	B	18.2	B	19.7	B	25.8	C	28.9	C
14	Ross Ave and Griffin St	21.4	C	31.1	C	19.4	B	19.8	B	29.7	C	18.3	B	25.2	C	23.6	C	36.1	D	28.3	C
15	San Jacinto St and Griffin St	14.1	B	12.2	B	13.7	B	12.8	B	12.2	B	10.3	B	15.7	B	14.7	B	16.2	B	13.9	B
17	San Jacinto St and Field St	14.6	B	11.0	B	14.9	B	12.0	B	9.6	A	10.9	B	23.0	C	12.3	B	10.6	B	11.4	B
125	San Jacinto St and Akard St	12.4	B	14.2	B	13.2	B	13.4	B	14.1	B	13.3	B	13.8	B	12.1	B	14.1	B	15.1	B
130	San Jacinto St and Ervay St	11.2	B	8.1	A	11.7	B	11.7	B	5.8	A	6.1	A	12.5	B	13.4	B	9.3	A	7.3	A
138	San Jacinto St and St Paul St	8.6	A	10.5	B	8.8	A	6.8	A	8.7	A	11.4	B	10.9	B	7.5	A	11.7	B	11.7	B
144	San Jacinto St and Harwood St	9.7	A	9.4	A	11.4	B	9.3	A	13.8	B	9.9	A	11.5	B	9.3	A	14.4	B	8.9	A
146	San Jacinto St and Olive St	14.2	B	18.6	B	14.1	B	14.0	B	14.6	B	17.4	B	15.0	B	16.4	B	16.7	B	16.4	B
147	San Jacinto St and Pearl St	17.8	B	13.6	B	17.9	B	16.7	B	12.5	B	13.4	B	19.4	B	17.6	B	13.7	B	12.4	B
126	Patterson St and Akard St	13.9	B	17.5	B	13.9	B	12.1	B	15.5	B	15.3	B	16.2	B	15.6	B	15.1	B	15.4	B
131	Patterson St and Ervay St	7.6	A	4.6	A	7.1	A	4.5	A	5.2	A	2.1	A	8.7	A	3.8	A	6.5	A	3.1	A
132	Federal St and Ervay St	9.3	A	10.7	B	9.1	A	9.1	A	11.8	B	11.0	B	9.5	A	8.9	A	11.1	B	11.7	B
139	Federal St and St Paul St	8.7	A	21.5	C	10.2	B	10.1	B	33.4	C	23.2	C	9.6	A	10.8	B	46.7	D	26.5	C
145	Federal St and Harwood St	7.3	A	14.2	B	7.3	A	6.8	A	14.2	B	14.8	B	7.1	A	7.3	A	16.7	B	13.8	B
73	Pacific Ave and Houston St	8.4	A	8.0	A	9.8	A	21.4	C	12.9	B	17.8	B	9.6	A	19.8	B	21.7	C	22.0	C
104	Pacific Ave and Record St	7.7	A	11.8	B	8.0	A	9.1	A	22.9	C	12.4	B	7.7	A	9.8	A	26.0	C	7.9	A
74	Pacific Ave and Market St	9.5	A	16.6	B	9.6	A	8.0	A	17.8	B	10.1	B	9.0	A	6.7	A	16.9	B	10.8	B
24	Pacific Ave and Lamar St	7.1	A	7.7	A	5.0	A	4.1	A	5.5	A	3.9	A	8.7	A	6.9	A	18.5	B	5.7	A
28	Pacific Ave and Griffin St	9.7	A	17.5	B	8.6	A	7.4	A	12.9	B	13.0	B	9.5	A	10.2	B	19.8	B	15.2	B
72	Pacific Ave and Field St	7.8	A	17.0	B	6.3	A	5.3	A	10.8	B	10.7	B	8.8	A	6.7	A	20.2	C	16.4	B
80	Pacific Ave and Akard St	8.9	A	16.7	B	10.1	B	9.1	A	10.9	B	9.0	A	9.6	A	10.2	B	12.5	B	11.3	B
79	Bryan St and Ervay St	7.8	A	7.6	A	7.4	A	7.2	A	6.9	A	7.5	A	7.2	A	6.2	A	6.1	A	8.5	A
81	Bryan St and St Paul St	10.2	B	10.7	B	10.6	B	10.4	B	12.3	B	12.9	B	10.8	B	10.5	B	13.5	B	15.6	B
82	Bryan St and Harwood St	10.6	B	9.6	A	13.0	B	9.4	A	11.1	B	6.9	A	13.0	B	8.9	A	11.4	B	6.1	A
148	Bryan St and Olive St	15.9	B	13.3	B	13.0	B	15.4	B	10.5	B	10.5	B	14.8	B	16.4	B	10.6	B	12.1	B
83	Bryan St and Pearl St	20.3	C	24.1	C	14.6	B	15.3	B	20.8	C	27.0	C	15.1	B	16.5	B	20.3	C	24.9	C
18	Elm St and Houston St	20.5	C	35.8	D	18.2	B	14.1	B	31.4	C	22.4	C	20.6	C	11.5	B	31.8	C	24.6	C
105	Elm St and Record St	10.8	B	30.5	C	9.9	A	5.7	A	15.7	B	11.3	B	14.5	B	6.8	A	20.9	C	15.1	B
21	Elm St and Market St	10.7	B	43.8	D	15.2	B	18.4	B	28.1	C	11.1	B	19.0	B	20.5	C	28.5	C	15.2	B
113	Elm St and Austin St	3.7	A	25.3	C	5.0	A	4.9	A	10.3	B	2.7	A	9.4	A	3.8	A	10.4	B	4.3	A
25	Elm St and Lamar St	11.7	B	34.2	C	13.5	B	16.9	B	14.8	B	16.4	B	15.4	B	15.8	B	19.7	B	19.8	B
29	Elm St and Griffin St	16.1	B	25.9	C	14.5	B	14.6	B	18.7	B	14.1	B	20.4	C	19.0	B	28.4	C	16.9	B
32	Elm St and Field St	14.3	B	24.5	C	16.2	B	19.5	B	14.2	B	12.7	B	18.8	B	20.8	C	18.9	B	17.7	B
75	Elm St and Akard St	13.9	B	11.2	B	13.5	B	16.4	B	9.3	A	8.2	A	16.4	B	18.4	B	11.0	B	15.4	B
151	Pacific Ave and Ervay St	7.2	A	12.6	B	7.7	A	6.6	A	9.6	A	15.6	B	8.7	A	7.2	A	11.1	B	14.9	B
39	Pacific Ave and St Paul St	18.5	B	15.7	B	11.6	B	10.1	B	11.3	B	16.1	B	15.8	B	11.5	B	23.1	C	30.7	C
42	Live Oak St and Harwood St	11.6	B	10.2	B	8.4	A	8.0	A	12.2	B	16.5	B	12.3	B	11.9	B	27.5	C	26.4	C
47	Live Oak St and Olive St	15.2	B	10.0	A	12.2	B	14.6	B	14.6	B	12.1	B	14.2	B	12.9	B	17.9	B	13.9	B
49	Live Oak St and Pearl St	16.8	B	34.6	C	19.7	B	22.7	C	24.8	C	26.8	C	23.8	C	22.8	C	22.3	C	30.0	C

Notes:

1. The HCM level of service is not directly from TransModeler.
2. The Control Delay for the intersctions is the average of 10 simulation runs in TransModeler.
3. The Control Delay obtained from TransModeler is compared to the following tables to obtain LOS
 - a. Signalized Intersection - Exhibit 19-8 LOS Criteria: Motorized Vehicle Mode (page 19-16, HCM 2016)
 - b. Two-Way Stop-Controlled Intersections - Exihbit 20-2 LOS Criteria : Motorized Vehicle Mode (Page 20-6, HCM 2016)
 - c. All-Way Stop-Controlled Intersections - Exihbit 21-8 LOS Criteria : Motorized Vehicle Mode (Page 21-9, HCM 2016)