

6th Avenue & Stephen D. Hogan Parkway Industrial Traffic Impact Study

comments provided on 07/19/24 seg

Responses provided on 9/27/24
Fox Tuttle, C. Slade

1. E-W road at northern end of site connecting over to Lisbon St shall be provided, if feasible.
Update analyses/report to reflect connection

1. In feasible at this time. The project is dedicating the right-of-way for future opportunities to connect on the north end.

2. There are significant thru queues reported on SDHP that will impact adjacent intersections resulting in the following:

- Intersection 1 should not be signalized and re
- Intersection 3 should be restricted to RIRO m

2. In review, it was determined that SDHP was modeled as a 4-lane roadway. The updated study changed it to 6-lane per NEATS. Note that the Stafford Logistics MTS shows 2 lanes per direction on SDHP (Figure 18). This improved the delays and queues on SDHP. Intersection 1 remained as full movement and signalization recommended since it is the only full movement access for this project. Intersection 101 was changed to RIRO.

3.. The majority of planned development in this vehicle % on SDHP to reflect industrial develop

3. Heavy vehicle % increased on SDHP.

4.. add auxiliary lane discussion and evaluation using CHAC

4. Auxiliary lanes discussion is within Section 7.0 Queue Analysis. The text was elaborated. The proposed storage lengths are in Table 2.

5.. see comments throughout report

5. THANK YOU! We appreciate your thorough review and comments.

Submittal Date: May 17, 2023

Submitted To:

Brennan Investment Group
PO Box 158
Louviers, CO 80131

Submitted By:

Fox Tuttle Transportation Group, LLC
1580 Logan St., 6th Floor
Denver, CO 80203

The following roadway and intersection improvements were assumed to be completed by Year 2026:

- **Lisbon Street** – Constructed between Stephen D. Hogan Parkway and Colfax Avenue.
- **Stephen D. Hogan Parkway at Lisbon Street** – Side-street stop-controlled with southbound left-turn lane, southbound right-turn lane, eastbound left-turn lane and westbound right-turn lane.

These roadway and intersection improvements were assumed to be in place in the Year 2026 Background condition and are shown on **Figure 4**.

5.3 Year 2026 Background Intersection Capacity Analysis

The Study area intersections were evaluated to determine baseline operations for the Year 2026 Background scenario and to identify any capacity constraints associated with background traffic (refer to **Section 5.1** for growth assumptions). It was assumed that the roadway and intersection improvements listed in **Section 5.2** will be implemented by Year 2026 Background, therefore, an additional study intersection was included in the future analysis (Stephen D. Hogan Parkway at Lisbon Street). The Year 2026 Background volumes, lane configuration, and traffic control are illustrated on **Figure 4**.

The Level of Service criteria discussed previously was applied to the Study area intersections to determine the impacts with the short-term background volumes. The details of LOS for each movement are provided in **Table 1** and the 95th percentile queues are provided in **Table 2** (refer to **Appendix**). The intersection Level of Service worksheets are attached in the **Appendix**.

In summary, the Study intersections were estimated to operate overall at LOS A in the in both peak hours with a majority of movements operating at LOS C or better. All estimated 95th percentile queues were calculated to be maintained within existing or proposed storage. The following movements were calculated to operate at LOS E or F in one or both peak hour in Year 2026 Background:

- **#2 – Stephen D. Hogan Parkway at Lisbon Street:** This stop-controlled intersection was calculated to operate overall at LOS A in the AM and PM peak hours. However, the southbound left-turn movement was estimated to operate at LOS F in the AM peak hour and LOS E in the PM peak hour. The 95th percentile queues were calculated to be approximately 20 feet in the AM peak hour and 53 feet in the PM peak hour.

overall LOS not relevant

Removed.

Recommendations: No mitigation measures are recommended. Consistent with the analysis in the *Stafford Logistics Center Transportation Impact Study*, this intersection does not meet MUTCD warrants for installing a traffic signal.

No change. It is understood that HCM states that stop-control overall LOS is the worst movement, however, the calculated overall is still part of the story to understand the performance of the entire intersection. Our studies always highlight, discuss, and look for solutions of all LOS E and LOS F, regardless of the overall letter grade or traffic control.

the peak hour factors were adjusted to 0.92 (if the existing factor is less than 0.92) on the roadways since it is assumed that the peak periods will become longer with peak hour traffic spread more evenly over the hour than is experienced today.

The details of LOS for each movement are provided in **Table 1** and the 95th percentile queues are provided in **Table 2** (refer to **Appendix**). The intersection Level of Service worksheets are attached in the **Appendix**.

In summary, the Study intersections were estimated to operate overall at LOS D or better in both peak periods and the majority of movements were calculated to operate at LOS D or better. All estimated 95th percentile queues were calculated to be maintained within proposed storage. The following intersections or movements were calculated to operate at LOS E or F in one or both peak hours in Year 2050 Background:

- **#1 Stephen D. Hogan Parkway at 6th Avenue:** When evaluated using side-street stop control, the southbound left-turn + right-turn movement was estimated to operate at LOS F in both peak hours. It is estimated that the average delay per vehicle for this movement could exceed five (5) minutes during the PM peak hour. The 95th percentile queue was calculated to be up to 115 feet (PM peak hour).

When evaluated using traffic signal control, the intersection operated overall at LOS C in the AM and PM peak hours. The southbound movements were calculated to improve to LOS D in the AM peak hour and LOS E in the PM peak hour. Southbound queues were estimated to be reduced significantly (to 40 feet in the PM peak hour), however eastbound and westbound 95th percentile queues were calculated to increase significantly (over 1,400 feet for the eastbound movement in the PM peak hour).

Recommendations: Monitor traffic volumes and intersection operations. Consider installing a traffic signal if or when MUTCD signal warrant thresholds are met or if the safety of the intersection is compromised.

6.0 Future Conditions with the Development

The 6th Avenue and Stephen D. Hogan Parkway Industrial Project proposes to construct two industrial buildings for warehousing, and for the purpose of this Study it was assumed that the entire Project will be complete by Year 2026.

add discussion regarding E-W road at northern end of site connecting over to Lisbon St, if feasible.

Discussion added. At this time only the right-of-way is being dedicated since the construction of a roadway is infeasible.

6.3 Proposed Roadway Network and Access

Access to the Project site is planned via three (3) driveways: one (1) access located on Stephen D. Hogan Parkway west of 6th Avenue, and two (2) accesses located on 6th Avenue. Due to heavy east-west volumes anticipated on Stephen D. Hogan Parkway, it is recommended that the access on Stephen D. Hogan Parkway be restricted to $\frac{3}{4}$ movement with one eastbound left-turn lane (by Year 2050), and not allow outbound left turns. The two (2) accesses on 6th Avenue are proposed to be full movement. All accesses are assumed to be side-street stop-controlled.

Southbound volumes at Stephen D. Hogan Parkway and 6th Avenue will warrant separate left-turn and right-turn lanes per the City's requirements.

The proposed access intersections are illustrated on **Figure 7**. The anticipated lane configuration and traffic control at the accesses are shown on **Figure 8** for Year 2026 and **Figure 9** for Year 2050. The need for turn lanes was based on turn volume, opposing volume, operations, and roadway classification, and used the State Highway Access Code⁴ thresholds for NR-B roadway classification (per City requirements).

6.4 Year 2026 Background + Project Intersection Capacity Analysis

This section discusses impacts associated with the addition of Project trips in the short-term scenario. The site-generated volumes were added to the Year 2026 Background volumes and are illustrated on **Figure 8**. This figure also provides the necessary traffic control and lane configurations for all of the Study intersections and proposed accesses. The recommended improvements in the Year 2026 Background scenario were assumed to be implemented.

The details of LOS for each movement are provided in **Table 1** and the 95th percentile queues are provided in **Table 2** (refer to **Appendix**). The intersection Level of Service worksheets are attached in the **Appendix**.

The Study intersections are anticipated to operate similarly to the Year 2026 Background conditions with the Project trips and the overall LOS were calculated to remain the same letter grade. All 95th percentile queues were calculated to be maintained within proposed storage. At the intersection of Stephen D. Hogan Parkway and 6th Avenue, the southbound left-turn movement was estimated to operate at LOS E in the PM peak hour. The estimated 95th percentile queue was calculated to be 60 feet in the PM peak hour.

overall LOS for STOP sign controlled intersections not relevant

See previous response

⁴ State of Colorado State Highway Access Code. Volume 2, Code of Colorado Regulations 601-1. March 2002.

No mitigation measures recommended since the intersection operates acceptably overall, and it is acceptable for side-street movements to **overall LOS for STOP sign controlled intersections not relevant, remove.** ionally, the intersection does not meet MUTCD signal wa **Removed.**

6.5 Year 2050 Background + Project Intersection Capacity Analysis

This section discusses impacts associated with the addition of Project trips in the long-term scenario. The site-generated volumes were added to the Year 2050 Background volumes and are illustrated on **Figure 9**. This figure also illustrates the necessary traffic control and lane configurations for all of the Study intersections and proposed accesses. The recommended improvements in the Year 2050 background scenario were assumed to be implemented.

The details of LOS for each movement are provided in **Table 1** and the 95th percentile queues are provided in **Table 2** (refer to **Appendix**). The intersection Level of Service worksheets are attached in the **Appendix**.

All the Study intersections operate at LOS D or better in both peak hours. When analyzed as side-street stop-controlled, the intersection of **Stephen D. Hogan Parkway and 6th Avenue** was estimated to operate at LOS A in the AM peak hour and LOS D in the PM peak hour. The southbound left-turn movement was estimated to operate at LOS F in both peak hours with the average delay per vehicle exceeding 5 minutes. Estimated 95th percentile queues were calculated to be up to 165 feet (PM peak hour).

When analyzed as signalized, the intersection of **Stephen D. Hogan Parkway at 6th Avenue** operates overall at LOS C in the AM and PM peak hours. Both the southbound left-turn and southbound right-turn movements improve to LOS D in the AM peak hour and LOS E in the PM peak hour, with southbound 95th percentile queues being reduced to a maximum of 64 feet (PM peak hour). However, eastbound and westbound 95th percentile queue lengths were estimated to increase from a free-flow condition to a signalized condition (up to 1,558 feet for eastbound movement in the PM peak hour). Note that the intersection was not anticipated to meet MUTCD signal warrant thresholds with Year 2050 Background + Project traffic. However, signalization is likely the only feasible mitigation to improve operations for the southbound movements. It is recommended to monitor traffic volumes and intersection operations, and to consider installing a traffic signal if or when MUTCD signal warrant thresholds are met or if the safety of the intersection is compromised.

add auxiliary lane discussion and evaluation using SHAC

Added

This warrant was not met at the intersection of Stephen D. Hogan Parkway and 6th Avenue in the Year 2050 Background + Project scenario.

Warrant 2 volume thresholds were only met for three (3) hours due to low volumes on 6th Avenue. Signal warrant worksheets are located in the **Appendix**.

Warrant 3 – Peak Hour Vehicular Volume

- Per the MUTCD, the Peak Hour warrant only applies for “unusual cases”, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.
- Although the Peak Hour warrant should not be used at this location as the sole warrant to determine if a traffic signal should be installed, Peak Hour warrants are commonly applied for future planning analyses where four-hour and eight-hour traffic data is not readily available or cannot be accurately projected, despite the “unusual cases” criteria.

This warrant was not met at the intersection of Stephen D. Hogan Parkway and 6th Avenue in the Year 2050 Background + Project scenario. Using the City of Aurora’s Traffic Impact Study Guidelines, a 50% reduction was applied to the right-turn volumes for the Peak Hour Warrant analysis. With this reduction, the minimum threshold of 75 vehicles per hour (vph) (70% factor) on the minor street was not met. Signal warrant worksheets are located in the **Appendix**.

8.2 Summary of Signal Warrants

In summary, a signal is not warranted in any scenario based on the volume thresholds set forth in the MUTCD for Warrants 1, 2 or 3. However, safety, volumes and operations should be monitored as the area develops. A signal should not be installed until the intersection meets one or more of the applicable MUTCD signal warrants.

9.0 Conclusions

update conclusion to
reflect comments

Updated

The 6th Avenue and Stephen D. Hogan Parkway Industrial Project proposes to develop up to 513,760± sq. ft. of industrial uses within two (2) buildings. The vacant property is located in the City of Aurora west of Picadilly Road, north of 6th Avenue and Stephen D. Hogan Parkway, and east of the future alignment of Lisbon Street. The Project proposes to construct two (2) accesses on 6th Avenue and one (1) access on

Table 1 - Peak Hour Intersection Level of Service Summary

Intersections and Lane Groups	Year 2023 Existing				Year 2026 Background				Year 2026 with Project				Year 2050 Background				Year 2050 Background with Improvements				Year 2050 with Project				Year 2050 with Project with Improvements					
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS		
SIGNAL CONTROL																														
1. Stephen D Hogan Pkwy at 6th Ave																27	C	25	C					26	C	28	C			
Eastbound Left + Through	Analyzed as Stop Control				Analyzed as Stop Control				Analyzed as Stop Control				Analyzed as Stop Control								Analyzed as Stop Control						29	C	5	A
Eastbound Left																25	C	4	A					3	A	38	D			
Eastbound Through																3	A	35	C					38	D	7	A			
Westbound Through + Right																38	D	5	A											
Southbound Left+Right																38	D	65	E					42	D	58	E			
Southbound Left																								42	D	62	E			
Southbound Right																														
2. Stephen D Hogan Pkwy at Lisbon St												21	C	37	D					21	C	37	D							
Eastbound Left	Future Intersection				Analyzed as Stop Control				Analyzed as Stop Control				47	D	11	B	No Mitigation Needed				50	D	11	B	No Mitigation Needed					
Eastbound Through												2	A	49	D					2	A	50	D							
Westbound Through												29	C	14	B					28	C	14	B							
Westbound Right												5	A	8	A					5	A	8	A							
Southbound Left												48	D	45	D					53	D	45	D							
Southbound Right												51	D	53	D					52	D	53	D							
STOP SIGN CONTROL																														
1. Stephen D Hogan Pkwy at 6th Ave	0	A	0	A	0	A	0	A	1	A	4	A	2	A	5	A					9	A	30	D						
Eastbound Left + Through	9	A	8	A	10	A	8	A	10	A	8	A					Analyzed as Signal								Analyzed as Signal					
Eastbound Left													30	D	15	B					35	D	15	C						
Eastbound Through													0	A	0	A					0	A	0	A						
Westbound Through + Right	0	A	0	A	0	A	0	A	0	A	0	A	0	A	0	A					0	A	0	A						
Southbound Left + Right	19	C	10	A	21	C	10	A					>120	F	>120	F					>120	F	>120	F						
Southbound Left									28	D	36	E									30	D	19	C						
Southbound Right									16	C	11	B																		
2. Stephen D Hogan Pkwy at Lisbon St					3	A	4	A	5	A	5	A																		
Eastbound Left	Future Intersection				12	B	8	A	12	B	8	A	Analyzed as Signal				Analyzed as Signal				Analyzed as Signal				No Mitigation Needed					
Eastbound Through					0	A	0	A	0	A	0	A	Analyzed as Signal				Analyzed as Signal				Analyzed as Signal				No Mitigation Needed					
Westbound Through					0	A	0	A	0	A	0	A	Analyzed as Signal				Analyzed as Signal				Analyzed as Signal				No Mitigation Needed					
Westbound Right					0	A	0	A	0	A	0	A	Analyzed as Signal				Analyzed as Signal				Analyzed as Signal				No Mitigation Needed					
Southbound Left					52	F	37	E	89	F	43	E	Analyzed as Signal				Analyzed as Signal				Analyzed as Signal				No Mitigation Needed					
Southbound Right					17	C	11	B	17	C	12	B	Analyzed as Signal				Analyzed as Signal				Analyzed as Signal				No Mitigation Needed					
101. Stephen D Hogan Pkwy at West Access									0	A	0	A									0	A	0	A						
Eastbound Left + Through	Project Access				Project Access				10	A	8	A	Project Access				No Mitigation Needed						29	D	15	B	No Mitigation Needed			
Eastbound Left																					0	A	0	A						
Eastbound Through																					0	A	0	A						
Westbound Through + Right									0	A	0	A	Project Access				No Mitigation Needed						29	D	18	C	No Mitigation Needed			
Southbound Right									15	C	10	B	Project Access				No Mitigation Needed													
102. 6th Ave at Center Access									4	A	4	A									2	A	2	A						
Eastbound Left + Through	Project Access				Project Access				7	A	7	A	Project Access				No Mitigation Needed						7	A	7	A	No Mitigation Needed			
Westbound Through + Right									0	A	0	A	Project Access				No Mitigation Needed						0	A	0	A	No Mitigation Needed			
Southbound Left + Right									8	A	9	A	Project Access				No Mitigation Needed						8	A	9	A	No Mitigation Needed			
103. 6th Ave at East Access									7	A	7	A									3	A	3	A						
Eastbound Left + Through	Project Access				Project Access				7	A	7	A	Project Access				No Mitigation Needed						7	A	7	A	No Mitigation Needed			
Westbound Through + Right									0	A	0	A	Project Access				No Mitigation Needed						0	A	0	A	No Mitigation Needed			
Southbound Left + Right									8	A	8	A	Project Access				No Mitigation Needed						8	A	9	A	No Mitigation Needed			

significant delay, restrict access to RIRO

Intersection 1 remained as full movement and signalization recommended since it is the only full movement access for this project.

Table 2 - Peak Hour Estimated Queues and Proposed Auxiliary Lanes

shortest summarized vehicle queue shall be one vehicle (25'). update table

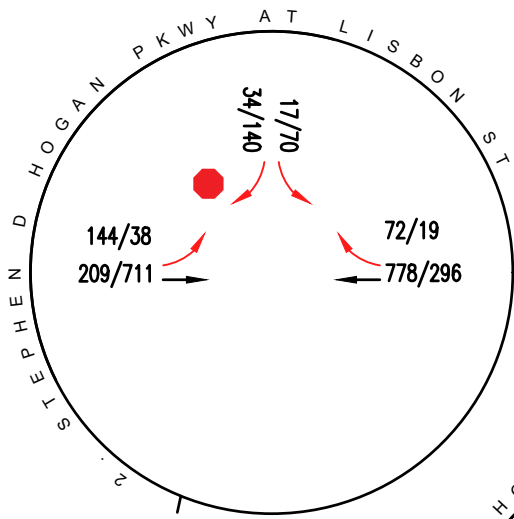
Updated

Intersections and Lane Groups	2023 Existing 95th% Queue		2026 Background 95th% Queue		2026 with Project 95th% Queue		2050 Background 95th% Queue		2050 Background with Improvements 95th% Queue		2050 with Project 95th% Queue		2050 with Project with Improvements 95th% Queue		Max. Queue	Existing Storage	Future Auxiliary Lanes		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM			Storage + Decel. (ft)	Taper (ft) (12 ft lanes)	Total Length (ft)
1. Stephen D Hogan Pkwy at 6th Ave	Stop-Controlled		Stop-Controlled		Stop-Controlled		Stop-Controlled		Signal		Stop-Controlled		Signal						
Eastbound Left + Through	0'	0'	0'	0'	3'	0'									3'	-	-	-	-
Eastbound Left							10'	3'	6'	4'	25'	5'	10'	6'	25'	-	50'	144'	194'
Eastbound Through							0'	0'	113'	1462'	0'	0'	116'	1558'	1558'	-	-	-	-
Westbound Through + Right	0'	0'	0'	0'	0'	0'	0'	0'	1003'	379'	0'	0'	1074'	407'	1074'	-	-	-	-
Southbound Left + Right	0'	0'	3'	0'			48'	115'	19'	40'					115'	-	-	-	-
Southbound Left					18'	60'					73'	165'	28'	64'	165'	-	165'	96'	261'
Southbound Right					5'	10'					8'	13'	18'	36'	13'	-	-	-	-
2. Stephen D Hogan Pkwy at Lisbon St	Future Intersection		Stop-Controlled		Stop-Controlled		Signal		No Mitigation Needed		Signal		No Mitigation Needed						
Eastbound Left			28'	3'	28'	3'	127'	18'			146'	18'			146'	-	150'	144'	294'
Eastbound Through			0'	0'	0'	0'	120'	1344'			148'	1348'			1348'	-	-	-	-
Westbound Through			0'	0'	0'	0'	1155'	431'			1202'	437'			1202'	-	-	-	-
Westbound Right			0'	0'	0'	0'	30'	12'			34'	21'			34'	-	100'	144'	244'
Southbound Left			20'	53'	70'	68'	36'	98'			73'	110'			110'	-	110'	144'	254'
Southbound Right			10'	23'	10'	23'	33'	90'			32'	91'			91'	-	-	-	-
101. Stephen D Hogan Pkwy at West Access	Project Access		Project Access		Stop-Controlled		Project Access		No Mitigation Needed		Stop-Controlled		No Mitigation Needed						
Eastbound Left + Through					3'	0'									3'	-	-	-	-
Eastbound Left											10'	3'			10'	-	50'	96'	146'
Eastbound Through											0'	0'			0'	-	-	-	-
Westbound Through + Right					0'	0'					0'	0'			0'	-	-	-	-
Southbound Right					3'	3'					3'	5'			5'	-	-	-	-
102. 6th Ave at Center Access	Project Access		Project Access		Stop-Controlled		Project Access		No Mitigation Needed		Stop-Controlled		No Mitigation Needed						
Eastbound Left + Through					0'	0'					0'	0'			0'	-	-	-	-
Westbound Through + Right					0'	0'					0'	0'			0'	-	-	-	-
Southbound Left + Right					0'	3'					0'	3'			3'	-	-	-	-
103. 6th Ave at East Access	Project Access		Project Access		Stop-Controlled		Project Access		No Mitigation Needed		Stop-Controlled		No Mitigation Needed						
Eastbound Left+Through					0'	0'					0'	0'			0'	-	-	-	-
Westbound Through+Right					0'	0'					0'	0'			0'	-	-	-	-
Southbound Left+Right					0'	3'					0'	3'			3'	-	-	-	-

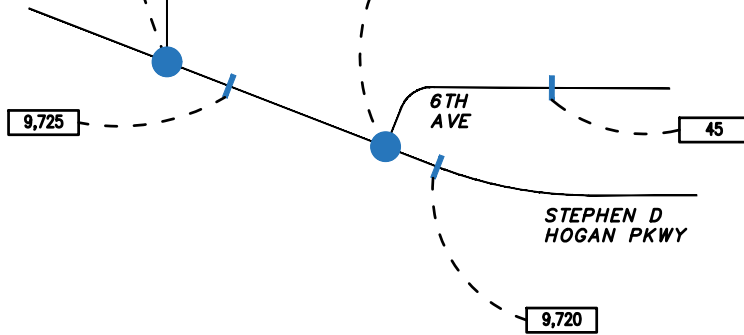
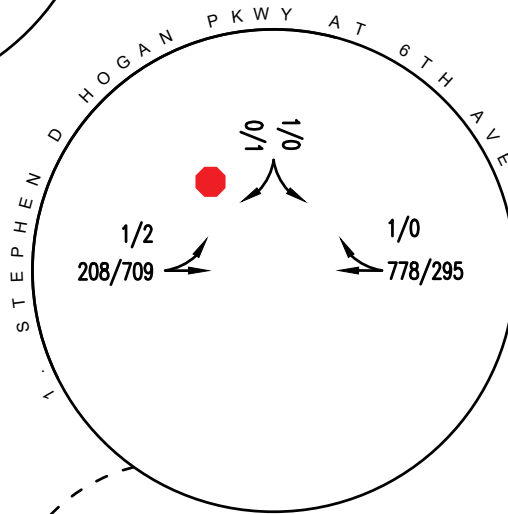
highlighted queues are significant and will impact adjacent intersections resulting in the following:

1. Intersection 1 should not be signalized and restricted to riro only
2. Intersection 3 should be restricted to riro only

Intersection 1 is the only full movement intersection for this project. This intersection remained full movement in this study.
Intersection 101 was changed to right-in, right-out.



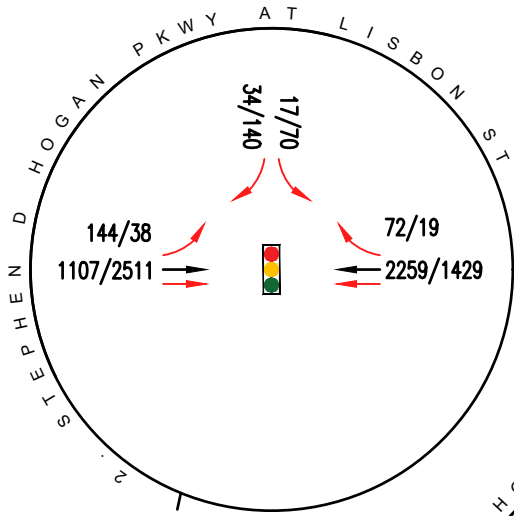
balance volumes
Updated



KEY

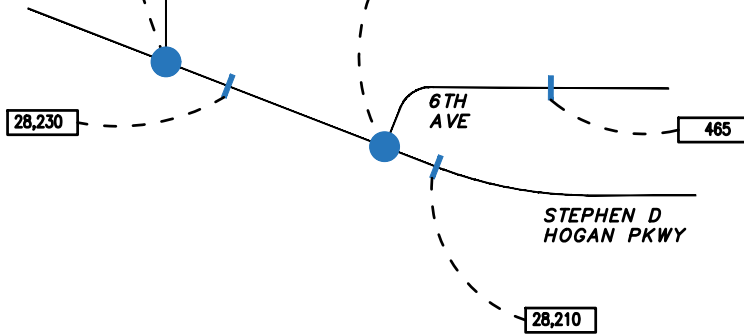
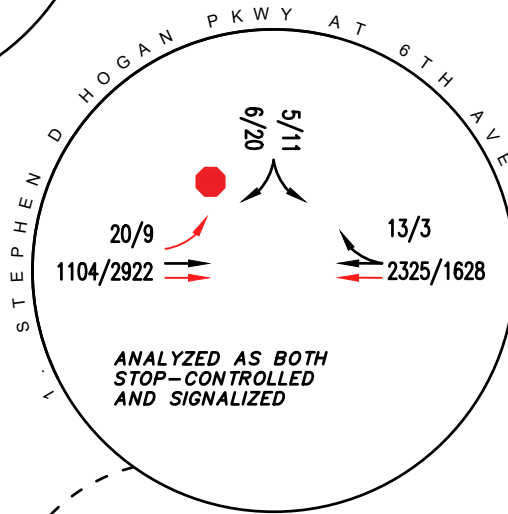
- XX/XX AM/PM PEAK HOUR TRAFFIC VOLUME
- X,XXX WEEKDAY DAILY TRAFFIC VOLUME
- EXISTING LANE CONFIGURATION
- FUTURE LANE CONFIGURATION





balance volumes

Updated



KEY

- XX/XX AM/PM PEAK HOUR TRAFFIC VOLUME
- X,XXX WEEKDAY DAILY TRAFFIC VOLUME
- EXISTING LANE CONFIGURATION
- FUTURE LANE CONFIGURATION



40%

To/From North via
Lisbon St

20%

To/From North via
Picadilly Rd

20%

To/From West via
Stephen D Hogan
Parkway

15%

To/From East via
Stephen D Hogan
Parkway

5%

To/From South via
Picadilly Rd

LISBON ST

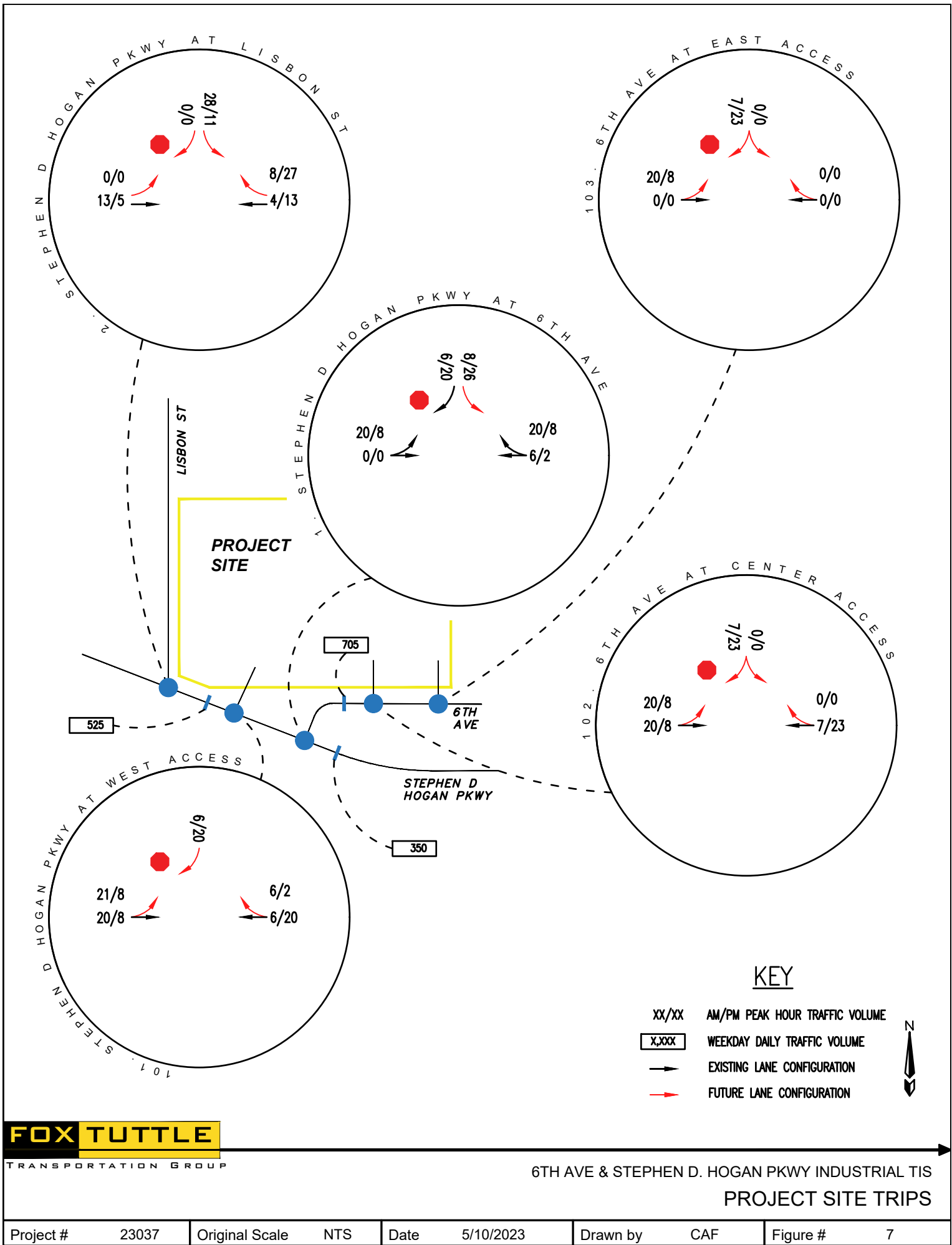
PICADILLY RD

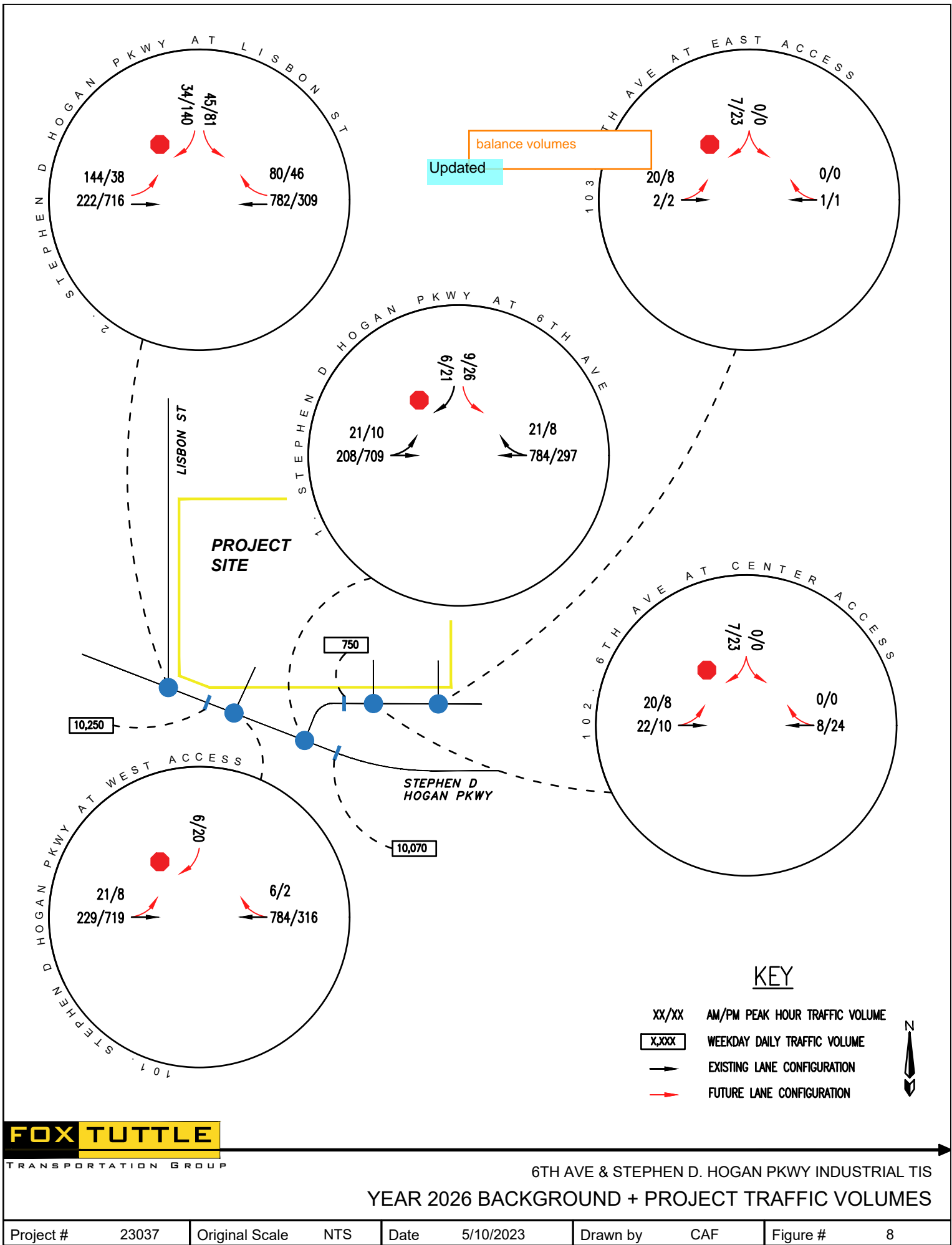
PROJECT
SITE

6TH
AVE

STEPHEN D
HOGAN PKWY







2050 volumes on SDHP are the same or lower than the 2040 total volumes documented in the Stafford Logistics TISs.

Increased through volumes on SDHP with an annual growth rate of 2.0% per average of growth in NEATS Refresh near the area and to be similar to the daily volume of buildout from NEATS

balance volumes

Updated

ANALYZED AS BOTH STOP-CONTROLLED AND SIGNALIZED

ADTs were calculated incorrect. Updated.

KEY

XX/XX AM/PM PEAK HOUR TRAFFIC VOLUME
 X,XXX WEEKDAY DAILY TRAFFIC VOLUME
 — EXISTING LANE CONFIGURATION
 — FUTURE LANE CONFIGURATION



Intersection Capacity Worksheets: 2026 Background

The majority of planned development in this area is planned to be industrial. Increase heavy vehicle % on SDHP to reflect industrial development, review Stafford Logistics TISs

Updated

Intersection Capacity Worksheets: 2050 Background

The majority of planned development in this area is planned to be industrial. Increase heavy vehicle % on SDHP to reflect industrial development, review Stafford Logistics TISs

Updated

Intersection Capacity Worksheets: 2026 Background + Project

The majority of planned development in this area is planned to be industrial. Increase heavy vehicle % on SDHP to reflect industrial development, review Stafford Logistics TISs

Updated

Intersection Capacity Worksheets: 2050 Background + Project

The majority of planned development in this area is planned to be industrial. Increase heavy vehicle % on SDHP to reflect industrial development, review Stafford Logistics TISs

Updated