

# Exhibit 1



# TOWN OF BARTONVILLE DEVELOPMENT APPLICATION

Application Type (check all applicable):

- Sketch Plat                       Land Study                       Preliminary                       Final  
 Development                       Replat                       Amending Plat

Current Legal Description: A0736A A. R. LOVING, TR 5A(1)(PT),6(PT), 82.6397 ACRES

Proposed Subdivision Name: ELTS ADDITION LOT 1, BLOCK A                       In Town Limits                       In ETJ

Current Zoning: AG                      Concurrent Zoning Change Req.?                       Yes (zoning change request attached)                       No

Proposed Zoning (if applicable): \_\_\_\_\_                      No. Proposed Lots: 1                      Total Acres: 99.744

Seeking Waiver/Suspension:                       Yes                       No                      If yes, please submit required information pursuant to Sec. 1.11 of Ordinance No. 336-03

Owner: Education Leads to Success Foundation

Phone: \_\_\_\_\_

Address: 2104 Cavalier Way, Flower Mound, TX 75022

Fax: \_\_\_\_\_

Applicant: CCM Engineering

Phone: \_\_\_\_\_

Address: 2570 Justin Rd., Highland Village, TX 75077

Fax: \_\_\_\_\_

*Please Note: If applicant is different from current owner a notarized statement, authorizing the applicant to act as owner's agent, must accompany this application along with submittal fees in accordance with the Town's adopted Fee Schedule.*

I understand that it is unlawful for any person to knowingly or willfully misrepresent, or fail to include, any information required by the Development Ordinance on this application. I further understand that misrepresentation, or deliberate omission, of facts pertaining to the land study or plat shall constitute grounds for denial of the land study or plat.

**Luke Spicer**

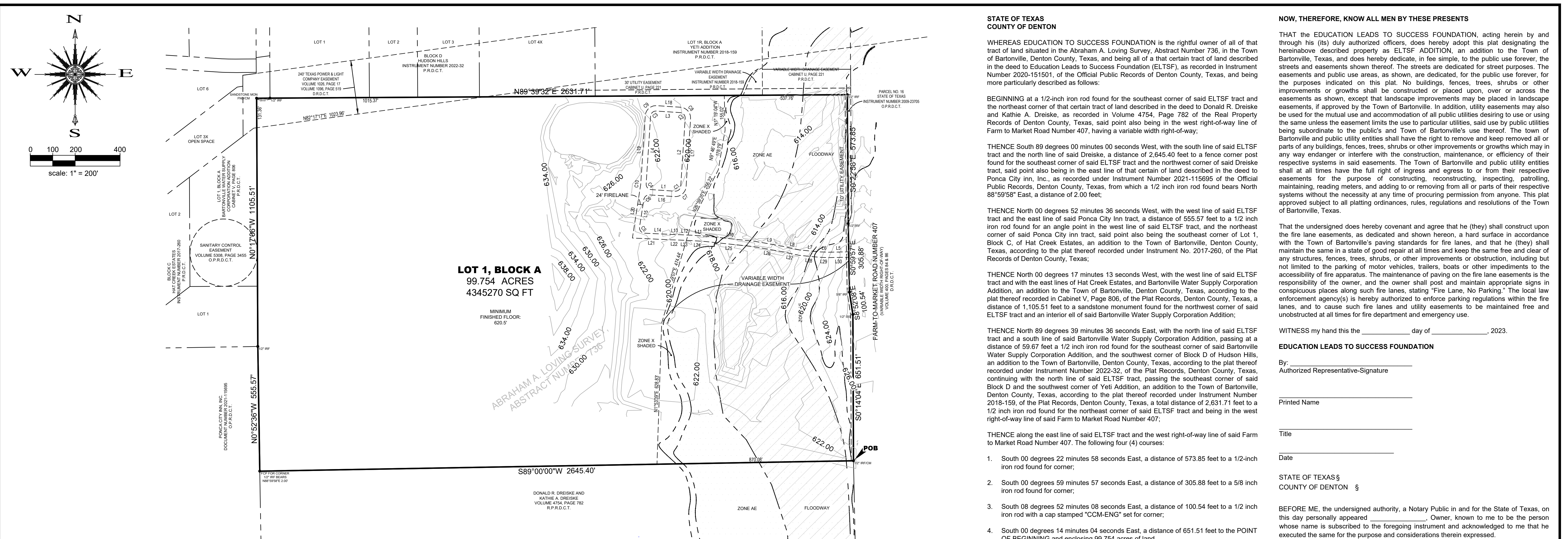
Digitally signed by Luke Spicer  
DN: C=US, E=luke@ccm-eng.com, O=CCM Engineering, CN=Luke Spicer  
Date: 2023.10.12 16:39:45-05'00'

**10-12-23**

Applicant Signature

Date

Office Use Only:	Fee Pd: _____	Check # _____	Date: _____
Schedule:	DRC: _____	P&Z: _____	TC: _____
Zoning Change? <input type="checkbox"/> Y <input type="checkbox"/> N	From _____ to _____	Publish Date: _____	Hearing Date: _____
<input type="checkbox"/> Street Construction	<input type="checkbox"/> Public Improvements	<input type="checkbox"/> Easements	<input type="checkbox"/> Simultaneous Submit
Hearing Req? <input type="checkbox"/> Y <input type="checkbox"/> N	Tax Certificate? <input type="checkbox"/> Y <input type="checkbox"/> N		
Disbursement: <input type="checkbox"/> Gas Co.	<input type="checkbox"/> Town Engineer/Planner	<input type="checkbox"/> Town Attorney	<input type="checkbox"/> DRC Members
<input type="checkbox"/> Elec Co.	<input type="checkbox"/> Cable Co.	<input type="checkbox"/> Fire Chief	<input type="checkbox"/> Water Supply



**LOT 1, BLOCK A**  
 99.754 ACRES  
 4345270 SQ FT

ABRAHAM A. LOVING SURVEY,  
 ABSTRACT NO. 736

Parcel Line Table			Parcel Line Table		
Line #	Length	Direction	Line #	Length	Direction
L1	106.45	S86°14'56"E	L16	112.32	S86°14'56"E
L2	302.37	N3°45'04"E	L17	302.23	N3°45'04"E
L3	105.54	N86°14'56"W	L18	105.17	N86°14'56"W
L4	302.37	S3°45'04"W	L19	305.04	S3°45'04"W
L5	90.80	S89°00'03"W	L20	240.67	S8°50'31"W
L6	37.82	N87°58'56"W	L21	169.74	S87°21'42"E
L7	89.60	N84°28'30"W	L22	34.48	S88°07'36"E
L8	75.33	N77°48'28"W	L23	54.48	S87°38'21"E
L9	130.18	N79°55'12"W	L24	63.78	S86°26'00"E
L10	221.25	N83°57'45"W	L25	219.88	S83°57'45"E
L11	64.55	N86°26'00"W	L26	128.89	S79°55'12"E
L12	54.84	N87°38'21"W	L27	76.29	S77°48'28"E
L13	34.42	N88°07'36"W	L28	91.73	S84°28'30"E
L14	116.08	N87°21'42"W	L29	39.19	S87°58'56"E
L15	124.12	N8°50'31"E	L30	91.43	N89°00'03"E

Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C1	37.70	24.00	90.0000	N48°45'04"E	33.94
C2	38.61	24.01	92.1241	N41°30'35"W	34.58
C3	38.38	24.01	91.6033	S48°45'04"W	34.42
C4	37.70	24.00	90.0000	S41°14'56"E	33.94
C5	40.30	24.00	96.2037	N39°15'35"W	35.73
C6	35.57	24.00	84.9091	N51°17'48"E	32.40
C7	75.40	48.00	90.0000	N48°45'04"E	67.88
C8	76.68	48.01	91.5021	N41°28'00"W	68.78
C9	76.36	48.01	91.1338	S48°45'04"W	68.56
C10	2.13	24.00	5.0999	S6°17'48"W	2.13

**GENERAL NOTES**

- The surveyor has not abstracted the site. Additional easements and/or other matters of record may or may not affect the subject tract.
- Bearings and Coordinates shown hereon are based on Texas State Plane Coordinates, North Central Zone 4202, NAD-83 Survey feet, derived from GPS observations and NGS Opus solutions. All dimensions shown are ground distances. Coordinates shown are grid coordinates.
- Selling a portion of this addition by metes and bounds is a violation of Town ordinance and State law and is subject to fines and/or withholding of utilities and building permits.
- Each lot corner is monumented by a 1/2" iron rod with red plastic cap stamped "CCM-ENG" unless denoted otherwise.
- The property shown hereon is legally owned by the applicant of this plat.

**Cross Timbers Water**

Declaration hereby reserves unto itself and the Cross Timbers Water Supply Corporation, and their respective agents, assignees, and employees, a perpetual non-exclusive easement under, over and across the Easement Property, or any areas conveyed and maintained by the Declarant and/or the Cross Timbers Water Supply Corporation, including but not limited to any service area or any areas reserved or held as Common Area for the installation, operation, maintenance, repair, relocation, removal and/or modification of any water line improvements, roadways or any other water public utility function on, beneath or above the surface of the grounds that serve as the Easement Property.

**FLOOD STATEMENT**

A portion of the surveyed property is situated in Shaded Zone "X", Zone AE, and Floodway in Denton County, Texas according to FEMA map number 48121C0510G dated April 18, 2011. Warning: This statement does not imply that the property and/or the structures thereon will be free from flooding or flood damage. This determination has been made by scaling the property on the referenced map and is not the result of an elevation survey. This flood statement shall not create liability on the part of the surveyor.

**STATE OF TEXAS  
 COUNTY OF DENTON**

WHEREAS EDUCATION TO SUCCESS FOUNDATION is the rightful owner of all of that tract of land situated in the Abraham A. Loving Survey, Abstract Number 736, in the Town of Bartonville, Denton County, Texas, and being all of a certain tract of land described in the deed to Education Leads to Success Foundation (ELTSF), as recorded in Instrument Number 2020-151501, of the Official Public Records of Denton County, Texas, and being more particularly described as follows:

BEGINNING at a 1/2-inch iron rod found for the southeast corner of said ELTSF tract and the northeast corner of that certain tract of land described in the deed to Donald R. Dreiske and Kathie A. Dreiske, as recorded in Volume 4754, Page 782 of the Real Property Records of Denton County, Texas, said point also being in the west right-of-way line of Farm to Market Road Number 407, having a variable width right-of-way;

THENCE South 89 degrees 00 minutes 00 seconds West, with the south line of said ELTSF tract and the north line of said Dreiske, a distance of 2,645.40 feet to a fence corner post found for the southeast corner of said ELTSF tract and the northwest corner of said Dreiske tract, said point also being in the east line of that certain land described in the deed to Ponca City Inn, Inc., as recorded under Instrument Number 2021-115695 of the Official Public Records, Denton County, Texas, from which a 1/2 inch iron rod found bears North 88°59'58" East, a distance of 2.00 feet;

THENCE North 00 degrees 52 minutes 36 seconds West, with the west line of said ELTSF tract and the east line of said Ponca City Inn tract, a distance of 555.57 feet to a 1/2 inch iron rod found for an angle point in the west line of said ELTSF tract, and the northeast corner of said Ponca City Inn tract, said point also being the southeast corner of Lot 1, Block C, of Hat Creek Estates, an addition to the Town of Bartonville, Denton County, Texas, according to the plat thereof recorded under Instrument No. 2017-260, of the Plat Records of Denton County, Texas;

THENCE North 00 degrees 17 minutes 13 seconds West, with the west line of said ELTSF tract and with the east lines of Hat Creek Estates, and Bartonville Water Supply Corporation Addition, an addition to the Town of Bartonville, Denton County, Texas, according to the plat thereof recorded in Cabinet V, Page 806, of the Plat Records, Denton County, Texas, a distance of 1,105.51 feet to a sandstone monument found for the northwest corner of said ELTSF tract and an interior ell of said Bartonville Water Supply Corporation Addition;

THENCE North 89 degrees 39 minutes 36 seconds East, with the north line of said ELTSF tract and a south line of said Bartonville Water Supply Corporation Addition, passing at a distance of 59.67 feet a 1/2 inch iron rod found for the southeast corner of said Bartonville Water Supply Corporation Addition, and the southwest corner of Block D of Hudson Hills, an addition to the Town of Bartonville, Denton County, Texas, according to the plat thereof recorded under Instrument Number 2022-32, of the Plat Records, Denton County, Texas, continuing with the north line of said ELTSF tract, passing the southeast corner of said Block D and the southwest corner of Yeti Addition, an addition to the Town of Bartonville, Denton County, Texas, according to the plat thereof recorded under Instrument Number 2018-159, of the Plat Records, Denton County, Texas, a total distance of 2,631.71 feet to a 1/2 inch iron rod found for the northeast corner of said ELTSF tract and being in the west right-of-way line of said Farm to Market Road Number 407;

THENCE along the east line of said ELTSF tract and the west right-of-way line of said Farm to Market Road Number 407. The following four (4) courses:

- South 00 degrees 22 minutes 58 seconds East, a distance of 573.85 feet to a 1/2-inch iron rod found for corner;
- South 00 degrees 59 minutes 57 seconds East, a distance of 305.88 feet to a 5/8 inch iron rod found for corner;
- South 08 degrees 52 minutes 08 seconds East, a distance of 100.54 feet to a 1/2 inch iron rod with a cap stamped "CCM-ENG" set for corner;
- South 00 degrees 14 minutes 04 seconds East, a distance of 651.51 feet to the POINT OF BEGINNING and enclosing 99.754 acres of land.

**SURVEYOR'S CERTIFICATE:**

This is to certify that I, Crystal Robertson, do hereby certify that I prepared this plat from an actual and accurate survey of the land and that the corners monuments shown thereon as set were properly placed under my supervision in accordance with the Development Ordinance of the Town of Bartonville.

Crystal Robertson  
 Registered Professional Land Surveyor #5447

STATE OF TEXAS §  
 COUNTY OF DENTON §

BEFORE ME, the undersigned authority, a Notary Public in and for the State of Texas, on this day personally appeared Crystal Robertson, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purpose and considerations therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2023.

Notary Public in and for the State of Texas

**NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS**

THAT the EDUCATION LEADS TO SUCCESS FOUNDATION, acting herein by and through his (its) duly authorized officers, does hereby adopt this plat designating the hereinabove described property as ELTSF ADDITION, an addition to the Town of Bartonville, Texas, and does hereby dedicate, in fee simple, to the public use forever, the streets and easements shown thereof. The streets are dedicated for street purposes. The easements and public use areas, as shown, are dedicated, for the public use forever, for the purposes indicated on this plat. No buildings, fences, trees, shrubs or other improvements or growths shall be constructed or placed upon, over or across the easements as shown, except that landscape improvements may be placed in landscape easements, if approved by the Town of Bartonville. In addition, utility easements may also be used for the mutual use and accommodation of all public utilities desiring to use or using the same unless the easement limits the use to particular utilities, said use by public utilities being subordinate to the public's and Town of Bartonville's use thereof. The town of Bartonville and public utility entities shall have the right to remove and keep removed all or parts of any buildings, fences, trees, shrubs or other improvements or growths which may in any way endanger or interfere with the construction, maintenance, or efficiency of their respective systems in said easements. The Town of Bartonville and public utility entities shall at all times have the full right of ingress and egress to or from their respective easements for the purpose of constructing, reconstructing, inspecting, patrolling, maintaining, reading meters, and adding to or removing from all or parts of their respective systems without the necessity at any time of procuring permission from anyone. This plat approved subject to all platting ordinances, rules, regulations and resolutions of the Town of Bartonville, Texas.

That the undersigned does hereby covenant and agree that he (they) shall construct upon the fire lane easements, as dedicated and shown hereon, a hard surface in accordance with the Town of Bartonville's paving standards for fire lanes; and that he (they) shall maintain the same in a state of good repair at all times and keep the same free and clear of any structures, fences, trees, shrubs, or other improvements or obstruction, including but not limited to the parking of motor vehicles, trailers, boats or other impediments to the accessibility of fire apparatus. The maintenance of paving on the fire lane easements is the responsibility of the owner, and the owner shall post and maintain appropriate signs in conspicuous places along such fire lanes, stating "Fire Lane, No Parking." The local law enforcement agency(s) is hereby authorized to enforce parking regulations within the fire lanes, and to cause such fire lanes and utility easements to be maintained free and unobstructed at all times for fire department and emergency use.

WITNESS my hand this the \_\_\_\_\_ day of \_\_\_\_\_, 2023.

**EDUCATION LEADS TO SUCCESS FOUNDATION**

By: \_\_\_\_\_  
 Authorized Representative-Signature

Printed Name \_\_\_\_\_

Title \_\_\_\_\_

Date \_\_\_\_\_

STATE OF TEXAS §  
 COUNTY OF DENTON §

BEFORE ME, the undersigned authority, a Notary Public in and for the State of Texas, on this day personally appeared \_\_\_\_\_, Owner, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purpose and considerations therein expressed.

Given under my hand and seal of office, this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

Notary Public in and for the State of Texas

STATE OF TEXAS §  
 COUNTY OF DENTON §

PRELIMINARY PLAT  
 Approved for preparation of final plat for the subdivision shown on this plat.  
 APPROVED BY: Planning and Zoning Commission Town of Bartonville, Texas.

Signature of Chairman \_\_\_\_\_ Date \_\_\_\_\_

APPROVED BY: Town Council

Signature of Mayor \_\_\_\_\_ Date \_\_\_\_\_

Attest:

Town Secretary \_\_\_\_\_ Date \_\_\_\_\_

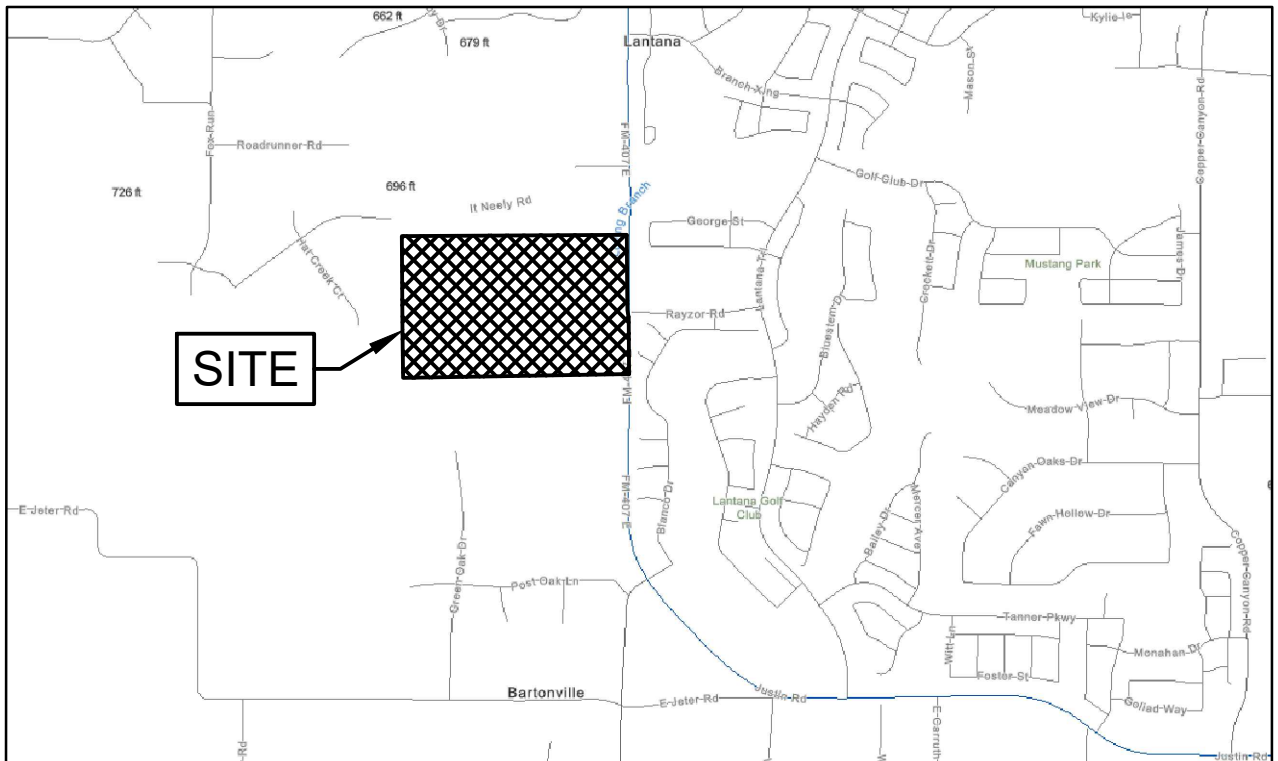
**ELTSF ADDITION**

BEING LOT 1, BLOCK A,

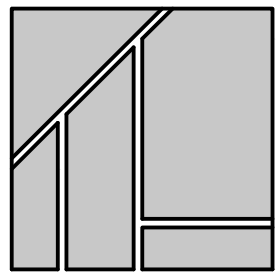
99.754 ACRES  
 SITUATED IN THE  
 ABRAHAM A. LOVING SURVEY,  
 ABSTRACT NO. 736  
 IN THE  
 TOWN OF BARTONVILLE  
 DENTON COUNTY, TEXAS

OCTOBER 2023

SHEET 1 OF 1



OWNER:  
 EDUCATION LEADS TO  
 SUCCESS FOUNDATION  
 2700 FM 407 E  
 BARTONVILLE, TX 76226  
 972-255-1800



CCM ENGINEERING  
 2570 JUSTIN ROAD #209  
 HIGHLAND VILLAGE, TX 75077  
 (972) 691-6633  
 TBPE FIRM # 605  
 TBLs FIRM # 10194794

## Exhibit 2

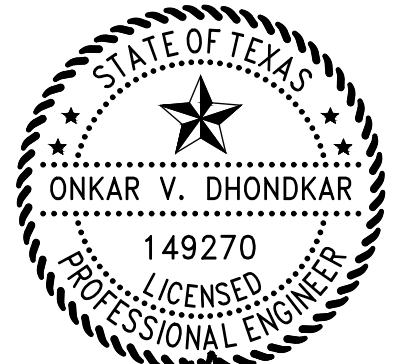
TRAFFIC IMPACT ANALYSIS UPDATE FOR  
**BARTONVILLE ELTS SCHOOL**

IN BARTONVILLE, TEXAS

*DeShazo Project No. 23031*

Prepared for:

**Mr. Luke Spicer. P.E.**  
**CCM Engineering**  
2570 FM 407, Suite 209  
Highland Village, TX 75077



Prepared by:

**Mr. Onkar Dhondkar, P.E.**  
**DeShazo Group, Inc.**

A handwritten signature in black ink that reads "Onkar Dhondkar". The signature is written over a horizontal line.

08/10/2023

**Texas Registered Engineering Firm F-3199**  
400 S Houston St, Suite 330, Dallas, TX-75202  
Office: 214-748-6740 | [www.deshazogroup.com](http://www.deshazogroup.com)

**REVISED**

**August 10, 2023**



**TRAFFIC . TRANSPORTATION PLANNING . PARKING . DESIGN**

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Traffic Impact Analysis Update for  
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~ DeShazo Project No. 23031 ~

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**LIST OF EXHIBITS:**

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**LIST OF APPENDICES:**

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Traffic Impact Analysis Update for  
**Bartonville ELTS School in Bartonville, Texas**  
 ~ DeShazo Project No. 23031 ~

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**LIST OF ABBREVIATIONS:**

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DeShazo/DGI:	DeShazo Group, Inc.	Dr:	Drive
TIA:	Traffic Impact Analysis	St:	Street
LOS:	Level of Service	Pkwy:	Parkway
NB:	North Bound	Ave:	Avenue
SB:	South Bound	ITE:	Institute of Transportation Engineers
EB:	East Bound	TxDOT:	Texas Department of Transportation
WB:	West Bound	AASHTO:	American Association of State Highway and Transportation Officials
L:	Left	MUTCD:	Manual on Uniform Traffic Control Devices
R:	Right	HCM:	Highway Capacity Manual
T:	Through	HCS:	Highway Capacity Software
In:	Inbound/ Ingress	NCTCOG:	North Central Texas Council of Governments
Out:	Outbound/ Egress	AMM:	Access Management Manual
AM:	Ante Meridiem	DU:	Dwelling Unit
PM:	Post Meridiem	SF:	Square Feet
PHF:	Peak Hour Factor	Ft:	Feet
VPH:	Vehicle Per Hour	MUD:	Mixed-Use Development
MPH:	Mile Per Hour	CBD:	Central Business District
V/C:	Volume/Capacity	PD:	Planned Development
TWSC:	Two-Way Stop-Control		
AWSC:	All-Way Stop-Control		
ISD:	Intersection Sight Distance		
TX:	Texas		
Blvd:	Boulevard		
Rd:	Road		
City/Town:	Town of Bartonville		



## EXECUTIVE SUMMARY

The services of **DeShazo Group, Inc.** (DeShazo) were retained by **CCM Engineering** (Client), to conduct Traffic Engineering Services for the proposed Bartonville ELTS School in Bartonville, Texas. The proposed development will be located in the northwest quadrant of FM 407 and CJ's Legacy Ranch Drive intersection in Bartonville, Texas.

Two-access drives will connect to FM 407 at the site, which are expected to be constructed by the year 2024. While the school will have a capacity of about 391 students, it is expected that all the students will be transported by bus and have a projected 5 bus operation per day.

DeShazo performed the analysis based on two scenarios. **Scenario 1** includes both the school bus and parent pick up and drop off together and **Scenario 2** includes only 5 buses/10 bus trips a day. Scenario 1 was considered and traffic analysis was performed considering; during a time of emergency, some of the parents may want to pick up or drop off their kids. It is generally understood that this scenario will not occur on a regular basis.

The analysis of the traffic generated by the proposed development resulted in a minimal impact on the local roadway system. Below is a summary of findings and suggested recommendations from the following TIA report.

## INTERSECTION CAPACITY ANALYSIS

From the findings in our analysis, DeShazo has suggested improvements to the roadway geometry and traffic control devices to improve traffic operations for the local roadway network. These suggested recommendations are summarized below.

### SUMMARY OF FINDINGS

**FINDING:** Based upon the existing 2023 analysis, all study intersections are currently operating at *LOS D* or better during the peak hour periods, except the following:

**FM 407 and McMakin Rd:**

The *EB* movement of this signalized intersection is operating at *LOS F* in 2023 Existing *AM* as well as *PM* condition.

**FM 407 and I T Neely Dr:** The *EBLR* movement of this unsignalized intersection is operating at *LOS F* in 2023 Existing *AM* as well as *PM* condition.

**FM 407 and Rayzor Rd:** The *WBL* movement of this unsignalized intersection is operating at *LOS E* in 2023 Existing *AM* and at *LOS F* in the existing *PM* condition.

**FINDING:** Based upon the 2024 Background and 2024 background-plus site buildout analysis, all study intersections are expected to operate at *LOS D* or better during the peak hour periods, except the following:

**FM 407 and McMakin Rd:**

The *EB* movement of this signalized intersection is expected to operate at *LOS F* during both the 2024 Background and Background Plus Site *AM* as well as *PM* conditions in both of the Scenarios.

**FM 407 and I T Neely Dr:**

The *EBLR* movement of this unsignalized intersection is expected to operate at *LOS F* during both the 2024 Background and Background Plus Site *AM* as well as *PM* conditions in both of the Scenarios.

**FM 407 and Rayzor Rd:**

The *WBL* movement of this unsignalized intersection is expected to operate at *LOS F* during both the Background Plus Site *AM* as well as *PM* conditions in Scenario 1. The intersection operates at *LOS E* during 2024 Background *AM* as well as Background Plus Site *AM* in Scenario 2.

**FM 407 and Driveway 2:**

The *EBLR* movement of this unsignalized intersection is expected to operate at *LOS F* during both the 2024 Background Plus Site *AM* as well as *PM* conditions in Scenario 1. And the intersection operates at *LOS E* during 2024 Background Plus Site *PM* Scenario 2.

**FINDING:** Based upon the 2029 horizon and 2029 horizon-plus site buildout analysis all the intersections are expected to operate at ***LOS D***, or better during the peak hour periods, with the exception of the following:

**FM 407 and McMakin Rd :**

The signalized intersection is expected to operate (overall) at *LOS C* and *LOS D* during 2029 Horizon and 2029 Horizon Plus Site *AM as well as PM* conditions, respectively for both scenarios. The *EB* movement is expected to operate at *LOS F* during both the 2029 Horizon and 2029 Horizon Plus Site *AM* and *PM* conditions for both scenarios.

**FM 407 and I T Neely Dr:**

The *EBLR* movement is expected to operate at *LOS F* during the 2029 Horizon and 2029 Horizon Plus Site *AM and PM* conditions for both scenarios.

**FM 407 and Rayzor Rd:**

The *WBL* movement is expected to operate at *LOS F* during both the 2029 Horizon and 2029 Horizon Plus Site *AM* and *PM* conditions for both scenarios.

**FM 407 and Driveway 2:**

The *EBLR* movement is expected to operate at *LOS F* during the 2029 Horizon Plus Site *AM and PM* conditions for scenario 1. And *LOS E* during 2029 Horizon Plus Site *PM* conditions for scenario 2.

**SUMMARY OF THE DESHAZO RECOMMENDATIONS FOR INTERSECTIONS:**

**FM 407 and McMakin Rd:**

Although, in general, this intersection is projected to function and remain at the overall LOS of LOS C and LOS D during the AM and PM horizon conditions. This signalized intersection's EB movement is already operating LOS F during both AM and PM conditions. Further, it is expected to worsen in the future scenarios. As the intersection is failing at current conditions and the proposed development is not contributing to any traffic at current conditions, DeShazo recommends that the Town should consider adding two exclusive left turns instead of one existing left turn, which will improve the level of service. This can be done by modifying the pavement markings, signage, and traffic signals.

This study has performed an intersection capacity analysis with these improvements (having two left turn lanes) and the results are attached to **Appendix E**.

**FM 407 at Rayzor Rd:**

The WBL movement is expected to operate at LOS E and LOS F in 2023 Existing AM and Existing PM conditions respectively and is expected to operate at LOS F in future scenarios. The proposed site has no impact on this intersection as the majority of the traffic for the proposed development is expected to travel north-south and vice-versa. Additionally, during peak hours of analysis, the maximum 95<sup>th</sup> percentile queue for Horizon and Horizon Plus Site is expected to be approximately 3 vehicles, which can be accommodated on the current turn lane of Razor Rd. Therefore no mitigation measure is recommended for this intersection by this development.

**FM 407 at IT Neely Dr:**

The EBLR movement is currently operating at LOS F with a maximum 95<sup>th</sup> percentile queue of 2 vehicles. The proposed site has no impact on this intersection as the majority of the traffic for the proposed development is expected to travel north-south and vice-versa. Therefore no mitigation measure is recommended for this intersection by this development.

**FM 407 and Driveway 2:**

The EBLR movement is expected to operate at failing LOS from the buildout year 2025 and onwards for both hypothetical scenarios. For this outbound movement from the proposed drive, a maximum 95<sup>th</sup> percentile queue of 20 vehicles is expected. Driveway 2 will have enough storage capacity to hold 20 projected vehicles. Therefore no mitigation measure is recommended for this intersection by this development.

The current and future expected queues at the failing intersection are represented in the following table.

**Vehicular Queue Summary**

Intersection	Traffic Movement	2023 Existing		2024 Background		2024 Background Plus Site(Scenario 1)		2024 Background Plus Site(Scenario 2)		2029 Horizon		2029 Horizon Plus Site(Scenario-1)		2029 Horizon Plus Site(Scenario-2)	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
<b>Queue Length (Feet)</b>															
FM 407	EB	16	16	16	16	16	16	16	16	17	17	17	17	17	17
McMakin Rd	EBL	253	499	258	512	271	514	258	512	288	580	301	582	288	580
<b>Queue (Vehicle)</b>															
FM 407	IT Neely Dr	2	1.8	2.2	2	2.7	2	2.2	2	3.4	3.2	4	3.3	3.4	3.2
CI's Legacy Ranch	FM 407	0	0	0	0	0.6	0.1	0	0	0	0	0.7	0.1	0	0
CI's Legacy Ranch	Dr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proposed Driveway	SBLR	--	--	--	--	0.2	0	--	0	--	--	0.2	0	--	0
FM 407	Rayzor Rd	1	1.6	1.1	1.6	1.5	1.6	1.1	1.6	1.6	2.4	2.2	2.5	1.6	2.4
FM 407	Driveway 2	0	0	0	0	18.4	1.6	0	0.1	0	0	20.1	2.3	0	0.2

**ROADWAY LINK ANALYSIS**

**FINDING:** Based upon the roadway link analysis, all roadway links are expected to operate at LOS D or better for all different scenarios.

**RECOMMENDATION:** Based on the results of the study conducted on roadway links, it appears that the implementation of additional mitigation measures is not necessary.

### DRIVEWAY SPACING ANALYSIS

**FINDING:** Based on TxDOT's driveway spacing guidelines and measurements from the preliminary site plan and Google Earth program, all the proposed site driveways satisfy the spacing criteria requirements.

**RECOMMENDATION:** Based on the results of the study conducted on driveway spacing, it appears that the implementation of additional mitigation measures is not necessary.

### RIGHT - TURN DECELERATION ANALYSIS

**FINDING:** Based upon the projected volumes derived in this study and TxDOT's right-turn deceleration lane requirements, the installation of a right-turn deceleration lane is required at Driveway 2 at FM 407.

**RECOMMENDATION:** DeShazo recommends the maximum possible right-turn deceleration lane (within TxDOT recommended lengths) at this intersection's SBR movement to accommodate the expected right-turning vehicles.

### LEFT-TURN DECELERATION ANALYSIS

**FINDING:** Based upon the projected volumes derived in this study and TxDOT's left-turn deceleration lane requirements, the installation of a left-turn deceleration lane is required at Driveway 2 at FM 407.

**RECOMMENDATION:** DeShazo recommends the maximum possible left-turn deceleration lane (within TxDOT recommended lengths) at this intersection's NBR movement to accommodate the expected left-turning vehicles.

### INTERSECTION SIGHT DISTANCE ANALYSIS

**FINDING:** Based on the AASHTO and the Town of Bartonville's guidelines and measurements from the Google Earth program, all the proposed site driveway meets the intersection sight distance requirements.

**RECOMMENDATION:** Based on the results of the study conducted on intersection sight distance requirements, it appears that the implementation of additional mitigation measures is not necessary.

**Disclaimer:** However, if the site plans are developed further to include additional infrastructure such as fencing, walls, or landscaping in the vicinity of proposed driveways, intersection sight distances may need to be re-evaluated.

END OF SUMMARY

## INTRODUCTION

The services of **DeShazo Group, Inc.** (DeShazo) were retained by **CCM Engineering** (Client), to conduct Traffic Engineering Services for the proposed ELTS School in Bartonville, Texas. The proposed development is located in the Northwest quadrant of FM 407 and CJ's Legacy Ranch Drive intersection in Bartonville, Texas.

Two-access drives will connect to FM 407 at the site, which are expected to be constructed by the year 2024. While the school will have a capacity of about 391 students, it is expected that all the students will be transported by bus and have a projected 5 bus operation per day. **Table 2.** represents Development Program Summary.

**Table 2. Development Program Summary**

Land Uses	Quantity	Unit	Buildout Year	Daily Busing Capacity
Charter Elementary School	391	Students	2024	5 Buses

A project vicinity map and a project location & surroundings map are provided in **Exhibit 1** and **Exhibit 2**, respectively. A preliminary site plan is provided in **Exhibit 3**.

## PURPOSE

The purpose of this TIA is to determine if any improvements to the adjacent transportation system are needed to maintain a satisfactory level of service, an acceptable level of safety, and appropriate access for the proposed development. The *Town of Bartonville* is requiring that a TIA be completed for the subject site as part of the approval process. The study parameters used in this TIA are based upon the requirements of the *TxDOT/ Town of Bartonville* and are consistent with the standard industry practices used in similar studies.

## TRAFFIC IMPACT ANALYSIS - METHODOLOGY

To achieve this objective, this analysis summarizes the traffic operational characteristics of the background conditions within a designated study area and the projected incremental impact of the Project as determined through standardized engineering analyses. The standard methodology used to conduct the traffic impact analysis is described below.

1. Collect current traffic volume data on a typical day throughout the study area to represent existing traffic conditions.
2. Apply growth factors to the existing volumes to project future background traffic at the site buildout year conditions.
3. Project traffic is generated by the proposed development using trip generation, trip distribution, and traffic assignment as described below.
  - a. Trip generation is calculated in terms of "trip ends" – a trip end is a one-way vehicular trip entering or exiting a site driveway (i.e., a single vehicle entering and exiting a site represents two trip ends).

- b. Trip distribution and assignment of site-generated trips to the surrounding roadway system are determined by proportionally estimating the orientation of travel via various travel routes. This is a subjective exercise based upon professional judgment considering such factors as directional characteristics of existing local traffic; trip attributes (e.g., trip purpose, trip length, travel time, etc.), roadway features (e.g., capacity, operational conditions, the character of the environment), regional demographics, etc.
4. Determine site-plus-background traffic by adding the projected site-generated traffic to the background traffic.
5. Analyze existing, background, and background-plus-site traffic volumes to evaluate the roadway conditions in the vicinity of the proposed development.
6. If needed, mitigation measures are recommended based on the analysis to improve roadway operational conditions.

## ANALYSIS SCENARIOS

This TIA analyzed the AM and PM peak hour periods that are considered the most critical conditions on the public roadway system related to the proposed project. The AM and PM peak hour periods were determined from the data collection of the study area.

**Appendix B** summarizes the peak hour volumes used in the study. The proposed project was analyzed as per the city of Bartonville standards for future scenarios. Those scenarios include 2023- the existing year, 2024 - the build year, and 2029 - the horizon year.

This TIA further analyzed these scenarios for the following peak hour periods that were considered the most critical conditions on the public roadway system related to the proposed project and land uses related to it.

### **Roadway Intersections:**

- Weekday: AM peak hour of adjacent street traffic (7:00 AM – 9:00 AM)
- Weekday: PM peak hour of adjacent street traffic (3:00 PM – 6:00 PM)

### **Roadway Links:**

- Weekday: 24-Hour bi-directional roadway tube counts were collected to verify the collected peak periods.

Development scenarios considered in this analysis are summarized in **Table 3**.

**Table 3. Development Scenarios Analyzed**

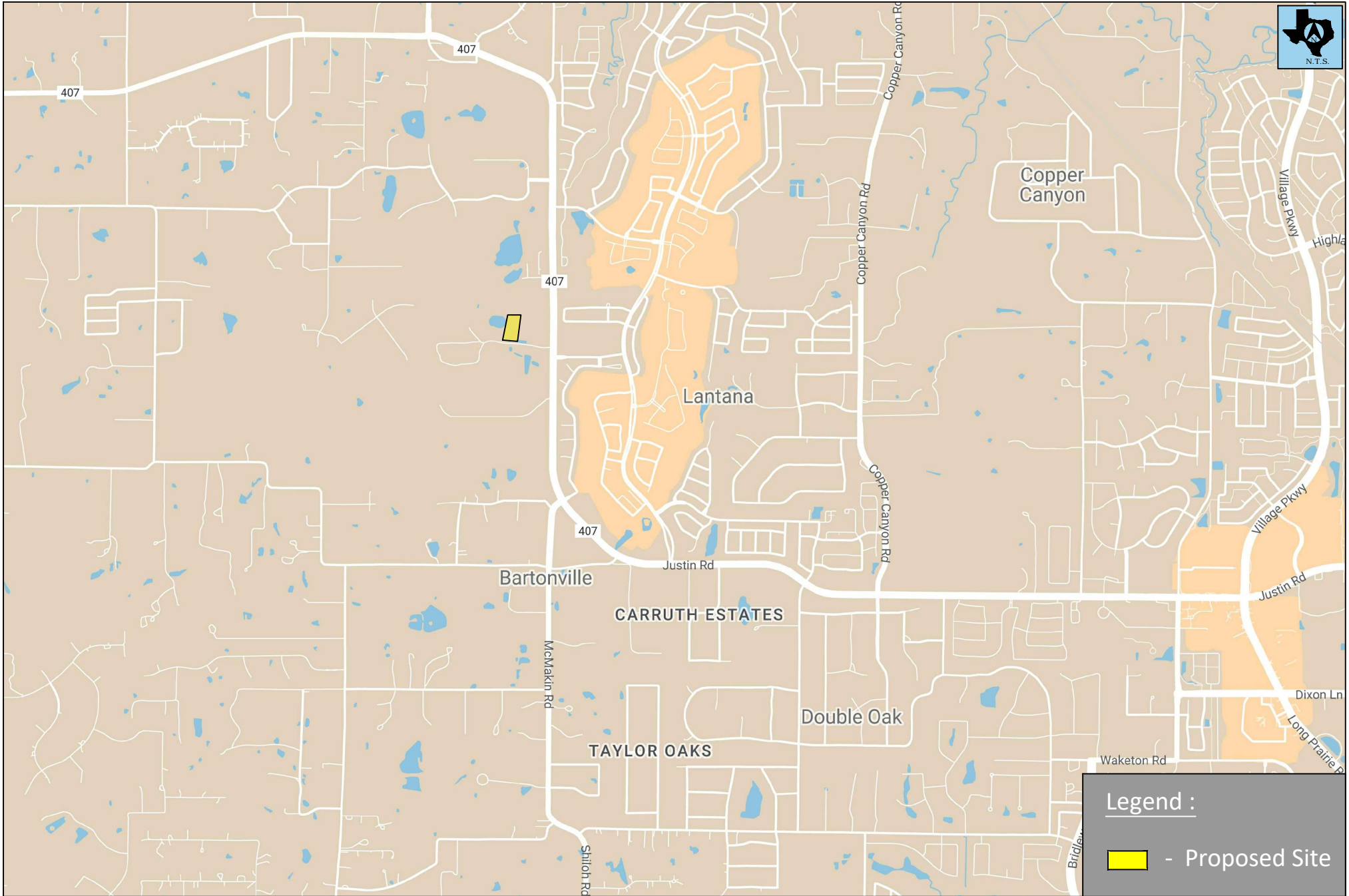
Scenario	Development Program	Traffic Volumes
2023 Existing	None Added	Existing 2023 Volumes
2024 Background	None Added	Existing 2023 volumes have grown at 2% <sup>[1]</sup> per year for 2 years
2024 Background + Full Buildout	Full Build Traffic Added Includes Scenario 1 <sup>[2]</sup> and Scenario 2 <sup>[3]</sup> )	Existing 2023 volumes have grown at 2% <sup>[1]</sup> per year for 2 years plus proposed site traffic
2029 Horizon	None Added	Existing 2023 volumes have grown at 2% <sup>[1]</sup> per year for 6 years
2029 Horizon + Site	Full Build Traffic Added	Existing 2023 volumes have grown at 2% <sup>[1]</sup> per year for 6 years plus proposed site traffic

**Notes:**


<sup>[1]</sup> The 2% growth rate is based on the Town of Bartonville’s Population growth rate. The table representing the population growth rate is attached to **Appendix E**.

<sup>[2]</sup> **Scenario 1:** This scenario is a hypothetical scenario where all students are picked up/drop off even though the school bus is in service. As a conservative approach, DeShazo has taken this situation into consideration.

<sup>[2]</sup> **Scenario 2:** 100% of the students are bused is valid in case of an emergency where complete evacuation is mandatory. For e.g., severe weather conditions.



**Legend :**

 - Proposed Site

## PROJECT VICINITY MAP

TIA for Bartonville ELTS School in Bartonville, Texas

DGI PROJECT #:23031

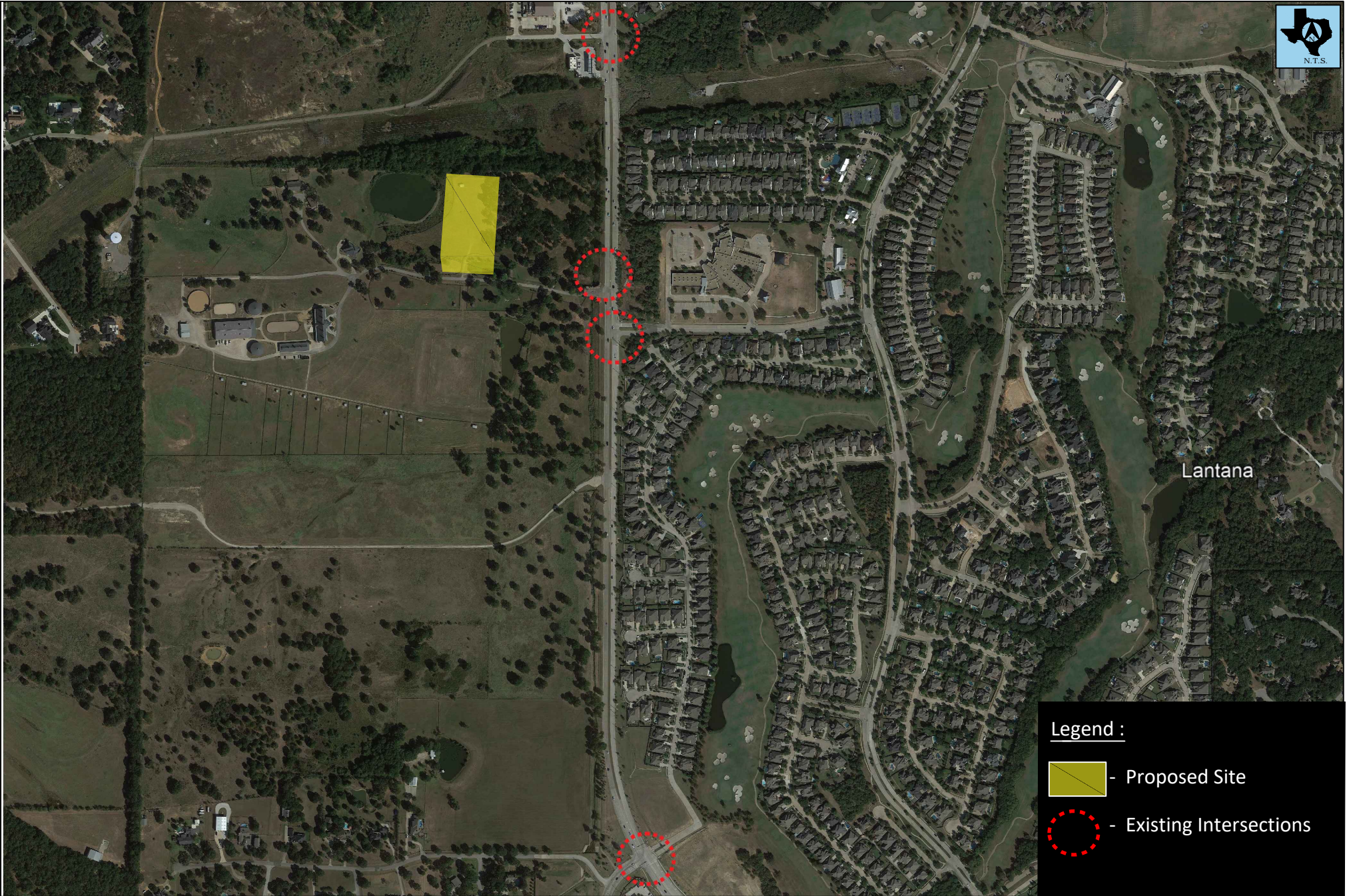
EXHIBIT

DATE : MARCH 2023



PREPARED BY: RD

1





**Legend :**

-  - Proposed Site
-  - Existing Intersections

### PROJECT LOCATION AND SURROUNDINGS MAP

TIA for Bartonville ELTS School in Bartonville, Texas

DGI PROJECT #:23031

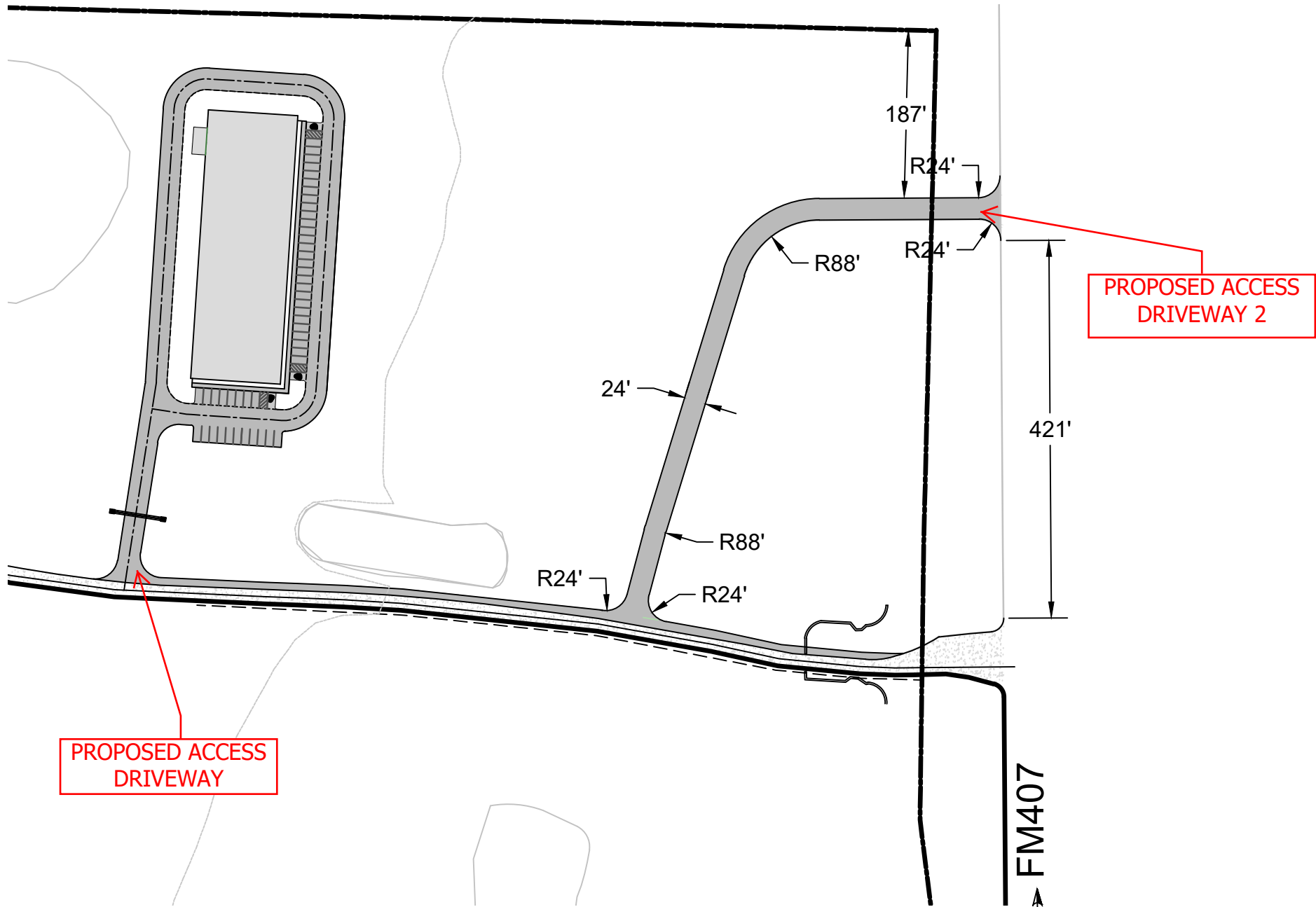
DATE : MARCH 2023

PREPARED BY: RD

EXHIBIT

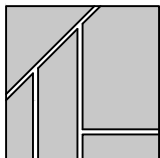
2

# EXHIBIT. 3. PRELIMINARY SITE PLAN



PROPOSED ACCESS DRIVEWAY

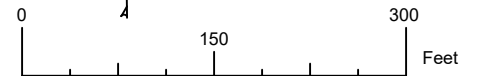
PROPOSED ACCESS DRIVEWAY 2



## CCM Engineering

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Highland Village, Texas 75077  
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Fax: 972.691.6628  
TBPE FIRM #605

## Bartonville ELTS New Driveway



## SITE LOCATION AND STUDY AREA

### STUDY AREA

The study area for a TIA is typically defined to allow an assessment of the most relevant traffic impacts on the local area. The extent of the study area is discretionary but is generally commensurate with the scale of the proposed development. Special localized factors may also be considered. **Table 4** below shows the existing and proposed roadway intersections analyzed in this study. All the existing intersections analyzed in this study were also shown in a project site location & surroundings map in **Exhibit 2**.

**Table 4. Existing and Proposed Roadway Intersections**

Intersection	Traffic control	Future Access Control Type
1. FM 407 at IT Neely Dr	Two-way-stop-control Intersection	--
2. FM 407 at CJ Legacy Ranch Dr	Two-way-stop-control Intersection	--
3. FM 407 at Rayzor Rd	Two-way-stop-control Intersection	--
4. Driveway 1 at CJ's Legacy Ranch Dr	Two-way-stop-control Intersection	--
5. FM 407 at McMakin Rd	Signalized Intersection	--
6. Driveway 2 at FM 407	Two-way-stop-control Intersection	Full Access

### EXISTING ZONING AND DEVELOPMENT

The proposed site is currently zoned as AG: Agriculture (Min.10 acre lots). The site is currently vacant land. A site location map with the surroundings of the project was shown in **Exhibit 2**.

### THOROUGHFARE SYSTEM

- FM 407 :
  - Existing operation and cross-section: Four lanes, Two-way operation, median divided.
  - Speed Limit: 50 MPH (posted)
  - TxDOT Functional Classification: Minor Arterial
  - Town of Bartonville Classification: Major Arterial 4 Lane Divided
  
- McMakin Rd :
  - Existing operation and cross-section: Two lanes, undivided, two-way operation
  - Speed Limit: 40 MPH (posted)
  - TxDOT Functional Classification: Major Collector
  - Town of Bartonville Classification: Principal Arterial 4 Lane Divided
  
- Rayzor Rd:
  - Existing operation and cross-section: Four lanes, undivided, two-way operation
  - Speed Limit: 20 MPH (posted)

- Denton County Functional Classification: Major Arterial 4 Lane Divided
- CJ Legacy Ranch Dr
  - Existing operation and cross-section: Two lanes, undivided, two-way operation
  - Speed Limit: 25 MPH assumed (Not posted)
- IT Neely Dr:
  - Existing operation and cross-section: Two lanes, Two-way operation
  - Speed Limit: 30 MPH assumed (Not posted)
  - TxDOT Functional Classification: Not Classified

A summary of the existing and proposed intersection/roadway geometry and traffic control devices is shown in **Exhibit 4** and **Exhibit 5**.

## TRAFFIC VOLUMES

### EXISTING TRAFFIC VOLUMES

Traffic volumes were collected for the following intersections during the analysis periods at the study area intersections on Thursday, March 23<sup>rd</sup>, 2023. The traffic counts were collected from 7:00 AM to 9:00 AM for morning peak hours and 3:00 PM to 6:00 PM for evening/afternoon peak hours. The evening peak data collection was included from 3 PM to account for the adjacent school's peak dismissal timings.

Traffic volumes are graphically summarized in **Appendix A** and detailed 15-minute-count data sheets are provided in **Appendix B**.

### PROJECTED BACKGROUND TRAFFIC VOLUMES

Background traffic growth is defined as normal traffic growth that is not directly related to the subject development of this study. Based on the recent TIA performed by DeShazo in the vicinity of the proposed development and the city official's comments, a 2% annual growth rate in the vicinity of the proposed site is considered very conservative. DeShazo used an annual growth rate of 2% from the collected (2023) for two years to 2024 background condition through the 2029 horizon year.

The 2% growth rate is based on the TxDOT Database System, city officials' comments, and previous TIA submitted in the vicinity of the proposed project. The approved TIA study scope from the city is attached in **Appendix E** of this report.

Future background traffic volumes estimated for the buildout years were calculated by applying the assumed growth rate to the study area intersections. These volumes are graphically summarized in **Appendix A**.

## SITE-TRAFFIC CHARACTERISTICS

Traffic generated by the development is projected by first determining the number of trips generated by the planned land use, then distributing and assigning projected site-related trips to the roadway system.

### TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual (11<sup>th</sup> Edition) is an accepted source for calculating trip generation for common land uses for which sufficient published data is available.

Trip generation is calculated in terms of “trip ends”. A trip end is a one-way vehicular trip entering or exiting a site driveway (i.e., a single vehicle entering and exiting a site represents two trip ends). Trip generation for this Project was calculated using the Institute of Transportation Engineers (ITE) Trip Generation Manual (11<sup>th</sup> Edition). ITE Trip Generation is a compilation of actual, vehicular traffic volume generation data and statistics by land use as collected over several decades by credible sources across the country. This analysis evaluates typical weekday AM and PM peak hour conditions of the local street traffic. **Table 5** and **Table 6** provide a summary of the trip ends generated for the project.

According to the proposed school, all the students will be bused. This situation may not be accurate in reality. ITE Trip Generation Manual (11<sup>th</sup> Edition) has trip generated based on students and employees only and states that ‘the percentage of students at the sites who were transported to school via bus varied considerably. Some sites experienced higher than-average trip rates because many students did not utilize the available school bus service. Due to the varied transit and school bus usage at these sites, it is desirable that future studies report additional detail on the percentage of students who were bused to school and the percentage that were dropped off and picked up. Because of the uncertainty of the trips and their behavior. DeShazo performed the analysis based on two Scenarios.

**Scenario 1:** Bus + Passenger Car/Parent Pick up or Drop off.

**Scenario 2:** Bus Only

**Scenario 1:** This scenario is a hypothetical scenario where all students are picked up/drop off even though the school bus is in service. As a conservative approach, DeShazo has taken this situation into consideration.

**Table 5. Full Buildout Projected Trip Generation for Scenario 1  
(Bus + Passenger Cars Traffic)**

ITE Code	ITE Land Use	Quantity	ay Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
536	Charter Elementary School	391 Students	723	408	212	196	63	22	41
		<i>Subtotals:</i>	723	408	212	196	63	22	41
		<b>Totals:</b>	<b>723</b>	<b>408</b>	<b>212</b>	<b>196</b>	<b>63</b>	<b>22</b>	<b>41</b>

**Scenario 2:** i.e., 100% of students are bused. is valid in case of an emergency where complete evacuation is mandatory. For e.g., severe weather conditions.

**Table 6. Full Buildout Projected Trip Generation for Scenario 2  
(Only Bus Traffic)**

Code	School Type	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
	Charter Elementary School	10 Buses	10	5	5	0	5	0	5
		<i>Subtotals:</i>	10	5	5	0	5	0	5
		<b>Totals:</b>	10	5	5	0	5	0	5

## TRIP DISTRIBUTION AND ASSIGNMENT

Traffic for the proposed development was distributed and assigned to the study area roadway network based upon the roadway network and regional travel flow [or existing traffic patterns]. Detailed trip distribution and traffic assignment calculations and results are summarized in **Appendix C**.

## SITE-GENERATED TRAFFIC VOLUMES

Site-generated traffic is calculated by multiplying the trip generation value by the corresponding traffic assignments-both inbound and outbound (from **Appendix C**). The resulting cumulative (for all uses) peak period site-generated traffic volumes at the buildout of the Project are graphically summarized in **Appendix A**.

# ROADWAY INTERSECTION ANALYSIS

## INTERSECTION CAPACITY ANALYSIS - METHODOLOGY

The level of performance of infrastructure can often be measured through an analysis of volume and capacity that considers various physical and operational characteristics of the system. For vehicular traffic, an operational analysis of roadway intersection capacity is the most detailed type of analysis. An industry-standardized methodology for this type of analysis is presented in the *Highway Capacity Manual (HCM)*. HCM uses the term “level of service” (LOS) to qualitatively describe the efficiency using a letter grade of A through F. Generally, LOS is described as follows.

- LOS A = free, unobstructed flow
- LOS B = reasonably free flow
- LOS C = stable flow
- LOS D = approaching unstable flow
- LOS E = unstable flow, operating at design capacity
- LOS F = operating over design capacity

Traffic operational analysis is typically measured in one-hour periods during day-to-day peak conditions. In most urban settings, LOS C (or better) is desirable, although LOS D is considered to be acceptable. Nevertheless, periods of LOS E or F conditions are not uncommon for brief periods at major transportation facilities. In some cases, measures to add more capacity—either through operational changes and/or physical improvements—can be identified to increase efficiency and sometimes improve the level of service.

For traffic-signal-controlled (“signalized”) intersections and STOP-controlled (“unsignalized”) intersections, LOS is determined based upon the calculated average seconds of delay per vehicle. For signalized intersections, the average delay per vehicle can be effectively calculated for the entire intersection. However, the average delay per vehicle for unsignalized intersections is calculated by the separate approach or by individual traffic maneuvers that must stop or yield the right-of-way. For unsignalized intersections of a minor street or driveway and a major roadway, the analysis methodology often breaks down and yields low levels of service (often, LOS F) that cannot be mitigated unless a traffic signal is installed. However, for a traffic signal to be installed, the responsible agency that governs the right-of-way must issue its approval subject to very specific warrant criteria being met, *and* several other operational considerations being satisfied. Neither level of service nor delay is considered a criterion for traffic signal installation.

The following table summarizes the LOS criteria for signalized and unsignalized intersections as defined in the latest edition of the *Highway Capacity Manual*.

	Signalized Intersection (Average Delay per Vehicle)	Unsignalized Intersection (Average Delay per Vehicle)
LOS A	≤ 10	≤ 10
LOS B	>10 - ≤20	>10 - ≤15
LOS C	>20 - ≤35	>15 - ≤25
LOS D	>35 - ≤55	>25 - ≤35
LOS E	>55 - ≤80	>35 - ≤50
LOS F	>80	>50

NOTE: Signalized intersection operational parameters and operational results in this TIA were obtained directly from the optimized software output and may differ slightly from actual traffic signal operations.



## 2023 EXISTING – INTERSECTION ANALYSIS

Existing traffic volumes were analyzed to determine current operational conditions. Intersection capacity analyses presented in this study were performed using the **SYNCHRO** software package. **Table 7** provides a summary of peak period intersectional operational conditions (\*). Detailed traffic volumes and software output for all intersection analyses are provided in **Appendix A** and **Appendix D**, respectively.

**Table 7. 2023 Existing Intersection Analysis**

Intersections	Traffic Movement	2023 Existing	
		AM	PM
<b>Signalized Intersection</b>			
<u>FM 407</u> McMakin Blvd/Blanco Dr	<b>Overall</b>	<b>C (25.9)</b>	<b>D (35.4)</b>
	EB	F (140.8)	F (119.7)
	WB	C (25.1)	C (31.4)
	NB	A (5.1)	A (9.9)
	SB	A (6.2)	B (10.1)
<b>Unsignalized Intersection (TWSC)</b>			
<u>FM 407</u> I T Neely Dr	NBL	B (12.7)	B (11.7)
	EBLR	F (83.5)	F (69.0)
<u>CJ's Legacy Ranch Dr</u> FM 407	EBR	B (14.0)	B (12.2)
<u>FM 407</u> Rayzor Rd	WBL	E (47.0)	F (121.4)
	WBR	B (12.0)	B (14.9)
	SBL	A (9.8)	C (15.2)
<u>FM 407</u> Driveway 2	NBL	--	--
	EBLR	--	--

**FINDING:** Based upon the existing 2023 analysis, all study intersections are currently operating at *LOS D* or better during the peak hour periods, except the following:

**FM 407 and McMakin Rd:**

The *EB* movement of this signalized intersection is operating at *LOS F* in 2023 Existing *AM* as well as *PM* condition.

**FM 407 and I T Neely Dr:** The *EBLR* movement of this unsignalized intersection is operating at *LOS F* in 2023 Existing *AM* as well as *PM* condition.

**FM 407 and Rayzor Rd:** The *WBL* movement of this unsignalized intersection is operating at *LOS E* in 2023 Existing *AM* and at *LOS F* in the existing *PM* condition.

**KEY:**

*A, B, C, D, E, F = Level-of-Service for each intersection approach  
NB, SB, EB, WB = North-, South-, East-, Westbound approach*

*L, T, R = Left, Through, Right Approach turning movement*

*AM = AM Peak Hour of Adjacent Street*

*PM = AM Peak Hour of Adjacent Street*

*NOTE: Signalized intersection operational parameters and operational results were obtained directly from the optimized software output and may differ slightly from actual traffic signal operations.*

## 2024 BACKGROUND AND BACKGROUND PLUS SITE – INTERSECTION ANALYSIS

The proposed Bartonville ELTS school development is expected to be completed by the year 2024. Therefore, the year 2024 background (no build) and background-plus site traffic volumes were analyzed to determine the incremental change in operational conditions during peak periods *without* and *with* site-related traffic. The background plus site condition is analyzed in two scenarios. The LOS results are provided in **Table 8**.

**Table 8. 2024 Scenario Intersection Analysis**

Intersections	Traffic Movement	2024 Background		2024 Background Plus Site(Scenario 1)		2024 Background Plus Site(Scenario 2)	
		AM	PM	AM	PM	AM	PM
<b>Signalized Intersection</b>							
FM 407 McMakin Blvd/ Blanco Dr	<b>Overall</b>	<b>C (27.0)</b>	<b>D (37.3)</b>	<b>C (27.9)</b>	<b>D (37.2)</b>	<b>C (26.9)</b>	<b>D (37.3)</b>
	EB	F >100	F >100	F >100	F >100	F >100	F >100
	WB	C (25.1)	C (31.4)	C (25.1)	C (31.4)	C (25.1)	C (31.4)
	NB	A (5.1)	A (10.0)	A (5.4)	A (10.0)	A (5.1)	A (10.0)
	SB	A (6.2)	B (10.2)	A (6.6)	B (10.3)	A (6.2)	B (10.2)
<b>Unsignalized Intersection (TWSC)</b>							
FM 407 I T Neely Dr	NBL	B (13.0)	B (11.9)	B (13.7)	B (12.0)	B (13.0)	B (11.9)
	EBLR	F (96.0)	F (74.8)	F >100	F (78.8)	F (96.0)	F (74.8)
CJ's Legacy Ranch Dr FM 407	EBR	B (14.1)	B (12.4)	C (16.9)	B (12.7)	B (14.2)	B (12.4)
FM 407 Rayzor Rd	WBL	E (49.0)	F >100	F (70.9)	F >100	E (49.0)	F >100
	WBR	B (12.1)	C (15.2)	B (13.1)	C (15.3)	B (12.1)	C (15.2)
	SBL	A (9.5)	B (12.9)	B (10.1)	B (13.0)	A (9.5)	B (12.9)
FM 407 Driveway 2	NBL	- -	- -	C (16.4)	B (11.1)	B (12.3)	A (0.0)
	EBLR	- -	- -	F >100	F (67.2)	A (0.0)	E (37.5)

**FINDING:** Based upon the 2024 Background and 2024 background-plus site buildout analysis, all study intersections are expected to operate at *LOS D* or better during the peak hour periods, except the following:

**FM 407 and McMakin Rd:**

The *EB* movement of this signalized intersection is expected to operate at *LOS F* during both the 2024 Background and Background Plus Site *AM* as well as *PM* conditions in both of the Scenarios.

**FM 407 and I T Neely Dr:**

The *EBLR* movement of this unsignalized intersection is expected to operate at *LOS F* during both the 2024 Background and Background Plus Site *AM* as well as *PM* conditions in both of the Scenarios.

**FM 407 and Rayzor Rd:**

The *WBL* movement of this unsignalized intersection is expected to operate at *LOS F* during both the Background Plus Site *AM* as well as *PM* conditions in Scenario 1. The intersection operates at *LOS E* during 2024 Background *AM* as well as Background Plus Site *AM* in Scenario 2.

**FM 407 and Driveway 2:**

The *EBLR* movement of this unsignalized intersection is expected to operate at *LOS F* during both the 2024 Background Plus Site *AM* as well as *PM* conditions in Scenario 1. And the intersection operates at *LOS E* during 2024 Background Plus Site *PM* Scenario 2.

## 2029 HORIZON AND HORIZON-PLUS-SITE – INTERSECTION ANALYSIS

A 5-year from full build year traffic analysis was performed. The 2029 horizon (no build), and horizon-plus-buildout traffic volumes were analyzed to determine the incremental change in operational conditions during peak periods *without* and *with* site-related traffic. The LOS results are provided in **Table 9**.

**Table 9. 2029 Scenario Intersection Analysis**

Intersections	Traffic Movement	2029 Horizon		2029 Horizon Plus Site(Scenario-1)		2029 Horizon Plus Site(Scenario-2)	
		AM	PM	AM	PM	AM	PM
<b>Signalized Intersection</b>							
FM 407 McMakin Blvd/ Blanco Dr	<b>Overall</b>	<b>C (32.8)</b>	<b>D (48.1)</b>	<b>C (34.0)</b>	<b>D (47.9)</b>	<b>C (32.8)</b>	<b>D (48.0)</b>
	EB	F >100	F >100	F >100	F >100	F >100	F >100
	WB	C (24.7)	A (0.9)	C (24.7)	C (30.9)	C (24.7)	C (30.9)
	NB	A (5.3)	B (10.4)	A (5.5)	B (10.5)	A (5.3)	B (10.4)
	SB	A (6.6)	B (10.5)	A (7.0)	B (10.6)	A (6.6)	B (10.5)
<b>Unsignalized Intersection (TWSC)</b>							
FM 407 I T Neely Dr	NBL	B (14.3)	B (12.9)	C (15.2)	B (13.0)	B (14.3)	B (12.9)
	EBLR	F >100	F >100	F >100	F >100	F >100	F >100
CJ's Legacy Ranch Dr FM 407	EBR	C (15.2)	B (13.0)	C (18.6)	B (13.4)	C (15.2)	B (13.1)
FM 407 Rayzor Rd	WBL	F (69.6)	F >100	F >100	F >100	F (69.6)	F >100
	WBR	B (12.8)	C (16.7)	B (14.1)	C (16.9)	B (12.8)	C (16.7)
	SBL	A (9.8)	B (14.2)	B (10.5)	B (14.3)	A (9.8)	B (14.2)
FM 407 Driveway 2	NBL	--	--	C (18.7)	B (11.8)	B (13.3)	A (0.0)
	EBLR	--	--	F >100	F >100	A (0.0)	E (48.0)

**FINDING:** Based upon the 2029 horizon and 2029 horizon-plus site buildout analysis all the intersections are expected to operate at **LOS D**, or better during the peak hour periods, with the exception of the following:

**FM 407 and McMakin Rd :**

- The signalized intersection is expected to operate (overall) at **LOS C** and **LOS D** during 2029 Horizon and 2029 Horizon Plus Site *AM as well as PM* conditions, respectively for both scenarios.
- The *EB* movement is expected to operate at **LOS F** during both the 2029 Horizon and 2029 Horizon Plus Site *AM and PM* conditions for both scenarios.

**FM 407 and I T Neely Dr:**

- The *EBLR* movement is expected to operate at **LOS F** during the 2029 Horizon and 2029 Horizon Plus Site *AM and PM* conditions for both scenarios.

**FM 407 and Rayzor Rd:**

- The *WBL* movement is expected to operate at **LOS F** during both the 2029 Horizon and 2029 Horizon Plus Site *AM and PM* conditions for both scenarios.

**FM 407 and Driveway 2:**

- The *EBLR* movement is expected to operate at *LOS F* during the 2029 Horizon Plus Site *AM* and *PM* conditions for scenario 1. And *LOS E* during 2029 Horizon Plus Site *PM* conditions for scenario 2.

## ROADWAY LINK ANALYSIS - METHODOLOGY

A roadway link is a roadway segment between two intersections. Roadway link capacity analysis is a comparison of actual or forecasted traffic volumes to the theoretical roadway capacity. The capacity of the roadway link is a function of the roadway’s cross-section (i.e., number of lanes, lane widths, type of center divider, etc.). However, other more theoretical factors also apply, such as the character of the environment and the functional classification of the roadway. Roadway link capacity is less critical than intersection capacity; however, it can provide a gauge of the utilization of a given roadway.

A specific industry standard for roadway link capacity does not exist, but the typical concept is derived from a base saturation flow rate (i.e., the maximum theoretical rate of continuous flow under ideal, unobstructed conditions). In the traffic engineering industry, this value is generally considered to range between 1,900-2,100 vehicles per lane per hour). A series of adjustment factors are then applied to the saturation flow rate to reflect the characteristics of a given location.

The North Central Texas Council of Governments (NCTCOG), the metropolitan planning agency for the DFW region, has derived internal “hourly service volume” guidelines used for transportation modeling purposes. The NCTCOG values were based upon the principles presented in the *Highway Capacity Manual* with “regional calibration” factors applied. Though these per-lane capacities, or “Service Volumes” (summarized in the table below), are intended for modeling purposes, they do provide a reasonable gauge of theoretical capacity.

Area Type	Hourly Service Volumes Capacity per Lane by Area Type and Roadway Function					
	Principal Arterial		Minor Arterial & Frontage Road		Collector & Local Street	
	Median-Divided or One-Way	Undivided Two-Way	Median-Divided or One-Way	Undivided Two-Way	Median-Divided or One-Way	Undivided Two-Way
CBD	725	650	725	650	475	425
Other Business	775	725	775	725	500	450
Urban/ Commercial	850	775	825	750	525	475
Suburban Residential	900	875	900	825	575	525
Rural	1,025	925	975	875	600	550

To determine the utilization of a roadway, the volume-to-capacity ratio is calculated – a V/C ratio of less than 1.0 indicates that the roadway is operating under capacity. NCTCOG’s level of service denominations is as follows.

- Volume: Capacity Ratio  $\leq$  45% is LOS A/B
- Volume: Capacity Ratio  $>$  45% and  $\leq$  65% is LOS C
- Volume: Capacity Ratio  $>$  65% and  $\leq$  80% is LOS D
- Volume: Capacity Ratio  $>$  80% and  $\leq$  100% is LOS E
- Volume: Capacity Ratio  $\geq$  100% is LOS F

## ROADWAY LINK ANALYSIS - RESULTS

For the purpose of the roadway link analysis, the area is considered Suburban Residential. Existing peak hour volumes, the growth rate factor, and peak hour projected site-generated trips were used to conduct the roadway link analysis which is summarized in **Table 10**.

**Table 10. Roadway Link Capacity Analysis Results Summary**

Roadway	Classification for Analysis	*Hourly Volume	# LANES	MEDIAN DIVIDED?	CAPACITY		V/C	LOS	
					Per Lane	Roadway			
<b>2023 Existing:</b>									
FM 407 ( Driveway 2 and CJ's Legacy Ranch Dr)	NB	Minor Arterial	1,267	2	Y	975	1,950	0.65	C
	SB		1,036	2		975	1,950	0.53	C
<b>2024 Background:</b>									
FM 407 ( Driveway 2 and CJ's Legacy Ranch Dr)	NB	Minor Arterial	1,292	2	Y	975	1,950	0.66	D
	SB		1,057	2		975	1,950	0.54	C
<b>2024 Background+Site: Scenario 1</b>									
FM 407 ( Driveway 2 and CJ's Legacy Ranch Dr)	NB	Minor Arterial	1,306	2	Y	975	1,950	0.67	D
	SB		1,352	2		975	1,950	0.69	D
<b>2024 Background+Site: Scenario 2</b>									
FM 407 ( Driveway 2 and CJ's Legacy Ranch Dr)	NB	Minor Arterial	1,292	2	Y	975	1,950	0.66	D
	SB		1,262	2		975	1,950	0.65	C
<b>2029 Horizon:</b>									
FM 407 ( Driveway 2 and CJ's Legacy Ranch Dr)	NB	Minor Arterial	1,427	2	Y	975	1,950	0.73	D
	SB		1,392	2		975	1,950	0.71	D
<b>2029 Horizon+Site: Scenario 1</b>									
FM 407 ( Driveway 2 and CJ's Legacy Ranch Dr)	NB	Minor Arterial	1,440	2	Y	975	1,950	0.74	D
	SB		1,483	2		975	1,950	0.76	D
<b>2029 Horizon+Site: Scenario 2</b>									
FM 407 ( Driveway 2 and CJ's Legacy Ranch Dr)	NB	Minor Arterial	1,295	2	Y	975	1,950	0.66	D
	SB		1,427	2		975	1,950	0.73	D

**FINDING:** Based upon the roadway link analysis, all roadway links are expected to operate at *LOS D* or better for all different scenarios.



## SITE ACCESS REVIEW

The proposed development will have future access drives connection to the public/private roadway systems. As part of this TIA study, it has performed the proposed site access review based on appropriate agency requirements and guidelines. The Driveway Spacing, Deceleration Lane Requirements, and Intersection Sight Distance were evaluated as part of this site access review.

**NOTE:** The review of site access is reliant on the present state of the site and the preliminary site plan. In the event that any of these factors change, the site access review must be updated accordingly.

## DRIVEWAY SPACING REVIEW

### **TXDOT DRIVEWAY SPACING CRITERIA:**

The TxDOT Access Management Manual provides guidelines for new driveways along roadways based upon the posted speed limit. Based upon Tables 2-1, 2-2 (**Appendix E**) from TxDOT's Access Management Manual, the minimum driveway connection spacing is 425 feet for a speed limit equal to 50 mph, such as FM 407. TxDOT considers the spacing between access points as inside-edge- (of driveway pavement)-to inside-edge.

### **DRIVEWAY SPACING REVIEW FOR PROJECT:**

A summary of the driveway spacing provided for each of the proposed site access points is presented in **Table 11**.

**Table 11. Driveway Spacing Summary**

Spacing Between	Speed Limit (MPH)	Required (Ft)	Provided (Ft)	Meets Requirements
CJ Legacy Ranch Dr and Driveway 2	50	425	~425	Yes
Driveway 2 and 7-Eleven Dr	50	425	~800	Yes

**FINDING:** Based on TxDOT's driveway spacing guidelines and measurements from the preliminary site plan and Google Earth program, all the proposed site driveways satisfy the spacing criteria requirements.

## DECELERATION LANE ANALYSIS

### **DECELERATION LANE REQUIREMENTS:**

The TxDOT criteria for providing right-turn deceleration auxiliary lanes are outlined in *Table 2-3 (Appendix E)* of the *Access Management Manual*. The threshold for roadways with a posted speed limit greater than 45 MPH is 50 vehicles per hour (or, 60 vehicles per hour for a posted speed limit of 45 MPH or lower).

**Table 12** summarizes the expected right-turn volumes at each driveway during peak hours. A summary of the projected peak hour driveway volumes is included in **Appendix A** for each scenario analyzed.

**Table 12. Right-Turn Deceleration Lane Analysis  
(full build at Scenario 1)**

Intersection	Traffic Movement	Analysis Scenario	Turning Vehicles (VPH)	Exceeds Requirements
CJ Legacy Ranch Dr at FM 407	SBR	2024 Full Buildout + Site AM	32	No
		2024 Full Buildout + Site PM	5	
Driveway 2 at FM 407	SBR	2024 Full Buildout + Site AM	55	Yes
		2024 Full Buildout + Site PM	6	

**FINDING:** Based upon the projected volumes derived in this study and *TxDOT's* right-turn deceleration lane requirements, the installation of a right-turn deceleration lane is required at Driveway 2 at FM 407.

**LEFT TURN DECELERATION LANE REQUIREMENTS:**

The *TxDOT* criteria for providing left-turn deceleration auxiliary lanes are outlined in *Table 2-3 (Appendix E)* of the *Access Management Manual*. The requirements state that;

1. For raised medians, left-turn deceleration lanes (“bays”) are required for all left-turn opportunities.

**FINDING:** Based upon the projected volumes derived in this study and *TxDOT's* left-turn deceleration lane requirements, the installation of a left-turn deceleration lane is required at Driveway 2 at FM 407.

**INTERSECTION SIGHT DISTANCE REVIEW**

**INTERSECTION SIGHT DISTANCE REVIEW FOR PROJECT**

**Table 13** provides the Intersection sight distance summary for this study.

**Table 13. Intersection Sight Distance Summary**

Intersections	Speed Limit (MPH)	Line of Sight to the Right ISD (Ft)		Line of Sight to the Left ISD (Ft)		Meets Requirements
		Required	Provided	Required	Provided	
CJ Legacy Ranch Dr at FM 407	50	480	>480	N/A	N/A	Yes
Driveway 2 at FM 407	50	480	>480	555	>555	Yes

**FINDING:** Based on the *AASHTO* and Town of Bartonville guidelines and measurements from the Google Earth program, the proposed site driveway meets the intersection sight distance requirements.

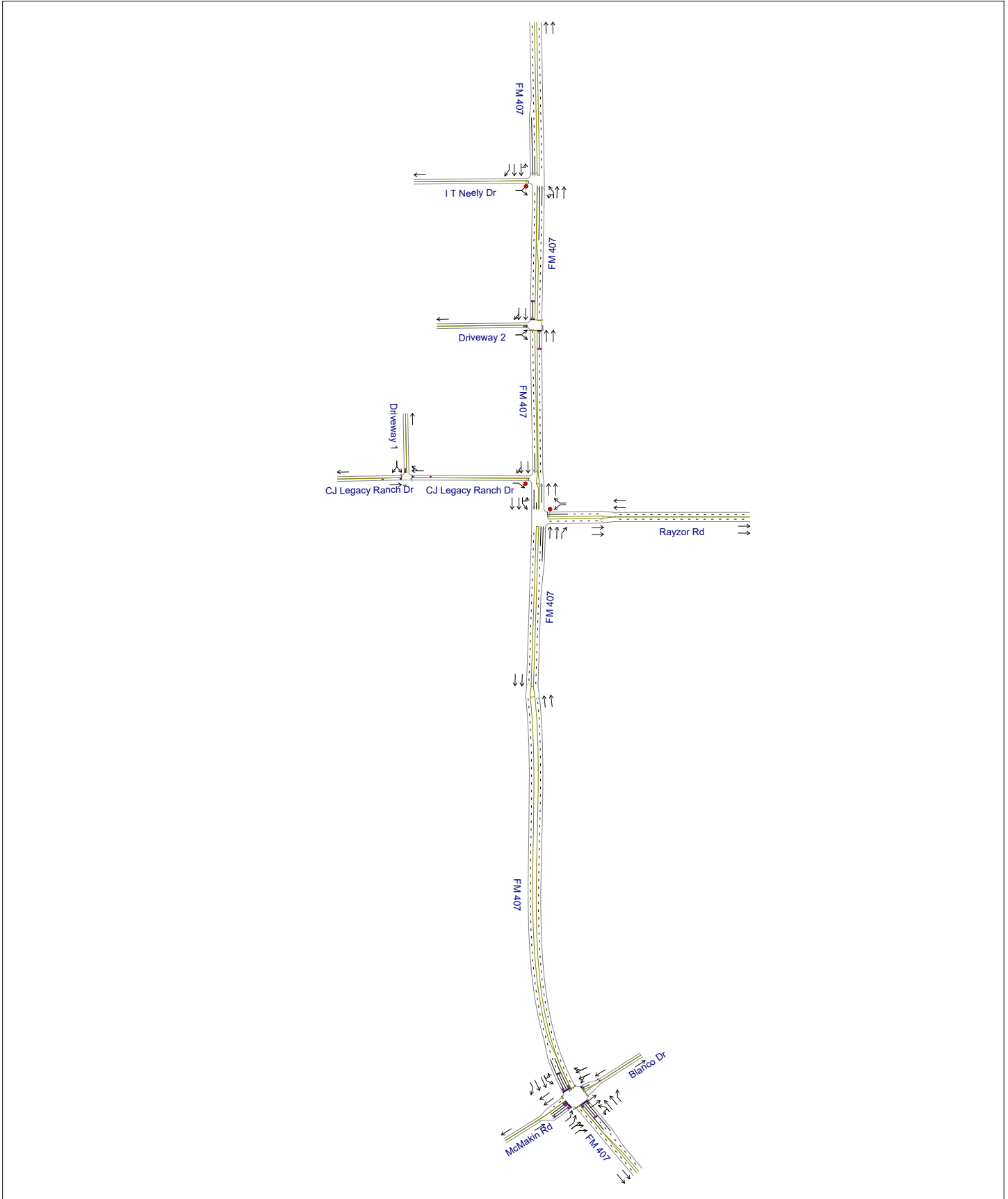
Disclaimer: However, if the site plans are developed further to include additional infrastructure such as fencing, walls, or landscaping in the vicinity of proposed driveways, intersection sight distances may need to be re-evaluated.

**END OF MEMO**



Exhibit 5. Proposed Roadway Geometry

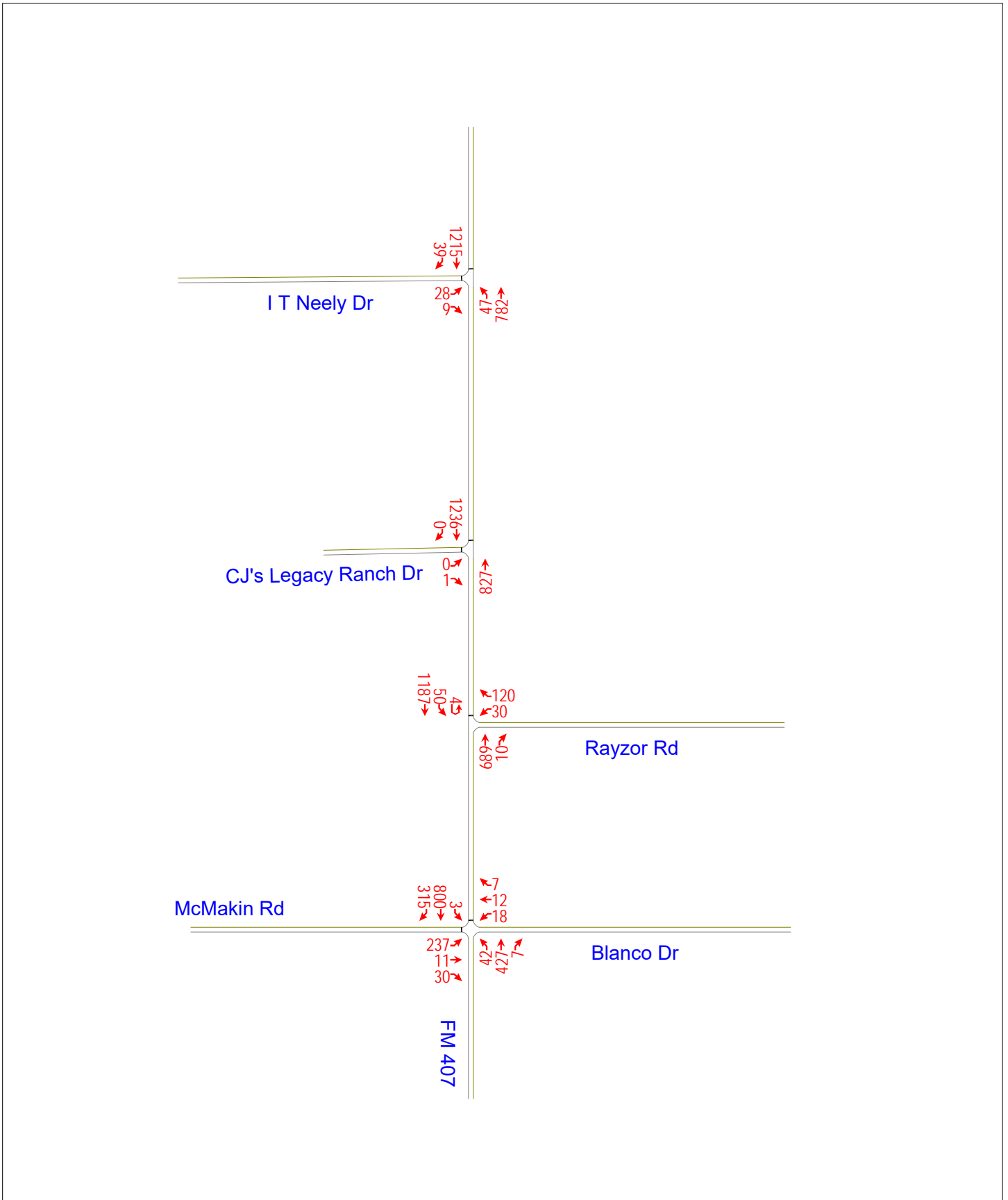
North ^  
Not to Scale



## Appendix A. Traffic Volume Exhibits

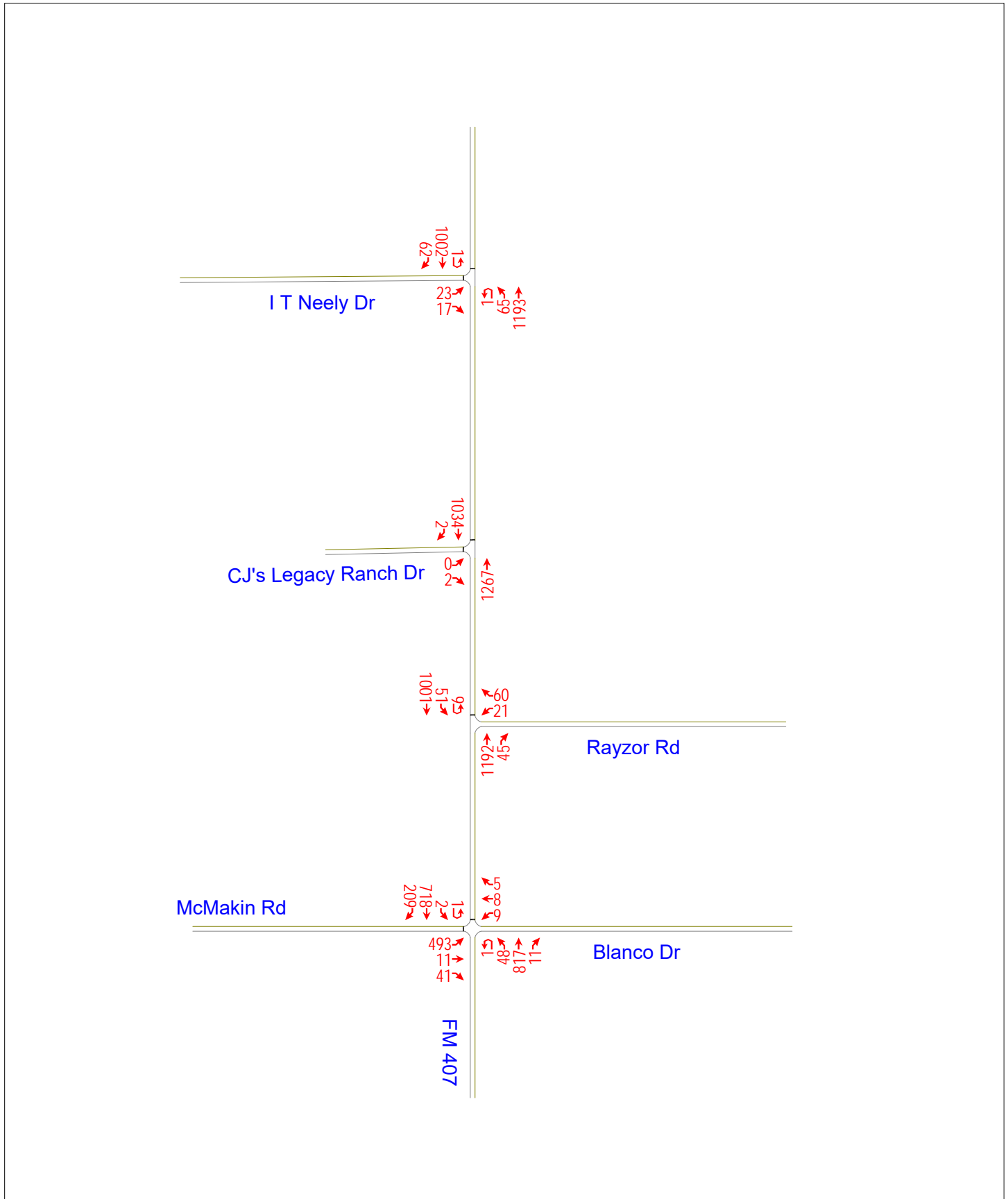
A1. 2023 Existing AM Peak Hour Traffic Volumes

North^  
Not to Scale



A2. 2023 Existing PM Peak Hour Traffic Volumes

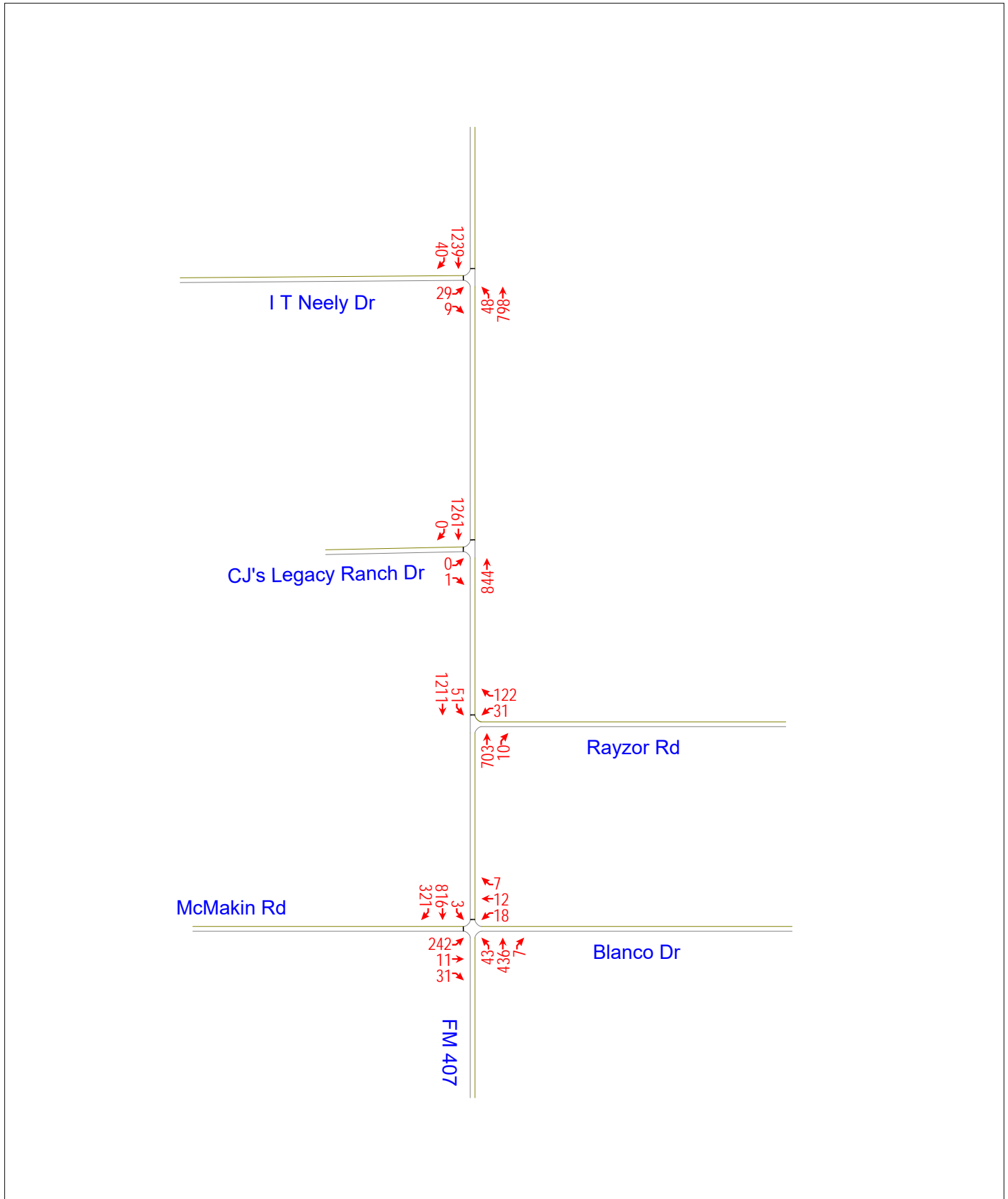
North^  
Not to Scale





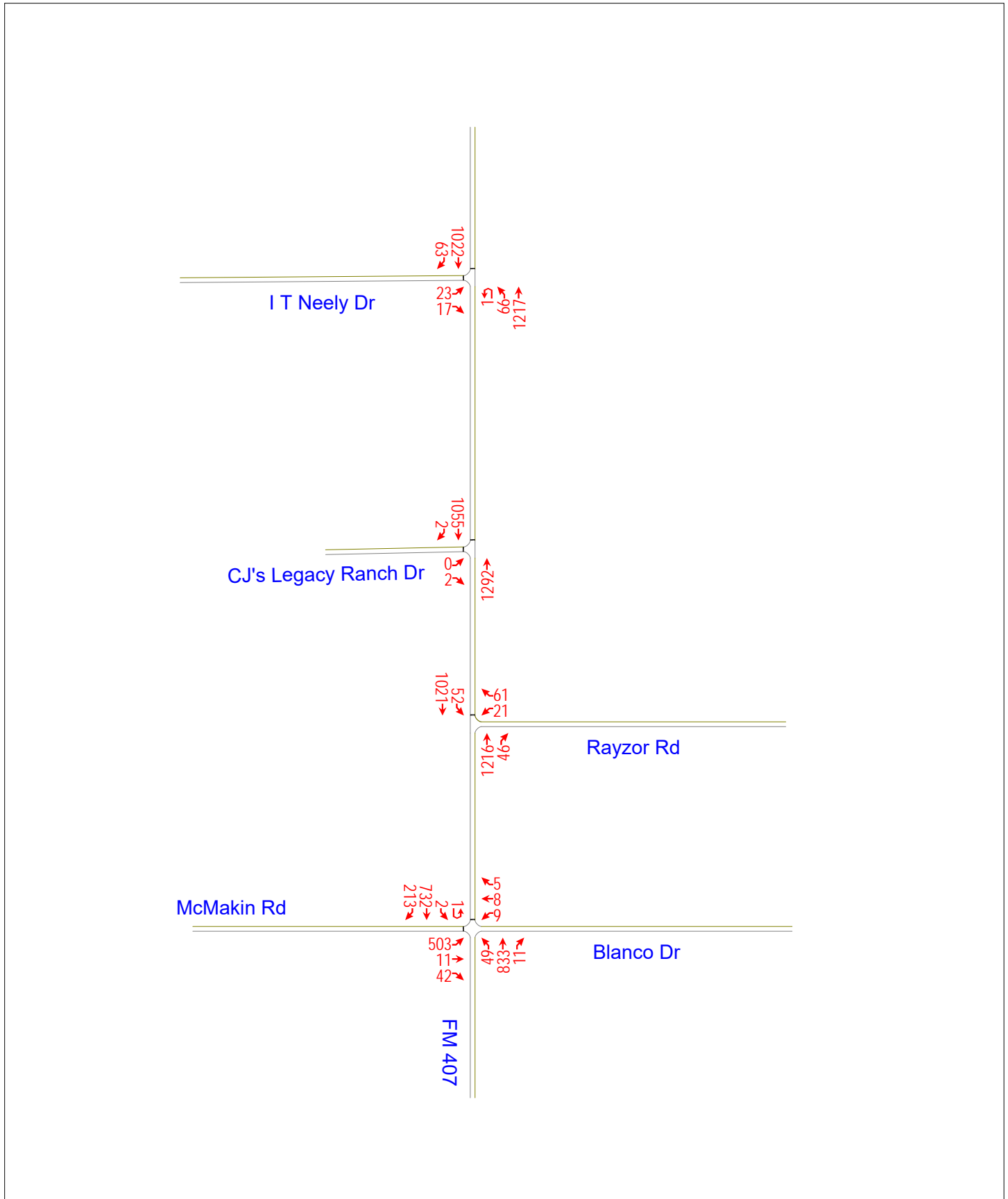
A3. 2024 Background AM Peak Hour Traffic Volumes

North^  
Not to Scale



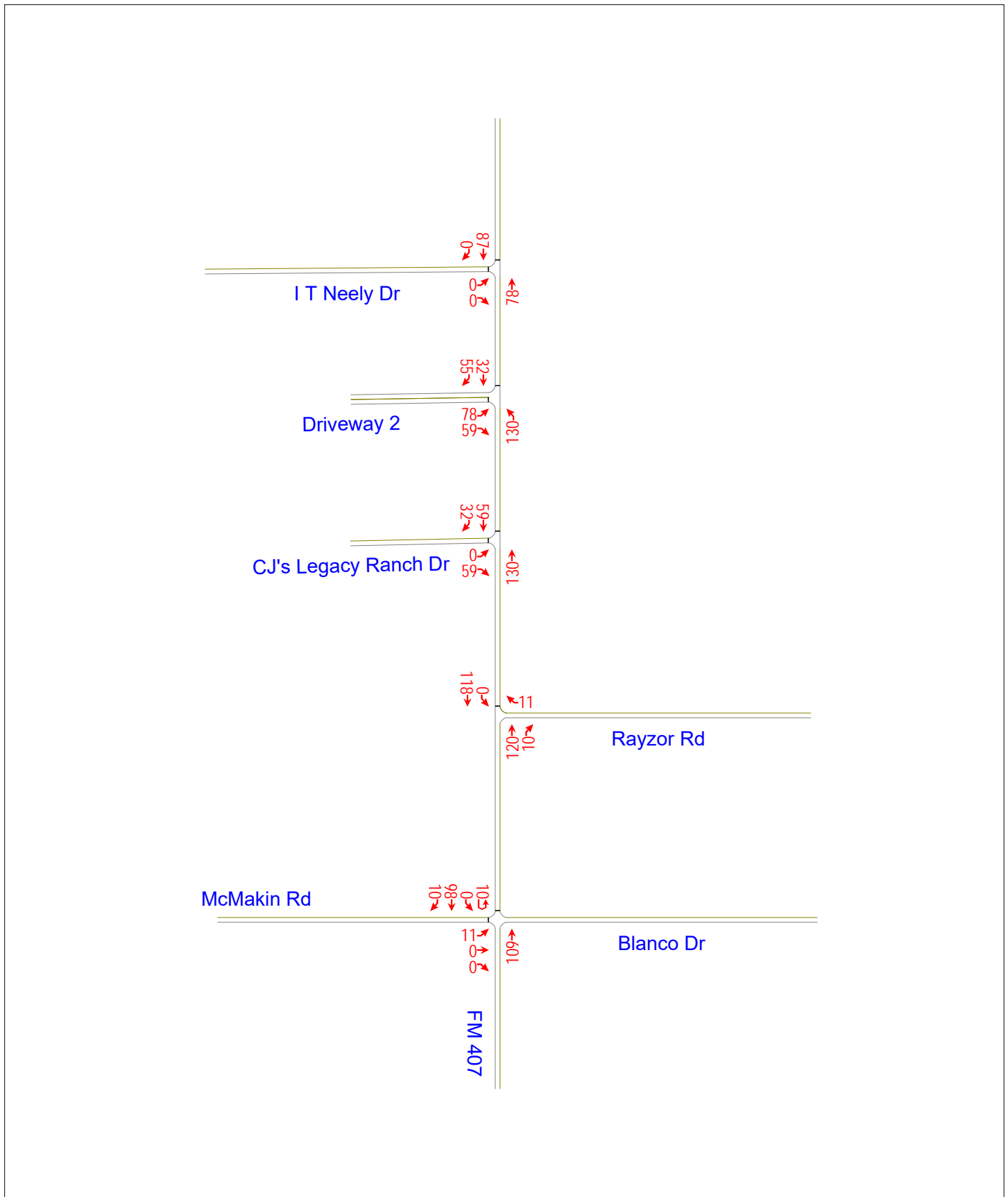
A4. 2024 Background PM Peak Hour Traffic Volumes

North^  
Not to Scale



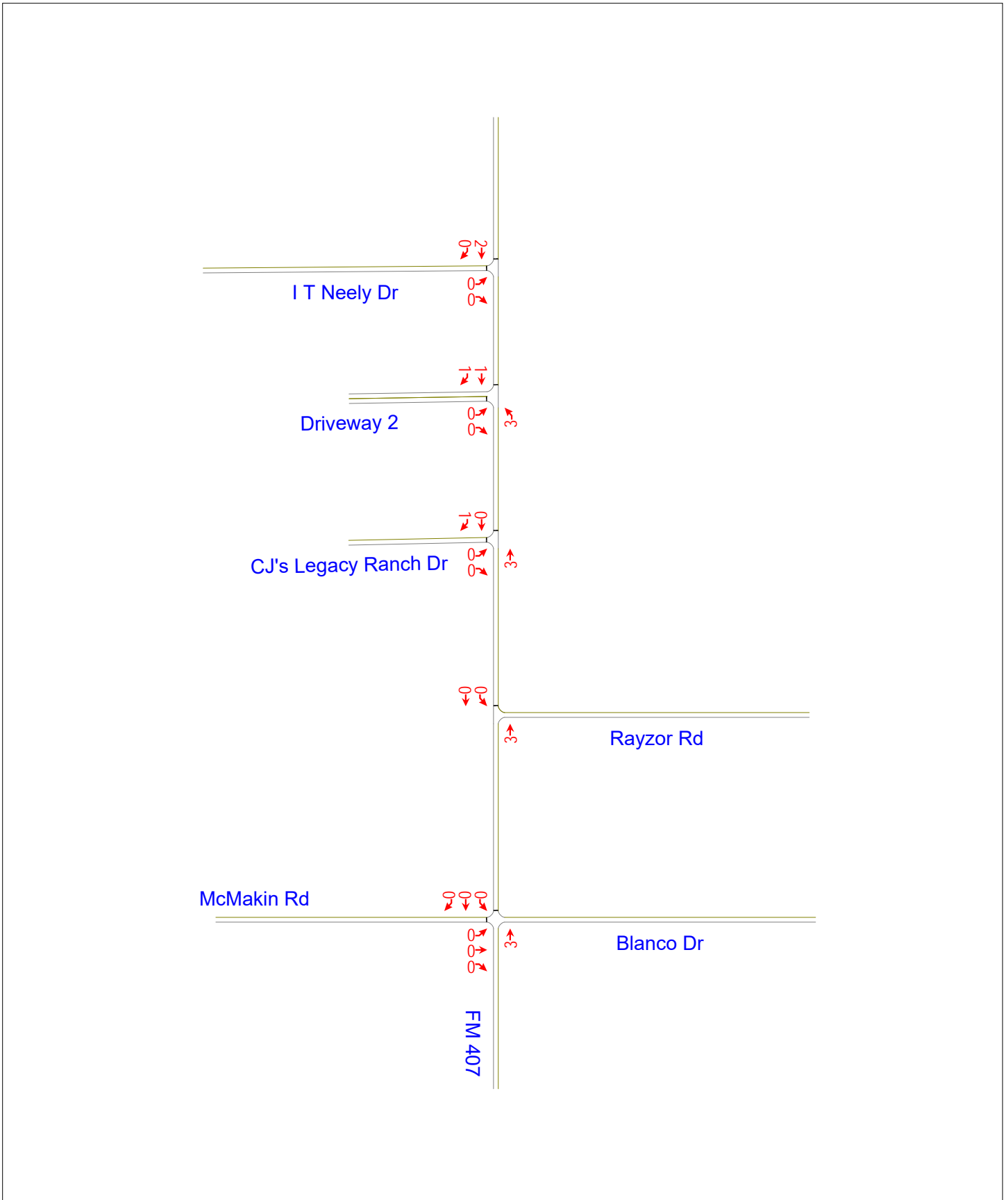
A5.1 2024 Site Generated AM Peak Hour Traffic Volumes ( Scenario 1 - Buses and Passenger )

North^  
Not to Scale



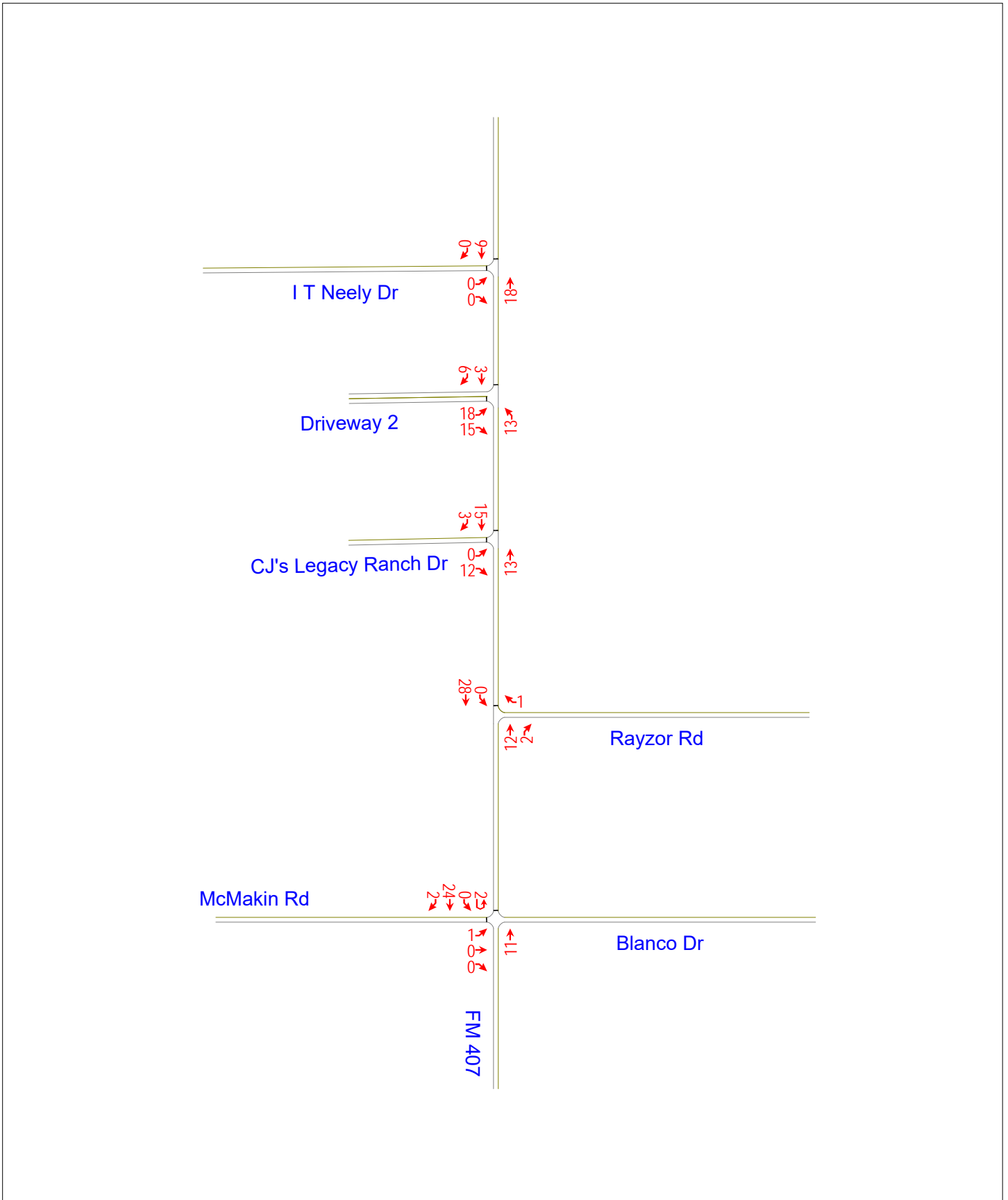
A5.2 2024 Site Generated AM Peak Hour Traffic Volumes ( Scenario 2 - Buses only )

North^  
Not to Scale



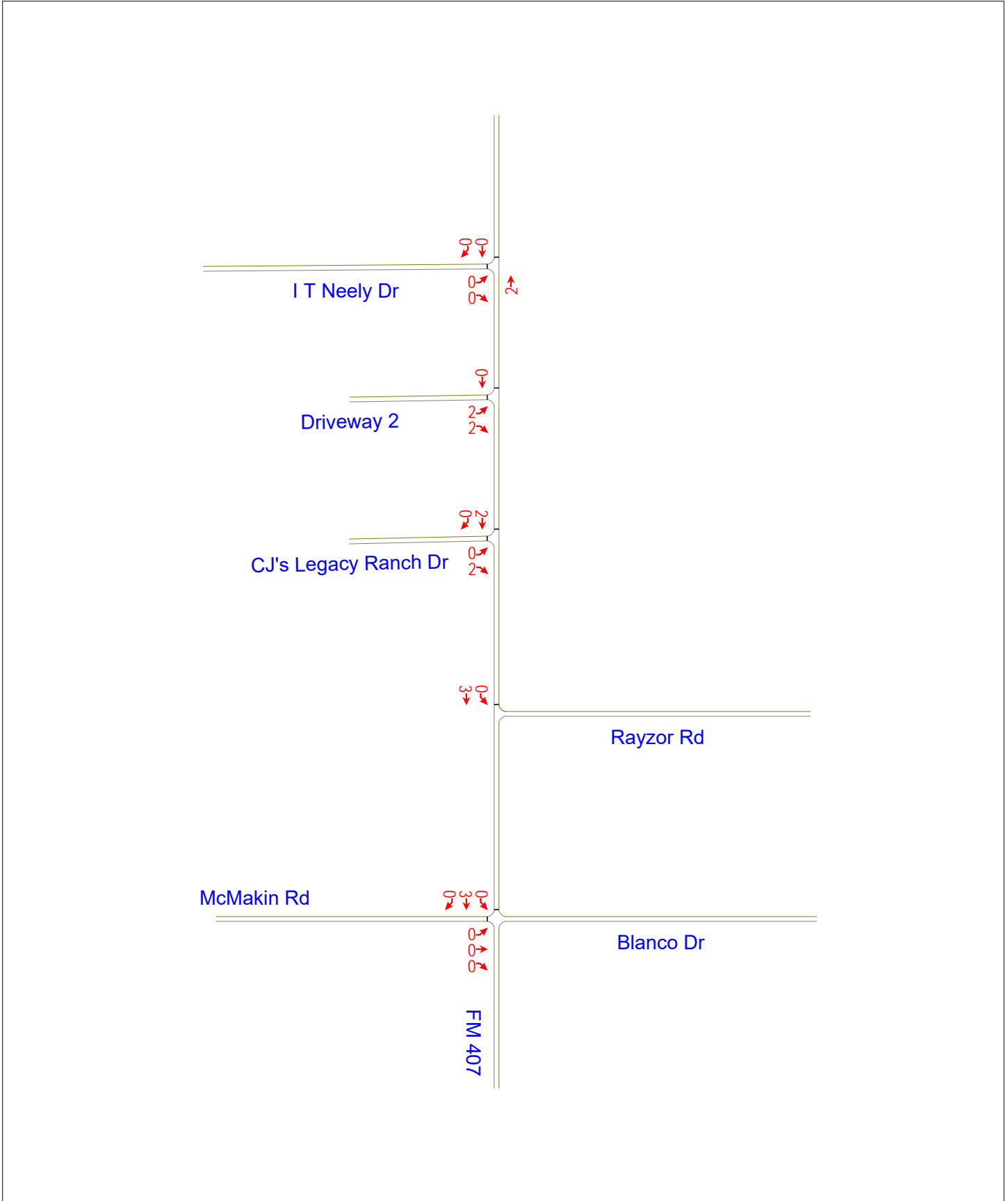
A6.1 2024 Site Generated PM Peak Hour Traffic Volumes ( Scenario 1 - Buses and Passenger )

North^  
Not to Scale



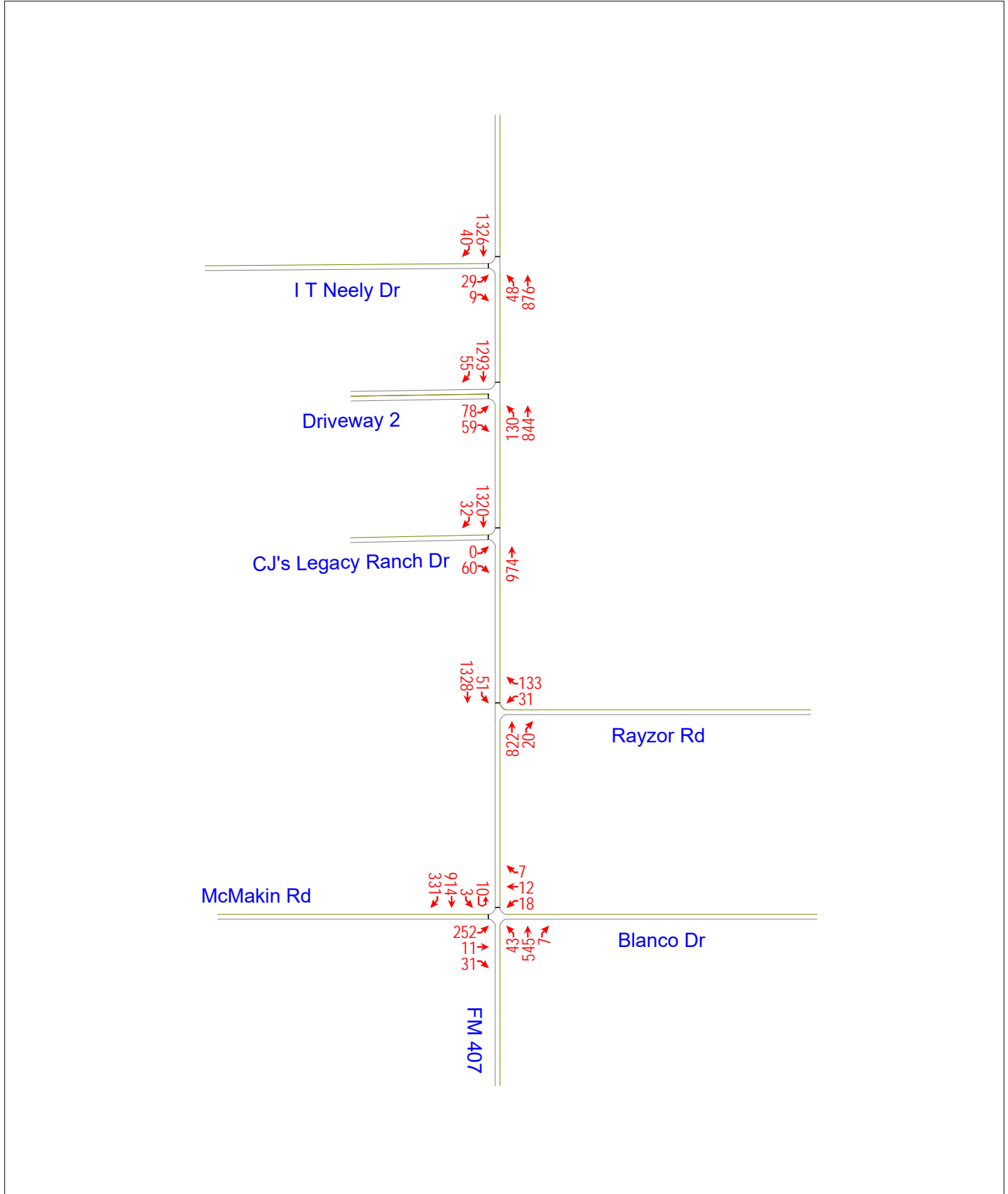
A6.2 2024 Site Generated PM Peak Hour Traffic Volumes ( Scenario 2 - Buses only )

North^  
Not to Scale



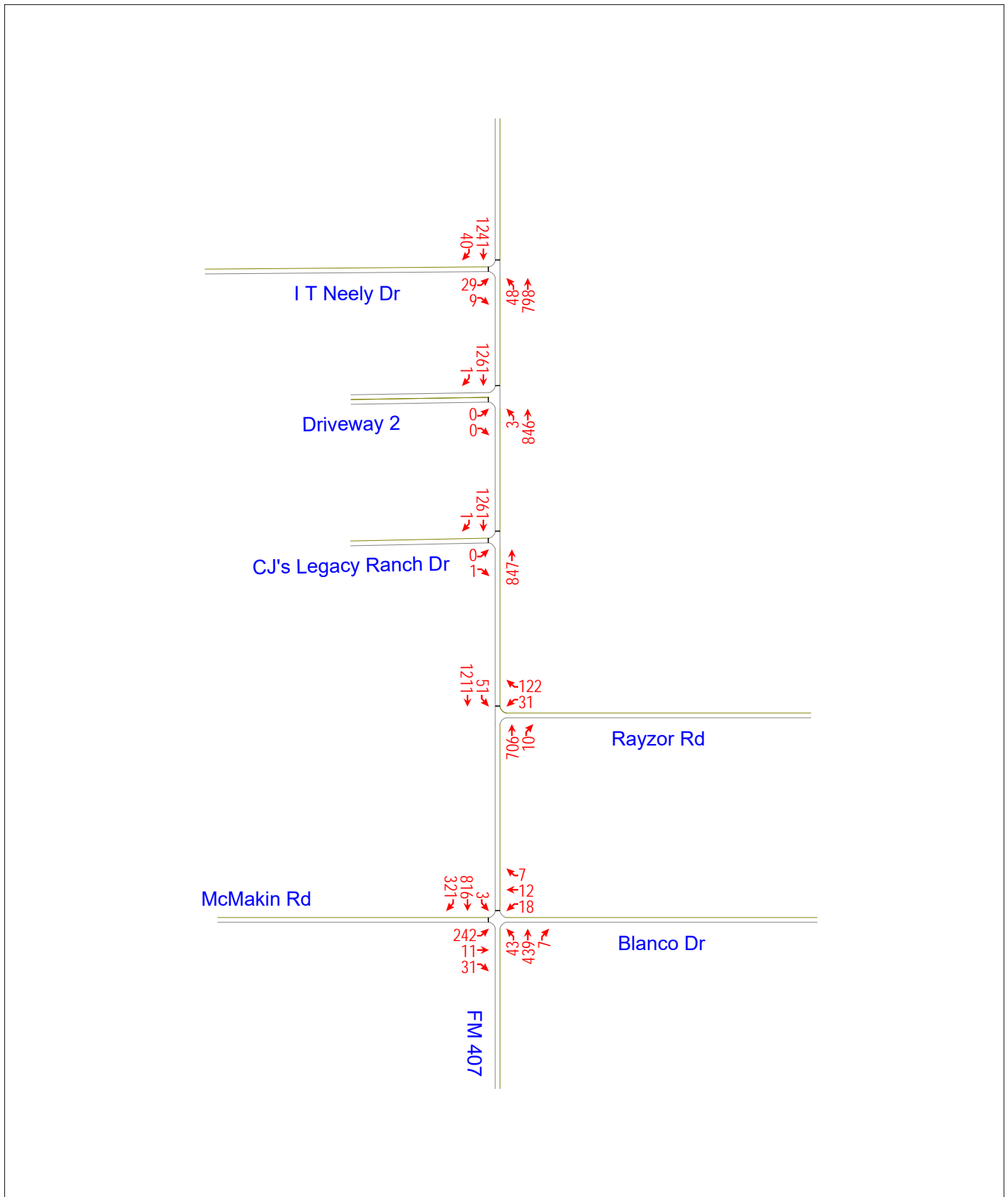
**A7.1 2024 Background Plus Site Generated AM Peak Hour Traffic Volumes  
( Scenario 1 - Buses and Passenger )**

**North^  
Not to Scale**



A7.2 2024 Background Plus Site Generated AM Peak Hour Traffic Volumes ( Scenario 2 - Buses only )

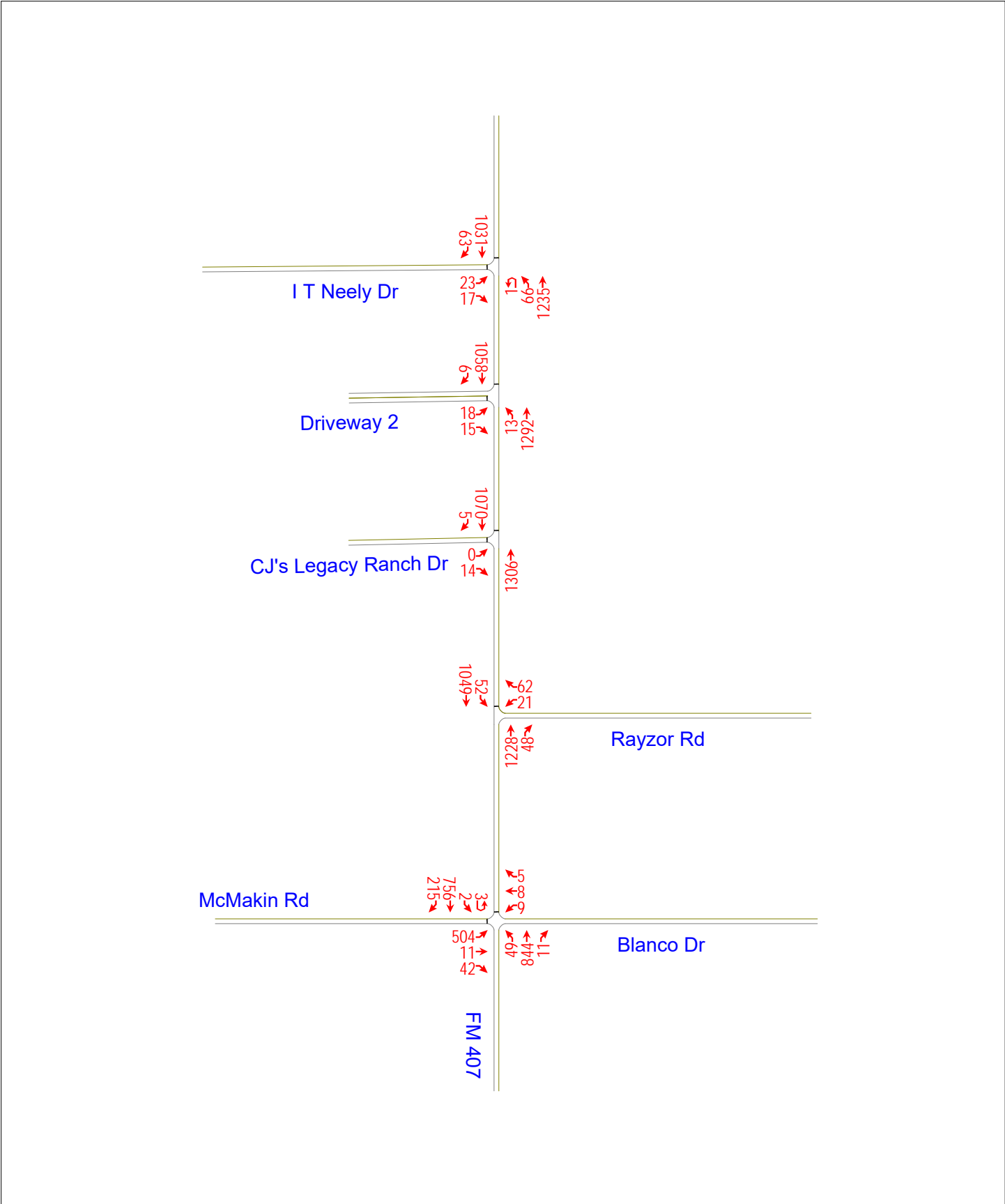
North^  
Not to Scale





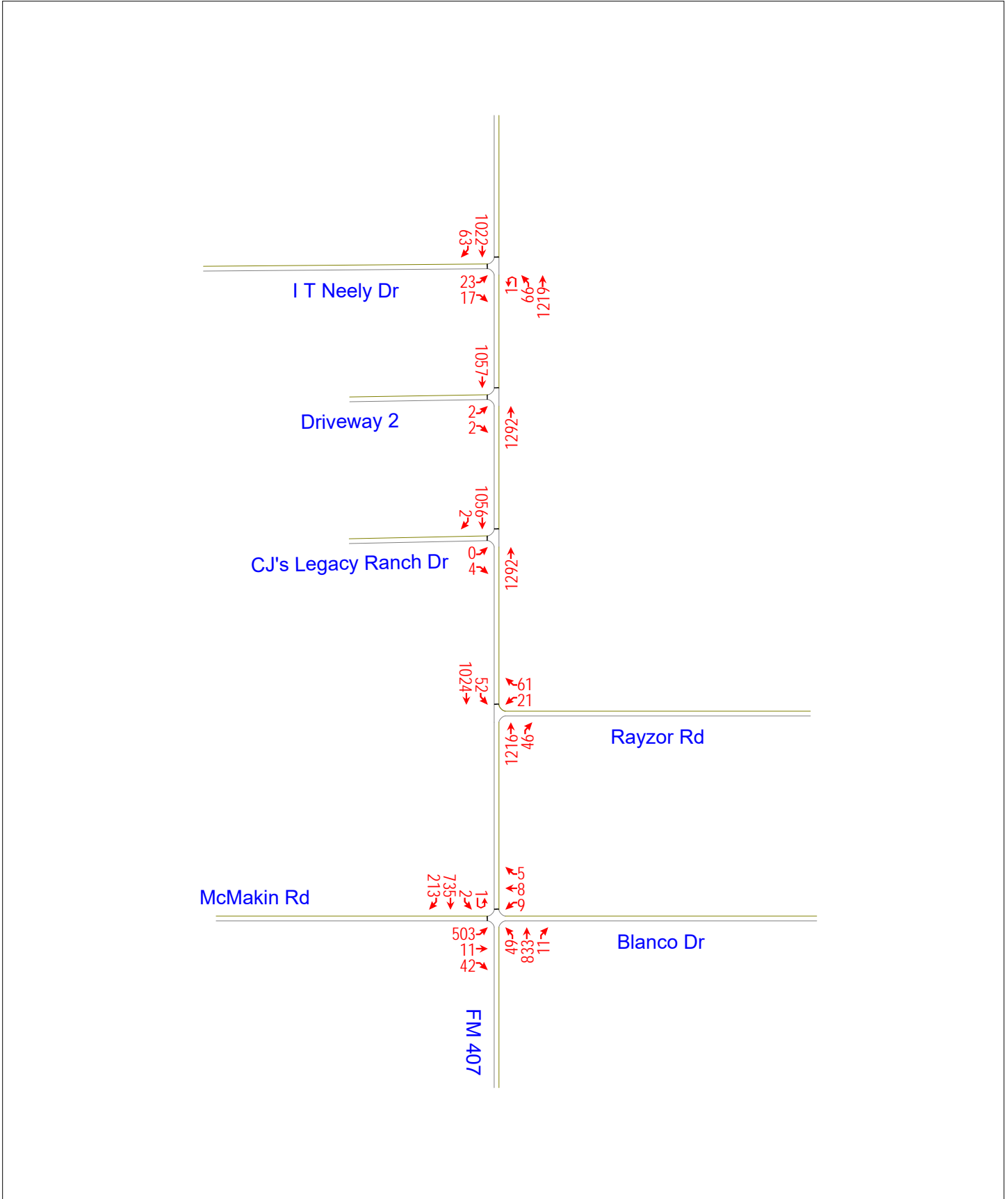
**A8.1 2024 Background Plus Site Generated PM Peak Hour Traffic Volumes  
( Scenario 1 - Buses and Passenger )**

**North^  
Not to Scale**



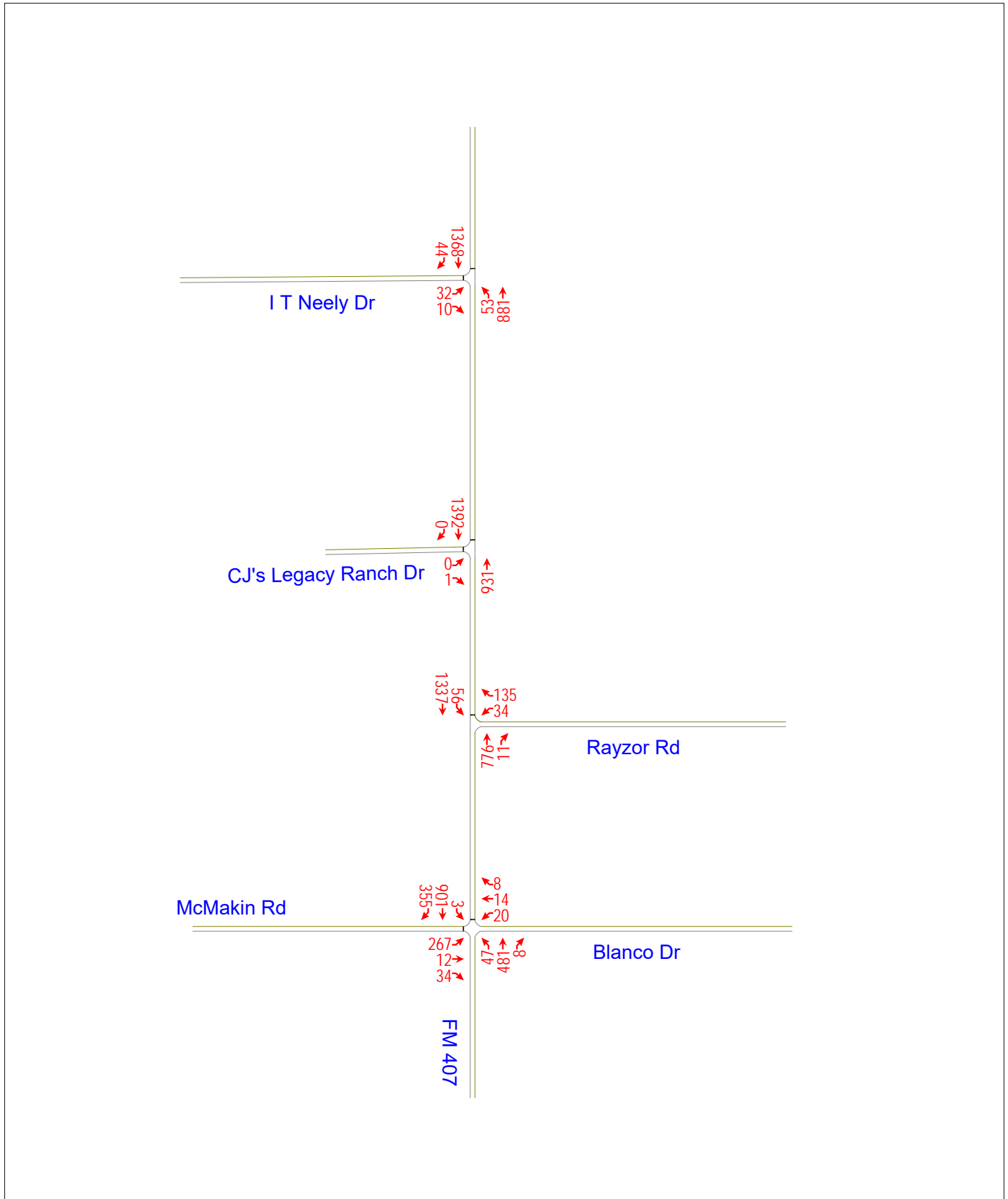
A8.2 2024 Background Plus Site Generated PM Peak Hour Traffic Volumes ( Scenario 2 - Buses only )

North^  
Not to Scale



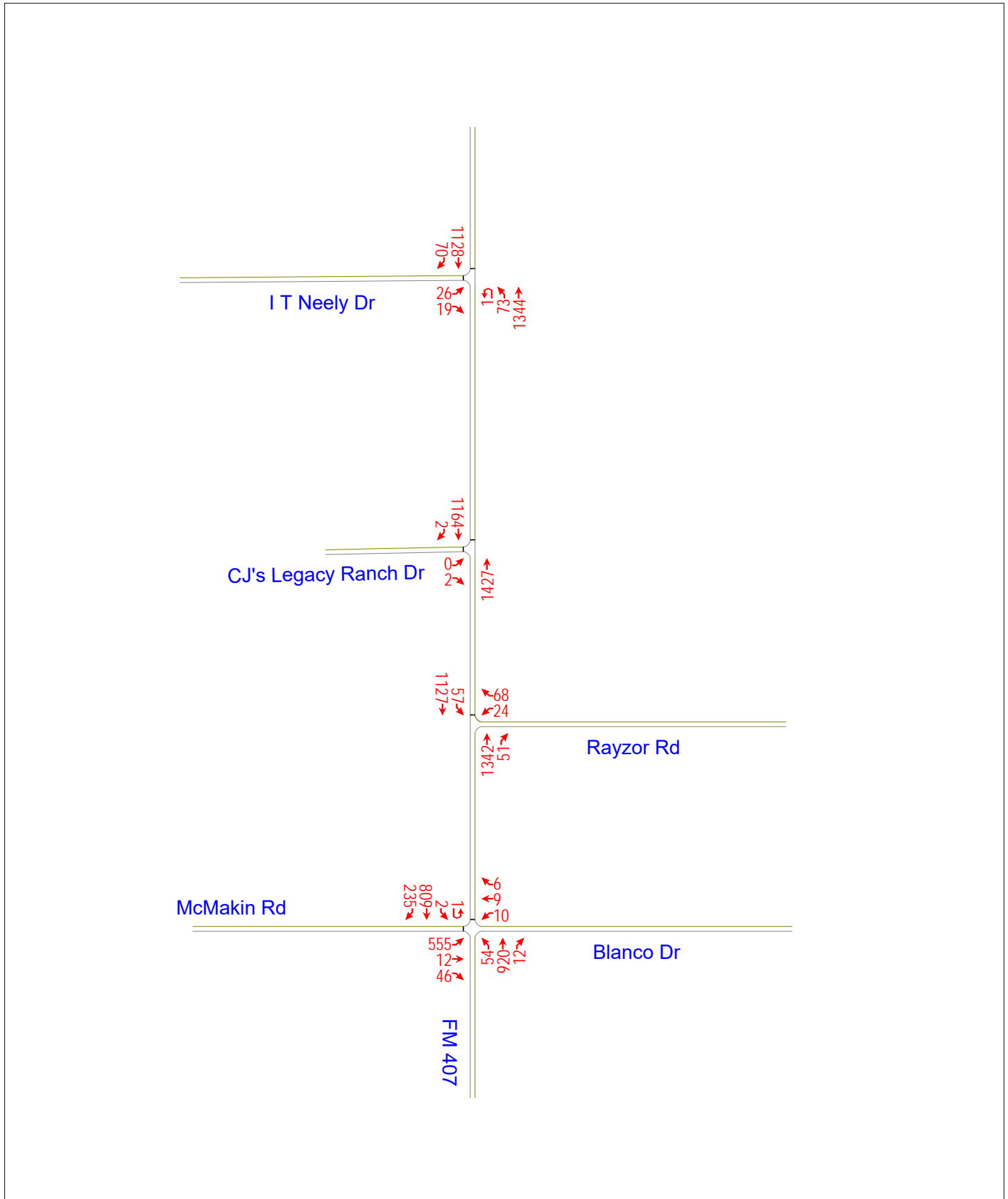
A9. 2029 Horizon AM Peak Hour Traffic Volumes

North^  
Not to Scale



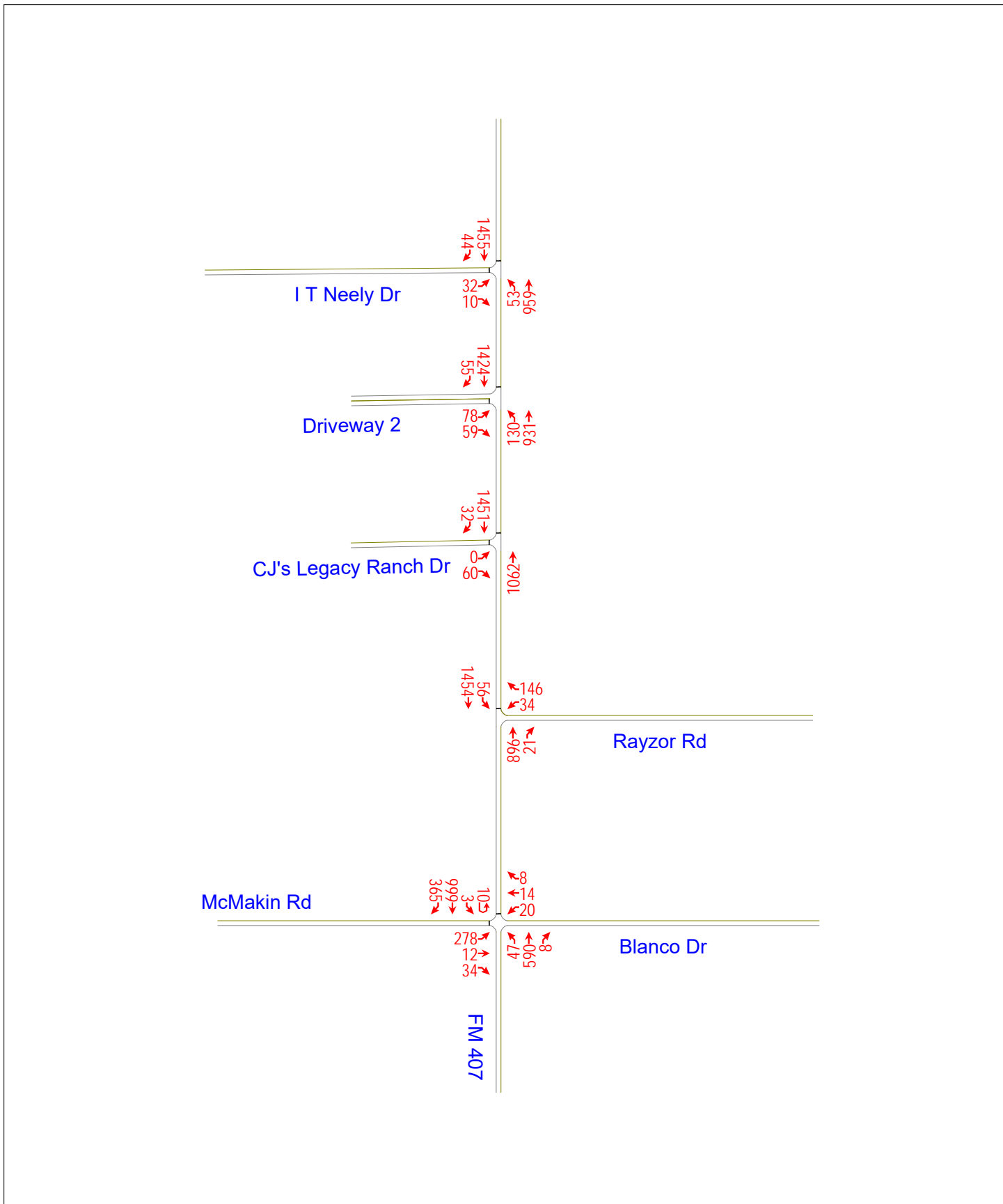
A10. 2029 Horizon PM Peak Hour Traffic Volumes

North^  
Not to Scale



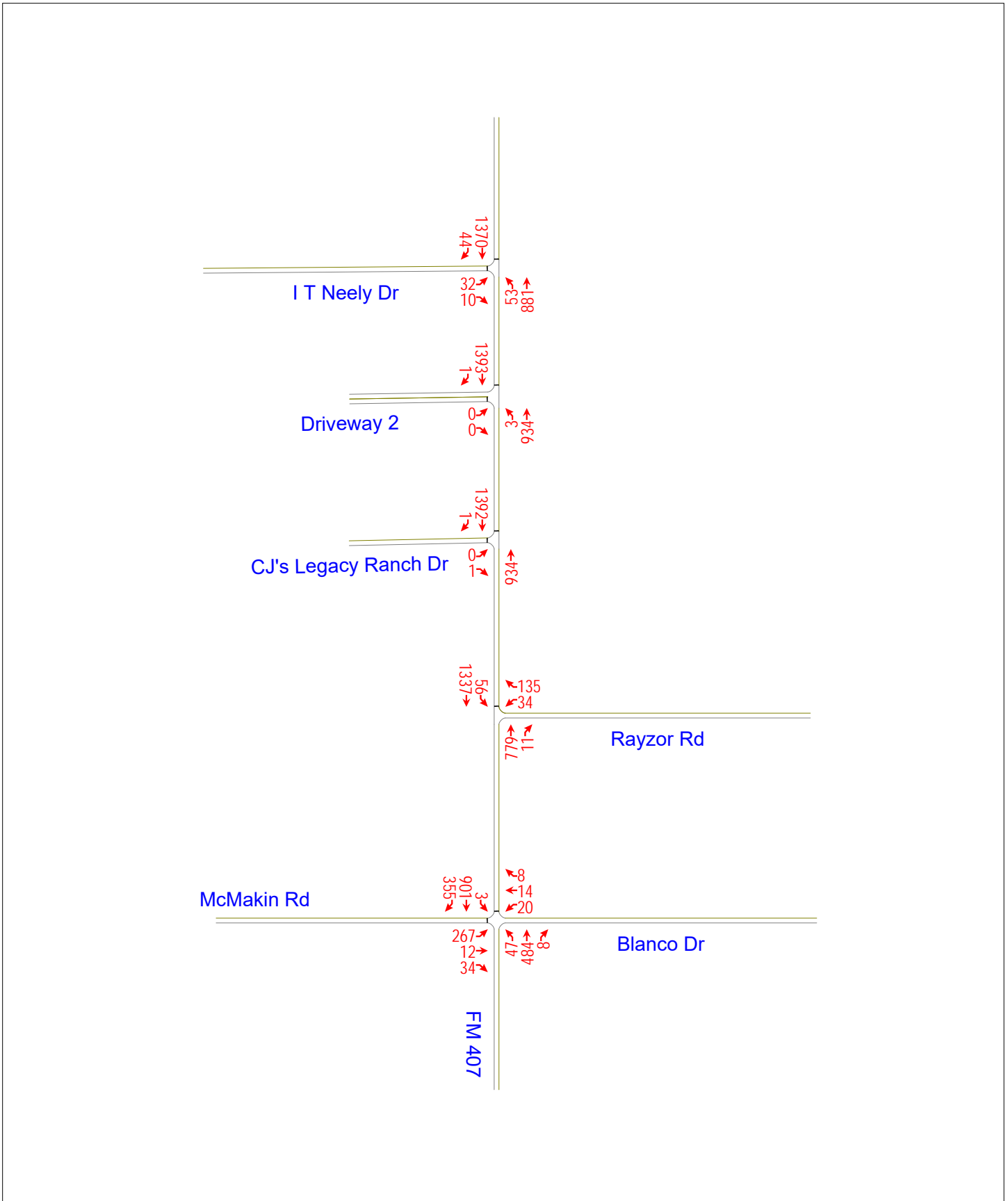
**A11.1 2024 Horizon Plus Site Generated AM Peak Hour Traffic Volumes  
( Scenario 1 - Buses and Passenger )**

**North^  
Not to Scale**



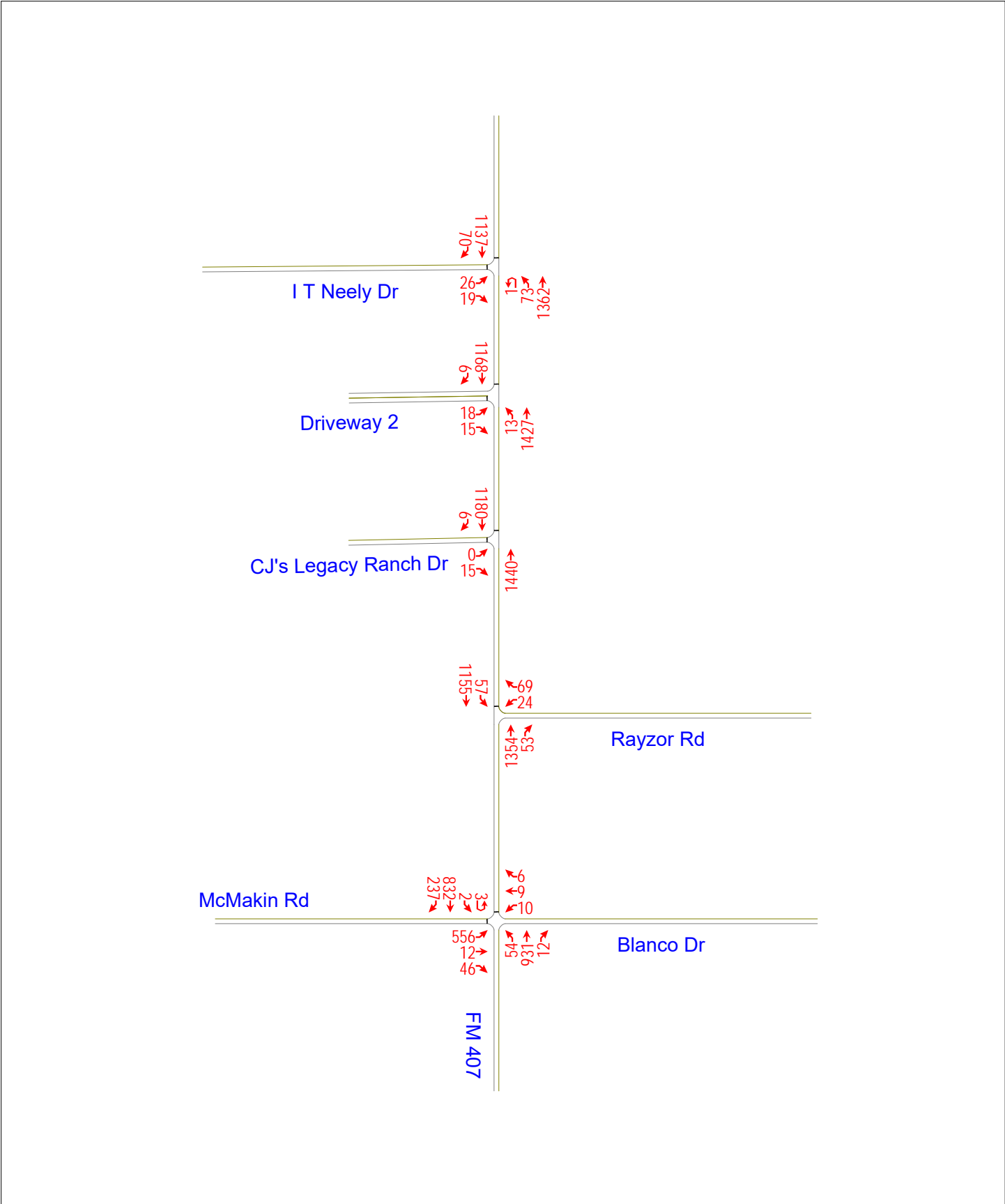
A11.2 2029 Horizon Plus Site Generated AM Peak Hour Traffic Volumes ( Scenario 2 - Buses only )

North^  
Not to Scale



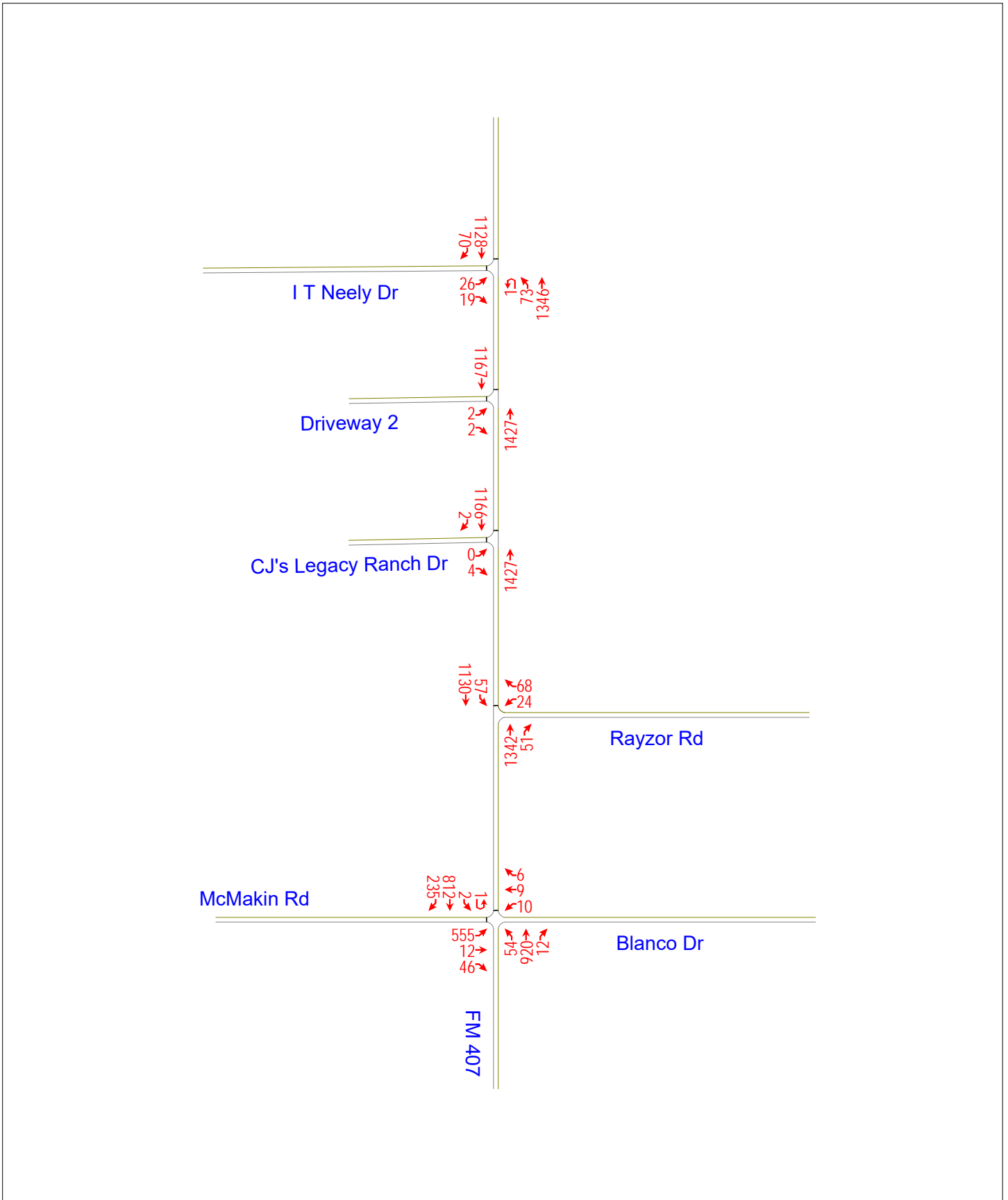
**A12.1 2024 Horizon Plus Site Generated PM Peak Hour Traffic Volumes  
( Scenario 1 - Buses and Passenger )**

**North^  
Not to Scale**



A12.2 2029 Horizon Plus Site Generated PM Peak Hour Traffic Volumes ( Scenario 2 - Buses only )

North^  
Not to Scale





## Appendix B. Existing Traffic Count Data

1. FM 407 at Rayzor Road - TMC

Thu Mar 23, 2023

Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048589, Location: 33.085902, -97.131193



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

Leg Direction	FM 407 Northbound					FM 407 Southbound					Rayzor Road Westbound					Int
	R	T	U	App	Ped*	T	L	U	App	Ped*	R	L	U	App	Ped*	
2023-03-23 7:00AM	4	71	0	75	0	184	16	0	200	0	5	4	0	9	0	284
7:15AM	6	117	0	123	0	217	22	0	239	0	37	17	0	54	0	416
7:30AM	1	143	0	144	0	280	22	1	303	0	73	18	0	91	0	538
7:45AM	3	185	0	188	0	308	9	3	320	0	20	6	0	26	0	534
Hourly Total	14	516	0	530	0	989	69	4	1062	0	135	45	0	180	0	1772
8:00AM	3	199	0	202	0	307	10	0	317	0	16	1	0	17	0	536
8:15AM	3	162	0	165	0	292	9	0	301	0	11	5	0	16	0	482
8:30AM	1	163	0	164	0	336	9	2	347	0	6	2	0	8	0	519
8:45AM	4	145	0	149	0	264	5	1	270	0	15	3	0	18	1	437
Hourly Total	11	669	0	680	0	1199	33	3	1235	0	48	11	0	59	1	1974
3:00PM	3	219	0	222	0	194	14	3	211	0	55	8	0	63	0	496
3:15PM	3	240	0	243	0	239	10	2	251	0	9	5	0	14	0	508
3:30PM	9	234	0	243	0	190	13	1	204	0	18	0	0	18	0	465
3:45PM	9	247	0	256	0	212	5	3	220	0	11	4	0	15	0	491
Hourly Total	24	940	0	964	0	835	42	9	886	0	93	17	0	110	0	1960
4:00PM	6	237	0	243	0	207	17	4	228	0	15	1	0	16	0	487
4:15PM	9	249	0	258	0	242	9	3	254	0	12	5	0	17	0	529
4:30PM	9	278	0	287	0	257	14	1	272	0	9	3	0	12	0	571
4:45PM	10	313	0	323	0	254	13	2	269	0	14	5	0	19	0	611
Hourly Total	34	1077	0	1111	0	960	53	10	1023	0	50	14	0	64	0	2198
5:00PM	8	289	0	297	0	239	8	2	249	0	17	6	0	23	0	569
5:15PM	18	312	0	330	0	251	16	4	271	0	20	7	0	27	0	628
5:30PM	12	259	0	271	0	239	15	1	255	0	21	5	0	26	0	552
5:45PM	13	288	0	301	0	217	11	0	228	0	9	4	0	13	0	542
Hourly Total	51	1148	0	1199	0	946	50	7	1003	0	67	22	0	89	0	2291
<b>Total</b>	134	4350	0	4484	0	4929	247	33	5209	0	393	109	0	502	1	10195
<b>% Approach</b>	3.0%	97.0%	0%	-	-	94.6%	4.7%	0.6%	-	-	78.3%	21.7%	0%	-	-	-
<b>% Total</b>	1.3%	42.7%	0%	44.0%	-	48.3%	2.4%	0.3%	51.1%	-	3.9%	1.1%	0%	4.9%	-	-
<b>Lights</b>	132	4300	0	4432	-	4866	243	33	5142	-	392	105	0	497	-	10071
<b>% Lights</b>	98.5%	98.9%	0%	98.8%	-	98.7%	98.4%	100%	98.7%	-	99.7%	96.3%	0%	99.0%	-	98.8%
<b>Articulated Trucks</b>	0	9	0	9	-	15	0	0	15	-	0	1	0	1	-	25
<b>% Articulated Trucks</b>	0%	0.2%	0%	0.2%	-	0.3%	0%	0%	0.3%	-	0%	0.9%	0%	0.2%	-	0.2%
<b>Buses and Single-Unit Trucks</b>	2	41	0	43	-	48	4	0	52	-	1	3	0	4	-	99
<b>% Buses and Single-Unit Trucks</b>	1.5%	0.9%	0%	1.0%	-	1.0%	1.6%	0%	1.0%	-	0.3%	2.8%	0%	0.8%	-	1.0%
<b>Pedestrians</b>	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-
<b>% Pedestrians</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-
<b>Bicycles on Crosswalk</b>	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
<b>% Bicycles on Crosswalk</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

**1. FM 407 at Rayzor Road - TMC**

Thu Mar 23, 2023

Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

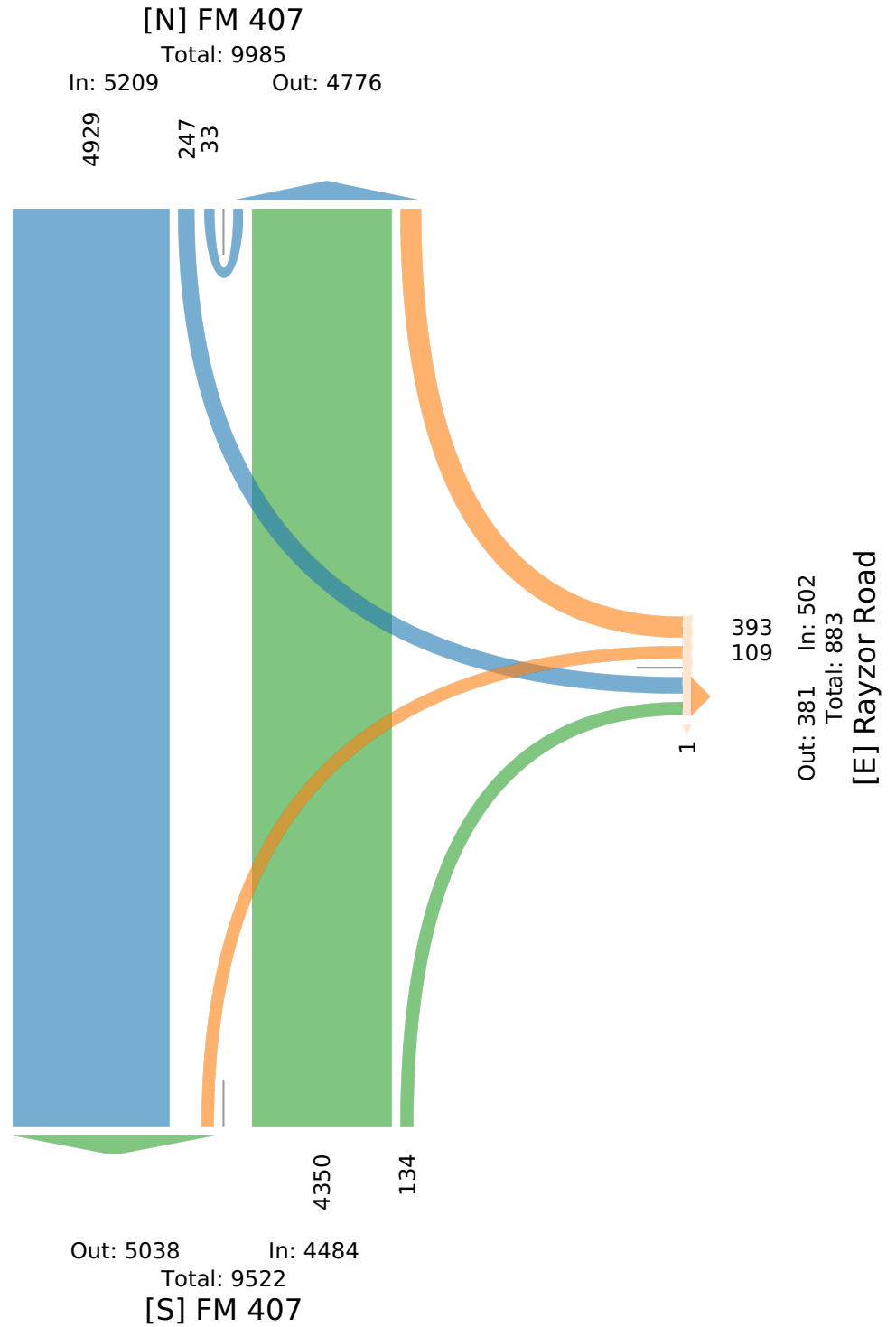
All Movements

ID: 1048589, Location: 33.085902, -97.131193



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US



1. FM 407 at Rayzor Road - TMC

Thu Mar 23, 2023

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048589, Location: 33.085902, -97.131193



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

Leg Direction	FM 407 Northbound					FM 407 Southbound					Rayzor Road Westbound					Int
	R	T	U	App	Ped*	T	L	U	App	Ped*	R	L	U	App	Ped*	
2023-03-23 7:30AM	1	143	0	144	0	280	22	1	303	0	73	18	0	91	0	538
7:45AM	3	185	0	188	0	308	9	3	320	0	20	6	0	26	0	534
8:00AM	3	199	0	202	0	307	10	0	317	0	16	1	0	17	0	536
8:15AM	3	162	0	165	0	292	9	0	301	0	11	5	0	16	0	482
<b>Total</b>	10	689	0	699	0	1187	50	4	1241	0	120	30	0	150	0	2090
<b>% Approach</b>	1.4%	98.6%	0%	-	-	95.6%	4.0%	0.3%	-	-	80.0%	20.0%	0%	-	-	-
<b>% Total</b>	0.5%	33.0%	0%	33.4%	-	56.8%	2.4%	0.2%	59.4%	-	5.7%	1.4%	0%	7.2%	-	-
<b>PHF</b>	0.833	0.866	-	0.865	-	0.963	0.568	0.333	0.970	-	0.411	0.417	-	0.412	-	0.971
<b>Lights</b>	10	670	0	680	-	1175	49	4	1228	-	120	30	0	150	-	2058
<b>% Lights</b>	100%	97.2%	0%	97.3%	-	99.0%	98.0%	100%	99.0%	-	100%	100%	0%	100%	-	98.5%
<b>Articulated Trucks</b>	0	4	0	4	-	3	0	0	3	-	0	0	0	0	-	7
<b>% Articulated Trucks</b>	0%	0.6%	0%	0.6%	-	0.3%	0%	0%	0.2%	-	0%	0%	0%	0%	-	0.3%
<b>Buses and Single-Unit Trucks</b>	0	15	0	15	-	9	1	0	10	-	0	0	0	0	-	25
<b>% Buses and Single-Unit Trucks</b>	0%	2.2%	0%	2.1%	-	0.8%	2.0%	0%	0.8%	-	0%	0%	0%	0%	-	1.2%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
<b>% Pedestrians</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
<b>% Bicycles on Crosswalk</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

**1. FM 407 at Rayzor Road - TMC**

Thu Mar 23, 2023

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

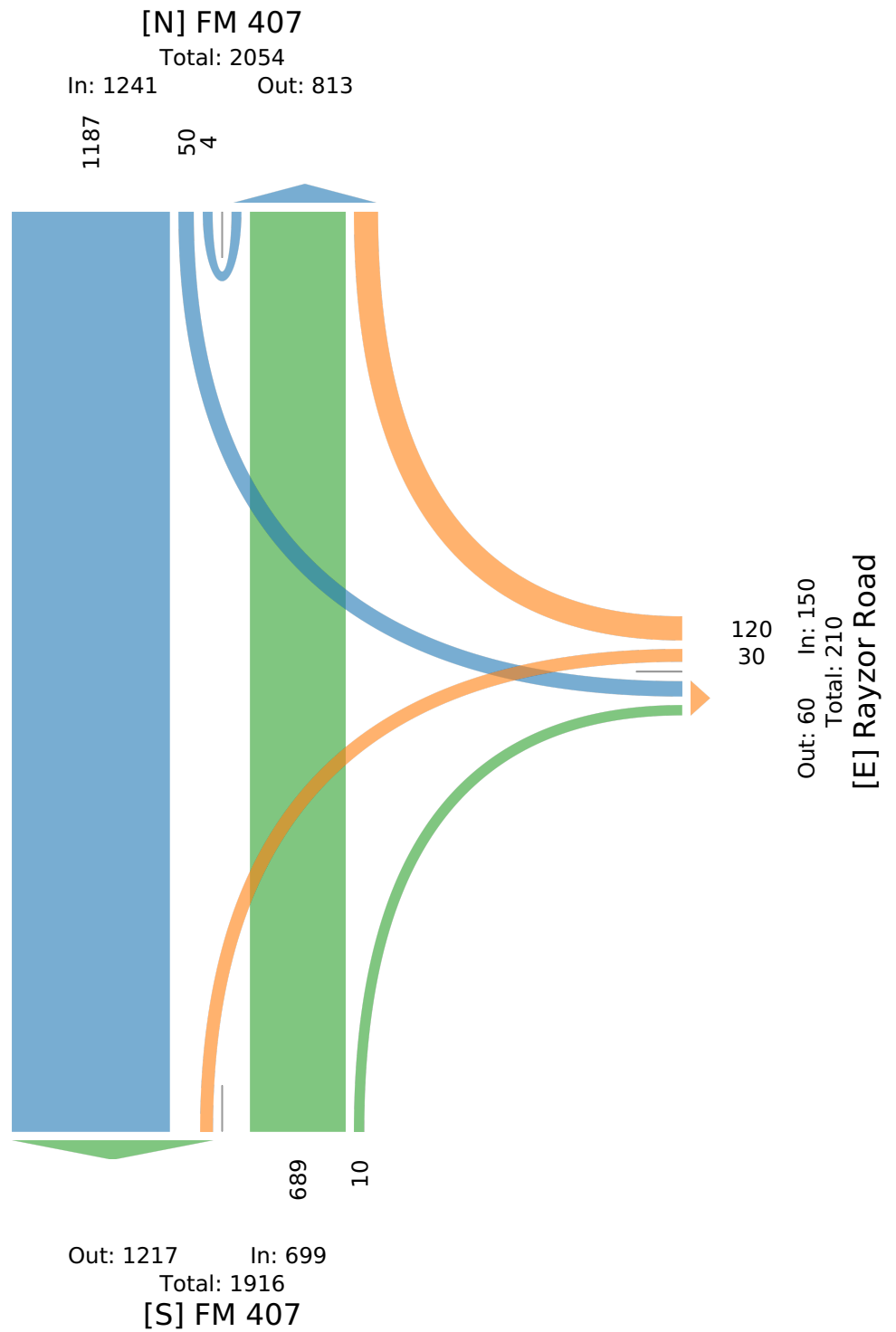
All Movements

ID: 1048589, Location: 33.085902, -97.131193



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US



**1. FM 407 at Rayzor Road - TMC**

Thu Mar 23, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048589, Location: 33.085902, -97.131193



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

Leg Direction	FM 407 Northbound					FM 407 Southbound					Rayzor Road Westbound					Int
	R	T	U	App	Ped*	T	L	U	App	Ped*	R	L	U	App	Ped*	
2023-03-23 4:30PM	9	278	0	287	0	257	14	1	272	0	9	3	0	12	0	571
4:45PM	10	313	0	323	0	254	13	2	269	0	14	5	0	19	0	611
5:00PM	8	289	0	297	0	239	8	2	249	0	17	6	0	23	0	569
5:15PM	18	312	0	330	0	251	16	4	271	0	20	7	0	27	0	628
<b>Total</b>	45	1192	0	1237	0	1001	51	9	1061	0	60	21	0	81	0	2379
<b>% Approach</b>	3.6%	96.4%	0%	-	-	94.3%	4.8%	0.8%	-	-	74.1%	25.9%	0%	-	-	-
<b>% Total</b>	1.9%	50.1%	0%	52.0%	-	42.1%	2.1%	0.4%	44.6%	-	2.5%	0.9%	0%	3.4%	-	-
<b>PHF</b>	0.625	0.952	-	0.937	-	0.974	0.797	0.563	0.975	-	0.750	0.750	-	0.750	-	0.947
<b>Lights</b>	45	1186	0	1231	-	990	51	9	1050	-	60	21	0	81	-	2362
<b>% Lights</b>	100%	99.5%	0%	99.5%	-	98.9%	100%	100%	99.0%	-	100%	100%	0%	100%	-	99.3%
<b>Articulated Trucks</b>	0	3	0	3	-	4	0	0	4	-	0	0	0	0	-	7
<b>% Articulated Trucks</b>	0%	0.3%	0%	0.2%	-	0.4%	0%	0%	0.4%	-	0%	0%	0%	0%	-	0.3%
<b>Buses and Single-Unit Trucks</b>	0	3	0	3	-	7	0	0	7	-	0	0	0	0	-	10
<b>% Buses and Single-Unit Trucks</b>	0%	0.3%	0%	0.2%	-	0.7%	0%	0%	0.7%	-	0%	0%	0%	0%	-	0.4%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

1. FM 407 at Rayzor Road - TMC

Thu Mar 23, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

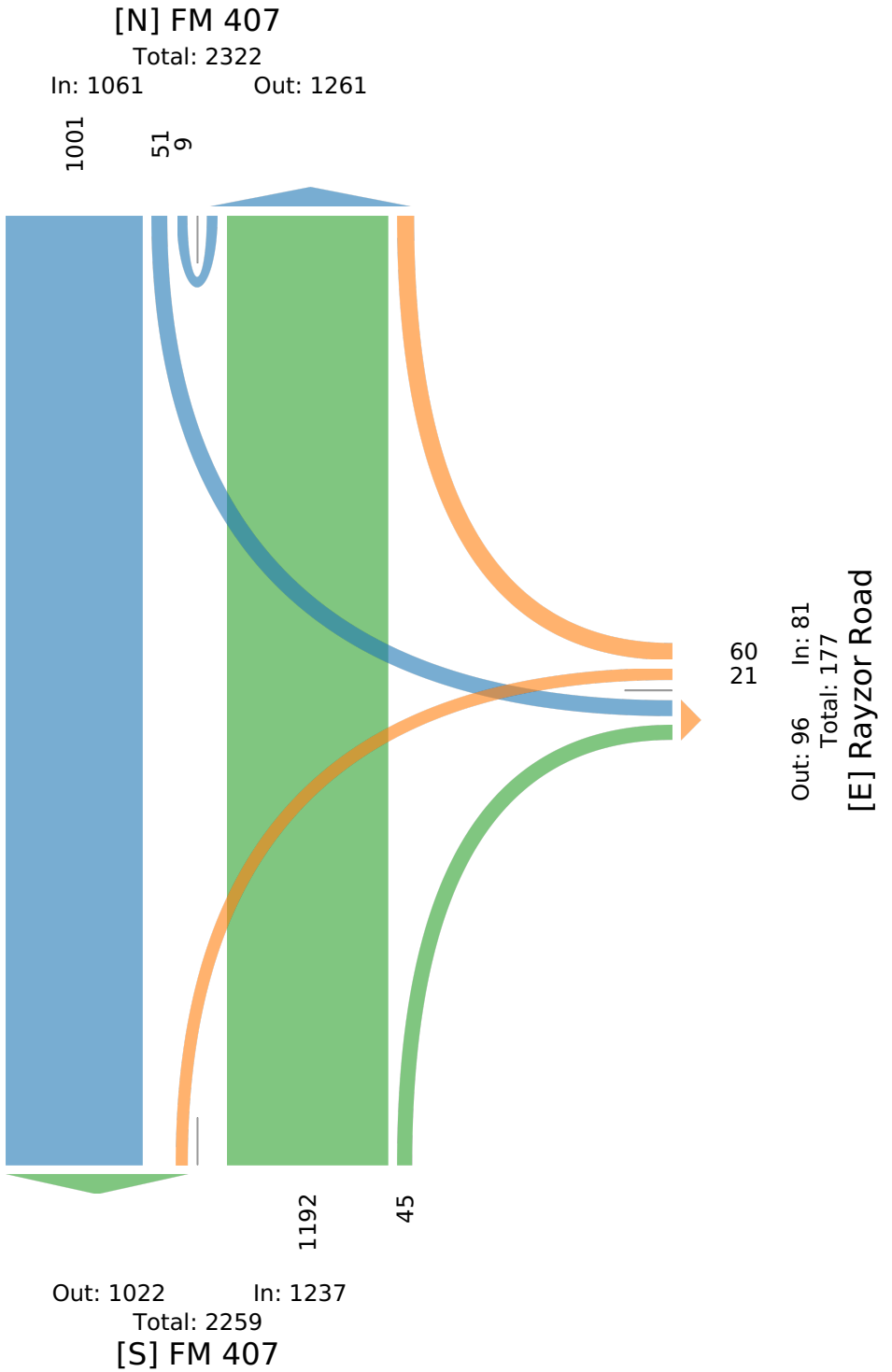
All Movements

ID: 1048589, Location: 33.085902, -97.131193



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US



2. FM 407 at CJ Legacy Ranch Drive - TMC

Thu Mar 23, 2023

Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048590, Location: 33.086445, -97.131205



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave., Pasadena, TX, 77503, US

Leg Direction	FM 407 Northbound					FM 407 Southbound					CJ Legacy Ranch Drive Eastbound					Int
	T	L	U	App	Ped*	R	T	U	App	Ped*	R	L	U	App	Ped*	
2023-03-23 7:00AM	90	0	0	90	0	0	183	0	183	0	0	0	0	0	0	273
7:15AM	132	0	0	132	0	0	238	0	238	0	0	0	0	0	0	370
7:30AM	244	0	0	244	0	0	309	0	309	0	0	0	0	0	0	553
7:45AM	188	0	0	188	0	0	316	0	316	0	1	0	0	1	0	505
Hourly Total	654	0	0	654	0	0	1046	0	1046	0	1	0	0	1	0	1701
8:00AM	215	0	0	215	0	0	316	0	316	0	0	0	0	0	0	531
8:15AM	180	0	0	180	0	0	295	0	295	0	0	0	0	0	0	475
8:30AM	171	0	0	171	0	0	331	0	331	0	0	0	0	0	0	502
8:45AM	160	0	0	160	0	1	277	0	278	0	0	0	0	0	0	438
Hourly Total	726	0	0	726	0	1	1219	0	1220	0	0	0	0	0	0	1946
3:00PM	262	0	0	262	0	0	201	0	201	0	1	0	0	1	0	464
3:15PM	252	0	0	252	0	0	253	0	253	0	1	0	0	1	0	506
3:30PM	259	0	0	259	0	0	190	0	190	0	0	0	0	0	0	449
3:45PM	265	0	0	265	0	3	227	0	230	0	0	0	0	0	0	495
Hourly Total	1038	0	0	1038	0	3	871	0	874	0	2	0	0	2	0	1914
4:00PM	262	0	0	262	0	0	218	0	218	0	2	0	0	2	0	482
4:15PM	255	0	0	255	0	1	250	0	251	0	0	0	0	0	0	506
4:30PM	289	0	0	289	0	0	287	0	287	0	0	0	0	0	0	576
4:45PM	331	0	0	331	0	2	244	0	246	0	1	0	0	1	0	578
Hourly Total	1137	0	0	1137	0	3	999	0	1002	0	3	0	0	3	0	2142
5:00PM	309	0	0	309	0	0	255	0	255	0	1	0	0	1	0	565
5:15PM	316	0	0	316	0	0	267	0	267	0	0	0	0	0	0	583
5:30PM	311	0	0	311	0	0	268	0	268	0	0	0	0	0	0	579
5:45PM	285	0	0	285	0	0	219	0	219	0	0	0	0	0	0	504
Hourly Total	1221	0	0	1221	0	0	1009	0	1009	0	1	0	0	1	0	2231
<b>Total</b>	4776	0	0	4776	0	7	5144	0	5151	0	7	0	0	7	0	9934
<b>% Approach</b>	100%	0%	0%	-	-	0.1%	99.9%	0%	-	-	100%	0%	0%	-	-	-
<b>% Total</b>	48.1%	0%	0%	48.1%	-	0.1%	51.8%	0%	51.9%	-	0.1%	0%	0%	0.1%	-	-
<b>Lights</b>	4718	0	0	4718	-	7	5095	0	5102	-	7	0	0	7	-	9827
<b>% Lights</b>	98.8%	0%	0%	98.8%	-	100%	99.0%	0%	99.0%	-	100%	0%	0%	100%	-	98.9%
<b>Articulated Trucks</b>	9	0	0	9	-	0	13	0	13	-	0	0	0	0	-	22
<b>% Articulated Trucks</b>	0.2%	0%	0%	0.2%	-	0%	0.3%	0%	0.3%	-	0%	0%	0%	0%	-	0.2%
<b>Buses and Single-Unit Trucks</b>	49	0	0	49	-	0	36	0	36	-	0	0	0	0	-	85
<b>% Buses and Single-Unit Trucks</b>	1.0%	0%	0%	1.0%	-	0%	0.7%	0%	0.7%	-	0%	0%	0%	0%	-	0.9%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn



2. FM 407 at CJ Legacy Ranch Drive - TMC

Thu Mar 23, 2023

Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048590, Location: 33.086445, -97.131205

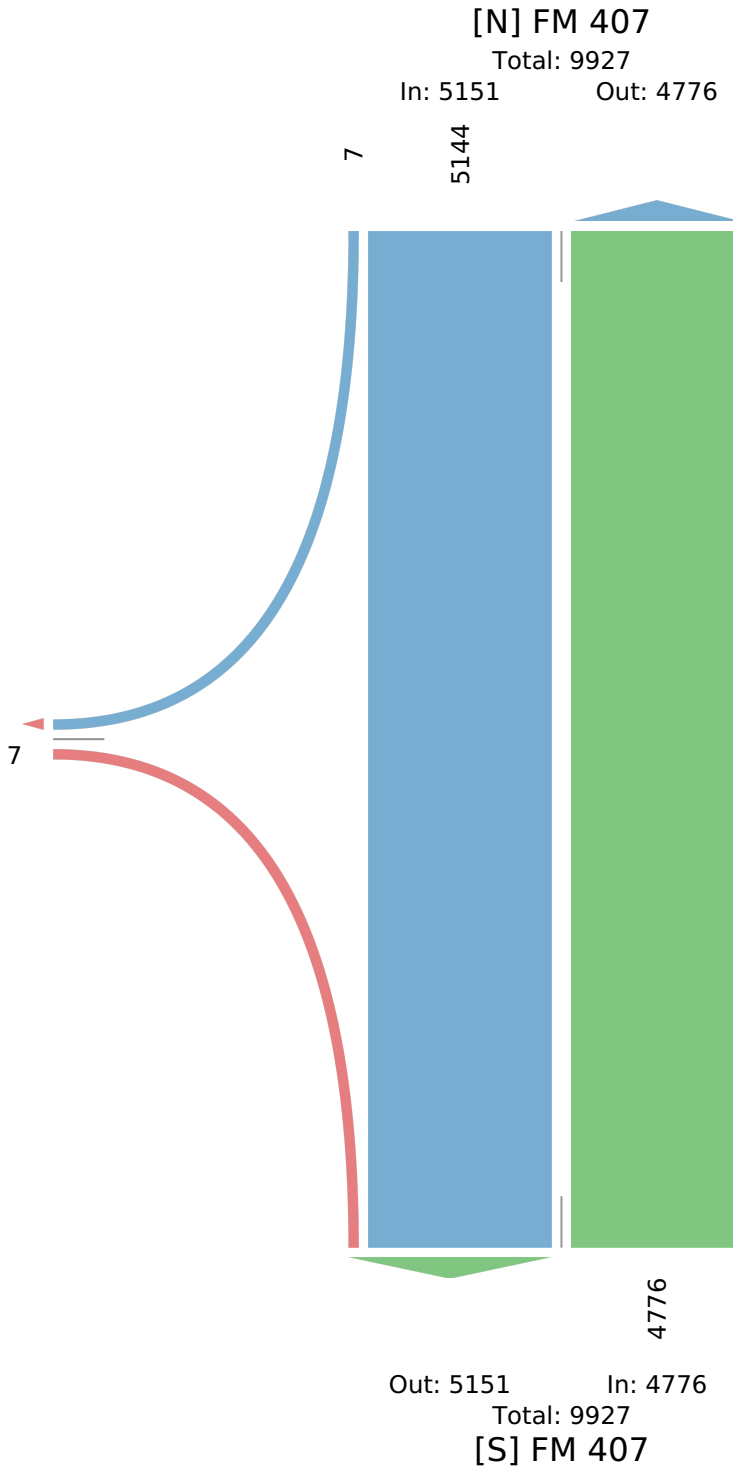


Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

[W] CJ Legacy Ranch Drive

Total: 14  
In: 7 Out: 7



2. FM 407 at CJ Legacy Ranch Drive - TMC

Thu Mar 23, 2023

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048590, Location: 33.086445, -97.131205



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

Leg Direction	FM 407 Northbound					FM 407 Southbound					CJ Legacy Ranch Drive Eastbound					Int
	T	L	U	App	Ped*	R	T	U	App	Ped*	R	L	U	App	Ped*	
2023-03-23 7:30AM	244	0	0	244	0	0	309	0	309	0	0	0	0	0	0	553
7:45AM	188	0	0	188	0	0	316	0	316	0	1	0	0	1	0	505
8:00AM	215	0	0	215	0	0	316	0	316	0	0	0	0	0	0	531
8:15AM	180	0	0	180	0	0	295	0	295	0	0	0	0	0	0	475
<b>Total</b>	827	0	0	827	0	0	1236	0	1236	0	1	0	0	1	0	2064
<b>% Approach</b>	100%	0%	0%	-	-	0%	100%	0%	-	-	100%	0%	0%	-	-	-
<b>% Total</b>	40.1%	0%	0%	40.1%	-	0%	59.9%	0%	59.9%	-	0%	0%	0%	0%	-	-
<b>PHF</b>	0.847	-	-	0.847	-	-	0.978	-	0.978	-	0.250	-	-	0.250	-	0.933
<b>Lights</b>	807	0	0	807	-	0	1225	0	1225	-	1	0	0	1	-	2033
<b>% Lights</b>	97.6%	0%	0%	97.6%	-	0%	99.1%	0%	99.1%	-	100%	0%	0%	100%	-	98.5%
<b>Articulated Trucks</b>	2	0	0	2	-	0	2	0	2	-	0	0	0	0	-	4
<b>% Articulated Trucks</b>	0.2%	0%	0%	0.2%	-	0%	0.2%	0%	0.2%	-	0%	0%	0%	0%	-	0.2%
<b>Buses and Single-Unit Trucks</b>	18	0	0	18	-	0	9	0	9	-	0	0	0	0	-	27
<b>% Buses and Single-Unit Trucks</b>	2.2%	0%	0%	2.2%	-	0%	0.7%	0%	0.7%	-	0%	0%	0%	0%	-	1.3%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

## 2. FM 407 at CJ Legacy Ranch Drive - TMC

Thu Mar 23, 2023

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048590, Location: 33.086445, -97.131205



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

[W] CJ Legacy Ranch Drive

Total: 1  
In: 1 Out: 0

1



2. FM 407 at CJ Legacy Ranch Drive - TMC

Thu Mar 23, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048590, Location: 33.086445, -97.131205



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave., Pasadena, TX, 77503, US

Leg Direction	FM 407 Northbound					FM 407 Southbound					CJ Legacy Ranch Drive Eastbound					Int
	T	L	U	App	Ped*	R	T	U	App	Ped*	R	L	U	App	Ped*	
2023-03-23 4:45PM	331	0	0	331	0	2	244	0	246	0	1	0	0	1	0	578
5:00PM	309	0	0	309	0	0	255	0	255	0	1	0	0	1	0	565
5:15PM	316	0	0	316	0	0	267	0	267	0	0	0	0	0	0	583
5:30PM	311	0	0	311	0	0	268	0	268	0	0	0	0	0	0	579
<b>Total</b>	1267	0	0	1267	0	2	1034	0	1036	0	2	0	0	2	0	2305
<b>% Approach</b>	100%	0%	0%	-	-	0.2%	99.8%	0%	-	-	100%	0%	0%	-	-	-
<b>% Total</b>	55.0%	0%	0%	55.0%	-	0.1%	44.9%	0%	44.9%	-	0.1%	0%	0%	0.1%	-	-
<b>PHF</b>	0.957	-	-	0.957	-	0.250	0.965	-	0.966	-	0.500	-	-	0.500	-	0.988
<b>Lights</b>	1262	0	0	1262	-	2	1025	0	1027	-	2	0	0	2	-	2291
<b>% Lights</b>	99.6%	0%	0%	99.6%	-	100%	99.1%	0%	99.1%	-	100%	0%	0%	100%	-	99.4%
<b>Articulated Trucks</b>	1	0	0	1	-	0	3	0	3	-	0	0	0	0	-	4
<b>% Articulated Trucks</b>	0.1%	0%	0%	0.1%	-	0%	0.3%	0%	0.3%	-	0%	0%	0%	0%	-	0.2%
<b>Buses and Single-Unit Trucks</b>	4	0	0	4	-	0	6	0	6	-	0	0	0	0	-	10
<b>% Buses and Single-Unit Trucks</b>	0.3%	0%	0%	0.3%	-	0%	0.6%	0%	0.6%	-	0%	0%	0%	0%	-	0.4%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

2. FM 407 at CJ Legacy Ranch Drive - TMC

Thu Mar 23, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048590, Location: 33.086445, -97.131205

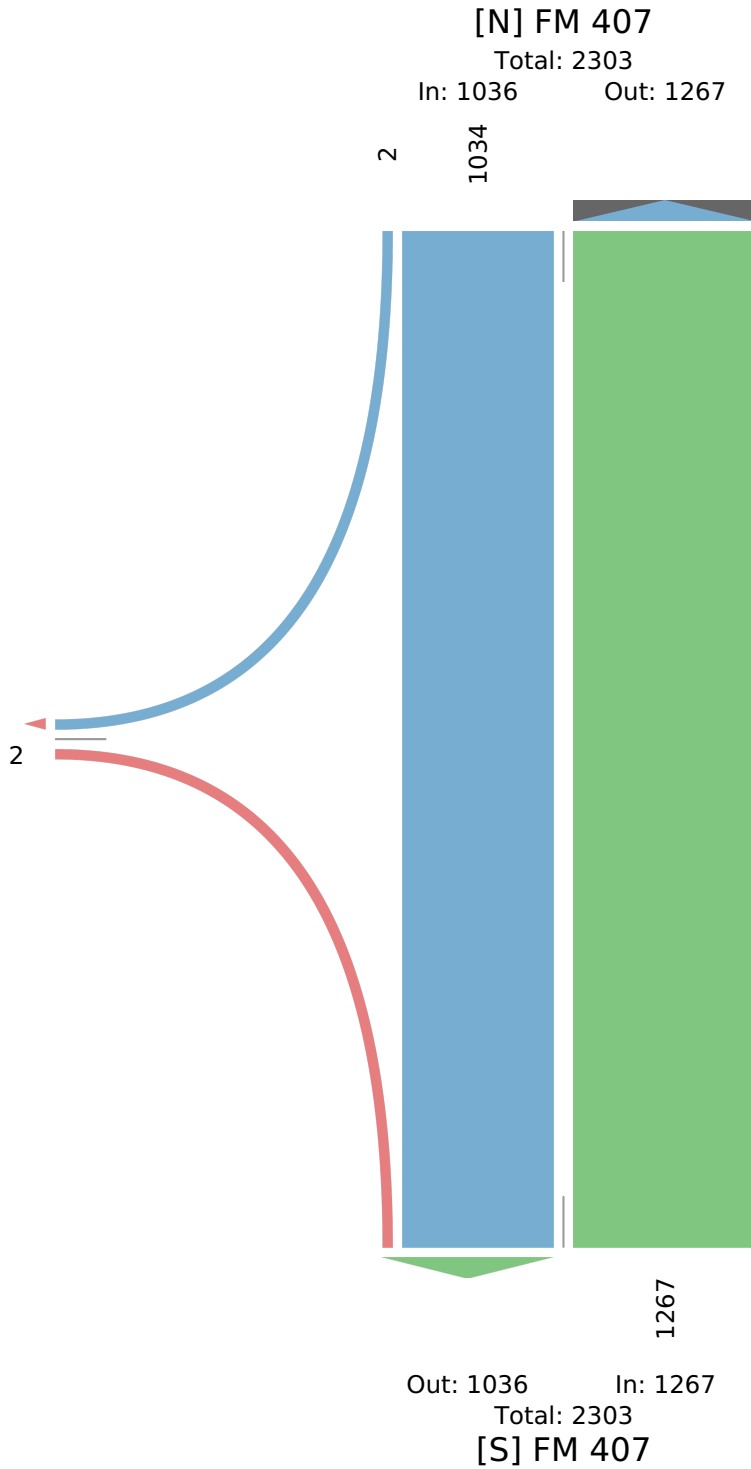


Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

[W] CJ Legacy Ranch Drive

Total: 4  
In: 2 Out: 2



### 3. FM 407 at IT Neely Drive - TMC

Thu Mar 23, 2023

Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048591, Location: 33.090544, -97.131222



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

Leg Direction	FM 407 Northbound					FM 407 Southbound					IT Neely Drive Eastbound					Int
	T	L	U	App	Ped*	R	T	U	App	Ped*	R	L	U	App	Ped*	
2023-03-23 7:00AM	85	3	0	88	0	5	196	0	201	0	0	3	0	3	0	292
7:15AM	133	6	0	139	0	12	226	0	238	0	2	2	0	4	0	381
7:30AM	229	10	0	239	0	11	304	0	315	0	0	6	0	6	0	560
7:45AM	191	12	0	203	0	10	307	0	317	0	3	6	0	9	0	529
Hourly Total	638	31	0	669	0	38	1033	0	1071	0	5	17	0	22	0	1762
8:00AM	194	14	0	208	0	7	312	0	319	0	2	12	0	14	0	541
8:15AM	168	11	0	179	0	11	292	0	303	0	4	4	0	8	0	490
8:30AM	169	8	0	177	0	9	329	0	338	0	2	7	0	9	0	524
8:45AM	146	8	0	154	0	6	265	1	272	0	1	5	0	6	0	432
Hourly Total	677	41	0	718	0	33	1198	1	1232	0	9	28	0	37	0	1987
3:00PM	252	12	0	264	0	13	198	1	212	0	9	2	0	11	0	487
3:15PM	241	12	0	253	0	18	227	1	246	0	7	5	0	12	0	511
3:30PM	255	17	1	273	0	11	182	0	193	0	6	4	0	10	0	476
3:45PM	246	17	1	264	0	8	223	0	231	0	4	7	0	11	0	506
Hourly Total	994	58	2	1054	0	50	830	2	882	0	26	18	0	44	0	1980
4:00PM	234	12	0	246	0	9	210	1	220	0	3	6	0	9	0	475
4:15PM	250	11	0	261	0	13	233	3	249	0	8	2	0	10	0	520
4:30PM	261	14	0	275	0	16	251	2	269	0	11	8	0	19	0	563
4:45PM	324	14	1	339	0	15	249	0	264	0	5	4	0	9	0	612
Hourly Total	1069	51	1	1121	0	53	943	6	1002	0	27	20	0	47	0	2170
5:00PM	293	11	0	304	0	17	234	0	251	0	6	6	0	12	0	567
5:15PM	311	10	0	321	0	20	266	1	287	0	4	8	0	12	0	620
5:30PM	265	30	0	295	0	10	253	0	263	0	2	5	0	7	0	565
5:45PM	267	16	0	283	0	9	209	3	221	0	8	11	0	19	0	523
Hourly Total	1136	67	0	1203	0	56	962	4	1022	0	20	30	0	50	0	2275
<b>Total</b>	4514	248	3	4765	0	230	4966	13	5209	0	87	113	0	200	0	10174
<b>% Approach</b>	94.7%	5.2%	0.1%	-	-	4.4%	95.3%	0.2%	-	-	43.5%	56.5%	0%	-	-	-
<b>% Total</b>	44.4%	2.4%	0%	46.8%	-	2.3%	48.8%	0.1%	51.2%	-	0.9%	1.1%	0%	2.0%	-	-
<b>Lights</b>	4466	246	3	4715	-	227	4901	11	5139	-	86	111	0	197	-	10051
<b>% Lights</b>	98.9%	99.2%	100%	99.0%	-	98.7%	98.7%	84.6%	98.7%	-	98.9%	98.2%	0%	98.5%	-	98.8%
<b>Articulated Trucks</b>	13	1	0	14	-	1	15	0	16	-	0	1	0	1	-	31
<b>% Articulated Trucks</b>	0.3%	0.4%	0%	0.3%	-	0.4%	0.3%	0%	0.3%	-	0%	0.9%	0%	0.5%	-	0.3%
<b>Buses and Single-Unit Trucks</b>	35	1	0	36	-	2	50	2	54	-	1	1	0	2	-	92
<b>% Buses and Single-Unit Trucks</b>	0.8%	0.4%	0%	0.8%	-	0.9%	1.0%	15.4%	1.0%	-	1.1%	0.9%	0%	1.0%	-	0.9%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

3. FM 407 at IT Neely Drive - TMC

Thu Mar 23, 2023

Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

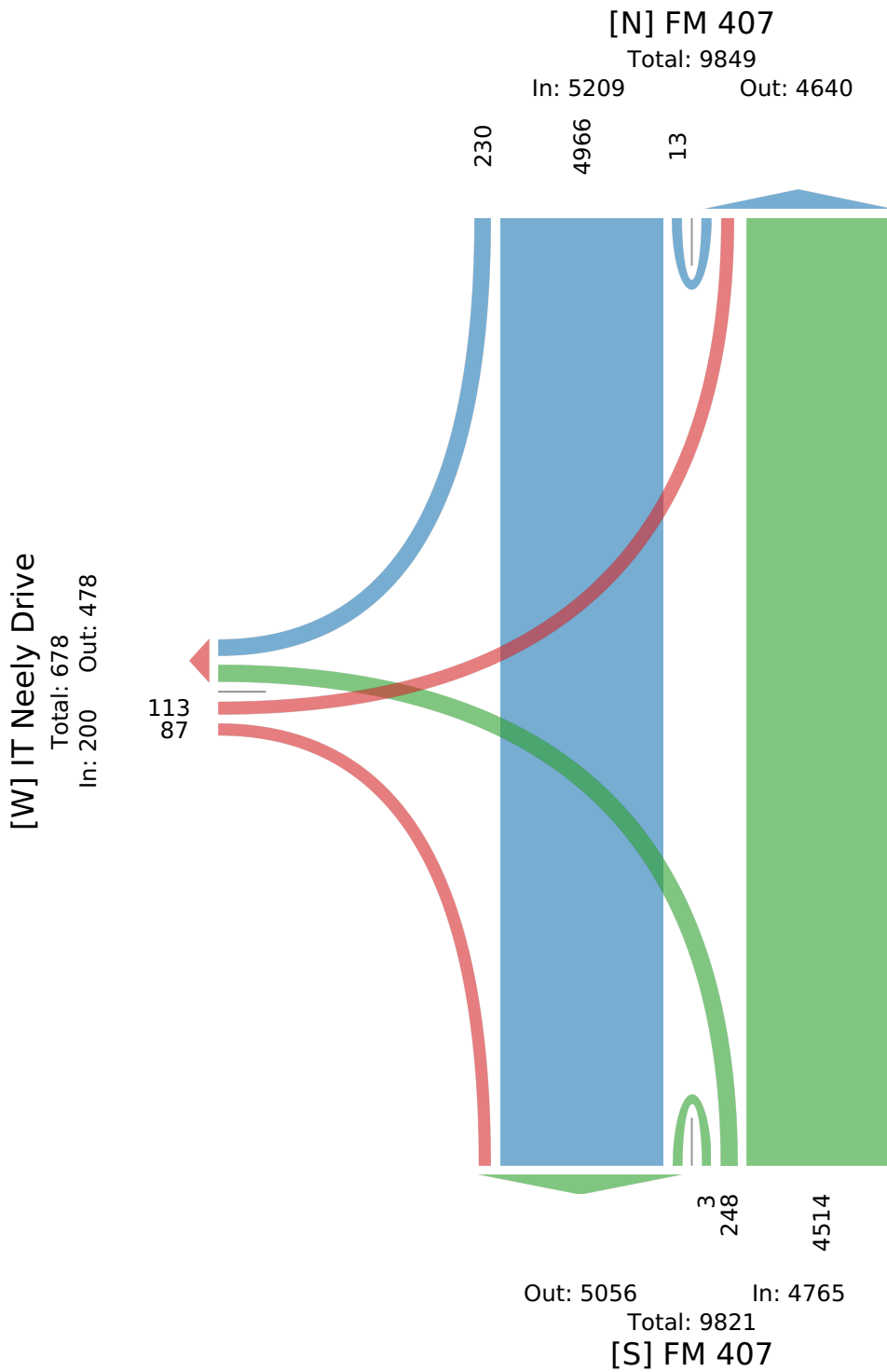
All Movements

ID: 1048591, Location: 33.090544, -97.131222



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US



### 3. FM 407 at IT Neely Drive - TMC

Thu Mar 23, 2023

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048591, Location: 33.090544, -97.131222



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

Leg Direction	FM 407 Northbound					FM 407 Southbound					IT Neely Drive Eastbound					Int
	T	L	U	App	Ped*	R	T	U	App	Ped*	R	L	U	App	Ped*	
2023-03-23 7:30AM	229	10	0	239	0	11	304	0	315	0	0	6	0	6	0	560
7:45AM	191	12	0	203	0	10	307	0	317	0	3	6	0	9	0	529
8:00AM	194	14	0	208	0	7	312	0	319	0	2	12	0	14	0	541
8:15AM	168	11	0	179	0	11	292	0	303	0	4	4	0	8	0	490
<b>Total</b>	782	47	0	829	0	39	1215	0	1254	0	9	28	0	37	0	2120
<b>% Approach</b>	94.3%	5.7%	0%	-	-	3.1%	96.9%	0%	-	-	24.3%	75.7%	0%	-	-	-
<b>% Total</b>	36.9%	2.2%	0%	39.1%	-	1.8%	57.3%	0%	59.2%	-	0.4%	1.3%	0%	1.7%	-	-
<b>PHF</b>	0.854	0.839	-	0.867	-	0.886	0.974	-	0.983	-	0.563	0.583	-	0.661	-	0.946
<b>Lights</b>	766	46	0	812	-	39	1203	0	1242	-	9	27	0	36	-	2090
<b>% Lights</b>	98.0%	97.9%	0%	97.9%	-	100%	99.0%	0%	99.0%	-	100%	96.4%	0%	97.3%	-	98.6%
<b>Articulated Trucks</b>	2	1	0	3	-	0	3	0	3	-	0	1	0	1	-	7
<b>% Articulated Trucks</b>	0.3%	2.1%	0%	0.4%	-	0%	0.2%	0%	0.2%	-	0%	3.6%	0%	2.7%	-	0.3%
<b>Buses and Single-Unit Trucks</b>	14	0	0	14	-	0	9	0	9	-	0	0	0	0	-	23
<b>% Buses and Single-Unit Trucks</b>	1.8%	0%	0%	1.7%	-	0%	0.7%	0%	0.7%	-	0%	0%	0%	0%	-	1.1%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn



### 3. FM 407 at IT Neely Drive - TMC

Thu Mar 23, 2023

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

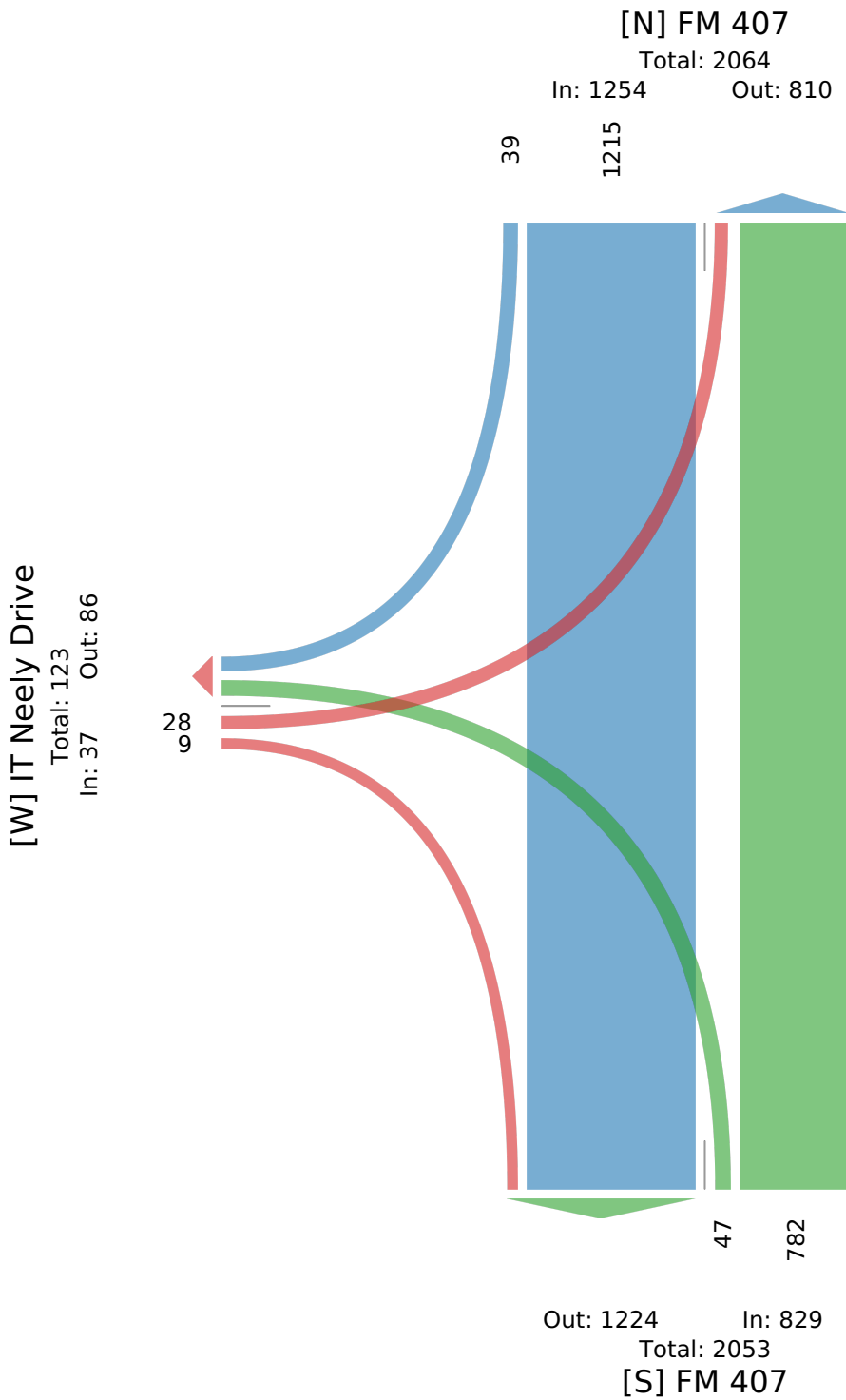
All Movements

ID: 1048591, Location: 33.090544, -97.131222



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US



### 3. FM 407 at IT Neely Drive - TMC

Thu Mar 23, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048591, Location: 33.090544, -97.131222



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

Leg Direction	FM 407 Northbound					FM 407 Southbound					IT Neely Drive Eastbound					Int
	T	L	U	App	Ped*	R	T	U	App	Ped*	R	L	U	App	Ped*	
2023-03-23 4:45PM	324	14	1	<b>339</b>	0	15	249	0	<b>264</b>	0	5	4	0	<b>9</b>	0	<b>612</b>
5:00PM	293	11	0	<b>304</b>	0	17	234	0	<b>251</b>	0	6	6	0	<b>12</b>	0	<b>567</b>
5:15PM	311	10	0	<b>321</b>	0	20	266	1	<b>287</b>	0	4	8	0	<b>12</b>	0	<b>620</b>
5:30PM	265	30	0	<b>295</b>	0	10	253	0	<b>263</b>	0	2	5	0	<b>7</b>	0	<b>565</b>
<b>Total</b>	1193	65	1	<b>1259</b>	0	62	1002	1	<b>1065</b>	0	17	23	0	<b>40</b>	0	<b>2364</b>
<b>% Approach</b>	94.8%	5.2%	0.1%	-	-	5.8%	94.1%	0.1%	-	-	42.5%	57.5%	0%	-	-	-
<b>% Total</b>	50.5%	2.7%	0%	<b>53.3%</b>	-	2.6%	42.4%	0%	<b>45.1%</b>	-	0.7%	1.0%	0%	<b>1.7%</b>	-	-
<b>PHF</b>	0.921	0.542	0.250	<b>0.928</b>	-	0.775	0.942	0.250	<b>0.928</b>	-	0.708	0.719	-	<b>0.833</b>	-	0.953
<b>Lights</b>	1188	65	1	<b>1254</b>	-	62	992	1	<b>1055</b>	-	17	23	0	<b>40</b>	-	2349
<b>% Lights</b>	99.6%	100%	100%	<b>99.6%</b>	-	100%	99.0%	100%	<b>99.1%</b>	-	100%	100%	0%	<b>100%</b>	-	99.4%
<b>Articulated Trucks</b>	1	0	0	<b>1</b>	-	0	3	0	<b>3</b>	-	0	0	0	<b>0</b>	-	4
<b>% Articulated Trucks</b>	0.1%	0%	0%	<b>0.1%</b>	-	0%	0.3%	0%	<b>0.3%</b>	-	0%	0%	0%	<b>0%</b>	-	0.2%
<b>Buses and Single-Unit Trucks</b>	4	0	0	<b>4</b>	-	0	7	0	<b>7</b>	-	0	0	0	<b>0</b>	-	11
<b>% Buses and Single-Unit Trucks</b>	0.3%	0%	0%	<b>0.3%</b>	-	0%	0.7%	0%	<b>0.7%</b>	-	0%	0%	0%	<b>0%</b>	-	0.5%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

3. FM 407 at IT Neely Drive - TMC

Thu Mar 23, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

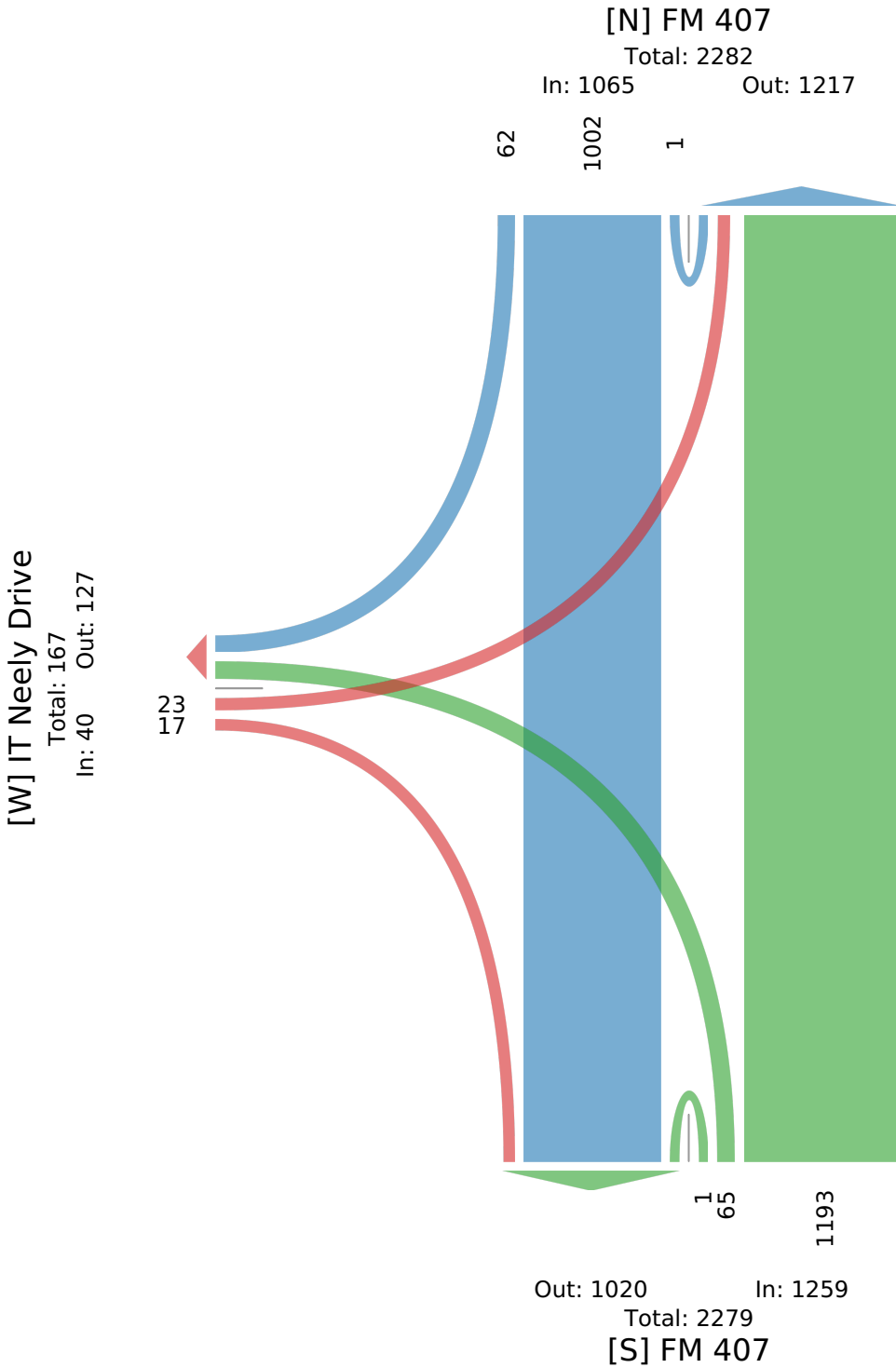
All Movements

ID: 1048591, Location: 33.090544, -97.131222



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US



**4. FM 407 at McMakin Road - TMC**

Tue Mar 28, 2023

Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048592, Location: 33.077608, -97.130532



Provided by: C. J. Hensch & Associates Inc.  
5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

Leg Direction	FM 407 Southbound						McMakin Road/Blanco Drive Westbound						FM 407 Northbound						McMakin Road Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2023-03-28 7:00AM	300	725	1	1	1027	0	5	10	12	0	27	0	2	343	31	0	376	0	26	4	173	0	203	0	1633
8:00AM	254	803	2	0	1059	0	5	14	18	0	37	0	7	424	31	0	462	0	37	10	238	0	285	0	1843
3:00PM	197	605	4	0	806	0	2	3	16	0	21	0	16	629	33	0	678	0	24	12	326	0	362	0	1867
4:00PM	210	668	2	0	880	0	2	8	12	0	22	0	14	725	52	1	792	0	29	9	371	0	409	0	2103
5:00PM	198	703	1	1	903	0	4	7	9	0	20	0	8	816	45	1	870	2	43	11	491	0	545	0	2338
<b>Total</b>	1159	3504	10	2	4675	0	18	42	67	0	127	0	47	2937	192	2	3178	2	159	46	1599	0	1804	0	9784
<b>% Approach</b>	24.8%	75.0%	0.2%	0%	-	-	14.2%	33.1%	52.8%	0%	-	-	1.5%	92.4%	6.0%	0.1%	-	-	8.8%	2.5%	88.6%	0%	-	-	-
<b>% Total</b>	11.8%	35.8%	0.1%	0%	47.8%	-	0.2%	0.4%	0.7%	0%	1.3%	-	0.5%	30.0%	2.0%	0%	32.5%	-	1.6%	0.5%	16.3%	0%	18.4%	-	-
<b>Lights</b>	1139	3456	10	2	4607	-	18	40	65	0	123	-	45	2904	192	2	3143	-	157	45	1589	0	1791	-	9664
<b>% Lights</b>	98.3%	98.6%	100%	100%	98.5%	-	100%	95.2%	97.0%	0%	96.9%	-	95.7%	98.9%	100%	100%	98.9%	-	98.7%	97.8%	99.4%	0%	99.3%	-	98.8%
<b>Articulated Trucks</b>	3	13	0	0	16	-	0	0	0	0	0	-	0	7	0	0	7	-	0	0	2	0	2	-	25
<b>% Articulated Trucks</b>	0.3%	0.4%	0%	0%	0.3%	-	0%	0%	0%	0%	0%	-	0%	0.2%	0%	0%	0.2%	-	0%	0%	0.1%	0%	0.1%	-	0.3%
<b>Buses and Single-Unit Trucks</b>	17	35	0	0	52	-	0	2	2	0	4	-	2	26	0	0	28	-	2	1	8	0	11	-	95
<b>% Buses and Single-Unit Trucks</b>	1.5%	1.0%	0%	0%	1.1%	-	0%	4.8%	3.0%	0%	3.1%	-	4.3%	0.9%	0%	0%	0.9%	-	1.3%	2.2%	0.5%	0%	0.6%	-	1.0%
<b>Pedestrians</b>	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
<b>% Pedestrians</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
<b>Bicycles on Crosswalk</b>	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	-	0
<b>% Bicycles on Crosswalk</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

**4. FM 407 at McMakin Road - TMC**

Tue Mar 28, 2023

Full Length (7 AM-9 AM, 3 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

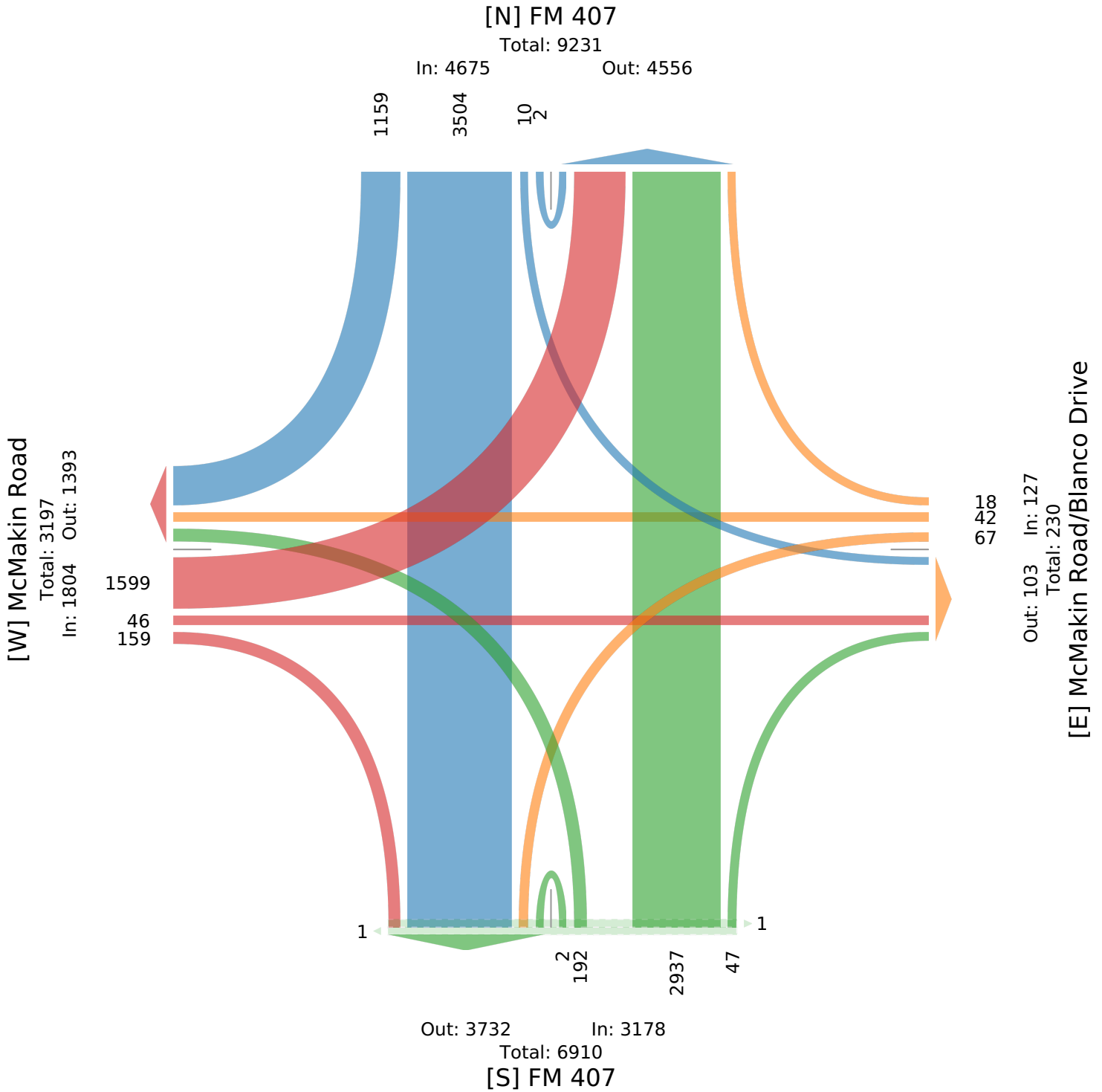
All Movements

ID: 1048592, Location: 33.077608, -97.130532



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US



4. FM 407 at McMakin Road - TMC

Tue Mar 28, 2023

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048592, Location: 33.077608, -97.130532



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave., Pasadena, TX, 77503, US

Leg Direction	FM 407 Southbound					McMakin Road/Blanco Drive Westbound					FM 407 Northbound					McMakin Road Eastbound									
Time	R	T	L	U	App Ped*	R	T	L	U	App Ped*	R	T	L	U	App Ped*	R	T	L	U	App Ped*	Int				
2023-03-28 7:30AM	90	171	1	0	262	0	2	3	11	0	16	0	0	99	11	0	110	0	8	2	54	0	64	0	452
7:45AM	83	237	0	0	320	0	2	2	0	0	4	0	2	103	12	0	117	0	8	1	55	0	64	0	505
8:00AM	84	189	2	0	275	0	2	3	4	0	9	0	2	106	8	0	116	0	7	4	76	0	87	0	487
8:15AM	58	203	0	0	261	0	1	4	3	0	8	0	3	119	11	0	133	0	7	4	52	0	63	0	465
<b>Total</b>	315	800	3	0	1118	0	7	12	18	0	37	0	7	427	42	0	476	0	30	11	237	0	278	0	1909
<b>% Approach</b>	28.2%	71.6%	0.3%	0%	-	-	18.9%	32.4%	48.6%	0%	-	-	1.5%	89.7%	8.8%	0%	-	-	10.8%	4.0%	85.3%	0%	-	-	-
<b>% Total</b>	16.5%	41.9%	0.2%	0%	58.6%	-	0.4%	0.6%	0.9%	0%	1.9%	-	0.4%	22.4%	2.2%	0%	24.9%	-	1.6%	0.6%	12.4%	0%	14.6%	-	-
<b>PHF</b>	0.875	0.844	0.375	-	0.873	-	0.875	0.750	0.409	-	0.578	-	0.583	0.897	0.875	-	0.895	-	0.938	0.688	0.780	-	0.799	-	0.945
<b>Lights</b>	313	789	3	0	1105	-	7	11	18	0	36	-	7	415	42	0	464	-	29	11	235	0	275	-	1880
<b>% Lights</b>	99.4%	98.6%	100%	0%	98.8%	-	100%	91.7%	100%	0%	97.3%	-	100%	97.2%	100%	0%	97.5%	-	96.7%	100%	99.2%	0%	98.9%	-	98.5%
<b>Articulated Trucks</b>	1	3	0	0	4	-	0	0	0	0	0	-	0	3	0	0	3	-	0	0	0	0	0	-	7
<b>% Articulated Trucks</b>	0.3%	0.4%	0%	0%	0.4%	-	0%	0%	0%	0%	0%	-	0%	0.7%	0%	0%	0.6%	-	0%	0%	0%	0%	0%	-	0.4%
<b>Buses and Single-Unit Trucks</b>	1	8	0	0	9	-	0	1	0	0	1	-	0	9	0	0	9	-	1	0	2	0	3	-	22
<b>% Buses and Single-Unit Trucks</b>	0.3%	1.0%	0%	0%	0.8%	-	0%	8.3%	0%	0%	2.7%	-	0%	2.1%	0%	0%	1.9%	-	3.3%	0%	0.8%	0%	1.1%	-	1.2%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

**4. FM 407 at McMakin Road - TMC**

Tue Mar 28, 2023

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

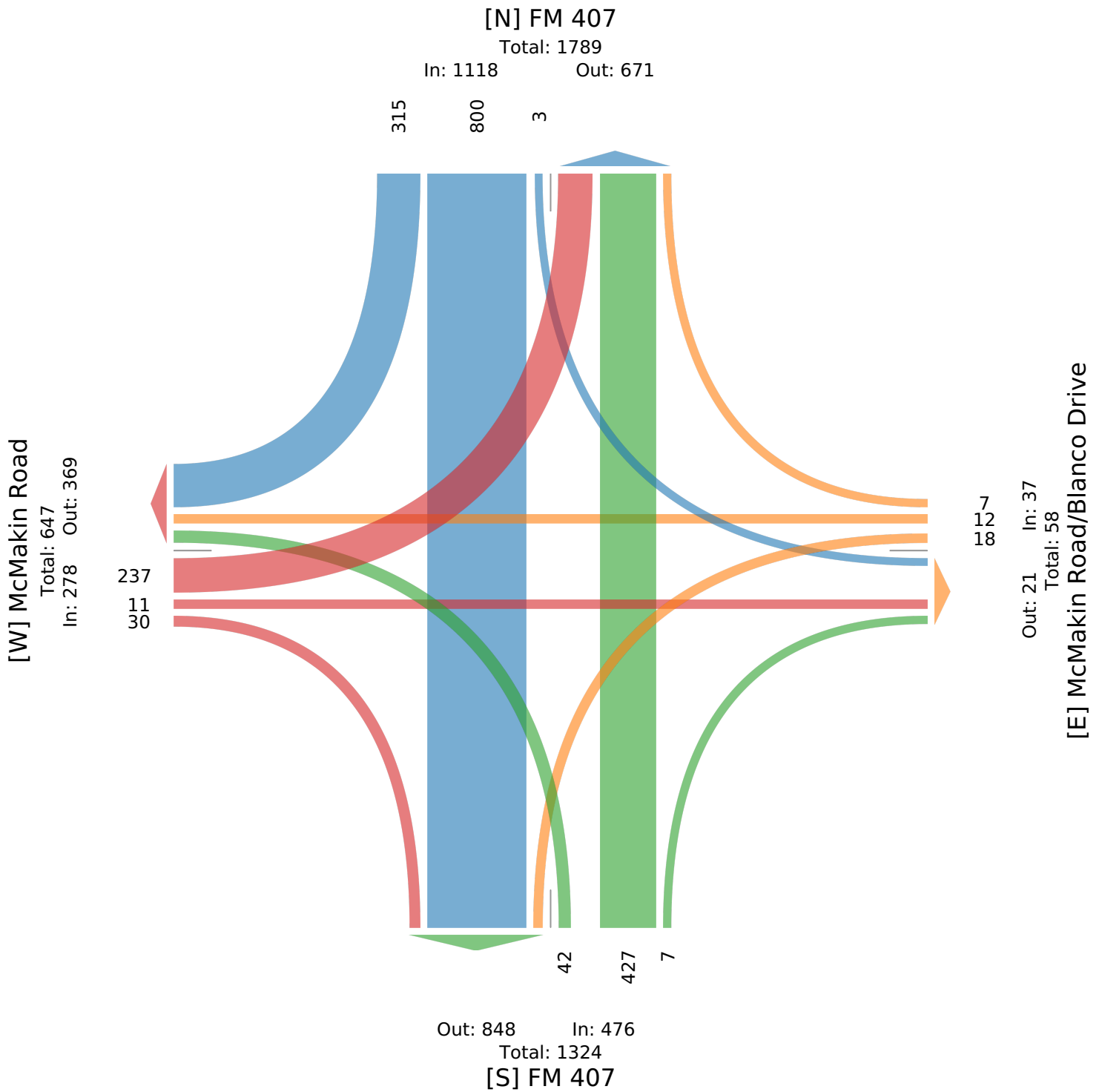
All Movements

ID: 1048592, Location: 33.077608, -97.130532



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US



4. FM 407 at McMakin Road - TMC

Tue Mar 28, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 1048592, Location: 33.077608, -97.130532



Provided by: C. J. Hensch & Associates Inc.  
5215 Sycamore Ave.,  
Pasadena, TX, 77503, US

Leg Direction	FM 407 Southbound						McMakin Road/Blanco Drive Westbound						FM 407 Northbound						McMakin Road Eastbound						Int
	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	
2023-03-28 4:45PM	53	185	1	0	239	0	1	1	2	0	4	0	3	208	15	0	226	0	10	2	106	0	118	0	587
5:00PM	56	171	1	0	228	0	0	2	5	0	7	0	2	182	13	1	198	0	15	4	124	0	143	0	576
5:15PM	49	179	0	0	228	0	2	3	0	0	5	0	2	219	10	0	231	1	4	4	136	0	144	0	608
5:30PM	51	183	0	1	235	0	2	2	2	0	6	0	4	208	10	0	222	1	12	1	127	0	140	0	603
<b>Total</b>	209	718	2	1	930	0	5	8	9	0	22	0	11	817	48	1	877	2	41	11	493	0	545	0	2374
<b>% Approach</b>	22.5%	77.2%	0.2%	0.1%	-	-	22.7%	36.4%	40.9%	0%	-	-	1.3%	93.2%	5.5%	0.1%	-	-	7.5%	2.0%	90.5%	0%	-	-	-
<b>% Total</b>	8.8%	30.2%	0.1%	0%	39.2%	-	0.2%	0.3%	0.4%	0%	0.9%	-	0.5%	34.4%	2.0%	0%	36.9%	-	1.7%	0.5%	20.8%	0%	23.0%	-	-
<b>PHF</b>	0.933	0.970	0.500	0.250	0.973	-	0.625	0.667	0.450	-	0.786	-	0.688	0.933	0.800	0.250	0.949	-	0.683	0.688	0.906	-	0.946	-	0.976
<b>Lights</b>	207	709	2	1	919	-	5	8	8	0	21	-	10	814	48	1	873	-	41	10	492	0	543	-	2356
<b>% Lights</b>	99.0%	98.7%	100%	100%	98.8%	-	100%	100%	88.9%	0%	95.5%	-	90.9%	99.6%	100%	100%	99.5%	-	100%	90.9%	99.8%	0%	99.6%	-	99.2%
<b>Articulated Trucks</b>	0	1	0	0	1	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1
<b>% Articulated Trucks</b>	0%	0.1%	0%	0%	0.1%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
<b>Buses and Single-Unit Trucks</b>	2	8	0	0	10	-	0	0	1	0	1	-	1	3	0	0	4	-	0	1	1	0	2	-	17
<b>% Buses and Single-Unit Trucks</b>	1.0%	1.1%	0%	0%	1.1%	-	0%	0%	11.1%	0%	4.5%	-	9.1%	0.4%	0%	0%	0.5%	-	0%	9.1%	0.2%	0%	0.4%	-	0.7%
<b>Pedestrians</b>	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-
<b>% Pedestrians</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-	-
<b>Bicycles on Crosswalk</b>	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-
<b>% Bicycles on Crosswalk</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-	-

\*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn



**4. FM 407 at McMakin Road - TMC**

Tue Mar 28, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

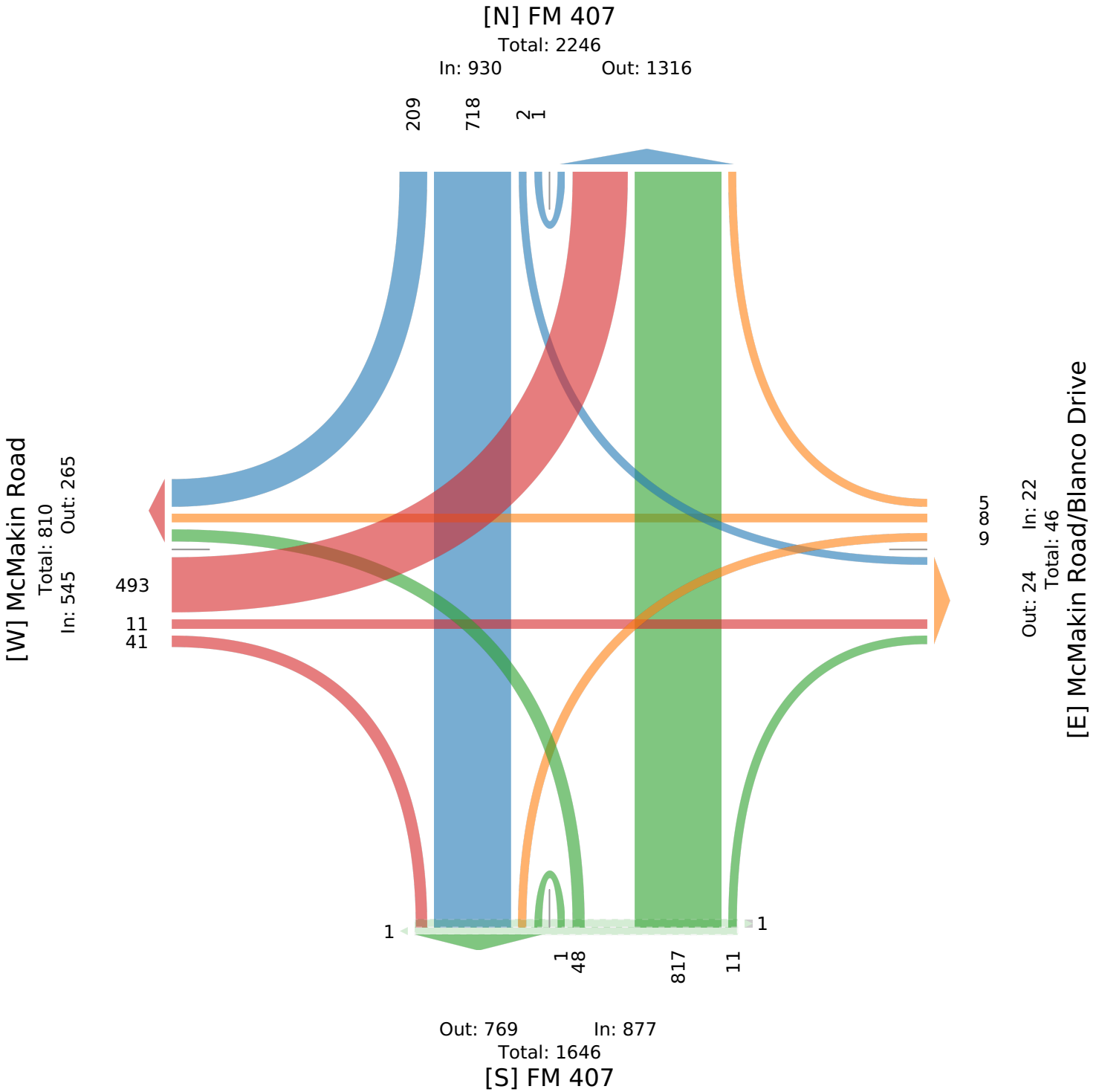
All Movements

ID: 1048592, Location: 33.077608, -97.130532

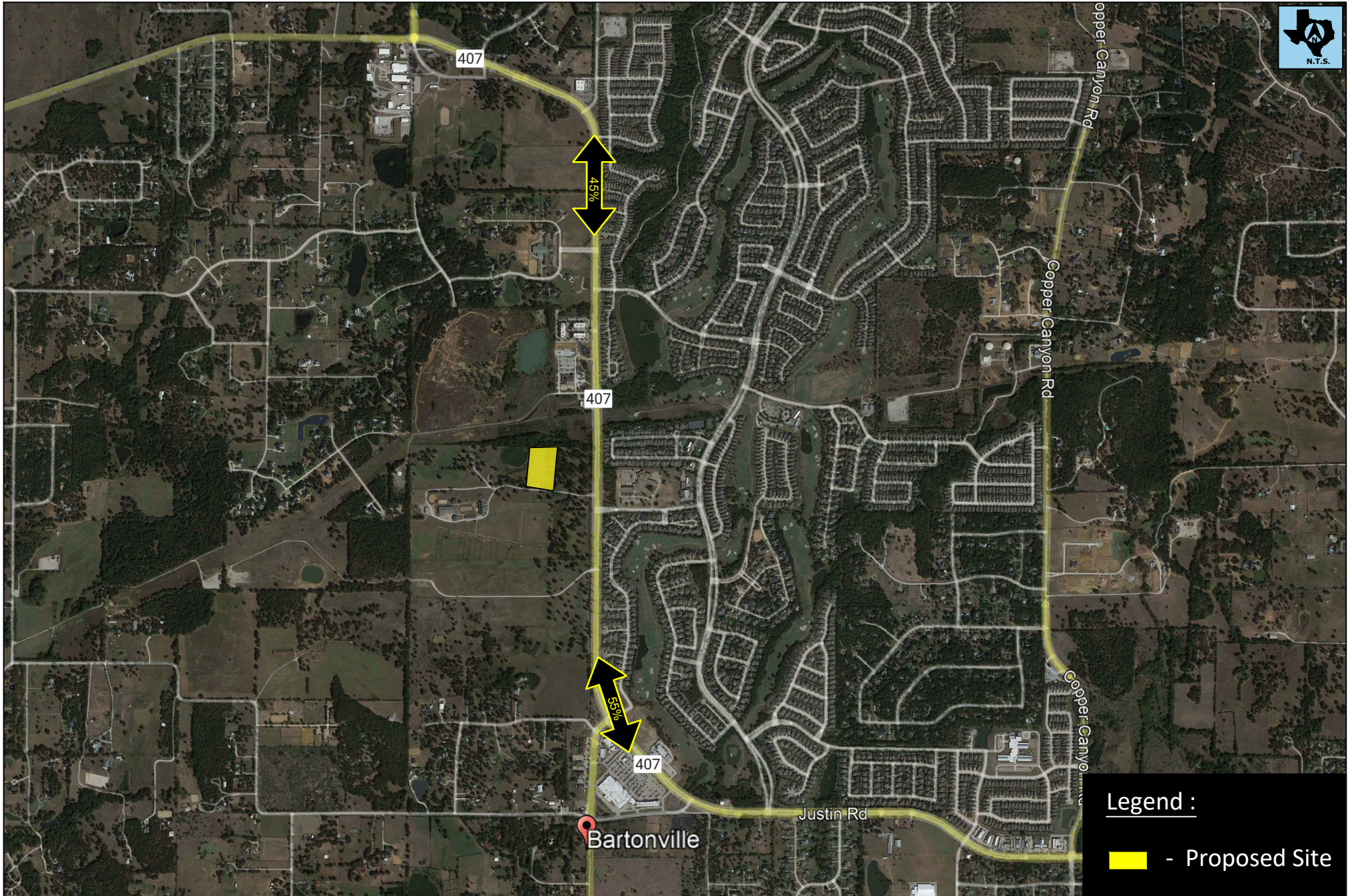


Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,  
Pasadena, TX, 77503, US



## Appendix C. Site-Generated Traffic Supplement



**Legend :**

 - Proposed Site

**GLOBAL DISTRIBUTION - WEEKDAY**

TIA for Bartonville ELTS School in Bartonville, Texas

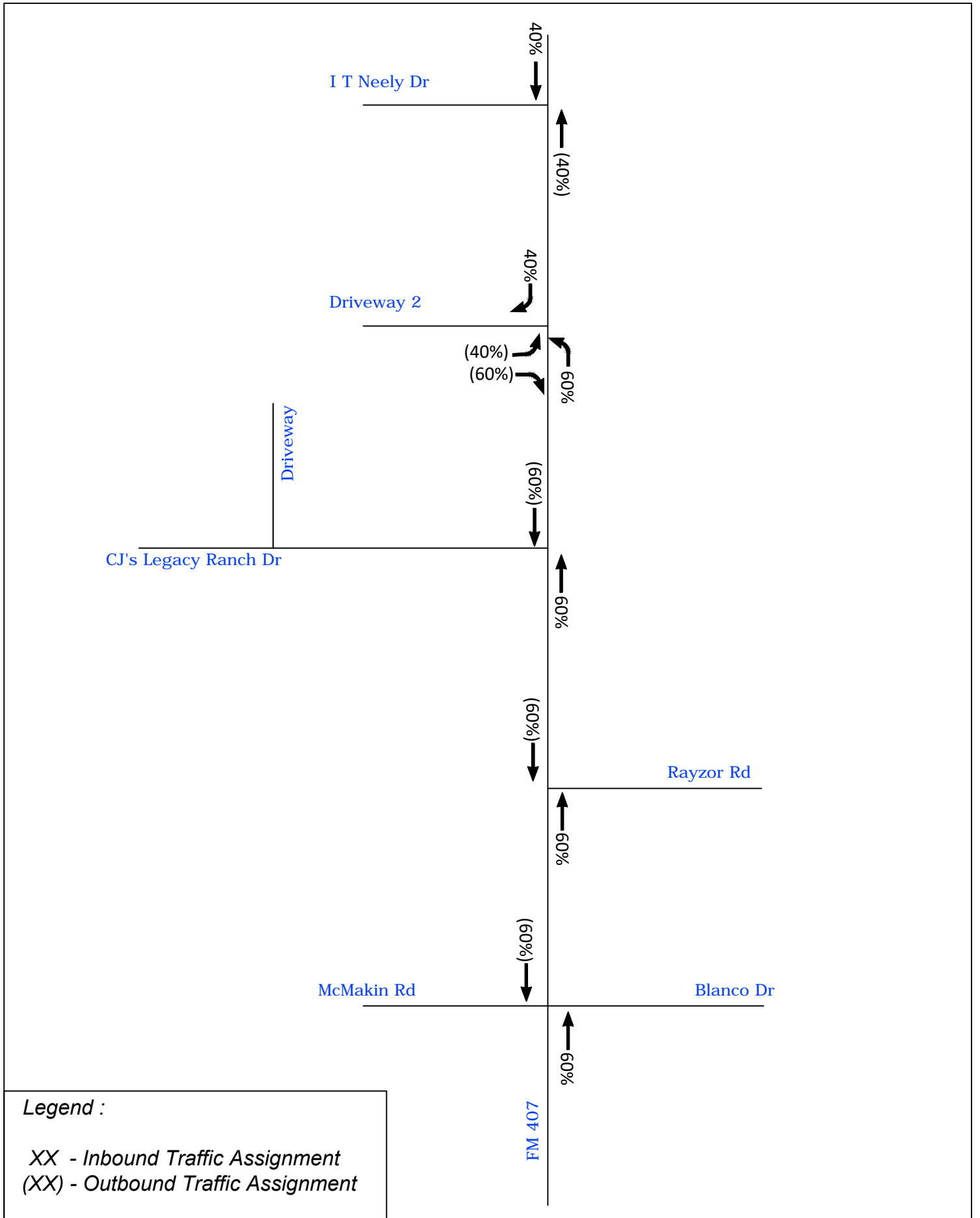
DGI PROJECT #:23031

DATE : APR.2023

PREPARED BY: RD

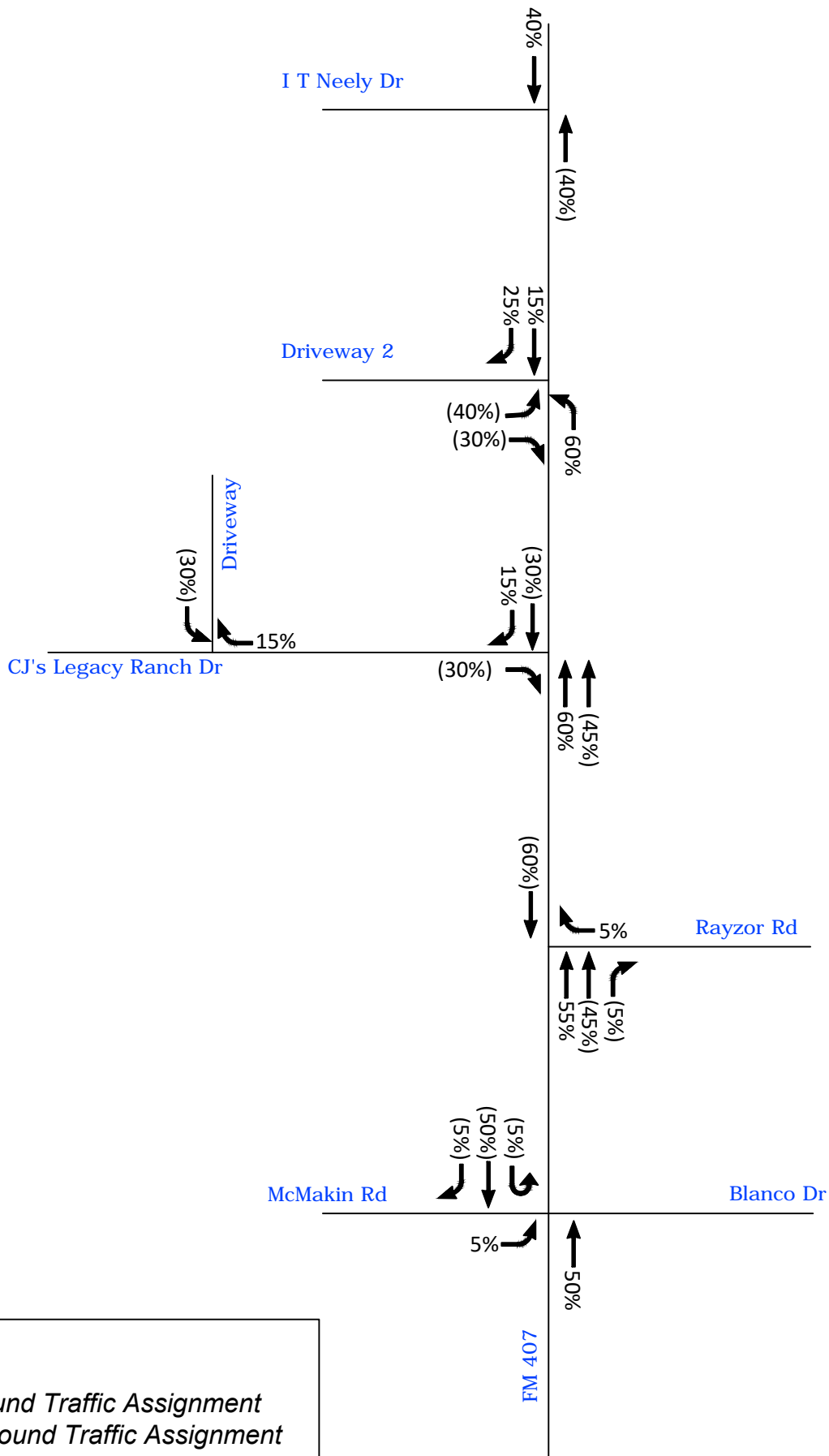
EXHIBIT

**C1**



**Legend :**

*XX - Inbound Traffic Assignment*  
*(XX) - Outbound Traffic Assignment*



**Legend :**

XX - Inbound Traffic Assignment  
 (XX) - Outbound Traffic Assignment

## Appendix D. Detailed Intersection Capacity Analysis Results

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2023 Existing  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	237	11	30	18	12	7	42	427	7	3	800	315
Future Volume (vph)	237	11	30	18	12	7	42	427	7	3	800	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	175	200	175	0	0	0	0
Storage Lanes	1	1	0	0	0	1	1	1	1	1	1	1
Taper Length (ft)	25			25			170			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850				0.973			0.850		0.850
Flt Protected	0.950				0.976		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	3361	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.488				0.928		0.287			0.490		
Satd. Flow (perm)	909	1863	1583	0	3196	0	535	3539	1583	913	3539	1583
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			73		7		127				335	
Link Speed (mph)	30				25			50			50	
Link Distance (ft)	180				124			512			2145	
Travel Time (s)	4.1				3.4			7.0			29.3	
Lane Group Flow (vph)	252	12	32	0	39	0	45	454	7	3	851	335
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	45.0	45.0
Total Split (s)	7.5	40.5	40.5	33.0	33.0		7.5	42.0	42.0	7.5	42.0	42.0
Total Split (%)	8.3%	45.0%	45.0%	36.7%	36.7%		8.3%	46.7%	46.7%	8.3%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	Max
Act Effect Green (s)	10.4	10.4	10.4		6.2		43.0	42.4	42.4	41.3	39.6	39.6
Actuated g/C Ratio	0.16	0.16	0.16		0.10		0.68	0.67	0.67	0.65	0.63	0.63
v/c Ratio	1.22	0.04	0.10		0.12		0.11	0.19	0.01	0.00	0.38	0.30
Control Delay	164.1	21.9	1.9		25.1		4.6	5.2	0.0	4.3	7.9	1.8
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	164.1	21.9	1.9		25.1		4.6	5.2	0.0	4.3	7.9	1.8
LOS	F	C	A		C		A	A	A	A	A	A
Approach Delay		140.8			25.1			5.1			6.2	
Approach LOS		F			C			A			A	
Queue Length 50th (ft)	-113	4	0		6		5	31	0	0	98	0
Queue Length 95th (ft)	#253	16	5		20		15	72	0	3	143	32
Internal Link Dist (ft)		100			44			432			2065	
Turn Bay Length (ft)							175		200	175		175
Base Capacity (vph)	206	1071	941		1459		422	2372	1103	636	2215	1116

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

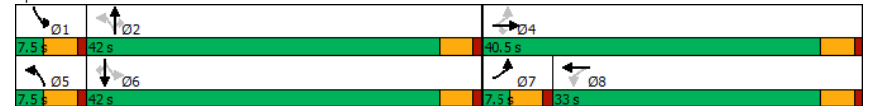
2023 Existing  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0	0		0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0		0	0	0	0	0	0
Reduced v/c Ratio	1.22	0.01	0.03		0.03		0.11	0.19	0.01	0.00	0.38	0.30

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	63.3
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.22
Intersection Signal Delay:	25.9
Intersection Capacity Utilization:	57.3%
ICU Level of Service:	B
Analysis Period (min):	15
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2023 Existing  
Timing Plan: AM

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕↕	↕↕	↔
Traffic Vol, veh/h	28	9	47	782	1215	39
Future Vol, veh/h	28	9	47	782	1215	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	280	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	3	3
Mvmt Flow	29	9	49	823	1279	41

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	1789	640	1320	0	0
Stage 1	1279	-	-	-	-
Stage 2	510	-	-	-	-
Critical Hdwy	6.84	6.94	4.16	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.23	-	-
Pot Cap-1 Maneuver	72	418	514	-	-
Stage 1	225	-	-	-	-
Stage 2	568	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	65	418	514	-	-
Mov Cap-2 Maneuver	65	-	-	-	-
Stage 1	204	-	-	-	-
Stage 2	568	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	83.5	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	514	-	82	-	-
HCM Lane V/C Ratio	0.096	-	0.475	-	-
HCM Control Delay (s)	12.7	-	83.5	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.3	-	2	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2023 Existing  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↔		↕↕	↕↕	
Traffic Vol, veh/h	0	1	0	827	1236	0
Future Vol, veh/h	0	1	0	827	1236	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	1	0	889	1329	0

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	665	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	403	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	403	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	403	-	-
HCM Lane V/C Ratio	-	0.003	-	-
HCM Control Delay (s)	-	14	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-



HCM 6th TWSC  
3: CJ Legacy Ranch Dr & Driveway

2023 Existing  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	1	0	0	0	0
Future Vol, veh/h	0	1	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	0	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	0
Stage 1	-	-	1
Stage 2	-	-	1
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1622	-	1021
Stage 1	-	-	1022
Stage 2	-	-	1022
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1622	-	1021
Mov Cap-2 Maneuver	-	-	1021
Stage 1	-	-	1022
Stage 2	-	-	1022

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1622	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC  
4: FM 407 & Rayzor Rd

2023 Existing  
Timing Plan: AM

Intersection							
Int Delay, s/veh	1.6						
Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	30	120	689	10	4	50	1187
Future Vol, veh/h	30	120	689	10	4	50	1187
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	0	-	180	-	225	-
Veh in Median Storage, #	0	-	0	-	-	-	0
Grade, %	0	-	0	-	-	-	0
Peak Hour Factor	97	97	97	97	92	97	97
Heavy Vehicles, %	2	2	2	2	2	3	3
Mvmt Flow	31	124	710	10	4	52	1224

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1434	355	0
Stage 1	710	-	-
Stage 2	724	-	-
Critical Hdwy	6.84	6.94	6.44
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.52
Pot Cap-1 Maneuver	125	641	509
Stage 1	448	-	-
Stage 2	441	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	116	641	802
Mov Cap-2 Maneuver	116	-	-
Stage 1	448	-	-
Stage 2	410	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	116	641	802	-
HCM Lane V/C Ratio	-	-	0.267	0.193	0.07	-
HCM Control Delay (s)	-	-	47	12	9.8	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q(veh)	-	-	1	0.7	0.2	-

HCM 6th TWSC  
6: FM 407 & Driveway 2

2023 Existing  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	0	827	1236	0
Future Vol, veh/h	0	0	0	827	1236	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	899	1343	0

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	1793	672	1343	0	0
Stage 1	1343	-	-	-	-
Stage 2	450	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-
Pot Cap-1 Maneuver	72	398	509	-	-
Stage 1	208	-	-	-	-
Stage 2	609	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	72	398	509	-	-
Mov Cap-2 Maneuver	72	-	-	-	-
Stage 1	208	-	-	-	-
Stage 2	609	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	509	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2023 Existing  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	493	11	41	9	8	5	1	48	817	11	1	2
Future Volume (vph)	493	11	41	9	8	5	1	48	817	11	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	0	0	175	200	0	0	175
Storage Lanes	1	1	1	0	0	0	0	1	1	1	0	1
Taper Length (ft)	25			25				170				100
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00
Frt			0.850					0.966				0.850
Flt Protected	0.950				0.980			0.950				0.950
Satd. Flow (prot)	1770	1863	1583	0	3351	0	0	1770	3539	1583	0	1770
Flt Permitted	0.588				0.955			0.306				0.295
Satd. Flow (perm)	1095	1863	1583	0	3265	0	0	570	3539	1583	0	550
Right Turn on Red			Yes		Yes				Yes			Yes
Satd. Flow (RTOR)			73		5				127			127
Link Speed (mph)	30				25				50			
Link Distance (ft)	180				124				512			
Travel Time (s)	4.1				3.4				7.0			
Lane Group Flow (vph)	503	11	42	0	22	0	0	50	834	11	0	3
Turn Type	pm+pt	NA	Perm	Perm	NA		custom	pm+pt	NA	Perm	custom	pm+pt
Protected Phases	7	4			8			5	2			1
Permitted Phases	4		4	8			5	2		2	1	6
Detector Phase	7	4	4	8	8		5	5	2	2	1	1
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	9.5	45.0	45.0	9.5	9.5
Total Split (s)	20.0	35.0	35.0	15.0	15.0		10.0	10.0	45.0	45.0	10.0	10.0
Total Split (%)	22.2%	38.9%	38.9%	16.7%	16.7%		11.1%	11.1%	50.0%	50.0%	11.1%	11.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	None	Max	Max	None	None
Act Effct Green (s)	19.7	19.7	19.7		6.1			45.9	44.9	44.9		44.2
Actuated g/C Ratio	0.26	0.26	0.26		0.08			0.61	0.59	0.59		0.59
v/c Ratio	1.18	0.02	0.09		0.08			0.11	0.40	0.01		0.01
Control Delay	131.6	21.4	2.6		31.4			7.4	10.2	0.0		7.3
Queue Delay	0.0	0.0	0.0		0.0			0.0	0.0	0.0		0.0
Total Delay	131.6	21.4	2.6		31.4			7.4	10.2	0.0		7.3
LOS	F	C	A		C			A	B	A		A
Approach Delay		119.7			31.4				9.9			
Approach LOS		F			C				A			
Queue Length 50th (ft)	-316	4	0		4			7	73	0		1
Queue Length 95th (ft)	#499	16	10		16			25	211	0		4
Internal Link Dist (ft)		100			44				432			
Turn Bay Length (ft)								175		200		175
Base Capacity (vph)	426	764	693		465			435	2106	993		412

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2023 Existing  
Timing Plan: PM

Lane Group	SBT	SBR
Lane Configurations	↓	↘
Traffic Volume (vph)	718	209
Future Volume (vph)	718	209
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		175
Storage Lanes		1
Taper Length (ft)		
Lane Util. Factor	0.95	1.00
Frt		0.850
Flt Protected		
Satd. Flow (prot)	3539	1583
Flt Permitted		
Satd. Flow (perm)	3539	1583
Right Turn on Red		Yes
Satd. Flow (RTOR)		213
Link Speed (mph)	50	
Link Distance (ft)	2145	
Travel Time (s)	29.3	
Lane Group Flow (vph)	733	213
Turn Type	NA	Perm
Protected Phases	6	
Permitted Phases	6	6
Detector Phase	6	6
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	45.0	45.0
Total Split (s)	45.0	45.0
Total Split (%)	50.0%	50.0%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	4.5	4.5
Lead/Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	Max	Max
Act Effct Green (s)	41.2	41.2
Actuated g/C Ratio	0.55	0.55
v/c Ratio	0.38	0.22
Control Delay	12.3	2.7
Queue Delay	0.0	0.0
Total Delay	12.3	2.7
LOS	B	A
Approach Delay	10.1	
Approach LOS	B	
Queue Length 50th (ft)	96	0
Queue Length 95th (ft)	181	35
Internal Link Dist (ft)	2065	
Turn Bay Length (ft)		175
Base Capacity (vph)	1929	959

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2023 Existing  
Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Starvation Cap Reductn	0	0	0		0			0	0	0		0
Spillback Cap Reductn	0	0	0		0			0	0	0		0
Storage Cap Reductn	0	0	0		0			0	0	0		0
Reduced v/c Ratio	1.18	0.01	0.06		0.05			0.11	0.40	0.01		0.01

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 75.5  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.18  
 Intersection Signal Delay: 35.4 Intersection LOS: D  
 Intersection Capacity Utilization 72.0% ICU Level of Service C  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2023 Existing  
Timing Plan: PM



Lane Group	SBT	SBR
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.38	0.22

Intersection Summary

HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2023 Existing  
Timing Plan: PM

Intersection								
Int Delay, s/veh	1.5							
Movement	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	23	17	1	65	1193	1	1002	62
Future Vol, veh/h	23	17	1	65	1193	1	1002	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	-	None
Storage Length	0	-	-	280	-	-	-	300
Veh in Median Storage, #	0	-	-	-	0	-	-	0
Grade, %	0	-	-	-	0	-	-	0
Peak Hour Factor	95	95	92	95	95	92	95	95
Heavy Vehicles, %	2	2	2	3	3	2	3	3
Mvmt Flow	24	18	1	68	1256	1	1055	65

Major/Minor	Minor2	Major1	Major2				
Conflicting Flow All	1823	528	1055	1120	0	1256	- 0
Stage 1	1057	-	-	-	-	-	-
Stage 2	766	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.16	-	6.44	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.23	-	2.52	-
Pot Cap-1 Maneuver	69	495	306	614	-	227	-
Stage 1	295	-	-	-	-	-	-
Stage 2	419	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	60	495	604	604	-	227	-
Mov Cap-2 Maneuver	60	-	-	-	-	-	-
Stage 1	261	-	-	-	-	-	-
Stage 2	414	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	69	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	604	-	96	-	-
HCM Lane V/C Ratio	0.115	-	0.439	-	-
HCM Control Delay (s)	11.7	-	69	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.4	-	1.8	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2023 Existing  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↔		↔	↔	↔
Traffic Vol, veh/h	0	2	0	1267	1034	2
Future Vol, veh/h	0	2	0	1267	1034	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	2	0	1280	1044	2

Major/Minor	Minor2	Major1	Major2				
Conflicting Flow All	-	523	-	0	-	0	-
Stage 1	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-	-
Pot Cap-1 Maneuver	0	499	0	-	-	-	-
Stage 1	0	-	0	-	-	-	-
Stage 2	0	-	0	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	499	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	499	-	-
HCM Lane V/C Ratio	-	0.004	-	-
HCM Control Delay (s)	-	12.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

HCM 6th TWSC  
3: CJ Legacy Ranch Dr & Driveway

2023 Existing  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	2	0	0	0	0
Future Vol, veh/h	0	2	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1	0	0	3	1
Stage 1	-	-	-	1	-
Stage 2	-	-	-	2	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1622	-	-	1019	1084
Stage 1	-	-	-	1022	-
Stage 2	-	-	-	1021	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	1019	1084
Mov Cap-2 Maneuver	-	-	-	1019	-
Stage 1	-	-	-	1022	-
Stage 2	-	-	-	1021	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1622	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC  
4: FM 407 & Rayzor Rd

2023 Existing  
Timing Plan: PM

Intersection							
Int Delay, s/veh	1.8						
Movement	WBL	WBR	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	21	60	1192	45	9	51	1001
Future Vol, veh/h	21	60	1192	45	9	51	1001
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	-	None
Storage Length	0	0	-	180	-	225	-
Veh in Median Storage, #	0	-	0	-	-	-	0
Grade, %	0	-	0	-	-	-	0
Peak Hour Factor	95	95	95	95	92	95	95
Heavy Vehicles, %	2	2	2	2	2	3	3
Mvmt Flow	22	63	1255	47	10	54	1054

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1910	628	0	0	1255
Stage 1	1255	-	-	-	-
Stage 2	655	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	6.44
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.52
Pot Cap-1 Maneuver	60	426	-	-	227
Stage 1	232	-	-	-	-
Stage 2	479	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	51	426	-	-	415
Mov Cap-2 Maneuver	51	-	-	-	-
Stage 1	232	-	-	-	-
Stage 2	406	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	42.5	0	0.9
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	51	426	415	-
HCM Lane V/C Ratio	-	-	0.433	0.148	0.153	-
HCM Control Delay (s)	-	-	121.4	14.9	15.2	-
HCM Lane LOS	-	-	F	B	C	-
HCM 95th %tile Q(veh)	-	-	1.6	0.5	0.5	-

HCM 6th TWSC  
6: FM 407

2023 Existing  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑↑	
Traffic Vol, veh/h	0	0	0	1267	1034	0
Future Vol, veh/h	0	0	0	1267	1034	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	1377	1124	0

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	1813	562	1124	0	0
Stage 1	1124	-	-	-	-
Stage 2	689	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-
Pot Cap-1 Maneuver	70	470	617	-	-
Stage 1	272	-	-	-	-
Stage 2	460	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	70	470	617	-	-
Mov Cap-2 Maneuver	70	-	-	-	-
Stage 1	272	-	-	-	-
Stage 2	460	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	617	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2024 Background  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	242	11	31	18	12	7	43	436	7	3	816	321
Future Volume (vph)	242	11	31	18	12	7	43	436	7	3	816	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	175	200	175	0	0	0	0
Storage Lanes	1	1	0	0	0	1	1	1	1	1	1	1
Taper Length (ft)	25			25			170			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850				0.973			0.850		0.850
Flt Protected	0.950				0.976		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	3361	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.488				0.928		0.280			0.485		
Satd. Flow (perm)	909	1863	1583	0	3196	0	522	3539	1583	903	3539	1583
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			73		7		127					341
Link Speed (mph)	30				25		50			50		
Link Distance (ft)	180				124		512			2145		
Travel Time (s)	4.1				3.4		7.0			29.3		
Lane Group Flow (vph)	257	12	33	0	39	0	46	464	7	3	868	341
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	45.0	45.0
Total Split (s)	7.5	40.5	40.5	33.0	33.0		7.5	42.0	42.0	7.5	42.0	42.0
Total Split (%)	8.3%	45.0%	45.0%	36.7%	36.7%		8.3%	46.7%	46.7%	8.3%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	Max
Act Effect Green (s)	10.4	10.4	10.4		6.2		42.9	42.3	42.3	41.2	39.5	39.5
Actuated g/C Ratio	0.16	0.16	0.16		0.10		0.68	0.67	0.67	0.65	0.62	0.62
v/c Ratio	1.25	0.04	0.10		0.12		0.11	0.20	0.01	0.00	0.39	0.31
Control Delay	172.2	21.9	2.2		25.1		4.7	5.3	0.0	4.3	8.0	1.8
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	172.2	21.9	2.2		25.1		4.7	5.3	0.0	4.3	8.0	1.8
LOS	F	C	A		C		A	A	A	A	A	A
Approach Delay		147.6			25.1			5.1			6.2	
Approach LOS		F			C			A			A	
Queue Length 50th (ft)	-118	4	0		6		5	32	0	0	101	0
Queue Length 95th (ft)	#258	16	6		20		15	73	0	3	147	32
Internal Link Dist (ft)		100			44			432			2065	
Turn Bay Length (ft)							175		200	175		175
Base Capacity (vph)	206	1073	943		1462		413	2370	1102	630	2213	1117

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

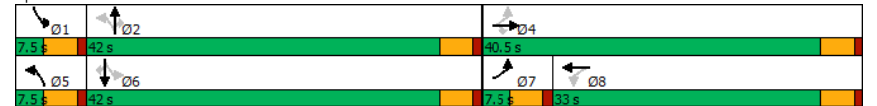
2024 Background  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0	0		0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0		0	0	0	0	0	0
Reduced v/c Ratio	1.25	0.01	0.03		0.03		0.11	0.20	0.01	0.00	0.39	0.31

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	63.2
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.25
Intersection Signal Delay:	27.0
Intersection Capacity Utilization:	58.0%
ICU Level of Service:	B
Analysis Period (min):	15
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr





HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2024 Background  
Timing Plan: AM

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕↕	↕↕	↔
Traffic Vol, veh/h	29	9	48	798	1239	40
Future Vol, veh/h	29	9	48	798	1239	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	280	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	3	3
Mvmt Flow	31	9	51	840	1304	42

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	1826	652	1346	0	0
Stage 1	1304	-	-	-	-
Stage 2	522	-	-	-	-
Critical Hdwy	6.84	6.94	4.16	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.23	-	-
Pot Cap-1 Maneuver	68	411	502	-	-
Stage 1	218	-	-	-	-
Stage 2	560	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	61	411	502	-	-
Mov Cap-2 Maneuver	61	-	-	-	-
Stage 1	196	-	-	-	-
Stage 2	560	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	96	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	502	-	76	-	-
HCM Lane V/C Ratio	0.101	-	0.526	-	-
HCM Control Delay (s)	13	-	96	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.3	-	2.2	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2024 Background  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↔		↕↕	↕↕	
Traffic Vol, veh/h	0	1	0	844	1261	0
Future Vol, veh/h	0	1	0	844	1261	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	1	0	908	1356	0

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	678	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	395	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	395	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	395	-	-
HCM Lane V/C Ratio	-	0.003	-	-
HCM Control Delay (s)	-	14.1	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

HCM 6th TWSC  
3: CJ Legacy Ranch Dr & Driveway

2024 Background  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	1	0	0	0	0
Future Vol, veh/h	0	1	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	0	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	0
Stage 1	-	-	1
Stage 2	-	-	1
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1622	-	1021
Stage 1	-	-	1022
Stage 2	-	-	1022
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1622	-	1021
Mov Cap-2 Maneuver	-	-	1021
Stage 1	-	-	1022
Stage 2	-	-	1022

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1622	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC  
4: FM 407 & Rayzor Rd

2024 Background  
Timing Plan: AM

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	31	122	703	10	51	1211
Future Vol, veh/h	31	122	703	10	51	1211
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	32	126	725	10	53	1248

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1455	363	0
Stage 1	725	-	-
Stage 2	730	-	-
Critical Hdwy	6.84	6.94	4.16
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.23
Pot Cap-1 Maneuver	121	634	860
Stage 1	440	-	-
Stage 2	438	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	113	634	860
Mov Cap-2 Maneuver	113	-	-
Stage 1	440	-	-
Stage 2	411	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.6	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	113	634	860	-
HCM Lane V/C Ratio	-	-	0.283	0.198	0.061	-
HCM Control Delay (s)	-	-	49	12.1	9.5	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q(veh)	-	-	1.1	0.7	0.2	-

HCM 6th TWSC  
6: FM 407 & Driveway 2

2024 Background  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕↕		↕↕
Traffic Vol, veh/h	0	0	0	844	1261	0
Future Vol, veh/h	0	0	0	844	1261	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	917	1371	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1830	686	1371	0	-	0
Stage 1	1371	-	-	-	-	-
Stage 2	459	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	68	390	497	-	-	-
Stage 1	201	-	-	-	-	-
Stage 2	603	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	68	390	497	-	-	-
Mov Cap-2 Maneuver	68	-	-	-	-	-
Stage 1	201	-	-	-	-	-
Stage 2	603	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	497	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2024 Background  
Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↕
Traffic Volume (vph)	503	11	42	9	8	5	49	833	11	1	2	732
Future Volume (vph)	503	11	42	9	8	5	49	833	11	1	2	732
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		200		175	
Storage Lanes	1		1	0		0	1		1		1	
Taper Length (ft)	25			25			170				100	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frt			0.850				0.966				0.850	
Flt Protected	0.950				0.980		0.950				0.950	
Satd. Flow (prot)	1770	1863	1583	0	3351	0	1770	3539	1583	0	1770	3539
Flt Permitted	0.588				0.955		0.299				0.288	
Satd. Flow (perm)	1095	1863	1583	0	3265	0	557	3539	1583	0	536	3539
Right Turn on Red			Yes		Yes		Yes		Yes			
Satd. Flow (RTOR)			73		5				127			
Link Speed (mph)	30				25			50				50
Link Distance (ft)	180				124			512				2145
Travel Time (s)	4.1				3.4			7.0				29.3
Lane Group Flow (vph)	513	11	43	0	22	0	50	850	11	0	3	747
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	custom	pm+pt	NA
Protected Phases	7	4			8		5	2			1	6
Permitted Phases	4		4	8			2		2	1	6	
Detector Phase	7	4	4	8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	9.5	45.0
Total Split (s)	20.0	35.0	35.0	15.0	15.0		10.0	45.0	45.0	10.0	10.0	45.0
Total Split (%)	22.2%	38.9%	38.9%	16.7%	16.7%		11.1%	50.0%	50.0%	11.1%	11.1%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	None	Max
Act Effect Green (s)	19.7	19.7	19.7		6.1		45.9	44.9	44.9		44.2	41.2
Actuated g/C Ratio	0.26	0.26	0.26		0.08		0.61	0.59	0.59		0.59	0.55
v/c Ratio	1.20	0.02	0.09		0.08		0.12	0.40	0.01		0.01	0.39
Control Delay	140.5	21.4	2.6		31.4		7.4	10.3	0.0		7.3	12.3
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	140.5	21.4	2.6		31.4		7.4	10.3	0.0		7.3	12.3
LOS	F	C	A		C		A	B	A		A	B
Approach Delay		127.8			31.4			10.0				10.2
Approach LOS		F			C			A				B
Queue Length 50th (ft)	-326	4	0		4		7	75	0		1	98
Queue Length 95th (ft)	#512	16	11		16		25	216	0		4	185
Internal Link Dist (ft)		100			44			432				2065
Turn Bay Length (ft)							175		200		175	
Base Capacity (vph)	426	764	693		465		428	2106	993		405	1929

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2024 Background  
Timing Plan: PM



Lane Group	SBR
Lane Configurations	↕
Traffic Volume (vph)	213
Future Volume (vph)	213
Ideal Flow (vphpl)	1900
Storage Length (ft)	175
Storage Lanes	1
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Right Turn on Red	Yes
Satd. Flow (RTOR)	217
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Lane Group Flow (vph)	217
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	45.0
Total Split (s)	45.0
Total Split (%)	50.0%
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	4.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effect Green (s)	41.2
Actuated g/C Ratio	0.55
v/c Ratio	0.23
Control Delay	2.7
Queue Delay	0.0
Total Delay	2.7
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	36
Internal Link Dist (ft)	
Turn Bay Length (ft)	175
Base Capacity (vph)	961

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2024 Background  
Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Starvation Cap Reductn	0	0	0		0		0	0	0		0	0
Spillback Cap Reductn	0	0	0		0		0	0	0		0	0
Storage Cap Reductn	0	0	0		0		0	0	0		0	0
Reduced v/c Ratio	1.20	0.01	0.06		0.05		0.12	0.40	0.01		0.01	0.39

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 75.5  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.20  
 Intersection Signal Delay: 37.3 Intersection LOS: D  
 Intersection Capacity Utilization 73.0% ICU Level of Service C  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2024 Background  
Timing Plan: PM



Lane Group	SBR
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.23

Intersection Summary

HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2024 Background  
Timing Plan: PM

Intersection							
Int Delay, s/veh	1.6						
Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	23	17	1	66	1217	1022	63
Future Vol, veh/h	23	17	1	66	1217	1022	63
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	280	-	-	300
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	95	95	92	95	95	95	95
Heavy Vehicles, %	2	2	2	3	3	3	3
Mvmt Flow	24	18	1	69	1281	1076	66

Major/Minor	Minor2	Major1	Major2				
Conflicting Flow All	1857	538	1076	1142	0	-	0
Stage 1	1076	-	-	-	-	-	-
Stage 2	781	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.16	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.23	-	-	-
Pot Cap-1 Maneuver	65	488	297	602	-	-	-
Stage 1	289	-	-	-	-	-	-
Stage 2	412	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	57	488	592	592	-	-	-
Mov Cap-2 Maneuver	57	-	-	-	-	-	-
Stage 1	254	-	-	-	-	-	-
Stage 2	412	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	74.8	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	592	-	91	-	-
HCM Lane V/C Ratio	0.119	-	0.463	-	-
HCM Control Delay (s)	11.9	-	74.8	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.4	-	2	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2024 Background  
Timing Plan: PM

Intersection							
Int Delay, s/veh	0						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↔		↔	↔	↔	
Traffic Vol, veh/h	0	2	0	1292	1055	2	
Future Vol, veh/h	0	2	0	1292	1055	2	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	0	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	99	99	99	99	99	99	
Heavy Vehicles, %	2	2	2	2	2	3	
Mvmt Flow	0	2	0	1305	1066	2	

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	534	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	491	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	491	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	491	-	-
HCM Lane V/C Ratio	-	0.004	-	-
HCM Control Delay (s)	-	12.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

HCM 6th TWSC  
3: CJ Legacy Ranch Dr & Driveway

2024 Background  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	2	0	0	0	0
Future Vol, veh/h	0	2	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	0	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	3
Stage 1	-	-	1
Stage 2	-	-	2
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.318
Pot Cap-1 Maneuver	1622	-	1019
Stage 1	-	-	1022
Stage 2	-	-	1021
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1622	-	1019
Mov Cap-2 Maneuver	-	-	1019
Stage 1	-	-	1022
Stage 2	-	-	1021

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1622	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC  
4: FM 407 & Rayzor Rd

2024 Background  
Timing Plan: PM

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	21	61	1216	46	52	1021
Future Vol, veh/h	21	61	1216	46	52	1021
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	22	64	1280	48	55	1075

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1928	640	1328
Stage 1	1280	-	-
Stage 2	648	-	-
Critical Hdwy	6.84	6.94	4.16
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.23
Pot Cap-1 Maneuver	58	418	510
Stage 1	225	-	-
Stage 2	483	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	52	418	510
Mov Cap-2 Maneuver	52	-	-
Stage 1	225	-	-
Stage 2	431	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.5	0	0.6
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	52	418	510
HCM Lane V/C Ratio	-	-	0.425	0.154	0.107
HCM Control Delay (s)	-	-	118	15.2	12.9
HCM Lane LOS	-	-	F	C	B
HCM 95th %tile Q(veh)	-	-	1.6	0.5	0.4

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			↑↑		↑↑
Traffic Vol, veh/h	0	0	0	1292	1055	0
Future Vol, veh/h	0	0	0	1292	1055	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	1404	1147	0

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	1849	574	1147	0	- 0
Stage 1	1147	-	-	-	-
Stage 2	702	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-
Pot Cap-1 Maneuver	66	462	605	-	-
Stage 1	265	-	-	-	-
Stage 2	453	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	66	462	605	-	-
Mov Cap-2 Maneuver	66	-	-	-	-
Stage 1	265	-	-	-	-
Stage 2	453	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	605	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-



Timings 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↔	↕	↔	↔	↔	↔	↔	↕	↔	↔	↔	↕
Traffic Volume (vph)	252	11	31	18	12	7	43	545	7	10	3	914
Future Volume (vph)	252	11	31	18	12	7	43	545	7	10	3	914
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		200		175	
Storage Lanes	1		1	0		0	1		1		1	
Taper Length (ft)	25			25			170				100	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frt			0.850				0.973				0.850	
Flt Protected	0.950				0.976		0.950				0.950	
Satd. Flow (prot)	1770	1863	1583	0	3361	0	1770	3539	1583	0	1770	3539
Flt Permitted	0.488				0.928		0.241				0.434	
Satd. Flow (perm)	909	1863	1583	0	3196	0	449	3539	1583	0	808	3539
Right Turn on Red			Yes		Yes		Yes		Yes			
Satd. Flow (RTOR)			73		7		127					
Link Speed (mph)	30				25		50					50
Link Distance (ft)	180				124		512					2145
Travel Time (s)	4.1				3.4		7.0					29.3
Lane Group Flow (vph)	268	12	33	0	39	0	46	580	7	0	14	972
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	custom	pm+pt	NA
Protected Phases	7	4			8		5	2			1	6
Permitted Phases	4		4	8			2		2	1	6	
Detector Phase	7	4	4	8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	9.5	45.0
Total Split (s)	7.5	40.5	40.5	33.0	33.0		7.5	42.0	42.0	7.5	7.5	42.0
Total Split (%)	8.3%	45.0%	45.0%	36.7%	36.7%		8.3%	46.7%	46.7%	8.3%	8.3%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	None	Max
Act Effect Green (s)	10.4	10.4	10.4		6.2		42.7	42.1	42.1		41.0	39.4
Actuated g/C Ratio	0.17	0.17	0.17		0.10		0.68	0.67	0.67		0.65	0.63
v/c Ratio	1.29	0.04	0.10		0.12		0.13	0.25	0.01		0.02	0.44
Control Delay	191.3	21.9	2.2		25.1		4.8	5.5	0.0		4.3	8.4
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	191.3	21.9	2.2		25.1		4.8	5.5	0.0		4.3	8.4
LOS	F	C	A		C		A	A	A		A	A
Approach Delay		164.8			25.1			5.4				6.6
Approach LOS		F			C			A				A
Queue Length 50th (ft)	-128	4	0		6		5	42	0		2	117
Queue Length 95th (ft)	#271	16	6		20		15	92	0		7	170
Internal Link Dist (ft)		100			44			432				2065
Turn Bay Length (ft)							175		200		175	
Base Capacity (vph)	207	1077	946		1467		367	2367	1101		572	2210

Timings 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

Lane Group	SBR
Lane Configurations	↕
Traffic Volume (vph)	331
Future Volume (vph)	331
Ideal Flow (vphpl)	1900
Storage Length (ft)	175
Storage Lanes	1
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Right Turn on Red	Yes
Satd. Flow (RTOR)	352
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Lane Group Flow (vph)	352
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	45.0
Total Split (s)	42.0
Total Split (%)	46.7%
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	4.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effect Green (s)	39.4
Actuated g/C Ratio	0.63
v/c Ratio	0.31
Control Delay	1.9
Queue Delay	0.0
Total Delay	1.9
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	33
Internal Link Dist (ft)	
Turn Bay Length (ft)	175
Base Capacity (vph)	1120

Timings 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

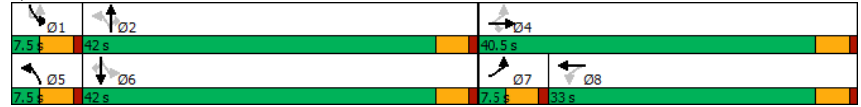


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.29	0.01	0.03	0.03	0.13	0.25	0.01	0.02	0.44			

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 63  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.29  
 Intersection Signal Delay: 27.9 Intersection LOS: C  
 Intersection Capacity Utilization 61.3% ICU Level of Service B  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



Timings 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM



Lane Group	SBR
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.31

Intersection Summary

HCM 6th TWSC 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
 1: FM 407 & I T Neely Dr Timing Plan: AM

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑	↑	↑	↑↑	↑↑	↑
Traffic Vol, veh/h	29	9	48	876	1326	40
Future Vol, veh/h	29	9	48	876	1326	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	280	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	3	3
Mvmt Flow	31	9	51	922	1396	42

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	1959	698	1438	0	0
Stage 1	1396	-	-	-	-
Stage 2	563	-	-	-	-
Critical Hdwy	6.84	6.94	4.16	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.23	-	-
Pot Cap-1 Maneuver	56	383	463	-	-
Stage 1	195	-	-	-	-
Stage 2	534	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	50	383	463	-	-
Mov Cap-2 Maneuver	50	-	-	-	-
Stage 1	174	-	-	-	-
Stage 2	534	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	131.9	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	463	-	63	-	-
HCM Lane V/C Ratio	0.109	-	0.635	-	-
HCM Control Delay (s)	13.7	-	131.9	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.4	-	2.7	-	-

HCM 6th TWSC 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
 2: CJ Legacy Ranch Dr & FM 407 Timing Plan: AM

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↑		↑↑	↑↑	
Traffic Vol, veh/h	0	60	0	974	1320	32
Future Vol, veh/h	0	60	0	974	1320	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	65	0	1047	1419	34

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	727	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	366	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	366	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.9	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	366	-	-
HCM Lane V/C Ratio	-	0.176	-	-
HCM Control Delay (s)	-	16.9	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.6	-	-

HCM 6th TWSC 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
 3: CJ Legacy Ranch Dr & Driveway Timing Plan: AM

Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	1	0	32	59	0
Future Vol, veh/h	0	1	0	32	59	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	35	64	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	35	0	0	19	18	
Stage 1	-	-	-	18	-	
Stage 2	-	-	-	1	-	
Critical Hdwy	4.12	-	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	5.42	-	
Follow-up Hdwy	2.218	-	-	3.518	3.318	
Pot Cap-1 Maneuver	1576	-	-	998	1061	
Stage 1	-	-	-	1005	-	
Stage 2	-	-	-	1022	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	1576	-	-	998	1061	
Mov Cap-2 Maneuver	-	-	-	998	-	
Stage 1	-	-	-	1005	-	
Stage 2	-	-	-	1022	-	
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	8.9			
HCM LOS			A			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1576	-	-	-	998	
HCM Lane V/C Ratio	-	-	-	-	0.064	
HCM Control Delay (s)	0	-	-	-	8.9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

HCM 6th TWSC 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
 4: FM 407 & Rayzor Rd Timing Plan: AM

Intersection						
Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	31	133	822	20	51	1328
Future Vol, veh/h	31	133	822	20	51	1328
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	32	137	847	21	53	1369
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1638	424	0	0	868	0
Stage 1	847	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	91	579	-	-	765	-
Stage 1	381	-	-	-	-	-
Stage 2	407	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	85	579	-	-	765	-
Mov Cap-2 Maneuver	85	-	-	-	-	-
Stage 1	381	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	24	0	0.4			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	85	579	765	-
HCM Lane V/C Ratio	-	-	0.376	0.237	0.069	-
HCM Control Delay (s)	-	-	70.9	13.1	10.1	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	1.5	0.9	0.2	-

HCM 6th TWSC 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
 6: FM 407 & Driveway 2 Timing Plan: AM

Intersection						
Int Delay, s/veh	137.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑			↑↑	↑↑	
Traffic Vol, veh/h	78	59	130	844	1293	55
Future Vol, veh/h	78	59	130	844	1293	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	64	141	917	1405	60

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2176	733	1465	0	-	0
Stage 1	1435	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	- 40	363	457	-	-	-
Stage 1	186	-	-	-	-	-
Stage 2	432	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	- 15	363	457	-	-	-
Mov Cap-2 Maneuver	- 15	-	-	-	-	-
Stage 1	- 69	-	-	-	-	-
Stage 2	432	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	2427.1	5.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	457	-	26	-	-
HCM Lane V/C Ratio	0.309	-	5.727	-	-
HCM Control Delay (s)	16.4	-	3.92427.1	-	-
HCM Lane LOS	C	A	F	-	-
HCM 95th %tile Q(veh)	1.3	-	18.4	-	-

Notes  
 -: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Timings 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	504	11	42	9	8	5	49	844	11	3	2	756
Future Volume (vph)	504	11	42	9	8	5	49	844	11	3	2	756
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		200		175	
Storage Lanes	1		1	0		0	1		1		1	
Taper Length (ft)	25			25			170				100	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frt			0.850				0.966				0.850	
Flt Protected	0.950				0.980		0.950				0.950	
Satd. Flow (prot)	1770	1863	1583	0	3351	0	1770	3539	1583	0	1770	3539
Flt Permitted	0.588				0.955		0.289				0.283	
Satd. Flow (perm)	1095	1863	1583	0	3265	0	538	3539	1583	0	527	3539
Right Turn on Red			Yes		Yes		Yes		Yes			
Satd. Flow (RTOR)			73		5				127			
Link Speed (mph)	30				25			50				50
Link Distance (ft)	180				124			512				2145
Travel Time (s)	4.1				3.4			7.0				29.3
Lane Group Flow (vph)	514	11	43	0	22	0	50	861	11	0	5	771
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	custom	pm+pt	NA
Protected Phases	7	4			8		5	2			1	6
Permitted Phases	4		4	8			2		2	1	6	
Detector Phase	7	4	4	8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	9.5	45.0
Total Split (s)	20.0	35.0	35.0	15.0	15.0		10.0	45.0	45.0	10.0	10.0	45.0
Total Split (%)	22.2%	38.9%	38.9%	16.7%	16.7%		11.1%	50.0%	50.0%	11.1%	11.1%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	None	Max
Act Effect Green (s)	19.7	19.7	19.7		6.1		45.9	44.9	44.9		44.2	41.2
Actuated g/C Ratio	0.26	0.26	0.26		0.08		0.61	0.59	0.59		0.59	0.55
v/c Ratio	1.21	0.02	0.09		0.08		0.12	0.41	0.01		0.01	0.40
Control Delay	141.5	21.4	2.6		31.4		7.5	10.3	0.0		7.2	12.5
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	141.5	21.4	2.6		31.4		7.5	10.3	0.0		7.2	12.5
LOS	F	C	A		C		A	B	A		A	B
Approach Delay		128.6			31.4			10.0				10.3
Approach LOS		F			C			B				B
Queue Length 50th (ft)	-327	4	0		4		7	76	0		1	102
Queue Length 95th (ft)	#514	16	11		16		25	220	0		6	192
Internal Link Dist (ft)		100			44			432				2065
Turn Bay Length (ft)							175		200		175	
Base Capacity (vph)	426	764	693		465		418	2106	993		400	1929

Timings 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM

Lane Group	SBR
Lane Configurations	↔
Traffic Volume (vph)	215
Future Volume (vph)	215
Ideal Flow (vphpl)	1900
Storage Length (ft)	175
Storage Lanes	1
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Right Turn on Red	Yes
Satd. Flow (RTOR)	219
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Lane Group Flow (vph)	219
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	45.0
Total Split (s)	45.0
Total Split (%)	50.0%
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	4.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effect Green (s)	41.2
Actuated g/C Ratio	0.55
v/c Ratio	0.23
Control Delay	2.7
Queue Delay	0.0
Total Delay	2.7
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	36
Internal Link Dist (ft)	
Turn Bay Length (ft)	175
Base Capacity (vph)	962

Timings 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.21	0.01	0.06	0.05	0.12	0.41	0.01	0.01	0.01	0.01	0.40	0.40

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 75.5  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.21  
 Intersection Signal Delay: 37.2 Intersection LOS: D  
 Intersection Capacity Utilization 73.3% ICU Level of Service D  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



Timings 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM



Lane Group	SBR
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.23

Intersection Summary

HCM 6th TWSC 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
 1: FM 407 & I T Neely Dr Timing Plan: PM

Intersection							
Int Delay, s/veh	1.6						
Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	23	17	1	66	1235	1031	63
Future Vol, veh/h	23	17	1	66	1235	1031	63
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	280	-	-	300
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	95	95	92	95	95	95	95
Heavy Vehicles, %	2	2	2	3	3	3	3
Mvmt Flow	24	18	1	69	1300	1085	66

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1875	543	1085	1151	0	0
Stage 1	1085	-	-	-	-	-
Stage 2	790	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.16	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.23	-	-
Pot Cap-1 Maneuver	63	484	293	597	-	-
Stage 1	285	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	55	484	587	587	-	-
Mov Cap-2 Maneuver	55	-	-	-	-	-
Stage 1	251	-	-	-	-	-
Stage 2	408	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	78.8	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	587	-	88	-	-
HCM Lane V/C Ratio	0.12	-	0.478	-	-
HCM Control Delay (s)	12	-	78.8	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.4	-	2	-	-

HCM 6th TWSC 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
 2: CJ Legacy Ranch Dr & FM 407 Timing Plan: PM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↔		↔	↔	↔
Traffic Vol, veh/h	0	14	0	1306	1070	5
Future Vol, veh/h	0	14	0	1306	1070	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	14	0	1319	1081	5

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	543	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	484	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	484	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	484	-	-
HCM Lane V/C Ratio	-	0.029	-	-
HCM Control Delay (s)	-	12.7	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-



HCM 6th TWSC 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
 3: CJ Legacy Ranch Dr & Driveway Timing Plan: PM

Intersection						
Int Delay, s/veh	6.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	2	0	3	12	0
Future Vol, veh/h	0	2	0	3	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	3	13	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	3	0	0	4	2	
Stage 1	-	-	-	2	-	
Stage 2	-	-	-	2	-	
Critical Hdwy	4.12	-	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	5.42	-	
Follow-up Hdwy	2.218	-	-	3.518	3.318	
Pot Cap-1 Maneuver	1619	-	-	1018	1082	
Stage 1	-	-	-	1021	-	
Stage 2	-	-	-	1021	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	1619	-	-	1018	1082	
Mov Cap-2 Maneuver	-	-	-	1018	-	
Stage 1	-	-	-	1021	-	
Stage 2	-	-	-	1021	-	
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	8.6			
HCM LOS			A			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBR
Capacity (veh/h)	1619	-	-	-	1018	-
HCM Lane V/C Ratio	-	-	-	-	0.013	-
HCM Control Delay (s)	0	-	-	-	8.6	-
HCM Lane LOS	A	-	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0	-

HCM 6th TWSC 2024 Background Plus Site (Scenario 1-For Buses + Passenger Car)  
 4: FM 407 & Rayzor Rd Timing Plan: PM

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	21	62	1228	48	52	1049
Future Vol, veh/h	21	62	1228	48	52	1049
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	22	65	1293	51	55	1104
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1955	647	0	0	1344	0
Stage 1	1293	-	-	-	-	-
Stage 2	662	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	56	414	-	-	503	-
Stage 1	221	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	50	414	-	-	503	-
Mov Cap-2 Maneuver	50	-	-	-	-	-
Stage 1	221	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	43	0	0.6			
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	50	414	503	-
HCM Lane V/C Ratio	-	-	0.442	0.158	0.109	-
HCM Control Delay (s)	-	-	124.9	15.3	13	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	1.6	0.6	0.4	-

**Intersection**

Int Delay, s/veh	1.3					
<b>Movement</b>	<b>EBL</b>	<b>EBR</b>	<b>NBL</b>	<b>NBT</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations	↔	↔	↔	↕↕	↕↕	↔
Traffic Vol, veh/h	18	15	13	1292	1058	6
Future Vol, veh/h	18	15	13	1292	1058	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	16	14	1404	1150	7

<b>Major/Minor</b>	<b>Minor2</b>	<b>Major1</b>	<b>Major2</b>		
Conflicting Flow All	1884	579	1157	0	0
Stage 1	1154	-	-	-	-
Stage 2	730	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-
Pot Cap-1 Maneuver	62	458	600	-	-
Stage 1	262	-	-	-	-
Stage 2	438	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	55	458	600	-	-
Mov Cap-2 Maneuver	55	-	-	-	-
Stage 1	234	-	-	-	-
Stage 2	438	-	-	-	-

<b>Approach</b>	<b>EB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	67.2	0.7	0
HCM LOS	F		

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>EBLn1</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	600	-	92	-	-
HCM Lane V/C Ratio	0.024	-	0.39	-	-
HCM Control Delay (s)	11.1	0.6	67.2	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.1	-	1.6	-	-

Timings 2024 Background Plus Site (Scenario 2 - For Buses only)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

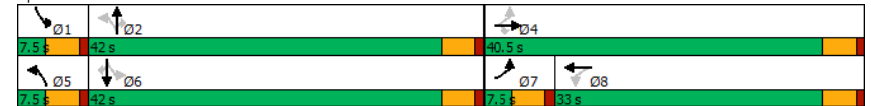
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	242	11	31	18	12	7	43	439	7	3	816	321
Future Volume (vph)	242	11	31	18	12	7	43	439	7	3	816	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	175	200	175	0	0	0	0
Storage Lanes	1	1	0	0	0	1	1	1	1	1	1	1
Taper Length (ft)	25			25			170			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850				0.973			0.850		0.850
Flt Protected	0.950				0.976		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	3361	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.488				0.928		0.280			0.484		
Satd. Flow (perm)	909	1863	1583	0	3196	0	522	3539	1583	902	3539	1583
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			73		7		127					341
Link Speed (mph)	30				25		50			50		
Link Distance (ft)	180				124		512			2145		
Travel Time (s)	4.1				3.4		7.0			29.3		
Lane Group Flow (vph)	257	12	33	0	39	0	46	467	7	3	868	341
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	45.0	45.0
Total Split (s)	7.5	40.5	40.5	33.0	33.0		7.5	42.0	42.0	7.5	42.0	42.0
Total Split (%)	8.3%	45.0%	45.0%	36.7%	36.7%		8.3%	46.7%	46.7%	8.3%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	Max
Act Effect Green (s)	10.4	10.4	10.4		6.2		42.9	42.3	42.3	41.2	39.5	39.5
Actuated g/C Ratio	0.16	0.16	0.16		0.10		0.68	0.67	0.67	0.65	0.62	0.62
v/c Ratio	1.25	0.04	0.10		0.12		0.11	0.20	0.01	0.00	0.39	0.31
Control Delay	172.2	21.9	2.2		25.1		4.7	5.3	0.0	4.3	8.0	1.8
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	172.2	21.9	2.2		25.1		4.7	5.3	0.0	4.3	8.0	1.8
LOS	F	C	A		C		A	A	A	A	A	A
Approach Delay		147.6			25.1			5.1			6.2	
Approach LOS		F			C			A			A	
Queue Length 50th (ft)	-118	4	0		6		5	32	0	0	101	0
Queue Length 95th (ft)	#258	16	6		20		15	74	0	3	147	32
Internal Link Dist (ft)		100			44			432			2065	
Turn Bay Length (ft)							175		200	175		175
Base Capacity (vph)	206	1073	943		1462		413	2370	1102	629	2213	1117

Timings 2024 Background Plus Site (Scenario 2 - For Buses only)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0	0		0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0		0	0	0	0	0	0
Reduced v/c Ratio	1.25	0.01	0.03		0.03		0.11	0.20	0.01	0.00	0.39	0.31

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 63.2  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.25  
 Intersection Signal Delay: 26.9 Intersection LOS: C  
 Intersection Capacity Utilization 58.0% ICU Level of Service B  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2024 Background Plus Site (Scenario 2 - For Buses only)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕↕	↕↕	↔
Traffic Vol, veh/h	29	9	48	798	1241	40
Future Vol, veh/h	29	9	48	798	1241	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	280	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	3	3
Mvmt Flow	31	9	51	840	1306	42

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	1828	653	1348	0	- 0
Stage 1	1306	-	-	-	-
Stage 2	522	-	-	-	-
Critical Hdwy	6.84	6.94	4.16	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.23	-	-
Pot Cap-1 Maneuver	68	410	502	-	-
Stage 1	218	-	-	-	-
Stage 2	560	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	61	410	502	-	-
Mov Cap-2 Maneuver	61	-	-	-	-
Stage 1	196	-	-	-	-
Stage 2	560	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	96	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	502	-	76	-	-
HCM Lane V/C Ratio	0.101	-	0.526	-	-
HCM Control Delay (s)	13	-	96	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.3	-	2.2	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2024 Background Plus Site (Scenario 2 - For Buses only)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↔		↕↕	↕↕	
Traffic Vol, veh/h	0	1	0	847	1261	1
Future Vol, veh/h	0	1	0	847	1261	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	1	0	911	1356	1

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	679	-	0	- 0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	394	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	394	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	394	-	-
HCM Lane V/C Ratio	-	0.003	-	-
HCM Control Delay (s)	-	14.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

HCM 6th TWSC  
3: CJ Legacy Ranch Dr & Driveway

2024 Background Plus Site (Scenario 2 - For Buses only)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	1	0	1	0	0
Future Vol, veh/h	0	1	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	1	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	2
Stage 1	-	-	1
Stage 2	-	-	1
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.318
Pot Cap-1 Maneuver	1622	-	1021
Stage 1	-	-	1022
Stage 2	-	-	1022
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1622	-	1021
Mov Cap-2 Maneuver	-	-	1021
Stage 1	-	-	1022
Stage 2	-	-	1022

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1622	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC  
4: FM 407 & Rayzor Rd

2024 Background Plus Site (Scenario 2 - For Buses only)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	31	122	706	10	51	1211
Future Vol, veh/h	31	122	706	10	51	1211
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	32	126	728	10	53	1248

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	1458	364	738
Stage 1	728	-	-
Stage 2	730	-	-
Critical Hdwy	6.84	6.94	4.16
Critical Hdwy Stg 1	5.84	-	-
Critical Hdwy Stg 2	5.84	-	-
Follow-up Hdwy	3.52	3.32	2.23
Pot Cap-1 Maneuver	120	633	857
Stage 1	439	-	-
Stage 2	438	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	113	633	857
Mov Cap-2 Maneuver	113	-	-
Stage 1	439	-	-
Stage 2	411	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.6	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	113	633	857	-
HCM Lane V/C Ratio	-	-	0.283	0.199	0.061	-
HCM Control Delay (s)	-	-	49	12.1	9.5	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q(veh)	-	-	1.1	0.7	0.2	-

HCM 6th TWSC  
6: FM 407 & Driveway 2

2024 Background Plus Site (Scenario 2 - For Buses only)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			↑↑	↑↑	
Traffic Vol, veh/h	0	0	3	846	1261	1
Future Vol, veh/h	0	0	3	846	1261	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	3	920	1371	1

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1838	686	1372	0	-	0
Stage 1	1372	-	-	-	-	-
Stage 2	466	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	67	390	496	-	-	-
Stage 1	201	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	66	390	496	-	-	-
Mov Cap-2 Maneuver	66	-	-	-	-	-
Stage 1	199	-	-	-	-	-
Stage 2	598	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	496	-	-	-	-
HCM Lane V/C Ratio	0.007	-	-	-	-
HCM Control Delay (s)	12.3	0.1	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Timings 2024 Background Plus Site (Scenario 2 -For Buses only)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	503	11	42	9	8	5	49	833	11	1	2	735
Future Volume (vph)	503	11	42	9	8	5	49	833	11	1	2	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		200		175	
Storage Lanes	1		1	0		0	1		1		1	
Taper Length (ft)	25			25			170				100	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frt			0.850				0.966				0.850	
Flt Protected	0.950				0.980		0.950				0.950	
Satd. Flow (prot)	1770	1863	1583	0	3351	0	1770	3539	1583	0	1770	3539
Flt Permitted	0.588				0.955		0.298				0.288	
Satd. Flow (perm)	1095	1863	1583	0	3265	0	555	3539	1583	0	536	3539
Right Turn on Red			Yes		Yes		Yes		Yes			
Satd. Flow (RTOR)			73		5				127			
Link Speed (mph)	30				25			50				50
Link Distance (ft)	180				124			512				2145
Travel Time (s)	4.1				3.4			7.0				29.3
Lane Group Flow (vph)	513	11	43	0	22	0	50	850	11	0	3	750
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	custom	pm+pt	NA
Protected Phases	7	4			8		5	2			1	6
Permitted Phases	4		4	8			2		2	1	6	
Detector Phase	7	4	4	8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	9.5	45.0
Total Split (s)	20.0	35.0	35.0	15.0	15.0		10.0	45.0	45.0	10.0	10.0	45.0
Total Split (%)	22.2%	38.9%	38.9%	16.7%	16.7%		11.1%	50.0%	50.0%	11.1%	11.1%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	None	Max
Act Effect Green (s)	19.7	19.7	19.7		6.1		45.9	44.9	44.9		44.2	41.2
Actuated g/C Ratio	0.26	0.26	0.26		0.08		0.61	0.59	0.59		0.59	0.55
v/c Ratio	1.20	0.02	0.09		0.08		0.12	0.40	0.01		0.01	0.39
Control Delay	140.5	21.4	2.6		31.4		7.4	10.3	0.0		7.3	12.3
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	140.5	21.4	2.6		31.4		7.4	10.3	0.0		7.3	12.3
LOS	F	C	A		C		A	B	A		A	B
Approach Delay		127.8			31.4			10.0				10.2
Approach LOS		F			C			A				B
Queue Length 50th (ft)	-326	4	0		4		7	75	0		1	98
Queue Length 95th (ft)	#512	16	11		16		25	216	0		4	186
Internal Link Dist (ft)		100			44			432				2065
Turn Bay Length (ft)							175		200		175	
Base Capacity (vph)	426	764	693		465		427	2106	993		405	1929

Timings 2024 Background Plus Site (Scenario 2 -For Buses only)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM

Lane Group	SBR
Lane Configurations	↔
Traffic Volume (vph)	213
Future Volume (vph)	213
Ideal Flow (vphpl)	1900
Storage Length (ft)	175
Storage Lanes	1
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Right Turn on Red	Yes
Satd. Flow (RTOR)	217
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Lane Group Flow (vph)	217
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	45.0
Total Split (s)	45.0
Total Split (%)	50.0%
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	4.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effect Green (s)	41.2
Actuated g/C Ratio	0.55
v/c Ratio	0.23
Control Delay	2.7
Queue Delay	0.0
Total Delay	2.7
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	36
Internal Link Dist (ft)	
Turn Bay Length (ft)	175
Base Capacity (vph)	961

Timings 2024 Background Plus Site (Scenario 2 -For Buses only)  
 5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Starvation Cap Reductn	0	0	0		0		0	0	0		0	0
Spillback Cap Reductn	0	0	0		0		0	0	0		0	0
Storage Cap Reductn	0	0	0		0		0	0	0		0	0
Reduced v/c Ratio	1.20	0.01	0.06		0.05		0.12	0.40	0.01		0.01	0.39

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 75.5  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.20  
 Intersection Signal Delay: 37.3 Intersection LOS: D  
 Intersection Capacity Utilization 73.0% ICU Level of Service C  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



Timings 2024 Background Plus Site (Scenario 2 -For Buses only)  
 5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM



Lane Group	SBR
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.23

Intersection Summary



HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2024 Background Plus Site (Scenario 2 -For Buses only)  
Timing Plan: PM

Intersection							
Int Delay, s/veh	1.6						
Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	23	17	1	66	1219	1022	63
Future Vol, veh/h	23	17	1	66	1219	1022	63
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	280	-	-	300
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	95	95	92	95	95	95	95
Heavy Vehicles, %	2	2	2	3	3	3	3
Mvmt Flow	24	18	1	69	1283	1076	66

Major/Minor	Minor2	Major1	Major2				
Conflicting Flow All	1858	538	1076	1142	0	-	0
Stage 1	1076	-	-	-	-	-	-
Stage 2	782	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.16	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.23	-	-	-
Pot Cap-1 Maneuver	65	488	297	602	-	-	-
Stage 1	289	-	-	-	-	-	-
Stage 2	411	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	57	488	592	592	-	-	-
Mov Cap-2 Maneuver	57	-	-	-	-	-	-
Stage 1	254	-	-	-	-	-	-
Stage 2	411	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	74.8	0.6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	592	-	91	-	-
HCM Lane V/C Ratio	0.119	-	0.463	-	-
HCM Control Delay (s)	11.9	-	74.8	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.4	-	2	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2024 Background Plus Site (Scenario 2 -For Buses only)  
Timing Plan: PM

Intersection							
Int Delay, s/veh	0						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↔		↔	↔	↔	
Traffic Vol, veh/h	0	4	0	1292	1056	2	
Future Vol, veh/h	0	4	0	1292	1056	2	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	0	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	99	99	99	99	99	99	
Heavy Vehicles, %	2	2	2	2	2	3	
Mvmt Flow	0	4	0	1305	1067	2	

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	535	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	490	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	490	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	490	-	-
HCM Lane V/C Ratio	-	0.008	-	-
HCM Control Delay (s)	-	12.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

HCM 6th TWSC  
3: CJ Legacy Ranch Dr & Driveway

2024 Background Plus Site (Scenario 2 -For Buses only)  
Timing Plan: PM

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	2	0	0	2	0
Future Vol, veh/h	0	2	0	0	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	0	2	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1	0	0	3	1	
Stage 1	-	-	-	1	-	
Stage 2	-	-	-	2	-	
Critical Hdwy	4.12	-	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	5.42	-	
Follow-up Hdwy	2.218	-	-	3.518	3.318	
Pot Cap-1 Maneuver	1622	-	-	1019	1084	
Stage 1	-	-	-	1022	-	
Stage 2	-	-	-	1021	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	1622	-	-	1019	1084	
Mov Cap-2 Maneuver	-	-	-	1019	-	
Stage 1	-	-	-	1022	-	
Stage 2	-	-	-	1021	-	
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	8.5			
HCM LOS			A			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1622	-	-	-	1019	
HCM Lane V/C Ratio	-	-	-	-	0.002	
HCM Control Delay (s)	0	-	-	-	8.5	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

HCM 6th TWSC  
4: FM 407 & Rayzor Rd

2024 Background Plus Site (Scenario 2 -For Buses only)  
Timing Plan: PM

Intersection						
Int Delay, s/veh	1.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	21	61	1216	46	52	1024
Future Vol, veh/h	21	61	1216	46	52	1024
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	22	64	1280	48	55	1078
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1929	640	0	0	1328	0
Stage 1	1280	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	58	418	-	-	510	-
Stage 1	225	-	-	-	-	-
Stage 2	482	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	52	418	-	-	510	-
Mov Cap-2 Maneuver	52	-	-	-	-	-
Stage 1	225	-	-	-	-	-
Stage 2	430	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	41.5	0	0.6			
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	52	418	510	-
HCM Lane V/C Ratio	-	-	0.425	0.154	0.107	-
HCM Control Delay (s)	-	-	118	15.2	12.9	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	1.6	0.5	0.4	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			↑↑		↑↑
Traffic Vol, veh/h	2	2	0	1292	1057	0
Future Vol, veh/h	2	2	0	1292	1057	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	0	1404	1149	0
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1851	575	1149	0	-	0
Stage 1	1149	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	66	461	604	-	-	-
Stage 1	264	-	-	-	-	-
Stage 2	453	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	66	461	604	-	-	-
Mov Cap-2 Maneuver	66	-	-	-	-	-
Stage 1	264	-	-	-	-	-
Stage 2	453	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	37.5	0	0			
HCM LOS	E					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	604	-	115	-	-	
HCM Lane V/C Ratio	-	-	0.038	-	-	
HCM Control Delay (s)	0	-	37.5	-	-	
HCM Lane LOS	A	-	E	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2029 Horizon  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	267	12	34	20	14	8	47	481	8	3	901	355
Future Volume (vph)	267	12	34	20	14	8	47	481	8	3	901	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	175	200	175	0	0	0	0
Storage Lanes	1	1	0	0	0	1	1	1	1	1	1	1
Taper Length (ft)	25			25			170			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.970			0.850			0.850
Flt Protected	0.950				0.977		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	3354	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.488				0.919		0.245			0.463		
Satd. Flow (perm)	909	1863	1583	0	3155	0	456	3539	1583	862	3539	1583
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			73		9		127				378	
Link Speed (mph)	30				25			50			50	
Link Distance (ft)	180				124			512			2145	
Travel Time (s)	4.1				3.4			7.0			29.3	
Lane Group Flow (vph)	284	13	36	0	45	0	50	512	9	3	959	378
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	45.0	45.0
Total Split (s)	7.5	40.5	40.5	33.0	33.0		7.5	42.0	42.0	7.5	42.0	42.0
Total Split (%)	8.3%	45.0%	45.0%	36.7%	36.7%		8.3%	46.7%	46.7%	8.3%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	Max
Act Effect Green (s)	10.4	10.4	10.4		6.3		42.4	41.8	41.8	40.7	39.0	39.0
Actuated g/C Ratio	0.17	0.17	0.17		0.10		0.68	0.67	0.67	0.65	0.62	0.62
v/c Ratio	1.37	0.04	0.11		0.14		0.13	0.22	0.01	0.00	0.44	0.34
Control Delay	217.6	21.9	2.8		24.7		4.9	5.4	0.0	4.3	8.4	1.9
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	217.6	21.9	2.8		24.7		4.9	5.4	0.0	4.3	8.4	1.9
LOS	F	C	A		C		A	A	A	A	A	A
Approach Delay		186.8			24.7			5.3			6.6	
Approach LOS		F			C			A			A	
Queue Length 50th (ft)	-144	4	0		7		6	36	0	0	116	0
Queue Length 95th (ft)	#288	17	8		22		16	81	0	3	167	34
Internal Link Dist (ft)		100			44			432			2065	
Turn Bay Length (ft)							175		200	175		175
Base Capacity (vph)	208	1083	951		1457		371	2360	1098	603	2204	1128

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

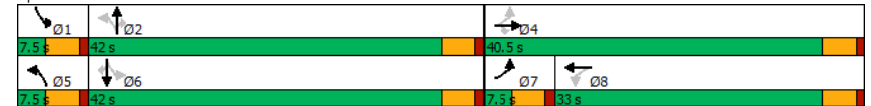
2029 Horizon  
Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0	0		0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0		0	0	0	0	0	0
Reduced v/c Ratio	1.37	0.01	0.04		0.03		0.13	0.22	0.01	0.00	0.44	0.34

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	62.7
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.37
Intersection Signal Delay:	32.8
Intersection Capacity Utilization:	61.8%
Intersection LOS:	C
ICU Level of Service:	B
Analysis Period (min):	15
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2029 Horizon  
Timing Plan: AM

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↕↕	↕↕	↔
Traffic Vol, veh/h	32	10	53	881	1368	44
Future Vol, veh/h	32	10	53	881	1368	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	280	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	3	3
Mvmt Flow	34	11	56	927	1440	46

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2016	720	1486	0	-	0
Stage 1	1440	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.16	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.23	-	-	-
Pot Cap-1 Maneuver	51	370	444	-	-	-
Stage 1	184	-	-	-	-	-
Stage 2	525	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	45	370	444	-	-	-
Mov Cap-2 Maneuver	45	-	-	-	-	-
Stage 1	161	-	-	-	-	-
Stage 2	525	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	174.5	0.8	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	444	-	57	-	-
HCM Lane V/C Ratio	0.126	-	0.776	-	-
HCM Control Delay (s)	14.3	-	174.5	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.4	-	3.4	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2029 Horizon  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↔		↕↕	↕↕	↔
Traffic Vol, veh/h	0	1	0	931	1392	0
Future Vol, veh/h	0	1	0	931	1392	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	1	0	1001	1497	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	749	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	354	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	354	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	354	-	-	-
HCM Lane V/C Ratio	-	0.003	-	-	-
HCM Control Delay (s)	-	15.2	-	-	-
HCM Lane LOS	-	C	-	-	-
HCM 95th %tile Q(veh)	-	0	-	-	-

HCM 6th TWSC  
3: CJ Legacy Ranch Dr & Driveway

2029 Horizon  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	1	0	0	0	0
Future Vol, veh/h	0	1	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	0	0	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1	0	-	0	2	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	1	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1622	-	-	-	1021	1084
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1022	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	-	1021	1084
Mov Cap-2 Maneuver	-	-	-	-	1021	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1022	-
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	0			
HCM LOS			A			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1622	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	-
HCM Lane LOS	A	-	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	-	-	-

HCM 6th TWSC  
4: FM 407 & Rayzor Rd

2029 Horizon  
Timing Plan: AM

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	34	135	776	11	56	1337
Future Vol, veh/h	34	135	776	11	56	1337
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	35	139	800	11	58	1378
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1605	400	0	0	811	0
Stage 1	800	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	96	600	-	-	805	-
Stage 1	403	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	89	600	-	-	805	-
Mov Cap-2 Maneuver	89	-	-	-	-	-
Stage 1	403	-	-	-	-	-
Stage 2	371	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	24.2	0	0.4			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	89	600	805	-
HCM Lane V/C Ratio	-	-	0.394	0.232	0.072	-
HCM Control Delay (s)	-	-	69.6	12.8	9.8	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	1.6	0.9	0.2	-

HCM 6th TWSC  
6: FM 407 & Driveway 2

2029 Horizon  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			↑↑		↑↑
Traffic Vol, veh/h	0	0	0	931	1392	0
Future Vol, veh/h	0	0	0	931	1392	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	1012	1513	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2019	757	1513	0	-	0
Stage 1	1513	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	51	350	438	-	-	-
Stage 1	168	-	-	-	-	-
Stage 2	571	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	51	350	438	-	-	-
Mov Cap-2 Maneuver	51	-	-	-	-	-
Stage 1	168	-	-	-	-	-
Stage 2	571	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	438	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2029 Horizon  
Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	555	12	46	10	9	6	54	920	12	1	2	809
Future Volume (vph)	555	12	46	10	9	6	54	920	12	1	2	809
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		200		175	
Storage Lanes	1		1	0		0	1		1		1	
Taper Length (ft)	25			25			170				100	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frt			0.850				0.964				0.850	
Flt Protected	0.950				0.980		0.950				0.950	
Satd. Flow (prot)	1770	1863	1583	0	3344	0	1770	3539	1583	0	1770	3539
Flt Permitted	0.580				0.955		0.265				0.251	
Satd. Flow (perm)	1080	1863	1583	0	3258	0	494	3539	1583	0	468	3539
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			73		6				127			
Link Speed (mph)	30				25			50				50
Link Distance (ft)	180				124			512				2145
Travel Time (s)	4.1				3.4			7.0				29.3
Lane Group Flow (vph)	566	12	47	0	25	0	55	939	12	0	3	826
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	Perm	custom	pm+pt	NA	NA
Protected Phases	7	4			8		5	2			1	6
Permitted Phases	4		4	8			2		2	1	6	
Detector Phase	7	4	4	8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	9.5	45.0
Total Split (s)	20.0	35.0	35.0	15.0	15.0		10.0	45.0	45.0	10.0	10.0	45.0
Total Split (%)	22.2%	38.9%	38.9%	16.7%	16.7%		11.1%	50.0%	50.0%	11.1%	11.1%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	None	Max
Act Effect Green (s)	19.7	19.7	19.7		6.1		45.9	44.9	44.9		44.2	41.1
Actuated g/C Ratio	0.26	0.26	0.26		0.08		0.61	0.59	0.59		0.59	0.54
v/c Ratio	1.33	0.02	0.10		0.09		0.14	0.45	0.01		0.01	0.43
Control Delay	191.0	21.4	3.1		30.9		7.6	10.7	0.0		7.3	12.8
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	191.0	21.4	3.1		30.9		7.6	10.7	0.0		7.3	12.8
LOS	F	C	A		C		A	B	A		A	B
Approach Delay		173.7			30.9			10.4				10.5
Approach LOS		F			C			B				B
Queue Length 50th (ft)	-378	4	0		4		7	86	0		1	112
Queue Length 95th (ft)	#580	17	13		17		27	245	0		4	209
Internal Link Dist (ft)		100			44			432				2065
Turn Bay Length (ft)							175		200		175	
Base Capacity (vph)	425	764	692		465		394	2105	993		370	1928

Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2029 Horizon  
Timing Plan: PM

Lane Group	SBR
Lane Configurations	↔
Traffic Volume (vph)	235
Future Volume (vph)	235
Ideal Flow (vphpl)	1900
Storage Length (ft)	175
Storage Lanes	1
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	0.850
Flt Protected	
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Right Turn on Red	Yes
Satd. Flow (RTOR)	240
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Lane Group Flow (vph)	240
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	45.0
Total Split (s)	45.0
Total Split (%)	50.0%
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	4.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effect Green (s)	41.1
Actuated g/C Ratio	0.54
v/c Ratio	0.25
Control Delay	2.7
Queue Delay	0.0
Total Delay	2.7
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	38
Internal Link Dist (ft)	
Turn Bay Length (ft)	175
Base Capacity (vph)	971



Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2029 Horizon  
Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Starvation Cap Reductn	0	0	0		0		0	0	0		0	0
Spillback Cap Reductn	0	0	0		0		0	0	0		0	0
Storage Cap Reductn	0	0	0		0		0	0	0		0	0
Reduced v/c Ratio	1.33	0.02	0.07		0.05		0.14	0.45	0.01		0.01	0.43

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 75.5  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.33  
 Intersection Signal Delay: 48.1 Intersection LOS: D  
 Intersection Capacity Utilization 78.3% ICU Level of Service D  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



Timings  
5: FM 407 & McMakin Rd/Blanco Dr

2029 Horizon  
Timing Plan: PM



Lane Group	SBR
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.25

Intersection Summary

HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2029 Horizon  
Timing Plan: PM

Intersection							
Int Delay, s/veh	2.7						
Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↕	↕	↕
Traffic Vol, veh/h	26	19	1	73	1344	1128	70
Future Vol, veh/h	26	19	1	73	1344	1128	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	280	-	-	300
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	95	95	92	95	95	95	95
Heavy Vehicles, %	2	2	2	3	3	3	3
Mvmt Flow	27	20	1	77	1415	1187	74

Major/Minor	Minor2	Major1	Major2				
Conflicting Flow All	2051	594	1187	1261	0	-	0
Stage 1	1187	-	-	-	-	-	-
Stage 2	864	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.16	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.23	-	-	-
Pot Cap-1 Maneuver	48	448	252	542	-	-	-
Stage 1	252	-	-	-	-	-	-
Stage 2	373	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	41	448	533	533	-	-	-
Mov Cap-2 Maneuver	41	-	-	-	-	-	-
Stage 1	215	-	-	-	-	-	-
Stage 2	373	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	139.2	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	533	-	67	-
HCM Lane V/C Ratio	0.146	-	0.707	-
HCM Control Delay (s)	12.9	-	139.2	-
HCM Lane LOS	B	-	F	-
HCM 95th %tile Q(veh)	0.5	-	3.2	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2029 Horizon  
Timing Plan: PM

Intersection							
Int Delay, s/veh	0						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↔		↕	↕	↕	
Traffic Vol, veh/h	0	2	0	1427	1164	2	
Future Vol, veh/h	0	2	0	1427	1164	2	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	0	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	99	99	99	99	99	99	
Heavy Vehicles, %	2	2	2	2	3	3	
Mvmt Flow	0	2	0	1441	1176	2	

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	589	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	452	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	452	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	-	452	-
HCM Lane V/C Ratio	-	0.004	-
HCM Control Delay (s)	-	13	-
HCM Lane LOS	-	B	-
HCM 95th %tile Q(veh)	-	0	-

HCM 6th TWSC  
3: CJ Legacy Ranch Dr & Driveway

2029 Horizon  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	2	0	0	0	0
Future Vol, veh/h	0	2	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1	0	0	3	1
Stage 1	-	-	-	1	-
Stage 2	-	-	-	2	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1622	-	-	1019	1084
Stage 1	-	-	-	1022	-
Stage 2	-	-	-	1021	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	1019	1084
Mov Cap-2 Maneuver	-	-	-	1019	-
Stage 1	-	-	-	1022	-
Stage 2	-	-	-	1021	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1622	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC  
4: FM 407 & Rayzor Rd

2029 Horizon  
Timing Plan: PM

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	24	68	1342	51	57	1127
Future Vol, veh/h	24	68	1342	51	57	1127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	25	72	1413	54	60	1186

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2126	707	0	0	1467
Stage 1	1413	-	-	-	-
Stage 2	713	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23
Pot Cap-1 Maneuver	43	378	-	-	451
Stage 1	191	-	-	-	-
Stage 2	447	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	37	378	-	-	451
Mov Cap-2 Maneuver	37	-	-	-	-
Stage 1	191	-	-	-	-
Stage 2	388	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	69.2	0	0.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	37	378	451	-
HCM Lane V/C Ratio	-	-	0.683	0.189	0.133	-
HCM Control Delay (s)	-	-	218	16.7	14.2	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	2.4	0.7	0.5	-

HCM 6th TWSC  
6: FM 407

2029 Horizon  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		↑↑		↑↑	
Traffic Vol, veh/h	0	0	0	1427	1164	0
Future Vol, veh/h	0	0	0	1427	1164	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	1551	1265	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2041	633	1265	0	-	0
Stage 1	1265	-	-	-	-	-
Stage 2	776	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	49	422	545	-	-	-
Stage 1	229	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	49	422	545	-	-	-
Mov Cap-2 Maneuver	49	-	-	-	-	-
Stage 1	229	-	-	-	-	-
Stage 2	414	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	545	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	278	12	34	20	14	8	47	590	8	10	3	999
Future Volume (vph)	278	12	34	20	14	8	47	590	8	10	3	999
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	175	200	175	0	0	0	0
Storage Lanes	1	1	1	0	0	1	1	1	0	0	0	0
Taper Length (ft)	25			25			170				100	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt			0.850			0.970			0.850			
Flt Protected	0.950				0.977		0.950				0.950	
Satd. Flow (prot)	1770	1863	1583	0	3354	0	1770	3539	1583	0	1770	3539
Flt Permitted	0.488				0.919		0.211				0.410	
Satd. Flow (perm)	909	1863	1583	0	3155	0	393	3539	1583	0	764	3539
Right Turn on Red			Yes		Yes		Yes				Yes	
Satd. Flow (RTOR)			73		9		127					
Link Speed (mph)	30				25		50					50
Link Distance (ft)	180				124		512					2145
Travel Time (s)	4.1				3.4		7.0					29.3
Lane Group Flow (vph)	296	13	36	0	45	0	50	628	9	0	14	1063
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	Perm	custom	pm+pt	NA	NA
Protected Phases	7	4			8		5	2			1	6
Permitted Phases	4		4	8			2		2	1	6	
Detector Phase	7	4	4	8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	9.5	45.0
Total Split (s)	7.5	40.5	40.5	33.0	33.0		7.5	42.0	42.0	7.5	7.5	42.0
Total Split (%)	8.3%	45.0%	45.0%	36.7%	36.7%		8.3%	46.7%	46.7%	8.3%	8.3%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	None	Max
Act Effect Green (s)	10.4	10.4	10.4		6.3		42.2	41.6	41.6		40.5	38.9
Actuated g/C Ratio	0.17	0.17	0.17		0.10		0.68	0.67	0.67		0.65	0.62
v/c Ratio	1.42	0.04	0.11		0.14		0.15	0.27	0.01		0.03	0.48
Control Delay	239.3	21.9	2.8		24.7		5.1	5.6	0.0		4.4	8.9
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	239.3	21.9	2.8		24.7		5.1	5.6	0.0		4.4	8.9
LOS	F	C	A		C		A	A	A		A	A
Approach Delay		206.5			24.7			5.5				7.0
Approach LOS		F			C			A				A
Queue Length 50th (ft)	-156	4	0		7		6	46	0		2	134
Queue Length 95th (ft)	#301	17	8		22		16	101	0		7	192
Internal Link Dist (ft)		100			44			432				2065
Turn Bay Length (ft)							175		200		175	
Base Capacity (vph)	209	1087	954		1463		331	2357	1096		544	2200

Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

Lane Group	SBR
Lane Configurations	↔
Traffic Volume (vph)	365
Future Volume (vph)	365
Ideal Flow (vphpl)	1900
Storage Length (ft)	175
Storage Lanes	1
Taper Length (ft)	
Lane Util. Factor	1.00
Flt	0.850
Flt Protected	
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Right Turn on Red	Yes
Satd. Flow (RTOR)	381
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Lane Group Flow (vph)	388
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	45.0
Total Split (s)	42.0
Total Split (%)	46.7%
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	4.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effect Green (s)	38.9
Actuated g/C Ratio	0.62
v/c Ratio	0.34
Control Delay	2.0
Queue Delay	0.0
Total Delay	2.0
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	1
Queue Length 95th (ft)	36
Internal Link Dist (ft)	
Turn Bay Length (ft)	175
Base Capacity (vph)	1128

Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
 5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

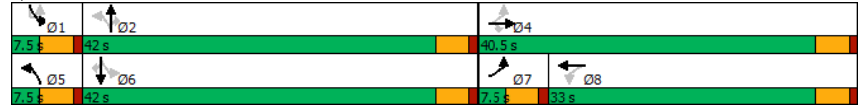


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0
Reduced v/c Ratio	1.42	0.01	0.04		0.03	0.15	0.27	0.01			0.03	0.48

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 62.5  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.42  
 Intersection Signal Delay: 34.0 Intersection LOS: C  
 Intersection Capacity Utilization 65.1% ICU Level of Service C  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
 5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM



Lane Group	SBR
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.34

Intersection Summary

HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	4.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↑		↑	↑↑	↑↑	↑
Traffic Vol, veh/h	32	10	53	959	1455	44
Future Vol, veh/h	32	10	53	959	1455	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	280	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	3	3
Mvmt Flow	34	11	56	1009	1532	46

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2149	766	1578	0	-	0
Stage 1	1532	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.16	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.23	-	-	-
Pot Cap-1 Maneuver	41	345	408	-	-	-
Stage 1	164	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	35	345	408	-	-	-
Mov Cap-2 Maneuver	35	-	-	-	-	-
Stage 1	142	-	-	-	-	-
Stage 2	501	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	269.2	0.8	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	408	-	45	-	-
HCM Lane V/C Ratio	0.137	-	0.982	-	-
HCM Control Delay (s)	15.2	-	269.2	-	-
HCM Lane LOS	C	-	F	-	-
HCM 95th %tile Q(veh)	0.5	-	4	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↑		↑↑	↑↑	
Traffic Vol, veh/h	0	60	0	1062	1451	32
Future Vol, veh/h	0	60	0	1062	1451	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	65	0	1142	1560	34

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	797	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	329	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	329	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.6	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	329	-	-
HCM Lane V/C Ratio	-	0.196	-	-
HCM Control Delay (s)	-	18.6	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.7	-	-

HCM 6th TWSC 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
 3: CJ Legacy Ranch Dr & Driveway Timing Plan: AM

Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	1	0	32	59	0
Future Vol, veh/h	0	1	0	32	59	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	35	64	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	35	0	0	19	18	
Stage 1	-	-	-	18	-	
Stage 2	-	-	-	1	-	
Critical Hdwy	4.12	-	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	5.42	-	
Follow-up Hdwy	2.218	-	-	3.518	3.318	
Pot Cap-1 Maneuver	1576	-	-	998	1061	
Stage 1	-	-	-	1005	-	
Stage 2	-	-	-	1022	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	1576	-	-	998	1061	
Mov Cap-2 Maneuver	-	-	-	998	-	
Stage 1	-	-	-	1005	-	
Stage 2	-	-	-	1022	-	
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	8.9			
HCM LOS			A			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1576	-	-	-	998	
HCM Lane V/C Ratio	-	-	-	-	0.064	
HCM Control Delay (s)	0	-	-	-	8.9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

HCM 6th TWSC 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
 4: FM 407 & Rayzor Rd Timing Plan: AM

Intersection						
Int Delay, s/veh	2.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	34	146	896	21	56	1454
Future Vol, veh/h	34	146	896	21	56	1454
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	35	151	924	22	58	1499
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1790	462	0	0	946	0
Stage 1	924	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	72	547	-	-	715	-
Stage 1	347	-	-	-	-	-
Stage 2	372	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	66	547	-	-	715	-
Mov Cap-2 Maneuver	66	-	-	-	-	-
Stage 1	347	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	32.1	0	0.4			
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	66	547	715	-
HCM Lane V/C Ratio	-	-	0.531	0.275	0.081	-
HCM Control Delay (s)	-	-	109.5	14.1	10.5	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	2.2	1.1	0.3	-



HCM 6th TWSC  
6: FM 407 & Driveway 2

2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	360.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗		↖	↗	
Traffic Vol, veh/h	78	59	130	931	1424	55
Future Vol, veh/h	78	59	130	931	1424	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	64	141	1012	1548	60

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	2366	804	1608	0	- 0
Stage 1	1578	-	-	-	-
Stage 2	788	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-
Pot Cap-1 Maneuver	- 29	326	402	-	-
Stage 1	155	-	-	-	-
Stage 2	409	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	- 6	326	402	-	-
Mov Cap-2 Maneuver	- 6	-	-	-	-
Stage 1	- 31	-	-	-	-
Stage 2	409	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	6980.7	7.5	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	402	-	10	-	-
HCM Lane V/C Ratio	0.352	-	14.891	-	-
HCM Control Delay (s)	18.7	-	6980.7	-	-
HCM Lane LOS	C	A	F	-	-
HCM 95th %tile Q(veh)	1.6	-	20.1	-	-

Notes  
 -: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	556	12	46	10	9	6	54	931	12	3	2	832
Future Volume (vph)	556	12	46	10	9	6	54	931	12	3	2	832
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		200		175	
Storage Lanes	1		1	0		0	1		1		1	
Taper Length (ft)	25			25			170				100	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fr			0.850				0.964				0.850	
Flt Protected	0.950				0.980		0.950				0.950	
Satd. Flow (prot)	1770	1863	1583	0	3344	0	1770	3539	1583	0	1770	3539
Flt Permitted	0.580				0.955		0.255				0.246	
Satd. Flow (perm)	1080	1863	1583	0	3258	0	475	3539	1583	0	458	3539
Right Turn on Red			Yes		Yes		Yes		Yes			
Satd. Flow (RTOR)			73		6		127					
Link Speed (mph)	30				25		50					50
Link Distance (ft)	180				124		512					2145
Travel Time (s)	4.1				3.4		7.0					29.3
Lane Group Flow (vph)	567	12	47	0	25	0	55	950	12	0	5	849
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	custom	pm+pt	NA
Protected Phases	7	4			8		5	2			1	6
Permitted Phases	4		4	8			2		2	1	6	
Detector Phase	7	4	4	8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	9.5	45.0
Total Split (s)	20.0	35.0	35.0	15.0	15.0		10.0	45.0	45.0	10.0	10.0	45.0
Total Split (%)	22.2%	38.9%	38.9%	16.7%	16.7%		11.1%	50.0%	50.0%	11.1%	11.1%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	None	Max
Act Effect Green (s)	19.7	19.7	19.7		6.1		45.9	44.9	44.9		44.2	41.1
Actuated g/C Ratio	0.26	0.26	0.26		0.08		0.61	0.59	0.59		0.59	0.54
v/c Ratio	1.33	0.02	0.10		0.09		0.14	0.45	0.01		0.01	0.44
Control Delay	192.0	21.4	3.1		30.9		7.7	10.8	0.0		7.2	12.9
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	192.0	21.4	3.1		30.9		7.7	10.8	0.0		7.2	12.9
LOS	F	C	A		C		A	B	A		A	B
Approach Delay		174.6			30.9			10.5				10.6
Approach LOS		F			C			B				B
Queue Length 50th (ft)	-379	4	0		4		7	87	0		1	116
Queue Length 95th (ft)	#582	17	13		17		27	249	0		6	216
Internal Link Dist (ft)		100			44			432				2065
Turn Bay Length (ft)							175		200		175	
Base Capacity (vph)	425	764	692		465		384	2105	993		365	1928

Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM

Lane Group	SBR
Lane Configurations	↔
Traffic Volume (vph)	237
Future Volume (vph)	237
Ideal Flow (vphpl)	1900
Storage Length (ft)	175
Storage Lanes	1
Taper Length (ft)	
Lane Util. Factor	1.00
Fr	0.850
Flt Protected	
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Right Turn on Red	Yes
Satd. Flow (RTOR)	242
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Lane Group Flow (vph)	242
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	45.0
Total Split (s)	45.0
Total Split (%)	50.0%
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	4.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effect Green (s)	41.1
Actuated g/C Ratio	0.54
v/c Ratio	0.25
Control Delay	2.7
Queue Delay	0.0
Total Delay	2.7
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	38
Internal Link Dist (ft)	
Turn Bay Length (ft)	175
Base Capacity (vph)	972

Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Starvation Cap Reductn	0	0	0		0		0	0	0		0	0
Spillback Cap Reductn	0	0	0		0		0	0	0		0	0
Storage Cap Reductn	0	0	0		0		0	0	0		0	0
Reduced v/c Ratio	1.33	0.02	0.07		0.05		0.14	0.45	0.01		0.01	0.44

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 75.5  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.33  
 Intersection Signal Delay: 47.9 Intersection LOS: D  
 Intersection Capacity Utilization 78.6% ICU Level of Service D  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM



Lane Group	SBR
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.25

Intersection Summary

HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
Timing Plan: PM

Intersection							
Int Delay, s/veh	2.8						
Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	26	19	1	73	1362	1137	70
Future Vol, veh/h	26	19	1	73	1362	1137	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	280	-	-	300
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	95	95	92	95	95	95	95
Heavy Vehicles, %	2	2	2	3	3	3	3
Mvmt Flow	27	20	1	77	1434	1197	74

Major/Minor	Minor2	Major1	Major2				
Conflicting Flow All	2070	599	1197	1271	0	-	0
Stage 1	1197	-	-	-	-	-	-
Stage 2	873	-	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.16	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.23	-	-	-
Pot Cap-1 Maneuver	47	445	248	537	-	-	-
Stage 1	249	-	-	-	-	-	-
Stage 2	369	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	40	445	528	528	-	-	-
Mov Cap-2 Maneuver	40	-	-	-	-	-	-
Stage 1	212	-	-	-	-	-	-
Stage 2	369	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	147.3	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	528	-	65	-	-
HCM Lane V/C Ratio	0.148	-	0.729	-	-
HCM Control Delay (s)	13	-	147.3	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.5	-	3.3	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
Timing Plan: PM

Intersection							
Int Delay, s/veh	0.1						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↔		↔	↔	↔	
Traffic Vol, veh/h	0	15	0	1440	1180	6	
Future Vol, veh/h	0	15	0	1440	1180	6	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	0	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	99	99	99	99	99	99	
Heavy Vehicles, %	2	2	2	2	3	3	
Mvmt Flow	0	15	0	1455	1192	6	

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	599	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	445	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	445	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	445	-	-
HCM Lane V/C Ratio	-	0.034	-	-
HCM Control Delay (s)	-	13.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

HCM 6th TWSC 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
 3: CJ Legacy Ranch Dr & Driveway Timing Plan: PM

Intersection						
Int Delay, s/veh	6.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	2	0	3	12	0
Future Vol, veh/h	0	2	0	3	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	3	13	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	3	0	0	4	2
Stage 1	-	-	-	2	-
Stage 2	-	-	-	2	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1619	-	-	1018	1082
Stage 1	-	-	-	1021	-
Stage 2	-	-	-	1021	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1619	-	-	1018	1082
Mov Cap-2 Maneuver	-	-	-	1018	-
Stage 1	-	-	-	1021	-
Stage 2	-	-	-	1021	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1619	-	-	-	1018
HCM Lane V/C Ratio	-	-	-	-	0.013
HCM Control Delay (s)	0	-	-	-	8.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
 4: FM 407 & Rayzor Rd Timing Plan: PM

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	24	69	1354	53	57	1155
Future Vol, veh/h	24	69	1354	53	57	1155
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	25	73	1425	56	60	1216

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2153	713	0	0	1481
Stage 1	1425	-	-	-	-
Stage 2	728	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23
Pot Cap-1 Maneuver	41	374	-	-	445
Stage 1	188	-	-	-	-
Stage 2	439	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	35	374	-	-	445
Mov Cap-2 Maneuver	35	-	-	-	-
Stage 1	188	-	-	-	-
Stage 2	380	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	74.1	0	0.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	35	374	445	-
HCM Lane V/C Ratio	-	-	0.722	0.194	0.135	-
HCM Control Delay (s)	-	-	238.5	16.9	14.3	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	2.5	0.7	0.5	-

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕↕	↕↕	↔
Traffic Vol, veh/h	18	15	13	1427	1168	6
Future Vol, veh/h	18	15	13	1427	1168	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	16	14	1551	1270	7

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2078	639	1277	0	-	0
Stage 1	1274	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	46	419	540	-	-	-
Stage 1	226	-	-	-	-	-
Stage 2	401	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	37	419	540	-	-	-
Mov Cap-2 Maneuver	37	-	-	-	-	-
Stage 1	184	-	-	-	-	-
Stage 2	401	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	120.3	1.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	540	-	63	-	-
HCM Lane V/C Ratio	0.026	-	0.569	-	-
HCM Control Delay (s)	11.8	1.1	120.3	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0.1	-	2.3	-	-

Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

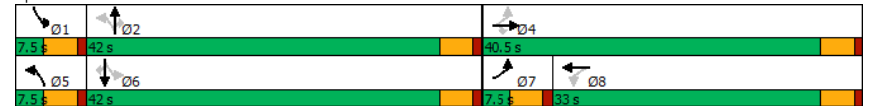
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	267	12	34	20	14	8	47	484	8	3	901	355
Future Volume (vph)	267	12	34	20	14	8	47	484	8	3	901	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	175	200	175	175	175	175	175
Storage Lanes	1	1	0	0	0	1	1	1	1	1	1	1
Taper Length (ft)	25			25			170			100		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.970			0.850			0.850
Flt Protected	0.950				0.977		0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	0	3354	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.488				0.919		0.245			0.462		
Satd. Flow (perm)	909	1863	1583	0	3155	0	456	3539	1583	861	3539	1583
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			73		9		127				378	
Link Speed (mph)	30				25			50			50	
Link Distance (ft)	180				124			512			2145	
Travel Time (s)	4.1				3.4			7.0			29.3	
Lane Group Flow (vph)	284	13	36	0	45	0	50	515	9	3	959	378
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	45.0	45.0
Total Split (s)	7.5	40.5	40.5	33.0	33.0		7.5	42.0	42.0	7.5	42.0	42.0
Total Split (%)	8.3%	45.0%	45.0%	36.7%	36.7%		8.3%	46.7%	46.7%	8.3%	46.7%	46.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	Max	Max
Act Effect Green (s)	10.4	10.4	10.4		6.3		42.4	41.8	41.8	40.7	39.0	39.0
Actuated g/C Ratio	0.17	0.17	0.17		0.10		0.68	0.67	0.67	0.65	0.62	0.62
v/c Ratio	1.37	0.04	0.11		0.14		0.13	0.22	0.01	0.00	0.44	0.34
Control Delay	217.6	21.9	2.8		24.7		4.9	5.4	0.0	4.3	8.4	1.9
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	217.6	21.9	2.8		24.7		4.9	5.4	0.0	4.3	8.4	1.9
LOS	F	C	A		C		A	A	A	A	A	A
Approach Delay		186.8			24.7			5.3			6.6	
Approach LOS		F			C			A			A	
Queue Length 50th (ft)	-144	4	0		7		6	36	0	0	116	0
Queue Length 95th (ft)	#288	17	8		22		16	82	0	3	167	34
Internal Link Dist (ft)		100			44			432			2065	
Turn Bay Length (ft)							175		200	175		175
Base Capacity (vph)	208	1083	951		1457		371	2360	1098	603	2204	1128

Timings 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: AM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0	0		0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0		0	0	0	0	0	0
Reduced v/c Ratio	1.37	0.01	0.04		0.03		0.13	0.22	0.01	0.00	0.44	0.34

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	62.7
Natural Cycle:	100
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.37
Intersection Signal Delay:	32.8
Intersection Capacity Utilization:	61.8%
ICU Level of Service:	B
Analysis Period (min):	15
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕↕	↕↕	↔
Traffic Vol, veh/h	32	10	53	881	1370	44
Future Vol, veh/h	32	10	53	881	1370	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	280	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	3	3	3	3
Mvmt Flow	34	11	56	927	1442	46

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	2018	721	1488	0	- 0
Stage 1	1442	-	-	-	-
Stage 2	576	-	-	-	-
Critical Hdwy	6.84	6.94	4.16	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.23	-	-
Pot Cap-1 Maneuver	51	370	443	-	-
Stage 1	184	-	-	-	-
Stage 2	525	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	45	370	443	-	-
Mov Cap-2 Maneuver	45	-	-	-	-
Stage 1	161	-	-	-	-
Stage 2	525	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	174.5	0.8	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	443	-	57	-	-
HCM Lane V/C Ratio	0.126	-	0.776	-	-
HCM Control Delay (s)	14.3	-	174.5	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.4	-	3.4	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↔		↕↕	↕↕	↔
Traffic Vol, veh/h	0	1	0	934	1392	1
Future Vol, veh/h	0	1	0	934	1392	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	1	0	1004	1497	1

Major/Minor	Minor2	Major1	Major2		
Conflicting Flow All	-	749	-	0	- 0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	354	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	354	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	354	-	-
HCM Lane V/C Ratio	-	0.003	-	-
HCM Control Delay (s)	-	15.2	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0	-	-



HCM 6th TWSC 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
 3: CJ Legacy Ranch Dr & Driveway Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	1	0	1	0	0
Future Vol, veh/h	0	1	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	1	0	0
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1	0	0	2	1	
Stage 1	-	-	-	1	-	
Stage 2	-	-	-	1	-	
Critical Hdwy	4.12	-	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	5.42	-	
Follow-up Hdwy	2.218	-	-	3.518	3.318	
Pot Cap-1 Maneuver	1622	-	-	1021	1084	
Stage 1	-	-	-	1022	-	
Stage 2	-	-	-	1022	-	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	1622	-	-	1021	1084	
Mov Cap-2 Maneuver	-	-	-	1021	-	
Stage 1	-	-	-	1022	-	
Stage 2	-	-	-	1022	-	
Approach	EB	WB	SB			
HCM Control Delay, s	0	0	0			
HCM LOS			A			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1622	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	-	0	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	-	

HCM 6th TWSC 2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
 4: FM 407 & Rayzor Rd Timing Plan: AM

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	34	135	779	11	56	1337
Future Vol, veh/h	34	135	779	11	56	1337
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	35	139	803	11	58	1378
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1608	402	0	0	814	0
Stage 1	803	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23	-
Pot Cap-1 Maneuver	96	598	-	-	802	-
Stage 1	401	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	89	598	-	-	802	-
Mov Cap-2 Maneuver	89	-	-	-	-	-
Stage 1	401	-	-	-	-	-
Stage 2	371	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	24.2	0	0.4			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	89	598	802	-
HCM Lane V/C Ratio	-	-	0.394	0.233	0.072	-
HCM Control Delay (s)	-	-	69.6	12.8	9.8	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	1.6	0.9	0.2	-

HCM 6th TWSC  
6: FM 407 & Driveway 2

2029 Horizon Plus Site(Scenario 1-For Buses + Passenger Car)  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕↕		↕↕
Traffic Vol, veh/h	0	0	3	934	1393	1
Future Vol, veh/h	0	0	3	934	1393	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	3	1015	1514	1

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2029	758	1515	0	-	0
Stage 1	1515	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	50	350	437	-	-	-
Stage 1	168	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	49	350	437	-	-	-
Mov Cap-2 Maneuver	49	-	-	-	-	-
Stage 1	165	-	-	-	-	-
Stage 2	565	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	437	-	-	-	-
HCM Lane V/C Ratio	0.007	-	-	-	-
HCM Control Delay (s)	13.3	0.1	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Timings 2029 Horizon Plus Site(Scenario 2 - For Buses only)  
 5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations	↔	↗	↘	↔	↗	↘	↔	↗	↘	↔	↗	↘
Traffic Volume (vph)	555	12	46	10	9	6	54	920	12	1	2	812
Future Volume (vph)	555	12	46	10	9	6	54	920	12	1	2	812
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	175		200		175	
Storage Lanes	1		1	0		0	1		1		1	
Taper Length (ft)	25			25			170				100	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frnt			0.850				0.964				0.850	
Flt Protected	0.950				0.980		0.950				0.950	
Satd. Flow (prot)	1770	1863	1583	0	3344	0	1770	3539	1583	0	1770	3539
Flt Permitted	0.580				0.955		0.264				0.251	
Satd. Flow (perm)	1080	1863	1583	0	3258	0	492	3539	1583	0	468	3539
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)			73		6		127					
Link Speed (mph)	30			25			50				50	
Link Distance (ft)	180			124			512				2145	
Travel Time (s)	4.1			3.4			7.0				29.3	
Lane Group Flow (vph)	566	12	47	0	25	0	55	939	12	0	3	829
Turn Type	pm+pt	NA	Perm	Perm	NA	NA	pm+pt	NA	Perm	custom	pm+pt	NA
Protected Phases	7	4			8		5	2			1	6
Permitted Phases	4		4	8			2		2	1	6	
Detector Phase	7	4	4	8	8		5	2	2	1	1	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	35.0	35.0	35.0	35.0		9.5	45.0	45.0	9.5	9.5	45.0
Total Split (s)	20.0	35.0	35.0	15.0	15.0		10.0	45.0	45.0	10.0	10.0	45.0
Total Split (%)	22.2%	38.9%	38.9%	16.7%	16.7%		11.1%	50.0%	50.0%	11.1%	11.1%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5		4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Max	Max	None	None	Max
Act Effct Green (s)	19.7	19.7	19.7		6.1		45.9	44.9	44.9		44.2	41.1
Actuated g/C Ratio	0.26	0.26	0.26		0.08		0.61	0.59	0.59		0.59	0.54
v/c Ratio	1.33	0.02	0.10		0.09		0.14	0.45	0.01		0.01	0.43
Control Delay	191.0	21.4	3.1		30.9		7.6	10.7	0.0		7.3	12.8
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	191.0	21.4	3.1		30.9		7.6	10.7	0.0		7.3	12.8
LOS	F	C	A		C		A	B	A		A	B
Approach Delay		173.7			30.9			10.4				10.5
Approach LOS		F			C			B				B
Queue Length 50th (ft)	-378	4	0		4		7	86	0		1	112
Queue Length 95th (ft)	#580	17	13		17		27	245	0		4	210
Internal Link Dist (ft)		100			44			432				2065
Turn Bay Length (ft)							175		200		175	
Base Capacity (vph)	425	764	692		465		393	2105	993		370	1928

Timings 2029 Horizon Plus Site(Scenario 2 - For Buses only)  
 5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM

Lane Group	SBR
Lane Configurations	↔
Traffic Volume (vph)	235
Future Volume (vph)	235
Ideal Flow (vphpl)	1900
Storage Length (ft)	175
Storage Lanes	1
Taper Length (ft)	
Lane Util. Factor	1.00
Frnt	0.850
Flt Protected	
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Right Turn on Red	Yes
Satd. Flow (RTOR)	240
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Lane Group Flow (vph)	240
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	45.0
Total Split (s)	45.0
Total Split (%)	50.0%
Yellow Time (s)	3.5
All-Red Time (s)	1.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	4.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	41.1
Actuated g/C Ratio	0.54
v/c Ratio	0.25
Control Delay	2.7
Queue Delay	0.0
Total Delay	2.7
LOS	A
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	38
Internal Link Dist (ft)	
Turn Bay Length (ft)	175
Base Capacity (vph)	971

Timings 2029 Horizon Plus Site(Scenario 2 - For Buses only)  
 5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Starvation Cap Reductn	0	0	0		0		0	0	0		0	0
Spillback Cap Reductn	0	0	0		0		0	0	0		0	0
Storage Cap Reductn	0	0	0		0		0	0	0		0	0
Reduced v/c Ratio	1.33	0.02	0.07		0.05		0.14	0.45	0.01		0.01	0.43

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 75.5  
 Natural Cycle: 100  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 1.33  
 Intersection Signal Delay: 48.0 Intersection LOS: D  
 Intersection Capacity Utilization 78.3% ICU Level of Service D  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 5: FM 407 & McMakin Rd/Blanco Dr



Timings 2029 Horizon Plus Site(Scenario 2 - For Buses only)  
 5: FM 407 & McMakin Rd/Blanco Dr Timing Plan: PM



Lane Group	SBR
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.25

Intersection Summary

HCM 6th TWSC  
1: FM 407 & I T Neely Dr

2029 Horizon Plus Site(Scenario 2 - For Buses only)  
Timing Plan: PM

Intersection							
Int Delay, s/veh	2.7						
Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↕	↕	↕
Traffic Vol, veh/h	26	19	1	73	1346	1128	70
Future Vol, veh/h	26	19	1	73	1346	1128	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	None	-	-	None	-	None
Storage Length	0	-	-	280	-	-	300
Veh in Median Storage, #	0	-	-	-	0	0	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	95	95	92	95	95	95	95
Heavy Vehicles, %	2	2	2	3	3	3	3
Mvmt Flow	27	20	1	77	1417	1187	74

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2052	594	1187	1261	0	-
Stage 1	1187	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Critical Hdwy	6.84	6.94	6.44	4.16	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.52	2.23	-	-
Pot Cap-1 Maneuver	48	448	252	542	-	-
Stage 1	252	-	-	-	-	-
Stage 2	373	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	41	448	533	533	-	-
Mov Cap-2 Maneuver	41	-	-	-	-	-
Stage 1	215	-	-	-	-	-
Stage 2	373	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	139.2	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	533	-	67	-	-
HCM Lane V/C Ratio	0.146	-	0.707	-	-
HCM Control Delay (s)	12.9	-	139.2	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.5	-	3.2	-	-

HCM 6th TWSC  
2: CJ Legacy Ranch Dr & FM 407

2029 Horizon Plus Site(Scenario 2 - For Buses only)  
Timing Plan: PM

Intersection							
Int Delay, s/veh	0						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		↔		↕	↕	↕	
Traffic Vol, veh/h	0	4	0	1427	1166	2	
Future Vol, veh/h	0	4	0	1427	1166	2	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	-	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	99	99	99	99	99	99	
Heavy Vehicles, %	2	2	2	2	3	3	
Mvmt Flow	0	4	0	1441	1178	2	

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	590	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	451	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	451	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	451	-	-	-
HCM Lane V/C Ratio	-	0.009	-	-	-
HCM Control Delay (s)	-	13.1	-	-	-
HCM Lane LOS	-	B	-	-	-
HCM 95th %tile Q(veh)	-	0	-	-	-

HCM 6th TWSC  
3: CJ Legacy Ranch Dr & Driveway

2029 Horizon Plus Site(Scenario 2 - For Buses only)  
Timing Plan: PM

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	0	2	0	0	2	0
Future Vol, veh/h	0	2	0	0	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	0	2	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1	0	0	3	1
Stage 1	-	-	-	1	-
Stage 2	-	-	-	2	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1622	-	-	1019	1084
Stage 1	-	-	-	1022	-
Stage 2	-	-	-	1021	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1622	-	-	1019	1084
Mov Cap-2 Maneuver	-	-	-	1019	-
Stage 1	-	-	-	1022	-
Stage 2	-	-	-	1021	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1622	-	-	-	1019
HCM Lane V/C Ratio	-	-	-	-	0.002
HCM Control Delay (s)	0	-	-	-	8.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC  
4: FM 407 & Rayzor Rd

2029 Horizon Plus Site(Scenario 2 - For Buses only)  
Timing Plan: PM

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕	↕	↕	↕	↕	↕
Traffic Vol, veh/h	24	68	1342	51	57	1130
Future Vol, veh/h	24	68	1342	51	57	1130
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	180	225	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	25	72	1413	54	60	1189

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2128	707	0	0	1467
Stage 1	1413	-	-	-	-
Stage 2	715	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.16
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.23
Pot Cap-1 Maneuver	43	378	-	-	451
Stage 1	191	-	-	-	-
Stage 2	446	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	37	378	-	-	451
Mov Cap-2 Maneuver	37	-	-	-	-
Stage 1	191	-	-	-	-
Stage 2	387	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	69.2	0	0.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	37	378	451	-
HCM Lane V/C Ratio	-	-	0.683	0.189	0.133	-
HCM Control Delay (s)	-	-	218	16.7	14.2	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	2.4	0.7	0.5	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	2	2	0	1427	1167	0
Future Vol, veh/h	2	2	0	1427	1167	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	0	1551	1268	0
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2044	634	1268	0	-	0
Stage 1	1268	-	-	-	-	-
Stage 2	776	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	49	422	544	-	-	-
Stage 1	228	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	49	422	544	-	-	-
Mov Cap-2 Maneuver	49	-	-	-	-	-
Stage 1	228	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	48	0	0			
HCM LOS	E					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	544	-	88	-	-	
HCM Lane V/C Ratio	-	-	0.049	-	-	
HCM Control Delay (s)	0	-	48	-	-	
HCM Lane LOS	A	-	E	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

## Appendix E. Supplemental Information



population growth indicates that growth is moving northward out of Tarrant County. Cities within close proximity to Bartonville have experienced increased rates of population growth over the past ten years. **Table 1-1** shows population growth for Bartonville, Denton County, and selected area cities from 1990 to 2016.

*Table 1-1  
Population Growth 1980 to 2016*

Place	Population Estimate				Growth 1990-2016		Compound Growth Rate	
	1990	2000	2010	2016	Change	% Change	1990-2010	2010-2016
Bartonville	849	1,093	1,469	1,650	801	94.3%	1.8%	1.2%
Denton County	273,525	432,976	662,614	784,840	511,315	186.9%	3.0%	1.7%
Argyle	1,575	2,365	3,282	3,820	2,245	142.5%	2.5%	1.5%
Copper Canyon	978	1,216	1,334	1,380	402	41.1%	1.0%	0.3%
Corinth	3,944	11,325	19,935	20,740	16,796	425.9%	5.5%	0.4%
Denton	66,270	80,537	113,383	125,980	59,710	90.1%	1.8%	1.1%
Double Oak	1,664	2,179	2,867	2,950	1,286	77.3%	1.8%	0.3%
Flower Mound	15,527	50,702	64,669	69,080	53,553	344.9%	4.9%	0.7%
Hickory Creek	1,893	2,078	3,247	3,730	1,837	97.0%	1.8%	1.4%
Highland Village	7,027	12,173	15,056	15,370	8,343	118.7%	2.6%	0.2%

SOURCE: U.S. Census, 1990, 2000, 2010, 2016

The data shows that Bartonville and its neighboring cities have experienced a moderate rate of growth over the past ten years. From 2000 to 2016, Bartonville has grown at a rate that is similar to Denton County as a whole. It is anticipated that the county population growth pattern will continue and that Bartonville will continue to experience a healthy rate of growth. Due to the limited opportunities for additional residential development within the Bartonville Planning Area, it is also expected that Bartonville’s residential areas will build-out relatively quickly.

# Elementary School

---

## Description

An elementary school is a public school that typically serves students attending kindergarten through the fifth or sixth grade. An elementary school is usually centrally located in a residential community to facilitate student access. Bus service is commonly provided to students living beyond a specified distance from the school. Middle school/junior high school (Land Use 522), private school (K-8) (Land Use 530), private school (K-12) (Land Use 532), charter elementary school (Land Use 536), and charter school (K-12) (Land Use 538) are related uses.

## Additional Data

Elementary school students generally used school buses more than regular transit and were dropped off and picked up more than high school students, who were apt to walk longer distances, ride bicycles, or, in some cases, drive to school. The percentage of students at the sites who were transported to school via bus varied considerably. Some sites experienced higher than average trip rates because many students did not utilize the available school bus service. Due to the varied transit and school bus usage at these sites, it is desirable that future studies report additional detail on the percentage of students who were bused to school and the percentage that were dropped off and picked up.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alabama, Arizona, British Columbia (CAN), California, Connecticut, Florida, Hawaii, Minnesota, Montana, Nevada, New York, Oregon, Texas, Utah, Washinton, and West Virginia.

## Source Numbers

186, 383, 390, 395, 533, 536, 572, 579, 583, 609, 611, 612, 613, 632, 707, 852, 856, 858, 866, 877, 878, 896, 940, 1039, 1048, 1067, 1083

Metric				US Customary			
Design speed (km/h)	Stopping sight distance (m)	Intersection sight distance for passenger cars		Design speed (mph)	Stopping sight distance (ft)	Intersection sight distance for passenger cars	
		Calculated (m)	Design (m)			Calculated (ft)	Design (ft)
20	20	36.1	40	15	80	143.3	145
30	35	54.2	55	20	115	191.1	195
40	50	72.3	75	25	155	238.9	240
50	65	90.4	95	30	200	286.7	290
60	85	108.4	110	35	250	334.4	335
70	105	126.5	130	40	305	382.2	385
80	130	144.6	145	45	360	430.0	430
90	160	162.6	165	50	425	477.8	480
100	185	180.7	185	55	495	525.5	530
110	220	198.8	200	60	570	573.3	575
120	250	216.8	220	65	645	621.1	625
130	285	234.9	235	70	730	668.9	670
				75	820	716.6	720
				80	910	764.4	765

Note: Intersection sight distance shown is for a stopped passenger car to turn right onto or cross a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated.

**Exhibit 9-58. Design Intersection Sight Distance—Case B2—Right Turn from Stop and Case B3—Crossing Maneuver**

Metric				US Customary			
Design speed (km/h)	Stopping sight distance (m)	Intersection sight distance for passenger cars		Design speed (mph)	Stopping sight distance (ft)	Intersection sight distance for passenger cars	
		Calculated (m)	Design (m)			Calculated (ft)	Design (ft)
20	20	41.7	45	15	80	165.4	170
30	35	62.6	65	20	115	220.5	225
40	50	83.4	85	25	155	275.6	280
50	65	104.3	105	30	200	330.8	335
60	85	125.1	130	35	250	385.9	390
70	105	146.0	150	40	305	441.0	445
80	130	166.8	170	45	360	496.1	500
90	160	187.7	190	50	425	551.3	555
100	185	208.5	210	55	495	606.4	610
110	220	229.4	230	60	570	661.5	665
120	250	250.2	255	65	645	716.6	720
130	285	271.1	275	70	730	771.8	775
				75	820	826.9	830
				80	910	882.0	885

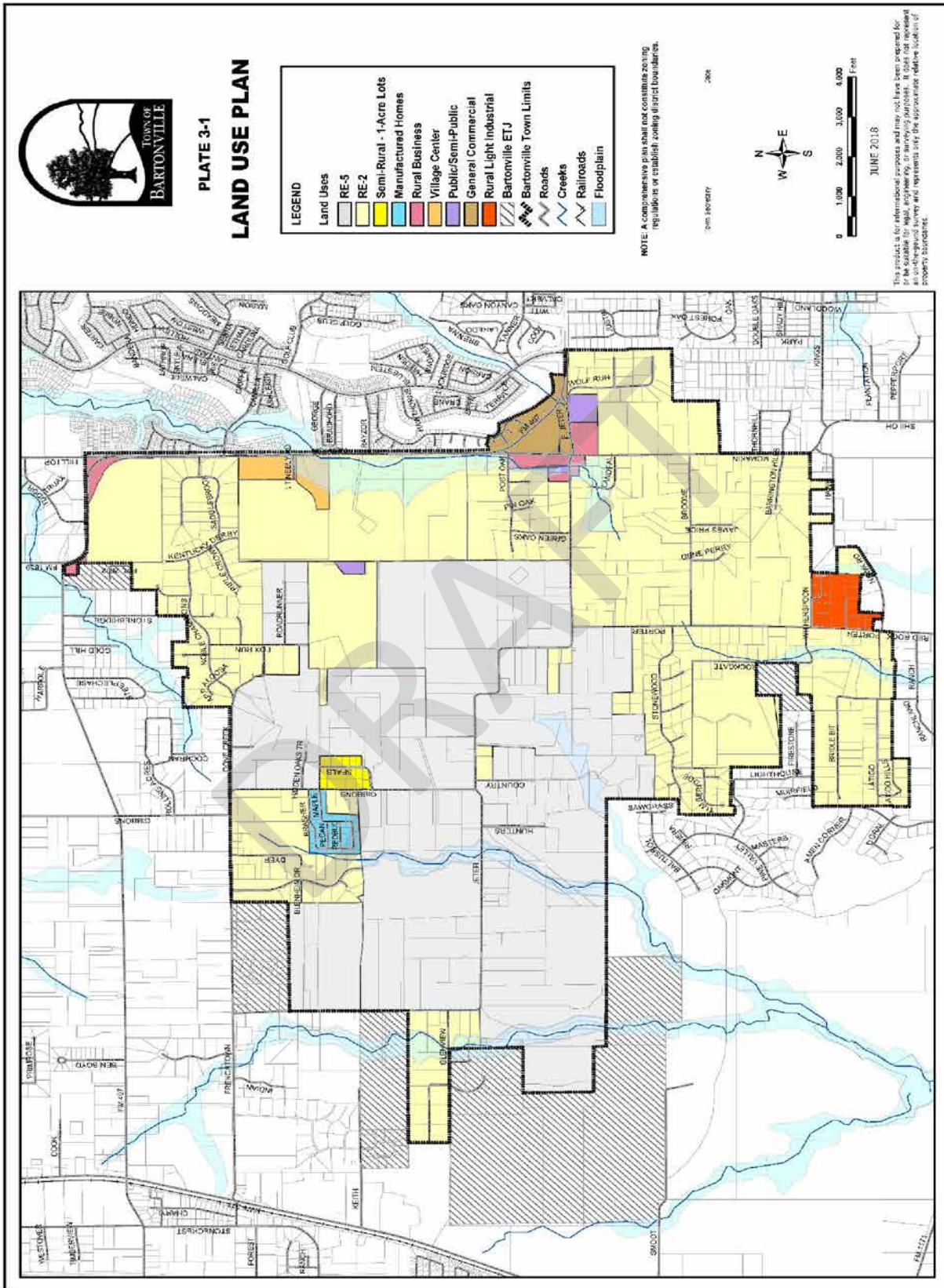
Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3 percent or less. For other conditions, the time gap must be adjusted and required sight distance recalculated.

**Exhibit 9-55. Design Intersection Sight Distance—Case B1—Left Turn from Stop**



# Future Land Use Plan

Please confirm accuracy / currency of data with contact on cover



















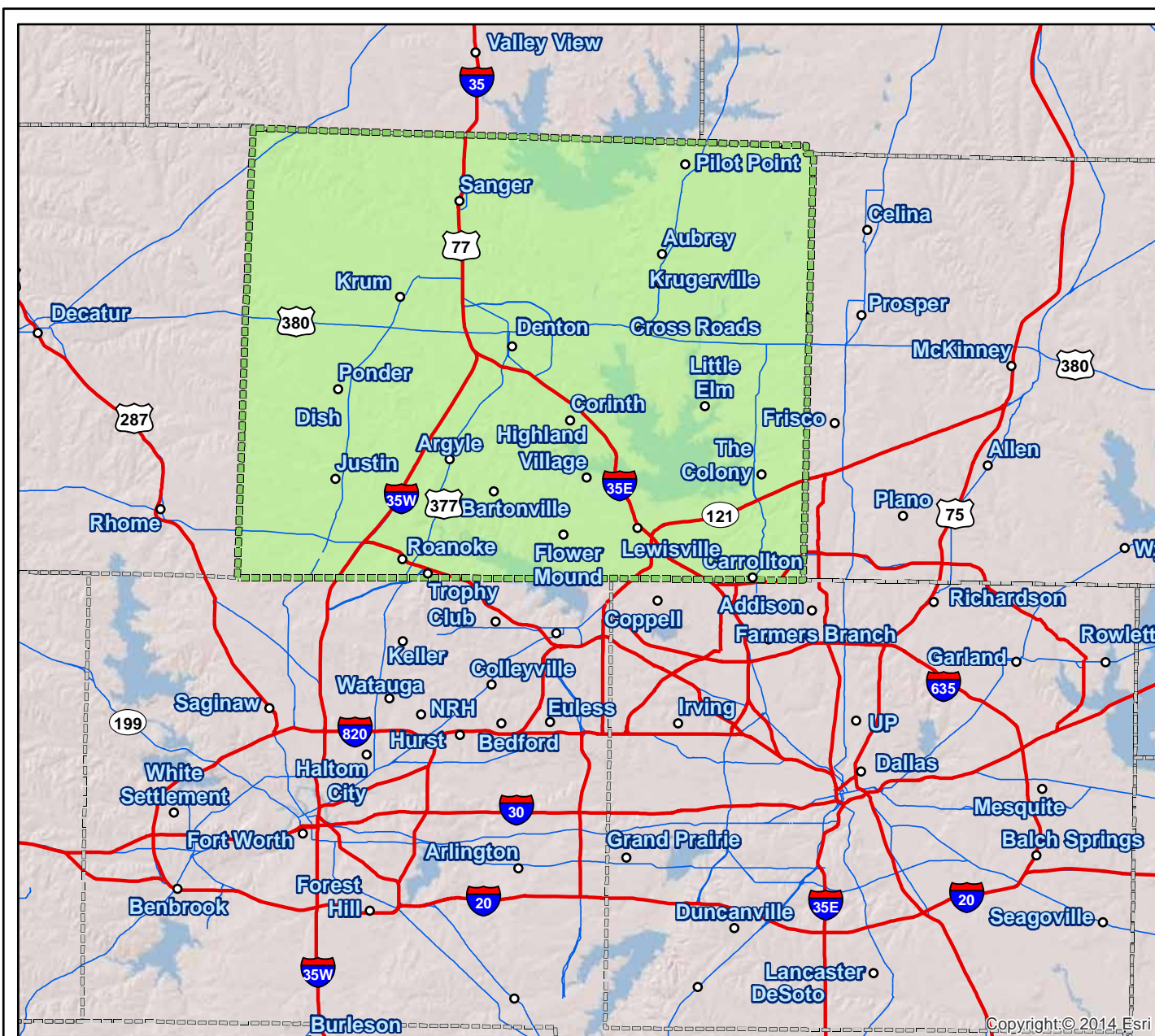
# Denton County Thoroughfare Plan

Approved: April 18, 2017

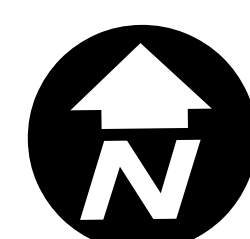
## LEGEND

### Road Types

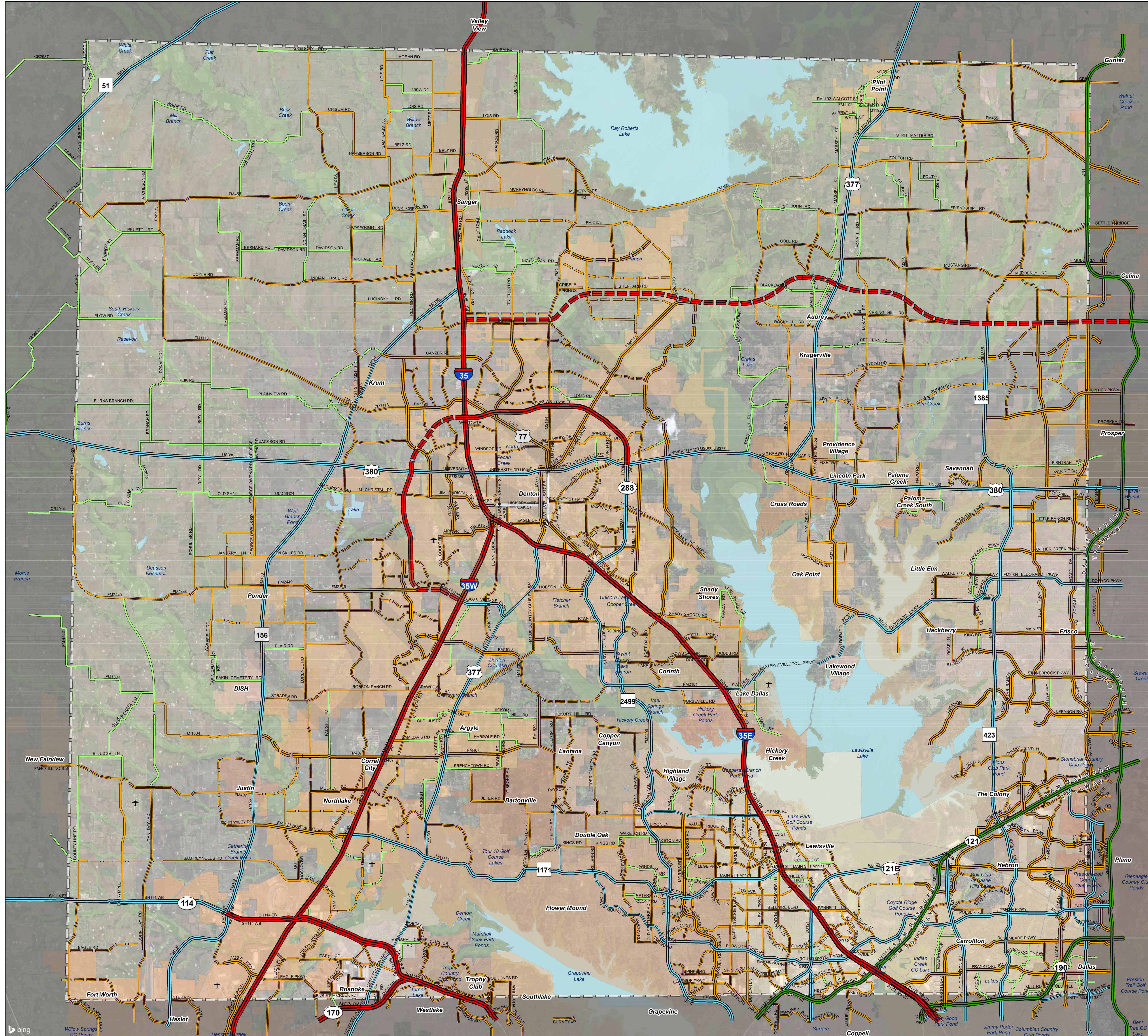
-  Freeway/Highway
-  Toll Road
-  Principal Arterial 6 Lane Divided (120' to 160' ROW)
-  Principal Arterial 4 Lane Divided (100' to 120' ROW)
-  Major Arterial 6 Lane Divided (120' to 140' ROW)
-  Major Arterial 4 Lane Divided (100' to 120' ROW)
-  Minor Arterial 4 Lane Undivided / 3 Lane (80' to 100' ROW)
-  One-way Couplet (Lanes and ROW vary)
-  Minor Arterial 2 Lane (70' ROW)
-  County Line
-  Airport
-  Rail Line
-  Lakes
-  1-Percent Flood Risk Zones (FEMA)



Relationship to the Region



0 0.5 1 2 3 4 Miles



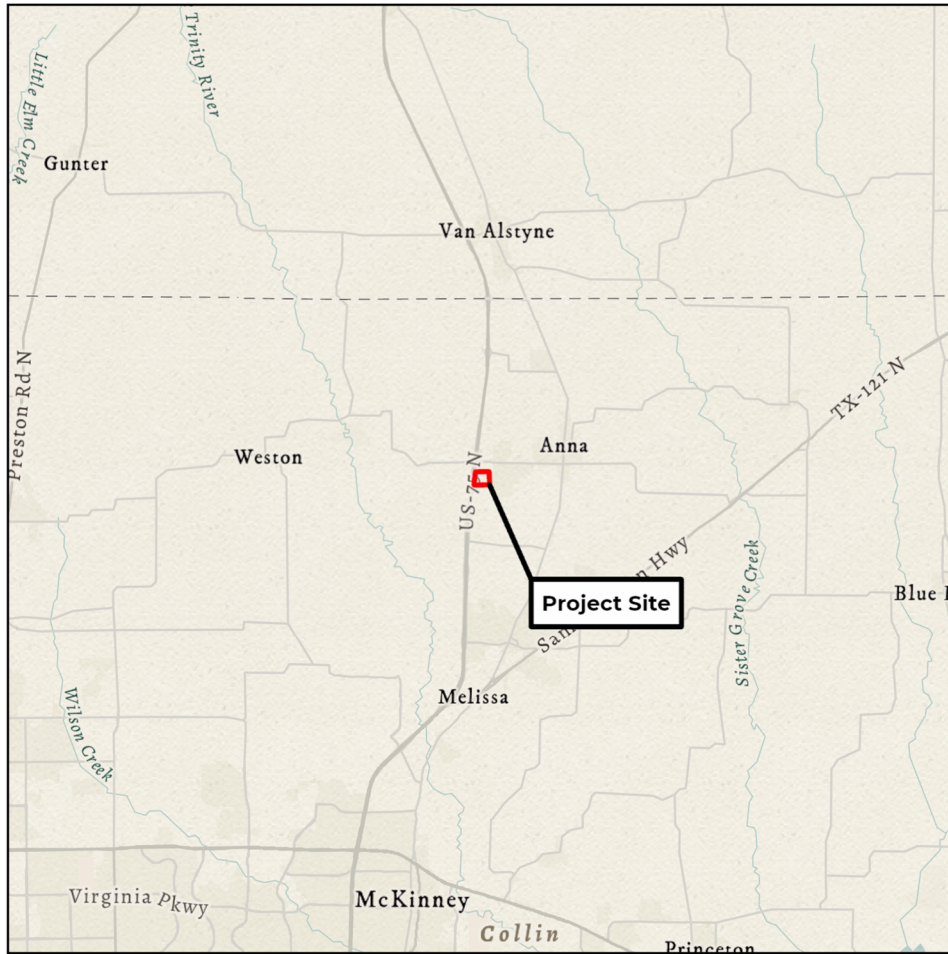


## Exhibit 3

# ELTSF ADDITION FLOOD STUDY

Loving Branch

Bartonville, TX



Prepared by:



TBPE Firm No. F -11976

Prepared for:



October 12, 2023



*John W. Foose*  
10/12/2023



**CCM Engineering**

Attn: Cody Crannell, P.E.  
2570 Justin Road  
Highland Village, TX 75077

**October 12, 2023**

Re: Flood Study – Loving Branch  
Project Name – ELTSF Addition, Bartonville, TX

**Dear Mr. Crannell:**

Enclosed is the Flood Study Report for Loving Branch to support the proposed improvements in Bartonville, Texas. This report includes hydrologic and hydraulic modeling and results for the Pre-Project and Post-Project conditions for FEMA effective and fully-developed flows.

Should you have any questions or concerns, please do not hesitate to contact me at (214) 986-2283 to discuss any items related to this report.

Sincerely,



John Foote, P.E, CFM  
Cardinal Strategies Engineering Services, LLC  
TBPE Firm Registration No. F-11976

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Appendix A – Collected Data
Appendix B – Hydrologic Data
Appendix C – Hydraulic Data
Appendix D – Digital Data

## 1.0 Project Description

### 1.1 Purpose

The purpose of this flood study is to evaluate the 100-year fully-developed peak discharges for Loving Branch in the vicinity of the ELTSF Addition development. The improvement includes the expansion of existing private drive and proposed construction of a secondary drive from FM-407 E. A hydrologic and hydraulic evaluation was performed for the watershed and stream. This study will establish the existing and ultimate 100-year channel velocities and water surface elevations of the floodplain for Loving Branch.

### 1.2 Site Location and Proposed Improvements

A new school building is proposed on the 95-acre site for the Education Leads to Success Foundation. The site is located on FM-407 East, Loving Branch flows from south to north through the site. The site location can be seen in Figure 1.

### 1.3 FEMA Flood Insurance Rate Map

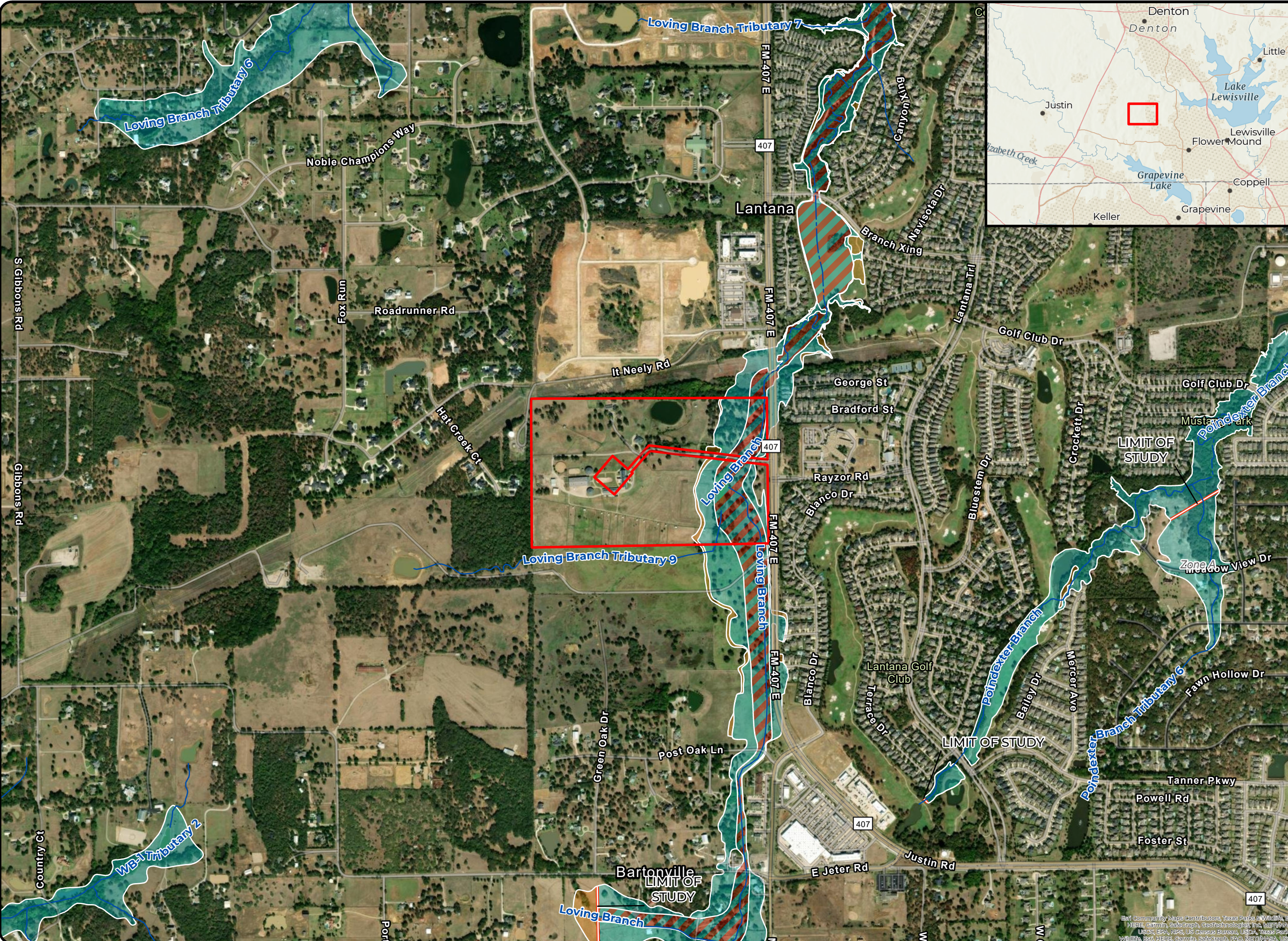
Loving Branch is currently mapped as a FEMA Zone AE with floodway on the Flood Insurance Rate Map (FIRM) 48121C0510G dated April 18, 2011, as shown in Figure 2.

### 1.4 Data Collection

Data obtained in support of the ELTSF Addition flood study includes:

- Texas Natural Resources Information System (TNRIS) 1m Lidar dated 2020.
- Soils provided by USDA Natural Resources Conservation Service (NRCS).
- Future Land Use Map of the Town of Bartonville effective by 2037.
- Engineering Plans and Survey by CCM Engineering dated June 2023

The horizontal datum utilized for the project is the NAD83 Texas State Plane North Central Zone FIPS 4202. The vertical datum is NAVD88.



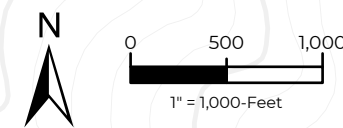
Project Site Boundary

**FEMA NFHL**

- Profile Baselines
- Water Lines

**Flood Hazard Zones**

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- 0.2% Annual Chance Flood Hazard



NAD 1983 StatePlane Texas North Central FIPS 4202 Feet  
 NAVD88

**Flood Study**

**Loving Branch**

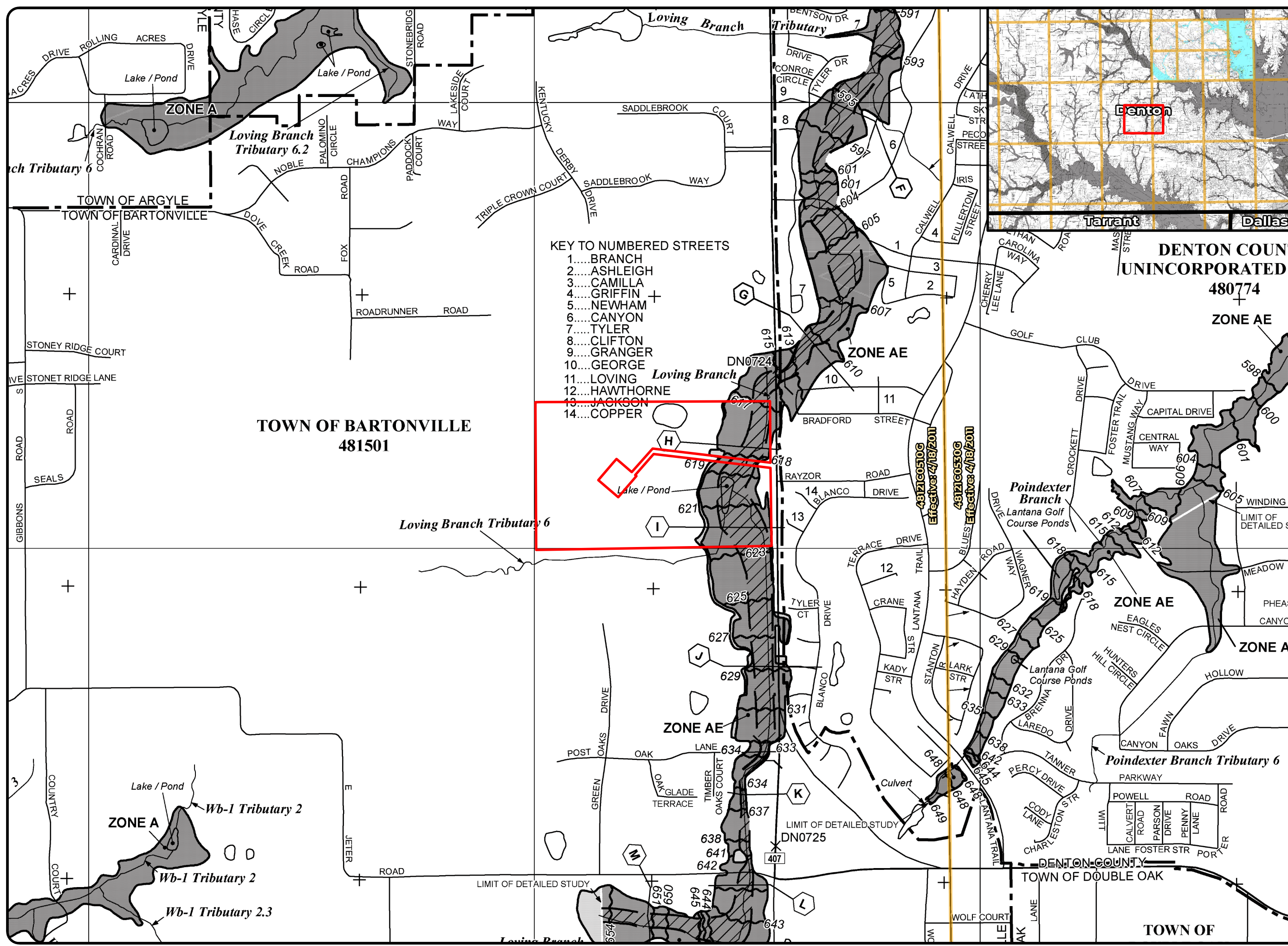
ELTSF Addition  
 Bartonville, TX

Prepared For:

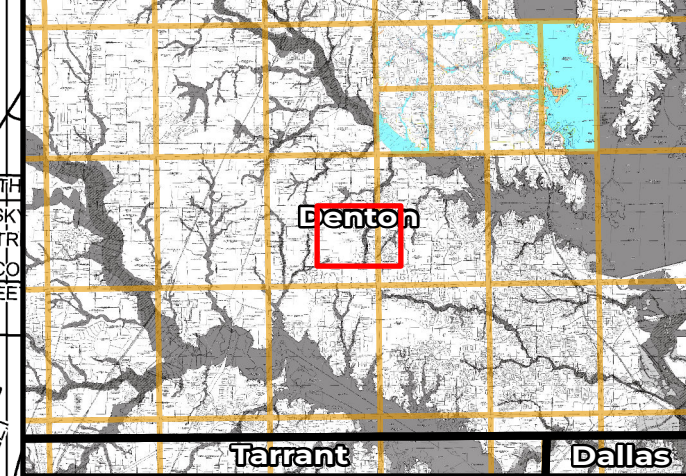


**Vicinity Map**

Figure  
**1**

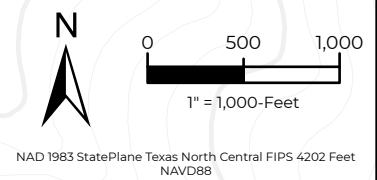


- KEY TO NUMBERED STREETS**
- 1.....BRANCH
  - 2.....ASHLEIGH
  - 3.....CAMILLA
  - 4.....GRIFFIN
  - 5.....NEWHAM
  - 6.....CANYON
  - 7.....TYLER
  - 8.....CLIFTON
  - 9.....GRANGER
  - 10.....GEORGE
  - 11.....LOVING
  - 12.....HAWTHORNE
  - 13.....JACKSON
  - 14.....COPPER



**DENTON COUNTY UNINCORPORATED AREA**  
 480774

- Project Site Boundary
- FIRM Panel Boundary



**Flood Study**

**Loving Branch**

ELTSF Addition  
 Bartonville, TX

Prepared For:  
**CGM ENGINEERING**

**FEMA FIRM**

Figure  
2



## 2.0 Hydrologic Analysis

A hydrologic analysis was performed for Loving Branch to calculate fully-developed peak discharges in the stream for the hydraulic analysis. The intersection of Loving Branch and FM-407 East crossing is the downstream extent of the hydrologic analysis.

A fully-developed SCS Unit Hydrograph model was created for the analysis using HEC-HMS version 4.10.

The drainage areas for Loving Branch were delineated using 1-foot contours from 2020 TNRIS lidar data. Figure 3 provides the fully-developed hydrologic map.

The watershed is comprised of type A, B, C and D soils provided by the NRCS. The SCS Curve Number and SCS time of concentration methods were used to estimate losses and lag times. The curve number values from from iSWM are shown below in Table 1.

*Table 1 - Land Use Curve Numbers*

HMS Element	Curve Number by Soil Group			
	A	B	C	D
Open Space - Good	39	61	74	80
Commercial/Business	89	92	94	95
Industrial	81	88	91	93
Residential - 2 acre	46	65	77	82
Paved - Roads	98	98	98	98

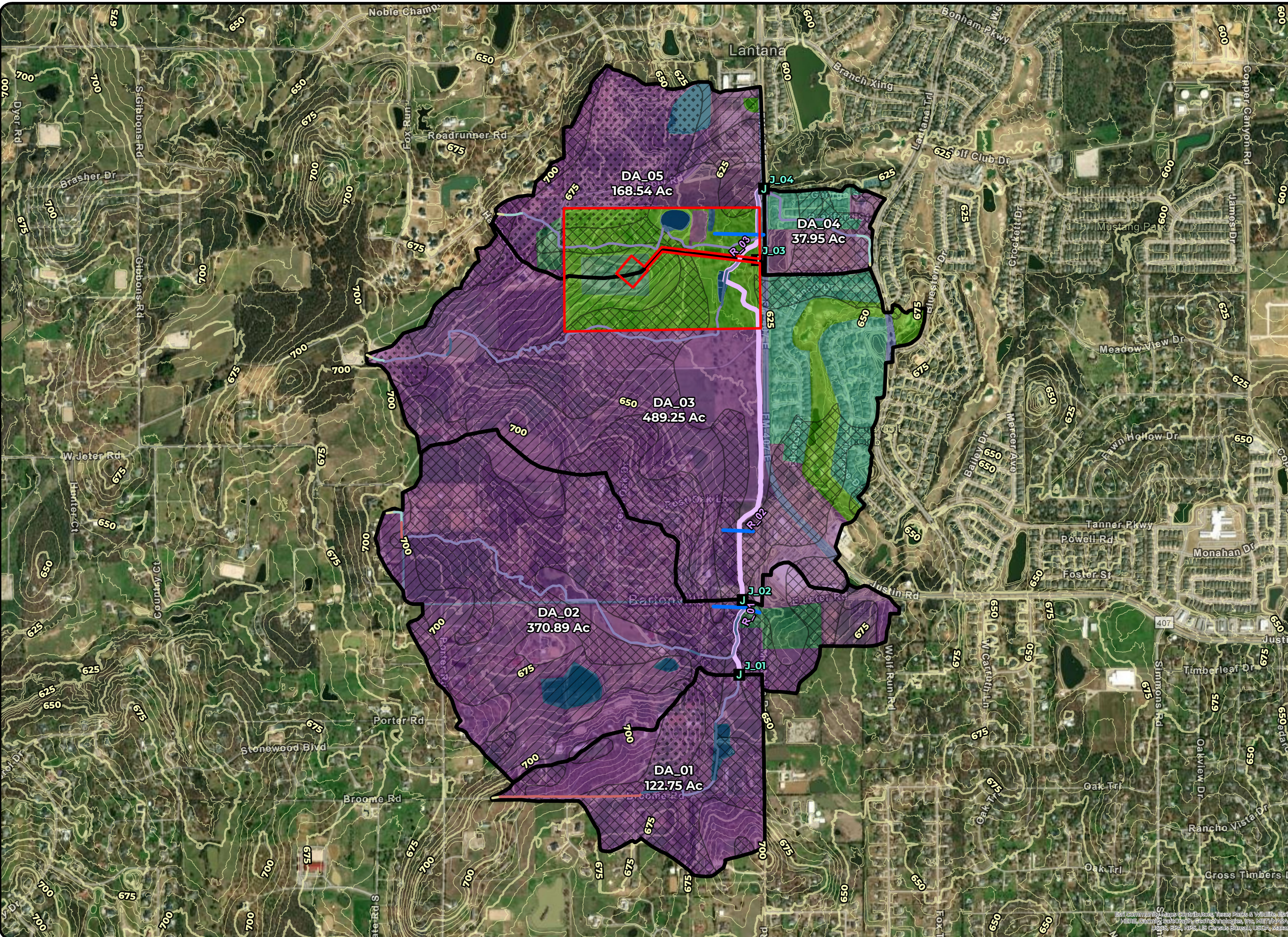
The times of concentration were calculated for the longest flow paths using TNRIS 1-foot contours and the equations used for calculating sheet, shallow, and channel flow. The calculations for the longest flow paths can be found in Appendix B. The time of concentration for each basin were converted to lag times by multiplying each value by 0.6. Lag times are provided in Table 2.

The fully-developed land use was developed based on the Town of Bartonville 2037 Comprehensive Plan. The composite curve number for each basin is shown below in Table 2. Muskingum-Cunge was used for all the routing reaches. The shapefile used for the routing can be found in Appendix D. The calculations can be found in Appendix B.

The rainfall depth used in this hydrologic analysis was obtained from the Denton Rainfall Table of iSWM Technical Manual, April 2020.

*Table 2 – Fully-Developed Hydrologic Parameters*

HMS Element	Area (mi <sup>2</sup> )	Area (acres)	Curve Number	Lag Time (min)
DA_01	0.1918	122.75	74.2	12.0
DA_02	0.5795	370.89	76.7	19.6
DA_03	0.7645	489.25	76.6	13.3
DA_04	0.0593	37.95	90.3	7.2
DA_05	0.2633	168.54	69.5	11.9



**Project Site Boundary**

**Pre-Project Fully-Developed Hydrology**

- Junctions
- Muskingum-Cunge 8-Point Cross Section

**Flow Paths**

- Sheet Flow
- Shallow Concentrated Flow
- Channel Flow
- Swale Flow
- Pond Flow

**Routing Reaches**

**Drainage Areas**

**Soil Hydrologic Group**

- A
- B
- C
- All Other Areas Group D

**iSWM Land Cover**

- Commercial/Business
- Industrial
- Lake
- Open Space - Good
- Paved - Roads
- Residential - 1/4 Acre
- Residential - 2 Acre

**TNRIS\_2020 Contours**

- 25-FT
- 5-FT

N

0 600 1,200

1" = 1,200-Feet

NAD 1983 StatePlane Texas North Central FIPS 4202 Feet NAVD88

**Flood Study**

**Loving Branch**

ELTSF Addition  
Bartonville, TX

Prepared For:

**CCM ENGINEERING**

## 2.1 Results

The results of 100-yr fully-developed peak discharges are shown below in Table 3. The following flow will be used in the hydraulic analysis to study the impacts of proposed driveway expansion. Section 4.0 describes hydraulic modeling.

*Table 3 –Fully-Developed Hydrologic Results*

HMS Element	Peak Discharge (cfs)
J-01	650
J-02	2225
J-03	3185
J-04	3925

### 3.0 Hydraulic Analysis

A hydraulic model was built for Loving Branch to evaluate the impacts of the proposed construction of the private drive in the stream. A hydraulic model was created using HEC-RAS version 6.3.1. The following sections will provide more detail for both the Pre-Project and Post-Project analysis.

#### 3.1 Flows Data

The FEMA Effective multiple profiles utilized effective WSELs at existing cross section letter “G” provided in the LOMR 11-06-3364P. The existing multiple profiles use the revised effective water surface elevation from LOMR study for the downstream boundary condition, while the fully-developed flows utilized the normal depth of 0.00314 ft/ft. Table 4 shows the peak discharges used in the hydraulic analysis.

*Table 4 - Peak Discharges*

<b>Cross-Section</b>	<b>10% (cfs)</b>	<b>2% (cfs)</b>	<b>1% (cfs)</b>	<b>0.2% (cfs)</b>	<b>1% FD (cfs)</b>
4455	1280	1730	1930	2340	2225
1984	1770	2440	2740	3340	3185
733	1900	2730	3070	3740	3925

#### 3.2 Pre-Project

Cross sections were cut approximately every 200 feet starting from FEMA cross-section letter “J” to cross-section letter “G”. Cross sections were made from the 2020 TNRIS points and on-site survey to develop an existing conditions geometry for the stream. Aerial imagery was used to determine the roughness coefficients for the channel and overbanks of the model. The Manning’s roughness values range from 0.045 to 0.05.

Table 5 shows the difference of 100YR WSELs under the existing and fully-developed conditions. The two profiles use the same geometry but different flow data and downstream boundary conditions.

Table 5 – 100 YR Comparison – Existing vs Fully-Developed Conditions.

Cross-Section	Existing WSEL (ft)	Fully-Developed WSEL (ft)	Difference (ft)
4450	628.69	628.84	0.15
4195	627.63	627.78	0.15
3932	626.04	626.16	0.12
3652	624.2	624.34	0.14
3111	621.8	621.97	0.17
2848	620.1	620.19	0.09
2659	618.66	618.88	0.22
2024	618.14	618.32	0.18
1984	618.08	618.25	0.17
1912	<b>Private Drive</b>		
1857	616.52	616.86	0.34
1577	616.24	616.62	0.38
1414	616.12	616.5	0.38
1383	616.1	616.49	0.39
1272	615.85	616.27	0.42
1237	615.49	615.85	0.36
938	612.82	613.29	0.47
890	612.42	612.93	0.51
759	<b>FM-407 E</b>		
733	612.53	612.96	0.43
622	612.02	612.45	0.43
237	611.1	611.75	0.65

### 3.3 Post-Project

The Pre-Project model was used as the starting point for the Post-Project hydraulic analysis. The existing drive across Loving Branch is widened by 10 ft and the upstream deck elevation is updated. The Post-Project model incorporates the second proposed drive from the grading plan provided by CCM Engineering. A 7' x 4' box culvert is proposed underneath the proposed drive as it crosses through the main channel at the entrance with FM-407 E. Grading is proposed to mitigate the rises in water surface elevation. The engineering plan can be found in Appendix A. The results of hydraulic analysis are shown below.

### 3.4 Results

The comparisons provided in Tables 6-9 demonstrate that the ELTSF Addition development does not cause any adverse changes to 100-YR existing and fully-developed water surface elevation and channel velocity in Loving Branch. Figure 4 shows the fully-developed hydraulic workmap.

Table 6 – Existing 100-YR Water Surface Elevations Comparison.

Cross-Section	Pre-Project WSEL (ft)	Post-Project WSEL (ft)	Difference (ft)
4450	628.69	628.69	0.00
4195	627.63	627.63	0.00
3932	626.04	626.04	0.00
3652	624.2	624.2	0.00
3111	621.8	621.8	0.00
2848	620.1	620.1	0.00
2659	618.66	618.66	0.00
2024	618.14	618.12	-0.02
1984	618.08	618.06	-0.02
1912	<b>Private Drive</b>		
1857	616.52	616.45	-0.07
1577	616.24	616.19	-0.05
1414	616.12	616.08	-0.04
1383	616.1	616.06	-0.04
1300	<b>Proposed Drive</b>		
1272	615.85	615.84	-0.01
1237	615.49	615.48	-0.01
938	612.82	612.82	0.00
890	612.42	612.42	0.00
759	<b>FM-407 E</b>		
733	612.53	612.53	0.00
622	612.02	612.02	0.00
237	611.1	611.1	0.00

*Table 7 – Fully Developed 100-YR Water Surface Elevations Comparison.*

Cross-Section	Pre-Project WSEL (ft)	Post-Project WSEL (ft)	Difference (ft)
4450	628.84	628.84	0.00
4195	627.78	627.78	0.00
3932	626.16	626.16	0.00
3652	624.34	624.34	0.00
3111	621.97	621.97	0.00
2848	620.19	620.19	0.00
2659	618.87	618.86	-0.01
2024	618.32	618.29	-0.03
1984	618.25	618.22	-0.03
1912	<b>Private Drive</b>		
1857	616.86	616.81	-0.05
1577	616.62	616.58	-0.04
1414	616.50	616.48	-0.02
1383	616.49	616.46	-0.03
1300	<b>Proposed Drive</b>		
1272	616.27	616.25	-0.02
1237	615.85	615.86	0.01
938	613.29	613.29	0.00
890	612.94	612.94	0.00
759	<b>FM-407 E</b>		
733	612.96	612.96	0.00
622	612.45	612.45	0.00
237	611.75	611.75	0.00

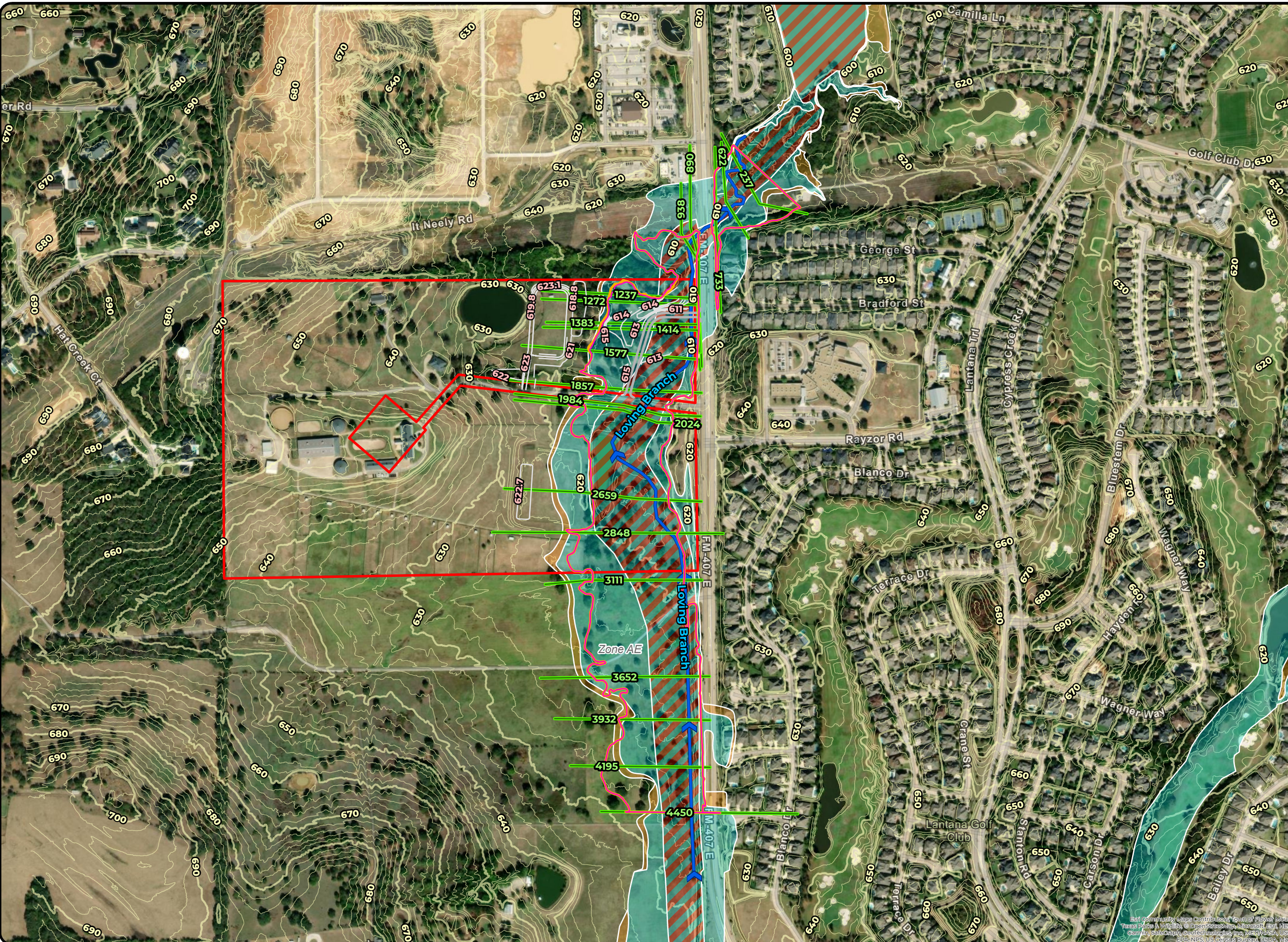


*Table 8 – Existing 100-YR Channel Velocity Comparison.*

Cross-Section	Pre-Project Velocity (fps)	Post-Project Velocity (fps)	Difference (ft)
4450	5.27	5.27	0.00
4195	5.14	5.14	0.00
3932	5.59	5.59	0.00
3652	4.22	4.21	-0.01
3111	3.20	3.20	0.00
2848	4.77	4.76	-0.01
2659	2.97	2.97	0.00
2024	1.98	1.99	0.01
1984	2.64	2.65	0.01
1912	<b>Private Drive</b>		
1857	3.18	3.29	0.11
1577	2.77	2.62	-0.15
1414	2.86	2.70	-0.16
1383	2.15	2.04	-0.11
1300	<b>Proposed Drive</b>		
1272	3.89	3.45	-0.44
1237	5.56	5.19	-0.37
938	7.88	7.87	-0.01
890	6.00	6.00	0.00
759	<b>FM-407 E</b>		
733	4.88	4.88	0.00
622	3.48	3.48	0.00
237	3.71	3.71	0.00

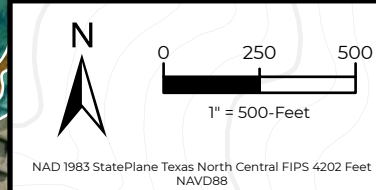
Table 9 – Fully Developed 100-YR Channel Velocity Comparison.

Cross-Section	Pre-Project Velocity (fps)	Post-Project Velocity (fps)	Difference (ft)
4450	5.57	5.57	0.00
4195	5.23	5.23	0.00
3932	5.87	5.88	0.01
3652	4.34	4.34	0.00
3111	3.37	3.38	0.01
2848	5.13	5.12	-0.01
2659	3.05	3.06	0.01
2024	2.15	2.16	0.01
1984	2.89	2.91	0.02
1912	<b>Private Drive</b>		
1857	3.20	3.28	0.08
1577	2.77	2.62	-0.15
1414	2.9	2.78	-0.12
1383	2.22	2.1	-0.12
1300	<b>Proposed Drive</b>		
1272	3.83	3.42	-0.41
1237	5.84	5.41	-0.43
938	7.79	7.79	0.00
890	6.19	6.19	0.00
759	<b>FM-407 E</b>		
733	5.58	5.58	0.00
622	3.69	3.69	0.00
237	3.35	3.35	0.00



- Post-Project 100yr Fully-Developed Floodplain
- Pre-Project 100yr Fully-Developed Floodplain
- Proposed Grading
- Cross Sections
- Stream Centerline
- Project Site Boundary

- FEMA NFHL**
- Flood Hazard Zones**
- 1% Annual Chance Flood Hazard
  - Regulatory Floodway
  - 0.2% Annual Chance Flood Hazard
- TNRIS\_20 Contours**
- 10-FT
  - 2-FT



**Flood Study**

**Loving Branch**

ELTSF Addition  
Bartonville, TX

Prepared For:



Base Community Maps Contributors: Town of Flower Mound, Texas Parks & Wildlife, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnology, Inc, MEO, NASA, USGS, EPA, NPS, US Census Bureau, USDA, Maxar

## 4.0 Conclusion

The proposed plan includes widening the existing private drive while proposing another drive from FM-407 E. The hydraulic results show that the improvement results in no adverse impacts to the existing and fully-developed 100-year flood risk. There is a minimal rise in channel velocity, but this should be negligible as the velocity is relatively small and not considered corrosive.

All collected data is provided in Appendix A, hydrologic output and calculations in Appendix B, and hydraulic output in Appendix C. Appendix D contains the digital models, GIS data.