TRAFFIC IMPACT ANALYSIS FOR

BAHIA COVE PHASE II

IN LEAGUE CITY, TEXAS

DeShazo Project No. 19030

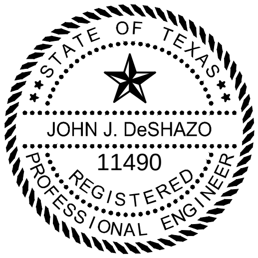
Prepared for:

Mr. Stephen Zuloaga
WRH Realty Services, Inc
100 3rd Street South, Suite 300
St. Petersburg, FL 33701

Prepared by:

DeShazo Group, Inc.
Texas Registered Engineering Firm F-3199
400 South Houston Street, Suite 330
Dallas, Texas 75202
214.748.6740

June 12, 2019



06/12/2019

DeShazo Group

Traffic. Transportation Planning. Parking. Design.

Texas Registered Engineering Firm F-3199

Traffic Impact Analysis for

Bahia Cove Phase II in League City, Texas

~ DeShazo Project No. 19030~

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EXECUTIVE SUMMARY

The services of **DeShazo Group, Inc.** (DeShazo) were retained by **WRH Realty Services, Inc.**, to conduct a traffic impact analysis (TIA) for the proposed residential development in League City, Texas. The subject property will be located west of existing Bahia Cove Apartments located at 901 FM 517 Rd W in League City, Texas. The TIA also analyzed the impact of the proposed site if it were to be developed with gas station, bank, fast-food restaurant or shopping center. The TIA analyzed several combinations of land uses to provide a comparison of the impact due to the other specified land uses. The table below shows the land uses assumed for the comparison.

Other Land Uses	Quantity	Buildout Year
Drive-in Bank	2,500 SF	2021
Fast-food with Drive-Thru	4,000 SF	2021
Gas Station with Market	10 Pumps	2021
Retail	28,000 SF	2021

The proposed project is planned to be fully constructed by 2021. **Table 1** shows the development program summary for the site development.

Table 1. Development Program Summary

Use	Quantity	Buildout Year
Multifamily development	78 dwelling units	2021

The analysis of the traffic generated by the proposed development resulted in no significant impact on the local roadway system. Below is a summary of findings from this TIA.

FINDING: All the study intersections currently operate at *LOS D* or better during both the peak periods.

FINDING: All intersections analyzed for the full buildout condition in the study are expected to operate at *LOS D* or better during the peak hour periods with the exception.

- Bahia Cove Driveway at FM 517: The SB movement is expected to operate at *LOS E* during the PM peak hour period. The highest 95th percentile queue is expected to be about one (1) vehicle.

FINDING: The comparison of the impact considering the other land uses is provided on Page 13 under the LOS table. The results show that the SB movement on the proposed Driveway 1 at FM 517 that will serve Bahia Cove Phase 2 is expected to operate at *LOS D* under the proposed multifamily development. By comparison, the SB movement is expected to operate at *LOS E* or F for all the other general commercial land use combinations evaluated in this study. The analysis shows that the multifamily units have the least impact on the adjacent roadway system and intersections.

RECOMMENDATIONS:

Bahia Cove Driveway at FM 517: The SB movement is expected to operate an *LOS E* during the PM peak hour, but with the 95th percentile queue being less than one (1) vehicle. The expected queueing is higher for this movement if the development were to consist of other land uses. The multifamily development has the minimum impact on this existing driveway. In Phase 2, there will be cut-through traffic entering in and exiting out of the proposed Bahia Cove. The additional cut-through traffic is not significant enough to consider any major changes on the driveway.

<u>Driveway 1 at FM 517:</u> The proposed Driveway 1 is expected to operate at *LOS D* or better at site buildout conditions. The expected queue is not significant; therefore, no improvements are needed.

<u>FINDING:</u> Based upon the roadway link analysis, the proposed development has no significant impact on FM 517. The volume-capacity ratio increased by only 0.02. For the purpose of this analysis and to be conservative, FM 517 was assumed to be a two-lane roadway with a divided median.

<u>RECOMMENDATION:</u> The proposed site has no significant impact on FM 517. No improvements are necessary due to the very low site traffic.

<u>RECOMMENDATION:</u> Based upon the projected volumes derived in this study, installation of an auxiliary deceleration does not meet TxDOT's threshold for the proposed site driveway.

<u>FINDING:</u> The distance between proposed Driveway 1 and the Bahia Cove Driveway will be less than 425 feet.

<u>RECOMMENDATION:</u> Driveway 1 is expected to operate at accepatble conditions at buildout conditions and beyond. An exception to the access criteria may be pursued with TxDOT to request a lower spacing requirement based upon the operational conditions. The estimated distance between Driveway 1 and the existing Bahia Cove Driveway is about 350 ft. The available distance is significant and a greater distance between the two driveways is not necessary due to the very low site traffic that will be generated by the existing Bahia Cove and future Bahia Cove Phase 2.

<u>FINDING:</u> Based upon a cursory review on Google Earth, the proposed site driveway meets the required intersection sight distance.

<u>CONCLUSION:</u> Based on a detailed comparative analysis, it is evident that the 78 multi-family units generate the lowest number of trips and also have the least impact compared to other land uses like shopping center, fast food restaurant, gas station etc. The Project's site-generated traffic can be accommodated with the existing roadway network. Therefore, it is DeShazo's recommendation that the site plan and the development program be approved.

END OF SUMMARY

INTRODUCTION

The services of **DeShazo Group, Inc.** (DeShazo) were retained by **WRH Realty Services, Inc.**, to conduct a traffic impact analysis (TIA) for the proposed residential development in League City, Texas. The subject property will be located west of existing Bahia Cove Apartments located at 901 FM 517 Rd W in League City, Texas. The proposed project is planned to be fully built by 2021.

A site location map and preliminary site plan are provided in **Exhibit 1** and **Exhibit 2**, respectively.

PURPOSE

TxDOT is requiring that a TIA be completed for the subject site as part of permit application. The purpose of the TIA is to determine if any improvements to the adjacent transportation system are needed in order to maintain a satisfactory level of service, an acceptable level of safety, and appropriate access for the proposed development.

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 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 is 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, character of 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. Recommend mitigation measures to improve roadway operational conditions, if needed, based upon the analysis.

ANALYSIS SCENARIOS

This TIA analyzed the following peak hour periods that were considered the most critical conditions on the public roadway system related to the proposed Project. The proposed development is to be fully built by 2021.

Roadway Intersections:

- Weekday: AM peak hour of adjacent street traffic (7:00– 8:00)
- Weekday: PM peak hour of adjacent street traffic (5:00– 6:00)

Development scenarios analyzed and considered in this analysis are summarized in **Table 2.**

Table 2. Development Scenarios Analyzed

Scenario	Development Program	Traffic Volumes
2019 Existing	None Added	Existing 2019 Volumes
2021 Background	None Added	Existing 2019 volumes grown at 3% per year for 2 years
2021 Background + Site	Residential development	Existing 2019 volumes grown at 3% per year for 2 years plus site traffic
2026 Horizon	None Added	Background 2021 volumes grown at 1% per year for 5 years
2026 Horizon + Site	Residential development	Background 2021 volumes grown at 1% per year for 5 years plus site traffic

DeShazo Group

TRAFFIC & TRANSPORTATION ENGINEERS

400 S. Houston Street Ste. 330
Dallas, Texas 75202
(214) 748-6740

Site Location

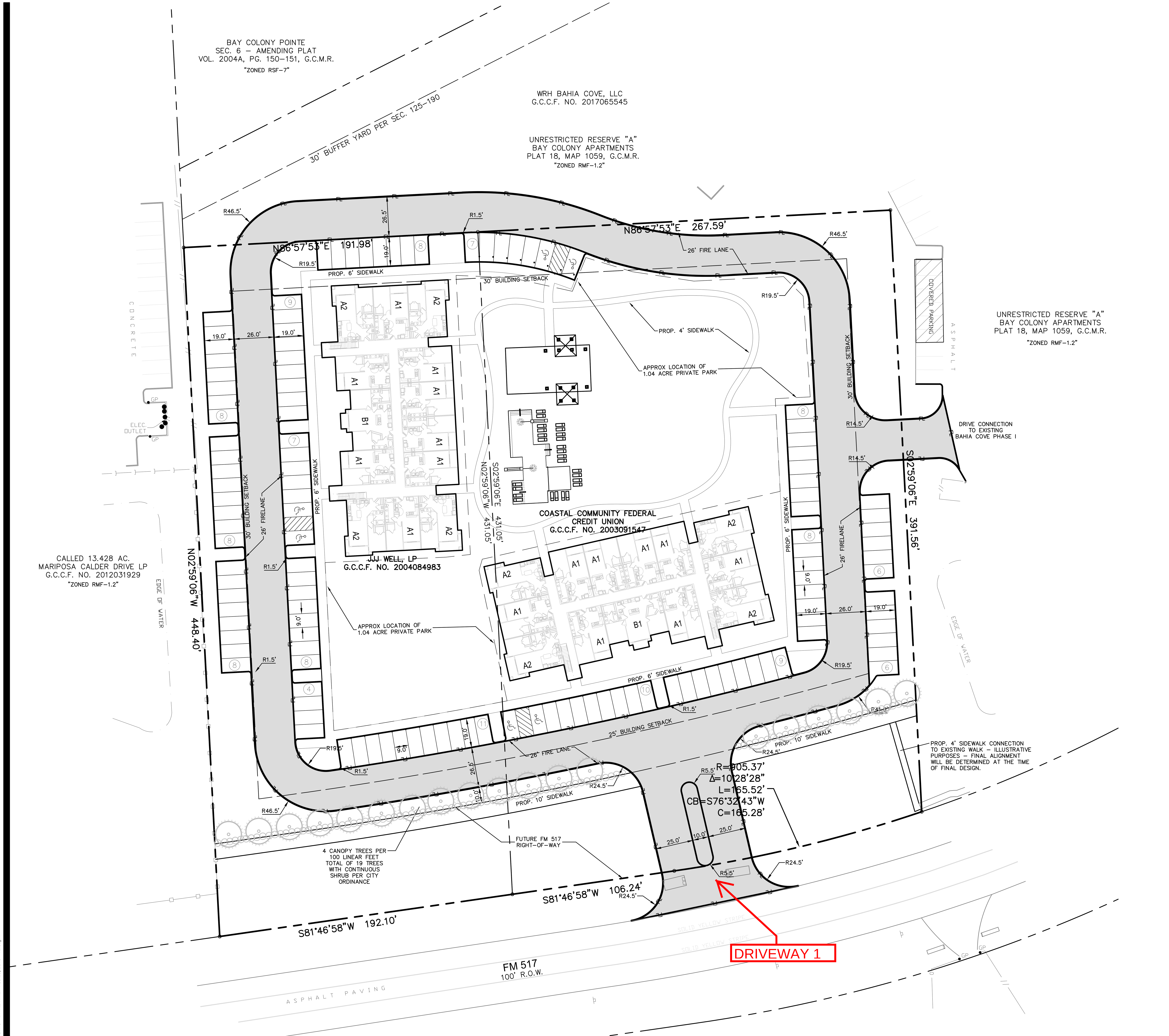
Traffic Impact Analysis for Bahia Cove Phase II in League City, Texas

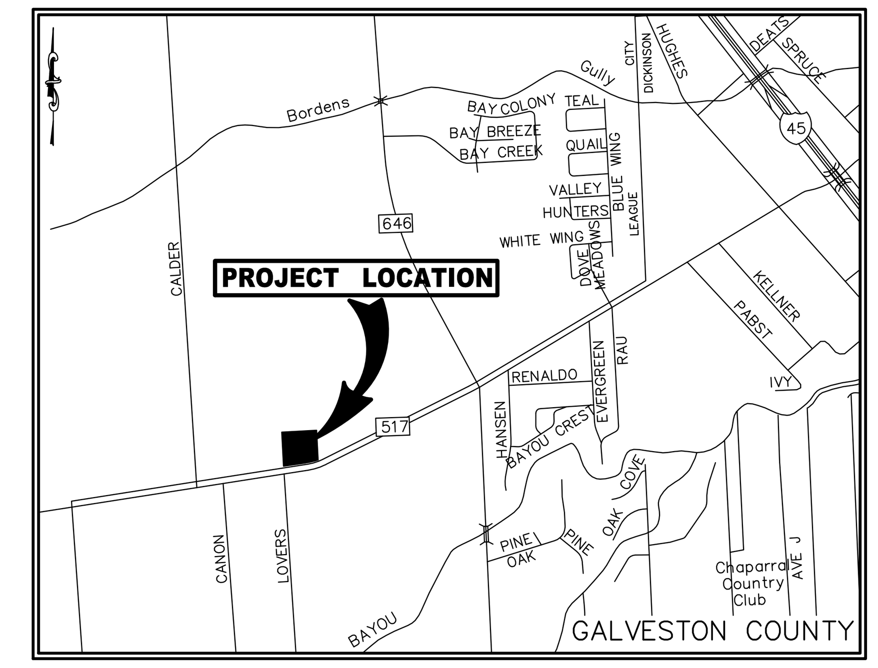
PROJECT #: 19030

DATE: JUNE 2019

EXHIBIT

1





VICINITY MAP
(NOT TO SCALE)

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.

LEGEND

- PROPOSED FIRELANE
- ACCESSIBLE CROSSWALK
- PROPOSED FENCE

NOTES

1. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED.
2. PARKING AND ACCESS ON AND FROM BAHIA COVE PHASE 1 WILL BE ADDRESSED PER A MUTUAL ACCESS AGREEMENT BETWEEN THE TWO PROPERTIES.
3. ALL MECHANICAL EQUIPMENT SHALL BE SCREENED IN ACCORDANCE WITH 125–170.L.
4. PER DISCUSSIONS WITH TxDOT, ALL STORM WATER RUNOFF WILL BE DETAINED TO TxDOT STANDARDS AND RELEASED INTO TxDOT RIGHT OF WAY AND WILL FALL UNDER TxDOT'S MS4.

SITE DATA SUMMARY TABLE

EXISTING ZONING PROPOSED ZONING	GENERAL COMMERCIAL MULTIFAMILY RMF–1.2		
PROPOSED USE	MULTIFAMILY		
LOT AREA	LOT NO.	SQUARE FEET	ACRE
	TRACT 1	84,273	1.935
	TRACT 2	111,438	2.558
	TxDOT ROW DED.	30,651	0.704
	TOTAL	165,049	3.789
LOT COVERAGE	TOTAL BLDG AREA (sf)		25,482
	TOTAL LOT AREA (sf)		165,049
	LOT COVERAGE		54.1%
LOT DENSITY	20.586 UNITS/ACRE		
OPEN SPACE PROVIDED	74,358 SQUARE FEET		45%
PARKING REQUIRED	PHASE II		
	1BR x 72 UNITS		72
	2BR x 6 UNITS		12
	0.3 x 78 UNITS		23
	TOTAL REGULAR		107
PARKING PROVIDED	GARAGE		0
	TANDEM		0
	CARPORT		0
	SURFACE		125
	TOTAL		125
	ADA		6

Engineer of Record:	CHB
Drawn by:	AV
Date Plotted:	2/26/2019
Issue for Pricing / Bidding:	
Issue for Permit Application:	
Issue for Construction:	

REVISIONS

#	DATE	COMMENTS

BAHIA COVE
PHASE II
LEAGUE CITY, GALVESTON COUNTY, TEXAS

civil engineering, LLC.
5339 ALPHA ROAD, SUITE 300 DALLAS, TEXAS 75240
972.701.9636 • 972.701.9639 FAX
TX REGISTERED ENGINEERING FIRM F–12600
www.hpcivileng.com

PRELIMINARY
[NOT FOR CONSTRUCTION]
THIS DRAWING IS RELEASED FOR THE PURPOSE OF SCHEMATIC REVIEW ONLY AND IS NOT INTENDED FOR PERMITTING, BIDDING, OR CONSTRUCTION PURPOSES.
THESE PLANS WERE PREPARED UNDER THE DIRECT SUPERVISION OF BRIAN C. ABBOTT, P.E., TEXAS REG. #108439 DATE: XX/XX/XXXX

SHEET TITLE
PRELIMINARY SITE PLAN

SHEET NO.
SP1

HPCE #18-252

EXHIBIT 2: PRELIMINARY SITE PLAN

EXISTING AND PROPOSED LAND USE

The study parameters used in this TIA are based upon TxDOT requirements and are consistent with the standard industry practices used in similar studies.

SITE LOCATION AND STUDY AREA

The proposed residential development will be located west of existing Bahia Cove Apartments located at 901 FM 517 Rd W in League City, Texas.

Roadway Intersections:

- Bahia Cove Driveway at FM 517: Stop Controlled on Bahia Cove Driveway
- Driveway 1 at FM 517: Stop Controlled on Driveway 1

EXISTING SITE AND DEVELOPMENT

The site is currently vacant. The proposed development will consist of 78 dwelling units. The estimated buildout year is 2021.

EXISTING AND PROPOSED TRANSPORTATION SYSTEM

Thoroughfare System

- FM 517:
  - Existing operation and cross-section: two lanes with TWLT, two-way
  - Speed Limit: 50 mph (posted speed limit)
  - Functional Classification: Major Arterial

A summary of the existing and proposed intersection/roadway geometries and traffic control devices are shown in **Exhibit 3** and **Exhibit 4.**

Existing Traffic Volumes

Current traffic volumes were collected during the analysis periods at the study area intersections on Wednesday, May 29, 2019. 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 the normal traffic growth that is not directly related to the subject development of this study. **Table 3** depicts historical traffic volumes near the site, from which DeShazo calculated an annual growth rate.

Historical traffic volumes in the area have fluctuated in the last several years. A growth rate of **3%** per year was used in this analysis until the buildout year (2021) and **1%** per year was used from 2021 to the 2026 horizon year.

Table 3. Historical Daily Traffic Volume Growth Trend

I 30 FR WB (East of S Buckner Blvd)		
Year	Volume	Growth Rate
2017	18,653	0%
2016	18,653	6%
2015	17,661	
	Average:	3%

Data Source: **TxDOT**

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

SITE-TRAFFIC CHARACTERISTICS

Traffic generated by the Project 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* (10th Edition) is an accepted source for calculating trip generation for common land uses for which sufficient published data is available.

Trip generation is summarized in trip ends – a trip end is a one-way vehicular trip entering or leaving a site (i.e., one vehicle arriving and departing represents two trip ends). This analysis evaluates typical weekday AM and PM peak hour conditions of the local street traffic.

Table 4A provides a summary of the calculated trip ends generated by the project. Excerpts from *ITE Trip Generation Manual* data are provided in the Appendix section of this report. Tables 4B – 4G show the trips generated by the various combination of land uses that were analyzed. Supplemental information used in the trip generation calculations is provided in **Appendix C**.

Table 4A. Projected Trip Generation (Full Buildout)

ITE Code	ITE Land Use	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
220	Multi-family Housing	78 DU	549	38	9	29	47	30	17
		Subtotals:	549	38	9	29	47	30	17
		Totals:	549	38	9	29	47	30	17

Table 4B. Projected Trip Generation (Bank and Fast-food)

ITE Code	ITE Land Use	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
912	Drive-in Bank	2,500 SF	250	24	14	10	51	26	25
934	Fast Food with Drive-Thru	4,000 SF	1,884	161	82	79	131	68	63
		Subtotals:	2,134	185	96	89	182	94	88
		Totals:	2,134	185	96	89	182	94	88

Table 4C. Projected Trip Generation (Fast-food and Gas Station)

ITE Code	ITE Land Use	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
934	Fast Food with Drive-Thru	4,000 SF	1,884	161	82	79	131	68	63
945	Gas Station w/Market	10 Pumps	1,528	119	61	58	139	71	68
		Subtotals:	3,412	280	143	137	270	139	131
		Totals:	3,412	280	143	137	270	139	131

Table 4D. Projected Trip Generation (Retail and Gas Station)

ITE Code	ITE Land Use	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
820	Shopping Center	28,000 SF	2,530	166	103	63	212	102	110
945	Gas Station w/Market	10 Pumps	1,528	119	61	58	139	71	68
		Subtotals:	4,058	285	164	121	351	173	178
	0%	*Ped/Transit Credit:*	0	0	0	0	0	0	0
		Totals:	4,058	285	164	121	351	173	178

Table 4E. Projected Trip Generation (Retail and Bank)

ITE Code	ITE Land Use	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
820	Shopping Center	28,000 SF	2,530	166	103	63	212	102	110
912	Drive-in Bank - Generator	2,500 lanes	250	24	14	10	51	26	25
		Subtotals:	2,780	190	117	73	263	128	135
		Totals:	2,780	190	117	73	263	128	135

Table 4F. Projected Trip Generation (Bank and Gas Station)

ITE Code	ITE Land Use	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
912	Drive-in Bank	2,500 SF	250	24	14	10	51	26	25
945	Gas Station w/Market	10 Pumps	1,528	119	61	58	139	71	68
		Subtotals:	1,778	143	75	68	190	97	93
		Totals:	1,778	143	75	68	190	97	93

Table 4G. Projected Trip Generation (Bank and Gas Station)

ITE Code	ITE Land Use	Quantity	Weekday Trips	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
820	Shopping Center	28,000 SF	2,530	166	103	63	212	102	110
934	Fast Food with Drive-Thru	4,000 SF	1,884	161	82	79	131	68	63
		Subtotals:	4,414	327	185	142	343	170	173
		Totals:	4,414	327	185	142	343	170	173

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 (from **Tables 4)** by the corresponding traffic assignments (from **Appendix C**). The resulting cumulative (for all uses) peak period site-generated traffic volumes at buildout of the Project are graphically summarized in **Appendix A**.

ROADWAY INTERSECTION ANALYSIS

INTERSECTION CAPACITY ANALYSIS - METHODOLGY

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 of time 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 only approach or by individual traffic maneuvers that must stop or yield 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	$\leq$ 10	$\leq$ 10
LOS B	>10 - $\leq$20	>10 - $\leq$15
LOS C	>20 - $\leq$35	>15 - $\leq$25
LOS D	>35 - $\leq$55	>25 - $\leq$35
LOS E	>55 - $\leq$80	>35 - $\leq$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.

2019 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 5** provides a summary of peak period intersection operational conditions. The detailed traffic volumes and software output for all intersection analysis are provided in **Appendix A** and **Appendix D**, respectively.

Table 5. Existing Intersection Analysis

			2019 Existing	
			AM	PM
Intersections	Traffic Movement		LOS Delay	LOS Delay
Bahia Cove Driveway at FM 517	EBL	Stop Controlled on Minor Street	A *(0.0)*	B *(12.0)*
	SBLR		C *(20.1)*	D *(31.9)*
Driveway 1 FM 517	EBL		- -	- -
	SBL		- -	- -
	SBR		- -	- -

Based upon the existing 2019 analysis, all study intersections are currently operating at *LOS D* or better during the peak hour periods.

Table 6. 2021 BACKGROUND AND BACKGROUND PLUS SITE - INTERSECTION ANALYSIS

Intersections	Traffic Movement		2021 Background AM LOS (Delay)	2021 Background PM LOS (Delay)	2021 Background Plus Site (Housing) AM LOS (Delay)	2021 Background Plus Site (Housing) PM LOS (Delay)	2021 Background Plus Site (Bank & Fastfood) AM LOS (Delay)	2021 Background Plus Site (Bank & Fastfood) PM LOS (Delay)	2021 Background Plus Site (Bank & Gas) AM LOS (Delay)	2021 Background Plus Site (Bank & Gas) PM LOS (Delay)	2021 Background Plus Site (Bank &Retail) AM LOS (Delay)	2021 Background Plus Site (Bank &Retail) PM LOS (Delay)	2021 Background Plus Site (Gas & Fastfood) AM LOS (Delay)	2021 Background Plus Site (Gas & Fastfood) PM LOS (Delay)	2021 Background Plus Site (Gas & Retail) AM LOS (Delay)	2021 Background Plus Site (Gas & Retail) PM LOS (Delay)	2021 Background Plus Site (Retail & Fastfood) AM LOS (Delay)	2021 Background Plus Site (Retail & Fastfood) PM LOS (Delay)
Bahia Cove Driveway at FM 517	EBL	Stop Controlled on Minor Street	A (0.0)	B (12.5)	A (0.0)	B (12.7)	A (0.0)	B (13.0)	A (0.0)	B (12.9)	A (0.0)	B (13.2)	A (0.0)	B (13.2)	A (0.0)	B (13.4)	A (0.0)	B (13.4)
	SBLR		C (21.3)	E (35.3)	C (22.9)	E (38.2)	D (25.7)	E (47.4)	C (23.7)	E (44.0)	D (25.3)	F (55.6)	D (27.5)	F (50.5)	D (26.8)	F (60.8)	D (29.2)	F (65.2)
Driveway 1 FM 517	EBL		- -	- -	A (9.2)	B (12.0)	A (9.6)	B (12.7)	A (9.6)	B (12.9)	A (9.7)	B (13.0)	A (9.9)	B (13.3)	A (9.9)	B (13.7)	A (10.0)	B (13.4)
	SBL		- -	- -	C (21.2)	D (30.0)	D (26.5)	E (44.3)	D (25.1)	E (48.5)	D (26.0)	F (64.1)	D (33.6)	F (69.9)	D (32.7)	F (>100)	E (35.6)	F (>100)
	SBR		- -	- -	B (13.9)	C (24.2)	B (14.8)	D (27.8)	B (14.8)	D (29.6)	B (14.8)	D (30.9)	C (15.7)	D (32.1)	C (15.7)	E (36.2)	C (15.7)	D (33.7)
								- -										

Based upon the 2021 background and 2021 background plus site anlysis, all the study intersection operate at LOS D of better during the peak hour period with the exception of:

For Housing Only	For Bank & Fastfood	For Bank & Fastfood	For Bank & Retail	For Gas & Fastfood	For Gas & Retail	For Retail & Fastfood
1. Bahia Cove Driveway at FM 517: The SB movement is expected to operate at LOS E during PM peak hour for background and background plus site conditions.	1. Bahia Cove Driveway at FM 517: The SB movement is expected to operate at LOS E during PM peak hour for background and background plus site conditions.	1. Bahia Cove Driveway at FM 517: The SB movement is expected to operate at LOS E during PM peak hour for background and background plus site conditions.	1. Bahia Cove Driveway at FM 517: The SB movement is expected to operate at LOS F during PM peak hour for background plus site condition.	1. Bahia Cove Driveway at FM 517: The SB movement is expected to operate at LOS F during PM peak hour for background plus site condition.	1. Bahia Cove Driveway at FM 517: The SB movement is expected to operate at LOS F during PM peak hour for background plus site condition.	1. Bahia Cove Driveway at FM 517: The SB movement is expected to operate at LOS F during PM peak hour for background plus site condition.
	2. Driveway 1 at FM 517: The SB left turn movement is expected to operate at LOS E during PM peak hour for background plus site condition.	2. Driveway 1 at FM 517: The SB left turn movement is expected to operate at LOS E during PM peak hour for background plus site condition.	2. Driveway 1 at FM 517: The SB left turn movement is expected to operate at LOS F during PM peak hour for background plus site condition.	2. Driveway 1 at FM 517: The SB left turn movement is expected to operate at LOS F during PM peak hour for background plus site condition.	2. Driveway 1 at FM 517: The SB left turn movement is expected to operate at LOS F during PM peak hour for background plus site condition.	2. Driveway 1 at FM 517: The SB left turn movement is expected to operate at LOS F during AM and PM peak hour for background plus site condition.
					The SB right turn movement is expected to operate at LOS E during PM peak hour for background plus site condition.	

2026 HORIZON AND HORIZON PLUS SITE – INTERSECTION ANALYSIS

A five-year horizon period and site buildout (build) was considered to account for additional traffic that may result from other potential development in the area. The LOS results are provided in **Table 7**.

Table 7. 2026 Intersection Analysis

Intersections	Traffic Movement		2026 Horizon AM LOS Delay	2026 Horizon PM LOS Delay	2026 Horizon Plus Site AM LOS Delay	2026 Horizon Plus Site PM LOS Delay
Bahia Cove Driveway at FM 517	EBL	Stop Controlled on Minor Street	A *(0.0)*	B *(12.9)*	A *(0.0)*	B *(13.2)*
	SBLR		C *(22.6)*	E *(39.0)*	C *(24.3)*	E *(42.6)*
Driveway 1 FM 517	EBL		- -	- -	A *(9.4)*	B *(12.5)*
	SBL		- -	- -	C *(22.3)*	D *(32.0)*
	SBR		- -	- -	B *(14.4)*	D *(26.1)*

Based upon the 2026 horizon and 2026 horizon-plus-site buildout analysis, all study intersections are expected to operate at *LOS D*, or better during the peak hour periods with the following exceptions.

- Bahia Cove Driveway at FM 517: The SB movement is expected to operate at *LOS E* during AM and PM peak hours for the 2026 Horizon and Horizon+Site conditions.

ROADWAY LINK ANALYSIS – METHODOLGY

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 theoretically 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 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 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 Dallas-Fort Worth region, has derived internal "hourly service volume" guidelines used for transportation modelling 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 modelling purposes, they do provide a reasonable gauge of theoretical capacity.

Area Type	Hourly Service Volumes by 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
Urban/ Commercial	850	775	825	750	525	475
Suburban Residential	925	8,75	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 are as follows.

Volume: Capacity Ratio ≤ 45% is *LOS A/B*
Volume: Capacity Ratio > 45% and ≤ 65% is *LOS C*
Volume: Capacity Ratio > 65% and ≤ 80% is *LOS D*
Volume: Capacity Ratio < 80% and ≤ 100% is *LOS E*
Volume: Capacity Ratio ≥ 100% is *LOS F*

ROADWAY LINK ANALYSIS – RESULTS

For purpose of the roadway link analysis, the area is considered suburban residential. The roadway link analysis is summarized in **Table 8**.

Table 8. Roadway Link Capacity Analysis Results Summary

Roadway	Classification for Analysis	*Hourly Volume	# LANES	MEDIAN DIVIDED?	CAPACITY		V/C	LOS
					Per Lane	Roadway		
2019 Existing:								
FM 517 (Between Existing Bahia Cove Drive and Driveway 1)	Major Arterial	1,942	2	Y	925	1,850	1.05	F
2021 Background:								
FM 517 (Between Existing Bahia Cove Drive and Driveway 1)	Major Arterial	2,059	2	Y	925	1,850	1.11	F
2021 Background + Site:								
FM 517 (Between Existing Bahia Cove Drive and Driveway 1)	Major Arterial	2,087	2	Y	925	1,850	1.13	F
2026 Horizon:								
FM 517 (Between Existing Bahia Cove Drive and Driveway 1)	Major Arterial	2,164	2	Y	925	1,850	1.17	F
2026 Horizon + Site:								
FM 517 (Between Existing Bahia Cove Drive and Driveway 1)	Major Arterial	2,192	2	Y	925	1,850	1.18	F

Based upon the roadway link analysis, the following results were determined for FM 517.

FM 517:

- Currently operates at *LOS F* for the 2019 Existing conditions
- Expected to operate at *LOS F* for the 2021 Background and Background+Site conditions
- Expected to operate at *LOS F* for the 2026 Horizon and Horizon+Site conditions

SITE ACCESS REVIEW

Intersection sight distance, driveway spacing and deceleration lane requirements were also evaluated as part of this TIA.

INTERSECTION SIGHT DISTANCE

INTERSECTION SIGHT CRITERIA:

Sight distance is the metric used to describe the ability of a motorist to physically see (via a direct line of sight) objects and/or other vehicles to a degree sufficient to allow safe and efficient use of a roadway in the intended manner. The sight distance is a function of the major roadway's geometric characteristics and 85th percentile speed.

INTERSECTION SIGHT DISTANCE REVIEW FOR PROJECT

A cursory review of the proposed driveways with Google Earth found that the proposed driveway satisfies the intersection sight distance criteria.

Table 9. Intersection Sight Distance Summary

Intersections	Required SSD (Ft)		Provided SSD (Ft)		Meets Requirements
	Right Turn	Left Turn	Right Turn	Left Turn	
Driveway 1 and FM 517	480	555	>480	>555	Yes

[NOTE: This does not rule out the potential that other impediments such and landscaping, signage, etc. may exist.]

DRIVEWAY SPACING REVIEW

TXDOT 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 of 50 mph such as FM 517. TxDOT considers the spacing between access points as inside-edge-(of driveway pavement)-to-inside-edge.

- **TxDOT's criteria for Other State Highway Connection:**
  - For 50 MPH: 425 feet

LEAGUE CITY DRIVEWAY SPACING CRITERIA:

The driveway spacing parameters for the League City are summarized in the City's *Access Management Policy.* The City determines the driveway spacing distance from centerline spacing for driveways and from the edge of the property line when considering the distance from intersections. The City requires the following spacing relative to the Project.

- Minimum Driveway-Driveway Spacing:
  - Major Arterial: 425 feet

DRIVEWAY SPACING REVIEW FOR PROJECT: A summary of the driveway spacing provided for each of the proposed site access points is presented in **Table 10.**

Table10. Driveway Spacing Summary

Spacing Between	Required (Ft)	Provided (Ft)	Meets Requirements
Driveway 1 and Bahia Cove Driveway	425	~350	No
Driveway 1 and Nearest West Driveway	425	~425	Yes

The proposed Driveway 1 doesn't meet TxDOT's Driveway spacing criteria with the existing Bahia Cove Driveway.

DECELERATION LANE ANALYSIS

DECELERATION LANE CRITERIA:

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 posted speed limit of 45 MPH or lower). Additionally, Table 3-11 from the TxDOT *Roadway Design Manual* was used in the determination of left-turn deceleration auxiliary lanes.

A summary of the projected peak hour driveway volumes is included in **Appendix A** for each scenario analyzed.

DECELERATION LANE RECOMMENDATIONS:

Based upon the projected volumes derived in this study, installation of an auxiliary deceleration does not meet TxDOT's threshold for the proposed site driveway.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The services of **DeShazo Group, Inc.** (DeShazo) were retained by **WRH Realty Services, Inc.**, to conduct a traffic impact analysis (TIA) for the proposed residential development in League City, Texas. The subject property will be located west of existing Bahia Cove Apartments located at 901 FM 517 Rd W. in League City, Texas. The TIA also analyzed the impact of the proposed site if it were to be developed with gas station, bank, fast-food restaurant or shopping center. The TIA analyzed several combinations of land uses to provide a comparison of the impact due to the other specified land uses. The table below shows the land uses assumed for the comparison.

Other Land Uses	Quantity	Buildout Year
Drive-in Bank	2,500 SF	2021
Fast-food with Drive-Thru	4,000 SF	2021
Gas Station with Market	10 Pumps	2021
Retail	28,000 SF	2021

The proposed project is planned to be fully constructed by 2021. **Table 1** shows the development program summary for the site development.

Table 1. Development Program Summary

Use	Quantity	Buildout Year
Multifamily development	78 dwelling units	2021

The analysis of the traffic generated by the proposed development resulted in no significant impact on the local roadway system. Below is a summary of findings from this TIA.

FINDING: All the study intersections currently operate at *LOS D* or better during both the peak periods.

FINDING: All intersections analyzed for the full buildout condition in the study are expected to operate at *LOS D* or better during the peak hour periods with the exception.

- Bahia Cove Driveway at FM 517: The SB movement is expected to operate at *LOS E* during the PM peak hour period. The highest 95th percentile queue is expected to be about one (1) vehicle.

FINDING: The comparison of the impact considering the other land uses is provided on Page 13 under the LOS table. The results show that the SB movement on the proposed Driveway 1 at FM 517 that will serve Bahia Cove Phase 2 is expected to operate at *LOS D* under the proposed multifamily development. By comparison, the SB movement is expected to operate at *LOS E* or F for all the other general commercial land use combinations evaluated in this study. The analysis shows that the multifamily units have the least impact on the adjacent roadway system and intersections.

RECOMMENDATIONS:

Bahia Cove Driveway at FM 517: The SB movement is expected to operate an *LOS E* during the PM peak hour, but with the 95th percentile queue being less than one (1) vehicle. The expected queueing is higher for this movement if the development were to consist of other land uses. The multifamily development has the minimum impact on this existing driveway. In Phase 2, there will be cut-through traffic entering in and exiting out of the proposed Bahia Cove. The additional cut-through traffic is not significant enough to consider any major changes on the driveway.

Driveway 1 at FM 517: The proposed Driveway 1 is expected to operate at *LOS D* or better at site buildout conditions. The expected queue is not significant; therefore, no improvements are needed.

FINDING: Based upon the roadway link analysis, the proposed development has no significant impact on FM 517. The volume-capacity ratio increased by only 0.02. For the purpose of this analysis and to be conservative, FM 517 was assumed to be a two-lane roadway with a divided median.

RECOMMENDATION: The proposed site has no significant impact on FM 517. No improvements are necessary due to the very low site traffic.

RECOMMENDATION: Based upon the projected volumes derived in this study, installation of an auxiliary deceleration does not meet TxDOT's threshold for the proposed site driveway.

FINDING: The distance between proposed Driveway 1 and the Bahia Cove Driveway will be less than 425 feet.

RECOMMENDATION: Driveway 1 is expected to operate at accepatble conditions at buildout conditions and beyond. An exception to the access criteria may be pursued with TxDOT to request a lower spacing requirement based upon the operational conditions. The estimated distance between Driveway 1 and the existing Bahia Cove Driveway is about 350 ft. The available distance is significant and a greater distance between the two driveways is not necessary due to the very low site traffic that will be generated by the existing Bahia Cove and future Bahia Cove Phase 2.

FINDING: Based upon a cursory review on Google Earth, the proposed site driveway meets the required intersection sight distance.

CONCLUSION: Based on a detailed comparative analysis, it is evident that the 78 multi-family units generate the lowest number of trips and also have the least impact compared to other land uses like shopping center, fast food restaurant, gas station etc. The Project's site-generated traffic can be accommodated with the existing roadway network. Therefore, it is DeShazo's recommendation that the site plan and the development program be approved.

END OF MEMO

Exhibit 3. Existing Roadway Geometry and Traffic Control

North ^
Not to Scale

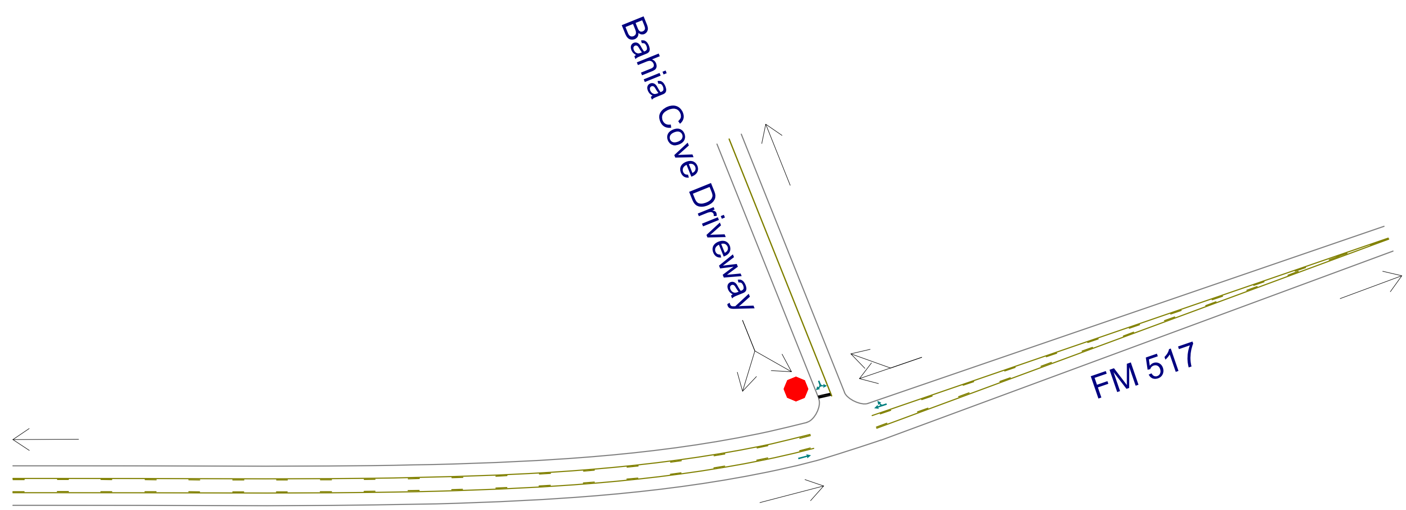
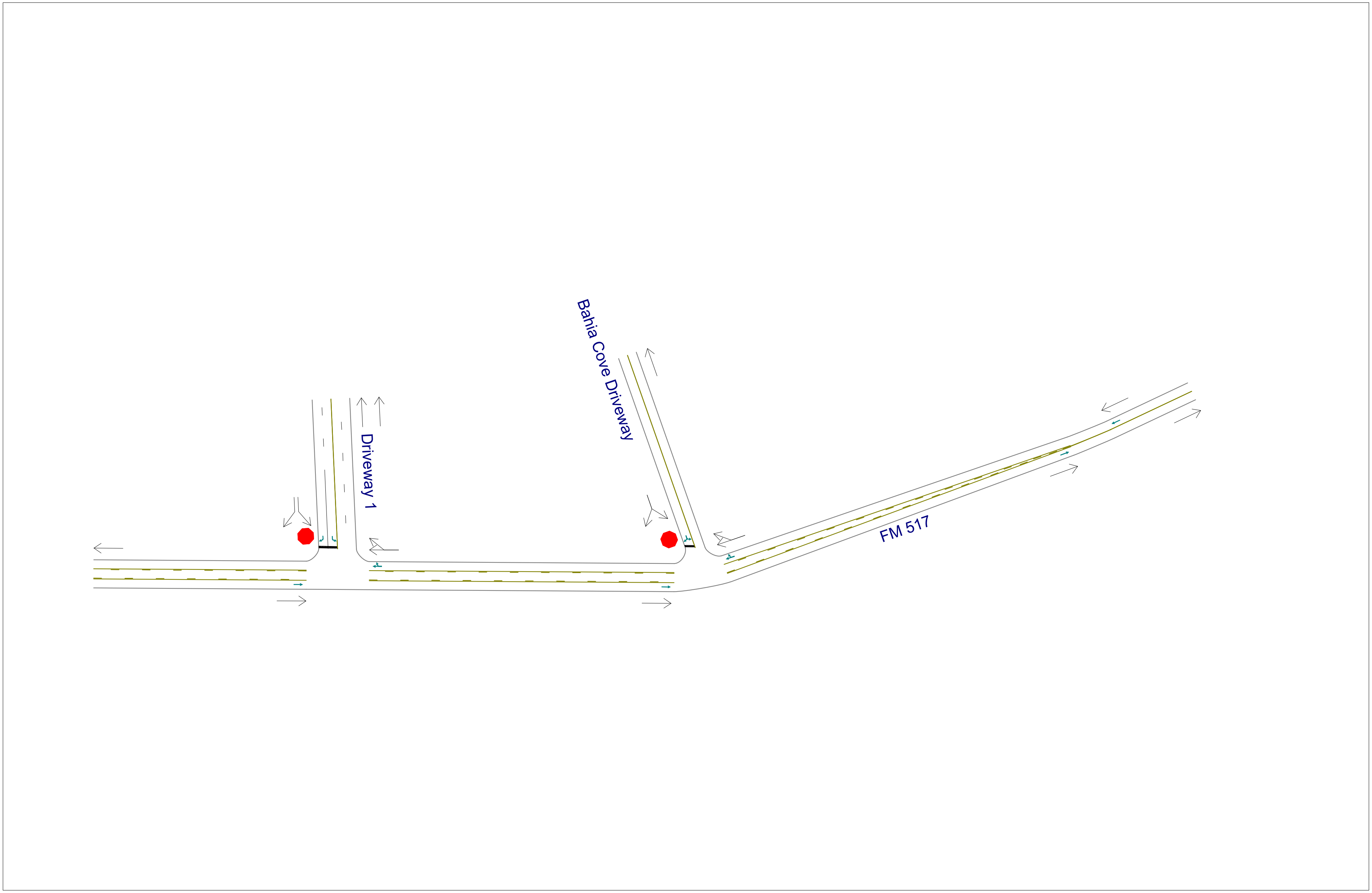


Exhibit 4. Proposed Roadway Geometry and Traffic Control

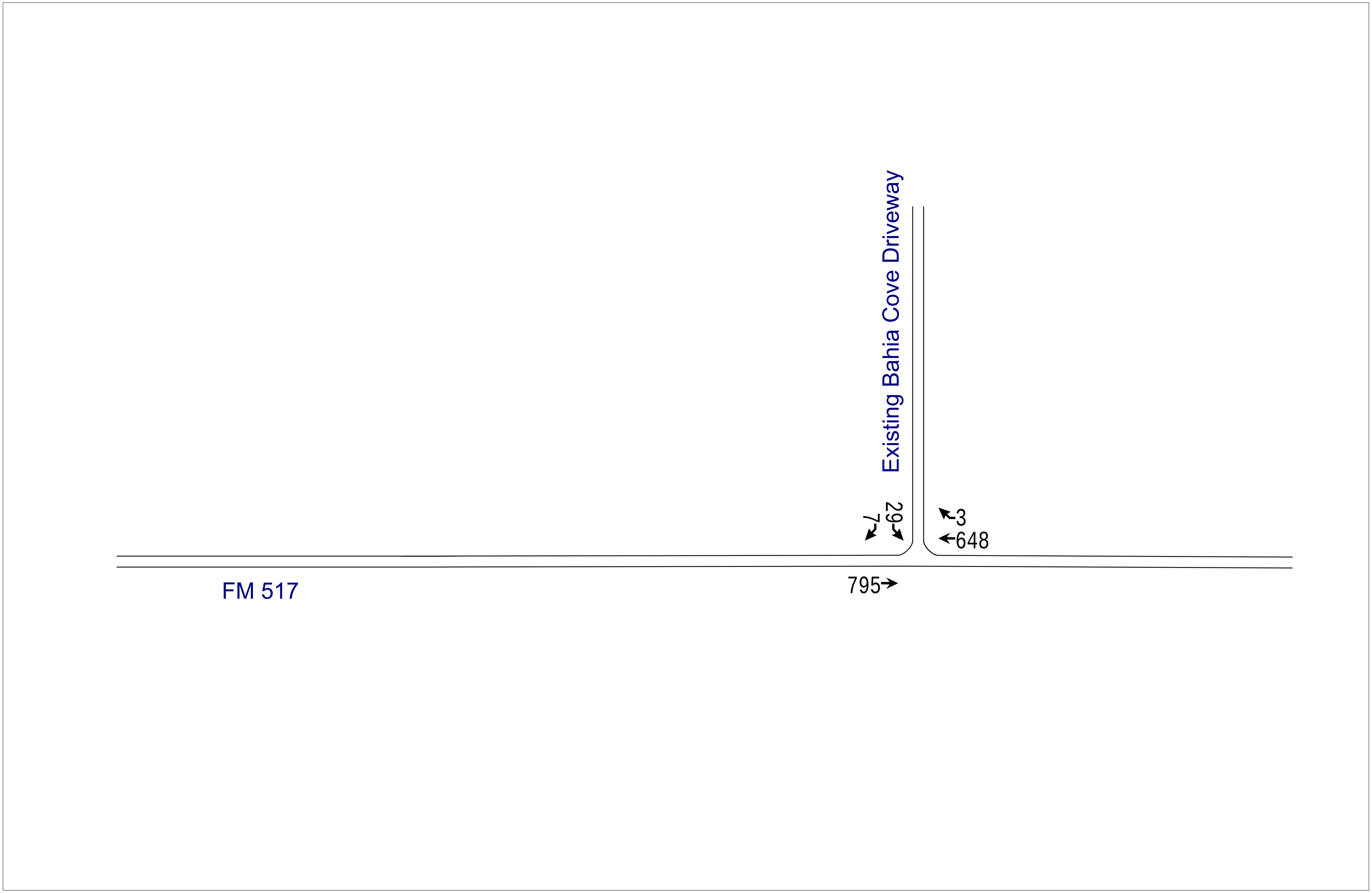
North ^
Not to Scale



Appendix A. Traffic Volume Exhibits

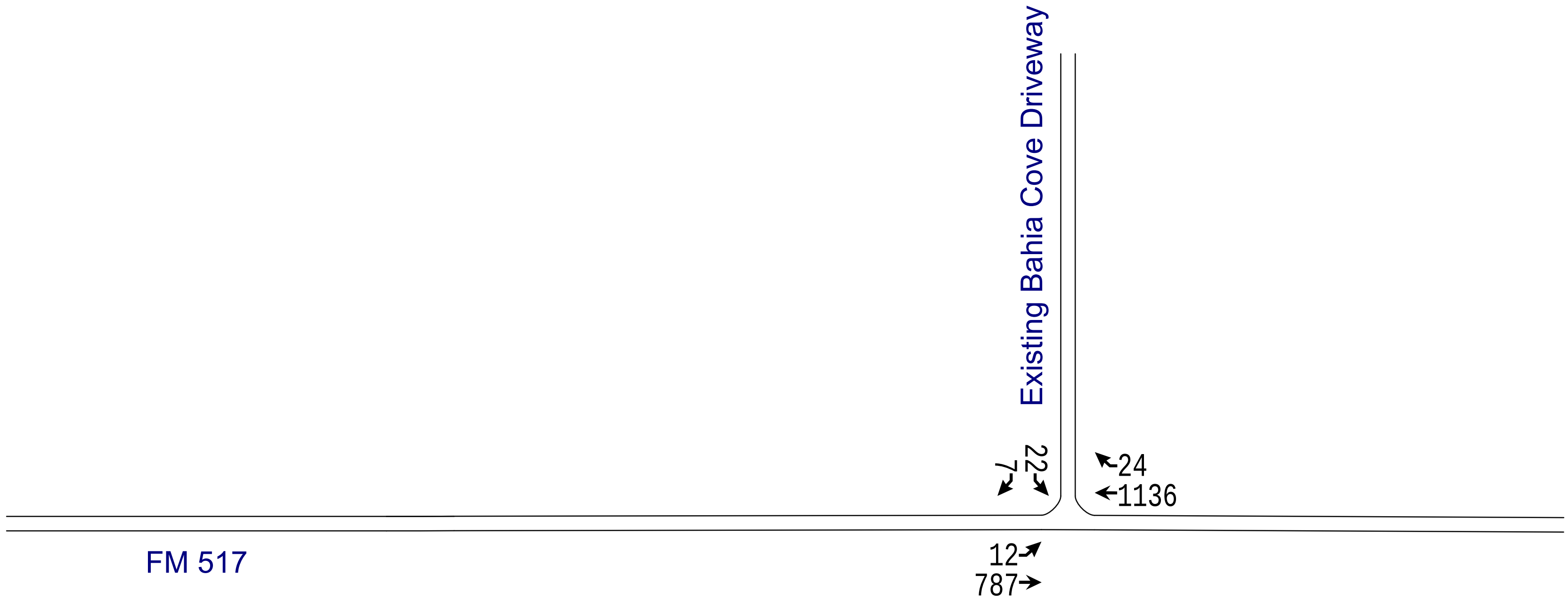
A1. 2019 Existing AM Peak Hour Traffic Volumes

North ^
Not to Scale



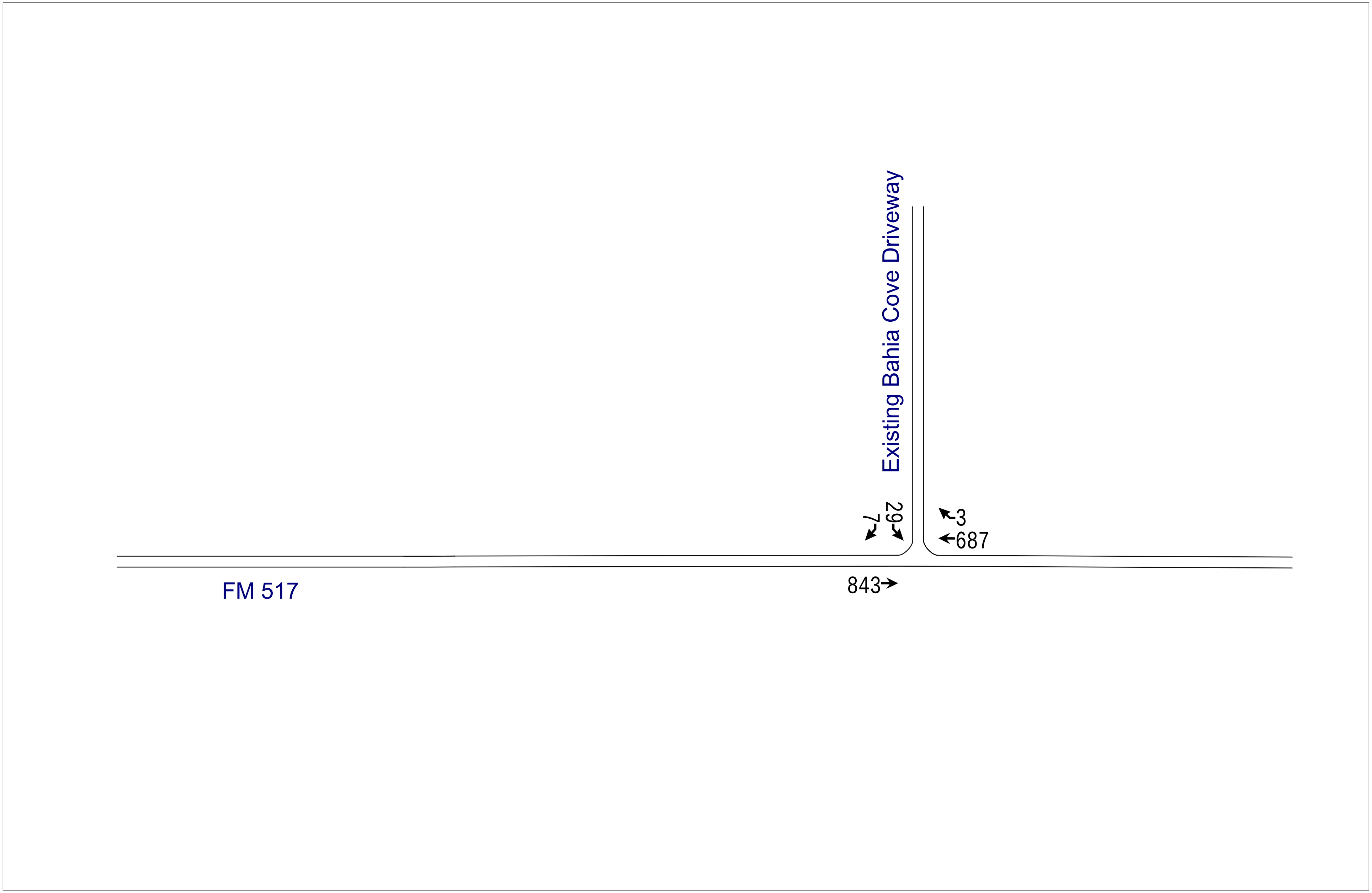
A2. 2019 Existing PM Peak Hour Traffic Volumes

North ^
Not to Scale



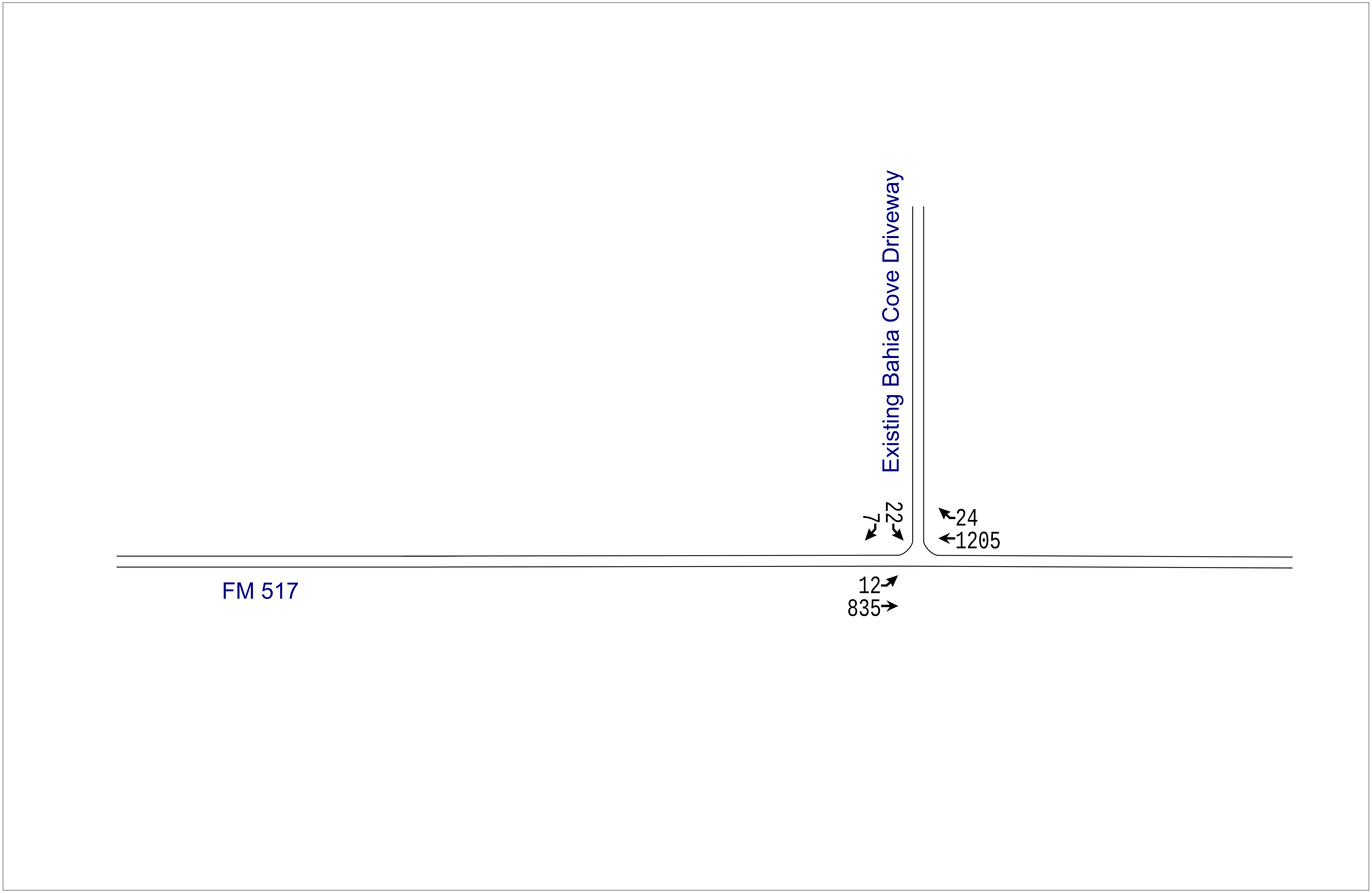
A3. 2021 Background AM Peak Hour Traffic Volumes

North ^
Not to Scale



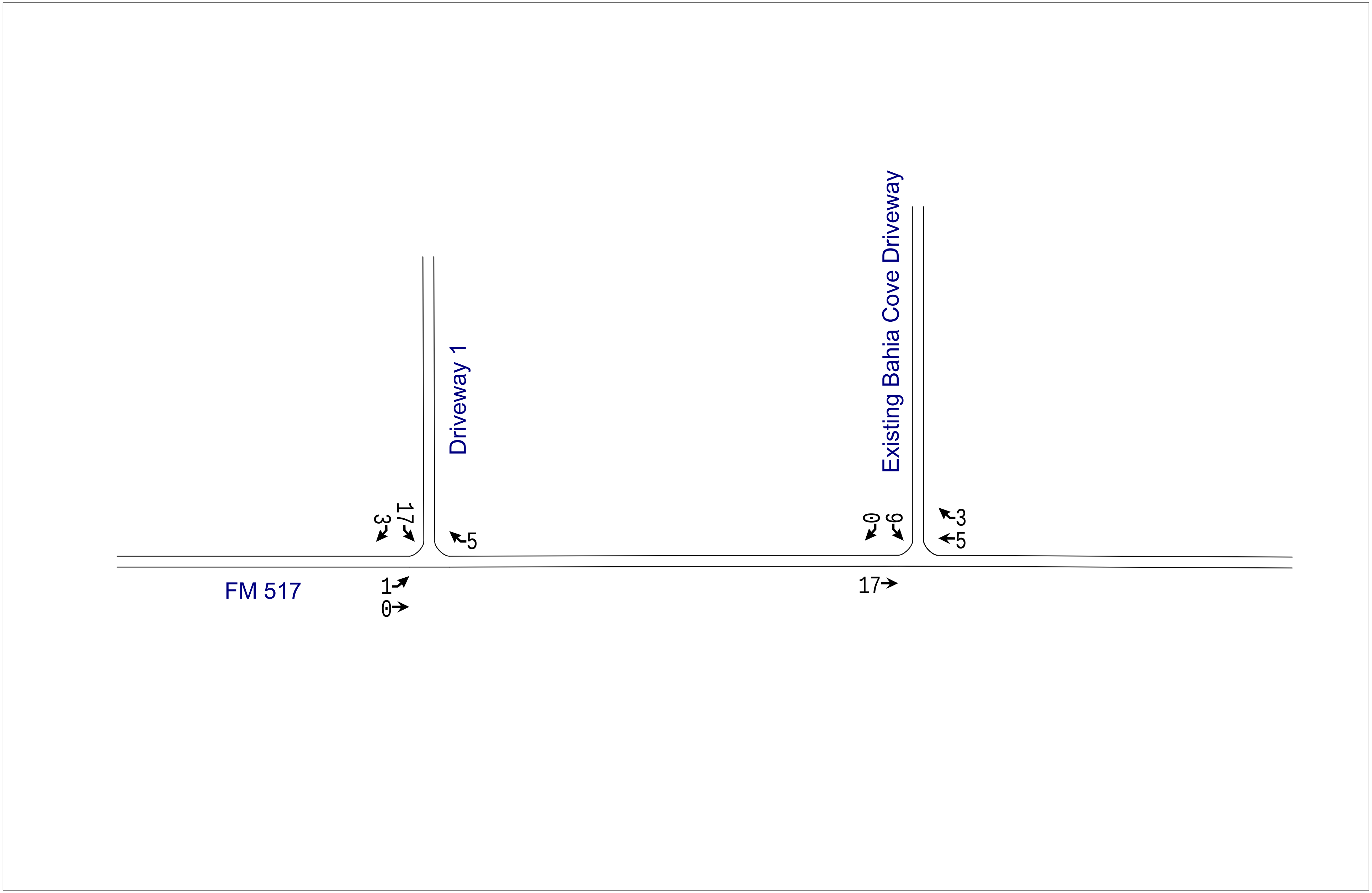
A4. 2021 Background PM Peak Hour Traffic Volumes

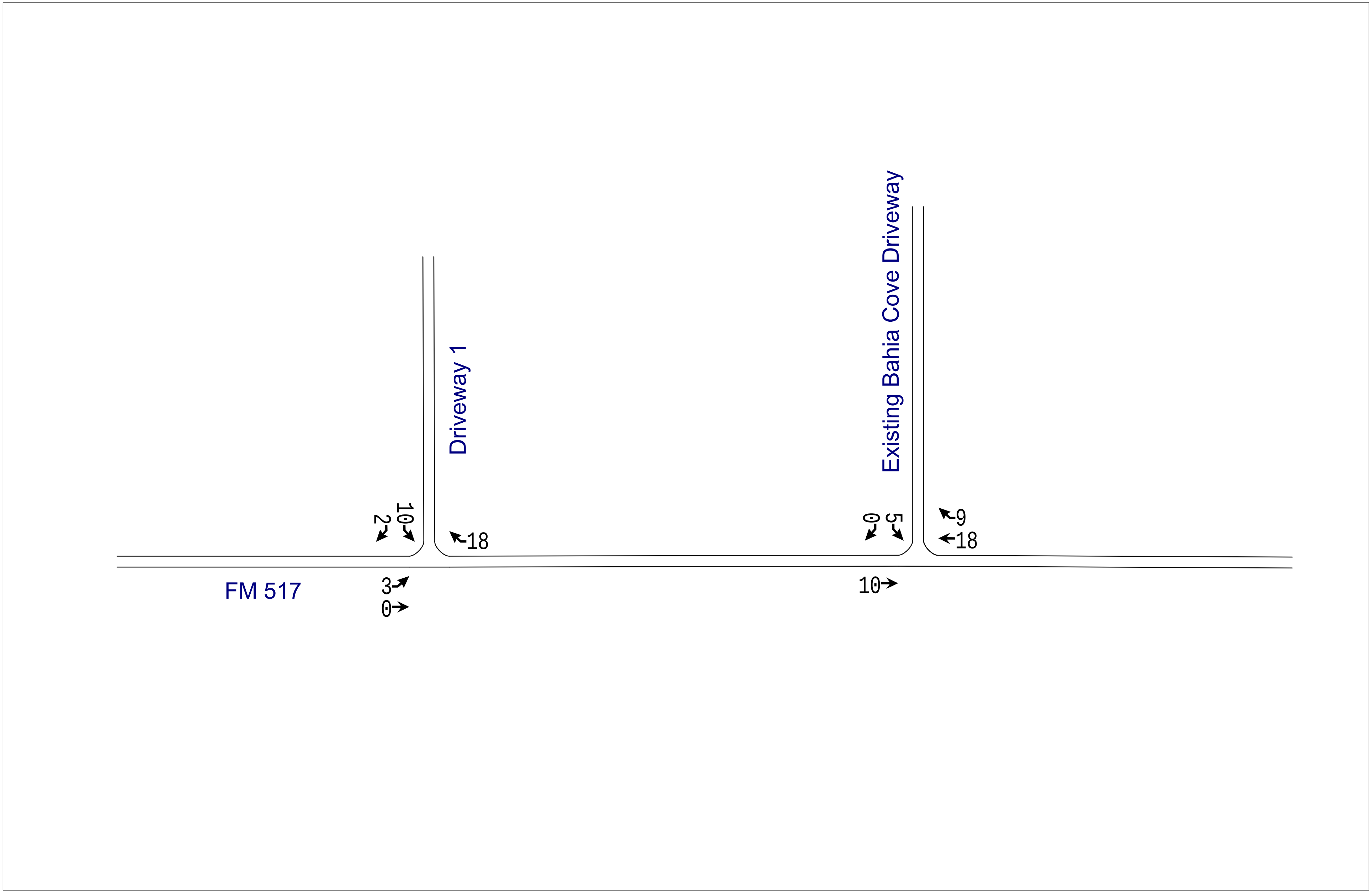
North ^
Not to Scale



A5. 2021 Site Generated (Housing) AM Peak Hour Traffic Volumes

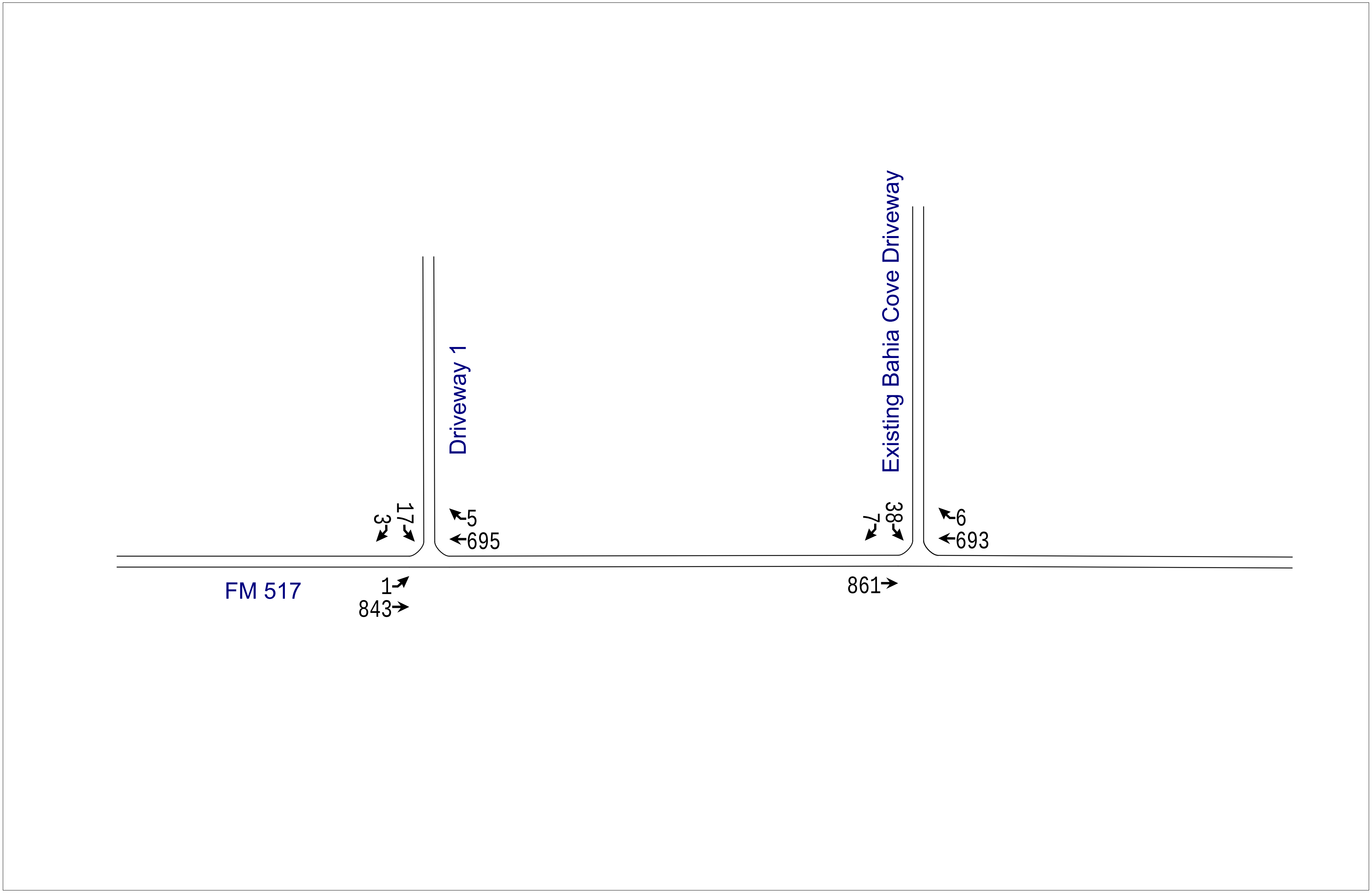
North ^
Not to Scale




Driveway 1
Existing Bahia Cove Driveway
FM 517
10
2
18
3
0
0
5
9
18
10

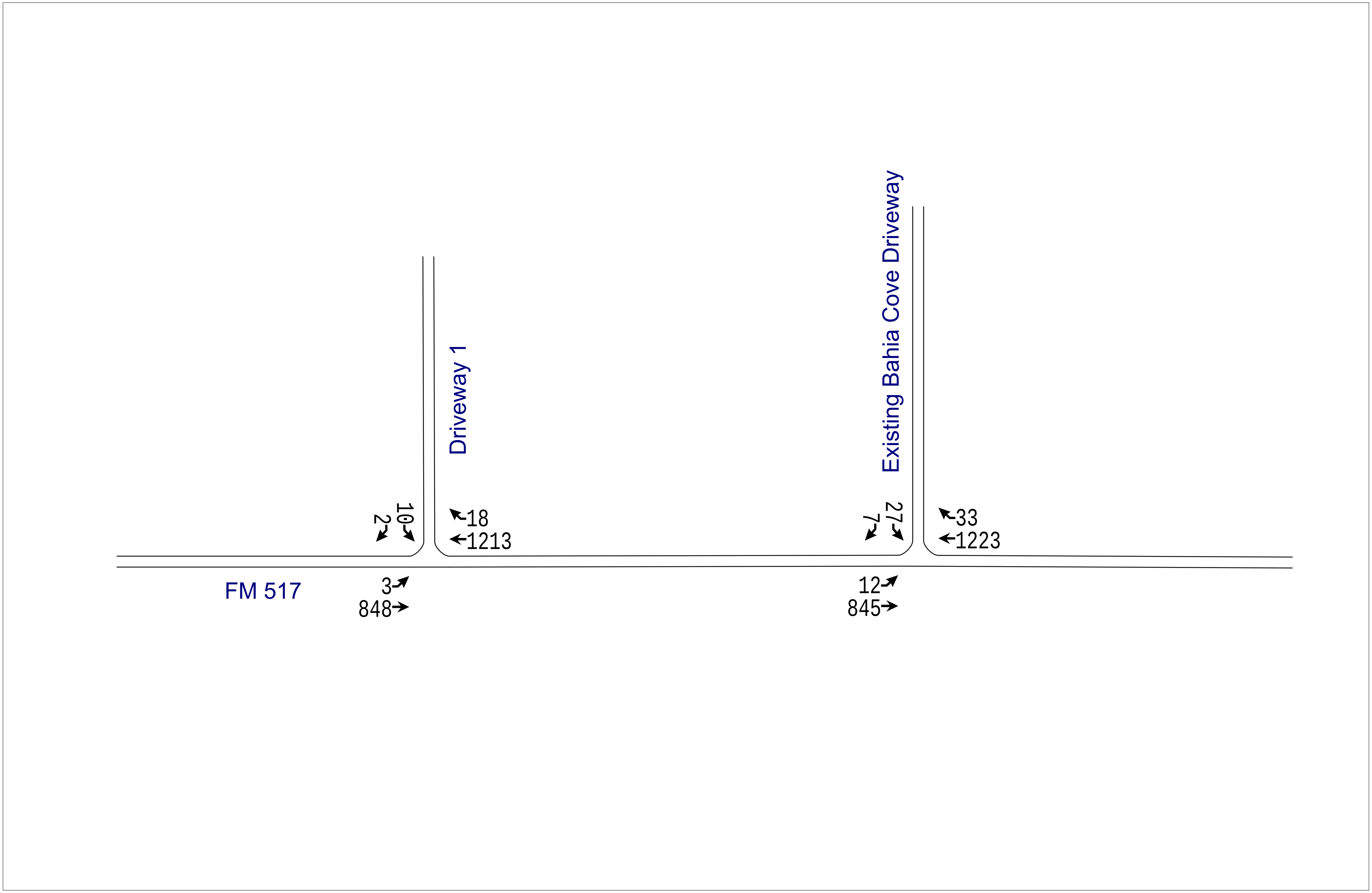
A7. 2021 Background Plus Site Generated (Housing) AM Peak Hour Traffic Volumes

North ^
Not to Scale



A8. 2021 Background Plus Site Generated (Housing) PM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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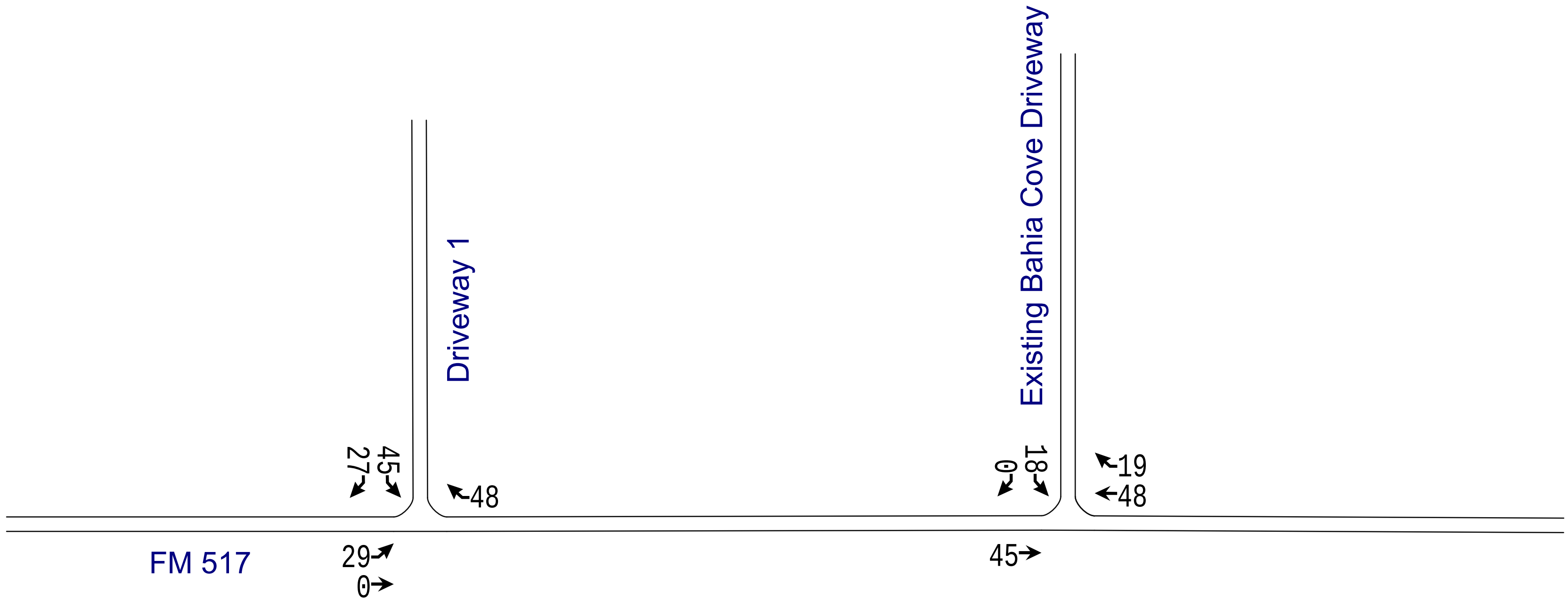
A9. 2021 Site Generated (Bank & Fast Food) AM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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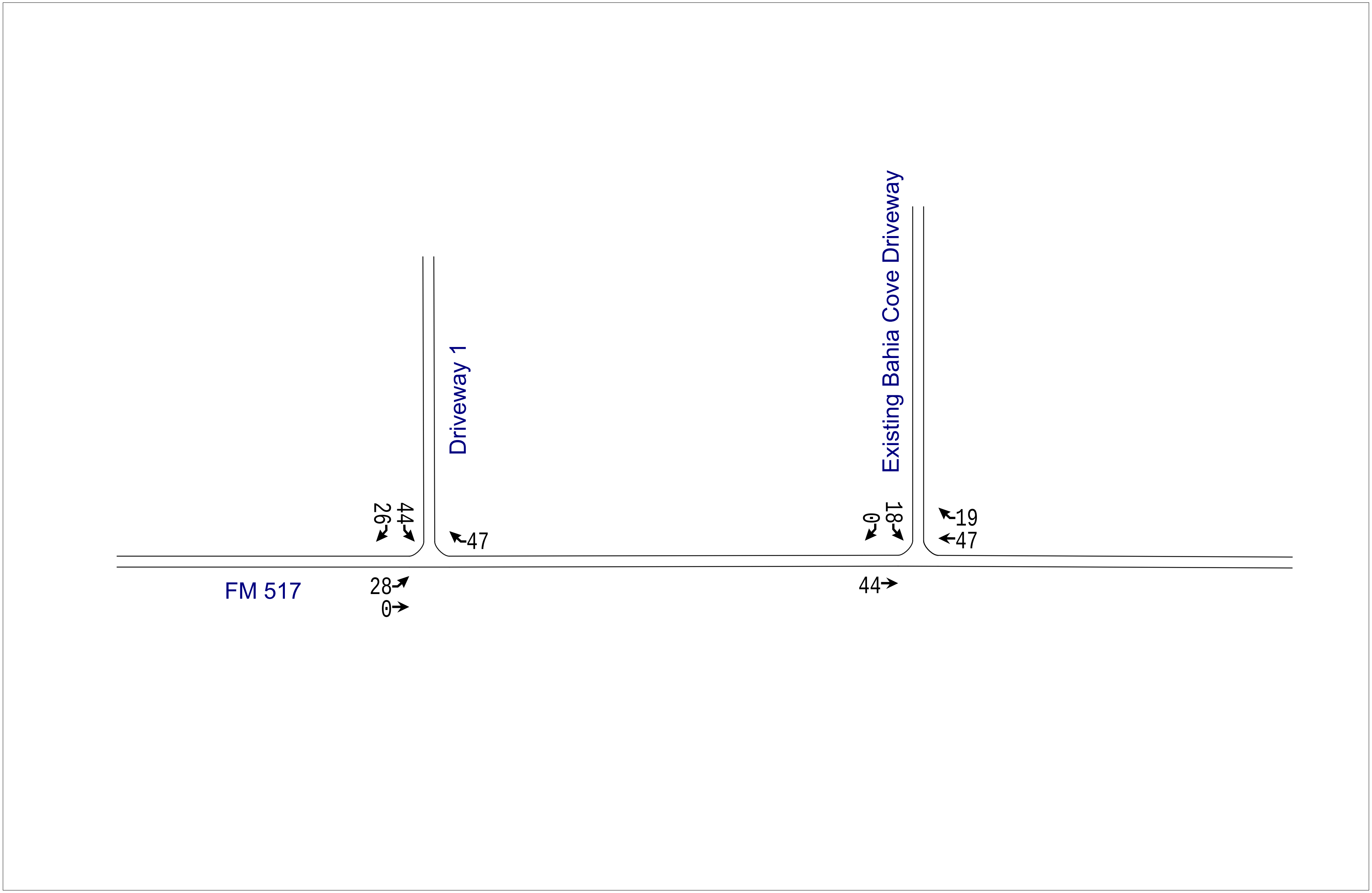
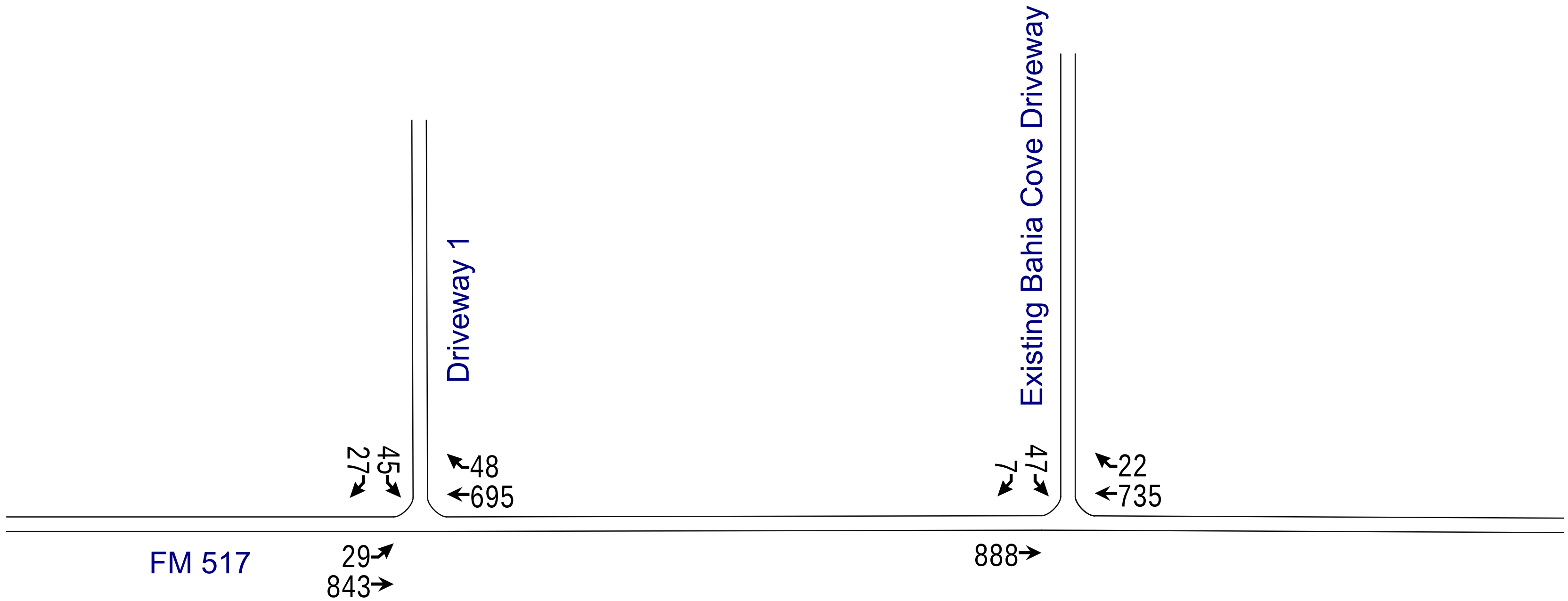
A10. 2021 Site Generated (Bank & Fast Food) PM Peak Hour Traffic Volumes

North ^
Not to Scale



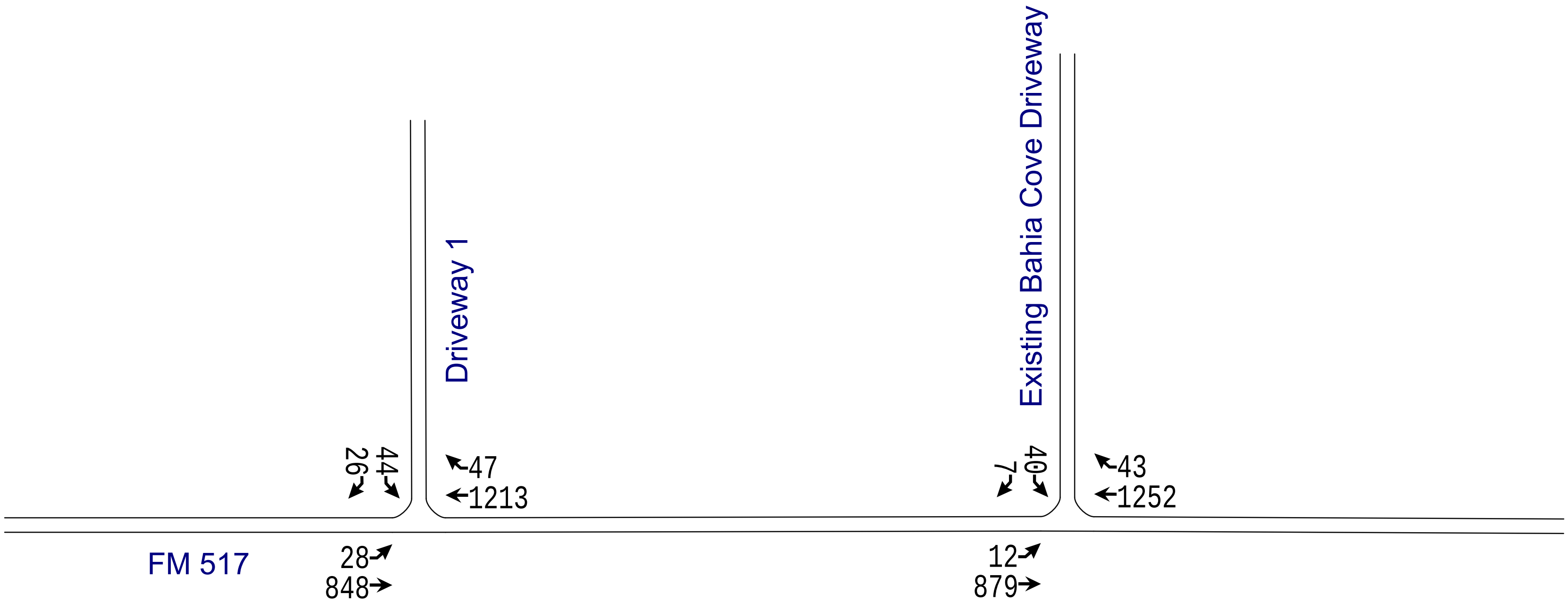
A11. 2021 Background Plus Site Generated (Bank & Fast Food) AM Peak Hour Traffic Volumes

North ^
Not to Scale



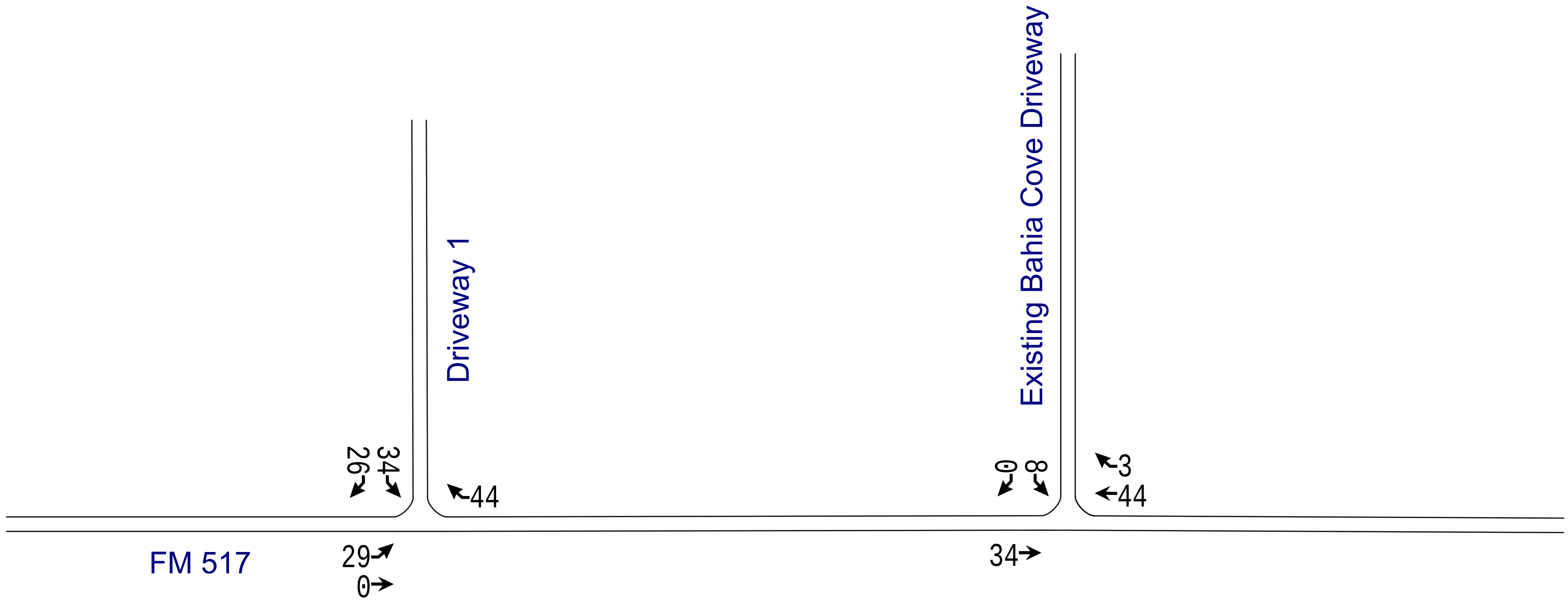
A12. 2021 Background Plus Site Generated (Bank & Fast Food) PM Peak Hour Traffic Volumes

North ^
Not to Scale



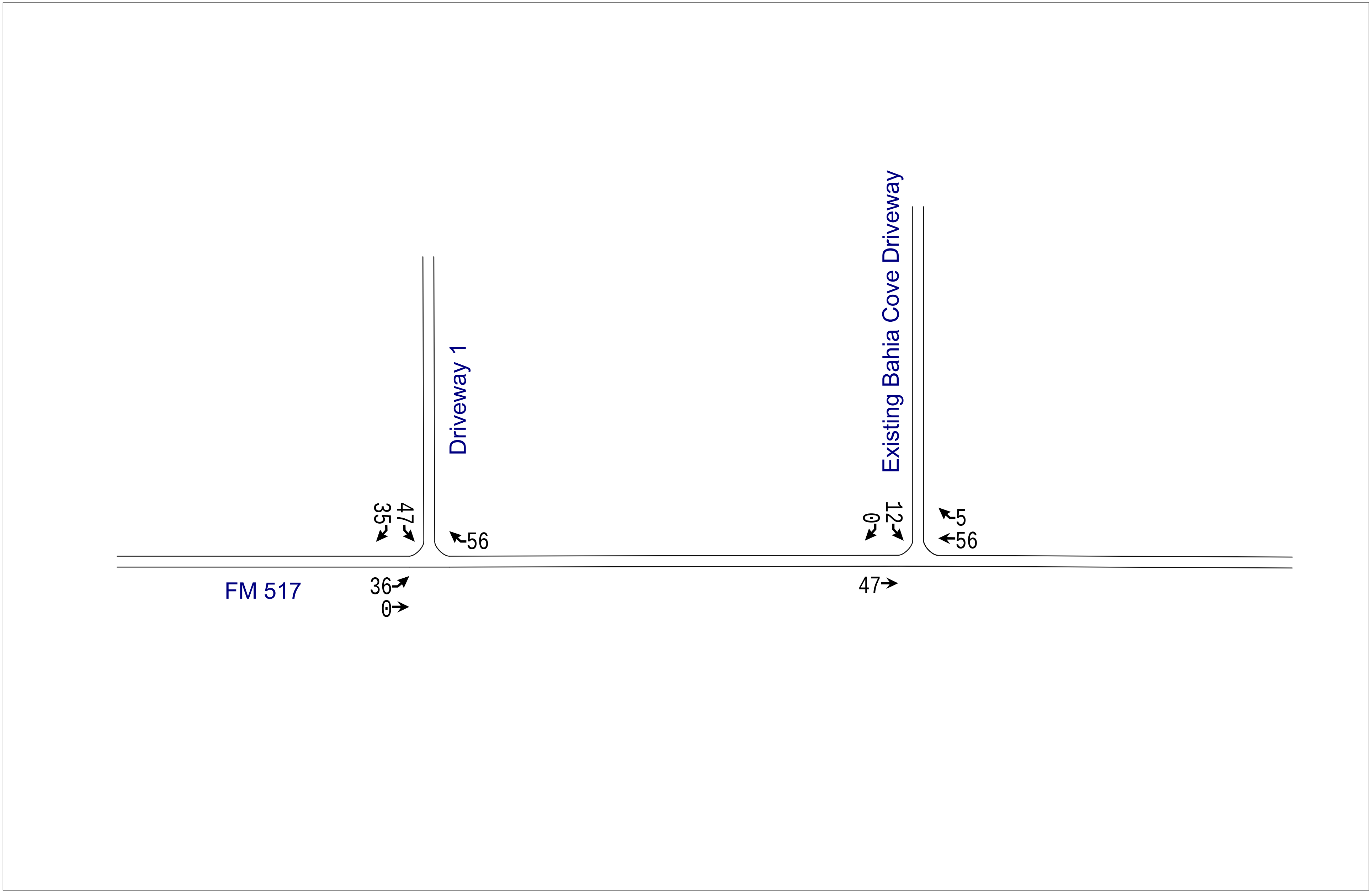
A13. 2021 Site Generated (Bank & Gas) AM Peak Hour Traffic Volumes

North ^
Not to Scale



A14. 2021 Site Generated (Bank & Gas) PM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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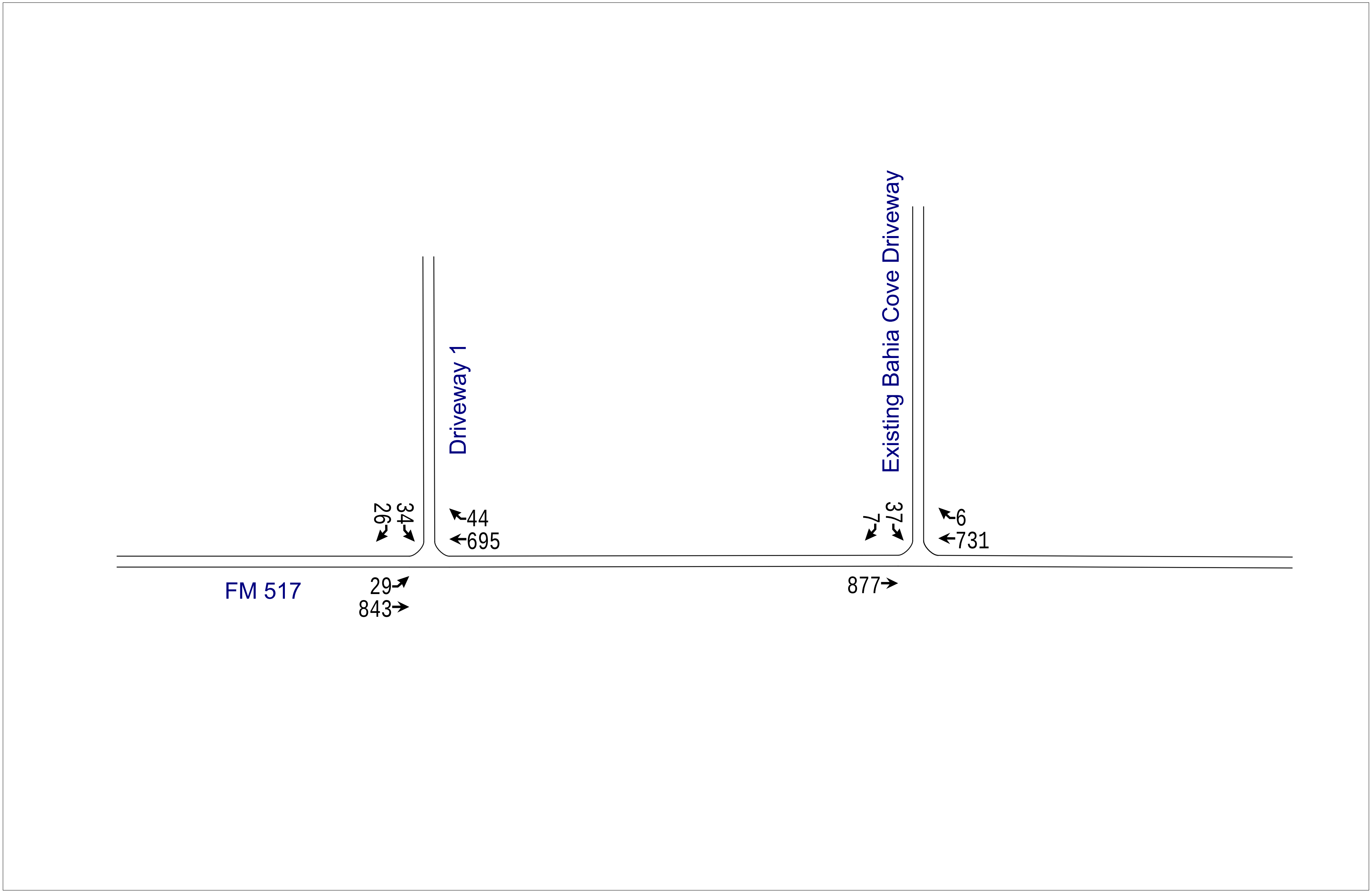
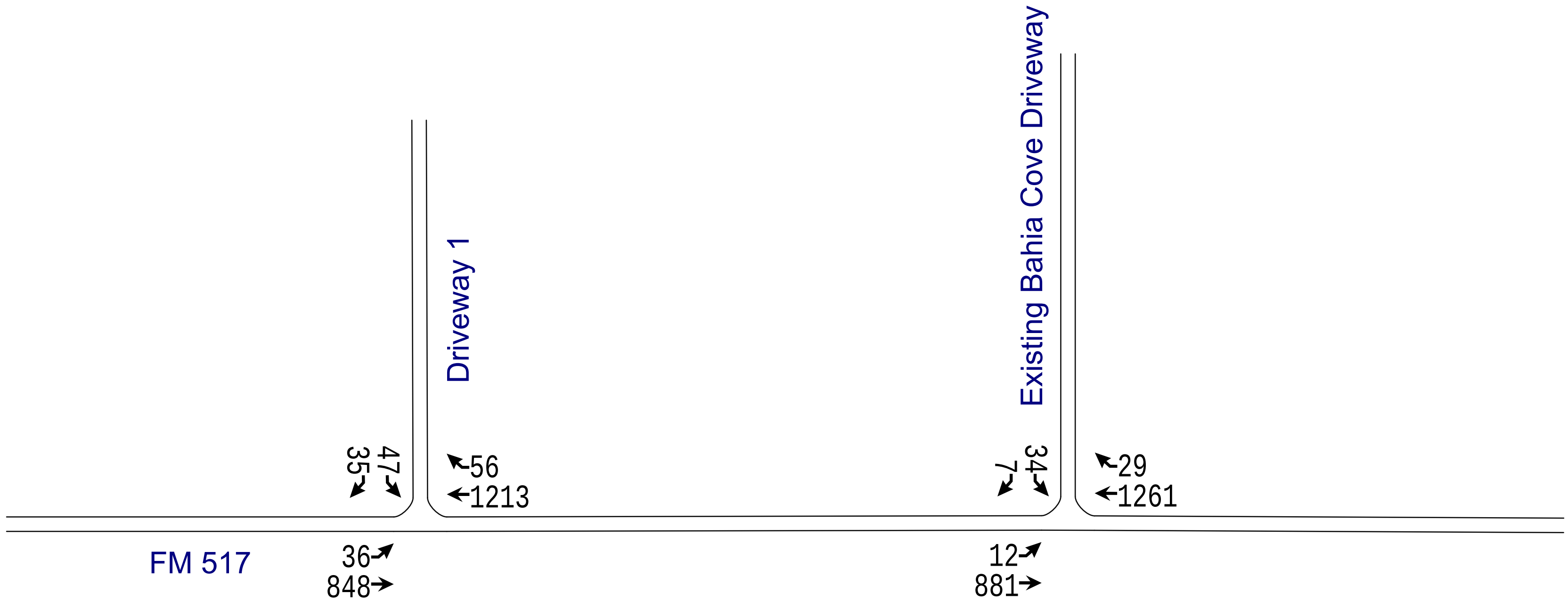
A15. 2021 Background Plus Site Generated (Bank & Gas) AM Peak Hour Traffic Volumes

North ^
Not to Scale



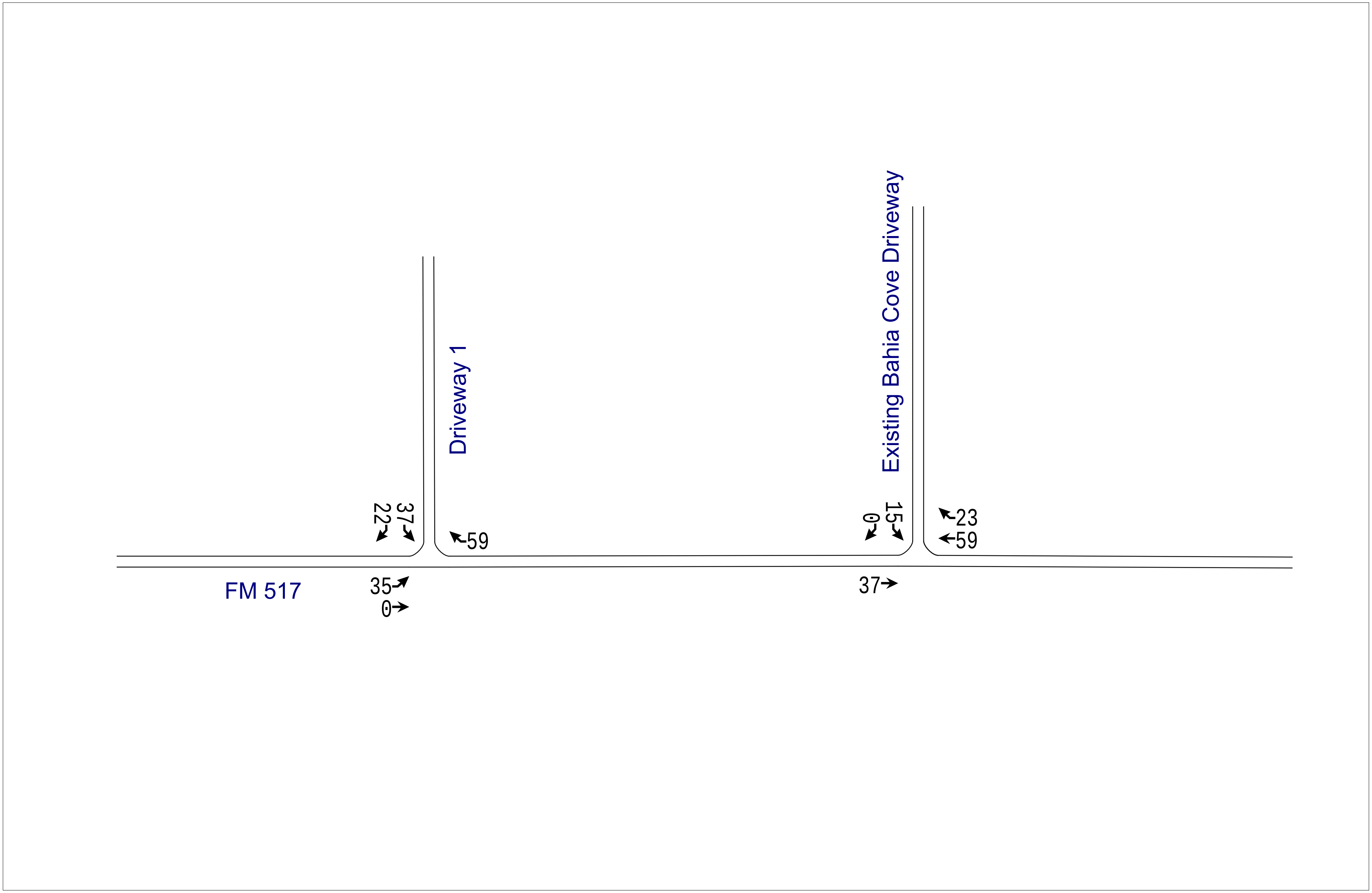
A16. 2021 Background Plus Site Generated (Bank & Gas) PM Peak Hour Traffic Volumes

North ^
Not to Scale



A17. 2021 Site Generated (Bank & Retail) AM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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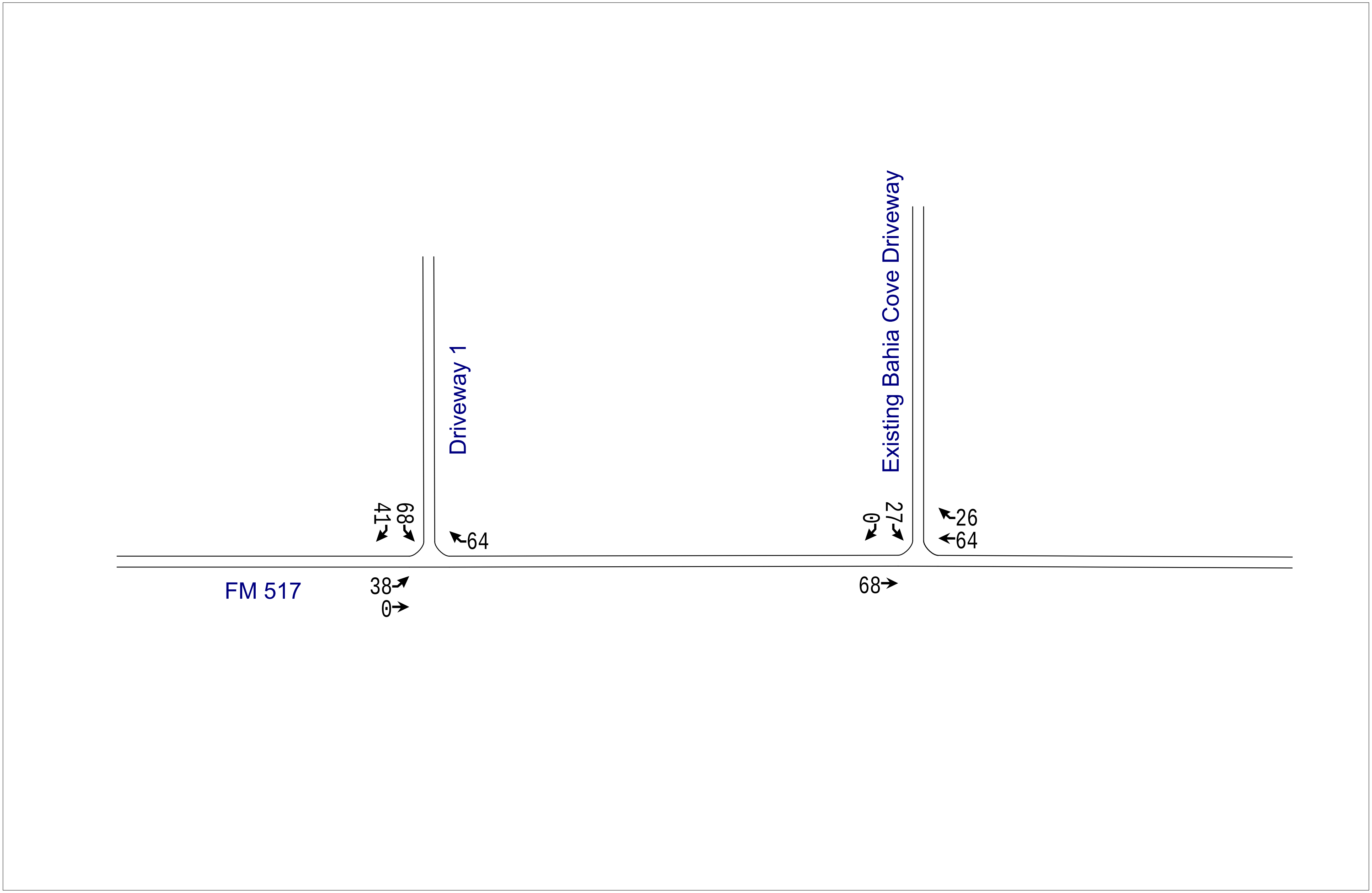
A18. 2021 Site Generated (Bank & Retail) PM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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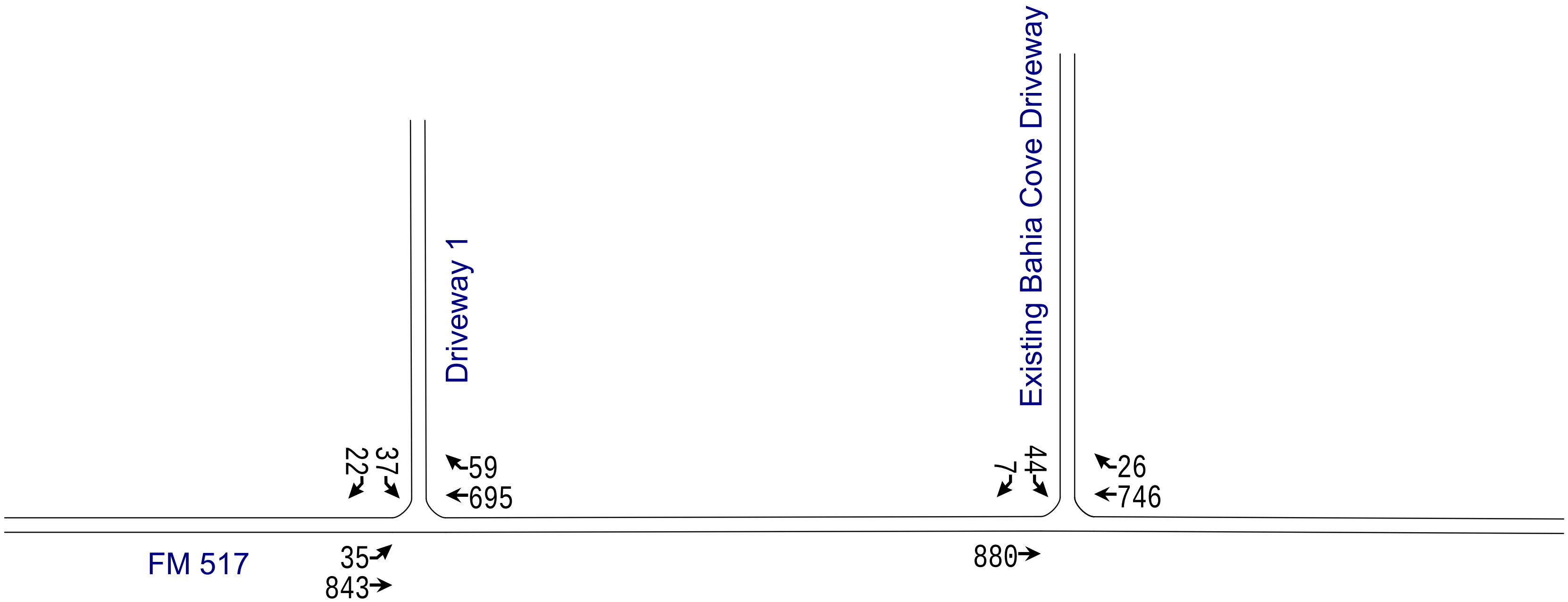
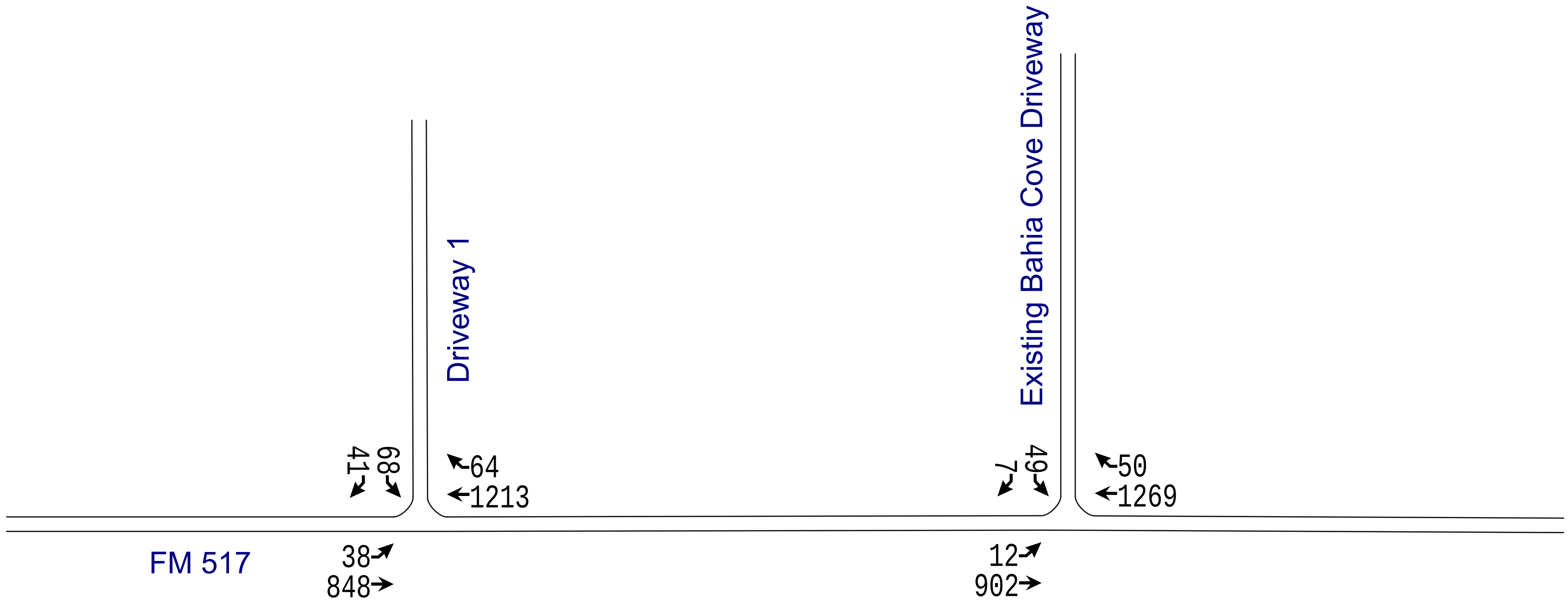
A19. 2021 Background Plus Site Generated (Bank & Retail) AM Peak Hour Traffic Volumes

North ^
Not to Scale



A20. 2021 Background Plus Site Generated (Bank & Retail) PM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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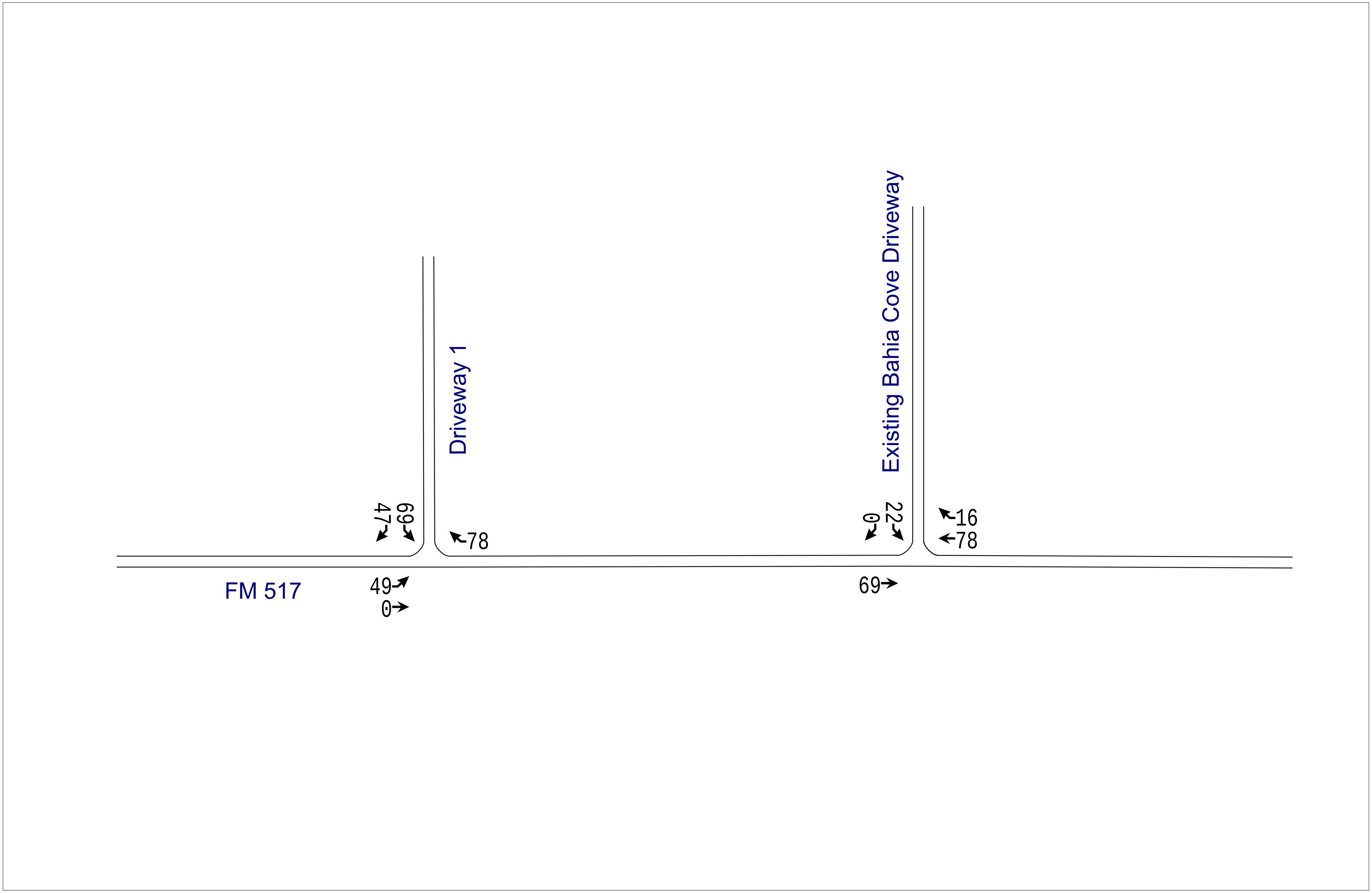
A21. 2021 Site Generated (Gas & Fast Foodl) AM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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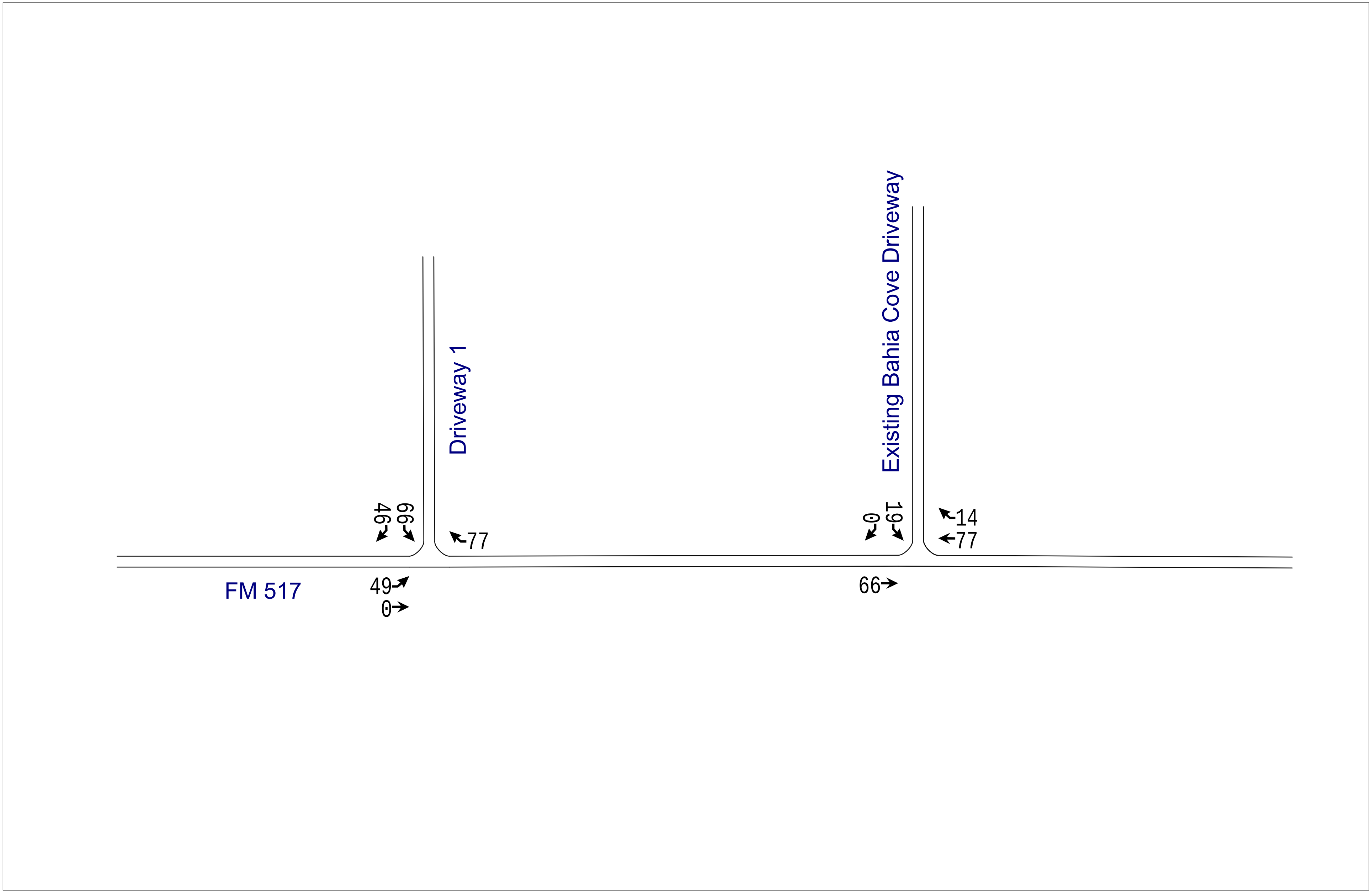
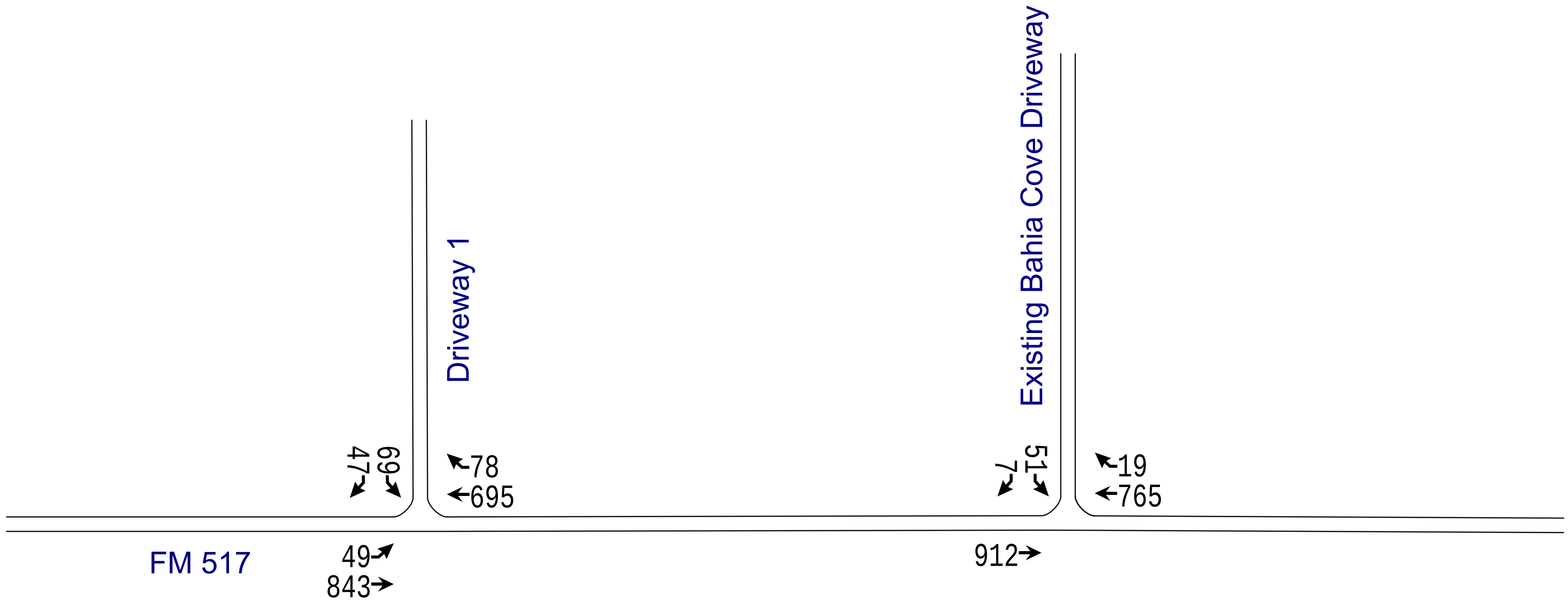
A22. 2021 Site Generated (Gas & Fast Foodl) PM Peak Hour Traffic Volumes

North ^
Not to Scale



A23. 2021 Background Plus Site Generated (Gas & Fast Foodl) AM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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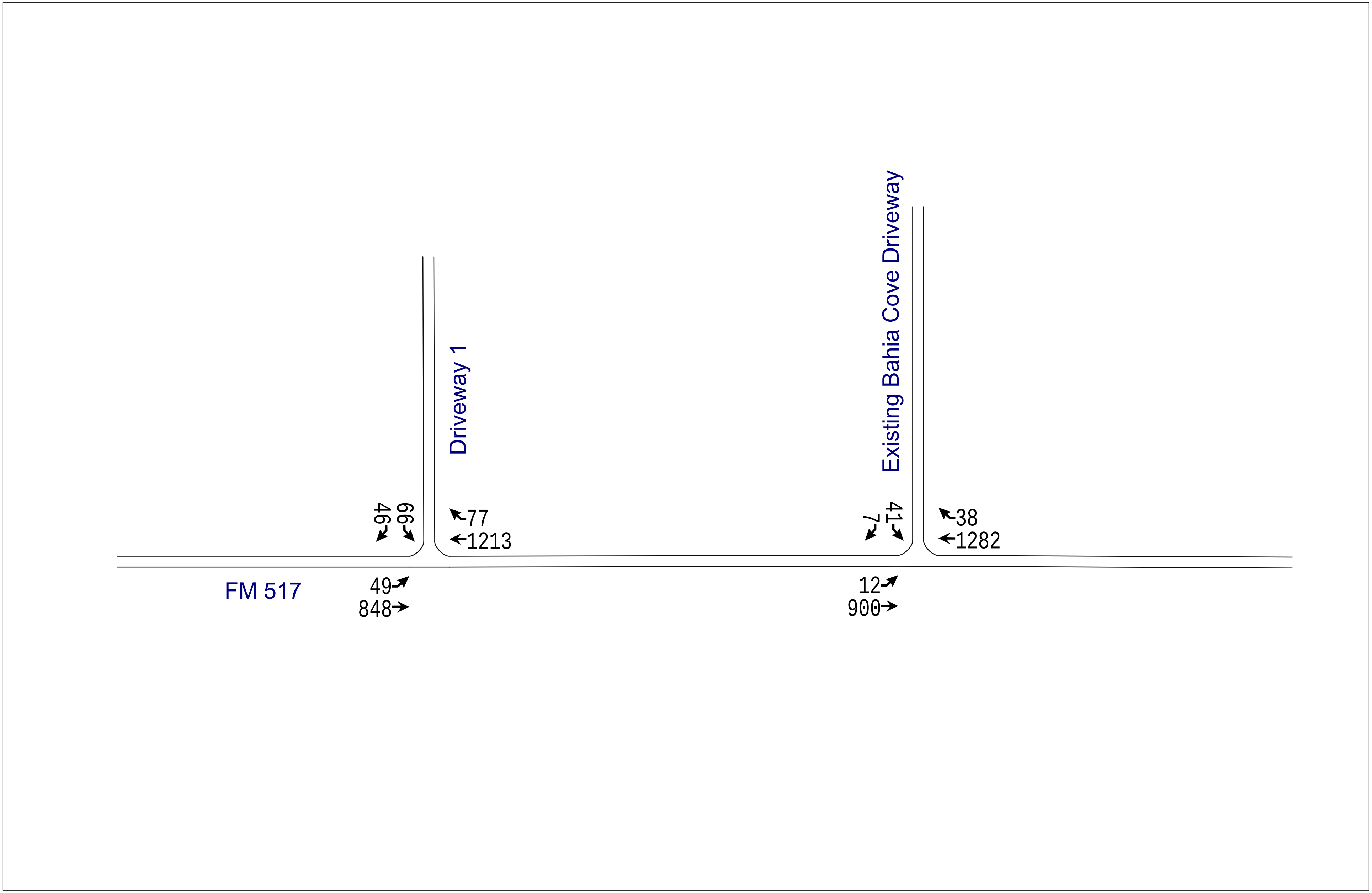
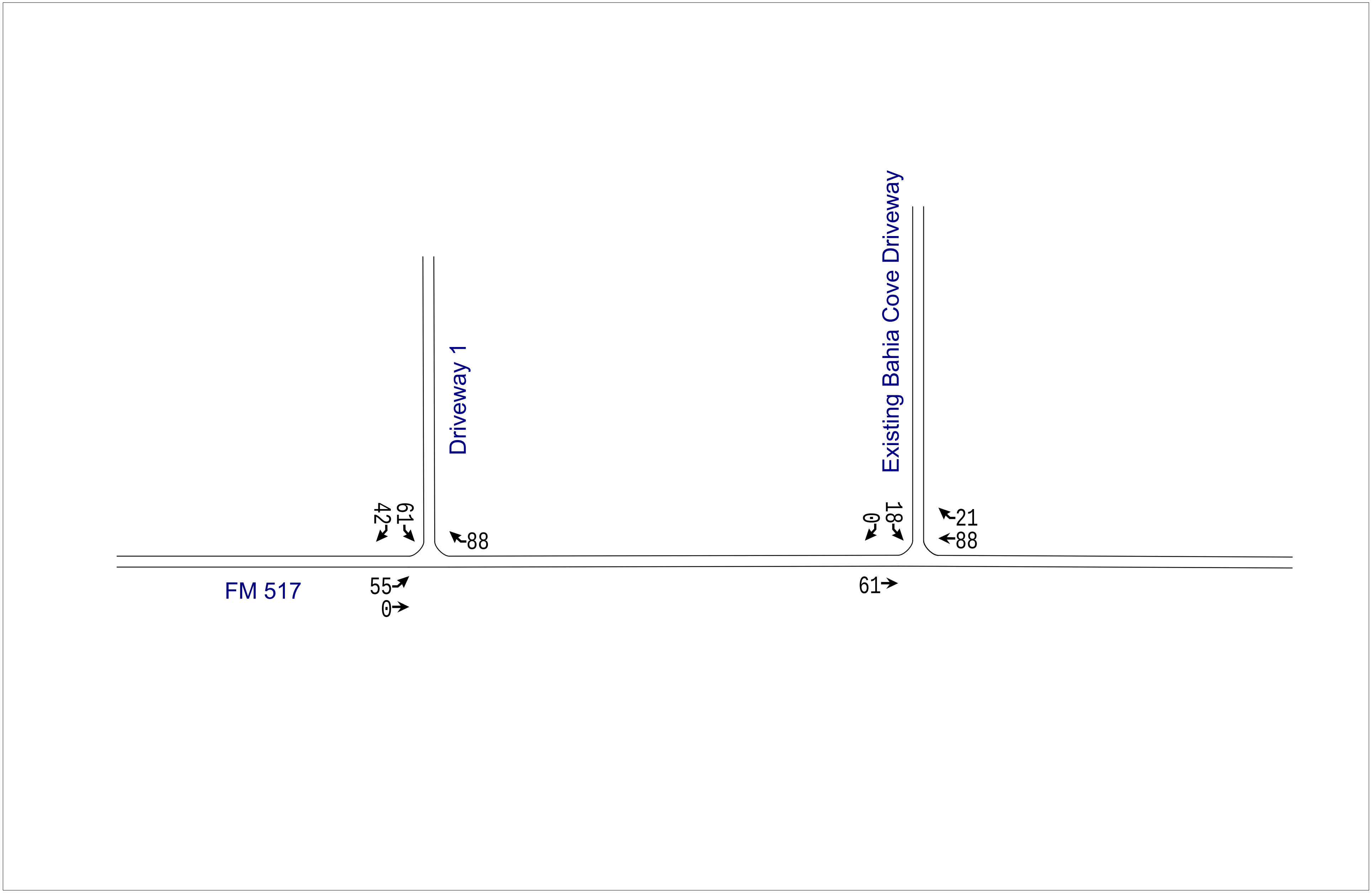
A24. 2021 Background Plus Site Generated (Gas & Fast Food) PM Peak Hour Traffic Volumes

North ^
Not to Scale

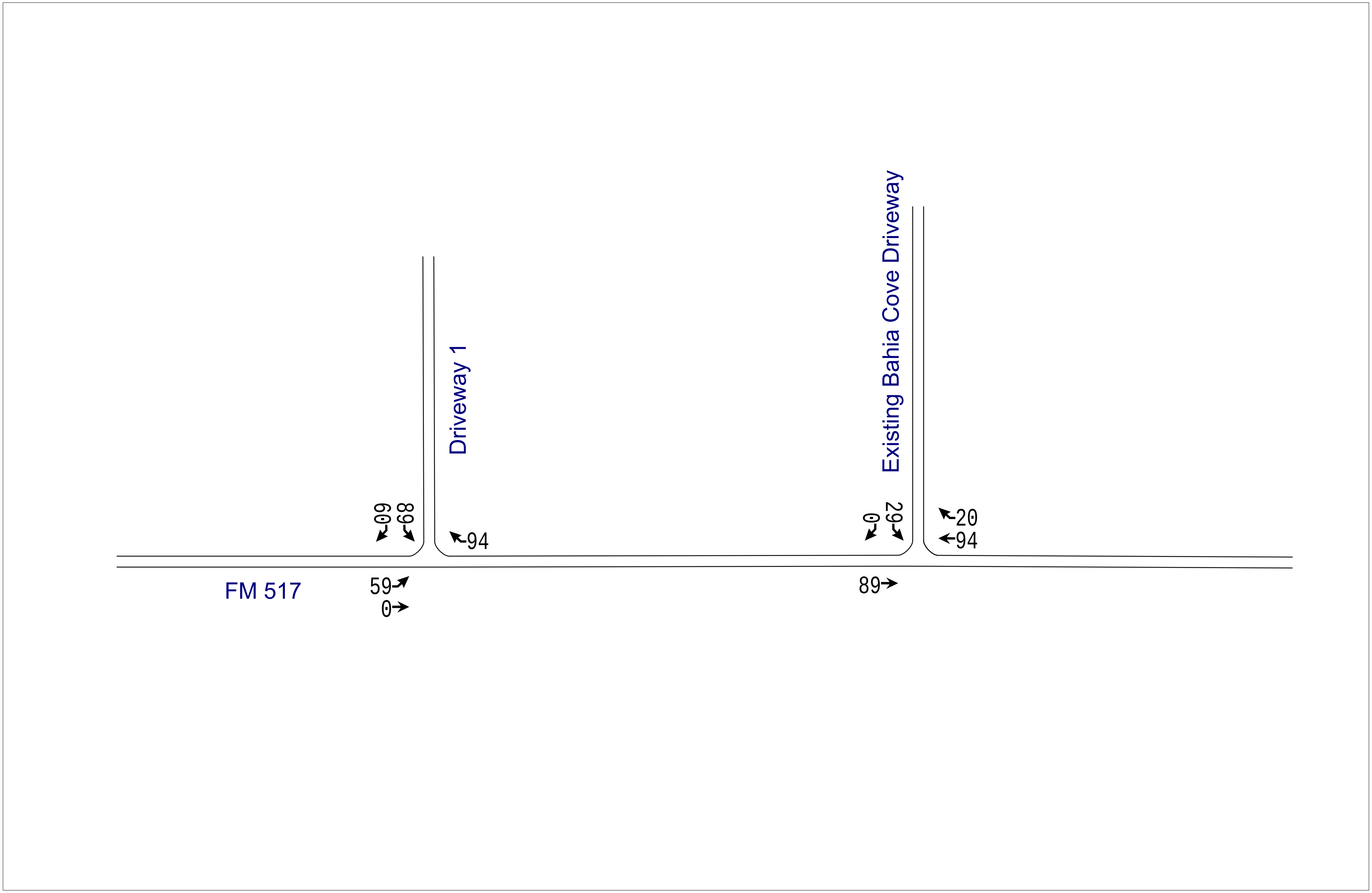


North ^
Not to Scale



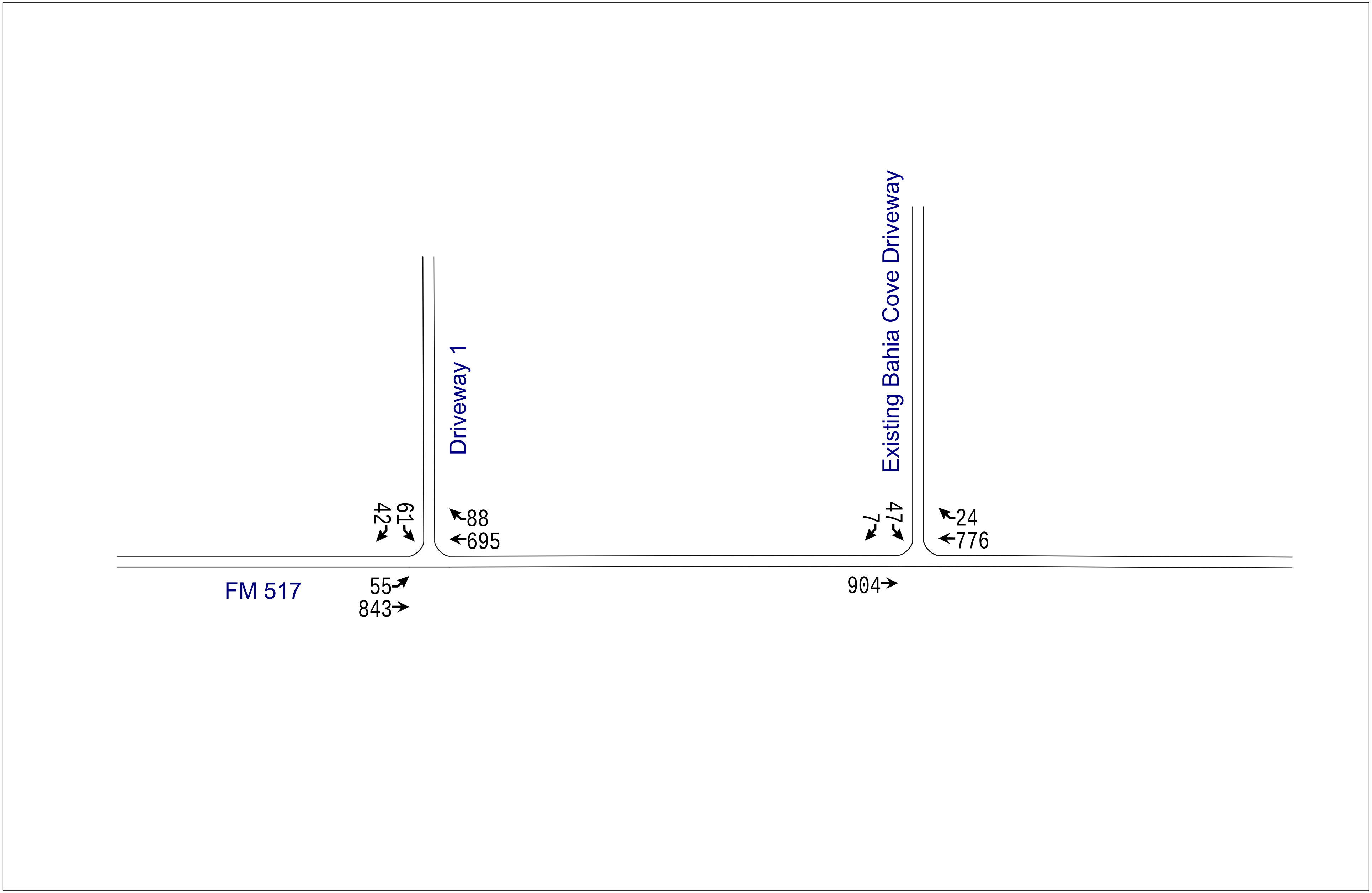
A26. 2021 Site Generated (Gas & Retail) PM Peak Hour Traffic Volumes

North ^
Not to Scale



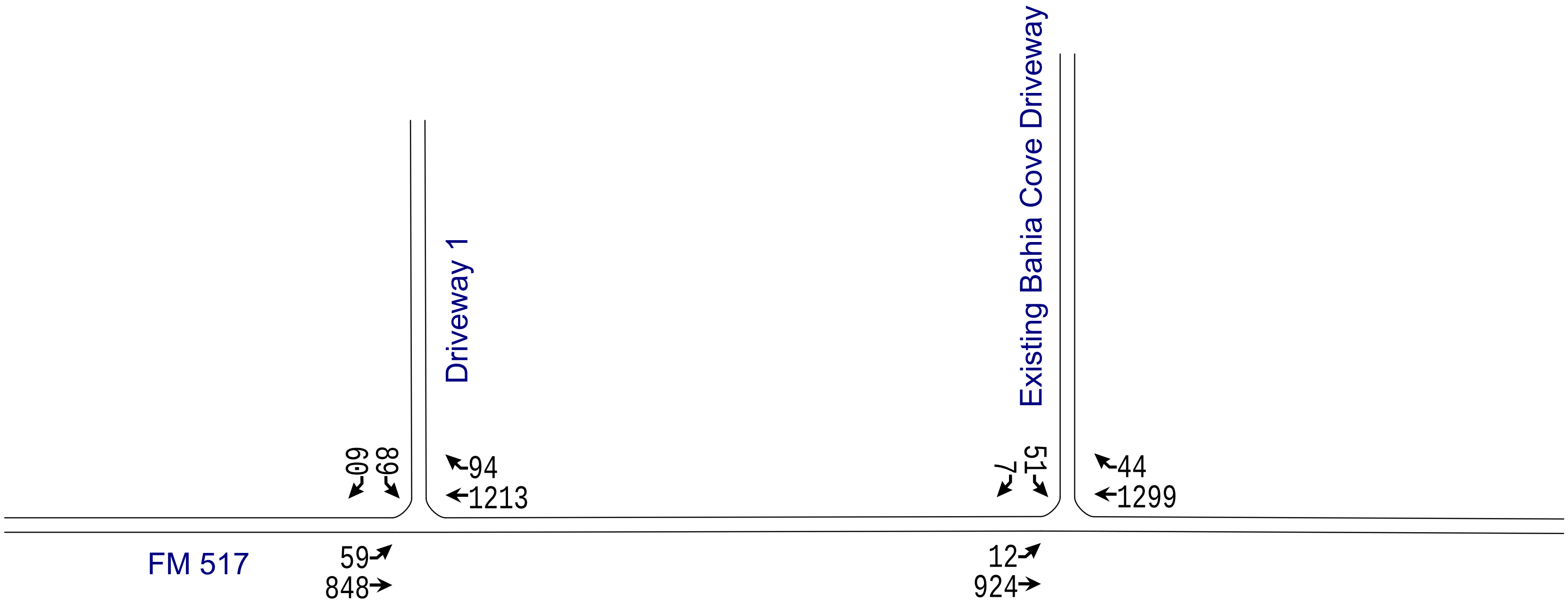
A27. 2021 Background Plus Site Generated (Gas & Retail) AM Peak Hour Traffic Volumes

North ^
Not to Scale



A28. 2021 Background Plus Site Generated (Gas & Retail) PM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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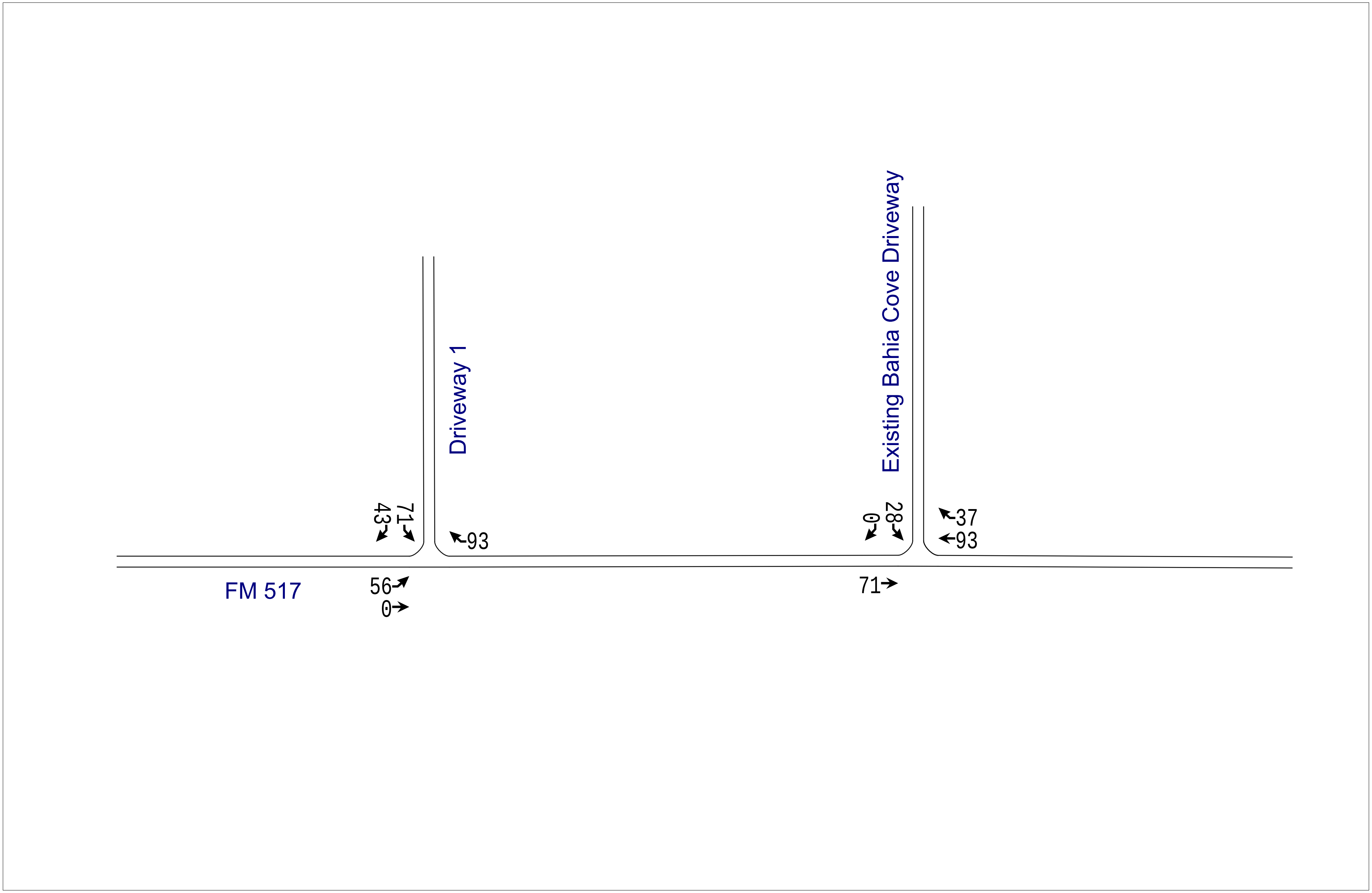
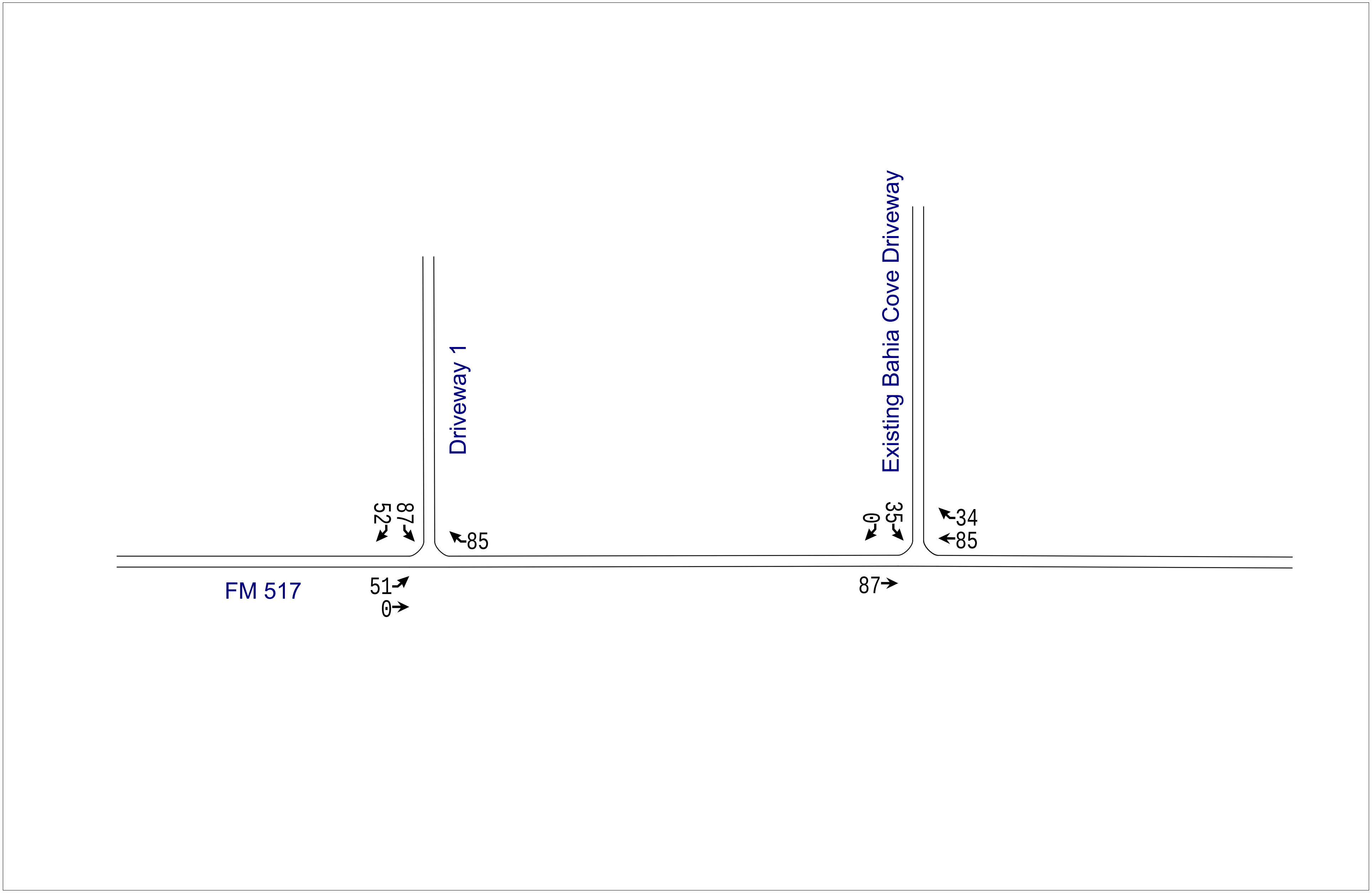
A29. 2021 Site Generated (Retail & Fast Food) AM Peak Hour Traffic Volumes

North ^
Not to Scale



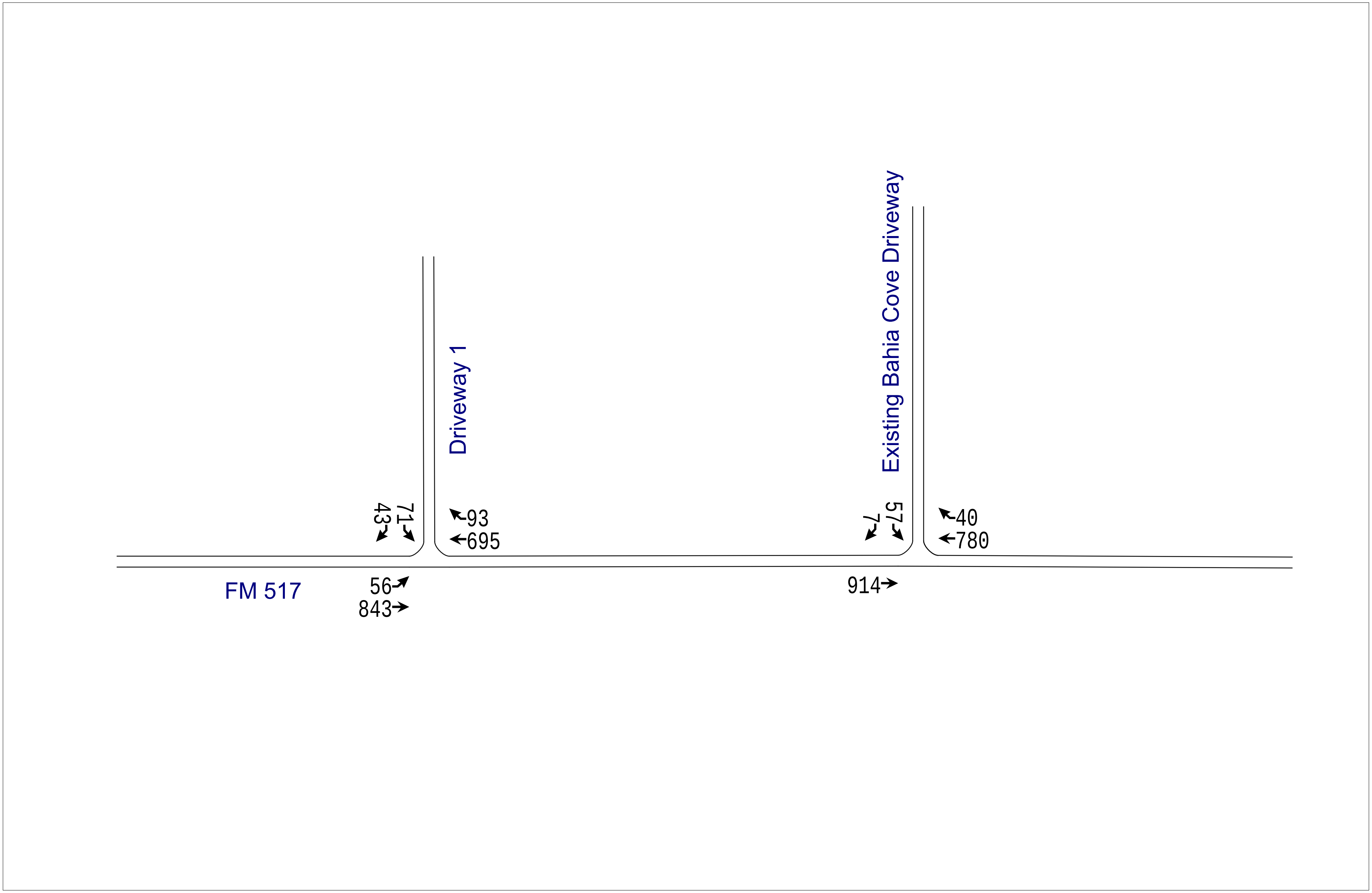
A30. 2021 Site Generated (Retail & Fast Food) PM Peak Hour Traffic Volumes

North ^
Not to Scale



A31. 2021 Background Plus Site Generated (Retail & Fast Food) AM Peak Hour Traffic Volumes

North ^
Not to Scale



TIA for Bahia Cove Phase II in League City, Texas

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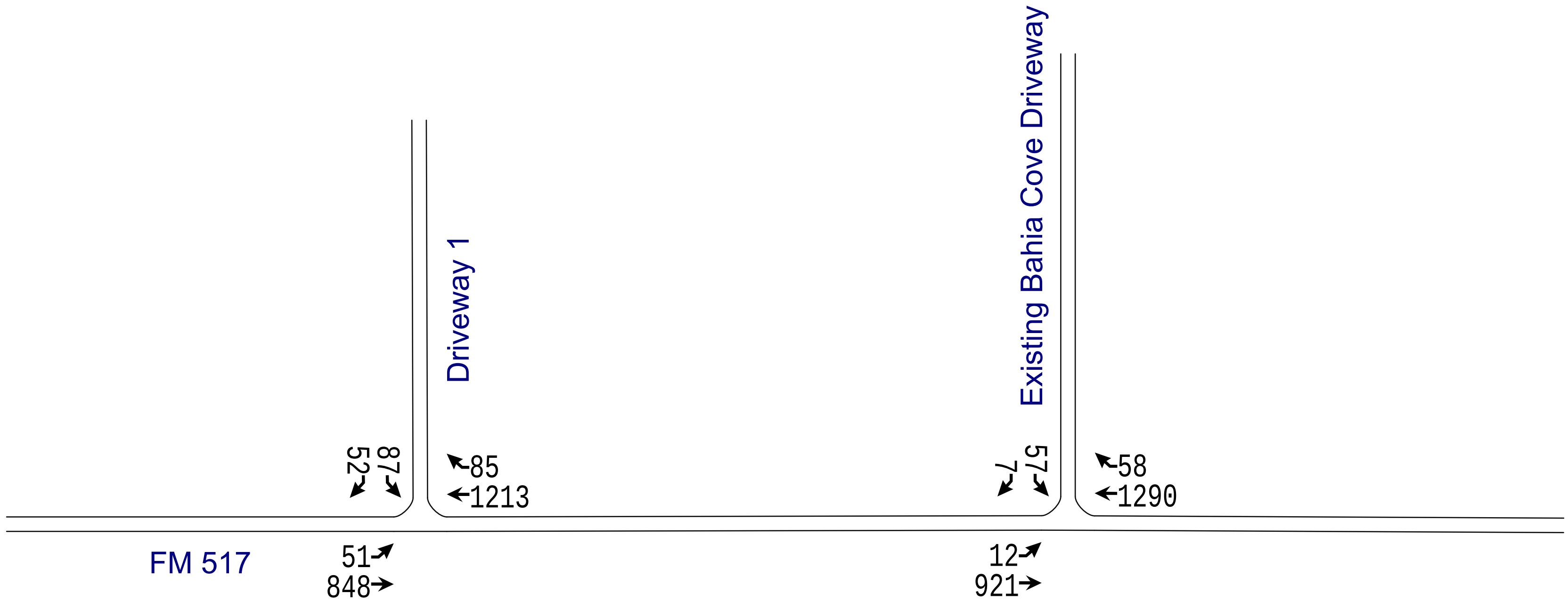
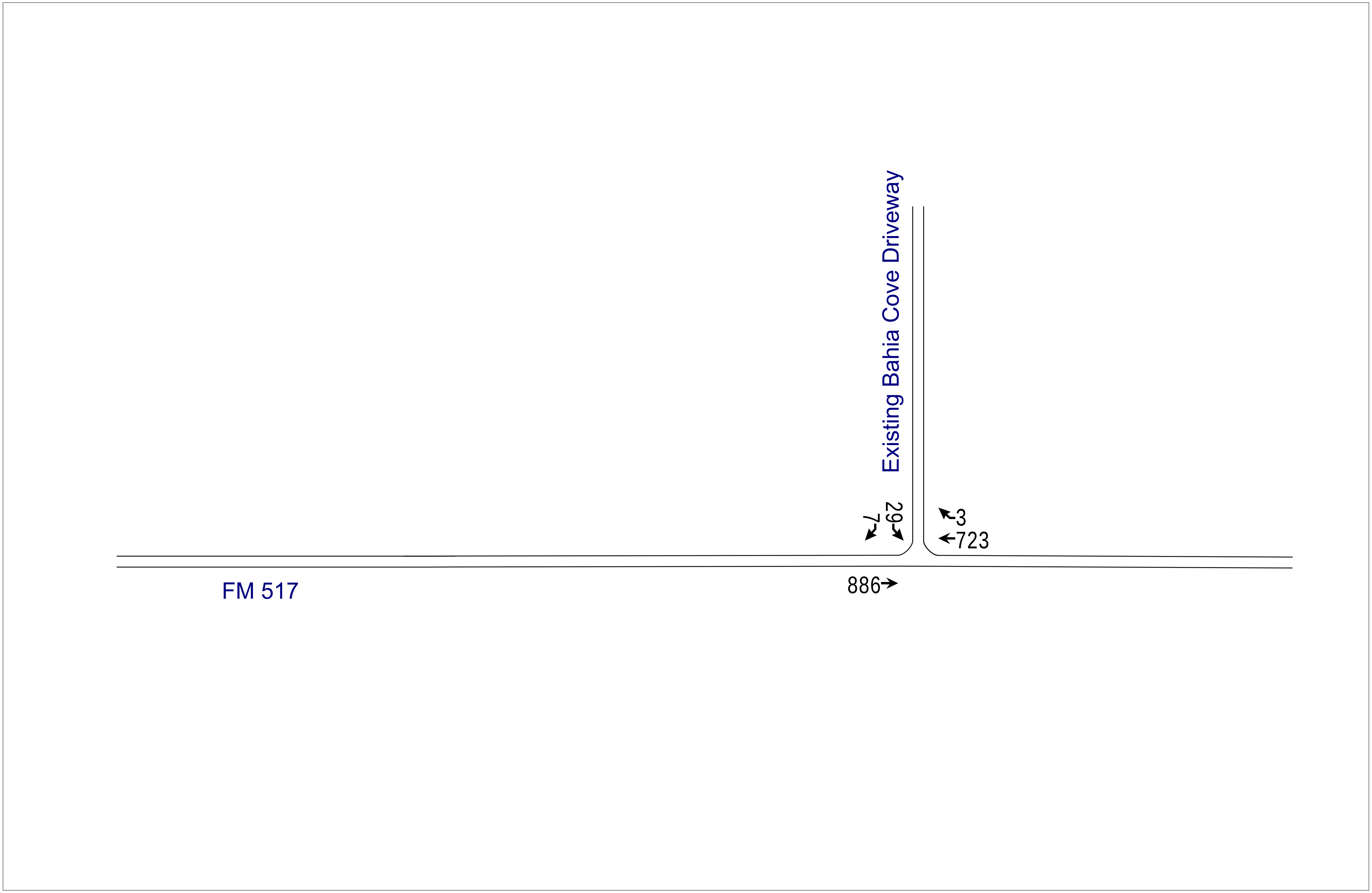
A32. 2021 Background Plus Site Generated (Retail & Fast Food) PM Peak Hour Traffic Volumes

North ^
Not to Scale



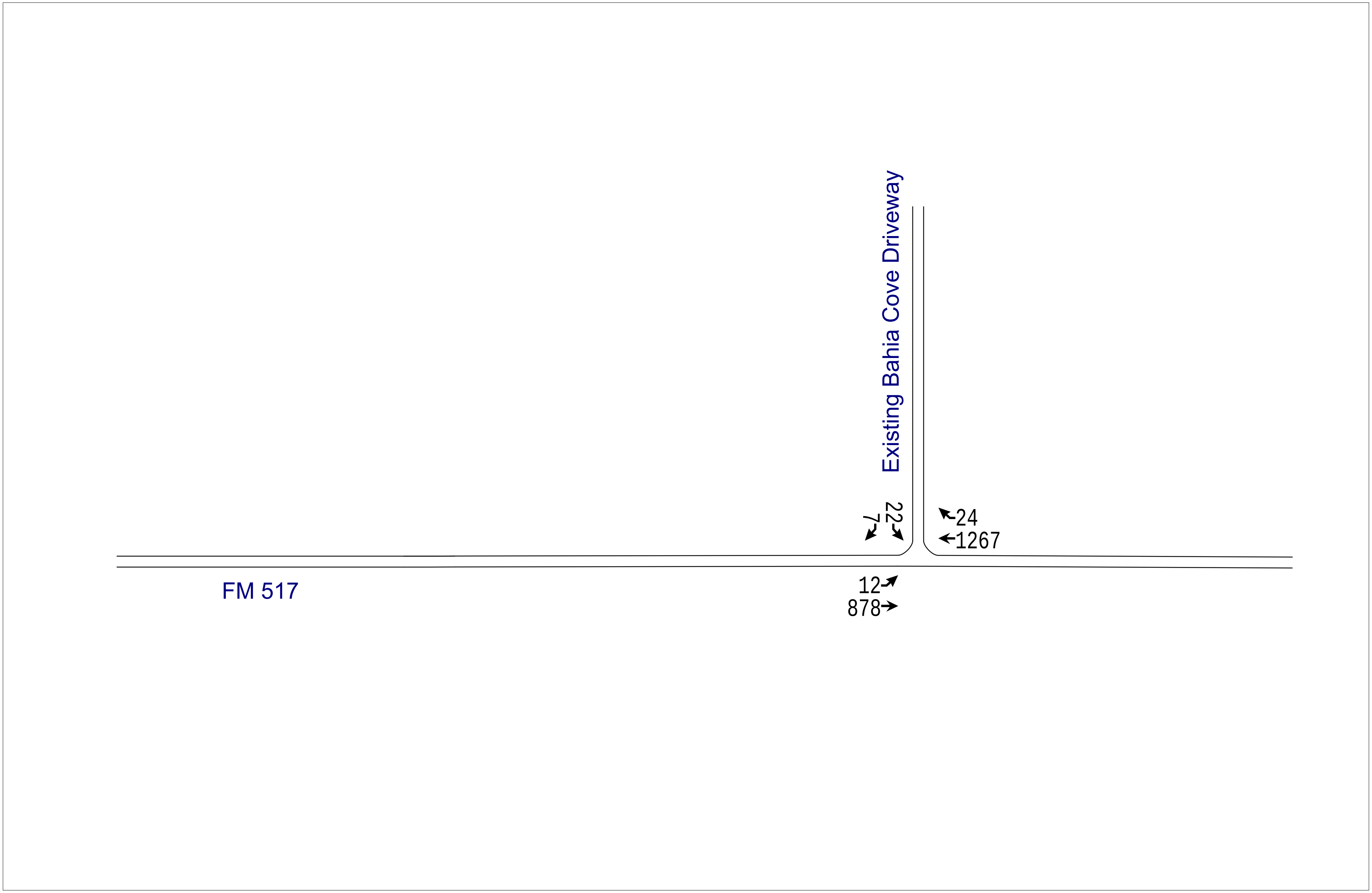
TIA for Bahia Cove Phase II in League City, Texas

DeShazo Group
LD


Existing Bahia Cove Driveway
7
29
3
723
FM 517
886

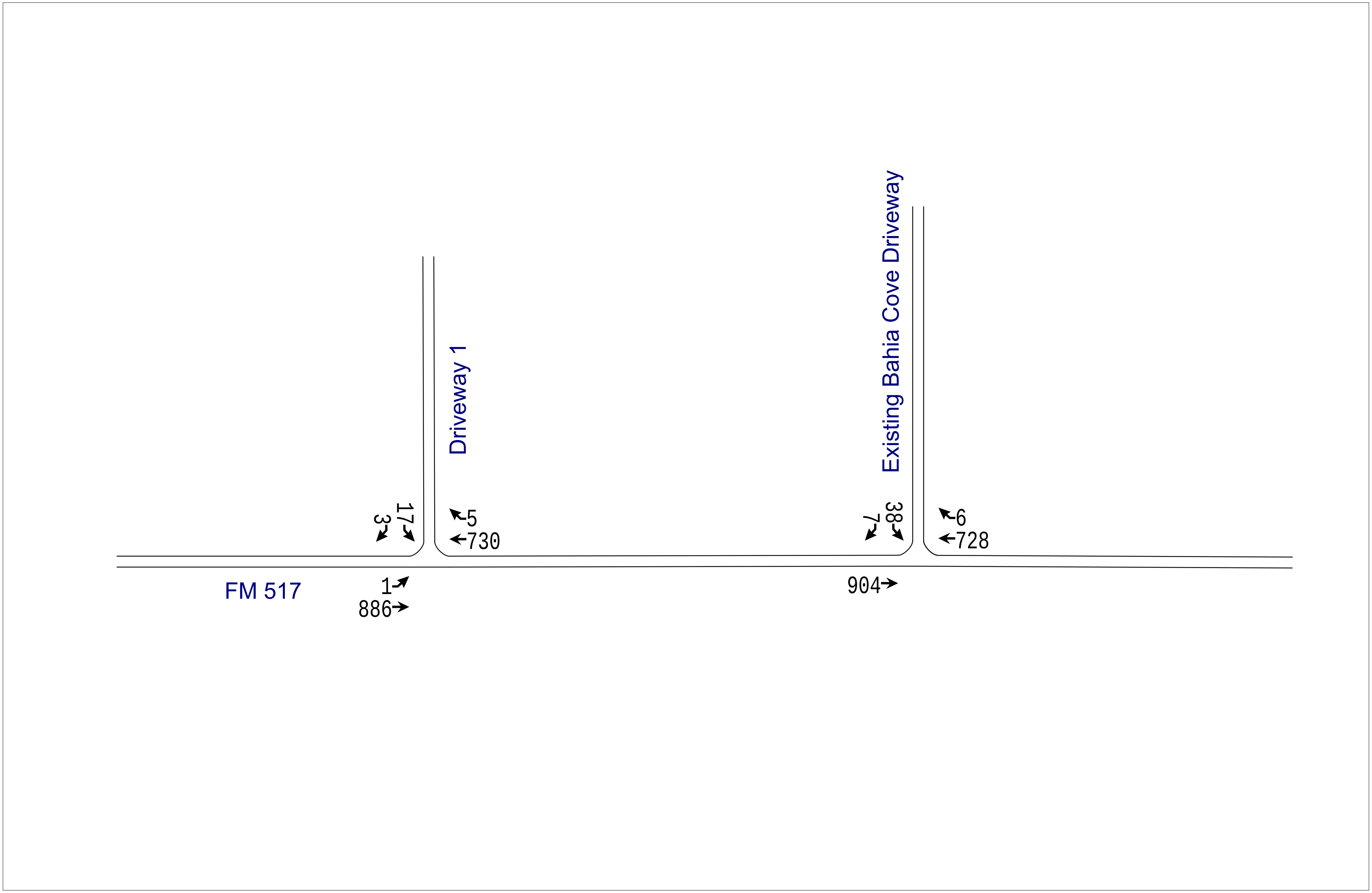
A34. 2026 Horizon PM Peak Hour Traffic Volumes

North ^
Not to Scale



A35. 2026 Horizon Plus Site Generated AM Peak Hour Traffic Volumes

North ^
Not to Scale

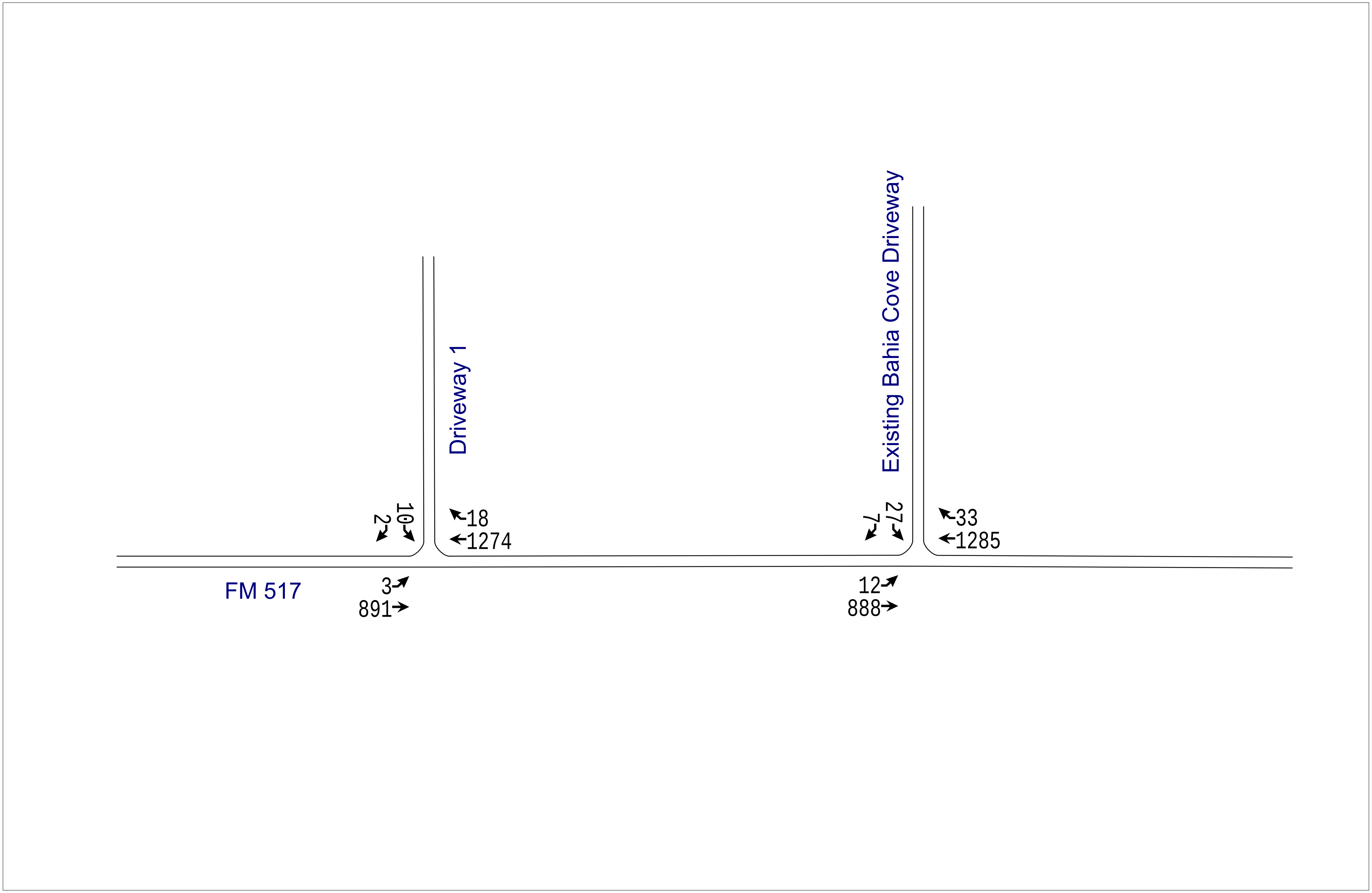


TIA for Bahia Cove Phase II in League City, Texas

DeShazo Group
LD

A36. 2026 Horizon Plus Site Generated PM Peak Hour Traffic Volumes

North ^
Not to Scale



Appendix B. Existing Traffic Count Data

Intersection Traffic Movements

DeShazo Group, Inc.

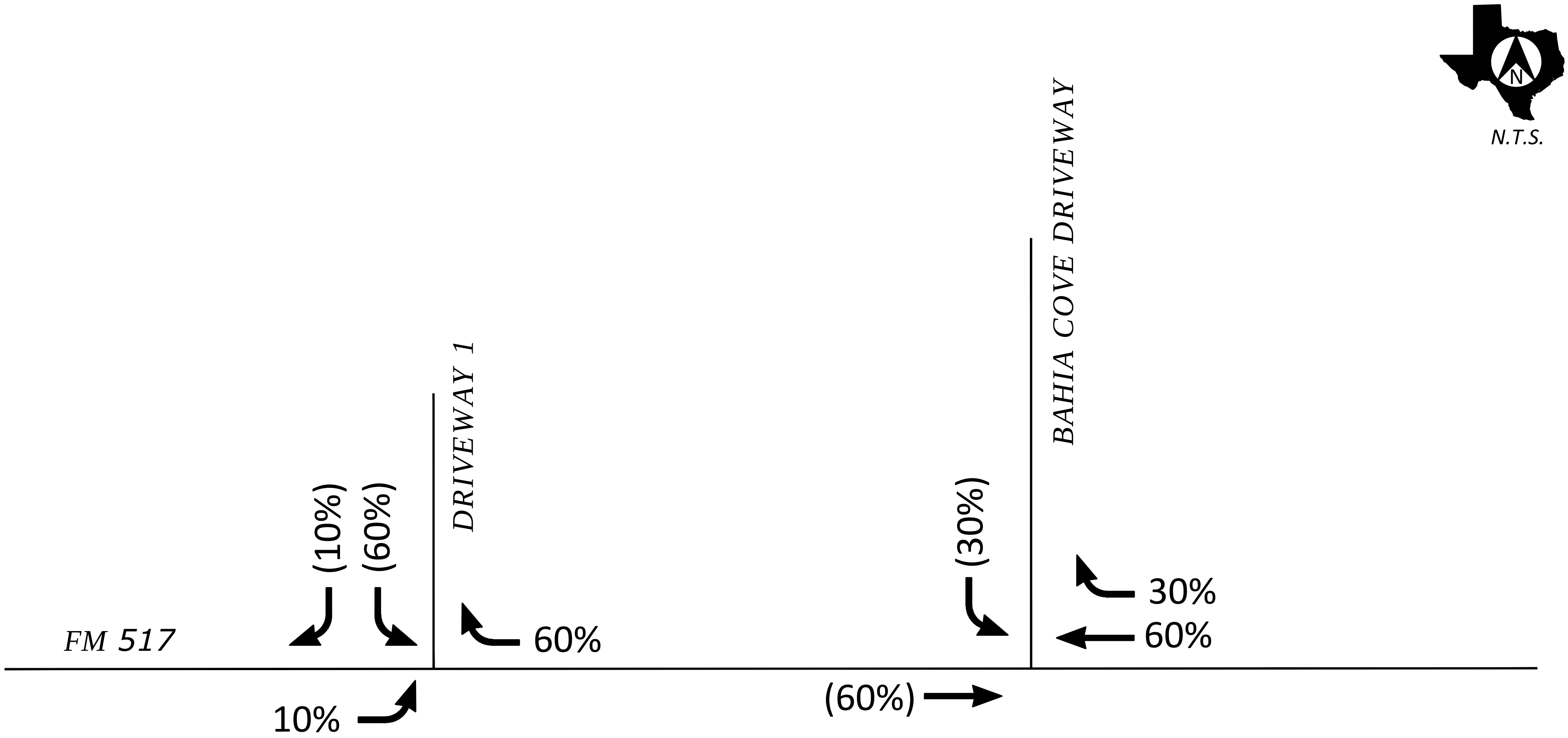
Location: **FM 517 at Existing Bahia Cove Driveway**
City/State: **League City, Texas**
Day/Date: **Wednesday, May 29, 2019**
Project-ID #: **19030**
Data Source: **CJ Hensch**
Data Collector(s): **Camera**
Weather Conditions: **Mild/Normal Conditions**
Traffic Control: **Unsignalized**
Description:

Time of Count		Northbound on Existing Bahia Cove Driveway				Southbound on Existing Bahia Cove Driveway				Eastbound on FM 517				Westbound on FM 517			
Begin	End	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
7:00 AM	7:15 AM	-	-	-	-	0	4	-	0	0	0	182	-	0	-	147	0
7:15 AM	7:30 AM	-	-	-	-	0	5	-	0	0	0	225	-	0	-	152	0
7:30 AM	7:45 AM	-	-	-	-	0	13	-	7	0	0	212	-	0	-	174	3
7:45 AM	8:00 AM	-	-	-	-	0	7	-	0	0	0	176	-	0	-	175	0
8:00 AM	8:15 AM	-	-	-	-	0	8	-	1	0	0	164	-	0	-	146	2
8:15 AM	8:30 AM	-	-	-	-	0	6	-	1	0	1	168	-	0	-	151	1
8:30 AM	8:45 AM	-	-	-	-	0	5	-	0	0	0	155	-	0	-	162	3
8:45 AM	9:00 AM	-	-	-	-	0	3	-	0	0	1	169	-	0	-	118	2
Intersection PHV:		0	0	0	0	0	29	0	7	0	0	795	0	0	0	648	3
PHF:		0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.25	0.00	0.00	0.88	0.00	0.00	0.00	0.93	0.25
Intersection Peak Hour: 7:00 AM - 8:00 AM														Intersection PHF: 0.91			
Study Area PHV:		**0**	**0**	**0**	**0**	**0**	**29**	**0**	**7**	**0**	**0**	**795**	**0**	**0**	**0**	**648**	**3**
PHF:		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.56**	**0.00**	**0.25**	**0.00**	**0.00**	**0.88**	**0.00**	**0.00**	**0.00**	**0.93**	**0.25**
Study Peak Hour: 7:00 AM - 8:00 AM														**Study Area PHF: 0.91**			
4:30 PM	4:45 PM	-	-	-	-	0	5	-	0	0	3	152	-	0	-	278	7
4:45 PM	5:00 PM	-	-	-	-	0	6	-	0	0	1	171	-	0	-	257	10
5:00 PM	5:15 PM	-	-	-	-	0	6	-	3	0	2	179	-	0	-	284	3
5:15 PM	5:30 PM	-	-	-	-	0	3	-	3	0	3	205	-	0	-	280	3
5:30 PM	5:45 PM	-	-	-	-	0	5	-	0	0	2	216	-	0	-	328	10
5:45 PM	6:00 PM	-	-	-	-	0	8	-	1	0	5	187	-	0	-	244	8
6:00 PM	6:15 PM	-	-	-	-	0	5	-	3	0	0	190	-	0	-	235	10
6:15 PM	6:30 PM	-	-	-	-	1	7	-	2	0	2	180	-	0	-	241	5
Intersection PHV:		0	0	0	0	0	22	0	7	0	12	787	0	0	0	1,136	24
PHF:		0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.58	0.00	0.60	0.91	0.00	0.00	0.00	0.87	0.60
Intersection Peak Hour: 5:00 PM - 6:00 PM														Intersection PHF: 0.89			
Study Area PHV:		**0**	**0**	**0**	**0**	**0**	**22**	**0**	**7**	**0**	**12**	**787**	**0**	**0**	**0**	**1,136**	**24**
PHF:		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.69**	**0.00**	**0.58**	**0.00**	**0.60**	**0.91**	**0.00**	**0.00**	**0.00**	**0.87**	**0.60**
Study Peak Hour: 5:00 PM - 6:00 PM														**Study Area PHF: 0.89**			

Observations:

File: C2X3HRS - 4L&12Mv_Peds.XLS

Appendix C. Site-Generated Traffic Supplement



Legend :

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

DeShazo Group
TRAFFIC & TRANSPORTATION ENGINEERS
400 S. Houston Street Ste. 330
Dallas, Texas 75202
(214) 748-6740

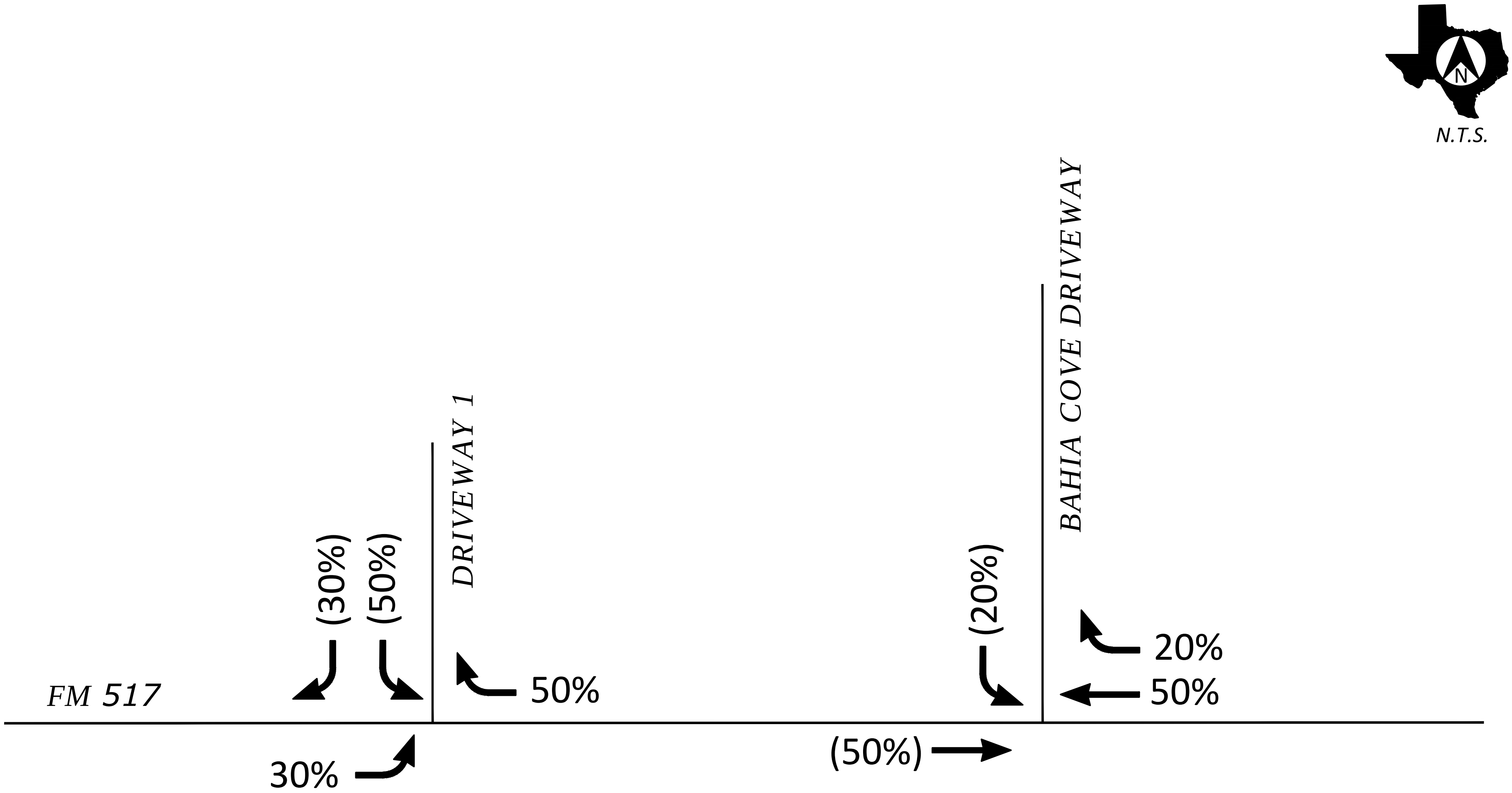
TRAFFIC ASSIGNMENT (FOR HOUSING) - INBOUND AND OUTBOUND

Traffic Impact Analysis for Bahia Cove Phase II in League City, Texas

PROJECT #: 19030

DATE: JUNE 2019

EXHIBIT
C1



Legend :

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

DeShazo Group
TRAFFIC & TRANSPORTATION ENGINEERS
400 S. Houston Street Ste. 330
Dallas, Texas 75202
(214) 748-6740

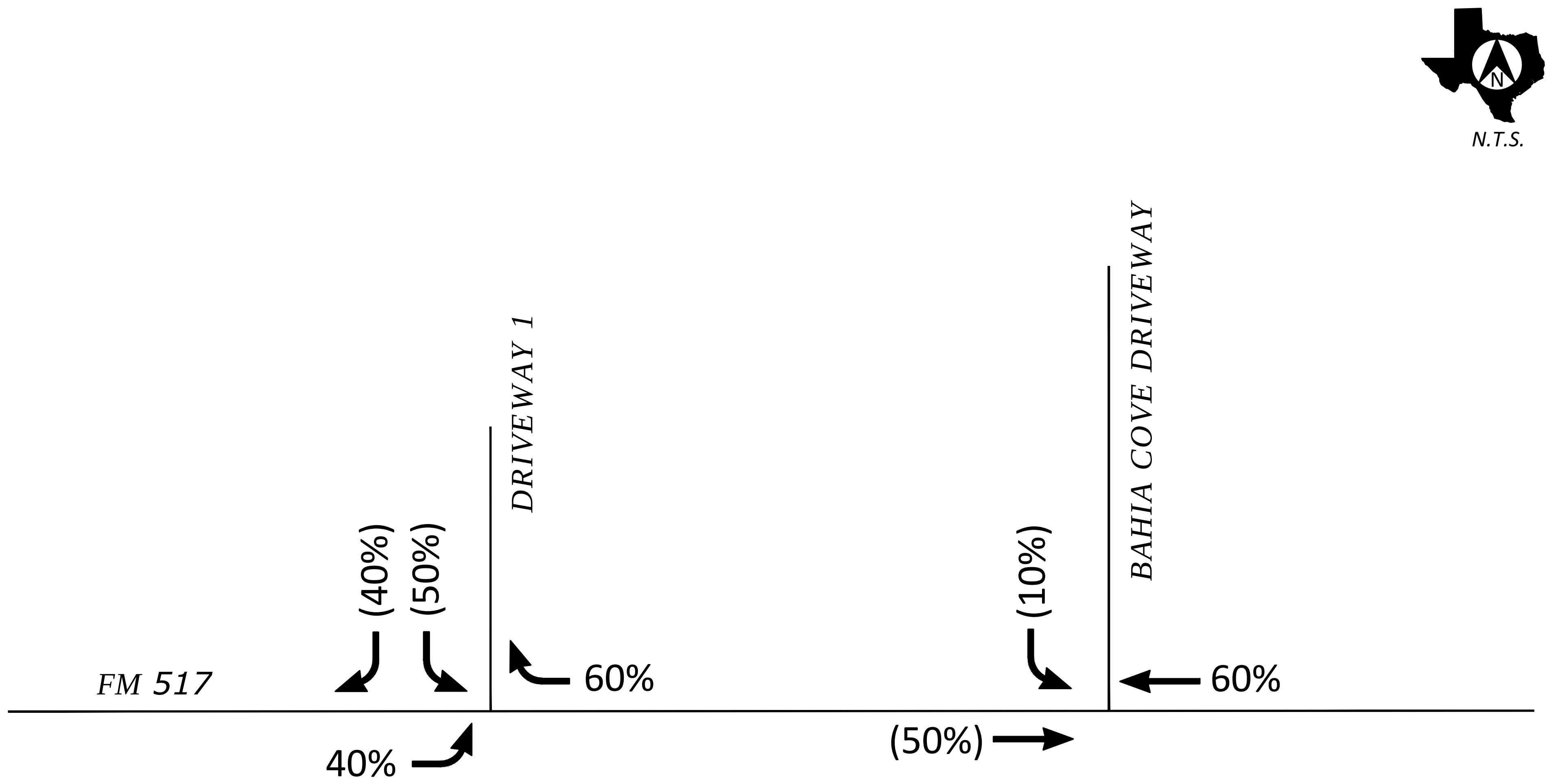
TRAFFIC ASSIGNMENT (FOR RETAIL, FAST FOOD & BANK) - INBOUND AND OUTBOUND

Traffic Impact Analysis for Bahia Cove Phase II in League City, Texas

PROJECT #: 19030

DATE: JUNE 2019

EXHIBIT
C2



Legend :

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

DeShazo Group
TRAFFIC & TRANSPORTATION ENGINEERS
400 S. Houston Street Ste. 330
Dallas, Texas 75202
(214) 748-6740

TRAFFIC ASSIGNMENT (FOR GAS STATION) - INBOUND AND OUTBOUND

Traffic Impact Analysis for Bahia Cove Phase II in League City, Texas

PROJECT #: 19030

DATE: JUNE 2019

EXHIBIT
C3

Appendix D. Detailed Intersection Capacity Analysis Results

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↱		Y	
Traffic Vol, veh/h	0	795	648	3	29	7
Future Vol, veh/h	0	795	648	3	29	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	874	712	3	32	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1588	714
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	874	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	119	431
Stage 1	0	-	-	-	485	-
Stage 2	0	-	-	-	408	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	119	431
Mov Cap-2 Maneuver	-	-	-	-	256	-
Stage 1	-	-	-	-	485	-
Stage 2	-	-	-	-	408	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20.1
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	278
HCM Lane V/C Ratio	-	-	-	0.142
HCM Control Delay (s)	-	-	-	20.1
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.5

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	787	1136	24	22	7
Future Vol, veh/h	12	787	1136	24	22	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	884	1276	27	25	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1303	0	-	0	2200	1290
Stage 1	-	-	-	-	1290	-
Stage 2	-	-	-	-	910	-
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	531	-	-	-	49	200
Stage 1	-	-	-	-	258	-
Stage 2	-	-	-	-	393	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	531	-	-	-	47	200
Mov Cap-2 Maneuver	-	-	-	-	158	-
Stage 1	-	-	-	-	246	-
Stage 2	-	-	-	-	393	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	31.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	531	-	-	-	166
HCM Lane V/C Ratio	0.025	-	-	-	0.196
HCM Control Delay (s)	12	-	-	-	31.9
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection						
Int Delay, s/veh	0.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↱		Y	
Traffic Vol, veh/h	0	843	687	3	29	7
Future Vol, veh/h	0	843	687	3	29	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	926	755	3	32	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1683	757
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	926	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	104	408
Stage 1	0	-	-	-	463	-
Stage 2	0	-	-	-	386	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	104	408
Mov Cap-2 Maneuver	-	-	-	-	239	-
Stage 1	-	-	-	-	463	-
Stage 2	-	-	-	-	386	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	21.3
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	260
HCM Lane V/C Ratio	-	-	-	0.152
HCM Control Delay (s)	-	-	-	21.3
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.5

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	835	1205	24	22	7
Future Vol, veh/h	12	835	1205	24	22	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	938	1354	27	25	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1381	0	-	0	2332	1368
Stage 1	-	-	-	-	1368	-
Stage 2	-	-	-	-	964	-
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	496	-	-	-	41	180
Stage 1	-	-	-	-	237	-
Stage 2	-	-	-	-	370	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	496	-	-	-	39	180
Mov Cap-2 Maneuver	-	-	-	-	144	-
Stage 1	-	-	-	-	224	-
Stage 2	-	-	-	-	370	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	35.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	496	-	-	-	151
HCM Lane V/C Ratio	0.027	-	-	-	0.216
HCM Control Delay (s)	12.5	-	-	-	35.3
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	843	695	5	17	3
Future Vol, veh/h	1	843	695	5	17	3
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	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	1	916	755	5	18	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	760	0	-	0	1676	758
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	918	-
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	852	-	-	-	105	407
Stage 1	-	-	-	-	463	-
Stage 2	-	-	-	-	389	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	852	-	-	-	105	407
Mov Cap-2 Maneuver	-	-	-	-	240	-
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	389	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	20.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	852	-	-	-	240	407
HCM Lane V/C Ratio	0.001	-	-	-	0.077	0.008
HCM Control Delay (s)	9.2	-	-	-	21.2	13.9
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	861	693	6	38	7
Future Vol, veh/h	0	861	693	6	38	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	946	762	7	42	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1712	766
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	946	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	100	403
Stage 1	0	-	-	-	459	-
Stage 2	0	-	-	-	377	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	100	403
Mov Cap-2 Maneuver	-	-	-	-	234	-
Stage 1	-	-	-	-	459	-
Stage 2	-	-	-	-	377	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	22.9
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	250
HCM Lane V/C Ratio	-	-	-	0.198
HCM Control Delay (s)	-	-	-	22.9
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.7

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	848	1213	18	10	2
Future Vol, veh/h	3	848	1213	18	10	2
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	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	3	922	1318	20	11	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1338	0	-	0	2256	1328
Stage 1	-	-	-	-	1328	-
Stage 2	-	-	-	-	928	-
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	515	-	-	-	45	190
Stage 1	-	-	-	-	247	-
Stage 2	-	-	-	-	385	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	515	-	-	-	44	190
Mov Cap-2 Maneuver	-	-	-	-	155	-
Stage 1	-	-	-	-	244	-
Stage 2	-	-	-	-	385	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	29
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	515	-	-	-	155	190
HCM Lane V/C Ratio	0.006	-	-	-	0.07	0.011
HCM Control Delay (s)	12	-	-	-	30	24.2
HCM Lane LOS	B	-	-	-	D	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0

Intersection						
Int Delay, s/veh	0.7					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	845	1223	33	27	7
Future Vol, veh/h	12	845	1223	33	27	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	949	1374	37	30	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1411	0	-	0	2368	1393
Stage 1	-	-	-	-	1393	-
Stage 2	-	-	-	-	975	-
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	483	-	-	-	39	174
Stage 1	-	-	-	-	230	-
Stage 2	-	-	-	-	366	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	483	-	-	-	37	174
Mov Cap-2 Maneuver	-	-	-	-	140	-
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	366	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	38.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	483	-	-	-	146
HCM Lane V/C Ratio	0.028	-	-	-	0.262
HCM Control Delay (s)	12.7	-	-	-	38.2
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	1

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	843	695	48	45	27
Future Vol, veh/h	29	843	695	48	45	27
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	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	32	916	755	52	49	29

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	807	0	-	0	1761	781
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	980	-
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	818	-	-	-	93	395
Stage 1	-	-	-	-	451	-
Stage 2	-	-	-	-	364	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	818	-	-	-	86	395
Mov Cap-2 Maneuver	-	-	-	-	216	-
Stage 1	-	-	-	-	415	-
Stage 2	-	-	-	-	364	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	22.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	818	-	-	-	216	395
HCM Lane V/C Ratio	0.039	-	-	-	0.226	0.074
HCM Control Delay (s)	9.6	-	-	-	26.5	14.8
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8	0.2

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	888	735	22	47	7
Future Vol, veh/h	0	888	735	22	47	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	976	808	24	52	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1796	820
Stage 1	-	-	-	-	820	-
Stage 2	-	-	-	-	976	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	88	375
Stage 1	0	-	-	-	433	-
Stage 2	0	-	-	-	365	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	88	375
Mov Cap-2 Maneuver	-	-	-	-	221	-
Stage 1	-	-	-	-	433	-
Stage 2	-	-	-	-	365	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	25.7
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	233
HCM Lane V/C Ratio	-	-	-	0.255
HCM Control Delay (s)	-	-	-	25.7
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	1

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	848	1213	47	44	26
Future Vol, veh/h	28	848	1213	47	44	26
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	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	30	922	1318	51	48	28

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1369	0	-	0	2326	1344
Stage 1	-	-	-	-	1344	-
Stage 2	-	-	-	-	982	-
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	501	-	-	-	~ 41	186
Stage 1	-	-	-	-	243	-
Stage 2	-	-	-	-	363	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	501	-	-	-	~ 36	186
Mov Cap-2 Maneuver	-	-	-	-	138	-
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	363	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	38.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	501	-	-	-	138	186
HCM Lane V/C Ratio	0.061	-	-	-	0.347	0.152
HCM Control Delay (s)	12.7	-	-	-	44.3	27.8
HCM Lane LOS	B	-	-	-	E	D
HCM 95th %tile Q(veh)	0.2	-	-	-	1.4	0.5

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

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	879	1252	43	40	7
Future Vol, veh/h	12	879	1252	43	40	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	988	1407	48	45	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1455	0	-	0	2445	1431
Stage 1	-	-	-	-	1431	-
Stage 2	-	-	-	-	1014	-
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	465	-	-	-	~ 34	165
Stage 1	-	-	-	-	220	-
Stage 2	-	-	-	-	350	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	465	-	-	-	~ 32	165
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	206	-
Stage 2	-	-	-	-	350	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	47.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	465	-	-	-	136
HCM Lane V/C Ratio	0.029	-	-	-	0.388
HCM Control Delay (s)	13	-	-	-	47.4
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	1.6

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

Intersection						
Int Delay, s/veh	0.9					
Movement	**EBL**	**EBT**	**WBT**	**WBR**	**SBL**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	29	843	695	44	34	26
Future Vol, veh/h	29	843	695	44	34	26
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	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	32	916	755	48	37	28

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	803	0	-	0	1759	779
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	980	-
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	821	-	-	-	93	396
Stage 1	-	-	-	-	452	-
Stage 2	-	-	-	-	364	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	821	-	-	-	86	396
Mov Cap-2 Maneuver	-	-	-	-	216	-
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	364	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	20.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	821	-	-	-	216	396
HCM Lane V/C Ratio	0.038	-	-	-	0.171	0.071
HCM Control Delay (s)	9.6	-	-	-	25.1	14.8
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6	0.2

Intersection						
Int Delay, s/veh	0.6					
Movement	**EBL**	**EBT**	**WBT**	**WBR**	**SBL**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	0	877	731	6	37	7
Future Vol, veh/h	0	877	731	6	37	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	964	803	7	41	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1771	807
Stage 1	-	-	-	-	807	-
Stage 2	-	-	-	-	964	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	91	381
Stage 1	0	-	-	-	439	-
Stage 2	0	-	-	-	370	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	91	381
Mov Cap-2 Maneuver	-	-	-	-	224	-
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	370	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	23.7
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	240
HCM Lane V/C Ratio	-	-	-	0.201
HCM Control Delay (s)	-	-	-	23.7
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.7

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	36	848	1213	56	47	35
Future Vol, veh/h	36	848	1213	56	47	35
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	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	39	922	1318	61	51	38

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1379	0	-	0	2349	1349
Stage 1	-	-	-	-	1349	-
Stage 2	-	-	-	-	1000	-
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	497	-	-	-	~ 40	184
Stage 1	-	-	-	-	242	-
Stage 2	-	-	-	-	356	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	497	-	-	-	~ 34	184
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	203	-
Stage 2	-	-	-	-	356	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	40.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	497	-	-	-	132	184
HCM Lane V/C Ratio	0.079	-	-	-	0.387	0.207
HCM Control Delay (s)	12.9	-	-	-	48.5	29.6
HCM Lane LOS	B	-	-	-	E	D
HCM 95th %tile Q(veh)	0.3	-	-	-	1.6	0.8

Notes

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

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	881	1261	29	34	7
Future Vol, veh/h	12	881	1261	29	34	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	990	1417	33	38	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1450	0	-	0	2450	1434
Stage 1	-	-	-	-	1434	-
Stage 2	-	-	-	-	1016	-
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	467	-	-	-	~ 34	164
Stage 1	-	-	-	-	220	-
Stage 2	-	-	-	-	350	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	467	-	-	-	~ 32	164
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	206	-
Stage 2	-	-	-	-	350	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	44
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	467	-	-	-	137
HCM Lane V/C Ratio	0.029	-	-	-	0.336
HCM Control Delay (s)	12.9	-	-	-	44
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	1.4

Notes

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

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	35	843	695	59	37	22
Future Vol, veh/h	35	843	695	59	37	22
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	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	38	916	755	64	40	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	819	0	-	0	1779	787
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	992	-
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	810	-	-	-	90	392
Stage 1	-	-	-	-	449	-
Stage 2	-	-	-	-	359	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	810	-	-	-	81	392
Mov Cap-2 Maneuver	-	-	-	-	211	-
Stage 1	-	-	-	-	406	-
Stage 2	-	-	-	-	359	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	21.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	810	-	-	-	211	392
HCM Lane V/C Ratio	0.047	-	-	-	0.191	0.061
HCM Control Delay (s)	9.7	-	-	-	26	14.8
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7	0.2

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	880	746	26	44	7
Future Vol, veh/h	0	880	746	26	44	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	967	820	29	48	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1802	835
Stage 1	-	-	-	-	835	-
Stage 2	-	-	-	-	967	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	88	368
Stage 1	0	-	-	-	426	-
Stage 2	0	-	-	-	369	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	88	368
Mov Cap-2 Maneuver	-	-	-	-	220	-
Stage 1	-	-	-	-	426	-
Stage 2	-	-	-	-	369	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	25.3
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	233
HCM Lane V/C Ratio	-	-	-	0.241
HCM Control Delay (s)	-	-	-	25.3
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	0.9

1: FM 517 & Driveway 1

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	848	1213	64	68	41
Future Vol, veh/h	38	848	1213	64	68	41
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	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	41	922	1318	70	74	45

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1388	0	-	0	2357	1353
Stage 1	-	-	-	-	1353	-
Stage 2	-	-	-	-	1004	-
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	493	-	-	-	~ 39	183
Stage 1	-	-	-	-	241	-
Stage 2	-	-	-	-	354	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	493	-	-	-	~ 32	183
Mov Cap-2 Maneuver	-	-	-	-	130	-
Stage 1	-	-	-	-	200	-
Stage 2	-	-	-	-	354	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	51.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	493	-	-	-	130	183
HCM Lane V/C Ratio	0.084	-	-	-	0.569	0.244
HCM Control Delay (s)	13	-	-	-	64.1	30.9
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.3	-	-	-	2.8	0.9

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

2: FM 517 & Bahia Cove Driveway

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	902	1269	50	49	7
Future Vol, veh/h	12	902	1269	50	49	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1013	1426	56	55	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1482	0	-	0	2493	1454
Stage 1	-	-	-	-	1454	-
Stage 2	-	-	-	-	1039	-
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	454	-	-	-	~ 32	160
Stage 1	-	-	-	-	215	-
Stage 2	-	-	-	-	341	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	454	-	-	-	~ 30	160
Mov Cap-2 Maneuver	-	-	-	-	128	-
Stage 1	-	-	-	-	201	-
Stage 2	-	-	-	-	341	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	55.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	454	-	-	-	131
HCM Lane V/C Ratio	0.03	-	-	-	0.48
HCM Control Delay (s)	13.2	-	-	-	55.6
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	2.2

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

Intersection						
Int Delay, s/veh	2					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	843	695	78	69	47
Future Vol, veh/h	49	843	695	78	69	47
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	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	53	916	755	85	75	51

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	840	0	-	0	1820	798
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	1022	-
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	795	-	-	-	85	386
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	347	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	795	-	-	-	~ 73	386
Mov Cap-2 Maneuver	-	-	-	-	199	-
Stage 1	-	-	-	-	383	-
Stage 2	-	-	-	-	347	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	26.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	795	-	-	-	199	386
HCM Lane V/C Ratio	0.067	-	-	-	0.377	0.132
HCM Control Delay (s)	9.9	-	-	-	33.6	15.7
HCM Lane LOS	A	-	-	-	D	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.6	0.5

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

Intersection						
Int Delay, s/veh	0.9					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	912	765	19	51	7
Future Vol, veh/h	0	912	765	19	51	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1002	841	21	56	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1854	852
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	1002	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	81	359
Stage 1	0	-	-	-	418	-
Stage 2	0	-	-	-	355	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	81	359
Mov Cap-2 Maneuver	-	-	-	-	212	-
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	355	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	27.5
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	223
HCM Lane V/C Ratio	-	-	-	0.286
HCM Control Delay (s)	-	-	-	27.5
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	1.1

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	848	1213	77	66	46
Future Vol, veh/h	49	848	1213	77	66	46
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	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	53	922	1318	84	72	50

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1402	0	-	0	2388	1360
Stage 1	-	-	-	-	1360	-
Stage 2	-	-	-	-	1028	-
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	487	-	-	-	~ 37	182
Stage 1	-	-	-	-	239	-
Stage 2	-	-	-	-	345	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	487	-	-	-	~ 29	182
Mov Cap-2 Maneuver	-	-	-	-	122	-
Stage 1	-	-	-	-	186	-
Stage 2	-	-	-	-	345	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	54.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	487	-	-	-	122	182
HCM Lane V/C Ratio	0.109	-	-	-	0.588	0.275
HCM Control Delay (s)	13.3	-	-	-	69.9	32.1
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.4	-	-	-	2.9	1.1

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

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	900	1282	38	41	7
Future Vol, veh/h	12	900	1282	38	41	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1011	1440	43	46	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1483	0	-	0	2499	1462
Stage 1	-	-	-	-	1462	-
Stage 2	-	-	-	-	1037	-
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	454	-	-	-	~ 32	158
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	342	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	454	-	-	-	~ 30	158
Mov Cap-2 Maneuver	-	-	-	-	127	-
Stage 1	-	-	-	-	199	-
Stage 2	-	-	-	-	342	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	50.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	454	-	-	-	131
HCM Lane V/C Ratio	0.03	-	-	-	0.412
HCM Control Delay (s)	13.2	-	-	-	50.5
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	1.8

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

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	55	843	695	88	61	42
Future Vol, veh/h	55	843	695	88	61	42
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	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	60	916	755	96	66	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	851	0	-	0	1839	803
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	1036	-
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	788	-	-	-	83	383
Stage 1	-	-	-	-	441	-
Stage 2	-	-	-	-	342	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	788	-	-	-	70	383
Mov Cap-2 Maneuver	-	-	-	-	195	-
Stage 1	-	-	-	-	373	-
Stage 2	-	-	-	-	342	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	25.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	788	-	-	-	195	383
HCM Lane V/C Ratio	0.076	-	-	-	0.34	0.119
HCM Control Delay (s)	9.9	-	-	-	32.7	15.7
HCM Lane LOS	A	-	-	-	D	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.4	0.4

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	904	776	24	47	7
Future Vol, veh/h	0	904	776	24	47	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	993	853	26	52	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1859	866
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	993	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	81	353
Stage 1	0	-	-	-	412	-
Stage 2	0	-	-	-	359	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	81	353
Mov Cap-2 Maneuver	-	-	-	-	212	-
Stage 1	-	-	-	-	412	-
Stage 2	-	-	-	-	359	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	26.8
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	224
HCM Lane V/C Ratio	-	-	-	0.265
HCM Control Delay (s)	-	-	-	26.8
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	1

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	848	1213	94	89	60
Future Vol, veh/h	59	848	1213	94	89	60
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	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	64	922	1318	102	97	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1420	0	-	0	2419	1369
Stage 1	-	-	-	-	1369	-
Stage 2	-	-	-	-	1050	-
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	479	-	-	-	~ 36	179
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	337	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	479	-	-	-	~ 26	179
Mov Cap-2 Maneuver	-	-	-	-	114	-
Stage 1	-	-	-	-	171	-
Stage 2	-	-	-	-	337	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	84.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	479	-	-	-	114	179
HCM Lane V/C Ratio	0.134	-	-	-	0.849	0.364
HCM Control Delay (s)	13.7	-	-	-	117.5	36.2
HCM Lane LOS	B	-	-	-	F	E
HCM 95th %tile Q(veh)	0.5	-	-	-	5	1.6

Notes

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

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	924	1299	44	51	7
Future Vol, veh/h	12	924	1299	44	51	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1038	1460	49	57	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1509	0	-	0	2549	1485
Stage 1	-	-	-	-	1485	-
Stage 2	-	-	-	-	1064	-
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	443	-	-	-	~ 29	153
Stage 1	-	-	-	-	207	-
Stage 2	-	-	-	-	332	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	443	-	-	-	~ 27	153
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	332	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	60.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	443	-	-	-	126
HCM Lane V/C Ratio	0.03	-	-	-	0.517
HCM Control Delay (s)	13.4	-	-	-	60.8
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	2.4

Notes

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

HCM 2010 Intersection Capacity Analysis 2021 Backgound Plus Site (Retail & Fastfood)
1: FM 517 & Driveway 1 AM

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	56	843	695	93	71	43
Future Vol, veh/h	56	843	695	93	71	43
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	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	61	916	755	101	77	47

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	856	0	-	0	1844	806
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	1038	-
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	784	-	-	-	82	382
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	341	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	784	-	-	-	~ 69	382
Mov Cap-2 Maneuver	-	-	-	-	193	-
Stage 1	-	-	-	-	370	-
Stage 2	-	-	-	-	341	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	28.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	784	-	-	-	193	382
HCM Lane V/C Ratio	0.078	-	-	-	0.4	0.122
HCM Control Delay (s)	10	-	-	-	35.6	15.7
HCM Lane LOS	A	-	-	-	E	C
HCM 95th %tile Q(veh)	0.3	-	-	-	1.8	0.4

Notes

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

TIA for Bahia Cove Phase II in League City, Texas
ZR

HCM 2010 Intersection Capacity Analysis 2021 Backgound Plus Site (Retail & Fastfood)
2: FM 517 & Bahia Cove Driveway AM

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	914	780	40	57	7
Future Vol, veh/h	0	914	780	40	57	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1004	857	44	63	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1883	879
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	1004	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	78	347
Stage 1	0	-	-	-	406	-
Stage 2	0	-	-	-	354	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	78	347
Mov Cap-2 Maneuver	-	-	-	-	208	-
Stage 1	-	-	-	-	406	-
Stage 2	-	-	-	-	354	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	29.2
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	218
HCM Lane V/C Ratio	-	-	-	0.323
HCM Control Delay (s)	-	-	-	29.2
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	1.3

TIA for Bahia Cove Phase II in League City, Texas
ZR

Intersection						
Int Delay, s/veh	4.8					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	51	848	1213	85	87	52
Future Vol, veh/h	51	848	1213	85	87	52
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	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	55	922	1318	92	95	57

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1410	0	-	0	2396	1364
Stage 1	-	-	-	-	1364	-
Stage 2	-	-	-	-	1032	-
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	484	-	-	-	~ 37	181
Stage 1	-	-	-	-	238	-
Stage 2	-	-	-	-	344	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	484	-	-	-	~ 28	181
Mov Cap-2 Maneuver	-	-	-	-	120	-
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	344	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	75.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	484	-	-	-	120	181
HCM Lane V/C Ratio	0.115	-	-	-	0.788	0.312
HCM Control Delay (s)	13.4	-	-	-	100.9	33.7
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.4	-	-	-	4.6	1.3

Notes

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

Intersection						
Int Delay, s/veh	1.9					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	921	1290	58	57	7
Future Vol, veh/h	12	921	1290	58	57	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	1035	1449	65	64	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1514	0	-	0	2543	1482
Stage 1	-	-	-	-	1482	-
Stage 2	-	-	-	-	1061	-
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	441	-	-	-	~ 30	154
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	333	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	441	-	-	-	~ 28	154
Mov Cap-2 Maneuver	-	-	-	-	124	-
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	333	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	65.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	441	-	-	-	127
HCM Lane V/C Ratio	0.031	-	-	-	0.566
HCM Control Delay (s)	13.4	-	-	-	65.2
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	2.8

Notes

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

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	886	723	3	29	7
Future Vol, veh/h	0	886	723	3	29	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	974	795	3	32	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1771	797
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	974	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	91	387
Stage 1	0	-	-	-	444	-
Stage 2	0	-	-	-	366	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	91	387
Mov Cap-2 Maneuver	-	-	-	-	224	-
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	366	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	22.6
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	244
HCM Lane V/C Ratio	-	-	-	0.162
HCM Control Delay (s)	-	-	-	22.6
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.6

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	878	1267	24	22	7
Future Vol, veh/h	12	878	1267	24	22	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	987	1424	27	25	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1451	0	-	0	2451	1438
Stage 1	-	-	-	-	1438	-
Stage 2	-	-	-	-	1013	-
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	467	-	-	-	34	163
Stage 1	-	-	-	-	219	-
Stage 2	-	-	-	-	351	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	467	-	-	-	32	163
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	205	-
Stage 2	-	-	-	-	351	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	39
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	467	-	-	-	138
HCM Lane V/C Ratio	0.029	-	-	-	0.236
HCM Control Delay (s)	12.9	-	-	-	39
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	886	730	5	17	3
Future Vol, veh/h	1	886	730	5	17	3
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	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	1	963	793	5	18	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	798	0	-	0	1761	796
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	965	-
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	824	-	-	-	93	387
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	370	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	824	-	-	-	93	387
Mov Cap-2 Maneuver	-	-	-	-	226	-
Stage 1	-	-	-	-	443	-
Stage 2	-	-	-	-	370	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	21.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	824	-	-	-	226	387
HCM Lane V/C Ratio	0.001	-	-	-	0.082	0.008
HCM Control Delay (s)	9.4	-	-	-	22.3	14.4
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	904	728	6	38	7
Future Vol, veh/h	0	904	728	6	38	7
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	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	993	800	7	42	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	1797	804
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	993	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	0	-	-	-	88	383
Stage 1	0	-	-	-	440	-
Stage 2	0	-	-	-	359	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	88	383
Mov Cap-2 Maneuver	-	-	-	-	220	-
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	359	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	24.3
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	236
HCM Lane V/C Ratio	-	-	-	0.21
HCM Control Delay (s)	-	-	-	24.3
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	0.8

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	891	1274	18	10	2
Future Vol, veh/h	3	891	1274	18	10	2
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	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	3	968	1385	20	11	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1405	0	-	0	2369	1395
Stage 1	-	-	-	-	1395	-
Stage 2	-	-	-	-	974	-
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	486	-	-	-	38	173
Stage 1	-	-	-	-	229	-
Stage 2	-	-	-	-	366	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	486	-	-	-	38	173
Mov Cap-2 Maneuver	-	-	-	-	144	-
Stage 1	-	-	-	-	226	-
Stage 2	-	-	-	-	366	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	31
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	486	-	-	-	144	173
HCM Lane V/C Ratio	0.007	-	-	-	0.075	0.013
HCM Control Delay (s)	12.5	-	-	-	32	26.1
HCM Lane LOS	B	-	-	-	D	D
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	888	1285	33	27	7
Future Vol, veh/h	12	888	1285	33	27	7
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	998	1444	37	30	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1481	0	-	0	2487	1463
Stage 1	-	-	-	-	1463	-
Stage 2	-	-	-	-	1024	-
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	454	-	-	-	32	158
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	347	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	454	-	-	-	~ 30	158
Mov Cap-2 Maneuver	-	-	-	-	128	-
Stage 1	-	-	-	-	199	-
Stage 2	-	-	-	-	347	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	42.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	454	-	-	-	133
HCM Lane V/C Ratio	0.03	-	-	-	0.287
HCM Control Delay (s)	13.2	-	-	-	42.6
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1

Notes

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

Appendix E. TxDOT Deceleration Lane Criteria

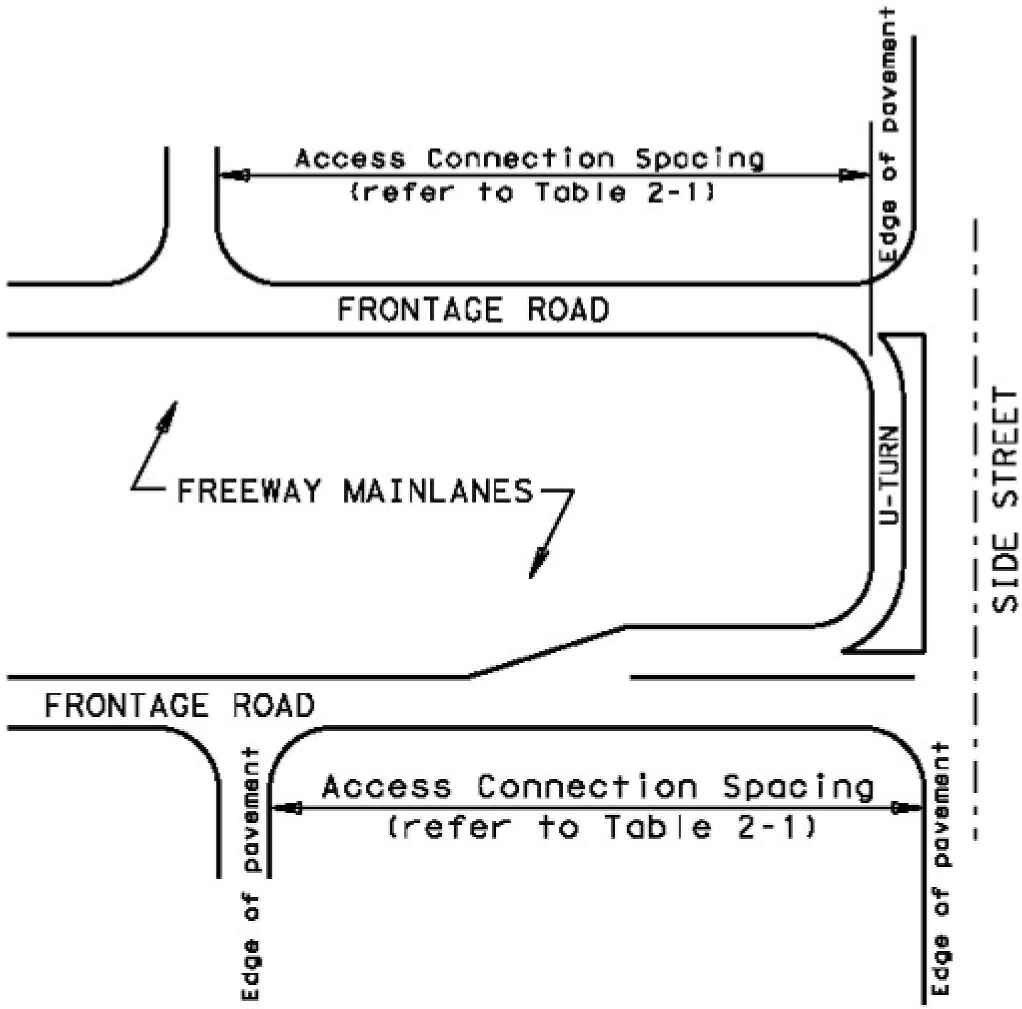


Figure 2-3. Frontage Road U-Turn Spacing Diagram

Table 2-1: Frontage Road Connection Spacing Criteria

Minimum Connection Spacing Criteria for Frontage Roads (1)(2)		
	Minimum Connection Spacing (feet)	
Posted Speed (mph)	**One-Way Frontage Roads**	**Two-Way Frontage Roads**
≤ 30	200	200
35	250	300
40	305	360
45	360	435
≥ 50	425	510

(1) Distances are for passenger cars on level grade. These distances may be adjusted for downgrades and/or significant truck traffic. Where present or projected traffic operations indicate specific needs, consideration may be given to intersection sight distance and operational gap acceptance measurement adjustments.

(2) When these values are not attainable, refer to the variance process as described in Chapter 2, Section 5.

Other State System Highways

This section applies to all state highway system routes that are not new highways on new alignments, freeway mainlanes, or frontage roads.

Table 2-2 provides minimum connection spacing criteria for other state system highways. However, a lesser connection spacing than set forth in this document may be allowed without variance in the situations described in Chapter 2, Section 5.

Table 2-2 does not apply to rural highways outside of metropolitan planning organization boundaries where there is little, if any, potential for development with current ADT volumes below 2000. For those highways, access location and design will be evaluated based on safety and traffic operation considerations. Such considerations may include traffic volumes, posted speed, turning volumes, presence or absence of shoulders, and roadway geometrics.

Table 2-2: Other State Highways Connection Spacing Criteria

Other State Highways Minimum Connection Spacing (1)(2)(3)	
Posted Speed (mph)	**Distance (ft)**
≤ 30	200
35	250
40	305
45	360
≥ 50	425

(1) Distances are for passenger cars on level grade. These distances may be adjusted for downgrades and/or significant truck traffic. Where present or projected traffic operations indicate specific needs, consideration may be given to intersection sight distance and operational gap acceptance measurement adjustments.

(2) When these values are not attainable, refer to the variance process as described in Chapter 2, Section 5.

(3) Access spacing values shown in this table do not apply to rural highways outside of metropolitan planning organization boundaries where there is little, if any, potential for development with current ADT levels below 2000. Access connection spacing below the values shown in this table may be approved based on safety and operational considerations as determined by TxDOT.

Corner clearance refers to the separation of access connections from roadway intersections. Table 2-2 provides minimum corner clearance criteria.

Where adequate access connection spacing cannot be achieved, the permitting authority may allow for a lesser spacing when shared access is established with an abutting property. Where no other alternatives exist, construction of an access connection may be allowed along the property line farthest from the intersection. To provide reasonable access under these conditions but also provide the safest operation, consideration should be given to designing the driveway connection to allow only the right-in turning movement or only the right-in/right out turning movements if feasible.

Auxiliary Lanes

This subsection describes the basic use and functional criteria associated with auxiliary lanes. Auxiliary lanes consist of left-turn and right-turn movements, deceleration, acceleration, and their associated transitions and storage requirements. Left-turn movements may pose challenges at driveways and street intersections. They may increase conflicts, delays, and crashes and often complicate traffic signal timing. These problems are especially acute at major highway intersections where heavy left-turn movements take place, but also occur where left-turn movements enter or leave driveways serving adjacent land development. As with left-turn movements, right-turn movements pose problems at both driveways and street intersections. Right-turn movements increase conflicts, delays, and crashes, particularly where a speed differential of 10 mph or more exists between the speed of through traffic and the vehicles that are turning right.

Table 2-3 presents thresholds for auxiliary lanes. These thresholds represent examples of where left turn and right turn lanes should be considered. Refer to the TxDOT *Roadway Design Manual*, Chapter 3, for proper acceleration and deceleration lengths.

Table 2-3: Auxiliary Lane Thresholds

Median Type	**Left Turn to or from Property**		**Right Turn to or from Property [(5)]**	
	Acceleration	**Deceleration**	**Acceleration**	**Deceleration**
Non-Traversable (Raised Median)	(2)	All	Right turn egress > 200 vph (4)	◆ > 45 mph where right turn volume is > 50 vph (3) ◆ ≤ 45 where right turn volume is > 60 vph (3)
Traversable (Undivided Road)	(2)	(1)	Same as above	Same as Above

(1) Refer to Table 3-11, TxDOT *Roadway Design Manua*l, for alternative left-turn-bay operational considerations.

(2) A left-turn acceleration lane may be required if it would provide a benefit to the safety and operation of the roadway. A left-turn acceleration lane would interfere with the left-turn ingress movements to any other access connection.

(3) Additional right-turn considerations:

- ◆ Conditions for providing an exclusive right-turn lane when the right-turn traffic volume projections are less than indicated in Table 2-3:
  - High crash experience
  - Heavier than normal peak flow movements on the main roadway
  - Large volume of truck traffic
  - Highways where sight distance is limited
- ◆ Conditions for NOT requiring a right-turn lane where right-turn volumes are more than indicated in Table 2-3:
  - Dense or built-out corridor where space is limited
  - Where queues of stopped vehicles would block the access to the right turn lane
  - Where sufficient length of property width is not available for the appropriate design

(4) The acceleration lane should not interfere with any downstream access connection.

- ◆ The distance from the end of the acceleration lane taper to the next unsignalized downstream access connection should be equal to or greater than the distances found in Table 2-2.
- ◆ Additionally, if the next access connection is signalized, the distance from the end of the acceleration lane taper to the back of the 90th percentile queue should be greater than or equal to the distances found Table 2-2.

(5) Continuous right-turn lanes can provide mobility benefits both for through movements and for the turning vehicles.[a] Access connections within a continuous right turn lane should meet the spacing requirements found in Table 2-2. However, when combined with crossing left in movements, a continuous right-turn lane can introduce additional operational conflicts.

Table 3-11: Guide for Left-Turn Lanes on Two-Lane Highways

Opposing Volume (vph)	**Advancing Volume (vph)**			
-	5 % Left Turns	10 % Left Turns	20 % Left Turns	30 % Left Turns
40 mph [60 km/h] Design Speed				
800	330	240	180	160
600	410	305	225	200
400	510	380	275	245
200	640	470	350	305
100	720	515	390	340
50 mph [80 km/h] Design Speed				
800	280	210	165	135
600	350	260	195	170
400	430	320	240	210
200	550	400	300	270
100	615	445	335	295
60 mph [100 km/h] Design Speed				
800	230	170	125	115
600	290	210	160	140
400	365	270	200	175
200	450	330	250	215
100	505	370	275	240

Right-Turn Deceleration Lanes. Shoulders 10 ft [3.0 m] wide alongside the traffic lanes generally provide sufficient area for acceleration or deceleration of right-turning vehicles. Where the right turn lane is being constructed in addition to the through lanes and shoulders, the minimum right turn lane width is 10 ft [3.0 m] with a 2 ft [0.6 m] surfaced shoulder. Where speed change lanes are used, they should be provided symmetrically along both sides of the highway for both directions of traffic, thus presenting drivers with a balanced section.

A deceleration-acceleration lane on one side of a two-lane highway, such as at a “tee” intersection, results in the appearance of a three-lane highway and may result in driver confusion. In this regard, right-turn speed change lanes are generally inappropriate for “tee” intersection design except where a four lane (2 through, 1 median left turn, 1 right acceleration/deceleration) section is provided.