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PK# 3897-16.515

Z167-163

TRAFFIC IMPACT ANALYSIS

Project:

Dentwood Mixed Use

In Dallas, Texas

Prepared for:

City of Dallas

On behalf of:

StreetLights Residential



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1/6/17

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EXECUTIVE SUMMARY

The services of **Pacheco Koch** were retained by **StreetLights Residential**, to conduct a Traffic Impact Analysis (TIA) for the proposed Mixed Use development known as *Dentwood Mixed Use* (the "Project") located in the area bound by Denton Drive Cut Off, Denton Drive, and Hudnall Street, adjacent to the DART Inwood/Love Field Light Rail Station in Dallas, Texas. The Project consists of a combination of residential and commercial uses. Buildout of the Project is estimated to occur by 2019. A TIA is required for review by the City of Dallas as part of the Owner's request for creation of a PD Subdistrict within PD 193 on a portion of the site.

The purpose of this report is to estimate the incremental impact on the background traffic operational conditions caused by the proposed development within a specific study area as determined by standardized engineering analyses. The study parameters used in this TIA are based upon the requirements of the City and are consistent with the standard industry practices used in similar studies.

Based upon the analyses performed herein, the following findings and recommendations were determined by PK.

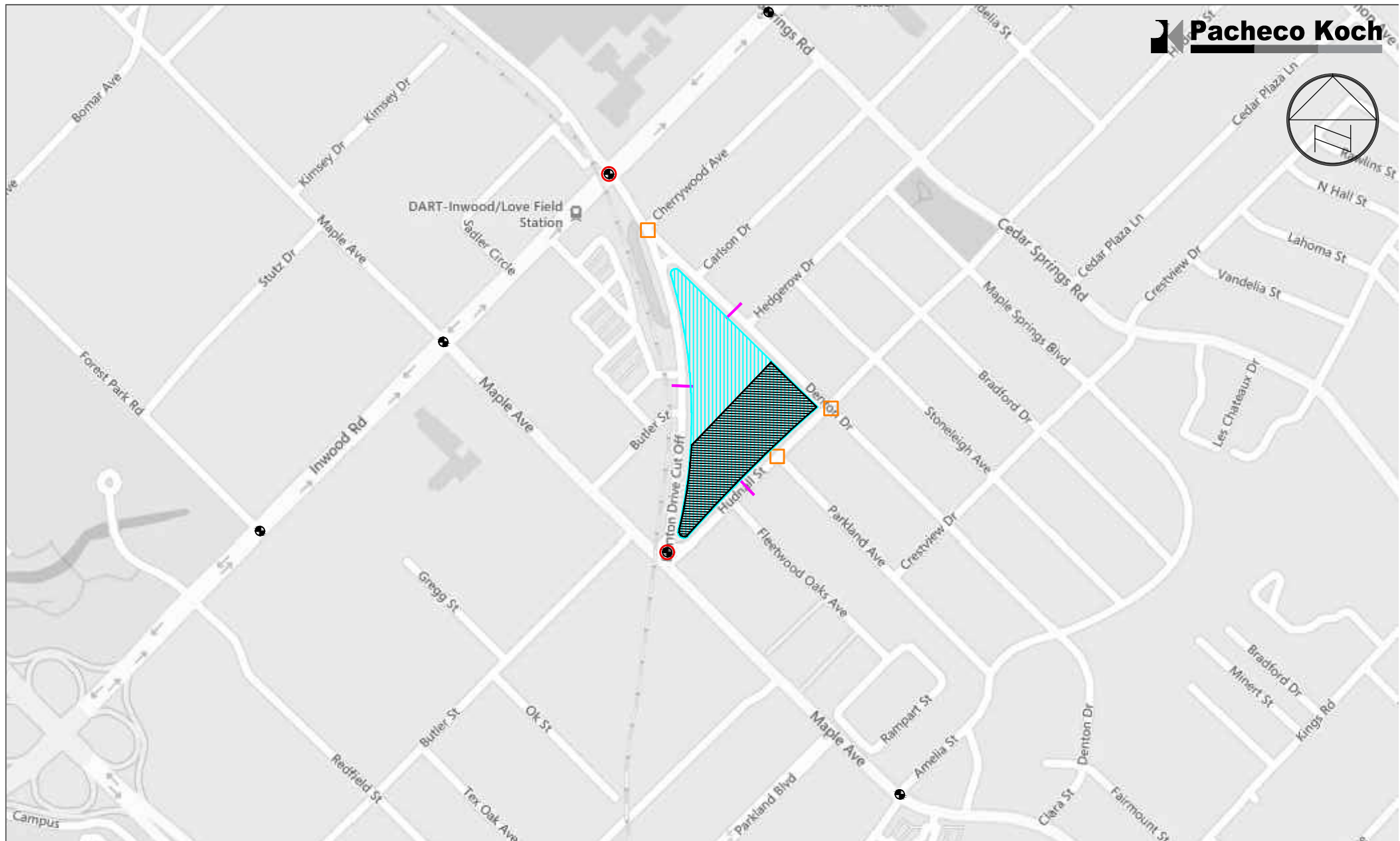
FINDING: Some existing intersections in the vicinity contain awkward geometries – such as the intersections of Denton Drive Cut Off/Denton Drive/Cherrywood Avenue and Denton Drive Cut Off/Hudnall Street/Maple Avenue.

FINDING: The existing roadway links and intersections in the vicinity of the subject site provide sufficient capacity and achieve acceptable Levels-of-Service during peak hour conditions. The addition of background growth and site-related traffic do impact these operational conditions. After the addition of background growth and site-related traffic, the intersections of Denton Drive Cut Off/Hudnall Street/Maple Avenue and may degrade to or slightly below "acceptable" conditions during peak hour conditions assuming no signal timing adjustments are made. However, a relatively minor adjustment of the traffic signal timing can offset those impacts.

- ❖ **RECOMMENDATION:** The City of Dallas periodically reviews traffic signal timing plans across the City; however, upon completion of the proposed development, it is recommended that the City staff specifically review and adjust traffic signal timing at the intersections of Inwood Road/Denton Drive Cut Off and Maple Avenue/Denton Drive Cut Off/Hudnall Street to improve overall efficiency.
- ❖ **RECOMMENDATION:** To better manage local vehicular traffic and improve the pedestrian environment, install an all-way STOP control at the intersection of Hudnall Street and Parkland Avenue. Other local street intersections on the periphery of the subject site (especially, along Hudnall Street and Denton Drive) may also be candidate locations for all-way STOP control.

- ❖ RECOMMENDATION: Research accident history at the intersection of Denton Drive Cut Off/Denton Drive/Cherrywood Avenue to determine whether safety improvements may be warranted based upon pre-existing conditions.
- ❖ RECOMMENDATION: Install advanced warning signs and/or supplemental warning devices, such as warning beacons, at the existing mid-block crosswalk on Denton Drive Cut Off to improve safety of pedestrian crossings between the subject site and the DART Inwood/Love Field Light Rail Station. Additional measures to improve pedestrian and bicycle safety in the area may also be warranted.
- ❖ RECOMMENDATION: Re-apply all existing marked crosswalks around the perimeter of the subject site along Denton Drive and Hudnall Street for improved visibility. New crosswalks should be added at any new STOP sign locations and at existing STOP sign locations upon request of the neighborhood.

END



- Project Location
- Study Area Intersection (Signalized)
- Road-Tube Counts
- Traffic Signal
- Study Area Intersection (Unsignalized)
- Portion of Property to be Re-zoned

Site Location Map

Dentwood, Dallas, Texas

PK #3897-16.515 (HWL: 01/06/17)



SCALE 1:50

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INTRODUCTION

The services of **Pacheco Koch** (PK) were retained by **StreetLights Residential** (the “Owner”) to conduct a Traffic Impact Analysis (TIA) for the proposed project known as *Dentwood Mixed Use* (the “Project”) located in the area bound by Denton Drive Cut Off, Denton Drive, and Hudnall Street, adjacent to the DART Inwood/Love Field Light Rail Station in Dallas, Texas. A proposed site plan is provided by StreetLights Residential and a site location map (**Exhibit 1**) are provided following the EXECUTIVE SUMMARY.

In order to facilitate development of the Project, StreetLights Residential (the “Applicant”) has made a request to the City of Dallas (the “Approving Agency”) for creation of a PD Subdistrict within PD 193 on a 5.0411-acre portion of the property. Submittal of a TIA, prepared by a registered Professional Engineer experienced and skilled in the field of traffic/transportation engineering, is one of the requirements of the City’s application process. This TIA was prepared by registered traffic engineers at Pacheco Koch (the “Engineer”) in accordance with industry and local standards. Pacheco Koch is a licensed engineering firm based in Dallas, Texas, that provides professional engineering and related services.

Purpose

A TIA, commissioned by the Applicant, may be required by the Approving Agency to assist that agency in the review of the Applicant’s request (for rezoning, site plan approval, etc.). A TIA is an investigation of existing and future traffic operations within a local area that is specifically designed to determine the impact associated with an individual project. Generally, the TIA results are used to identify occasions where the project-related impact results in undue degradation of traffic operations.¹ Under certain circumstances, the Applicant may, within established legal parameters, be required to mitigate such impacts. However, the Applicant is not responsible for issues that are pre-existing or caused by background growth.

Where appropriate and feasible, the Engineer may recommend measures that are specifically intended to mitigate project-related impacts. The Engineer may also make general recommendations, unrelated to the Project, to improve overall traffic operations, safety, site access, circulation, etc. All recommendations are the opinion of the Engineer and are subject to the customary review and approval processes of the respective agency. Acceptance of any recommendation shall be at the discretion of the Approving Agency.

A TIA is not a detailed site plan review nor a substitute for local or regional transportation planning.

¹ Undue impact is a subjective interpretation but is generally characterized when traffic operations degrade from conditions that are generally considered “acceptable” to conditions that are generally considered “unacceptable”. Typically, in urban areas, “acceptable” conditions are categorized as Level of Service D, or better; while in rural areas, “acceptable” conditions may be categorized as Level of Service C, or better.

Project Description

The Project will consist of a combination of residential and commercial uses. The Project will be built in a single phase. Buildout of the Project is estimated to occur by 2019. A summary of the proposed development program, by phase, is provided in **Table 1**.

Table 1. Development Program Summary

USE	PROPOSED AMOUNT
Residential	425 DU
Restaurant	8,800 SF
Retail	69,836 SF

NOTE: The development program provided above is based upon the most current and complete information available at the time of this study publication.

The subject property consists of five tracts that are located within PD-193 - The Oak Lawn Special Purpose District. Two of the five tracts (as generally shown in **Exhibit 1**) are being requested for rezoning as summarized in **Table 2**.

Table 2. Zoning Change Summary

TRACT	ACRES	EXISTING ZONING	PROPOSED ZONING
Tract 1	0.8201	PD 193 (LC)	PD 193 Subdistrict
Tract 2	1.5033	PD 193 (GR)	(no change)
Tract 3	3.4073	PD 193 (GR)	(no change)
Tract 4	0.4904	PD 193 (GR)	(no change)
Tract 5	4.2210	PD 193 (MF-2)	PD 193 Subdistrict

Study Parameters

The study parameters used in this TIA are based upon the requirements of the City of Dallas and are consistent with the standard industry practices used in similar studies. Specific study parameters were reviewed with the City staff at the outset of the study.

This TIA analyzed the day-to-day traffic operations at time periods that were considered representative of the overall most critical conditions on the public roadway system with some effect from the proposed Project. Based upon the prevailing background traffic conditions and the trip generation characteristics of the proposed development, the following periods were analyzed:

- traditional weekday AM and PM peak hours of adjacent street traffic
 - at existing conditions ("Existing" scenario)
 - at site buildout year without site-generated traffic ("Background" scenario)

- o at site buildout year with site-generated traffic ("Buildout" scenario)
- o at Regional with site-generated traffic ("Horizon" or "Regional" scenario)

NOTE: Analyses of all future conditions scenarios utilize projected traffic volume data derived by Pacheco Koch using reasonable and customary assumptions that are based upon existing conditions where available. Industry publications appropriately point out that the margin of error for projecting traffic volumes is directly related to the length of time of the projection, and projections beyond five years from current conditions should take into consideration that natural changes in traffic characteristics will occur that cannot be anticipated.

The following technical assumptions were also made in this analysis.

- An existing development currently is present at the subject site, however the volumes were estimated to be very low and no traffic volumes were deducted from the background traffic.

Study Area

The study area for a TIA is typically defined to allow an assessment of the most relevant traffic impacts to the local area. The extent of the study area is discretionary but is generally commensurate with the scale of the proposed development. Special localized factors may also be considered. The specific locations included in the study area of this TIA are listed below and depicted in **Exhibit 1**.

Intersections:

- (a) Denton Drive and Inwood Road: *traffic-signal-controlled*
- (b) Denton Drive Cut Off/Hudnall Street and Maple Avenue: *traffic-signal-controlled*
- (c) Denton Drive Cut Off/Denton Drive and Cherrywood Avenue: *STOP-controlled on Denton Drive and Cherrywood Avenue*
- (d) Denton Drive and Hudnall Street: *all-way STOP-controlled*
- (e) Denton Drive and Parkland Avenue: *STOP-controlled on Texas Street*
- (f) Major site driveways: *STOP-controlled on driveway*

Roadway Links:

- (A) Denton Drive Cut Off adjacent to site
 - ❑ Existing operation and cross-section: *four lanes, two-way operation, no median*
 - ❑ City of Dallas Thoroughfare Plan Designation: *M-4-U*
 - ❑ Current Daily Traffic Volume: 6,360 (Friday, December 16th, 2016)
- (B) Denton Drive adjacent to site
 - ❑ Existing operation and cross-section: *two lanes, two-way operation*
 - ❑ City of Dallas Thoroughfare Plan Designation: *none (local street)*
 - ❑ Current Daily Traffic Volume: 2,710 (Friday, December 16th, 2016)
- (C) Hudnall Street adjacent to site
 - ❑ Existing operation and cross-section: *two lanes, two-way operation*
 - ❑ City of Dallas Thoroughfare Plan Designation: *none (local street)*
 - ❑ Current Daily Traffic Volume: 5,134 (Friday, December 16th, 2016)

TRAFFIC IMPACT ANALYSIS

Submittal of a Traffic Impact Analysis to the City of Dallas is required as part of the application process for the Project. The study is provided to the Staff for technical review. Staff review comments are provided to the City Planning Commission and City Council for consideration. Approval of any recommendations made in this study are also subject to approval of the respective department(s).

Approach

The TIA presented in this report analyzed the operational conditions for the peak hours and study area as defined above using standardized analytical methodologies where applicable. Current (or recent) traffic volume data were collected on a typical day throughout the study area to represent existing traffic conditions. Where applicable, growth factors were applied to the existing volumes to project future background traffic at the site buildout year conditions. Then, traffic generated by the proposed development was projected using the standard three-step approach: Trip Generation, Trip Distribution, and Traffic Assignment. By adding the site-generated traffic to the background traffic, the resulting site-plus-background traffic impact to operational conditions may be assessed from which approach mitigation measures may be recommended, if needed.

Background Traffic Volume Data

Existing Volumes

Current traffic volumes were collected during the analysis periods at the study area intersections on Friday, December 16th, 2016. Traffic volumes are graphically summarized in **Appendix A**; detailed data sheets are provided in **Appendix B**.

Projected Background Traffic Volumes

Background traffic growth is defined as the normal growth of traffic that is not directly related to the subject development of this study. A review of historical traffic volume data can provide an indication of the local traffic growth patterns. **Table 3** provides a comparison of recent traffic volumes with prior traffic volumes in the vicinity of the subject site, from which PK calculated an annual growth rate.

Table 3. Historical Daily Traffic Volume Data

ROADWAY SEGMENT	HISTORICAL DAILY VOLUME (DATE)	ANNUAL GROWTH RATE
Denton Drive Cut Off, southeast of Inwood Road	5,689 ('09) ^A 7,140 ('04) ^A	-4.41%

Data Source: A = TxDOT (from NCTCOG Traffic Information System)

According to these data from a consistent source, traffic volumes in the vicinity of the subject site appear to be decreasing in recent years. Although no positive growth factor is consistently evident, PK assumed an annual growth rate of one percent (1.0%) to determine background traffic growth.

By applying the assumed growth rate(s) described previously, future background traffic volumes at the Project buildout year were calculated for the study area intersections. These volumes are graphically summarized in **Appendix A**.

Site-Related Traffic

Trip Generation

Trip generation is calculated in terms of “trip ends” – a trip end is a one-way vehicular trip entering or exiting a site driveway (i.e., a single vehicle entering and exiting a site represents two trip ends). Trip generation for this Project was calculated using the Institute of Transportation Engineers (ITE) *Trip Generation* manual (9th Edition). ITE *Trip Generation* is a compilation of actual, vehicular traffic volume generation data and statistics by land use as collected over several decades by creditable sources across the country. Using the ITE equations and rates is an accepted methodology to calculate the projected site-generated traffic volumes for many land uses (though engineering judgment is strongly advised).

The base trip generation data from ITE generally reflect average conditions for a standalone use on a typical day. However, in some cases, the Engineer may judge that other factors may be of sufficient significance to warrant adjusting the base ITE calculations in order to more accurately reflect Project-specific conditions.

In this analysis “mode split” and “internal trip capture” were considered to be of sufficient significance to justify adjustment of the base ITE data.

“Mode split” is the consideration of trips being conducted by all modes of transportation, including public transit, bicycle, walking, etc. – a ten percent (10%) reduction to vehicular trip ends was applied.

“Internal trip capture” refers to the phenomenon that some portion of the trips generated by a given use originates from within the same site and, therefore, do not impact the external roadway network. The methodology used to calculate internal trip capture is recognized by ITE. The most current research and data collection is presented in the Transportation Research Board's *NCHRP Report 684* (2011).

Table 4 provides a summary of the calculated net increase in trip ends generated by the project. For detailed information and supplemental information used in the trip generation calculations is provided in **Appendix C**.

Table 4. Projected Trip Generation Summary

SCENARIO	DAILY TRIP ENDS (WEEKDAY)	AM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)	PM PEAK HOUR TRIP ENDS (ADJACENT STREET PEAK)
		Total (In/Out)	Total (In/Out)
Proposed Uses	9,444	461 (203/258)	654 (368/286)

Trip Distribution and Assignment

The distribution and assignment of site-generated trip ends 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.

Traffic for the proposed redevelopment was distributed and assigned to the study area roadway network based upon consideration of the factors listed above. Separate traffic assignments were generated for residential and for commercial trips at site buildout). 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 **Table 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**.

Traffic Operational Analysis — Roadway Intersections

Description

The level of performance of civil 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 was developed by the Transportation Research Board and is presented in the Highway Capacity Manual (HCM). HCM uses the term “Level of Service” (or, LOS) to qualitatively describe the efficiency using a letter grade of A through F. Generally, LOS can be 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 raise 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, for unsignalized intersections the average delay per vehicle is calculated only by approach or by individual traffic maneuvers that must stop or yield right-of-way.

NOTE: The HCM unsignalized intersection analysis methodology was developed and calibrated for low-to-moderate volume intersections. When applied to intersections with one or more high-volume or high-capacity approaches, the analyses often reflect poor results (i.e., low Level of Service). However, the actual delay/operational conditions are typical of similar locations and do not necessarily represent unique conditions. Low-performing, high-volume, unsignalized intersections cannot be analytically mitigated unless a traffic signal is installed. (Traffic signal installation is subject to a detailed analysis of established criteria AND approval of the responsible agency. Neither Level of Service nor vehicle delay is a warrant for traffic signal installation.)

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

	Signalized Intersection (Average Delay per Vehicle)	Unsignalized Intersection (Average Delay per Vehicle)
LOS A	≤ 10	≤ 10
LOS B	$> 10 - \leq 20$	$> 10 - \leq 15$
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

Analysis Traffic Volumes

Determination of the traffic impact associated with the Project is measured by comparing the incremental change in operational conditions during peak periods with and without site-related traffic. **Appendix A** provides exhibits summarizing the following:

- Existing traffic volumes during study peak hours
- Projected Background traffic volumes at the Site Buildout Year during study peak hours
- Projected Site-Generated traffic volumes during study peak hours
- Projected Background-plus-Site-Generated traffic volumes at the Site Buildout Year during study peak hours
- Projected Regional traffic volumes, including Site-Generated traffic during study peak hours

A summary of the existing intersection/roadway geometry and traffic control devices is also graphically summarized in **Appendix A**.

Summary of Results

Intersection capacity analyses presented in this study were performed using the *Synchro* software package. **Table 5** and **Table 6** provide a summary of the peak period intersection operational conditions under the analysis conditions presented previously. Detailed software output is provided in **Appendix D**.

NOTE: Traffic signal operational parameters used in this analysis were based upon actual, existing traffic signal operational characteristics observed in the field at the time of traffic data collection.

See specific recommendations in the SUMMARY OF FINDINGS AND RECOMMENDATIONS section of this report.

Traffic Operational Analysis — Roadway Links

Description

A roadway link is a segment of roadway between two intersections. Roadway link capacity analysis is a comparison of actual or forecasted traffic volumes to the theoretically optimum roadway capacity. The capacity of the roadway link is predominantly 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. Generally, roadway link capacity is less critical than intersection capacity; however, it can provide a gage 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 principals 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 gage of theoretical capacity.

Table 5. Peak Hour Intersection Capacity Analysis Results Summary
(Signalized Intersections)

INTERSECTION	EXISTING CONDITIONS		BACKGROUND CONDITIONS		BUILDOUT CONDITIONS		REGIONAL CONDITIONS	
	AM	PM	AM	PM	AM	PM	AM	PM
Inwood Road @ Denton Drive	C (24.9)	C (28.6)	C (27.3)	C (30.7)	D (49.9)	D (38.8)	E (56.0)	D (46.4)
w/ Improvement ¹	-	-	-	-	-	-	D (36.1)	D (45.9)
Maple Avenue @ Denton Drive Cut Off/Hudnall Street	D (47.0)	C (32.5)	D (50.4)	C (33.0)	E (65.8)	D (36.1)	E (66.6)	D (37.9)
w/ Improvement ¹	-	-	-	-	D (36.9)	C (28.6)	D (37.1)	C (30.7)

NOTE: Traffic signal operational parameters used in this analysis were based upon actual traffic signal operational characteristics observed in the field at the time of data collection.

Table 6. Peak Hour Intersection Capacity Analysis Results Summary
(Unsignalized Intersections)

INTERSECTION	TRAFFIC MANEUVER	EXISTING CONDITIONS		BACKGROUND CONDITIONS		BUILDOUT CONDITIONS	
		AM	PM	AM	PM	AM	PM
Denton Drive @ Hudnall Street	NB	A (9.2)	B (13.1)	A (9.3)	B (13.6)	A (9.9)	C (19.2)
	EB	A (8.5)	A (9.1)	A (8.5)	A (9.2)	A (9.0)	B (10.2)
	WB	A (9.1)	B (13.0)	A (9.2)	B (13.4)	A (9.5)	C (15.5)
	SB	A (9.6)	B (10.5)	A (9.8)	B (10.7)	B (10.6)	B (12.3)
Denton Drive Cut Off @ Denton Drive/ Cherrywood Avenue	SWLTR	B (11.5)	B (14.9)	B (11.6)	C (15.4)	C (15.9)	E (36.6)
	WBLTR	B (11.5)	B (13.3)	B (11.6)	B (13.6)	B (14.2)	C (17.6)
	SBL	A (8.2)	A (9.0)	A (8.2)	A (9.1)	A (8.5)	B (10.4)
Hudnall Street @ Parkland Avenue/Drive 6	NBL	-	-	-	-	A (8.0)	A (7.8)
	EBLTR	-	-	-	-	B (12.3)	C (15.7)
	WBLTR	B (10.5)	B (11.4)	B (10.6)	B (11.5)	B (12.1)	B (14.1)
	SBL	A (7.6)	A (8.1)	A (7.6)	A (8.1)	A (7.6)	A (8.2)
Denton Drive Cut Off @ Drive 1	WBLTR	-	-	-	-	B (11.1)	B (12.2)
	SBL	-	-	-	-	A (8.1)	A (8.3)
Denton Drive Cut Off @ Drive 2	WBLTR	-	-	-	-	B (10.2)	B (10.8)
	SBL	-	-	-	-	A (8.1)	A (8.1)
Denton Drive Cut Off @ Butler Street/Drive 3	NBL	-	-	-	-	A (7.5)	A (8.1)
	EBL	-	-	-	-	B (11.5)	B (13.7)
	WBL	-	-	-	-	B (11.7)	B (13.6)
	SBL	-	-	-	-	A (8.0)	A (7.9)
Denton Drive @ Drive 4	NBLTR	-	-	-	-	B (12.1)	B (13.0)
Denton Drive @ Drive 5	NBLTR	-	-	-	-	B (10.5)	B (10.6)
	WBL	-	-	-	-	A (7.4)	A (7.6)
Hudnall Street @ Drive 7	NBL	-	-	-	-	A (8.0)	A (7.7)
	EBLTR	-	-	-	-	B (10.2)	A (9.4)

KEY:

A, B, C, D, E, F = Level-of-Service

NB, SB, EB, WB = intersection approach

AM = AM Peak Hour of Adjacent Street

(##.#) = Average Seconds of Delay Per Vehicle

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

PM = PM Peak Hour of Adjacent Street

IMPROVEMENTS (PROPOSED):

1 - Improve efficiency of signal timing

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
Residential	925	875	900	825	575	525
Rural	1,025	925	975	875	600	550

To determine the utilization of a roadway, the volume:capacity ratio can be 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 $\leq$ 25% is LOS A,
 Volume:Capacity Ratio $>$ 25% and $\leq$ 45% is LOS B,
 Volume:Capacity Ratio $>$ 45% and $\leq$ 65% is LOS C,
 Volume:Capacity Ratio $>$ 65% and $\leq$ 80% is LOS D,
 Volume:Capacity Ratio $>$ 80% and $\leq$ 100% is LOS E,
 Volume:Capacity Ratio $\geq$ 100% is LOS F

Summary of Results

For roadways adjacent to or in the vicinity of the subject site, the volume/capacity ratio was calculated for existing and site buildout conditions. A summary of the link capacity analysis is provided in **Table 7**. See specific recommendations in the *Recommendations* section of this report.

Table 7. Roadway Link Capacity Analysis Results Summary

ROADWAY/ SCENARIO	DAILY VOLUME	THEORETICAL DAILY CAPACITY	V:C RATIO/ LEVEL OF SERVICE
<u>Denton Drive Cut Off</u>			
Existing Conditions	6,360	21,000	0.30 – B
Background Conditions	6,553	21,000	0.31 – B
Back+Site Conditions	11,554	21,000	0.55 – C
Regional Conditions	12,026	21,000	0.57 – C
<u>Denton Drive</u>			
Existing Conditions	2,710	10,500	0.26 – B
Background Conditions	2,792	10,500	0.27 – B
Back+Site Conditions	4,973	10,500	0.47 – C
Regional Conditions	5,175	10,500	0.49 – C
<u>Hudnall Street</u>			
Existing Conditions	5,134	10,500	0.49 – C
Background Conditions	5,290	10,500	0.50 – C
Back+Site Conditions	6,782	10,500	0.65 – C
Regional Conditions	7,164	10,500	0.68 – D

SITE ACCESS REVIEW

Intersection Sight Distance

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 a roadway in the intended manner. The sight distance is a function of the major roadway's geometric characteristics and 85th percentile speed.

The City of Dallas *Off-Street Parking and Driveways Handbook* provides the City's criteria for intersection sight distance as a function of the roadways functional classification and speed of the oncoming vehicle. Intersection sight distance is specifically intended to provide a sufficient line of sight between a vehicle waiting at a driveway or cross street to safely turn onto or cross the street without requiring the approaching traffic to reduce speed. The line of sight measurement is taken from the "driver's eye" location of the waiting vehicle, which is defined as 11 feet behind the street edge and 3.5 feet high. [NOTE: These criteria specifically apply to passenger vehicles. When applicable, large commercial vehicles often have less issues with line of sight simply because the driver's eye height is much higher than that of a passenger vehicle, which yields better visibility.]

PK performed a cursory analysis of the intersection sight distance for the proposed site driveways based upon the site plan, internet data, and visual inspection (not based upon topographical surveys). A summary of the intersection sight distance analysis results is provided in **Table 8** and graphically shown in **Exhibit 2** (A-H) [NOTE: The intersection sight distance analysis considers future construction anticipated on the subject site. Any other future construction in unforeseen but is not anticipated to affect the results.]

Table 8. Intersection Sight Distance Results Summary

DRIVEWAY	DESIGN SPEED (MPH)	CONDITION	SIGHT DISTANCE REQUIREMENT		STATUS
			Minimum	Desirable	
Denton Drive, Denton Drive Cut Off	40	Left Side	225'	485'	Sufficient
	40	Right Side	275'	485'*	Sufficient
Drive 1, Denton Drive Cut Off	40	Left Side	225'	485'	Sufficient
	40	Right Side	275'	485'	Sufficient
Drive 2, Denton Drive Cut Off	40	Left Side	225'	485'	Sufficient
	40	Right Side	275'	485'	Sufficient
Drive 3, Denton Drive Cut Off	40	Left Side	225'	485'	Sufficient
	40	Right Side	275'	485'	Sufficient
Drive 4, Denton Drive	35	Left Side	180'	405'*	Sufficient
	35	Right Side	225'	410'	Sufficient
Drive 5, Denton Drive	35	Left Side	180'	405'	Sufficient
	35	Right Side	225'	410'*	Sufficient
Drive 6, Hudnall Street	35	Left Side	180'	405'*	Sufficient
	35	Right Side	225'	410'	Sufficient
Drive 7, Hudnall Street	35	Left Side	180'	405'	Sufficient
	35	Right Side	225'	410'*	Sufficient

Based upon PK's visual observation, intersection sight distance at the proposed site driveways are not encumbered by vertical or horizontal curvature in the roadways or by other visual obstruction. Also, the proposed site driveways are in close proximity to prior driveway locations, which are not known to have been problematic regarding visibility. Additionally, the adjacent intersections on the right side and left side of the driveways are signalized, which regulates speed of oncoming traffic and creates gaps in the traffic flow for access maneuvers. As long as the site planners are mindful of basic visibility triangle requirements, intersection sight distance is not considered to be an issue.

The sight distance at the intersection of Denton Drive Cut Off/Denton Drive/Cherrywood Drive is not encumbered by visual obstruction; however, the angle of intersection is greater than ideal conditions. Although this is a pre-existing condition, good visibility is challenged by the intersection geometry.

Deceleration Lane Analysis

The TxDOT criteria for providing right-turn deceleration auxiliary lanes are outlined in Table 2-3 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 less). For raised medians, left-turn deceleration lanes ("bays") are required for all left-turn opportunities.

A summary of the projected peak hour driveway volumes and evaluation of the deceleration criteria for site buildout is presented in **Table 9**.

Table 9. Driveway Deceleration Lane Analysis Summary

ANALYSIS	CONDITION	PROJECTED PEAK HOUR TURNING VOLUME	CRITERION		AUXILIARY LANE REQUIRED?
			CITY OF DALLAS	TxDOT (For Reference Only)	
Denton Drive Cut Off at Drive 1	Projected (Buildout)	9 (AM) 16 (PM)	120+ turning vehicles in peak hour	60+ turning vehicles in peak hour	NO
Denton Drive Cut Off at Drive 2	Projected (Buildout)	11 (AM) 15 (PM)	120+ turning vehicles in peak hour	60+ turning vehicles in peak hour	NO
Denton Drive Cut Off at Drive 3	Projected (Buildout)	8 (AM) 11 (PM)	120+ turning vehicles in peak hour	60+ turning vehicles in peak hour	NO
Denton Drive at Drive 4	Projected (Buildout)	8 (AM) 11 (PM)	120+ turning vehicles in peak hour	60+ turning vehicles in peak hour	NO
Denton Drive at Drive 5	Projected (Buildout)	29 (AM) 111 (PM)	120+ turning vehicles in peak hour	60+ turning vehicles in peak hour	NO
Hudnall Street at Drive 6	Projected (Buildout)	23 (AM) 30 (PM)	120+ turning vehicles in peak hour	60+ turning vehicles in peak hour	NO
Hudnall Street at Drive 7	Projected (Buildout)	0 (AM) 0 (PM)	120+ turning vehicles in peak hour	60+ turning vehicles in peak hour	NO

Based upon PK's analysis, deceleration lanes at the proposed site driveways are not required pursuant to the City of Dallas standards. The site is also in a low-speed urban area where deceleration lanes are not common. PK does not recommend construction of any driveway deceleration lanes.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

NOTE: Recommendations presented in this report reflect the opinion of Pacheco Koch based solely upon technical analysis and professional judgment but are not intended to infer mandates or funding responsibility. Any proposed improvements in the public right-of-way are subject to approval of the responsible agency(-ies). Should the approving agency determine that any off-site improvements are required for approval of the Project, legal precedents apply with regard to jurisdiction and funding allocation.

The following findings and recommendations are based upon buildout of the subject property in accordance with the hypothetical development scenario outlined in the *Project Description* section of this report. **Exhibit 3** provides a graphical summary of the recommendations.

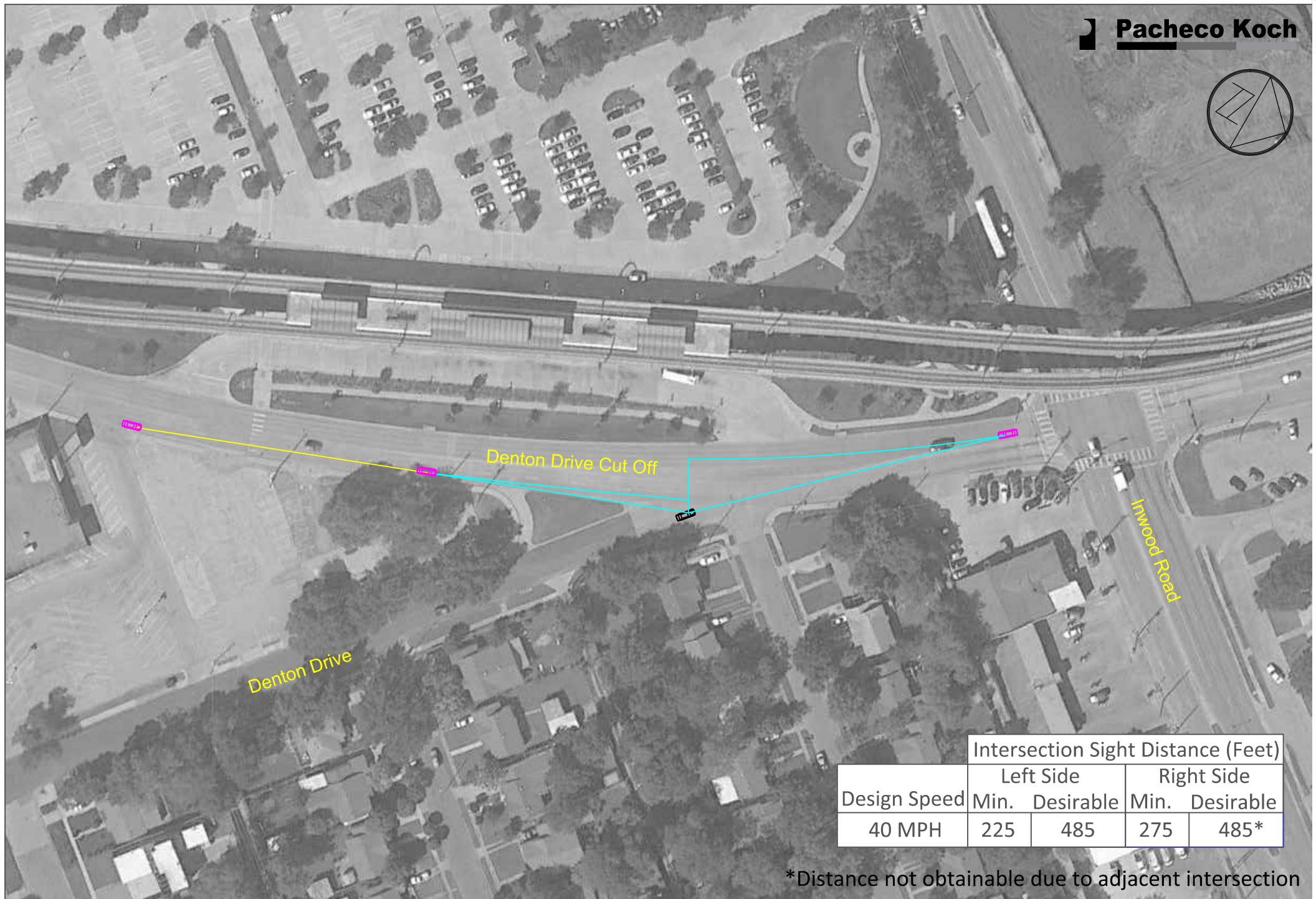
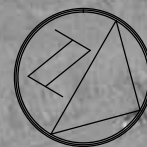
FINDING: Some existing intersections in the vicinity contain awkward geometries – such as the intersections of Denton Drive Cut Off/Denton

Drive/Cherrywood Avenue and Denton Drive Cut Off/Hudnall Street/Maple Avenue.

FINDING: The existing roadway links and intersections in the vicinity of the subject site provide sufficient capacity and achieve acceptable Levels-of-Service during peak hour conditions. The addition of background growth and site-related traffic do impact these operational conditions. After the addition of background growth and site-related traffic, the intersections of Denton Drive Cut Off/Hudnall Street/Maple Avenue and may degrade to or slightly below "acceptable" conditions during peak hour conditions assuming no signal timing adjustments are made. However, a relatively minor adjustment of the traffic signal timing can offset those impacts.

- ❖ RECOMMENDATION: The City of Dallas periodically reviews traffic signal timing plans across the City; however, upon completion of the proposed development, it is recommended that the City staff specifically review and adjust traffic signal timing at the intersections of Inwood Road/Denton Drive Cut Off and Maple Avenue/Denton Drive Cut Off/Hudnall Street to improve overall efficiency.
- ❖ RECOMMENDATION: To better manage local vehicular traffic and improve the pedestrian environment, install an all-way STOP control at the intersection of Hudnall Street and Parkland Avenue. Other local street intersections on the periphery of the subject site (especially, along Hudnall Street and Denton Drive) may also be candidate locations for all-way STOP control.
- ❖ RECOMMENDATION: Research accident history at the intersection of Denton Drive Cut Off/Denton Drive/Cherrywood Avenue to determine whether safety improvements may be warranted based upon pre-existing conditions.
- ❖ RECOMMENDATION: Install advanced warning signs and/or supplemental warning devices, such as warning beacons, at the existing mid-block crosswalk on Denton Drive Cut Off to improve safety of pedestrian crossings between the subject site and the DART Inwood/Love Field Light Rail Station. Additional measures to improve pedestrian and bicycle safety in the area may also be warranted.
- ❖ RECOMMENDATION: Re-apply all existing marked crosswalks around the perimeter of the subject site along Denton Drive and Hudnall Street for improved visibility. New crosswalks should be added at any new STOP sign locations and at existing STOP sign locations upon request of the neighborhood.

END OF MEMO



Intersection Sight Distance (Feet)				
Design Speed	Left Side		Right Side	
	Min.	Desirable	Min.	Desirable
40 MPH	225	485	275	485*

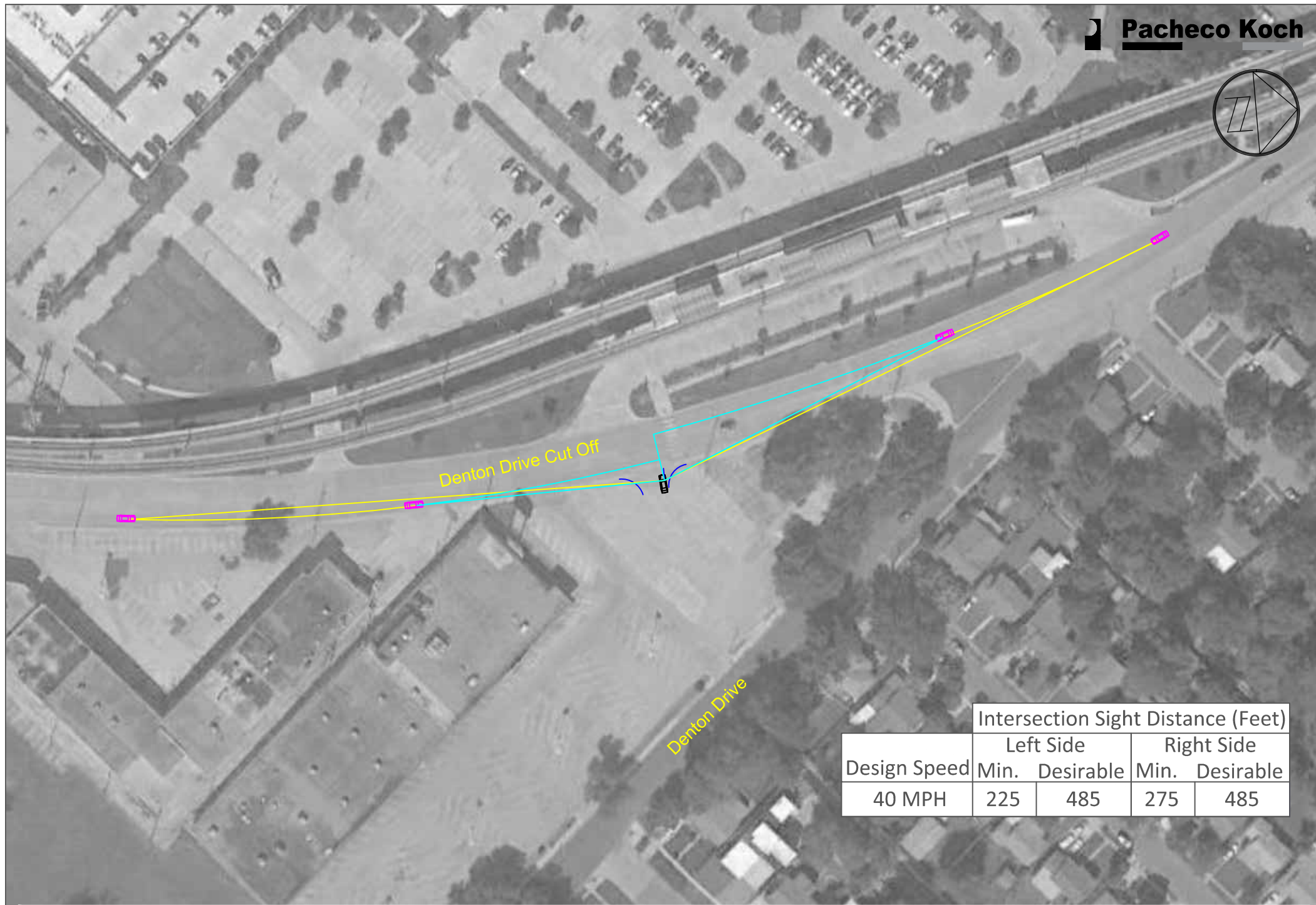
*Distance not obtainable due to adjacent intersection

Intersection Sight Distance - Denton Drive and Denton Drive Cut Off

Dentwood, Dallas, Texas

PK #3897-16.515 (HWL: 01/03/17)

EXHIBIT 2A



Design Speed	Intersection Sight Distance (Feet)			
	Left Side		Right Side	
	Min.	Desirable	Min.	Desirable
40 MPH	225	485	275	485

Intersection Sight Distance - Drive 1

Fairmount Hotel, Dallas, Texas

PK #3877-16.467 (HWL: 01/03/17)

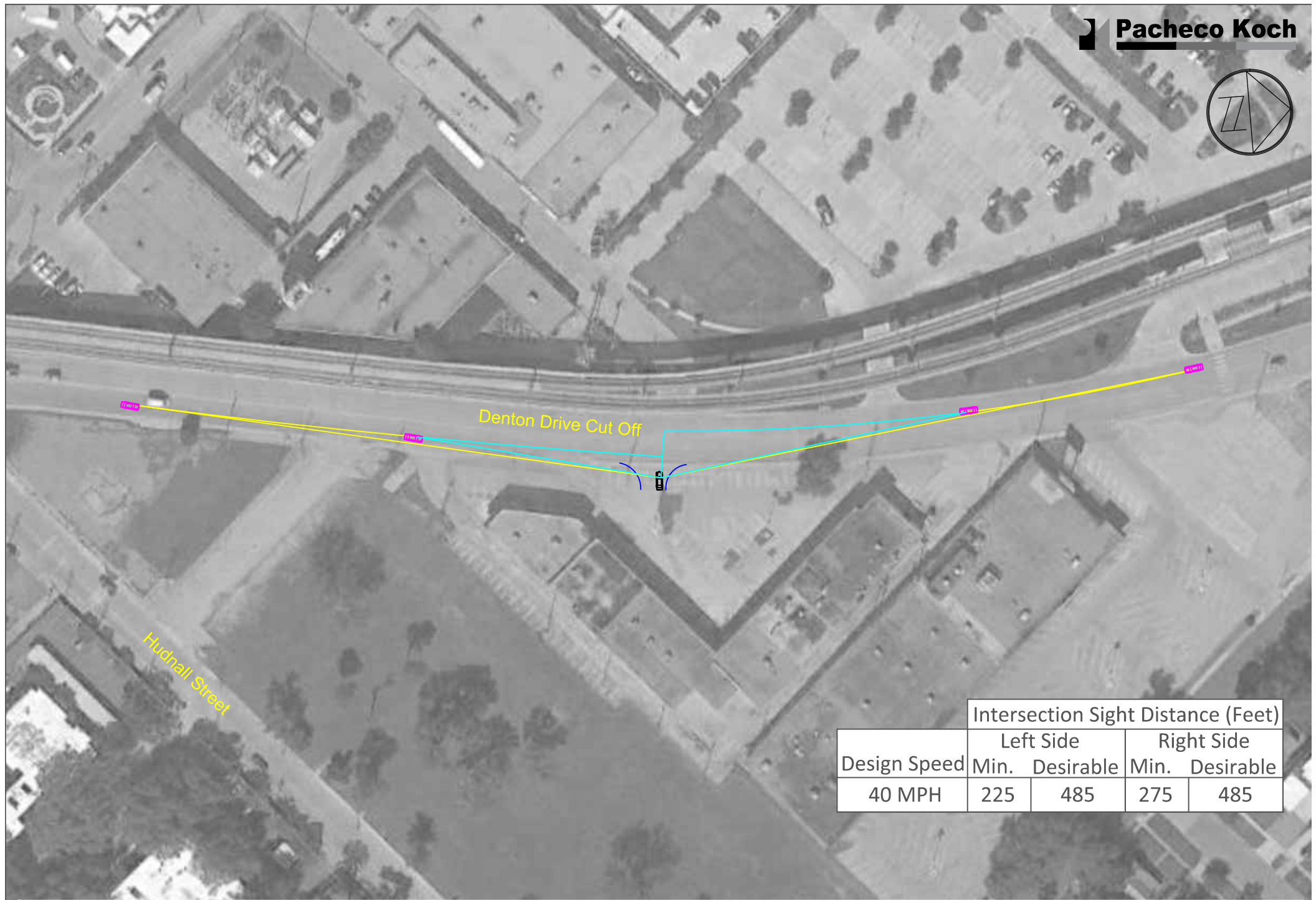


Intersection Sight Distance (Feet)				
Design Speed	Left Side		Right Side	
	Min.	Desirable	Min.	Desirable
40 MPH	225	485	275	485

Intersection Sight Distance - Drive 2

Fairmount Hotel, Dallas, Texas

PK #3877-16.467 (HWL: 01/03/17)



Design Speed	Intersection Sight Distance (Feet)			
	Left Side		Right Side	
	Min.	Desirable	Min.	Desirable
40 MPH	225	485	275	485

Intersection Sight Distance - Drive 3

Fairmount Hotel, Dallas, Texas

PK #3877-16.467 (HWL: 01/03/17)



	Intersection Sight Distance (Feet)			
	Left Side		Right Side	
Design Speed	Min.	Desirable	Min.	Desirable
35 MPH	180	405*	225	410

*Distance not obtainable due to adjacent intersection

Intersection Sight Distance - Drive 4

Fairmount Hotel, Dallas, Texas

PK #3877-16.467 (HWL: 01/03/17)



	Intersection Sight Distance (Feet)			
	Left Side		Right Side	
Design Speed	Min.	Desirable	Min.	Desirable
35 MPH	180	405	225	410*

*Distance not obtainable due to adjacent intersection

Intersection Sight Distance - Drive 5

Fairmount Hotel, Dallas, Texas

PK #3877-16.467 (HWL: 01/03/17)



Design Speed	Intersection Sight Distance (Feet)			
	Left Side		Right Side	
	Min.	Desirable	Min.	Desirable
35 MPH	180	405*	225	410

*Distance not obtainable due to adjacent intersection

Intersection Sight Distance - Drive 7

Fairmount Hotel, Dallas, Texas

PK #3877-16.467 (HWL: 01/03/17)



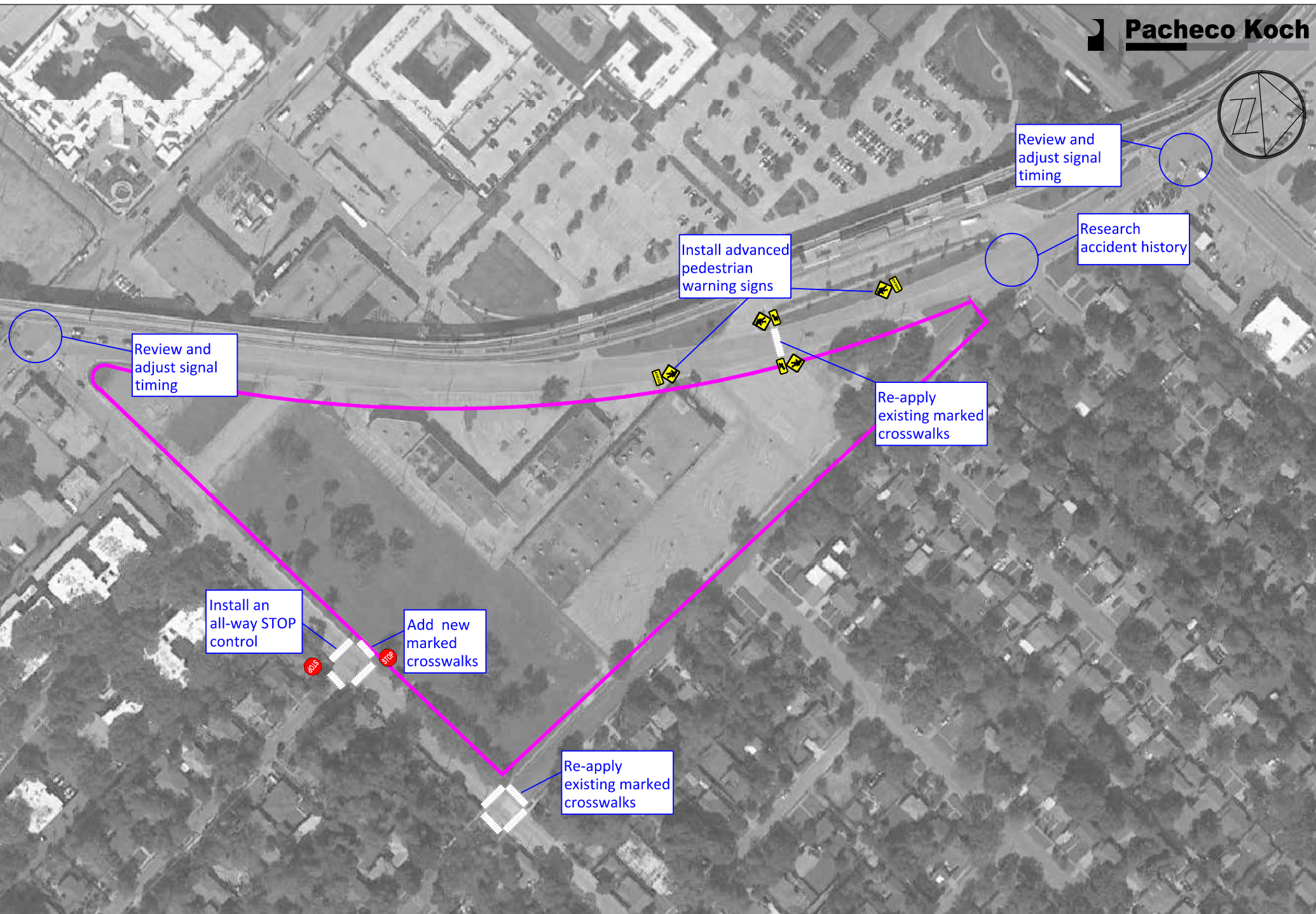
Design Speed	Intersection Sight Distance (Feet)			
	Left Side		Right Side	
	Min.	Desirable	Min.	Desirable
35 MPH	180	405	225	410*

*Distance not obtainable due to adjacent intersection

Intersection Sight Distance - Drive 6

Fairmount Hotel, Dallas, Texas

PK #3877-16.467 (HWL: 01/03/17)



Recommendations

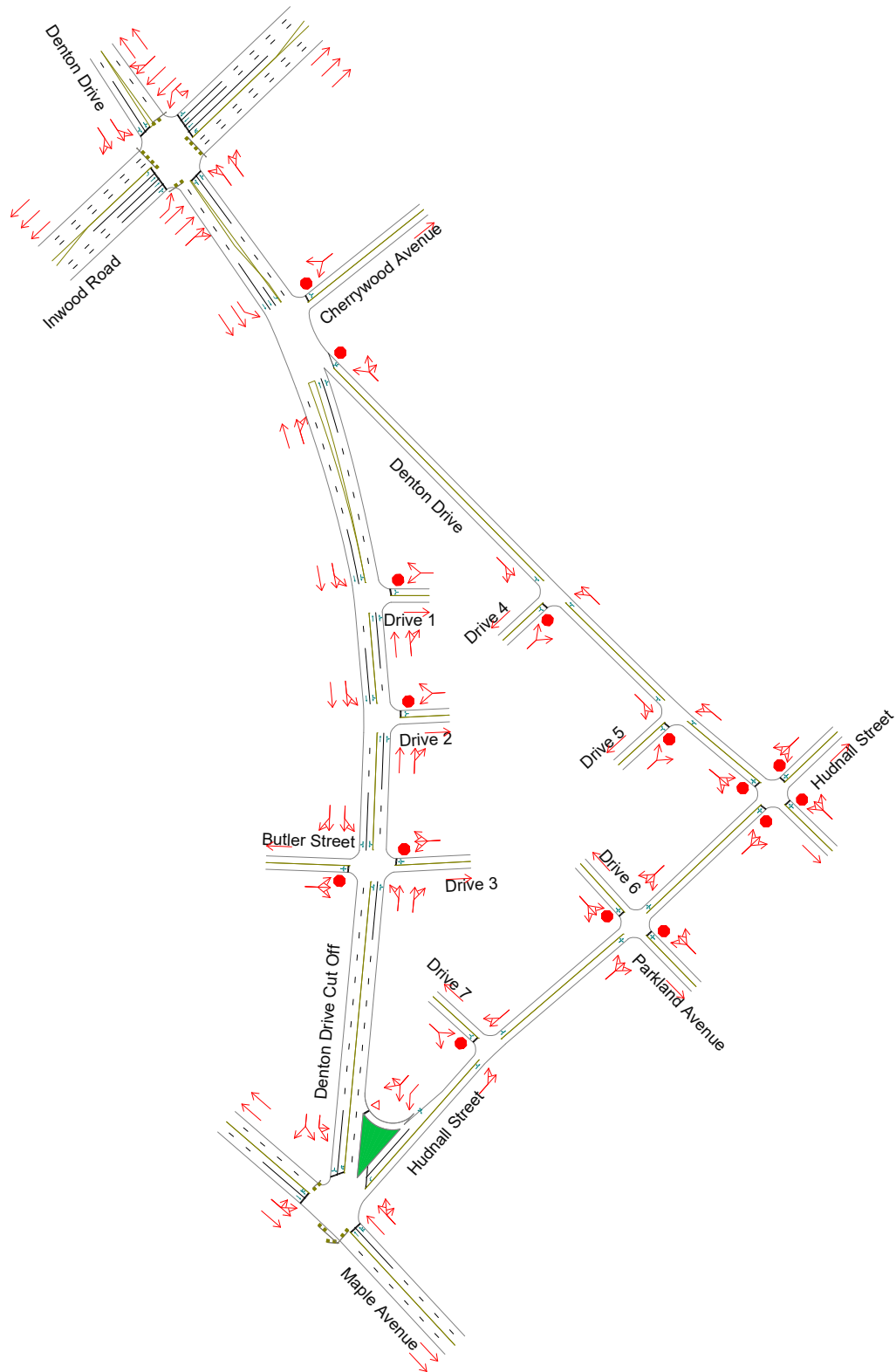
Dentwood, Dallas, Texas

PK #3897-16.515 (HWL: 01/03/17)

Appendix A. Traffic Volume Exhibits

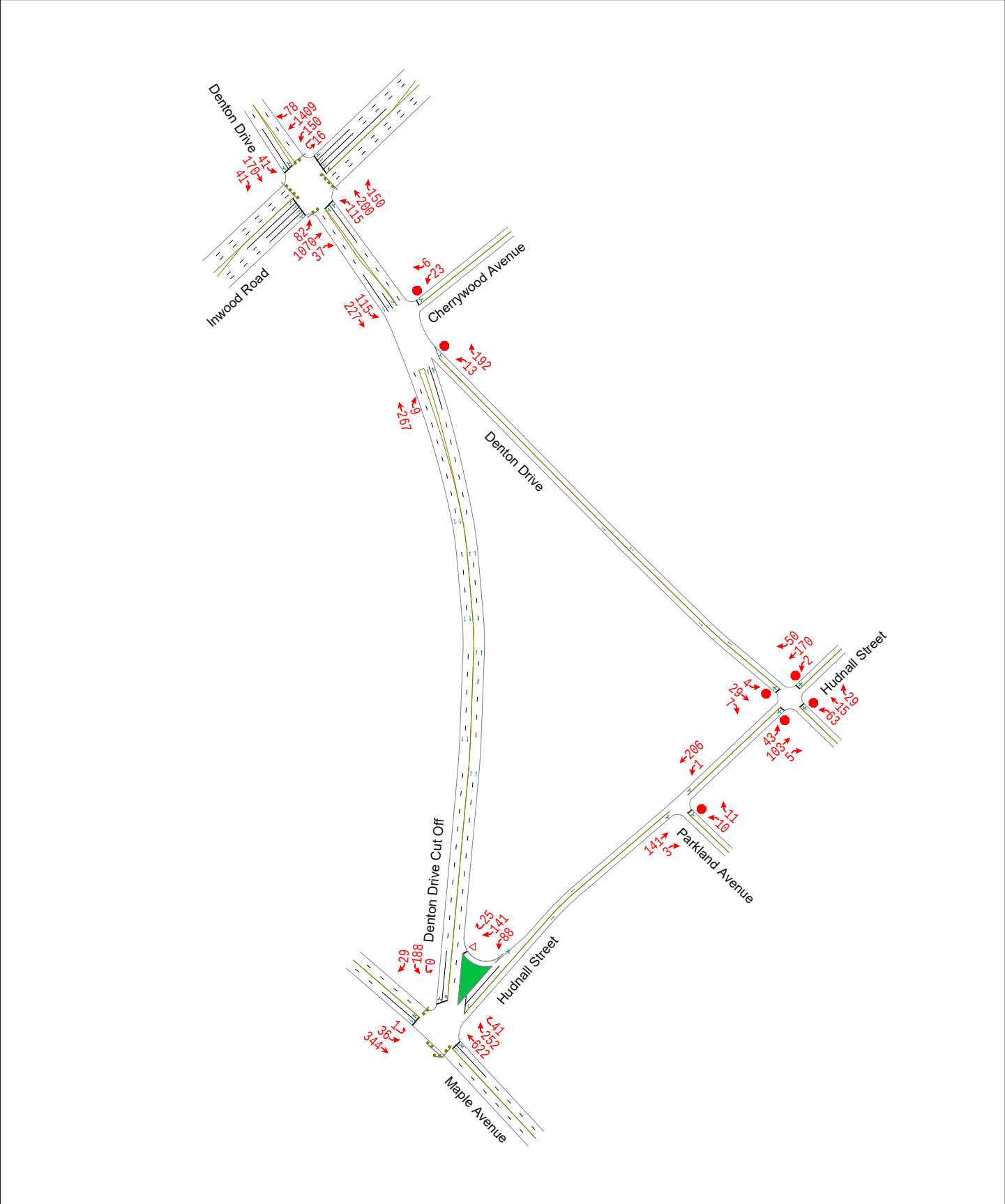
Appendix A1 - Existing Roadway Geometry

North ^
Not to Scale



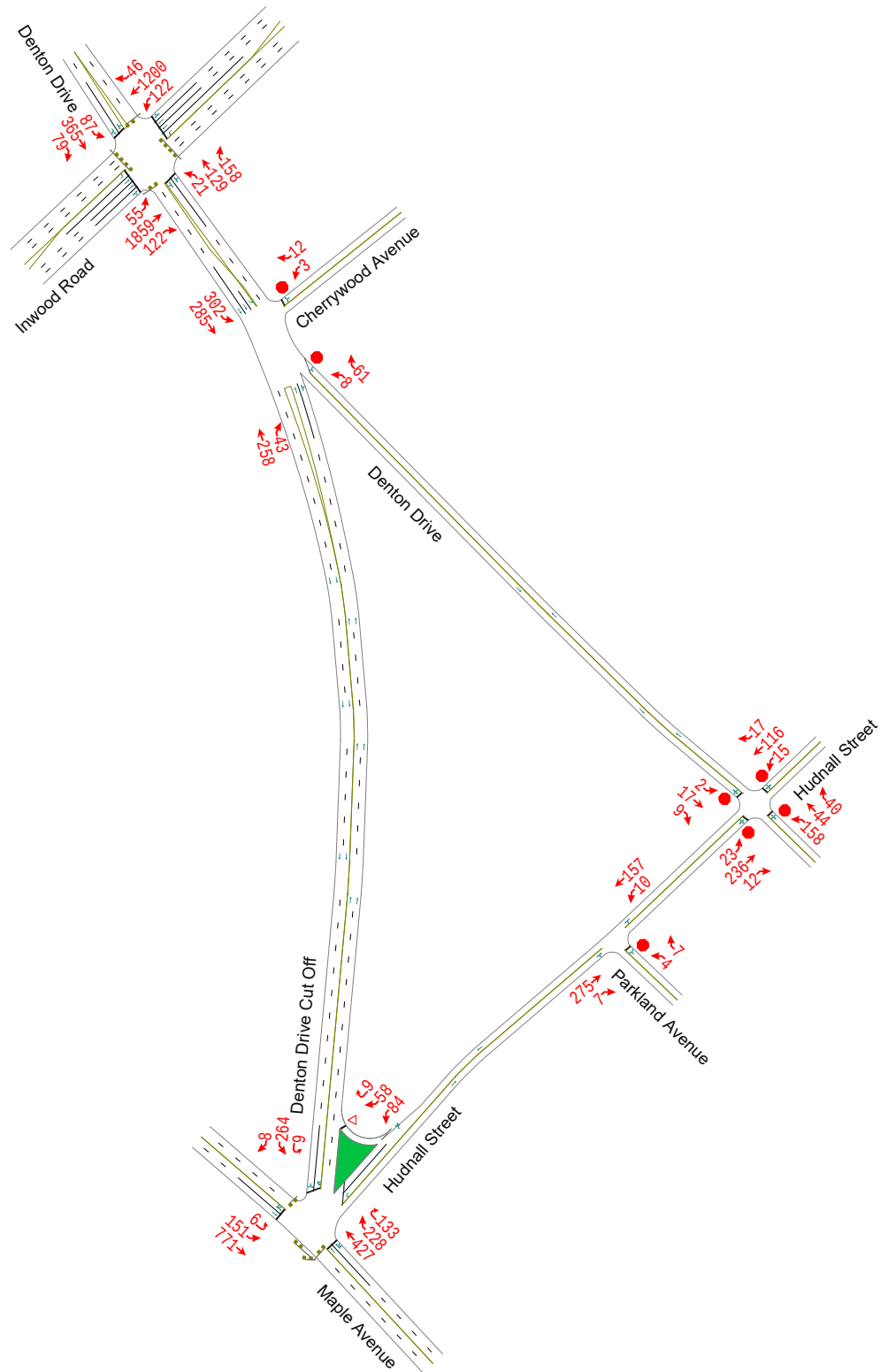
Appendix A2 - Existing AM Peak Hour Traffic Volumes

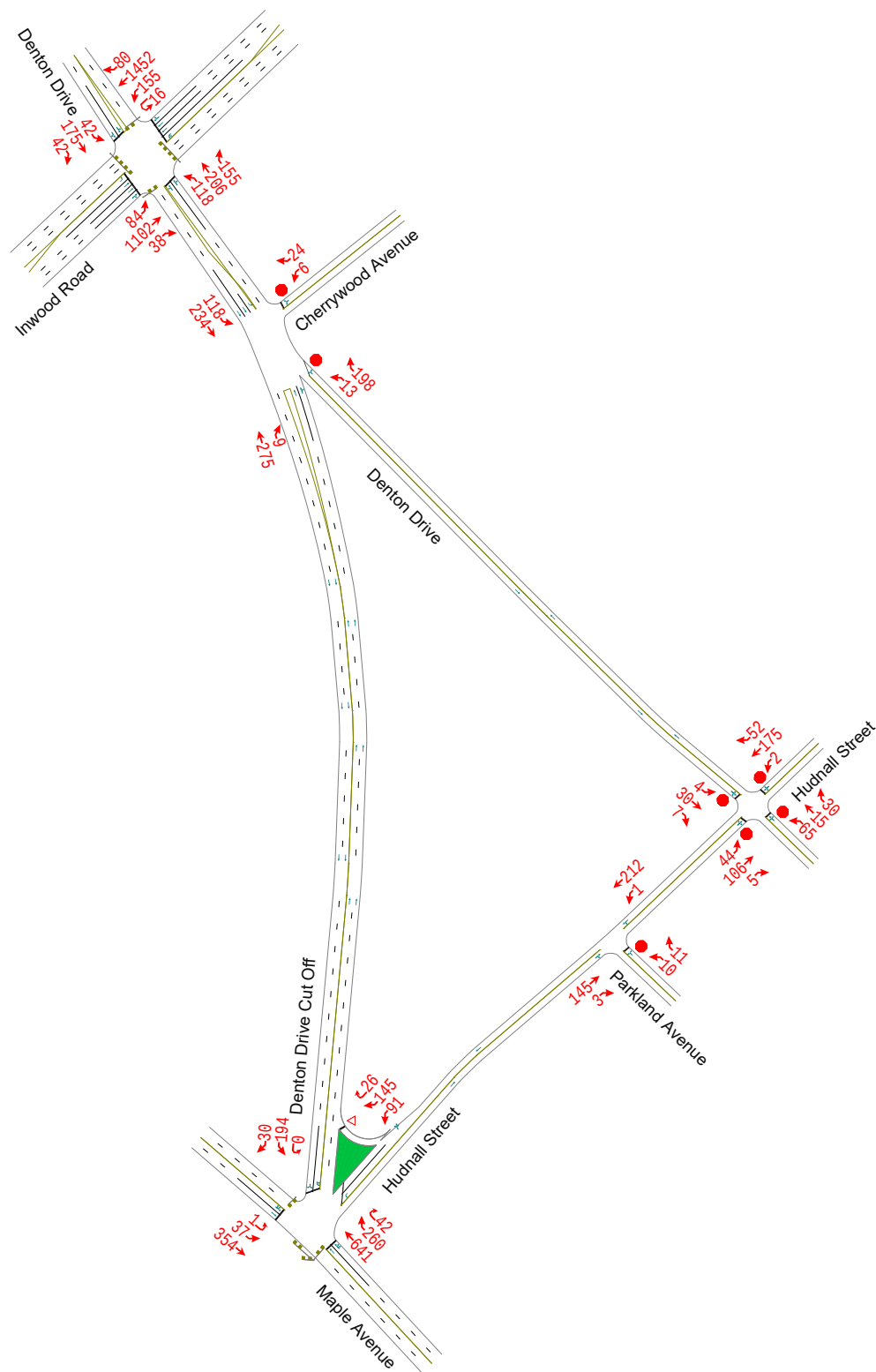
North ^
Not to Scale



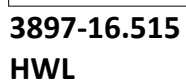
Appendix A3 - Existing PM Peak Hour Traffic Volumes

North ^
Not to Scale





North ^
Not to Scale

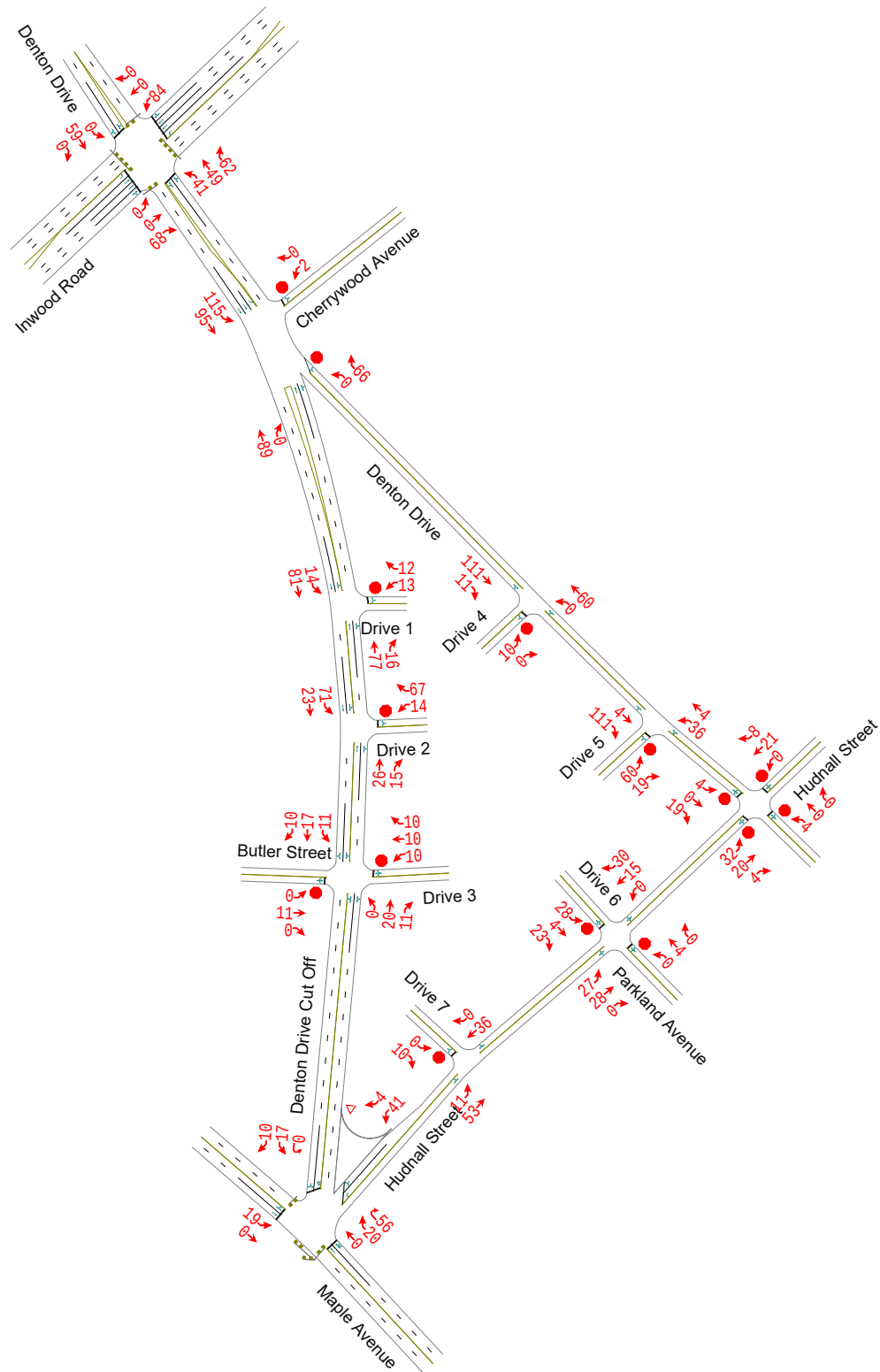


12/30/2016
Pacheco Koch

North ^
Not to Scale

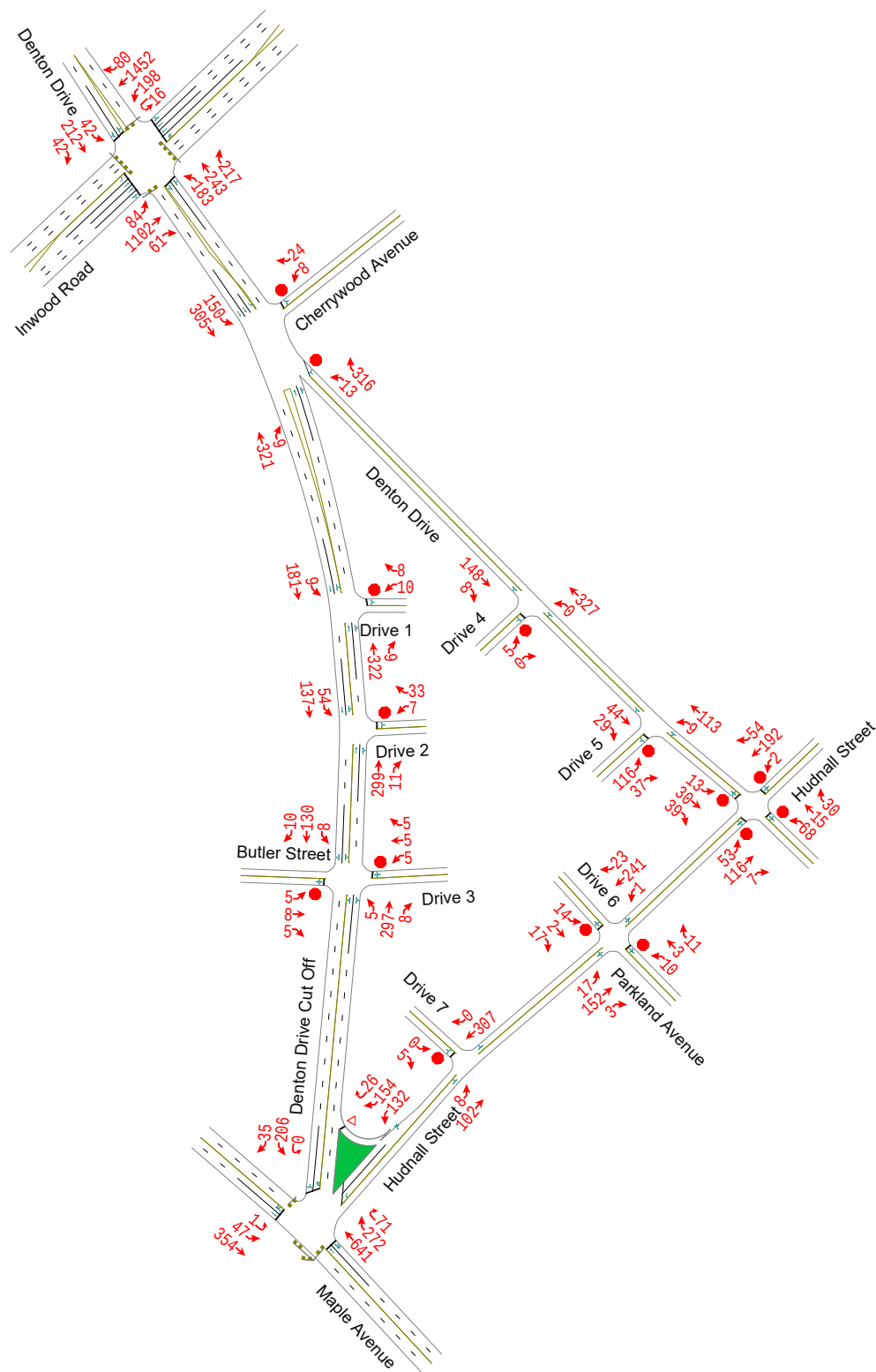
Appendix A7 - Site Generated PM Peak Hour Traffic Volumes

North ^
Not to Scale



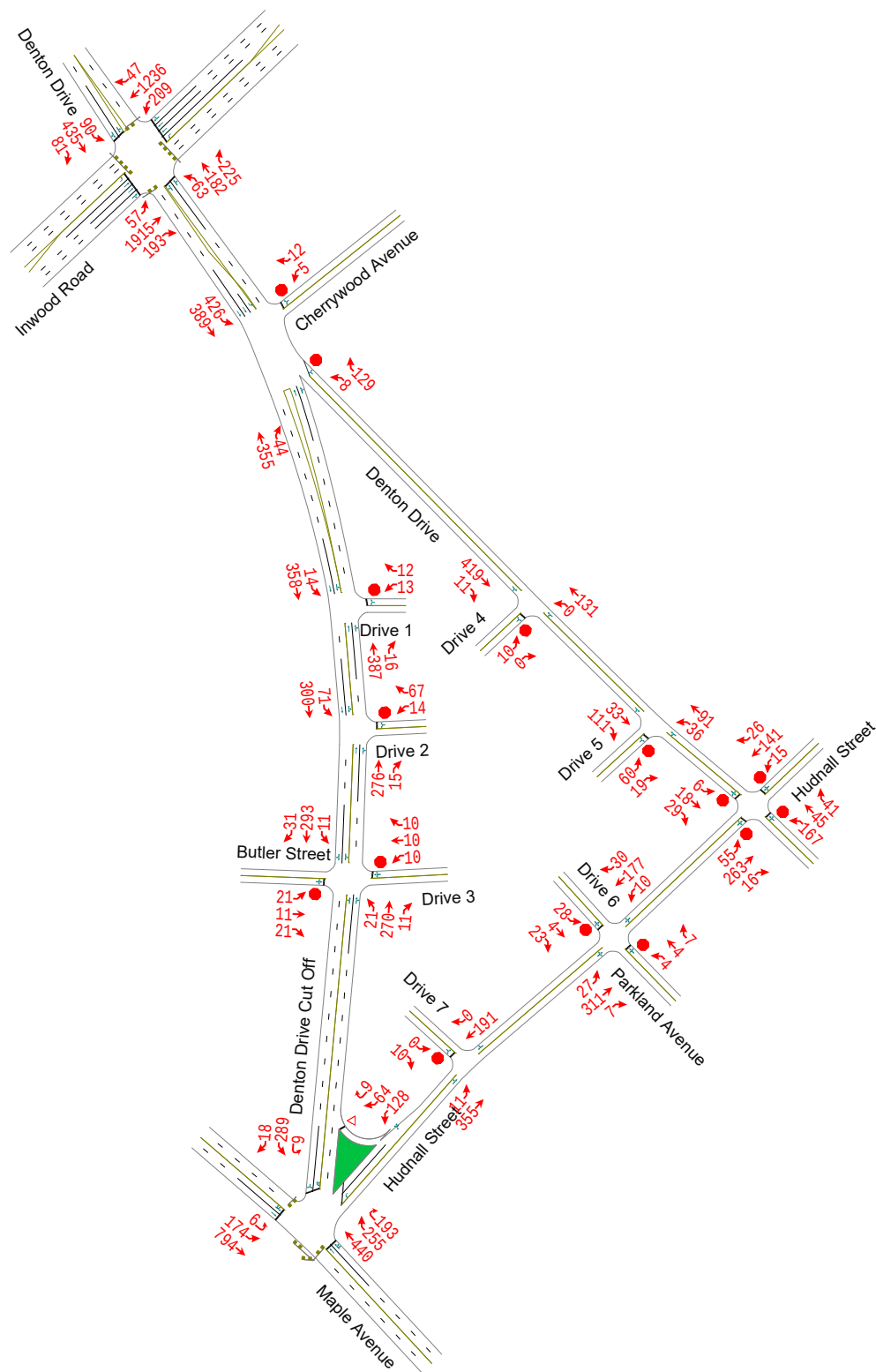
Appendix A8 - Background Plus Site Generated AM Peak Hour Traffic Volumes

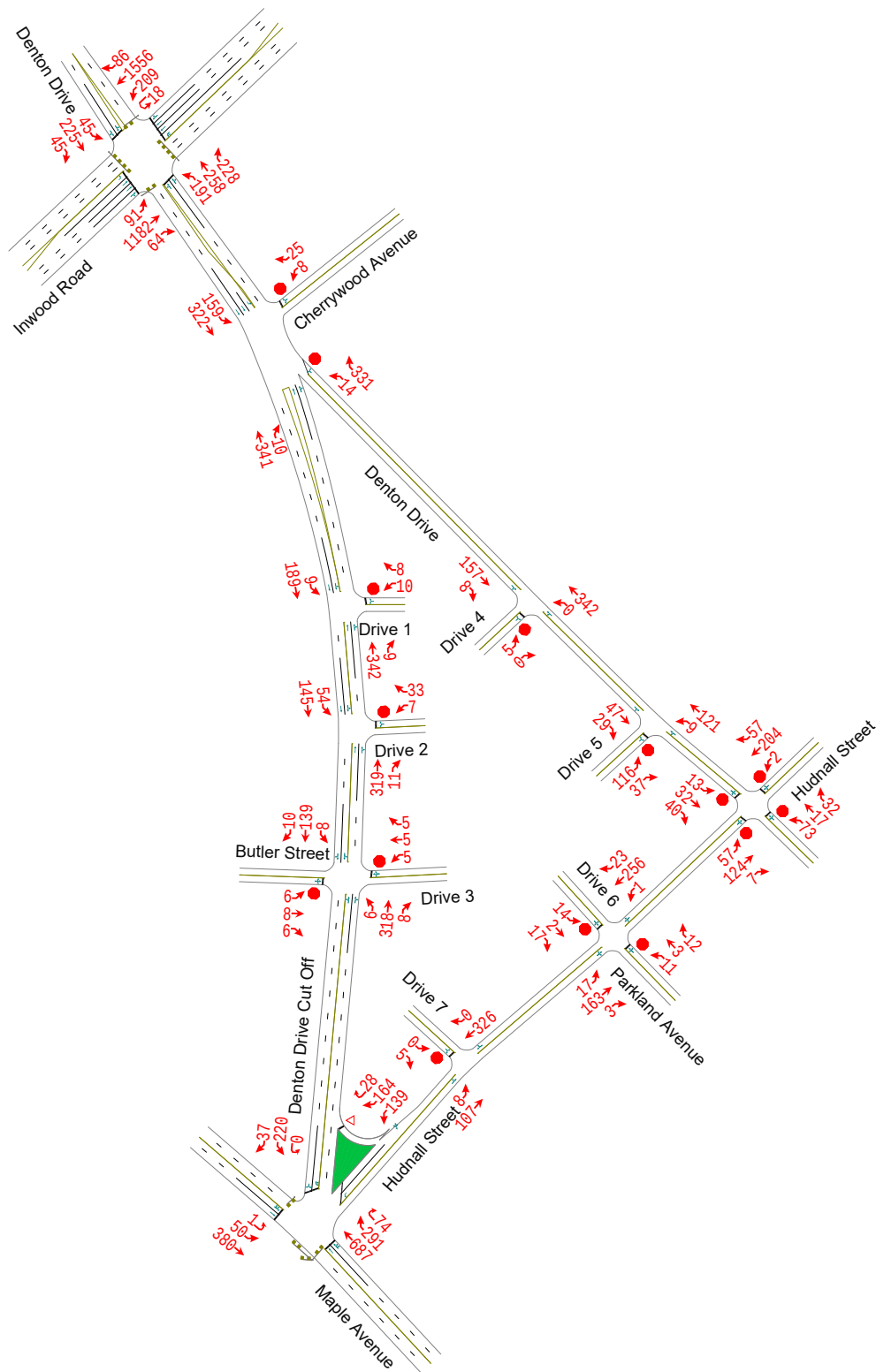
North ^
Not to Scale



Appendix A9 - Background Plus Site Generated PM Peak Hour Traffic Volumes

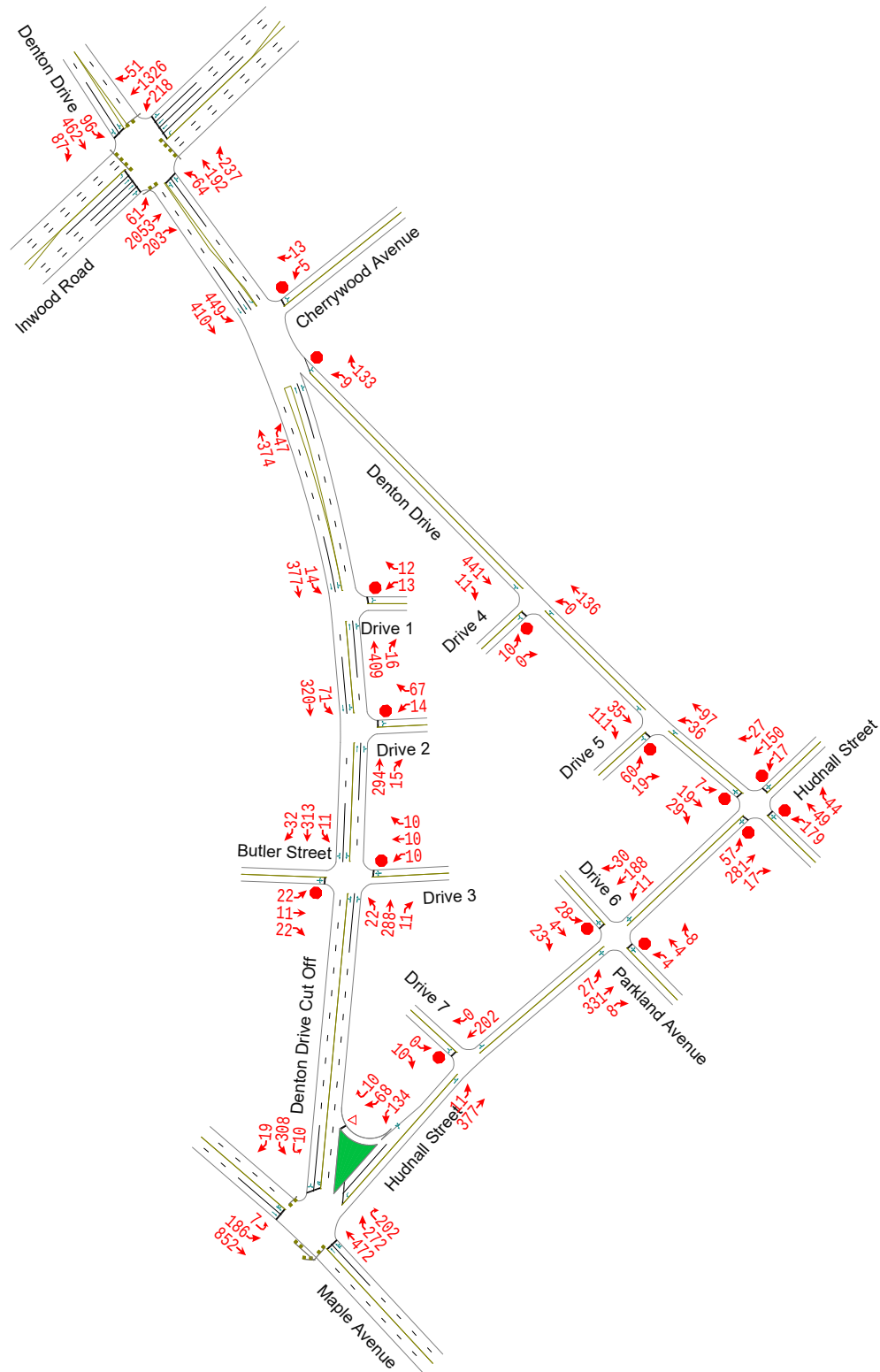
North ^
Not to Scale





Appendix A11 - Regional PM Peak Hour Traffic Volumes

North ^
Not to Scale



Appendix B. Detailed Traffic Volume Data

Intersection Turning Movement Counts

			NORTH LEG							EAST LEG							SOUTH LEG							WEST LEG						
			Southbound Approach on Denton Drive							Westbound Approach on Inwood Road							Northbound Approach on Denton Drive							Eastbound Approach on Inwood Road						
			Vehicles				Peds			Vehicles				Peds			Vehicles				Peds			Vehicles				Peds		
			U	L	T	R	CCW	CW		U	L	T	R	CCW	CW		U	L	T	R	CCW	CW		U	L	T	R	CCW	CW	
City: Dallas State: Texas Day: Friday Date: December 16th Year: 2016 Data Collector: Camera Data Source: CJ Hensch Traffic Control: Traffic Signal Observations:	START END																													
	7:00 AM 7:15 AM		2	14	9		0	0		0	24	263	18	0	0		16	27	20		0	0		26	220	8		0	0	
	7:15 AM 7:30 AM		8	20	5		0	0		0	28	306	16	1	0		17	38	40		1	0		14	245	3		0	0	
	7:30 AM 7:45 AM		10	29	10		0	0		2	25	377	11	1	0		24	34	30		3	2		24	287	8		0	0	
	7:45 AM 8:00 AM		17	50	6		0	1		5	44	356	15	0	2		37	54	42		2	4		26	250	5		0	1	
	8:00 AM 8:15 AM		5	37	9		0	0		4	35	344	25	4	0		27	60	42		0	2		19	293	14		0	0	
	8:15 AM 8:30 AM		9	54	15		1	3		5	46	332	27	5	1		27	52	36		1	1		13	240	10		0	3	
	8:30 AM 8:45 AM		15	25	7		0	2		1	22	307	27	4	0		14	27	38		1	0		14	270	8		0	2	
	8:45 AM 9:00 AM		9	32	5		1	0		1	21	317	17	0	0		6	31	27		0	0		14	256	9		0	0	
	4:30 PM 4:45 PM		30	77	21		1	1		0	25	316	8	0	2		6	37	46		1	2		9	489	21		1	1	
	4:45 PM 5:00 PM		19	99	22		0	0		0	27	268	19	0	0		4	38	39		2	0		23	451	26		1	0	
	5:00 PM 5:15 PM		13	95	20		3	0		0	38	317	8	0	0		7	27	40		0	1		12	439	39		1	0	
	5:15 PM 5:30 PM		25	94	16		0	0		0	32	299	11	1	0		4	27	33		2	0		11	480	36		0	0	
	5:30 PM 5:45 PM		14	75	27		1	0		2	48	319	14	0	0		12	30	36		0	0		15	384	22		1	0	
	5:45 PM 6:00 PM		26	66	23		0	0		1	24	328	20	1	0		10	40	31		1	0		11	408	13		0	0	
	6:00 PM 6:15 PM		19	59	20		3	0		3	27	311	9	0	0		8	29	29		0	1		13	406	30		0	0	
	6:15 PM 6:30 PM		23	56	16		0	0		1	41	344	7	0	0		10	23	31		0	0		12	311	11		0	0	
AM Peak Hour	Intersection PHF: 0.97		Intersection PHV: 41 170 40							16 150 1,409 78							115 200 150							82 1,070 37						
	Peak Hour: 7:30 AM - 8:30 AM		PHF: 0.60 0.79 0.67							0.82 0.93 0.72							0.78 0.83 0.89							0.79 0.91 0.66						
	Study Area PHF: 0.97		Study Area PHV: 41 170 40							16 150 1,409 78							115 200 150							82 1,070 37						
	Peak Hour: 7:30 AM - 8:30 AM		PHF: 0.60 0.79 0.67							0.82 0.93 0.72							0.78 0.83 0.89							0.79 0.91 0.66						
	Intersection PHF: 0.98		Intersection PHV: 87 365 79							0 122 1,200 46							21 129 158							55 1,859 122						
	Peak Hour: 4:30 PM - 5:30 PM		PHF: 0.73 0.92 0.90							0.80 0.95 0.61							0.75 0.85 0.86							0.60 0.95 0.78						
PM Peak Hour	Study Area PHF: 0.98		Study Area PHV: 87 365 79							0 122 1,200 46							21 129 158							55 1,859 122						
	Peak Hour: 4:30 PM - 5:30 PM		PHF: 0.73 0.92 0.90							0.80 0.95 0.61							0.75 0.85 0.86							0.60 0.95 0.78						

Intersection Turning Movement Counts

Intersection Turning Movement Counts				NORTH LEG							EAST LEG							SOUTH LEG							WEST LEG						
				Southbound Approach on Denton Drive Cut Off							Westbound Approach on Maple Avenue							Southwestbound Approach on Hudnall Street							Eastbound Approach on Maple Avenue						
				Vehicles				Peds			Vehicles				Peds			Vehicles				Peds			Vehicles				Peds		
				U	L2	L	R	CCW	CW	U	T	R	R2	CCW	CW	U	L	R	R2	CCW	CW	U	L2	L	T	CCW	CW				
City:	Dallas	7:00 AM	7:15 AM	0	27	6	0	0	99	36	13	0	0	12	28	2	0	0	0	2	38	0	0								
State:	Texas	7:15 AM	7:30 AM	0	39	3	0	0	146	60	5	0	0	22	22	5	0	0	0	7	66	0	0								
Day:	Friday	7:30 AM	7:45 AM	0	28	4	0	0	166	60	7	0	2	21	37	8	0	0	1	7	86	0	0								
Date:	December 16th	7:45 AM	8:00 AM	0	56	13	1	0	174	72	7	0	0	29	51	6	0	0	0	11	94	0	0								
Year:	2016	8:00 AM	8:15 AM	0	41	5	2	1	137	62	19	0	0	21	33	7	1	1	0	12	90	0	0								
Data Collector:	Camera	8:15 AM	8:30 AM	0	63	7	0	1	145	58	8	0	0	17	20	4	1	1	0	6	74	0	0								
Data Source:	CJ Hensch	8:30 AM	8:45 AM	0	40	2	0	0	104	54	10	0	0	20	26	9	0	0	0	10	79	0	0								
Traffic Control:	Traffic Signal	8:45 AM	9:00 AM	1	36	2	0	0	116	39	12	0	0	18	20	1	0	0	0	6	85	0	0								
Observations:		4:30 PM	4:45 PM	1	60	2	0	1	111	65	28	0	0	26	14	4	0	0	0	34	183	0	0								
		4:45 PM	5:00 PM	1	61	3	1	0	105	63	32	0	0	20	15	2	1	0	2	27	188	0	0								
		5:00 PM	5:15 PM	3	77	1	1	2	110	49	40	0	1	16	12	2	0	3	3	53	200	0	0								
		5:15 PM	5:30 PM	4	66	2	1	2	101	51	33	2	1	22	17	1	1	0	1	37	200	0	0								
		5:30 PM	5:45 PM	6	62	3	0	1	87	39	33	0	0	18	11	5	0	1	3	50	169	1	0								
		5:45 PM	6:00 PM	2	71	2	1	0	90	63	24	0	0	16	13	2	2	0	2	33	178	0	0								
		6:00 PM	6:15 PM	4	59	0	2	0	79	50	39	0	0	26	17	4	2	1	0	11	165	0	0								
		6:15 PM	6:30 PM	1	64	1	0	1	88	43	24	0	0	24	16	4	0	1	1	19	158	0	0								

City:	<i>Dallas</i>
State:	<i>Texas</i>
Day:	<i>Friday</i>
Date:	<i>December 16th</i>
Year:	<i>2016</i>
Data Collector:	<i>Camera</i>
Data Source:	<i>CJ Hensch</i>
Traffic Control:	<i>All-Way Stop</i>
Observations:	

AM Peak Hour	Intersection PHF:	0.86	Intersection PHV:	2	170	50			63	15	29			43	103	5			4	29	7	
	Peak Hour	7:30 AM - 8:30 AM		PHF:	0.25	0.89	0.74			0.72	0.63	0.66			0.72	0.74	0.63			0.33	0.60	0.88
	Study Area PHF:	0.86	Study Area PHV:	2	170	50			63	15	29			43	103	5			4	29	7	
	Peak Hour:	7:30 AM - 8:30 AM		PHF:	0.25	0.89	0.74			0.72	0.63	0.66			0.72	0.74	0.63			0.33	0.60	0.88
PM Peak Hour	Intersection PHF:	0.86	Intersection PHV:	15	126	18			141	55	38			28	268	22			2	11	8	
	Peak Hour	5:00 PM - 6:00 PM		PHF:	0.63	0.88	0.64			0.75	0.81	0.68			0.78	0.82	0.79			0.50	0.69	0.67
	Study Area PHF:	0.81	Study Area PHV:	15	116	17			158	44	40			23	236	12			2	17	9	
	Peak Hour:	4:30 PM - 5:30 PM		PHF:	0.63	0.88	0.61			0.84	0.85	0.71			0.72	0.72	0.50			0.50	0.53	0.75

City:	<i>Dallas</i>
State:	<i>Texas</i>
Day:	<i>Friday</i>
Date:	<i>December 16th</i>
Year:	<i>2016</i>
Data Collector:	<i>Camera</i>
Data Source:	<i>CJ Hensch</i>
Traffic Control:	<i>Minor Approach Stop</i>
Observations:	

AM Peak Hour	Intersection PHF:	0.93	Intersection PHV:	5	110	227			13	188	4			267	4	5			1	5	23	
	Peak Hour	7:30 AM - 8:30 AM		PHF:	0.63	0.86			0.86	0.65	0.87			0.50	0.91	0.50			0.42	0.25	0.42	
	Study Area PHF:	0.93	Study Area PHV:	5	110	227			13	188	4			267	4	5			1	5	23	
	Peak Hour:	7:30 AM - 8:30 AM		PHF:	0.63	0.86			0.86	0.65	0.87			0.50	0.91	0.50			0.42	0.25	0.42	
PM Peak Hour	Intersection PHF:	0.94	Intersection PHV:	37	269	307			8	68	3			231	8	38			0	6	15	
	Peak Hour	4:45 PM - 5:45 PM		PHF:	0.66	0.90			0.95	0.50	0.74			0.38	0.86	0.67			0.73	0.00	0.50	
	Study Area PHF:	0.93	Study Area PHV:	37	265	285			8	58	3			258	9	34			0	3	12	
	Peak Hour:	4:30 PM - 5:30 PM		PHF:	0.66	0.88			0.88	0.50	0.73			0.38	0.87	0.56			0.85	0.00	0.25	

City:	<i>Dallas</i>
State:	<i>Texas</i>
Day:	<i>Friday</i>
Date:	<i>December 16th</i>
Year:	<i>2016</i>
Data Collector:	<i>Camera</i>
Data Source:	<i>CJ Hensch</i>
Traffic Control:	<i>Minor Approach Stop</i>
Observations:	

AM Peak Hour	Intersection PHF:	0.78	Intersection PHV:	1	206	0		10	0	11		0	141	3			
	Peak Hour:	7:30 AM - 8:30 AM	PHF:	0.25	0.80	0.00		0.50	0.00	0.69		0.00	0.77	0.75			
	Study Area PHF:	0.78	Study Area PHV:	1	206	0		10	0	11		0	141	3			
	Peak Hour:	7:30 AM - 8:30 AM	PHF:	0.25	0.80	0.00		0.50	0.00	0.69		0.00	0.77	0.75			
PM Peak Hour	Intersection PHF:	0.86	Intersection PHV:	13	160	0		6	0	11		0	303	10			
	Peak Hour:	5:00 PM - 6:00 PM	PHF:	0.54	0.89	0.00		0.50	0.00	0.69		0.00	0.83	0.83			
	Study Area PHF:	0.78	Study Area PHV:	10	157	0		4	0	7		0	275	7			
	Peak Hour:	4:30 PM - 5:30 PM	PHF:	0.42	0.87	0.00		0.50	0.00	0.44		0.00	0.76	0.58			

ROADWAY: Denton Drive Cut Off
 LOCATION: Adjacent to site
 DAY: Friday
 DATE: December 16th
 YEAR: 2016
 SOURCE: CJ Hensch

24-HOUR, BI-DIRECTIONAL VOLUME

6,360
 (WEEKDAY)

Denton Drive Cut Off

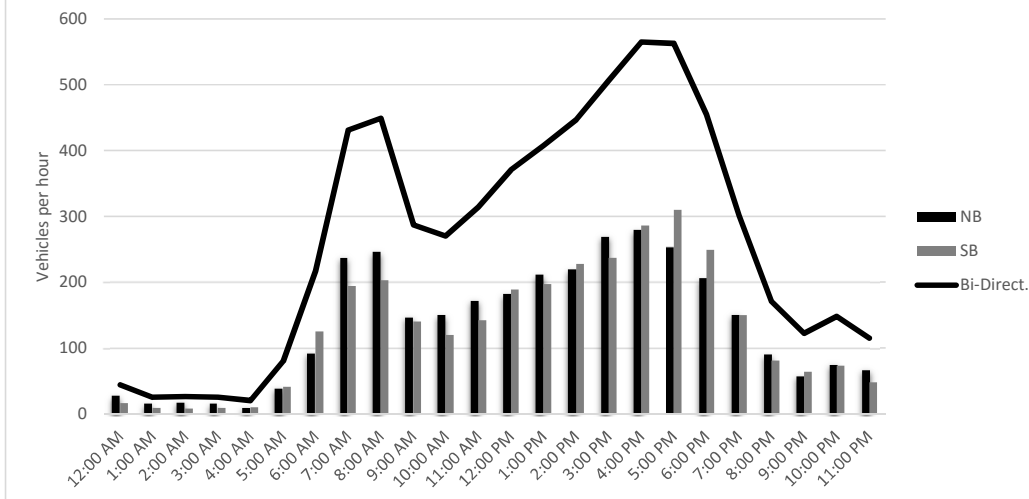
START TIME	Northbound				Southbound				Totals		
	0:00	0:15	0:30	0:45	0:00	0:15	0:30	0:45	NB	SB	Bi-Direct.
12:00 AM	6	3	12	7	5	3	8	0	28	16	44
1:00 AM	5	2	6	3	4	3	0	2	16	9	25
2:00 AM	12	2	3	1	5	1	1	1	18	8	26
3:00 AM	3	6	3	4	0	2	2	5	16	9	25
4:00 AM	0	3	4	3	2	1	3	4	10	10	20
5:00 AM	4	8	13	14	10	4	12	15	39	41	80
6:00 AM	16	14	27	35	21	36	32	36	92	125	217
7:00 AM	44	65	54	74	36	46	46	66	237	194	431
8:00 AM	72	64	66	44	52	70	35	46	246	203	449
9:00 AM	34	40	41	32	40	37	32	31	147	140	287
10:00 AM	32	38	38	42	26	37	31	26	150	120	270
11:00 AM	31	42	44	55	22	36	47	37	172	142	314
12:00 PM	54	38	42	48	42	52	39	56	182	189	371
1:00 PM	58	53	56	44	48	62	46	41	211	197	408
2:00 PM	51	56	56	56	48	54	70	56	219	228	447
3:00 PM	74	56	79	60	45	60	68	64	269	237	506
4:00 PM	71	63	78	67	68	74	60	84	279	286	565
5:00 PM	69	56	50	78	87	70	78	75	253	310	563
6:00 PM	64	41	50	51	73	68	60	48	206	249	455
7:00 PM	40	40	42	29	50	36	34	30	151	150	301
8:00 PM	37	17	16	20	18	29	13	21	90	81	171
9:00 PM	14	15	17	12	18	17	19	10	58	64	122
10:00 PM	16	18	27	14	24	16	13	20	75	73	148
11:00 PM	19	14	18	16	14	17	10	7	67	48	115

7:45 AM 8:45 AM
 4:15 PM 5:15 PM
 4:00 PM 5:00 PM
 4:45 PM 5:45 PM

24-Hour Total:
 (Bi-Direct.) AM Peak Hour Total:
 (Bi-Direct.) PM Peak Hour Total:
 Highest By Direction (NB):
 Highest By Direction (SB):

NB	SB	Bi-Direct.
3,231	3,129	6,360
276	223	499
277	305	582
279		
	319	

Graph



ROADWAY: Denton Drive
 LOCATION: Adjacent to site
 DAY: Friday
 DATE: December 16th
 YEAR: 2016
 SOURCE: CJ Hensch

24-HOUR, BI-DIRECTIONAL VOLUME

2,710
 (WEEKDAY)

Denton Drive

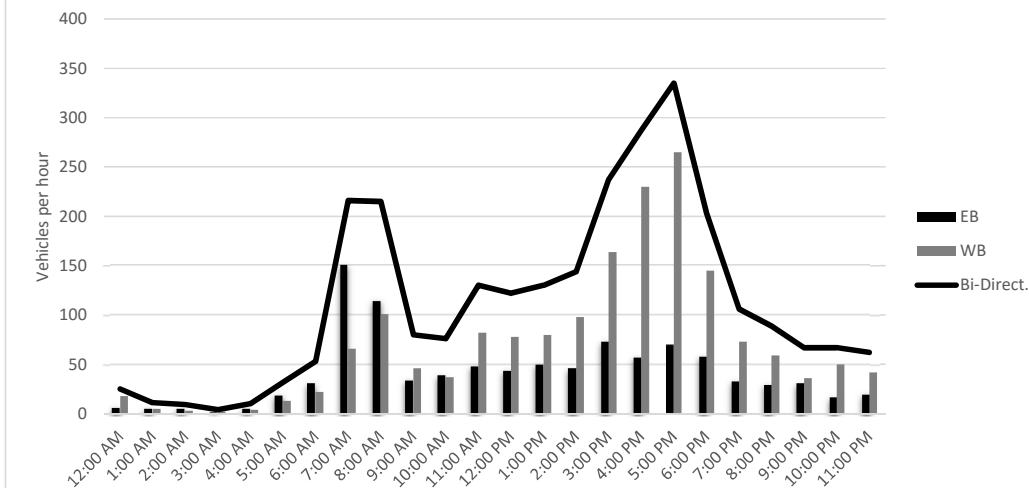
START TIME	Eastbound				Westbound				Totals		
	0:00	0:15	0:30	0:45	0:00	0:15	0:30	0:45	EB	WB	Bi-Direct.
12:00 AM	0	3	4	0	4	1	11	2	7	18	25
1:00 AM	2	2	1	1	0	4	1	0	6	5	11
2:00 AM	3	2	0	1	1	1	0	1	6	3	9
3:00 AM	1	0	0	1	1	1	0	0	2	2	4
4:00 AM	1	3	2	0	1	0	2	1	6	4	10
5:00 AM	1	5	5	8	2	2	4	5	19	13	32
6:00 AM	4	6	5	16	8	5	5	4	31	22	53
7:00 AM	21	32	54	43	7	5	19	35	150	66	216
8:00 AM	53	30	14	17	36	30	21	14	114	101	215
9:00 AM	14	6	10	4	8	13	12	13	34	46	80
10:00 AM	5	11	12	11	10	5	10	12	39	37	76
11:00 AM	13	12	10	13	17	23	22	20	48	82	130
12:00 PM	11	9	10	14	21	23	18	16	44	78	122
1:00 PM	13	10	16	11	20	23	20	17	50	80	130
2:00 PM	12	11	13	10	23	22	19	34	46	98	144
3:00 PM	16	15	25	17	35	17	43	69	73	164	237
4:00 PM	20	12	13	12	50	53	59	68	57	230	287
5:00 PM	15	17	24	14	82	81	66	36	70	265	335
6:00 PM	16	14	12	16	45	38	29	33	58	145	203
7:00 PM	10	6	7	10	21	19	16	17	33	73	106
8:00 PM	9	5	6	10	18	10	23	8	30	59	89
9:00 PM	11	5	8	7	12	7	13	4	31	36	67
10:00 PM	2	8	5	2	11	16	16	7	17	50	67
11:00 PM	3	10	4	3	12	8	13	9	20	42	62

24-Hour Total:
 (Bi-Direct.) AM Peak Hour Total:
 (Bi-Direct.) PM Peak Hour Total:
 Highest By Direction (EB):
 Highest By Direction (WB):

EB	WB	Bi-Direct.
991	1,719	2,710
180	120	300
68	297	365
182		
	297	

7:30 AM 8:30 AM
 4:45 PM 5:45 PM
 7:15 AM 8:15 AM
 4:45 PM 5:45 PM

Graph



ROADWAY: Hudnall Street
 LOCATION: Adjacent to site
 DAY: Friday
 DATE: December 16th
 YEAR: 2016
 SOURCE: CJ Hensch

24-HOUR, BI-DIRECTIONAL VOLUME

5,134
 (WEEKDAY)

Hudnall Street

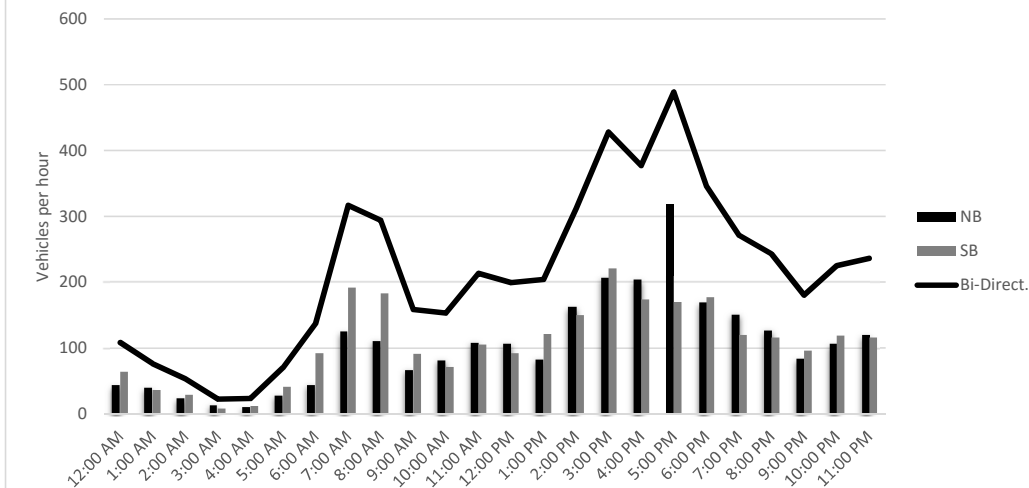
START TIME	Northbound				Southbound				Totals		
	0:00	0:15	0:30	0:45	0:00	0:15	0:30	0:45	NB	SB	Bi-Direct.
12:00 AM	9	10	18	7	26	14	17	7	44	64	108
1:00 AM	9	12	8	11	5	14	12	5	40	36	76
2:00 AM	12	9	1	2	12	13	3	1	24	29	53
3:00 AM	5	0	2	7	3	1	1	3	14	8	22
4:00 AM	5	2	1	3	2	3	5	2	11	12	23
5:00 AM	4	6	8	11	1	10	17	13	29	41	70
6:00 AM	12	11	9	13	12	16	30	34	45	92	137
7:00 AM	20	27	32	46	39	41	48	64	125	192	317
8:00 AM	40	23	26	22	59	47	41	36	111	183	294
9:00 AM	20	18	14	15	21	15	29	26	67	91	158
10:00 AM	17	21	26	18	16	17	19	19	82	71	153
11:00 AM	30	23	20	35	20	25	32	28	108	105	213
12:00 PM	25	39	21	22	22	21	22	27	107	92	199
1:00 PM	23	23	20	17	33	41	22	25	83	121	204
2:00 PM	35	40	32	55	39	35	37	39	162	150	312
3:00 PM	51	47	47	62	58	55	44	64	207	221	428
4:00 PM	45	41	63	54	45	49	42	38	203	174	377
5:00 PM	90	70	89	70	46	39	40	45	319	170	489
6:00 PM	41	45	44	39	47	43	45	42	169	177	346
7:00 PM	39	39	46	27	39	24	33	24	151	120	271
8:00 PM	41	24	31	31	30	22	36	28	127	116	243
9:00 PM	28	22	23	11	23	29	22	22	84	96	180
10:00 PM	25	20	30	31	33	36	27	23	106	119	225
11:00 PM	23	31	28	38	31	30	23	32	120	116	236

7:30 AM 8:30 AM
 5:00 PM 6:00 PM
 5:00 PM 6:00 PM
 3:00 PM 4:00 PM

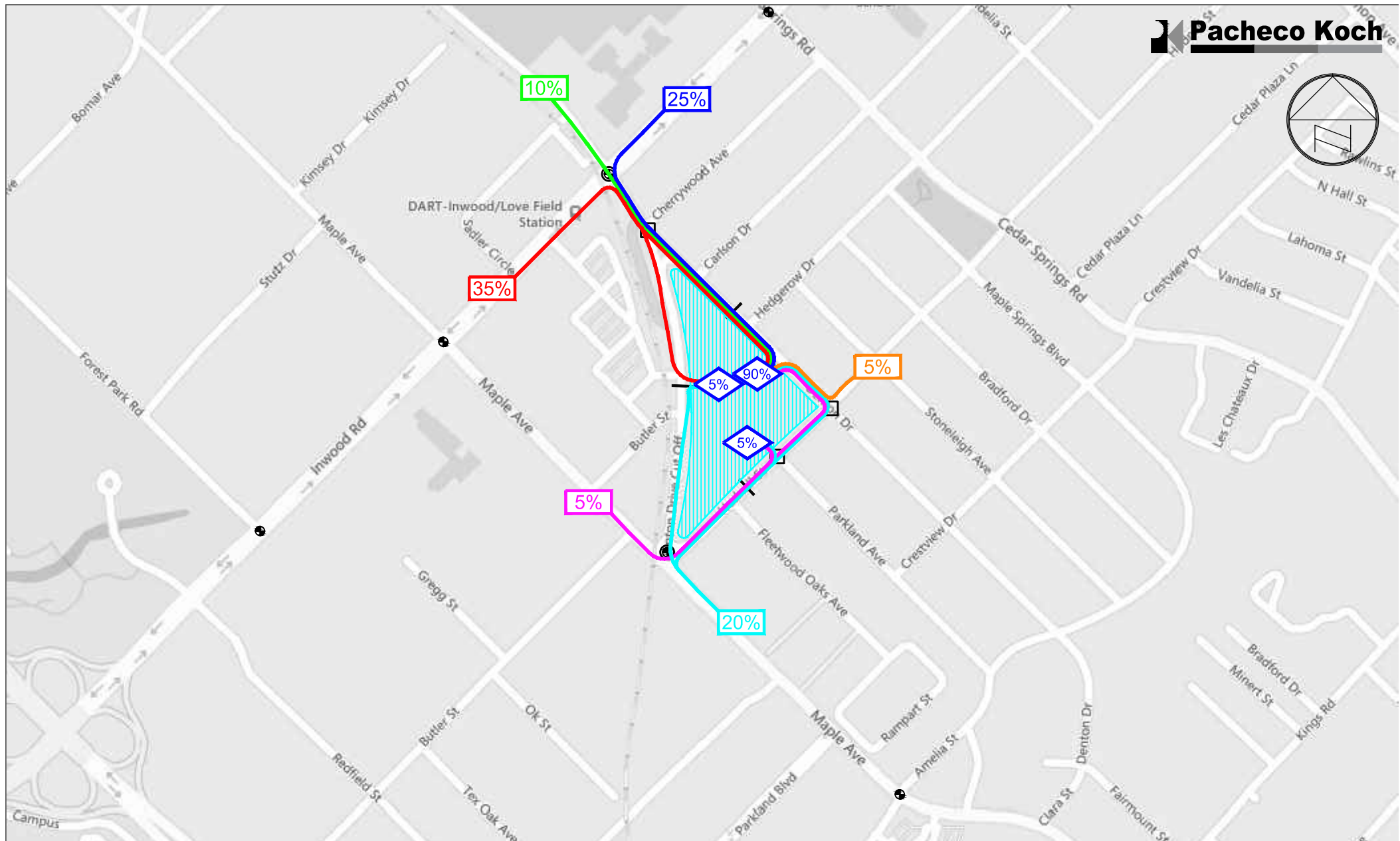
24-Hour Total:
 (Bi-Direct.) AM Peak Hour Total:
 (Bi-Direct.) PM Peak Hour Total:
 Highest By Direction (NB):
 Highest By Direction (SB):

	NB	SB	Bi-Direct.
24-Hour Total:	2,538	2,596	5,134
(Bi-Direct.) AM Peak Hour Total:	141	218	359
(Bi-Direct.) PM Peak Hour Total:	319	170	489
Highest By Direction (NB):	319		
Highest By Direction (SB):		221	

Graph



Appendix C. Site-Generated Traffic Supplement

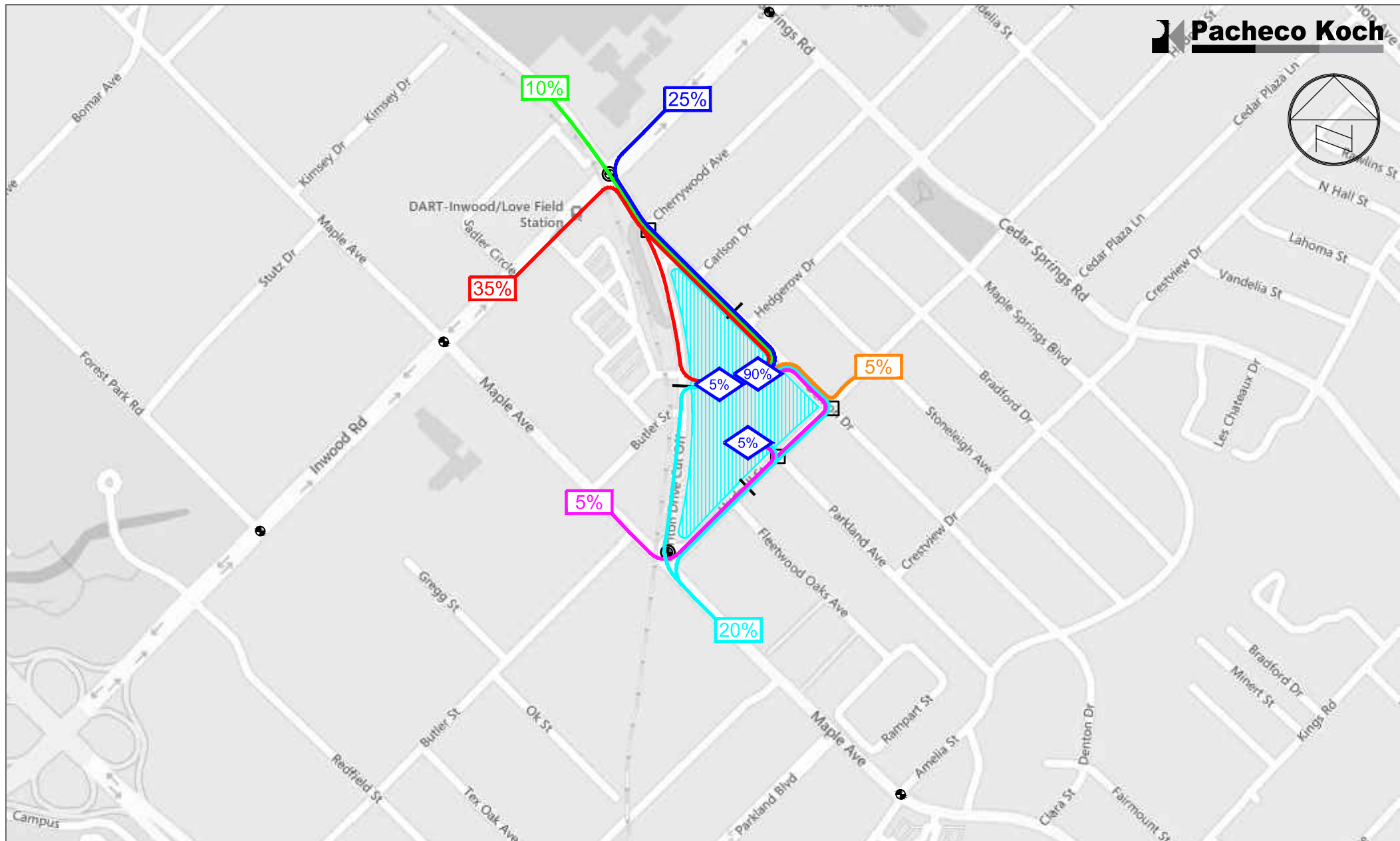


- Project Location
- Study Area Intersection (Signalized)
- Road-Tube Counts
- Traffic Signal
- Study Area Intersection (Unsignalized)

Site Generated Trip Distribution - Inbound: Residential

Dentwood, Dallas, Texas

PK #3897-16.515 (HWL: 01/03/17)

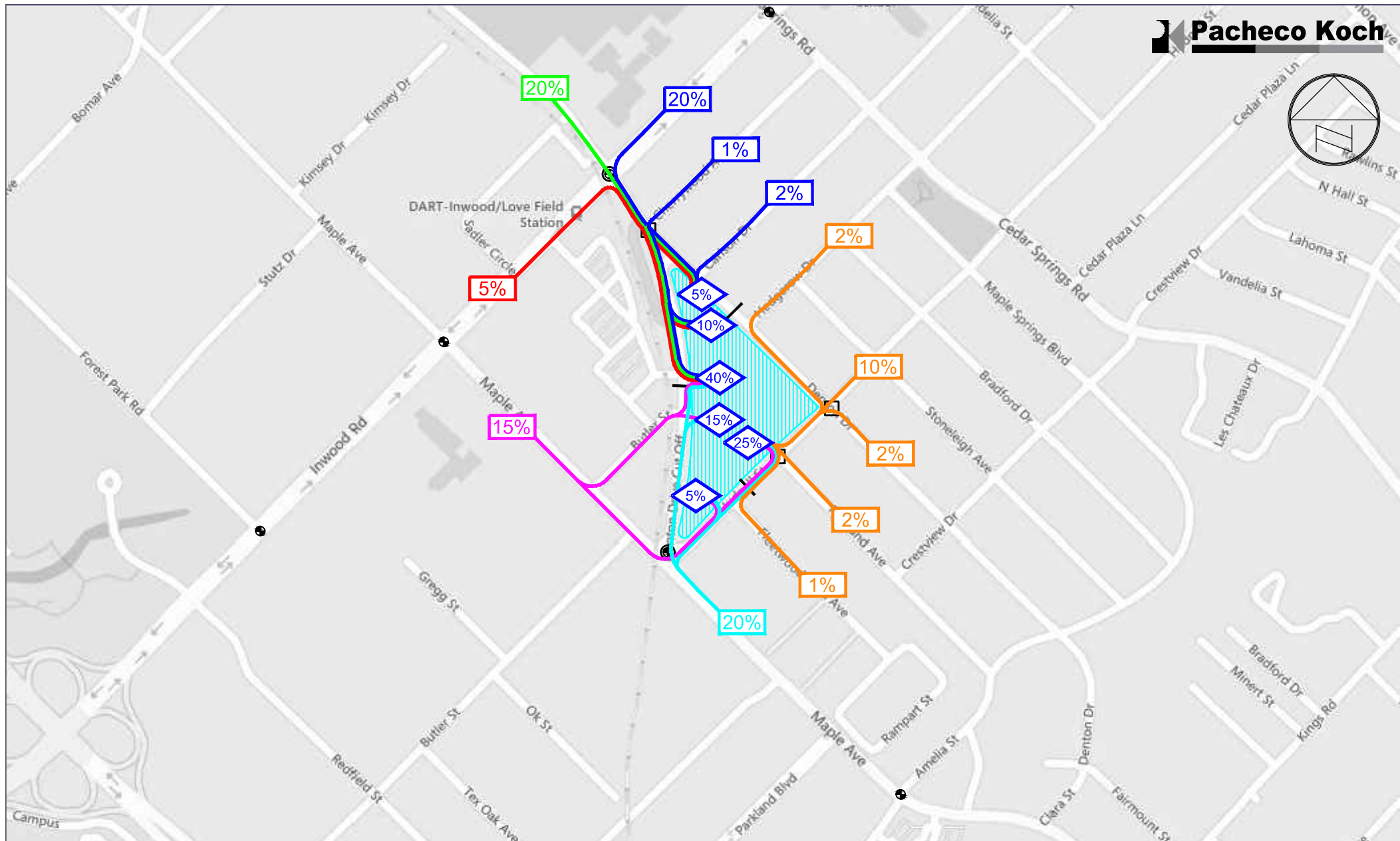


- Project Location
- Study Area Intersection (Signalized)
- Road-Tube Counts
- Traffic Signal
- Study Area Intersection (Unsignalized)

Site Generated Trip Distribution - Outbound: Residential

Dentwood, Dallas, Texas

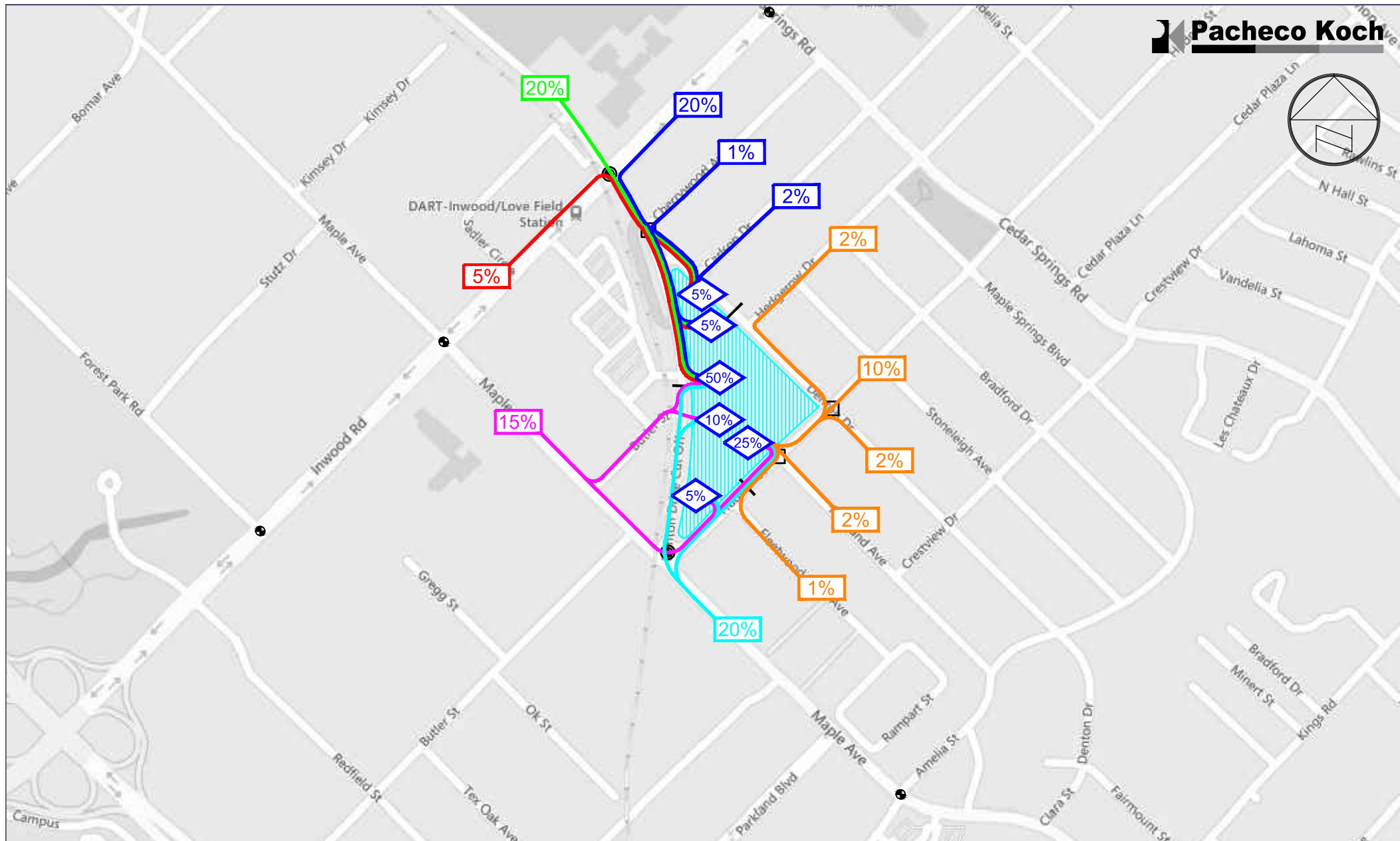
PK #3897-16.515 (HWL: 01/03/17)



Site Generated Trip Distribution - Inbound: Commercial

Dentwood, Dallas, Texas

PK #3897-16.515 (HWL: 12/30/16)



Site Generated Trip Distribution - Outbound: Commercial

Dentwood, Dallas, Texas

PK #3897-16.515 (HWL: 12/30/16)

	ITE Land Use Code	Development Program			Weekday Trip Ends						
		Land Use	Quantity	Units	Weekday Daily	AM Peak - Adjacent Street			PM Peak - Adjacent Street		
						In	Out	Total	In	Out	Total
Use "A"	220	Multifamily	394	DU	2699	42	170	212	163	88	251
Use "B"	826	Specialty Retail	12,036	SF	551	0	0	0	22	28	50
Use "C"	850	Supermarket	55,000	SF	5074	116	71	187	255	245	500
Use "D"	912	Bank Drive-In	2,800	SF	415	19	15	34	34	34	68
Use "E"	932	Restaurant	8,800	SF	1119	52	43	95	52	35	87
Use "F"	944	Gas Station	8	Positions	1348	49	48	97	56	55	111
		Total Multifamily			2699	42	170	212	163	88	251
		Total Retail			6915	164	99	263	214	202	417
Subtotal (no adjustments)					11206	278	347	625	582	485	1067
Ped/Trans Reductions											
Internal Capture						30	30	60	141	141	282
Subtotal					11206	248	317	565	441	344	785
Pass-by											
Pacheco Koch Gas Station Internal Trip Capture			35%		472	17	17	34	20	19	39
Pacheco Koch Transit/Walking Reduction			10%		1121	25	32	57	44	34	79
Net Driveway Vols					9614	206	269	475	377	290	668

Appendix D. Detailed Intersection Capacity Analysis Results

1: Denton Drive & Inwood Road
3897-16.515

Existing
Timing Plan: AM

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	82	1070	37	16	150	1409	78	115	200	150	41	170
Future Volume (vph)	84	1092	38	16	153	1437	80	117	204	153	42	173
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	87	1126	39	16	158	1481	82	121	210	158	43	178
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	1141	0	0	171	1533	0	0	480	0	0	259
Turn Type	D,P+P	NA		D,P+P	D,P+P	NA		D,P+P	NA		D,P+P	NA
Protected Phases	5	2			1	1	6		3	8		7
Permitted Phases	6			2	2			4			8	4
Detector Phase	5	2		1	1	6		3	8		7	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	9.5	22.5		9.5	22.5		9.5	22.5
Total Split (s)	15.0	65.0		19.0	19.0	69.0		6.5	22.0		14.0	29.5
Total Split (%)	12.5%	54.2%		15.8%	15.8%	57.5%		5.4%	18.3%		11.7%	24.6%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0		1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	
Lead/Lag	Lag	Lag		Lead	Lead	Lead		Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max		None	None		Min	None
Act Effct Green (s)	75.9	65.2			75.0	67.5		21.5			31.5	
Actuated g/C Ratio	0.63	0.54			0.62	0.56		0.18			0.26	
v/c Ratio	0.34	0.41			0.50	0.54		0.92			0.38	
Control Delay	19.7	16.9			13.1	17.9		66.3			34.9	
Queue Delay	0.0	0.0			0.0	0.0		0.0			0.0	
Total Delay	19.7	16.9			13.1	17.9		66.3			34.9	
LOS	B	B			B	B		E			C	
Approach Delay		17.1				17.4		66.3			34.9	
Approach LOS		B				B		E			C	
Queue Length 50th (ft)	21	182			45	275		173			78	
Queue Length 95th (ft)	40	228			73	319		#275			116	
Internal Link Dist (ft)		207				255		276			141	
Turn Bay Length (ft)	150				200							
Base Capacity (vph)	266	2750			406	2842		524			682	
Starvation Cap Reductn	0	0			0	0		0			0	
Spillback Cap Reductn	0	0			0	0		0			0	
Storage Cap Reductn	0	0			0	0		0			0	
Reduced v/c Ratio	0.32	0.41			0.42	0.54		0.92			0.38	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92

1: Denton Drive & Inwood Road
3897-16.515

Existing
Timing Plan: AM

	
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	41
Future Volume (vph)	42
Peak Hour Factor	0.97
Adj. Flow (vph)	43
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

1: Denton Drive & Inwood Road
3897-16.515

Existing
Timing Plan: AM

Intersection Signal Delay: 24.9

Intersection LOS: C

Intersection Capacity Utilization 69.4%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Denton Drive & Inwood Road



2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Existing
Timing Plan: AM

Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR	SWR2
Lane Configurations			↕↕	↕↕			↕↕	↕↕	↕↕	↕↕	
Traffic Volume (vph)	1	36	344	622	252	41	188	29	88	141	25
Future Volume (vph)	1	37	351	635	257	42	192	30	90	144	26
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	1	43	408	738	299	49	223	35	105	167	30
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	452	1086	0	0	258	0	302	0	0
Turn Type	custom	pm+pt	NA	NA			Prot		Prot		
Protected Phases			13	14			7		5		
Permitted Phases	13	10									
Minimum Split (s)	9.5	9.5	22.5	22.5			22.5		22.5		
Total Split (s)	26.0	26.0	84.0	58.0			41.0		21.0		
Total Split (%)	17.8%	17.8%	57.5%	39.7%			28.1%		14.4%		
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5		3.5		
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0		1.0		
Lost Time Adjust (s)			0.0	0.0			0.0		0.0		
Total Lost Time (s)			4.5	4.5			4.5		4.5		
Lead/Lag	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes		Yes							
Act Effect Green (s)			79.5	53.5			36.5		16.5		
Actuated g/C Ratio			0.54	0.37			0.25		0.11		
v/c Ratio			0.31	0.88			0.28		1.08dr		
Control Delay			18.1	52.7			31.3		83.1		
Queue Delay			0.0	0.0			0.0		0.0		
Total Delay			18.1	52.7			31.3		83.1		
LOS			B	D			C		F		
Approach Delay			18.1	52.7			31.3		83.1		
Approach LOS			B	D			C		F		
Queue Length 50th (ft)			114	506			70		147		
Queue Length 95th (ft)			140	563			103		#204		
Internal Link Dist (ft)			174	239			547		259		
Turn Bay Length (ft)											
Base Capacity (vph)			1443	1234			907		362		
Starvation Cap Reductn			0	0			0		0		
Spillback Cap Reductn			0	0			0		0		
Storage Cap Reductn			0	0			0		0		
Reduced v/c Ratio			0.31	0.88			0.28		0.83		

Intersection Summary

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 0 (0%), Referenced to phase 10:EBTL and 14:WBT, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 47.0

Intersection LOS: D

Intersection Capacity Utilization 63.6%

ICU Level of Service B

Analysis Period (min) 15

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

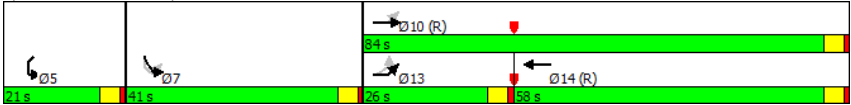
2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Existing
Timing Plan: AM

Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 2: Maple Avenue & Denton Drive Cut Off & Hudnall Street



3: Hudnall Street & Denton Drive
3897-16.515

Existing
Timing Plan: AM

Intersection												
Intersection Delay, s/veh	9.3											
Intersection LOS	A											

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	4	29	7	0	63	15	29	0	43	103	5
Future Vol, veh/h	0	4	30	7	0	64	15	30	0	44	105	5
Peak Hour Factor	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	5	35	8	0	74	17	35	0	51	122	6
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.5	9.1	9.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	10%	59%	1%
Vol Thru, %	68%	73%	14%	77%
Vol Right, %	3%	17%	28%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	154	41	109	226
LT Vol	44	4	64	2
Through Vol	105	30	15	173
RT Vol	5	7	30	51
Lane Flow Rate	179	48	127	263
Geometry Grp	1	1	1	1
Degree of Util (X)	0.234	0.067	0.174	0.325
Departure Headway (Hd)	4.702	5.034	4.953	4.448
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	761	707	721	807
Service Time	2.745	3.094	3.006	2.486
HCM Lane V/C Ratio	0.235	0.068	0.176	0.326
HCM Control Delay	9.2	8.5	9.1	9.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.2	0.6	1.4

3: Hudnall Street & Denton Drive
3897-16.515

Existing
Timing Plan: AM

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	2	170	50
Future Vol, veh/h	0	2	173	51
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	201	59
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.6
HCM LOS	A

4: Denton Drive Cut Off & Cherrywood Avenue & Denton Drive
3897-16.515

Existing
Timing Plan: AM

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕↑			↕	↕↑	
Traffic Vol, veh/h	6	0	23	13	0	192	0	267	9	115	227	0
Future Vol, veh/h	6	0	23	13	0	196	0	272	9	117	232	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	40	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	25	14	0	211	0	292	10	126	249	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	647	803	125	673	798	151	249	0	0	302	0	0
Stage 1	501	501	-	297	297	-	-	-	-	-	-	-
Stage 2	146	302	-	376	501	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	356	315	902	341	317	868	1314	-	-	1256	-	-
Stage 1	521	541	-	687	666	-	-	-	-	-	-	-
Stage 2	842	663	-	617	541	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	249	283	902	306	285	868	1314	-	-	1256	-	-
Mov Cap-2 Maneuver	249	283	-	306	285	-	-	-	-	-	-	-
Stage 1	521	487	-	687	666	-	-	-	-	-	-	-
Stage 2	638	663	-	540	487	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.5			11.5			0			2.7		
HCM LOS	B			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1314	-	-	585	779	1256	-	-
HCM Lane V/C Ratio	-	-	-	0.053	0.288	0.1	-	-
HCM Control Delay (s)	0	-	-	11.5	8.2	-	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	1.2	0.3	-	-

5: Hudnall Street & Parkland Avenue
3897-16.515

Existing
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕		↕			↕
Traffic Vol, veh/h	10	11	141	3	1	206
Future Vol, veh/h	10	11	144	3	1	210
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	14	185	4	1	269

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	459	187	0	0	188	0
Stage 1	187	-	-	-	-	-
Stage 2	272	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	560	855	-	-	1386	-
Stage 1	845	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	559	855	-	-	1386	-
Mov Cap-2 Maneuver	559	-	-	-	-	-
Stage 1	845	-	-	-	-	-
Stage 2	773	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	10.5		0		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	683	1386	-
HCM Lane V/C Ratio	-	-	0.039	0.001	-
HCM Control Delay (s)	-	-	10.5	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

1: Denton Drive & Inwood Road
3897-16.515

Existing
Timing Plan: PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔		↔	↔↔↔		↔	↔↔↔	
Traffic Volume (vph)	55	1859	122	122	1200	46	21	129	158	87	365	79
Future Volume (vph)	56	1896	124	124	1224	47	21	132	161	89	372	81
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	57	1935	127	127	1249	48	21	135	164	91	380	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	2062	0	127	1297	0	0	320	0	0	554	0
Turn Type	D,P+P	NA		D,P+P	NA		D,P+P	NA		D,P+P	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2			4			8		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	65.0		19.0	69.0		6.5	22.0		14.0	29.5	
Total Split (%)	12.5%	54.2%		15.8%	57.5%		5.4%	18.3%		11.7%	24.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		Min	None	
Act Effct Green (s)	81.9	70.9		81.0	73.5		15.5			25.5		
Actuated g/C Ratio	0.68	0.59		0.68	0.61		0.13			0.21		
v/c Ratio	0.17	0.69		0.61	0.42		0.63			1.07		
Control Delay	8.3	19.0		33.1	13.2		29.5			101.0		
Queue Delay	0.0	0.0		0.0	0.0		0.0			0.0		
Total Delay	8.3	19.0		33.1	13.2		29.5			101.0		
LOS	A	B		C	B		C			F		
Approach Delay		18.7			15.0		29.5			101.0		
Approach LOS		B			B		C			F		
Queue Length 50th (ft)	11	372		43	189		60			~231		
Queue Length 95th (ft)	26	503		108	236		107			#338		
Internal Link Dist (ft)		207			255		276			141		
Turn Bay Length (ft)	150			200								
Base Capacity (vph)	338	2983		275	3097		555			520		
Starvation Cap Reductn	0	0		0	0		0			0		
Spillback Cap Reductn	0	0		0	0		0			0		
Storage Cap Reductn	0	0		0	0		0			0		
Reduced v/c Ratio	0.17	0.69		0.46	0.42		0.58			1.07		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.07

1: Denton Drive & Inwood Road
3897-16.515

Existing
Timing Plan: PM

Intersection Signal Delay: 28.6

Intersection LOS: C

Intersection Capacity Utilization 84.8%

ICU Level of Service E

Analysis Period (min) 15

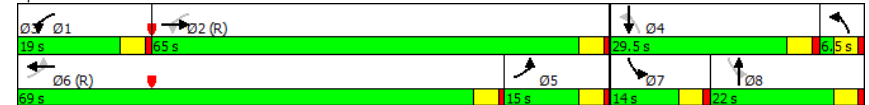
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Denton Drive & Inwood Road



2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Existing
Timing Plan: PM

	↖	↗	→	←	↖	↗	↘	↙	↘	↙	↖	↗
Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL2	SBL	SBR	SWL	SWR	SWR2
Lane Configurations			↕↕	↕↕				↕↕		↕↕		
Traffic Volume (vph)	6	151	771	427	228	133	9	264	8	84	58	9
Future Volume (vph)	6	154	786	436	233	136	9	269	8	86	59	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	162	827	459	245	143	9	283	8	91	62	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	995	847	0	0	0	300	0	162	0	0
Turn Type	custom	pm+pt	NA	NA			Perm	Prot		Prot		
Protected Phases		13	10	14				7		5		
Permitted Phases	13	10					7					
Minimum Split (s)	9.5	9.5	22.5	22.5			22.5	22.5		22.5		
Total Split (s)	43.0	43.0	101.0	58.0			25.0	25.0		20.0		
Total Split (%)	29.5%	29.5%	69.2%	39.7%			17.1%	17.1%		13.7%		
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5	3.5		3.5		
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0		1.0		
Lost Time Adjust (s)			0.0	0.0			0.0	0.0		0.0		
Total Lost Time (s)			4.5	4.5			4.5	4.5		4.5		
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Act Effct Green (s)			96.5	53.5			20.5	15.5				
Actuated g/C Ratio			0.66	0.37			0.14	0.11				
v/c Ratio			0.60	0.70			0.55	0.47				
Control Delay			13.4	43.3			47.0	66.1				
Queue Delay			0.0	0.0			0.0	0.0				
Total Delay			13.4	43.3			47.0	66.1				
LOS			B	D			D	E				
Approach Delay			13.4	43.3			47.0	66.1				
Approach LOS			B	D			D	E				
Queue Length 50th (ft)			221	360			102	75				
Queue Length 95th (ft)			264	438			152	114				
Internal Link Dist (ft)			174	239			547	259				
Turn Bay Length (ft)												
Base Capacity (vph)			1668	1207			549	348				
Starvation Cap Reductn			0	0			0	0				
Spillback Cap Reductn			0	0			0	0				
Storage Cap Reductn			0	0			0	0				
Reduced v/c Ratio			0.60	0.70			0.55	0.47				

Intersection Summary

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 88 (60%), Referenced to phase 10:EBTL and 14:WBT, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 32.5

Intersection LOS: C

Intersection Capacity Utilization 76.8%

ICU Level of Service D

Analysis Period (min) 15

2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Existing
Timing Plan: PM

Splits and Phases: 2: Maple Avenue & Denton Drive Cut Off & Hudnall Street



3: Hudnall Street & Denton Drive
3897-16.515

Existing
Timing Plan: PM

Intersection												
Intersection Delay, s/veh	12.3											
Intersection LOS	B											

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	2	17	9	0	158	44	40	0	23	236	12
Future Vol, veh/h	0	2	17	9	0	161	45	41	0	23	241	12
Peak Hour Factor	0.92	0.81	0.81	0.81	0.92	0.81	0.81	0.81	0.92	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	21	11	0	199	56	51	0	28	298	15
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	9.1	13	13.1
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	7%	65%	10%
Vol Thru, %	87%	61%	18%	79%
Vol Right, %	4%	32%	17%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	276	28	247	150
LT Vol	23	2	161	15
Through Vol	241	17	45	118
RT Vol	12	9	41	17
Lane Flow Rate	341	35	305	185
Geometry Grp	1	1	1	1
Degree of Util (X)	0.491	0.055	0.459	0.276
Departure Headway (Hd)	5.183	5.71	5.414	5.369
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	695	626	665	669
Service Time	3.213	3.758	3.447	3.407
HCM Lane V/C Ratio	0.491	0.056	0.459	0.277
HCM Control Delay	13.1	9.1	13	10.5
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	2.7	0.2	2.4	1.1

3: Hudnall Street & Denton Drive
3897-16.515

Existing
Timing Plan: PM

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	15	116	17
Future Vol, veh/h	0	15	118	17
Peak Hour Factor	0.92	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	19	146	21
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.5
HCM LOS	B

4: Denton Drive Cut Off & Cherrywood Avenue & Denton Drive
3897-16.515

Existing
Timing Plan: PM

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Vol, veh/h	3	0	12	8	0	61	0	258	43	302	285	0
Future Vol, veh/h	3	0	12	8	0	62	0	263	44	308	291	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	40	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	13	9	0	67	0	283	47	331	313	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1116	1305	156	1125	1281	165	313	0	0	330	0	0
Stage 1	975	975	-	306	306	-	-	-	-	-	-	-
Stage 2	141	330	-	819	975	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	162	159	862	160	164	850	1244	-	-	1226	-	-
Stage 1	270	328	-	679	660	-	-	-	-	-	-	-
Stage 2	847	644	-	336	328	-	-	-	-	-	-	-
Platoon blocked, %							-	-	-	-	-	-
Mov Cap-1 Maneuver	118	116	862	125	120	850	1244	-	-	1226	-	-
Mov Cap-2 Maneuver	118	116	-	125	120	-	-	-	-	-	-	-
Stage 1	270	239	-	679	660	-	-	-	-	-	-	-
Stage 2	781	644	-	242	239	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	14.9			13.3			0			4.6		
HCM LOS	B			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1244	-	-	381	511	1226	-	-
HCM Lane V/C Ratio	-	-	-	0.042	0.147	0.27	-	-
HCM Control Delay (s)	0	-	-	14.9	13.3	9	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	1.1	-	-

5: Hudnall Street
3897-16.515

Existing
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Vol, veh/h	4	7	275	7	10	157
Future Vol, veh/h	4	7	281	7	10	160
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	9	360	9	13	205

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	596	365	0	0	369	0
Stage 1	365	-	-	-	-	-
Stage 2	231	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	466	680	-	-	1190	-
Stage 1	702	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	460	680	-	-	1190	-
Mov Cap-2 Maneuver	460	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	797	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	11.4		0		0.5	
HCM LOS	B					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	579	1190	-
HCM Lane V/C Ratio	-	-	0.024	0.011	-
HCM Control Delay (s)	-	-	11.4	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

1: Denton Drive & Inwood Road
3897-16.515

Background
Timing Plan: AM

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	84	1102	38	16	155	1452	80	118	206	155	42	175
Future Volume (vph)	86	1124	39	16	158	1481	82	120	210	158	43	179
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	89	1159	40	16	163	1527	85	124	216	163	44	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	1199	0	0	179	1612	0	0	503	0	0	273
Turn Type	D,P+P	NA		D,P+P	D,P+P	NA		D,P+P	NA		D,P+P	NA
Protected Phases	5	2			1	1	6		3	8		7
Permitted Phases	6				2	2			4			8
Detector Phase	5	2			1	1	6		3	8		7
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0		5.0	5.0		5.0
Minimum Split (s)	9.5	22.5			9.5	9.5	22.5		9.5	22.5		9.5
Total Split (s)	15.0	65.0			19.0	19.0	69.0		6.5	22.0		14.0
Total Split (%)	12.5%	54.2%			15.8%	15.8%	57.5%		5.4%	18.3%		11.7%
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5		3.5	3.5		3.5
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0			0.0			0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5			4.5			4.5
Lead/Lag	Lag	Lag			Lead	Lead	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes		Yes	Yes		Yes
Recall Mode	None	C-Max			None	C-Max			None			None
Act Effct Green (s)	75.0	64.9			75.0	64.5			21.5			31.5
Actuated g/C Ratio	0.62	0.54			0.62	0.54			0.18			0.26
v/c Ratio	0.36	0.44			0.55	0.59			0.97			0.41
Control Delay	24.1	17.3			14.5	19.8			75.5			35.5
Queue Delay	0.0	0.0			0.0	0.0			0.0			0.0
Total Delay	24.1	17.3			14.5	19.8			75.5			35.5
LOS	C	B			B	B			E			D
Approach Delay		17.8				19.3			75.5			35.5
Approach LOS		B				B			E			D
Queue Length 50th (ft)	22	194			48	295			184			83
Queue Length 95th (ft)	41	243			76	343			#298			122
Internal Link Dist (ft)		207				255			276			141
Turn Bay Length (ft)	150				200							
Base Capacity (vph)	247	2740			390	2716			521			665
Starvation Cap Reductn	0	0			0	0			0			0
Spillback Cap Reductn	0	0			0	0			0			0
Storage Cap Reductn	0	0			0	0			0			0
Reduced v/c Ratio	0.36	0.44			0.46	0.59			0.97			0.41

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97

1: Denton Drive & Inwood Road
3897-16.515

Background
Timing Plan: AM

	
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	42
Future Volume (vph)	43
Peak Hour Factor	0.97
Adj. Flow (vph)	44
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

1: Denton Drive & Inwood Road
3897-16.515

Background
Timing Plan: AM

Intersection Signal Delay: 27.3

Intersection LOS: C

Intersection Capacity Utilization 71.0%

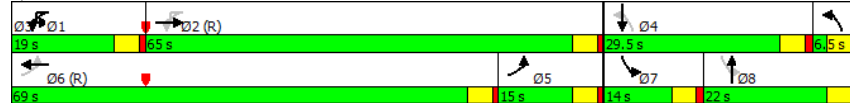
ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Denton Drive & Inwood Road



2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Background
Timing Plan: AM

	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR	SWR2
Lane Configurations			↔↔	↔↔			↔↔	↔↔	↔↔	↔↔	
Traffic Volume (vph)	1	37	254	641	260	42	194	30	91	145	26
Future Volume (vph)	1	38	259	654	265	43	198	31	93	148	27
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	1	44	301	760	308	50	230	36	108	172	31
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	346	1118	0	0	266	0	311	0	0
Turn Type	custom	pm+pt	NA	NA			Prot		Prot		
Protected Phases			13	14			7		5		
Permitted Phases	13	10									
Minimum Split (s)	9.5	9.5	22.5	22.5			22.5		22.5		
Total Split (s)	26.0	26.0	84.0	58.0			41.0		21.0		
Total Split (%)	17.8%	17.8%	57.5%	39.7%			28.1%		14.4%		
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5		3.5		
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0		1.0		
Lost Time Adjust (s)			0.0	0.0			0.0		0.0		
Total Lost Time (s)			4.5	4.5			4.5		4.5		
Lead/Lag	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes		Yes							
Act Effect Green (s)			79.5	53.5			36.5		16.5		
Actuated g/C Ratio			0.54	0.37			0.25		0.11		
v/c Ratio			0.24	0.91			0.29		1.12dr		
Control Delay			17.3	55.2			31.9		85.9		
Queue Delay			0.0	0.0			0.0		0.0		
Total Delay			17.3	55.2			31.9		85.9		
LOS			B	E			C		F		
Approach Delay			17.3	55.2			31.9		85.9		
Approach LOS			B	E			C		F		
Queue Length 50th (ft)			84	528			73		152		
Queue Length 95th (ft)			107	586			107		#213		
Internal Link Dist (ft)			174	239			547		259		
Turn Bay Length (ft)											
Base Capacity (vph)			1413	1234			907		362		
Starvation Cap Reductn			0	0			0		0		
Spillback Cap Reductn			0	0			0		0		
Storage Cap Reductn			0	0			0		0		
Reduced v/c Ratio			0.24	0.91			0.29		0.86		

Intersection Summary

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 0 (0%), Referenced to phase 10:EBTL and 14:WBT, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 50.4

Intersection LOS: D

Intersection Capacity Utilization 62.3%

ICU Level of Service B

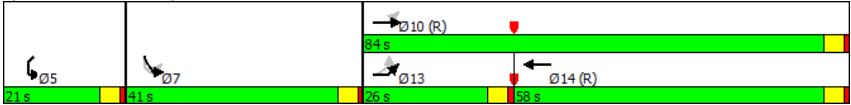
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 2: Maple Avenue & Denton Drive Cut Off & Hudnall Street



3: Hudnall Street & Denton Drive
3897-16.515

Background
Timing Plan: AM

Intersection												
Intersection Delay, s/veh	9.4											
Intersection LOS	A											

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	4	30	7	0	65	15	30	0	44	106	5
Future Vol, veh/h	0	4	31	7	0	66	15	31	0	45	108	5
Peak Hour Factor	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	5	36	8	0	77	17	36	0	52	126	6
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.5	9.2	9.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	28%	10%	59%	1%
Vol Thru, %	68%	74%	13%	76%
Vol Right, %	3%	17%	28%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	158	42	112	234
LT Vol	45	4	66	2
Through Vol	108	31	15	179
RT Vol	5	7	31	53
Lane Flow Rate	184	49	130	272
Geometry Grp	1	1	1	1
Degree of Util (X)	0.241	0.069	0.181	0.338
Departure Headway (Hd)	4.728	5.078	4.99	4.468
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	757	701	715	803
Service Time	2.776	3.142	3.045	2.51
HCM Lane V/C Ratio	0.243	0.07	0.182	0.339
HCM Control Delay	9.3	8.5	9.2	9.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.2	0.7	1.5

3: Hudnall Street & Denton Drive
3897-16.515

Background
Timing Plan: AM

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	2	175	52
Future Vol, veh/h	0	2	179	53
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	208	62
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.8
HCM LOS	A

4: Denton Drive Cut Off & Cherrywood Avenue & Denton Drive
3897-16.515

Background
Timing Plan: AM

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕↑			↕	↕↑	
Traffic Vol, veh/h	6	0	24	13	0	198	0	275	9	118	234	0
Future Vol, veh/h	6	0	24	13	0	202	0	281	9	120	239	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	40	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	0	26	14	0	217	0	302	10	129	257	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	666	827	128	694	822	156	257	0	0	312	0	0
Stage 1	515	515	-	307	307	-	-	-	-	-	-	-
Stage 2	151	312	-	387	515	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	345	305	898	329	307	862	1305	-	-	1245	-	-
Stage 1	511	533	-	678	660	-	-	-	-	-	-	-
Stage 2	836	656	-	608	533	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	238	273	898	294	275	862	1305	-	-	1245	-	-
Mov Cap-2 Maneuver	238	273	-	294	275	-	-	-	-	-	-	-
Stage 1	511	478	-	678	660	-	-	-	-	-	-	-
Stage 2	625	656	-	529	478	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.6			11.6			0			2.7		
HCM LOS	B			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1305	-	-	578	772	1245	-	-
HCM Lane V/C Ratio	-	-	-	0.056	0.299	0.104	-	-
HCM Control Delay (s)	0	-	-	11.6	8.2	-	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	1.3	0.3	-	-

5: Hudnall Street & Parkland Avenue
3897-16.515

Background
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕		↕			↕
Traffic Vol, veh/h	10	11	145	3	1	212
Future Vol, veh/h	10	11	148	3	1	216
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	14	190	4	1	277

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	471	192	0	0	194	0
Stage 1	192	-	-	-	-	-
Stage 2	279	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	551	850	-	-	1379	-
Stage 1	841	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	550	850	-	-	1379	-
Mov Cap-2 Maneuver	550	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	10.6		0		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	675	1379	-
HCM Lane V/C Ratio	-	-	0.04	0.001	-
HCM Control Delay (s)	-	-	10.6	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

1: Denton Drive & Inwood Road
3897-16.515

Background
Timing Plan: PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↱	↰ ↱		↰ ↱	↰ ↱		↰ ↱	↰ ↱		↰ ↱	↰ ↱	
Traffic Volume (vph)	57	1915	126	126	1236	47	22	133	163	90	376	81
Future Volume (vph)	58	1953	129	129	1261	48	22	136	166	92	384	83
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	59	1993	132	132	1287	49	22	139	169	94	392	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	2125	0	132	1336	0	0	330	0	0	571	0
Turn Type	D,P+P	NA		D,P+P	NA		D,P+P	NA		D,P+P	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2			4			8		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	65.0		19.0	69.0		6.5	22.0		14.0	29.5	
Total Split (%)	12.5%	54.2%		15.8%	57.5%		5.4%	18.3%		11.7%	24.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		Min	None	
Act Effct Green (s)	81.8	70.6		80.9	73.4		15.6			25.6		
Actuated g/C Ratio	0.68	0.59		0.67	0.61		0.13			0.21		
v/c Ratio	0.19	0.72		0.61	0.43		0.65			1.10		
Control Delay	8.7	19.9		33.5	13.4		30.3			113.1		
Queue Delay	0.0	0.0		0.0	0.0		0.0			0.0		
Total Delay	8.7	19.9		33.5	13.4		30.3			113.1		
LOS	A	B		C	B		C			F		
Approach Delay		19.6			15.2		30.3			113.1		
Approach LOS		B			B		C			F		
Queue Length 50th (ft)	12	394		46	197		62			~250		
Queue Length 95th (ft)	26	536		112	247		111			#360		
Internal Link Dist (ft)		207			255		276			141		
Turn Bay Length (ft)	150			200								
Base Capacity (vph)	329	2968		277	3095		549			517		
Starvation Cap Reductn	0	0		0	0		0			0		
Spillback Cap Reductn	0	0		0	0		0			0		
Storage Cap Reductn	0	0		0	0		0			0		
Reduced v/c Ratio	0.18	0.72		0.48	0.43		0.60			1.10		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.10

12/29/2016
HWL

Synchro 9 Report
Page 1

1: Denton Drive & Inwood Road
3897-16.515

Background
Timing Plan: PM

Intersection Signal Delay: 30.7

Intersection LOS: C

Intersection Capacity Utilization 86.9%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Denton Drive & Inwood Road



12/29/2016
HWL

Synchro 9 Report
Page 2

2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Background
Timing Plan: PM

Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL2	SBL	SBR	SWL	SWR	SWR2
Lane Configurations												
Traffic Volume (vph)	6	156	794	440	235	137	9	272	8	87	60	9
Future Volume (vph)	6	159	810	449	240	140	9	277	8	89	61	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	167	853	473	253	147	9	292	8	94	64	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1026	873	0	0	0	309	0	167	0	0
Turn Type	custom	pm+pt	NA	NA			Perm	Prot		Prot		
Protected Phases		13	10	14				7		5		
Permitted Phases	13	10					7					
Minimum Split (s)	9.5	9.5	22.5	22.5			22.5	22.5		22.5		
Total Split (s)	43.0	43.0	101.0	58.0			25.0	25.0		20.0		
Total Split (%)	29.5%	29.5%	69.2%	39.7%			17.1%	17.1%		13.7%		
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5	3.5		3.5		
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0		1.0		
Lost Time Adjust (s)			0.0	0.0				0.0		0.0		
Total Lost Time (s)			4.5	4.5				4.5		4.5		
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Act Effct Green (s)			96.5	53.5			20.5			15.5		
Actuated g/C Ratio			0.66	0.37			0.14			0.11		
v/c Ratio			0.62	0.72			0.56			0.48		
Control Delay			13.7	44.1			47.8			66.5		
Queue Delay			0.0	0.0			0.0			0.0		
Total Delay			13.7	44.1			47.8			66.5		
LOS			B	D			D			E		
Approach Delay			13.7	44.1			47.8			66.5		
Approach LOS			B	D			D			E		
Queue Length 50th (ft)			231	375			106			78		
Queue Length 95th (ft)			275	455			158			118		
Internal Link Dist (ft)			174	239			547			259		
Turn Bay Length (ft)												
Base Capacity (vph)			1658	1207			549			348		
Starvation Cap Reductn			0	0			0			0		
Spillback Cap Reductn			0	0			0			0		
Storage Cap Reductn			0	0			0			0		
Reduced v/c Ratio			0.62	0.72			0.56			0.48		

Intersection Summary

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 88 (60%), Referenced to phase 10:EBTL and 14:WBT, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 33.0

Intersection LOS: C

Intersection Capacity Utilization 78.7%

ICU Level of Service D

Analysis Period (min) 15

2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Background
Timing Plan: PM

Splits and Phases: 2: Maple Avenue & Denton Drive Cut Off & Hudnall Street



3: Hudnall Street & Denton Drive
3897-16.515

Background
Timing Plan: PM

Intersection												
Intersection Delay, s/veh	12.7											
Intersection LOS	B											

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	2	18	9	0	163	45	41	0	24	243	12
Future Vol, veh/h	0	2	18	9	0	166	46	42	0	24	248	12
Peak Hour Factor	0.92	0.81	0.81	0.81	0.92	0.81	0.81	0.81	0.92	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	22	11	0	205	57	52	0	30	306	15
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	9.2	13.4	13.6
HCM LOS	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	7%	65%	10%
Vol Thru, %	87%	62%	18%	79%
Vol Right, %	4%	31%	17%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	284	29	254	155
LT Vol	24	2	166	15
Through Vol	248	18	46	122
RT Vol	12	9	42	18
Lane Flow Rate	351	36	314	191
Geometry Grp	1	1	1	1
Degree of Util (X)	0.51	0.058	0.476	0.288
Departure Headway (Hd)	5.234	5.797	5.47	5.427
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	687	616	659	662
Service Time	3.268	3.851	3.506	3.468
HCM Lane V/C Ratio	0.511	0.058	0.476	0.289
HCM Control Delay	13.6	9.2	13.4	10.7
HCM Lane LOS	B	A	B	B
HCM 95th-tile Q	2.9	0.2	2.6	1.2

3: Hudnall Street & Denton Drive
3897-16.515

Background
Timing Plan: PM

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	15	120	18
Future Vol, veh/h	0	15	122	18
Peak Hour Factor	0.92	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	19	151	22
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.7
HCM LOS	B

4: Denton Drive Cut Off & Cherrywood Avenue & Denton Drive
3897-16.515

Background
Timing Plan: PM

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕		↕	↕	
Traffic Vol, veh/h	3	0	12	8	0	63	0	266	44	311	294	0
Future Vol, veh/h	3	0	12	8	0	64	0	271	45	317	300	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	40	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	13	9	0	69	0	291	48	341	323	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1150	1344	161	1159	1320	170	323	0	0	340	0	0
Stage 1	1004	1004	-	316	316	-	-	-	-	-	-	-
Stage 2	146	340	-	843	1004	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	153	151	855	151	156	844	1234	-	-	1216	-	-
Stage 1	259	318	-	670	654	-	-	-	-	-	-	-
Stage 2	842	638	-	325	318	-	-	-	-	-	-	-
Platoon blocked, %							-	-	-	-	-	-
Mov Cap-1 Maneuver	110	109	855	116	112	844	1234	-	-	1216	-	-
Mov Cap-2 Maneuver	110	109	-	116	112	-	-	-	-	-	-	-
Stage 1	259	229	-	670	654	-	-	-	-	-	-	-
Stage 2	773	638	-	230	229	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	15.4			13.6			0			4.7		
HCM LOS	C			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1234	-	-	363	497	1216	-	-
HCM Lane V/C Ratio	-	-	-	0.044	0.156	0.28	-	-
HCM Control Delay (s)	0	-	-	15.4	13.6	9.1	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	1.2	-	-

5: Hudnall Street
3897-16.515

Background
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↕		↕			↕
Traffic Vol, veh/h	4	7	283	7	10	162
Future Vol, veh/h	4	7	289	7	10	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	9	371	9	13	212

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	612	375	0	0	379	0
Stage 1	375	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	456	671	-	-	1179	-
Stage 1	695	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	451	671	-	-	1179	-
Mov Cap-2 Maneuver	451	-	-	-	-	-
Stage 1	695	-	-	-	-	-
Stage 2	792	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	11.5		0		0.5	
HCM LOS	B					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	570	1179	-
HCM Lane V/C Ratio	-	-	0.025	0.011	-
HCM Control Delay (s)	-	-	11.5	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

1: Denton Drive & Inwood Road
3897-16.515

Background Plus Site Generated
Timing Plan: AM

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	84	1102	61	16	198	1452	80	183	243	217	42	212
Future Volume (vph)	86	1124	62	16	202	1481	82	187	248	221	43	216
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	89	1159	64	16	208	1527	85	193	256	228	44	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	1223	0	0	224	1612	0	0	677	0	0	311
Turn Type	D,P+P	NA		D,P+P	D,P+P	NA		D,P+P	NA		D,P+P	NA
Protected Phases	5	2			1	1	6		3	8		7
Permitted Phases	6				2	2			4			8
Detector Phase	5	2			1	1	6		3	8		7
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0		5.0	5.0		5.0
Minimum Split (s)	9.5	22.5			9.5	9.5	22.5		9.5	22.5		9.5
Total Split (s)	15.0	65.0			19.0	19.0	69.0		6.5	22.0		14.0
Total Split (%)	12.5%	54.2%			15.8%	15.8%	57.5%		5.4%	18.3%		11.7%
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5		3.5	3.5		3.5
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0			0.0			0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5			4.5			4.5
Lead/Lag	Lag	Lag			Lead	Lead	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes		Yes	Yes		Yes
Recall Mode	None	C-Max			None	C-Max			None			None
Act Effct Green (s)	75.0	63.6			75.0	64.5			21.5			31.5
Actuated g/C Ratio	0.62	0.53			0.62	0.54			0.18			0.26
v/c Ratio	0.36	0.46			0.67	0.59			1.33			0.52
Control Delay	24.1	18.3			20.2	19.8			197.2			38.2
Queue Delay	0.0	0.0			0.0	0.0			0.0			0.0
Total Delay	24.1	18.3			20.2	19.8			197.2			38.2
LOS	C	B			C	B			F			D
Approach Delay		18.7				19.9			197.2			38.2
Approach LOS		B				B			F			D
Queue Length 50th (ft)	22	204			61	295			~337			97
Queue Length 95th (ft)	41	257			111	343			#461			140
Internal Link Dist (ft)		207				255			276			141
Turn Bay Length (ft)	150				200							
Base Capacity (vph)	247	2678			380	2716			509			599
Starvation Cap Reductn	0	0			0	0			0			0
Spillback Cap Reductn	0	0			0	0			0			0
Storage Cap Reductn	0	0			0	0			0			0
Reduced v/c Ratio	0.36	0.46			0.59	0.59			1.33			0.52

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.33

1: Denton Drive & Inwood Road
3897-16.515

Background Plus Site Generated
Timing Plan: AM

	
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	42
Future Volume (vph)	43
Peak Hour Factor	0.97
Adj. Flow (vph)	44
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

1: Denton Drive & Inwood Road
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection Signal Delay: 49.9

Intersection LOS: D

Intersection Capacity Utilization 76.9%

ICU Level of Service D

Analysis Period (min) 15

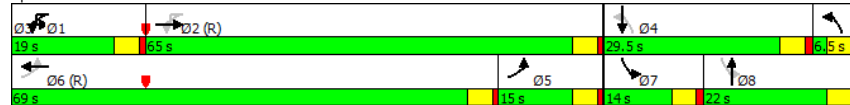
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Denton Drive & Inwood Road



2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Background Plus Site Generated

Timing Plan: AM

	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR	SWR2
Lane Configurations		↑↑	↑↑			↑↑	↑↑	↑↑	↑↑	
Traffic Volume (vph)	1	47	641	272	71	206	35	132	154	26
Future Volume (vph)	1	48	654	277	72	210	36	135	157	27
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	1	56	760	322	84	244	42	157	183	31
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	57	1166	0	0	286	0	371	0	0
Turn Type	pm+pt	NA	NA			Prot		Prot		
Protected Phases	13	10	14			7		5		
Permitted Phases	10									
Minimum Split (s)	9.5	22.5	22.5			22.5		22.5		
Total Split (s)	26.0	84.0	58.0			41.0		21.0		
Total Split (%)	17.8%	57.5%	39.7%			28.1%		14.4%		
Yellow Time (s)	3.5	3.5	3.5			3.5		3.5		
All-Red Time (s)	1.0	1.0	1.0			1.0		1.0		
Lost Time Adjust (s)		0.0	0.0			0.0		0.0		
Total Lost Time (s)		4.5	4.5			4.5		4.5		
Lead/Lag	Lead		Lag							
Lead-Lag Optimize?	Yes		Yes							
Act Effct Green (s)		79.5	53.5			36.5		16.5		
Actuated g/C Ratio		0.54	0.37			0.25		0.11		
v/c Ratio		0.03	0.95			0.32		1.18dr		
Control Delay		15.5	60.9			33.1		114.0		
Queue Delay		0.0	0.0			0.0		0.0		
Total Delay		15.5	60.9			33.1		114.0		
LOS		B	E			C		F		
Approach Delay		15.5	60.9			33.1		114.0		
Approach LOS		B	E			C		F		
Queue Length 50th (ft)		12	564			82		~191		
Queue Length 95th (ft)		23	#635			117		#276		
Internal Link Dist (ft)		174	239			547		322		
Turn Bay Length (ft)										
Base Capacity (vph)		1863	1229			905		365		
Starvation Cap Reductn		0	0			0		0		
Spillback Cap Reductn		0	0			0		0		
Storage Cap Reductn		0	0			0		0		
Reduced v/c Ratio		0.03	0.95			0.32		1.02		

Intersection Summary

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 0 (0%), Referenced to phase 10:EBTL and 14:WBT, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 65.8

Intersection LOS: E

Intersection Capacity Utilization 56.4%

ICU Level of Service B

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

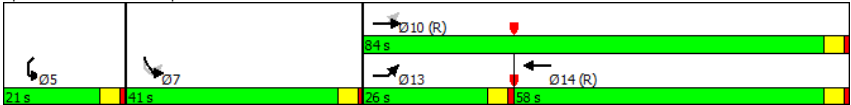
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 2: Maple Avenue & Denton Drive Cut Off & Hudnall Street



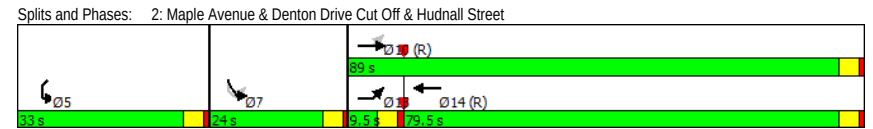
2: Maple Avenue & Denton Drive Cut Off & Backhaul Street Plus Site Generated With Improvement
3897-16.515 Timing Plan: AM

										
Lane Group	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR	SWR2
Lane Configurations										
Traffic Volume (vph)	1	47	641	272	71	206	35	132	154	26
Future Volume (vph)	1	48	654	277	72	210	36	135	157	27
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	1	56	760	322	84	244	42	157	183	31
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	57	1166	0	0	286	0	371	0	0
Turn Type	pm+pt	NA	NA			Prot		Prot		
Protected Phases	13	10	14			7		5		
Permitted Phases	10									
Minimum Split (s)	9.5	22.5	22.5			22.5		22.5		
Total Split (s)	9.5	89.0	79.5			24.0		33.0		
Total Split (%)	6.5%	61.0%	54.5%			16.4%		22.6%		
Yellow Time (s)	3.5	3.5	3.5			3.5		3.5		
All-Red Time (s)	1.0	1.0	1.0			1.0		1.0		
Lost Time Adjust (s)		0.0	0.0			0.0		0.0		
Total Lost Time (s)		4.5	4.5			4.5		4.5		
Lead/Lag	Lead		Lag							
Lead-Lag Optimize?	Yes		Yes							
Act Effct Green (s)		84.5	75.0			19.5		28.5		
Actuated g/C Ratio		0.58	0.51			0.13		0.20		
v/c Ratio		0.03	0.68			0.55		0.59		
Control Delay		13.2	29.0			47.0		57.8		
Queue Delay		0.0	0.0			0.0		0.0		
Total Delay		13.2	29.0			47.0		57.8		
LOS		B	C			D		E		
Approach Delay		13.2	29.0			47.0		57.8		
Approach LOS		B	C			D		E		
Queue Length 50th (ft)		11	424			96		167		
Queue Length 95th (ft)		21	468			137		210		
Internal Link Dist (ft)		174	239			547		322		
Turn Bay Length (ft)										
Base Capacity (vph)		1951	1723			520		630		
Starvation Cap Reductn		0	0			0		0		
Spillback Cap Reductn		0	0			0		0		
Storage Cap Reductn		0	0			0		0		
Reduced v/c Ratio		0.03	0.68			0.55		0.59		

Intersection Summary

Cycle Length: 146	
Actuated Cycle Length: 146	
Offset: 0 (0%), Referenced to phase 10:EBTL and 14:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 36.9	Intersection LOS: D
Intersection Capacity Utilization 56.4%	ICU Level of Service B
Analysis Period (min) 15	

2: Maple Avenue & Denton Drive Cut Off & Backhaul Street Plus Site Generated With Improvement
3897-16.515 Timing Plan: AM



3: Hudnall Street & Denton Drive
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection												
Intersection Delay, s/veh	10											
Intersection LOS	A											

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	13	30	39	0	68	15	30	0	53	116	7
Future Vol, veh/h	0	13	31	40	0	69	15	31	0	54	118	7
Peak Hour Factor	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	15	36	47	0	80	17	36	0	63	137	8
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	9	9.5	9.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	30%	15%	60%	1%
Vol Thru, %	66%	37%	13%	77%
Vol Right, %	4%	48%	27%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	179	84	115	253
LT Vol	54	13	69	2
Through Vol	118	31	15	196
RT Vol	7	40	31	55
Lane Flow Rate	208	98	134	294
Geometry Grp	1	1	1	1
Degree of Util (X)	0.284	0.137	0.193	0.38
Departure Headway (Hd)	4.906	5.048	5.2	4.65
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	726	702	683	768
Service Time	2.981	3.14	3.287	2.717
HCM Lane V/C Ratio	0.287	0.14	0.196	0.383
HCM Control Delay	9.9	9	9.5	10.6
HCM Lane LOS	A	A	A	B
HCM 95th-tile Q	1.2	0.5	0.7	1.8

3: Hudnall Street & Denton Drive
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	2	192	54
Future Vol, veh/h	0	2	196	55
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	228	64
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.6
HCM LOS	B

4: Denton Drive Cut Off & Cherrywood Avenue & Denton Drive Background Plus Site Generated
3897-16.515

Timing Plan: AM

Intersection												
Int Delay, s/veh	5.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕↑			↕↑		
Traffic Vol, veh/h	8	0	24	13	0	316	0	321	9	150	305	0
Future Vol, veh/h	8	0	24	13	0	322	0	327	9	153	311	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	40	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	26	14	0	346	0	352	10	165	334	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	839	1024	167	852	1019	181	334	0	0	361	0	0
Stage 1	663	663	-	356	356	-	-	-	-	-	-	-
Stage 2	176	361	-	496	663	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	259	234	848	253	236	831	1222	-	-	1194	-	-
Stage 1	417	457	-	634	628	-	-	-	-	-	-	-
Stage 2	809	624	-	524	457	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	135	202	848	219	203	831	1222	-	-	1194	-	-
Mov Cap-2 Maneuver	135	202	-	219	203	-	-	-	-	-	-	-
Stage 1	417	394	-	634	628	-	-	-	-	-	-	-
Stage 2	472	624	-	438	394	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	15.9			14.2			0			2.8		
HCM LOS	C			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1222	-	-	365	750	1194	-	-
HCM Lane V/C Ratio	-	-	-	0.094	0.48	0.138	-	-
HCM Control Delay (s)	0	-	-	15.9	14.2	8.5	-	-
HCM Lane LOS	A	-	-	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	2.6	0.5	-	-

5: Hudnall Street & Drive 6/Parkland Avenue
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Vol, veh/h	14	2	17	10	3	11	17	152	3	1	241	23
Future Vol, veh/h	14	2	17	10	3	11	17	155	3	1	246	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	78	92	78	92	78	78	78	78	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	2	18	13	3	14	18	199	4	1	315	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	576	570	328	579	581	201	340	0	0	203	0	0
Stage 1	330	330	-	238	238	-	-	-	-	-	-	-
Stage 2	246	240	-	341	343	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	428	431	713	426	425	840	1219	-	-	1369	-	-
Stage 1	683	646	-	765	708	-	-	-	-	-	-	-
Stage 2	758	707	-	674	637	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	413	423	713	408	417	840	1219	-	-	1369	-	-
Mov Cap-2 Maneuver	413	423	-	408	417	-	-	-	-	-	-	-
Stage 1	671	645	-	752	696	-	-	-	-	-	-	-
Stage 2	729	695	-	654	636	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	12.3			12.1			0.7			0		
HCM LOS	B			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1219	-	-	528	539	1369	-	-
HCM Lane V/C Ratio	0.015	-	-	0.068	0.056	0.001	-	-
HCM Control Delay (s)	8	0	-	12.3	12.1	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

7: Denton Drive Cut Off & Drive 1
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y		Y	Y
Traffic Vol, veh/h	10	8	322	9	9	181
Future Vol, veh/h	10	8	328	9	9	185
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	9	357	10	10	201

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	481	183	0	0	366
Stage 1	361	-	-	-	-
Stage 2	120	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	514	828	-	-	1189
Stage 1	676	-	-	-	-
Stage 2	892	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	509	828	-	-	1189
Mov Cap-2 Maneuver	509	-	-	-	-
Stage 1	676	-	-	-	-
Stage 2	884	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	614	1189
HCM Lane V/C Ratio	-	-	0.032	0.008
HCM Control Delay (s)	-	-	11.1	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

8: Denton Drive Cut Off & Drive 2
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y		Y	Y
Traffic Vol, veh/h	7	33	299	11	54	137
Future Vol, veh/h	7	34	305	11	55	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	37	332	12	60	152

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	533	172	0	0	343
Stage 1	337	-	-	-	-
Stage 2	196	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	477	842	-	-	1213
Stage 1	695	-	-	-	-
Stage 2	818	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	451	842	-	-	1213
Mov Cap-2 Maneuver	451	-	-	-	-
Stage 1	695	-	-	-	-
Stage 2	774	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	2.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1213
HCM Lane V/C Ratio	-	-	0.061	0.049
HCM Control Delay (s)	-	-	10.2	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0.2

9: Denton Drive Cut Off & Butler Street/Drive 3
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	5	8	5	5	5	5	5	297	8	8	130	10
Future Vol, veh/h	5	8	5	5	5	5	5	303	8	8	133	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	9	5	5	5	5	5	329	9	9	145	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	345	516	78	439	518	169	155	0	0	338	0	0
Stage 1	167	167	-	345	345	-	-	-	-	-	-	-
Stage 2	178	349	-	94	173	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	585	461	967	502	460	845	1423	-	-	1218	-	-
Stage 1	818	759	-	644	635	-	-	-	-	-	-	-
Stage 2	806	632	-	902	755	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	571	455	967	487	454	845	1423	-	-	1218	-	-
Mov Cap-2 Maneuver	571	455	-	487	454	-	-	-	-	-	-	-
Stage 1	815	753	-	641	632	-	-	-	-	-	-	-
Stage 2	791	629	-	879	749	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	11.7	0.1	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1423	-	-	571	552	1218	-	-
HCM Lane V/C Ratio	0.004	-	-	0.034	0.03	0.007	-	-
HCM Control Delay (s)	7.5	0	-	11.5	11.7	8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

11: Drive 4 & Denton Drive
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕			↕	↕	
Traffic Vol, veh/h	148	8	0	327	5	0
Future Vol, veh/h	151	8	0	334	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	9	0	363	5	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	173	0	531	168
Stage 1	-	-	-	-	168	-
Stage 2	-	-	-	-	363	-
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	-	-	1404	-	509	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	704	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1404	-	509	876
Mov Cap-2 Maneuver	-	-	-	-	509	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	704	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	509	-	-	1404	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	12.1	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

13: Drive 5 & Denton Drive
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4	2	9	11	11	3
Traffic Vol, veh/h	44	29	9	113	116	37
Future Vol, veh/h	45	30	9	115	118	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	33	10	125	128	41

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	82	0	210	65
Stage 1	-	-	-	-	65	-
Stage 2	-	-	-	-	145	-
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	-	-	1515	-	778	999
Stage 1	-	-	-	-	958	-
Stage 2	-	-	-	-	882	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1515	-	773	999
Mov Cap-2 Maneuver	-	-	-	-	773	-
Stage 1	-	-	-	-	958	-
Stage 2	-	-	-	-	876	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	818	-	-	1515	-
HCM Lane V/C Ratio	0.207	-	-	0.006	-
HCM Control Delay (s)	10.5	-	-	7.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0	-

14: Hudnall Street & Drive 7
3897-16.515

Background Plus Site Generated
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	2	2	8	10	3	0
Traffic Vol, veh/h	0	5	8	102	307	0
Future Vol, veh/h	0	5	8	104	313	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	9	113	340	0

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	470	340	340	0	-
Stage 1	340	-	-	-	-
Stage 2	130	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	552	702	1219	-	-
Stage 1	721	-	-	-	-
Stage 2	896	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	548	702	1219	-	-
Mov Cap-2 Maneuver	548	-	-	-	-
Stage 1	721	-	-	-	-
Stage 2	889	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1219	-	702	-	-
HCM Lane V/C Ratio	0.007	-	0.008	-	-
HCM Control Delay (s)	8	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

1: Denton Drive & Inwood Road
3897-16.515

Background Plus Site Generated
Timing Plan: PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔		↔	↔↔↔		↔	↔↔↔	
Traffic Volume (vph)	57	1915	193	209	1236	47	63	182	225	90	435	81
Future Volume (vph)	58	1953	197	213	1261	48	64	186	230	92	444	83
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	59	1993	201	217	1287	49	65	190	235	94	453	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	2194	0	217	1336	0	0	490	0	0	632	0
Turn Type	D,P+P	NA		D,P+P	NA		D,P+P	NA		D,P+P	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2			4			8		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	65.0		19.0	69.0		6.5	22.0		14.0	29.5	
Total Split (%)	12.5%	54.2%		15.8%	57.5%		5.4%	18.3%		11.7%	24.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		Min	None	
Act Effct Green (s)	75.9	61.7		75.0	67.5		21.5			31.5		
Actuated g/C Ratio	0.63	0.51		0.62	0.56		0.18			0.26		
v/c Ratio	0.20	0.85		0.84	0.47		0.92			1.08		
Control Delay	11.6	29.2		57.0	16.8		57.0			100.8		
Queue Delay	0.0	0.0		0.0	0.0		0.0			0.0		
Total Delay	11.6	29.2		57.0	16.8		57.0			100.8		
LOS	B	C		E	B		E			F		
Approach Delay		28.7			22.4		57.0			100.8		
Approach LOS		C			C		E			F		
Queue Length 50th (ft)	15	525		113	227		137			~253		
Queue Length 95th (ft)	30	598		#236	267		#243			#406		
Internal Link Dist (ft)		207			255		276			141		
Turn Bay Length (ft)	150			200								
Base Capacity (vph)	305	2585		275	2846		530			585		
Starvation Cap Reductn	0	0		0	0		0			0		
Spillback Cap Reductn	0	0		0	0		0			0		
Storage Cap Reductn	0	0		0	0		0			0		
Reduced v/c Ratio	0.19	0.85		0.79	0.47		0.92			1.08		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08

1: Denton Drive & Inwood Road
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection Signal Delay: 38.8
Intersection Capacity Utilization 99.2%

Intersection LOS: D
ICU Level of Service F

Analysis Period (min) 15

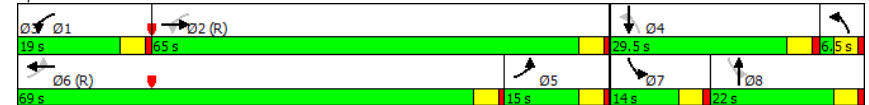
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Denton Drive & Inwood Road



2: Maple Avenue & Denton Drive Cut Off & Hudnall Street Background Plus Site Generated
3897-16.515 Timing Plan: PM

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2: Maple Avenue & Denton Drive Cut Off & Backus Street Plus Site Generated With Improvement
3897-16.515

Timing Plan: PM

	↖	↗	→	←	↖	↗	↘	↙	↘	↙	↖	↗
Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL2	SBL	SBR	SWL	SWR	SWR2
Lane Configurations			↕↕	↕↕				↕↕		↕↕		
Traffic Volume (vph)	6	174	794	440	255	193	9	289	18	128	64	9
Future Volume (vph)	6	177	810	449	260	197	9	295	18	131	65	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	186	853	473	274	207	9	311	19	138	68	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1045	954	0	0	0	339	0	215	0	0
Turn Type	custom	pm+pt	NA	NA			Perm	Prot		Prot		
Protected Phases		13	10	14				7		5		
Permitted Phases	13	10					7					
Minimum Split (s)	9.5	9.5	22.5	22.5			22.5	22.5		22.5		
Total Split (s)	9.5	9.5	99.0	89.5			24.2	24.2		22.8		
Total Split (%)	6.5%	6.5%	67.8%	61.3%			16.6%	16.6%		15.6%		
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5	3.5		3.5		
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0		1.0		
Lost Time Adjust (s)			0.0	0.0				0.0		0.0		
Total Lost Time (s)			4.5	4.5				4.5		4.5		
Lead/Lag	Lead	Lead		Lag								
Lead-Lag Optimize?	Yes	Yes		Yes								
Act Effect Green (s)			94.5	85.0			19.7			18.3		
Actuated g/C Ratio			0.65	0.58			0.13			0.13		
v/c Ratio			0.79	0.50			0.64			0.52		
Control Delay			22.2	19.1			51.8			64.6		
Queue Delay			0.0	0.0			0.0			0.0		
Total Delay			22.2	19.1			51.8			64.6		
LOS			C	B			D			E		
Approach Delay			22.2	19.1			51.8			64.6		
Approach LOS			C	B			D			E		
Queue Length 50th (ft)			247	271			122			100		
Queue Length 95th (ft)			295	326			176			144		
Internal Link Dist (ft)			174	239			547			259		
Turn Bay Length (ft)												
Base Capacity (vph)			1330	1903			529			415		
Starvation Cap Reductn			0	0			0			0		
Spillback Cap Reductn			0	0			0			0		
Storage Cap Reductn			0	0			0			0		
Reduced v/c Ratio			0.79	0.50			0.64			0.52		

Intersection Summary

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 88 (60%), Referenced to phase 10:EBTL and 14:WBT, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 28.6

Intersection LOS: C

Intersection Capacity Utilization 83.7%

ICU Level of Service E

Analysis Period (min) 15

01/03/2017

HWL

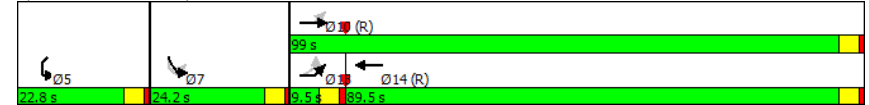
Synchro 9 Report

Page 1

2: Maple Avenue & Denton Drive Cut Off & Backus Street Plus Site Generated With Improvement
3897-16.515

Timing Plan: PM

Splits and Phases: 2: Maple Avenue & Denton Drive Cut Off & Hudnall Street



01/03/2017

HWL

Synchro 9 Report

Page 2

3: Hudnall Street & Denton Drive
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection												
Intersection Delay, s/veh	16											
Intersection LOS	C											

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↕				↕				↕	
Traffic Vol, veh/h	0	6	18	34	0	167	45	41	0	66	264	16
Future Vol, veh/h	0	6	18	35	0	170	46	42	0	67	269	16
Peak Hour Factor	0.92	0.81	0.81	0.81	0.92	0.81	0.81	0.81	0.92	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	7	22	43	0	210	57	52	0	83	332	20
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.2	15.5	19.2
HCM LOS	B	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	10%	66%	8%
Vol Thru, %	76%	31%	18%	78%
Vol Right, %	5%	59%	16%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	352	59	258	185
LT Vol	67	6	170	15
Through Vol	269	18	46	144
RT Vol	16	35	42	26
Lane Flow Rate	435	73	319	228
Geometry Grp	1	1	1	1
Degree of Util (X)	0.669	0.127	0.526	0.368
Departure Headway (Hd)	5.543	6.254	5.947	5.802
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	648	577	602	614
Service Time	3.614	4.254	4.025	3.89
HCM Lane V/C Ratio	0.671	0.127	0.53	0.371
HCM Control Delay	19.2	10.2	15.5	12.3
HCM Lane LOS	C	B	C	B
HCM 95th-tile Q	5.1	0.4	3.1	1.7

3: Hudnall Street & Denton Drive
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	15	141	25
Future Vol, veh/h	0	15	144	26
Peak Hour Factor	0.92	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	19	178	32
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	12.3
HCM LOS	B

4: Denton Drive Cut Off & Cherrywood Avenue & Denton Drive Background Plus Site Generated
3897-16.515

Timing Plan: PM

Intersection												
Int Delay, s/veh	5.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕↑			↕↑↔		
Traffic Vol, veh/h	5	0	12	8	0	126	0	353	44	422	387	0
Future Vol, veh/h	5	0	12	8	0	129	0	360	45	430	395	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	40	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	13	9	0	139	0	387	48	462	425	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1543	1784	212	1548	1760	218	425	0	0	435	0	0
Stage 1	1349	1349	-	411	411	-	-	-	-	-	-	-
Stage 2	194	435	-	1137	1349	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	78	81	793	78	84	786	1131	-	-	1121	-	-
Stage 1	159	217	-	589	593	-	-	-	-	-	-	-
Stage 2	789	579	-	215	217	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	44	48	793	52	49	786	1131	-	-	1121	-	-
Mov Cap-2 Maneuver	44	48	-	52	49	-	-	-	-	-	-	-
Stage 1	159	128	-	589	593	-	-	-	-	-	-	-
Stage 2	650	579	-	124	128	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	36.6			17.6			0			5.4		
HCM LOS	E			C								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1131	-	-	132	431	1121	-	-
HCM Lane V/C Ratio	-	-	-	0.138	0.342	0.412	-	-
HCM Control Delay (s)	0	-	-	36.6	17.6	10.4	-	-
HCM Lane LOS	A	-	-	E	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.5	1.5	2.1	-	-

5: Hudnall Street & Drive 6
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Vol, veh/h	29	4	18	4	4	7	19	321	7	10	182	30
Future Vol, veh/h	30	4	18	4	4	7	19	327	7	10	186	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	78	92	78	92	78	78	78	78	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	4	20	5	4	9	21	419	9	13	238	34

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	753	751	255	758	763	424	272	0	0	428	0	0
Stage 1	281	281	-	465	465	-	-	-	-	-	-	-
Stage 2	472	470	-	293	298	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	326	340	784	324	334	630	1291	-	-	1131	-	-
Stage 1	726	678	-	578	563	-	-	-	-	-	-	-
Stage 2	573	560	-	715	667	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	310	328	784	304	322	630	1291	-	-	1131	-	-
Mov Cap-2 Maneuver	310	328	-	304	322	-	-	-	-	-	-	-
Stage 1	711	669	-	566	551	-	-	-	-	-	-	-
Stage 2	549	548	-	683	658	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	15.7			14.1			0.4			0.4		
HCM LOS	C			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1291	-	-	394	414	1131	-	-
HCM Lane V/C Ratio	0.016	-	-	0.143	0.045	0.011	-	-
HCM Control Delay (s)	7.8	0	-	15.7	14.1	8.2	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.1	0	-	-

7: Denton Drive Cut Off & Drive 1
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y		Y	Y
Traffic Vol, veh/h	10	10	388	11	11	358
Future Vol, veh/h	10	10	396	11	11	365
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	11	430	12	12	397

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	658	221	0	0	442
Stage 1	436	-	-	-	-
Stage 2	222	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	397	783	-	-	1114
Stage 1	619	-	-	-	-
Stage 2	794	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	391	783	-	-	1114
Mov Cap-2 Maneuver	391	-	-	-	-
Stage 1	619	-	-	-	-
Stage 2	783	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	522	1114
HCM Lane V/C Ratio	-	-	0.042	0.011
HCM Control Delay (s)	-	-	12.2	8.3
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

8: Denton Drive Cut Off & Drive 2
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y		Y	Y
Traffic Vol, veh/h	14	67	271	15	71	297
Future Vol, veh/h	14	68	276	15	72	303
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	74	300	16	78	329

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	629	158	0	0	316
Stage 1	308	-	-	-	-
Stage 2	321	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	414	859	-	-	1241
Stage 1	719	-	-	-	-
Stage 2	708	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	382	859	-	-	1241
Mov Cap-2 Maneuver	382	-	-	-	-
Stage 1	719	-	-	-	-
Stage 2	653	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	1.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	708	1241
HCM Lane V/C Ratio	-	-	0.126	0.063
HCM Control Delay (s)	-	-	10.8	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.4	0.2

9: Denton Drive Cut Off & Butler Street/Drive 3
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	21	11	21	10	10	10	21	266	11	11	290	31
Future Vol, veh/h	21	11	21	10	10	10	21	271	11	11	296	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	12	23	11	11	11	23	295	12	12	322	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	561	715	178	537	726	153	357	0	0	307	0	0
Stage 1	363	363	-	346	346	-	-	-	-	-	-	-
Stage 2	198	352	-	191	380	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	410	355	834	427	350	866	1198	-	-	1250	-	-
Stage 1	628	623	-	643	634	-	-	-	-	-	-	-
Stage 2	785	630	-	792	612	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	384	343	834	394	338	866	1198	-	-	1250	-	-
Mov Cap-2 Maneuver	384	343	-	394	338	-	-	-	-	-	-	-
Stage 1	614	616	-	628	619	-	-	-	-	-	-	-
Stage 2	744	616	-	746	605	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	13.7			13.6			0.6			0.3		
HCM LOS	B			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1198	-	-	473	451	1250	-	-
HCM Lane V/C Ratio	0.019	-	-	0.122	0.072	0.01	-	-
HCM Control Delay (s)	8.1	0.1	-	13.7	13.6	7.9	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.2	0	-	-

11: Drive 4 & Denton Drive
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Vol, veh/h	414	11	0	128	10	0
Future Vol, veh/h	422	11	0	131	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	459	12	0	142	11	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	471	0	607	465
Stage 1	-	-	-	-	465	-
Stage 2	-	-	-	-	142	-
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	-	-	1091	-	460	597
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1091	-	460	597
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	632	-
Stage 2	-	-	-	-	885	-

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

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	460	-	-	1091	-
HCM Lane V/C Ratio	0.024	-	-	-	-
HCM Control Delay (s)	13	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

13: Drive 5 & Denton Drive
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection						
Int Delay, s/veh	3.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↱		↱	
Traffic Vol, veh/h	33	106	46	91	57	25
Future Vol, veh/h	34	108	47	93	58	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	-
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	37	117	51	101	63	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	154	0	299	96
Stage 1	-	-	-	-	96	-
Stage 2	-	-	-	-	203	-
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	-	-	1426	-	692	960
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	831	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1426	-	666	960
Mov Cap-2 Maneuver	-	-	-	-	666	-
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	799	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	736	-	-	1426	-
HCM Lane V/C Ratio	0.124	-	-	0.036	-
HCM Control Delay (s)	10.6	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

14: Hudnall Street & Drive 7
3897-16.515

Background Plus Site Generated
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↱		↱		↱	
Traffic Vol, veh/h	0	10	11	357	192	0
Future Vol, veh/h	0	10	11	364	196	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	12	396	213	0

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	633	213	213	0	-
Stage 1	213	-	-	-	-
Stage 2	420	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	444	827	1357	-	-
Stage 1	823	-	-	-	-
Stage 2	663	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	439	827	1357	-	-
Mov Cap-2 Maneuver	439	-	-	-	-
Stage 1	823	-	-	-	-
Stage 2	656	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0.2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1357	-	827	-	-
HCM Lane V/C Ratio	0.009	-	0.013	-	-
HCM Control Delay (s)	7.7	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

1: Denton Drive & Inwood Road
3897-16.515

Regional
Timing Plan: AM

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	91	1182	64	18	209	1556	86	191	258	228	45	225
Future Volume (vph)	93	1206	65	18	213	1587	88	195	263	233	46	230
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	96	1243	67	19	220	1636	91	201	271	240	47	237
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	1310	0	0	239	1727	0	0	712	0	0	331
Turn Type	D,P+P	NA		D,P+P	D,P+P	NA		D,P+P	NA		D,P+P	NA
Protected Phases	5	2			1	1	6		3	8		7
Permitted Phases	6				2	2			4			8
Detector Phase	5	2			1	1	6		3	8		7
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0		5.0	5.0		5.0
Minimum Split (s)	9.5	22.5			9.5	9.5	22.5		9.5	22.5		9.5
Total Split (s)	15.0	65.0			19.0	19.0	69.0		6.5	22.0		14.0
Total Split (%)	12.5%	54.2%			15.8%	15.8%	57.5%		5.4%	18.3%		11.7%
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5		3.5	3.5		3.5
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0			0.0			0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5			4.5			4.5
Lead/Lag	Lag	Lag			Lead	Lead	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes		Yes	Yes		Yes
Recall Mode	None	C-Max			None	C-Max			None			None
Act Effct Green (s)	75.0	62.9			75.0	64.5			21.5			31.5
Actuated g/C Ratio	0.62	0.52			0.62	0.54			0.18			0.26
v/c Ratio	0.42	0.49			0.74	0.64			1.41			0.57
Control Delay	30.7	19.3			27.7	20.7			230.1			39.6
Queue Delay	0.0	0.0			0.0	0.0			0.0			0.0
Total Delay	30.7	19.3			27.7	20.7			230.1			39.6
LOS	C	B			C	C			F			D
Approach Delay		20.0				21.5			230.1			39.6
Approach LOS		C				C			F			D
Queue Length 50th (ft)	24	228			66	328			~370			105
Queue Length 95th (ft)	61	280			148	378			#495			149
Internal Link Dist (ft)		207				255			276			141
Turn Bay Length (ft)	150				200							
Base Capacity (vph)	231	2649			357	2716			505			580
Starvation Cap Reductn	0	0			0	0			0			0
Spillback Cap Reductn	0	0			0	0			0			0
Storage Cap Reductn	0	0			0	0			0			0
Reduced v/c Ratio	0.42	0.49			0.67	0.64			1.41			0.57

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.41

1: Denton Drive & Inwood Road
3897-16.515

Regional
Timing Plan: AM

	
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	45
Future Volume (vph)	46
Peak Hour Factor	0.97
Adj. Flow (vph)	47
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

1: Denton Drive & Inwood Road
3897-16.515

Regional
Timing Plan: AM

Intersection Signal Delay: 56.0

Intersection LOS: E

Intersection Capacity Utilization 81.0%

ICU Level of Service D

Analysis Period (min) 15

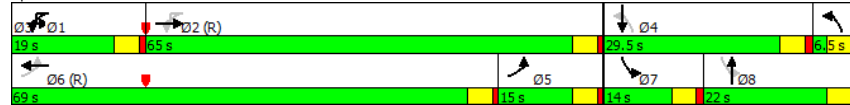
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Denton Drive & Inwood Road



2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Regional
Timing Plan: AM

Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR	SWR2
Lane Configurations			↕↕	↕↕			↕↕	↕↕	↕↕	↕↕	
Traffic Volume (vph)	1	50	380	687	291	74	220	37	139	164	28
Future Volume (vph)	1	51	388	701	297	75	224	38	142	167	29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	1	59	451	815	345	87	260	44	165	194	34
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	511	1247	0	0	304	0	393	0	0
Turn Type	custom	pm+pt	NA	NA			Prot		Prot		
Protected Phases			13	14			7		5		
Permitted Phases	13	10									
Minimum Split (s)	9.5	9.5	22.5	22.5			22.5		22.5		
Total Split (s)	26.0	26.0	84.0	58.0			41.0		21.0		
Total Split (%)	17.8%	17.8%	57.5%	39.7%			28.1%		14.4%		
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5		3.5		
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0		1.0		
Lost Time Adjust (s)			0.0	0.0			0.0		0.0		
Total Lost Time (s)			4.5	4.5			4.5		4.5		
Lead/Lag	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes		Yes							
Act Effect Green (s)			79.5	53.5			36.5		16.5		
Actuated g/C Ratio			0.54	0.37			0.25		0.11		
v/c Ratio			0.39	1.01			0.34		1.25dr		
Control Delay			18.7	74.8			34.0		128.3		
Queue Delay			0.0	0.0			0.0		0.0		
Total Delay			18.7	74.8			34.0		128.3		
LOS			B	E			C		F		
Approach Delay			18.7	74.8			34.0		128.3		
Approach LOS			B	E			C		F		
Queue Length 50th (ft)			132	~656			90		~213		
Queue Length 95th (ft)			159	#732			125		#299		
Internal Link Dist (ft)			174	239			547		259		
Turn Bay Length (ft)											
Base Capacity (vph)			1303	1229			905		365		
Starvation Cap Reductn			0	0			0		0		
Spillback Cap Reductn			0	0			0		0		
Storage Cap Reductn			0	0			0		0		
Reduced v/c Ratio			0.39	1.01			0.34		1.08		

Intersection Summary

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 0 (0%), Referenced to phase 10:EBTL and 14:WBT, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 66.6

Intersection LOS: E

Intersection Capacity Utilization 75.1%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

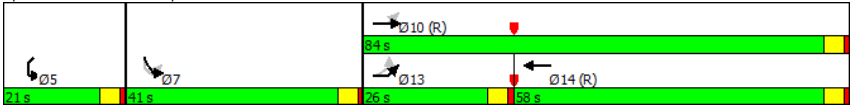
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 2: Maple Avenue & Denton Drive Cut Off & Hudnall Street



1: Denton Drive & Inwood Road
3897-16.515

Regional With Improvement
Timing Plan: AM

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	91	1182	64	18	209	1556	86	191	258	228	45	225
Future Volume (vph)	93	1206	65	18	213	1587	88	195	263	233	46	230
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	96	1243	67	19	220	1636	91	201	271	240	47	237
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	1310	0	0	239	1727	0	0	712	0	0	331
Turn Type	D,P+P	NA		D,P+P	D,P+P	NA		D,P+P	NA		D,P+P	NA
Protected Phases	5	2			1	1	6		3	8		7
Permitted Phases	6			2	2			4			8	
Detector Phase	5	2		1	1	6		3	8		7	4
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	9.5	22.5		9.5	22.5		9.5	22.5
Total Split (s)	13.0	43.5		24.0	24.0	54.5		9.5	43.0		9.5	43.0
Total Split (%)	10.8%	36.3%		20.0%	20.0%	45.4%		7.9%	35.8%		7.9%	35.8%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5		3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0		1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0			0.0			0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5			4.5			4.5
Lead/Lag	Lag	Lag		Lead	Lead	Lead		Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max		None	None		Min	None
Act Effct Green (s)	61.4	45.4			61.4	52.9			35.6			45.1
Actuated g/C Ratio	0.51	0.38			0.51	0.44			0.30			0.38
v/c Ratio	0.51	0.69			0.78	0.77			0.89			0.35
Control Delay	45.0	34.7			44.5	31.9			50.1			25.3
Queue Delay	0.0	0.0			0.0	0.0			0.0			0.0
Total Delay	45.0	34.7			44.5	31.9			50.1			25.3
LOS	D	C			D	C			D			C
Approach Delay		35.4				33.4			50.1			25.3
Approach LOS		D				C			D			C
Queue Length 50th (ft)	36	322			123	421			243			84
Queue Length 95th (ft)	80	394			214	489			323			118
Internal Link Dist (ft)		207				255			276			141
Turn Bay Length (ft)	150				200							
Base Capacity (vph)	188	1912			356	2230			857			949
Starvation Cap Reductn	0	0			0	0			0			0
Spillback Cap Reductn	0	0			0	0			0			0
Storage Cap Reductn	0	0			0	0			0			0
Reduced v/c Ratio	0.51	0.69			0.67	0.77			0.83			0.35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89

1: Denton Drive & Inwood Road
3897-16.515

Regional With Improvement
Timing Plan: AM

	
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	45
Future Volume (vph)	46
Peak Hour Factor	0.97
Adj. Flow (vph)	47
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

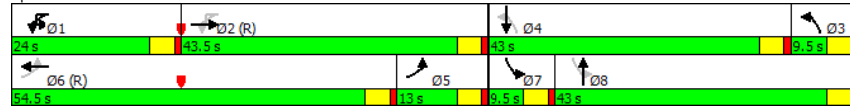
1: Denton Drive & Inwood Road
3897-16.515

Regional With Improvement
Timing Plan: AM

Intersection Signal Delay: 36.1
Intersection Capacity Utilization 81.0%
Analysis Period (min) 15

Intersection LOS: D
ICU Level of Service D

Splits and Phases: 1: Denton Drive & Inwood Road



2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Regional With Improvement
Timing Plan: AM

Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR	SWR2
Lane Configurations			↔↔	↔↔			↔↔	↔↔	↔↔	↔↔	
Traffic Volume (vph)	1	50	380	687	291	74	220	37	139	164	28
Future Volume (vph)	1	51	388	701	297	75	224	38	142	167	29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	1	59	451	815	345	87	260	44	165	194	34
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	511	1247	0	0	304	0	393	0	0
Turn Type	custom	pm+pt	NA	NA			Prot		Prot		
Protected Phases		13	10	14			7		5		
Permitted Phases	13	10									
Minimum Split (s)	9.5	9.5	22.5	22.5			22.5		22.5		
Total Split (s)	9.5	9.5	91.0	81.5			31.0		24.0		
Total Split (%)	6.5%	6.5%	62.3%	55.8%			21.2%		16.4%		
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5		3.5		
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0		1.0		
Lost Time Adjust (s)			0.0	0.0			0.0		0.0		
Total Lost Time (s)			4.5	4.5			4.5		4.5		
Lead/Lag	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes		Yes							
Act Effect Green (s)			86.5	77.0			26.5		19.5		
Actuated g/C Ratio			0.59	0.53			0.18		0.13		
v/c Ratio			0.38	0.70			0.45		1.06dr		
Control Delay			15.7	28.7			41.5		88.1		
Queue Delay			0.0	0.0			0.0		0.0		
Total Delay			15.7	28.7			41.5		88.1		
LOS			B	C			D		F		
Approach Delay			15.7	28.7			41.5		88.1		
Approach LOS			B	C			D		F		
Queue Length 50th (ft)			116	457			98		193		
Queue Length 95th (ft)			141	501			138		#265		
Internal Link Dist (ft)			174	239			547		259		
Turn Bay Length (ft)											
Base Capacity (vph)			1329	1769			678		431		
Starvation Cap Reductn			0	0			0		0		
Spillback Cap Reductn			0	0			0		0		
Storage Cap Reductn			0	0			0		0		
Reduced v/c Ratio			0.38	0.70			0.45		0.91		

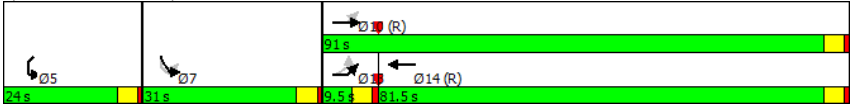
Intersection Summary

Cycle Length: 146
Actuated Cycle Length: 146
Offset: 0 (0%), Referenced to phase 10:EBTL and 14:WBT, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 37.1
Intersection Capacity Utilization 75.1%
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 2: Maple Avenue & Denton Drive Cut Off & Hudnall Street



1: Denton Drive & Inwood Road
3897-16.515

Regional
Timing Plan: PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↱ ↲	↰ ↱ ↲		↰ ↱ ↲	↰ ↱ ↲		↰ ↱ ↲	↰ ↱ ↲		↰ ↱ ↲	↰ ↱ ↲	
Traffic Volume (vph)	61	2053	203	218	1326	51	64	192	237	96	462	87
Future Volume (vph)	62	2094	207	222	1353	52	65	196	242	98	471	89
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	63	2137	211	227	1381	53	66	200	247	100	481	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	2348	0	227	1434	0	0	513	0	0	672	0
Turn Type	D,P+P	NA		D,P+P	NA		D,P+P	NA		D,P+P	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2			4			8		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	65.0		19.0	69.0		6.5	22.0		14.0	29.5	
Total Split (%)	12.5%	54.2%		15.8%	57.5%		5.4%	18.3%		11.7%	24.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		Min	None	
Act Effct Green (s)	75.9	61.3		75.0	67.5		21.5			31.5		
Actuated g/C Ratio	0.63	0.51		0.62	0.56		0.18			0.26		
v/c Ratio	0.23	0.91		0.86	0.50		1.00			1.17		
Control Delay	13.2	33.5		60.6	17.3		73.1			131.5		
Queue Delay	0.0	0.0		0.0	0.0		0.0			0.0		
Total Delay	13.2	33.5		60.6	17.3		73.1			131.5		
LOS	B	C		E	B		E			F		
Approach Delay		33.0			23.3		73.1			131.5		
Approach LOS		C			C		E			F		
Queue Length 50th (ft)	16	595		122	250		151			~298		
Queue Length 95th (ft)	31	676		#256	293		#272			#446		
Internal Link Dist (ft)		207			255		276			141		
Turn Bay Length (ft)	150			200								
Base Capacity (vph)	284	2573		275	2846		514			575		
Starvation Cap Reductn	0	0		0	0		0			0		
Spillback Cap Reductn	0	0		0	0		0			0		
Storage Cap Reductn	0	0		0	0		0			0		
Reduced v/c Ratio	0.22	0.91		0.83	0.50		1.00			1.17		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.17

01/03/2017
HWL

Synchro 9 Report
Page 1

1: Denton Drive & Inwood Road
3897-16.515

Regional
Timing Plan: PM

Intersection Signal Delay: 46.4

Intersection LOS: D

Intersection Capacity Utilization 104.4%

ICU Level of Service G

Analysis Period (min) 15

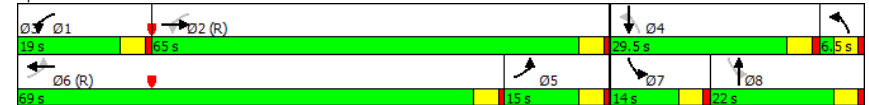
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Denton Drive & Inwood Road



01/03/2017
HWL

Synchro 9 Report
Page 2

2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Regional
Timing Plan: PM

Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL2	SBL	SBR	SWL	SWR	SWR2				
Lane Configurations																
Traffic Volume (vph)	7	186	852	472	272	202	10	308	19	134	68	10				
Future Volume (vph)	7	190	869	481	277	206	10	314	19	137	69	10				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95				
Adj. Flow (vph)	7	200	915	506	292	217	11	331	20	144	73	11				
Shared Lane Traffic (%)																
Lane Group Flow (vph)	0	0	1122	1015	0	0	0	362	0	228	0	0				
Turn Type	custom	pm+pt	NA	NA			Perm	Prot		Prot						
Protected Phases		13	10	14				7		5						
Permitted Phases	13	10					7									
Minimum Split (s)	9.5	9.5	22.5	22.5			22.5	22.5		22.5						
Total Split (s)	43.0	43.0	101.0	58.0			25.0	25.0		20.0						
Total Split (%)	29.5%	29.5%	69.2%	39.7%			17.1%	17.1%		13.7%						
Yellow Time (s)	3.5	3.5	3.5	3.5			3.5	3.5		3.5						
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0	1.0		1.0						
Lost Time Adjust (s)			0.0	0.0				0.0		0.0						
Total Lost Time (s)			4.5	4.5				4.5		4.5						
Lead/Lag	Lead	Lead		Lag												
Lead-Lag Optimize?	Yes	Yes		Yes												
Act Effct Green (s)			96.5	53.5			20.5			15.5						
Actuated g/C Ratio			0.66	0.37			0.14			0.11						
v/c Ratio			0.69	0.85			0.66			0.65						
Control Delay			14.9	50.4			52.8			72.0						
Queue Delay			0.0	0.0			0.0			0.0						
Total Delay			14.9	50.4			52.8			72.0						
LOS			B	D			D			E						
Approach Delay			14.9	50.4			52.8			72.0						
Approach LOS			B	D			D			E						
Queue Length 50th (ft)			262	465			134			109						
Queue Length 95th (ft)			311	558			189			155						
Internal Link Dist (ft)			174	239			547			259						
Turn Bay Length (ft)																
Base Capacity (vph)			1621	1199			547			351						
Starvation Cap Reductn			0	0			0			0						
Spillback Cap Reductn			0	0			0			0						
Storage Cap Reductn			0	0			0			0						
Reduced v/c Ratio			0.69	0.85			0.66			0.65						

Intersection Summary

Cycle Length: 146

Actuated Cycle Length: 146

Offset: 88 (60%), Referenced to phase 10:EBTL and 14:WBT, Start of Green

Natural Cycle: 110

Control Type: Pretimed

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 37.9

Intersection LOS: D

Intersection Capacity Utilization 88.4%

ICU Level of Service E

Analysis Period (min) 15

2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Regional
Timing Plan: PM

Splits and Phases: 2: Maple Avenue & Denton Drive Cut Off & Hudnall Street



1: Denton Drive & Inwood Road
3897-16.515

Regional With Improvement
Timing Plan: PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰ ↱	↰ ↱		↰ ↱	↰ ↱		↰ ↱	↰ ↱		↰ ↱	↰ ↱	
Traffic Volume (vph)	61	2053	203	218	1326	51	64	192	237	96	462	87
Future Volume (vph)	62	2094	207	222	1353	52	65	196	242	98	471	89
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	63	2137	211	227	1381	53	66	200	247	100	481	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	2348	0	227	1434	0	0	513	0	0	672	0
Turn Type	D,P+P	NA		D,P+P	NA		D,P+P	NA		D,P+P	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6			2			4			8		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	11.0	56.4		16.4	61.8		9.5	37.7		9.5	37.7	
Total Split (%)	9.2%	47.0%		13.7%	51.5%		7.9%	31.4%		7.9%	31.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	None		Min	None	
Act Effct Green (s)	71.6	54.7		70.7	66.4		26.3				35.8	
Actuated g/C Ratio	0.60	0.46		0.59	0.55		0.22				0.30	
v/c Ratio	0.29	1.02		0.76	0.51		0.79				1.00	
Control Delay	18.9	57.2		46.5	18.4		36.4				75.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0				0.0	
Total Delay	18.9	57.2		46.5	18.4		36.4				75.0	
LOS	B	E		D	B		D				E	
Approach Delay		56.2			22.3		36.4				75.0	
Approach LOS		E			C		D				E	
Queue Length 50th (ft)	16	~710		113	239		131				~265	
Queue Length 95th (ft)	42	#836		#290	335		180				#291	
Internal Link Dist (ft)		207			255		276				141	
Turn Bay Length (ft)	150			200								
Base Capacity (vph)	223	2298		297	2798		767				671	
Starvation Cap Reductn	0	0		0	0		0				0	
Spillback Cap Reductn	0	0		0	0		0				0	
Storage Cap Reductn	0	0		0	0		0				0	
Reduced v/c Ratio	0.28	1.02		0.76	0.51		0.67				1.00	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.02

1: Denton Drive & Inwood Road
3897-16.515

Regional With Improvement
Timing Plan: PM

Intersection Signal Delay: 45.9
 Intersection Capacity Utilization 104.4%

Intersection LOS: D
 ICU Level of Service G

Analysis Period (min) 15

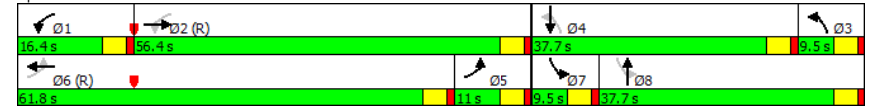
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Denton Drive & Inwood Road



2: Maple Avenue & Denton Drive Cut Off & Hudnall Street
3897-16.515

Regional With Improvement
Timing Plan: PM

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