

TRAFFIC IMPACT STUDY

For

Pioneer Ranch Development Douglas County, Colorado

September 2015

Prepared for:

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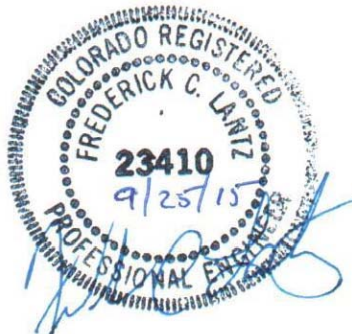
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15-07443

I. Introduction

Project Overview

This traffic impact study addresses the capacity, geometric, and control requirements associated with the proposed development entitled Pioneer Ranch.

The mixed-use development is approximately 388 acres in size and is located on Front Street in Douglas County, Colorado. The development site is further bound to the east by Founders Parkway (State Highway 86), Scott Boulevard to the south, and Black Feather Trail on the north while being surrounded by the Town of Castle Rock. Annexation into the Town of Castle Rock is being pursued.

It is acknowledged that the development must go through procedures of rezoning, subdivision and site development permitting before land uses assumed in this study can become formalized and begin to operate. It is only during the later procedures that true traffic impacts from the development site can be analyzed. Briefly described, rezoning entails the change of uses allowed on a property, subdivision breaks down larger parcels of land to developable sizes, and site development permit is the review of real site construction. As actual uses within the development become defined over time, traffic characteristics and influencing factors considered in this study are subject to change and will need to be updated.

A traffic impact study commonly considers two analytic horizons. The first horizon (short-term) is two to five years after development construction and start of operation. In this short-term horizon, immediate development influence on the short-term roadway system is investigated. The second horizon evaluates development influence on the long-term regional roadway situation and is commonly defined as twenty years after development operation. The long-term analysis horizon, Year 2035, is based on and consistent with regional transportation plans established by Douglas County, Denver Regional Council of Governments (DRCOG), and the Town of Castle Rock.

It is important to note that no short-term analysis is included in this study since development phases or specific land uses within the development are unknown and development operation is not anticipated in the short-term horizon. The provision of analysis for only Year 2035 is considered reasonable.

This study is intended to serve as an overall guide that can be used for any order of site development that occurs. The combination of development land use areas presented herein are assumed and analyzed to estimate projected traffic levels through Year 2035.

Study Area Boundaries

The study area to be examined in this analysis, as coordinated with Town Staff, encompasses the following existing or proposed intersections along each described roadway:

Founders Parkway (State Highway 86)

- Allen Way, Front Street, Woodlands Boulevard, Crowfoot Valley Road, Site Access (proposed), Crimson Sky Drive, and 5th Street/Ridge Road.

Front Street

- Black Feather Trail, East/West Collector Road A (proposed), and Scott Boulevard.

Woodlands Boulevard

- Black Feather Trail, and Scott Boulevard.

Stated intersections are collectively referred to as “studied intersections”. These studied intersections were selected because of their key proximity to the development site. It is acknowledged that other intersections are adjacent to the overall development site and could be considered within studied intersections. However, it would be impracticable to analyze other intersections to any degree of certainty since no specific land uses, density or phasing is yet established for the overall development.

The general location of development site is shown on Figure 1.



Figure 1
SITE LOCATION

II. Proposed Development

Description of Development Site

Land for this development is vacant. Surrounding land uses are predominantly residential and also include a mix of commercial or retail uses.

Pioneer Ranch is a mixed-use development envisioned for residential dwelling units with a minor area set aside for future office and retail land use. This office and retail area is located on the west end of the development site between Front Street and Woodlands Boulevard. It is further anticipated that approximately twenty-six (26) percent, or 100 acres, of development site area is planned for open space, recreation or park land area.

As discussed in Section I, no specific plans or time-line for development is known at this time. For purpose of this study, it is assumed that development build out would be completed by end of Year 2035. It is, however, likely that only a percentage of development would occur by Year 2035 due to uncertainty of specific land uses.

Primary development access is planned at locations along Founders Parkway, Woodlands Boulevard, and Front Street. It is acknowledged that the exact use of these existing intersections, including intersection geometry and applicable operation mitigation, is to be finalized upon specific site development. As such, more specific traffic analyses or studies will be necessary as phases, individual parcels, subdivisions, or developments are proposed with actual land uses, densities, or site plans. This will help determine when transportation improvements identified within this overall study are needed, or if additional improvements are needed to mitigate the proposed development's impact. Additionally, the more specific traffic analyses or studies, if required, can assist a proposal to address concerns that were not able to be evaluated in this overall study.

A conceptual site plan, as prepared by Atwell, is shown on Figure 2 and is provided for illustrative purposes.

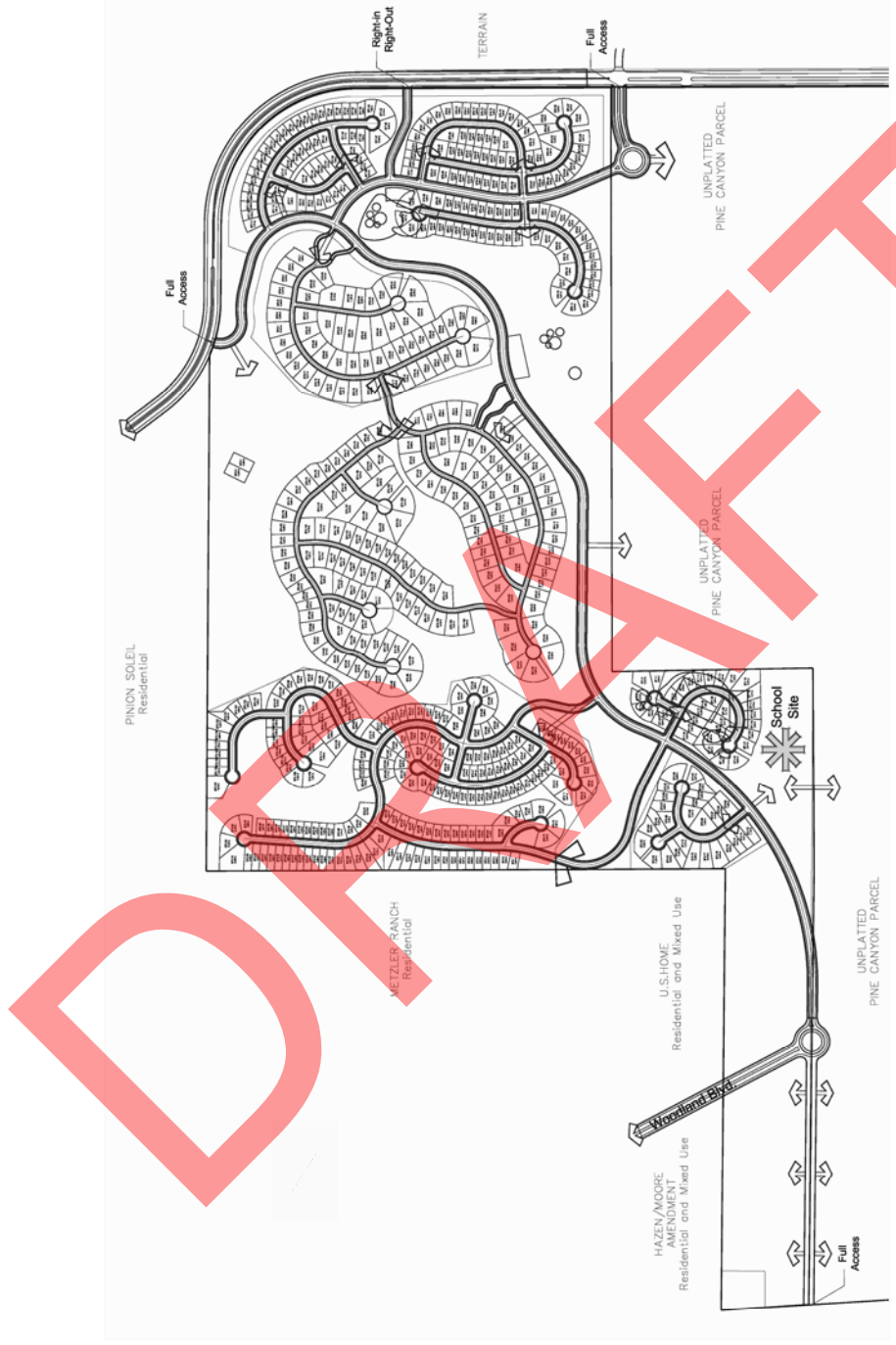


Figure 2
CONCEPT SITE PLAN
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III. Existing Area Conditions

Existing and Committed Surface Transportation Network

Within the study area, Founders Parkway, Woodlands Boulevard, and Front Street are the primary roadways likely to accommodate traffic to and from the proposed development. Secondary roadways include Scott Boulevard, Black Feather Drive, and 5th Street. A brief description of each roadway is provided below:

Founders Parkway, within vicinity of development site, is a north-south arterial roadway having four through lanes (two lanes in each direction). The orientation of Founders Parkway changes to east-west along the northern boundary of proposed development site. Exclusive turn lanes are provided at the study intersections along the Founders Parkway corridor. The area posted speed limit is 45 MPH west of Woodlands Boulevard and 50 MPH east of Woodlands Boulevard to near the approach to 5th Street where the posted speed limit steps down to 35 MPH. CDOT categorizes the adjacent section of Founders Parkway (State Highway 86) as a Regional Highway (RA). Douglas County's and Town of Castle Rock's Transportation Plans envision Founders Parkway being a four lane roadway. The Town of Castle Rock's Transportation Plan further projects Founders Parkway to carry between approximately 26,000 to 47,300 vehicles per day by Year 2030 (31,000 to 55,000 vehicles by Year 2035). CDOT's current twenty year projected daily volume for State Highway 86 is approximately 20,000 vehicles along roadway segment adjacent to Crimson Sky Drive, and approximately 27,500 vehicles adjacent to Woodlands Boulevard. CDOT has recently reconstructed the travel lanes on Founders Parkway, west from Woodlands Boulevard, to re-assign them as three full time lanes with the outside lane shared for right turn movements. CDOT has further defined an access control plan for State Highway 86 that envisions potential future traffic signals at the Crimson Sky Drive.

Woodlands Boulevard is a north-south arterial roadway located in the Town of Castle Rock. Woodlands Boulevard has two through lanes in each direction, a raised landscape median, and is posted at 30 MPH. Currently, Woodlands Boulevard has no continuity through the Pioneer Ranch development area. The current Town Transportation Plan anticipates the future roadway connection and an associated daily roadway volume of approximately 9,300 vehicles by Year 2030 (10,500 vehicles by Year 2035).

Front Street is a 40 MPH, north-south arterial roadway providing limited connectivity for area commercial, residential and retail land uses located between Founders Parkway and 5th Street. Front Street is a four lane roadway having a combination of exclusive or shared turn lane configurations at major intersections.

Scott Boulevard, Black Feather Drive and 5th Street are secondary arterial and collector roadways providing local access to surrounding commercial, retail and residential areas. Scott Boulevard (collector), Black Feather Drive (collector), and 5th Street (arterial) are within Town of Castle Rock limits. Scott Boulevard (30 MPH) is a four lane roadway having a combination of exclusive or shared turn lane configurations at major intersections. Black Feather Drive is a two lane roadway that provides both shared and exclusive turn lanes at intersections. 5th Street (45 MPH) provides for a varying number of through lanes in each east/west direction and also provides a mix of shared or exclusive turn lanes at roadway intersections. The existing number of travel lanes described for each secondary roadway matches the Town of Castle Rock's Year 2020 roadway plan.

A number of study intersections are signalized. These signalized intersections include:

- Founders Parkway intersections with Allen Way, Front Street, Woodland Boulevard, Crowfoot Valley Road, and 5th Street/Ridge Road,
- Front Street intersections with Black Feather Trail, and Scott Boulevard.

All other existing study intersections are stop-controlled. A stop-controlled intersection is defined as a roadway intersection where vehicle rights-of-way are controlled by one or more "STOP" signs.

Although transportation plans for Douglas County and Town of Castle Rock describe various transportation improvements for area roadways, no defined timeline or committed extent of improvements is known for the above described roadways. Additionally, the Town of Castle Rock is updating their transportation plan.

Existing Traffic Conditions

Morning (AM) and afternoon (PM) peak hour traffic counts were collected at studied intersections on various days throughout the Year 2014 and 2015. An exception is the Founders Parkway intersection with Crowfoot Valley Road where Year 2009 peak hour count data was considered. Some count data was obtained from Town Staff or CDOT through adjacent development traffic studies or public roadway improvement projects. Year 2009 and 2014 traffic counts used in this analysis were adjusted to reflect Year 2015 volume growth and existing traffic volumes. The traffic count data considered in this study is provided for reference in Appendix A.

Existing traffic volumes are graphically depicted on Figure 3. Existing intersection lane geometry is shown on Figure 4.

The Signalized and Unsignalized Intersection Analysis techniques, as published in the Highway Capacity Manual (HCM) by the Transportation Research Board and as incorporated into the SYNCHRO computer program, were used to analyze study intersections under existing traffic conditions. This nationally accepted technique allows for the determination of the intersection Level of Service (LOS) based on congestion and delay of each traffic movement.

Results of Level of Service analyses for existing conditions are presented in Table 1.

Definitions of level of service are given in Appendix B. Intersection capacity worksheets are provided in Appendix C.

TABLE 1 INTERSECTION CAPACITY ANALYSIS SUMMARY EXISTING TRAFFIC		
INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
5th Street / Founders Parkway (Signalized)	B (18.2)	C (21.5)
Scott Boulevard / Front Street (Signalized)	A (6.9)	B (10.9)
Black Feather Trail / Front Street (Signalized)	B (14.0)	B (16.1)
Founders Parkway / Allen Way (Signalized)	B (18.5)	C (25.4)
Founders Parkway / Front Street (Signalized)	B (11.2)	B (11.8)
Founders Parkway / Woodlands Boulevard (Signalized)	A (9.6)	B (19.5)
Founders Parkway / Crowfoot Valley Road (Signalized)	D (47.6)	B (18.9)
Black Feather Trail / Woodlands Boulevard (4-Way Stop-Controlled)		
Eastbound Approach	A	A
Westbound Approach	A	A
Northbound Approach	A	A
Southbound Approach	A	A
Crimson Sky Drive / Founders Parkway (Stop-Controlled)		
Westbound Left	D	D
Westbound Right	B	B
Southbound Left	B	A

Key: Signalized Intersections: Level of Service for overall intersection (control delay in sec/veh)
Stop-Controlled Intersections: Level of Service

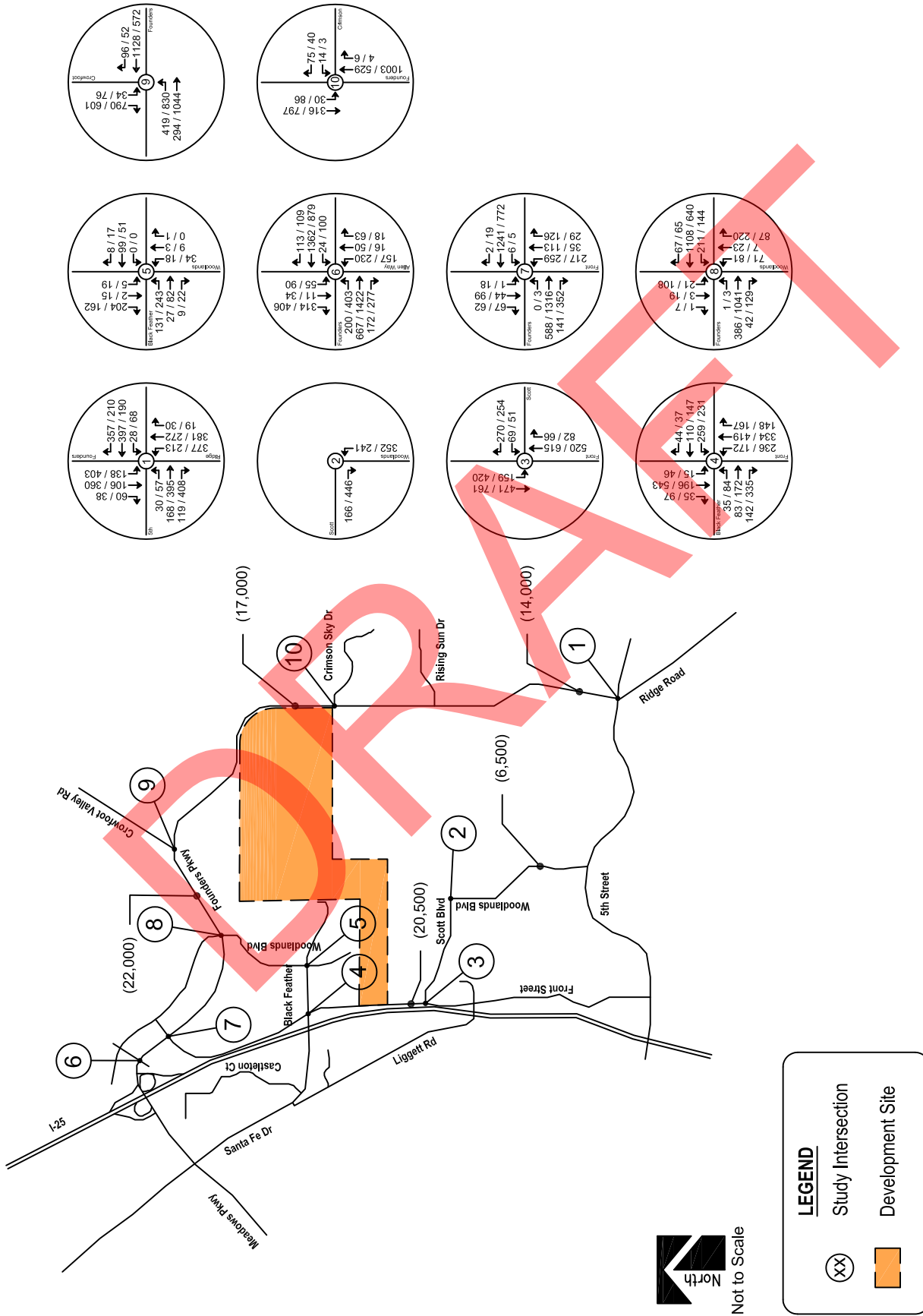


Figure 3
EXISTING TRAFFIC
 AM / PM Peak Hour Volumes
 (ADT) : Average Daily Traffic

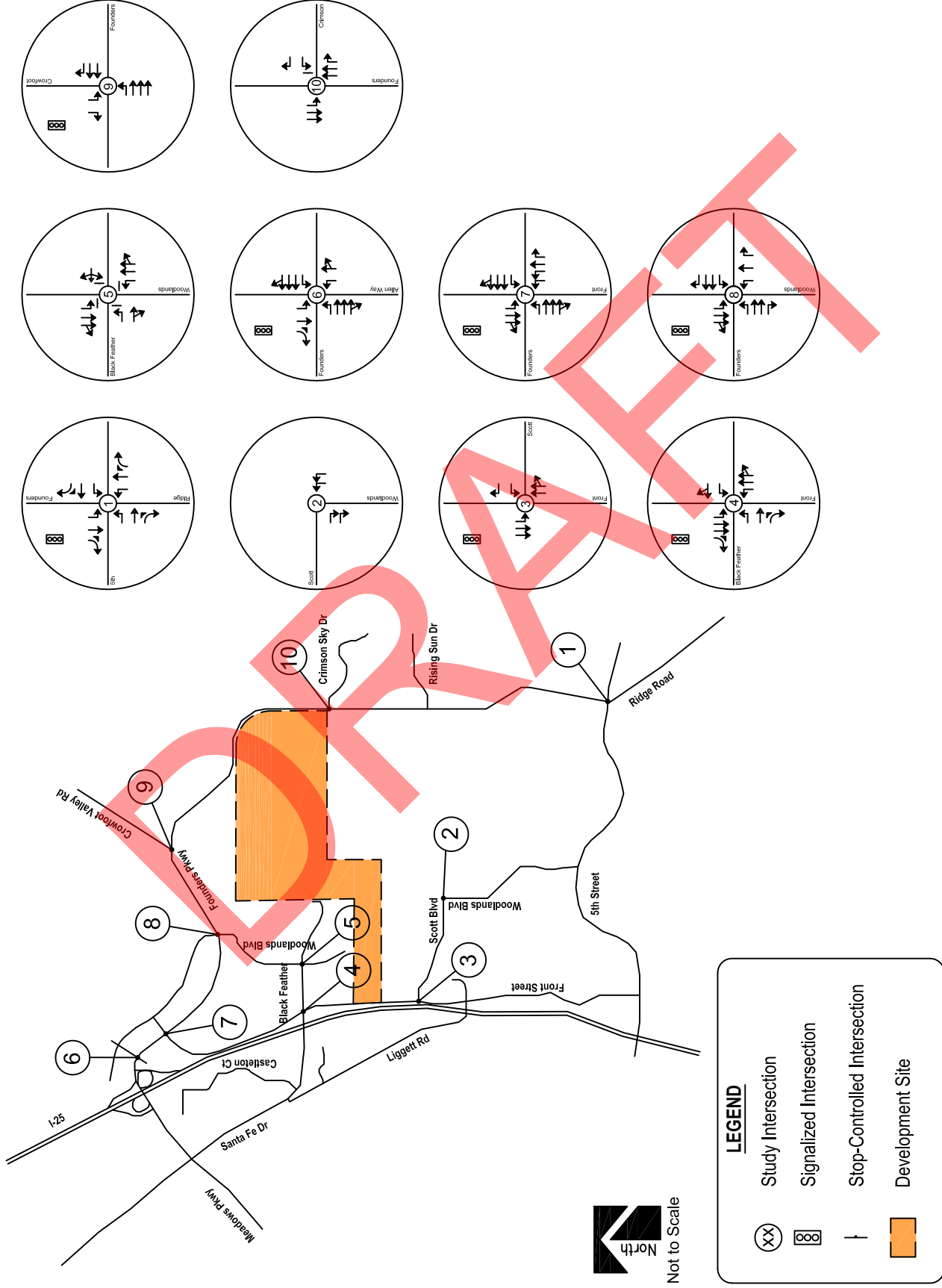


Figure 4
EXISTING TRAFFIC
 Intersection Geometry

IV. Future Traffic Conditions without Proposed Development

Background traffic volumes for the long term planning horizon of Year 2035 were based on recent traffic count data collected at study intersections and future traffic volume taken from the Town's transportation plan update.

Background traffic is the traffic projected to be on area roadways without consideration of the proposed development. Background traffic includes traffic generated by development of vacant parcels in the area.

To account for projected increases in background traffic for Year 2035, a compounded annual growth rate of approximately three (3) percent was applied to applicable movements of existing traffic volumes of study intersections along Founders Parkway. An approximate two (2) percent growth rate was applied to applicable movements at all other study intersections. Use of these growth rates were coordinated with Town Staff and correspond to published CDOT traffic data for State Highway 86 or anticipated traffic volume growth presented in Town Transportation Plan update. Although Douglas County and Town of Castle Rock transportation plans describe a varying and higher (in some cases) aggregate growth rate for each jurisdiction, the growth rate used in this study is considered conservative and appropriate for the in-fill nature of this proposed development.

Pursuant to future road classification discussions in Section I, Year 2035 background traffic (without proposed Pioneer Ranch development) assumes several roadway or intersection improvements in order to accommodate long-term regional transportation needs as either described by Town Staff or in the Town of Castle Rock Transportation Plan. These funded or un-funded (assumed) improvements are summarized as:

Improvement Location	Year 2035 – Improvement Description Per Town Transportation Plan Without Site Development
Founders Parkway & 5 th Street	Dual left turn and dual through lanes for northbound/southbound travel
Founders Parkway & Woodlands Blvd	Conversion of eastbound/westbound right turn lane to shared through and right turn movements
Founders Parkway & Allen Way	Provision of an exclusive westbound and eastbound right turn lane, dual eastbound left turn lane, three through lanes for east/west travel, and dual southbound right turn lane
Founders Parkway & Front Street	Provision of three through lanes for east/west travel with outside lanes shared with right turn
Woodlands Boulevard	Extension of Woodlands Boulevard (four through lanes – two travel lanes in each direction) through private property between Black Feather Trail and Scott Boulevard
Woodlands Boulevard & Black Feather	Traffic signal with roadway striping to allow for exclusive eastbound and westbound left turn lane on Black Feather Trail
Woodlands Boulevard & Scott Boulevard	Exclusive turn lanes for eastbound and northbound travel

The extension of Woodlands Boulevard, through private property and between Black Feather Trail and Scott Boulevard, is contemplated in the Town Transportation Plan but defined as a low priority improvement. For consistency to the Town Transportation Plan and defined regional transportation need, this study assumes the Woodlands Boulevard extension in the long-term background traffic condition. This assumed roadway extension is also expected to relocate a percentage of traffic volume from Front Street and Scott Boulevard to which is accounted for in background traffic projections. Additionally, the Woodlands Boulevard extension will provide regional benefit to Town citizens by providing an additional north/south travel route and help to evenly distribute or lessen north/south travel volumes along existing and adjacent Town roadways. It is to be noted that implementation of regional benefits could be further delayed if the Woodlands Boulevard is not a Town sponsored project since the extension traverses through private property. These private property owners or developers would likely be limited to building pieces of the extension as future development would allow.

A peak hour signal warrant analysis was conducted for the existing Black Feather Trail/Woodlands Boulevard all-way stop intersection in order to review the potential for a signalized intersection based on projected vehicle volumes. No reduction of right turn volume for the side street was used. Analysis results indicate that the intersection was found to have the minimum vehicle volumes required to meet Warrant 3, Peak Hour, from the Manual on Uniform Traffic Control Devices (MUTCD) for installation of a traffic signal. Warrant 3 is intended for use at a location where traffic conditions are such that for a minimum of one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. Warrant 3 is also commonly used as a general indicator for intersection signalization when projected traffic volumes are being considered. Therefore, the existing Black Feather Trail/Woodlands Boulevard intersection was analyzed under signal control for the background year 2035 condition. Base signal timing parameters assumed to analyze intersection operations are considered complementary to the major road corridors and any future traffic signal coordination plans. The MUTCD Warrant 3, Peak Hour worksheet is included for reference in Appendix A.

Figure 5 describes projected background traffic volumes for Year 2305. Envisioned intersection geometry is shown on Figure 6.

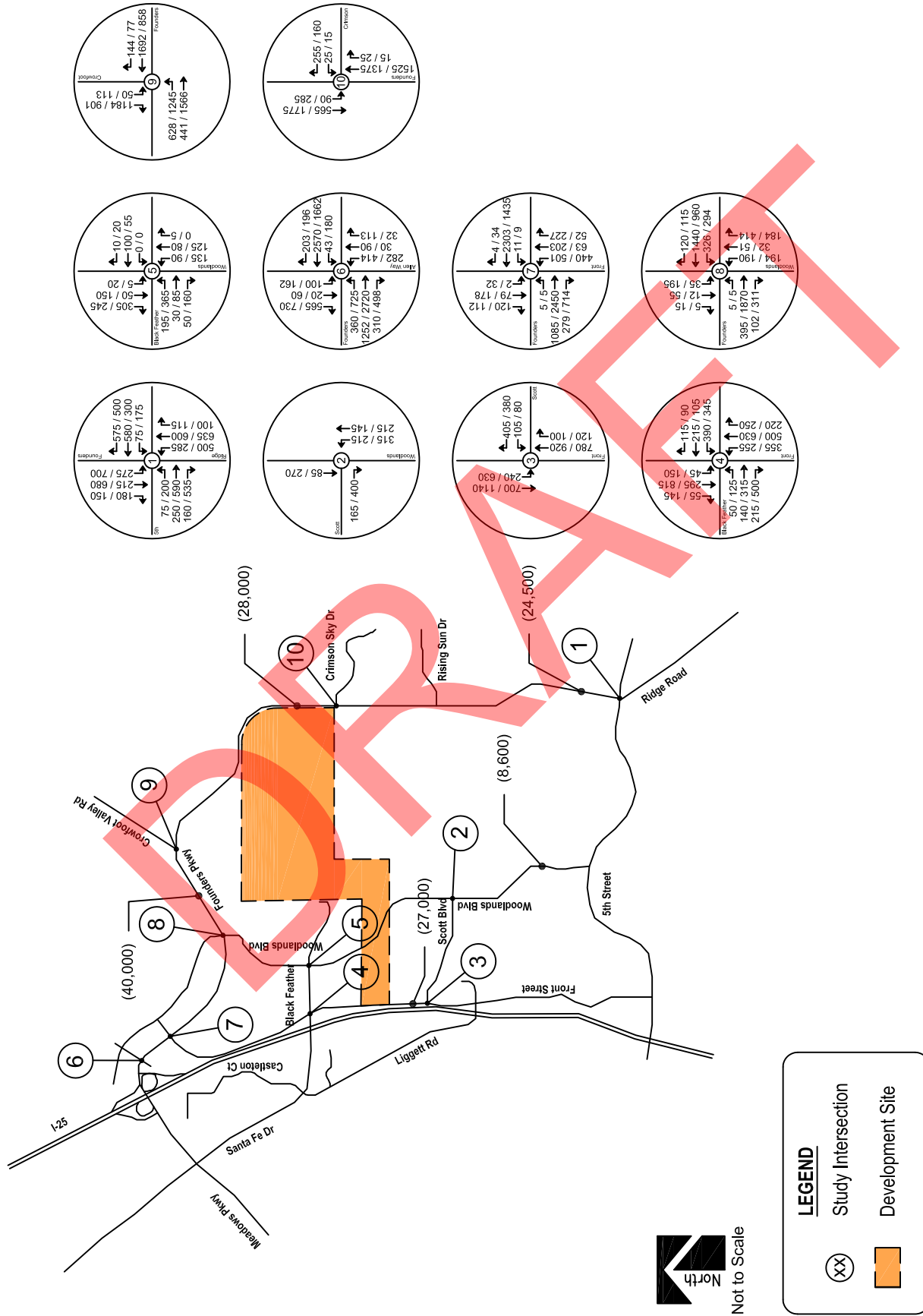
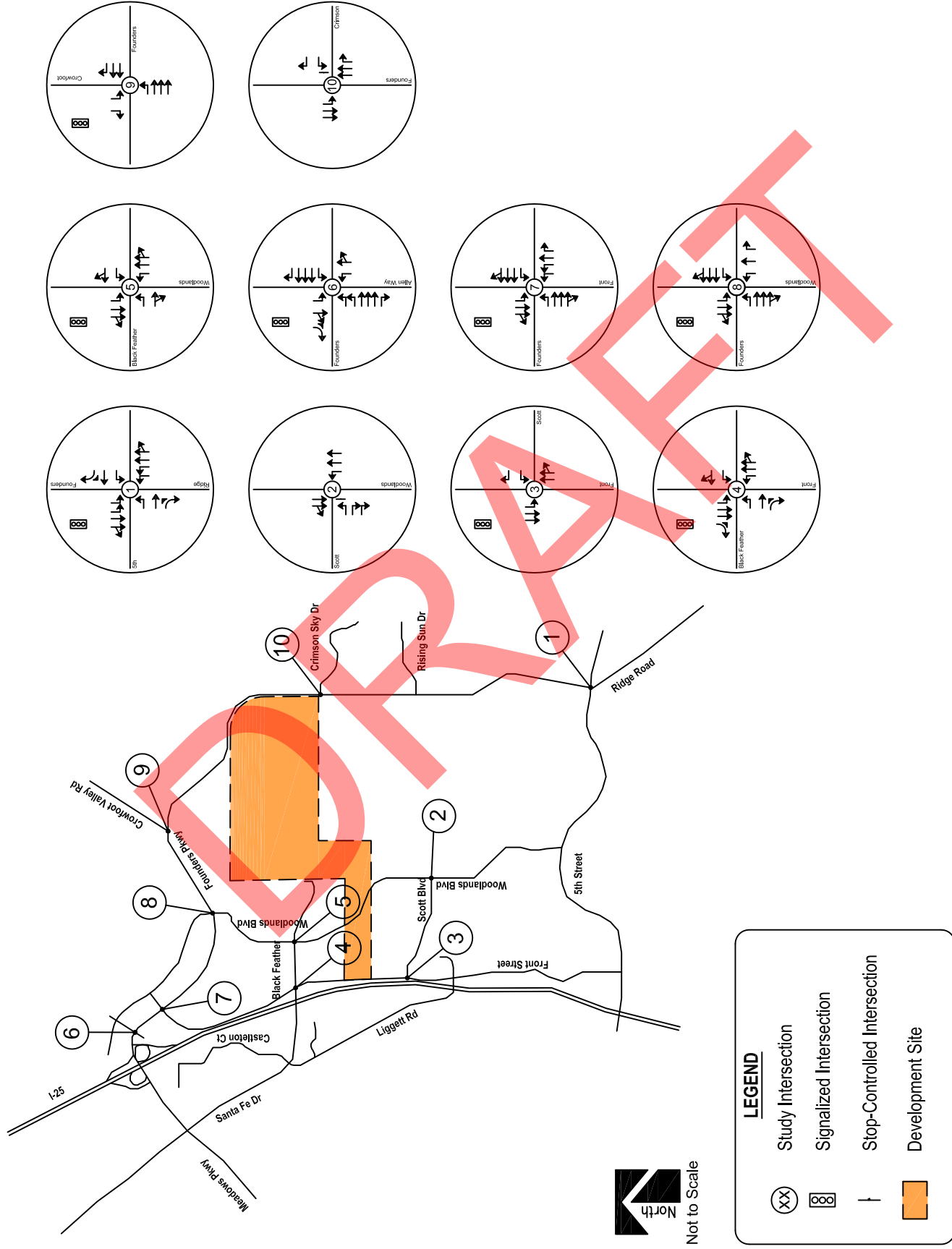


Figure 5
BACKGROUND TRAFFIC - YEAR 2035
 AM / PM Peak Hour Volumes
 (ADT) : Average Daily Traffic



Peak Hour Intersection Levels of Service

As with existing traffic conditions, operations of study intersections were analyzed under background conditions, without the proposed development and envisioned improvements earlier described, using the SYNCHRO computer program.

Table 2 summarizes background traffic level of service analyses results for Year 2035.

Definitions of levels of service are given in Appendix B. Appendix C includes intersection capacity worksheets.

TABLE 2 INTERSECTION CAPACITY ANALYSIS SUMMARY BACKGROUND TRAFFIC - YEAR 2035		
INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
5th Street / Founders Parkway (Signalized)	C (23.6)	D (39.9)
Scott Boulevard / Front Street (Signalized)	B (10.8)	C (22.0)
Black Feather Trail / Front Street (Signalized)	C (21.3)	C (33.9)
Founders Parkway / Allen Way (Signalized)	D (41.1)	F (84.0)
Founders Parkway / Front Street (Signalized)	B (18.8)	C (33.5)
Founders Parkway / Woodlands Boulevard (Signalized)	B (13.8)	D (42.6)
Founders Parkway / Crowfoot Valley Road (Signalized)	F (156.3)	E (79.7)
Black Feather Trail / Woodlands Boulevard (Signalized)	B (11.3)	B (12.5)
Scott Boulevard / Woodlands Boulevard (Stop-Controlled)		
Eastbound Left	A	A
Eastbound Right	A	B
Northbound Left	A	A
Crimson Sky Drive / Founders Parkway (Stop-Controlled)		
Westbound Left	F	F
Westbound Right	F	C
Southbound Left	C	D

Key: Signalized Intersections: Level of Service for overall intersection (control delay in sec/veh)
 Stop-Controlled Intersections: Level of Service

Background Traffic Analysis Results – Year 2035

Year 2035 background traffic analysis indicated that majority of studied intersections, either operating under a signalized or stop-controlled condition, have overall or specific turn movement operations at LOS D or better during peak traffic hours. These intersections are shown to meet the Town's operational goal of LOS D. Exceptions to the LOS D or better operations occur at the Founders Parkway intersections with Allen Way, Crowfoot Valley Road, and Crimson Sky Drive.

Under background conditions, operational analysis indicates that the Founders Parkway signalized intersection with Allen Way has a projected overall operation at LOS F only during the afternoon (PM) peak traffic hour. This LOS F operation, as indicated in this study, was derived from projected 2035 weekday peak hour traffic volumes, general assumptions for future intersection geometry based on apparent land area availability, and optimized traffic signal operations under an assumed actuated-coordinated control condition. It is understood that detailed analysis of this intersection is ongoing by CDOT and Town Staff. It is to be noted that a peak hour LOS F operation can be an acceptable operation for an intersection located in within an urbanized area, and is a level of operation commonly accepted by CDOT. Mitigation to the LOS F operation could include overall intersection widening to provide for additional through and turn lanes or adjustments to established corridor signal timing plans to assign priority green time to this intersection. However, the physical improvement of some of these mitigation measures appear unreasonable due to the local and restrictive nature of the existing intersection and minimal availability of surrounding land area. Exact determination of appropriate or available intersection operation mitigation measure for this intersection or any other studied intersection would require further detailed study separate from this study.

The signalized intersection of Founders Parkway and Crowfoot Valley Road shows a projected and overall long-term morning peak hour operation of LOS F that changes to LOS E during the afternoon peak hour. The LOS F and LOS E operation is attributed to the large traffic volumes occurring with east/west through, eastbound left, and southbound right turn movements plus the restricted land area surrounding the intersection.

The stop-controlled intersection of Crimson Sky Drive and Founders Parkway is shown to have long-term LOS F operations for the westbound left turn movement during both peak traffic hours, and a LOS F operation for the westbound right turn movement only in the morning (AM) peak hour. It is not uncommon for unsignalized movements onto or from an arterial or collector roadway to operate with noticeable delays during peak traffic hours. The LOS F operation projected at the intersection is attributed to the volume of through traffic on Founders Parkway and the stop-controlled nature of the intersection. No reasonable mitigation to the LOS F operation during the background year 2035 condition appears available. Detailed analysis of this intersection is also included within the traffic study prepared for the Castle Oaks/Terrain Development. Specific, if any, mitigation measure being proposed to bring the intersection's LOS F operation to LOS D would be described within that study.

V. Proposed Project Traffic

Trip Generation

The Pioneer Ranch development is contemplated with no specific development plans defined at this time. As introduced in Section I, complete build out of the development is not likely to be immediate and could take up to ten to fifteen years or even longer. This is well into the Year 2035 analysis horizon contemplated in this study and consequently can defer a larger portion of development and related traffic impacts.

Land uses presented in assumed development are not exact and have a density range measured in either square feet, acres, or dwelling units. This range can be attributed to influencing factors such as market demand or buildable area. For example, single-family residential components of development area can range from 4 to 672 dwelling units. The multi-family residential area of development area ranges between 59 to 454 dwelling units.

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers in their report entitled Trip Generation, 9th Edition, were applied to the proposed land uses in order to begin estimating average daily traffic (ADT), AM Peak Hour, and PM Peak Hour vehicle trips that could be associated with the assumed development. A vehicle trip is defined as a one-way vehicle movement from a point of origin to a point of destination.

Based on information available at this time and planning areas proposed, the following land use sizes and ITE Trip Generation Manual codes were assumed and are considered reflective of the highest potential land use likely to occur:

- 672 Single-Family Residential Dwelling Units (Land Use Code 210)
- 454 Apartment Dwelling Units (Land Use Code 220)
- 60,000 Square Feet General Office (Land Use Code 710)
- 140,000 Square Feet Retail (Land Use Code 820)

The corresponding trip generation rates used in this study are presented in Table 3.

TABLE 3 TRIP GENERATION RATES									
ITE CODE	LAND USE	UNIT	TRIP GENERATION RATES						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Residential	DU	9.52	0.1875	0.5625	0.75	0.6300	0.3700	1.00
220	Apartments	DU	6.65	0.1020	0.4080	0.51	0.4030	0.2170	0.62
710	General Office	KSF	11.03	1.3728	0.1872	1.56	0.2533	1.2367	1.49
820	Shopping Center	KSF	42.70	0.5952	0.3648	0.96	1.7808	1.9292	3.71

Key: DU = Dwelling Units, KSF = Thousand Square Feet Gross Floor Area

Note: All data and calculations presented in above table are subject to being rounded to nearest value

It is again emphasized that there are no specific development plans established for the Pioneer Ranch development. ITE land use codes used for estimating traffic generation were selected because of their best fit to the assumed land use description. An example is ITE Land Use Code 820 (Shopping Center) being used for the assumed retail areas of development. It is also important to note that ITE's land use code and respective trip generation rates for Shopping Center include supporting services such as banks, restaurants, and service stations. Use of Land Use Code 210 and 220 were applied to the respective area of residential development. The application of best fitted ITE land use codes and average trip generation rates provides for a conservative estimate of development traffic likely to be generated upon build out or full occupancy of proposed development.

Table 4 presents the projected average daily traffic (ADT) and peak hour traffic volumes generated by the assumed development. Development build out is not anticipated to occur until after the Year 2035 planning horizon. However, for planning and analysis purposes, it is assumed that entire site development construction would occur before end of Year 2035.

As actual land uses, densities or site plans within the development become defined over time, it is expected that traffic generation characteristics analyzed in this overall study will need to be updated by more specific traffic analyses or studies to help re-evaluate when transportation improvements identified within this overall study are needed, or if additional improvements are needed to mitigate the proposed development's impact.

TABLE 4 TRIP GENERATION SUMMARY										
ITE CODE LAND USE SIZE				TOTAL TRIPS GENERATED						
				24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL	
Year 2035 (Assumed 100% Build-Out)										
210	(SF1-SF7) Single-Family Residential	672 DU		6,397	126	378	504	423	249	672
220	(MF1-MF3 & MU1) Multi-Family Residential	454 DU		3,019	46	185	232	183	99	281
710	(MU1@30%) Office	60 KSF		662	82	11	94	15	74	89
820	(MU1@70%) Shopping Center	140 KSF		5,978	83	51	134	249	270	519
8% Trip Reduction:				1,285	27	50	77	70	55	125
Project Total				14,772	311	575	886	801	636	1,437

Note: All data and calculations presented in above table are subject to being rounded to nearest value

As Table 4 illustrates, the combined land uses, upon build out and full occupancy, have the potential to generate approximately 14,772 daily trips with 886 of those occurring during the morning peak hour and 1,437 during the afternoon peak hour.

Adjustments to Trip Generation Rates

As a development with a variety of land uses is likely to attract trips from within the site (internal capture) as well as pass-by trips from the adjacent roadway system, use of a trip reduction percentage is applicable.

ITE published data indicates that trip reduction rates for mixed-use developments of similar size and characteristics vary between twenty-five and fifty-five percent. A conservative eight (8) percent internal capture reduction was applied because of the likelihood for shared trips between land uses located within the vicinity of one another in a large mixed-use development. A copy of ITE's worksheet used to estimate an internal capture percentage within this multi-use development is included for reference in Appendix A. It is to be noted that application of specific trip reduction methodology, as described by ITE, cannot be accurately employed as no specific land uses or related densities have been defined for this development.

Trip Distribution

Overall directional distribution of site-generated traffic was determined based on existing traffic counts, the location of the site within Douglas County and surrounding Town of Castle Rock, surrounding land uses, and available roadway network.

The trip distribution pattern for overall site development is shown on Figure 7.

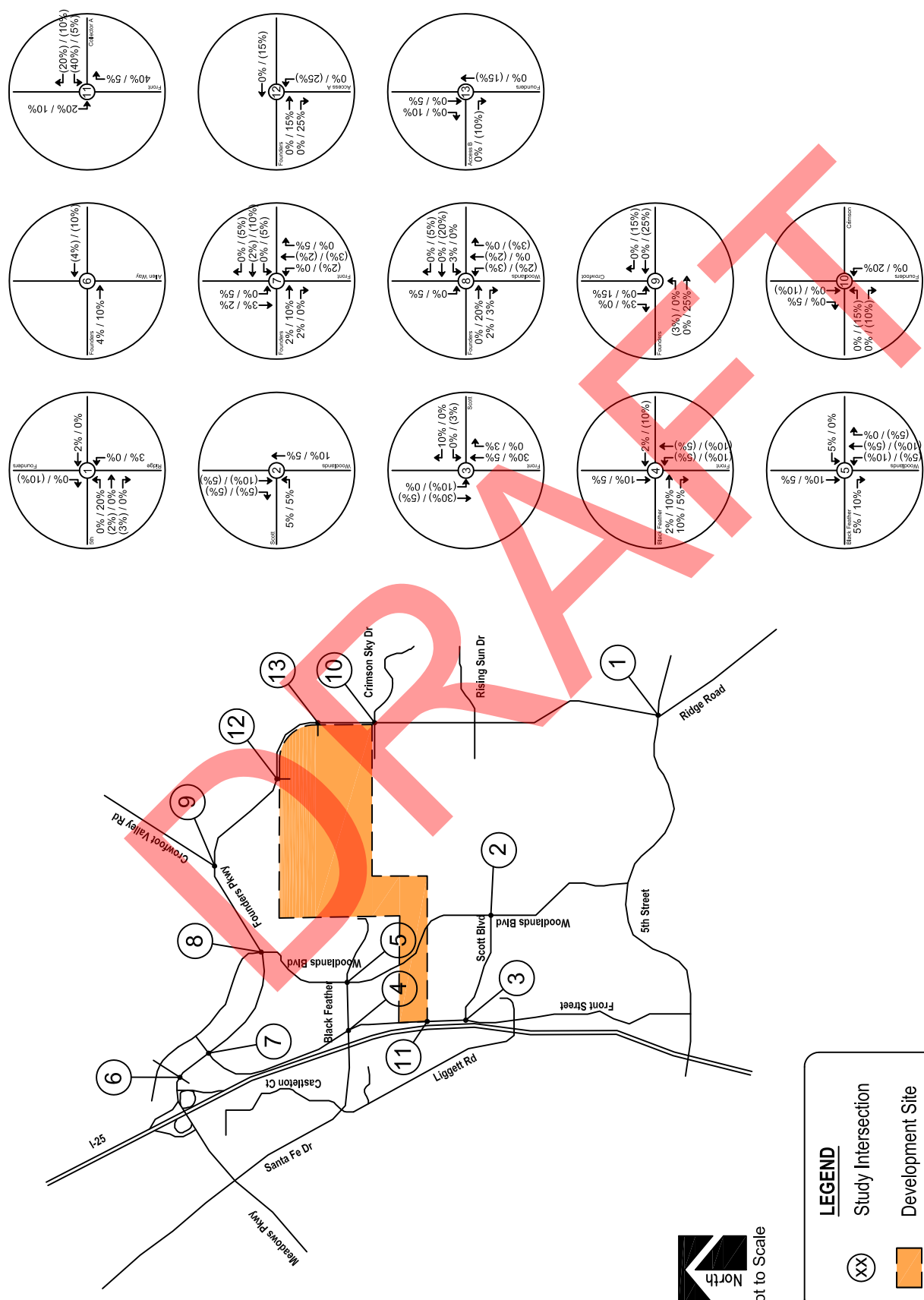
Trip Assignment

Traffic assignment is how the generated and distributed trips are expected to be loaded on the roadway network.

Applying trip distribution patterns to site-generated traffic provides the site-generated trip assignments as shown on Figure 8.

Internal Trip Distribution and Assignment

No internal trip distribution or assignment is considered in this traffic study since specific development plans for the site are not defined at this time.



LEGEND

- Study Intersection
- Development Site



PIONEER RANCH
Traffic Impact Study

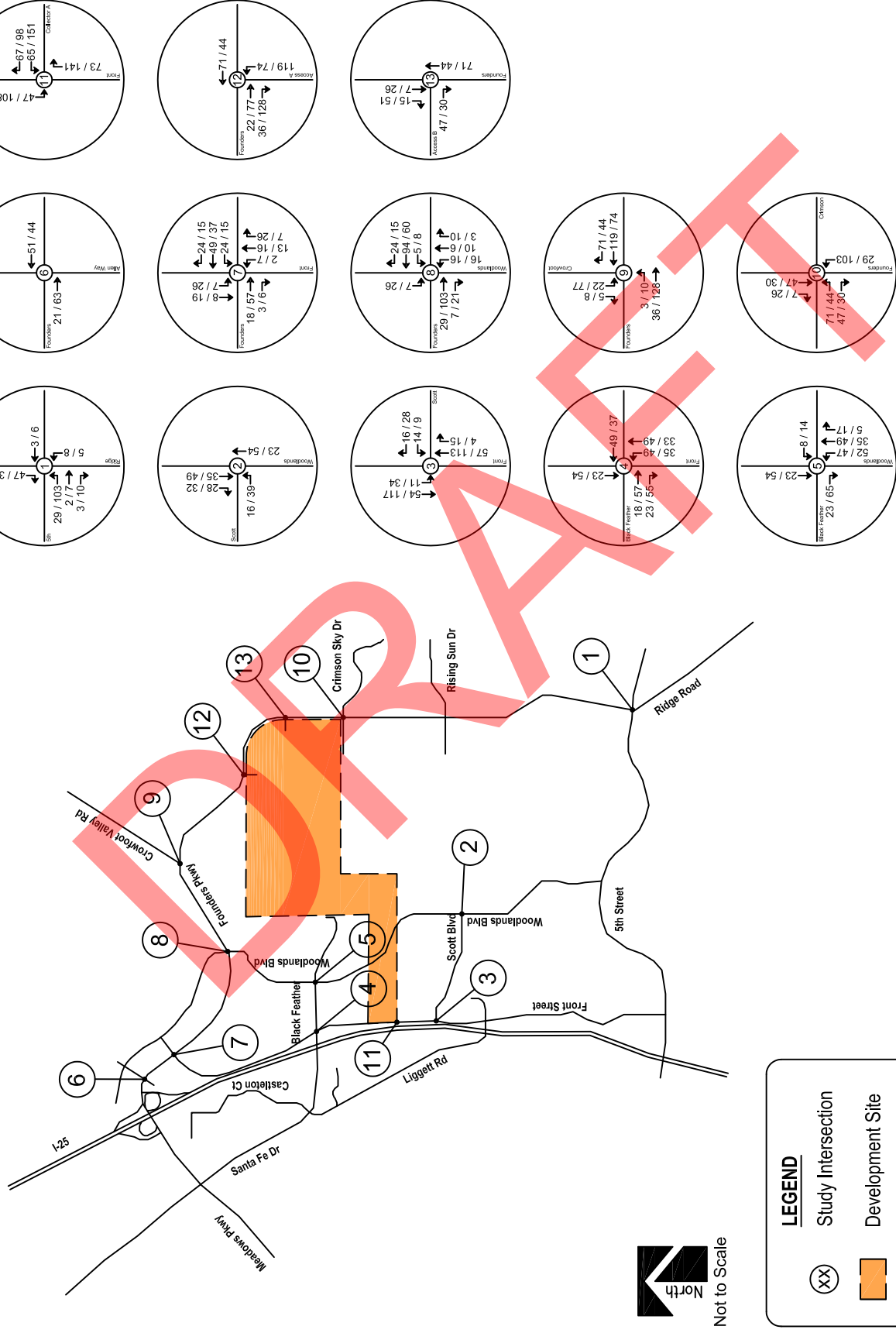
SM ROCHA, LLC
Traffic and Transportation Consultants

Figure 7

SITE DEVELOPMENT DISTRIBUTION

(%) : Outbound
% : Inbound

Development Area (DA) West of Woodlands / DA East of Woodlands



VI. Future Traffic Forecasts with Proposed Development

Site-generated traffic was added to background traffic projections for Year 2035 to develop total traffic projections.

As earlier discussed, this traffic impact study conservatively assumes entire site development occurring by end of Year 2035. It is again emphasized that no specific plans or timeline for development is known at this time.

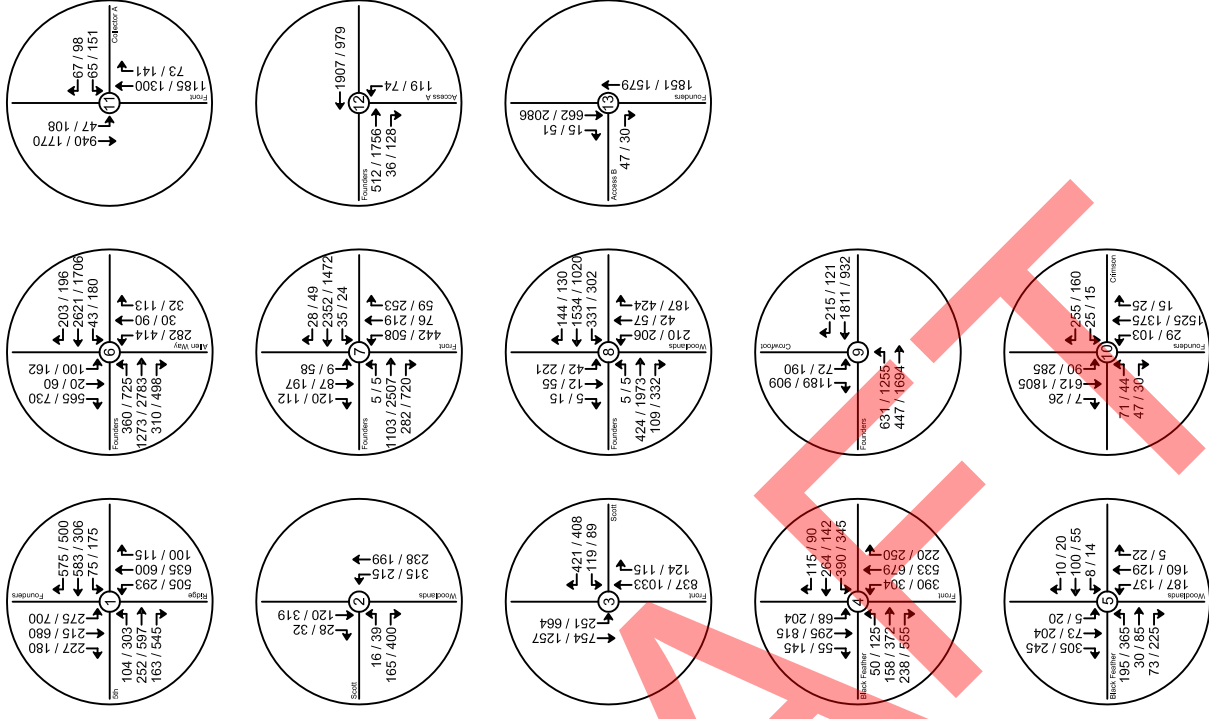
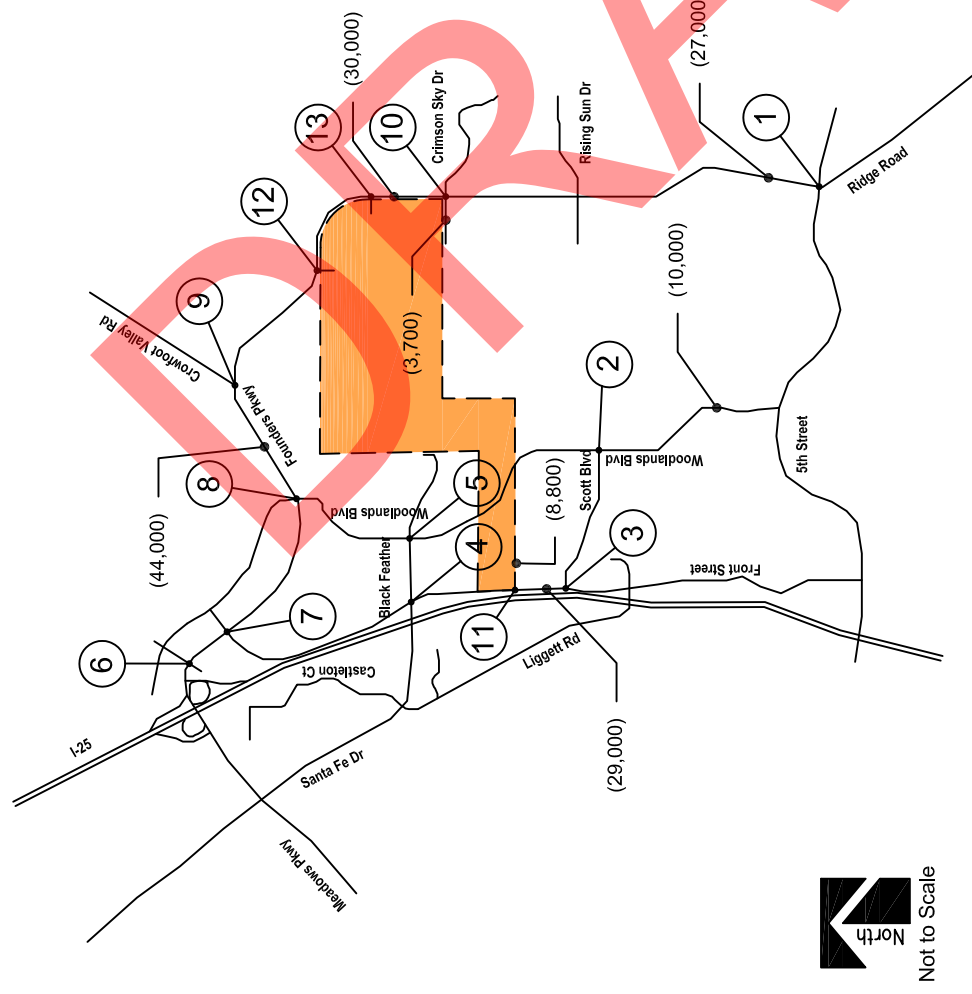
Year 2035 total traffic analyses assume some roadway or intersection improvements to accommodate site generated traffic. These improvements are described as:

Improvement Location	Year 2035 – Improvement Description With Site Development
East/West Collector A	Build internal roadway between Woodlands Boulevard (Extension) and Front Street
Front Street	Modification of roadway to allow for an exclusive southbound left turn lane at proposed East/West Collector A
Crimson Sky Drive & Founders Parkway	Roadway improvement and striping modification to create west leg of intersection
Site Access A & Founders Parkway	Traffic signal
Site Access & Founders Parkway	Roadway improvement and striping modification to create intersection for proposed Site Access A and Site Access B

It is understood that more specific traffic studies are to follow upon specific site development proposals. It is then that additional or more detailed improvements may be identified.

A peak hour signal warrant analysis was conducted for the assumed site access intersections on Front Street and Founders Parkway in order to review the potential for a signalized intersection. Analysis results indicate that assumed intersections, except for Site Access B, were found to have the minimum vehicle volumes required to meet Warrant 3, Peak Hour, from the Manual on Uniform Traffic Control Devices (MUTCD) for installation of a traffic signal. As earlier discussed, Warrant 3 is intended for use at a location where traffic conditions are such that for a minimum of one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. Therefore, the assumed intersection (Access A) on Founders Parkway and Front Street (Collector A) was analyzed under signal control. No signal progression analysis was conducted in this study because of specific site development plans not yet defined and the assumed long term nature of the intersections. Base signal timing parameters assumed to analyze intersection operations is considered complementary to the Founders Parkway and Front Street corridor and any future traffic signal coordination plans. MUTCD Warrant 3, Peak Hour, worksheets are included for reference in Appendix A. The assumed Founders Parkway and Front Street intersections should also be monitored by applicable CDOT and Town Staff as development build out occurs to determine when actual warrants for signalization may be met.

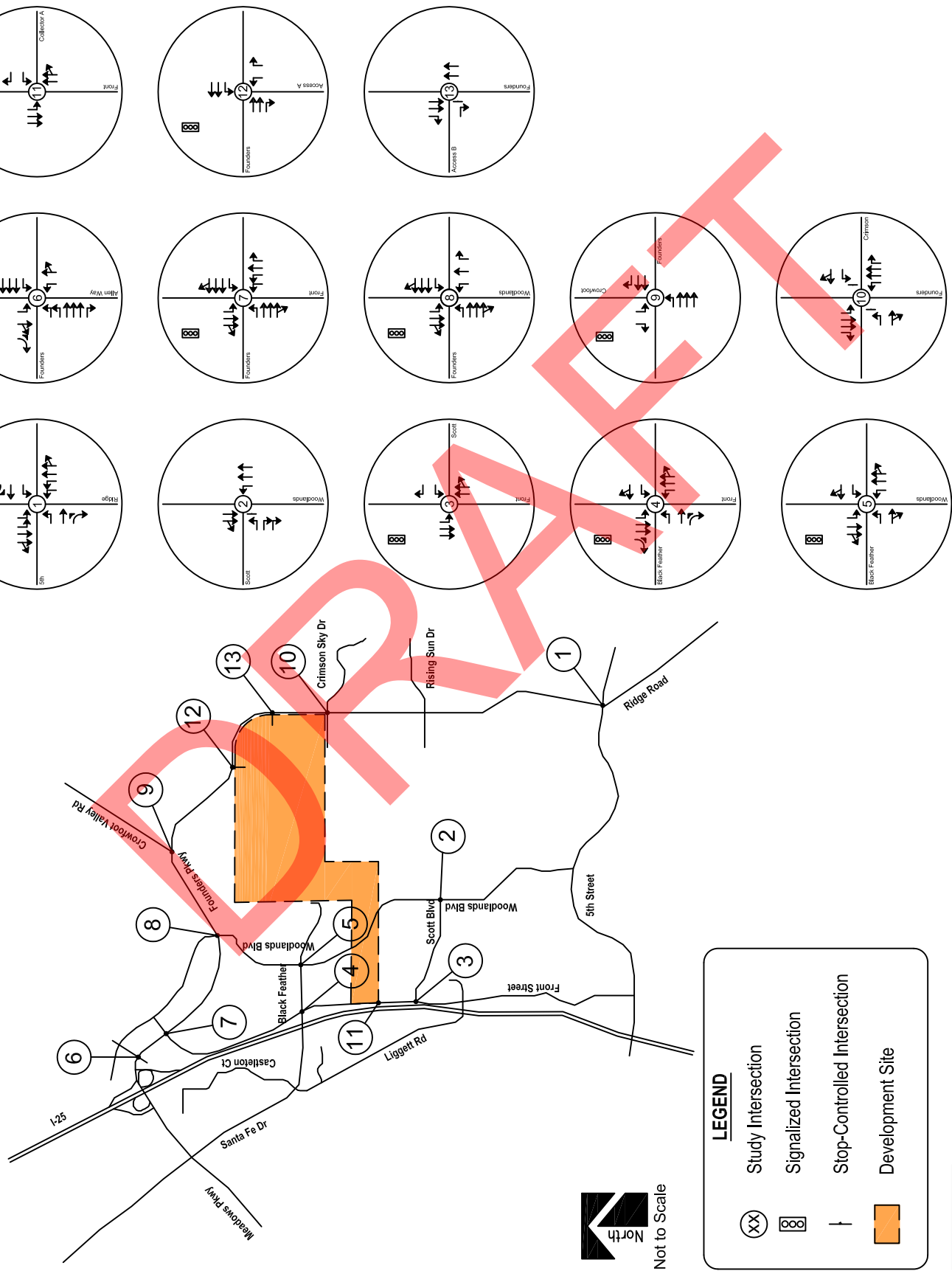
The projected total traffic volumes and intersection geometry for Year 2035 are shown on Figure 9 and Figure 10, respectively.



Not to Scale

Study Intersection

Development Site



VII. Project Impacts

The analyses and procedures described in this report were performed in accordance with the Highway Capacity Manual (HCM) and are based upon the worst case conditions that occur during a typical weekday upon build out and full occupancy of the assumed development. Therefore, study intersections are likely to operate with traffic conditions better than those described within this study, which represent the peak hours of operation only.

Level of service is a method of measurement used by transportation professionals to quantify a driver's perception of travel conditions that include travel time, number of stops, and total amount of stopped delay experienced on a roadway network. The HCM categorizes level of service into a range from "A" which indicates little, if any, vehicle delay, to "F" which indicates a level of operation considered unacceptable to most drivers. These levels of service grades with brief descriptions of the operating condition, for signalized and unsignalized intersections, are included for reference in Appendix B and have been used throughout this study.

In general, Douglas County and the Town of Castle Rock have established LOS D as the operation goal for all intersections before mitigation measures are to be considered. Moreover, Town criteria defines that no left turn movements shall operate worse than LOS E, nor have queues that block through traffic during any peak hour. It is important to note that CDOT does not follow the described LOS D operational goal for roadways under their jurisdiction. Potential mitigation measures to achieve operation goals, local or regional, could include intersection signalization, the coordination of traffic signals, additional travel lanes on the available roadway network, the provision of auxiliary lanes such as exclusive left and right turn lanes, or turn movement restriction at intersections.

Peak Hour Intersection Levels of Service

Similar to background traffic, the operations of study intersections were analyzed under projected total traffic conditions using SYNCHRO computer program. Total traffic level of service analysis results for Year 2035, with assumed improvements described in this study, are listed in Table 5.

Definitions of levels of service are given in Appendix B. Intersection capacity worksheets are provided in Appendix C.

TABLE 5 INTERSECTION CAPACITY ANALYSIS SUMMARY TOTAL TRAFFIC - YEAR 2035		
INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
5th Street / Founders Parkway (Signalized)	C (25.0)	D (41.5)
Scott Boulevard / Front Street (Signalized)	B (12.8)	C (28.5)
Black Feather Trail / Front Street (Signalized)	C (23.4)	D (45.5)
Founders Parkway / Allen Way (Signalized)	E (60.7)	F (86.5)
Founders Parkway / Front Street (Signalized)	B (19.9)	D (54.5)
Founders Parkway / Woodlands Boulevard (Signalized)	B (11.5)	D (50.7)
Founders Parkway / Crowfoot Valley Road (Signalized)	F (169.0)	F (96.9)
Black Feather Trail / Woodlands Boulevard (Signalized)	B (12.6)	B (14.6)
Front Street / Collector A (Signalized)	A (7.1)	B (12.7)
Founders Parkway / Access A (Signalized)	A (9.7)	A (7.3)
Scott Boulevard / Woodlands Boulevard (Stop-Controlled)		
Eastbound Left	D	D
Eastbound Right	A	B
Northbound Left	A	A
Crimson Sky Drive / Founders Parkway (Stop-Controlled)		
Eastbound Left	F	F
Eastbound Through and Right	B	C
Westbound Left	F	F
Westbound Through and Right	F	C
Northbound Left	A	D
Southbound Left	C	D
Founders Parkway / Access B (Stop-Controlled)		
Eastbound Right	B	D

Key: Signalized Intersections: Level of Service for overall intersection (control delay in sec/veh)
 Stop-Controlled Intersections: Level of Service

Total Traffic Analysis Results Upon Development Build Out – Year 2035

With few exceptions, Table 5 shows that existing and proposed signalized or stop-controlled intersections continue overall or specific turn movement operations at LOS D and LOS E or better during peak traffic hours. These intersections are again shown to meet Town operational goals of LOS D (and LOS E for left turn movements) upon assumed development build out with all conservative assumptions defined in this study.

The signalized Founders Parkway intersections of Allen Way and Crowfoot Valley Road continue to have overall peak hour operations of LOS F or LOS E, similar to that concluded with background traffic analyses.

The signalized intersection of Access A and Founders Parkway has an overall projected morning and afternoon peak hour operation at LOS A. This signalized intersection location also complies with a previous land owner, Town and CDOT agreement for future site access upon construction of Founders Parkway (State Highway 86). The future coordination of an access permit application and intersection improvements, including auxiliary lanes, is expected upon actual site development plans.

The existing Crimson Sky Drive intersection with Founders Parkway is shown to have future LOS A or LOS D operations during the morning and afternoon peak hours. The eastbound left, westbound left, and westbound right turn movements are projected to operate with LOS F. As previously discussed, it is not uncommon for unsignalized movements onto or from an arterial or collector roadway to operate with noticeable delays during peak traffic hours. The projected LOS F operation for eastbound/westbound turn movements is attributed to the through traffic volume projected to be on Founders Parkway and the stop-controlled nature of the intersection. No reasonable site development mitigation to the LOS F operation for this particular left turn movement appears available.

The signalized intersection of Front Street and assumed site collector roadway (Collector A) has an overall projected LOS A operation occurring during the morning peak hour and changes to LOS B during the afternoon peak hour. Town design criteria further defines a general term standard of half mile intervals for proposed major arterial accesses that may require signalization. Signalization of this intersection would not comply with the Town interval standard, but it appears possible that signal timing or coordination parameters could be established to achieve good speed, capacity and optimal signal progression along the Front Street corridor as signalization of this intersection is considered. The assumed Front Street and Collector A intersection should be monitored by Town Staff as actual area development occurs to determine when, or if, additional warrants for signalization may be met.

Scott Boulevard is shown to provide a peak hour LOS D operation for the eastbound left turn at the assumed stop-controlled, T-intersection (3-way intersection) with Woodlands Boulevard. This LOS D operation complies with Town defined intersection operation goals. Peak hour operations for other intersection turn movements are at LOS B or better.

VIII. Conclusion

This traffic impact study addressed the capacity, geometric, and control requirements associated with the assumed Pioneer Ranch development. The mixed-use development is approximately 388 acres in size and is located on Front Street in Douglas County, Colorado. The development site is further bound to the east by Founders Parkway (State Highway 86), Scott Boulevard to the south, and Black Feather Trail on the north while being surrounded by the Town of Castle Rock. Annexation into the Town of Castle Rock is being pursued.

Pioneer Ranch is a mixed-use development envisioned for residential dwelling units with a minor area set aside for future office and retail land use. This office and retail area is located on the west end of the development site between Front Street and Woodlands Boulevard. It is further anticipated that approximately twenty-six (26) percent, or 100 acres, of development site area is planned for open space, recreation or park land area. No specific plans or time-line for development is known at this time.

This study is intended to serve as an overall guide that can be used for any order of site development that occurs. The combination of development land use areas presented herein are assumed and analyzed to estimate projected traffic levels through Year 2035. As actual uses within the development become defined over time, traffic characteristics and influencing factors considered in this study are subject to change and will need to be updated accordingly.

Only long-term analysis, Year 2035, is included in this study since specific land uses or phasing within the development is unknown and development operation is not anticipated in the short-term horizon.

The study area examined in this traffic study encompasses multiple intersections along Founders Parkway (State Highway 86), Front Street, and Woodlands Boulevard.

Analyses were conducted for the critical morning (AM) and afternoon (PM) peak hour traffic operations for existing conditions, Year 2035 background traffic conditions and Year 2035 total traffic conditions.

Without the assumed development, Year 2035 background traffic analysis indicated that majority of studied intersections, either operating under a signalized or stop-controlled condition, have overall or specific turn movement operations at LOS D or better during peak traffic hours. These intersections are shown to meet the Town's operational goal of LOS D. Exceptions to the LOS D or better operations occur at the Founders Parkway intersections with Allen Way, Crowfoot Valley Road, and Crimson Sky Drive. The Founders Parkway signalized intersection with Allen Way has a projected overall operation at LOS F only during the afternoon (PM) peak traffic hour. This LOS F operation, as indicated in this study, was derived from projected 2035 weekday peak hour traffic volumes, general assumptions for future intersection geometry based on apparent land area availability, and optimized traffic signal operations under an assumed actuated-coordinated control condition. It is understood that detailed analysis of this intersection is ongoing by CDOT and Town Staff. It is to be noted that a peak hour LOS F operation can be an acceptable operation for an intersection located in within an urbanized area, and is a level of operation commonly accepted by CDOT. Mitigation to

the LOS F operation could include overall intersection widening to provide for additional through and turn lanes or adjustments to established corridor signal timing plans to assign priority green time to this intersection. However, the physical improvement of some of these mitigation measures appear unreasonable due to the local and restrictive nature of the existing intersection and minimal availability of surrounding land area. Exact determination of appropriate or available intersection operation mitigation measure for this intersection or any other studied intersection would require further detailed study separate from this study. The signalized intersection of Founders Parkway and Crowfoot Valley Road shows a projected and overall long-term morning peak hour operation of LOS F that changes to LOS E during the afternoon peak hour. The LOS F and LOS E operation is attributed to the large traffic volumes occurring with east/west through, eastbound left, and southbound right turn movements plus the restricted land area surrounding the intersection. The stop-controlled intersection of Crimson Sky Drive and Founders Parkway is shown to have long-term LOS F operations for the westbound left turn movement during both peak traffic hours, and a LOS F operation for the westbound right turn movement only in the morning (AM) peak hour. It is not uncommon for unsignalized movements onto or from an arterial or collector roadway to operate with noticeable delays during peak traffic hours. The LOS F operation projected at the intersection is attributed to the volume of through traffic on Founders Parkway and the stop-controlled nature of the intersection. No reasonable mitigation to the LOS F operation during the background year 2035 condition appears available. Detailed analysis of this intersection is also included within the traffic study prepared for the Castle Oaks/Terrain Development. Specific, if any, mitigation measure being proposed to bring the intersection's LOS F operation to LOS D would be described within that study.

A development of this size is likely to have some influence to the surrounding transportation system. The need for roadway improvements to ensure adequate intersection operations pursuant to County, Town, and CDOT standards is anticipated. However, roadway improvements or potential operation mitigation can only be assumed since no specific development plans are known at this time.

Analyses of Year 2035 total traffic projections, with all conservative assumptions and roadway improvements identified in this study, indicate that the addition of site-generated traffic will cause no significant impact to operations of the surrounding roadway network upon the conservative development build out assumed. With few exceptions, existing and proposed signalized or stop-controlled intersections continue overall or specific turn movement operations at LOS D (and LOS E for left turn movements) or better during peak traffic hours. These intersections continue to meet the Town's intersection operational goals. The signalized Founders Parkway intersections of Allen Way and Crowfoot Valley Road continue to have overall peak hour operations of LOS F or LOS E, similar to that concluded with background traffic analyses. The signalized intersection of Access A and Founders Parkway has an overall projected morning and afternoon peak hour operation at LOS A. This signalized intersection location also complies with a previous land owner, Town and CDOT agreement for future site access upon construction of Founders Parkway (State Highway 86). The future coordination of an access permit application and intersection improvements, including auxiliary lanes, is expected upon actual site development plans. The existing Crimson Sky Drive intersection with Founders Parkway is shown to have future LOS A or LOS D operations during the morning and afternoon peak hours. The eastbound left, westbound left, and westbound right turn movements are projected to operate with LOS F. As previously discussed, it is not uncommon for unsignalized movements onto or from an arterial or collector roadway to operate with noticeable delays during peak traffic hours. The projected LOS F operation for eastbound/westbound turn movements is attributed to the through traffic volume projected to be on Founders Parkway and the

stop-controlled nature of the intersection. No reasonable site development mitigation to the LOS F operation for this particular left turn movement appears available. The signalized intersection of Front Street and assumed site collector roadway (Collector A) has an overall projected LOS A operation occurring during the morning peak hour and changes to LOS B during the afternoon peak hour. Town design criteria further defines a general term standard of half mile intervals for proposed major arterial accesses that may require signalization. Signalization of this intersection would not comply with the Town interval standard, but it appears possible that signal timing or coordination parameters could be established to achieve good speed, capacity and optimal signal progression along the Front Street corridor as signalization of this intersection is considered. The assumed Front Street and Collector A intersection should be monitored by Town Staff as actual area development occurs to determine when, or if, additional warrants for signalization may be met. Scott Boulevard is shown to provide a peak hour LOS D operation for the eastbound left turn at the assumed stop-controlled, T-intersection (3-way intersection) with Woodlands Boulevard. This LOS D operation complies with Town defined intersection operation goals. Peak hour operations for other intersection turn movements are at LOS B or better.

Further coordination of on-site and off-site roadway improvements, including applicable intersection operation mitigation, is anticipated as actual uses within the assumed development become defined.

DRAFT

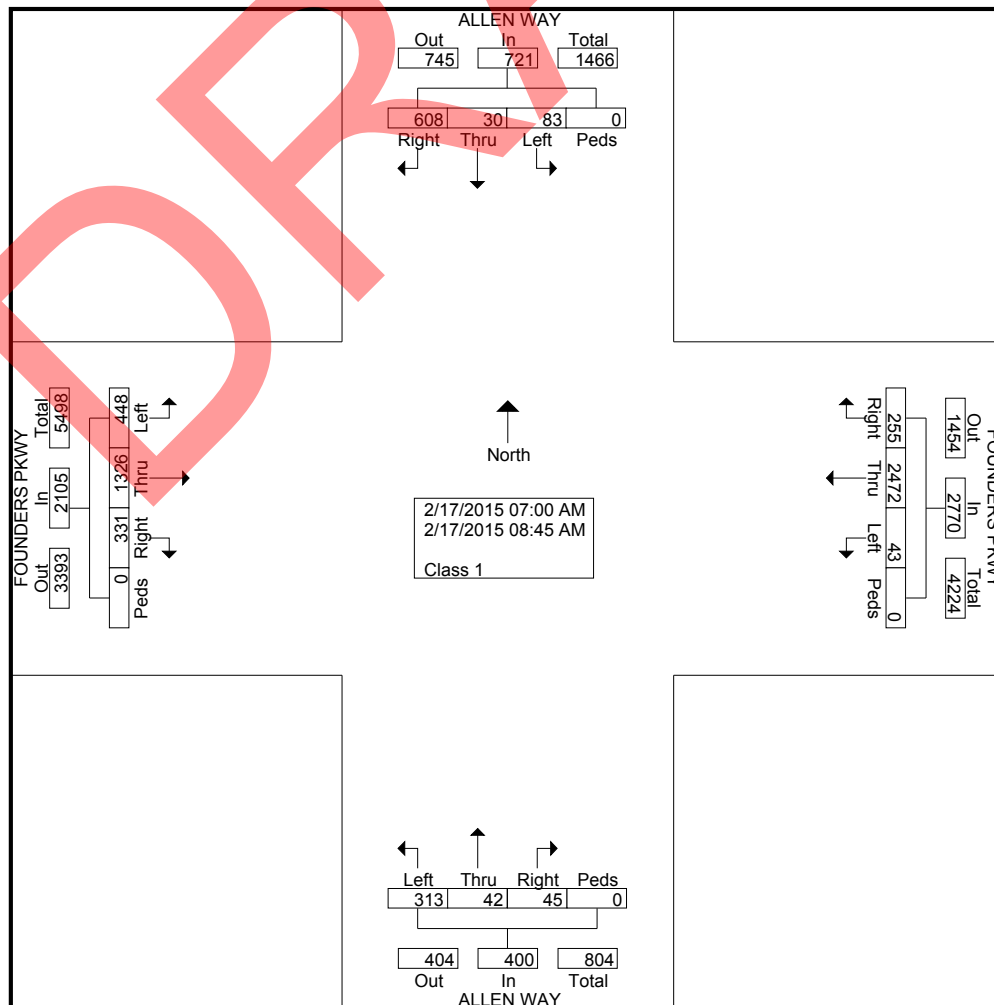
APPENDIX A

Traffic Count Data

File Name : #1 AllenWay@FoundersPkwyAM
 Site Code : 00000000
 Start Date : 2/17/2015
 Page No : 1

Groups Printed- Class 1

Start Time	ALLEN WAY Southbound				FOUNDERS PKWY Westbound				ALLEN WAY Northbound				FOUNDERS PKWY Eastbound				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	64	2	8	0	24	312	3	0	6	2	41	0	35	104	46	0	647
07:15 AM	85	1	12	0	33	392	5	0	5	1	35	0	38	134	41	0	782
07:30 AM	86	5	16	0	26	368	6	0	4	4	42	0	55	172	53	0	837
07:45 AM	68	2	12	0	30	321	8	0	4	2	43	0	48	189	67	0	794
Total	303	10	48	0	113	1393	22	0	19	9	161	0	176	599	207	0	3060
08:00 AM	75	3	15	0	24	281	5	0	5	9	37	0	31	172	39	0	696
08:15 AM	81	5	9	0	40	262	5	0	4	8	32	0	38	175	66	0	725
08:30 AM	65	4	7	0	28	255	7	0	8	8	45	0	49	179	69	0	724
08:45 AM	84	8	4	0	50	281	4	0	9	8	38	0	37	201	67	0	791
Total	305	20	35	0	142	1079	21	0	26	33	152	0	155	727	241	0	2936
Grand Total	608	30	83	0	255	2472	43	0	45	42	313	0	331	1326	448	0	5996
Apprch %	84.3	4.2	11.5	0	9.2	89.2	1.6	0	11.2	10.5	78.2	0	15.7	63	21.3	0	
Total %	10.1	0.5	1.4	0	4.3	41.2	0.7	0	0.8	0.7	5.2	0	5.5	22.1	7.5	0	



File Name : #1 AllenWay@FoundersPkwyAM
 Site Code : 00000000
 Start Date : 2/17/2015
 Page No : 2

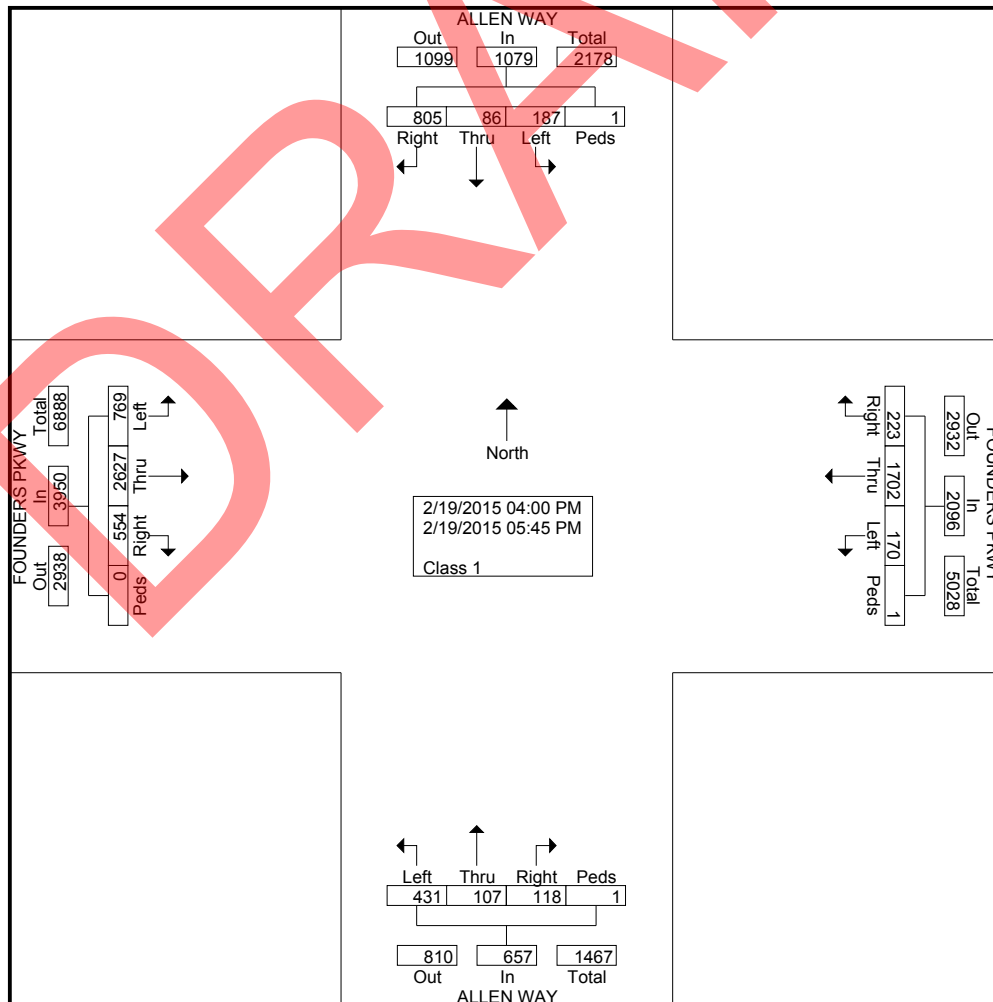
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Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	85	1	12	0	98	33	392	5	0	430	5	1	35	0	41	38	134	41	0	213	782
07:30 AM	86	5	16	0	107	26	368	6	0	400	4	4	42	0	50	55	172	53	0	280	837
07:45 AM	68	2	12	0	82	30	321	8	0	359	4	2	43	0	49	48	189	67	0	304	794
08:00 AM	75	3	15	0	93	24	281	5	0	310	5	9	37	0	51	31	172	39	0	242	696
Total Volume	314	11	55	0	380	113	1362	24	0	1499	18	16	157	0	191	172	667	200	0	1039	3109
% App. Total	82.6	2.9	14.5	0		7.5	90.9	1.6	0		9.4	8.4	82.2	0		16.6	64.2	19.2	0		
PHF	.913	.550	.859	.000	.888	.856	.869	.750	.000	.872	.900	.444	.913	.000	.936	.782	.882	.746	.000	.854	.929



File Name : #1 AllenWay@FoundersPkwyPM
Site Code : 00000000
Start Date : 2/19/2015
Page No : 1

Groups Printed- Class 1

	ALLEN WAY Southbound				FOUNDERS PKWY Westbound				ALLEN WAY Northbound				FOUNDERS PKWY Eastbound				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	97	9	29	1	24	203	20	1	11	17	45	0	73	297	89	0	916
04:15 PM	105	15	19	0	31	195	23	0	15	15	60	0	78	307	98	0	961
04:30 PM	98	14	20	0	27	223	12	0	17	8	38	0	69	302	86	0	914
04:45 PM	99	14	29	0	32	202	15	0	12	17	58	1	57	299	93	0	928
Total	399	52	97	1	114	823	70	1	55	57	201	1	277	1205	366	0	3719
05:00 PM	98	14	25	0	40	218	35	0	13	14	47	0	46	336	92	0	978
05:15 PM	109	5	23	0	23	255	32	0	16	20	75	0	83	342	93	0	1076
05:30 PM	86	9	20	0	22	208	13	0	16	9	58	0	69	371	108	0	989
05:45 PM	113	6	22	0	24	198	20	0	18	7	50	0	79	373	110	0	1020
Total	406	34	90	0	109	879	100	0	63	50	230	0	277	1422	403	0	4063
Grand Total	805	86	187	1	223	1702	170	1	118	107	431	1	554	2627	769	0	7782
Apprch %	74.6	8	17.3	0.1	10.6	81.2	8.1	0	18	16.3	65.6	0.2	14	66.5	19.5	0	
Total %	10.3	1.1	2.4	0	2.9	21.9	2.2	0	1.5	1.4	5.5	0	7.1	33.8	9.9	0	



File Name : #1 AllenWay@FoundersPkwyPM
Site Code : 00000000
Start Date : 2/19/2015
Page No : 2

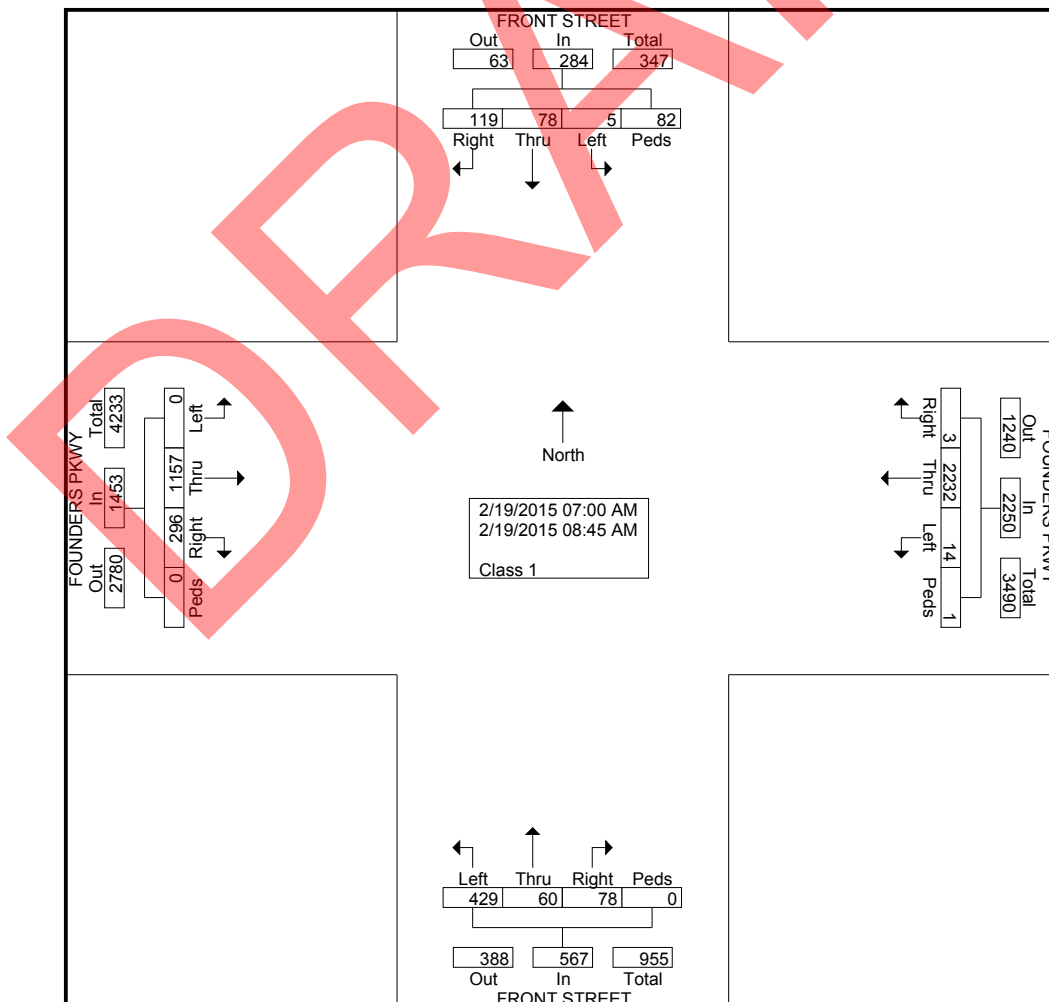
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Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	98	14	25	0	137	40	218	35	0	293	13	14	47	0	74	46	336	92	0	474	978
05:15 PM	109	5	23	0	137	23	255	32	0	310	16	20	75	0	111	83	342	93	0	518	1076
05:30 PM	86	9	20	0	115	22	208	13	0	243	16	9	58	0	83	69	371	108	0	548	989
05:45 PM	113	6	22	0	141	24	198	20	0	242	18	7	50	0	75	79	373	110	0	562	1020
Total Volume	406	34	90	0	530	109	879	100	0	1088	63	50	230	0	343	277	1422	403	0	2102	4063
% App. Total	76.6	6.4	17	0		10	80.8	9.2	0		18.4	14.6	67.1	0		13.2	67.6	19.2	0		
PHF	.898	.607	.900	.000	.940	.681	.862	.714	.000	.877	.875	.625	.767	.000	.773	.834	.953	.916	.000	.935	.944



File Name : #2 FrontSt@FoundersPkwyAM
Site Code : 00000000
Start Date : 2/19/2015
Page No : 1

Groups Printed- Class 1

Start Time	FRONT STREET Southbound				FOUNDERS PKWY Westbound				FRONT STREET Northbound				FOUNDERS PKWY Eastbound				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	18	8	2	6	1	287	3	0	9	6	59	0	33	92	0	0	524
07:15 AM	22	7	0	15	1	362	2	0	7	4	54	0	37	136	0	0	647
07:30 AM	15	6	0	10	0	351	1	0	5	10	68	0	45	154	0	0	665
07:45 AM	12	15	0	9	0	268	0	0	9	11	33	0	33	145	0	0	535
Total	67	36	2	40	2	1268	6	0	30	31	214	0	148	527	0	0	2371
08:00 AM	18	16	1	9	1	260	3	0	8	10	62	0	26	153	0	0	567
08:15 AM	13	10	0	14	0	255	1	0	14	7	37	0	45	154	0	0	550
08:30 AM	10	9	1	3	0	215	2	0	14	3	63	0	36	161	0	0	517
08:45 AM	11	7	1	16	0	234	2	1	12	9	53	0	41	162	0	0	549
Total	52	42	3	42	1	964	8	1	48	29	215	0	148	630	0	0	2183
Grand Total	119	78	5	82	3	2232	14	1	78	60	429	0	296	1157	0	0	4554
Apprch %	41.9	27.5	1.8	28.9	0.1	99.2	0.6	0	13.8	10.6	75.7	0	20.4	79.6	0	0	
Total %	2.6	1.7	0.1	1.8	0.1	49	0.3	0	1.7	1.3	9.4	0	6.5	25.4	0	0	



File Name : #2 FrontSt@FoundersPkwyAM
Site Code : 00000000
Start Date : 2/19/2015
Page No : 2

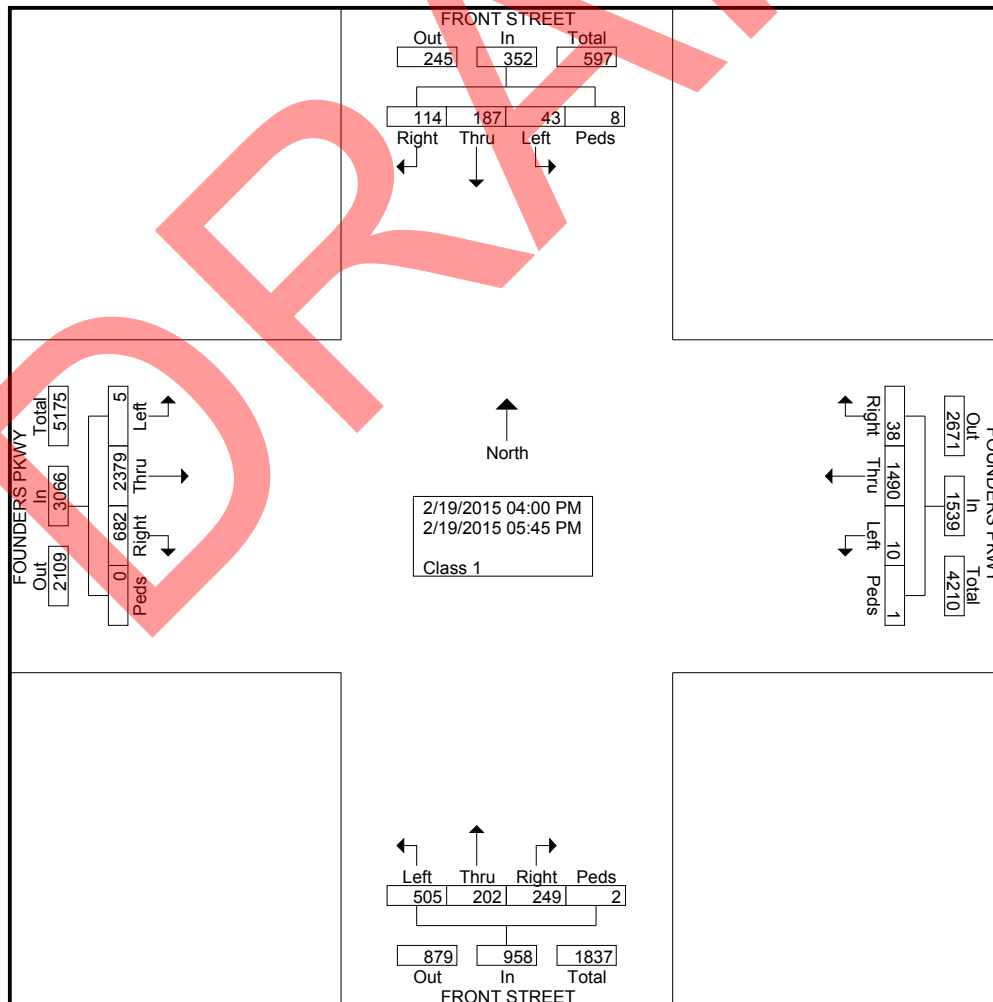
	FRONT STREET Southbound					FOUNDERS PKWY Westbound					FRONT STREET Northbound					FOUNDERS PKWY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	22	7	0	15	44	1	362	2	0	365	7	4	54	0	65	37	136	0	0	173	647
07:30 AM	15	6	0	10	31	0	351	1	0	352	5	10	68	0	83	45	154	0	0	199	665
07:45 AM	12	15	0	9	36	0	268	0	0	268	9	11	33	0	53	33	145	0	0	178	535
08:00 AM	18	16	1	9	44	1	260	3	0	264	8	10	62	0	80	26	153	0	0	179	567
Total Volume	67	44	1	43	155	2	1241	6	0	1249	29	35	217	0	281	141	588	0	0	729	2414
% App. Total	43.2	28.4	0.6	27.7		0.2	99.4	0.5	0		10.3	12.5	77.2	0		19.3	80.7	0	0		
PHF	.761	.688	.250	.717	.881	.500	.857	.500	.000	.855	.806	.795	.798	.000	.846	.783	.955	.000	.000	.916	.908



File Name : #2 FrontSt@FoundersPkwyPM
Site Code : 00000000
Start Date : 2/19/2015
Page No : 1

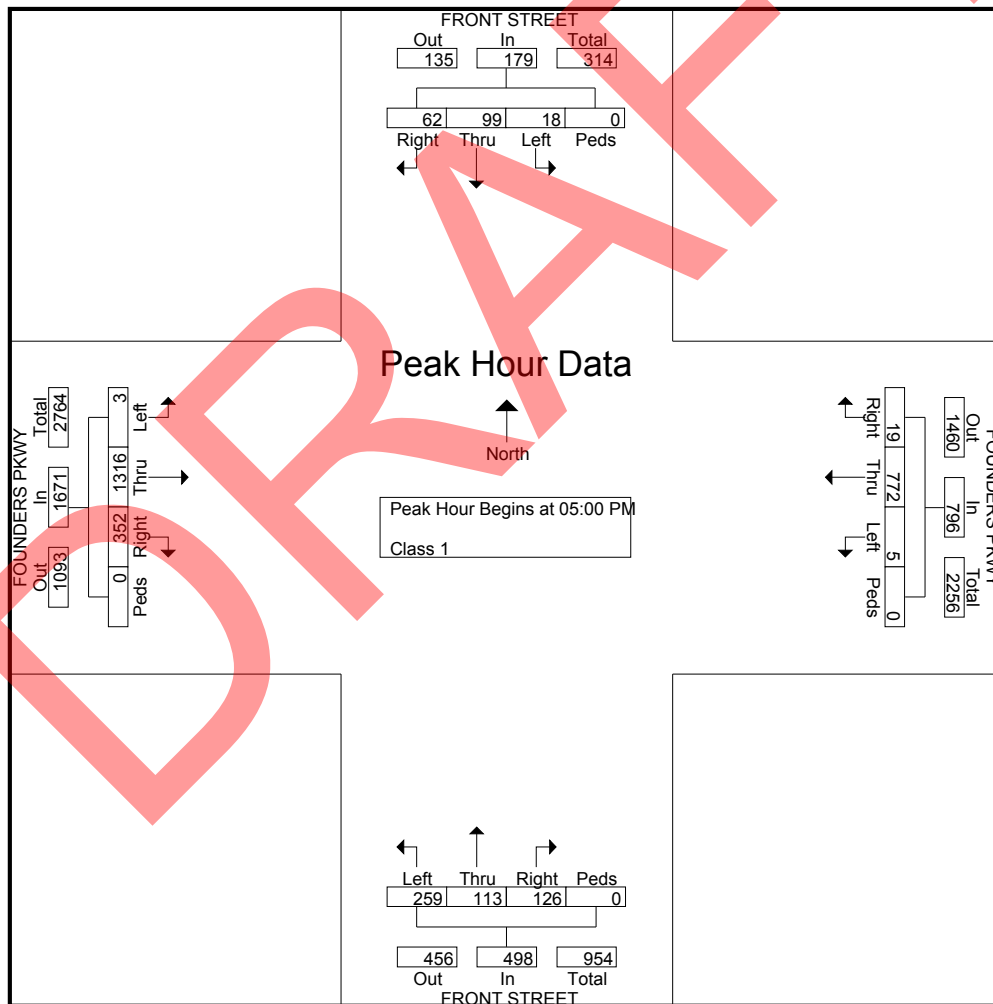
Groups Printed- Class 1

Start Time	FRONT STREET Southbound				FOUNDERS PKWY Westbound				FRONT STREET Northbound				FOUNDERS PKWY Eastbound				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	14	33	6	5	4	175	2	0	28	14	64	1	93	243	2	0	684
04:15 PM	7	22	7	2	4	170	3	1	27	21	68	1	77	277	0	0	687
04:30 PM	17	15	5	1	7	192	0	0	30	32	61	0	66	275	0	0	701
04:45 PM	14	18	7	0	4	181	0	0	38	22	53	0	94	268	0	0	699
Total	52	88	25	8	19	718	5	1	123	89	246	2	330	1063	2	0	2771
05:00 PM	12	25	5	0	5	206	0	0	33	37	77	0	93	331	0	0	824
05:15 PM	20	27	6	0	5	237	3	0	35	22	53	0	91	321	0	0	820
05:30 PM	19	31	2	0	6	162	0	0	28	28	64	0	84	319	1	0	744
05:45 PM	11	16	5	0	3	167	2	0	30	26	65	0	84	345	2	0	756
Total	62	99	18	0	19	772	5	0	126	113	259	0	352	1316	3	0	3144
Grand Total	114	187	43	8	38	1490	10	1	249	202	505	2	682	2379	5	0	5915
Apprch %	32.4	53.1	12.2	2.3	2.5	96.8	0.6	0.1	26	21.1	52.7	0.2	22.2	77.6	0.2	0	
Total %	1.9	3.2	0.7	0.1	0.6	25.2	0.2	0	4.2	3.4	8.5	0	11.5	40.2	0.1	0	



File Name : #2 FrontSt@FoundersPkwyPM
Site Code : 00000000
Start Date : 2/19/2015
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	FRONT STREET Southbound					FOUNDERS PKWY Westbound					FRONT STREET Northbound					FOUNDERS PKWY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	12	25	5	0	42	5	206	0	0	211	33	37	77	0	147	93	331	0	0	424	824
05:15 PM	20	27	6	0	53	5	237	3	0	245	35	22	53	0	110	91	321	0	0	412	820
05:30 PM	19	31	2	0	52	6	162	0	0	168	28	28	64	0	120	84	319	1	0	404	744
05:45 PM	11	16	5	0	32	3	167	2	0	172	30	26	65	0	121	84	345	2	0	431	756
Total Volume	62	99	18	0	179	19	772	5	0	796	126	113	259	0	498	352	1316	3	0	1671	3144
% App. Total	34.6	55.3	10.1	0		2.4	97	0.6	0		25.3	22.7	52	0		21.1	78.8	0.2	0		
PHF	.775	.798	.750	.000	.844	.792	.814	.417	.000	.812	.900	.764	.841	.000	.847	.946	.954	.375	.000	.969	.954



File Name : #3 WOODLANDS&BLACKFEATHERAM

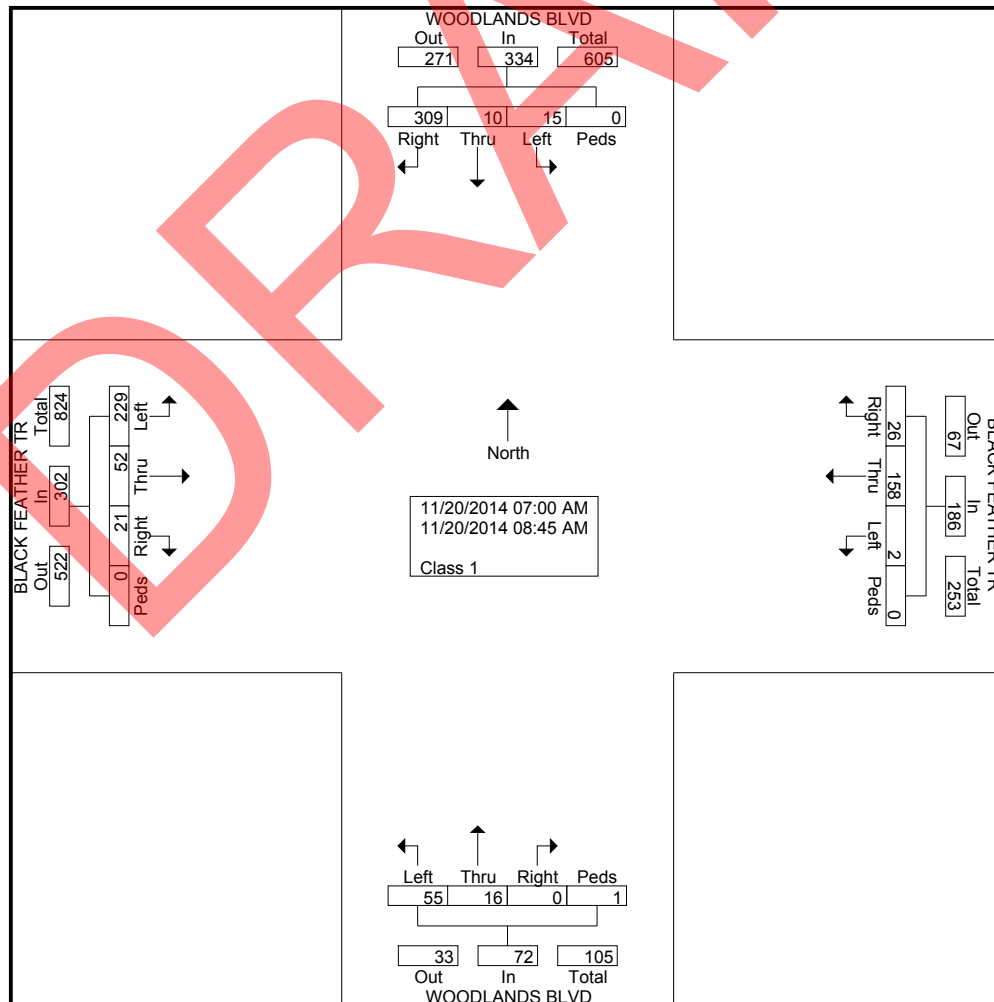
Site Code : 00000000

Start Date : 11/20/2014

Page No : 1

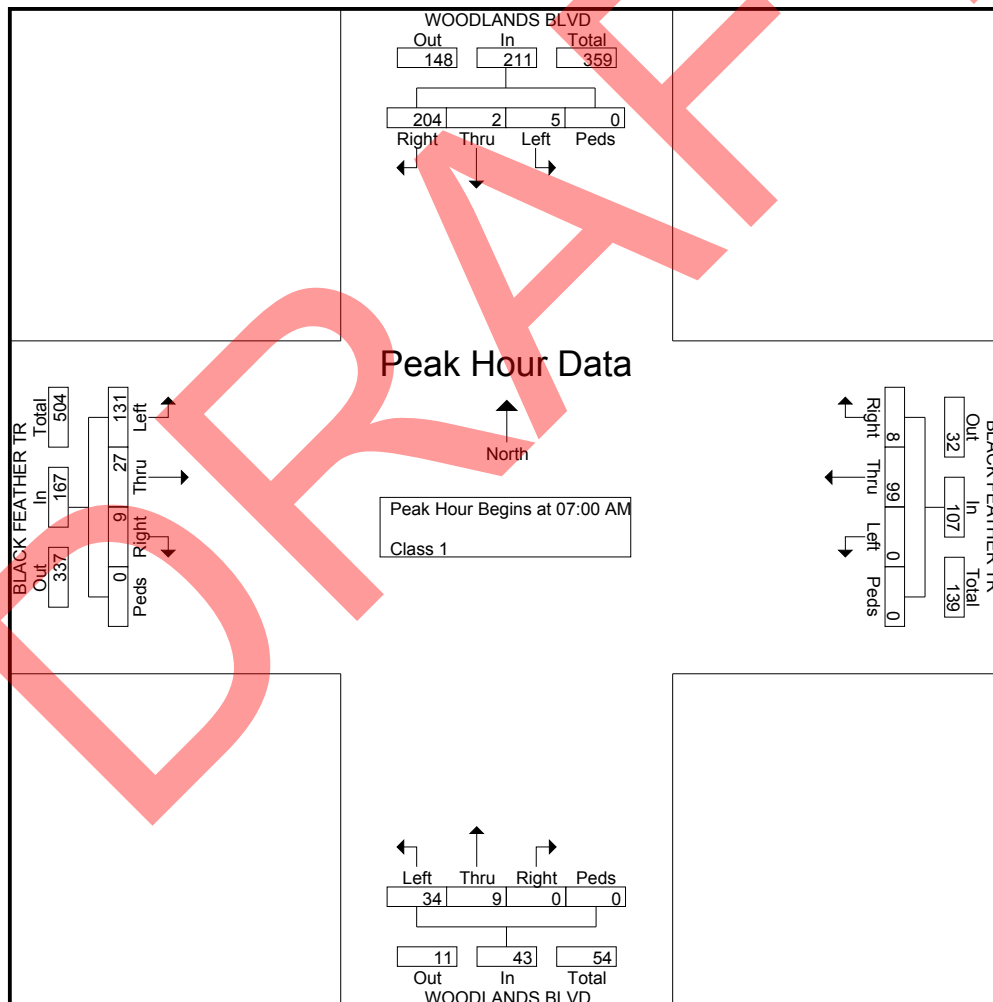
Groups Printed- Class 1

	WOODLANDS BLVD Southbound				BLACK FEATHER TR Westbound				WOODLANDS BLVD Northbound				BLACK FEATHER TR Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	41	1	1	0	0	18	0	0	0	0	6	0	1	2	22	0	92
07:15 AM	77	0	2	0	4	34	0	0	0	4	13	0	2	6	31	0	173
07:30 AM	48	1	1	0	3	23	0	0	0	2	6	0	6	14	46	0	150
07:45 AM	38	0	1	0	1	24	0	0	0	3	9	0	0	5	32	0	113
Total	204	2	5	0	8	99	0	0	0	9	34	0	9	27	131	0	528
08:00 AM	15	3	2	0	5	9	1	0	0	0	2	0	4	8	22	0	71
08:15 AM	32	2	3	0	7	23	0	0	0	3	9	0	0	5	23	0	107
08:30 AM	30	2	4	0	4	14	1	0	0	1	5	1	7	7	28	0	104
08:45 AM	28	1	1	0	2	13	0	0	0	3	5	0	1	5	25	0	84
Total	105	8	10	0	18	59	2	0	0	7	21	1	12	25	98	0	366
Grand Total	309	10	15	0	26	158	2	0	0	16	55	1	21	52	229	0	894
Apprch %	92.5	3	4.5	0	14	84.9	1.1	0	0	22.2	76.4	1.4	7	17.2	75.8	0	
Total %	34.6	1.1	1.7	0	2.9	17.7	0.2	0	0	1.8	6.2	0.1	2.3	5.8	25.6	0	



File Name : #3 WOODLANDS&BLACKFEATHERAM
Site Code : 00000000
Start Date : 11/20/2014
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	WOODLANDS BLVD Southbound					BLACK FEATHER TR Westbound					WOODLANDS BLVD Northbound					BLACK FEATHER TR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	41	1	1	0	43	0	18	0	0	18	0	0	6	0	6	1	2	22	0	25	92
07:15 AM	77	0	2	0	79	4	34	0	0	38	0	4	13	0	17	2	6	31	0	39	173
07:30 AM	48	1	1	0	50	3	23	0	0	26	0	2	6	0	8	6	14	46	0	66	150
07:45 AM	38	0	1	0	39	1	24	0	0	25	0	3	9	0	12	0	5	32	0	37	113
Total Volume	204	2	5	0	211	8	99	0	0	107	0	9	34	0	43	9	27	131	0	167	528
% App. Total	96.7	0.9	2.4	0		7.5	92.5	0	0		0	20.9	79.1	0		5.4	16.2	78.4	0		
PHF	.662	.500	.625	.000	.668	.500	.728	.000	.000	.704	.000	.563	.654	.000	.632	.375	.482	.712	.000	.633	.763



File Name : #3 WOODLANDS&BLACKFEATHERPM

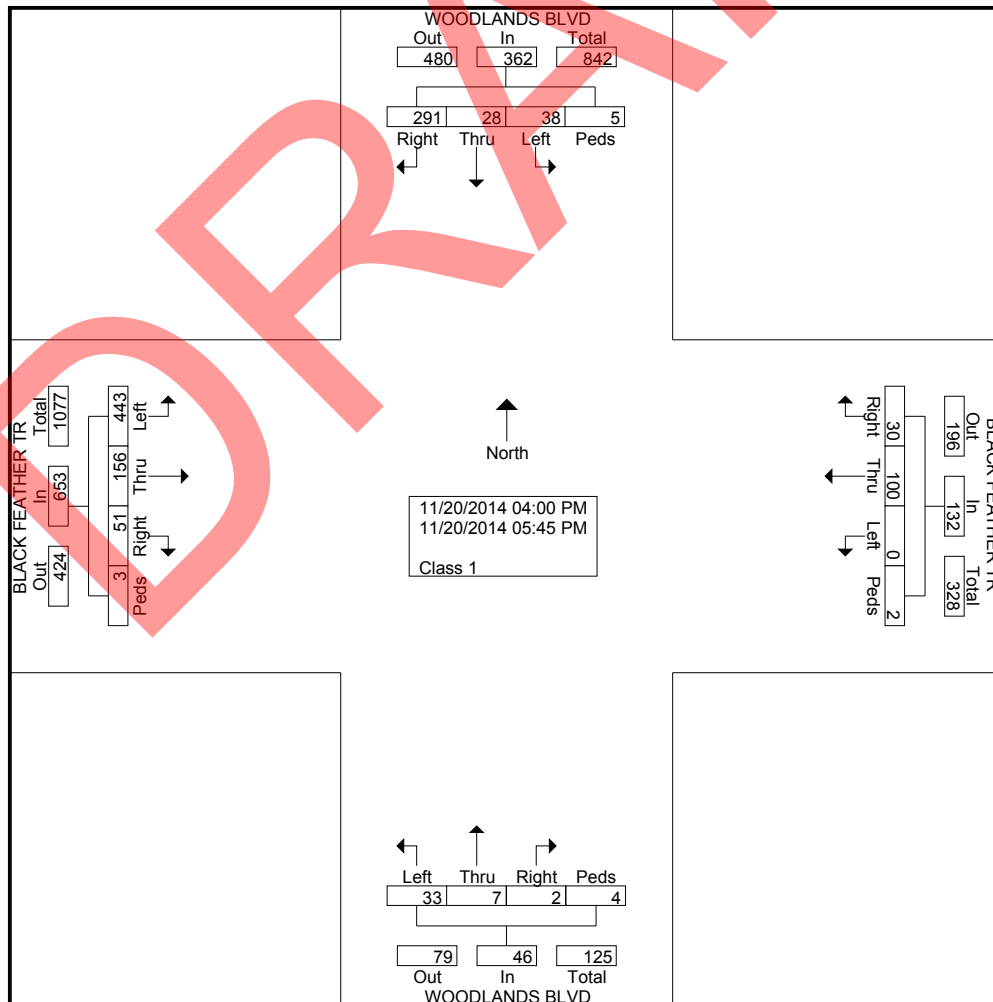
Site Code : 00000000

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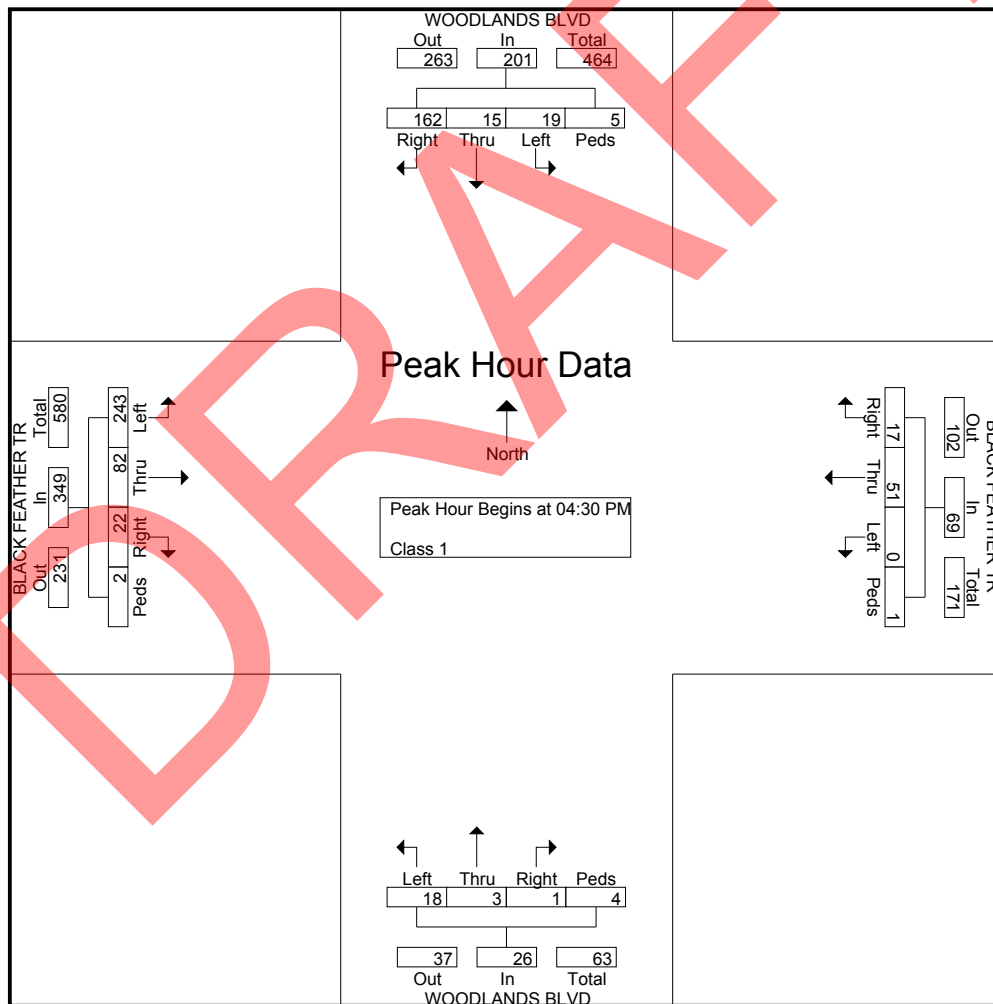
Groups Printed- Class 1

	WOODLANDS BLVD Southbound				BLACK FEATHER TR Westbound				WOODLANDS BLVD Northbound				BLACK FEATHER TR Eastbound				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	29	6	5	0	4	13	0	0	0	1	3	0	8	20	43	0	132
04:15 PM	35	4	3	0	1	13	0	0	0	2	3	0	4	17	47	1	130
04:30 PM	40	4	5	0	7	8	0	0	1	1	7	1	7	22	47	1	151
04:45 PM	43	1	5	5	1	9	0	0	0	1	3	2	5	24	54	1	154
Total	147	15	18	5	13	43	0	0	1	5	16	3	24	83	191	3	567
05:00 PM	41	5	3	0	6	14	0	1	0	0	2	1	5	21	72	0	171
05:15 PM	38	5	6	0	3	20	0	0	0	1	6	0	5	15	70	0	169
05:30 PM	24	1	5	0	3	18	0	1	0	0	2	0	8	20	61	0	143
05:45 PM	41	2	6	0	5	5	0	0	1	1	7	0	9	17	49	0	143
Total	144	13	20	0	17	57	0	2	1	2	17	1	27	73	252	0	626
Grand Total	291	28	38	5	30	100	0	2	2	7	33	4	51	156	443	3	1193
Apprch %	80.4	7.7	10.5	1.4	22.7	75.8	0	1.5	4.3	15.2	71.7	8.7	7.8	23.9	67.8	0.5	
Total %	24.4	2.3	3.2	0.4	2.5	8.4	0	0.2	0.2	0.6	2.8	0.3	4.3	13.1	37.1	0.3	



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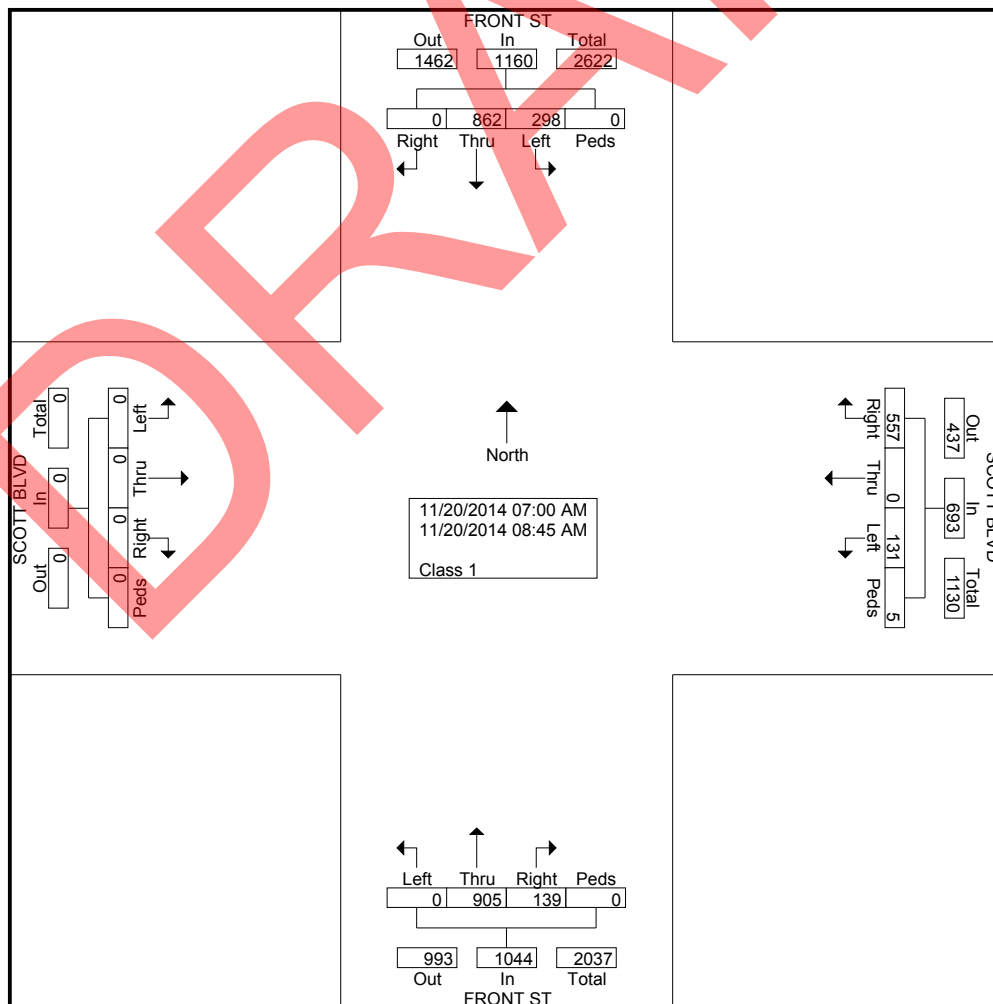
	WOODLANDS BLVD Southbound					BLACK FEATHER TR Westbound					WOODLANDS BLVD Northbound					BLACK FEATHER TR Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	40	4	5	0	49	7	8	0	0	15	1	1	7	1	10	7	22	47	1	77	151
04:45 PM	43	1	5	5	54	1	9	0	0	10	0	1	3	2	6	5	24	54	1	84	154
05:00 PM	41	5	3	0	49	6	14	0	1	21	0	0	2	1	3	5	21	72	0	98	171
05:15 PM	38	5	6	0	49	3	20	0	0	23	0	1	6	0	7	5	15	70	0	90	169
Total Volume	162	15	19	5	201	17	51	0	1	69	1	3	18	4	26	22	82	243	2	349	645
% App. Total	80.6	7.5	9.5	2.5		24.6	73.9	0	1.4		3.8	11.5	69.2	15.4		6.3	23.5	69.6	0.6		
PHF	.942	.750	.792	.250	.931	.607	.638	.000	.250	.750	.250	.750	.643	.500	.650	.786	.854	.844	.500	.890	.943



File Name : #4 FRONT&SCOTTAM
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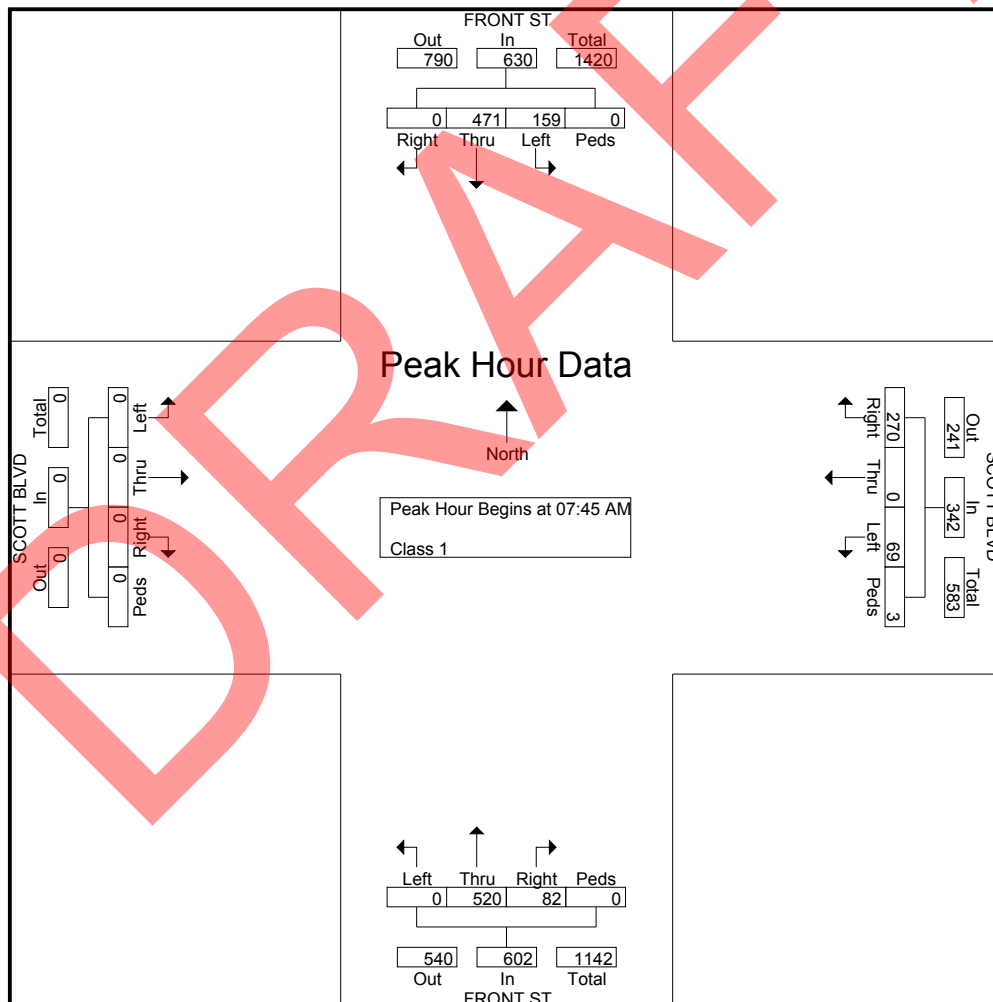
Groups Printed- Class 1

Start Time	FRONT ST Southbound				SCOTT BLVD Westbound				FRONT ST Northbound				SCOTT BLVD Eastbound				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	0	85	26	0	76	0	24	0	16	81	0	0	0	0	0	0	308
07:15 AM	0	112	38	0	86	0	16	0	13	106	0	0	0	0	0	0	371
07:30 AM	0	106	44	0	69	0	17	2	18	119	0	0	0	0	0	0	375
07:45 AM	0	112	34	0	68	0	25	0	13	110	0	0	0	0	0	0	362
Total	0	415	142	0	299	0	82	2	60	416	0	0	0	0	0	0	1416
08:00 AM	0	129	33	0	46	0	31	1	36	122	0	0	0	0	0	0	398
08:15 AM	0	93	48	0	76	0	10	2	22	152	0	0	0	0	0	0	403
08:30 AM	0	137	44	0	80	0	3	0	11	136	0	0	0	0	0	0	411
08:45 AM	0	88	31	0	56	0	5	0	10	79	0	0	0	0	0	0	269
Total	0	447	156	0	258	0	49	3	79	489	0	0	0	0	0	0	1481
Grand Total	0	862	298	0	557	0	131	5	139	905	0	0	0	0	0	0	2897
Apprch %	0	74.3	25.7	0	80.4	0	18.9	0.7	13.3	86.7	0	0	0	0	0	0	
Total %	0	29.8	10.3	0	19.2	0	4.5	0.2	4.8	31.2	0	0	0	0	0	0	



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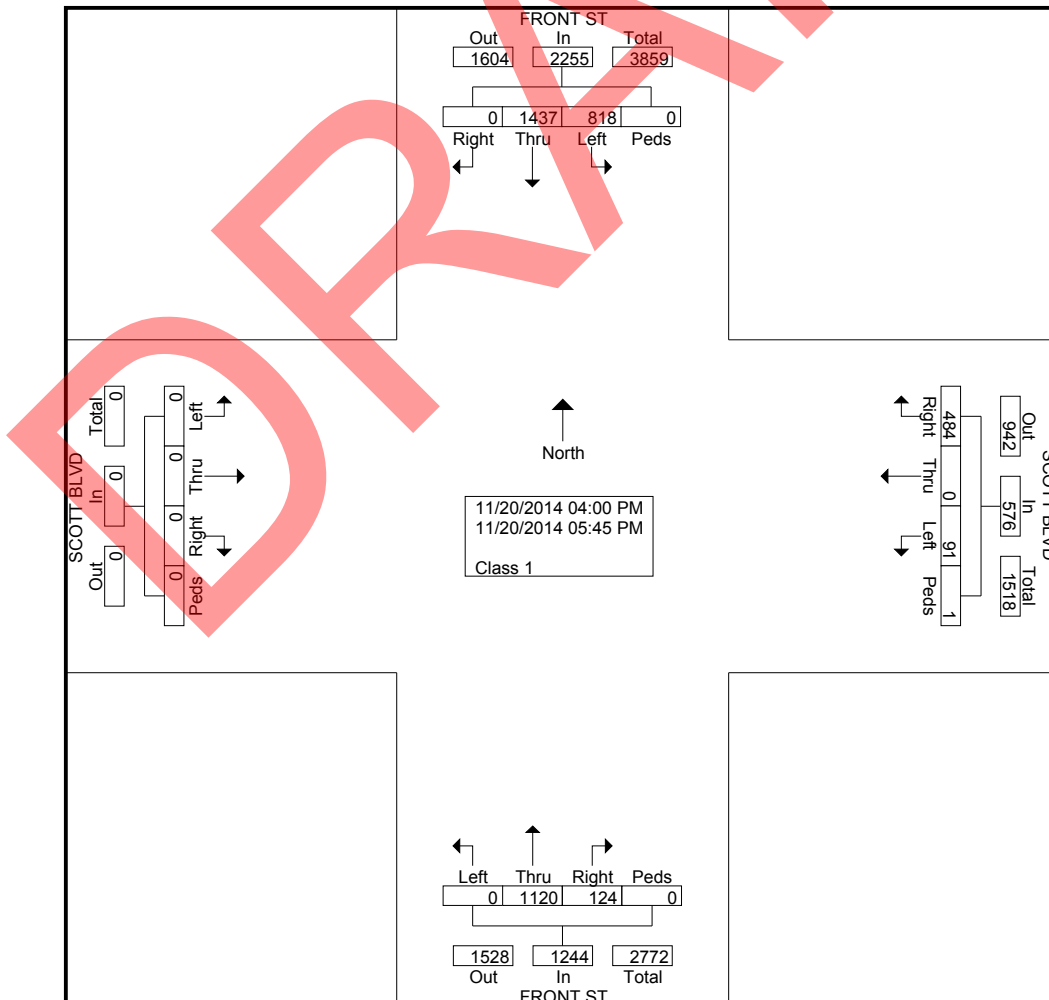
	FRONT ST Southbound					SCOTT BLVD Westbound					FRONT ST Northbound					SCOTT BLVD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	112	34	0	146	68	0	25	0	93	13	110	0	0	123	0	0	0	0	0	362
08:00 AM	0	129	33	0	162	46	0	31	1	78	36	122	0	0	158	0	0	0	0	0	398
08:15 AM	0	93	48	0	141	76	0	10	2	88	22	152	0	0	174	0	0	0	0	0	403
08:30 AM	0	137	44	0	181	80	0	3	0	83	11	136	0	0	147	0	0	0	0	0	411
Total Volume	0	471	159	0	630	270	0	69	3	342	82	520	0	0	602	0	0	0	0	0	1574
% App. Total	0	74.8	25.2	0		78.9	0	20.2	0.9		13.6	86.4	0	0		0	0	0	0		
PHF	.000	.859	.828	.000	.870	.844	.000	.556	.375	.919	.569	.855	.000	.000	.865	.000	.000	.000	.000	.000	.957



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Groups Printed- Class 1

	FRONT ST Southbound				SCOTT BLVD Westbound				FRONT ST Northbound				SCOTT BLVD Eastbound				Int. Total
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	0	160	83	0	54	0	13	0	16	148	0	0	0	0	0	0	474
04:15 PM	0	183	81	0	75	0	15	1	12	144	0	0	0	0	0	0	511
04:30 PM	0	188	95	0	56	0	9	0	15	144	0	0	0	0	0	0	507
04:45 PM	0	181	131	0	70	0	18	0	18	160	0	0	0	0	0	0	578
Total	0	712	390	0	255	0	55	1	61	596	0	0	0	0	0	0	2070
05:00 PM	0	209	113	0	53	0	9	0	21	167	0	0	0	0	0	0	572
05:15 PM	0	181	91	0	56	0	11	0	10	143	0	0	0	0	0	0	492
05:30 PM	0	171	115	0	64	0	11	0	18	113	0	0	0	0	0	0	492
05:45 PM	0	164	109	0	56	0	5	0	14	101	0	0	0	0	0	0	449
Total	0	725	428	0	229	0	36	0	63	524	0	0	0	0	0	0	2005
Grand Total	0	1437	818	0	484	0	91	1	124	1120	0	0	0	0	0	0	4075
Apprch %	0	63.7	36.3	0	84	0	15.8	0.2	10	90	0	0	0	0	0	0	
Total %	0	35.3	20.1	0	11.9	0	2.2	0	3	27.5	0	0	0	0	0	0	



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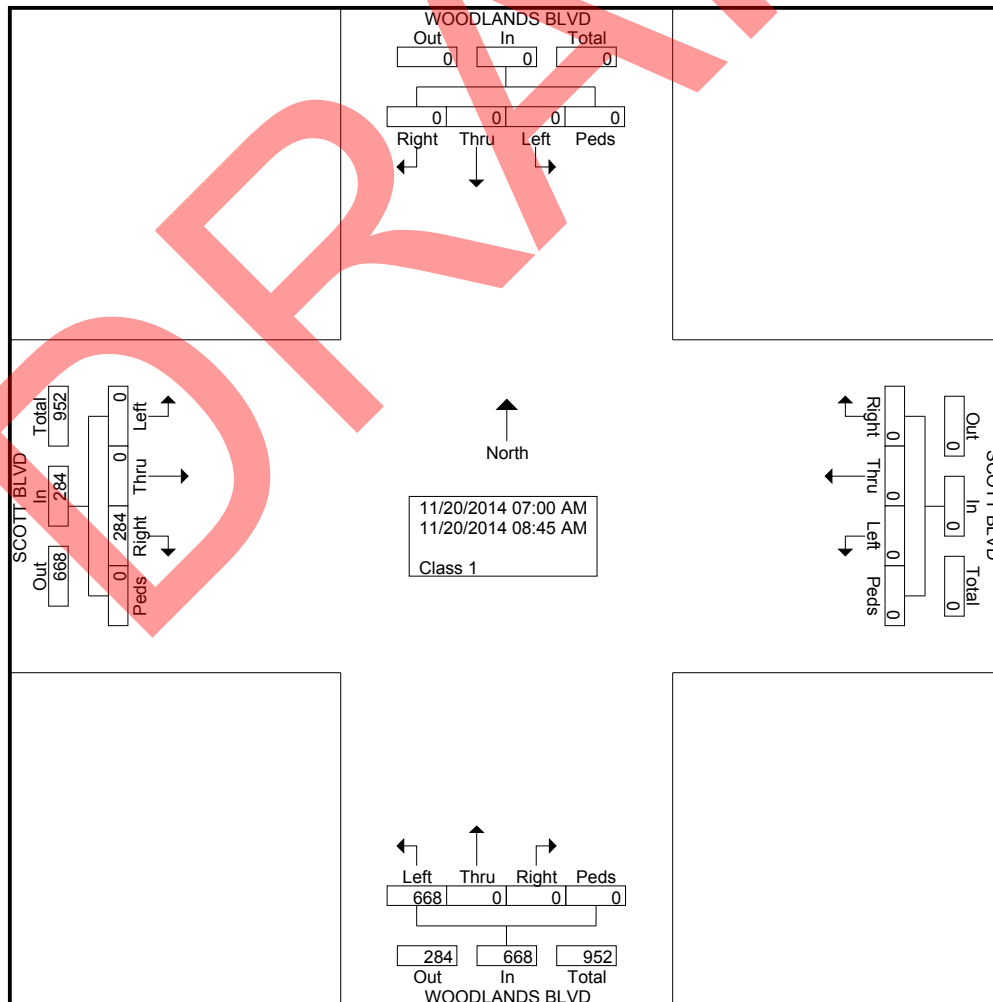
	FRONT ST Southbound					SCOTT BLVD Westbound					FRONT ST Northbound					SCOTT BLVD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	183	81	0	264	75	0	15	1	91	12	144	0	0	156	0	0	0	0	0	511
04:30 PM	0	188	95	0	283	56	0	9	0	65	15	144	0	0	159	0	0	0	0	0	507
04:45 PM	0	181	131	0	312	70	0	18	0	88	18	160	0	0	178	0	0	0	0	0	578
05:00 PM	0	209	113	0	322	53	0	9	0	62	21	167	0	0	188	0	0	0	0	0	572
Total Volume	0	761	420	0	1181	254	0	51	1	306	66	615	0	0	681	0	0	0	0	0	2168
% App. Total	0	64.4	35.6	0		83	0	16.7	0.3		9.7	90.3	0	0		0	0	0	0		
PHF	.000	.910	.802	.000	.917	.847	.000	.708	.250	.841	.786	.921	.000	.000	.906	.000	.000	.000	.000	.000	.938



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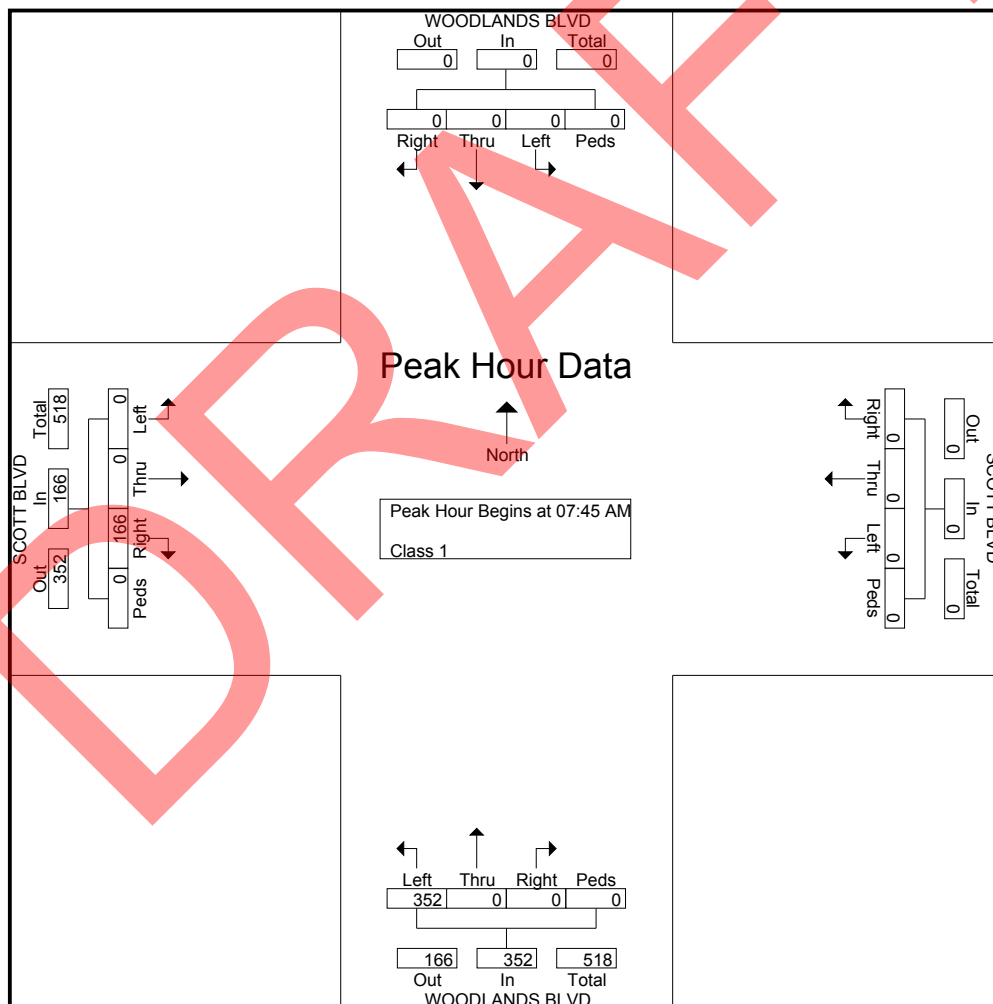
Groups Printed- Class 1

	WOODLANDS BLVD Southbound				SCOTT BLVD Westbound				WOODLANDS BLVD Northbound				SCOTT BLVD Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	78	0	35	0	0	0	113
07:15 AM	0	0	0	0	0	0	0	0	0	0	106	0	34	0	0	0	140
07:30 AM	0	0	0	0	0	0	0	0	0	0	76	0	16	0	0	0	92
07:45 AM	0	0	0	0	0	0	0	0	0	0	78	0	12	0	0	0	90
Total	0	0	0	0	0	0	0	0	0	0	338	0	97	0	0	0	435
08:00 AM	0	0	0	0	0	0	0	0	0	0	130	0	56	0	0	0	186
08:15 AM	0	0	0	0	0	0	0	0	0	0	76	0	62	0	0	0	138
08:30 AM	0	0	0	0	0	0	0	0	0	0	68	0	36	0	0	0	104
08:45 AM	0	0	0	0	0	0	0	0	0	0	56	0	33	0	0	0	89
Total	0	0	0	0	0	0	0	0	0	0	330	0	187	0	0	0	517
Grand Total	0	0	0	0	0	0	0	0	0	0	668	0	284	0	0	0	952
Apprch %	0	0	0	0	0	0	0	0	0	0	100	0	100	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	70.2	0	29.8	0	0	0	



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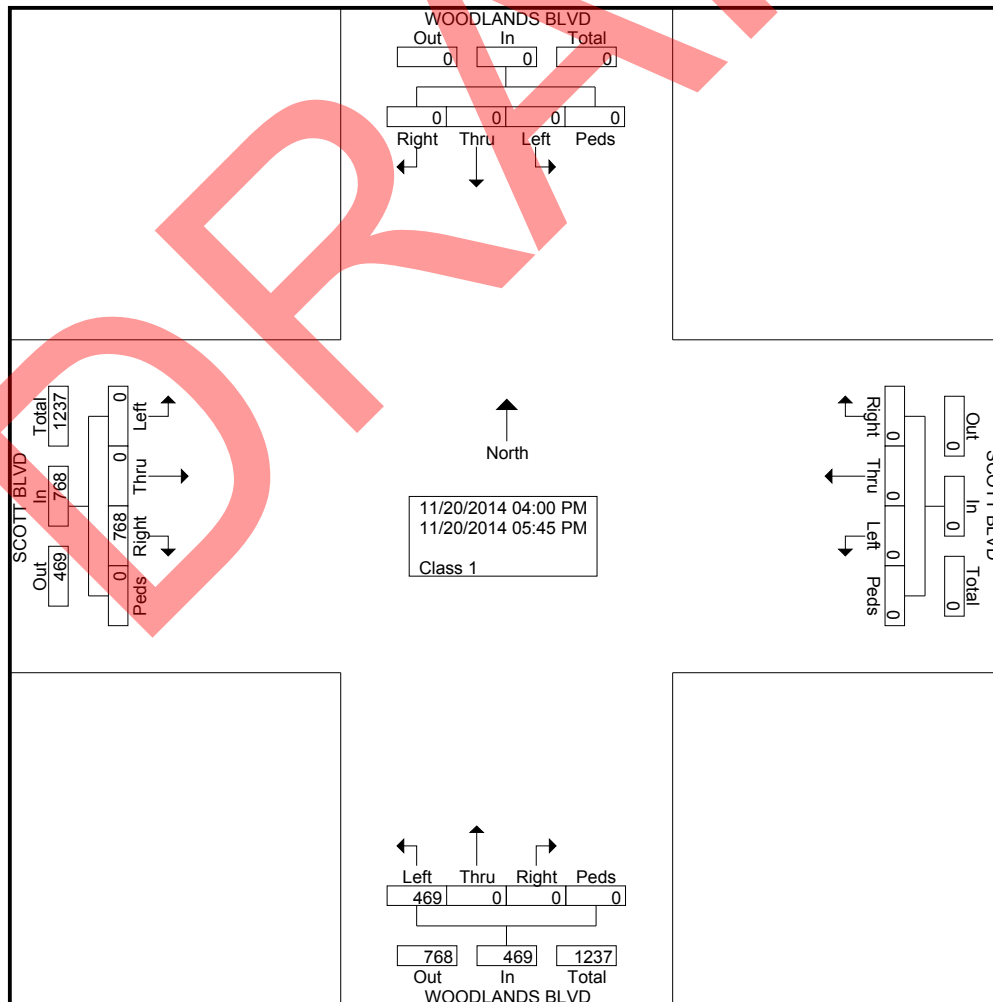
	WOODLANDS BLVD Southbound					SCOTT BLVD Westbound					WOODLANDS BLVD Northbound					SCOTT BLVD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	78	0	78	12	0	0	0	12	90
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	130	0	130	56	0	0	0	56	186
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	76	0	76	62	0	0	0	62	138
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	68	0	68	36	0	0	0	36	104
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	352	0	352	166	0	0	0	166	518
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	100	0	100	100	0	0	0	100	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.677	.000	.677	.669	.000	.000	.000	.669	.696



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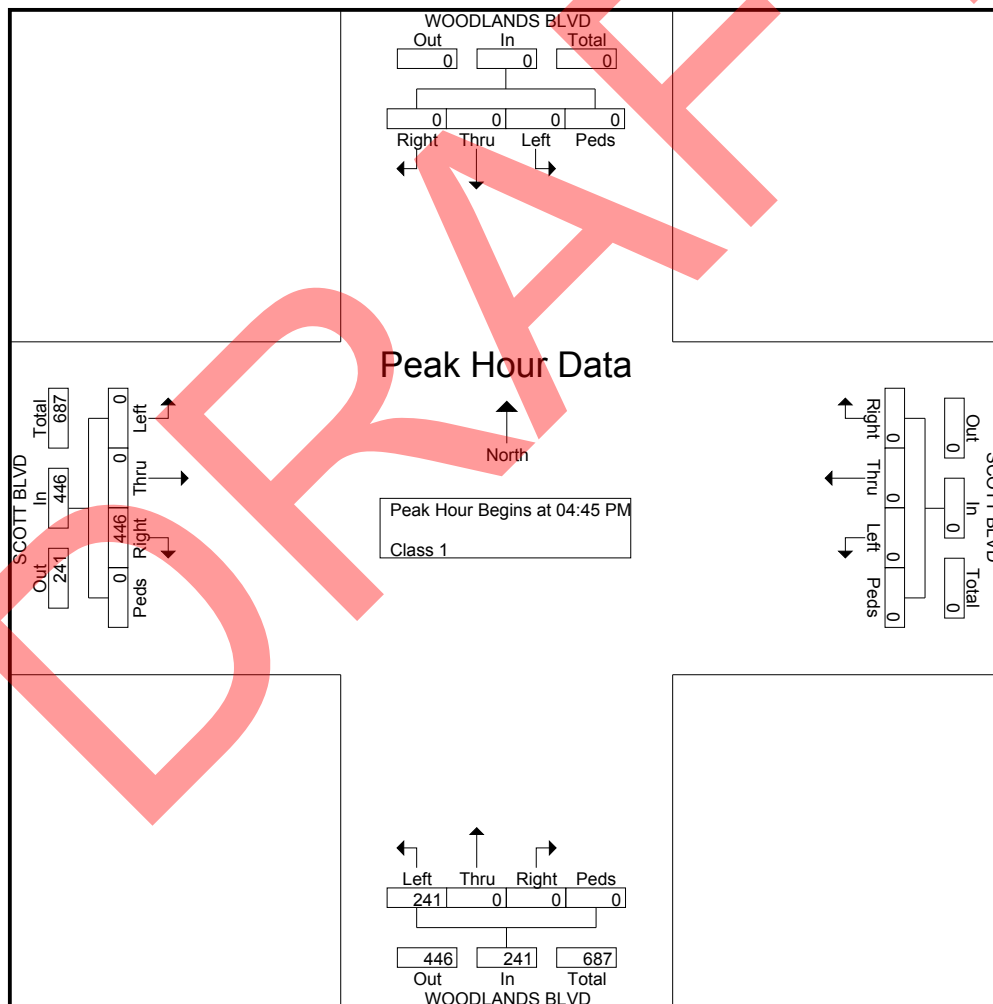
Groups Printed- Class 1

	WOODLANDS BLVD Southbound				SCOTT BLVD Westbound				WOODLANDS BLVD Northbound				SCOTT BLVD Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	58	0	66	0	0	0	124
04:15 PM	0	0	0	0	0	0	0	0	0	0	67	0	64	0	0	0	131
04:30 PM	0	0	0	0	0	0	0	0	0	0	54	0	88	0	0	0	142
04:45 PM	0	0	0	0	0	0	0	0	0	0	72	0	116	0	0	0	188
Total	0	0	0	0	0	0	0	0	0	0	251	0	334	0	0	0	585
05:00 PM	0	0	0	0	0	0	0	0	0	0	47	0	118	0	0	0	165
05:15 PM	0	0	0	0	0	0	0	0	0	0	62	0	90	0	0	0	152
05:30 PM	0	0	0	0	0	0	0	0	0	0	60	0	122	0	0	0	182
05:45 PM	0	0	0	0	0	0	0	0	0	0	49	0	104	0	0	0	153
Total	0	0	0	0	0	0	0	0	0	0	218	0	434	0	0	0	652
Grand Total	0	0	0	0	0	0	0	0	0	0	469	0	768	0	0	0	1237
Apprch %	0	0	0	0	0	0	0	0	0	0	100	0	100	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	37.9	0	62.1	0	0	0	



File Name : #7 WOODLANDS&SCOTTPM
Site Code : 00000000
Start Date : 11/20/2014
Page No : 2

	WOODLANDS BLVD Southbound					SCOTT BLVD Westbound					WOODLANDS BLVD Northbound					SCOTT BLVD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	72	0	72	116	0	0	0	116	188
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	47	0	47	118	0	0	0	118	165
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	62	0	62	90	0	0	0	90	152
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	60	0	60	122	0	0	0	122	182
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	241	0	241	446	0	0	0	446	687
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	100	0	100	100	0	0	0	100	100
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.837	.000	.837	.914	.000	.000	.000	.914	.914



COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO 80206
303-333-7409

N/S STREET: FOUNDERS PKY
E/W STREET: 5TH ST / SH-86
CITY: CASTLE ROCK
COUNTY: DOUGLAS

File Name : FOUN5THS
Site Code : 00000008
Start Date : 4/17/2014
Page No : 1

Groups Printed- VEHICLES

	FOUNDERS PKY Southbound			SH-86 Westbound			FOUNDERS PKY Northbound			5TH ST Eastbound			Int. Total
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	21	9	4	8	39	94	48	68	4	6	23	14	338
06:45 AM	33	11	8	10	73	100	45	73	1	2	41	33	430
Total	54	20	12	18	112	194	93	141	5	8	64	47	768
07:00 AM	51	32	5	1	78	85	76	88	7	0	35	30	488
07:15 AM	34	19	13	10	111	108	108	120	3	4	45	27	602
07:30 AM	18	19	14	5	101	98	91	84	5	13	45	31	524
07:45 AM	35	36	28	12	107	66	102	89	4	13	43	31	566
Total	138	106	60	28	397	357	377	381	19	30	168	119	2180
08:00 AM	27	26	15	4	83	66	85	76	8	18	51	25	484
08:15 AM	34	31	17	9	81	77	70	59	5	14	47	42	486
Total	61	57	32	13	164	143	155	135	13	32	98	67	970
04:00 PM	93	82	31	18	49	46	49	63	6	24	83	72	616
04:15 PM	93	80	17	18	53	52	39	44	4	18	89	68	575
04:30 PM	98	68	13	18	58	67	51	75	7	8	69	77	609
04:45 PM	95	94	15	14	49	51	59	65	5	15	103	80	645
Total	379	324	76	68	209	216	198	247	22	65	344	297	2445
05:00 PM	108	79	8	17	46	55	40	51	12	21	102	101	640
05:15 PM	94	79	8	17	55	52	54	72	7	9	104	99	650
05:30 PM	106	108	7	20	40	52	60	84	6	12	86	128	709
05:45 PM	110	91	14	19	41	39	47	55	7	18	87	87	615
Total	418	357	37	73	182	198	201	262	32	60	379	415	2614
Grand Total	1050	864	217	200	1064	1108	1024	1166	91	195	1053	945	8977
Apprch %	49.3	40.5	10.2	8.4	44.9	46.7	44.9	51.1	4.0	8.9	48.0	43.1	
Total %	11.7	9.6	2.4	2.2	11.9	12.3	11.4	13.0	1.0	2.2	11.7	10.5	

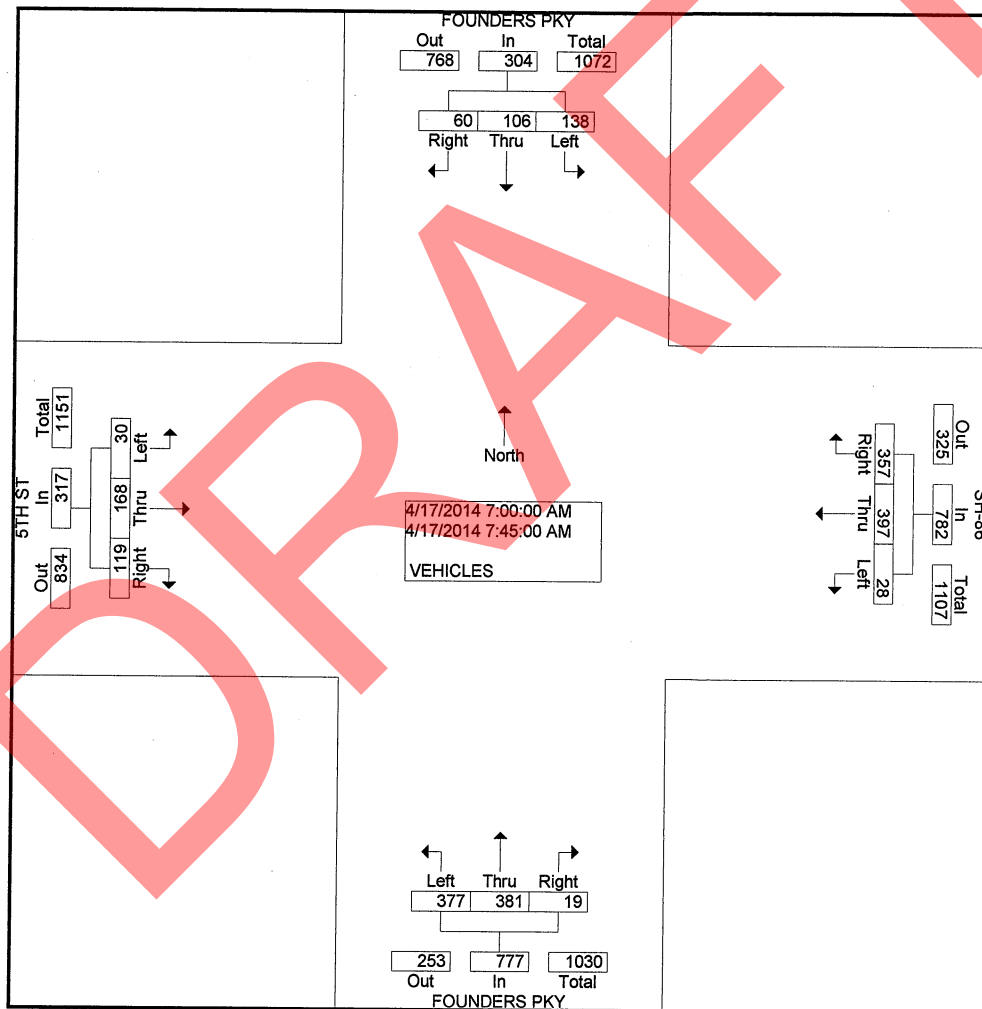
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO 80206
303-333-7409

N/S STREET: FOUNDERS PKY
E/W STREET: 5TH ST / SH-86
CITY: CASTLE ROCK
COUNTY: DOUGLAS

File Name : FOUN5THS
Site Code : 00000008
Start Date : 4/17/2014
Page No : 2

	FOUNDERS PKY Southbound				SH-86 Westbound				FOUNDERS PKY Northbound				5TH ST Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:30 AM - Peak 1 of 1																	
Intersection 07:00 AM																	
Volume	138	106	60	304	28	397	357	782	377	381	19	777	30	168	119	317	2180
Percent	45.4	34.9	19.7		3.6	50.8	45.7		48.5	49.0	2.4		9.5	53.0	37.5		
07:15																	
Volume	34	19	13	66	10	111	108	229	108	120	3	231	4	45	27	76	602
Peak Factor																	0.905
High Int. 07:45 AM					07:15 AM				07:15 AM				07:30 AM				
Volume	35	36	28	99	10	111	108	229	108	120	3	231	13	45	31	89	
Peak Factor				0.768				0.854				0.841				0.890	



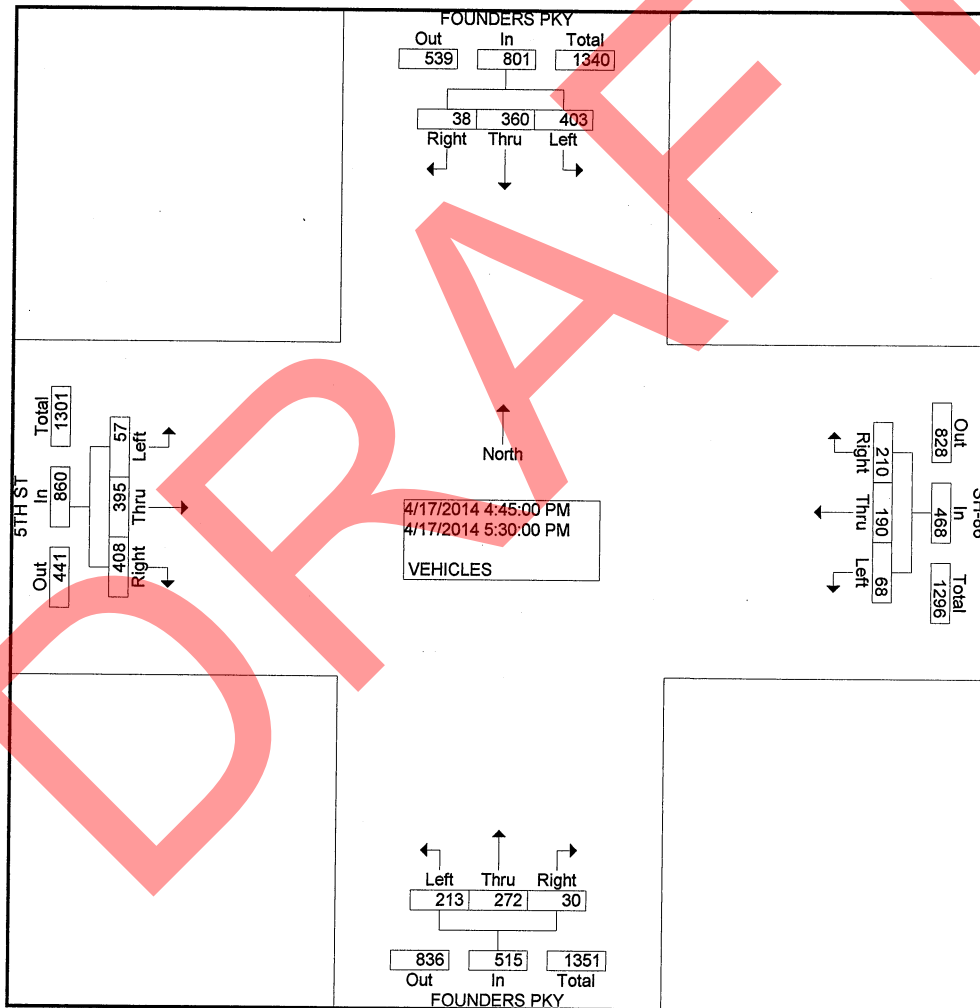
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO 80206
303-333-7409

N/S STREET: FOUNDERS PKY
E/W STREET: 5TH ST / SH-86
CITY: CASTLE ROCK
COUNTY: DOUGLAS

File Name : FOUN5THS
Site Code : 00000008
Start Date : 4/17/2014
Page No : 2

	FOUNDERS PKY Southbound				SH-86 Westbound				FOUNDERS PKY Northbound				5TH ST Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	403	360	38	801	68	190	210	468	213	272	30	515	57	395	408	860	2644
Percent	50.3	44.9	4.7		14.5	40.6	44.9		41.4	52.8	5.8		6.6	45.9	47.4		
05:30																	
Volume	106	108	7	221	20	40	52	112	60	84	6	150	12	86	128	226	709
Peak Factor																	0.932
High Int.	05:30 PM				05:15 PM				05:30 PM				05:30 PM				
Volume	106	108	7	221	17	55	52	124	60	84	6	150	12	86	128	226	
Peak Factor																	0.951
	0.906				0.944				0.858				0.951				



COUNTER MEASURES INC.

1889 YORK STREET

DENVER, COLORADO 80206

303-333-7409

N/S STREET: FOUNDERS PKY
E/W STREET: CRIMSON SKY DR
CITY: CASTLE ROCK
COUNTY: DOUGLAS

File Name : FOUNCRIM

Site Code : 00000013

Start Date : 5/20/2014

Page No : 1

Groups Printed- VEHICLES

Start Time	FOUNDERS PKY Southbound			CRIMSON SKY DR Westbound			FOUNDERS PKY Northbound			Eastbound			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	9	61	0	0	0	13	0	203	5	0	0	0	291
06:45 AM	15	97	0	1	0	17	0	224	1	0	0	0	355
Total	24	158	0	1	0	30	0	427	6	0	0	0	646
07:00 AM	1	71	0	3	0	21	0	241	1	0	0	0	338
07:15 AM	3	77	0	1	0	16	0	272	2	0	0	0	371
07:30 AM	11	71	0	9	0	21	0	266	0	0	0	0	378
07:45 AM	11	62	0	2	0	24	0	198	1	0	0	0	298
Total	26	281	0	15	0	82	0	977	4	0	0	0	1385
08:00 AM	7	84	0	3	0	21	0	174	2	0	0	0	291
08:15 AM	14	79	0	2	0	12	0	168	1	0	0	0	276
Total	21	163	0	5	0	33	0	342	3	0	0	0	567
04:00 PM	17	180	0	3	0	7	0	183	1	0	0	0	391
04:15 PM	18	194	0	2	0	11	0	158	2	0	0	0	385
04:30 PM	12	194	0	2	0	6	0	146	1	0	0	0	361
04:45 PM	9	169	0	1	0	12	0	125	0	0	0	0	316
Total	56	737	0	8	0	36	0	612	4	0	0	0	1453
05:00 PM	26	207	0	1	0	8	0	144	1	0	0	0	387
05:15 PM	20	197	0	0	0	10	0	152	2	0	0	0	381
05:30 PM	18	210	0	1	0	13	0	115	1	0	0	0	358
05:45 PM	22	183	0	1	0	9	0	118	2	0	0	0	335
Total	86	797	0	3	0	40	0	529	6	0	0	0	1461
Grand Total	213	2136	0	32	0	221	0	2887	23	0	0	0	5512
Apprch %	9.1	90.9	0.0	12.6	0.0	87.4	0.0	99.2	0.8	0.0	0.0	0.0	
Total %	3.9	38.8	0.0	0.6	0.0	4.0	0.0	52.4	0.4	0.0	0.0	0.0	

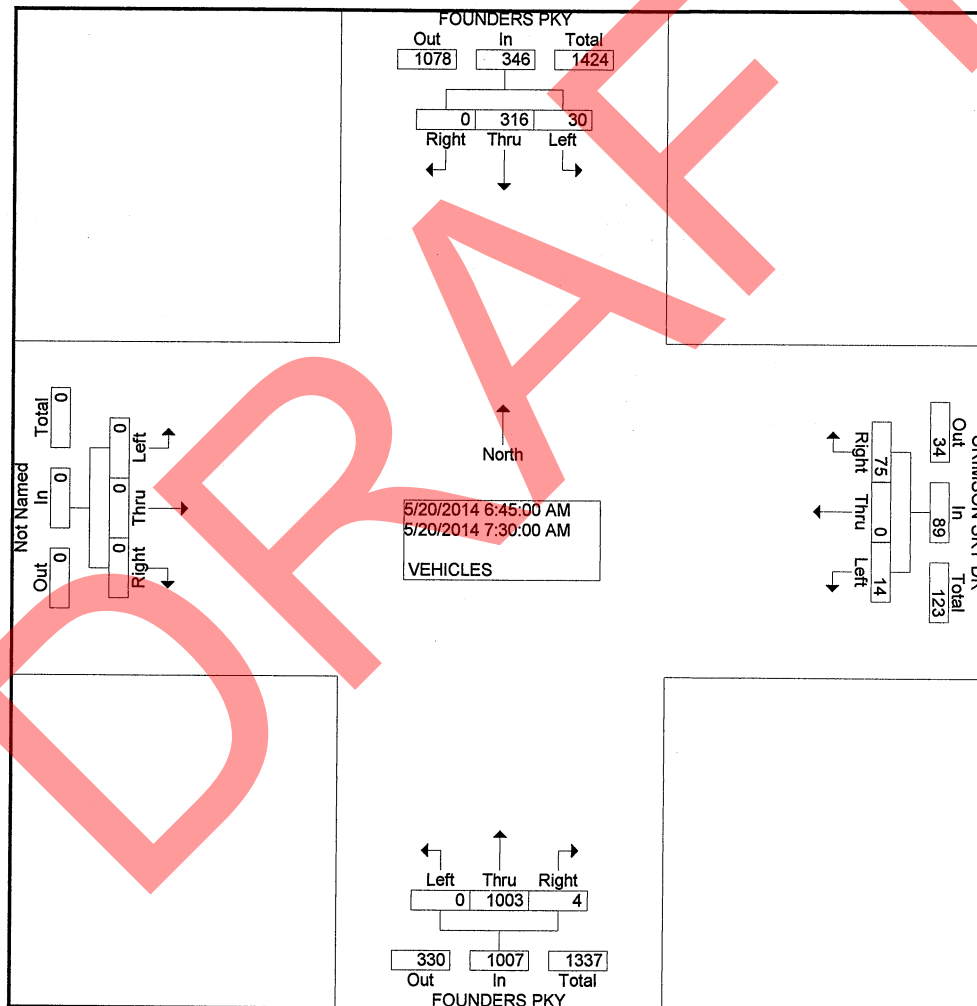
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO 80206
303-333-7409

N/S STREET: FOUNDERS PKY
E/W STREET: CRIMSON SKY DR
CITY: CASTLE ROCK
COUNTY: DOUGLAS

File Name : FOUNCRIM
Site Code : 00000013
Start Date : 5/20/2014
Page No : 2

	FOUNDERS PKY Southbound				CRIMSON SKY DR Westbound				FOUNDERS PKY Northbound				Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 06:30 AM to 08:30 AM - Peak 1 of 1																	
Intersection	06:45 AM																
Volume	30	316	0	346	14	0	75	89	0	1003	4	1007	0	0	0	0	1442
Percent	8.7	91.3	0.0		15.7	0.0	84.3		0.0	99.6	0.4		0.0	0.0	0.0		
07:30																	
Volume	11	71	0	82	9	0	21	30	0	266	0	266	0	0	0	0	378
Peak Factor																	0.954
High Int.	06:45 AM				07:30 AM				07:15 AM				6:15:00 AM				
Volume	15	97	0	112	9	0	21	30	0	272	2	274					
Peak Factor	0.772				0.742				0.919								



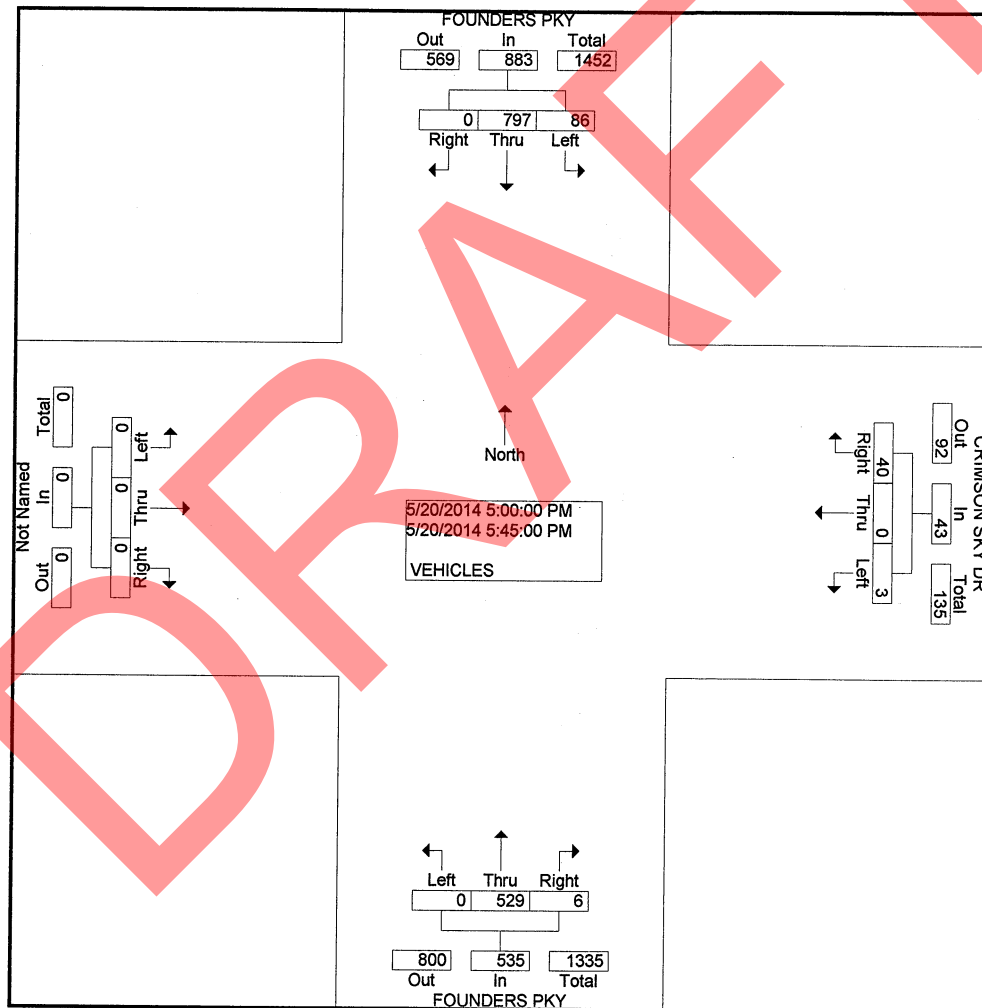
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO 80206
303-333-7409

N/S STREET: FOUNDERS PKY
E/W STREET: CRIMSON SKY DR
CITY: CASTLE ROCK
COUNTY: DOUGLAS

File Name : FOUNCRIM
Site Code : 00000013
Start Date : 5/20/2014
Page No : 2

	FOUNDERS PKY Southbound				CRIMSON SKY DR Westbound				FOUNDERS PKY Northbound				Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	05:00 PM																
Volume	86	797	0	883	3	0	40	43	0	529	6	535	0	0	0	0	1461
Percent	9.7	90.3	0.0		7.0	0.0	93.0		0.0	98.9	1.1		0.0	0.0	0.0		
05:00																	
Volume	26	207	0	233	1	0	8	9	0	144	1	145	0	0	0	0	387
Peak Factor																	0.944
High Int.	05:00 PM				05:30 PM				05:15 PM								
Volume	26	207	0	233	1	0	13	14	0	152	2	154					
Peak Factor	0.947				0.768				0.869								



File Name : #1 FRONT&BLACKFEATHERAM

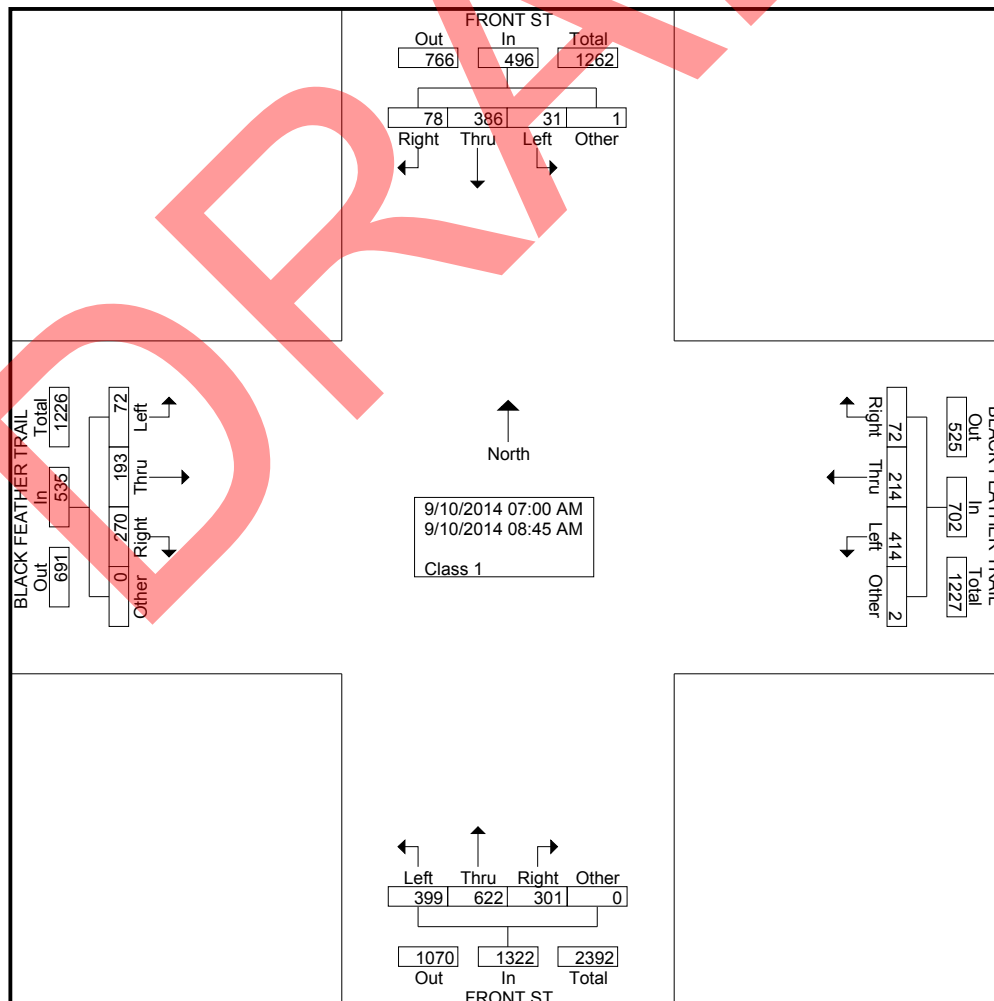
Site Code : 00000000

Start Date : 9/10/2014

Page No : 1

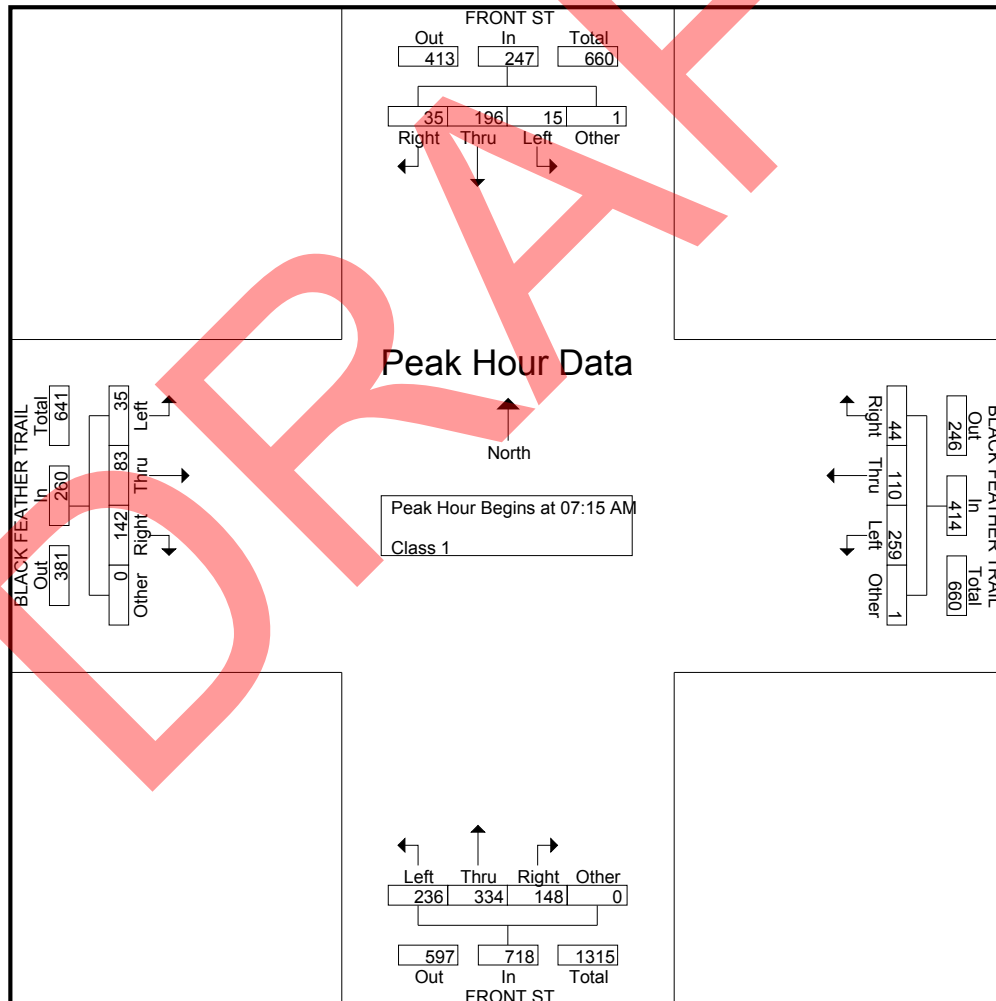
Groups Printed- Class 1

	FRONT ST Southbound				BLACK FEATHER TRAIL Westbound				FRONT ST Northbound				BLACK FEATHER TRAIL Eastbound				Int. Total
Start Time	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other	
07:00 AM	10	31	2	0	7	22	23	0	13	61	43	0	27	5	6	0	250
07:15 AM	8	57	3	1	13	27	82	1	29	77	54	0	42	18	7	0	419
07:30 AM	9	57	2	0	12	31	91	0	62	119	74	0	45	24	11	0	537
07:45 AM	9	47	4	0	11	32	53	0	35	75	56	0	35	23	8	0	388
Total	36	192	11	1	43	112	249	1	139	332	227	0	149	70	32	0	1594
08:00 AM	9	35	6	0	8	20	33	0	22	63	52	0	20	18	9	0	295
08:15 AM	9	53	3	0	6	12	28	0	34	74	36	0	21	35	4	0	315
08:30 AM	9	56	6	0	9	46	62	0	78	80	41	0	39	57	10	0	493
08:45 AM	15	50	5	0	6	24	42	1	28	73	43	0	41	13	17	0	358
Total	42	194	20	0	29	102	165	1	162	290	172	0	121	123	40	0	1461
Grand Total	78	386	31	1	72	214	414	2	301	622	399	0	270	193	72	0	3055
Apprch %	15.7	77.8	6.2	0.2	10.3	30.5	59	0.3	22.8	47	30.2	0	50.5	36.1	13.5	0	
Total %	2.6	12.6	1	0	2.4	7	13.6	0.1	9.9	20.4	13.1	0	8.8	6.3	2.4	0	



File Name : #1 FRONT&BLACKFEATHERAM
 Site Code : 00000000
 Start Date : 9/10/2014
 Page No : 2

	FRONT ST Southbound					BLACK FEATHER TRAIL Westbound					FRONT ST Northbound					BLACK FEATHER TRAIL Eastbound					
Start Time	Right	Thru	Left	Other	App. Total	Right	Thru	Left	Other	App. Total	Right	Thru	Left	Other	App. Total	Right	Thru	Left	Other	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	8	57	3	1	69	13	27	82	1	123	29	77	54	0	160	42	18	7	0	67	419
07:30 AM	9	57	2	0	68	12	31	91	0	134	62	119	74	0	255	45	24	11	0	80	537
07:45 AM	9	47	4	0	60	11	32	53	0	96	35	75	56	0	166	35	23	8	0	66	388
08:00 AM	9	35	6	0	50	8	20	33	0	61	22	63	52	0	137	20	18	9	0	47	295
Total Volume	35	196	15	1	247	44	110	259	1	414	148	334	236	0	718	142	83	35	0	260	1639
% App. Total	14.2	79.4	6.1	0.4		10.6	26.6	62.6	0.2		20.6	46.5	32.9	0		54.6	31.9	13.5	0		
PHF	.972	.860	.625	.250	.895	.846	.859	.712	.250	.772	.597	.702	.797	.000	.704	.789	.865	.795	.000	.813	.763



File Name : #1 FRONT&BLACKFEATHERPM

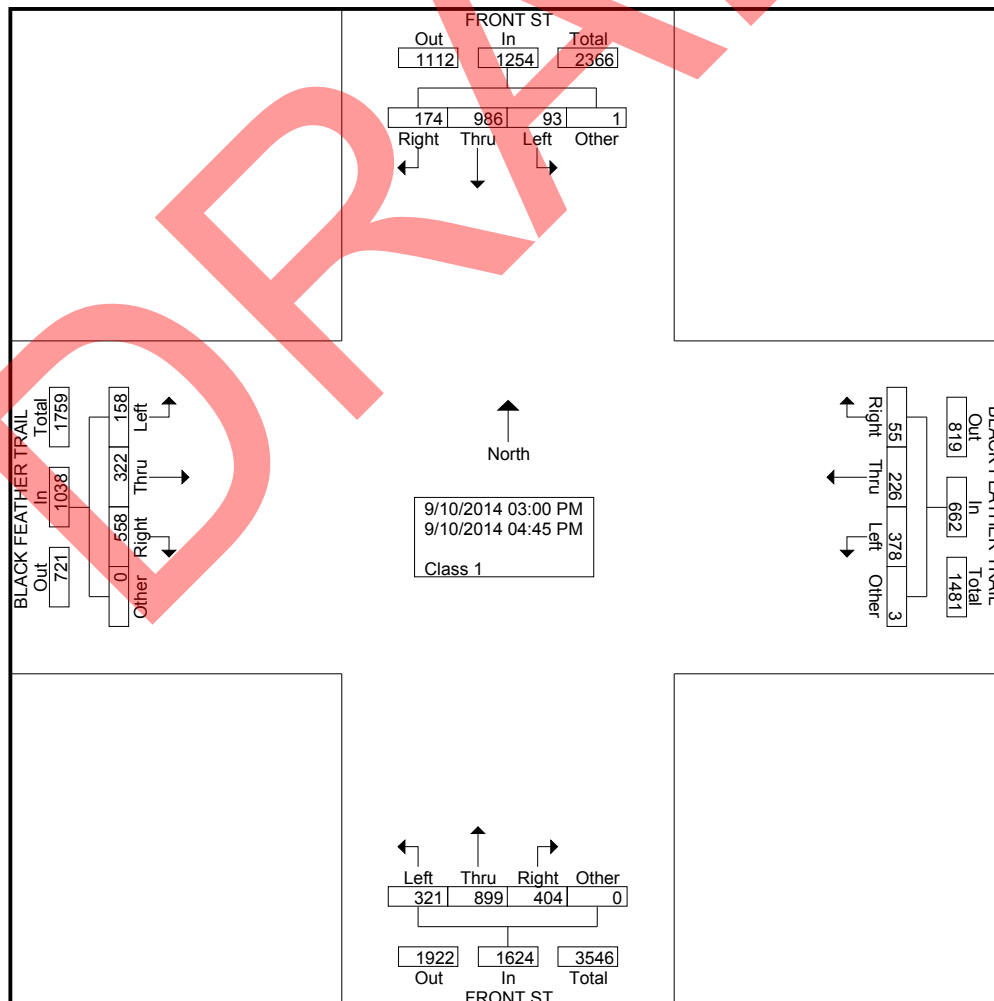
Site Code : 00000000

Start Date : 9/10/2014

Page No : 1

Groups Printed- Class 1

	FRONT ST Southbound				BLACK FEATHER TRAIL Westbound				FRONT ST Northbound				BLACK FEATHER TRAIL Eastbound				Int. Total
Start Time	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other	Right	Thru	Left	Other	
03:00 PM	18	115	6	0	3	14	42	0	62	138	56	0	54	28	12	0	548
03:15 PM	23	124	10	1	3	30	53	2	46	114	36	0	52	28	14	0	536
03:30 PM	16	97	23	0	7	23	33	0	35	107	31	0	55	30	23	0	480
03:45 PM	20	107	8	0	5	12	19	0	94	121	26	0	62	64	25	0	563
Total	77	443	47	1	18	79	147	2	237	480	149	0	223	150	74	0	2127
04:00 PM	19	111	7	0	13	47	62	0	58	106	41	0	80	66	16	0	626
04:15 PM	32	152	14	0	14	44	81	0	43	104	45	0	79	26	21	0	655
04:30 PM	23	151	16	0	4	31	39	1	32	91	44	0	98	38	24	0	592
04:45 PM	23	129	9	0	6	25	49	0	34	118	42	0	78	42	23	0	578
Total	97	543	46	0	37	147	231	1	167	419	172	0	335	172	84	0	2451
Grand Total	174	986	93	1	55	226	378	3	404	899	321	0	558	322	158	0	4578
Apprch %	13.9	78.6	7.4	0.1	8.3	34.1	57.1	0.5	24.9	55.4	19.8	0	53.8	31	15.2	0	
Total %	3.8	21.5	2	0	1.2	4.9	8.3	0.1	8.8	19.6	7	0	12.2	7	3.5	0	



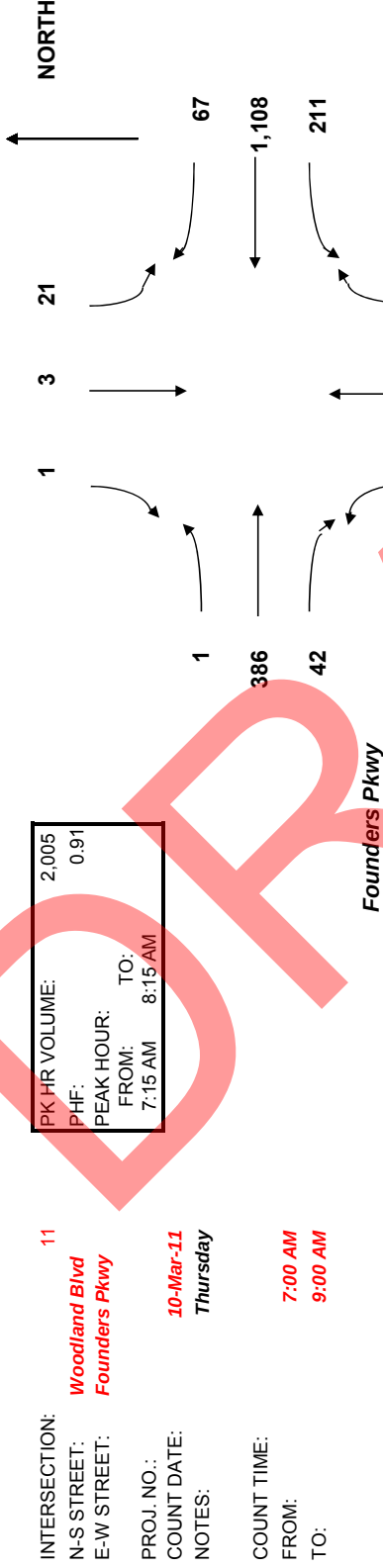
File Name : #1 FRONT&BLACKFEATHERPM
 Site Code : 00000000
 Start Date : 9/10/2014
 Page No : 2

	FRONT ST Southbound					BLACK FEATHER TRAIL Westbound					FRONT ST Northbound					BLACK FEATHER TRAIL Eastbound					
Start Time	Right	Thru	Left	Other	App. Total	Right	Thru	Left	Other	App. Total	Right	Thru	Left	Other	App. Total	Right	Thru	Left	Other	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 04:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	19	111	7	0	137	13	47	62	0	122	58	106	41	0	205	80	66	16	0	162	626
04:15 PM	32	152	14	0	198	14	44	81	0	139	43	104	45	0	192	79	26	21	0	126	655
04:30 PM	23	151	16	0	190	4	31	39	1	75	32	91	44	0	167	98	38	24	0	160	592
04:45 PM	23	129	9	0	161	6	25	49	0	80	34	118	42	0	194	78	42	23	0	143	578
Total Volume	97	543	46	0	686	37	147	231	1	416	167	419	172	0	758	335	172	84	0	591	2451
% App. Total	14.1	79.2	6.7	0		8.9	35.3	55.5	0.2		22	55.3	22.7	0		56.7	29.1	14.2	0		
PHF	.758	.893	.719	.000	.866	.661	.782	.713	.250	.748	.720	.888	.956	.000	.924	.855	.652	.875	.000	.912	.935



TURNING MOVEMENT COUNT SUMMARY

Peak Hour Volumes



COUNT DATA INPUT:

TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
	L	T	R	L	T	R	L	T	R	L	T	R	
FROM: 7:00 AM TO: 7:15 AM	16	3	17	0	76	4	7	1	0	32	277	10	443
7:15 AM TO: 7:30 AM	16	1	16	0	61	11	4	1	0	74	330	20	534
7:30 AM TO: 7:45 AM	17	2	45	0	98	12	6	0	1	60	290	18	549
7:45 AM TO: 8:00 AM	16	3	15	0	120	12	3	1	0	44	244	16	474
8:00 AM TO: 8:15 AM	22	1	11	1	107	7	8	1	0	33	244	13	448
8:15 AM TO: 8:30 AM	13	0	12	1	122	15	7	2	0	55	184	12	423
8:30 AM TO: 8:45 AM	27	5	41	0	109	11	7	4	0	47	215	10	476
8:45 AM TO: 9:00 AM	16	1	13	1	114	21	2	2	2	29	228	13	442

HOURLY TOTALS:

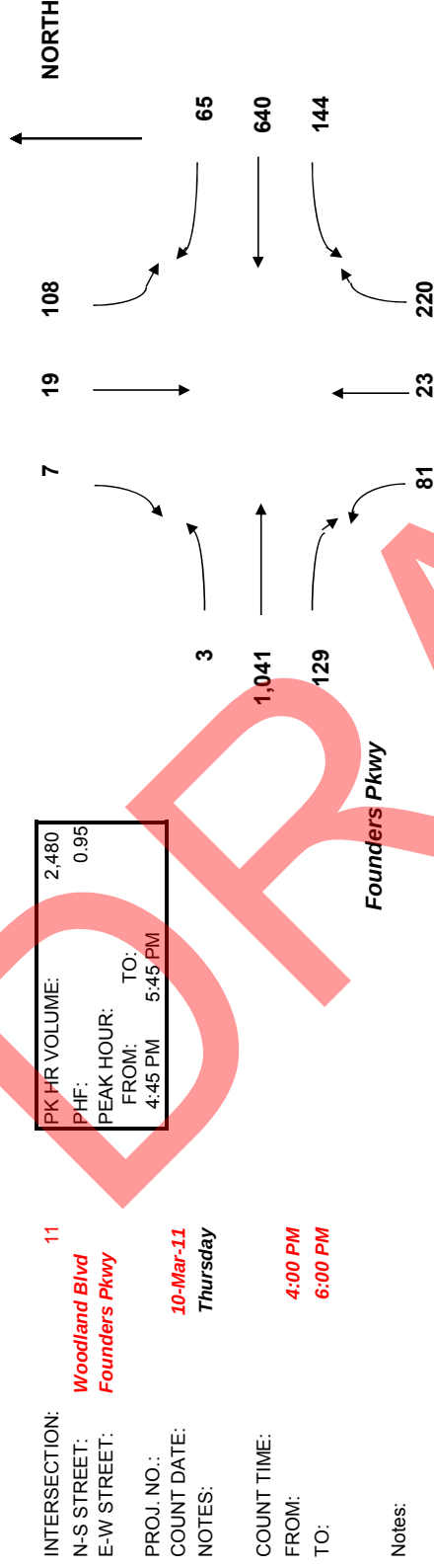
TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES	DO NOT DELETE BELOW FORMULAS
	L	T	R	L	T	R	L	T	R	L	T	R		
FROM: 7:00 AM TO: 8:00 AM	65	9	93	0	355	39	20	3	1	210	1,141	64	2,000	0
7:15 AM TO: 8:15 AM	71	7	87	1	386	42	21	3	1	211	1,108	67	2,005	1
7:30 AM TO: 8:30 AM	68	6	83	2	447	46	24	4	1	192	962	59	1,894	0
7:45 AM TO: 8:45 AM	78	9	79	2	458	45	25	8	0	179	887	51	1,821	0
8:00 AM TO: 9:00 AM	78	7	77	3	452	54	24	9	2	164	871	48	1,789	0

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.

PBS&J

TURNING MOVEMENT COUNT SUMMARY

Peak Hour Volumes



PK HR VOLUME:	2,480
PHF:	0.95
PEAK HOUR:	
FROM:	TO:
4:45 PM	5:45 PM

INTERSECTION: 11
 N-S STREET: Woodland Blvd
 E-W STREET: Founders Pkwy
 PROJ. NO.:
 COUNT DATE: 10-Mar-11
 NOTES: Thursday

COUNT TIME:
 FROM: 4:00 PM
 TO: 6:00 PM

Notes:

COUNT DATA INPUT:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	4:15 PM	4:30 PM	12	1	79	1	251	39	18	6	1	34	163	12	617
4:15 PM	4:30 PM	4:45 PM	18	5	38	3	262	22	19	7	0	35	166	14	589
4:30 PM	4:45 PM	5:00 PM	18	9	36	0	255	34	15	6	0	28	161	16	578
4:45 PM	5:00 PM	5:15 PM	24	4	48	0	246	30	28	5	1	41	168	15	610
5:00 PM	5:15 PM	5:30 PM	20	7	68	0	274	34	24	6	3	35	163	16	650
5:15 PM	5:30 PM	5:45 PM	23	5	48	0	243	32	31	4	2	39	144	13	584
5:30 PM	5:45 PM	6:00 PM	14	7	56	3	278	33	25	4	1	29	165	21	636
5:45 PM	6:00 PM		21	5	36	2	258	33	28	2	2	31	164	18	600

HOURLY TOTALS:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES	DO NOT DELETE BELOW FORMULAS
			L	T	R	L	T	R	L	T	R	L	T	R		
4:00 PM	5:00 PM		72	19	201	4	1,014	125	80	24	2	138	658	57	2,394	0
4:15 PM	5:15 PM		80	25	190	3	1,037	120	86	24	4	139	658	61	2,427	0
4:30 PM	5:30 PM		85	25	200	0	1,018	130	98	21	6	143	636	60	2,422	0
4:45 PM	5:45 PM		81	23	220	3	1,041	129	108	19	7	144	640	65	2,480	1
5:00 PM	6:00 PM		78	24	208	5	1,053	132	108	16	8	134	636	68	2,470	1

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.

Analyst SMRCHHA LLC
Date SEPT 2015

MULTI-USE DEVELOPMENT TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Name of Dvlpmt PIONEER RANCH
Time Period PM PK HR OF ADJ
STREET TRAFFIC

LAND USE A RETAIL

ITE LU Code	820	Size	140 KSF
Enter	249	Internal	27
Exit	270	37	233
Total	519	64	455
%	100%	12%	88%

Exit to External 233
Enter from External 222

3% 8 Demand
5 Balanced
31% 5 Demand
23% 17 Demand
2% 5 Demand
12% 32 Demand
9% 22 Demand
22 Balanced
53% 184 Demand

LAND USE B OFFICE

ITE LU Code	710	Size	60 KSF
Enter	15	Internal	5
Exit	74	6	68
Total	89	11	78
%	100%	12%	88%

Exit to External 68
Enter from External 10

LAND USE C RESIDENTIAL

ITE LU Code	210	Size	220 Du's
Enter	606	Internal	34
Exit	348	22	326
Total	954	56	898
%	100%	6%	94%

Enter from External 572
Exit to External 326

Net External Trips for Multi-Use Development

	LAND USE A	LAND USE B	LAND USE C	TOTAL
Enter	222	10	326	558
Exit	233	68	572	873
Total	455	78	898	1430
Single-Use Trip Gen. Est.	519	89	954	1562
INTERNAL CAPTURE %				8.4%

Source: Kaku Associates, Inc.

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APPENDIX B

Level of Service Definitions

The following information can be found in the Highway Capacity Manual, Transportation Research Board, 2010:
Chapter 18 – Signalized Intersections and Chapter 19 – Two-Way Stop Controlled Intersections.

Automobile Level of Service (LOS) for Signalized Intersections

Levels of service are defined to represent reasonable ranges in control delay.

LOS A

Describes operations with a control delay of 10s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B

Describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C

Describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D

Describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E

Describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F

Describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Level of Service (LOS) for Unsignalized TWSC Intersections

Level of Service	Average Control Delay (s/veh)
A	0 - 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

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APPENDIX C

Capacity Worksheets

Timings
1: 5th Street & Founders Pkwy

Existing Traffic Volumes
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.270			0.580			0.536			0.485		
Satd. Flow (perm)	503	1863	1583	1080	1863	1583	998	1863	1583	903	1863	1583
Satd. Flow (RTOR)			129			356			20			65
Volume (vph)	30	168	119	28	397	357	377	381	19	138	106	60
Lane Group Flow (vph)	33	183	129	30	432	388	410	414	21	150	115	65
Turn Type	pm+pt		Free	pm+pt		Free	pm+pt		Free	pm+pt		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Total Split (s)	9.0	39.0	0.0	9.0	39.0	0.0	27.0	39.0	0.0	13.0	25.0	0.0
Act Effct Green (s)	27.4	24.6	84.0	27.4	24.6	84.0	46.2	36.7	84.0	32.9	24.9	84.0
Actuated g/C Ratio	0.31	0.29	1.00	0.31	0.29	1.00	0.55	0.44	1.00	0.38	0.30	1.00
v/c Ratio	0.14	0.34	0.08	0.08	0.79	0.25	0.58	0.51	0.01	0.35	0.21	0.04
Uniform Delay, d1	18.0	24.9	0.0	18.0	29.2	0.0	11.8	18.8	0.0	11.3	22.6	0.0
Control Delay	18.6	25.0	0.1	17.7	32.2	0.4	17.4	24.6	0.0	16.2	30.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.6	25.0	0.1	17.7	32.2	0.4	17.4	24.6	0.0	16.2	30.1	0.1
LOS	B	C	A	B	C	A	B	C	A	B	C	A
Approach Delay		15.1			17.1			20.5			17.9	
Approach LOS		B			B			C			B	
Queue Length 50th (ft)	12	83	0	11	231	0	141	189	0	43	53	0
Queue Length 95th (ft)	29	138	0	28	339	0	255	323	0	91	113	0
Internal Link Dist (ft)		2269			1238			1504			6463	
Turn Bay Length (ft)												
Base Capacity (vph)	231	703	1583	378	703	1583	709	814	1583	441	552	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.26	0.08	0.08	0.61	0.25	0.58	0.51	0.01	0.34	0.21	0.04

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 84

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 18.2

Intersection LOS: B

Intersection Capacity Utilization 62.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: 5th Street & Founders Pkwy

			
13 s	39 s	9 s	39 s
			
27 s	25 s	9 s	39 s

Timings
3: Scott Blvd & Front Street

Existing Traffic Volumes
AM Peak Hour

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑↓		↘	↙
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	3468	0	1770	3539
Flt Permitted	0.950				0.238	
Satd. Flow (perm)	1770	1583	3468	0	443	3539
Satd. Flow (RTOR)		293	19			
Volume (vph)	69	270	520	82	159	471
Lane Group Flow (vph)	75	293	654	0	173	512
Turn Type	Perm				pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Total Split (s)	36.0	36.0	38.0	0.0	26.0	64.0
Act Effct Green (s)	10.1	10.1	47.5		60.1	60.1
Actuated g/C Ratio	0.13	0.13	0.61		0.77	0.77
v/c Ratio	0.33	0.64	0.31		0.36	0.19
Uniform Delay, d1	31.0	0.0	7.1		2.3	2.4
Control Delay	31.2	6.2	8.3		3.9	2.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	31.2	6.2	8.3		3.9	2.9
LOS	C	A	A		A	A
Approach Delay	11.3		8.3			3.2
Approach LOS	B		A			A
Queue Length 50th (ft)	34	0	67		16	25
Queue Length 95th (ft)	72	65	126		41	53
Internal Link Dist (ft)	2986		753			2885
Turn Bay Length (ft)						
Base Capacity (vph)	566	706	2116		609	2720
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.13	0.42	0.31		0.28	0.19

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 78.2

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 6.9

Intersection LOS: A

Intersection Capacity Utilization 40.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Scott Blvd & Front Street

↖ ø1	↑ ø2	
26 s	38 s	
↙ ø6		↘ ø8
64 s		36 s

Timings
4: Black Feather Tr & Front Street

Existing Traffic Volumes
AM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↗		↖	↑		↖	↑	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1783	0	1770	3376	0	1770	3539	1583
Flt Permitted	0.620			0.699			0.501			0.458		
Satd. Flow (perm)	1155	1863	1583	1302	1783	0	933	3376	0	853	3539	1583
Satd. Flow (RTOR)			154		25			76				38
Volume (vph)	35	83	142	259	110	44	236	334	148	15	196	35
Lane Group Flow (vph)	38	90	154	282	168	0	257	524	0	16	213	38
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Total Split (s)	46.0	46.0	46.0	46.0	46.0	0.0	27.0	38.0	0.0	16.0	27.0	27.0
Act Effct Green (s)	20.7	20.7	20.7	20.7	20.7		40.3	38.5		30.4	23.8	23.8
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.58	0.56		0.39	0.34	0.34
v/c Ratio	0.11	0.16	0.27	0.72	0.30		0.37	0.27		0.04	0.18	0.07
Uniform Delay, d1	19.5	19.8	0.0	24.1	17.5		6.6	8.2		7.1	14.7	0.0
Control Delay	17.7	18.0	4.0	24.5	16.1		10.4	9.6		11.9	19.8	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	17.7	18.0	4.0	24.5	16.1		10.4	9.6		11.9	19.8	8.6
LOS	B	B	A	C	B		B	A		B	B	A
Approach Delay		10.3			21.4			9.8			17.7	
Approach LOS		B			C			A			B	
Queue Length 50th (ft)	11	27	0	103	45		47	42		3	32	0
Queue Length 95th (ft)	34	62	36	200	96		124	133		14	78	23
Internal Link Dist (ft)		996			1260			2885			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	541	873	824	610	849		711	1909		498	1214	568
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.07	0.10	0.19	0.46	0.20		0.36	0.27		0.03	0.18	0.07

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 69.3

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 14.0

Intersection LOS: B

Intersection Capacity Utilization 50.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Black Feather Tr & Front Street

↖ ø1	↑ ø2	↗ ø4
16 s	38 s	46 s
↖ ø5	↓ ø6	↖ ø8
27 s	27 s	46 s

HCM Unsignalized Intersection Capacity Analysis 5: Black Feather Tr & Woodlands Blvd

Existing Traffic Volumes
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop				Stop			Stop	
Volume (vph)	131	27	9	0	99	8	34	9	0	5	2	204
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	142	29	10	0	108	9	37	10	0	5	2	222
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	142	39	0	116	42	5	7	223				
Volume Left (vph)	142	0	0	0	37	0	5	0				
Volume Right (vph)	0	10	0	9	0	0	0	222				
Hadj (s)	0.5	-0.1	0.0	0.0	0.5	0.0	0.5	-0.7				
Departure Headway (s)	5.8	5.1	5.1	5.1	6.0	5.5	5.8	4.7				
Degree Utilization, x	0.23	0.06	0.00	0.16	0.07	0.01	0.01	0.29				
Capacity (veh/h)	589	663	523	539	568	608	596	744				
Control Delay (s)	8.1	7.0	6.9	7.2	7.9	7.3	7.6	6.9				
Approach Delay (s)	7.8		7.2		7.8		7.0					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay			7.3									
HCM Level of Service			A									
Intersection Capacity Utilization			34.1%	ICU Level of Service		A						
Analysis Period (min)			15									

Timings
6: Founders Pkwy & Allen Way

Existing Traffic Volumes
AM Peak Hour

	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	↰	↑↑↑		↰	↑↑↑		↰	↑		↰	↑	↰
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4928	0	1770	5024	0	1770	1712	0	1770	1863	1583
Flt Permitted	0.082			0.301			0.653			0.733		
Satd. Flow (perm)	153	4928	0	561	5024	0	1216	1712	0	1365	1863	1583
Satd. Flow (RTOR)		78			13			20				309
Volume (vph)	200	667	172	24	1362	113	157	16	18	55	11	314
Lane Group Flow (vph)	217	912	0	26	1603	0	171	37	0	60	12	341
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Total Split (s)	26.0	65.0	0.0	10.0	49.0	0.0	14.0	35.0	0.0	10.0	31.0	31.0
Act Effct Green (s)	85.6	78.9		73.7	66.8		24.1	17.6		20.0	12.4	12.4
Actuated g/C Ratio	0.71	0.66		0.61	0.56		0.20	0.15		0.17	0.10	0.10
v/c Ratio	0.70	0.28		0.06	0.57		0.59	0.14		0.23	0.06	0.77
Uniform Delay, d1	19.4	9.3		6.5	18.4		38.6	20.7		36.3	46.7	4.5
Control Delay	25.0	9.3		8.4	20.0		49.6	24.3		38.1	44.6	11.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	25.0	9.3		8.4	20.0		49.6	24.3		38.1	44.6	11.7
LOS	C	A		A	C		D	C		D	D	B
Approach Delay		12.3			19.9			45.1			16.5	
Approach LOS		B			B			D			B	
Queue Length 50th (ft)	82	95		4	311		118	12		39	9	24
Queue Length 95th (ft)	174	157		15	467		165	40		68	25	114
Internal Link Dist (ft)		627			1110			783			596	
Turn Bay Length (ft)												
Base Capacity (vph)	408	3268		414	2804		291	457		259	419	596
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.28		0.06	0.57		0.59	0.08		0.23	0.03	0.57

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 119 (99%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 18.5

Intersection LOS: B

Intersection Capacity Utilization 67.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: Founders Pkwy & Allen Way

↰ ø1	↑ ø2	↰ ø3	↓ ø4
10 s	65 s	14 s	31 s
↰ ø5	↰ ø6	↰ ø7	↑ ø8
26 s	49 s	10 s	35 s

Timings
7: Founders Pkwy & Front Street

Existing Traffic Volumes
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1863	4938	0	1770	5085	0	3433	1863	1583	1770	3221	0
Flt Permitted				0.268			0.627			0.732		
Satd. Flow (perm)	1863	4938	0	499	5085	0	2266	1863	1583	1364	3221	0
Satd. Flow (RTOR)		55							32		73	
Volume (vph)	0	588	141	6	1241	2	217	35	29	1	44	67
Lane Group Flow (vph)	0	792	0	7	1351	0	236	38	32	1	121	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	18.0	51.0	0.0	18.0	51.0	0.0	21.0	32.0	32.0	19.0	30.0	0.0
Act Effct Green (s)		84.0		86.2	86.2		25.8	23.6	23.6	15.0	8.3	
Actuated g/C Ratio		0.70		0.72	0.72		0.22	0.20	0.20	0.13	0.07	
v/c Ratio		0.23		0.02	0.37		0.38	0.10	0.09	0.01	0.42	
Uniform Delay, d1		8.8		6.0	8.1		36.4	39.5	0.0	35.0	19.5	
Control Delay		6.1		6.0	7.1		40.6	40.2	13.9	35.0	23.7	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		6.1		6.0	7.1		40.6	40.2	13.9	35.0	23.7	
LOS		A		A	A		D	D	B	C	C	
Approach Delay		6.1			7.1			37.7			23.8	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)		54		1	128		80	24	0	1	18	
Queue Length 95th (ft)		98		7	182		110	58	29	5	48	
Internal Link Dist (ft)		1110			1511			712			591	
Turn Bay Length (ft)												
Base Capacity (vph)		3473		507	3653		652	435	394	314	755	
Starvation Cap Reductn		0		0	0		0	0	0	0	0	
Spillback Cap Reductn		0		0	0		0	0	0	0	0	
Storage Cap Reductn		0		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.23		0.01	0.37		0.36	0.09	0.08	0.00	0.16	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 96 (80%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 11.2

Intersection LOS: B

Intersection Capacity Utilization 43.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Founders Pkwy & Front Street

ø1	ø2	ø3	ø4
18 s	51 s	21 s	30 s
ø5	ø6	ø7	ø8
18 s	51 s	19 s	32 s

Timings
8: Founders Pkwy & Woodlands Blvd

Existing Traffic Volumes
AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	3405	0
Flt Permitted	0.140			0.415			0.722			0.752		
Satd. Flow (perm)	261	3539	1583	773	3539	1583	1345	1863	1583	1401	3405	0
Satd. Flow (RTOR)			46			73			95		1	
Volume (vph)	1	386	42	211	1108	67	71	7	87	21	3	1
Lane Group Flow (vph)	1	420	46	229	1204	73	77	8	95	23	4	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Total Split (s)	15.0	54.0	54.0	24.0	63.0	63.0	16.0	27.0	27.0	15.0	26.0	0.0
Act Effct Green (s)	86.6	80.1	80.1	94.9	92.8	92.8	16.8	9.5	9.5	10.2	8.1	
Actuated g/C Ratio	0.72	0.67	0.67	0.79	0.77	0.77	0.14	0.08	0.08	0.09	0.07	
v/c Ratio	0.00	0.18	0.04	0.33	0.44	0.06	0.32	0.05	0.45	0.16	0.02	
Uniform Delay, d1	4.0	9.3	0.0	4.2	8.1	0.0	42.1	48.8	0.0	41.3	41.5	
Control Delay	5.0	9.1	3.3	5.2	7.6	2.8	46.3	50.3	11.8	47.5	46.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.0	9.1	3.3	5.2	7.6	2.8	46.3	50.3	11.8	47.5	46.5	
LOS	A	A	A	A	A	A	D	D	B	D	D	
Approach Delay		8.5			7.0			28.3			47.3	
Approach LOS		A			A			C			D	
Queue Length 50th (ft)	0	64	0	47	155	3	53	6	0	17	1	
Queue Length 95th (ft)	2	109	17	m52	m220	m2	93	21	52	37	7	
Internal Link Dist (ft)		871			2620			2102			246	
Turn Bay Length (ft)												
Base Capacity (vph)	336	2360	1071	777	2735	1240	259	357	380	186	625	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.00	0.18	0.04	0.29	0.44	0.06	0.30	0.02	0.25	0.12	0.01	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37 (31%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 9.6

Intersection LOS: A

Intersection Capacity Utilization 54.6%

ICU Level of Service A

Analysis Period (min) 15

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

Timings
8: Founders Pkwy & Woodlands Blvd

Existing Traffic Volumes
AM Peak Hour

Splits and Phases: 8: Founders Pkwy & Woodlands Blvd

 ø1 24 s		 ø2 54 s		 ø3 16 s		 ø4 26 s	
 ø5 15 s		 ø6 63 s		 ø7 15 s		 ø8 27 s	

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Timings
9: Founders Pkwy & Crowfoot Valley Rd

Existing Traffic Volumes
AM Peak Hour

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		  	 			
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	5085	3539	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	5085	3539	1583	1770	1583
Satd. Flow (RTOR)				104		5
Volume (vph)	419	294	1128	96	34	790
Lane Group Flow (vph)	455	320	1226	104	37	859
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Total Split (s)	16.0	39.0	23.0	23.0	21.0	16.0
Act Effct Green (s)	27.9	53.3	19.0	19.0	7.5	33.0
Actuated g/C Ratio	0.47	0.89	0.32	0.32	0.13	0.55
v/c Ratio	0.55	0.07	1.09	0.18	0.17	0.98
Uniform Delay, d1	11.6	1.3	22.0	0.0	26.5	10.4
Control Delay	14.7	0.9	79.4	4.8	23.3	43.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	0.9	79.4	4.8	23.3	43.4
LOS	B	A	E	A	C	D
Approach Delay		9.0	73.6		42.6	
Approach LOS		A	E		D	
Queue Length 50th (ft)	86	0	~272	0	12	272
Queue Length 95th (ft)	#225	12	#386	28	34	#529
Internal Link Dist (ft)		2620	2873		941	
Turn Bay Length (ft)	550					
Base Capacity (vph)	822	4514	1121	572	502	873
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	0.55	0.07	1.09	0.18	0.07	0.98
Intersection Summary						
Cycle Length: 60						
Actuated Cycle Length: 60						
Offset: 45 (75%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.09						
Intersection Signal Delay: 47.6				Intersection LOS: D		
Intersection Capacity Utilization 86.8%				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.						

Timings
 9: Founders Pkwy & Crowfoot Valley Rd

Existing Traffic Volumes
 AM Peak Hour

Splits and Phases: 9: Founders Pkwy & Crowfoot Valley Rd

 Ø2 39 s	 Ø4 21 s
 Ø5 16 s	 Ø6 23 s

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HCM Unsignalized Intersection Capacity Analysis 10: Crimson Sky Dr & Founders Pkwy

Existing Traffic Volumes
AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Sign Control	Stop		Free			Free		
Grade	0%		0%			0%		
Volume (veh/h)	14	75	1003	4	30	316		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	15	82	1090	4	33	343		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage (veh)								
Upstream signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	1327	545			1095			
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	1327	545			1095			
tC, single (s)	6.8	6.9			4.1			
tC, 2 stage (s)								
tF (s)	3.5	3.3			2.2			
p0 queue free %	89	83			95			
cM capacity (veh/h)	139	482			633			
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	15	82	545	545	4	33	172	172
Volume Left	15	0	0	0	0	33	0	0
Volume Right	0	82	0	0	4	0	0	0
cSH	139	482	1700	1700	1700	633	1700	1700
Volume to Capacity	0.11	0.17	0.32	0.32	0.00	0.05	0.10	0.10
Queue Length (ft)	9	15	0	0	0	4	0	0
Control Delay (s)	34.0	14.0	0.0	0.0	0.0	11.0	0.0	0.0
Lane LOS	D	B				B		
Approach Delay (s)	17.1		0.0			1.0		
Approach LOS	C							
Intersection Summary								
Average Delay			1.3					
Intersection Capacity Utilization			39.0%		ICU Level of Service		A	
Analysis Period (min)			15					

Timings
1: 5th Street & Founders Pkwy

Existing Traffic Volumes
PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑	↗	↖	↑	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.521			0.207			0.492			0.270		
Satd. Flow (perm)	970	1863	1583	386	1863	1583	916	1863	1583	503	1863	1583
Satd. Flow (RTOR)			409			228			33			41
Volume (vph)	57	395	408	68	190	210	213	272	30	403	360	38
Lane Group Flow (vph)	62	429	443	74	207	228	232	296	33	438	391	41
Turn Type	pm+pt		Free	pm+pt		Free	pm+pt		Free	pm+pt		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2		Free	6		Free
Total Split (s)	9.0	34.0	0.0	9.0	34.0	0.0	17.0	28.0	0.0	29.0	40.0	0.0
Act Effct Green (s)	29.5	25.6	93.0	29.5	25.6	93.0	40.6	28.7	93.0	52.0	36.6	93.0
Actuated g/C Ratio	0.31	0.28	1.00	0.31	0.28	1.00	0.44	0.31	1.00	0.56	0.39	1.00
v/c Ratio	0.18	0.84	0.28	0.38	0.40	0.14	0.46	0.51	0.02	0.80	0.53	0.03
Uniform Delay, d1	20.2	32.3	0.0	20.4	28.0	0.0	11.5	26.9	0.0	12.2	22.1	0.0
Control Delay	20.9	41.1	0.4	25.8	29.9	0.2	16.1	34.3	0.0	22.9	27.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	41.1	0.4	25.8	29.9	0.2	16.1	34.3	0.0	22.9	27.2	0.0
LOS	C	D	A	C	C	A	B	C	A	C	C	A
Approach Delay		20.5			16.0			24.7			23.7	
Approach LOS		C			B			C			C	
Queue Length 50th (ft)	25	248	0	29	104	0	74	161	0	161	196	0
Queue Length 95th (ft)	52	#376	0	59	168	0	122	263	0	269	296	0
Internal Link Dist (ft)		2269			1238			1504			6463	
Turn Bay Length (ft)												
Base Capacity (vph)	344	578	1583	193	578	1583	525	575	1583	592	733	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.74	0.28	0.38	0.36	0.14	0.44	0.51	0.02	0.74	0.53	0.03

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 93

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 21.5

Intersection LOS: C

Intersection Capacity Utilization 74.5%

ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Timings
1: 5th Street & Founders Pkwy

Existing Traffic Volumes
PM Peak Hour

Splits and Phases: 1: 5th Street & Founders Pkwy

 ø1 29 s	 ø2 28 s	 ø3 9 s	 ø4 34 s
 ø5 17 s	 ø6 40 s	 ø7 9 s	 ø8 34 s

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Timings
3: Scott Blvd & Front Street

Existing Traffic Volumes
PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	3486	0	1770	3539
Flt Permitted	0.950				0.160	
Satd. Flow (perm)	1770	1583	3486	0	298	3539
Satd. Flow (RTOR)		276	12			
Volume (vph)	51	254	615	66	420	761
Lane Group Flow (vph)	55	276	740	0	457	827
Turn Type	Perm				pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Total Split (s)	26.0	26.0	34.0	0.0	40.0	74.0
Act Effct Green (s)	9.8	9.8	47.0		70.1	70.1
Actuated g/C Ratio	0.11	0.11	0.53		0.80	0.80
v/c Ratio	0.28	0.65	0.40		0.82	0.29
Uniform Delay, d1	35.8	0.0	11.8		13.0	2.3
Control Delay	36.3	8.0	15.0		17.2	2.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	36.3	8.0	15.0		17.2	2.9
LOS	D	A	B		B	A
Approach Delay	12.7		15.0			8.0
Approach LOS	B		B			A
Queue Length 50th (ft)	28	0	113		124	44
Queue Length 95th (ft)	63	68	237		240	90
Internal Link Dist (ft)	2986		753			2885
Turn Bay Length (ft)						
Base Capacity (vph)	389	564	1867		708	2823
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.14	0.49	0.40		0.65	0.29

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 87.9

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 55.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Scott Blvd & Front Street

 ø1	 ø2	
40 s	34 s	
 ø6		 ø8
74 s		26 s

Timings
4: Black Feather Tr & Front Street

Existing Traffic Volumes
PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1807	0	1770	3387	0	1770	3539	1583
Flt Permitted	0.580			0.595			0.228			0.407		
Satd. Flow (perm)	1080	1863	1583	1108	1807	0	425	3387	0	758	3539	1583
Satd. Flow (RTOR)			364		15			69				105
Volume (vph)	84	172	335	231	147	37	172	419	167	46	543	97
Lane Group Flow (vph)	91	187	364	251	200	0	187	637	0	50	590	105
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Total Split (s)	45.0	45.0	45.0	45.0	45.0	0.0	23.0	42.0	0.0	13.0	32.0	32.0
Act Effct Green (s)	23.4	23.4	23.4	23.4	23.4		46.6	40.4		39.0	31.9	31.9
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.59	0.51		0.47	0.41	0.41
v/c Ratio	0.28	0.34	0.50	0.76	0.36		0.43	0.36		0.11	0.41	0.15
Uniform Delay, d1	22.1	22.5	0.0	26.2	20.9		6.8	10.8		6.9	15.8	0.0
Control Delay	22.0	21.9	3.8	29.3	20.4		11.2	13.9		10.5	20.1	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	22.0	21.9	3.8	29.3	20.4		11.2	13.9		10.5	20.1	5.5
LOS	C	C	A	C	C		B	B		B	C	A
Approach Delay		11.7			25.4			13.3			17.4	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)	36	74	0	116	74		38	94		9	105	0
Queue Length 95th (ft)	73	127	54	203	129		100	187		33	212	36
Internal Link Dist (ft)		996			1260			2885			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	467	806	891	479	790		528	1776		474	1440	706
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.19	0.23	0.41	0.52	0.25		0.35	0.36		0.11	0.41	0.15

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 78.5

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 16.1

Intersection LOS: B

Intersection Capacity Utilization 59.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Black Feather Tr & Front Street

		
ø1	ø2	ø4
13 s	42 s	45 s
		
ø5	ø6	ø8
23 s	32 s	45 s

HCM Unsignalized Intersection Capacity Analysis 5: Black Feather Tr & Woodlands Blvd

Existing Traffic Volumes
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	243	82	22	0	51	17	18	3	1	19	15	162
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	264	89	24	0	55	18	20	3	1	21	16	176
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total (vph)	264	113	0	74	21	3	29	184				
Volume Left (vph)	264	0	0	0	20	0	21	0				
Volume Right (vph)	0	24	0	18	0	1	0	176				
Hadj (s)	0.5	-0.1	0.0	-0.1	0.5	-0.2	0.4	-0.6				
Departure Headway (s)	5.7	5.1	5.1	5.0	6.4	5.6	6.1	5.0				
Degree Utilization, x	0.42	0.16	0.00	0.10	0.04	0.00	0.05	0.26				
Capacity (veh/h)	608	683	509	532	526	590	561	679				
Control Delay (s)	8.5	7.1	6.9	6.9	8.2	7.4	7.9	7.3				
Approach Delay (s)	8.1		6.9		8.2		7.4					
Approach LOS	A		A		A		A					
Intersection Summary												
Delay	7.7											
HCM Level of Service	A											
Intersection Capacity Utilization	39.7%			ICU Level of Service					A			
Analysis Period (min)	15											

Timings
6: Founders Pkwy & Allen Way

Existing Traffic Volumes
PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑		↖	↑		↖	↑	↖
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4963	0	1770	5004	0	1770	1706	0	1770	1863	1583
Flt Permitted	0.149			0.087			0.635			0.679		
Satd. Flow (perm)	278	4963	0	162	5004	0	1183	1706	0	1265	1863	1583
Satd. Flow (RTOR)		49			21			50				313
Volume (vph)	403	1422	277	100	879	109	230	50	63	90	34	406
Lane Group Flow (vph)	438	1847	0	109	1073	0	250	122	0	98	37	441
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Total Split (s)	26.0	65.5	0.0	10.5	50.0	0.0	14.0	34.0	0.0	10.0	30.0	30.0
Act Effct Green (s)	79.9	68.0		58.2	50.3		32.1	22.1		24.1	18.1	18.1
Actuated g/C Ratio	0.67	0.57		0.49	0.42		0.27	0.18		0.20	0.15	0.15
v/c Ratio	0.87	0.65		0.59	0.51		0.68	0.34		0.35	0.13	0.88
Uniform Delay, d1	22.7	17.3		13.1	25.1		37.8	24.6		34.3	44.1	14.0
Control Delay	42.1	19.8		37.8	21.5		46.9	24.6		36.5	41.0	22.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	42.1	19.8		37.8	21.5		46.9	24.6		36.5	41.0	22.5
LOS	D	B		D	C		D	C		D	D	C
Approach Delay		24.1			23.0			39.6			26.1	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	215	355		30	178		164	48		58	25	99
Queue Length 95th (ft)	#461	439		#110	206		227	97		95	53	222
Internal Link Dist (ft)		627			1110			783			596	
Turn Bay Length (ft)												
Base Capacity (vph)	504	2832		185	2109		365	464		279	404	588
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.87	0.65		0.59	0.51		0.68	0.26		0.35	0.09	0.75

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 69 (58%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 25.4

Intersection LOS: C

Intersection Capacity Utilization 71.1%

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.

Timings
6: Founders Pkwy & Allen Way

Existing Traffic Volumes
PM Peak Hour

Splits and Phases: 6: Founders Pkwy & Allen Way

 ø1	 ø2		 ø3	 ø4	
10.5 s	65.5 s		14 s	30 s	
 ø5	 ø6		 ø7	 ø8	
26 s	50 s		10 s	34 s	

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Timings
7: Founders Pkwy & Front Street

Existing Traffic Volumes
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4923	0	1770	5065	0	3433	1863	1583	1770	3337	0
Flt Permitted	0.240			0.085			0.571			0.659		
Satd. Flow (perm)	447	4923	0	158	5065	0	2063	1863	1583	1228	3337	0
Satd. Flow (RTOR)		66			4				137		67	
Volume (vph)	3	1316	352	5	772	19	259	113	126	18	99	62
Lane Group Flow (vph)	3	1813	0	5	860	0	282	123	137	20	175	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	18.0	51.0	0.0	18.0	51.0	0.0	21.0	32.0	32.0	19.0	30.0	0.0
Act Effct Green (s)	82.5	81.2		82.7	81.3		28.7	23.6	23.6	17.7	10.1	
Actuated g/C Ratio	0.69	0.68		0.69	0.68		0.24	0.20	0.20	0.15	0.08	
v/c Ratio	0.01	0.54		0.03	0.25		0.43	0.34	0.32	0.09	0.51	
Uniform Delay, d1	6.7	13.1		6.6	10.4		35.5	41.5	0.0	33.8	30.4	
Control Delay	4.0	4.8		7.2	8.6		39.0	44.1	8.8	33.9	32.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	4.0	4.8		7.2	8.6		39.0	44.1	8.8	33.9	32.4	
LOS	A	A		A	A		D	D	A	C	C	
Approach Delay		4.8			8.6			32.5			32.6	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	0	80		1	80		93	78	0	12	42	
Queue Length 95th (ft)	m1	97		6	150		125	145	55	31	77	
Internal Link Dist (ft)		1110			1511			712			591	
Turn Bay Length (ft)												
Base Capacity (vph)	465	3351		298	3430		687	438	476	325	776	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.01	0.54		0.02	0.25		0.41	0.28	0.29	0.06	0.23	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 87 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 11.8

Intersection LOS: B

Intersection Capacity Utilization 55.4%

ICU Level of Service B

Analysis Period (min) 15

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

Timings
7: Founders Pkwy & Front Street

Existing Traffic Volumes
PM Peak Hour

Splits and Phases: 7: Founders Pkwy & Front Street

 ø1	 ø2	 ø3	 ø4
18 s	51 s	21 s	30 s
 ø5	 ø6	 ø7	 ø8
18 s	51 s	19 s	32 s

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Timings
8: Founders Pkwy & Woodlands Blvd

Existing Traffic Volumes
PM Peak Hour

	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	↰	↰↰	↰	↰	↰↰	↰	↰	↰	↰	↰	↰↰	↰
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	3394	0
Flt Permitted	0.383			0.105			0.737			0.679		
Satd. Flow (perm)	713	3539	1583	196	3539	1583	1373	1863	1583	1265	3394	0
Satd. Flow (RTOR)			139			71			239		8	
Volume (vph)	3	1041	129	144	640	65	81	23	220	108	19	7
Lane Group Flow (vph)	3	1132	140	157	696	71	88	25	239	117	29	0
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Total Split (s)	12.0	57.0	57.0	22.0	67.0	67.0	13.0	26.0	26.0	15.0	28.0	0.0
Act Effct Green (s)	64.9	58.3	58.3	75.0	72.8	72.8	31.3	22.6	22.6	34.8	24.3	
Actuated g/C Ratio	0.54	0.49	0.49	0.63	0.61	0.61	0.26	0.19	0.19	0.29	0.20	
v/c Ratio	0.01	0.66	0.17	0.54	0.32	0.07	0.23	0.07	0.49	0.29	0.04	
Uniform Delay, d1	9.3	23.3	0.1	9.2	13.6	0.0	30.3	40.0	0.0	30.7	27.8	
Control Delay	9.3	26.2	3.7	26.1	10.4	2.3	32.1	41.3	8.9	32.9	30.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.3	26.2	3.7	26.1	10.4	2.3	32.1	41.3	8.9	32.9	30.9	
LOS	A	C	A	C	B	A	C	D	A	C	C	
Approach Delay		23.7			12.5			17.0			32.5	
Approach LOS		C			B			B			C	
Queue Length 50th (ft)	1	338	0	72	95	2	50	16	0	67	6	
Queue Length 95th (ft)	5	453	37	m115	143	m7	92	42	70	116	21	
Internal Link Dist (ft)		871			2625			2102			246	
Turn Bay Length (ft)												
Base Capacity (vph)	465	1719	840	359	2148	989	391	351	492	418	694	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.01	0.66	0.17	0.44	0.32	0.07	0.23	0.07	0.49	0.28	0.04	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 23 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 19.5

Intersection LOS: B

Intersection Capacity Utilization 59.4%

ICU Level of Service B

Analysis Period (min) 15

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

Timings
8: Founders Pkwy & Woodlands Blvd

Existing Traffic Volumes
PM Peak Hour

Splits and Phases: 8: Founders Pkwy & Woodlands Blvd

 ø1 22 s	 ø2 57 s	 ø3 13 s	 ø4 28 s
 ø5 12 s	 ø6 67 s	 ø7 15 s	 ø8 26 s

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Timings
9: Founders Pkwy & Crowfoot Valley Rd

Existing Traffic Volumes
PM Peak Hour

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	5085	3539	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	5085	3539	1583	1770	1583
Satd. Flow (RTOR)				57		16
Volume (vph)	830	1044	572	52	76	601
Lane Group Flow (vph)	902	1135	622	57	83	653
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Total Split (s)	71.0	99.0	28.0	28.0	21.0	71.0
Act Effct Green (s)	72.5	103.3	26.0	26.0	11.7	86.0
Actuated g/C Ratio	0.60	0.86	0.22	0.22	0.10	0.72
v/c Ratio	0.84	0.26	0.81	0.15	0.48	0.57
Uniform Delay, d1	19.2	1.8	45.6	0.0	52.4	7.5
Control Delay	20.3	1.1	54.5	11.2	53.9	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	1.1	54.5	11.2	53.9	10.2
LOS	C	A	D	B	D	B
Approach Delay		9.6	50.9		15.1	
Approach LOS		A	D		B	
Queue Length 50th (ft)	235	19	248	0	62	195
Queue Length 95th (ft)	#875	42	#346	36	111	282
Internal Link Dist (ft)		2625	2894		994	
Turn Bay Length (ft)	550					
Base Capacity (vph)	1077	4378	767	388	251	1145
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	0.84	0.26	0.81	0.15	0.33	0.57
Intersection Summary						
Cycle Length: 120						
Actuated Cycle Length: 120						
Offset: 23 (19%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.84						
Intersection Signal Delay: 18.9				Intersection LOS: B		
Intersection Capacity Utilization 76.0%				ICU Level of Service D		
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						

Timings
 9: Founders Pkwy & Crowfoot Valley Rd

Existing Traffic Volumes
 PM Peak Hour

Splits and Phases: 9: Founders Pkwy & Crowfoot Valley Rd

 ø2 99 s	 ø4 21 s
 ø5 71 s	 ø6 28 s

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HCM Unsignalized Intersection Capacity Analysis 10: Crimson Sky Dr & Founders Pkwy

Existing Traffic Volumes
PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Sign Control	Stop		Free			Free		
Grade	0%		0%			0%		
Volume (veh/h)	3	40	529	6	86	797		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	3	43	575	7	93	866		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage (veh)								
Upstream signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	1195	288			582			
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	1195	288			582			
tC, single (s)	6.8	6.9			4.1			
tC, 2 stage (s)								
tF (s)	3.5	3.3			2.2			
p0 queue free %	98	94			91			
cM capacity (veh/h)	162	709			989			
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	3	43	288	288	7	93	433	433
Volume Left	3	0	0	0	0	93	0	0
Volume Right	0	43	0	0	7	0	0	0
cSH	162	709	1700	1700	1700	989	1700	1700
Volume to Capacity	0.02	0.06	0.17	0.17	0.00	0.09	0.25	0.25
Queue Length (ft)	2	5	0	0	0	8	0	0
Control Delay (s)	27.7	10.4	0.0	0.0	0.0	9.0	0.0	0.0
Lane LOS	D	B				A		
Approach Delay (s)	11.6		0.0			0.9		
Approach LOS	B							
Intersection Summary								
Average Delay			0.9					
Intersection Capacity Utilization			32.7%		ICU Level of Service		A	
Analysis Period (min)			15					

Timings
1: 5th Street & Founders Pkwy

Background Traffic Volumes
AM Peak Hour - Year 2035

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖↗	↑↗		↖↗	↑↗	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	3468	0	3433	3299	0
Flt Permitted	0.159			0.500			0.276			0.176		
Satd. Flow (perm)	296	1863	1583	931	1863	1583	997	3468	0	636	3299	0
Satd. Flow (RTOR)			174			327		15			163	
Volume (vph)	75	250	160	75	580	575	500	635	100	275	215	180
Lane Group Flow (vph)	82	272	174	82	630	625	543	799	0	299	430	0
Turn Type	pm+pt		Free	pm+pt		Free	pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2			6		
Total Split (s)	10.0	56.0	0.0	10.0	56.0	0.0	24.0	39.0	0.0	15.0	30.0	0.0
Act Effct Green (s)	44.9	40.3	106.4	44.9	40.3	106.4	49.8	35.9		40.2	29.9	
Actuated g/C Ratio	0.41	0.38	1.00	0.41	0.38	1.00	0.47	0.34		0.38	0.28	
v/c Ratio	0.40	0.39	0.11	0.19	0.89	0.39	0.65	0.68		0.58	0.41	
Uniform Delay, d1	16.6	24.5	0.0	16.6	31.6	0.0	18.0	30.1		17.5	18.9	
Control Delay	21.5	25.0	0.1	16.7	37.7	0.7	23.1	36.0		24.4	23.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	21.5	25.0	0.1	16.7	37.7	0.7	23.1	36.0		24.4	23.3	
LOS	C	C	A	B	D	A	C	D		C	C	
Approach Delay		16.2			19.1			30.8			23.7	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	31	137	0	31	410	0	126	260		64	82	
Queue Length 95th (ft)	58	205	0	58	566	0	193	371		106	147	
Internal Link Dist (ft)		2269			1238			1504			6463	
Turn Bay Length (ft)												
Base Capacity (vph)	205	827	1583	433	827	1583	902	1180		536	1044	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.40	0.33	0.11	0.19	0.76	0.39	0.60	0.68		0.56	0.41	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 106.4

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 23.6

Intersection LOS: C

Intersection Capacity Utilization 76.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: 5th Street & Founders Pkwy

↖ ø1	↑ ø2	↖ ø3	↗ ø4
15 s	39 s	10 s	56 s
↖ ø5	↓ ø6	↖ ø7	↗ ø8
24 s	30 s	10 s	56 s

HCM Unsignalized Intersection Capacity Analysis

2: Scott Blvd & Woodlands Blvd

Background Traffic Volumes
AM Peak Hour - Year 2035

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Sign Control	Stop			Free	Free			
Grade	0%			0%	0%			
Volume (veh/h)	0	165	315	215	85	0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	0	179	342	234	92	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage veh)								
Upstream signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	894	46	92					
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	894	46	92					
tC, single (s)	6.8	6.9	4.1					
tC, 2 stage (s)								
tF (s)	3.5	3.3	2.2					
p0 queue free %	100	82	77					
cM capacity (veh/h)	217	1013	1500					
Direction, Lane #	EB 1	EB 2	EB 3	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	0	90	90	342	117	117	62	31
Volume Left	0	0	0	342	0	0	0	0
Volume Right	0	90	90	0	0	0	0	0
cSH	1700	1013	1013	1500	1700	1700	1700	1700
Volume to Capacity	0.00	0.09	0.09	0.23	0.07	0.07	0.04	0.02
Queue Length (ft)	0	7	7	22	0	0	0	0
Control Delay (s)	0.0	8.9	8.9	8.1	0.0	0.0	0.0	0.0
Lane LOS	A	A	A	A				
Approach Delay (s)	8.9			4.8			0.0	
Approach LOS	A							
Intersection Summary								
Average Delay			5.2					
Intersection Capacity Utilization			27.5%		ICU Level of Service		A	
Analysis Period (min)			15					

Timings
3: Scott Blvd & Front Street

Background Traffic Volumes
AM Peak Hour - Year 2035

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑↓		↘	↑↑
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	3468	0	1770	3539
Flt Permitted	0.950				0.127	
Satd. Flow (perm)	1770	1583	3468	0	237	3539
Satd. Flow (RTOR)		415	20			
Volume (vph)	105	405	780	120	240	700
Lane Group Flow (vph)	114	440	978	0	261	761
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Total Split (s)	32.0	32.0	43.0	0.0	25.0	68.0
Act Effct Green (s)	12.9	12.9	48.2		64.2	64.2
Actuated g/C Ratio	0.15	0.15	0.57		0.75	0.75
v/c Ratio	0.43	0.74	0.50		0.66	0.29
Uniform Delay, d1	32.7	1.8	10.8		5.9	3.3
Control Delay	33.3	8.1	13.9		13.5	4.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	33.3	8.1	13.9		13.5	4.1
LOS	C	A	B		B	A
Approach Delay	13.3		13.9			6.5
Approach LOS	B		B			A
Queue Length 50th (ft)	56	12	137		39	48
Queue Length 95th (ft)	104	99	304		139	113
Internal Link Dist (ft)	2986		753			2885
Turn Bay Length (ft)						
Base Capacity (vph)	496	742	1972		504	2670
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.23	0.59	0.50		0.52	0.29

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 85.1

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 10.8

Intersection LOS: B

Intersection Capacity Utilization 57.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Scott Blvd & Front Street

↖ ø1	↑ ø2	
25 s	43 s	
↙ ø6		↘ ø8
68 s		32 s

Timings
4: Black Feather Tr & Front Street

Background Traffic Volumes
AM Peak Hour - Year 2035

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↖		↖	↑		↖	↑	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1766	0	1770	3376	0	1770	3539	1583
Flt Permitted	0.440			0.648			0.329			0.356		
Satd. Flow (perm)	820	1863	1583	1207	1766	0	613	3376	0	663	3539	1583
Satd. Flow (RTOR)			234		36			77				60
Volume (vph)	50	140	215	390	215	115	355	500	220	45	295	55
Lane Group Flow (vph)	54	152	234	424	359	0	386	782	0	49	321	60
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Total Split (s)	51.0	51.0	51.0	51.0	51.0	0.0	28.0	39.0	0.0	10.0	21.0	21.0
Act Effct Green (s)	34.3	34.3	34.3	34.3	34.3		41.8	36.6		25.5	19.9	19.9
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41		0.50	0.43		0.29	0.24	0.24
v/c Ratio	0.16	0.20	0.30	0.87	0.49		0.71	0.52		0.18	0.39	0.14
Uniform Delay, d1	16.8	17.1	0.0	24.2	17.4		13.2	16.5		12.7	26.0	0.0
Control Delay	16.5	16.2	2.9	30.6	17.6		22.0	20.5		18.8	33.2	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	16.5	16.2	2.9	30.6	17.6		22.0	20.5		18.8	33.2	10.9
LOS	B	B	A	C	B		C	C		B	C	B
Approach Delay		9.2			24.6			21.0			28.4	
Approach LOS		A			C			C			C	
Queue Length 50th (ft)	19	54	0	213	130		139	167		14	82	0
Queue Length 95th (ft)	43	93	40	346	204		252	260		38	144	35
Internal Link Dist (ft)		996			1260			2885			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	402	914	896	592	885		592	1506		268	832	418
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.13	0.17	0.26	0.72	0.41		0.65	0.52		0.18	0.39	0.14

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 84.4

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 21.3

Intersection LOS: C

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Black Feather Tr & Front Street

↖ ø1	↑ ø2	↗ ø4
10 s	39 s	51 s
↖ ø5	↓ ø6	↖ ø8
28 s	21 s	51 s

Timings
5: Black Feather Tr & Woodlands Blvd

Background Traffic Volumes
AM Peak Hour - Year 2035

	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	↰	↱		↰	↱		↰	↱		↰	↱	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1690	0	1863	1837	0	1770	3539	0	1770	3083	0
Flt Permitted	0.554						0.407			0.666		
Satd. Flow (perm)	1032	1690	0	1863	1837	0	758	3539	0	1241	3083	0
Satd. Flow (RTOR)		54			5						332	
Volume (vph)	195	30	50	0	100	10	135	125	0	5	50	305
Lane Group Flow (vph)	212	87	0	0	120	0	147	136	0	5	386	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	25.0	37.0	0.0	17.0	29.0	0.0	17.0	29.0	0.0	17.0	29.0	0.0
Act Effct Green (s)	27.1	26.9			10.6		32.4	31.7		25.4	20.5	
Actuated g/C Ratio	0.40	0.40			0.16		0.48	0.48		0.34	0.31	
v/c Ratio	0.38	0.12			0.41		0.28	0.08		0.01	0.32	
Uniform Delay, d1	16.2	5.5			27.2		8.8	11.7		9.0	2.3	
Control Delay	11.2	5.0			23.5		14.4	15.4		16.2	6.2	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	11.2	5.0			23.5		14.4	15.4		16.2	6.2	
LOS	B	A			C		B	B		B	A	
Approach Delay		9.4			23.5			14.9			6.3	
Approach LOS		A			C			B			A	
Queue Length 50th (ft)	41	6			35		32	14		1	8	
Queue Length 95th (ft)	92	28			95		86	49		8	49	
Internal Link Dist (ft)		1260			432			424			2102	
Turn Bay Length (ft)												
Base Capacity (vph)	616	826			576		542	1815		562	1588	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.34	0.11			0.21		0.27	0.07		0.01	0.24	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 65.5

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 11.3

Intersection LOS: B

Intersection Capacity Utilization 46.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Black Feather Tr & Woodlands Blvd

↰ ø1	↱ ø2	↰ ø3	↱ ø4
17 s	29 s	17 s	37 s
↰ ø5	↱ ø6	↰ ø7	↱ ø8
17 s	29 s	25 s	29 s

Timings
6: Founders Pkwy & Allen Way

Background Traffic Volumes
AM Peak Hour - Year 2035

	↖	→	↘	↙	←	↖	↙	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↑		↖	↑	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1717	0	1770	1522	1504
Flt Permitted	0.082			0.177			0.158			0.713		
Satd. Flow (perm)	296	5085	1583	330	5085	1583	294	1717	0	1328	1522	1504
Satd. Flow (RTOR)			337			114		35			270	270
Volume (vph)	360	1252	310	43	2570	203	282	29	32	100	20	565
Lane Group Flow (vph)	391	1361	337	47	2793	221	307	67	0	109	329	307
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt			pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Total Split (s)	26.0	65.0	65.0	10.0	49.0	49.0	14.0	35.0	0.0	10.0	31.0	31.0
Act Effct Green (s)	83.1	74.4	74.4	72.4	65.6	65.6	26.5	18.0		22.4	14.8	14.8
Actuated g/C Ratio	0.69	0.62	0.62	0.60	0.55	0.55	0.22	0.15		0.19	0.12	0.12
v/c Ratio	0.70	0.43	0.30	0.17	1.01	0.24	1.63	0.23		0.39	0.77	0.73
Uniform Delay, d1	17.6	13.0	0.0	6.9	27.8	6.7	38.6	21.5		36.1	8.5	5.6
Control Delay	20.5	13.8	2.3	8.0	39.7	4.7	337.2	22.3		40.4	14.7	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	20.5	13.8	2.3	8.0	39.7	4.7	337.2	22.3		40.4	14.7	12.3
LOS	C	B	A	A	D	A	F	C		D	B	B
Approach Delay		13.2			36.7			280.8			17.4	
Approach LOS		B			D			F			B	
Queue Length 50th (ft)	74	192	0	7	773	9	~308	22		70	45	28
Queue Length 95th (ft)	138	293	46	m14	#1132	m37	#439	56		104	140	115
Internal Link Dist (ft)		627			1110			783			596	
Turn Bay Length (ft)												
Base Capacity (vph)	780	3154	1110	282	2779	917	188	470		282	552	548
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.50	0.43	0.30	0.17	1.01	0.24	1.63	0.14		0.39	0.60	0.56

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 119 (99%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.63

Intersection Signal Delay: 41.1

Intersection LOS: D

Intersection Capacity Utilization 101.6%

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.

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

Timings
6: Founders Pkwy & Allen Way

Background Traffic Volumes
AM Peak Hour - Year 2035

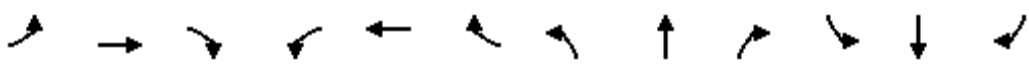
Splits and Phases: 6: Founders Pkwy & Allen Way

 ø1	 ø2	 ø3	 ø4
10 s	65 s	14 s	31 s
 ø5	 ø6	 ø7	 ø8
26 s	49 s	10 s	35 s

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Timings
7: Founders Pkwy & Front Street

Background Traffic Volumes
AM Peak Hour - Year 2035

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4928	0	1770	5085	0	3433	1863	1583	1770	3221	0
Flt Permitted	0.085			0.085			0.521			0.713		
Satd. Flow (perm)	158	4928	0	158	5085	0	1883	1863	1583	1328	3221	0
Satd. Flow (RTOR)		62							57		130	
Volume (vph)	5	1085	279	11	2303	4	440	63	52	2	79	120
Lane Group Flow (vph)	5	1482	0	12	2507	0	478	68	57	2	216	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	18.0	51.0	0.0	18.0	51.0	0.0	21.0	32.0	32.0	19.0	30.0	0.0
Act Effct Green (s)	80.7	79.2		80.7	79.2		30.5	28.3	28.3	16.3	9.6	
Actuated g/C Ratio	0.67	0.66		0.67	0.66		0.25	0.24	0.24	0.14	0.08	
v/c Ratio	0.03	0.45		0.06	0.75		0.69	0.15	0.14	0.01	0.57	
Uniform Delay, d1	7.6	13.4		7.7	19.5		35.4	36.3	0.0	32.0	19.3	
Control Delay	11.6	13.2		7.3	16.6		44.0	37.9	10.7	32.5	22.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	11.6	13.2		7.3	16.6		44.0	37.9	10.7	32.5	22.1	
LOS	B	B		A	B		D	D	B	C	C	
Approach Delay		13.2			16.6			40.2			22.2	
Approach LOS		B			B			D			C	
Queue Length 50th (ft)	1	146		3	409		165	41	0	1	33	
Queue Length 95th (ft)	m5	321		10	673		211	87	37	8	71	
Internal Link Dist (ft)		1110			1511			712			591	
Turn Bay Length (ft)												
Base Capacity (vph)	295	3275		295	3358		699	458	432	328	800	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.45		0.04	0.75		0.68	0.15	0.13	0.01	0.27	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 96 (80%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 18.8

Intersection LOS: B

Intersection Capacity Utilization 73.2%

ICU Level of Service D

Analysis Period (min) 15

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

Timings
7: Founders Pkwy & Front Street

Background Traffic Volumes
AM Peak Hour - Year 2035

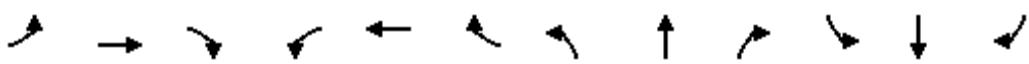
Splits and Phases: 7: Founders Pkwy & Front Street

 ø1	 ø2	 ø3	 ø4
18 s	51 s	21 s	30 s
 ø5	 ø6	 ø7	 ø8
18 s	51 s	19 s	32 s

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Timings
8: Founders Pkwy & Woodlands Blvd

Background Traffic Volumes
AM Peak Hour - Year 2035

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4928	0	1770	5024	0	1770	1863	1583	1770	3391	0
Flt Permitted	0.114			0.322			0.656			0.734		
Satd. Flow (perm)	212	4928	0	600	5024	0	1222	1863	1583	1367	3391	0
Satd. Flow (RTOR)		54			15				200		5	
Volume (vph)	5	395	102	326	1440	120	194	32	184	35	12	5
Lane Group Flow (vph)	5	540	0	354	1695	0	211	35	200	38	18	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	16.0	39.0	0.0	36.0	59.0	0.0	19.0	29.0	29.0	16.0	26.0	0.0
Act Effct Green (s)	77.5	70.9		90.3	88.1		21.7	13.5	13.5	12.6	8.5	
Actuated g/C Ratio	0.65	0.59		0.75	0.73		0.18	0.11	0.11	0.11	0.07	
v/c Ratio	0.02	0.18		0.59	0.46		0.72	0.17	0.56	0.22	0.07	
Uniform Delay, d1	5.8	11.6		5.8	9.7		42.4	46.8	0.0	39.0	39.9	
Control Delay	7.2	11.9		8.4	9.0		57.5	48.9	9.4	42.8	41.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	7.2	11.9		8.4	9.0		57.5	48.9	9.4	42.8	41.1	
LOS	A	B		A	A		E	D	A	D	D	
Approach Delay		11.9			8.9			35.3			42.2	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)	1	58		85	169		152	26	0	28	5	
Queue Length 95th (ft)	5	107		m70	m163		217	56	69	52	17	
Internal Link Dist (ft)		871			2631			2102			246	
Turn Bay Length (ft)												
Base Capacity (vph)	302	2932		763	3692		299	388	488	222	626	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.18		0.46	0.46		0.71	0.09	0.41	0.17	0.03	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37 (31%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 13.8

Intersection LOS: B

Intersection Capacity Utilization 61.2%

ICU Level of Service B

Analysis Period (min) 15

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

Timings
8: Founders Pkwy & Woodlands Blvd

Background Traffic Volumes
AM Peak Hour - Year 2035

Splits and Phases: 8: Founders Pkwy & Woodlands Blvd

 ø1 36 s		 ø2 39 s		 ø3 19 s		 ø4 26 s	
 ø5 16 s		 ø6 59 s		 ø7 16 s		 ø8 29 s	

DRAFT

Timings
9: Founders Pkwy & Crowfoot Valley Rd

Background Traffic Volumes
AM Peak Hour - Year 2035

	↖	→	←	↗	↘	↙
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑	↗	↖	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	5085	3539	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	5085	3539	1583	1770	1583
Satd. Flow (RTOR)				88		1
Volume (vph)	628	441	1692	144	50	1184
Lane Group Flow (vph)	683	479	1839	157	54	1287
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Total Split (s)	48.0	99.0	51.0	51.0	21.0	48.0
Act Effct Green (s)	53.2	105.0	47.0	47.0	9.9	65.0
Actuated g/C Ratio	0.44	0.88	0.39	0.39	0.08	0.54
v/c Ratio	0.87	0.11	1.33	0.23	0.37	1.50
Uniform Delay, d1	30.3	1.3	37.0	10.5	53.1	26.9
Control Delay	42.4	1.2	184.0	12.0	53.3	256.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	1.2	184.0	12.0	53.3	256.7
LOS	D	A	F	B	D	F
Approach Delay		25.4	170.5		248.5	
Approach LOS		C	F		F	
Queue Length 50th (ft)	491	9	~972	34	40	~1394
Queue Length 95th (ft)	#768	14	#1111	81	81	#1660
Internal Link Dist (ft)		2631	2887		903	
Turn Bay Length (ft)	550					
Base Capacity (vph)	785	4449	1386	674	251	858
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	0.87	0.11	1.33	0.23	0.22	1.50

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37 (31%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.50

Intersection Signal Delay: 156.3

Intersection LOS: F

Intersection Capacity Utilization 126.8%

ICU Level of Service H

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.

Timings
 9: Founders Pkwy & Crowfoot Valley Rd

Background Traffic Volumes
 AM Peak Hour - Year 2035

Splits and Phases: 9: Founders Pkwy & Crowfoot Valley Rd

 Ø2 99 s	 Ø4 21 s
 Ø5 48 s	 Ø6 51 s

DRAFT

HCM Unsignalized Intersection Capacity Analysis

10: Crimson Sky Dr & Founders Pkwy

Background Traffic Volumes
AM Peak Hour - Year 2035

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Sign Control	Stop		Free			Free		
Grade	0%		0%			0%		
Volume (veh/h)	25	255	1525	15	90	565		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	27	277	1658	16	98	614		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage (veh)								
Upstream signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	2160	829			1674			
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	2160	829			1674			
tC, single (s)	6.8	6.9			4.1			
tC, 2 stage (s)								
tF (s)	3.5	3.3			2.2			
p0 queue free %	10	12			74			
cM capacity (veh/h)	30	314			379			
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	27	277	829	829	16	98	307	307
Volume Left	27	0	0	0	0	98	0	0
Volume Right	0	277	0	0	16	0	0	0
cSH	30	314	1700	1700	1700	379	1700	1700
Volume to Capacity	0.90	0.88	0.49	0.49	0.01	0.26	0.18	0.18
Queue Length (ft)	75	204	0	0	0	25	0	0
Control Delay (s)	324.5	62.6	0.0	0.0	0.0	17.8	0.0	0.0
Lane LOS	F	F				C		
Approach Delay (s)	86.0		0.0			2.4		
Approach LOS	F							
Intersection Summary								
Average Delay			10.4					
Intersection Capacity Utilization			64.6%		ICU Level of Service		C	
Analysis Period (min)			15					

Timings
1: 5th Street & Founders Pkwy

Background Traffic Volumes
PM Peak Hour - Year 2035

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	3454	0	3433	3444	0
Flt Permitted	0.329			0.103			0.226			0.121		
Satd. Flow (perm)	613	1863	1583	192	1863	1583	817	3454	0	437	3444	0
Satd. Flow (RTOR)			300			542		17			25	
Volume (vph)	200	590	535	175	300	500	285	600	115	700	680	150
Lane Group Flow (vph)	217	641	582	190	326	543	310	777	0	761	902	0
Turn Type	pm+pt		Free	pm+pt		Free	pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2			6		
Total Split (s)	17.0	47.0	0.0	13.0	43.0	0.0	12.0	33.0	0.0	27.0	48.0	0.0
Act Effct Green (s)	55.0	42.4	119.4	47.9	38.9	119.4	37.0	29.0		56.0	44.0	
Actuated g/C Ratio	0.46	0.36	1.00	0.40	0.33	1.00	0.31	0.24		0.47	0.37	
v/c Ratio	0.54	0.97	0.37	0.97	0.54	0.34	0.72	0.91		0.97	0.70	
Uniform Delay, d1	19.5	37.8	0.0	26.2	32.9	0.0	21.0	43.0		33.4	31.2	
Control Delay	24.7	64.6	0.7	86.5	37.0	0.6	32.5	59.2		60.1	34.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	24.7	64.6	0.7	86.5	37.0	0.6	32.5	59.2		60.1	34.8	
LOS	C	E	A	F	D	A	C	E		E	C	
Approach Delay		32.8			27.2			51.6			46.4	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	100	482	0	96	206	0	70	304		252	303	
Queue Length 95th (ft)	155	#722	0	#249	300	0	100	#420		#381	380	
Internal Link Dist (ft)		2269			1238			1504			6463	
Turn Bay Length (ft)												
Base Capacity (vph)	409	668	1583	196	607	1583	428	852		782	1285	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.53	0.96	0.37	0.97	0.54	0.34	0.72	0.91		0.97	0.70	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 119.4

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 39.9

Intersection LOS: D

Intersection Capacity Utilization 94.3%

ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Timings
1: 5th Street & Founders Pkwy

Background Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 1: 5th Street & Founders Pkwy

 ø1	 ø2	 ø3	 ø4
27 s	33 s	13 s	47 s
 ø5	 ø6	 ø7	 ø8
12 s	48 s	17 s	43 s

DRAFT

HCM Unsignalized Intersection Capacity Analysis

2: Scott Blvd & Woodlands Blvd

Background Traffic Volumes
PM Peak Hour - Year 2035

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Sign Control	Stop			Free	Free			
Grade	0%			0%	0%			
Volume (veh/h)	0	400	215	145	270	0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	0	435	234	158	293	0		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage veh)								
Upstream signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	840	147	293					
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	840	147	293					
tC, single (s)	6.8	6.9	4.1					
tC, 2 stage (s)								
tF (s)	3.5	3.3	2.2					
p0 queue free %	100	50	82					
cM capacity (veh/h)	248	874	1265					
Direction, Lane #	EB 1	EB 2	EB 3	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	0	217	217	234	79	79	196	98
Volume Left	0	0	0	234	0	0	0	0
Volume Right	0	217	217	0	0	0	0	0
cSH	1700	874	874	1265	1700	1700	1700	1700
Volume to Capacity	0.00	0.25	0.25	0.18	0.05	0.05	0.12	0.06
Queue Length (ft)	0	25	25	17	0	0	0	0
Control Delay (s)	0.0	10.5	10.5	8.5	0.0	0.0	0.0	0.0
Lane LOS	A	B	B	A				
Approach Delay (s)	10.5			5.1			0.0	
Approach LOS	B							
Intersection Summary								
Average Delay			5.8					
Intersection Capacity Utilization			28.1%		ICU Level of Service		A	
Analysis Period (min)			15					

Timings
3: Scott Blvd & Front Street

Background Traffic Volumes
PM Peak Hour - Year 2035

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	3486	0	1770	3539
Flt Permitted	0.950				0.105	
Satd. Flow (perm)	1770	1583	3486	0	196	3539
Satd. Flow (RTOR)		413	13			
Volume (vph)	80	380	920	100	630	1140
Lane Group Flow (vph)	87	413	1109	0	685	1239
Turn Type	Perm				pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Total Split (s)	22.0	22.0	38.0	0.0	40.0	78.0
Act Effct Green (s)	11.4	11.4	35.5		74.1	74.1
Actuated g/C Ratio	0.12	0.12	0.38		0.79	0.79
v/c Ratio	0.40	0.74	0.83		0.93	0.44
Uniform Delay, d1	37.9	0.0	26.0		21.5	3.1
Control Delay	39.7	9.6	34.0		40.4	4.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	39.7	9.6	34.0		40.4	4.0
LOS	D	A	C		D	A
Approach Delay	14.9		34.0			17.0
Approach LOS	B		C			B
Queue Length 50th (ft)	48	0	310		311	90
Queue Length 95th (ft)	94	87	#487		#610	175
Internal Link Dist (ft)	2986		753			2885
Turn Bay Length (ft)						
Base Capacity (vph)	319	624	1332		751	2805
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.27	0.66	0.83		0.91	0.44

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 93.5

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 22.0

Intersection LOS: C

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

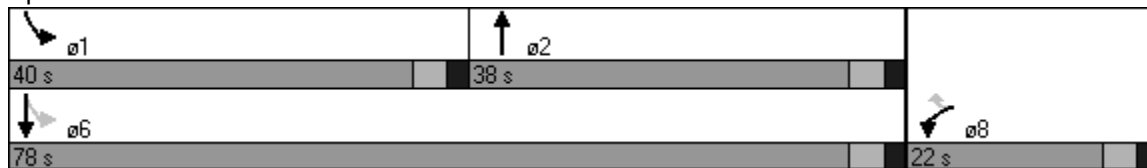
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Timings
3: Scott Blvd & Front Street

Background Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 3: Scott Blvd & Front Street



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Timings
4: Black Feather Tr & Front Street

Background Traffic Volumes
PM Peak Hour - Year 2035

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1734	0	1770	3387	0	1770	3539	1583
Flt Permitted	0.584			0.456			0.125			0.143		
Satd. Flow (perm)	1088	1863	1583	849	1734	0	233	3387	0	266	3539	1583
Satd. Flow (RTOR)			260		58			62				158
Volume (vph)	125	315	500	345	105	90	255	630	250	150	815	145
Lane Group Flow (vph)	136	342	543	375	212	0	277	957	0	163	886	158
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Total Split (s)	51.0	51.0	51.0	51.0	51.0	0.0	17.0	36.0	0.0	13.0	32.0	32.0
Act Effct Green (s)	44.9	44.9	44.9	44.9	44.9		45.1	32.2		37.0	28.0	28.0
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.46		0.46	0.33		0.38	0.29	0.29
v/c Ratio	0.27	0.40	0.63	0.96	0.26		0.89	0.83		0.69	0.87	0.28
Uniform Delay, d1	16.4	17.6	9.5	25.8	11.5		21.0	28.3		16.6	33.2	0.0
Control Delay	18.0	19.1	13.2	60.0	12.3		53.9	36.4		34.7	44.9	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	18.0	19.1	13.2	60.0	12.3		53.9	36.4		34.7	44.9	6.0
LOS	B	B	B	E	B		D	D		C	D	A
Approach Delay		15.8			42.7			40.3			38.4	
Approach LOS		B			D			D			D	
Queue Length 50th (ft)	51	137	124	219	55		123	281		61	285	0
Queue Length 95th (ft)	93	207	235	#413	102		#277	#370		#138	#397	47
Internal Link Dist (ft)		996			1260			2885			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	511	876	882	399	846		312	1153		239	1013	566
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.27	0.39	0.62	0.94	0.25		0.89	0.83		0.68	0.87	0.28

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 98

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 33.9

Intersection LOS: C

Intersection Capacity Utilization 85.7%

ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Timings
4: Black Feather Tr & Front Street

Background Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 4: Black Feather Tr & Front Street

 ø1 13 s	 ø2 36 s	 ø4 51 s
 ø5 17 s	 ø6 32 s	 ø8 51 s

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Timings
5: Black Feather Tr & Woodlands Blvd

Background Traffic Volumes
PM Peak Hour - Year 2035

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1680	0	1863	1788	0	1770	3511	0	1770	3210	0
Flt Permitted	0.595						0.262			0.694		
Satd. Flow (perm)	1108	1680	0	1863	1788	0	488	3511	0	1293	3210	0
Satd. Flow (RTOR)		113			17			5			266	
Volume (vph)	365	85	160	0	55	20	90	80	5	20	150	245
Lane Group Flow (vph)	397	266	0	0	82	0	98	92	0	22	429	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	32.0	44.0	0.0	14.0	26.0	0.0	18.0	28.0	0.0	14.0	24.0	0.0
Act Effct Green (s)	25.6	25.6			9.5		18.2	15.6		14.6	12.1	
Actuated g/C Ratio	0.46	0.46			0.16		0.31	0.28		0.24	0.22	
v/c Ratio	0.53	0.32			0.27		0.27	0.09		0.06	0.47	
Uniform Delay, d1	10.1	5.0			19.9		11.8	15.3		11.6	7.2	
Control Delay	12.0	6.4			24.9		17.1	20.1		17.4	11.5	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	12.0	6.4			24.9		17.1	20.1		17.4	11.5	
LOS	B	A			C		B	C		B	B	
Approach Delay		9.7			24.9			18.5			11.8	
Approach LOS		A			C			B			B	
Queue Length 50th (ft)	91	30			24		25	11		5	30	
Queue Length 95th (ft)	197	86			73		67	38		22	84	
Internal Link Dist (ft)		1260			432			424			2102	
Turn Bay Length (ft)												
Base Capacity (vph)	931	1071			596		477	1468		434	1326	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.43	0.25			0.14		0.21	0.06		0.05	0.32	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 55.3

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 12.5

Intersection LOS: B

Intersection Capacity Utilization 53.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Black Feather Tr & Woodlands Blvd

ø1	ø2	ø3	ø4
14 s	28 s	14 s	44 s
ø5	ø6	ø7	ø8
18 s	24 s	32 s	26 s

Timings
6: Founders Pkwy & Allen Way

Background Traffic Volumes
PM Peak Hour - Year 2035

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↑		↖	↑	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1708	0	1770	1545	1504
Flt Permitted	0.082			0.089			0.190			0.573		
Satd. Flow (perm)	296	5085	1583	166	5085	1583	354	1708	0	1067	1545	1504
Satd. Flow (RTOR)			324			170		48			190	244
Volume (vph)	725	2721	498	180	1662	196	414	90	113	162	61	730
Lane Group Flow (vph)	788	2958	541	196	1807	213	450	221	0	176	425	434
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt			pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Total Split (s)	26.0	63.0	63.0	12.0	49.0	49.0	24.0	29.0	0.0	16.0	21.0	21.0
Act Effct Green (s)	71.0	59.0	59.0	53.0	45.0	45.0	41.0	25.4		28.6	17.0	17.0
Actuated g/C Ratio	0.59	0.49	0.49	0.44	0.38	0.38	0.34	0.21		0.24	0.14	0.14
v/c Ratio	1.05	1.18	0.57	1.09	0.95	0.30	1.26	0.55		0.55	1.11	1.03
Uniform Delay, d1	35.3	30.5	7.5	29.9	36.3	4.9	32.7	32.6		29.6	25.9	21.8
Control Delay	81.9	116.5	10.6	115.1	45.4	11.3	168.8	38.9		36.8	106.7	73.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	81.9	116.5	10.6	115.1	45.4	11.3	168.8	38.9		36.8	106.7	73.2
LOS	F	F	B	F	D	B	F	D		D	F	E
Approach Delay		96.7			48.3			126.0			80.8	
Approach LOS		F			D			F			F	
Queue Length 50th (ft)	~291	~1008	106	~120	449	8	~389	121		99	~255	~194
Queue Length 95th (ft)	#417	#1094	211	m#223	m564	m78	#597	204		159	#470	#411
Internal Link Dist (ft)		627			1110			783			596	
Turn Bay Length (ft)												
Base Capacity (vph)	750	2500	943	180	1907	700	357	400		328	382	423
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.05	1.18	0.57	1.09	0.95	0.30	1.26	0.55		0.54	1.11	1.03

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 69 (58%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.26

Intersection Signal Delay: 84.0

Intersection LOS: F

Intersection Capacity Utilization 117.0%

ICU Level of Service H

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.

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

Timings
6: Founders Pkwy & Allen Way

Background Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 6: Founders Pkwy & Allen Way

 ø1	 ø2	 ø3	 ø4
12 s	63 s	24 s	21 s
 ø5	 ø6	 ø7	 ø8
26 s	49 s	16 s	29 s

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Timings
7: Founders Pkwy & Front Street

Background Traffic Volumes
PM Peak Hour - Year 2035

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4912	0	1770	5070	0	3433	1863	1583	1770	3334	0
Flt Permitted	0.107			0.056			0.282			0.407		
Satd. Flow (perm)	199	4912	0	104	5070	0	1019	1863	1583	758	3334	0
Satd. Flow (RTOR)		109			5				103		84	
Volume (vph)	5	2450	714	9	1435	34	501	203	227	32	178	112
Lane Group Flow (vph)	5	3439	0	10	1597	0	545	221	247	35	315	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	9.0	76.0	0.0	9.0	76.0	0.0	14.0	25.0	25.0	10.0	21.0	0.0
Act Effct Green (s)	82.4	81.4		82.4	81.4		28.8	22.8	22.8	20.8	14.8	
Actuated g/C Ratio	0.69	0.68		0.69	0.68		0.24	0.19	0.19	0.17	0.12	
v/c Ratio	0.02	1.02		0.07	0.46		1.22	0.62	0.64	0.19	0.65	
Uniform Delay, d1	6.4	21.5		6.4	12.0		40.1	44.6	25.4	34.2	35.0	
Control Delay	1.6	23.0		7.3	10.2		155.6	54.0	34.8	37.0	40.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	1.6	23.0		7.3	10.2		155.6	54.0	34.8	37.0	40.6	
LOS	A	C		A	B		F	D	C	D	D	
Approach Delay		23.0			10.2			104.0			40.2	
Approach LOS		C			B			F			D	
Queue Length 50th (ft)	0	~1063		2	195		~230	162	105	21	88	
Queue Length 95th (ft)	m0	m#889		8	287		#295	250	199	48	137	
Internal Link Dist (ft)		1110			1511			712			591	
Turn Bay Length (ft)												
Base Capacity (vph)	210	3367		149	3441		446	354	384	182	544	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	1.02		0.07	0.46		1.22	0.62	0.64	0.19	0.58	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 87 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.22

Intersection Signal Delay: 33.5

Intersection LOS: C

Intersection Capacity Utilization 96.1%

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.

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

Timings
7: Founders Pkwy & Front Street

Background Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 7: Founders Pkwy & Front Street

 ø1	 ø2	 ø3	 ø4
9 s	76 s	14 s	21 s
 ø5	 ø6	 ø7	 ø8
9 s	76 s	10 s	25 s

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Timings
8: Founders Pkwy & Woodlands Blvd

Background Traffic Volumes
PM Peak Hour - Year 2035

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4979	0	1770	5004	0	1770	1863	1583	1770	3426	0
Flt Permitted	0.230			0.066			0.564			0.721		
Satd. Flow (perm)	428	4979	0	123	5004	0	1051	1863	1583	1343	3426	0
Satd. Flow (RTOR)		36			29				183		16	
Volume (vph)	5	1870	311	294	960	115	190	51	414	195	55	15
Lane Group Flow (vph)	5	2371	0	320	1168	0	207	55	450	212	76	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	10.0	61.0	0.0	22.0	73.0	0.0	17.0	27.0	27.0	10.0	20.0	0.0
Act Effct Green (s)	63.0	57.0		79.0	77.0		33.0	23.0	23.0	18.8	14.3	
Actuated g/C Ratio	0.53	0.48		0.66	0.64		0.28	0.19	0.19	0.16	0.12	
v/c Ratio	0.02	0.99		0.98	0.36		0.53	0.15	1.00	0.91	0.18	
Uniform Delay, d1	9.2	31.6		35.3	12.2		34.7	39.4	28.0	42.5	38.2	
Control Delay	8.2	48.3		44.8	12.4		41.5	41.8	71.1	85.1	37.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	8.2	48.3		44.8	12.4		41.5	41.8	71.1	85.1	37.4	
LOS	A	D		D	B		D	D	E	F	D	
Approach Delay		48.2			19.4			60.3			72.5	
Approach LOS		D			B			E			E	
Queue Length 50th (ft)	1	645		201	143		132	36	225	136	22	
Queue Length 95th (ft)	6	#784		m203	m156		206	74	#447	#250	46	
Internal Link Dist (ft)		871			2627			2102			246	
Turn Bay Length (ft)												
Base Capacity (vph)	292	2384		328	3221		391	357	451	232	471	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.99		0.98	0.36		0.53	0.15	1.00	0.91	0.16	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 23 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 42.6

Intersection LOS: D

Intersection Capacity Utilization 89.5%

ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Timings
8: Founders Pkwy & Woodlands Blvd

Background Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 8: Founders Pkwy & Woodlands Blvd

 ø1 22 s	 ø2 61 s	 ø3 17 s	 ø4 20 s
 ø5 10 s	 ø6 73 s	 ø7 10 s	 ø8 27 s

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Timings
9: Founders Pkwy & Crowfoot Valley Rd

Background Traffic Volumes
PM Peak Hour - Year 2035

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑	↱	↰	↱
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	5085	3539	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	5085	3539	1583	1770	1583
Satd. Flow (RTOR)				73		3
Volume (vph)	1245	1566	858	77	113	901
Lane Group Flow (vph)	1353	1702	933	84	123	979
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Total Split (s)	68.0	99.0	31.0	31.0	21.0	68.0
Act Effct Green (s)	67.1	98.0	27.0	27.0	14.0	85.0
Actuated g/C Ratio	0.56	0.82	0.23	0.23	0.12	0.71
v/c Ratio	1.37	0.41	1.17	0.20	0.60	0.87
Uniform Delay, d1	26.5	3.0	46.5	4.8	50.3	13.3
Control Delay	188.1	1.8	132.0	12.1	56.6	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	188.1	1.8	132.0	12.1	56.6	24.1
LOS	F	A	F	B	E	C
Approach Delay		84.3	122.1		27.7	
Approach LOS		F	F		C	
Queue Length 50th (ft) ~1378		52	~453	7	91	516
Queue Length 95th (ft)m#1465		m61	#584	49	153	#844
Internal Link Dist (ft)		2627	2882		979	
Turn Bay Length (ft)	550					
Base Capacity (vph)	989	4155	796	413	251	1122
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	94	0	0	0	0
Reduced v/c Ratio	1.37	0.42	1.17	0.20	0.49	0.87

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37 (31%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.37

Intersection Signal Delay: 79.7

Intersection LOS: E

Intersection Capacity Utilization 109.0%

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.

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

Timings
9: Founders Pkwy & Crowfoot Valley Rd

Background Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 9: Founders Pkwy & Crowfoot Valley Rd

 Ø2	 Ø4
99 s	21 s
 Ø5	 Ø6
68 s	31 s

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HCM Unsignalized Intersection Capacity Analysis

10: Crimson Sky Dr & Founders Pkwy

Background Traffic Volumes
PM Peak Hour - Year 2035

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Sign Control	Stop		Free			Free		
Grade	0%		0%			0%		
Volume (veh/h)	15	160	1375	25	285	1775		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	16	174	1495	27	310	1929		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage (veh)								
Upstream signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	3079	747			1522			
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	3079	747			1522			
tC, single (s)	6.8	6.9			4.1			
tC, 2 stage (s)								
tF (s)	3.5	3.3			2.2			
p0 queue free %	0	51			29			
cM capacity (veh/h)	3	355			434			
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	16	174	747	747	27	310	965	965
Volume Left	16	0	0	0	0	310	0	0
Volume Right	0	174	0	0	27	0	0	0
cSH	3	355	1700	1700	1700	434	1700	1700
Volume to Capacity	6.09	0.49	0.44	0.44	0.02	0.71	0.57	0.57
Queue Length (ft)	Err	65	0	0	0	138	0	0
Control Delay (s)	Err	24.5	0.0	0.0	0.0	31.4	0.0	0.0
Lane LOS	F	C				D		
Approach Delay (s)	879.4		0.0			4.3		
Approach LOS	F							
Intersection Summary								
Average Delay			44.8					
Intersection Capacity Utilization			67.1%		ICU Level of Service		C	
Analysis Period (min)			15					

Timings
1: 5th Street & Founders Pkwy

Total Traffic Volumes
AM Peak Hour - Year 2035

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖↗	↑↗		↖↗	↑↗	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	3468	0	3433	3267	0
Flt Permitted	0.143			0.507			0.210			0.210		
Satd. Flow (perm)	266	1863	1583	944	1863	1583	759	3468	0	759	3267	0
Satd. Flow (RTOR)			177			325		15			196	
Volume (vph)	104	252	163	75	583	575	505	635	100	275	215	227
Lane Group Flow (vph)	113	274	177	82	634	625	549	799	0	299	481	0
Turn Type	pm+pt		Free	pm+pt		Free	pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2			6		
Total Split (s)	11.0	56.0	0.0	10.0	55.0	0.0	26.0	40.0	0.0	14.0	28.0	0.0
Act Effct Green (s)	51.0	45.5	111.4	48.3	42.2	111.4	49.9	36.2		38.0	28.2	
Actuated g/C Ratio	0.46	0.41	1.00	0.43	0.38	1.00	0.45	0.32		0.34	0.25	
v/c Ratio	0.52	0.36	0.11	0.18	0.90	0.39	0.71	0.70		0.60	0.49	
Uniform Delay, d1	16.0	23.3	0.0	15.9	32.1	0.0	20.6	32.8		20.0	20.6	
Control Delay	24.5	24.5	0.1	16.6	40.9	0.7	25.4	37.5		26.6	24.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	24.5	24.5	0.1	16.6	40.9	0.7	25.4	37.5		26.6	24.4	
LOS	C	C	A	B	D	A	C	D		C	C	
Approach Delay		16.9			20.7			32.6			25.2	
Approach LOS		B			C			C			C	
Queue Length 50th (ft)	44	138	0	31	420	0	134	265		67	92	
Queue Length 95th (ft)	76	206	0	58	581	0	195	366		106	162	
Internal Link Dist (ft)		2269			1238			1504			6463	
Turn Bay Length (ft)												
Base Capacity (vph)	217	824	1583	446	793	1583	839	1139		501	973	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.52	0.33	0.11	0.18	0.80	0.39	0.65	0.70		0.60	0.49	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 111.4

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 25.0

Intersection LOS: C

Intersection Capacity Utilization 78.4%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: 5th Street & Founders Pkwy

↖ ø1	↑ ø2	↖ ø3	↑ ø4
14 s	40 s	10 s	56 s
↖ ø5	↓ ø6	↖ ø7	↑ ø8
26 s	28 s	11 s	55 s

HCM Unsignalized Intersection Capacity Analysis

2: Scott Blvd & Woodlands Blvd

Total Traffic Volumes
AM Peak Hour - Year 2035

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Sign Control	Stop			Free	Free			
Grade	0%			0%	0%			
Volume (veh/h)	16	165	315	238	120	28		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	17	179	342	259	130	30		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage veh								
Upstream signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	960	80	161					
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	960	80	161					
tC, single (s)	6.8	6.9	4.1					
tC, 2 stage (s)								
tF (s)	3.5	3.3	2.2					
p0 queue free %	91	81	76					
cM capacity (veh/h)	193	963	1416					
Direction, Lane #	EB 1	EB 2	EB 3	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	17	90	90	342	129	129	87	74
Volume Left	17	0	0	342	0	0	0	0
Volume Right	0	90	90	0	0	0	0	30
cSH	193	963	963	1416	1700	1700	1700	1700
Volume to Capacity	0.09	0.09	0.09	0.24	0.08	0.08	0.05	0.04
Queue Length (ft)	7	8	8	24	0	0	0	0
Control Delay (s)	25.5	9.1	9.1	8.4	0.0	0.0	0.0	0.0
Lane LOS	D	A	A	A				
Approach Delay (s)	10.6			4.8			0.0	
Approach LOS	B							
Intersection Summary								
Average Delay			5.2					
Intersection Capacity Utilization			35.0%		ICU Level of Service		A	
Analysis Period (min)			15					

Timings
3: Scott Blvd & Front Street

Total Traffic Volumes
AM Peak Hour - Year 2035

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑↓		↘	↑↑
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	3472	0	1770	3539
Flt Permitted	0.950				0.103	
Satd. Flow (perm)	1770	1583	3472	0	192	3539
Satd. Flow (RTOR)		407	19			
Volume (vph)	119	421	837	124	251	754
Lane Group Flow (vph)	129	458	1045	0	273	820
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Total Split (s)	32.0	32.0	43.0	0.0	25.0	68.0
Act Effct Green (s)	14.2	14.2	46.9		64.3	64.3
Actuated g/C Ratio	0.16	0.16	0.54		0.74	0.74
v/c Ratio	0.44	0.76	0.55		0.71	0.31
Uniform Delay, d1	32.6	3.5	12.7		12.6	3.7
Control Delay	33.2	9.6	16.5		19.2	4.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	33.2	9.6	16.5		19.2	4.8
LOS	C	A	B		B	A
Approach Delay	14.8		16.5			8.4
Approach LOS	B		B			A
Queue Length 50th (ft)	64	24	168		66	56
Queue Length 95th (ft)	114	119	360		175	140
Internal Link Dist (ft)	2986		753			1474
Turn Bay Length (ft)						
Base Capacity (vph)	496	736	1891		484	2631
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.26	0.62	0.55		0.56	0.31

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 86.5

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 12.8

Intersection LOS: B

Intersection Capacity Utilization 59.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Scott Blvd & Front Street

↖ ø1	↑ ø2	
25 s	43 s	
↓ ø6		↘ ø8
68 s		32 s

Timings
4: Black Feather Tr & Front Street

Total Traffic Volumes
AM Peak Hour - Year 2035

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↖		↖	↑↑		↖	↑↑	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1777	0	1770	3383	0	1770	3539	1583
Flt Permitted	0.385			0.624			0.329			0.343		
Satd. Flow (perm)	717	1863	1583	1162	1777	0	613	3383	0	639	3539	1583
Satd. Flow (RTOR)			259		29			70				60
Volume (vph)	50	158	238	390	264	115	390	533	220	68	295	55
Lane Group Flow (vph)	54	172	259	424	412	0	424	818	0	74	321	60
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Total Split (s)	50.0	50.0	50.0	50.0	50.0	0.0	29.0	40.0	0.0	10.0	21.0	21.0
Act Effct Green (s)	36.9	36.9	36.9	36.9	36.9		44.6	37.1		26.5	20.8	20.8
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41		0.50	0.41		0.29	0.23	0.23
v/c Ratio	0.18	0.22	0.32	0.89	0.55		0.76	0.57		0.29	0.39	0.15
Uniform Delay, d1	17.3	17.6	0.0	25.1	19.0		14.6	18.7		13.8	28.5	0.0
Control Delay	17.8	17.3	3.0	35.5	20.3		24.7	22.8		20.3	34.8	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	17.8	17.3	3.0	35.5	20.3		24.7	22.8		20.3	34.8	10.8
LOS	B	B	A	D	C		C	C		C	C	B
Approach Delay		9.7			28.0			23.4			29.3	
Approach LOS		A			C			C			C	
Queue Length 50th (ft)	20	63	0	223	165		175	196		24	92	0
Queue Length 95th (ft)	45	106	42	#396	250		276	273		52	144	35
Internal Link Dist (ft)		996			1260			1331			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	337	876	882	547	851		594	1441		259	819	413
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.16	0.20	0.29	0.78	0.48		0.71	0.57		0.29	0.39	0.15

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 89.7

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 23.4

Intersection LOS: C

Intersection Capacity Utilization 73.0%

ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Timings
4: Black Feather Tr & Front Street

Total Traffic Volumes
AM Peak Hour - Year 2035

Splits and Phases: 4: Black Feather Tr & Front Street

 ø1	 ø2	 ø4
10 s	40 s	50 s
 ø5	 ø6	 ø8
29 s	21 s	50 s

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Timings
5: Black Feather Tr & Woodlands Blvd

Total Traffic Volumes
AM Peak Hour - Year 2035

	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	↰	↱		↰	↱		↰	↱		↰	↱	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1665	0	1770	1837	0	1770	3525	0	1770	3111	0
Flt Permitted	0.541			0.685			0.290			0.639		
Satd. Flow (perm)	1008	1665	0	1276	1837	0	540	3525	0	1190	3111	0
Satd. Flow (RTOR)		79			5			3			332	
Volume (vph)	195	30	73	8	100	10	187	160	5	5	73	305
Lane Group Flow (vph)	212	112	0	9	120	0	203	179	0	5	411	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	23.0	35.0	0.0	15.0	27.0	0.0	25.0	35.0	0.0	15.0	25.0	0.0
Act Effct Green (s)	25.1	23.2		15.6	10.4		31.3	32.1		22.7	19.6	
Actuated g/C Ratio	0.39	0.36		0.22	0.16		0.48	0.51		0.32	0.31	
v/c Ratio	0.39	0.17		0.03	0.40		0.40	0.10		0.01	0.34	
Uniform Delay, d1	15.8	5.4		15.2	25.7		9.7	12.1		9.8	3.5	
Control Delay	13.5	7.3		15.0	26.5		14.3	14.4		15.8	7.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.5	7.3		15.0	26.5		14.3	14.4		15.8	7.7	
LOS	B	A		B	C		B	B		B	A	
Approach Delay		11.4			25.7			14.4			7.8	
Approach LOS		B			C			B			A	
Queue Length 50th (ft)	46	6		2	38		47	20		1	13	
Queue Length 95th (ft)	113	48		11	103		111	59		7	60	
Internal Link Dist (ft)		1260			432			424			2102	
Turn Bay Length (ft)												
Base Capacity (vph)	608	779		412	560		592	1938		495	1491	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.35	0.14		0.02	0.21		0.34	0.09		0.01	0.28	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 62.5

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 12.6

Intersection LOS: B

Intersection Capacity Utilization 49.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Black Feather Tr & Woodlands Blvd

ø1	ø2	ø3	ø4
15 s	35 s	15 s	35 s
ø5	ø6	ø7	ø8
25 s	25 s	23 s	27 s

Timings
6: Founders Pkwy & Allen Way

Total Traffic Volumes
AM Peak Hour - Year 2035

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↑		↖	↑	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1719	0	1770	1522	1504
Flt Permitted	0.062			0.140			0.174			0.713		
Satd. Flow (perm)	224	5085	1583	261	5085	1583	324	1719	0	1328	1522	1504
Satd. Flow (RTOR)			337			142		35			78	78
Volume (vph)	360	1273	310	43	2621	203	282	30	32	100	20	565
Lane Group Flow (vph)	391	1384	337	47	2849	221	307	68	0	109	329	307
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt			pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Total Split (s)	13.0	68.5	68.5	9.5	65.0	65.0	19.0	32.0	0.0	10.0	23.0	23.0
Act Effct Green (s)	73.7	66.5	66.5	66.5	61.0	61.0	33.4	23.9		27.6	19.0	19.0
Actuated g/C Ratio	0.61	0.55	0.55	0.55	0.51	0.51	0.28	0.20		0.23	0.16	0.16
v/c Ratio	1.03	0.49	0.33	0.22	1.10	0.25	1.13	0.18		0.31	1.07	1.01
Uniform Delay, d1	29.1	17.8	0.0	9.9	30.1	5.7	32.7	19.5		29.2	37.7	36.9
Control Delay	84.6	17.6	2.4	9.3	76.1	3.5	131.0	21.3		35.0	108.5	92.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	84.6	17.6	2.4	9.3	76.1	3.5	131.0	21.3		35.0	108.5	92.0
LOS	F	B	A	A	E	A	F	C		C	F	F
Approach Delay		27.5			69.9			111.1			91.0	
Approach LOS		C			E			F			F	
Queue Length 50th (ft)	~116	239	0	10	~926	6	~215	20		61	~241	~198
Queue Length 95th (ft)	#218	279	43	m15	#997	m18	#399	59		108	#437	#398
Internal Link Dist (ft)		627			1110			783			596	
Turn Bay Length (ft)												
Base Capacity (vph)	378	2814	1027	214	2585	875	271	428		351	307	304
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.03	0.49	0.33	0.22	1.10	0.25	1.13	0.16		0.31	1.07	1.01

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 119 (99%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 60.7

Intersection LOS: E

Intersection Capacity Utilization 102.6%

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.

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

Timings
6: Founders Pkwy & Allen Way

Total Traffic Volumes
AM Peak Hour - Year 2035

Splits and Phases: 6: Founders Pkwy & Allen Way

 ø1	 ø2	 ø3	 ø4
9.5 s	68.5 s	19 s	23 s
 ø5	 ø6	 ø7	 ø8
13 s	65 s	10 s	32 s

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Timings
7: Founders Pkwy & Front Street

Total Traffic Volumes
AM Peak Hour - Year 2035

	↖	→	↘	↙	←	↖	↙	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑↑		↖	↑↑↑		↖↖	↑	↖	↖	↑↑	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4928	0	1770	5075	0	3433	1863	1583	1770	3231	0
Flt Permitted	0.059			0.116			0.400			0.703		
Satd. Flow (perm)	110	4928	0	216	5075	0	1445	1863	1583	1310	3231	0
Satd. Flow (RTOR)		87			2				64		61	
Volume (vph)	5	1103	282	35	2352	28	442	76	59	9	87	120
Lane Group Flow (vph)	5	1506	0	38	2587	0	480	83	64	10	225	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	9.0	72.0	0.0	9.0	72.0	0.0	18.0	29.0	29.0	10.0	21.0	0.0
Act Effct Green (s)	78.8	75.0		80.8	79.7		30.4	28.4	28.4	18.4	12.4	
Actuated g/C Ratio	0.66	0.63		0.67	0.66		0.25	0.24	0.24	0.15	0.10	
v/c Ratio	0.03	0.48		0.16	0.77		0.80	0.19	0.15	0.04	0.58	
Uniform Delay, d1	7.8	14.4		7.7	19.8		35.5	36.6	0.0	31.7	34.4	
Control Delay	9.0	12.2		8.5	16.9		50.0	38.2	10.0	33.0	39.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	9.0	12.2		8.5	16.9		50.0	38.2	10.0	33.0	39.4	
LOS	A	B		A	B		D	D	B	C	D	
Approach Delay		12.2			16.8			44.4			39.2	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	1	151		9	435		167	50	0	6	64	
Queue Length 95th (ft)	m3	215		23	697		211	101	38	19	102	
Internal Link Dist (ft)		1110			1511			712			591	
Turn Bay Length (ft)												
Base Capacity (vph)	161	3114		234	3370		598	443	425	224	510	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	0.48		0.16	0.77		0.80	0.19	0.15	0.04	0.44	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 96 (80%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 19.9

Intersection LOS: B

Intersection Capacity Utilization 74.9%

ICU Level of Service D

Analysis Period (min) 15

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

Timings
7: Founders Pkwy & Front Street

Total Traffic Volumes
AM Peak Hour - Year 2035

Splits and Phases: 7: Founders Pkwy & Front Street

 ø1	 ø2	 ø3	 ø4
9 s	72 s	18 s	21 s
 ø5	 ø6	 ø7	 ø8
9 s	72 s	10 s	29 s

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Timings
8: Founders Pkwy & Woodlands Blvd

Total Traffic Volumes
AM Peak Hour - Year 2035

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4928	0	1770	5019	0	1770	1863	1583	1770	3391	0
Flt Permitted	0.114			0.300			0.615			0.727		
Satd. Flow (perm)	212	4928	0	559	5019	0	1146	1863	1583	1354	3391	0
Satd. Flow (RTOR)		53			18				203		5	
Volume (vph)	5	424	109	331	1534	144	210	42	187	42	12	5
Lane Group Flow (vph)	5	579	0	360	1824	0	228	46	203	46	18	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	13.0	39.0	0.0	35.0	61.0	0.0	23.0	33.0	33.0	13.0	23.0	0.0
Act Effct Green (s)	76.7	70.1		87.7	85.5		24.4	14.1	14.1	11.8	8.0	
Actuated g/C Ratio	0.64	0.58		0.73	0.71		0.20	0.12	0.12	0.10	0.07	
v/c Ratio	0.02	0.20		0.66	0.51		0.68	0.21	0.56	0.28	0.08	
Uniform Delay, d1	6.4	12.1		6.7	11.4		40.6	45.6	0.0	37.4	40.2	
Control Delay	7.6	12.5		7.7	5.3		52.0	47.4	8.3	44.3	42.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	7.6	12.5		7.7	5.3		52.0	47.4	8.3	44.3	42.1	
LOS	A	B		A	A		D	D	A	D	D	
Approach Delay		12.4			5.7			33.0			43.7	
Approach LOS		B			A			C			D	
Queue Length 50th (ft)	1	60		50	107		165	34	0	34	5	
Queue Length 95th (ft)	6	116		m46	m125		230	67	67	58	17	
Internal Link Dist (ft)		871			1587			2102			246	
Turn Bay Length (ft)												
Base Capacity (vph)	257	2898		721	3579		347	450	537	172	541	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	0.20		0.50	0.51		0.66	0.10	0.38	0.27	0.03	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37 (31%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 11.5

Intersection LOS: B

Intersection Capacity Utilization 64.5%

ICU Level of Service C

Analysis Period (min) 15

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

Timings
8: Founders Pkwy & Woodlands Blvd

Total Traffic Volumes
AM Peak Hour - Year 2035

Splits and Phases: 8: Founders Pkwy & Woodlands Blvd

 ø1 35 s		 ø2 39 s		 ø3 23 s		 ø4 23 s	
 ø5 13 s		 ø6 61 s		 ø7 13 s		 ø8 33 s	

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Timings
9: Founders Pkwy & Crowfoot Valley Rd

Total Traffic Volumes
AM Peak Hour - Year 2035

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑	↱	↰	↱
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	5085	3539	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	5085	3539	1583	1770	1583
Satd. Flow (RTOR)				126		1
Volume (vph)	631	447	1811	215	72	1189
Lane Group Flow (vph)	686	486	1968	234	78	1292
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Total Split (s)	46.0	99.0	53.0	53.0	21.0	46.0
Act Effct Green (s)	49.8	103.6	49.0	49.0	11.4	63.0
Actuated g/C Ratio	0.42	0.86	0.41	0.41	0.10	0.53
v/c Ratio	0.93	0.11	1.36	0.32	0.46	1.55
Uniform Delay, d1	33.5	1.5	36.0	10.8	52.5	28.0
Control Delay	54.1	2.5	199.9	16.5	53.8	280.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.1	2.5	199.9	16.5	53.8	280.3
LOS	D	A	F	B	D	F
Approach Delay		32.7	180.4		267.4	
Approach LOS		C	F		F	
Queue Length 50th (ft)	522	17	~1080	77	58	~1425
Queue Length 95th (ft)	#830	58	#1220	m147	106	#1690
Internal Link Dist (ft)		1587	2936		1043	
Turn Bay Length (ft)	550					
Base Capacity (vph)	735	4390	1445	721	251	832
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	0.93	0.11	1.36	0.32	0.31	1.55

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37 (31%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.55

Intersection Signal Delay: 169.0

Intersection LOS: F

Intersection Capacity Utilization 130.3%

ICU Level of Service H

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.

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

Timings
9: Founders Pkwy & Crowfoot Valley Rd

Total Traffic Volumes
AM Peak Hour - Year 2035

Splits and Phases: 9: Founders Pkwy & Crowfoot Valley Rd

 Ø2	 Ø4
99 s	21 s
 Ø5	 Ø6
46 s	53 s

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HCM Unsignalized Intersection Capacity Analysis 10: Crimson Sky Dr & Founders Pkwy

Total Traffic Volumes
AM Peak Hour - Year 2035

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Volume (veh/h)	71	0	47	25	0	255	29	1525	15	90	612	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	0	51	27	0	277	32	1658	16	98	665	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2030	2598	333	2300	2589	829	673			1674		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2030	2598	333	2300	2589	829	673			1674		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	92	0	100	12	97			74		
cM capacity (veh/h)	3	18	663	15	18	314	914			379		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	77	51	27	277	32	829	829	16	98	333	333	8
Volume Left	77	0	27	0	32	0	0	0	98	0	0	0
Volume Right	0	51	0	277	0	0	0	16	0	0	0	8
cSH	3	663	15	314	914	1700	1700	1700	379	1700	1700	1700
Volume to Capacity	25.23	0.08	1.81	0.88	0.03	0.49	0.49	0.01	0.26	0.20	0.20	0.00
Queue Length (ft)	Err	6	101	204	3	0	0	0	25	0	0	0
Control Delay (s)	Err	10.9	907.0	62.6	9.1	0.0	0.0	0.0	17.8	0.0	0.0	0.0
Lane LOS	F	B	F	F	A				C			
Approach Delay (s)	6020.7		138.0		0.2				2.3			
Approach LOS	F		F									
Intersection Summary												
Average Delay	280.6											
Intersection Capacity Utilization	80.2%			ICU Level of Service					D			
Analysis Period (min)	15											

Timings
11: Collector A & Front Street

Total Traffic Volumes
AM Peak Hour - Year 2035

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑↓		↘	↑↑
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	3507	0	1770	3539
Flt Permitted	0.950				0.098	
Satd. Flow (perm)	1770	1583	3507	0	183	3539
Satd. Flow (RTOR)		73	10			
Volume (vph)	65	67	1185	73	47	940
Lane Group Flow (vph)	71	73	1367	0	51	1022
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Total Split (s)	26.0	26.0	59.0	0.0	15.0	74.0
Act Effct Green (s)	9.9	9.9	59.3		70.4	71.3
Actuated g/C Ratio	0.11	0.11	0.69		0.82	0.83
v/c Ratio	0.36	0.30	0.56		0.18	0.35
Uniform Delay, d1	36.8	0.0	7.1		1.6	2.2
Control Delay	37.1	10.3	8.7		3.2	2.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	37.1	10.3	8.7		3.2	2.9
LOS	D	B	A		A	A
Approach Delay	23.5		8.7			2.9
Approach LOS	C		A			A
Queue Length 50th (ft)	37	0	186		4	62
Queue Length 95th (ft)	77	38	282		13	104
Internal Link Dist (ft)	618		1474			1331
Turn Bay Length (ft)						
Base Capacity (vph)	389	405	2427		339	2942
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.18	0.18	0.56		0.15	0.35

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 85.8

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 7.1

Intersection LOS: A

Intersection Capacity Utilization 49.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 11: Collector A & Front Street

↖ ø1	↑ ø2	
15 s	59 s	
↓ ø6		↘ ø8
74 s		26 s

Timings
12: Founders Pkwy & Access A

Total Traffic Volumes
AM Peak Hour - Year 2035

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	3539	1583	1863	3539	1770	1863
Flt Permitted					0.950	
Satd. Flow (perm)	3539	1583	1863	3539	1770	1863
Satd. Flow (RTOR)		39				
Volume (vph)	512	36	0	1907	119	0
Lane Group Flow (vph)	557	39	0	2073	129	0
Turn Type		Perm	pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Total Split (s)	82.0	82.0	13.0	95.0	25.0	25.0
Act Effct Green (s)	86.7	86.7		97.2	14.8	
Actuated g/C Ratio	0.72	0.72		0.81	0.12	
v/c Ratio	0.22	0.03		0.72	0.59	
Uniform Delay, d1	5.5	0.0		5.2	49.7	
Control Delay	7.8	1.9		7.7	53.0	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	7.8	1.9		7.7	53.0	
LOS	A	A		A	D	
Approach Delay	7.4			7.7	53.0	
Approach LOS	A			A	D	
Queue Length 50th (ft)	117	0		307	96	
Queue Length 95th (ft)	161	2		493	153	
Internal Link Dist (ft)	2936			992	535	
Turn Bay Length (ft)						
Base Capacity (vph)	2556	1154		2866	310	
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	0.22	0.03		0.72	0.42	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 84 (70%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 9.7
 Intersection LOS: A
 Intersection Capacity Utilization 66.0%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 12: Founders Pkwy & Access A

↙ ø1	→ ø2	
13 s	82 s	
↖ ø6		↗ ø8
95 s		25 s

HCM Unsignalized Intersection Capacity Analysis 13: Access B & Founders Pkwy

Total Traffic Volumes
AM Peak Hour - Year 2035

							
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations				 	 		
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Volume (veh/h)	0	47	0	1851	662	15	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	51	0	2012	720	16	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None						
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1726	360	736				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1726	360	736				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	92	100				
cM capacity (veh/h)	80	637	865				
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	51	1006	1006	360	360	16
Volume Left	0	0	0	0	0	0	0
Volume Right	0	51	0	0	0	0	16
cSH	1700	637	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.08	0.59	0.59	0.21	0.21	0.01
Queue Length (ft)	0	7	0	0	0	0	0
Control Delay (s)	0.0	11.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	B					
Approach Delay (s)	11.1		0.0		0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			54.5%		ICU Level of Service		A
Analysis Period (min)			15				

Timings
1: 5th Street & Founders Pkwy

Total Traffic Volumes
PM Peak Hour - Year 2035

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖↗	↑↗		↖↗	↑↗	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	3433	3454	0	3433	3429	0
Flt Permitted	0.272			0.118			0.190			0.121		
Satd. Flow (perm)	507	1863	1583	220	1863	1583	687	3454	0	437	3429	0
Satd. Flow (RTOR)			301			482		17			31	
Volume (vph)	303	597	545	175	306	500	293	600	115	700	680	180
Lane Group Flow (vph)	329	649	592	190	333	543	318	777	0	761	935	0
Turn Type	pm+pt		Free	pm+pt		Free	pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		Free	8		Free	2			6		
Total Split (s)	22.0	47.0	0.0	13.0	38.0	0.0	13.0	33.0	0.0	27.0	47.0	0.0
Act Effct Green (s)	55.9	42.9	119.9	43.4	34.4	119.9	38.0	29.0		56.0	43.0	
Actuated g/C Ratio	0.47	0.36	1.00	0.36	0.29	1.00	0.32	0.24		0.47	0.36	
v/c Ratio	0.78	0.97	0.37	0.97	0.62	0.34	0.75	0.92		0.98	0.75	
Uniform Delay, d1	21.0	37.9	0.0	26.7	37.0	0.0	21.3	43.3		33.7	32.5	
Control Delay	35.2	67.1	0.7	87.0	43.3	0.6	33.6	59.8		61.2	37.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	35.2	67.1	0.7	87.0	43.3	0.6	33.6	59.8		61.2	37.0	
LOS	D	E	A	F	D	A	C	E		E	D	
Approach Delay		35.4			29.3			52.2			47.9	
Approach LOS		D			C			D			D	
Queue Length 50th (ft)	163	491	0	96	225	0	72	304		252	322	
Queue Length 95th (ft)	#255	#737	0	#249	327	0	#107	#420		#381	402	
Internal Link Dist (ft)		2269			1238			1504			6463	
Turn Bay Length (ft)												
Base Capacity (vph)	424	668	1583	196	536	1583	424	849		779	1250	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.78	0.97	0.37	0.97	0.62	0.34	0.75	0.92		0.98	0.75	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 119.9

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 41.5

Intersection LOS: D

Intersection Capacity Utilization 94.7%

ICU Level of Service F

Analysis Period (min) 15

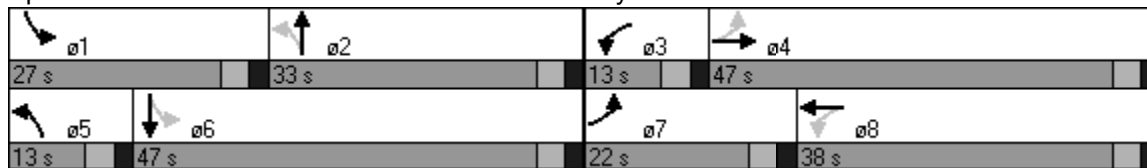
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Timings
1: 5th Street & Founders Pkwy

Total Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 1: 5th Street & Founders Pkwy



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HCM Unsignalized Intersection Capacity Analysis

2: Scott Blvd & Woodlands Blvd

Total Traffic Volumes
PM Peak Hour - Year 2035

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Sign Control	Stop			Free	Free			
Grade	0%			0%	0%			
Volume (veh/h)	39	400	215	199	319	32		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly flow rate (vph)	42	435	234	216	347	35		
Pedestrians								
Lane Width (ft)								
Walking Speed (ft/s)								
Percent Blockage								
Right turn flare (veh)								
Median type	None							
Median storage veh)								
Upstream signal (ft)								
pX, platoon unblocked								
vC, conflicting volume	940	191	382					
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	940	191	382					
tC, single (s)	6.8	6.9	4.1					
tC, 2 stage (s)								
tF (s)	3.5	3.3	2.2					
p0 queue free %	80	47	80					
cM capacity (veh/h)	210	819	1174					
Direction, Lane #	EB 1	EB 2	EB 3	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	42	217	217	234	108	108	231	150
Volume Left	42	0	0	234	0	0	0	0
Volume Right	0	217	217	0	0	0	0	35
cSH	210	819	819	1174	1700	1700	1700	1700
Volume to Capacity	0.20	0.27	0.27	0.20	0.06	0.06	0.14	0.09
Queue Length (ft)	18	27	27	19	0	0	0	0
Control Delay (s)	26.4	11.0	11.0	8.8	0.0	0.0	0.0	0.0
Lane LOS	D	B	B	A				
Approach Delay (s)	12.4			4.6			0.0	
Approach LOS	B							
Intersection Summary								
Average Delay			6.1					
Intersection Capacity Utilization			35.1%		ICU Level of Service		A	
Analysis Period (min)			15					

Timings
3: Scott Blvd & Front Street

Total Traffic Volumes
PM Peak Hour - Year 2035

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑↓		↘	↑↑
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	3486	0	1770	3539
Flt Permitted	0.950				0.103	
Satd. Flow (perm)	1770	1583	3486	0	192	3539
Satd. Flow (RTOR)		443	13			
Volume (vph)	89	408	1033	115	664	1257
Lane Group Flow (vph)	97	443	1248	0	722	1366
Turn Type		Perm			pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Total Split (s)	22.0	22.0	39.0	0.0	39.0	78.0
Act Effct Green (s)	12.0	12.0	35.1		74.1	74.1
Actuated g/C Ratio	0.13	0.13	0.37		0.79	0.79
v/c Ratio	0.43	0.75	0.95		0.98	0.49
Uniform Delay, d1	37.9	0.0	28.5		22.8	3.5
Control Delay	40.1	9.8	46.2		53.0	4.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	40.1	9.8	46.2		53.0	4.5
LOS	D	A	D		D	A
Approach Delay	15.2		46.2			21.3
Approach LOS	B		D			C
Queue Length 50th (ft)	54	0	368		356	108
Queue Length 95th (ft)	103	91	#577		#675	204
Internal Link Dist (ft)	2986		753			1474
Turn Bay Length (ft)						
Base Capacity (vph)	319	648	1307		739	2787
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.30	0.68	0.95		0.98	0.49

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 94.1

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 28.5

Intersection LOS: C

Intersection Capacity Utilization 83.9%

ICU Level of Service E

Analysis Period (min) 15

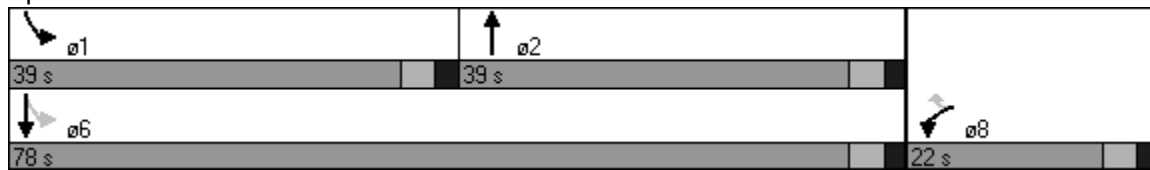
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Timings
3: Scott Blvd & Front Street

Total Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 3: Scott Blvd & Front Street



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Timings
4: Black Feather Tr & Front Street

Total Traffic Volumes
PM Peak Hour - Year 2035

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↖		↖	↑↑		↖	↑↑	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1863	1583	1770	1755	0	1770	3398	0	1770	3539	1583
Flt Permitted	0.547			0.404			0.133			0.154		
Satd. Flow (perm)	1019	1863	1583	753	1755	0	248	3398	0	287	3539	1583
Satd. Flow (RTOR)			272		44			55				158
Volume (vph)	125	372	555	345	142	90	304	679	250	204	815	145
Lane Group Flow (vph)	136	404	603	375	252	0	330	1010	0	222	886	158
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Total Split (s)	52.0	52.0	52.0	52.0	52.0	0.0	18.0	35.0	0.0	13.0	30.0	30.0
Act Effct Green (s)	48.0	48.0	48.0	48.0	48.0		44.0	31.0		35.0	26.0	26.0
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48		0.44	0.31		0.35	0.26	0.26
v/c Ratio	0.28	0.45	0.67	1.04	0.29		1.02	0.93		0.95	0.96	0.30
Uniform Delay, d1	15.6	17.2	9.9	25.9	12.7		24.9	31.5		20.6	36.5	0.0
Control Delay	17.6	19.3	14.6	86.0	13.9		84.1	46.7		72.4	59.4	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	17.6	19.3	14.6	86.0	13.9		84.1	46.7		72.4	59.4	6.5
LOS	B	B	B	F	B		F	D		E	E	A
Approach Delay		16.6			57.0			55.9			55.0	
Approach LOS		B			E			E			E	
Queue Length 50th (ft)	50	165	152	~259	75		~174	311		90	293	0
Queue Length 95th (ft)	93	244	279	#438	129		#348	#441		#238	#422	48
Internal Link Dist (ft)		996			1260			1331			1141	
Turn Bay Length (ft)												
Base Capacity (vph)	489	894	901	361	865		322	1091		234	920	529
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.28	0.45	0.67	1.04	0.29		1.02	0.93		0.95	0.96	0.30

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 45.5

Intersection LOS: D

Intersection Capacity Utilization 91.4%

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.

Timings
4: Black Feather Tr & Front Street

Total Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 4: Black Feather Tr & Front Street

 ø1 13 s	 ø2 35 s	 ø4 52 s
 ø5 18 s	 ø6 30 s	 ø8 52 s

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Timings
5: Black Feather Tr & Woodlands Blvd

Total Traffic Volumes
PM Peak Hour - Year 2035

	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	↰	↱		↰	↱		↰	↱		↰	↱	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1660	0	1770	1788	0	1770	3461	0	1770	3249	0
Flt Permitted	0.591			0.558			0.211			0.648		
Satd. Flow (perm)	1101	1660	0	1039	1788	0	393	3461	0	1207	3249	0
Satd. Flow (RTOR)		157			17			19			266	
Volume (vph)	365	85	225	14	55	20	137	129	22	20	204	245
Lane Group Flow (vph)	397	337	0	15	82	0	149	164	0	22	488	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	31.0	43.0	0.0	13.0	25.0	0.0	20.0	31.0	0.0	13.0	24.0	0.0
Act Effct Green (s)	26.8	25.2		13.1	9.7		24.3	21.2		17.3	12.7	
Actuated g/C Ratio	0.43	0.41		0.19	0.15		0.38	0.34		0.25	0.21	
v/c Ratio	0.57	0.44		0.05	0.30		0.37	0.14		0.06	0.55	
Uniform Delay, d1	12.4	7.9		13.3	21.8		12.3	14.5		12.2	9.9	
Control Delay	15.2	9.5		16.4	27.3		16.4	17.6		16.8	13.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.2	9.5		16.4	27.3		16.4	17.6		16.8	13.9	
LOS	B	A		B	C		B	B		B	B	
Approach Delay		12.6			25.6			17.1			14.0	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)	106	42		3	26		41	20		6	45	
Queue Length 95th (ft)	224	153		15	77		93	57		21	107	
Internal Link Dist (ft)		1260			432			424			2102	
Turn Bay Length (ft)												
Base Capacity (vph)	852	979		329	530		507	1517		419	1233	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.47	0.34		0.05	0.15		0.29	0.11		0.05	0.40	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 61.8

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 14.6

Intersection LOS: B

Intersection Capacity Utilization 58.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Black Feather Tr & Woodlands Blvd

ø1	ø2	ø3	ø4
13 s	31 s	13 s	43 s
ø5	ø6	ø7	ø8
20 s	24 s	31 s	25 s

Timings
6: Founders Pkwy & Allen Way

Total Traffic Volumes
PM Peak Hour - Year 2035

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖	↑↑↑	↗	↖	↑		↖	↑	↗
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1708	0	1770	1545	1504
Flt Permitted	0.082			0.089			0.190			0.573		
Satd. Flow (perm)	296	5085	1583	166	5085	1583	354	1708	0	1067	1545	1504
Satd. Flow (RTOR)			322			166		48			194	244
Volume (vph)	725	2783	498	180	1706	196	414	90	113	162	60	730
Lane Group Flow (vph)	788	3025	541	196	1854	213	450	221	0	176	426	432
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt			pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Total Split (s)	26.0	64.0	64.0	11.0	49.0	49.0	24.0	29.0	0.0	16.0	21.0	21.0
Act Effct Green (s)	71.0	60.0	60.0	52.0	45.0	45.0	41.0	25.4		28.6	17.0	17.0
Actuated g/C Ratio	0.59	0.50	0.50	0.43	0.38	0.38	0.34	0.21		0.24	0.14	0.14
v/c Ratio	1.05	1.19	0.57	1.18	0.97	0.31	1.26	0.55		0.55	1.11	1.02
Uniform Delay, d1	35.3	30.0	7.3	28.4	36.9	5.3	32.7	32.6		29.6	25.5	21.8
Control Delay	81.9	118.8	10.3	146.6	50.2	12.2	168.8	38.9		36.8	104.1	71.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	81.9	118.8	10.3	146.6	50.2	12.2	168.8	38.9		36.8	104.1	71.9
LOS	F	F	B	F	D	B	F	D		D	F	E
Approach Delay		98.6			55.0			126.0			79.2	
Approach LOS		F			D			F			E	
Queue Length 50th (ft)	~291	~1035	105	~132	469	11	~389	121		99	~250	~191
Queue Length 95th (ft)	#417	#1120	209	m#238	m581	m83	#597	204		159	#466	#406
Internal Link Dist (ft)		627			1110			783			596	
Turn Bay Length (ft)												
Base Capacity (vph)	750	2543	953	166	1907	697	357	400		328	385	423
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.05	1.19	0.57	1.18	0.97	0.31	1.26	0.55		0.54	1.11	1.02

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 69 (58%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.26

Intersection Signal Delay: 86.5

Intersection LOS: F

Intersection Capacity Utilization 118.2%

ICU Level of Service H

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.

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

Timings
6: Founders Pkwy & Allen Way

Total Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 6: Founders Pkwy & Allen Way

 ø1	 ø2	 ø3	 ø4
11 s	64 s	24 s	21 s
 ø5	 ø6	 ø7	 ø8
26 s	49 s	16 s	29 s

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Timings
7: Founders Pkwy & Front Street

Total Traffic Volumes
PM Peak Hour - Year 2035

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4917	0	1770	5060	0	3433	1863	1583	1770	3348	0
Flt Permitted	0.097			0.056			0.256			0.398		
Satd. Flow (perm)	181	4917	0	104	5060	0	925	1863	1583	741	3348	0
Satd. Flow (RTOR)		106			7				91		78	
Volume (vph)	5	2507	720	24	1472	49	508	219	253	58	197	112
Lane Group Flow (vph)	5	3508	0	26	1653	0	552	238	275	63	336	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	9.0	75.0	0.0	9.0	75.0	0.0	15.0	26.0	26.0	10.0	21.0	0.0
Act Effct Green (s)	79.3	76.3		80.9	79.9		30.3	22.3	22.3	21.3	15.3	
Actuated g/C Ratio	0.66	0.64		0.67	0.67		0.25	0.19	0.19	0.18	0.13	
v/c Ratio	0.03	1.11		0.17	0.49		1.19	0.69	0.75	0.35	0.68	
Uniform Delay, d1	6.6	22.5		6.5	12.5		39.4	45.6	30.3	34.4	37.3	
Control Delay	1.6	63.7		9.4	11.1		141.9	56.4	43.5	39.9	43.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	1.6	63.7		9.4	11.1		141.9	56.4	43.5	39.9	43.2	
LOS	A	E		A	B		F	E	D	D	D	
Approach Delay		63.6			11.0			97.4			42.7	
Approach LOS		E			B			F			D	
Queue Length 50th (ft)	0	~1223		6	211		~192	174	138	37	100	
Queue Length 95th (ft)	m0	m#934		16	309		#304	265	#261	75	151	
Internal Link Dist (ft)		1110			1511			712			591	
Turn Bay Length (ft)												
Base Capacity (vph)	194	3166		149	3372		464	354	375	182	541	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.03	1.11		0.17	0.49		1.19	0.67	0.73	0.35	0.62	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 87 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 54.5

Intersection LOS: D

Intersection Capacity Utilization 98.0%

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.

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

Timings
7: Founders Pkwy & Front Street

Total Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 7: Founders Pkwy & Front Street

 ø1	 ø2	 ø3	 ø4
9 s	75 s	15 s	21 s
 ø5	 ø6	 ø7	 ø8
9 s	75 s	10 s	26 s

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Timings
8: Founders Pkwy & Woodlands Blvd

Total Traffic Volumes
PM Peak Hour - Year 2035

	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	↰	↰↰↰		↰	↰↰↰		↰	↰	↰	↰	↰↰	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	4973	0	1770	4999	0	1770	1863	1583	1770	3426	0
Flt Permitted	0.211			0.065			0.577			0.717		
Satd. Flow (perm)	393	4973	0	121	4999	0	1075	1863	1583	1336	3426	0
Satd. Flow (RTOR)		38			33				192		16	
Volume (vph)	5	1973	332	302	1020	130	206	57	424	221	55	15
Lane Group Flow (vph)	5	2506	0	328	1250	0	224	62	461	240	76	0
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Total Split (s)	9.0	62.0	0.0	22.0	75.0	0.0	14.0	26.0	26.0	10.0	22.0	0.0
Act Effct Green (s)	63.0	58.0		80.0	78.2		32.0	22.0	22.0	20.4	15.9	
Actuated g/C Ratio	0.53	0.48		0.67	0.65		0.27	0.18	0.18	0.17	0.13	
v/c Ratio	0.02	1.03		1.00	0.38		0.61	0.18	1.03	0.96	0.16	
Uniform Delay, d1	8.8	31.1		35.9	11.9		35.9	40.4	28.2	43.8	37.0	
Control Delay	8.2	58.4		46.6	20.0		45.4	43.1	79.3	94.1	35.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	8.2	58.4		46.6	20.0		45.4	43.1	79.3	94.1	35.8	
LOS	A	E		D	C		D	D	E	F	D	
Approach Delay		58.3			25.5			66.1			80.1	
Approach LOS		E			C			E			F	
Queue Length 50th (ft)	1	~758		208	194		146	41	~253	158	21	
Queue Length 95th (ft)	6	#852		m200	m241		225	82	#462	#293	45	
Internal Link Dist (ft)		871			1491			2102			246	
Turn Bay Length (ft)												
Base Capacity (vph)	264	2423		328	3269		370	342	447	249	528	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.02	1.03		1.00	0.38		0.61	0.18	1.03	0.96	0.14	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 23 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 50.7

Intersection LOS: D

Intersection Capacity Utilization 94.0%

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.

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

Timings
8: Founders Pkwy & Woodlands Blvd

Total Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 8: Founders Pkwy & Woodlands Blvd

 ø1 22 s	 ø2 62 s	 ø3 14 s	 ø4 22 s
 ø5 9 s	 ø6 75 s	 ø7 10 s	 ø8 26 s

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Timings
9: Founders Pkwy & Crowfoot Valley Rd

Total Traffic Volumes
PM Peak Hour - Year 2035

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑	↱	↰	↱
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	5085	3539	1583	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	5085	3539	1583	1770	1583
Satd. Flow (RTOR)				107		3
Volume (vph)	1255	1694	932	121	190	909
Lane Group Flow (vph)	1364	1841	1013	132	207	988
Turn Type	Prot			Perm		pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases				6		4
Total Split (s)	67.0	99.0	32.0	32.0	21.0	67.0
Act Effct Green (s)	63.5	95.5	28.0	28.0	16.5	84.0
Actuated g/C Ratio	0.53	0.80	0.23	0.23	0.14	0.70
v/c Ratio	1.46	0.45	1.23	0.29	0.85	0.89
Uniform Delay, d1	28.3	3.9	46.0	6.8	50.5	14.3
Control Delay	239.4	8.1	150.1	9.6	76.5	26.5
Queue Delay	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	239.4	8.3	150.1	9.6	76.5	26.5
LOS	F	A	F	A	E	C
Approach Delay		106.6	133.9		35.2	
Approach LOS		F	F		D	
Queue Length 50th (ft) ~1491		254	~512	11	158	546
Queue Length 95th (ft)m#1469		m250	#648	37	#286	#950
Internal Link Dist (ft)		1491	2435		1058	
Turn Bay Length (ft)	550					
Base Capacity (vph)	936	4047	826	451	251	1109
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	1130	0	0	0	0
Reduced v/c Ratio	1.46	0.63	1.23	0.29	0.82	0.89

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 76 (63%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.46

Intersection Signal Delay: 96.9

Intersection LOS: F

Intersection Capacity Utilization 115.8%

ICU Level of Service H

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.

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

Timings
9: Founders Pkwy & Crowfoot Valley Rd

Total Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 9: Founders Pkwy & Crowfoot Valley Rd

→ ø2 99 s		↖ ø4 21 s
↙ ø5 67 s	← ø6 32 s	

DRAFT

HCM Unsignalized Intersection Capacity Analysis 10: Crimson Sky Dr & Founders Pkwy

Total Traffic Volumes
PM Peak Hour - Year 2035

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	44	0	30	15	0	160	103	1375	25	285	1805	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	0	33	16	0	174	112	1495	27	310	1962	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3727	4327	981	3352	4328	747	1990			1522		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3727	4327	981	3352	4328	747	1990			1522		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	87	0	100	51	61			29		
cM capacity (veh/h)	0	0	249	1	0	355	285			434		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	48	33	16	174	112	747	747	27	310	981	981	28
Volume Left	48	0	16	0	112	0	0	0	310	0	0	0
Volume Right	0	33	0	174	0	0	0	27	0	0	0	28
cSH	0	249	1	355	285	1700	1700	1700	434	1700	1700	1700
Volume to Capacity	194.40	0.13	19.51	0.49	0.39	0.44	0.44	0.02	0.71	0.58	0.58	0.02
Queue Length (ft)	Err	11	Err	65	45	0	0	0	138	0	0	0
Control Delay (s)	Err	21.7	Err	24.5	25.5	0.0	0.0	0.0	31.4	0.0	0.0	0.0
Lane LOS	F	C	F	C	D				D			
Approach Delay (s)	5954.1		879.4		1.7				4.2			
Approach LOS	F		F									
Intersection Summary												
Average Delay		156.7										
Intersection Capacity Utilization		82.2%			ICU Level of Service					E		
Analysis Period (min)		15										

Timings
11: Collector A & Front Street

Total Traffic Volumes
PM Peak Hour - Year 2035

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↑↓		↖	↑↑
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	1770	1583	3486	0	1770	3539
Flt Permitted	0.950				0.066	
Satd. Flow (perm)	1770	1583	3486	0	123	3539
Satd. Flow (RTOR)		107	19			
Volume (vph)	151	98	1300	141	108	1770
Lane Group Flow (vph)	164	107	1566	0	117	1924
Turn Type	Perm				pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Total Split (s)	23.0	23.0	61.0	0.0	16.0	77.0
Act Effct Green (s)	14.7	14.7	60.3		73.1	73.1
Actuated g/C Ratio	0.15	0.15	0.63		0.76	0.76
v/c Ratio	0.61	0.32	0.71		0.48	0.71
Uniform Delay, d1	37.8	0.0	11.7		2.9	5.9
Control Delay	42.9	9.1	15.0		14.4	8.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	42.9	9.1	15.0		14.4	8.3
LOS	D	A	B		B	A
Approach Delay	29.6		15.0			8.6
Approach LOS	C		B			A
Queue Length 50th (ft)	94	0	299		15	264
Queue Length 95th (ft)	160	44	475		71	406
Internal Link Dist (ft)	618		1474			1331
Turn Bay Length (ft)						
Base Capacity (vph)	336	387	2201		291	2701
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.49	0.28	0.71		0.40	0.71

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 95.8

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 12.7

Intersection LOS: B

Intersection Capacity Utilization 64.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 11: Collector A & Front Street

↖ ø1	↑ ø2	
16 s	61 s	
↙ ø6		↘ ø8
77 s		23 s

Timings
12: Founders Pkwy & Access A

Total Traffic Volumes
PM Peak Hour - Year 2035

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↑
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Satd. Flow (prot)	3539	1583	1863	3539	1770	1863
Flt Permitted					0.950	
Satd. Flow (perm)	3539	1583	1863	3539	1770	1863
Satd. Flow (RTOR)		137				
Volume (vph)	1756	128	0	979	74	0
Lane Group Flow (vph)	1909	139	0	1064	80	0
Turn Type		Perm	pm+pt			Perm
Protected Phases	2		1	6	8	
Permitted Phases		2	6			8
Total Split (s)	84.0	84.0	12.0	96.0	24.0	24.0
Act Effct Green (s)	92.2	92.2		103.5	11.6	
Actuated g/C Ratio	0.77	0.77		0.86	0.10	
v/c Ratio	0.70	0.11		0.35	0.47	
Uniform Delay, d1	7.5	0.1		2.0	52.5	
Control Delay	8.5	1.1		2.6	52.8	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	8.5	1.1		2.6	52.8	
LOS	A	A		A	D	
Approach Delay	8.0			2.6	52.8	
Approach LOS	A			A	D	
Queue Length 50th (ft)	274	5		75	60	
Queue Length 95th (ft)	768	m20		121	108	
Internal Link Dist (ft)	2435			1542	1077	
Turn Bay Length (ft)						
Base Capacity (vph)	2719	1248		3052	295	
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	0.70	0.11		0.35	0.27	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 89 (74%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 7.3

Intersection LOS: A

Intersection Capacity Utilization 59.3%

ICU Level of Service B

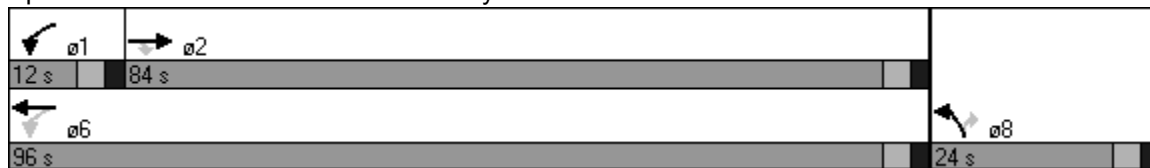
Analysis Period (min) 15

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

Timings
12: Founders Pkwy & Access A

Total Traffic Volumes
PM Peak Hour - Year 2035

Splits and Phases: 12: Founders Pkwy & Access A



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HCM Unsignalized Intersection Capacity Analysis 13: Access B & Founders Pkwy

Total Traffic Volumes
PM Peak Hour - Year 2035

							
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Volume (veh/h)	0	30	0	1579	2086	51	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	33	0	1716	2267	55	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None						
Median storage veh							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	3126	1134	2323				
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	3126	1134	2323				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)							
tF (s)	3.5	3.3	2.2				
p0 queue free %	100	83	100				
cM capacity (veh/h)	9	197	211				
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	33	858	858	1134	1134	55
Volume Left	0	0	0	0	0	0	0
Volume Right	0	33	0	0	0	0	55
cSH	1700	197	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.17	0.50	0.50	0.67	0.67	0.03
Queue Length (ft)	0	15	0	0	0	0	0
Control Delay (s)	0.0	26.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	D					
Approach Delay (s)	26.9		0.0		0.0		
Approach LOS	D						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			67.7%		ICU Level of Service		C
Analysis Period (min)			15				