

**TRAFFIC IMPACT STUDY
FOR
EAST COBB RETIREMENT
COMMUNITY
COBB, GEORGIA**

Prepared for:

Isakson Living
12 Kings Circle
Atlanta, GA 30305

Prepared by:



A&R Engineering Inc.

2160 Kingston Court, Suite O
Marietta, GA 30067
Tel: (770) 690-9255 Fax: (770) 690-9210
www.areng.com

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A&R Project No: 13-036

EXECUTIVE SUMMARY

The purpose of this study is to determine the traffic impact that will result from the development's access point on SR 120 (Roswell Road) across from Providence Road. The developed site will contain a Continuing Care Retirement Community that includes independent living as well as healthcare and assisted living units. The traffic analysis evaluated the existing conditions at the Providence Road intersection with SR 120 (Roswell Road) and future buildout (2017) conditions with the traffic generated by the development and geometric modifications to the intersection.

From the existing conditions analysis, it was found that the study intersection is currently operating at a level-of-service of C or better during peak hours, which is better than minimum industry standards. The future conditions analysis indicates that the study intersection will continue to operate at a level-of-service of C or better after including site generated traffic. Recommendations have been made in this report regarding changes to the signal phasing at the intersection and necessary geometric modifications to accommodate the site driveway's approach. A recommendation is also included to lengthen the storage for the eastbound left turn lane on Roswell Road based on current and future traffic demands.

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1. PROJECT DESCRIPTION

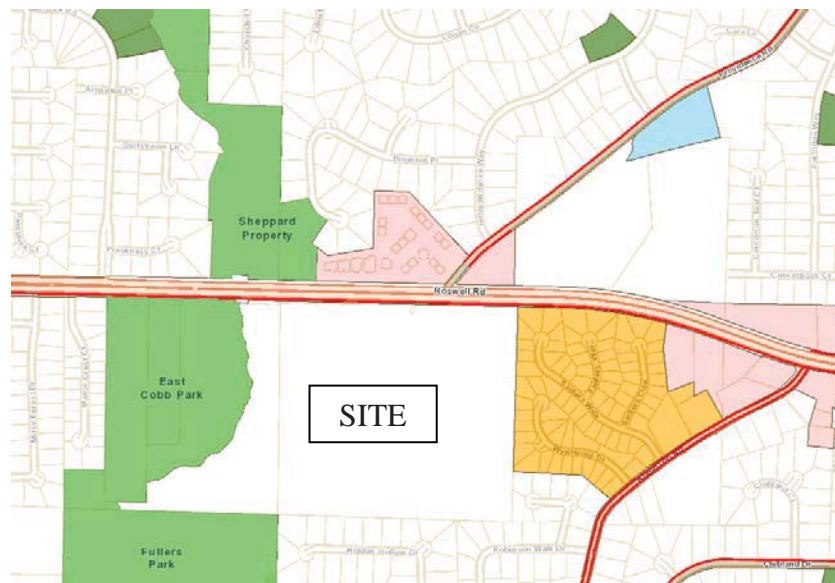
The purpose of this study is to determine the traffic impact that will result from the development's access point on SR 120 (Roswell Road) across from Providence Road. Measures to avoid or mitigate possible impacts have been identified where appropriate. The proposed development will be a new Continuing Care Retirement Community located in unincorporated Cobb County. The largest portion of the development, closest to SR 120 (Roswell Road), is designed as independent senior living that will include centralized amenities like dining, housekeeping, and recreational activities. A separate health care building at the back of the property will provide 150 healthcare units that focus on assisted living and nursing care. A location map for the site is shown in Figure 1.

1.1 Site Plan

A site plan for this project is shown in Figure 2. A larger size drawing and a digital copy of the site plan are also provided with this report.

1.2 Consistency with Adopted Comprehensive County Plan

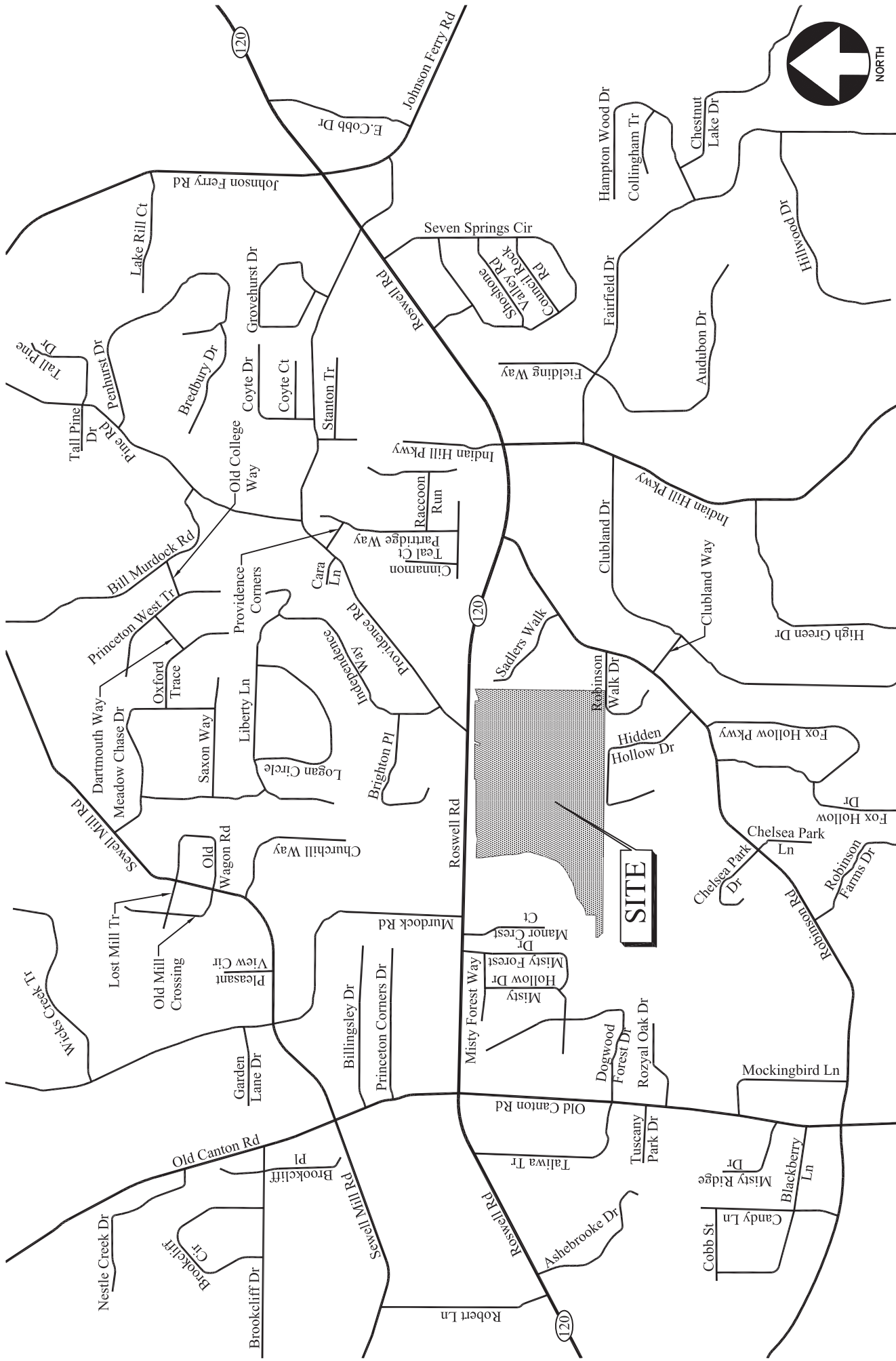
The property is currently characterized as a "Suburban Residential" in the Cobb County 2030 Comprehensive Plan. The future land use map indicates the property as low density residential, with medium density residential for the adjacent property to the east and neighborhood activity center for the adjacent property to the north. The adjacent property to the west is East Cobb Park and Fullers Park.



Cobb County Future Land Use Map

1.3 Project Phasing

The project's impact has been evaluated in one phase, estimated for completion in the year 2017. This study will evaluate the traffic operations in the vicinity of the site for the existing (2013) conditions and future (2017) conditions including the added traffic from the development.



LOCATION MAP

FIGURE 1

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BUILDING USE SUMMARY	
BUILDINGS A - K	INDEPENDENT LIVING
BUILDING L	100 HEALTH CARE BEDS
BUILDING M	MAINTENANCE BUILDING

SITE DATA	
TOTAL SITE AREA	53.7 ACRES
TOTAL UNDISTURBED AREA	21.5 ACRES
TOTAL OPEN SPACE	32.2 ACRES (19.9%)
INDEPENDENT LIVING UNITS	827 UNITS
CLUBHOUSE / COMMON SPACES	~115,000 SF
HEALTH CARE UNITS	100 BEDS



Scale: 1" = 100'

Isakson Living

East Cobb Site - Option C

2. TRIP GENERATION

Trip generation estimates were calculated according to the rates and equations published in the 9th edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual. The Continuing Care Retirement Community land use (ITE Land Use 255) was considered; however, this was ruled out because of the manual's cautions regarding the varying proportions within the limited data used. The trip generation for the development was instead based on the following ITE Land Uses: 253 – Congregate Care Facility, 620 – Nursing Home, and 254 – Assisted Living.

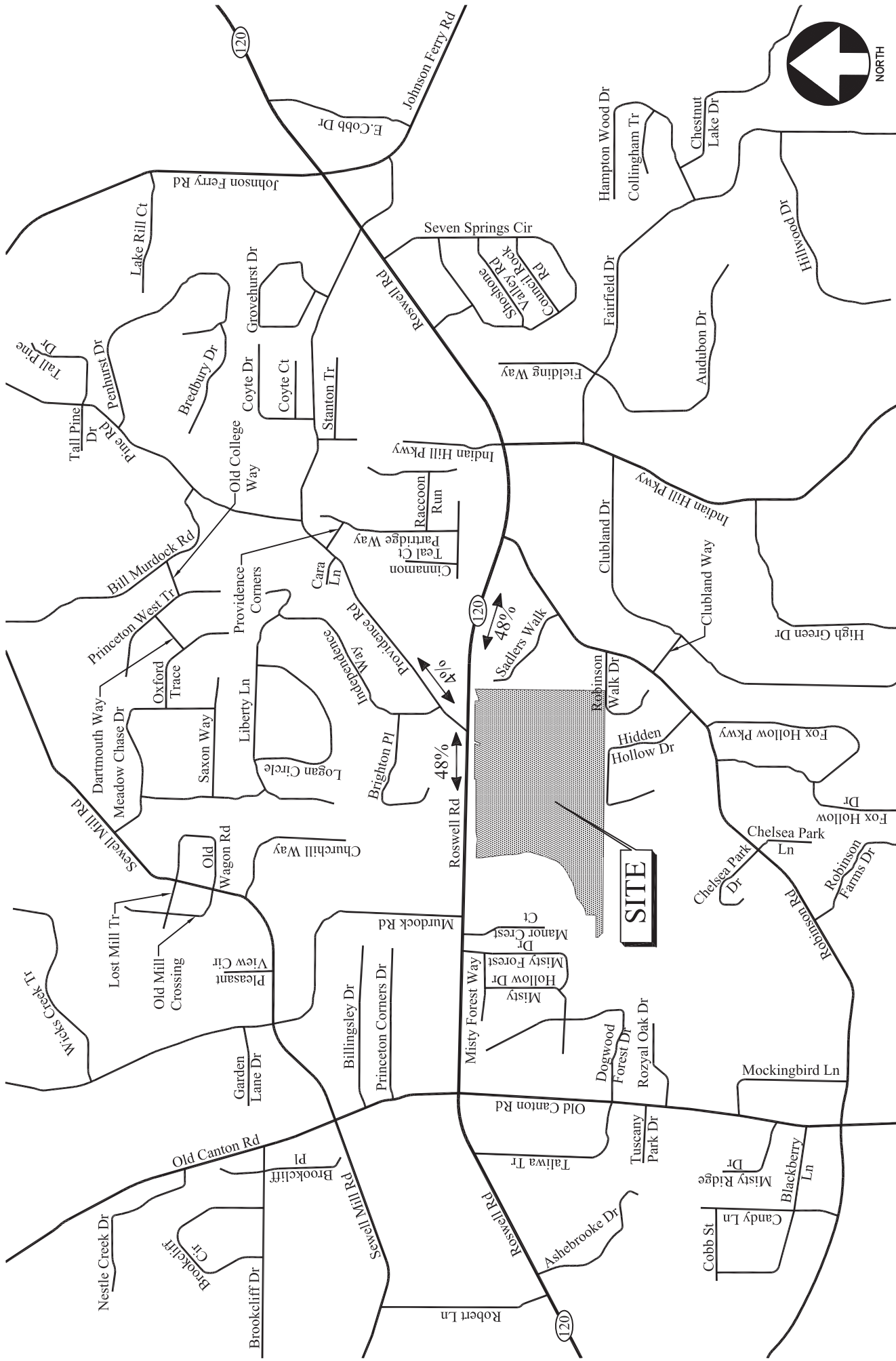
In regards to the Congregate Care Facility land use, The ITE Trip Generation Manual (9th Edition) states that “vehicle ownership levels were very low at congregate care facilities; the facilities’ employees or services provided to the residents generated the majority of the trips to the sites.” For the Assisted Living land use, ITE adds that “one study reported that according to national and local data, less than 5 percent of the residents owned cars, which were rarely driven.”

Trip generation calculations for the development are shown in Table 1.

TABLE 1 TRIP GENERATION								
Land Use	Size	A.M. Peak Hour			P.M. Peak Hour			24-Hour
		Enter	Exit	Total	Enter	Exit	Total	
Congregate Care Facility	837	30	20	50	78	64	142	1,691
Assisted living	75	7	4	11	7	10	17	200
Nursing Home	75	7	6	13	6	11	17	173
Total		44	30	74	91	85	173	2,064

3. TRIP DISTRIBUTION & ASSIGNMENT

The trip distribution is the percentage of the traffic generated by the site that travels to and from the site on each segment of the surrounding roadway network. The trip distribution, shown in Figure 3, was estimated based on GDOT and Cobb ADT volumes and the location of major roadways and highways that will serve the development. The site-generated volumes were then distributed to the surrounding roadway network based on the driver's destination and the most easily accessible route.



TRIP DISTRIBUTION

FIGURE 3

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4. STUDY NETWORK DETERMINATION

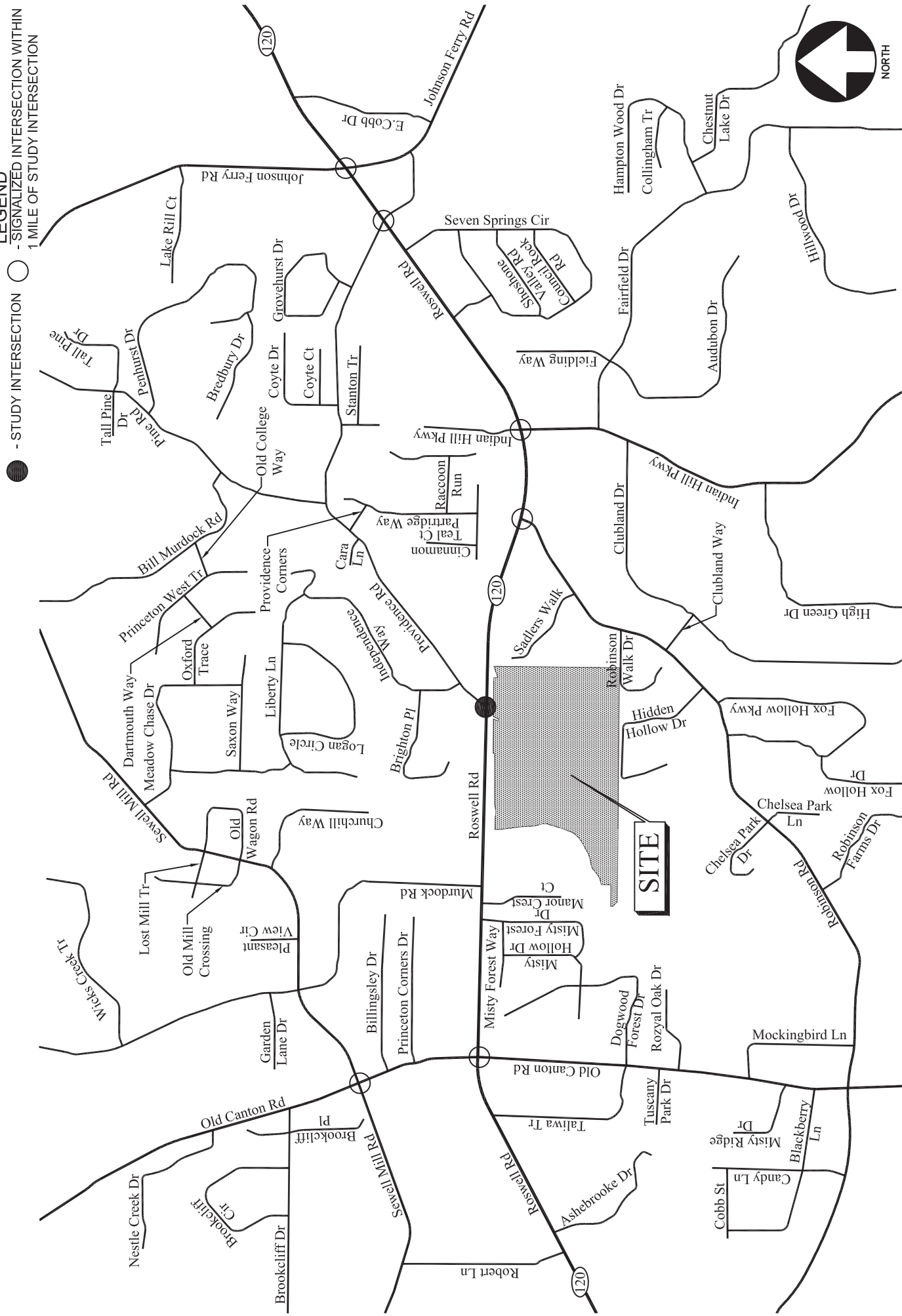
The study network was determined by evaluating the amount of traffic that the proposed development will add to each roadway segment in the area. According to GRTA requirements, a roadway segment carries a “significant” amount of traffic if the project contributes 7% or more trips to the two-way daily service volumes of the roadway at the appropriate level of service standard. Upon agreement with GRTA a level of service standard of “D” was used for determining the study area network.

The traffic generated by the proposed project was then assigned to the area roadways using the trip distribution to determine the site-generated traffic on each roadway segment. The boundaries of the study network extend to the most distant intersections where at least 7% of the service volumes on the segment are attributed to project traffic. The following study intersection fell within the 7% rule and/or have been selected as being suitable for evaluation in discussions with GRTA, GDOT and Cobb County:

- SR 120 (Roswell Road) @ Providence Road

The study intersection is shown graphically in Figure 4. Other intersections within this corridor, such as unsignalized side streets, right-in / right-out driveways or private driveways were viewed as not being significantly impacted and have not been included in the study network.

LEGEND
 - STUDY INTERSECTION
 - SIGNALIZED INTERSECTION WITHIN 1 MILE OF STUDY INTERSECTION



ADJACENT SIGNALIZED INTERSECTIONS

FIGURE 4

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5. PLANNED & PROGRAMMED IMPROVEMENTS

The following improvements have been identified in the Regional Transportation Plan (Plan 2040). These improvements are within the vicinity of the proposed development.

TABLE 2			
ARC Number	Route	Type of Improvement	Status
CO-426	SR 120 (Roswell Road) Widening	General Purpose Roadway Capacity	Long Range



Extents of SR 120 Widening Project CO-426

6. EXISTING CONDITIONS

The Existing Conditions analyses include an inventory of the transportation facilities at the study location and an evaluation of the current traffic operations in terms of delays and queuing. Other relevant observations are included from site visits and reported information from the local jurisdiction and GDOT.

6.1 Description of Transportation Facilities in Study Network

An inventory was performed of the roadways in the area surrounding the site. The following is a brief description of each of these facilities.

SR 120 (Roswell Road)

SR 120 is an east-west, divided four lane roadway with a posted speed limit of 45 mph in the vicinity of the site.

Providence Road

Providence Road is a north-south, two-lane, undivided roadway with a posted with a speed limit of 35 mph in the vicinity of the site.

6.2 Existing Analysis Summary

Existing traffic counts were performed at the intersections listed in Section 4 - Study Area Network. In addition to traffic counts, intersection geometry data was also obtained. Turning movement counts were collected during standard morning and evening hours of 7:00 AM – 9:00 AM and 4:00 PM – 6:00 PM on a weekday. The four consecutive 15-minute interval volumes that summed to produce the highest volume at each intersection during each two-hour period were then determined. These volumes make up the AM and PM peak hour traffic volumes for the intersections counted.

The counts for the intersection of SR 120 at Providence Road were collected on May 21, 2013. The existing traffic volumes are shown in Figure 5 and the existing intersections traffic control and lane geometry for the study area network is shown in Figure 6. Existing traffic operations at all study intersections were analyzed in accordance with HCM methodology using Synchro software. The results of the analysis are shown in Table 3.

TABLE 3						
EXISTING INTERSECTION OPERATIONS						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c* ratio	LOS (Delay)	v/c* ratio
SR 120 (Roswell Rd) / Providence Rd.	D / D	Signalized	B (12.6)	0.56	C (20.6)	0.80

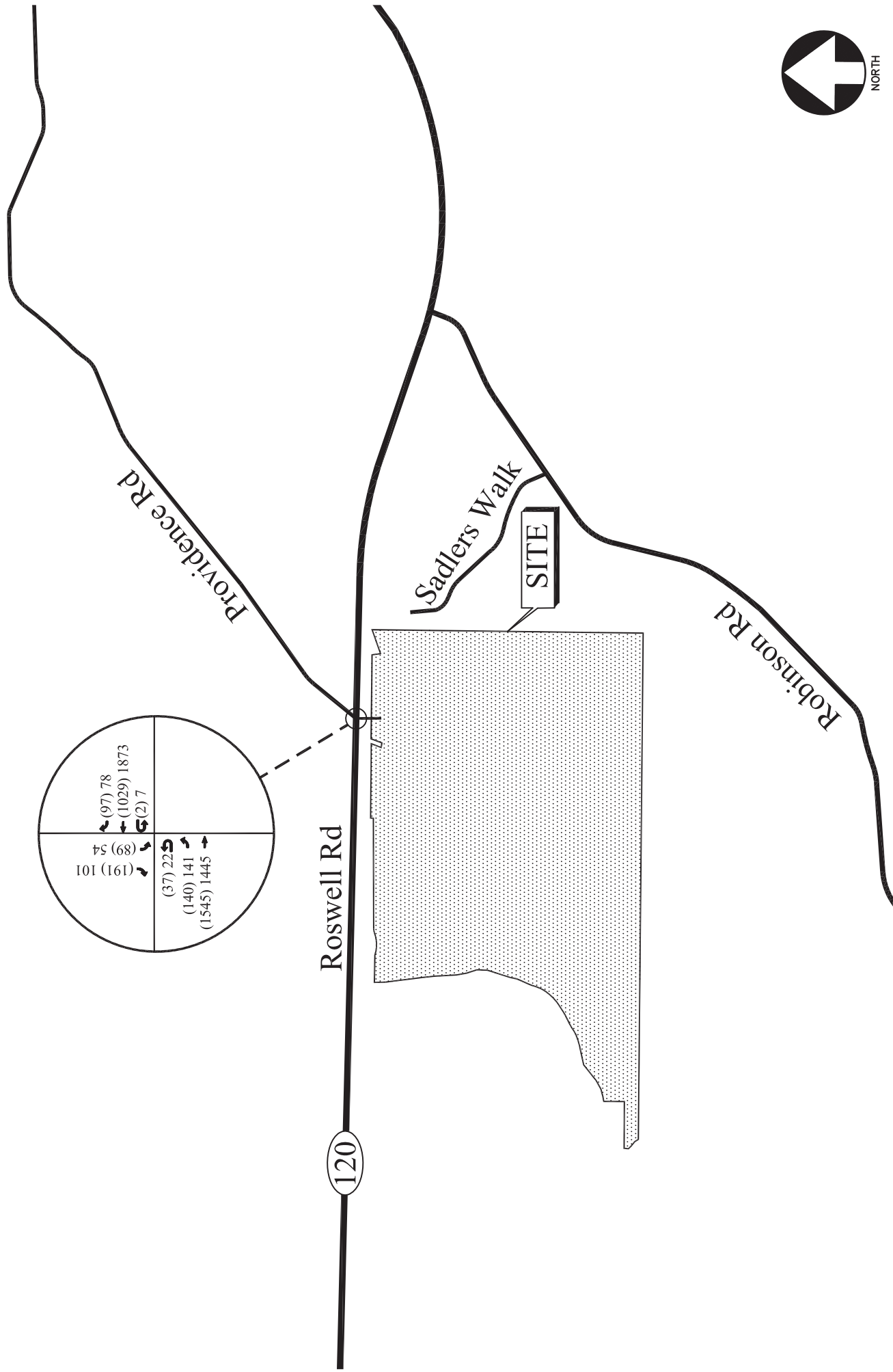
The result of the existing intersection analysis indicates that the study intersection is currently operating at a LOS D standard. Queue lengths have been analyzed for the current traffic conditions at the study intersection. The 95th percentile queue lengths are shown in Table 4.

TABLE 4 EXISTING 95 TH PERCENTILE QUEUE LENGTHS (IN FEET) WITHOUT SIGNAL			
Intersection	Available Storage (feet)	A.M. Peak Hour	P.M. Peak Hour
SR 120 (Roswell Rd) @ Providence Rd / Site Drwy			
-Eastbound Left	100	57	205
-Eastbound Through	-	328	300
-Westbound Left	100	5	9
-Westbound Through	-	358	1123
-Southbound Left	-	145	112
-Southbound Through	-	78	43

The results in Table 4 show that there is currently insufficient storage for the eastbound left turn lane on SR 120 (Roswell Road) during the evening peak hour. If feasible, it is recommended that this left turn lane be extended to accommodate the vehicle queues (200+ feet) at the intersection as a system improvement.

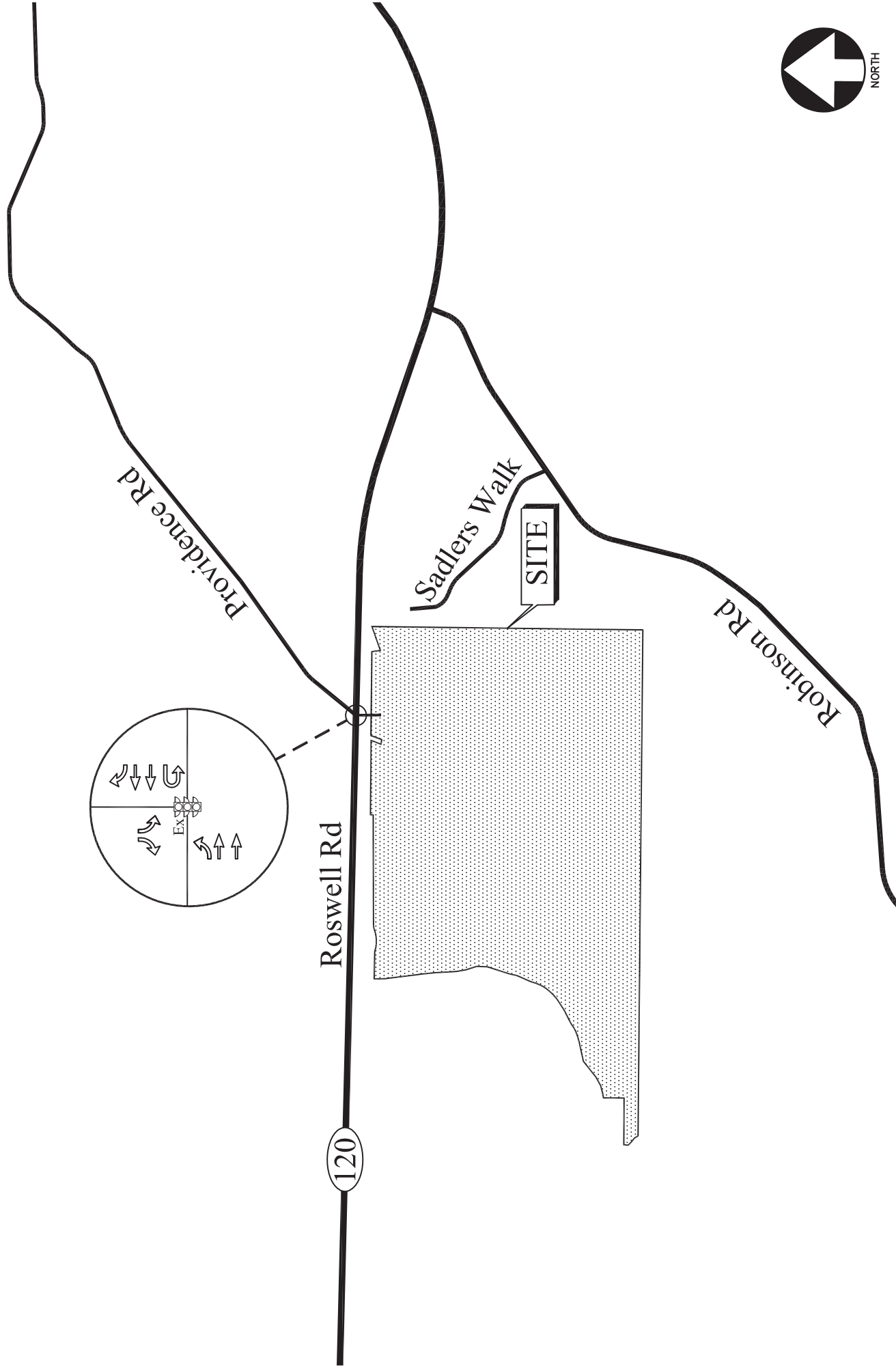
6.3 Accident History

Accident report history was obtained at the intersection of SR 120 (Roswell Rd) / Providence Rd West. During the most recent three years (2010, 2011, and 2012) there have been 27 accidents at the intersection, ranging from 6-11 accidents each year. Of the 27 accidents reported, 10 were rear-end collisions, 2 were sideswipe collisions, and 8 were not collisions with another vehicle (e.g. deer, sign, tree). The remaining 7 accidents in the past three years involved head-on or angled collisions. Five of the angle and head-on collisions involved eastbound left turning vehicles colliding with westbound through vehicles at the intersection. A common theme in these reports includes left turns failing to yield to through traffic. The remaining two angle collisions were between eastbound U-turning vehicles and southbound right turning vehicles. There is an sign on Providence Road directing right turners to yield to U-turning vehicles on Roswell Road. Accident data and collision diagrams are also included in the Appendix.



EXISTING 2013 WEEKDAY PEAK-HOUR VOLUMES

FIGURE 5



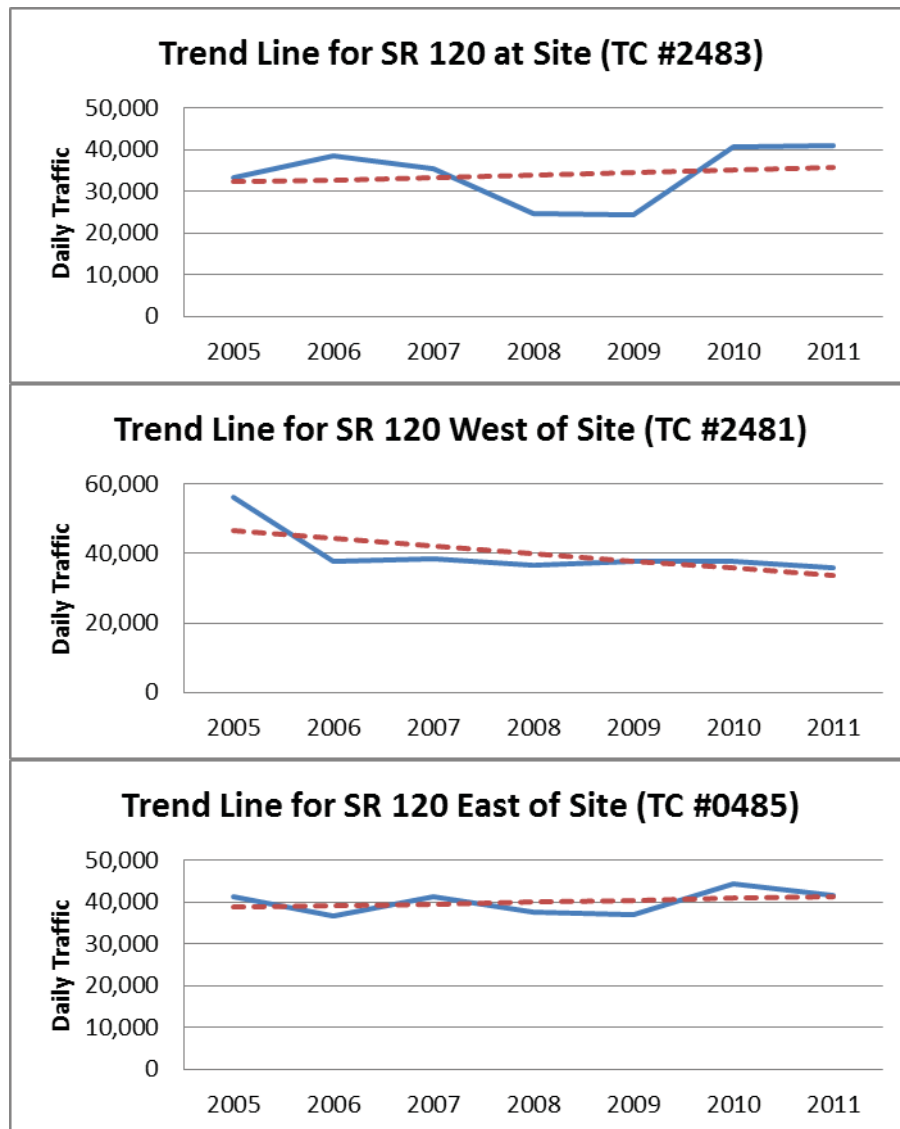
EXISTING 2013 TRAFFIC CONTROL AND LANE GEOMETRY

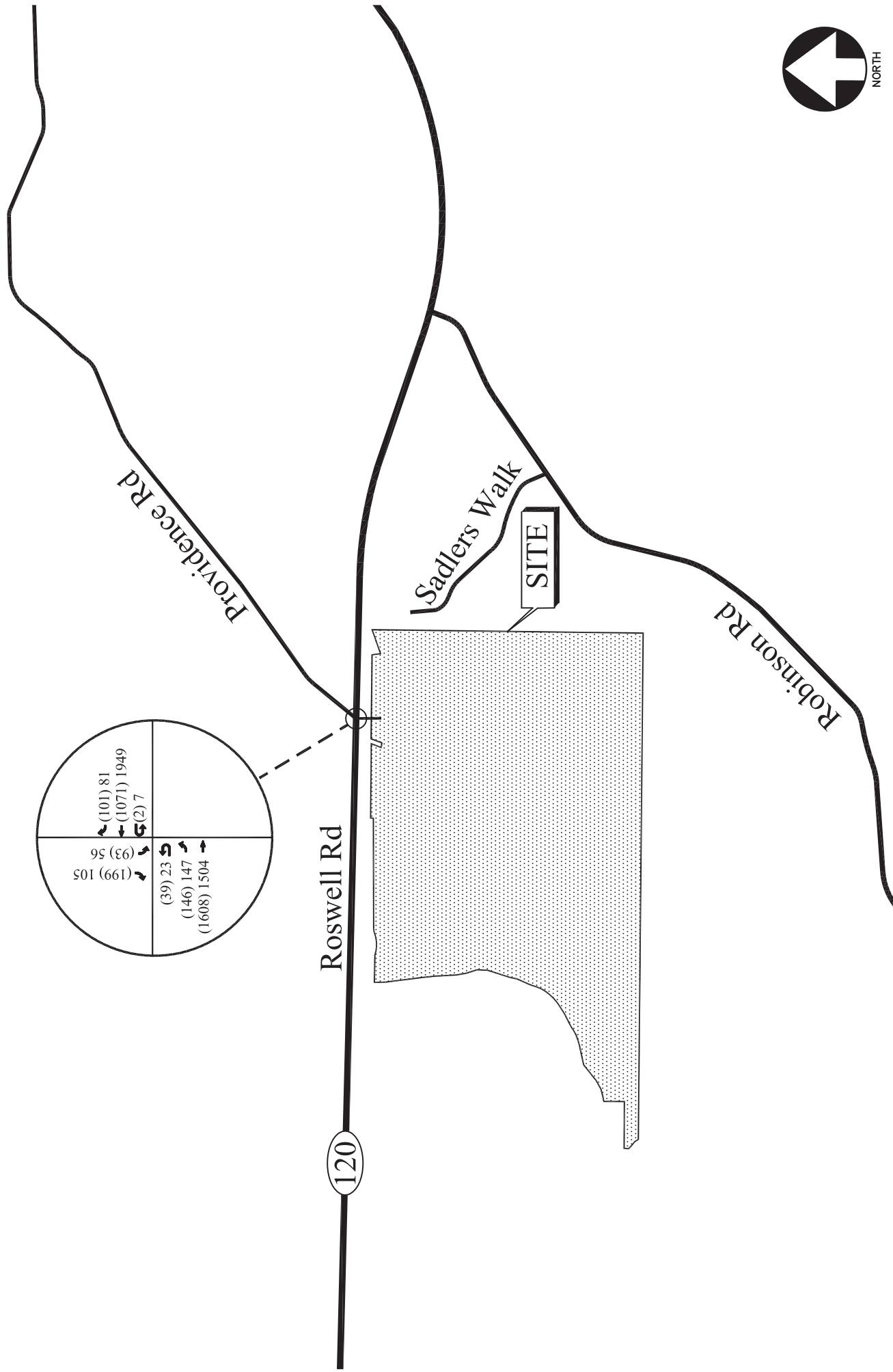
FIGURE 6

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7. FUTURE YEAR BACKGROUND TRAFFIC

In order to evaluate future traffic operations in this area, a projection was made for base year traffic volumes. It was agreed upon with GRTA to use a growth factor of 1% per year up to 2017. This growth factor accounts for the expected increases in non-site related traffic volumes on SR 120 (Roswell Road) and Providence Road. The growth rate was applied to the existing traffic volumes on the roadways to estimate the future year 2017 traffic volumes prior to the addition of the site-generated volumes. Future year (base) traffic volumes for 2017 for the study intersection are shown in Figure 7.

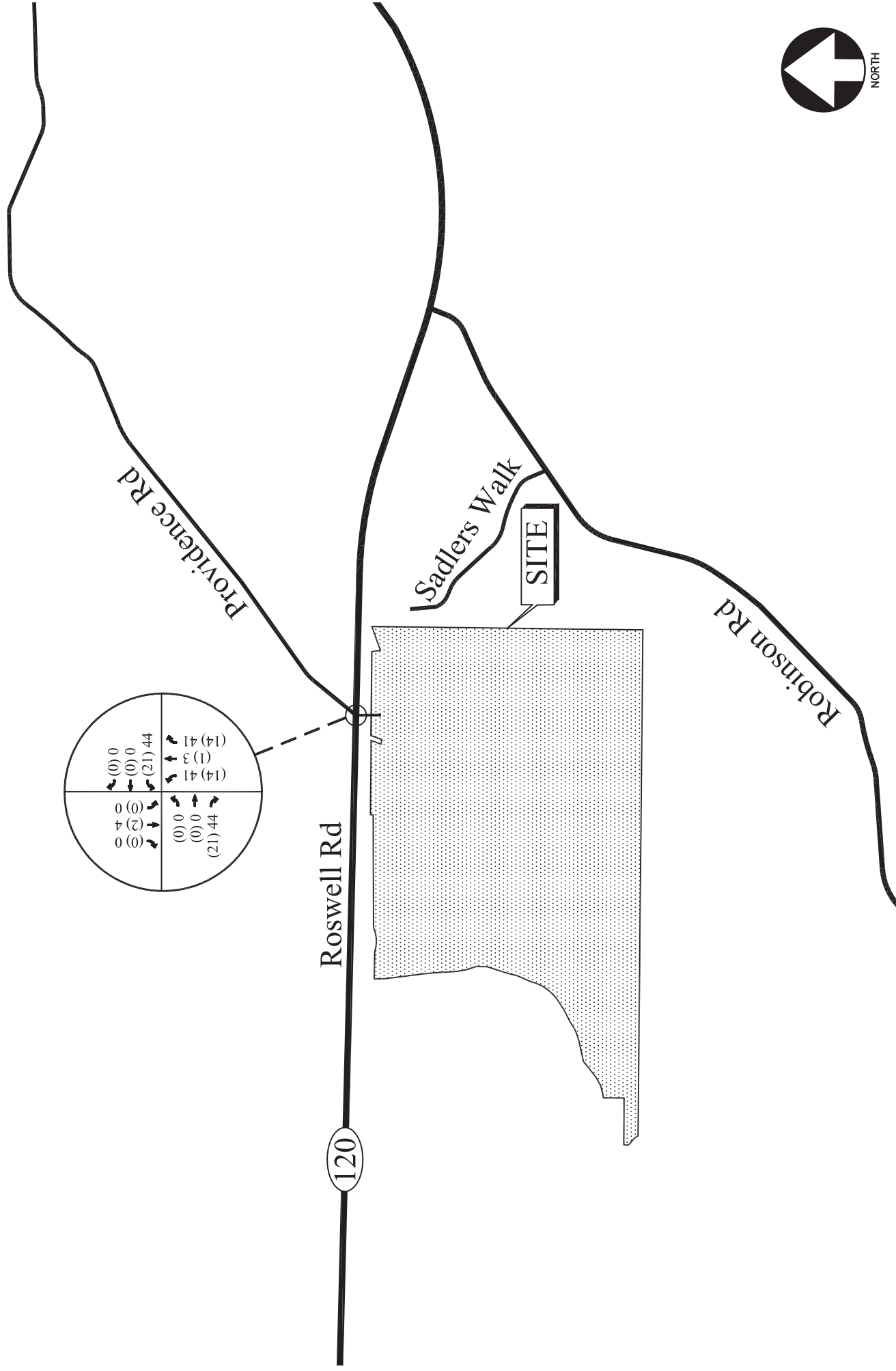


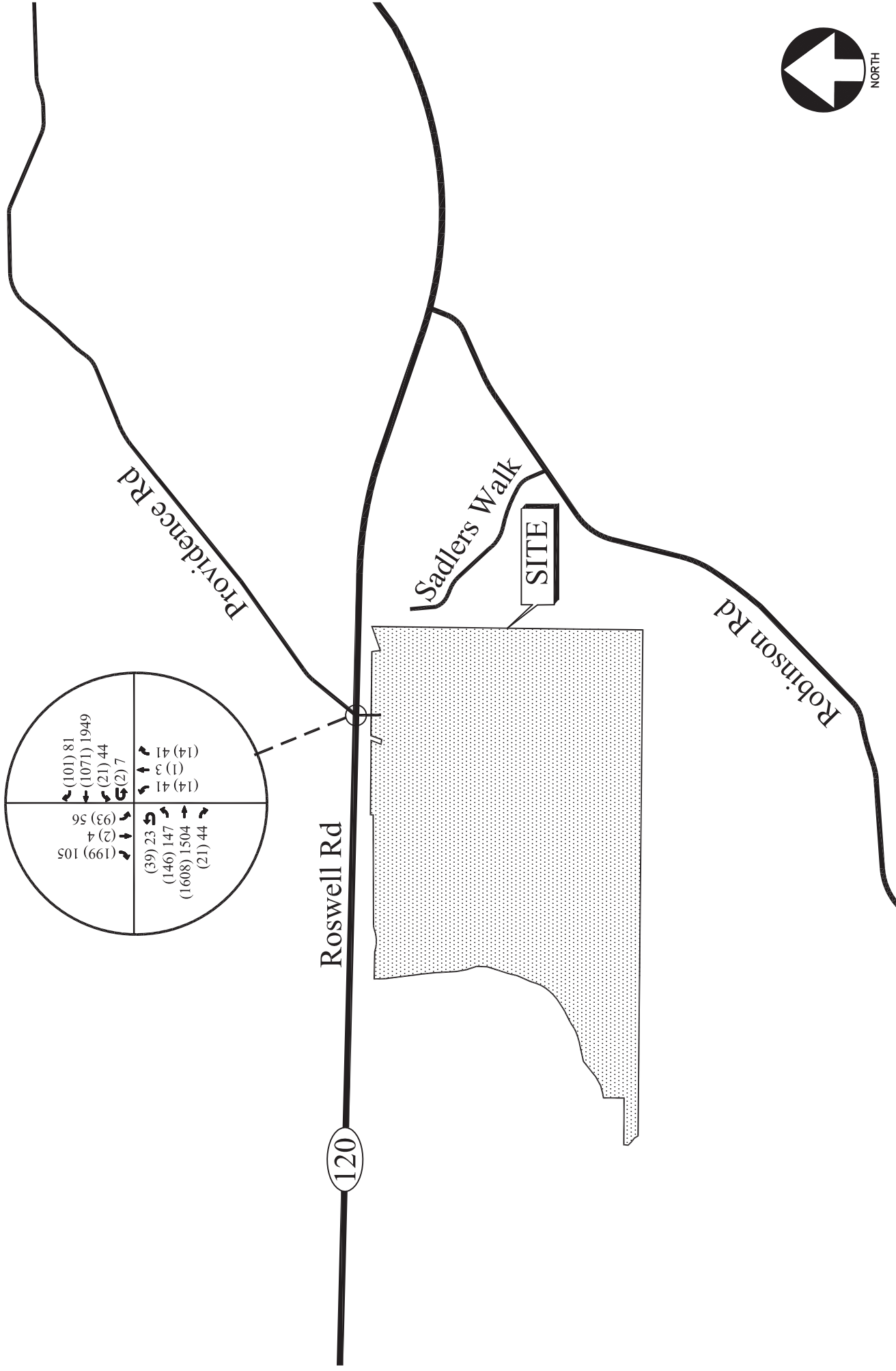


BASE 2017 WEEKDAY PEAK HOUR VOLUMES

8. FUTURE YEAR TOTAL TRAFFIC

The traffic volumes that will be generated by the proposed development (Figure 8) were added to the future base traffic volumes in order to determine the traffic volumes that will be on the roadway network after completion of the project. The future traffic volumes for 2017, including the site-generated volumes for the study intersections, are shown in Figure 9.





FUTURE 2017 WEEKDAY PEAK HOUR VOLUMES

FIGURE 9

9. FACILITY NEEDS ANALYSIS

9.1 Site Access

The future site proposes a single full access driveway that will act as the only access to the development. The proposed driveway will add a northbound to the signalized intersection of Providence Road at SR 120 (Roswell Road). It is recommended that the driveway approach be given a dedicated left turn lane and a shared through / right lane for traffic exiting the development. If feasible, Providence Road should be restriped to include a short through lane to accommodate one or two cars worth of stacking for vehicles that would enter the site from this approach. Because of the acute angle of the intersection, it is important that care be given to align through movements along the side street approaches to the intersection (Providence Road and the site driveway).

It is also recommended that the side street approaches (Providence Road and the site driveway) have permissive signal phasing with similar split times as the current signal timing plan, in which 37 seconds of time is allocated to the side streets during each cycle. The projected traffic volumes turning left from SR 120 (Roswell Road) into the site do not warrant the inclusion of a westbound left turn lane; therefore, permissive phasing is recommended for this approach as well.

GDOT standards require the installation of a left and right turn lane on SR 120 (Roswell Road) for traffic entering the development as there are greater than 75 right-turns per day and greater than 250 left turns per day. The current westbound left lane at the intersection will be utilized for traffic entering the site driveway. There is an existing bus lane that can be utilized in construction of a right turn on SR 120 (Roswell Road) for traffic entering the site; however, it will likely need to be lengthened.

9.2 Intersection Analysis

The future year total traffic volumes were used to analyze the study network intersections. This analysis assumes the required left and right turn lanes are constructed with the site driveway, along with the recommended signal phasing discussed in Section 9.1. The results of the analysis are shown in Table 5.

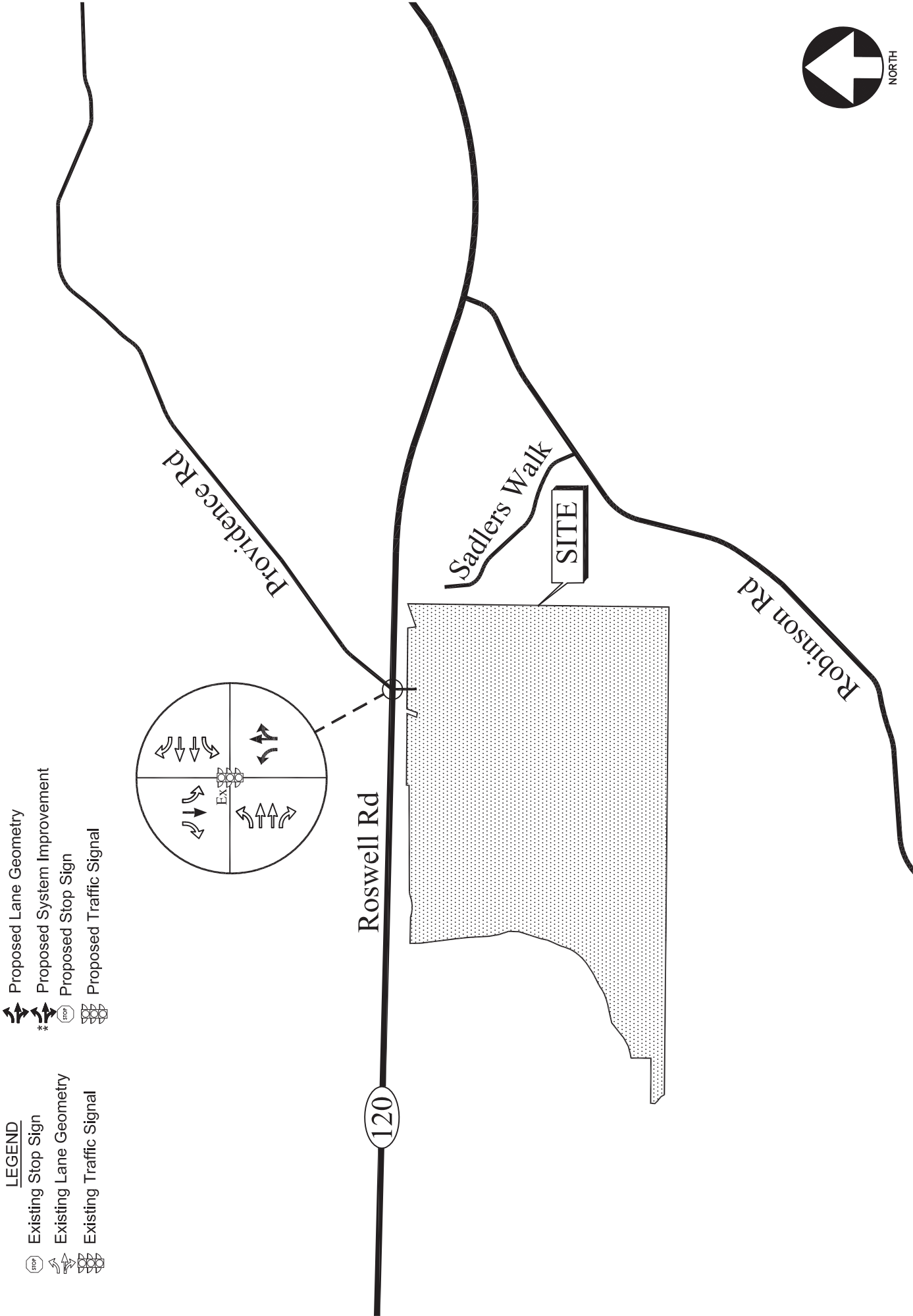
TABLE 5						
FUTURE INTERSECTION OPERATIONS						
Intersection	AM/PM LOS Standard	Traffic Control	A.M. Peak Hour		P.M. Peak Hour	
			LOS (Delay)	v/c ratio	LOS (Delay)	v/c ratio
SR 120 (Roswell Rd) @ Providence Rd / Site Drwy	D / D	Signalized	B (14.3)	0.61	C (25.4)	0.85

The result of the future intersection analysis indicates that the study intersection will continue to operate at the same level-of-service as in the existing conditions, with minor increases in overall delay at the intersection. The recommended traffic control and lane geometry for the site driveways are shown in Figure 10.

The calculated future 95th percentile queue lengths for the study intersection are shown in Table 6.

TABLE 6 FUTURE 95 TH PERCENTILE QUEUE LENGTHS (IN FEET) SIGNAL			
Intersection	Available Storage (feet)	A.M. Peak Hour	P.M. Peak Hour
SR 120 (Roswell Rd) @ Providence Rd / Site Drwy			
-Eastbound Left	100	69	230
-Eastbound Through	-	420	394
-Westbound Left	100	31	89
-Westbound Through	-	413	1283
-Northbound Left	100	36	91
-Northbound Through	-	24	46
-Southbound Left	-	151	116
-Southbound Through	-	10	17

A recommendation from the existing conditions queue analysis (Section 6.2) was to extend the storage for this lane to 200 feet to accommodate current stacking demands for this movement. With the proposed changes to signal timing and configuration of the intersection to accommodate the site driveway approach, the eastbound left turn lane is anticipated to need additional storage to accommodate 230 feet of storage.



10. EXPEDITED REVIEW CRITERIA

According to the Criteria for Expedited Review as outlined in Section 3-102 of the *Procedures and Principles for GRTA DRI Review* (Effective Date: February 13, 2013):

“A proposed DRI shall be eligible for Expedited Review if the Proposed DRI complies with the requirements of any one of the subsections B, C, D, E, or F, of this Section 3-102, and is consistent with all of the general criteria applicable to the proposed DRIs listed in Section 3-101.”

Section 3-102, Subsection B.2 further states:

“More than one thousand (1,000) but no more than three thousand (3,000) gross daily trips will be generated by the DRI, based on a trip generation memorandum and requires the submittal of an Access Analysis.”

As indicated in the trip generation analysis in this report (Section 2, Table 1), the development will generate 2,064 projected daily trips. Therefore, the expedited DRI criterion is met and is supported with the Access Analysis in this Traffic Impact Study.

The following information is in reference to Section 3-101, General Criteria Applicable to All Proposed DRIs:

A. Accessibility

The proposed DRI is designed to provide both vehicular and pedestrian access to the site. Sidewalks are in-place along SR 120 (Roswell Road) and will be continued into the site. Furthermore, sidewalks are planned between onsite buildings, amenities, and trail areas.

B. Connectivity

The proposed DRI will provide access to SR 120 (Roswell Road) at an existing traffic signal. The proposed intersection modifications will provide safe ingress and egress to the public roadway and without significant impacts anticipated to the current operations in the area.

C. Access Management

The operational characteristics of the proposed site access have been evaluated in the previous sections in this Traffic Impact Study and are further outlined in the following section.

D. Regional Policies and Adopted Plans

The proposed development does not conflict with planned or programmed improvements in the Regional Transportation Plan (RTP) or Transportation Improvement Program (TIP) as indicated in Section 5 of this report.

E. Local Standards Supporting Regional Policies

The proposed DRI does not conflict with locally adopted codes that support regionally adopted policies and does not conflict with the locally adopted comprehensive plan as discussed in Section 1.2 of this report.

11. SIGNIFICANT IMPACT ANALYSIS

From the existing conditions analysis, it was found that the study intersection is currently operating at a level-of-service of D or better, which is in accordance with industry standards. The future conditions analysis indicates that the study intersection will continue to operate at a level-of-service of D or better after adding including site generated traffic.

No improvements are need to the road network to mitigate site traffic except for those required to accommodate the site driveway's approach to the signalized intersection of SR 120 (Roswell Road) at Providence Road. These improvements have been summarized below. Further details can be found in Section 9.1 – Site Access.

- The site driveway's approach to the signal should be given a dedicated left turn lane and a shared through / right lane for traffic exiting the development.
- If feasible, Providence Road should be restriped to include a short through lane to accommodate one or two cars worth of stacking for vehicles that would enter the site from this approach.
- The existing traffic signal equipment at the intersection should be upgraded to accommodate the fourth approach and all pedestrian movements.
- The eastbound left turn lane should be extended to accommodate 200 feet of storage.
- An eastbound right turn lane should be provided for traffic entering the site from SR 120 (Roswell Road).

Appendix

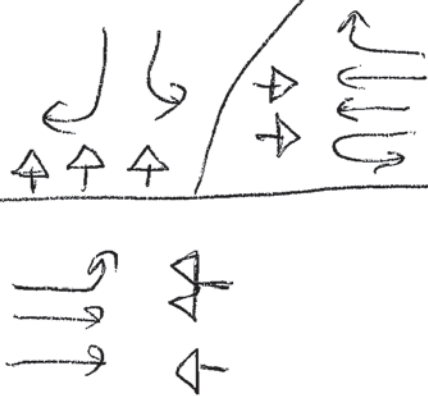
Traffic Counts

33860001

Providence Rd
(35 mph)

Roswell Rd

(SR 120) (45 mph)



Reliable Traffic Data Services, LLC

Tel: (770) 578-8158 | Fax: (770) 578-8159
info@reliabletraffic.org | www.reliabletraffic.org

TMC Data
Roswell Rd (SR120) @ Providence Rd
7-9am | 4-6pm

File Name : 33860001
Site Code : 33860001
Start Date : 5/21/2013
Page No : 1

Groups Printed- Cars, Trucks & Buses

	Northbound					Providence Rd Southbound					Roswell Rd (SR120) Eastbound					Roswell Rd (SR120) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	5	0	46	0	51	19	328	0	0	347	0	210	9	0	219	617
07:15 AM	0	0	0	0	0	26	0	56	0	82	13	400	0	0	413	0	221	10	0	231	726
07:30 AM	0	0	0	0	0	23	0	49	0	72	23	404	0	0	427	0	255	18	0	273	772
07:45 AM	0	0	0	0	0	22	0	49	0	71	41	386	0	0	427	0	260	38	0	298	796
Total	0	0	0	0	0	76	0	200	0	276	96	1518	0	0	1614	0	946	75	0	1021	2911
08:00 AM	0	0	0	0	0	21	0	50	0	71	43	368	0	0	411	0	240	23	0	263	745
08:15 AM	0	0	0	0	0	23	0	43	0	66	33	387	0	0	420	0	274	18	0	292	778
08:30 AM	0	0	0	0	0	10	0	31	0	41	30	386	0	0	416	0	278	15	0	293	750
08:45 AM	0	0	0	0	0	9	0	39	0	48	34	394	0	0	428	0	233	19	0	252	728
Total	0	0	0	0	0	63	0	163	0	226	140	1535	0	0	1675	0	1025	75	0	1100	3001
*** BREAK ***																					
04:00 PM	0	0	0	0	0	11	0	19	0	30	24	271	0	0	295	0	417	15	0	432	757
04:15 PM	0	0	0	0	0	17	0	27	0	44	40	357	0	0	397	0	449	18	0	467	908
04:30 PM	0	0	0	0	0	9	0	32	0	41	26	370	0	0	396	0	447	27	0	474	911
04:45 PM	0	0	0	0	0	17	0	24	0	41	36	322	0	0	358	0	478	14	0	492	891
Total	0	0	0	0	0	54	0	102	0	156	126	1320	0	0	1446	0	1791	74	0	1865	3467
05:00 PM	0	0	0	0	0	15	0	28	0	43	47	336	0	0	383	0	449	16	0	465	891
05:15 PM	0	0	0	0	0	13	0	17	0	30	32	417	0	0	449	0	499	21	0	520	999
05:30 PM	0	0	0	0	0	25	0	32	0	57	41	310	0	0	351	0	445	19	0	464	872
05:45 PM	0	0	0	0	0	22	0	18	0	40	45	323	0	0	368	0	448	24	0	472	880
Total	0	0	0	0	0	75	0	95	0	170	165	1386	0	0	1551	0	1841	80	0	1921	3642
Grand Total	0	0	0	0	0	268	0	560	0	828	527	5759	0	0	6286	0	5603	304	0	5907	13021
Apprch %	0	0	0	0		32.4	0	67.6	0		8.4	91.6	0	0		0	94.9	5.1	0		
Total %	0	0	0	0	0	2.1	0	4.3	0	6.4	4	44.2	0	0	48.3	0	43	2.3	0	45.4	

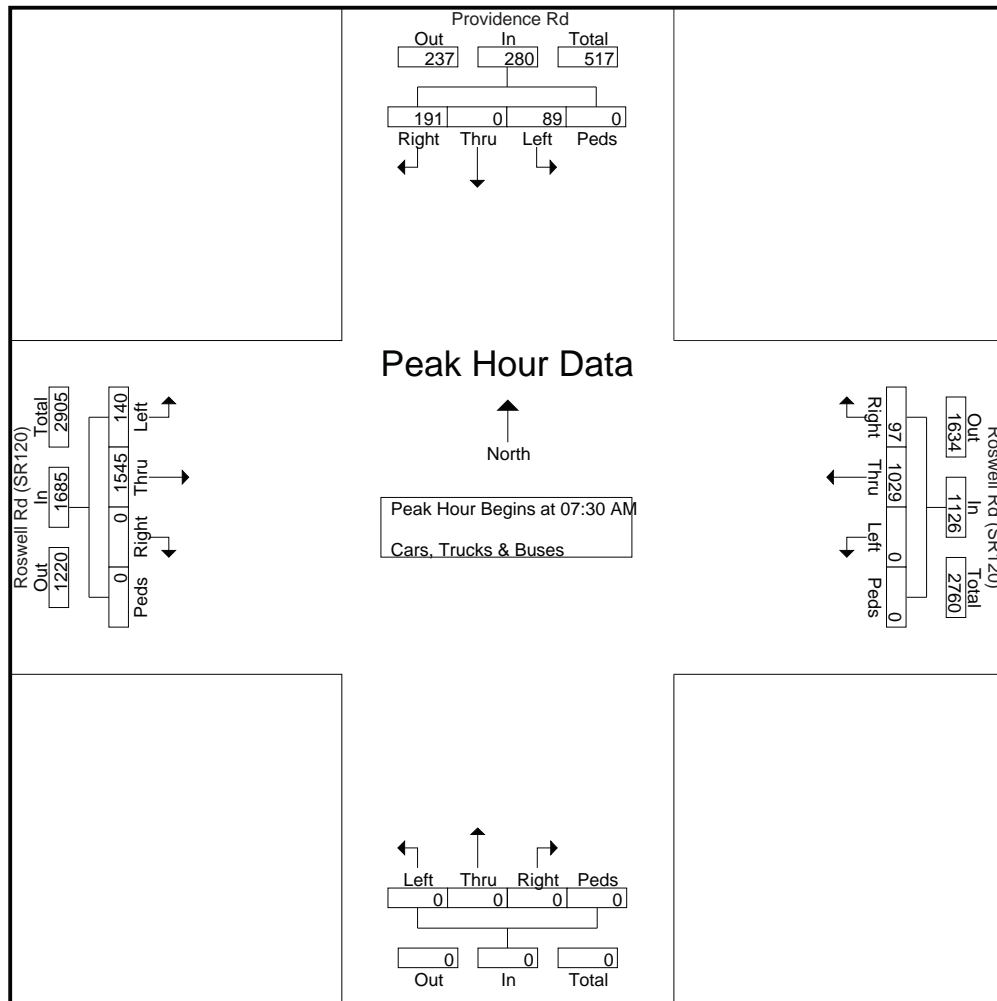
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TMC Data
Roswell Rd (SR120) @ Providence Rd
7-9am | 4-6pm

File Name : 33860001
Site Code : 33860001
Start Date : 5/21/2013
Page No : 2

	Northbound					Providence Rd Southbound					Roswell Rd (SR120) Eastbound					Roswell Rd (SR120) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	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 07:30 AM																					
07:30 AM	0	0	0	0	0	23	0	49	0	72	23	404	0	0	427	0	255	18	0	273	772
07:45 AM	0	0	0	0	0	22	0	49	0	71	41	386	0	0	427	0	260	38	0	298	796
08:00 AM	0	0	0	0	0	21	0	50	0	71	43	368	0	0	411	0	240	23	0	263	745
08:15 AM	0	0	0	0	0	23	0	43	0	66	33	387	0	0	420	0	274	18	0	292	778
Total Volume	0	0	0	0	0	89	0	191	0	280	140	1545	0	0	1685	0	1029	97	0	1126	3091
% App. Total	0	0	0	0	0	31.8	0	68.2	0	0	8.3	91.7	0	0	0	0	91.4	8.6	0	0	0
PHF	.000	.000	.000	.000	.000	.967	.000	.955	.000	.972	.814	.956	.000	.000	.987	.000	.939	.638	.000	.945	.971



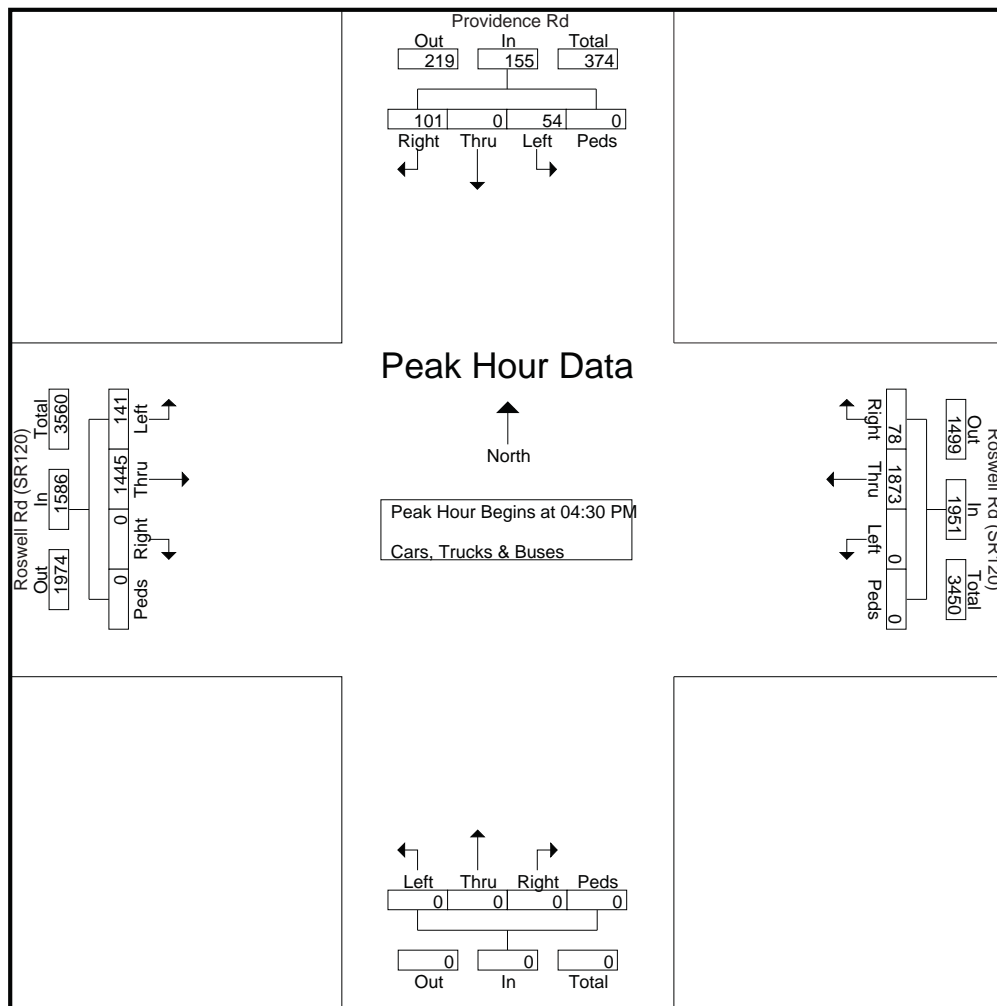
Reliable Traffic Data Services, LLC

Tel: (770) 578-8158 | Fax: (770) 578-8159
info@reliabletraffic.org | www.reliabletraffic.org

TMC Data
Roswell Rd (SR120) @ Providence Rd
7-9am | 4-6pm

File Name : 33860001
Site Code : 33860001
Start Date : 5/21/2013
Page No : 3

	Northbound					Providence Rd Southbound					Roswell Rd (SR120) Eastbound					Roswell Rd (SR120) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	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	0	0	0	0	0	9	0	32	0	41	26	370	0	0	396	0	447	27	0	474	911
04:45 PM	0	0	0	0	0	17	0	24	0	41	36	322	0	0	358	0	478	14	0	492	891
05:00 PM	0	0	0	0	0	15	0	28	0	43	47	336	0	0	383	0	449	16	0	465	891
05:15 PM	0	0	0	0	0	13	0	17	0	30	32	417	0	0	449	0	499	21	0	520	999
Total Volume	0	0	0	0	0	54	0	101	0	155	141	1445	0	0	1586	0	1873	78	0	1951	3692
% App. Total	0	0	0	0	0	34.8	0	65.2	0	0	8.9	91.1	0	0	0	0	96	4	0	0	0
PHF	.000	.000	.000	.000	.000	.794	.000	.789	.000	.901	.750	.866	.000	.000	.883	.000	.938	.722	.000	.938	.924



Reliable Traffic Data Services, LLC

Tel: (770) 578-8158 | Fax: (770) 578-8159
info@reliabletraffic.org | www.reliabletraffic.org

File Name : 33860001-Peds

Site Code : 33860001

Start Date : 5/21/2013

Page No : 1

Groups Printed- Cars, Trucks & Buses

	Northbound					Providence Rd Southbound					Roswell Rd (SR120) Eastbound					Roswell Rd (SR120) Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	U-Turns	App. Total	Left	Thru	Right	U-Turns	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	3
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	5
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0	0	0	1	1	7
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	0	0	0	0	0	8
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	22	22	0	0	0	1	1	23
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	10
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	0	0	0	1	1	14
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	0	0	0	1	1	10
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	0	0	0	3	3	11
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	0	0	0	5	5	45
*** BREAK ***																					
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	2	2	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0	0	0	4	4	10
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	7	7	0	0	0	1	1	8
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	4	4	9
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	0	0	0	11	11	32
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0	0	0	0	0	6
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	2	2	6
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	2	2	5
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	2	2	6
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	17	17	0	0	0	6	6	23
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	0	0	0	23	23	123
Apprch %	0	0	0	0		0	0	0	0		0	0	0	100		0	0	0	100		
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	81.3	81.3	0	0	0	18.7	18.7	

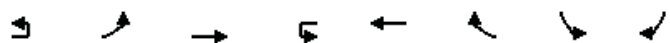
Existing Conditions Analysis

Queues

Existing AM

1: SR 120 (Roswell Rd) & Providence Road

6/5/2013



Lane Group	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩↩	↩	↩↩	↩	↩	↩
Volume (vph)	37	140	1545	2	1029	97	89	191
Lane Group Flow (vph)	0	219	1609	3	1095	152	92	201
Turn Type	pm+pt	pm+pt		Perm		Perm		Perm
Protected Phases	1	1	6		2		8	
Permitted Phases	6	6		2		2		8
Detector Phase	1	1	6	2	2	2	8	8
Switch Phase		6						
Minimum Initial (s)	5.0	5.0	15.0	15.0	15.0	15.0	6.0	6.0
Minimum Split (s)	10.5	10.5	21.5	21.5	21.5	21.5	30.5	30.5
Total Split (s)	32.0	32.0	113.0	81.0	81.0	81.0	37.0	37.0
Total Split (%)	21.3%	21.3%	75.3%	54.0%	54.0%	54.0%	24.7%	24.7%
Yellow Time (s)	3.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	1.5	1.5	1.5	1.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.5	6.5	6.5	6.5	7.5	7.5
Lead/Lag	Lead	Lead		Lag	Lag	Lag		
Lead-Lag Optimize?								
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min	None	None
v/c Ratio		0.49	0.56	0.01	0.45	0.13	0.59	0.62
Control Delay		6.7	5.7	10.5	12.0	3.5	80.2	16.4
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		6.7	5.7	10.5	12.0	3.5	80.2	16.4
Queue Length 50th (ft)		35	228	1	238	12	88	0
Queue Length 95th (ft)		57	328	5	358	19	145	78
Internal Link Dist (ft)			1287		1595		807	
Turn Bay Length (ft)		100		100		195		95
Base Capacity (vph)		568	2897	200	2449	1130	348	473
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		0.39	0.56	0.01	0.45	0.13	0.26	0.42

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 28 (19%), Referenced to phase 2:WBTU and 6:EBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Splits and Phases: 1: SR 120 (Roswell Rd) & Providence Road


















HCM Signalized Intersection Capacity Analysis

1: SR 120 (Roswell Rd) & Providence Road

Existing AM

6/5/2013

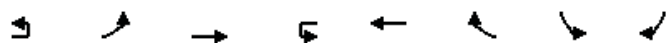
								
Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Volume (vph)	37	140	1545	2	1029	97	89	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.5	6.5	6.5	6.5	7.5	7.5
Lane Util. Factor		1.00	0.95	1.00	0.95	1.00	1.00	1.00
Frt		1.00	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1770	3539	1770	3539	1583	1770	1583
Flt Permitted		0.21	1.00	0.16	1.00	1.00	0.95	1.00
Satd. Flow (perm)		393	3539	289	3539	1583	1770	1583
Peak-hour factor, PHF	0.81	0.81	0.96	0.75	0.94	0.64	0.97	0.95
Adj. Flow (vph)	46	173	1609	3	1095	152	92	201
RTOR Reduction (vph)	0	0	0	0	0	34	0	183
Lane Group Flow (vph)	0	219	1609	3	1095	118	92	18
Turn Type	pm+pt	pm+pt		Perm		Perm		Perm
Protected Phases	1	1	6		2		8	
Permitted Phases	6	6		2		2		8
Actuated Green, G (s)		122.8	122.8	103.8	103.8	103.8	13.2	13.2
Effective Green, g (s)		122.8	122.8	103.8	103.8	103.8	13.2	13.2
Actuated g/C Ratio		0.82	0.82	0.69	0.69	0.69	0.09	0.09
Clearance Time (s)		5.5	6.5	6.5	6.5	6.5	7.5	7.5
Vehicle Extension (s)		3.0	5.0	5.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)		446	2897	200	2449	1095	156	139
v/s Ratio Prot		0.04	c0.45		0.31		c0.05	
v/s Ratio Perm		0.36		0.01		0.07		0.01
v/c Ratio		0.49	0.56	0.01	0.45	0.11	0.59	0.13
Uniform Delay, d1		5.4	4.5	7.2	10.3	7.7	65.8	63.1
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.9	0.8	0.1	0.6	0.2	5.6	0.4
Delay (s)		6.3	5.3	7.3	10.9	7.9	71.4	63.5
Level of Service		A	A	A	B	A	E	E
Approach Delay (s)			5.4		10.5		66.0	
Approach LOS			A		B		E	
Intersection Summary								
HCM Average Control Delay			12.6		HCM Level of Service		B	
HCM Volume to Capacity ratio			0.56					
Actuated Cycle Length (s)			150.0		Sum of lost time (s)		14.0	
Intersection Capacity Utilization			77.3%		ICU Level of Service		D	
Analysis Period (min)			15					
c Critical Lane Group								

Queues

Existing PM

1: SR 120 (Roswell Rd) & Providence Road

6/5/2013



Lane Group	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰↰	↰	↰↰	↰	↰	↰
Volume (vph)	22	141	1445	7	1873	78	54	101
Lane Group Flow (vph)	0	217	1661	16	1993	108	68	128
Turn Type	pm+pt	pm+pt		Perm		Perm		Perm
Protected Phases	1	1	6		2		8	
Permitted Phases	6	6		2		2		8
Detector Phase	1	1	6	2	2	2	8	8
Switch Phase		6						
Minimum Initial (s)	5.0	5.0	15.0	15.0	15.0	15.0	6.0	6.0
Minimum Split (s)	10.5	10.5	21.5	21.5	21.5	21.5	30.5	30.5
Total Split (s)	23.0	23.0	133.0	110.0	110.0	110.0	37.0	37.0
Total Split (%)	13.5%	13.5%	78.2%	64.7%	64.7%	64.7%	21.8%	21.8%
Yellow Time (s)	3.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	1.5	1.5	1.5	1.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.5	6.5	6.5	6.5	7.5	7.5
Lead/Lag	Lead	Lead		Lag	Lag	Lag		
Lead-Lag Optimize?								
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min	None	None
v/c Ratio		0.73	0.55	0.09	0.84	0.10	0.54	0.56
Control Delay		61.4	4.8	13.4	26.1	6.5	91.6	20.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		61.4	4.8	13.4	26.1	6.5	91.6	20.0
Queue Length 50th (ft)		172	229	6	832	21	75	0
Queue Length 95th (ft)		205	300	9	1123	38	112	43
Internal Link Dist (ft)			1287		1595		807	
Turn Bay Length (ft)		100		100		195		95
Base Capacity (vph)		300	2998	185	2386	1083	307	380
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		0.72	0.55	0.09	0.84	0.10	0.22	0.34

Intersection Summary

Cycle Length: 170

Actuated Cycle Length: 170

Offset: 28 (16%), Referenced to phase 2:WBTU and 6:EBTL, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Splits and Phases: 1: SR 120 (Roswell Rd) & Providence Road



HCM Signalized Intersection Capacity Analysis

1: SR 120 (Roswell Rd) & Providence Road

Existing PM

6/5/2013



Movement	EBU	EBL	EBT	WBU	WBT	WBR	SBL	SBR
Lane Configurations								
Volume (vph)	22	141	1445	7	1873	78	54	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.5	6.5	6.5	6.5	7.5	7.5
Lane Util. Factor		1.00	0.95	1.00	0.95	1.00	1.00	1.00
Frt		1.00	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected		0.95	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)		1770	3539	1770	3539	1583	1770	1583
Flt Permitted		0.04	1.00	0.15	1.00	1.00	0.95	1.00
Satd. Flow (perm)		71	3539	274	3539	1583	1770	1583
Peak-hour factor, PHF	0.75	0.75	0.87	0.44	0.94	0.72	0.79	0.79
Adj. Flow (vph)	29	188	1661	16	1993	108	68	128
RTOR Reduction (vph)	0	0	0	0	0	16	0	119
Lane Group Flow (vph)	0	217	1661	16	1993	92	68	9
Turn Type	pm+pt	pm+pt		Perm		Perm		Perm
Protected Phases	1	1	6		2		8	
Permitted Phases	6	6		2		2		8
Actuated Green, G (s)		144.0	144.0	114.6	114.6	114.6	12.0	12.0
Effective Green, g (s)		144.0	144.0	114.6	114.6	114.6	12.0	12.0
Actuated g/C Ratio		0.85	0.85	0.67	0.67	0.67	0.07	0.07
Clearance Time (s)		5.5	6.5	6.5	6.5	6.5	7.5	7.5
Vehicle Extension (s)		3.0	5.0	5.0	5.0	5.0	3.0	3.0
Lane Grp Cap (vph)		299	2998	185	2386	1067	125	112
v/s Ratio Prot		c0.10	0.47		c0.56		c0.04	
v/s Ratio Perm		0.51		0.06		0.06		0.01
v/c Ratio		0.73	0.55	0.09	0.84	0.09	0.54	0.08
Uniform Delay, d1		56.4	3.7	9.6	20.7	9.6	76.4	73.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		8.5	0.7	0.9	3.6	0.2	4.8	0.3
Delay (s)		64.9	4.5	10.5	24.3	9.7	81.1	74.2
Level of Service		E	A	B	C	A	F	E
Approach Delay (s)			11.5		23.5		76.6	
Approach LOS			B		C		E	
Intersection Summary								
HCM Average Control Delay			20.6		HCM Level of Service		C	
HCM Volume to Capacity ratio			0.80					
Actuated Cycle Length (s)			170.0		Sum of lost time (s)		19.5	
Intersection Capacity Utilization			83.3%		ICU Level of Service		E	
Analysis Period (min)			15					
c Critical Lane Group								























Future Conditions Analysis

Queues

Future AM

1: SR 120 (Roswell Rd) & Providence Road

6/6/2013

												
Lane Group	EBU	EBL	EBT	WBU	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	146	1608	2	21	1071	101	14	1	93	2	199
Lane Group Flow (vph)	0	228	1698	0	26	1139	158	15	16	96	2	209
Turn Type	pm+pt	pm+pt		Perm	Perm		Perm	Perm		Perm		Perm
Protected Phases	1	1	6			2			4		8	
Permitted Phases	6	6		2	2		2	4		8		8
Detector Phase	1	1	6	2	2	2	2	4	4	8	8	8
Switch Phase	6	6										
Minimum Initial (s)	5.0	5.0	15.0	15.0	15.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.5	10.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	30.5	30.5	30.5
Total Split (s)	32.0	32.0	113.0	81.0	81.0	81.0	81.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	21.3%	21.3%	75.3%	54.0%	54.0%	54.0%	54.0%	24.7%	24.7%	24.7%	24.7%	24.7%
Yellow Time (s)	3.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.5	6.5	6.5	6.5	6.5	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lag					
Lead-Lag Optimize?												
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio		0.54	0.60		0.15	0.48	0.14	0.10	0.09	0.66	0.01	0.59
Control Delay		8.4	7.2		14.6	13.9	4.1	59.3	24.9	84.2	56.5	14.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		8.4	7.2		14.6	13.9	4.1	59.3	24.9	84.2	56.5	14.2
Queue Length 50th (ft)		41	284		9	276	15	14	1	92	2	0
Queue Length 95th (ft)		69	420		31	413	23	36	24	151	10	76
Internal Link Dist (ft)			1287			1595			396		807	
Turn Bay Length (ft)		100			100		195	100				95
Base Capacity (vph)		541	2831		171	2373	1098	277	327	274	366	479
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		0.42	0.60		0.15	0.48	0.14	0.05	0.05	0.35	0.01	0.44

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Splits and Phases: 1: SR 120 (Roswell Rd) & Providence Road





















	ø1		ø2		ø4
32 s		81 s		37 s	
	ø6				ø8
113 s				37 s	

HCM Signalized Intersection Capacity Analysis

1: SR 120 (Roswell Rd) & Providence Road

Future AM

6/6/2013

												
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	39	146	1608	21	2	21	1071	101	14	1	14	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.5			6.5	6.5	6.5	7.5	7.5		7.5
Lane Util. Factor		1.00	0.95			1.00	0.95	1.00	1.00	1.00		1.00
Frt		1.00	1.00			1.00	1.00	0.85	1.00	0.86		1.00
Flt Protected		0.95	1.00			0.95	1.00	1.00	0.95	1.00		0.95
Satd. Flow (prot)		1770	3532			1770	3539	1583	1770	1601		1770
Flt Permitted		0.19	1.00			0.14	1.00	1.00	0.76	1.00		0.75
Satd. Flow (perm)		361	3532			255	3539	1583	1409	1601		1392
Peak-hour factor, PHF	0.81	0.81	0.96	0.92	0.75	0.92	0.94	0.64	0.92	0.92	0.92	0.97
Adj. Flow (vph)	48	180	1675	23	3	23	1139	158	15	1	15	96
RTOR Reduction (vph)	0	0	0	0	0	0	0	37	0	13	0	0
Lane Group Flow (vph)	0	228	1698	0	0	26	1139	121	15	3	0	96
Turn Type	pm+pt	pm+pt			Perm	Perm		Perm	Perm			Perm
Protected Phases	1	1	6				2			4		
Permitted Phases	6	6			2	2		2	4			8
Actuated Green, G (s)		120.2	120.2			100.6	100.6	100.6	15.8	15.8		15.8
Effective Green, g (s)		120.2	120.2			100.6	100.6	100.6	15.8	15.8		15.8
Actuated g/C Ratio		0.80	0.80			0.67	0.67	0.67	0.11	0.11		0.11
Clearance Time (s)		5.5	6.5			6.5	6.5	6.5	7.5	7.5		7.5
Vehicle Extension (s)		3.0	5.0			5.0	5.0	5.0	5.0	5.0		3.0
Lane Grp Cap (vph)		422	2830			171	2373	1062	148	169		147
v/s Ratio Prot		0.05	c0.48				0.32			0.00		
v/s Ratio Perm		0.38				0.10		0.08	0.01			c0.07
v/c Ratio		0.54	0.60			0.15	0.48	0.11	0.10	0.02		0.65
Uniform Delay, d1		7.1	5.7			9.1	12.0	8.8	60.7	60.1		64.5
Progression Factor		1.00	1.00			1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		1.4	0.9			1.9	0.7	0.2	0.6	0.1		10.0
Delay (s)		8.5	6.6			10.9	12.7	9.0	61.3	60.2		74.4
Level of Service		A	A			B	B	A	E	E		E
Approach Delay (s)			6.9				12.2			60.7		
Approach LOS			A				B			E		
Intersection Summary												
HCM Average Control Delay			14.3				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			86.5%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: SR 120 (Roswell Rd) & Providence Road

Future AM

6/6/2013























	↓	↘
Movement	SBT	SBR
Lane Configurations	↑	↑
Volume (vph)	2	199
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	7.5	7.5
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	1863	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1863	1583
Peak-hour factor, PHF	0.92	0.95
Adj. Flow (vph)	2	209
RTOR Reduction (vph)	0	187
Lane Group Flow (vph)	2	22
Turn Type	Perm	
Protected Phases	8	
Permitted Phases		8
Actuated Green, G (s)	15.8	15.8
Effective Green, g (s)	15.8	15.8
Actuated g/C Ratio	0.11	0.11
Clearance Time (s)	7.5	7.5
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	196	167
v/s Ratio Prot	0.00	
v/s Ratio Perm		0.01
v/c Ratio	0.01	0.13
Uniform Delay, d1	60.1	60.9
Progression Factor	1.00	1.00
Incremental Delay, d2	0.0	0.4
Delay (s)	60.1	61.2
Level of Service	E	E
Approach Delay (s)	65.4	
Approach LOS	E	
Intersection Summary		

Queues

Future PM

1: SR 120 (Roswell Rd) & Providence Road

6/6/2013

												
Lane Group	EBU	EBL	EBT	WBU	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	147	1504	7	44	1949	81	41	3	56	4	105
Lane Group Flow (vph)	0	227	1777	0	64	2073	112	45	48	71	4	133
Turn Type	pm+pt	pm+pt		Perm	Perm		Perm	Perm		Perm		Perm
Protected Phases	1	1	6			2			4		8	
Permitted Phases	6	6		2	2		2	4		8		8
Detector Phase	1	1	6	2	2	2	2	4	4	8	8	8
Switch Phase	6	6										
Minimum Initial (s)	5.0	5.0	15.0	15.0	15.0	15.0	15.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	10.5	10.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5	30.5	30.5	30.5
Total Split (s)	23.0	23.0	133.0	110.0	110.0	110.0	110.0	37.0	37.0	37.0	37.0	37.0
Total Split (%)	13.5%	13.5%	78.2%	64.7%	64.7%	64.7%	64.7%	21.8%	21.8%	21.8%	21.8%	21.8%
Yellow Time (s)	3.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.5	6.5	6.5	6.5	6.5	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lag					
Lead-Lag Optimize?												
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None	None
v/c Ratio		0.74	0.61		0.40	0.90	0.11	0.38	0.27	0.62	0.03	0.54
Control Delay		65.5	6.2		25.3	32.4	7.3	81.0	22.9	96.9	68.0	21.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		65.5	6.2		25.3	32.4	7.3	81.0	22.9	96.9	68.0	21.0
Queue Length 50th (ft)		191	292		33	990	25	48	3	78	4	9
Queue Length 95th (ft)		230	394		89	#1283	40	91	46	116	17	51
Internal Link Dist (ft)			1287			1595			396		807	
Turn Bay Length (ft)		100			100		195	100				95
Base Capacity (vph)		308	2937		159	2305	1048	244	315	235	323	377
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		0.74	0.61		0.40	0.90	0.11	0.18	0.15	0.30	0.01	0.35

Intersection Summary

Cycle Length: 170

Actuated Cycle Length: 170

Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: SR 120 (Roswell Rd) & Providence Road





















	ø1		ø2		ø4
23 s		110 s		37 s	
	ø6				ø8
133 s				37 s	

HCM Signalized Intersection Capacity Analysis

1: SR 120 (Roswell Rd) & Providence Road

Future PM

6/6/2013

												
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Volume (vph)	23	147	1504	44	7	44	1949	81	41	3	41	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.5			6.5	6.5	6.5	7.5	7.5		7.5
Lane Util. Factor		1.00	0.95			1.00	0.95	1.00	1.00	1.00		1.00
Frt		1.00	1.00			1.00	1.00	0.85	1.00	0.86		1.00
Flt Protected		0.95	1.00			0.95	1.00	1.00	0.95	1.00		0.95
Satd. Flow (prot)		1770	3525			1770	3539	1583	1770	1601		1770
Flt Permitted		0.03	1.00			0.13	1.00	1.00	0.76	1.00		0.73
Satd. Flow (perm)		64	3525			243	3539	1583	1407	1601		1352
Peak-hour factor, PHF	0.75	0.75	0.87	0.92	0.44	0.92	0.94	0.72	0.92	0.92	0.92	0.79
Adj. Flow (vph)	31	196	1729	48	16	48	2073	112	45	3	45	71
RTOR Reduction (vph)	0	0	1	0	0	0	0	17	0	41	0	0
Lane Group Flow (vph)	0	227	1776	0	0	64	2073	95	45	7	0	71
Turn Type	pm+pt	pm+pt			Perm	Perm		Perm	Perm			Perm
Protected Phases	1	1	6				2			4		
Permitted Phases	6	6			2	2		2	4			8
Actuated Green, G (s)		141.6	141.6			110.7	110.7	110.7	14.4	14.4		14.4
Effective Green, g (s)		141.6	141.6			110.7	110.7	110.7	14.4	14.4		14.4
Actuated g/C Ratio		0.83	0.83			0.65	0.65	0.65	0.08	0.08		0.08
Clearance Time (s)		5.5	6.5			6.5	6.5	6.5	7.5	7.5		7.5
Vehicle Extension (s)		3.0	5.0			5.0	5.0	5.0	5.0	5.0		3.0
Lane Grp Cap (vph)		308	2936			158	2305	1031	119	136		115
v/s Ratio Prot		c0.11	0.50				c0.59			0.00		
v/s Ratio Perm		0.50				0.26		0.06	0.03			c0.05
v/c Ratio		0.74	0.61			0.41	0.90	0.09	0.38	0.05		0.62
Uniform Delay, d1		58.9	4.8			14.0	25.0	11.0	73.6	71.5		75.1
Progression Factor		1.00	1.00			1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		8.9	0.9			7.5	6.1	0.2	4.2	0.3		9.5
Delay (s)		67.8	5.7			21.6	31.1	11.2	77.7	71.8		84.6
Level of Service		E	A			C	C	B	E	E		F
Approach Delay (s)			12.7				29.8			74.7		
Approach LOS			B				C			E		
Intersection Summary												
HCM Average Control Delay			25.4				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			170.0				Sum of lost time (s)			19.5		
Intersection Capacity Utilization			97.3%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: SR 120 (Roswell Rd) & Providence Road

Future PM

6/6/2013

	↓	↘
Movement	SBT	SBR
Lane Configurations	↑	↑
Volume (vph)	4	105
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	7.5	7.5
Lane Util. Factor	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	1863	1583
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1863	1583
Peak-hour factor, PHF	0.92	0.79
Adj. Flow (vph)	4	133
RTOR Reduction (vph)	0	113
Lane Group Flow (vph)	4	20
Turn Type	Perm	
Protected Phases	8	
Permitted Phases		8
Actuated Green, G (s)	14.4	14.4
Effective Green, g (s)	14.4	14.4
Actuated g/C Ratio	0.08	0.08
Clearance Time (s)	7.5	7.5
Vehicle Extension (s)	3.0	3.0
Lane Grp Cap (vph)	158	134
v/s Ratio Prot	0.00	
v/s Ratio Perm		0.01
v/c Ratio	0.03	0.15
Uniform Delay, d1	71.4	72.1
Progression Factor	1.00	1.00
Incremental Delay, d2	0.1	0.5
Delay (s)	71.4	72.6
Level of Service	E	E
Approach Delay (s)	76.7	
Approach LOS	E	
Intersection Summary		

Volume Worksheets

13-036 Isakson Living Center
Traffic Volumes
Future Conditions

A&R Engineering
 June 2013

SR 120 @ Providence Rd

A.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	Tot	U	L	T	R	Tot	U	L	T	R	Tot	Tot
Existing:	0	0	0	0	0	0	89	0	191	280	37	140	1545	0	1722	1128
Growth Factor (%):	1	1	1	1		1	1	1	1		1	1	1	1	1	1
Base Condition:	0	0	0	0	0	0	93	0	199	292	39	146	1608	0	1793	1174
Total New Trips	0	14	1	14	29	0	0	2	0	2	0	0	0	21	21	21
Future Traffic Volumes:	0	14	1	14	29	0	93	2	199	294	39	146	1608	21	1814	1195

P.M. Peak Hour

Condition	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	Tot	U	L	T	R	Tot	U	L	T	R	Tot	Tot
Existing:	0	0	0	0	0	0	54	0	101	155	22	141	1445	0	1608	1958
Growth Factor (%):	1	1	1	1		1	1	1	1		1	1	1	1	1	1
Base Condition:	0	0	0	0	0	0	56	0	105	161	23	147	1504	0	1674	2037
Total New Trips	0	41	3	41	85	0	0	4	0	4	0	0	0	44	44	44
Future Traffic Volumes:	0	41	3	41	85	0	56	4	105	165	23	147	1504	44	1718	2081

Accident Diagrams



Accident Diagram

Year 2010



04-03-10
06:40pm
DRY

06-23-10
08:30am
DRY

06-17-10
12:10pm
DRY

02-06-10
02:05pm
DRY

07-30-10
04:55pm
DRY

10-21-10
05:52pm
DRY

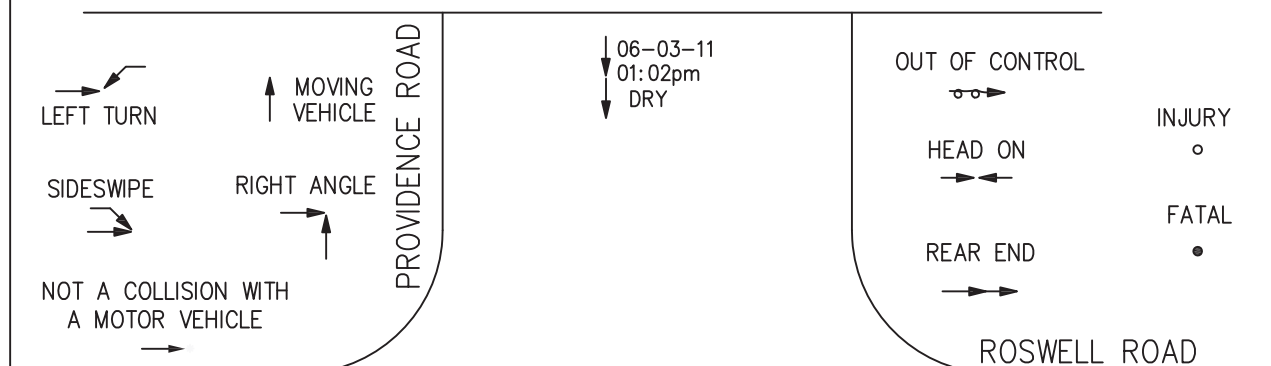
ROSWELL ROAD

ROAD	ACC	TIME	ACC	TYPE	ACC	ACCIDENT SEVERITY	ACC
DRY	6	0600-1000	1	SIDESWIPE	0	FATAL	0
WET	0	1000-1600	2	REAR END	3	NONFATAL	3
ICY	0	1600-1900	3	ANGLE	2	PROP DAM.	0
TOTAL	6	1900-2400	0	OTHERS	1	TOTAL	3
		2400-0600	0	HEAD ON	0		
		TOTAL	6	TOTAL	6		
SEASON	ACC	WEATHER	ACC				
WINTER	1						
(Dec-Feb)							
SPRING	1						
(Mar-May)		CLEAR	0				
SUMMER	3	CLOUDY	0				
(June-Aug)		RAIN	0				
FALL	1	FOG	0				
(Sept-Nov)		SNOW	0				
TOTAL	6	TOTAL	0				



Accident Diagram

Year 2011



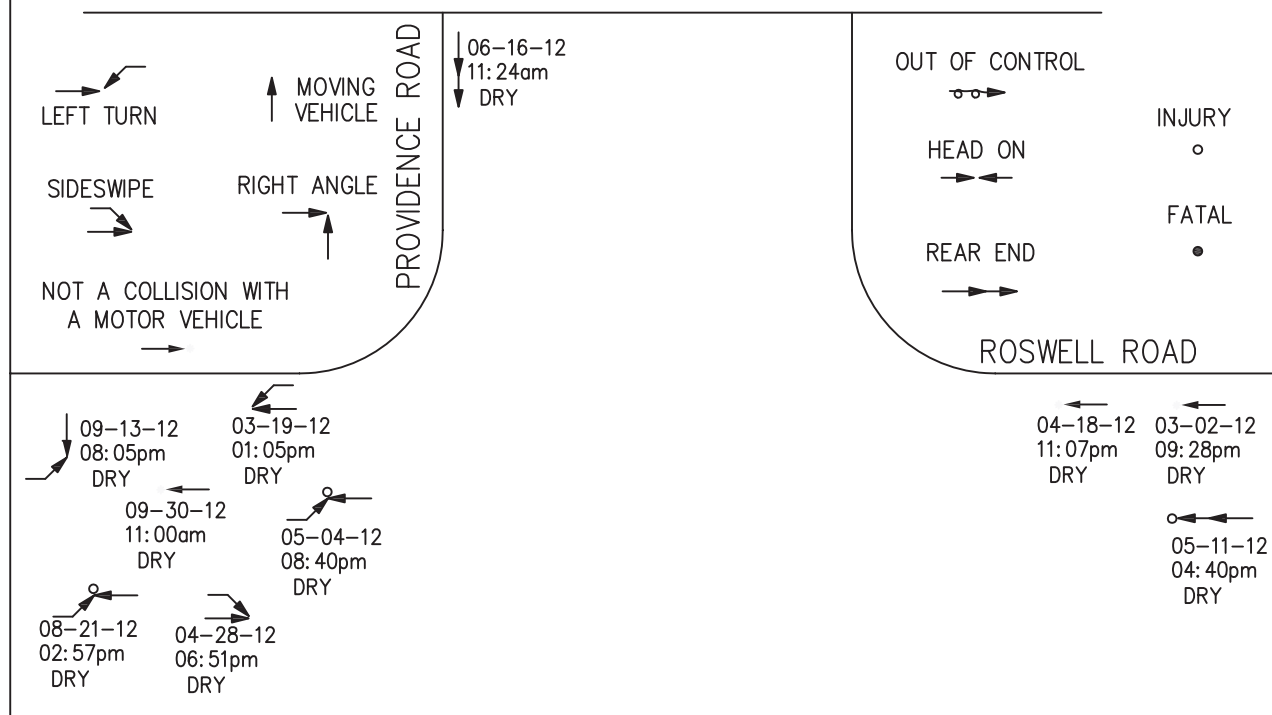
ROSWELL ROAD

<u>ROAD</u>	<u>ACC</u>	<u>TIME</u>	<u>ACC</u>	<u>TYPE ACC</u>	<u>ACC</u>	<u>ACCIDENT SEVERITY</u>	<u>ACC</u>
DRY	11	0600-1000	1	SIDESWIPE	0	FATAL	0
WET	0	1000-1600	6	REAR END	5	NONFATAL	0
ICY	0	1600-1900	1	ANGLE	2	PROP DAM.	0
TOTAL	11	1900-2400	2	OTHERS	4	TOTAL	0
		2400-0600	1	HEAD ON	0		
		TOTAL	11	TOTAL	11		
<u>SEASON</u>	<u>ACC</u>	<u>WEATHER</u>	<u>ACC</u>				
WINTER	4						
(Dec-Feb)							
SPRING	2						
(Mar-May)		CLEAR	0				
SUMMER	3	CLOUDY	0				
(June-Aug)		RAIN	0				
FALL	2	FOG	0				
(Sept-Nov)		SNOW	0				
TOTAL	11	TOTAL	0				



Accident Diagram

Year 2012



ROSWELL ROAD

<u>ROAD</u>	<u>ACC</u>	<u>TIME</u>	<u>ACC</u>	<u>TYPE</u>	<u>ACC</u>	<u>ACCIDENT SEVERITY</u>	<u>ACC</u>
DRY	10	0600-1000	0	SIDESWIPE	2	FATAL	0
WET	0	1000-1600	4	REAR END	2	NONFATAL	4
ICY	0	1600-1900	2	ANGLE	2	PROP DAM.	0
TOTAL	10	1900-2400	4	OTHERS	3	TOTAL	4
		2400-0600	0	HEAD ON	1		
<u>SEASON</u>	<u>ACC</u>	TOTAL	10	TOTAL	10		
WINTER	0						
(Dec-Feb)		<u>WEATHER</u>	<u>ACC</u>				
SPRING	6	CLEAR	0				
(Mar-May)		CLOUDY	0				
SUMMER	2	RAIN	0				
(June-Aug)		FOG	0				
FALL	2	SNOW	0				
(Sept-Nov)		TOTAL	0				
TOTAL	10						